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Abstract Book



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Abbreviations

The following abbreviations are used in this Abstract Book to order the abstracts of the 2024 World Ophthalmology Congress (WOC2024):

FT = Fast Track Research Presentations

P = Poster presentations

V = Videos

Topic codes:

AVS = Advances in Vision Sciences

IMA = Artificial Intelligence & Ocular Imaging

CAT = Cataract and Refractive Surgery

COR = Cornea

EPI = Epidemiology

GLA = Glaucoma

INT = International Eye Care

MYO = Myopia

NEU= Neuro-ophthalmology

ONC = Ocular Oncology

PAT = Ophthalmic Pathology

TRA = Ophthalmic Trauma

OCU = Orbital, Oculoplastic, and Lacrimal Diseases

PED = Pediatric Ophthalmology and Strabismus

RET = Retina and Uveitis

VRE = Vision Rehabilitation

YOU = Young Ophthalmologists

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Advances in Vision Sciences

P-AVS-001

Combining MSC exosomes and cerium oxide nanocrystals for enhanced dry eye syndrome therapy

Z. Yiquan¹, Y. Tian¹, Y. Tao¹

¹Department of Ophthalmology, Beijing Chaoyang Hospital, Capital Medical University, Beijing, China

Introduction: Dry eye syndrome (DES) is a multifactorial ocular disorder characterized by diminished tear production and/or increased tear evaporation, leading to ocular surface discomfort. Moreover, DES can result in ocular surface damage, raising the risk of ocular infections and surface injuries, such as corneal abrasions or ulcers. This can negatively impact vision-related quality of life and interferes with daily activities. Up to 34–50% of people are suffering from DES. As a chronic condition that necessitates continuous management, there is an urgent demand for the development of innovative therapies.

Objectives: Inflammation is one core cause of the DES vicious cycle. Moreover, there are ROS that regulate inflammation in the cycle from the upstream, which leads to treatment failure in current therapies that merely target inflammation. Therefore, we aim to develop a multi-dimensional synergistic drug and explore its potential in the treatment of DES, providing a new treatment option for patients.

Methods: We developed a synergistic therapeutic nanoparticle approach for the in situ growth of cerium oxide (Ce) nanocrystals on mesenchymal stem cell-derived exosomes (MSCExo), which integrates the three-dimensional approach of "anti-inflammatory, ROS clearance, and tissue repair" for the treatment. While employing MSCExo as a carrier, the MSCExo membrane can function as a template to subtly adjust the nanocrystals' size and proportion of Ce, thereby amplifying the efficiency of ROS clearance. Its efficacy and biosafety were verified by in vitro cell experiment and in vivo animal experiment.

Results: Specifically, we have successfully achieved in situ crystallization of Ce nanocrystals onto the membrane of MSCExo as a specific implementation method, enabling efficient ROS scavenging. What's more, the experimental results demonstrate the enhanced therapeutic effects of the MSCExoCe formulation. The MSCExoCe particles exhibit a unique ability to simultaneously mitigate inflammation, clear ROS, and promote tissue repair, providing a comprehensive treatment strategy for DES. Finally, MSCExoCe was proved to be highly biocompatible and well tolerated by various tissue sections and intraocular pressure.

Conclusions: Our study presents valuable insights into innovative approaches for ocular disorder therapy and will contribute to the advancement of the field. However, due to the complexity of DED, the mechanism by which MSCExoCe exerts its therapeutic role in DED needs to be further studied.

P-AVS-002

A study of different spatial localization of human eyes under color differences-an example of dynamic vision

Y. Wang¹, Y. Ding¹, X. Yu², X. Li¹, L. Ding²

¹Peking University Third Hospital, Beijing, China, ²Beihang University, Beijing, China

Introduction: With scientific and technological progress, high altitude with varying degrees of hypoxia has become a major area for human exploration, hypoxia results in the occurrence of vasovagal syncope and acute cerebral oedema, endangering the visual and brain decision-making systems and posing a potential threat to flight safety.

Objectives: To investigate the human eye's recognition of moving objects of various colors in different spaces. Through detailed analysis of the three major factors, namely, altitude, angular velocity (AV) and color, we will clarify the human eye's colorful and dynamic visual localization in high-altitude environments and explore its possible related mechanisms.

Methods: The study group comprised 16 healthy participants. Dynamic visual acuity (DVA) was measured with self-developed software. Measurements were taken at 5 altitudes (d1: ground; d2: 3500m; d3: 4000m; d4: 4500m; d5: end of experiment) and at 6 colors.

Results: Red DVAs at d1 (at 40, 60 and 80dps), d2 (at 60 and 80dps) and d3 (at 60 and 80dps) were significantly better than DVAs at the corresponding AV at d4. Orange DVA at d1 (at 80 dps) was remarkably higher than DVA at d4 (at 80 dps). Blue DVAs at d1 (at 60 dps), d2 (at 40, 60 and 80 dps) were significantly higher than that at d4 at the corresponding AVs. Purple DVAs at d2 (at 60 and 80 dps) were significantly higher than that at d4 at the corresponding AVs.

At d0 (at 20, 40, 60 and 80dps), the blue DVAs were remarkably better than other colors' DVAs, with yellow and green DVAs being significantly lower than purple DVA at 40dps, and orange DVA was lower than the green DVA at 60 dps. At d1 and d2, red, orange, yellow and green DVAs were significantly lower than blue DVA (at 40 dps) and purple DVA (at 20, 60 and 80 dps). At 40 dps, red (only at d2), yellow and green (at d1 and d2) DVAs were significantly lower than purple DVA. At d3 and d4, red, orange, yellow and green DVAs were statistically lower than blue (at all AVs) and purple DVAs (at 40, 60 and 80 dps). At 20 dps, orange, yellow and green DVAs were lower than purple DVA.

Conclusions: The acute hypobaric hypoxic environment affects the human eye's ability to spatially localize objects of different colors, especially the four colored DVAs of red, orange, yellow, and green, which decrease progressively with aggravated hypoxia. This will affect the pilot's ability to acquire visual information resulting in biased acquisition and judgment of instrument panel and surrounding information during flight.

P-AVS-003

Autosomal dominant circular iris coloboma: a novel rare disease caused by balanced translocation at noncoding regions

X. Xiao¹, W. Sun¹, S. Li¹, Q. Zhang¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: Rare inherited diseases provide important venue in disclosing the function of human genome as well as the molecular mechanism involving the development and maintenance of functional tissue in human beings.

Objectives: About half of genetic disorders have yet been resolved although next-generation sequencing enable the simultaneous detection of the entire genome sequence. This study aims to identify the genetic deficits responsible for a new phenotype, circular iris coloboma, based on a large family.

Methods: A large family with six individuals affected by a specific iris coloboma was ascertained. Clinical data and blood samples of the six patients and six unaffected members of the family were collected. A genome-wide scan was performed on genomic DNA from all 12 family members. Next generation sequencing by a short-read sequencing platform and a long-read sequencing platform were performed. Sanger sequencing was used to validate the detected variants as well as to the segregations in all available members of the family.

Results: A new phenotype, namely circular iris coloboma involving pupillary zone, was identified in the large family with an autosomal dominant pattern of transmission. The features of the new disease include a history of photophobia since birth, bilateral circular coloboma of iris pupillary zone with a pupil of approximate 6 × 6 mm, and normal fundus with foveal reflex. The genome-wide scan demonstrated two linked regions, namely on 6q and 18p with a maximum LOD score of 2.65 and 2.78 at $\theta = 0$, respectively. Whole-exome sequencing and whole-genome sequencing failed to identify any pathogenic variant. Next-generation long-read sequencing identified a balanced reciprocal translocation between the two chromosomes with both breakpoints at intergenic regions through Nanopore platform. Both breakpoints of the translocation were validated and confirmed at intergenic regions by Sanger sequencing. The translocation completely co-segregated with circular coloboma of the iris pupillary zone within the family.

Conclusions: Our results highlight the importance of the identification of complex structural variations, at noncoding intergenic regions relevant to Mendelian diseases.

P-AVS-004

Mast cell-derived granzyme B increases choroidal neovascularization in ex vivo model of AMD

M. Uppal¹, K. Bilal¹, W. Khan¹, D. Yoo¹, G. Obasanmi¹, I. Samad¹, E. To¹, J. Zu¹, D. Granville², J. Matsubara¹

¹Ophthalmology and visual sciences, University of British Columbia, Vancouver, Canada, ²Department of Pathology, University of British Columbia, Vancouver, Canada

Introduction: Granzyme B (GzmB) is a cytotoxic serine protease. Emerging evidence suggests that GzmB plays a critical role in neovascular AMD (nAMD). GzmB can be expressed and secreted by mast cells and retinal pigment epithelium (RPE) in the outer retina. Previous data suggest that mast cells contribute to choroidal neovascularization (CNV) in the choroid. GzmB may be an important therapeutic target for halting this process.

Objectives: Using a GzmB-specific inhibitor VTI-1002, this study aims to investigate the role of GzmB in CNV using an ex vivo model of microvascular angiogenesis.

Methods: Human donor eyes and paraffin embedded choroidal cross-sections of C57BL/6J mice and were stained for GzmB, Tryptase and/or c-kit to locate GzmB+ mast cells in these tissue samples. Mouse wholemounts were bleached using hydrogen peroxide (10%, 1H, 55°C) prior to toluidine blue staining. Next, a choroidal sprouting assay (CSA) was prepared from mouse choroid tissue. In this study, tissue from 3-month-old C57BL/6J or GzmB -/- (with C57Bl/6J background) mice were cultured for 8-14 days on a gel matrix, and the extent of vascular sprouting was quantified on ImageJ. CNV was assessed after adding HBSS (control), exogenous GzmB, 48/80 (mast cell activator) and/or VTI-1002.

Results: Toluidine blue+ profiles had a pink granular appearance, characteristic of mast cells. GzmB and tryptase double staining revealed granular GzmB+ profiles in the choroid that were also tryptase+. GzmB+ profiles also co-localized with c-kit, another marker for mast cells. CSA data showed a significant decrease in sprouting from the 48/80 + VTI-1002 treated compared to the 48/80 treated explants (3 replicates from N=8 p<0.05). Notably, 48/80 + VTI-1002 treated explants had nearly equivalent sprouting to the HBSS (control) group (N=4). Explants treated with 48/80 from GzmB -/- mice had significantly less sprouting than WTs (N=4 p<0.005).

Conclusions: Previous studies suggest that GzmB is involved in CNV. Our study suggests that mast cell secretion of GzmB contributes to increased vascular sprouting. These data suggest that VTI-1002 attenuates CNV.

P-AVS-006

Analysis of eye related factors affecting the formation of amblyopia in patients with congenital ptosis

Z. Weiwei¹, R. Xiaoxia¹, W. Jingjing², C. Min³

¹Oculoplastic Department, Shanxi Eye Hospital, Taiyuan, China, ²Scientific Research Section, Shanxi Eye Hospital, Taiyuan, China, ³Strabismus and Pediatric Ophthalmology, Shanxi Eye Hospital, Taiyuan, China

Introduction: The clinical data of 696 patients with congenital ptosis were retrospectively analyzed. We observed the refractive characteristics in patients with congenital blepharoptosis, and analyzed the eye related factors influencing the formation of amblyopia in them. And draw the conclusions: SE, amblyopic anisometropia, amblyopic ametropia, strabismus and OBL were the risk factors of amblyopia with congenital ptosis.

Objectives: To observe the refractive characteristics and incidence of amblyopia in patients with congenital blepharoptosis, and analyze the eye related factors influencing the formation of amblyopia in patients with congenital ptosis.

Methods: Retrospective case analysis study. The clinical data of 696 cases (1007 eyes) with congenital blepharoptosis in Shanxi ophthalmic hospital from January 2016 to December 2019 were retrospectively analyzed, including uncorrected visual acuity, best corrected visual acuity, levator function, ptosis degree, spherical equivalent, astigmatism, astigmatism type, strabismus and amblyopia. According to the degree of ptosis, the patients were divided into mild, moderate and severe groups. The uncorrected visual acuity, best corrected visual acuity, spherical equivalent, spherical diopter, astigmatism, incidence of amblyopia and astigmatism were compared among the three groups. Binary logistic regression was used to analyze the related factors of amblyopia in patients with congenital ptosis.

Results: 1. Patients with monocular amblyopia were more likely to have anisometropic amblyopia, and patients with binocular amblyopia were more likely to have ametropic amblyopia (all $P < 0.05$). The incidence of amblyopia, astigmatism in patients with severe congenital ptosis were higher than those in mild and moderate patients (all $P < 0.05$). The astigmatism in severe patients was higher than that in mild to moderate patients ($P < 0.05$).

2. The incidence of amblyopia in OBL was higher than that in WTR and ATR ($P < 0.05$).

3. SE, amblyopic anisometropia, amblyopic ametropia, strabismus and OBL were the risk factors of amblyopia with congenital ptosis.

Conclusions: 1. Patients with amblyopia in severe congenital ptosis are often accompanied by refractive abnormalities and/or strabismus. Compared with patients with mild to moderate congenital ptosis, the incidence of amblyopia and astigmatism in severe congenital ptosis patients were higher.

2. SE, amblyopic anisometropia, amblyopic ametropia, strabismus and OBL were the risk factors of amblyopia with congenital ptosis.

P-AVS-007

Effect of cyclosporine A on UVB irradiation-induced TLR3 signaling pathway in pterygium

C.-C. Lai¹, C.-J. Wu²

¹Ophthalmology, National Cheng Kung University Hospital, Tainan, Taiwan, China , ²Department of Medicine, National Cheng Kung University, Tainan, Taiwan, China

Introduction: Toll-like receptor 3 (TLR3) is a pattern recognition receptor that can detect RNA released from pterygium epithelial cells (PECs). Pterygium pathogenesis might be associated with RNA released from abnormally proliferating and damaged PECs, which might act as danger associated molecular patterns. Also, cyclosporine A was found to inhibit primary and recurrent pterygium proliferation, serving as a potential drug candidate.

Objectives: In this research, we aimed to investigate the effect of cyclosporine A on TLR3 signaling pathway in pterygium, which were stimulated with or without poly I:C, UVB-irradiated pterygium cell lysates, or U1 RNA. Also, the effect of cell proliferation rate was studied in different treatment groups.

Methods: Human pterygium and ipsilateral pterygium-free conjunctiva from the same patients were used in this study. PECs were treated with poly I:C, UVB-irradiated cell lysates, or U1 RNA complemented with or without cyclosporine A treatment. Expression of TLR3, TRIF, phosphorylated NF- κ B/NF- κ B ratio, IL-6, and IL-8 were evaluated by western blot, quantitative PCR (qPCR), and ELISA. Tissue specimens from patients treated with or without topical cyclosporine A were also investigated for the expression of TLR3, NF- κ B and p63. Cell proliferation rate was determined using WST-1 assay.

Results: Western blot and qPCR indicated a decrease in TLR3, TRIF, and NF- κ B expression in cyclosporin A-treated pterygium epithelial cells, compared to cell groups that were induced by poly I:C or UVB-irradiated (20 mJ/cm²) cell lysates. IL-6 and IL-8 were also found to decrease in cyclosporin A-treated group. Cyclosporine A reduced cell proliferation rate in PECs compared to poly I:C or UVB-irradiated cell lysates treated group. Moreover, RNase could revert the level of TLR3, TRIF and NF- κ B activation to that of control group under the stimulation of UVB radiation. Not only was U1 RNA found to increase in PECs after UVB irradiation, but synthetic U1 RNA was also found to induce TLR3, TRIF, IL-6, and IL-8 mRNA expression. Lastly, tissue immunostaining showed that TLR3 and NF- κ B were significantly lowered in cyclosporine A treated pterygium, but the same effect was not observed in ipsilateral pterygium-free conjunctival tissue.

Conclusions: Cyclosporine A can generally lower TLR3, TRIF, NF- κ B, and also inflammatory cytokines such as IL-6 and IL-8 in pterygium tissues and epithelial cells to the normal range as conjunctiva, which may further lead to alleviation of pterygium differentiation and proliferation.

P-AVS-008

DoaaS (digital optometry as a service), the future of optometry service delivery

S. Venkatakrisnan¹, K. Sidiq²

¹Research & Development, Forus Health Pvt. Ltd., Bangalore, India, ²Research & Development, Forus Health Pvt. Ltd., Bangalore, India

Introduction: Traditional optometry faces challenges due to limited access to skilled optometrists in remote areas and increased expectations for convenient eye checkups. Digital Optometry as a Service (DoaaS) emerges as a potential solution, offering comprehensive remote subjective refraction through cloud and AI capabilities.

Objectives: This study investigates the feasibility and effectiveness of delivering core optometry as a service over cloud infrastructure, especially in generating accurate prescriptions and AI assistance for tailoring eyewear choices for improved patient experience.

Methods: The infrastructure involved:

- State-of-the-art digital wearable tunable lens-based subjective refractor controlled by a mobile app for near and far vision tests.
- Cloud-based Digital Health Platform for Patient data management, onboarding remote Optometrists, facilitating remote tests, and generating optometrist-approved prescriptions through Audio/Video/Chat.
- AI-assisted vision chart generation for remote control of chart patterns.
- AI-assisted augmented reality-based user spectacle frame selection and spectacle measurements from just a selfie camera.

The research involved 25 participants. Unaided visual acuity measurements for each eye were obtained using a digital chart displayed on a laptop. A qualified optometrist remotely conducted subjective refraction, encompassing spherical, cylindrical, near vision, and binocular testing. Subsequently, participants utilized the AI-powered app for personalized spectacle selection based on facial measurements, inter-pupillary distance, and prescription requirements.

Results: The DoaaS platform facilitated remote optometrists to generate accurate prescriptions by allowing remote control of subjective refractor device and Digital charts. AI-powered spectacle selection provided personalized recommendations based on objective facial analysis and subjective preferences. Over 95% of participants found the AI recommendations to be "very helpful" in choosing suitable frames, and many expressed increased satisfaction with both the aesthetics and comfort of their chosen eyewear.

Conclusions: DoaaS demonstrates the potential for revolutionizing optometry service delivery by overcoming geographical barriers, promoting patient convenience, and enhancing eyewear personalization through AI integration. Further research is warranted to optimize DoaaS protocols and ensure widespread accessibility, paving the way for a future of convenient, personalized, and proven clinical practices.

P-AVS-009

Portable simulation model of cataract surgery, cornea designed by extraction of lignin from cellulose of vitis vinifera

*D. Melo Orta*¹

¹Oftalmología, Universidad Nacional Autónoma de México, HOSPITAL PEMEX SUR, Ciudad de México, Mexico

Introduction: The cornea is an almost perfectly transparent optical tissue, and its incorporation in surgical simulation constitutes a challenge to recreate the precise characteristics of this structure and simulate almost all of its characteristics, promoting learning.

Objectives: Design a cornea model by implementing lignin by separating vitis vinifera cellulose for use in a portable simulator in ophthalmology.

Methods: An experimental, prospective study. Extraction of lignin from vitis vinifera cellulose. To eliminate impurities, the samples were washed with distilled water and dried at 60-80° C for 24 hours, were separated into two groups of samples; stem (T) and fruit (F) of vitis vinifera. For the extraction of lignin and cellulose, it was carried out following the ORGANOSOLV methodology (XU et al 2006), separated into two groups (F), (T), the samples were subjected to hydrolysis with a mixture of acetic acid (AC), acid formic acid (AF) and distilled water (AD), (AC/AF/AD 60:30:10 v/v/v ratio 1:10 w/v) for 4 hours at 80°C, followed by filtering. For its separation in a 0.5 mm nylon mesh, obtaining the two components (solid and liquid), the liquid phase requires the elimination of hemicellulose with a 95% ethanol dilution with drying of said sample. Lignin was extracted from two groups of samples; stem (T) and fruit (F) of vitis vinifera, was added to cellulose (C) and prepared from agar (A), the thickness of the corneal prototype, length of central to periphery fibers and transparency of the sample were recorded. A random model with 4 replicates and 6 samples per replicate was performed, and the results were submitted to a descriptive statistical analysis and Student's T statistical test with IBM SPSS

Results: The group of lignin that showed the greatest tendency to produce peripheral fibers is the group of cellulose + stem lignin (CT), representing the group with the longest length of fibers when implementing lignin in cellulose. Regarding thickness, the group with the greatest thickness is that of cellulose + stem lignin (CT), which showed a greater final thickness when implementing vitis vinifera stem lignin. There is a statistical significance when implementing lignin concerning the final weight and the length of fibers. The use of lignin confers a more complex structural fibers as well as greater transparency.

Conclusions: The development of this prototype shows an implementation of lignin as a possible therapy in diseases of the cornea and the ocular surface by properties and various chemical transformations.

P-AVS-010

Insights and gaps: applications of frailty in ophthalmology, a scoping review

K. Montgomery¹, O. Mohammadi¹, M. Botross¹, M. Sargazi²

¹TCU Burnett School of Medicine, Fort Worth, United States, ²Department of Ophthalmology, Zahedan University of Medical Sciences, Zahedan, Iran, Islamic Republic of

Introduction: Frailty increases risk for poor health outcomes and is assessed using tools like the Modified Frailty Index (mFI). Frailty indexes have been validated as objective risk assessment tools and predictors of adverse outcomes in other surgical fields, but are understudied in ophthalmology.

Objectives: To review the current landscape of literature examining applications of frailty and Frailty Indexes to visual impairment and eye disease, and to identify research gaps in the utilization of mFI in the field of ophthalmology.

Methods: A systematic scoping review was conducted across Pubmed, Cochrane, Embase, Scopus, and Web of Science. The search included terms related to frailty, ocular conditions, surgeries, and visual impairment. A total of 4746 studies were screened, and 104 were assessed in full text for eligibility. Studies involving human participants that explored relationships between frailty and eye disease, surgeries, or visual impairment were included. Non-human studies and those inapplicable to ophthalmology were excluded. The PRISMA-ScR checklist and review criteria were used. Thirty-eight studies were selected for data extraction, which included publication characteristics, key outcomes, and conclusions.

Results: This review examined 38 studies and revealed a consistent association between visual impairment and frailty. Across methodologies and populations, the significant impact of visual impairment on health outcomes was a recurring theme. Notable findings were that visual impairment, especially in the context of eye diseases, contributes to risk of frailty progression and all-cause mortality. Two meta-analyses further underscored the collective odds of frailty associated with visual impairment. Specific eye diseases, such as cataracts and macular degeneration, were identified as potential contributors to frailty syndromes. The bidirectional association between visual impairment and frailty highlights the reciprocal influence of these factors over time. Research gaps were found in applications of mFI in ophthalmology; there is currently no literature applying the index in the field.

Conclusions: This review found a robust association between frailty and visual impairment. These results underscore the importance of addressing visual impairment and eye disease as modifiable risk factors for frailty and suggest that routine eye care could prevent diseases linked to frailty outcomes. More research is needed to determine the utility of mFI in predicting outcomes in eye surgeries and ocular disease.

P-AVS-011

Preseptal cellulitis (insect bite) case and treatment

V. Mammadova¹, A. Abdullayeva¹, V. Nasirova¹, M. Amirova², S. Musali¹

¹Ophthalmology, Azerbaijan Medical University, Baku, Azerbaijan, ²Biochemistry, Azerbaijan Medical University, Baku, Azerbaijan

Introduction: Periorbital cellulitis, or preseptal cellulitis (PC) is an inflammation and infection of the eyelid and portions of skin around the eye anterior to the orbital septum. PC in adults is caused in the same way and treatment is the same as in children. As for disease etiology, it can develop as a complication of eyelid infection- hordeolum, chalazia, dacryocystitis, periocular and facial trauma, upper respiratory tract infections, dental diseases, sinusitis, and insect or animal bites. In the study of Bagheri et al., the most common cause of PC was shown to be sinusitis (36.6%), the second - skin lesion. It is clear that in the clinical case, insect sting is an etiological factor rarely found in the sources (6.1%). Complications without the proper treatment appear as orbital cellulitis, orbital abscess, loss of vision, cavernous sinus thrombosis, subperiosteal abscess, intracerebral abscess, meningitis, empyema or abscess of the epidural or subdural space.

Objectives: To cure a complication from a rare adult eye disease – PC, which arose after an insect bite on the cataract surgery with intraocular lenses background.

Methods: Patient we discuss about previously underwent surgery for cataracts with intraocular lenses for both eyes. Later, in 2021, the patient's left upper eyelid was stung by an insect and the condition worsened an hour later. Initial complaints included headache, general weakness, and loss of appetite. Later, the upper eyelid of the left eye, forehead, eyebrow, and hairy head area are involved by degrees. **Differential diagnosis** of PC included its distinction from orbital cellulitis, orbital pseudotumor, herpes zoster, blepharitis, conjunctivitis, and dermatitis.

Methods: PC diagnosis was clarified by computed tomography (CT) scanning of the orbit and sinuses. We used antimicrobial therapy for treatment.

Results: After this therapy, no complication of PC for the patient was left since he received the general treatment immediately. However, the local signs including a residual sign, and ptosis of the upper eyelid have remained. As a result of our additional conservative treatment by proserin and glycine, the patient's upper eyelid was raised, and ptosis removed.

Conclusions: PC and its residual phenomenon - ptosis after surgery for cataracts and an insect bite can be treated with the listed antibiotics and glycine along with proserin.

P-AVS-012

The particle-wave dualism? Standing waves reception concept in the nature for color vision, photosynthesis, audioanalyze

A. Hovsepyan^{1,2}

¹Mobile Eye Hospital & Regional Eye Centers, Armenian EyeCare Project, Yerevan, Armenia,

²Vitreoretinal, S. V. Malayan's Eye Center, Yerevan, Armenia

Introduction: This hypothesis is not an opponent of the existing Young-Helmholtz color theory, but puts everything in its place: in particular, how colorless protein structures called "pigments" are working?? and finally, tilts the existing dualism in the scientific world towards the wave theory.

Objectives: To return the Science out of the "impasse" created due to materialistic tendencies in XVIII-XIX centuries explaining any processes of Nature by that they have their own substance (f.e. color detection substances of retina: erythrolob, cyanolob etc.).

Methods: This article design may be classified as an empirical research or Bayesian experimental design to declare the author's hypothesis.

The author applied a generalization of the literature data on the anatomical structure of light and sound receptors in animals and chloroplasts in plants from the point of view that either the light or the sound have a wave nature, as opposed to the generally accepted "pigment molecules excited by light particle" and "resonance"-theories of perception, respectively.

Considering the work of light and sound analyzers of Nature from the point of view of wave theory, especially standing wave physics, gives answers to all these questions and formulates a clearer picture of "how does it work in Nature?" according to the author's hypothesis.

Results: This hypothesis is based on the similarity of the anatomical microstructure of all receptor elements in the Nature and declares that the light and the sound must be considered as waves that enter the organism via special structures, refract within the internal media and reflect back from special mirrors with final making of standing waves. These waves clearly distribute their energy at proper distances from the mirror depending on the frequency of the wave, and the organism takes the energy just from their antinodes where the oscillating electric field vector energy of the light (or compression/rarefaction energy of the sound) is maximal. Note that all transmembrane proteins (opsins) are located in a strongly perpendicular plane to the propagating light ray (and for sound - receptor hair-cells for each frequency are located in a line strongly perpendicular to the axis of Scala tympani).

Conclusions: Nature is unique, and sometimes it's important to zoom-out from taken by electronic microscope pictures for understanding how it works and all educational books must be revised and be edited respectively.

P-AVS-013

Effect of different levels of hypobaric hypoxia on the cone ERG and flicker ERG

X. Yu¹, Y. Wang², J. Li², J. Zhou¹, D. Huang¹, L. Ding¹, X. Li²

¹Beihang University, Beijing, China, ²Peking University Third Hospital, Beijing, China

Introduction: The retina is a metabolically active and highly differentiated neural structure, and the correct balance between retinal oxygen supply and oxygen consumption is critical for retinal homeostasis, which may be disrupted by a hypoxic environment.

Objectives: To explore the effect of different hypoxia degree on retinal function in light adaptation environment.

Methods: Cone and 30-Hz flicker ERGs were recorded with the RETeval system from participants who had no visual or mental illness. They were exposed for 10 minutes at simulated altitudes of 3500, 4000 and 4500 meters. Statistical analysis of generalized equations to analyze whether there is a significant change in the amplitude of the ERG of bright adaptation in different height cases.

Results: A total of 40 subjects (29 males, 11 females) participated in this experiment, with a mean age of 24 ± 2.8 years. The mean values of blood oxygen of the subjects at ground level, 3500m, 4000m and 4500m were 97.13 ± 0.22 , 84.94 ± 0.51 , 81.62 ± 0.5 , 78.42 ± 1.91 respectively, we observed a significant reduction ($P < 0.001$) in the oxygen saturation level of the hemoglobin. No significant change in the amplitude of the cone ERG was found in any recording. The flicker ERG amplitude was significantly different ($P < 0.001$) from baseline values during moderate hypoxia (at altitudes of 4000 and 4500 meters), but not ($P = 0.81$) in mild hypoxia (at altitudes of 3500 meters).

Conclusions: Our results indicate that acute hypoxia has an effect on the function of the optic cone system, and in particular, the results of the flicker ERG show a significant decrease with increasing altitude, which means the inner layers of the retina is more susceptible to hypoxia.

Artificial Intelligence & Ocular Imaging

FT-IMA-001

Deep learning approach for visual field parameters prediction with circumpapillary optical coherence tomography images

K. Sriwatana¹, C. Puttanawarut², T. Achakulvisut³, Y. Suwan⁴

¹Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand, ²Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Samut Prakan, Thailand, ³Department of Biomedical Engineering, Faculty of Engineering, Mahidol University, Nakhon Pathom, Thailand, ⁴Department of Ophthalmology, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

Introduction: Glaucoma involves progressive degeneration of the optic nerve and corresponding visual field loss. While visual field testing is variable and effort-dependent, retinal imaging with optical coherence tomography (OCT) provides an objective structural assessment. However, the link between structural and functional changes in glaucoma is complex and not fully understood.

Objectives: This study developed a deep learning model to predict visual field parameters from OCT imaging alone. By visualizing the features extracted by the model, we aimed to provide insight into how the network learns to mimic structure-function relationships in glaucoma.

Methods: The design was a cross-sectional, retrospective study. The training set included 1,640 eyes from 548 subjects with glaucoma, suspected glaucoma, or healthy diagnoses. The test set of 423 eyes from 194 different subjects was prepared separately, preserving a similar subgroup distribution without overlap between training and test data. The DINO-ViT (self-distillation with no labels), a self-supervised vision transformer (ViT)-based model, was trained via transfer learning to predict 24-2 and 30-2 Humphrey visual field mean deviation (VF MD) from circumpapillary retinal nerve fiber layer (cpRNFL) thickness maps derived from OCT scans. During training, PCA (principal component analysis) and t-SNE (t-distributed stochastic neighbor embedding) were applied to visualize extracted the semantically meaningful features relevant to the predicted VF MD values.

Results: Main Outcome Measures: Spearman and Pearson correlation coefficients, mean absolute error (MAE) for predicted vs. actual VF MD.

Results: The model showed strong correlations between predicted and actual VF MD values, with Spearman's and Pearson's correlation coefficients of 0.70 and 0.74, respectively ($P < 0.001$). The MAE of VF MD prediction was 2.50 decibels (dB) on the test set (95% CI [2.20-2.86]). The visualization of DINO-ViT features showed that it extracts features from retinal nerve fiber bundles and neuroretinal rim (NRR) contours, demonstrating good model interpretability.

Conclusions: The DINO-ViT model demonstrates the ability to estimate visual field parameters from OCT scans alone. Our deep learning model might be useful in the management of glaucoma for diagnosis and follow-up, especially when inherent limitations constrain visual field testing.

FT-IMA-002

Ocular insights: multi-modal imaging's predictive power in cardiovascular disease assessment

F. Song¹, W. Zhang¹, D. Shi¹, M. He¹

¹School of Optometry, Hong Kong Polytechnic University, Hong Kong, China

Introduction: Cardiovascular disease (CVD) is the foremost cause of mortality worldwide, with preventable instances predominantly in lower-income regions, yet current assessment tools are invasive and impractical for widespread use.

Objectives: To investigate the potential of multi-modal ophthalmic images in cardiovascular disease (CVD) risk prediction.

Methods: We developed a deep learning model, Multi-CVD, to estimate the WHO cardiovascular disease score from 201,742 multi-modal ophthalmic images. These images included detailed retinal and slit lamp photos from 4,752 Chinese participants. The model's accuracy was validated using regression and classification metrics, specifically mean absolute error (MAE), coefficient of determination (R^2), accuracy, and sensitivity. Pixel contribution to predictions was also analyzed using integrated gradient visualization.

Results: The Multi-CVD model demonstrated superior performance when utilizing multi-modal imaging, achieving a 0.697 accuracy, 0.609 R^2 , and a 4.456 mean absolute error. These outcomes surpassed those obtained using solely slit lamp images or retinal photographs, which scored lower in all tested metrics. Notably, the model's sensitivity was 0.699, with an increased sensitivity of 0.756 in detecting high-risk individuals. An enhancement in predictive metrics was also noted with the augmentation of multi-modal image inputs. Integrated gradient visualizations indicated the model's emphasis on key ophthalmic regions, including arcade blood vessels, optic cup region, eyelid, lens, and conjunctiva.

Conclusions: Our study demonstrated the presence of CVD biomarkers both in retinal photographs and slit lamp images. The multi-modality deep learning model implies a great potential to achieve non-invasive, time-saving, and cost-effective CVD screening, especially in the high-risk group.

FT-IMA-003

CNV-net: segmentation, classification, and activity score measurement of CNV using OCTA

E. Khalili Pour¹, H. Riazi Esfahani¹, M. Vali², D.H. Steel³, A. Hurlbert⁴, J. C. A. Read⁵, R. Kafieh⁶, H. Faghihi¹

¹Retina, Tehran University of Medical Sciences/Farabi Eye Hospital, Tehran, Iran, Islamic Republic of, ²Department of Electrical and Computer Engineering, Isfahan University of Technology, Isfahan, Iran, Islamic Republic of, ³Sunderland Eye Infirmary, Sunderland, United Kingdom, ⁴Center for Transformative Neuroscience and Institute of Biosciences, Newcastle University, Newcastle, United Kingdom, ⁵Center for Transformative Neuroscience and Institute of Biosciences, Newcastle University, Newcastle, United Kingdom, ⁶Department of Engineering, Durham University, South Road, Durham, Durham, United Kingdom

Introduction: The advent of OCT angiography (OCTA) has made it possible to accurately evaluate the microvascular morphology of CNV lesions, This raises the possibility that CNV could be detected, assessed, and monitored entirely non-invasively, without the need for dyes. However, exclusively using OCTA to identify neovascular activity would require defined OCTA parameters for determining the disease stage of a CNV, including quantitative criteria with proven sensitivity and specificity. Cascos et al. proposed criteria to determine CNV activity based on OCTA images. A lesion was assessed as an active CNV if it revealed at least three of the five active features. (A) anastomosis and loops, (B) branching, (C) peripheral arcade, (D) shape, (E) dark halo.

Objectives: To develop Deep learning-based decision support based on the mentioned five CNV activity features for ophthalmologists to determine the CNV activity in daily clinical work. The algorithms were tested via cross-validation and benchmarked against two retina specialists to validate the robustness.

Methods: This retrospective and cross-sectional study includes 130 OCTA images from 101 patients with treatment-naïve CNV. At baseline, OCTA volumes of 6 *6 mm² were obtained to develop an AI-based algorithm to evaluate the theCNV activity based on five activity criteria, including tiny branching vessels, anastomoses and loops, peripheral arcades, and perilesional hypointense halos. The proposed algorithm comprises two steps. The first block includes the pre-processing and segmentation of CNVs in OCTA images using a modified U-Net network. This second block consists of five binary classification networks, each implemented with various models from scratch, and using transfer learning from pre-trained networks.

Results: The proposed segmentation network yielded an averaged Dice coefficient of 0.86. The individual classifiers corresponding to the five activity criteria (branch, peripheral arcade, dark halo, shape, loop, and anastomoses) showed accuracies of 0.84, 0.81, 0.86, 0.85, and 0.82, respectively.

Conclusions: The AI-based algorithm potentially allows the reliable detection and segmentation of CNV from OCTA alone, without the need for imaging with contrast agents. The evaluation of the activity criteria in CNV lesions obtains acceptable results, and this algorithm could enable the objective, repeatable assessment of CNV features.

FT-IMA-004

Artificial intelligence algorithm for estimation of anterior chamber depth from slit-lamp images

E. Shimizu^{1,2,3}, K. Tanaka¹, H. Nishimura^{1,2,3}, S. Nakayama^{1,2}, R. Khemlanj^{1,3}, T. Hattori³

¹OUI Inc., Tokyo, Japan, ²Department of Ophthalmology, Keio University School of Medicine, Tokyo, Japan, ³Yokohama Keiai Eye Clinic, Kanagawa, Japan

Introduction: The study aimed to evaluate the accuracy of an artificial intelligence (AI)-based algorithm in estimating the anterior chamber depth (ACD) from slit-lamp images, leveraging a combination of video-recordable slit-lamp devices and anterior-segment optical coherence tomography (AS-OCT). This approach seeks to address the scarcity of tools for anterior chamber disease diagnosis, particularly in measuring ACD.

Objectives: This approach seeks to address the scarcity of tools for anterior chamber disease diagnosis, particularly in measuring ACD.

Methods: This retrospective study involved the collection of 37,034 anterior segment images extracted from 805 videos using a portable slit-lamp microscope, specifically the Smart Eye Camera (SEC; OUI Inc., Tokyo, Japan). Each subject's eye was subjected to concurrent examination by AS-OCT (CASIA2; Tomey, Aichi, Japan) and the aforementioned portable slit-lamp microscope. The collected dataset was systematically divided into distinct subsets for training, validation, and test dataset. Following the initial organization and preprocessing of the dataset, a two-stage machine learning approach was employed. The first stage involved the application of machine learning techniques to select frames from the videos that were suitable for estimating the ACD. Subsequently, the second stage of machine learning was applied to these selected frames to identify those that were diagnosable and to associate them with their corresponding ACD values as measured by AS-OCT. For the development and refinement of the machine learning model, the ResNet architecture was utilized.

Results: The initial phase of the study, which involved the selection of appropriate frames from video recordings for ACD estimation, achieved a high accuracy rate of 0.994. For the test dataset, the estimation of ACD resulted in a Mean Absolute Error (MAE) of 0.118 mm and a Mean Squared Error (MSE) of 0.154 mm. Furthermore, when analyzing the video test dataset specifically for ACD estimation, the performance improved, with a reported MAE of 0.100 mm and an MSE of 0.093 mm.

Conclusions: The study successfully developed and validated an AI model capable of accurately estimating ACD from slit-lamp images. This algorithm represents a significant advancement for risk assessment of acute glaucoma attacks, particularly in resource-limited settings such as developing countries and rural clinics, where access to advanced diagnostic tools may be limited.

FT-IMA-005

Development and validation of models for predicting anti-VEGF therapy outcomes in DME based on multimodal data

X. Leng¹, R. Shi¹, Z. Xu¹, H. Zhang¹, X. Lu^{1,2,3,4}

¹Chengdu University of Traditional Chinese Medicine, Chengdu, China, ²Ophthalmology, Ineye Hospital of Chengdu University of Traditional Chinese Medicine, Chengdu, China, ³Key Laboratory of Sichuan Province Ophthalmopathy Prevention & Cure and Visual Function Protection with TCM Laboratory, Chengdu, China, ⁴Retinal Image Technology and Chronic Vascular Disease Prevention & Control and Collaborative Innovation Center, Chengdu, China

Introduction: Artificial intelligence (AI) has developed rapidly in the medical field in recent years, and deep learning (DL) is widely used for clinical diagnosis, lesion detection, treatment outcome prediction and other research. For diabetic macular edema (DME), predicting the clinical indicators after treatment is of great significance for disease control, clinical decision-making and disease progression. To reduce the economic burden on patients and achieve precise treatment, the prediction of the efficacy of anti-VEGF therapy for DME is indispensable.

Objectives: To develop and validate multimodal deep learning models for predicting clinical outcomes of anti-vascular endothelial growth factor (anti-VEGF) therapy for DME using real-world data.

Methods: This study collected multimodal clinical data (patient demographics, optical coherence tomography [OCT] numerical information, and OCT images) from DME patients who visited the Ineye Hospital of Chengdu University of Traditional Chinese Medicine between April 20, 2017 and June 30, 2022. Multimodal deep learning models were developed and evaluated to predict the changes in four outcomes after anti-VEGF treatment: visual acuity (VA), central subfield thickness (CST), cube volume (CV), and cube average thickness (CAT). The models were based on a modified Xception convolutional neural network (CNN) and a multilayer perceptron (MLP), using TensorFlow as the framework. The models had a multi-input single-output structure, where the MLP branch processed the tabular data and the CNN branch processed the image data. The outputs of the two branches were concatenated and fed into a fully connected layer to generate the final predictions. Mean absolute error (MAE) (loss function), mean squared error (MSE) and mean squared logarithmic error (MSLE) were used as accuracy metrics.

Results: Four models were trained and tested to predict the follow-up outcomes of DME patients after anti-VEGF therapy. The MAEs of the predicted outcomes were 0.142, 0.104, 0.039, and 0.057 for VA, CST, CV, and CAT, respectively. The MSEs of the predicted outcomes were 0.029, 0.019, 0.005, and 0.011 for VA, CST, CV, and CAT, respectively. The MSLEs of the predicted outcomes were 0.016, 0.009, 0.002, and 0.005 for VA, CST, CV, and CAT, respectively.

Conclusions: The multimodal CNN-MLP models can effectively predict the short-term clinical efficacy of anti-VEGF therapy for DME. The models can capture the complex and heterogeneous features of DME and provide valuable insights for personalized treatment.

FT-IMA-006

Evaluation of a computer-aided diagnostic model for corneal diseases by analyzing in vivo confocal microscopy images

Y. Yang¹, Y. Yan¹

¹Department of Ophthalmology, Renmin Hospital of Wuhan University, Wuhan, China

Introduction: A computer-aided diagnostic model was developed for IVCM images based on deep learning, which rapidly recognized the layers of corneal images and classified them as normal and abnormal.

Objectives: In order to automatically and rapidly recognize the layers of corneal images using in vivo confocal microscopy (IVCM) and classify them into normal and abnormal images, a computer-aided diagnostic model was developed and tested based on deep learning to reduce physicians' workload.

Methods: A total of 19,612 corneal images were retrospectively collected from 423 patients who underwent IVCM between January 2021 and August 2022 from Renmin Hospital of Wuhan University and Zhongnan Hospital of Wuhan University. Images were then reviewed and categorized by three corneal specialists, including the layer recognition model (epithelium, bowman's membrane, stroma, and endothelium) and diagnostic model (normal and abnormal). Totally, 580 database-independent IVCM images were used in a human-machine competition to assess the speed and accuracy of image recognition by 4 ophthalmologists and artificial intelligence (AI). To evaluate the efficacy of the model, 8 trainees were employed to recognize these 580 images both with and without model assistance, and the results of the two evaluations were analyzed to explore the effects of model assistance.

Results: The accuracy of the model reached 0.914, 0.957, 0.967, and 0.950 for the recognition of 4 layers of epithelium, bowman's membrane, stroma, and endothelium in the internal test dataset, respectively, and it was 0.961, 0.932, 0.945, and 0.959 for the recognition of normal/abnormal images at each layer, respectively. In the external test dataset, the accuracy of the recognition of corneal layers was 0.960, 0.965, 0.966, and 0.964, respectively, and the accuracy of normal/abnormal image recognition was 0.983, 0.972, 0.940, and 0.982, respectively. In the human-machine competition, the model achieved an accuracy of 0.929, which was similar to that of specialists and higher than that of senior physicians, and the recognition speed was 237 times faster than that of specialists. With model assistance, the accuracy of trainees increased from 0.712 to 0.886.

Conclusions: A computer-aided diagnostic model was developed for IVCM images based on deep learning, which rapidly recognized the layers of corneal images and classified them as normal and abnormal. This model can increase the efficacy of clinical diagnosis and assist physicians in training for clinical purposes.

FT-IMA-007

Automated quantification of retinal nonperfusion areas in UWF-SS-OCTA images of patients using AI-UNet model

Y. Zhu¹, Y. Liao², M. Tao¹, T. Lan¹, J. Pan¹, J. Zhou¹, H. Xie¹, H. Li¹, Y. Ou¹, X. Wu¹, D. Ou¹, J. Huang¹, T. Tian², Y. Jiang², X. Wang³, Y. Luo¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China, ²Sun Yat-Sen University, Guangzhou, China, ³School of Management, University of Science and Technology of China, Hefei, China

Introduction: Measurement of nonperfusion areas (NPAs) is crucial in the diagnosis and treatment of ischemic retinal diseases (IRDs). With the development of imaging technology, accurate segmentation of fundus images and the application of OCTA in fundus diseases have become increasingly important.

Objectives: Measurement of retinal nonperfusion areas (NPAs) is crucial in the diagnosis and treatment of IRDs. This study aimed to accurately delineate retinal nonperfusion areas on ultra-widefield swept-source optical coherence tomography angiography (UWF-SS-OCTA) images using an efficient NP-UNet model, and calculate the ischemic index (ISI), to assist the treatment of retinal vascular diseases.

Methods: 29×24mm UWF-SS-OCTA images (VG200, Intalight imaging, Ltd., Luoyang, China) were collected from patients with branch retinal vein occlusion (BRVO), central retinal vein occlusion (CRVO), diabetic retinopathy (DR), and retinal vasculitis. Enhanced retinal vascular inner layer OCTA images were selected to construct the image dataset. An AI model was utilized to segment and quantify NPAs, relative ischemic areas, and foveal avascular zone (FAZ). The NP-UNet model, employing a cross-entropy loss function and transfer learning strategy, was utilized for segmentation, with image augmentation via randomly smooth cropping to enhance segmentation performance.

Results: The NP-UNet model could accurately segment individual specific area. For isolated NPAs segmentation, the accuracy was 96.164%, with an AUC (area under the curve) of 0.907 and a mean Intersection over Union (mIoU) of 0.795. Segmenting the relative ischemic area alone, the accuracy reached 95.064%, with an AUC of 0.647 and an mIoU of 0.635. The AI model also efficiently and accurately segment the NPAs, ischemic regions, and FAZ simultaneously with an accuracy of 97.25%, AUC of 0.903, mIoU of 0.932, and DSC (Dice similarity coefficient) of 97.3%. The segmentation model was expanded to unencountered CRVO, DR, and retinal vasculitis showing good performance, with DSCs of 87.2%, 82.6%, and 90.3%, respectively. Compared to manual annotation, this model exhibited the same performance for large NPAs but superior for small NPAs. Moreover, ISI measurements were more accurate than the commercial software of instrument.

Conclusions: The Ai-UNet model can accurately segment NPAs in UWF-SS-OCTA images and calculate ISI, aiding in the diagnosis and treatment of retinal vascular diseases.

FT-IMA-008

Domain adaptation for automated retinal image segmentation using deep learning

G. Ozturan¹, S. Wang¹, O. Yilmaz², I. Oruc¹

¹Ophthalmology, University of British Columbia, Vancouver, Canada, ²Mathematics, University of British Columbia, Vancouver, Canada

Introduction: Deep convolutional neural networks (CNN) have successfully automated retinal image segmentation. Their performance, however, depends heavily on the properties of the dataset used in their development.

Objectives: In previous work, our group has shown that models trained on diverse datasets perform poorer on single-domain tasks but better on domain adaptation, compared to models trained on less heterogeneous datasets, which showed the opposite pattern. Here we examine the performance of a retinal image segmentation model developed using the Indian Diabetic Retinopathy Image Dataset (IDRiD), when tested on a subset of EYEPACS, a dataset collected from a primarily Latin American and Caucasian population.

Methods: We trained a UNet3 (Ref-Unet3 + CBAM) model using the IDRiD dataset to segment hard exudates in retinal fundus images. We randomly partitioned the IDRiD dataset (N=54) into Training (80%), Validation (10%), and Test (10%) sets. We also created a secondary validation set (gold standard) for hard exudate counts for 100 retinal images (50 Females, 84% Latin American) from the EYEPACS dataset where hard exudate counts were generated by an ophthalmologist (Dr. Ozturan) and tested the IDRiD-trained UNet3 model on the EYEPACS distribution to assess domain adaptation performance.

Results: The Test AUC for the UNet3 model was 0.78. On the EYEPACS Validation set, the model's exudate counts (M=7.54 SD=17.41) were similar to the ophthalmologist counts (M= 7.66, SD=21.78, $p>0.2$). However, a close inspection of the segmentation outputs revealed that the model missed at least one lesion on 26% of all images, averaging 9.38 missed hard exudates. It also incorrectly labeled false lesions on 52% of all images, with an average of 4.35 false labels, misidentifying features like peripapillary atrophy, soft exudates, optic disc vessels, RNFL light reflexes, vessel light reflex, RPE changes, retinal atrophy, as hard exudates.

Conclusions: Our findings underscore the significance of dataset diversity for the generalization performance of CNNs in healthcare. While the UNet3 model showed reasonable accuracy, its inconsistencies in lesion detection highlight the limitations of using a CNN trained on a homogeneous dataset for diverse image distributions. These findings emphasize the necessity of matching the development set with the target population's diversity in AI applications, particularly in healthcare settings.

FT-IMA-009

Deep learning based functional classification and prognosis of pathological myopia

W. He¹

¹Ophthalmology, Eye & ENT Hospital of Fudan University, Shanghai, China

Introduction: Several morphological classification systems, though not very precise, have been proposed for classifying myopic maculopathy, which incurs a high risk of visual impairment among highly myopic eyes.

Objectives: To establish a comprehensive artificial intelligence (AI) system to classify myopic maculopathy using the macular function test results and to evaluate the prognosis of pathological myopia after cataract surgery.

Methods: 1,005 highly myopic eyes (axial length > 26.00mm) of 1005 patients were enrolled in this prospective cohort study. Routine ophthalmic examinations were carried out before and within 1 month after cataract surgery. Myopic maculopathy from fundus photographs were firstly classified into five categories based on the *International Photographic Classification and Grading System*. Then, macular sensitivity images acquired by Macular Integrity Assessment (MAIA) microperimetry, along with age and axial length, were used to train a deep learning model for evaluating post-operative visual outcomes.

Results: Based on morphological classification, with increasing grade of myopic maculopathy, the best corrected visual acuity (BCVA), macular sensitivity and fixation stability all decreased (all $P < 0.001$). Among the 14 patients with island-like macular atrophy pattern out of the 154 patients in category 3, their mean postoperative BCVA and macular sensitivity lay between the mean values of categories 3 and 4. When evaluating patients' post-operative visual outcomes, the deep learning model based on macular function test results demonstrated an accuracy of 93.1% and ROC-AUC of 0.918 in the validation cohort.

Conclusions: AI based on macular sensitivity images acquired by microperimetry demonstrated a high accuracy in classifying the myopic maculopathy functionally and evaluating the prognosis of pathological myopia after cataract surgery.

P-IMA-001

Validation of reliability, repeatability and consistency of three-dimensional choroidal vascular index

F. Ma¹, Y. Bai¹, J. Duan¹, Y. Liang¹, Q. Shang¹

¹Ophthalmology, The Second Hospital of Hebei Medical University, Shijiazhaung, China

Introduction: Quantified choroidal parameters have been applied in clinical evaluation for choroidal disorders, including SFCT, choroidal volume (CV), choroidal vascularity index (CVI). CVI has been found extensive application in exploring diverse choroidal and retinal conditions. Yet, most CVI analyses was rely on a two-dimensional choroidal vascular index calculated from a single optical coherence tomography (OCT). Even though previous studies have investigated CVI in both healthy individuals and those with ocular pathologies, the reliability for this parameter remained unassessed in a comprehensive manner in previous research.

Objectives: This study aimed to investigate the reliability, repeatability and consistency of choroidal vascularity index (CVI) measurements provided by an artificial intelligence-based software in swept-source optical coherence tomography (SS-OCT) in normal subject, and to evaluate the influencing factors for 3D-CVI.

Methods: Repeatability of 3D-CVI by SS-OCT was evaluated based on different scanning modes including Macular Cubes (3 mm × 3 mm, 6mm × 6 mm, 9 mm × 9 mm) and Optic Nerve Head (ONH) 6mm× 6mm. Intraclass Correlation Coefficient (ICC) was used to estimate the repeatability and reproducibility of five repeated measurement by SS-OCT. Consistency of CVI between SS-OCT and spectral-domain optical coherence tomography (SD-OCT) was measured and compared in a pilot study of ten eyes and agreement between SS-OCT and SD-OCT was evaluated by Bland-Altman analysis and Deming regression. The influencing factors for 3D-CVI including age, gender, axial length and spherical equivalent on CVI was further investigated in a prospective study of 125 eyes of 125 healthy subjects.

Results: ICC between different measurements by SS-OCT was 0.934 (95% CI: 0.812-0.956) indicating good repeatability. Intraclass correlation coefficient between CVI measure by SS-OCT and SD-OCT was 0.887 (95% CI: 0.796-0.938, P value < 0.001). The mean difference between 3D-CVI measured by SS-OCT and SD-OCT 0.133. CVI measured with SS-OCTA showed stronger correlations with axial length and age but not correlated with gender.

Conclusions: There is good agreement between CVIs obtained from the built-in software that requires less timing in manual quantification. Studies investigating choroidal vascularity can be standardized by the AI-based CVI analyze software.

P-IMA-002

A non-contact in vivo conjunctival goblet cell fluorescence microscope with high-contrast and large image field-of-view

Y. Liu¹, Z. Duan¹, J. Zhang¹, K. Fei¹, Z. Luo¹, B. Wang¹, J. Yuan¹, P. Xiao¹

¹Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Conjunctival goblet cells (CGCs) secrete mucins involved in maintaining tear film homeostasis, its structural and functional changes are the main pathogenic factors for ocular surface diseases including dry eye. Efficient and non-invasive CGC image evaluation is the key to accurate diagnosis and treatment of these diseases. Imprinting cytology and confocal microscopy for CGC imaging cannot be widely used clinically due to their invasiveness and low image contrast.

Objectives: To develop a non-contact imaging technique with high-contrast, high-resolution and large field-of-view for in vivo visual assessment of CGC in ocular surface disease diagnosis and management.

Methods: A novel high-resolution non-contact ocular surface microscopy system was customized based on moxifloxacin fluorescence labelling for high-contrast CGC imaging. Axially-swept imaging by a tunable liquid lens incorporated with a stack registration and fusion algorithm was developed for all-in-focus large-field fluorescence image acquisition on curved conjunctival surface. System feasibility was demonstrated through in vivo CGC imaging in both mice and rabbits. Its utility was further validated through a longitudinal observation of the CGCs in 0.2% benzalkonium chloride induced dry eye mouse models.

Results: The system achieved a resolution of 1.8 μm over a field-of-view of approximately 1.4 \times 1.4 mm with an imaging speed of 30 frames/second, resolving high-contrast images of individual CGC. CGCs were observed to be aggregated in clusters in mice palpebral conjunctiva, while they were scattered individually in rabbit conjunctiva. Non-contact CGC imaging evaluation showed that Benzalkonium chloride induced significant CGC decrease in mouse palpebral conjunctiva, which gradually recovered after 7 days of drug cessation and almost recovered to normal in 3 weeks.

Conclusions: A feasible non-contact high-contrast fluorescence microscope was developed for high-resolution large-field in vivo CGC imaging and longitudinal monitoring, which is of great value in the evaluation of ocular surface diseases like dry eye.

P-IMA-003

Clarity in a click: AI-powered smartphone photography for tackling corneal opacities

T. Gupta¹, N. Gupta¹, J.S. Titiyal¹, R. Tandon¹, P. Vashist¹, M. Vanathi¹, V. Gupta¹, N. Lomi¹

¹Dr. Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, New Delhi, India

Introduction: While corneal blindness is a major cause of avoidable vision loss, there is limited community-based data on the burden, and gaps persist regarding quantification of the need for sight-restoring keratoplasty procedures. Smartphone-based imaging leveraging artificial intelligence (AI), conducted by non-ophthalmic personnel can help improve screening accessibility in underprivileged populations.

Objectives: This study aimed to develop an AI system to detect corneal opacities based on smartphone images, and assess its field efficacy in a community setting.

Methods: A dataset of 2000 smartphone images of the eye, collected from patients in a community-based survey on corneal opacities was collated, and quality assessed and graded by a trained cornea specialist. After cropping images to obtain regions of interest, a ResNet-50 deep convolutional neural network (CNN) was initialised using a 8:2 partition scheme over 4 epochs. Further model optimisation and fine-tuning created ResNeCO - an algorithm tailored to identify the presence of corneal opacities from smartphone eye images. The algorithm was deployed in Google Colab. An Android smartphone application was developed using Flutter framework, incorporating a questionnaire to record patient demographics, medical history, torchlight examination of cornea and capture eye images. Trained optometrists and field investigators used the application in a population-based survey. Captured images were submitted to ResNeCO and the app screen displayed real-time results and the need for keratoplasty.

Results: The AI model had a predictive accuracy of 92.25% after training and testing on the initial dataset. In the field assessment, 4268 community participants underwent examination. 21 patients (26 eyes) had corneal opacities, indicating a 0.49% prevalence of corneal opacities in the population. The AI algorithm demonstrated 94.59% accuracy in detecting corneal opacities from smartphone images. The sensitivity and positive predictive value were 72.41% indicating a significant proportion of corneal opacity cases were correctly identified. The specificity and negative predictive value were 97% suggesting a high rate of correctly classifying normal corneas without opacity.

Conclusions: Smartphone image based AI systems have a high diagnostic accuracy and such widely accessible and scalable systems can be used to improve screening accessibility and connect marginalised groups to sight-restoring interventions.

P-IMA-004

Prompt engineering with ChatGPT 3.5 and GPT4 to improve patient education material on retinal diseases

J. Oh¹, H. Jung¹, K. Stephenson², A. Joe², Z. Mammo²

¹Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²Department of Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: Patient education resources in ophthalmology often exceed a grade reading level of 10.4-12.6, surpassing the recommended reading level of grade 8 or lower. Large language models (LLMs) like ChatGPT (Chat-Generative Pre-trained Transformer) 3.5 and its successor, GPT4, have been investigated as potential tools for tailored and accessible patient education. The accuracy and appropriateness of LLMs are dependent on the provided prompts, which can be engineered to control for the output's length, tone, and readability.

Objectives: To evaluate the effect of prompt engineering on the accuracy, comprehensiveness, and readability of LLM-generated responses to common questions on retinal diseases.

Methods: Twenty common patient questions regarding five retinal conditions were inputted to ChatGPT3.5 and GPT4 as a standalone, preceded by an optimized prompt (prompt A), or preceded by prompt A with specified limits of 300 words and a grade reading level limit of 8 (prompt B). Each response was graded on a Likert scale (1-5) for accuracy and comprehensiveness by three masked and independent retina specialists. Readability (Flesh Kinkaid (F-K) Grade Level) was calculated using Readable.com, a validated tool.

Results: There were no significant differences in accuracy, comprehensiveness, or readability between LLMs. The F-K Grade Level (mean \pm SD) of responses to questions inputted as a standalone, with prompt A, or with prompt B was 12.1 ± 1.2 , 9.8 ± 1.0 , and 8.7 ± 1.2 , respectively, with significant differences between each group ($p < 0.001$). 25% of ChatGPT 3.5 and 40% of GPT4 responses to questions with prompt B adhered to the specified grade reading level limit of 8. Across both LLMs, standalone questions had a mean accuracy and comprehensiveness of 4.6 ± 0.4 and 4.7 ± 0.3 , respectively. The use of prompt A did not lead to any significant differences in accuracy (4.6 ± 0.4 , $p = 0.926$) or comprehensiveness (4.6 ± 0.4 , $p = 0.201$) of responses. However, responses to questions with prompt B had a significantly lower accuracy (4.3 ± 0.4 , $p = 0.001$) and comprehensiveness (4.0 ± 0.4 , $p < 0.001$) compared to standalone questions.

Conclusions: Prompt engineering can significantly improve the readability of LLM-generated responses to common questions on retinal disease. However, this can come at the cost of reducing accuracy and comprehensiveness.

P-IMA-005

CorneAI: validating smartphone YOLOv5 model for diagnosing anterior segment diseases - performance and reliability

Y. Kitaguchi¹, Y. Yoshinaga¹, Y. Ueno², H. Maehara³, T. Yamaguchi⁴, D. Miyazaki⁵, N. Ryohei⁶, T. Inomata⁷, N. Kato⁸, T. Chikama⁹, J. Ominato¹⁰, T. Yunoki¹¹, K. Tsubota¹², M. Oda¹³, K. Nishida^{1,14}, T. Oshika², Japan Anterior Segment Artificial Intelligence Research Group

¹Ophthalmology, Osaka University Graduate School of Medicine, Osaka, Japan, ²Ophthalmology, University of Tsukuba, Tsukuba, Japan, ³Ophthalmology, Fukushima Medical University School of Medicine, Fukushima, Japan, ⁴Ophthalmology, Nippon Medical School, Tokyo, Japan, ⁵Ophthalmology, Tottori University Faculty of Medicine, Tottori, Japan, ⁶Miyata Eye Hospital, Miyazaki, Japan, ⁷Ophthalmology, Juntendo University Graduate School of Medicine, Tokyo, Japan, ⁸Ophthalmology, Tsukazaki Hospital, Hyogo, Japan, ⁹Ophthalmology and Visual Science, Hiroshima University Graduate School of Biomedical and Health Sciences, Hiroshima, Japan, ¹⁰Ophthalmology and Visual Science, Niigata University Graduate School of Medical and Dental Sciences, Niigata, Japan, ¹¹Ophthalmology, University of Toyama Graduate School of Medicine and Pharmaceutical Sciences, Toyama, Japan, ¹²Ophthalmology, Tokyo Medical University, Tokyo, Japan, ¹³Information Technology Center, Nagoya University, Nagoya, Japan, ¹⁴Osaka University, Institute for Open and Transdisciplinary Research Initiatives, Osaka, Japan

Introduction: CorneAI is a YOLOv5-based deep-learning model trained on 6,106 slit-lamp images to differentiate 36 major anterior segment diseases into 9 categories (normal condition, infectious keratitis, immunological keratitis, scarring, deposition, bullous keratopathy, neoplastic lesions, lens opacity, and acute angle-closure glaucoma). We recently implemented this model into the iOS using CoreML for on-device processing, in which prediction is done by scanning images displayed on the PC (personal computer) screen. However, it remains unclear whether its prediction matches that of a PC model in a clinical setting.

Objectives: To validate the performance, repeatability, and reproducibility of the smartphone-implemented CorneAI.

Methods: The validation process used 100 images of 50 eyes across nine anterior segment disease categories, captured both with an iPhone13Pro in macro mode and via a slit-lamp diffuser. The model's accuracy was compared between the PC and smartphone versions. Cohen's Kappa was calculated to assess the concordance of judgments between these versions. Repeatability was tested by repeating image analysis three times in the consistent setting with the same examiner, and reproducibility by changing examiners, PC screens, and smartphones. Fleiss Kappa was used for both assessments.

Results: The Accuracy of CorneAI was 86% for the PC version (84% for smartphone-captured images and 88% for slit-lamp-captured images) and 79% for the smartphone version (70% for smartphone-captured images and 89% for slit-lamp-captured images). The Cohen's Kappa between the PC and smartphone versions was 0.83 (0.81 for smartphone-captured images and 0.86 for slit-lamp-captured images), indicating a substantial agreement between the two modalities. Fleiss Kappa values in each condition exceeded 0.80, demonstrating the model's repeatability and reproducibility.

Conclusions: This validation study confirms that the smartphone-implemented CorneAI model produces outputs that are consistent with those of the PC version in diagnosing anterior segment diseases, despite slight decrease in accuracy in smartphone-captured images. The model's high consistency supports its potential utility in a clinical setting, including in locations with limited access to PC-based diagnostic tools.

P-IMA-006

Machine learning technology in classification of glaucoma severity using fundus photographs

S. Thanapaisal¹, P. Hanpinitsak², P. Suvannachart³, P. Supasai¹

¹Department of Ophthalmology, Faculty of Medicine, Srinagarind Hospital, Khon Kaen University, Khon Kaen, Thailand, ²Faculty of Engineering, Khon Kaen University, Khon Kaen, Thailand, ³Department of Ophthalmology, Suddhavej Hospital, Mahasarakham University, Mahasarakham, Thailand

Introduction: Color fundus photographs were widely used for glaucoma screening, which is essential for early detection and treatment of the disease. Machine learning (ML) technology has been applied to the detection and classification of glaucoma using fundus photographs. However, most of the previous studies classified the severity of glaucoma by the mean deviation value of the visual field test only.

Objectives: To evaluate the performance of the ML model in classifying glaucoma severity using color fundus photographs. Glaucoma severity grading is based on the Hodapp-Parrish-Anderson criteria including the mean deviation value, the defective points in the pattern deviation probability map, and the defect proximity to the fixation point.

Methods: This is a diagnostic study. The dataset, which consisted of 2940 fundus photographs taken from 1789 patients, was classified into three groups: normal, mild-moderate, and severe stages of glaucoma according to the Hodapp-Parrish-Anderson criteria. The data set of color fundus images was cropped around the optic disc region. The images were trained on the EfficientNetB7, a convolutional neural network model, using the transfer learning and fine-tuning techniques.

Results: The machine learning model, EfficientNetB7, provided the overall accuracy of 0.882 (95%CI, 0.826 to 0.924). Based on the normal, mild-moderate, and severe classes; the ROC were 0.986, 0.929 and 0.961, the sensitivity were 0.936, 0.887 and 0.823, and the specificity were 0.968, 0.887 and 0.968, respectively. The average inference time per image of the model was 184 milliseconds. The confusion matrix revealed that the structure and function relationship in glaucoma affects the performance of the model.

Conclusions: The study demonstrated the benefit of the machine learning model EfficientNetB7 in accurately classifying glaucoma by using the visual field tests as a standard for severity grading according to the Hodapp-Parrish-Anderson criteria. This model is helpful to health care professionals, as it provides accurate glaucoma screening and classification, leading to appropriate clinical management based on disease severity.

P-IMA-007

The DLS in assisting junior ophthalmologists in diagnosing 13 fundus diseases: a multi-center clinical trial

B. Li¹, Y. Chen¹, W. Yu¹, M. Zhang², J. Ma³, X. Li⁴, L. Shen⁵, D. Ding⁶, X. Li⁷

¹Department of Ophthalmology, Peking Union Medical College Hospital, Key Lab of Ocular Fundus Diseases, Chinese Academy of Medical Sciences, Beijing, China, ²West China Hospital, Sichuan University, Sichuan, China, ³Second Hospital of Hebei Medical University, Shijiazhuang, China, ⁴Tianjin Medical University Eye Hospital, Tianjin, China, ⁵Affiliated Eye Hospital of Wenzhou Medical University, Wenzhou, China, ⁶Visionary Intelligence Ltd., Beijing, China, ⁷MoE Key Lab of DEKE, Renmin University of China, Beijing, China

Introduction: Fundus diseases have become the most common irreversible leading causes of blindness worldwide. However, conventional screening is time-consuming and costly and calls for large numbers of human assessors and sustained financial assistance, both of which still remain as huge challenges globally.

Objectives: To evaluate the diagnostic performance of a deep learning system (DLS) in assisting junior ophthalmologists in detecting 13 major fundus diseases.

Methods: This is a multicenter, prospective, self-controlled clinical trial. The DLS was developed for the detection of 13 major fundus diseases. The testing images were prospectively collected from five tertiary hospitals in China and annotated by six retinal specialists as standard diagnosis. The evaluation and comparison were conducted among three groups: DLS-assisted junior ophthalmologist group (test group), junior ophthalmologist group (control group) and DLS group. The effectiveness of the three groups was assessed using diagnostic consistency, accuracy, sensitivity, specificity, and the accuracy of the principal diagnosis.

Results: The prospectively collected dataset contained 1493 fundus images from 748 patients. The diagnostic consistency was 84.9% (95% CI, 83.0%~86.9%), 72.9% (95% CI, 70.3%~75.6%) and 85.5% (95% CI, 83.5%~87.4%) in the test group, control group and DLS group, respectively. The diagnostic accuracy in the three groups was 44.2%, 60.5% and 40.0%, respectively. A higher sensitivity and a comparable specificity were achieved in the test group than in the control group (sensitivity, 96.6% vs. 94.3%; specificity, 81.8% vs. 67.1%) in detecting any fundus abnormality. For the detection of 13 diseases, the test group achieved significantly higher sensitivities (91.6%±7.3%, range 72.2%~100.0%) and comparable specificities (95.9%±2.7%, range 90.8%~98.7%) with respect to the control group (sensitivities, 72.7%±15.9%, range 50.0%~100.0%; specificities 98.0%±1.3%, range 96.7~99.7%). The DLS group presented with a similar performance to that of the test group in detecting any fundus abnormality (sensitivity, 95.7%; specificity, 87.2%) and each of the 13 diseases (sensitivity, 93.0%±4.3%, range 83.3%~100%; specificity, 94.0%±3.7%, range 89.0%~98.0%).

Conclusions: With the assistance of DLS, junior ophthalmologists achieved significant improvements in diagnostic consistency and sensitivity for the detection of 13 major fundus diseases.

P-IMA-008

Revolutionizing corneal staining assessment: interpretable evaluation through fine-grained knowledge distillation

Y. Deng^{1,2,3}, P. Cheng^{4,5,6}, X. Li⁷, X. Tang^{4,5,6}, J. Yuan^{1,2,3}

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China, ²Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China, ³Guangdong Provincial Clinical Research Center for Ocular Diseases, Guangzhou, China, ⁴Department of Electrical and Electronic Engineering, Southern University of Science and Technology, Shenzhen, China, ⁵Jiaying Research Institute, Southern University of Science and Technology, Jiaying, China, ⁶Department of Electrical and Electronic Engineering, the University of Hong Kong, Hong Kong, China, ⁷Zhaoke (Guangzhou) Eye Care Technology Co., Ltd., Guangzhou, China

Introduction: Corneal staining score (CSS) evaluation is crucial for dry eye diagnosis and severity assessment. Yet existing AI models for CSS assessments struggle with detailed lesion identification with interpretability, and lack applicability in real-world clinical settings. Moreover, the output of current AI-assist staining evaluation system only provides categories of grades, leading to potential “plateau” effect, which could misrepresent treatment response in clinical practices.

Objectives: Our study aims to address the challenges in the evaluation of corneal punctuate staining by developing a novel Fine-Grained Knowledge Distillation-based CSS Grading (FKD-CSS) model for the detection and outputs continuous scores of corneal staining images of dry eye in real-world setting.

Methods: The training phase framework of FKD-ICSS encompasses three key stages: ROI cropping, segmentation teacher network training, and CSS grading network training. The model was trained and cross-validated by 1471 images of dry eye patients of heterogeneous sources. External datasets with a total of 2376 images from six regions of China are used for external real-world tests. To highlight the superiority of the proposed FKD-CSS model over traditional deep learning methods, we provide a feature visualization comparison between the FKD-CSS model and ResNet50. We employed Pearson Correlation and the AUC-ROC (Area under the curve -Receiver operating characteristic curve) to evaluate the regression consistency and categorization performance of the model. The performance of CSS are also observed between the model and ophthalmologists.

Results: For interpretability visualization, the FKD-CSS model successfully captures fine-grained staining areas of different CSS gradings, whereas ResNet50 only captures coarse-grained staining areas. Furthermore, FKD-CSS demonstrates robust accuracy with a Pearson's r of 0.898 against ground-truth and an AUC of 0.881 in internal validation, rivaling senior ophthalmologists. Additionally, the model achieved expert performance with considerable Pearson's r (0.844-0.899) and AUCs (0.804-0.883) in six external test datasets.

Conclusions: This study proposes a knowledge distillation strategy for fine-grained corneal staining score assessment, addressing the gap in the identifying the corneal punctuate lesion with interpretability, demonstrates the AI-assisted FKD-CSS model will facilitate standardizing the evaluation of diseases severity and provide accurate endpoints for multi-center clinical trials in dry eye.

P-IMA-009

CT-based artificial intelligence prediction model for ocular motility score of thyroid eye disease

K. Tan¹, Z. Liu², H. Zhang¹, G. Zhai², X. Song¹, H. Zhou¹

¹Ophthalmology, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²Electronic Information and Electrical Engineering, Shanghai Jiao Tong University, Shanghai, China

Introduction: Thyroid eye disease (TED) is the most common orbital disease in adults. Ocular motility restriction is the primary complaint of patients, while its evaluation is quite difficult.

Objectives: The present study aimed to introduce an artificial intelligence (AI) model based on orbital computed tomography (CT) images for ocular motility score.

Methods: A total of 410 CT images and clinical data were obtained from the hospital. To build a triple classification predictive model for ocular motility score, multiple deep learning models were employed to extract features of images and clinical data. Subgroup analyses based on pertinent clinical features were performed to test the efficacy of models.

Results: The ResNet-34 network outperformed Alex-Net and VGG16-Net in prediction of ocular motility score, with the optimal accuracy (ACC) of 0.907, 0.870, 0.890, respectively. Subgroup analyses indicated that there was no significant difference in ACC between active or inactive phase, functional visual field diplopia or peripheral visual field diplopia ($p > 0.05$). However, in the gender subgroup, the prediction model performed more accurately in female patients than males ($p = 0.02$).

Conclusions: In conclusion, AI models based on CT images and clinical data successfully realized automatic scoring of ocular motility of TED patients. This approach potentially enhanced efficiency and accuracy of ocular motility evaluation, thus facilitating clinical application.

P-IMA-010

Exploring ChatGPT's diagnostic performance and inference abilities for retinal vascular disease classification

K. Jin¹, J. Ye¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Benefiting from the exceptional ability of text understanding and rich knowledge, large language models (LLMs) like ChatGPT, have shown great potential in English clinical environments. However, the performance of ChatGPT in non-English clinical settings, as well as its reasoning, have not been explored in-depth.

Objectives: This study aimed to evaluate ChatGPT's diagnostic performance and inference abilities for retinal vascular diseases in a non-English clinical environment.

Methods: In this cross-sectional study, we collected 1226 fundus fluorescein angiography reports and corresponding diagnosis written in Chinese, and tested ChatGPT with four prompting strategies (direct diagnosis or diagnosis with step-by-step reasoning process and in Chinese or English).

Results: Compared with ChatGPT using Chinese prompt for direct diagnosis that achieved F1-score of 70.47%, ChatGPT using English prompt for direct diagnosis achieved the best diagnostic performance (80.05%), which was inferior to ophthalmologists (89.35%) but close to ophthalmologist interns (82.69%). As for the inference abilities, ChatGPT using different languages can derive reasoning process with a low error rate (0.4 per report), but ChatGPT with English prompt involved more reasoning steps, with less misinformation (1.96%), hallucination (0.59%), and inconsistency (0.39%). In a word, the performance of ChatGPT with English prompts was better and more robust than that of ChatGPT with Chinese prompts.

Conclusions: ChatGPT can serve as a helpful medical assistant to provide diagnosis under non-English clinical environments, but there are still performance gaps, language disparity, and errors compared to professionals, which demonstrates the potential limitations and the desiration to continually explore more robust LLMs in ophthalmology practice.

P-IMA-011

Characteristic analysis of retinal telangiectasia in pathologic myopia with wide-angle swept source-OCT/OCTA

*Y. Wang*¹

¹Eye Center of the Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Pathologic myopia is accompanied with many complications. Retinal telangiectasia in eyes with pathologic myopia has been seldom discussed.

Objectives: To analyze the critical features of retinal telangiectasia in pathologic myopia patients using wide-angle swept source (SS)-OCT/ OCTA.

Methods: Patient 1, a 25-year-old female with high myopia, sought myopia laser surgery for both eyes. She had a BCVA of 1.0 in the right eye (-9.0DS/-0.5DC*133) and 0.8 in the left eye (-8.5DS). Scattered hemorrhagic spots were noted in temporal posterior pole in both eyes. Fluorescein angiography confirmed retinal telangiectasia with leakage. OCT reveals retinal schisis in the nerve fiber layers. Wide-angle SS-OCTA identified the co-localization of retinal telangiectasia and retinal inner layer schisis. Patient 2, a 32-year-old female, reported a one-month history of decreased vision in the left eye. BCVA was 0.2 in the right eye (-8.25DS/-1.5DC) and 0.06 in the left eye (-8.75DS/-0.75DC). SS-OCT revealed inner and outer layer schisis in both eyes, with central foveal detachment in the left eye. Wide-angle OCTA also confirmed the co-localization of retinal telangiectasia and retinal inner layer schisis. The patient underwent vitrectomy in the left eye. Postoperatively, SS-OCT displayed a flattened retina with the disappearance of macular schisis, and SS-OCTA revealed a significant reduction of retinal telangiectasia.

Results: Retinal telangiectasia in pathologic myopia often affects both eyes and is located at the area of retinal inner layer schisis. The pathogenesis may stem from traction caused high myopia, leading to loss of vascular endothelial cells. Wide-angle SS-OCT/OCTA can detect retinal schisis and retinal telangiectasia in pathologic myopic eyes. Vitrectomy is needed when vision-threatening complications occur. With the release of traction, postoperative improvement is observed in both retinal schisis and retinal telangiectasia.

Conclusions: Wide-angle SS-OCT/OCTA can non-invasively detect and accurately locate retinal schisis and retinal telangiectasia in high myopia at an early stage. It can also be used to assess the tractional status of the vitreoretinal interface.

P-IMA-012

Multimodal fusion enhances fundus disease diagnosis

W. Li¹, H. Qi¹

¹Ophthalmology, Peking University Third Hospital, Beijing, China

Introduction: The prevalence of fundus diseases like DR, RVO and AMD in China poses significant health challenges. Conventional diagnostic methods encounter efficiency issues, while AI, especially deep learning, holds promise. Color fundus photograph (CFP) is favored for AI screening, yet relying solely on it may lead to information gaps. Our study integrates CFP, fundus fluorescein angiogram (FFA), and clinical features, enhancing diagnostic accuracy and trustworthiness through the incorporation of attention mechanisms.

Objectives: We aim to enhance fundus disease diagnosis by integrating attention mechanisms into deep learning models, combining CNN architectures with traditional transformers. Our study explores multimodal information integration for improved diagnostic accuracy and efficiency, contributing reliable diagnostic tools for prevalent fundus diseases.

Methods: Data from patients at Peking University Third Hospital were utilized to develop four models: Basic Classification (BCL), Basic Attention mechanism incorporated Classification (BACL), Clinical features incorporated Classification (CCL), and Clinical features and Attention mechanism incorporated Classification (CACL) models. Performance was compared across modalities (CFP, FFA) and fusion approaches (early and late fusion of CFP and FFA - CFP_FFA_E and CFP_FFA_L). Performance differences among models within the same modality were also assessed.

Results: A dataset of 13,130 eye examinations from 7,076 patients was curated, comprising 13,130 CFPs and 173,722 FFAs after excluding subjects with poor-quality CFPs or lacking clinical information. The dataset was randomly split into training (8,403 eyes), validation (2,100 eyes), and test sets (2,627 eyes). Late fusion of CFP and FFA significantly enhanced overall model performance, with all models achieving optimal results in the CFP_FFA_L modality (average Cohen's kappa values are BCL: 0.716; BACL: 0.736; CCL: 0.732; CACL: 0.748). Incorporating clinical features and attention mechanisms further boosted model performance, particularly in the optimal fusion modality, where the CACL model exhibited the highest performance.

Conclusions: Multimodal fusion enhances fundus disease diagnosis significantly. Late fusion of CFP and FFA consistently produces optimal results. Integrating clinical features and attention mechanisms further boosts performance, highlighting the potential of AI for reliable diagnosis and improved patient outcomes.

P-IMA-013

Predictive models for surgical methods of rhegmatogenous retinal detachment based on machine learning

Y. Lin¹, Z. Lin¹, X. Xiong¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: Rhegmatogenous retinal detachment (RRD) occurs when a retinal 'break' caused by the rupture of retina allows the fluid from the vitreous cavity to accumulate in the potential space between the neurosensory retina and the underlying retinal pigment epithelium (RPE).

Surgery is the main treatment to RRD currently, including pneumatic retinopexy (PR), scleral buckling (SB), and pars plana vitrectomy (PPV). In China, PPV and SB are the main surgery for RRD, for which we did not consider PR in this paper.

Objectives: This study aimed to establish and optimize machine learning models for prediction in surgical methods to cure patients with rhegmatogenous retinal detachment(RRD), with a hope to assist clinical decision-making.

Methods: A total of 482 eyes from 482 patients were included in this study. We developed Logistic Regression (LR), Support Vector Machine(SVM) , Stochastic Gradient Descent(SGD), Random Forest (RF) , eXtreme Gradient Boosting(XGBoost) models. For each model, 70% of the data were randomly selected for the training set and the remaining 30% were used as the test set. Correlation analysis and importance ranking were conducted for feature selection. The predictive accuracy, weighted average precision, weighted average recall, weighted average F1 score(F1), the micro-average area under the curve (AUC) of receiver operating characteristic (ROC) curves, and the macro-average AUC were calculated to evaluate the predictive performance.

Results: The five models achieved prediction accuracies ranging from 74.2% to 82.5%. The weighted average precision ranged from 75.1% to 80.2%, the weighted average recall ranged from 74.2% to 82.5%, and the weighted average F1 score ranged from 75.4% to 80.5%. The micro-average AUC ranged from 0.69 to 0.93, and the macro-average AUC ranged from 0.52 to 0.88. Both RF and XGBoost attribute the top five features in terms of importance to the following (albeit with potential variations in ranking): age, intraocular pressure, extent of retinal detachment, hole size, and PVR grade.

Conclusions: The trained models developed above had shown the potential ability to predict the optimal surgical method for RRD patients. The RF model outperformed other models mentioned above on our dataset. Age, intraocular pressure, extent of retinal detachment, hole size, and PVR grade should be considered when making clinically surgical decision.

P-IMA-014

AI in ophthalmology. A paradigm shift

N. Ul Ain¹, T. Malik²

¹Ophthalmology, Mughal Eye Hospital (Trust), Lahore, Pakistan, ²Ophthalmology Eye Unit 1, Lahore General Hospital, Lahore, Pakistan

Introduction: Diabetic retinopathy is considered to be one of the leading cause of blindness worldwide. In Pakistan, cases of DR have been increasing at an alarming rate. AI-based diagnostic system can assist doctors and medical staff in basic health units of rural areas in early diagnosis and referral of patients to advanced tertiary care centers for further management.

Objectives: To design an AI model that can detect the presence of diabetic retinopathy based on the signs of exudates, microaneurysm, hemorrhages and neo vessels in the fundus image and check its reliability.

Methods: An AI model was designed to detect the presence of DR based on the signs of exudates, microaneurysm, hemorrhages and neo vessels on the fundus. It is a two step study. In the first step, sample of 1000 fundus images is classified into DR or no DR by 2-3 skilled ophthalmologist with clinical experience of more than 10 years. Out of the 1000 fundus images, we used 800 fundus images to train our AI model. Once AI model was trained, rest of 200 subset was shown to the AI model to detect the presence or absence of DR. We found that our model had good results in the prediction of DR. Next step was to compare the results of AI with the optometrists, general practitioners to see if the AI model or the optometrists/GP (who were earlier trained) are more reliable in the detection of DR in the patients.

Results: First step showed high reliability of AI in the detection of normal fundus from abnormal diabetic fundus. The second step of comparison of AI with optometrist to check the reliability is under process and the results will be available within a month.

Conclusions: Due to overburdened healthcare system there's delay in timely intervention. AI-based diagnostic systems can improve the situation. Early detection and timely intervention can save the vision.

P-IMA-015

Deep learning fundus tessellation grading model based on real-world data

R. Shi¹, X. Leng¹, X. Lu^{1,2,3}

¹Department of Ophthalmology, Chengdu University of Traditional Chinese Medicine, Chengdu, China,

²Ineye Hospital of Chengdu University of Traditional Chinese Medicine, Chengdu, China, ³Key Laboratory of Sichuan Province Ophthalmopathy Prevention & Cure and Visual Function Protection with Traditional Chinese Medicine, Chengdu, China

Introduction: Fundus tessellation (FT) is a prevalent clinical feature associated with myopia and has implications in the development of myopic maculopathy, which causes irreversible visual impairment. Accurate grading of FT in color fundus photos can help predict the disease progression and prognosis. Deep learning is a branch of artificial intelligence (AI), which is mostly used in clinical practice for efficacy prediction, disease diagnosis and lesion detection. Therefore, grading fundus tessellation by deep learning could be valuable.

Objectives: The objective of this study was to use color fundus photos taken in real-world to establish an FT grading model based on a convolutional neural network (CNN).

Methods: Patients diagnosed with high myopia in Ineye Hospital of Chengdu University of Traditional Chinese Medicine from October 2023 to November 2023 were included. The patients' fundus photos were taken and graded by the same ophthalmologist according to Fundus tessellation grading. All pictures were divided into training and validation sets according to the ratio of 7:3. The grading model was established based on Resnet152 architecture and the optimizer was Adam's algorithm, with images as input, and grading as output. *Accuracy*, *precision*, *F1-score*, loss function (negative log-likelihood), and *recall* were used as the evaluation metrics to assess the performance of the model.

Results: 170 fundus photos were included in this study, 5 of level 0, 44 of level 1, 45 of level 2, and 76 of level 3. *Accuracy* was 36.4%, *precision* was 9%, *F1-score* was 0.13. The value of the loss function was 4.2, and *recall* was 0.25.

Conclusions: The performance of this FT grading model was not well. After analyzing the results, the possible reasons included lack of data volume, poor data preprocessing, and inappropriate hyperparameters. Adequate high-quality fundus photos and suitable parameter settings may improve the performance of the model. With the rapid development of computer science and ophthalmic imaging technology, the FT fundus classification model with higher accuracy could emerge and be used in clinical practice. Which allows for earlier intervention in the development of high myopia and assists clinical decision-making.

P-IMA-016

Ultrasonographic description of meibomian glands and main lacrimal gland in patients with dry eye disease

P. Maturana¹, D. Cabrerizo¹, D. López^{1,2}, X. Wortsman³, M.C. Goya², R. López⁴, L. Traipe¹

¹Unidad de Lágrima y Superficie Ocular (ULSO), Clinica Las Condes, Santiago, Chile, ²Departamento de Tecnología Médica, Facultad de Medicina, Universidad de Chile., Santiago, Chile, ³Instituto de Investigación y Diagnóstico por Imágenes en Piel y Tejidos Blandos (IDIEP), Santiago, Chile, ⁴Instituto de Ciencias Biomédica (ICBM), Facultad de Medicina, Universidad de Chile, Santiago, Chile

Introduction: Meibomian gland dysfunction is the leading cause of evaporative dry eye disease (DED), being meibography the main structural exam. On the other hand, damage to the main lacrimal gland (LG) induces dry eye due to aqueous deficit reported in Sjögren's syndrome. Currently, the use of ultrasonography to evaluate the parenchyma of both glands has not been studied.

Objectives: To describe ultrasound findings in meibomian glands (MG) and lacrimal glands (LG) of patients with DED (Dry Eye Disease) due to MGD (meibomian gland dysfunction), AID (autoimmune disease) and SS (Sjögren's syndrome).

Methods: Descriptive study of 47 patients with DED diagnosis according to DEWS II criteria (11 patients with SS, 9 with AID, and 27 with MGD), who underwent Doppler ultrasound of MG and LG in both eyes (24 and 70 MHz transducer). The imaging results were analyzed by a radiologist sub-specialized in ultrasound and morphometric parameters were registered for both glands, such as: intra and inter-gland ultrasound density, vascularization characteristics and structural changes in acini and ducts.

Results: Forty-seven patients were enrolled, mean age was 49.4 ± 12.63 (range: 16 - 77), and 89% were women. In relation to MG, intra- and inter-acinus echogenicity alterations were observed in all cases. In addition, structural alterations were found in 44.7% of patients and hypervascularization was detected in 93.6%. As for LG, alterations in echogenicity, structure and hypervascularization were observed in 96%, 15% and 74.5%, respectively.

Conclusions: Ultrasound evaluation provides relevant information about structural changes of both LG and MG as result of the pathophysiologic process of DED. Adaptive changes and inflammatory effects not observable by other methods, such as meibography, can be evidenced by ultrasound techniques. Alterations in gland echogenicity and in their vascularization were the most frequently found in this group of patients. This information can contribute to the knowledge of the functional state of the glands in the course of this pathology and pave the way for more detailed ultrasound patterns and new lines of research.

P-IMA-017

Birefringence of trabecular meshwork in normal and glaucomatous eyes measured by Polarization-Sensitive OCT

K. Kikuchi¹, Y. Ueno¹, H. Mori², M. Yamanari³, T. Oshika¹

¹Ophthalmology, University of Tsukuba, Tsukuba, Japan, ²Ophthalmology, Okaido Mori Ophthalmology Clinic, Ishinomaki, Japan, ³Engineering, TOMEY Corporation, Nagoya, Japan

Introduction: Polarization-sensitive optical coherence tomography (PS-OCT) can evaluate birefringence of the tissue by measuring local polarization phase retardation. As the birefringence originates from the fibrous microscopic organization of tissues, previous studies reported that PS-OCT was useful for distinguishing the anterior chamber angle structures.

Objectives: In this study, we quantitatively analyzed the birefringence of the trabecular meshwork of normal and glaucomatous eyes using PS-OCT.

Methods: In 32 eyes of 18 normal subjects and 65 eyes of 37 patients with glaucoma, nasal and temporal angles were scanned using PS-OCT: 12×12mm square areas. The local phase retardation of the trabecular meshwork was measured by manual specification within cross-sectional images. The mean values of the five representative cross sections were statistically compared between normal and glaucomatous eyes, and examined for age-related changes.

Results: The average local phase retardation in the trabecular meshwork was 0.36 ± 0.07 deg/ μm for normal eyes and 0.44 ± 0.12 deg/ μm for glaucomatous eyes on the temporal angle, and 0.32 ± 0.08 deg/ μm for normal eyes and $0.38 \text{ deg} \pm 0.09 \text{ deg}/\mu\text{m}$ for glaucomatous eyes on the nasal side, with a significant difference between the two groups ($P < 0.05$). The local phase retardation increased with age for normal eyes and decreased for glaucomatous eyes.

Conclusions: Birefringence of trabecular meshwork was higher in the glaucomatous eyes than in the normal eyes from PS-OCT findings. Trabecular meshwork in young glaucomatous eyes showed particularly high birefringence.

P-IMA-018

Virtual reality application to simulate visual field defects in glaucoma for patient education

S. Bains^{1,2}, W. Brahim¹, G. Khurme¹, O. Huang¹, E. Sogbesan^{1,2}

¹McMaster University, Hamilton, Canada, ²St. Joseph Healthcare Hamilton, Hamilton, Canada

Introduction: Virtual reality (VR) has been introduced as an interactive tool to experience virtual 3D imaging. In ophthalmology, VR application may be used to improve empathy and educate patients on the importance of long-term medical adherence and compliance by giving them a chance to experience more severe disease stages.

Objectives: To assess the impact of visual field defects on healthy participants using Oculus Virtual Reality (VR) simulations, the usability and satisfaction of the VR system.

Methods: Humphrey visual field (HVF) imaging from glaucoma patients (controls) were imported into developed VR simulations (grocery store, kitchen setting, and driving) to demonstrate mild-advance stages of glaucoma. Healthy participants completed the simulations. Results compared the time to complete the simulation, number of collisions, number of correct and incorrect objects selected between controls vs health participants. A 5-point Likert scale was used to assess the usability of the Oculus and simulations.

Results: Healthy participants (n=44), with a mean age of 43.2 (SD 15.2) years and 61.5% were female. The Glaucoma Staging System (1) was used to classify the controls HVF: 20 participants completed stage 3 right/stage 5 left eye simulations; 14 participants completed Stage 2 both eye simulations, and 10 participants completed stage 2 right/stage 1 left eye. The results showed the controls took longer to complete the kitchen simulations by 170.63 seconds (95% CI, 135.5-205.7s), grocery simulation by 196.6 seconds (95% CL, 156.2-236.9s), and driving simulation by 31.3 seconds (95% CI, 0.35-62.3s). Controls had reduced number of collisions [-1.42 collisions (95% CI, -4.74 - 1.88)] and infarctions [-0.17 (95% CI, -1.6 - 1.27)] during the driving simulation; -0.02 collisions (95% CI, -1.06 - 1.0) grocery simulations; and -1.56 collisions (95%CI, -2.56 - -0.56) kitchen simulations. Two thirds of participants agreed that they enjoyed the experience with the simulations and do think the simulations would be helpful for educating patients with glaucoma.

Conclusions: Patients with various degree of visual field loss had longer time to complete the simulations, reduced number of collisions, infarctions, and number of incorrect objects selected when compared to healthy participants completing the same simulations with implemented visual field defects. This VR application will help educate patients, families, and medical professionals to have a better understanding of their glaucoma patient's needs and quality of life.

P-IMA-019

Prediction of best corrected visual acuity in patients with multiple retinal diseases using multi-modal medical imaging

L. Dong¹, W. Wei¹

¹Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: Best corrected visual acuity (BCVA) is a measurement of the highest level of achievable vision after receiving optimal correction. BCVA represents the severity and prognosis of retinal disease damage, and is also the most concerning issue for patients and doctors. It is determined through subjective self-report results during eye tests using charts like Snellen or Early Treatment Diabetic Retinopathy Study (ETDRS), which display letters or symbols of varying sizes. However, measurement of BCVA has certain limitations and drawbacks. In order to achieve more universally applicable prediction for BCVA, we first established a dataset including patients with multiple retinal diseases to better align with ophthalmic clinical practice. Then we try to train models to predict BCVA using multi-modal medical imaging.

Objectives: This study aims to use multi-modal medical imaging to predict the BCVA of patients with multiple retinal diseases, based on artificial intelligence (AI).

Methods: We collected macular and optic disc OCT scans, macula-centered fundus images from patients in Beijing Tongren Hospital and converted decimal visual acuity to ETDRS results. Within the single modality, we test with different backbone networks, adapting three feature fusion methods, during which also tried to simulate OCT images as a short video and use 3D ResNet50 to predict BCVA. Furthermore, it was tested by using macular OCT, optic disc OCT, and fundus image to predict BCVA and adapting three different feature fusion methods.

Results: In single modality BCVA prediction, the best results for using macular OCT were MAE of 3.851 and RMSE of 7.844, while fundus images were MAE of 3.795 and RMSE of 7.954. The results of Optical Disc OCT were poor among various intra-modality feature fusion methods; the best results were obtained with an MAE of 4.977 and an RMSE of 10.026 based on average aggregation. In multi-modal BCVA prediction with real clinical data, using macular OCT, optic disc OCT, and fundus images leads to improved prediction of BCVA. The best results were obtained using the average aggregation strategy for single-modal and multi-modal feature fusion, achieving an average MAE of 2.865, RMSE of 6.229, and R2 score of 0.935.

Conclusions: Through the multi-modal fusion analysis of macular OCT, optic disc OCT, and fundus images, we obtained the most accurate estimation of BCVA. This study emphasizes the potential of artificial intelligence in facilitating efficient and cost-effective evaluation of BCVA in clinical settings.

P-IMA-020

Ultra-wide field perfusion density as a quick and reliable biomarker for screening diabetic nephropathy

*T. Liu*¹

¹Eye Hospital of Shandong First Medical University, Jinan, China

Introduction: To find the reliable biomarker for screening diabetic nephropathy by the ultra-wide field swept-source optical coherence tomography angiography.

Objectives: g.

Methods: The study analyzed 15211 data of 169 patients (287 eyes), including not only the basic demographic data of each subject, but also basic clinical data and retinal and choroidal data by ultra-wide field swept-source optical coherence tomography angiography of each eye. Statistical analysis, ten-fold cross-validation method and random forest approach were used for data processing.

Results: There was a correlation between perfusion density and diabetic nephropathy diagnosis from physical examination population ($r=-0.562\sim-0.507$, $P<0.001$) or type 2 diabetes mellitus population ($r=-0.397\sim-0.364$, $P<0.001$). The average classification accuracy of random forest for patients with diabetic nephropathy from physical examination population was 85.8442%, while that of patients with diabetic nephropathy from type 2 diabetes mellitus population was 82.5739%.

Conclusions: There is a correlation between diabetic retinopathy and diabetic nephropathy by quantitative analysis of microvasculature. ultra-wide field perfusion density may be a remarkable and non-invasive biomarker evaluating patients with diabetic nephropathy by deep learning. swept-source optical coherence tomography angiography may be a quick and reliable device to screen diabetic nephropathy.

P-IMA-021

Quality and residents' preference of facilitated self-service fundus disease screening based on automation and AI

H. Zou^{1,2}

¹Ophthalmology, Shanghai General Hospital, Shanghai Jiaotong University, Shanghai, China,

²Shanghai Eye Hospital, Shanghai, China

Introduction: A facilitated self-service eye screening pattern has been newly established in 2022 in Shanghai, China, which may help solve the problem of insufficient human resources in primary healthcare institutions. However, residents' preference for this new pattern is unclear.

Objectives: To test whether the facilitated self-service eye screening can achieve service quality similar to traditional manual screening and more residents' preference.

Methods: We conducted a cross-sectional study in two communities. The exposure group was the facilitated self-service fundus disease screening pattern. The control group was the traditional telemedicine screening pattern. In the exposure group, the residents were screened by a full-automatic fundus camera. In the control group, the residents were screened by the traditional fundus camera operated by an optometrist. The primary outcome was the screening service quality, including effectiveness (image quality and screening efficiency), physiological discomfort, safety, convenience, and trustworthiness. The secondary outcome was the participants' preference. The service quality and the participants' preferences between the two groups were compared using Chi-square tests separately. Subgroup analysis was conducted using generalized logit models.

Results: A total of 358 residents enrolled. Among them, 176 residents (49.16%) participated in the exposure group, and the rest 182 residents (50.84%) participated in the control group. Residents' basic characteristics were balanced between the two groups. There was no significant difference between the service quality of the two groups (Image quality pass rate: $p=0.79$; the average screening time: $p=0.57$; No physiological discomfort rate: $p=0.92$; Safety rate: $p=0.78$; Convenience rate: $p=0.95$; Trustworthiness rate: $p=0.20$). However, the proportion of 'Prefer facilitated self-service eye screening' in the exposure group was significantly lower than the proportion of 'Prefer traditional manual screening' in the control group ($p<0.01$). Subgroup analysis indicated that distrust in the facilitated self-service eye screening might increase the probability of 'Refusal of screening'.

Conclusions: The association between the service quality of the screening technology and residents' preference was weak, suggesting that the algorithm aversion might exist. Although the facilitated self-service eye screening can achieve the service quality similar to traditional manual screening, residents still tend to choose the manual service.

P-IMA-022

Digital technologies in enhancing of ophthalmic education in the leading countries of the world and its Azerbaijan model

E. Alihuseynli¹, E. Kasimov², Y. Abdiyeva²

¹Assistance for Development of Modern Ophthalmology Union, Sumgait, Azerbaijan, ²Azerbaijan Society of Ophthalmologists, Baku, Azerbaijan

Introduction: In last decades, the opportunities for widespread use of the Internet and computer technologies have steadily increased the trend towards digital education in medicine, also, in ophthalmology. This includes the development of tele-learning modules, the creation of video libraries designed to develop clinical and surgical skills, the use of video training, the use of simulators and intelligent teaching systems for clinical and surgical training.

Objectives: Purpose - includes the study of current trends in online educational programs for ophthalmology, surgical simulation, telemedicine, intelligent training systems (ITS) and other systems based on artificial intelligence (AI).

Methods: A review of published articles on digital education in ophthalmology was conducted between April and May of 2022. The PubMed database was utilized to search for works in ophthalmology on web-based educational programs, surgical simulation, telemedicine, ITS and other AI-based systems.

Results: The key findings of this study are as follows: 1) web-based programs have shown to be an effective means for acquiring knowledge in ophthalmology, 2) virtual ophthalmic training curricula, web-based society meetings, and online examinations serve a role as additions to in-person activities and may replace certain activities in the future, 3) telesurgery and surgical simulators, including AI-based systems, have been developed for ophthalmologists and trainees, and 4) there is a need for trainee education in the operation of teleophthalmology programs.

Conclusions: In age of digital communications, tele-ophthalmology programs, virtual ophthalmological society meetings and online examinations have become essential to the clinical work and education of ophthalmologists, especially in light of recent global events that have prevented large gatherings. Going forward, web modules and resources, AI-based systems, and telemedicine programs will complement existing curricula for trainee ophthalmologists.

In addition to the experience of the leading countries of the world, programs and various projects implemented by the ASO and the ADMO Union help develop and spread the noted trend in Azerbaijan.

P-IMA-023

Application of corneal AI automated classification model to the treatment process of bacterial keratitis

D. Nakajima¹, Y. Ueno¹, Y. Hasegawa¹, T. Oshika¹

¹University of Tsukuba Hospital, Tsukuba, Japan

Introduction: We presented the accuracy of automatic classification of an AI model (prototype: CorneAI) trained on anterior segment color photographs at The 76th Annual Congress of Japan Clinical Ophthalmology.

Objectives: In this study, we applied CorneAI to photographs taken during the treatment of bacterial keratitis, and tested how the AI classifies the process of scarring from active lesions.

Methods: Three eyes of three patients treated as typical bacterial keratitis were included in this study. Case 1 was the left eye of a 63-year-old woman and Case 2 was the left eye of a 66-year-old man. Both eyes tested negative for culture. Case 3 was a 49-year-old woman's right eye, from which *Pseudomonas aeruginosa* was isolated by culture. CorneAI was applied to color anterior segment photographs taken during treatment, and the classification name and likelihood of AI were confirmed.

Results: Case 1 was automatically classified as infected corneal infiltrates (infection) by CorneAI up to 4 weeks after the start of treatment, and was classified as scar after 5 weeks. Similarly, Case 2 was classified as infected until 3 weeks after the start of treatment and as scarring after 4 weeks. Case 3 was classified as infected until 2 weeks after the start of treatment and as scarring after 3 weeks. The time of the transition of AI classification from infection to scar was generally consistent with the time when the patient was assessed by the treating physician as no longer having an active infection.

Conclusions: We simulated the implementation of a trained AI classification model, CorneAI, in the treatment of bacterial keratitis. It was suggested that AI could be used to objectively assess the scarring of the infection in typical cases.

P-IMA-024

Cutting-edge AI for eye imaging: Intuitive hyperspectral analysis

J. Liyau^{1,2}, Y. Liang¹, N. Yu^{1,3}, A. Popovic¹, T. Tkaczyk⁴, K. Uchida², N. Gupta^{5,6,2}, X. Zhou², Y. Yuce^{2,5,7,8,3,6}

¹Mathematics, Toronto Metropolitan University, Toronto, Canada, ²Keenan Research Centre for Biomedical Research, Li Ka Shin Knowledge Institute, St. Michael's Hospital, Unity Health Toronto, Toronto, Canada, ³Institute of Bioengineering, Science and Technology (iBEST), Unity Health Toronto, and Toronto Metropolitan University, Toronto, Canada, ⁴School of Bioengineering, Rice University, Houston, United States, ⁵Ophthalmology and Visual Sciences, Faculty of Medicine, University of British Columbia, Vancouver, Canada, ⁶Ophthalmology and Vision Sciences, Laboratory Medicine, St. Michael's Hospital, Unity Health Toronto, Temerty Faculty of Medicine, University of Toronto, Toronto, Canada, ⁷Physics, Faculty of Science, Toronto Metropolitan University, Toronto, Canada, ⁸Faculty of Engineering and Architectural Sciences, Toronto Metropolitan University, Toronto, Canada

Introduction: The eye consists of multiple layers, each with unique optical properties, including the cornea, sclera, uvea, and retina. These layers exhibit autofluorescence. By integrating fluorescence microscopy with hyperspectral imaging technology, we have been able to acquire datasets with enhanced spectral and spatial resolutions. However, the visualization and analysis of Hyperspectral Fluorescence Microscopy Imaging (HFMI) data present significant challenges. Our objective is to develop an open-source desktop application designed for the preprocessing, visualization, semantic segmentation, and boundary detection of hyperspectral images of eye tissue sections.

Objectives: This platform was developed using hyperspectral datacubes (210 X 210 X 54), captured from frozen sections of pigmented and albino mouse eyes using a hyperspectral fluorescence microscope. The aim is to devise segmentation and boundary detection algorithms for examining the distribution of biomolecules exhibiting endogenous fluorescence within specific layers of eye tissue using the desktop application.

Methods: The segmentation algorithms, including Spectral Information Divergence Spectral Angle Mapper (SIDSAM) with an optional unmixing feature, and Spatial Fuzzy C-means (FCM) clustering integrated with a Sobel edge detector, have been incorporated into the application. This app provides various tools for data preprocessing—such as normalization, denoising, and superpixel generation—alongside visualization tools. These tools enable 2D and 3D spectral-based interactive exploration, selection of regions of interest (ROI), calculation and display of average spectral curves, and the preliminary identification of eye layer signatures.

Results: The integrated tools and segmentation algorithms offer an effective approach for analyzing HFMI across different environments. This integration facilitates the unsupervised, label-free segmentation of eye layers, including the retina, choroid, and sclera, significantly diminishing the time required for experts to label these layers for subsequent quantitative analysis.

Conclusions: The described desktop application enables users to derive insights from and add significance to complex biomedical hyperspectral data. Intended for release as an open-source tool, it is adaptable for use with various tissues beyond its initial scope. Ultimately, this application is poised to expedite research efforts aimed at validating clinical imaging techniques through hyperspectral imaging.

P-IMA-025

Ultrasound Biomicroscopy utility as a diagnostic method in ocular hypotony

A. García Moreno¹, H. Wong Chavarría¹, H.J. Pérez Cano¹

¹Fundacion hospital nuestra señora de la luz, Mexico city, Mexico

Introduction: Ocular hypotony presents a long list of differential diagnoses. Depending on the cause and clinical impact, treatment seeks to correct the pathology that causes hypotension and thereby reestablish anatomical integrity.

Ultrabiomicroscopy is a very useful diagnostic tool to detect structural abnormalities in ocular hypotony, and with this to be able to support the decision of the best treatment for the patient.

Objectives: Analyze the most common causes of structural diagnostic in Ultrasound Biomicroscopy

Methods: Prospective, observational, descriptive study in patients with diagnostic of uveitis, rhegmatogenous retinal detachment and closed globe trauma that have also ocular hypotony, and whom will be asked for an Ultrasound Biomicroscopy to find the morphologic cause of the hypotony.

Results: Among 52 patients, hypotony was noted in males in 34 (67%) patients. The rate of cyclodialysis in patients with hypotony and ocular globe trauma was 40% (21 out of 52 eyes), and 9.6% (5 out of 52 eyes) in patients without ocular globe trauma, the difference was statistically significant ($P=0.003$). The rate of cyclitic membranes in patients with hypotony and uveitis was 19% (10 out of 52 eyes). The rate of ciliochoroidal detachment in patients with hypotony was 8% (4 out of 52 eyes). The rate of increase in ciliary body size in patients with hypotony was 4% (2 out of 52 eyes). The rate of loss of zonular fibers in patients with hypotony was 4% (2 out of 52 eyes). The rate of iridocrystalline diaphragm displacement in patients with hypotony was 2% (1 out of 52 eyes). The rate of iridodialysis in patients with hypotony was 4% (2 out of 52 eyes). The rate of ciliary body inflammation in patients with hypotony was 2% (1 out of 52 eyes). The rate of shortened zonule in patients with hypotony was 2% (1 out of 52 eyes). In 13% (7 out of 52 eyes), there wasn't a structural cause found in the Ultrasound Biomicroscopy.

Conclusions: Based on the results, it can be concluded that Ultrasound Biomicroscopy is the technique of choice to assess the morphological alteration of ocular hypotony, where it can guide us where to direct the management for hypotony.

When observing the main alteration of hypotony in the patients followed in this study, in 40% it was cyclodialysis, and this condition is treatable, so it will help us to have the diagnosis of Ultrasound Biomicroscopy to regulate the behavior to follow, and provide them with a better prognosis for patients and thus directly treat hypotony.

P-IMA-026

3D Digital, Heads-up visualization best tool for training and teaching cataract surgery

R. Singh¹, R. Bhaura², S. Bhaura¹, B. Bhaura¹

¹Akal Eye Hospital & Lasik Laser Centre, Jalandhar, Jalandhar, Punjab, India, ²Glaucoma, G.E.M Clinic, Winnipeg, Canada

Introduction: Intraocular visualization is as of now accomplished utilizing conventional ophthalmic surgical microscope. Three dimensional 3D Heads up display in ophthalmology is a latest intraocular visualisation method for cataract or VR surgery , which allows surgeon to visualize surgery from a 3D Monitor instead of eyepieces of the conventional ophthalmic microscope. This visualization method was first utilized in posterior segment (VR) surgery and along the years few specialists have illustrated their viability & efficiency in anterior segment surgery, mainly Cataract surgery.

Objectives: Heads-up three-dimensional (3D) visualisation system and its benefits as a wonderful tool for training and teaching phacoemulsification cataract surgery to trainees and fellows.

Methods: Three-dimensional (3D) digital visualization (NGENUITY 3D) system was used at our institution Akal Eye Hospital, Jalandhar to visualise cataract surgery from 2023 january to 2024 january. During this period close to 1400 cataract surgeries were done under this visualisation system. Oertli Faros phacoemulsification system was used to carry out phacoemulsification surgery and to teach this surgery to the trainees. 3D polarized glasses were worn by operating surgeon, assisting staff and trainee cataract surgeons inside the operation theatre. The total time length of cataract surgery by operating surgeon as well as trainees was noted. Also the incidence of complications if any was noted.

Results: The heads-up position allowed by 3D HUD visualization diminished the strain on the surgeon's cervical and lumbar spine to a great extent hence better ergonomics. 3D HUD gave the opportunity for learning cataract surgeons to visualise the same surgical field as was being viewed by the operation surgeon resulting in faster learning experience. 3D platform and its increased depth of field permitted students to see accurately and precisely how deep the instruments were being placed.

Conclusions: We observed low incidence of complications and significant decrease in complication rates in 3D HUD as compared to conventional ophthalmic microscope. In addition 3D HD visualisation in cataract surgery posed other potential benefits including improved ergonomics, educational benefits, enhanced intraocular depth perception, remarkable visualisation at low illumination.

P-IMA-027

FN-OCT: disease detection algorithm for retinal optical coherence tomography based on a fusion network

H. Wang¹, Y. Tao²

¹Beijing Chaoyang Hospital, Capital Medical University, Beijing, China, ²Department of Ophthalmology, Beijing Chaoyang Hospital, Capital Medical University, Beijing, China

Introduction:

Optical coherence tomography (OCT) is a new type of tomography that has experienced rapid development and potential in recent years. It is playing an increasingly important role in retinopathy diagnoses. At present, due to the uneven distributions of medical resources in various regions, the uneven proficiency levels of doctors in grassroots and remote areas, and the development needs of rare disease diagnosis and precision medicine, artificial intelligence technology based on deep learning can provide fast, accurate, and effective solutions for the recognition and diagnosis of retinal OCT images.

Objectives:

To prevent vision damage and blindness caused by the delayed discovery of retinopathy, a fusion network (FN)-based retinal OCT classification algorithm (FN-OCT) is proposed in this paper to improve upon the adaptability and accuracy of traditional classification algorithms.

Methods:

The InceptionV3, Inception-ResNet, and Xception deep learning algorithms are used as base classifiers, a convolutional block attention mechanism (CBAM) is added after each base classifier, and three different fusion strategies are used to merge the prediction results of the base classifiers to output the final prediction results (choroidal neovascularization (CNV), diabetic macular oedema (DME), drusen, normal).

Results: The results show that in a classification problem involving the UCSD common retinal OCT dataset (108,312 OCT images from 4,686 patients), compared with that of the InceptionV3 network model, the prediction accuracy of FN-OCT is improved by 5.3% (accuracy = 98.7%, area under the curve (AUC) = 99.1%). The predictive accuracy and AUC achieved on an external dataset for the classification of retinal OCT diseases are 92 and 94.5%, respectively, and gradient-weighted class activation mapping (Grad-CAM) is used as a visualization tool to verify the effectiveness of the proposed FNs.

Conclusions:

This finding indicates that the developed fusion algorithm can significantly improve the performance of classifiers while providing a powerful tool and theoretical support for assisting with the diagnosis of retinal OCT.

P-IMA-028

Automated classification of multiple ophthalmic diseases using ultrasound images by deep learning

Y. Wang¹, J. Ye¹

¹Ophthalmology, The Second Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China

Introduction: Ultrasound imaging is an effective tool for detecting and diagnosing various ophthalmic conditions. However, the scarcity of experienced sonographers and ophthalmologists poses a challenge.

Objectives: This study seeks to develop a Multibranch Transformer Network (MBT-Net) aimed at automating the classification of a range of ophthalmic diseases using B-mode ultrasound imagery.

Methods: This study utilized ultrasound images categorized into six clinical groups: normal, retinal detachment, vitreous hemorrhage, intraocular tumor, posterior scleral staphyloma, and other abnormalities. The MBT-Net was developed and assessed using these images, which were collected from five distinct ultrasound machines operated by different sonographers. The image dataset was divided into training, validation, internal testing, and temporal external testing sets. To gauge the model's efficacy, its performance was compared with that of two senior and two junior ophthalmologists.

Results: A total of 10,184 ultrasound images were gathered for this study. In the internal testing set, the MBT-Net achieved an accuracy of 87.80% (95% Confidence Interval [CI]: 86.26% to 89.18%), outperforming the junior ophthalmologists (95% CI: 67.37% to 79.16%; $p < 0.05$) but falling short of senior ophthalmologists (95% CI: 89.45% to 92.61%; $p < 0.05$). The micro-average area under the curve for the six-category classification was 0.98. In terms of alignment with comprehensive clinical diagnoses, the MBT-Net demonstrated almost perfect agreement ($\kappa = 0.85$, $p < 0.05$). The accuracy of the MBT-Net was consistent across all five ultrasound devices ($p = 0.27$). In the temporal external testing set, the MBT-Net achieved an accuracy of 82.21% (95% CI: 78.45% to 85.44%).

Conclusions: The MBT-Net proved to be highly accurate in screening and diagnosing multiple ophthalmic diseases using ultrasound images, demonstrating consistent performance across various operators and devices. This suggests its potential as a valuable tool in ophthalmic diagnostics, particularly in settings with limited access to experienced medical professionals.

P-IMA-030

An innovative automatic segmentation model for meibomian glands in infrared images with limited annotation

L. Li^{1,2,3,4}, L. Lin^{5,6}, Y. Xue^{1,4}, J. Lin^{5,7}, K. Xiao⁴, Z. Zhu^{2,3}

¹Department of Ophthalmology, Fujian Provincial Hospital South Branch, Fujian Provincial Hospital, Fuzhou, China, ²Centre for Eye Research Australia, Royal Victorian Eye and Ear Hospital, East Melbourne, Australia, ³Department of Surgery (Ophthalmology), The University of Melbourne, Melbourne, Australia, ⁴Department of Ophthalmology and Optometry, Fujian Medical University, Fuzhou, China, ⁵College of Computer and Data Science, Fuzhou University, Fuzhou, China, ⁶Fujian Provincial Key Laboratory of Networking Computing and Intelligent information processing, Fuzhou University, Fuzhou, China, ⁷Fujian Provincial Key Laboratory of Networking Computing and Intelligent Information Processing, Fuzhou University, Fuzhou, China

Introduction: Meibomian gland dysfunction (MGD) presents challenges in ophthalmology due to its prevalence and impact on patient well-being and vision. Precise segmentation of meibomian glands in infrared images is essential for diagnosing and managing MGD. However, manual annotation of these images is laborious, underscoring the need for automated segmentation methods. Here, we propose a novel automatic segmentation model, the Rectified Scribble-Supervised Glands Segmentation (RSSGS) model, tailored to overcome existing limitations by leveraging limited annotation. We assess the efficacy of the RSSGS model using a dataset of infrared meibomian images, aiming to enhance diagnostic accuracy and clinical outcomes for MGD patients.

Objectives: The objectives of this study are to develop an automatic segmentation model for meibomian glands in infrared images, assess its effectiveness with limited annotation, compare it with existing weakly supervised methods, evaluate potential cost reductions, and demonstrate its clinical utility in improving diagnostic efficiency for meibomian gland dysfunction.

Methods: 285 infrared meibomian images from 156 patients with dry eye disease, along with corresponding annotations, were collected for study. A rectified scribble-supervised glands segmentation (RSSGS) model including temporal ensemble prediction, uncertainty estimation, and transformation consistency constraints was proposed to address the limited supervision information resulting from the scribble annotation. The feasibility and effectiveness of the proposed model were analysed by accuracy, intersection over union and dice coefficient.

Results: The RSSGS model achieved impressive results, with an accuracy of 94.36%, dice coefficient of 79.62%, and intersection over union of 66.32%, surpassing state-of-the-art weakly supervised methods by 0.81%, 2.32%, and 2.76%, respectively. Despite an approximately 80% reduction in annotation cost, the model's performance was only marginally lower (0.68%, 1.32%, and 1.98% for the respective metrics) compared to fully annotated methods.

Conclusions: We have developed a novel automatic segmentation model for meibomian glands in infrared eyelid images, trained with scribble annotation. This model maintains exceptionally high segmentation accuracy while significantly reducing training costs. It holds promise for improving clinical parameters calculation, thereby enhancing the diagnostic efficiency of ophthalmologists in evaluating meibomian gland dysfunction.

P-IMA-031

Automated measurement of fundus tessellation and optic disc characteristics and their associations with myopia

J. Li^{1,2}, H. Xu^{1,2}, Z. Guo^{1,2}

¹Qingdao Eye Hospital of Shandong First Medical University, Qingdao, China, ²State Key Laboratory Cultivation Base, Shandong Provincial Key Laboratory of Ophthalmology, Shandong Eye Institute, Shandong First Medical University & Shandong Academy of Medical Sciences, Qingdao, China

Introduction: In our previous study, we using deep convolutional neural network (DCNN) to automate detection of myopic maculopathy from color fundus photographs, which demonstrated reliable performance with high sensitivity, specificity, and AUC to classify different myopic maculopathy levels on fundus photographs.

Objectives: This study aimed to automatically quantify fundus changes in young patients with myopia by applying deep learning (DL) algorithms to myopic fundus images and determine the prevalence of fundus tessellation (FT) and optic disc characteristics and their associations with ocular and general parameters.

Methods: We developed two DL models on 1,126 eyes (the development dataset) to segment the FT, optic disc, peripapillary atrophy (PPA), and macula at the pixel level. Using the developed DL models, seven fundus measurements were calculated for another 1,198 eyes (the evaluation dataset). The differences in fundus characteristics between high myopes and mild or moderate myopes were explored, and the correlation between the fundus measurements and ocular parameters was analyzed.

Results: On the development dataset, the DL models achieved Dice coefficients of 0.7223, 0.8123, 0.9294, and 0.7093 for FT, PPA, optic disc, and macula, and pixel accuracies of 95.28%, 99.69%, 99.80%, and 99.69%, respectively. On the the evaluation dataset, calculated fundus measurements showed significant differences between the high myopia and mild or moderate myopia groups ($p < 0.001$). In the correlation analysis, spherical equivalent and axial length were found to be significantly associated with all fundus measurements ($p < 0.001$), while K1, K2, crystal thickness, and foveal thickness were related to part of the fundus measurements at a significance level of 0.01.

Conclusions: FT and optic disc characteristics can be automatically quantified in young patients with myopia using DL algorithms. The tessellated density showed an increasing trend, with myopia severity approaching from mild or moderate to high. A similar trend was observed for optic disc characteristics.

P-IMA-032

Methodology quality of deep learning studies predicting systemic diseases through fundus images: a systematic review

Y. Li¹, W. Wei¹

¹Medical Artificial Intelligence Research and Verification Key Laboratory of the Ministry of Industry and Information Technology, Beijing Tongren Hospital, Beijing, China

Introduction: Analyzing fundus images with deep learning techniques is promising for screening systematic diseases. However, the quality of the rapidly increasing number of studies was variable and lacked systematic evaluation.

Objectives: To systematically review all the articles that aimed to predict systemic parameters and conditions using fundus image and deep learning, assessing their performance, and providing suggestions that would enable translation into clinical practice.

Methods: We included studies that aimed to use fundus images for predicting systematic diseases. We extracted the data in the following four aspects: study characteristics, transparent reporting, risk of bias, and clinical availability. The **reporting transparency aspect** was evaluated based on the TRIPOD (transparent reporting of a multivariable prediction model for individual prognosis or diagnosis) statement, published by BMJ in 2015. We used a modified TRIPOD list of 29 total points. The **risk of bias** was assessed based on PROBAST (prediction model risk of bias assessment tool), we used a modified version that recorded items except for applicability and predictor variables due to its inapplicability in deep learning studies. We assessed each model's **clinical availability** levels and categorized them into 4 groups, according to whether it is prospective validated and applied in clinical.

Results: 4969 articles were identified through systematic research. **Thirty-one** articles were included in the review. A variety of vascular and non-vascular diseases can be predicted by fundus images, including diabetes and related diseases (19%), sex (22%), and age (19%). Most of the studies focused on developed countries. The models' reporting was insufficient in **determining sample size and missing data treatment** according to the TRIPOD. **Full access to datasets and code** was also under-reported. 1/31(3.2%) studies were classified as having a low risk of bias overall, whereas 30/31(96.8%) were classified as having a high risk of bias according to the PROBAST. 5/31(16.1%) of studies used **prospective external validation cohorts**. Only two (6.4%) described the study's **calibration**. The number of publications by year increased significantly from 2018 to 2023. However, only two models (6.5%) were **applied to the device**, and no model has been applied in clinical.

Conclusions: Deep learning fundus images have shown great potential in predicting systematic conditions in clinical situations. Further work needs to be done to improve the methodology and clinical application.

P-IMA-033

Axial length and refractive error prediction using fundus parameters of normal eyes in the Kumejima population study

*T. Yamashita*¹, *R. Asaoka*², *A. Iwase*³, *H. Sakai*⁴, *H. Terasaki*¹, *T. Sakamoto*¹, *M. Araie*⁵

¹Ophthalmology, Kagoshima University Hospital, Kagoshima, Japan, ²Ophthalmology, Seirei Hamamatsu General Hospital, Shizuoka, Japan, ³Ophthalmology, Tajimi Iwase Eye Clinic, Gifu, Japan, ⁴Ophthalmology, Urasoe Sakai Eye Clinic, Okinawa, Japan, ⁵Ophthalmology, Kanto Central Hospital, Tokyo, Japan

Introduction: Artificial intelligence can predict the axial length (AL) and refractive error (RE) of an individual using color fundus photographs (CFPs). This study aimed to investigate the accuracy of AL and RE prediction in the Kumejima study using regression analysis of fundus parameters and to clarify AL or RE-related changes in the fundus.

Objectives: We used nonmydriatic CFPs obtained from the Kumejima population study, including 1,646 right eyes of healthy participants with reliable fundus parameter measurements.

Methods: The tessellation fundus index was calculated as $R/(R + G + B)$ using the mean value of the red-green-blue intensity in eight locations around the optic disc and foveal region. The optic disc ovality ratio, papillomacular angle, and retinal vessel angle were quantified as previously described. Least absolute shrinkage and selection operator regression with leave-one-out cross-validation was used to predict AL and RE. The relationship between the actual and predicted axial AL and RE were investigated using Spearman's correlation coefficient.

Results: The mean AL and RE of include participants (834 males and 812 females) were 23.50 ± 0.88 mm and -0.14 ± 1.62 diopter. The mean predicted AL and RE based on fundus parameters was 23.50 ± 0.48 mm and -0.14 ± 1.62 diopter, with a mean absolute error of 0.59 mm and 0.91 diopter, and the correlation coefficient between actual and predicted AL and RE were 0.51 and 0.63 ($p < 0.001$). Eyes with longer axial length had narrower temporal vessel angles, weaker green intensities and stronger blue intensities and tessellation in fundus color ($p < 0.001$).

Conclusions: AL and RE could be predicted using the CFP parameters, and the main AL or RE-related change in the fundus was vessel angles and peripapillary color intensity. The AL or RE-related changes in the fundus may aid the understanding of the mechanism of fundus diseases such as glaucoma.

P-IMA-034

Feasibility of AI phone call for post-operative cataract surgery assessment in a diverse Canadian population

A. Hatamnejad¹, S. Somani², E. Tam², A. Higham³, E. Lim³, S. Khavandi³, N.d. Pennington³, H.H. Chiu²

¹Medicine, McMaster University, Hamilton, Canada, ²Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, Canada, ³Ufonia Limited, Oxford, United Kingdom

Introduction: Cataract surgery involves post-operative monitoring for complications and to evaluate success. Artificial Intelligence, notably Dora, has shown promise in the UK for post-surgery management, addressing the need for innovative healthcare approaches.

Objectives: Dora, a UK AI system, assesses postoperative condition after cataract surgery. This study evaluates Dora's safety, acceptability, and efficacy at postoperative week 1 (POW1) in Canada.

Methods: Native and non-native English-speaking patients from a surgical center (July-October 2023) were recruited. Dora called pre-POW1 visit, identifying clinical issues. Dora's outcomes were compared with clinician assessments and Net Promoter Scores (NPS) were collected.

Results: Of 198 patients, 124 completed calls. Dora passed 69% patients. At POW1, 9% reported minor symptoms like dry eye, without any management changes. Patients gave Dora a mean NPS of 8/10. Patients reported that Dora calls saved travel time to clinics (mean 3.34 on 1 (strongly disagree) - 5 (strongly agree) scale). 49% of patients and 52% people accompanying them took half or full day off for POW1 appointments.

Conclusions: Dora safely identifies patient's post-cataract surgery who would necessitate an in-person visit at POW1, potentially reducing unnecessary appointments. This increases clinical capacity and offers convenience, saving patients travel time and time off from work.

P-IMA-035

Alzheimer's disease and depression: a comprehensive OCT imaging study of their simultaneous effects

T. MohammadReza¹, Z. Zia¹, M.H. Nowroozadeh¹, V. Ostovan²

¹Ophthalmology, Shiraz University of Medical Sciences, Shiraz, Iran, Islamic Republic of, ²Neurology, Shiraz University of Medical Sciences, Shiraz, Iran, Islamic Republic of

Introduction: Alzheimer's disease and depression commonly afflict the elderly and may manifest with visual symptoms.

Objectives: This study concurrently investigates the impact of these two conditions on the optic nerve head (pRNFL) and macula using OCT imaging.

Methods: A cross-sectional study included two groups: individuals with mild to moderate Alzheimer's disease (n=50) and a healthy control group (n=50). Participants underwent PHQ-9 and MMS tests, comprehensive ophthalmic examinations, and were included if they lacked severe visual issues. Heidelberg OCT imaging of pRNFL and all macular layers was performed. Data were analyzed using SPSS 26.

Results: A significant decrease in pRNFL thickness in all quadrants was observed in Alzheimer's patients compared to healthy controls, notably in superior and inferior quadrants (p-value <0.05). Statistically significant differences were also noted in macular inner layer thickness and volume (mRNFL, GCL, and IPL). When comparing depression severity with macular layer thickness, only the ganglion cell layer showed significant differences. Additionally, pRNFL thickness correlated with depression severity in Alzheimer's patients but not in healthy individuals.

Conclusions: Alzheimer's and depression in the elderly simultaneously impact distinct retinal regions, suggesting simultaneous degenerative changes in the brain and retina. Addressing depression may mitigate these effects.

P-IMA-036

Influence of corneal white-to-white (WTW) in tomographical interpretation: A novel discovery

H. Matalia¹, J. Matalia², M. Francis³, A. John¹, N. Chinnappaiah¹, R. Shetty^{1,4}, A. Sinha Roy³

¹Corneal & Refractive Surgery, Narayana Nethralaya, Bangalore, India, ²Pediatric Ophthalmology & Strabismus,, Narayana Nethralaya, Bangalore, India, ³Imaging, Biomechanics and Mathematical Modelling Solutions, Narayana Nethralaya Foundation, Bangalore, India, ⁴University Eye Clinic Maastricht, Maastricht University Medical Center (MUMC+), Maastricht, Netherlands

Introduction: Vertical, horizontal, maximum and minimum white-to-white and their meridians were defined on Pentacam using a novel densitometry based automated technique to accurately predict the corneal astigmatism and tomographic indices.

Objectives: To define the external scleral sulcus (ESS) on a Scheimpflug image and use it for a morphometric analysis of corneal white-to-white (WtW). To study the relationship between corneal WtW and corneal tomography.

Methods: One eye (randomly selected) of 353 pediatric Indian subjects between age of 5 to 18 years underwent corneal tomography using Pentacam HR (OCULUS Optikgeräte GmbH). A novel technique using densitometry on Pentacam HR was used to measure WtW. Multiple regression models with WtW and other Pentacam parameters were built. The agreement of prediction was validated using the intraclass correlation coefficient (ICC). Estimated horizontal WtW (hWtW) was validated against digital caliper measurement using ICC. P-value less than 0.05 was considered as significant. Vertical, hWtW, maximum (maxWtW) and minimum (minWtW) WtW and their meridians were defined. Their associations with Pentacam parameters were analyzed to predict keratometry (K), astigmatism and its axis, and Belin/Ambrósio enhanced ectasia display deviation (BAD-D).

Results: The ICC (95% CI) between caliper and hWtW was 0.96 [0.93, 0.97]. Multiple regression prediction of astigmatism, astigmatism axis, Kmean, and BAD-D using WtW parameters, anterior chamber depth, corneal volume, and distance from the corneal thinnest location to apex were significant ($p < 0.001$). These predictions achieved an ICC of 0.34 [0.18, 0.46], 0.82 [0.78, 0.86], 0.87 [0.84, 0.89] and 0.81 [0.76, 0.84], respectively. The astigmatism axis prediction depended on the meridian of minWtW and maxWtW. Its within-subject standard deviation (4.97°) was less than the angle between two consecutive Pentacam scans (7.2°).

Conclusions: The WtW metrics strongly correlated with the astigmatism axis, keratometry and BAD-D. Spatial description of WtW may have an important role in corneal treatment planning and disease diagnoses.

P-IMA-038

Segmentation of retinal nerve fiber layer with a deep learning algorithm in glaucoma

R. Arian¹, R. Kafieh², R. Sadeghi³, M. Aghsaei Fard³, M. Safizade³

¹Isfahan University, Isfahan, Iran, Islamic Republic of, ²Durham University, Durham, United Kingdom,

³Farabi Eye Hospital, Tehran, Iran, Islamic Republic of

Introduction: Accurate assessment of the retinal nerve fiber layer (RNFL) in peripapillary OCT B-scans is crucial for diagnosing glaucoma. However, artifacts such as vessel shadows often hinder precise segmentation, limiting reliable measurements.

Objectives: This study proposes an innovative algorithm for RNFL segmentation, utilizing a modified U-net architecture capable of handling scans from both normal and glaucomatous eyes simultaneously.

Methods: The algorithm introduces a novel approach for vessel identification, employing the radon transform and Singular Value Decomposition (SVD). Vessel-free images are obtained by inpainting eliminated areas.

Results: Quantitative evaluations compare the algorithm's outcomes, automatic segmentations (without vessel removal), and Heidelberg software segmentations with manually corrected ground truths. The dataset comprises 179 scans from 43 glaucoma patients and 469 scans from 103 individuals with normal eyes, divided into test and train datasets via 5-fold cross-validation. The proposed algorithm achieves a mean absolute error of $4.5 \pm 0.31 \mu\text{m}$ prior to vessel removal, improving to $4.0 \pm 0.25 \mu\text{m}$ post-removal. In contrast, Heidelberg software segmentations result in a mean absolute error of $15.15 \mu\text{m}$.

Conclusions: Our approach offers a reliable tool for segmenting RNFL in circular OCT B-scans of both healthy and glaucomatous eyes, enhancing diagnostic accuracy for glaucoma.

V-IMA- 001

Visualization in scarred corneas during phaco-emulsification surgery using chandelier lighting system

R.S. Bhaura^{1,2}, S. Bhaura¹, R. Singh¹, B.S. Bhaura¹

¹Ophthalmology, Akal Eye Hospital, Jalandhar, India, ²Glaucoma, G.E.M. Clinic, Winnipeg, Canada

Introduction: Visualization of the anterior segment structures can be quite a challenge in a scarred cornea. We devised a novel adaptation of a well known vitreo-retinal viewing system to enhance our surgical view, thereby enabling better view and safer outcomes in these challenging anterior segment surgeries.

Objectives: To achieve a better visualization of ophthalmic structures especially in special situations like scarred corneas, thereby enabling a safer and better surgical outcome.

Methods: 23-Gauge Endo illuminator probe was used through the pars- plana route to achieve a better view of the anterior segment structures in a patient undergoing Phaco-emulsification with PCIOL implantation. The Conventional co axial microscope light was switched off as it was scattering the light and making the view of all structures posterior to the cornea difficult. The anterior lens capsule was stained using trypan blue dye for a better control of continuous curvilinear capsularhexis. The operating microscope used was a Carl Zeiss Lumera I microscope . An experienced surgeon was using a high end dual pump Phaco-emulsification machine with good fluidics and torsional phaco-emulsification capabilities.

Results: A much superior visualization of ophthalmic structures was achieved using the light reflected back from the retina via an endo-illuminator probe. This minimized the scattering of light from the corneal scars thereby enabling a much safer and predictable outcome in such challenging cases.

Conclusions: This method of using endo -illuminator probe lighting has been designed and used extensively for Vitreo-retinal surgeries. However, in patients with scarred corneas where usual co-axial microscope light gets scattered, this a useful tool to tackle such cases with good outcomes.

Video

[Click here to play video](#)

Cataract and Refractive Surgery

FT-CAT-001

Impact of intraoperative OCT for predicting the vault and adjustment ICL during implantation

H. Yan¹, X. Du^{1,2}, J. Zhang³, H. Zhou³, L. Qu¹

¹Shaanxi Eye Hospital, Xi'an People's Hospital (Xi'an Fourth Hospital), Affiliated People's Hospital of Northwest University, Xi'an, China, ²Xi'an Medical University, Xi'an, China, ³Department of Ophthalmology, Shaanxi Provincial People's Hospital, Xi'an, China

Introduction: Predicting the vault and ideal implantable Collamer lens (ICL) size remains technically challenging. Despite the growing use of artificial intelligence (AI) in this field, rare AI studies have provided available choices of intraoperative OCT and combinations for further vault predictions, and adjustment ICL position during surgery.

Objectives: This study aimed to fill this gap and to achieve the optimal post-operative vault. We have developed artificial intelligence (AI) models that utilize intraoperative OCT (iOCT) to predict the ICL vault, and then be employed to guide the adjustment of ICL intraoperatively.

Methods: The iOCT was utilized to measure the vault during the surgery. The anterior segment OCT to measure the vault at specific time points postoperation (1 day, 1 week, and 1 month). Based on these measurements, AI models were developed to predict the postoperative vault. Then utilizing to the cases where the vault exceeded the ideal range, it was adjusted intraoperatively by rotating the ICL based on the AI model from iOCT analysis.

Results: In this prospective study, a total of 179 eyes from 108 patients who underwent ICL implantation surgery were included. The neural network model ($R^2=0.90$), linear regression model ($R^2=0.88$), and random forest model ($R^2=0.87$) all demonstrated strong correlations between predicted and achieved vault. The neural network model performed the best, with a mean absolute error of $35.62\mu\text{m}$ in the predicted values. Moreover, a higher percentage of eyes (90.0%) achieved the intended vault within $\pm 200\mu\text{m}$ compared to the conventional nomogram (78.8%) and KS formula (62.0%). Ten eyes where the intraoperative high vault was detected, ICL repositioning guided by iOCT. The mean vault reduction achieved through vertical or oblique adjustment was $335.2\mu\text{m}$.

Conclusions: Based on our knowledge, this maybe the first report of utilizing iOCT to measure the vault and adjustment in real-time. Predicting the postoperative vault and guiding ICL rotation have been proven to be an effective approach for achieving the desired vault range.

FT-CAT-002

Rejuvenation of dynamic range of focus using laser scleral microporation in presbyopes: 24-month pilot study outcome

M. Collazos¹, A. Hipsley², B. Ang³, M. Jackson⁴

¹ophthalmology, Ace Vision Group, Boston, United States, ²ophthalmology, Ace Vision Group Inc, Boston, United States, ³ophthalmology, Asian Eye Institute, Makati City, Philippines, ⁴ophthalmology, Jackson Eye, Chicago, United States

Introduction: A new therapeutic laser treatment aimed at uncrosslinking rigid sclera was evaluated in an IRB registered Pilot Study. Results after 2 years are presented.

Objectives: To evaluate the Dynamic Range of Focus (DRoF) following bilateral Laser Scleral Microporation (LSM) in emmetropic presbyopic subjects.

Methods: LSM was performed bilaterally using a 2.94 μ m Er:YAG laser in four oblique quadrants of the rigid sclera of presbyopic patients overlying five critical zones of anatomic significance to improve the DRoF of 100 eyes of 50 patients. Patients were over 45 years of age with demonstrated loss of visual acuity and function for near, far, and distance. Visual outcomes were assessed using the Early Diabetic Retinopathy Study (EDTRS) LogMar charts for uncorrected and distance corrected visual acuity at 40cm, 60cm and 2m. Reading addition was measured using manifest refraction, and visual function and satisfaction was assessed using the standardized Near Activity Vision Questionnaire (NAVQ).

Results: 50 patients (71% female and 29% male) of average age 52.6 (SD 4.0) underwent bilateral LSM. LSM provided improved monocular DCIVA, DCNVA from 0.16 \pm 0.15 and 0.49 \pm 0.14 preoperatively to 0.12 \pm 0.14 and 0.29 \pm 0.13 at 24 months respectively postoperatively (sig for DCNVA; P<0.001). Binocular intermediate and near visual acuity (DCIVA, DCNVA) improved from 0.12 \pm 0.15 and 0.45 \pm 0.1 respectively to 0.10 \pm 0.14 and 0.29 \pm 0.14 (sig for DCNVA; P<0.001) at 24 months postoperatively with no reduction in distance vision. Add power decreased from +2.0D to +1.32D at 24 months. Rasch Scores dropped significantly from 65.0 at baseline to 36 (p < 0.05) at 24 months after LSM. MRSE was not significantly different 24 months postoperatively (P=0.37). Refractive power required to read letters at the LogMar 0.00 level at 40 cm dropped from 2.0 \pm 0.21 D at baseline to 1.3 \pm 0.49D (P<0.001) at 24 months postoperatively. No vision threatening complications occurred.

Conclusions: Early results suggest LSM is a safe and effective procedure for restoring the DRoF for all ranges of vision in presbyopes. LSM improves vision function sustainably over twenty-four months including reducing reading add and improved satisfaction with near and intermediate visual activities without touching the visual axis or comprising distance visual quality. Data collection is ongoing.

FT-CAT-003

Comparison of haze in photorefractive keratectomy with ablation depth of less than 70 micron with and without mitomycin

S. Kavousnezhad¹, N. Nassiri², K. Sheibani³

¹Vanak Eye Surgery Center, Tehran, Iran, Islamic Republic of, ²Ophthalmology, Imam Hossein Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, Islamic Republic of, ³Basir Eye Health Research Center, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of

Introduction: It has been suggested that the prophylactic use of MMC during PRK should only be considered when the ablation depth is higher than 50-75 μm and correction exceeds 4.0 to 6.0 diopters. But to our knowledge, only one previous study has been performed to evaluate the effect of prophylactic MMC on haze and its toxic effects among patients with low ablation depth.

Objectives: To evaluate the efficacy and safety of mitomycin C (MMC) application during photorefractive keratectomy (PRK) in patients with low myopia and an ablation depth of less than 70 microns.

Methods: This prospective, randomized, double-masked, placebo-controlled clinical trial included patients with low myopia (less than three diopters) and a corneal ablation depth of less than 70 microns, who were candidates for PRK in both eyes. In each patient, one eye was randomly treated with intraoperative topical MMC 0.02% for 20 to 30 seconds, while the contralateral eye received a placebo. The main outcome measures were corneal haze, as assessed by confocal microscopy at six months postoperatively, and mean endothelial cell density.

Results: Seventy eyes from thirty-five patients were evaluated. There was no statistically significant difference between the case and control groups in terms of mean preoperative age, sex, best corrected visual acuity, uncorrected visual acuity, sphere, cylinder, spherical equivalent, intraocular pressure, or endothelial cell count. The mean corneal haze, based on confocal microscopy readings at six months postoperatively, was significantly lower in the group receiving MMC ($p = 0.003$). The mean endothelial cell density at six months postoperatively was significantly lower in the MMC group compared to the control group ($p = 0.006$).

Conclusions: The application of MMC 0.02% reduces haze formation in eyes with low myopia undergoing PRK with an ablation depth of less than 70 microns, compared to placebo, up to six months postoperatively. However, it is associated with a significant reduction in endothelial cell count.

FT-CAT-004

Relationship between corneal biomechanics and epithelial remodeling after refractive surgery in high myopia

K. Long¹, J. Zhang¹, T. Shao¹, H. Li¹, H. Wang¹, Y. Peng¹

¹Corneal Refractive Surgery, Eye Institute of Shandong First Medical University, Qingdao Eye Hospital of Shandong First Medical University, Qingdao, China

Introduction: At present, the effect and safety of corneal refractive surgery have made remarkable progress, but there are still some complications perplexing patients. Refractive regression is a common postoperative complication, which not only affects the predictability and effectiveness of the operation, but also threatens the long-term stability of the operation. A large number of clinical data have confirmed that excessive remodeling and thickening of corneal epithelium is the main cause of postoperative refractive regression. At present, the reason of corneal epithelial remodeling is not clear, corneal biomechanics may be one of the important reasons.

Objectives: To investigate influence of corneal biomechanics on the corneal epithelial distribution characteristics after transepithelial photorefractive keratectomy (TPRK), femtosecond laser-assisted laser in situ keratomileusis (FS-LASIK), and small incision lenticule extraction (SMILE), especially in high myopia.

Methods: This prospective study included 90 healthy individuals (90 eyes) who underwent myopic refractive surgery. All eyes were highly myopic (spherical equivalent refraction < -6.00 diopters). Epithelial thickness map were measured by spectral-domain optical coherence tomography (SD-OCT) and corneal biomechanics is measured by Corvis-ST before the pre-operation, 1 month, 3 months, and 6 months and 1 year postoperatively. The correlation between the distribution of corneal epithelium and corneal biomechanics was analyzed.

Results: We found that the corneal epithelium thickened to varying degrees in different regions after the three refractive surgeries, especially in the central and paracentral regions. This phenomenon was most significant after FS-LASIK, while the TPRK group fluctuated the most during the follow-up period. According to the distribution characteristics of corneal epithelium, the remodeling of corneal epithelium was divided into "half moon" and "convex lens". We found that the distribution of corneal epithelium of "convex lens" was related to the changes of corneal biomechanics.

Conclusions: Different surgical methods have different effects on corneal biomechanics, so the trend of epithelial remodeling after surgery is different. Corneal epithelial remodeling was stable 6 months after surgery. The changes of corneal biomechanics after surgery affect the distribution of corneal epithelium and thus affect the change of refractive status, which may be an important reason for refractive regression.

FT-CAT-005

Nominal and real stromal ablation depth after myopic TPRK: implications for residual stromal thickness calculation

Y. Feng¹, A. Stojanovic^{2,1}

¹The Arctic University of Norway, Tromsø, Norway, ²Eye Department, University Hospital of North Norway, Tromsø, Norway

Introduction: Understanding the relationship between achieved and nominal central stromal ablation is vital in myopic surgery. The nominal depth, assumed to represent stromal ablation depth, is crucial for calculating residual stromal thickness (RST). Discrepancies between these measures are particularly concerning in low preoperative corneal thickness, impacting surgical safety. Excessive ablation raises the risk of iatrogenic corneal ectasia development, emphasizing the importance of accurate ablation depth assessment.

Objectives: To compare the nominal central ablation depth with the reduction in central corneal stromal thickness after StreamLight transepithelial photorefractive keratectomy (tPRK) for myopia with WaveLight® laser by Alcon Laboratories, TX, USA.

Methods: This ambispective study encompassed a retrospective analysis of 40 eyes who underwent treatment for myopia and astigmatism, followed by a prospective examination conducted 6-9 months postoperatively. Pre- and postoperative Avanti spectral domain optical coherence tomography (SD-OCT) from Optovue Inc., CA, USA, provided stromal- and epithelial thickness maps (ETM). The difference between preoperative and postoperative central stromal thicknesses at the corneal vertex was used to calculate the achieved stromal thickness reduction. This value was then compared with the corresponding central nominal depth on the laser ablation planning map.

Results: A total of 40 eyes (OD/OS:18/22) of 40 patients (31.4 ± 9.2 years) were available for evaluation. The mean treated spherical equivalent was -3.00 ± 1.51 D. The mean nominal and achieved central stromal ablation depths were $51.22 \mu\text{m}$ and $59.67 \mu\text{m}$, respectively, showing a mean excessive reduction of 16.5%. The mean pre- and postoperative central epithelial thicknesses were $53.74 \mu\text{m}$ and $59.31 \mu\text{m}$, respectively, showing a mean postoperative thickness increase of 10.5%. This increase in the epithelial thickness reduced the mean postoperative pachymetry ($59.67 \mu\text{m} - 5.56 \mu\text{m} = 54.11 \mu\text{m}$), only 2.3% higher than the mean nominal ablation depth.

Conclusions: The study revealed a central stromal removal 16.5% larger than the nominal ablation depth. This excessive stromal removal was largely compensated for by the increase in epithelial thickness, resulting in a mean difference between the nominal ablation depth and the achieved central corneal pachymetry reduction of only 2.3%. The significant excessive central stromal removal must be considered when calculating the residual stromal thickness.

FT-CAT-006

Changes of binocular corneal innervation and ocular surface function after unilateral SMILE and tPRK

L. Hu¹, Q. Gong¹, K. Huang¹, F. Lu¹

¹Eye Hospital of Wenzhou Medical University, Wenzhou, China

Introduction: Laser vision correction surgery is widely used in clinical practice. Previously, the sensory nerves in the cornea were considered to be transmitted mainly through the unilateral eye pathway. However, multiple studies have reported that unilateral ocular lesions can also damage the contralateral eye. And, bilateral changes in corneal nerves and ocular surface after unilateral refractive surgery in humans have not yet been reported. Considering that laser vision correction surgery results in varying degrees of corneal nerve transection, our study investigated the effects of unilateral laser vision correction on bilateral corneal nerve morphology and function, ocular surface function, and tear neuromediators.

Objectives: To evaluate the bilateral changes in the sub-basal nerve plexus of the cornea and ocular surface function after unilateral small incision lenticule extraction (SMILE) and transepithelial photorefractive keratectomy (tPRK) procedures.

Methods: Thirty-four patients were enrolled in the study and underwent unilateral SMILE (21/34 patients) or unilateral tPRK (13/34 patients). Complete ophthalmic examinations, tear film function tests, and Cochet-Bonnet esthesiometry were conducted to assess the effects of the surgeries on the corneal nerves and tear function. Morphological changes were assessed using in vivo confocal microscopy to evaluate the corneal sub-basal nerve plexus and dendritic cells. Enzyme-linked immunosorbent assay was used to measure the tear neuromediators. Clinical and morphological data at each follow-up point were compared with preoperative baseline values.

Results: All patients who underwent unilateral SMILE or tPRK procedures exhibited bilateral corneal nerve degenerative changes, decreased corneal sensitivity, worsening of dry eye symptoms, and changes in bilateral tear neuromediators. In the SMILE group, bilateral corneal sensitivity was positively correlated with corneal nerve fiber length and negatively correlated with dendritic cell area. The dry eye severity was negatively correlated with corneal sensitivity. Tear levels of substance P and nerve growth factor were positively correlated with mean dendritic cell area and dry eye severity, but negatively correlated with corneal sensitivity. In the tPRK group, bilateral corneal sensitivity was positively correlated with corneal nerve fiber density.

Conclusions: Unilateral refractive surgery may bilaterally affect the morphology and function of corneal nerves and ocular surface status postoperatively.

FT-CAT-007

Comparing the Clinical Outcome of Transepithelial and Conventional Photorefractive Keratectomy in Correction of Myopia

K. Sheibani¹, N. Nassiri², S. Kavousnezhad³

¹Basir Eye Health Research Center, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of, ²Ophthalmology, Imam Hossein Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, Islamic Republic of, ³Vanak Eye Surgery Center, Tehran, Iran, Islamic Republic of

Introduction: Some previous studies have compared conventional photorefractive keratectomy (PRK) and transepithelial photorefractive keratectomy (tPRK) postoperative results including haze, visual and refractive outcomes. The association between surgical method and patients' reported outcomes like postoperative pain and discomfort has been reported by fewer studies with sometimes contradictory results.

Objectives: To compare the clinical outcomes of one-step tPRK with those of conventional PRK.

Methods: In this prospective randomized case-control study, consecutive patients with moderate myopia were randomly assigned to undergo either one-step tPRK or conventional PRK. Both procedures were performed using the Schwind Amaris excimer laser system. Outcome measures included patients' uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), sphere, cylinder, spherical equivalent (SE), intraocular pressure, haze, pain, and discomfort at one and three months post-surgery.

Results: One hundred and twenty eyes from 60 consecutive patients were evaluated from May to December 2020. The mean UCVA, BCVA, and SE did not show statistically significant differences at one and three months postoperatively. The mean haze among patients undergoing tPRK was significantly lower than that in the PRK group one month postoperatively ($p < 0.001$), but no difference was observed at three months postoperatively. Patients undergoing tPRK experienced less pain ($p = 0.027$) and discomfort ($p < 0.001$) one day postoperatively. No difference was noted between the two groups regarding postoperative intraocular pressure.

Conclusions: Our study results suggest that the tPRK method is associated with less early postoperative pain and discomfort on day one and less corneal haze at one month postoperatively, compared to the conventional PRK method. No differences were found between the two methods regarding postoperative intraocular pressure, UCVA, BCVA, or SE.

FT-CAT-008

A clinical trial on safety and efficacy of a progressive polyfocal IOL - a no negative dysphotopsia IOL

A.K. Morya¹, J.M Kakadia², R.C Shah³

¹Ophthalmology, All India Institute of Medical Sciences, Hyderabad, India, ²Ophthalmology, Aksardeep Eye Hospital, Bhavnagar, India, ³Ophthalmology, Private Hospital, Mumbai, India

Introduction: A Prospective Phase-IV Clinical Trial on a Novel Polyfocal Progressive IOL-Autofocus Pro PCIOL.

Objectives: To aim for improvement in Distance, Intermediate, Near vision.Improvement in Depth of focus- average reading speed and contrast sensitivity and to observe for no negative dysphotopsia, haloes, glare and no difficulty during night driving.

Methods: Prospective study, single surgeon phaco in Cataract patients with Clear Cornea and Healthy Retina & Astigmatism <1.25 D.88 eyes of 44 patients.Paired t-tests & Wilcoxon signed-rank test to compare pre- and postoperative values,. The software version SPSS22 was used for calculations.

Results: 64 eyes had uncorrected distance,intermediate&near vision improved to logMAR0.0,I-6&N-6.18 eyes improved to 0.2,I-6&N-6.06 improved to 0.30,I-6&N-6.Significant p-value of <0.001 for improvement in 3 types of vision,contrast sensitivity,depth of focus avg+1.5to-3D,no negative dysphotopsia,halo,glare.

Conclusions: Autofocus is a novel progressive polyfocal IOL that corrects distance,intermediate&near vision&no negative dysphotopsia.

FT-CAT-009

The relationships between lens diameter and ocular biometric parameters: an ultrasound biomicroscopy-based study

Z. Huang¹, J. Qi¹, K. Cheng¹, S. Liu¹, K. Zhang¹, Y. Du¹, Y. Lu¹, X. Zhu¹, C. Chen¹

¹Department of Ophthalmology, Eye and Ear, Nose, and Throat Hospital of Fudan University, Shanghai, China

Introduction: Cataract has always been one of the most common causes of vision loss worldwide. With advances in surgical technology and application of various functional IOLs, cataract surgery has entered the era of refractive surgery. The postoperative stability of the IOL position is the critical fundament of achieving optimal visual outcomes, but the difficulty in measuring lens diameter (LD) directly, as an indicator for the size of the capsular bag, presents challenges for surgeons in choosing a corresponding compatible IOL. Thus, investigation of the relationships of LD with measurable ocular biometric parameters might provide useful information for cataract surgeons to predict LD and further select compatible IOLs.

Objectives: This study aims to explore the relationships between lens diameter (LD) measured with ultrasound biomicroscopy (UBM) and ocular biometric parameters, thereby guiding surgeons to choose a compatible IOL and achieve better visual outcomes.

Methods: Ocular biometric parameters including axial length (AL), white-to-white distance (WTW), anterior chamber depth (ACD), lens thickness (LT) and anterior segment length (ASL) were measured with IOL-Master 700. A newly developed UBM (Insight 100) was introduced to perform direct delineation and measurement of LD through generating two best fitting arcs to delineate the equator of the lens. Relationships between LD and ocular biometric parameters were then investigated with univariate analysis and multiple linear regressions. Eyes with AL \geq 28 mm were defined as eyes with extreme myopia, and eyes with AL < 28 mm were defined as eyes without extreme myopia.

Results: The mean LD of 194 eyes included was 9.58 ± 0.49 mm, ranging from 8.60 to 10.96 mm. According to univariate analysis, larger LD was associated with elder age, male gender, larger WTW, ACD and ASL (all $P < 0.05$). It is noteworthy that LD was positively correlated with AL in eyes without extreme myopia ($P < 0.05$), but not in eyes with extreme myopia ($P > 0.05$). Multiple linear regressions revealed that a larger LD was associated with larger WTW, ASL and AL in eyes without extreme myopia (all $P < 0.05$), while ASL was the only significant predictor in eyes with extreme myopia ($P < 0.05$).

Conclusions: With the novel UBM introduced, our study demonstrated that a larger LD was associated with elder age, male gender, larger WTW, ACD and ASL, while the correlation between AL and LD was not linear. Conventional parameters including AL, WTW and ASL in eyes without extreme myopia, as well as ASL in eyes with extreme myopia, would help to better predict LD, hopefully to aid in personalized surgical decision-making and to promise ideal visual outcomes.

FT-CAT-010

Association between composite dietary antioxidant index and cataract in American adults aged ≥ 50 years

X. Xia¹, Q. Zhang¹, S. Xiong¹

¹Eye Center of Xiangya Hospital, Central South University, Changsha, China

Introduction: Oxidative stress is one of the main causes of acquired cataract. Excessive reactive oxidative species (ROS) can lead to lipid peroxidation, resulting in the change of cell membrane permeability, the internal composition and configuration of cells, and loss of protein function³. To this end, dietary intake of antioxidants is a promising way to scavenge free radicals and prevent or slow cataract progression. Natural antioxidant therapy for cataract has been widely reported, including vitamin C, vitamin E, beta-carotene, and lutein.

Objectives: Oxidative stress is one of the crucial pathogenesis of cataract. The composite dietary antioxidant index (CDAI) represents the antioxidant capacity of one's diet. The aim of this study was to explore the association between CDAI and cataract.

Methods: The data was from the National Health and Nutrition Examination Survey (NHANES) 2003–2008. A weighted multiple logistic regression, generalized weighted models, and smoothed fitted curves were performed to investigate the association between CDAI and cataract.

Results: A total of 5,814 participants aged ≥ 50 years with complete data were included in the study. In the fully adjusted model, the ORs (95% CI) for the association between CDAI and cataract were 0.95 (0.93, 0.98). After dividing continuous CDAI into tertiles, consistent negative associations between CDAI and cataract were observed in the highest tertile compared to the lowest (OR = 0.77; 95% CI, 0.62-0.95). The CDAI components (zinc, magnesium, selenium, vitamin A and vitamin E) also negatively associated with cataract odds in the fully adjusted model. Subgroup analysis showed inconsistent association among subgroups, but no statistically significant interaction effects were found.

Conclusions: This cross-sectional study revealed that higher CDAI was associated with lower odds of cataract. These findings may contribute to cataract prevention through antioxidant dietary patterns.

FT-CAT-011

In-situ 3D bioprinting of individualized, biomechanical-biomimetic and anti-biofouling PEGDA-HAMA-based A-IOL

S. Jia¹, L. Zhang¹

¹Ophthalmology, Zhejiang University, Hangzhou, China

Introduction: Cataract is the most prevalent blindness but is treatable via replacing hardened cataractous lens with artificial intraocular lens (IOL). Yet, loss of adjustable accommodative ability and risks of postoperative complications have been besetting patients' vision.

Objectives: To develop synthetically cross-linked poly(ethylene glycol) diacrylate (PEGDA)-hyaluronic acid methacryloyl (HAMA) (PEH) bioink for application as accommodating intraocular lens (A-IOL) via *in-situ* three-dimensional (3D) bioprinting.

Methods: Mechanical characterization, *ex-vivo* testing, *in-vitro* evaluation, and *in-vivo* assessment were conducted.

Results: Herein, synthetically cross-linked poly(ethylene glycol) diacrylate (PEGDA)-hyaluronic acid methacryloyl (HAMA) (PEH) bioink is developed for application as accommodating IOL (A-IOL) via *in-situ* three-dimensional (3D) bioprinting. Our *in-situ* lens bioprinting owns advantages of case-by-case refractive customization and all-in-one postoperative risk solution. The bioprinted PEH-A-IOL displays highly water-retaining and meets the targeted optical and biomechanical properties of a natural crystalline lens. *Ex-vivo* assessment illustrated the feasibility of capsular PEH-A-IOL bioprinting via micro-capsularhexis without any structural disruption of the zonular-capsular complex, thereby theoretically preserving the accommodative capability after surgery. *In-vitro* evaluation indicated PEH-A-IOL's absence of cytotoxicity in co-culture system, whereas suppressed cell adhesion, proliferation, and migration but promoted apoptosis when being directly seeded on top, all in accord with its anti-biofouling and bioinert characteristics. *In-vivo* study using rabbit lensectomy models demonstrated PEH-A-IOL's biosafety and biofunction, neither remarkable postoperative inflammation nor opacification during observation periods. Our results revealed that the globe and vital organs were not affected for the original 3-month study, so was the accommodation system of the eye as evidenced by pupillary light reflex. Additionally, apoptosis instead of fibrosis were induced in residual epithelial cells on lens capsule by bioprinting PEH-A-IOL.

Conclusions: Overall, the bioprinted PEH-A-IOL has great potential as *in-situ* generated A-IOL in treating cataract, enabling accommodation, and limiting surgery-related complications.

FT-CAT-012

Comparison of optical biometers with swept source technology: IOL Master 700 vs Revo FC 130

A. Ortiz¹, J. Ortiz², E. García¹, J. de Vera¹, E. Vazquez¹, V. Romero², M. Carillo²

¹Anterior Segment, Centro de Especialidades Oftalmológicas Aljaorza, Machala, Ecuador, ²Optometry, Centro de Especialidades Oftalmológicas Aljaorza, Machala, Ecuador

Introduction: Optical biometers since its advent have been position as the gold standard to determine the power of intraocular lenses. Optical biometry with these devices as less operator dependent and more reproducible, so several optical biometers have been developed and are no available. IOL Master 700 uses partial coherence interferometry and has revolutionized the field due to its superior repeatability and reproducibility and has become the gold standard for calculating intraocular lenses. Revo FC 130 is a new optical biometer based on spectral-domain optical coherence tomography and also obtains high-definition scans.

Objectives: This study aims to evaluate the reliability and accuracy of two optical biometers, the IOL Master 700 and Revo FC 130 in cataract-diagnosed patients.

Methods: Prospective observational case-control study performed at Centro de Especialidades Oftalmológicas Aljaorza in which optical biometry was conducted in 504 eyes of 279 patients during a single session. Statistical analyses were performed using Statistical Package for the Social Sciences software (SPSS 22.0). A p value <0.05 was deemed statistically significant. Parametric and nonparametric statistics were applied. Measurements of axial length, keratometry, anterior chamber depth, white-to-white distance, and lens thickness were compared between the two devices.

Results: Statistically significant differences were observed, but several were clinically irrelevant. The Revo tended to underestimate axial length by -0.06 mm, with a statistically significant overestimation of mean keratometry by 0.73 diopters. In anterior chamber depth, an insignificant difference of 0.00 mm was noted. White-to-white distance measurements showed a statistically significant 0.66 mm overestimation by the Revo, while lens thickness measurements exhibited a 0.7 mm overestimation compared to the IOLMaster 700.

Conclusions: Positive correlations were found in biometric measurements of axial length and anterior chamber depth between the Revo FC 130 and IOLMaster 700, but not in keratometry. Although statistical differences existed, many were clinically inconsequential, except for keratometry, showing significant variability up to 0.7 diopters. This variability in lens thickness and white-to-white distance could impact the effective lens position when applying fourth-generation formulas. Overall, the IOLMaster 700 demonstrated good repeatability compared to other biometers.

FT-CAT-013

Setting surgically induced astigmatism as 0 diopters – a simple but effective calculated method in toric IOLS

F. Song¹, Y. Dai¹

¹Eye Institute of Shandong First Medical University, Qingdao Eye Hospital of Shandong First Medical University, Qingdao, China

Introduction: Currently, the most common toric IOLS calculated method is to enter the experiential SIA or the surgeon's actual SIA value. But SIA was highly variability for most young surgeons and even for experienced surgeons. In addition, it had 3 to 5 degree rotation between the calculated and actual IOL axial. For these reasons, the uncertainty of the calculation is increased. In this study, we improved the calculated method by setting SIA as 0 diopters (D), which is equivalent to first using toric IOLS to correct all corneal astigmatism, then performed cataract surgery in the low astigmatism eye.

Objectives: To investigate the clinical effect of input the SIA as 0 D of toric IOLS.

Methods: Seventy cataract patients with regular corneal astigmatism of more than 1.0 D who underwent phacoemulsification combined with implantation of a Tecnis Toric IOLS were enrolled and divided into two groups. In the group A, SIA was set as 0.5 D, incision position and alignment axis were set according to the IOL Calculator. In the group B, SIA was set as 0 D, incision was in the surgeon's accustomed position and alignment axis was same to steep-axis of corneal astigmatism. Main outcome measurements including visual acuity, visual quality (evaluated by HOA, Coma, Spherical and Trefoil), expected residual astigmatism (PRA), residual astigmatism and toric IOLS alignment axis were detected at 3 months postoperatively. SIA and error of refractive astigmatism (ERA) were analyzed by vector analysis.

Results: Measurements of postoperative uncorrected and corrected distance visual acuity (UDVA and CDVA), toric IOL rotation(°), vector analysis of SIA showed no differences between the two groups ($P > 0.05$). The differences between the toric IOLS direction and the cornea steep axis was higher in the group A ($P < 0.05$), and was correlated with HOA, Coma analyzed using Pearson correlation analysis. The ERA of the group B (0.15 ± 0.32 D) was significantly smaller than the group A (0.58 ± 0.48 D) ($P < 0.001$). Vector analysis of total error vector (EV) was smaller in the group B (0.30 ± 0.24 D) than the the group B (0.60 ± 0.46 D) ($P = 0.001$). The group B showed lower postoperative cylinder (0.49 ± 0.23 D) than the group A (0.71 ± 0.49 D), although had no significant differences ($P = 0.055$).

Conclusions: The improved input method of SIA set as 0 D showed better predictability of corneal astigmatism correction and better visual quality. And it was a simple, effective toric IOLS calculated method, especially for inexperienced doctor who had an unstable SIA.

FT-CAT-014

Effects of different solutions on anterior chamber inflammation after phacoemulsification in diabetes

X. Li¹

¹Tianjin Medical University Eye Hospital, Tianjin, China

Introduction:

Cataract is considered one of the major blinding diseases worldwide. As the external environment that directly contacts the anterior chamber (AC) tissues during surgery, the intraocular irrigating solution affects the severity of postoperative inflammation. In this study, AS-OCT was conducted to determine whether there was a significant difference in AC inflammation between the 2 solutions in patients with cataracts and diabetes mellitus (DM).

In addition to clinical studies, a series of in vitro experiments was conducted to explore the mechanism underlying the protective effect of fBSS. The transendothelial electrical resistance and zonula occludens-1 content were measured to observe the effects of the 2 perfusions on the BAB. Monocytic leukemia cell line transmigration assay was performed to observe the effects of the 2 perfusates on the inflammatory response in vitro.

Objectives:

To compare the effects of fortified balanced salt solution (fBSS) and Ringer's lactate solution (Ringer) on anterior chamber (AC) inflammation in patients undergoing phacoemulsification.

Methods:

80 patients (40 patients with regular cataract and 40 cataract patients with diabetes mellitus [DM]) were randomized to receive either fBSS (n = 40) or Ringer's solution (n = 40). Anterior segment optical coherence tomography was used to evaluate AC cells and flare. Transepithelial electrical resistance (TEER) and zonula occludens-1 (ZO-1) immunofluorescence were used for tight junction examination. Monocytic leukemia cell line transmigration assay was performed to observe the effects of the 2 perfusates on the inflammatory response in vitro.

Results:

In patients with regular cataracts, postoperative AC cells and flare on the 1st and 7th days were not significantly different between the Ringer and fBSS groups. However, in cataract patients with DM, AC cells were higher in the Ringer group than in the fBSS group (P = .003) on postoperative day 1. The AC flare was also significantly higher in the Ringer group than in the fBSS group (P < .0001). No significant differences between the groups were observed on day 7. Compared with Ringer, fBSS increased the TEER value and ZO-1 content and reduced the adhesion of THP-1 cells.

Conclusions:

The results of this study indicated that early post-operative AC inflammation is more severe in patients with cataracts and DM. In addition, fBSS attenuates inflammation by protecting the blood-aqueous barrier and inhibiting the exudation of inflammatory cells.

FT-CAT-015

Outcomes and complications of various techniques of secondary intraocular lens

B.K. Singh¹, S. Kumar¹, V.K. Singh¹, S. Bhalerao²

¹Ophthalmology, Regional Institute of Ophthalmology, Prayagraj, India, ²Shantilal Shanghvi Cornea Institute, L V Prasad Eye Institute, Vijayawada, India

Introduction: Rehabilitation of aphakia following successful cataract extraction is difficult. Regarding the drawbacks of aphakic correction, intraocular lens (IOL) implantation with vitrectomy has attracted a lot of attention in recent years and is universally preferred over aphakic spectacles or contact lenses as a method for visual rehabilitation in aphakic eyes.

Objectives: The purpose of this study was to compare and evaluate the visual outcome and complications of various techniques of secondary intraocular lens (IOL) (i.e., suture-fixated posterior chamber IOL [PCIOL], anterior chamber IOL [ACIOL], and glue-fixated PCIOL). Wearing aphakic spectacles is the safest approach but the least physiologic method of optical correction and can only be pursued for a short time before patient acceptance and feasibility become issues. Use of this method is reasonable in the young amblyopic child who is undergoing extensive patching and is monocular most of the time. Fixation of IOLs in cases of insufficient or no capsular support is challenging and requires a large armamentarium of techniques to resolve different situations.

Methods: This was a randomized, prospective, interventional, comparative, clinical trial study. Patients of either sex having aphakia and lacking posterior capsular support were included in the study, and patients having corneal or scleral pathology, optic atrophy, uncontrolled glaucoma, retinal detachment, and other retinal pathology were excluded from the study. The patients were divided into three groups after comprehensive ophthalmological examination – Group A (secondary ACIOL) included 44 patients, Group B (secondary scleral-fixated sutured PCIOL) included 32 patients, and Group C (fibrin glue-fixated sutured PCIOL) included 34 patients.

Results: A total of 110 patients were included in this study, of which 59 (53.63%) were males and 51 (46.37%) were females. The best-corrected visual acuity (VA) after 6 weeks was in the range of 20/60–20/40 in 36.4% of Group A and 40.6% of Group B patients. In Group C, 52.9% of patients had best-corrected VA in the range of 20/30–20/20. The overall complications were less in glued PCIOL group.

Conclusions: It can be concluded that fibrin glue-assisted PCIOL implantation provides better visual outcome with minimal complications in eyes with deficient capsular support.

FT-CAT-016

Complete lens regeneration in situ using hESCs-derived cells - similar to natural lens

X. Chen¹, H. Wang¹, H. Chen¹, L. Ren¹, W. Wang¹, J. Xu¹, C. Luo¹, P. Hu¹, Q. Fu¹, K. Yao¹

¹Eye Center of the Second Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China

Introduction: Currently, the only method of treating cataracts is surgical removal of opaque lenses combined with implantation of an intraocular lens (IOL). However, IOLs have many disadvantages. Lenses with biological functions like natural one have been proposed as new treatment. Previous studies have reported limited regenerated tissues from lens epithelial cells are opaque and far away to natural lenses. Our research team successfully induced iPSCs into lentoid body (LB) in vitro, but LB are still vastly different from natural lens and transplantation in vivo after LB regeneration in vitro is difficult to realize. Therefore, in vivo in situ regeneration of lenses is still the ultimate goal of solving the stated problem.

Objectives: Based on experience on LB, directional differentiated cells were transplanted in lens capsule to get in vivo in situ regeneration of lenses with biological function.

Methods: We used human embryonic stem cells (hESCs) for directional differentiation into lens fate cells (LFCs) in vitro, mixed these cells with hyaluronate(HA), then used an original micro-capsulotomy method to implant LFCs-HA compound into lens capsule. In the next two years, we used slit lamp, Pentacam, UBM to observe the lens regeneration process in vivo. Rabbits were euthanized at 3, 6, 8, 12, 15, and 20 weeks after surgery to obtain the regenerated lens, and used histological analysis, Western blot, immunofluorescence and immunohistochemistry, RNA sequencing analysis, tumorigenicity to confirm the regeneration resources, safety, relating pathway.

Results: We used exogenous hESCs-derived LFCs to implant into lens capsule, successfully achieving lens regeneration, and the thickness of the regenerated lens reached 85%-88% of the contralateral eye, making it the most transparent, thickest, and most similar to the original natural lens. The regenerated lens expressed mature lens markers. WB and RNA sequencing verified that part of the regenerated lens was derived from implanted cells.

Conclusions: The regenerated lens created in this study is the only successful complete regenerated lens with biological function in vivo in the world, the thickness reached 85% of the contralateral eye. The completely regenerated lens is very similar to the natural lens in all aspects. The regeneration process represents not only a new attempt in the field of cataract, but also a very unique discovery in ophthalmology. This research transcends previous limits in the field of cataract treatment, provides a new therapeutic strategy.

FT-CAT-017

Comparison of femtosecond laser-assisted cataract surgery and conventional phacoemulsification on corneal impact

H. Wang¹, K. Yao¹

¹Eye Institute of Zhejiang University, Hangzhou, China

Introduction: This meta-analysis aimed to compare corneal impact and function after FLACS and CPS so as to provide a reference for clinical application.

Objectives: This meta-analysis aims to compare corneal injuries and function after femtosecond laser-assisted cataract surgery (FLACS) and conventional phacoemulsification surgery (CPS).

Methods: A comprehensive literature search of PubMed, EMBASE, and the Cochrane Controlled Trials Register was conducted to identify randomized controlled trials (RCT) and high-quality prospective comparative cohort studies comparing FLACS with CPS. Endothelial cell loss percentage (ECL%), central corneal thickness (CCT), endothelial cell density (ECD), endothelial cell loss (ECL), percentage of hexagonal cell (6A), and coefficient of variance (CoV) were used as an indicator of corneal injury and function.

Results: Totally 42 trials (23 RCTs and 19 prospective cohort studies), including 3916 eyes, underwent FLACS, and a total of 3736 eyes underwent CPS. ECL% is significantly lower in the FLACS group at 1-3 days ($P=0.005$), 1 week ($P=0.004$), 1 month ($P<0.0001$), 3 months ($P=0.001$), and 6 months ($P=0.004$) after surgery compared to CPS. ECD and ECL appeared no statistically significant difference between the two groups, except for the significant reduction of ECD at 3 months in the CPS group ($P=0.002$). CCT was significantly lower in the FLACS group at 1 week ($P=0.05$) and 1 month ($P=0.002$) early postoperatively. While at 1-3 days ($P=0.50$), 3 months ($P=0.18$), and 6 months ($P=0.11$), there was no difference between the FLACS group and CPS group. No significant difference was found in the percentage of hexagonal cells and the coefficient of variance.

Conclusions: FLACS, compared with CPS, has a better protective effect on the cornea. Corneal edema recovered faster in the FLACS group in the early postoperative period. In addition, FLACS may be a better option for patients with corneal dysfunction.

FT-CAT-019

Cyclorotation during cataract surgery measured using Verion image-guided system

I. Kaczmarek¹, J. Dereń-Szumelda¹, G. Rotuski¹, R. Różycki¹

¹Department of Ophthalmology, Military Institute of Aviation Medicine, Warsaw, Poland

Introduction:

Ocular cyclorotation is an important factor to be considered for accurate placement of incisions and good alignment of the toric intraocular lens (IOL).

Objectives: To assess posture-induced cyclorotation in eyes having cataract phacoemulsification with IOL implantation using Verion image-guided system.

Methods: The study included 31 patients (31 eyes) with cataract scheduled for conventional cataract phacoemulsification with IOL implantation in December 2023. Patients who had keratopathy, pterygium, corneal ectasias, strabismus, crystalline lens subluxation, a history of eye trauma or previous surgery in the operative eye were excluded from the study. The data including age, sex, surgical eye, and axial length were obtained preoperatively.

Using Verion image-guided system (Alcon, Fort Worth, TX, USA), a preoperative scan of the operative eye was performed in the sitting position. Subsequently, during cataract surgery, cyclotorsion was measured in supine position before giving incisions, before capsulorhexis, before IOL implantation and after wound hydration. Preoperative measurements taken with the patient seated were used as the reference point for the amount of cyclorotation in supine position which was reported on the screen as either clockwise (CW) or counter clockwise (CCW) rotation.

Results: The study enrolled 20 women and 11 men (16 right eyes and 15 left eyes). The mean age of the patients was 71.35 ± 8.48 (range, 49-90; median, 71) years. The mean axial length was 23.59 ± 1.59 (range, 20.44-29.22; median, 23.37) mm. The mean cyclotorsion induced by change in posture from sitting to supine position was $2.13 \pm 4.83^\circ$ (range, 0-11; median, 2). The amount of cyclorotation was most commonly between 1 degree and 5 degrees. Overall, clockwise (CW) rotation (67.74%) was more common than counter clockwise (CCW) rotation (32.26%). It was noted that the degree of cyclorotation did not change significant at various stages of cataract surgery. Overall, incyclotorsion was seen in 17 eyes (54.84%), and excyclotorsion was seen in 13 eyes (41.94%). There was 1 eye that did not show cyclorotation (3.22%). There was no significant correlation between axial length, and cyclotorsion of the eye ball.

Conclusions: Ocular cyclorotation can occur in supine position during conventional cataract phacoemulsification with IOL implantation, and the Verion image-guided system is useful in accounting for cyclorotation during this procedure. The degree of cyclorotation is stable at various stages of cataract surgery.

FT-CAT-020

Precision pulse capsulotomy to perform capsulorhexis with automated method with easier control and superior outcomes

M. Piovella¹, B. Kusa¹

¹Global Center for Ophthalmology srl, Monza, Italy

Introduction: Zepto provides efficient and controlled anterior capsulotomy with medium small pupils and in white cataract where femtolaser could not be effective

Objectives: Radial tears in the manual capsulorhexis increase the rate of surgical complications. Zepto precision pulse capsulotomy (PPC) technology (Centricity Vision-Fremont, California) is compared with manual continuous curvilinear capsulorhexis (CCC) outcomes by the reproducibility, uniformity, circularity, diameter size and complications rate. Also with FLACS

Methods: A novel mechanical capsulotomy method and technology called PPC and tradenamed Zepto was adopted on 526 consecutive eyes with cataract. Incision size 2,4mm. Suction time 10 seconds. Minimum Anterior chamber depth 2mm. Callisto system adoption to better center the cup

Results: Preoperatively the ACD was 2.77 ± 0.43 . ECC preop was 2378 ± 443 and 6 months postop $2268,20 \pm 241$ with a 4.61 % lost cells. We experienced 30 anterior radial tears (5.7%) during the learning curve and later in difficult cases

Conclusions: The Zepto PPC technology creates a precise circular anterior capsulotomy. This technique allows cataract surgeons to reduce the rate of capsulorhexis and cataract surgery complications

FT-CAT-021

Machine learning algorithms to detect subclinical keratoconus: a multicenter research

Y. Jiang¹, H. Jiang¹, Y. Li¹, Y. Chen¹

¹Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, BEIJING, China

Introduction: Early detection of KC is challenging. In the earliest stages, subclinical keratoconus (SKC) does not show classical keratometric or biomicroscopic features. However, misdiagnosis of SKC leads to an increased risk of iatrogenic ectasia after refractive surgery, which is the most severe and irreversible complication after corneal refractive surgery. Therefore, better diagnostic screening methods are needed in the clinic.

Objectives: To improve the detection of subclinical keratoconus (SKC) using machine learning algorithms in real-life scenarios at multiple centers.

Methods: Patient data from three clinics were evaluated. Artificial intelligence (AI) models were generated using Pentacam® HR (Oculus, Wetzlar, Germany) to discriminate the data of the three groups: normal eyes (NEs, 444 eyes), keratoconus (KC; 551 eyes), and SKC (101 eyes).

Results: The accuracy of the efficientnet-b0 model between the eyes of patients with KC and NEs in all three clinics (99% accuracy, area under the receiver operating characteristic (ROC) curve AUC of 1.00, 99% sensitivity, 99% specificity) was higher than that for Belin-Ambrósio enhanced ectasia display total deviation (BAD-D) (86% accuracy, AUC of 0.97, 97% sensitivity, 69% specificity). The accuracy of the efficientnet-b0 model between eyes with SKC and NEs in all three clinics (98% accuracy, AUC of 0.96, 98% sensitivity, 98% specificity) was higher than that of BAD-D (69% accuracy, AUC of 0.73, 67% sensitivity, 69% specificity).

Conclusions: Machine learning algorithms can enhance the diagnosis of KC (particularly SKC), thereby helping refractive surgeons detect potential cases of ectasia.

FT-CAT-022

Observation on the effect of intraoperative fissure examination and positioning on reducing abnormal vault in ICL

Y. Xue¹, Y. Guo¹

¹Northwest University Affiliated Xi'an Ancient City Aier Ophthalmology Hospital, Xi'an, China

Introduction: It's still a challenging problem in ICL implantation for the reason that calculate the appropriate lens size and predict appropriate vault value.

Objectives: To observe the effect of using the comprehensive analysis method of the anterior segment of the eye to reduce abnormal vault in ICL(implantable collamer lens surgery) by intraoperative crack detection and positioning.

Methods: 433 patients (840 eyes) with Toric lenses and 244 patients (482 eyes) with non toric lenses surgery at Xi'an Ancient City Aier Ophthalmology Hospital during May 1, 2021 to April 11, 2023 were included.Using a comprehensive analysis method of the anterior segment to calculate ICL size. After non astigmatic ICL surgery, immediately use the slit lamp attached to the surgical microscope to check the vault, adjust the axial position according to the patient's ACD to make the vault suitable,make the anterior chamber depth ≥ 2.1 mm; Record the angle of axis adjustment and the vault before and after adjustment, and measure the vault under a slit lamp microscope the next day after surgery in all cases.

Results: Non astigmatic ICL 482 eyes had an average vault of 1.19 ± 0.66 CT on the day of surgery and 1.09 ± 0.31 CT on the next day. The average vault decreased by 0.1 CT on the next day. Only 2 eyes had low vault the next day, while the rest had normal vault (1-1.5 CT). There were 96 eyes with middle note position adjustment, which accounted for 19.9% of non astigmatic ICL, indicating that 1/5 cases could obtain more ideal vault after middle note position adjustment. In addition, 81 eyes (84%) had a rotation degree within 45 degrees. Out of 358 eyes with astigmatism, 52 eyes had abnormal vault the next day after surgery, accounting for 14.5%. Among them, 9 eyes with low vault and 43 eyes with high vault. Only 2 eyes with high vault underwent repositioning and replacement due to the postoperative ACD being less than 2.0mm, while the remaining 41 eyes had a postoperative ACD of ≥ 2.1 mm. Long term follow-up observation is needed. In this study, out of 840 eyes, there were 11 eyes with low vault, 2 eyes with high vault undergoing surgical intervention, and 13 eyes with abnormal vault, accounting for only 1.5%.

Conclusions: The difficulty of ICL surgery is to achieve ideal vault after surgery.Our study for the first time during surgery using the slit lamp equipped with a surgical microscope was used to check the vault for positioning, which is simple to operate and cost-effective, and can be widely promoted in clinical practice.

FT-CAT-023

5042 calculation app: optimized Angle Kappa positioning technology for rotationally asymmetric multifocal lens

X. Zhang¹, W. Xu², H. Qi¹

¹Medical Department, Dongguan Huaxia Eye Hospital, Dongguan City, China, ²Ophthalmology Department, Third Affiliated Hospital of Jinzhou Medical University, jinzhou city, China

Introduction: Rotationally Asymmetric Multifocal IOL has two separated sectoral segments for distant and near focus. Because of its radial asymmetric design, a significant pupil shift can cause an imbalance of the **Distant Segment** and **Near Segment Exposure Ratio(DS/NS)** within the pupil area, affecting visual quality. Pazo et al. have reported: **Optimized Visual Outcome After Asymmetrical Multifocal IOL Rotation**, We have similar experiences. Angle Kappa can represent the shift of the pupil centre. So, we invented the **5042 Calculation APP** which can customize the implantation angle of RAMIOLs based on Kappa data, in order to get the optimal exposure ratio of **DS/NS** within pupil. We invented the IMAGE V2 APP to measure DS/NS prospectively, and to analyse its relationship with visual quality.

Objectives: To study the **Angle Kappa Optimized Positioning Technique** for Rotationally Asymmetric MIOLs guided by the **5042 APP**.

Methods: A prospective study was conducted, collecting data from 53 eyes of 42 cataract patients who implanted the Rotationally Asymmetric MIOLs. Utilized the **5042 APP** to pre-calculate the rotational position of the IOL based on angle kappa, and guided the implantation. Three months postoperatively, **IMAGE V2** was used to measure the **DS/NS** within pupil, to assess the centration of the IOLs. The Uncorrected Distance and Near Visual Acuity were tested. The absolute value of the difference between them(**|UDVA-UNVA|**) in the same eye were calculated to analyze its relationship with the **DS/NS**. Satisfaction and spectacle independence were evaluated through questionnaires.

Results: At three months postoperatively, the mean UDVA and UNVA were 0.14 ± 0.16 and 0.09 ± 0.23 logMAR, showing significant improvement ($P < 0.05$). The mean of **|UDVA-UNVA|** was 0.89 ± 0.67 lines, 86.8% (46 eyes) achieved relative balanced vision which have **|UDVA-UNVA| ≤ 1 line**.

The mean **DS/NS** was 0.787 ± 0.123 (target value = 1). 26.4% (14 eyes) have the same UDVA and UNVA, with the $DS/NS = 0.860 \pm 0.064$, which is higher than the average. 13.2% (7 eyes) exhibited unbalanced vision which have **|UDVA-UNVA| ≥ 2 line**, with the $DS/NS = 0.659 \pm 0.093$, lower than the average. The rate of spectacle independence was 92.5%. Postoperative satisfactions were high.

Conclusions: The centration of the rotationally asymmetric mIOL within pupil is related to visual quality. Optimized Angle Kappa Positioning Technology with 5042 APP can help center the RAMIOL within the pupil, achieving better balance of distance and near vision, avoiding serious complications caused by pupil shift.

P-CAT-001

Bromfenac-eluting intraocular lens for preventing posterior capsular opacification

H. Han¹, X. Zhang¹, K. Yao¹

¹Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Cataract is the leading cause of visual impairment, and posterior capsular opacification (PCO) is the most common long-term complication of modern cataract surgery, which can cause severe visual impairment after surgery. The proliferation, migration, and epithelial-mesenchymal transition (EMT) of residual lens epithelial cells (LECs) stimulated by growth factors and cytokines, are the key pathological mechanisms involved developing PCO.

Objectives: This study demonstrated that non-steroidal anti-inflammatory drug (NSAID), bromfenac, was capable of effectively inhibiting cell migration, overexpression of EMT markers, such as fibronectin (FN), matrix metalloproteinase 2 (MMP2), α -smooth muscle actin (α -SMA), and transcription factor Snail, and extracellular signal-regulated kinase (ERK)/glycogen synthase kinase-3 β (GSK-3 β) signaling induced by transforming growth factor- β 2 (TGF- β 2).

Methods: We designed and prepared a novel drug-eluting IOL based on ultrasonic spray technology using PLGA that has been used as drug carriers in ophthalmic implantation (Ozurdex®) to achieve sustained intraocular release of bromfenac. The PLGA with bromfenac was precisely sprayed onto the plate haptics of IOL, ensuring the smoothness and transparency of the IOL's optics, which was beneficial for clinical translation. The PCO prevention effect of the novel drug-eluting IOL with sustained drug release property was investigated in a rabbit PCO model.

Results: The inhibitory effect of bromfenac on TGF- β 2-induced EMT was also verified on a primary lens epithelial cell model using human anterior capsules. In the rabbit models of cataract surgery, bromfenac-eluting IOL exhibited remarkable PCO prevention and inflammation suppression effects with excellent biocompatibility.

Conclusions: In conclusion, bromfenac can inhibit TGF- β 2-induced cell migration and the EMT of LECs via ERK/GSK-3 β /Snail signaling. The present study offers a novel approach for preventing PCO through PLGA-based drug sustained-release IOLs.

P-CAT-002

A Novel surgical technique for intrascleral fixation of flanged three-piece foldable IOL through a Hoffman pocket

H. Ye¹, M. Wu¹, P. Zhao¹

¹Xinhua Hospital affiliated to Shanghai Jiaotong University School of Medicine, Shanghai, China

Introduction: Scleral fixation of posterior chamber intraocular lens (PCIOLs) is a popular technique for secondary IOL implantation in the absence of capsular support, which allows placement of IOL in the physiologic anatomical position and theoretically decreases the complications compared with anterior chamber IOL, iris sutured IOL, and iris-claw lenses. Although sutureless scleral fixation techniques can overcome the risk of suture-related complications, the stability of the IOL is still of great concern and the long-term outcome is not evaluated satisfactorily. Up to now, scleral suture fixation of PCIOLs provides better long-term durability and offers relatively easier management of potential surgical complications.

Traditionally applied scleral-sutured IOL, such as CZ70BD (Alcon, Fort Worth, TX), is made of polymethyl methacrylate (PMMA), which requires a large incision. The IOLs of this kind are gradually less used over recent years because of the risk of intraoperative damages and postoperative complications. Though it is reported that foldable IOLs are applicable for suture fixation in several studies, they were mostly designed with closed-loop haptics. The options of foldable IOLs are still limited for scleral fixation. In our previous study, a modified technique for scleral suture fixation of a three-piece PCIOL was proposed. While it is a general trend to develop novel fixation techniques for more flexible usage of various designs of IOLs.

Objectives: To present a new technique for intrascleral fixation of flanged three-piece foldable intraocular lens (IOL) without conjunctival incision.

Methods: A retrospective chart review of a consecutive series of 12 eyes of 12 patients who underwent scleral IOL fixation using this technique was performed. The range of follow-up time was between 3 to 12 months.

Results: Best-corrected visual acuity improved from 1.10 ± 0.78 logMAR preoperatively to 0.61 ± 0.52 logMAR at the last follow-up point postoperatively ($P=0.012$). Complications included pupillary IOL capture and increased intraocular pressure ($n=1$).

Conclusions: Our novel technique is a viable option for management of secondary IOL fixation with flexible usage of more designs of IOLs, and also simplifies the reposition procedures of dislocated three-piece IOL, which could reduce complications and hasten patient's recovery.

P-CAT-003

Efficacy of scleral fixated intraocular lens implantation with knotless Z-suture technique

*M. Qi*¹

¹Ocular Trauma Department, Beijing Tongren Eye Center, Beijing Key Laboratory of Ophthalmology & Visual Sciences, Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: Eighty-eight eyes of 78 Moderate to severe inadequate capsule/zonular support patients, who were cases with over 180° zonular weakness or residual capsule inadequate to support intraocular lens ciliary groove implantation, were included from July 2017 to January 2021 in Ocular Trauma Department of Beijing Tongren Hospital.

Objectives: To observe the efficacy of the scleral fixated intraocular lens implantation with knotless Z-suture technique for moderate to severe inadequate capsule/zonular support.

Methods: All patients underwent surgeries including the standard procedure of scleral fixated intraocular lens implantation with knotless Z-suture technique. The median follow-up duration was 19 months (range 12~50, quartile 15~25.5 months). Preoperative and postoperative visual acuity, complications, intraocular lens position were observed. The distribution of uncorrected visual acuity, best corrected visual acuity (logarithm of the minimal angle of resolution, LogMAR), complications, and intraocular lens position.

Results: The uncorrected visual acuity was hand motions~0.4 at baseline. It improved to 0.04~1.0 at 6th month follow-up including 80 eyes (90.9%) \geq 0.3. The BCVA (LogMAR) improved significantly from 0.79 ± 0.36 at baseline to 0.20 ± 0.15 at last follow-up ($t=-9.783$, $P<0.001$). No suture-related complications (0.0%) such as wound leakage at the sutures, sclera thinning, sclera melting, chronic inflammation around the suture, suture erosion, suture exposure, and endophthalmitis was observed in any cases. The Z-sutures were invisible in all cases under the slit lamp microscopy. Complications requiring invasive treatment were retinal detachment in 1 eye (1.1%) and intraocular lens pupillary capture in 1 eye (1.1%). Both cases were children with Marfan syndrome. All the other intraocular lens were in the expected position without obvious pseudophakodonesis, dislocation, decentration or tilt. No cystoid macular edema, corneal endothelial decompensation, secondary glaucoma, suprachoroidal hemorrhage or endophthalmitis was observed.

Conclusions: Knotless Z-suture technique can effectively reduce the occurrence of suture-related complications which is applicable for various cases of moderate to severe inadequate capsule/zonular support.

P-CAT-005

Cost analysis of immediately vs delayed sequential bilateral cataract surgery at a community-based surgical center

S. Somani¹, E. Tam¹, S. Arshinoff², H. Chiu¹, L. Tong¹, Z. Somani³, F. Lee⁴

¹Uptown Eye Specialists, Brampton, Canada, ²York Finch Eye Associates, North York, Canada, ³Medicine, University of Minnesota, Minneapolis, United States, ⁴Epidemiology, Biostatistics, and Occupational Health, McGill University, Montreal, Canada

Introduction: Emerging evidence has pointed towards immediately sequential bilateral cataract surgery (ISBCS) as an advantageous technique for cataract extraction surgery, particularly in terms of healthcare-related costs. Although there have been limited studies examining cataract surgery health economics in both ISBCS and DSBCS primarily in a hospital-based environment, there are no prior reports focusing on the health economic impact on a primarily senior demographic in a community based surgical center environment in the post-COVID-19 era.

Objectives: To assess the cost-effectiveness of ISBCS versus delayed sequential cataract surgery (DSBCS) among Canadian adults over the age of 65 who undergo different sequencing of cataract extraction surgery at a community ambulatory surgical-based center (C-ASC) in the Greater Toronto Area following the COVID-19 pandemic.

Methods: Cost metrics were collected from 202 patients who underwent either DSBCS or ISBCS at one of two CACs between January 2022 and January 2023. Data consisted of direct and indirect costs. Direct cost measures included pre-, intra-, and post-operative surgical expenses. Pre-operative measures included diagnostic and consultation fees. Intra-operative metrics consisted of medical and non-medical labor, anesthesia fees, and consumables (including amortized cost of equipment and sterilization). Post-operative surgical costs included post-operative follow-up visits at post-operative day 0 (POD0) and post-operative week 1 (POW1). Indirect costs were measured by time lost due to travel and additional post-operative visits (any visits other than required POD0 and POW1).

Results: The average surgical costs were reduced by 18.21% when performing ISBCS ($p < 0.001$); the average total cost of DSBCS was \$1638.56 compared to \$ 1340.21 for ISBCS. Average direct surgical costs were found to be \$1491.09 and \$1249.41 for DSBCS and ISBCS respectively ($p < 0.001$), whereas average indirect costs were calculated to be \$147.46 and \$90.80 ($p = 0.010$). Additional post-operative visits accounted for a significant proportion of the difference in indirect costs between study groups ($p = 0.010$). No other variables, including current comorbidity, pre-and intra-operative ocular metrics, and perioperative systemic vitals had a significant effect on cost-effectiveness between ISBCS and DSBCS.

Conclusions: Average costs of cataract extraction in a community ambulatory surgical center were significantly reduced when performing ISBCS compared to DSBCS.

P-CAT-006

Two-step YAG capsulotomy for complete closure of anterior capsulorhexis in anterior chamber contraction syndrome (ACC)

S. Holak¹, M. Djaber¹, A. Felix¹, H. Holak¹

¹Eyeclinic Holak, Salzgitter, Germany

Introduction: A risk of ACC is associated with PEX, uveitis, retinitis pigmentosa, keratoplasty, diabetes, prematurity. Treatment of ACC with surgery, YAG or femtosecond laser shouldn't be associated with secondary complications.

Objectives: Some complications have been described after circular capsulotomy for complete closure of the anterior capsulorhexis (CCAC), such as mobile capsular fragment in the anterior chamber or adhesion of the capsular remnant to the cornea. All these complications required additional intraocular surgery. To avoid this, we would like to introduce a new two-step YAG capsulotomy in CCAC.

Methods: In 5 patients (3 females, 2 males) severe ACC was diagnosed 6 months after cataract surgery. All phacoemulsifications were performed by two very experienced surgeons. No complications were observed during the postoperative period (6 weeks). Therapeutically, a two-step YAG capsulotomy with an energy of 1.8 mJ was performed by the same ophthalmologist. In the first step, a circular capsulotomy was performed in the membrane of CCAC with an asymmetric superior bow-shaped incision. The medial margin was placed higher and the lateral margin was placed lower. Immediately after treatment, a normal and a retroillumination photograph were taken. After 3 days of topical prednisolone therapy, visual acuity and intraocular pressure were checked. 3 weeks later, the second step of the YAG capsulotomy was performed. The new superior semilunar opening in the CCAC was enlarged inferiorly until a thin connection with the capsular bag was created. This connection has bound the capsular bag with fibrotic materials of the ACC. Photodocumentation and the same procedures as after first step were made.

Results: After YAG capsulotomy, visual acuity increased from counting fingers to 20/25 (mean) in 3 patients with CCAC. In two patients with extreme capsular bag phimosis treated by radial capsulotomy, the visual acuity increased from 20/125 to 20/25. The mean intraocular pressure measured 3 days after capsulotomy was 16 mmHg. Morphologically in patients with CCAC already after two steps of capsulotomy no fibrotic membrane parts were found in the anterior chamber. A fibrotic material of the ACC was stabilised behind the iris diaphragm without any possibility of movement towards the anterior chamber.

Conclusions: Two-step YAG capsulotomy is a safe, uncomplicated method for the treatment of CCAC in ACC and reduces the complication rate.

The greater elasticity of the new IOL may cause an increasing number of CCAC.

P-CAT-007

Pupils at large: exploring surprising dilations in diabetes

J. Dereń-Szumelda¹, M. Dorecka², E. Mrukwa-Kominek², R. Różycki¹

¹Ophthalmology, Military Institute of Aviation Medicine, Warsaw, Poland, ²Ophthalmology, University Clinical Centre named after Prof. K. Gibiński, Medical University of Silesia, Katowice, Poland

Introduction: Diabetes mellitus (DM) is one of the causes of small pupil occurrence. Moreover, it poses difficulties in achieving adequate mydriasis during operation, thus complicating the surgeon's task and reducing the safety of the procedure.

Objectives: The aim of the study was to verify whether an appropriate blend of mydriatics combined with an anesthetic, administered in close proximity to the iris receptors by injecting it into the anterior chamber, would improve iris reaction and achieve a satisfactory pupil diameter (≥ 6.0 mm) in patients with DM.

Methods: The study included 71 patients (71 eyes) with cataract scheduled for phacoemulsification surgery, including 35 patients with DM. Mydriasis was achieved with an intracameral injection of a standardized combination of mydriatics and anesthetic (IC-SMA) without the use of additional pupil-dilating agents. Pupil diameter was measured just prior to capsulorhexis and compared between patients with and without DM.

Results: All patients were divided into 2 groups: with DM ($n = 35$) and without DM ($n = 36$). Adequate pupil dilation (≥ 6.0 mm) was achieved prior to capsulorhexis with IC-SMA administration, comparable to that in the control group. In the DM group, the measured pupil diameter was paradoxically significantly larger ($p = 0.04$) than in the reference group.

Conclusions: Administering IC-SMA directly into the vicinity of the iris receptors allowed to achieve adequate pupil dilation in all operated patients during cataract phacoemulsification. IC-SMA may paradoxically induce a greater mydriatic effect in individuals with diabetes.

P-CAT-008

Visual outcomes and patient satisfaction with bilateral implantation of a hydrophobic acrylic trifocal intraocular lens

*L. Mosaddegh*¹

¹Mosaddegh Eye Institute, San Francisco, United States

Introduction: Patients have high expectations of spectacle independence after cataract surgery and intraocular lens (IOL) implantation. Many trifocal IOLs are designed to provide spectacle independence at all ranges of vision (distance, intermediate, and near). The first trifocal IOL approved by the US Food and Drug Administration was the AcrySof PanOptix, which approved in 2019. The same optical design is now available in a new material, Clareon. However, to date there is minimal real world clinical data on the performance of the Clareon PanOptix IOL.

Objectives: To evaluate visual outcomes and patient satisfaction following bilateral implantation of a hydrophobic acrylic IOL.

Methods: This was a prospective single-arm study. Subjects were bilaterally implanted with the Clareon PanOptix IOL. Uncorrected and distance corrected visual acuities at distance (UDVA, CDVA), intermediate (UIVA, DCIVA; 60cm), and near (UNVA, DCNVA; 40cm) were evaluated. Other evaluations included manifest refraction, defocus curve, and administration of a visual disturbance questionnaire (QUVID) and a satisfaction questionnaire (IOLSAT).

Results: This study included 62 eyes of 31 subjects. At 3 months postoperatively, binocular CDVA, DCIVA, and DCNVA were 20/25 or better in 100%, 100%, 100% of subjects, respectively. Binocular UDVA, UIVA, and UNVA were 20/25 or better in 97%, 94%, 100% of subjects, respectively. On the QUVID questionnaire, 54%, 65%, and 45% of subjects reported experiencing halo, glare, and starburst, respectively. On the IOLSAT, patient-reported spectacle independence (overall) at distance, intermediate, and near was 100%, 100%, and 97%, respectively.

Conclusions: The results of this study suggest that the Clareon PanOptix IOL can provide excellent visual outcomes, high spectacle independence, and high patient satisfaction.

P-CAT-009

Refractive rehabilitation in patients with previous corneal surgeries

L. Faz¹

¹Ophthalmology, Hospital Lomas de San Luis, San Luis Potosi, Mexico

Introduction: Due to technology and long life expectancy, the demands of patients in terms of visual acuity have increased as well as the need to not depend on glasses or contact lenses for their activities, so the help of the professional in Ophthalmology it is key to achieve this and the social impact that this has on a daily basis. For these reasons, we have designed this study in patients who already had a previous corneal pathology and surgery.

Objectives: To rehabilitate the patients with previous corneal surgeries leaving the least possible amount of residual prescription and the best visual acuity without depending on the use of glasses or contact lenses through refractive surgery.

Methods: Retrospective review of 51 eyes operated previously in our center, 45 with previous PKP, 5 with corneal rings and one with crosslinking.

Out of the 51 operated, 45 had phacoemulsification with implant of IQ Toric T3-T9 lenses (Alcon®) or AT Torbi M/MP lenses (Zeiss®), and 6 patients younger than 40 years had ICL Phakic lenses (Staar Surgical®).

We Included patients with regular and moderate astigmatism after the removal of stitches 12-15 months after Penetrant Keratoplasty and 6 months after in the cases of Corneal Rings and Crosslinking.

The primary Results included UCVA, CDVA and Manifest Spheric Refraction Equivalent (MSRE).

Results: The average last of follow up after refractive surgery was 18,9± standard deviation 13.8 months.

There was a significant improvement of UCVA and CDVA since the first month post operatory until the end ($p<0,001$).

The average of visual acuity with and without correction didn't change significantly ($p=0,68$ and $0,74$ respectively).

The MSRE improved from $3.73\pm 1.92DP$ to $1,88\pm 1,06DP$ ($p=<0,001$) and it didn't change along the time.

No lens realignment was required post-surgeries.

Only 2 eyes (3.9%) had one episode of mild rejection at 2 and 4 months respectively that was solved fast and without consequences.

The best visual acuity with correction CDVA was 20/40 or better in 96% of the eyes.

The best visual acuity without correction UDVA was 20/40 or better in 51% of the eyes.

Conclusions: It is possible to diminish the sphere and residual corneal astigmatism after PKP, corneal rings or crosslinking surgeries, with phacoemulsification and Toric intraocular lenses implant, or with phakic lenses in young patients, if they have moderate and regular astigmatism after corneal surgeries, in order to avoid the use of contact lenses or even glasses, and to meet the broad demands of our patients.

P-CAT-010

Retrospective analysis of glued intraocular lens implantation in aphakic eyes at a tertiary eye care hospital in Uganda

S.A. Hussain¹

¹Dr Agarwal's Eye Hospital, Kampala, Uganda

Introduction:

The management of aphakia has always been a challenge with eye surgeons. Various intra ocular lens fixation surgical techniques have been use; including but not limited to scleral fixation, iris fixation, sulcus placed, etc. However, each surgical technique has its own challenges. The novel technique of Glued Intra Ocular Lens addresses various issues commonly encountered by surgeons; thus providing excellent post operative visual recovery.

Objectives: A retrospective non-randomized case series which analyses the safety and post operative visual outcome of fibrin glue-assisted intra ocular lens implantation technique in eyes with deficient posterior capsule in a tertiary eye care hospital in Uganda

Methods: The technique of Glued IOL was first introduced by Prof. Dr. Amar Agarwal in December 2007. In this retrospective study 14 eyes which underwent sutureless, fibrin glue-assisted intra ocular lens (IOL) implantation technique called as Glued IOL from 2019 to 2022 were included in the retrospective study. The per-operative and post-operative complications, if any; were assessed. The post-operative BCVA (Best Corrected Visual Acuity) was recorded at 1 month, 3 months the end of 6 months.

Results: A significant improvement in BCVA was noted post-operatively. The various modifications of Glued IOL technique are including but not limited to foldable or injectable Glued IOL, the Hand-shake technique, multi-focal Glued IOL and trocar-cannula-assisted infusion Glued IOL. Complications such as decentration, cystoid macular edema and post-operative optic capture were noted, if any.

Conclusions: The technique of Glued IOL has been proven to show good post operative visual recovery with minimal complications.

P-CAT-011

Preclinical biocompatibility and biosafety evaluation of a new foldable brown-diaphragm intraocular lens

K. Zhang¹, S. Zhang¹, W. He¹, Y. Lu¹, X. Zhu¹

¹Eye & ENT Hospital of Fudan University, Shanghai, China

Introduction: There are limited alternative products suitable for cataract patients with iris defects or aniridia. Therefore, the development of a new foldable integrated brown iris-diaphragm intraocular lens (IOL) is urgently needed and has potential for clinical application.

Objectives: A new foldable brown-diaphragm IOL was preclinically evaluated in vitro and in vivo by comparing its biocompatibility and biosafety with those of a commercially available IOL.

Methods: The new brown-diaphragm IOL is made of hydrophobic acrylic material, with incorporating a transparent optical zone and surrounding brown diaphragm. Cellular experiments evaluating lens epithelial cell morphology, adhesion, and migration were conducted to exclude cytotoxic effects.

Twelve New Zealand rabbits had the new brown-diaphragm IOL implanted in one eye and another 12 had a commercially available foldable IOL implanted, followed by slit-lamp evaluations, corneal endothelial cells density measurement and aqueous humor analysis to identify any dye leakage from the brown-diaphragm IOL. Haematoxylin and eosin staining of ocular tissue and scanning electron microscopy (SEM) of the IOL surface were performed after 12-week observation.

Results: In vivo experiments showed there were no statistically significant differences between the two groups in terms of postoperative inflammation and capsular biocompatibility. There were no significant changes in corneal endothelial cell density between before and after surgery in either group. LC-MS/MS analysis showed that the target dye was not detected in aqueous humor samples. Histopathology of ocular sections and SEM imaging of IOL surfaces showed similar changes in both groups.

Conclusions: The newly-invented brown-diaphragm IOL showed good biocompatibility and biosafety. Combined with its foldability and peripheral shading, it could be a new choice for patients with iris defects.

P-CAT-012

Comparison of Outcomes after Wavefront-optimized and Topography-guided Transepithelial Photorefractive Keratectomy

S. Kim¹, S. Na², S. Choi¹, S.-H. Choi²

¹Department of Ophthalmology, Veterans Health Service (VHS) Medical Center, Seoul, Korea, Republic of, ²Ophthalmology, First Samsung Eye Clinic, Seoul, Korea, Republic of

Introduction: New treatment profiles and topography-guided surgeries have been used to minimize the postoperative induction of HOAs. Several studies have investigated the clinical outcomes of wavefront-optimized (WFO) and topography-guided (TG) laser in-situ keratomileusis (LASIK) in the treatment of myopia and astigmatism. However, studies comparing the clinical outcomes of WFO and TG transepithelial photorefractive keratectomy (transPRK) in patients with myopia and astigmatism are lacking. Therefore, this study aimed to compare the clinical outcomes, including visual and refractive outcomes, as well as corneal HOAs, after transPRK following wavefront-optimized and topography-guided algorithms.

Objectives: To evaluate the outcomes of wavefront-optimized (WFO) and topography-guided (TG) transepithelial photorefractive keratectomy (transPRK) in the treatment of myopia and myopic astigmatism.

Methods: Patients who underwent transPRK using the WaveLight® EX500 excimer laser for the correction of myopia and myopic astigmatism between January 2022 and March 2023 were divided into the WFO transPRK (77 eyes of 36 patients) or TG transPRK (63 eyes of 31 patients) groups in this retrospective, observational cohort study. The pre- and postoperative 3-month refractive and visual outcomes of the two groups were analyzed.

Results: The uncorrected distance visual acuity was 0.0 logMAR or better in 95% of eyes 3 months postoperatively, and the mean manifest refraction spherical equivalent was within ± 1.0 diopter (D) in 90% of eyes. No significant differences were observed between the groups in terms of the UDVA or astigmatism. A significant induction of higher-order aberrations (HOAs) was observed in both groups. However, the induction of total corneal HOAs ($P = .014$) and spherical aberrations ($P = .000$) was significantly lower in the TG group than that in the WFO group.

Conclusions: WFO and TG transPRK effectively improved the visual and refractive outcomes; however, the induction of total corneal HOAs and spherical aberration was lesser following the TG ablation.

P-CAT-013

Effects of centration and torsion control on visual outcomes in lenticule based refractive surgery

N. Sie¹, A.Z.-B. Lau², J.W.X. Koh³, Y.-C. Liu^{1,4}, J.S. Mehta^{1,4}

¹Cornea and External Eye Disease, Singapore National Eye Centre, Singapore, Singapore, ²Centre for Ophthalmology and Visual Science (affiliated with the Lions Eye Institute), University of Western Australia, Perth, Australia, ³School of Medicine, Lee Kong Chian, Nanyang Technological University, Singapore, Singapore, ⁴Singapore Eye Research Institute, Singapore, Singapore

Introduction: Smooth Incision Lenticule Surgery (SILK) is a new second generation lenticule extraction procedure, performed using the ELITA femtosecond laser. The laser uses a flat applanator to compress the cornea prior to lenticule creation. Currently the last as a 2 step docking system, with suction applied to the ocular surface, then the laser head applanated into the suction ring. The laser system also has the ability to recenter and rotate the lenticule following suction application allowing lenticule creation in any position on the cornea.

Objectives: The aim of this study was to understand the frequency of the re-centration and torsion adjustment following docking with this laser system.

Methods: This was a retrospective review of all consecutive patients who underwent the SILK procedure at the Singapore National Eye Centre. All patients underwent standard preoperative refractive assessment including manifest and cycloplegic refraction, cornea tomography, biomechanics assessment, and clinical examination. Prior to the laser procedure the horizontal axis (0-180) was marked on the patients eye as well as the visual axis using a slit lamp. Intra-operative videos of the docking and applanation procedure were obtained and assessed for manual centration frequency and torsion variation. All lenticules were created in standard width dimensions of 6mmOZ with a 7.6mm TZ, incision width was 3mm.

Results: Sixty consecutive SILK procedures were included in this study. The mean age of the patients was 30.1years (range 22-38). There were 30 right eyes respectively. Mean refractive correction was - 5.92D sphere, -0.83 cylinder, mean flat K 42.5D steep K 43.8D. Torsional adjustment was required in 50% of cases. The mean torsional adjustment was 2.1degrees, 90% of the adjustments were counter-clockwise, 10% clockwise. 87% of eyes required centration adjustment. The mean applanation pressure during lenticule creation was 38.5mmHg and there was only 1mmHg of deviation between the creation of the lenticule and its completion. There were no suction breaks in the series or complications following lenticule extraction.

Conclusions: SILK is a second generation lenticule extraction procedure, allowing accurate placement of the lenticule prior to creation. Following applanation the majority of patients need centration adjustment to ensure accurate centration on the visual axis, torsional control was less frequently required.

P-CAT-014

PM_{2.5} exposure disrupts the structure and metabolism of ocular lens by triggering ferroptosis

*Q. Fu*¹

¹Zhejiang University, Hangzhou, China

Introduction: Epidemiological studies show a positive association between air pollution and age-related cataracts, but the pathogenic mechanism is unknown.

Objectives: In order to investigate the molecular mechanism of air pollution on lens.

Methods: The internal structure of the rats' lenses was analyzed by haematoxylin and eosin staining. Participation of ferroptosis was determined by RNA-seq, western blot, realtime-PCR, and immunofluorescence staining using human lens anterior capsules, human lens epithelial cells and rat's lens. GSH and Fe²⁺ contents were determined using GSH and GSSG assay kits and iron assay kit. A hydrogen peroxide (H₂O₂) content kit (Mbio) was used to detect ROS content in aqueous humour.

Results: In this study, we find that the internal structure of the rats' lenses is disrupted and many vacuoles form in the equatorial region by analysis of haematoxylin and eosin staining after airborne fine particulate matter (PM_{2.5}) exposure. It is further noted that ferroptosis is involved, which is confirmed by the high content of Fe²⁺ and the lipid peroxide 4-hydroxynonenal (4-HNE), along with the decreased level of glutathione and connexin 43 (Cx43) in the lens. Ferroptosis is also observed in human lens epithelial cells treated with PM_{2.5} suspension, accompanied by decreased cell viability and migration. Furthermore, we collect about 60 human lens anterior capsule (HLAC) samples for RNA-seq, which show that, compared to HLACs from clean areas, those from contaminated areas have significantly altered expression of ferroptosis-related genes, such as glutathione peroxidase 4 and STEAP family member 3. We also find that the levels of the transferrin receptor and 4-HNE are elevated, along with the down-regulation of Cx43 in the human lens.

Conclusions: These results confirm that ferroptosis plays a key role in PM_{2.5}-induced cataractogenesis, indicating a potential precautionary target in age-related cataracts.

P-CAT-015

Five-year follow-up of intraocular pressure and anterior chamber dimensions changes after corneal refractive surgery

*X. Zhang*¹

¹Hangzhou Chaoju Eye Hospital, Hangzhou, China

Introduction: The measurements of intraocular pressure (IOP) and anterior chamber dimensions are important to affect those following corneal laser surgery, particularly to patients with high myopia or high IOP before surgery. However, there is little report on this topic.

Objectives: Herein, this study aims to evaluate these changes over a 5-year period after femtosecond laser-assisted laser in situ keratomileusis (FS-LASIK) and small incision lenticule extraction (SMILE).

Methods: Totally, 713 eyes of 361 myopic patients were retrospectively enrolled according to the surgery methods and degrees of myopia. Patients were classified into a FS-LASIK group and SMILE group, and then subdivided into low spherical equivalent (SE), moderate SE, and high SE groups according to the preoperative spherical equivalent values. Intraocular pressure (IOP), anterior chamber indicators were tested. Depth (ACD), anterior chamber angle (ACA), anterior chamber volume (ACV) and central corneal thickness (CCT) were evaluated before and five years post operation.

Results: The magnitudes of IOP, depth (ACD), anterior chamber angle (ACA), anterior chamber volume (ACV) and central corneal thickness (CCT) decreased significantly postoperatively (all $p < 0.05$). In both of SMILE and FS-LASIK groups, postoperative ACDs were all significantly shallower ($p < 0.001$) and ACVs significantly decreased ($p < 0.001$). IOPs were significantly lower after surgery ($p < 0.001$), while ACA was merely significantly narrowed in SMILE group. Only in the high SE group, we found that significant difference between SMILE and FS-LASIK group in terms of ΔACV ($P < 0.01$) and ΔACD (all $p < 0.001$), respectively. Compared with moderate SE and high SE groups, low SE group showed a relatively significant difference between preoperative and postoperative ACA. After adjusted for many parameters preoperatively, ΔIOP was positively correlated with preoperative SE and all of the four mentioned variables ($\Delta IOP, \Delta ACD, \Delta ACA$ and ΔACV) were negatively correlated with their corresponding preoperative indicators.

Conclusions: IOP and anterior chamber parameters decreased significantly after refractive surgery. Corneal deformation and AC remodeling may account for these changes. From the perspective of the extent of anterior chamber dimensions changes after surgery, FS-LASIK is slightly better for patients with high myopia.

P-CAT-016

Particles, deposits, and sediments: unraveling the complexities of IOL opacification

Y. Zhang¹, F. Zhang¹

¹The First Affiliated Hospital of Zhengzhou University, Zhengzhou, China

Introduction: Opacification of hydrophilic intraocular lenses is one of the rare complications after cataract extraction and IOL implantation, and the mechanism of opacification is still unclear. In this paper, we explored IOL Turbidity by analyzing a sample of hydrophilic IOLs with late opacification and observing the morphology and compositional characteristics of IOLs turbidity.

Objectives: Through morphological observation and elemental analysis of a special opacification IOL, the morphology and elemental patterns of deposits in different parts of the opacification IOL were summarized to provide support for the study of the mechanism of IOL turbidity occurrence.

Methods: Opacified IOL from patients who developed IOL turbidity 6 years after performing phacoemulsification and IOL implantation. Morphological analysis of opacified IOL was performed using optical microscope and scanning electron microscopy, and elemental analysis of opacified IOL was performed using energy dispersive X-ray spectroscopy.

Results: The IOL was heterogeneously turbid under the optical microscope, and the opacified portion of the deposit was in the form of particles under the optical microscope, with larger clumps of opacified particles interspersed on the IOL loops. The surface of the transparent portion of the opacified IOL under SEM was not smooth, and there were rounded bumps with low calcium content that did not deposit to the interior; The opacified portion of the periphery of the surface of the IOL optical component is coarser grained and has a high calcium and phosphorus content, accompanied by scattered specialized deposits containing specific elements; The opacified portion of the center of the optical capture had finer surface particles and also higher calcium and phosphorus content, but the precipitation morphology and elemental compositions were similar from different regions toward the interior of the IOL. Areas of high turbidity have a higher density of sedimentary particles, and a fusion of flaky particles containing other elements is visible in the center.

Conclusions: Opacified hydrophilic IOL transparent portion also have low calcium content deposits, the opacified portion of the deposit is granular with high calcium and phosphorus content, different portions can show different sizes and morphology, and the particle density correlates with the degree of turbidity. Different elements can make the surface particles appear special morphology, but the internal deposition is typical calcium particles.

P-CAT-017

Visual quality after FS laser-assisted cataract surgery combined with trifocal intraocular lens implantation

*J. Ma*¹

¹Cataract, Weifang Eye Hospital, Weifang, China

Introduction: Femtosecond laser-assisted cataract surgery with IOL implantation can remove the lens from the patient with satisfactory visual quality and significantly improve the postoperative satisfaction of the patient. This study is the first observation of Alcon's PanOptix trifocal intraocular lens (IOL) implanted in 55 cataract patients with femtosecond laser-assisted cataract surgery. Visual acuity, defocus curve, higher order aberration (HOA), refractive stability, eyeglass removal rate, and satisfaction were evaluated and analyzed.

Objectives: This study is the first observation of Alcon's PanOptix trifocal intraocular lens (IOL) implanted in 55 cataract patients with femtosecond laser-assisted cataract surgery.

Methods: Fifty-five patients (63 eyes) with cataract were treated with femtosecond laser-assisted cataract surgery combined with trifocal IOL implantation. Visual acuity, defocus curve, higher order aberration (HOA), refractive stability, eyeglass removal rate, and satisfaction were evaluated and analyzed.

Results: We found that the visual acuity of patients with near, intermediate, and distance vision was better than 0.1 LogMAR at 1, 3, and 6 months after the completion of surgery. The uncorrected near visual acuity (UCNVA), uncorrected intermediate visual acuity (UCIVA), and uncorrected distance visual acuity (UCDVA) of patients at 1, 3, and 6 months after surgery were compared with those before operation, showing statistical significance. Six months after the operation, all patients' surgical eyes had a smooth transition in the defocus range from +0D to -2.5D, and the visual acuity of the surgical eyes reached a level better than 0.1 LogMAR. The statistical results of 6-month follow-up showed that the eyeglass removal rate at near, intermediate, and far distances was 100%. At 6 months postoperatively, only 1 case had nocturnal glare, which affected life; 3 cases developed glare and halo but did not affect life. The patient satisfaction rate was 98.18%.

Conclusions: Femtosecond laser-assisted cataract surgery with trifocal IOL implantation can remove the lens from the patient with satisfactory visual quality and significantly improve the postoperative satisfaction of the patient.

P-CAT-019

Differences in the change of post-OP ocular surface antioxidant levels between LALEX and FS-LASIK

A. Chen^{1,2}, C.-K. Chang³

¹Kaohsiung Wufu Nobel Eye Clinic, Kaohsiung, Taiwan, China, ²Ophthalmology, Antai Medical Care Cooperation Antai Tian-Sheng Memorial Hospital, Pingtung, Taiwan, China, ³Nobel Eye Institute, Taipei, Taiwan, China

Introduction: The keratorefractive surgeries, such as photorefractive keratectomy (PRK), microkeratome laser in situ keratomileusis, femtosecond laser in situ keratomileusis (FS-LASIK), and laser-assisted lenticule extraction (LALEX), are popular for correcting myopia, hyperopia, and astigmatism. The number of patients receiving FS-LASIK and LALEX has increased over time. Studies have found that the visual and refractive outcomes of FS-LASIK and LALEX are similar, with greater postoperative corneal sensitivity in LALEX patients. Additionally, individuals who received LALEX surgery had higher optical density during the early postoperative periods. Postoperative complications such as dry eye disease (DED) are common after these surgeries, with FS-LASIK showing a higher rate of severe DED compared to LALEX. Both surgeries face issues with delayed corneal healing and severe complications such as diffuse lamellar keratitis and infectious keratitis. The expression of oxidative stress is crucial in systemic and ocular diseases, and the present study aims to evaluate the concentrations of total antioxidant capacity (TAC) and ascorbic acid (AA) before and after refractive surgeries, comparing the differences between FS-LASIK and LALEX procedures.

Objectives: To evaluate the change of total antioxidant capacity (TAC) and ascorbic acid (AA) between femtosecond laser in situ keratomileusis (FS-LASIK) and laser assisted lenticule extraction (LALEX).

Methods: A prospective non-randomized study was conducted, and 33 and 75 eyes that had undergone FS-LASIK or LALEX surgeries were enrolled, respectively. The tear films near corneal incisions were collected and the concentrations of TAC and AA were determined. The generalized linear mixed model was adopted to calculate the adjusted odds ratio (aOR) with 95% confidence interval (CI) of TAC and AA between the two groups.

Results: The AA reduction was significant one month after the LALEX and FS-LASIK procedures (both $P < 0.05$), and the decrement of AA level was significantly larger in the FS-LASIK group compared to the LALEX group ($P = 0.0002$). In the subgroup analysis, the LALEX group demonstrated a lower decrement of TAC level in the individuals with DED than the FS-LASIK group ($P = 0.0424$), and the LALEX group demonstrated a significantly lower AA decrement in the participants with high myopia ($P = 0.0165$) and DED ($P = 0.0043$).

Conclusions: The LALEX surgery causes lesser AA decrement compared to FS-LASIK surgery especially for the patients with DED.

P-CAT-020

The regulatory mechanism and interventional target of IL-8 during EMT of PCO-associated lens capsular epithelial cells

W. Si¹, J. Liu¹, Y. Mao¹, Y. Zhang¹, K. Guo¹, Y. Hu^{1,2}, F. Zhang¹

¹Ophthalmology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, China, ²The jointed National Laboratory of Antibody Drug Engineering, The First Affiliated Hospital of Henan University, Kaifeng, China

Introduction: Posterior capsular opacification (PCO) is a common complication after IOL surgery. The main pathology is characterized by a process consisting of capsular residual epithelial cells' EMT, migration, and fibrosis. The fibrotic tissue-embraced IOL is the cause of the patient's loss of vision again. This process is regulated by multiple inflammatory cytokines and growth factors. Our study shows that IL-8, which can be produced by residual LECs, plays a key role in promoting the migration of capsular residual epithelial cells by down-regulating E-cadherin and ZO-1 expression, which demonstrated that IL-8 is a potential therapeutic target for PCO prevention.

Objectives: To explore the molecular mechanisms that lead to increased IL-8 production by lens epithelial cells (LECs) after surgical injury and the role of IL8 in PCO formation.

Methods: We first collected 60 aqueous humor (AH) and anterior lens capsules (ALC) of patients with age-related cataracts: 1. Lens epithelial cells line SRA01/04 was treated with AH and cell migration was detected by transwell assay in vitro. Patients' AH was grouped according to different migrated rates. IL-8 levels in different groups were measured by ELISA. 2. The mRNA levels of IL-8 and its receptor in ALC cells corresponding to the AH were evaluated by RT-qPCR. We next treated IL-8 in vitro: 1. CCK8 and EdU staining detected cell proliferation. 2. Cell migration was detected by the transwell assay. 3. EMT-related proteins and mRNA were detected by western blot and rt-qPCR. We also constructed a rat model of PCO ex vivo. Residual LECs migrate and proliferate within the capsular bag was visualized using IF staining. WB and rt-PCR were used to detect EMT-related proteins and mRNA to validate the in vitro results further.

Results: Different patients' AH has different effects on the regulation of cell migration: IL-8 level was positively correlated with the HM group. RT-qPCR demonstrated that the ALC cells of senile cataract patients express IL-8 and its receptors. The anterior capsules in the HM group express a higher level of IL-8 and its receptor than those in the LM group. Accordingly, in vitro cell experiments and the PCO rat model established both verified that IL-8 promoted LECs proliferation, migration, and early-EMT process.

Conclusions: LECs can produce and secrete IL-8. IL-8 can promote ALC cells to proliferate, migrate, and trigger the early process of EMT occurrence. Our study demonstrated that IL-8 may provide novel targets for the prevention and treatment of PCO.

P-CAT-021

Hydrophobic versus hydrophilic acrylic intraocular lens on posterior capsule opacification: a meta-analysis

*Q. Wu*¹

¹Cataract Intraocular Lens Center, Xi'an People's Hospital (Xi'an Fourth Hospital), Xi'an Shaanxi Province, China

Introduction:

To conduct a Meta-analysis pooling randomized controlled trials (RCTs) to compare hydrophobic with hydrophilic acrylic intraocular lenses in terms of posterior capsule opacification (PCO) development.

Objectives:

Electronic databases including PubMed, Embase, and the Cochrane Library were queried from their starting till January 2020. RCTs investigating the impact of hydrophobic versus hydrophilic acrylic intraocular lenses on PCO were considered eligible in this study. The pooled effect estimates were calculated using the random-effects model.

Methods:

Electronic databases including PubMed, Embase, and the Cochrane Library were queried from their starting till January 2020. RCTs investigating the impact of hydrophobic versus hydrophilic acrylic intraocular lenses on PCO were considered eligible in this study. The pooled effect estimates were calculated using the random-effects model.

Results: Thirteen RCTs comprising of 939 patients (1263 eyes) were covered in this study. Patients with hydrophobic acrylic intraocular lenses had a lower PCO score than those with a hydrophilic acrylic intraocular lenses [standard mean difference: -1.80; 95% confidence interval (CI): -2.62 to -0.98; $P < 0.001$]. Moreover, the frequency of neodymium-doped yttrium aluminum garnet (Nd:YAG) capsulotomy in patients with hydrophobic acrylic intraocular lenses was significantly lower than patients with hydrophilic acrylic intraocular lenses (relative risk: 0.38; 95%CI: 0.20- 0.71; $P = 0.003$).

Conclusions:

These findings suggest that hydrophobic acrylic intraocular lenses are superior to hydrophilic acrylic intraocular lenses in patients after cataract surgery due to lower PCO score and reduced Nd:YAG capsulotomy. While similar studies are conducted by other researchers, the present study conducted subgroup analyses that show superior results with hydrophobic lenses in trials conducted in western countries.

P-CAT-022

Comparison of angle kappa measurements obtained with Sirius, Keratron, Pentacam, and Amaris750S

Y. Wang¹, L. Hu^{1,2,3}

¹Eye Hospital of Wenzhou Medical University, Wenzhou, China, ²State Key Laboratory of Ophthalmology, Optometry and Visual Science, Eye Hospital, Wenzhou Medical University, Wenzhou, China, ³National Clinical Research Center for Ocular Diseases, Eye Hospital, Wenzhou Medical University, Wenzhou, China

Introduction: Which angle kappa measured by a corneal topographer is more consistent with that measured by Amaris during surgery needs to be identified. However, no previous studies have reported this result. This study found that Sirius, Keratron, and Pentacam pre-operatively measured angle kappa was different from that measured intraoperatively by Amaris750S. Among them, Keratron has the best consistency with Amaris750S.

Objectives: To compare the angle kappa obtained with Sirius, Keratron, Pentacam, and Amaris750S and assess the intra-observer repeatability and comparability of the four instruments.

Methods: This study included 110 patients scheduled to undergo transepithelial photorefractive keratectomy or femtosecond laser-assisted in situ keratomileusis. Before surgery, each patient underwent angle kappa measurement using three instruments: Pentacam, Sirius, and Keratron. Prior to corneal ablation with the excimer laser during surgery, the angle kappa was measured again using an Amaris750S. Within-subject standard deviation, test-retest repeatability, within-subject coefficient of variation, and intraclass correlation coefficient (ICC) were calculated to assess the repeatability of the angle kappa measurements using the three instruments before surgery. A Bland-Altman plot was used to evaluate the agreement between these three instruments and Amaris750S to measure the angle kappa.

Results: For the kappa offsets measured by Sirius, Keratron, and Pentacam, the ICC values were 0.948, 0.950, and 0.931, respectively. For the measurement of the kappa axis using the three instruments, the ICC values were 0.996, 0.997, and 0.994, respectively. The 95% limits of agreement (LoA) of kappa offset between Keratron and Amaris750S was from -0.15 to $+0.09$ mm, which was the narrowest among the three instruments compared with Amaris750S, and the narrowest 95% LoA of kappa axial was also between Keratron and Amaris750S.

Conclusions: The results measured before Keratron, whether kappa offset or kappa axial, were relatively consistent with those measured intraoperatively using the Amaris750S.

P-CAT-023

Different approaches in the management of Post LASIK Epithelial Ingrowth: A tale of three eyes

T. Chauhan¹, K.S. Hikkalagutti², G. Dabas²

¹Cornea, Cataract and Refractive, Centre for Sight, New Delhi, India, ²Cataract and Refractive, Centre for Sight, New Delhi, India

Introduction: Post-LASIK epithelial ingrowth (PLEI) is an uncommon complication that is usually asymptomatic and does not warrant treatment. However, it can cause significant refractive error, dreadful complications, and flap melt in some patients.

Objectives: This is a prospective case series of three eyes with epithelial ingrowth which were managed using different approaches (flap lifting & scraping, Nd Yag Laser, Conservative approach).

Methods: Eyes with epithelial ingrowth presenting to the outpatient clinic of refractive surgery department between September 2022 to February 2023 were included. A thorough clinical evaluation, visual acuity assessment, slit lamp photography, and anterior segment optical coherence tomography were done in all cases.

Results: All three eyes underwent blade LASIK more than 20 years back. Two eyes underwent LASIK re-do procedure and 1 eye had fingernail trauma. Out of the 2 eyes with enhancement, one underwent surgical flap lifting and scraping while the other was managed using Nd YAG laser. One eye with fingernail trauma was managed conservatively.

Conclusions: While some cases may need observation and close follow up others may need intervention. A customized tailored approach is needed in each case of PLEI.

P-CAT-024

Complications and early outcomes of small incision cataract surgery at a rural tertiary hospital in Burundi

A. Bironkwaniquvu¹, F. Niyonsaba², M. Fatacky¹, P. Baribarira¹, D. Citegetse¹, P. Budengeri³, V. Bucumi⁴, D. Bigirimana⁵

¹Ophthalmology, Third Referral Hospital Natwe Turashoboye of Karusi, Karusi, Burundi, ²East African Nutritional Sciences Institute, University of Burundi, Bujumbura, Burundi, ³Ophthalmology, Kamege Military hospital, Bujumbura, Burundi, ⁴Programme National Intégré de lutte contre les Maladies Tropicales Négligées et la Cécité, Ministère de la Santé Publique et de la Lutte contre le SIDA, Bujumbura, Burundi, ⁵Ophthalmology, Glaucoma Investigation and Research Unit, the Royal Victorian Eye and Ear Hospital, Melbourne, Australia; ChM in Clinical Ophthalmology, University of Edinburgh, Edinburgh, UK Centre for Eye Research Australia (CERA), Melbourne, Australia

Introduction: Cataract is the leading cause of blindness globally and is particularly common in sub-Saharan Africa including Burundi. A RAAB conducted in two Northern provinces of Burundi without eye services during 2011 found that the leading cause of blindness was cataract (55%). Or, in 2020 the cataract surgery rate was 262 per a million of people in Burundi, what brought to developing a strategic plan for prevention of avoidable blindness, especially cataract in 2021 with the support of Fred Hollows Foundation Australia which accompanied also the beginning of its implementation in two rural hospitals including Karusi Hospital by supplying equipment of biometry and consumables. After training nurses on performing pre-operative ocular biometry, a need of surgical audit was essential.

Objectives: To evaluate complications and initial outcomes of small incision cataract surgery in resource-limited setting at a Rural Hospital.

Methods: A retrospective chart review was conducted for patients undergoing cataract extraction between July and December 2023. Data on patient demographics, cataract complexity, intra-ocular (IOL) power, axial lens (AL), corneal astigmatism, per-operative complications, and visual acuity at Day one post-op. Categorical data are presented as frequency (percentages) and parametric ones as mean (SD). Statistical analysis was performed using STATA.

Results: A total of 382 eyes (256 patients) were included in the study, with a mean (SD) age of 67 (14) years. The majority of cases were females (60%). Preoperative vision was notably poor, with 77% having vision of counting fingers (CF) or below. Most cataracts were complex (white = 82%, dense = 74%, and no-fundus view = 66%). The complication rates was low at 3.4% (n = 11), with 98% of IOLs implanted in the capsular bag, 1% having sulcus implantation, and 1% aphakia. At Day 1 postoperatively, visual acuity significantly improved to 6/24 or better in 68% of cases.

Conclusions: Despite the complexity of cataracts, small incision cataract surgery provides good visual outcome with low incidence of surgical complications comparable to phacoemulsification.

P-CAT-025

Identification of hub mRNAs in an H₂O₂-induced zebrafish cataract spontaneous recovery model

M. Ji¹, J.w. Luo¹

¹Eye Institute, Affiliated Hospital of Nantong University, Nantong, China

Introduction: Age-related cataract (ARC) is the first cause of blindness without non-surgical therapy. Oxidative stress was reported to be the main factors of ARC. The zebrafish cataract formed at day 14 and spontaneously recovered to transparent 30 days after H₂O₂ injection. To identify the hub genes involved in the cataract recovery, we performed RNA sequencing to detect the profiles of mRNAs in zebrafish lens at three timepoints.

Objectives: The study aimed to identify hub mRNAs contributing to the spontaneous recovery of a zebrafish cataract model, hoping to provide novel targets for effective non-surgical therapies for ARC.

Methods: Group A (day 0) were normal fish. Group B (day 14) and group C (day 30) fish were reared for 14 or 30 days after H₂O₂-injection, respectively. After examined by stereomicroscope and OCT, mRNA profiles of fish lenses were detected by RNA-seq. Differentially expressed genes (DEGs) were identified between each two of three groups. The DEGs changed in opposite positions between "B vs. A" and "C vs. B" were defined as ODGs (opposite positions changed DEGs). Gene functions were analyzed by GO and KEGG. The protein-protein interaction (PPI) network was built by STRING.

Results: Lens were turbid on day 14 and recovered to transparent on day 30. 1366 DEGs were identified in C vs B, like *socs1a*, *foxa*, *calcr1b*, *rbfox1*, *lpl*, *crybgx*, etc. "C vs. B" DEGs were enriched in gene clusters related to development and oxidative phosphorylation. Among three groups, we identified 786 ODGs including *lct1b*, *bco2a*, *nat16*, *insig1*, *kcnk2a*, etc. The ODGs were enriched in pathways like chemical synaptic transmission, gated channel activity, intrinsic components of the plasma membrane, etc. Some ODGs (such as *neurod1*, *elavl3*, *crx*, *cyp26a1*, *isl1*, *ube2ka*), which had higher betweenness and event values, were hub in the PPI network.

Conclusions: Several hub mRNAs and hub pathways were identified in the formation and reversal of zebrafish cataracts. The hub genes could be potential targets for the gene therapy of ARC.

P-CAT-026

Comparison of low contrast visual acuity between rotationally asymmetric multifocal and monofocal intraocular lens

Y. Hasegawa¹, F. Okamoto², R. Hiraoka¹, T. Oshika¹

¹Department of Ophthalmology, Faculty of Medicine, University of Tsukuba, Ibaraki, Japan,

²Department of Ophthalmology, Nippon Medical School Hospital, Tokyo, Japan

Introduction: There have been no reports comparing the intermediate and near low-contrast visual acuity between rotationally asymmetric multifocal intraocular lens and monofocal intraocular lens.

Objectives: To compare the low contrast visual acuity at different distances of rotationally asymmetric multifocal intraocular lens (IOL) (Lentis Comfort, LS-313 MF15, Santen) with monofocal IOL.

Methods: The study included 77 eyes of 43 patients with LS-313 MF15 implantation and 49 eyes of 26 patients with XY1 (HOYA) implantation matched for age. 100% contrast distance corrected visual acuity at distance, intermediate (70 cm), and near (40 cm) was measured using Binoptometer 4P (OCULUS) at 2 months postoperatively, and 40% contrast visual acuity at 3 months postoperatively. The results were compared between the two groups.

Results: There was no significant difference in 100% contrast distance visual acuity between the two groups. However, at 70 cm and 40 cm, the LS-313 MF15 group showed significantly better 100% contrast visual acuity with values of 0.09 ± 0.13 (logMAR) and 0.28 ± 0.23 compared to the XY-1 group with values of 0.18 ± 0.11 and 0.45 ± 0.19 , respectively ($P < 0.001$). For 40% contrast visual acuity, there was no difference in distance visual acuity, but at 70 cm and 40 cm, the LS-313 MF15 group performed significantly better with values of 0.20 ± 0.12 and 0.44 ± 0.20 , compared to the XY-1 group with values of 0.33 ± 0.12 and 0.69 ± 0.21 , respectively ($P < 0.001$).

Conclusions: The rotationally asymmetric multifocal IOL demonstrated superior low contrast visual acuity at intermediate and near distances compared to monofocal IOL.

P-CAT-027

Surgically induced astigmatism in MSICS: blessing in disguise - A promise of multifocality with monofocal IOL

*M. Dixit*¹

¹SRI Eye Care and Laser Center, Belagavi, India

Introduction: Today Manual SICS is an emerging and popular technique of cataract surgery globally. Simple and economical MSICS has proven to have plethora of advantages and blessings in disguise over technology driven PHACOEMULSIFICATION This has inspired me to perform "MSICS my way" passionately and consistently over last 18 years, with total conviction.

Objectives: Once upon a time I was a Phaco - freak, today I am SICS - Savvy! I needed to authenticate "why I do what I do" at global ophthalmology forum "That's the purpose of this study.

Methods: This is an observational and retrospective analytical study of - post operative Visual outcomes of 10,000 MSICS cases done by a single surgeon.

MSICS My Way: - Frowning outside - Smiling inside superior funnel incision; 1.50mm away from the limbus with PHACOFAGMENTATION and VISCOEXPRESSION in funnel (Initial size of the incision 4-5mm/3mm/6-7mm. External scleral incision expanded according to hardness of the nucleus, later during surgery if needed).

Results: • 10,000 MSICS cases done by a single surgeon over the period of 15 years with "MSICS my Way" technique were randomly selected for the study.

- All cases were kept 0.50 D Myopic & Monofocal IOLs were used.
- 70% patients had Excellent vision when checked 6 weeks postoperatively.
- "Need to wear glasses" was analysed for all distances far, intermediate and near.
- (NN - not needed, ON - occasionally needed , AN - Always needed).
- 95% patients did not need glasses for all distances.
- 98% Of NN patients had V/A 6/9 N 8-12 and SIA 0.70- 1.25 D.
- All these had incision size between 4.25 - 5.5 mm.

Conclusions: MSICS is a simple, economical and easy to learn technique of cataract surgery; if done meticulously and consistently, can give excellent visual outcome, with less dependence on glasses ! Surgically induced astigmatism (SIA) with incision size 4.25 - 5.5 mm has been blessing in disguise, as it has given workable Multifocality to all patients. This study has shown strong association of SIA and Multifocality - A promise of Multifocality with monofocal IOL.

P-CAT-028

Impact of astigmatism on visual acuity across various distances after monofocal intraocular lens implantation

H. Suzuki¹, Y. Hasegawa¹, T. Oshika¹

¹University of Tsukuba Hospital, Tsukuba, Japan

Introduction: Some patients experience "apparent accommodation" after cataract surgery with a monofocal intraocular lens, where they achieve good near and distance vision with only distance correction. Factors influencing apparent accommodation include corneal multifocality, coma-like aberrations, and pupil size, while corneal astigmatism was considered unrelated in some previous studies. However, some studies reported that against-the-rule astigmatism improved intermediate and near visual acuity.

Objectives: To investigate the association between astigmatism and intermediate or near visual acuity in eyes after cataract surgery.

Methods: Eighteen volunteers (64.2 ± 12.8 [mean \pm SD] years) with monofocal intraocular lenses (IOLs) were recruited. After correcting each refractive error by spectacles, against-the-rule (ATR), with-the-rule (WTR) or oblique astigmatism of +0.50, +1.00 and +1.50 D was intentionally produced, and then distance, intermediate (70cm) and near (40cm) visual acuity was measured. The cylindrical addition of different powers was compensated with spherical lenses so that the spherical equivalent refraction became zero in each eye. The relation between visual acuity and astigmatic power and axis was investigated.

Results: In the distance full correction, distance, intermediate, and near visual acuity was -0.07 ± 0.05 , 0.18 ± 0.25 , 0.43 ± 0.26 logMAR respectively. Distance visual acuity decreased as astigmatic power increased in all type of astigmatism. Intermediate visual acuity in 1.50D WTR astigmatism was significantly worse than that in full correction. There was no significant differences among astigmatic power in intermediate visual acuity with ATR and oblique astigmatism, and near visual acuity in all type of astigmatism. In 1.50D ATR, however, the distance visual acuity was 0.16 ± 0.17 , intermediate was 0.15 ± 0.17 , and near was 0.30 ± 0.29 , and it was observed that the difference between distance visual acuity and intermediate as well as near visual acuity diminished.

Conclusions: In eyes with monofocal IOL, astigmatism reduced distance visual acuity in all types of astigmatism. ATR tends to minimize the decline in intermediate and near visual acuity.

P-CAT-029

An atypical presentation of bilateral diffuse lamellar keratitis after the femto-LASIK

P. Thanakroekkiat^{1,2}, W. Tangpagasit¹, K. Klanarongran³, A. Watcharapanjamart²

¹ophthalmology, Thammasat hospital, Pathum Thani, Thailand, ²ophthalmology, Thammasat hospital, Pathum thani, Thailand, ³ophthalmology, Phramongkutkloa hospital, Bangkok, Thailand

Introduction: Diffuse lamellar keratitis arises from diverse etiologies, spanning both endogenous and exogenous factors. Intraoperative bleeding and sterile instrument use are key endogenous and exogenous triggers, respectively. This case suggests DLK's likely exogenous genesis, implicating markers or polyvinyl alcohol sponge spears as potential instigators.

Objectives: The aim of this case report was to describe a patient who was presented with bilateral diffuse lamellar keratitis after the femto-LASIK procedure.

Methods: Retrospective review assessed patient's history, clinical features, treatments, and outcomes post-femto-LASIK bilateral diffuse lamellar keratitis.

Results: We present the case of a 29-year-old Thai female who underwent bilateral femtosecond laser-assisted in situ keratomileusis surgery. Preoperatively, her manifest refraction was -4.25-0.25x175 in the right eye and -4.25-0.75x165 in the left eye, with corrected distance visual acuity of 20/20 in both eyes. The surgeries were uneventful, with immediate postoperative care including Moxifloxacin eyedrops and an eye shield. Postoperatively, she received a combination medication of 0.5% Moxifloxacin and 0.1% Dexamethasone four times daily. On the second postoperative day, bilateral diffuse lamellar keratitis was suspected due to whitish haze along the inferotemporal edge of the flap in the right eye and a faint haze at the inferonasal edge of the flap in the left eye. Treatment adjustments were made, with 1% Prednisolone acetate eyedrops every 2 hours in both eyes and 1.5% Levofloxacin eyedrops hourly. At one month postoperative, vision improved to 20/15, with autorefraction indicating a slight hyperopic shift: +0.25+0.50x175 in the right eye and +0.50+1.00x166 in the left eye, alongside normal intraocular pressure. Slit-lamp examination revealed complete resolution of infiltrative changes, though minimal punctate epithelial erosions were observed bilaterally. To address these concerns, the patient was advised to use lubricating eye drops more frequently. This case underscores the management challenges of DLK following femto-LASIK surgery, emphasizing the importance of prompt intervention and close monitoring to optimize patient outcomes.

Conclusions: Exogenous DLK following femto-LASIK is rare but can be managed effectively with timely intervention. High-dose topical steroids, antibiotics, and lubricating eye drops often facilitate corneal healing, eliminating the need for flap lifting.

P-CAT-030

Association of myopia and astigmatism with postoperative ocular high order aberration after SMILE

Y. Du¹, Y. Li²

¹Department of Ophthalmology, Peking Union Medical College, Peking Union Medical College, Chinese Academy of Medical Sciences, Peking Union Medical College Hospital, Beijing, China, ²Department of Ophthalmology, Peking Union Medical College, Peking Union Medical College, Chinese Academy of Medical Sciences, Beijing, China

Introduction: The increasing advancement and popularity of visual and aberration analysis tools have led to the recognition of HOA as the primary component that significantly impacts the quality of vision on SMILE. However, there are no definitive results on the effect of the degree of myopia/astigmatism and other factors corrected by SMILE on HOA.

Objectives: To thoroughly examine the relationship between HOA following SMILE and the extent of corrected myopia and astigmatism, as well as the factors that influence it. The findings will provide valuable insights for minimizing the occurrence of HOA after SMILE and enhancing visual quality.

Methods: A total of 75 patients (150 eyes) with myopia and astigmatism who underwent SMILE were divided into four groups based on the severity of their myopia and astigmatism: low myopia group ($DS \leq -4.00D$), moderate to high myopia group ($DS > -4.00D$), low astigmatism group ($DC \leq -1.00D$), and moderate to high astigmatism group ($DC > -1.00D$). Subsequently, a thorough evaluation was conducted to analyze the link between HOA and numerous influencing factors, including a full analysis of subgroups.

Results: The group with low myopia had significantly lower levels of whole eye coma aberrations (CA), corneal total HOA (tHOA), internal tHOA, and C7 after SMILE compared to the group with moderate to high myopia ($P < 0.05$). Similarly, the group with low astigmatism had significantly lower levels of whole eye tHOA, CA, trefoil aberrations (TA), corneal tHOA, TA, and C6 after SMILE compared to the group with moderate to high astigmatism ($P < 0.05$). The Pearson correlation analysis indicated a statistically significant positive link between the severity of myopia/astigmatism and most HOAs ($P < 0.05$). Subgroup studies demonstrated a notable rise in the occurrence of postoperative HOAs linked to myopia and astigmatism in the groups with moderate to high myopia and astigmatism, as compared to the matched reference group. Factors such as lenticule thickness, post-CCT, post-UCVA, and postoperative corneal Km and Cyl were strongly correlated with most HOAs. Factors like gender, age, eye laterality (right/left), astigmatic axis and postoperative IOP were only linked to specific HOAs.

Conclusions: The level of HOA after SMILE is positively correlated with the severity of corrected myopia and astigmatism. However, this connection is not strictly linear. HOAs after SMILE is influenced by various circumstances, additional specialized investigations are required to establish its precise clinical importance.

P-CAT-031

Corneal stromal lens implantation for correction of hyperopia

Y. Xue¹, J. Huo¹, R. Zhao¹, Y. Guo¹

¹Northwest University Affiliated Xi'an Ancient City Aier Ophthalmology Hospital, Xi'an, China

Introduction: The ophthalmic application of femtosecond laser and the development of SMILE corneal refractive surgery have led to the complete removal of a large number of corneal stromal lenses during surgery, providing new ideas for the treatment of hyperopia through lens reuse.

Objectives: We evaluated short-term results of intracorneal lenses as a surgical alternative for the correction of hyperopia.

Methods: In four eyes of two patients with hyperopia between +6.00 and +10.00 diopters (D), corneal stromal lens removed after small incision lens extraction surgery was implanted. Mean baseline hyperopia was +8.40 D. Manifest refraction, uncorrected visual acuity, and spectacle-corrected visual acuity were evaluated. Examinations were done at 1 day, 1 week, 1 and 3 months after intracorneal lens implantation. The lens implanted in the cornea is sourced from the lens extracted by small incision lenticule extraction surgery (Zeiss VisuMax 3.0) to correct myopia and astigmatism and reused. The Zeiss VisuMax 3.0 was also used to create a 110µm corneal flap with a diameter of 8.1 mm. The intracorneal lens was placed under the flap.

Results: Anterior segment OCT showed interface edema at 1 day, that resolved after 1 week. No flap dissolved or displaced of the lens was observed. In 2 eyes, small amount of debris under the flap was seen. At 3 months, the edge of the lens showed excellent compatibility, the cornea is transparent, and the corneal topography shows no posterior corneal surface dilation or keratoconus inclination. After surgery, uncorrected visual acuity (UCVA) improved 5 lines in 2 eyes, 4 lines improved in 2 eyes, 3 lines improved in 1 eye at 3 months.

Conclusions: Lens implantation is safe and effective as an alternative for the correction of hyperopia. Further research is still needed on the predictability of hyperopia but results in these four eyes were stable up to 6 months.

P-CAT-032

Early results after phakic IOL implantation for patients with moderate degree of hyperopia

A. Yusupov¹, N. Zaynutdinov², K. Kamilov³

¹Ophthalmology, Republican Specialized Scientific and Practical Medical Center for Eye MicroSurgery, Tashkent, Uzbekistan, ²Ophthalmology, Nazar Eye Medical Center, Tashkent, Uzbekistan,

³Ophthalmology, Tashkent Medical Institute of Advanced Education, Tashkent, Uzbekistan

Introduction: The EVO Implantable Collamer Lens (HICL; V5 model; STAAR Surgical, Monrovia, California, USA) is a single-piece posterior chamber phakic intraocular lens designed with a central port. It has been shown to be a safe and effective way to correct refractive errors. In this study we try to evaluate the initial results after implantation of these phakic IOLs in patients with moderate hyperopia.

Objectives: The purpose of this study was to evaluate changes in vault and intraocular pressure (IOP) after implantation of a phakic IOL model HICL V5 in patients with moderate hyperopia.

Methods: In this observational research study, 32 eyes of 18 patients were observed after implantation of the spherical HICL (VICH5) V5 model. These patients had been checked up for 6 months in the postoperative period. Uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), intraocular pressure (IOP) and space between the lens and the anterior surface of the natural lens (vault) were measured.

Results: All surgeries were performed safely and without complications from 2021 to 2023 at the NAZAR Medical Eye Center. The safety and efficacy indices were 1.32 and 1.21, respectively. There was no decrease in BCVA in any eye, and BCVA was equal to or better than preoperative BCVA in 32 eyes (100%) with moderate hyperopia. The mean preoperative manifest spherical equivalent (MSE) was $+ 4.39 \pm 1.1$ D and the mean anterior chamber depth was 2.65 ± 0.25 mm, with postoperative refractive index decreasing to ± 0.5 D, respectively. During the 6-month follow-up, the average postoperative IOP was 18.96 ± 2.70 mmHg. At the beginning of the 1st day of the postoperative period, increased intraocular pressure was detected in 6 (18.7%) eyes. IOP increased up to 29.0 mmHg. Hypotensive eye drops were immediately prescribed. Sol. Fotil 1% - 5 ml 2 times a day for 1 week. The elevated IOP slowly decreased to 17.00 mmHg within 1 week respectively. During the observation period, no cases of secondary glaucoma were identified. In the postoperative period, as well as 1 month after ICL implantation and during the last 6 months of follow-up, the average vault values were 269.2 ± 85.3 μ m respectively.

Conclusions: Implantation of the Visian HICL V5 model is a safe, effective and alternative method of refractive surgery for the correction of moderate hyperopia. Pre and postoperative vault parameters may influence changes in postoperative IOP outcome during short-term follow-up.

P-CAT-033

Satisfaction rate after laser correction of presbyopia (presbyond) among patients aged 40 years and older in Taif, KSA

*T. Althomali*¹

¹Ophthalmology, Taif University, Taif, Saudi Arabia

Introduction: Presbyopia is a physiological condition arising due to the loss of accommodation within the crystalline lens. One of the most widely accepted theories of the mechanism of accommodation was that in response to ciliary muscle contraction, the crystalline lens thickness increases, the lens diameter decreases, and both the anterior and posterior curvature of the lens increase, resulting in an increase in lenticular power therefore, accommodation. A contrasting theory suggests that ciliary muscle contraction leads to a selective increase in equatorial zonular tension, with the lens equator moving toward the sclera and the equatorial diameter of the lens increasing. This results in a change of lens optical power. Until now, clinical approaches to correct presbyopia have included monovision, multifocality, and extended depth of focus, all three of which can be achieved surgically on the cornea or by lens surgery.

Objectives: To study Satisfaction Rate After Laser Correction of Presbyopia (Presbyond) Among Patients Aged 40 Years and Older.

Methods: This was a cross-sectional study adopted among patients who had Presbyond surgery in Taif City, Saudi Arabia, and were aged 40 years and older. The data was collected by conducting phone interviews to increase the response rate with a prepared questionnaire that was studied to achieve equality between participants to determine whether they were satisfied or not about the results after this surgery. The data was collected for the period beginning on the first of January 2019 until the first of February 2023.

Results: A significant number of participants (28.1%, n=25) reported experiencing complete improvement and returning to normal life within 1-30 days after surgery. A slightly larger percentage (39.2%, n=35) experienced this within 1-3 months. Most of the participants (80.9%, n=72) reported an overall improvement in their quality of life after the surgery. In terms of recommendations, a total of 49 (55.1%, n=49) participants stated that they were very likely to recommend refractive surgery to a family member or friend experiencing vision problems.

Conclusions: The majority of participants did not experience any problems during the surgery, and most were able to resume their normal activities within a relatively brief period of time. The surgery achieved its goals for the majority of participants, Overall, the participants were satisfied with the surgery, with the majority being very likely to recommend it to others.

P-CAT-034

How to plan cataract surgery in keratoconus

S. Thompson¹, A.A. Rodriguez Libarona², C. Thompson¹, A. Pividori³

¹Cataract and Refractive Surgery, Formosa Eye Center, Formosa, Argentina, ²Glaucoma, Formosa Eye Center, Formosa, Argentina, ³Pediatric Ophthalmology, Formosa Eye Center, Formosa, Argentina

Introduction: Keratoconus is a common ectatic disorder resulting in progressive corneal thinning and irregular astigmatism. It has been observed that patients affected by KC are more likely to develop lens opacities earlier compared to non-keratoconic patients.

Objectives: Intraocular lens selection and refractive outcome prediction are among a number of factors that can make cataract surgery in keratoconic patients challenging. Accurate biometry is often difficult to obtain due to unreliable K measurements and lack of dedicated biometric formulae.

Methods: The bibliographic search of scientific publications was carried out with the following keyword "*Keratoconus, Cataract surgery, Biometry, Toric IOL*" in Pubmed search engine until 2023 inclusive. Preoperative factors that could improve the prediction of postoperative refraction accuracy were analyzed.

Results: The estimation of the corneal power, axial length, the intraocular lens selection and the power estimation formula in keratoconic eyes can be challenging and may ultimately affect the predictability of post-cataract surgery outcomes.

Conclusions: Determining the stage of keratoconus, pre-operative patient counselling and the preferred method of refractive correction are all crucial to obtain successful postoperative outcomes and good patient satisfaction. The use of toric IOLs can achieve good results only in selected low-grade keratoconic eyes.

P-CAT-035

Pneumatic iridodialysis repair: sharing our experience

S. Tyagi¹, R. Agarwal¹, S. Dadeya¹

¹Ophthalmology, Guru Nanak Eye Centre, Maulana Azad Medical College, New Delhi, India

Introduction: Iris root being the thinnest and weakest portion of iris stroma, detaches first in blunt trauma and accidental engagement during intraocular surgery. Sutural restoration predisposes to reduction in endothelial cell density, crystalline lens touch or IOL dislocation, eventual suture erosion and even scleral melt. Isoexpansile gases like sulphur hexafluoride are used as tamponading agents in retinal surgeries and descemetopexy with consistently good outcomes. Their use for iridodialysis repair is described very recently with limited peer-reviewed literature.

Objectives: Presently, we share our experience of employing SF6 for iridodialysis repair in a series of four patients.

Methods: Case 1: 77-year-old female referred on postoperative day 3 with 120 degree iridodialysis in superonasal quadrant. 20% SF6 was injected intra-camerally and advised head end elevation for first 24 hours. Iris was found attached to its root with a round pupil.

Case 2: 65-year-old female undergoing cataract surgery had inadvertent 270 degree inferior iridodialysis. 20% SF6 was injected providing full intracameral tamponade for 5 minutes, then burped to fill 2/3rd chamber. Postoperative foot end elevation, resulted in 180 degree iris reposition.

Case 3: 18-year-old male had blunt trauma with cricket ball, resulting in 180 degree superior iridodialysis. Intracameral SF6 failed in repositing the iris. Suture-assisted reposition was done, resulting in lens touch and localized cataract.

Case 4: 68-year-old male had iatrogenic infero-nasal iridodialysis. Intra-operatively intracameral SF6 was injected. Patient was advised foot end elevation. All but one clock hour of iris reattached.

Results: The iris root was well approximated in 3 out of 4 cases, with no incidence of eccentric pupil. Minimal anterior chamber inflammation was observed postoperatively. No hyphema or IOP elevation was noted. There was no remarkable complication for upto one-month follow-up.

Conclusions: Pneumatic iridodialysis repair by intracameral 20% SF6 injection is a minimally invasive technique, employed in intraoperative rescue management. Early restoration prevents iris necrosis. No large or separate incision needed, thus no additional risk of infection and a faster recovery time. Visual acuity, intraocular pressure, endothelial cell loss, pupil shape and intra and postoperative complications have promising results on long-term follow-up. However, appropriate case selection is required for this technique.

P-CAT-036

Early changes in corneal volume and corneal thickness spatial profile after SMILE and FS-LASIK for high myopia

*T. Shen*¹

¹Eye Center, The Second Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China

Introduction: The change of corneal morphology after refractive surgeries is quite important for evaluating the safety and effectiveness, also predicting the instability in the long run, especially for high myopia. We compared the different early changes of cornea between SMILE and FS-LASIK for high myopia to explore more about refractive surgery.

Objectives: To evaluate the early corneal changes after small incision lenticule extraction (SMILE) and femtosecond laser-assisted in situ keratomileusis (FS-LASIK) for high myopia patients in a clinical setting based on the corneal volume (CV) and corneal thickness spatial profile (CTSP).

Methods: This retrospective study included patients with high myopia who underwent corneal refractive surgery at the Eye Center of the Second Affiliated Hospital of Zhejiang University from December 2020 to December 2022 and completed 6-month follow-up, and were divided into 23 patients (46 eyes) in the SMILE group and 23 patients (46 eyes) in the FS-LASIK group according to the surgical procedures. Pre- and post-operative (1, 3, 6 months) CV and corneal thickness (CT) on the central, thinnest point, and 2, 4, 6 mm diameter concentric circles of the study subjects were measured by Pentacam® anterior segment analyzer, and the percentage of thickness increase (PTI) was calculated. Repeated measurements of CV, CTSP and PTI at different postoperative time points were analyzed using Friedman's test, and the correlation between postoperative PTI and preoperative gender, age, surgical procedure, central corneal thickness and intraocular pressure was performed using multiple linear regression.

Results: After SMILE, CT at the central, thinnest point and 2-mm, 4-mm, and 6-mm concentric circles were significantly increased at 3 months compared with 1 month ($Z=-3.32, p<0.001$; $Z=-3.09, p=0.002$; $Z=-3.49, p<0.001$; $Z=-3.31, p<0.001$; $Z=-2.75, p=0.006$); CV ($Z=-2.51, p=0.012$), CT at the central, thinnest point and 2-mm, 4-mm, and 6-mm concentric circles ($Z=-3.98, p<0.001$; $Z=-3.82, p<0.001$; $Z=-3.75, p<0.001$; $Z=-3.34, p<0.001$; $Z=-2.97, p=0.003$), as well as PTI at 2-mm, 4-mm, and 6-mm concentric circles ($Z=-2.11, p=0.035$; $Z=-3.53, p<0.001$; $Z=-3.90, p<0.001$) were significantly elevated at 6 months compared with 1 month. After FS-LASIK, CT at the center, thinnest point, and 2-mm, 4-mm concentric circles ($Z=-3.40, p<0.001$; $Z=-2.97, p=0.003$; $Z=-2.61, p=0.009$; $Z=-2.26, p=0.024$), as well as PTI at 4-mm and 6-mm concentric circles ($Z=-2.54, p=0.011$; $Z=-1.97, p=0.049$), were significantly increased at 3 months compared with 1 month; CT at the center, thinnest point, and 2-mm, 4-mm concentric circles ($Z=-4.19, p<0.001$; $Z=-3.76, p<0.001$; $Z=-3.42, p<0.001$; $Z=-2.70, p=0.007$), as well as PTI at 2-mm, 4-mm and 6-mm concentric circles ($Z=-2.26, p=0.024$; $Z=-3.09, p=0.002$; $Z=-3.37, p<0.001$), were significantly increased at 6 months compared with 1 month. Changes in CV, CTSP and PTI were not statistically significant at 6 months postoperatively compared to 3 months ($p>0.05$) in both groups. The results of multiple linear regression showed that the PTI on the 2-mm and 4-mm concentric rings was higher in the FS-LASIK group compared to the SMILE group at 6 months postoperatively ($b=0.55, p=0.008$; $b=1.44, p=0.009$).

Conclusions: After SMILE and FS-LASIK for patients with high myopia, CT increased and CV changed insignificantly within 3 months, while changes in CV, CT and PTI stabilized between 3 and 6 months. Compared to the SMILE group, the PTI in the FS-LASIK group was higher postoperatively and changed significantly within 3 months.

P-CAT-038

Argentinian flag sign in 3D surgery

*M.V. Cibran*¹

¹Instituto OFTALMOS, Ciudad Autónoma de Buenos Aires, Argentina

Introduction: The Argentinian flag sign is a complication that can occur during cataract surgery in the setting of intumescent cataracts. As trypan blue dye is routinely used to better visualize the capsule, the appearance of a biradial tear in the stained capsule during the capsulorhexis simulates the Argentinian national flag. This tear can further extend to the periphery, leading to zonular rupture, posterior capsular rupture, vitreous loss, and nucleus drop. Surgeons must be prepared to optimize the surgical technique to prevent the occurrence of this complication and be mindful to identify and manage it when it does present.

Objectives: To analyze a case of intumescent cataract surgery with the Argentinian Flag Sign complication and discuss the different techniques described to prevent and manage this.

Methods: The presentation may include the clinical history of the patient and the video of the surgery with the Argentinian Flag Sign complication and its management. The surgery was performed with 3D Ngenuity visualization system from Alcon. A literature search was done on PubMed, the Cochrane Library, MEDLINE and PubMed Central up to February 2024 by using MESH terms such as "anterior capsular tear", "Argentinian flag sign", "surgical technique", "posterior capsule rupture" with interpositions "AND" and "OR" to review different approaches to enhance the outcome and minimize the risks.

Results: There is a subtype of the intumescent cataract with no obvious liquification of the cortex but a raised intralenticular pressure. The lens fibers in this variety are hydrated and swollen, as seen in our patient, leading to these types of complications during surgery. Multiple techniques were described to prevent this sign in the literature, but all agree that a correct diagnosis and classification of the cataract prior to surgery are most important.

Conclusions: Phacoemulsification of an intumescent cataract remains a challenging entity even for experienced surgeons. Capsulotomy is one of the most difficult steps in cataract surgery for intumescent cases due to the highly pressurized intralenticular compartment and increased risk of radial extension of capsular tears. There are numerous surgical techniques described to prevent this complication. However, success is largely dependent on the experience of the surgeon and, mostly importantly, on an excellent diagnosis before the surgery.

P-CAT-039

Lid Scrub & Thermal pulsation treatment to improve film quality and biometry accuracy to adopt presbyopic IOLs

M. Piovella¹, B. Kusa¹

¹Global Center for Ophthalmology srl, Monza, Italy

Introduction: Refractive cataract surgery is based on the possibility to achieve a good postoperative refractive outcome within a range of 0.50 diopters after implanting trifocal IOLs. Advanced biometry is effective when an healthy tear film and cornea surface provide the proper K1K2 to decrease halos and glare postoperatively. Blephex and LipiFlow routinely adopted before cataract surgery help to detect the lens precise power to better support patient needs.

Objectives: To evaluate two systems Blephex for Lid Scrub (Alcon – Fort Worth Texas) and LipiFlow (J&J - Santa Ana Ca) for the thermal pulsation treatment of Meibomian Gland Dysfunction (MGD) to improve quality of the surface of the cornea to get better IOLs power biometry calculations.

Methods: Since 2017, 378 patients (mean age 66.58 ± 11.55 years) were treated for MGD. Patients received a LipiFlow treatment to remove obstructions and restore meibomian gland function. 123 of these patients received also Blephex treatment immediately before since September 2019.

Results: Postop quality of vision improved in all patients, and regular cornea surface provided more precise and stable biometry results. The adoption of lipiflow and blephex treatments provided 97% of eyes inside the planned refractive postoperative outcome.

Conclusions: These treatments have a priority role in adopting implants to correct refractive defects and treat presbyopia in cataract patients.

P-CAT-040

The complication and learning curve of femtosecond laser-assisted cataract surgery: a cohort study of 3,289 cases

X. Zhang¹, K. Yao¹

¹Eye Center, Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Femtosecond Laser-Assisted Cataract Surgery (FLACS) has emerged as a promising advancement in ophthalmic surgery, offering precision and potential improvements in patient outcomes compared to traditional methods. However, the transition to this new technology raises questions about its learning curve and safety. This study examines the efficacy and safety of FLACS through a prospective analysis of 3,289 Chinese cases, focusing on the incidence of intraoperative complications and the number of cases required for a surgeon to achieve proficiency. The findings aim to clarify the learning curve associated with FLACS and assess its overall safety, providing essential insights for ophthalmologists adopting this innovative surgical approach.

Objectives: To identify the length of the learning curve of femtosecond laser -assisted cataract surgery (FLACS) and evaluate the safety of FLACS according to the surgical efficacy parameters and the incidence of intraoperative complications.

Methods: Prospective consecutive cohort study of Chinese patients who underwent FLACS (3,289 cases) between February 2015 and September 2018. The patients were divided into three groups. Group 1 consisted of the first 50 cases by each surgeon (250 cases), and group 2 consisted of the 51th-100th cases by each surgeon (250 cases) and group 3 consisted of the subsequent 2,789 cases. We recorded intraoperative complication rates, and compared with surgical efficacy parameters and between groups.

Results: In this study, incomplete capsulotomies occurred in 6.09% of the cases; anterior capsule tears occurred in 1.63%; and posterior capsule ruptures occurred in 1.16%. The incidence of intraoperative complications, such as anterior tags and bridges, anterior capsule tear, pupillary constriction and posterior capsule rupture, were significant differences between group 1 and 2, but there was no significant difference in the incidence of most of the complications between group 2 and group 3.

Conclusions: This study suggests that FLACS is a safe and efficient technology with an acceptable rate of complications. The length of the learning curve for FLACS is 100 cases, which means a surgeon is required to undergo at least 100 FLACS procedures before they can be considered to be professionally competent in the technique.

P-CAT-041

Safety and efficacy of hydro injection Intraocular Lens (IOL) in Phacoemulcification

K.R. Dayawansa¹, P.V. Dayasena², S.C. De Silva², K.S. Thilakarathna³

¹Ophthalmology, National Eye Hospital, Colombo, Sri Lanka, ²OPHTHALMOLOGY, NATIONAL EYE HOSPITAL, COLOMBO, Sri Lanka, ³Medical Student, University Of Colombo, Colombo, Sri Lanka

Introduction: IOL insertion is normally followed by inflation of viscoelastic in to the capsular bag following Phacoemulcification which needs subsequent complete removal of viscoelastic to avoid post operative TASS and Intraocular pressure. Hydro injection of IOL is done with inflation of anterior chamber with Balanced salt solution which can eliminate the additional procedure after IOL insertion

Objectives: This study to evaluate the safety and efficacy of Hydro injection of IOL following successful phacoemulcification

Methods: Retrospective study of all the case notes of all patients had hydro injection of IOL in single centre by single surgeon using single type IOL for three months from November 2023 to January 2024. All uncomplicated phacoemulcification cases up to the IOL insertion step were included . At the completion of phacoemulcification and aspiration of the cortex, surgeon holds bimanual irrigation with non dominant hand and assisting nurse screw and push the IOL into the anterior chamber while surgeon holds the injector with dominant hand. In the meantime surgeon guides the IOL in to the capsule bag with the help of bimanual irrigation and aspiration. Patient demographics, problems encountered with this new technique were analysed to evaluate the safety and effectiveness of this procedure. When surgeon feels that the capsular bag complex is pushing forward or any unsafe AC depth at the end of phacoemulcification, those cases were excluded from the study and those IOL s were injected using viscoelastic as conventional procedure.

Results: Total number of 180 eyes of 180 patients. Females were 61.6% and Left eyes were 54.4%. Majority were between 50-70 years age group (55.5%) and majority of the IOL power was 22 to 24 Diopter(41%). Only one patient was noted to have an iris capture with IOL haptic and residual cortex in the anterior chamber on following day which needed re operation to correct the problem. Surgeon personally felt that surgical time was significantly reduced because of the elimination of last step viscoelastic aspiration

Conclusions: Hydro injection of IOL at the end of successful phacoemulcification seems to be safe and effective procedure in selective cases. it will eliminate the additional step of removing viscoelastic by which less risking these eyes with TASS or raised Eye Pressure. it will need further studies to have firm conclusion.

P-CAT-042

Retrospective analysis of YAG Capsulotomy post phacoemulsification

*S. Bhide*¹

¹Ophthalmology, Bhide Clinic & Ruby Hall Clinic Pune, Pune, India

Introduction: PCO is a Common cause of diminution of vision following uneventful cataract surgery

- 2 to 5 percent in first 3 yrs post operatively
- 8 to 10 percent in 5 yrs post operatively
- PCO rates vary depending on type of lens and lens material
- Review of literature has not shown higher incidence in a particular eye (R / L)

Objectives: To analyze retrospectively incidence of PCO

Methods: •1752 YAG laser capsulotomies performed by a solo practitioner over a period of last 17 years were analyzed

- 1368 cases (eyes) were operated by a single surgeon
- All cases were done by using Alcon phacoemulsification machine and coaxial I&A was used in all the cases
- All cases were performed by surgeon sitting superiorly and incision site was at 11 o'clock position in all cases i.e supero temporally in right eye and supero nasally in left eye

Results: •Incidence of PCO development is more in Left eyes

- PCO development in left eye is earlier as compared to right eye
- Average postop period for PCO in left eye was 2.5 years compared to 5 years for right eye
- More in hydrophilic acrylic lenses as compared to hydrophobic acrylic lenses
- More in patients with associated comorbidity like diabetes, uveitis

Conclusions: •Incidence of PCO development is more in Left eyes

- PCO development in left eye is earlier as compared to right eye

P-CAT-043

Gender differences in health-related quality of life following laser scleral microporation therapy in presbyopes

A. Hipsley¹, B. Ang², M. Rau³, D. Zhu⁴

¹CEO, Ace Vision Group, Boston, United States, ²ophthalmology, Asian Eye Institute, Makati City, Philippines, ³Ophthalmology, Augenklinik, Cham, Germany, ⁴ophthalmology, Nvision Eye Centers, California, United States

Introduction: Patient Reported Outcomes (PROMs) were measured using a standardized Near Activity Visual Questionnaire (NAVQ) before and after Laser Scleral Microporation (LSM) in emmetropic presbyopes

Objectives: To assess gender differences of satisfaction of visual function for near activities following Laser Scleral Microporation (LSM) therapy using Patient Reported Outcome Measures (PROMs). Presbyopic patients were followed up to 24 months post-treatment.

Methods: Prospective pilot clinical trial of 94 eyes of 47 emmetropic presbyopic patients (mean age 52.8 ± 4.0 years) demonstrating presbyopia with DCNVA at 40cm $\geq 20/50$ and requiring a reading add power of +1.75D or more. UDVA was 20/40 or better in eyes free of ocular anomalies. Thirty-two female and 15 male subjects were enrolled. All subjects underwent bilateral LSM therapy to treat emmetropic presbyopia. The Near Activity Visual Questionnaire (NAVQ), a standardized patient-reported outcome measure, assessed function before LSM therapy at baseline and post-LSM at one week, one month, 3, 6, 12, 18, and 24 months. Gender differences were assessed, including quantitative analysis of visual outcomes and qualitative analysis of health-related quality of life (HRQoL) factors.

Results: Data analysis up to 24 months after LSM showed female Rasch Scores dropped significantly from 65.2 at baseline to 41.8 at month 24 ($p < 0.005$), indicating a statistically significant improvement in the ability to perform near vision activities up to 24 months after LSM. Males also demonstrated improvement from 64.8 at baseline to 30.7 at 24 months. ($P=0.0001$) PROMs also improved quality of life, with 74% of the patients reporting moderate to complete satisfaction with their near vision at 12 months. Men were slightly more satisfied than women at all postoperative post therapy visits.

Conclusions: The NAVQ demonstrated a positive impact of LSM therapy on near-visual function with high patient satisfaction among presbyopic emmetropes. While all patients achieved a sustainable improvement in functional vision satisfaction, males showed greater satisfaction than females, likely due to a difference in near and intermediate activities of daily life demand (ADL). Women appeared to have increased near vision functional demand and expectation. More studies are needed to inform clinical and therapeutic expectations.

P-CAT-044

Analysis of the impact of different body and head positions on intraocular pressure measurements

*Y. Wang*¹

¹Aier eye hospital of Wuhan University (Wuhan Aier Eye Hospital), Wuhan, China

Introduction: Analyzing the relationship between intraocular pressure and head and body positions

Objectives: Evaluate the consistency and influencing factors of intraocular pressure measurements in different body and head positions

Methods: Using random sampling method, 100 patients (200 eyes) at our hospital from August to December 2023 were selected for a single arm prospective experiment. Measure intraocular pressure using a handheld tonometer (iCare ic200 rebound tonometer) in four positions of the patient: supine, semi supine, seated, and prone, with the head facing forward, head facing left, and head facing right.

Results: When the patient is in a supine position, the intraocular pressure of (13.80 ± 3.62) mmHg, (14.25 ± 3.66) mmHg, and (13.78 ± 3.40) mmHg in the head forward, head right, and head left positions are not statistically different; When the patient is in a semi recumbent position, the intraocular pressure of (12.08 ± 3.34) mmHg, (12.12 ± 3.22) mmHg, and (12.04 ± 3.38) mmHg in the head forward position, head right position, and head left position, respectively, are not statistically different; When the patient is in a sitting position, the intraocular pressure (IOP) for head forward, head right, and head left positions is (11.73 ± 3.29) mmHg, (11.73 ± 3.22) mmHg, and (11.59 ± 3.17) mmHg, respectively, with no statistically significant difference among the three; When the patient is in a prone position, the intraocular pressure of (14.19 ± 3.73) mmHg, (14.42 ± 3.93) mmHg, and (14.74 ± 3.81) mmHg in the head forward, head right, and head left positions are not statistically different. Head position has no effect on intraocular pressure. Under the same head position, the sitting position has the lowest intraocular pressure, while the prone position has the highest. Different body positions have an impact on intraocular pressure values. The intraocular pressure between the four postures showed good consistency, with $ICC=0.801$ ($P<0.0001$) when the head position was forward; When the head position is to the right, $ICC=0.796$ ($P<0.001$); When the head position is to the left, $ICC=0.758$ ($P<0.001$)

Conclusions: The intraocular pressure value is related to the position, and as the inclination of the position increases from an upright position to a horizontal position, the intraocular pressure value increases. The lowest intraocular pressure is observed in the seated position, while the highest is observed in the prone position. The intraocular pressure value is independent of head position.

P-CAT-045

Influence of corneal epithelium thickening on the accuracy of IOL degree calculation for Refractive cataract surgery

J. Guo¹, Z. Zhou², Z. Liu³

¹Peking University, Beijing, China, ²Tianjin Eye Hospital, Tianjin, China, ³Peking University Third Hospital, Beijing, China

Introduction: Anterior segment optical coherence tomography provides a novel method for mapping corneal epithelium. It has been found that corneal epithelium thickening was common in the elderly. It is unknown whether the epithelial thickening would affect keratometry and IOL calculation. Formula accuracy was assessed in this study in patients with thickened corneal epithelium.

Objectives: To explore and compare the effect of corneal epithelial thickening on predictability of Haigis, Holladay1, SRK/T, universal 2, Kane, evo and hill-rbf for cataract surgery.

Methods: The data were collected from 149 eyes of 149 patients who underwent cataract surgery. Only eyes with anterior chamber depth from 2.0mm to 4.0mm and axial length from 22mm to 25.5mm were included. To simplify the calculation, the thickness of corneal epithelium was defined as the average of 5 epithelium statistics within the central 3mm zone of the corneal epithelial thickness map. In order to investigate the effect of the thickening of corneal epithelium on IOL power prediction for each formula, the median thickness of the whole population (56.4 μm) was set as a grouping criterion. The postoperative refraction was measured 3 months after the surgery. The absolute value of the difference between the actual and expected refractive error after surgery was regarded as an indicator for evaluating the IOL power prediction of each formula.

Results: While in normal corneal epithelium group Kane performed better than evo and hill-rbf, evo hill-rbf and Kane played far better than evo in thickening group.

Conclusions: For eyes with thickening corneal epithelium, Hill-rbf and Kane are more proper.

P-CAT-046

A study to evaluate the effect of intraocular lens centration and tilt on visual performance

A. Chokshi¹, R. Shetty¹, H. Schaffner², H. Keeton², K. Freidl¹, S.A. Hasan¹, R. Browning¹, O. Gayasaddin¹, M. Lott¹, R. Goldfaden²

¹Florida Eye Specialists, Jacksonville, FL, United States, ²East Coast Institute for Research, Jacksonville, FL, United States

Introduction: Clareon® intraocular lenses (IOLs) have demonstrated excellent mechanical stability, however no studies have been performed to assess the effects of decentration and tilt of the Clareon® IOLs on visual outcomes. This study is designed to assess whether visual acuity is associated with decentration or tilt of Clareon® Vivity® and Clareon® Vivity® Toric IOLs.

Objectives: Primary: To determine whether monocular BCDVA is associated with IOL decentration or tilt

Secondary: To determine whether the following outcomes are associated with IOL decentration or tilt:

1. Monocular UCDVA
2. Monocular DCIVA
3. Monocular UCIVA

Methods: This was a non-interventional, single center, multi-surgeon, observational study. The study population included individuals implanted with Clareon® Vivity® and Clareon® Vivity® Toric IOLs. Preoperative and operative implantation data was collected through retrospective chart review of 100 implanted individuals (200 eyes), and postoperative assessments occurred via examination at least one month post-operation. Examination included measurements of monocular corrected and uncorrected distance and intermediate visual acuities. Decentration and tilt of the IOLs were measured with the CASIA2 AS-OCT (Tomey Corporation). Mesopic pupil size as well as coma and spherical corneal higher-order aberrations were also measured. The primary and secondary endpoint analyses were initially approached using single crude models, followed by subsequent analyses using a single adjusted model to determine the association between the outcome and the exposure of interest. The Holm-Bonferroni method was applied to control the family-wise error rate for multiple comparisons in the adjusted analyses.

Results: N/A - expected June 2024

Conclusions: N/A - expected June 2024

P-CAT-047

Retrofixated iris claw lens-long term results in a tertiary care centre in India

H. Kauldhar¹, K. Singh¹

¹Ophthalmology, Government Medical College, Amritsar, India

Introduction: Complicated Cataract surgery is the most common cause of aphakia. Zonular dialysis or posterior capsular tear/dehiscence can cause inadequate capsular support and difficulty to implant "in the bag" IOL or ciliary sulcus supported IOL. Angle supported anterior chamber intraocular lens (ACIOL), anterior chamber (AC) iris-claw lens, retropupillary iris fixated IOL and Scleral-fixated IOL (SFIOL) are the various options available for surgical correction of aphakia. Retropupillary iris fixated IOL is a simple, effective and safer technique than ACIOL or Anterior chamber Iris claw IOL or SFIOL.

Objectives: The purpose of study was to analyse the visual outcomes and long term results after the retropupillary iris fixated IOL implantation for correction of aphakia, both as primary or secondary procedure.

Methods: This is a retrospective study conducted at Government Medical College Amritsar, India. 100 patients who underwent retropupillary iris fixated IOL were studied. The study was conducted in accordance with tenets of Declaration of Helsinki. Data was analysed as: Timing of surgery, Uncorrected Visual Acuity (UCVA), Best Corrected Visual Activity (BCVA), Clinical signs of Endothelial Cell Loss, Condition of Iris IOL position, Intraocular Pressure (IOP), Pigment dispersion, Gonioscopy (wherever was necessary) and other complications.

Results: The study comprised of 100 patients with monocular aphakia. The mean age was 58±6 years. IOLs were inserted during primary lens procedure in 60 patients and as secondary lens procedure in 40 patients. Pigment clumping was noted in 27 eyes. Mean IOP at 6 months was 16mmHg. 12 eyes had significant ovalisation of pupil post operatively. 9 eyes had glaucoma. Choroidal detachment was noted in 2 eyes. CME in 9 eyes. 1 eye had retinal detachment and 12 eyes had iris atrophy. Mean endothelial cell loss was 12%. Pupillary distortion was the most common complication in 40 patients followed by pigment clumping over the IOL (27%). Elevated IOP and macular edema were noted in 9 patients. Iris chaffing at the enclavation site of the IOL was noted in 2 patients. Pupillary capture was noted in 1 patient.

Conclusions: The retropupillary iris claw IOL implantation provided good visual outcome with fewer complications. It has the advantage of posterior chamber lens position near to nodal point of eye. Surgery is easy to master and faster technique with no significant corneal damage. It is a safe and effective method to correct aphakia in patients with no posterior capsule support.

P-CAT-048

Early clinical outcomes of trans-PRK using high performance laser system in a North-Eastern Malaysia University Hospital

M. Ibrahim¹, J. Muhamad¹, A. Yaakub¹, S. Ismail¹

¹Ophthalmology and Visual Sciences, Universiti Sains Malaysia, Kubang Kerian, Malaysia

Introduction: Laser refractive surgery has been around for quite sometime. Three modalities of treatment are in use that include Photo-Refractive Keratectomy (PRK), Laser in-Situ Keratomileusis (LASIK) and Kerato-Lenticular Extraction (KLEX). PRK was the first laser refractive surgery approved by FDA in 1995. It became less popular ever since the introduction of LASIK and later KLEX. With introduction of the latest high performance excimer laser system which enable Trans-PRK to be done as a non-touch-seamless-one-step-fast procedure, its popularity re-emerge as a sole procedure or combine usage with LASIK. We report early clinical outcomes of a newly established laser refractive center in a University Hospital.

Objectives: To report the profiles of the cases and clinical outcomes of Tran-PRK procedures performed on eligible clients. The outcomes include safety, accuracy and predictability and magnitude of astigmatism at three months post surgery

Methods: At one an a half year of commission we have operated about 150 cases. Potential cases were screened, refracted and other diagnostic parameters were done by trained optometrists. The parameters were measured using Schwind Sirius. The laser surgery was performed using Schwind Amaris^(R) 1050RS (Smart Sur^{FACE}). Standard surgical techniques were applied. The cases were reviewed at 1 week, 1 month, 3 months, 6 months and 1 year. The inclusion criteria for this study include:

1. Eligibility for laser surgery on those age from 21-39 years and myopia of -1.50 D to -12.0D.
2. Completed 3 months follow up.
3. Surgery performed on both eyes.

The exclusion criteria include:

1. Planned mono-vision procedure.

A retrospective analysis were made to fulfil the objectives.

Results: A total of 35 cases (70 eyes) fulfilled the criteria. There were 11 male and 24 female. The age ranges from 21-37 years with average of 29.5years. The spherical equivalence were -1.50D to -11.50 D. Astigmatism ranges from 0 to -2.0D. At 3 months of review the Efficacy index was 1.12. The Safety index was 1.15. There were no cases with lost of one or more lines. As for Accuracy and Predictability 95.83% were within plus or minus 0.50D and 100% were within plus or minus 1.00D. As for the magnitude of astigmatism 100% were within 0.50 D. There were no major complications noted in all the eyes at 3 months.

Conclusions: The results were comparable to most other established centers. A larger samples and a longer follow-up review are required to determine the long term results.

P-CAT-049

Across the dark to the light: surgical management for complex cataract and iridodialysis following traumatic hyphema

*H. Riyanto*¹

¹Tritya Eye Clinic, Surabaya, Indonesia

Introduction: We describe the surgical treatment of a case of traumatic cataracts accompanied by lens subluxation and iridodialysis resulting from complete hyphema caused by penetrating trauma. The surgical outcomes vary based on the degree of iridodialysis, the severity of hyphema grading, and the etiology of trauma at the initial presentation of the patient.

Objectives: To present the surgical treatment of a case of complicated cataracts and iridodialysis resulting from traumatic hyphema.

Methods: A case report.

Results: A 60-year-old man with a nail injury had blurred vision in his left eye. A hazy cornea, flat anterior chamber, complete hyphema, and corneal lacerations on a limbal position of around 3 mm were found on objective examination. His visual acuity was hand movement. A post-trauma evaluation was done after the initial therapy. Traumatic cataracts, subluxated lens, one-and-half quadrants iridodialysis, and secondary glaucoma were found. Cataract surgery and iridoplasty were performed to resolve these issues. His best corrected visual acuity was 6/10, with a mid-mydriatic pupil and stable intraocular lens at three months follow-up.

Conclusions: Performing cataract surgery combined with iridoplasty is a complex and demanding scenario. Accurate diagnosis, initial treatment, and advanced care are crucial in order to obtain favorable functional and anatomical results for ocular injuries.

P-CAT-050

Scleral contact lens in complex corneal situations in a tertiary eye center in India

P. Jain¹, A. Hariani¹, I. Gupta¹, U. Sharma¹, N. Trivedi¹, A. Mehta¹, M. Sethi¹, K. Garg¹, A. Soman¹, C. Ogia¹, G. Reddy¹

¹Guru Nanak Eye Centre, Delhi, India

Introduction: Scleral contact lenses (SCLs) are wide-diameter, rigid, gas permeable systems that vault over the whole cornea, creating a fluid reservoir between the anterior surface of cornea and posterior surfaces of the lens. They are being used extensively to treat various ocular surface disorders and show potential in managing many conditions that until now could be managed only surgically.

Objectives: The purpose of this study is to showcase a myriad of complex scenarios where scleral contact lenses were used as a treatment choice in patients for better quality of vision and comfort.

Methods: This is a retrospective analysis of scleral contact lens fitting done in complex corneal situations in contact lens clinic in a tertiary eye center in Delhi, India.

Results: The most common indication for the use of scleral contact lenses in our setup was irregular astigmatism due to keratoconus not amenable to correction conventional lenses. Other complex situations that were corrected by SCLs included post radial keratotomy, post lasik ectasia, operated optical/ therapeutic penetrating keratoplasty, operated lamellar keratoplasty, surface irregularities like epithelial basement membrane dystrophy, pellucid marginal degeneration, terrien's degeneration, Salzmann nodular keratopathy, severe dry eyes, Steven johnson syndrome.

Conclusions: There has been a shifting trend to manage various degrees of irregular corneas due to varied etiology with scleral contact lens (SCLs) hence adopting a more conservative approach which is reversible and more acceptable to the patients. These lenses have become a useful tool in ocular surface abnormalities providing a protective interface as well as improving the visual acuity and quality of life.

P-CAT-051

Efficacy and safety of iris claw lenses: a cost-effective solution for complicated cataract surgeries in Guatemala

L. León Nieto¹, R. Papa¹, L. Silva¹, H. Quintanilla¹

¹Ophthalmology, Visualiza Hospital, Guatemala, Guatemala

Introduction: Complicated cataract surgeries pose significant challenges for anterior segment surgeons, often requiring innovative approaches to achieve optimal outcomes. In resource-limited settings, where financial constraints restrict the use of premium intraocular lens (IOL) options nor a second surgery with a retina specialist, the choice between iris claw lenses (ICLs) and scleral fixation lenses becomes crucial. By assessing visual acuity outcomes, complication rates, endothelial cell count and follow up with UBM to assess inflammation of the iris, we aim to elucidate the role of ICLs as a viable alternative.

Objectives: This study aims to evaluate the efficacy and safety of iris claw lenses (ICLs) in complicated cataract surgeries, particularly assessing their utility in low-income patients where an anterior segment surgeon may opt against using scleral fixation lenses due to cost constraints.

Methods: A descriptive retrospective analysis was conducted on 215 patients who underwent complicated cataract surgeries with ICL implantation in Visualiza Hospital in Guatemala, from January 2020 to December 2021. The uncorrected visual acuity, best-corrected visual acuity, intraocular pressure, intraoperative and postoperative complications were recorded. 15 ultrasound biomicroscopy were performed 6 months postoperatively. 30 patients had an endothelial cell count measured one week after surgery and 6 months after surgery evaluated with non-contact specular microscope.

Results: Significant improvements in visual acuity were observed postoperatively ($p < 0.001$). Of the 19 eyes that had visual acuity worse than 20/200 at last follow-up, 12 (63%) had pre-existing conditions. Complication rates were low, with no instances of iris claw dislocation and minimal pupillary/iris abnormalities measured by ultrasound. The late complications (4%) recorded were rhegmatogenous retinal detachment, hemolytic glaucoma, Irvine Gass Syndrome, irreversible corneal edema. 1 week after surgery, mean corneal endothelial cell density was 2312.34 ± 349.76 cells/mm², while mean central corneal thickness was 501.89 ± 30.82 μ m. The average corneal endothelial cells loss in 6 months was 0.26%.

Conclusions: According to our study, iris claw lenses are a safe and effective alternative in complicated cataract surgeries, offering favorable visual outcomes and low complication rates. Their utility in low-income patients is particularly noteworthy, as they provide a cost-effective solution where scleral fixation lenses may not be feasible.

P-CAT-052

Study of the prevalence of incision types in cataract surgery and their relation to postoperative complications

M. Sargazi¹, M. Khosro Abadi¹, S.O. Mohammadi², D. Najafi³

¹Ophthalmology, Zahedan University of Medical Sciences, Zahedan, Iran, Islamic Republic of, ²Texas Christian University, Fort Worth, United States, ³Shahid Beheshti University of Medical Sciences, Tehran, Iran, Islamic Republic of

Introduction: Cataract is the opacity of the different layers of the human eye's natural lens, leading to blurred vision and decreased visual acuity. Given that there is no effective drug treatment for this disease, various surgical methods, including phacoemulsification, have long been considered the only treatment option. In this study, we examined the type and structure of incisions in cataract surgery of patients referred to Al-Zahra Eye Hospital, Zahedan, utilizing AS-OCT.

Objectives: To examine the type and structure of incisions in cataract surgery of patients referred to Al-Zahra Eye Hospital, Zahedan, using AS-OCT capabilities and to evaluate their impact on the endothelial gap, epithelial gap, Descemet's membrane detachment, surgically induced astigmatism, and the healing process of the incision.

Methods: The study population included all patients who underwent cataract surgery at Al-Zahra Eye Hospital, Zahedan, in 2021. Eligible individuals were selected based on inclusion and exclusion criteria. A questionnaire was completed for each patient. The day after the surgery, all patients were examined at the hospital to determine postoperative astigmatism with an auto-refractometer and afterward to evaluate the structure and possible complications of the incision with an OCT device.

Results: In this study, 78 patients participated with an average age of 64 ± 7 years. The youngest was 55 and the oldest was 75 years old. In total, 35 male patients (44.9%) and 43 female patients (55.1%) participated in this research, with 40 individuals (51.3%) having surgery on the right eye and 32 individuals (48.7%) on the left eye. As for the surgery, uniplanar, biplanar, and tri-planar incisions were performed, with 26 patients (33.3%) undergoing each type of surgical procedure.

Conclusions: There was no significant relationship between a one-day and one-month endothelial gap and the type of incision. The same result was observed for the epithelial gap. The average astigmatism after one day was higher in the uniplanar incision type compared to the biplanar incision and higher in the biplanar incision compared to the triplanar incision. This difference was statistically significant. However, for the astigmatism developing after one month in the three types of planar incisions, the average astigmatism was not significant.

P-CAT-053

The postoperative outcomes of toric intraocular lens implantation in patients aged above 85 years

S. Nakano¹, T. Oshika²

¹Ophthalmology, Ryugasaki Saiseikai Hospital, Ryugasaki, Japan, ²Department of Ophthalmology, Faculty of Medicine, University of Tsukuba, Tsukuba, Japan

Introduction: This study analyzed the visual outcome following cataract surgery with toric intraocular lenses (IOLs) in patients older than 85 years with corneal astigmatism.

Objectives: To evaluate the postoperative outcomes of toric intraocular lens (T-IOL) implantation in cataract surgery patients aged above 85 years.

Methods: We analyzed consecutive cases of 30 eyes from 17 patients aged over 85 years (mean age 88.5 ± 4.1 years) with preexisting astigmatism ranging from 0.75 diopters (D) to 3.52D who underwent cataract surgery with T-IOL implantation. Preoperative corneal astigmatism was measured using anterior segment optical coherence tomography (CASIA2® Tomey, Japan) and axis marking was performed using a digital guidance system (VERION® Alcon, USA). Conventional phacoemulsification and aspiration were conducted with a 2.2mm corneal incision placed at the 12 o'clock position. Postoperative outcomes, including uncorrected distance visual acuity (UDVA) measured by logarithm of the minimum angle of resolution (logMAR), postoperative astigmatism (D), and axis misalignment of the IOL in degrees against the planned axis ($^{\circ}$), were assessed at 3 months postoperatively. Results were compared with those from 30 eyes of 15 younger patients (mean age 73.9 ± 8.6 years) who underwent the same T-IOL implantation procedure.

Results: There were no statistically significant differences in preoperative parameters between the two age groups, except for age and UDVA logMAR ($p < 0.001$ each). Postoperatively, there were no statistically significant differences observed in mean UDVA logMAR (0.00 for the >85 age group and -0.05 for the younger age group, $p = 0.17$), postoperative astigmatism (0.21D vs. 0.16D, $p = 0.33$), or IOL axis rotation (1.97° vs. 1.43° , $p = 0.14$) between the two groups.

Conclusions: Implanting T-IOLs in patients over 85 years of age, when performed using appropriate surgical techniques, can achieve postoperative outcomes comparable to those observed in younger patients.

P-CAT-054

Assessment of implantable collamer lens efficacy and safety in hyperopia correction

*A.S. Alampur*¹

¹Cataract, Cornea and Refractive, Saijyothi eye hospital, Secunderabad, India

Introduction: Hyperopia poses challenges for surgical correction, with Implantable Collamer Lenses (ICL) being less frequently employed compared to myopia correction. This hesitation is often attributed to concerns related to shorter axial lengths and shallower anterior chamber angles in hyperopic eyes, which may predispose patients to complications such as intraocular pressure elevation.

Objectives: To evaluate the efficacy, safety, and stability of Implantable collamer lens implantation as a refractive correction method for hyperopia, considering factors such as visual acuity, refractive outcomes, complications, and patient satisfaction over a specified follow-up period.

Methods: This single-case observational study was conducted at Saijyothi Eye Hospital over a 2-year period from February 2022 to February 2024. The study involved a 23-year-old hyperopic patient eligible for refractive surgery. Preoperative assessment included a thorough ophthalmic examination encompassing uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), manifest refraction, corneal topography, anterior segment optical coherence tomography, endothelial cell count, and White-to-White measurements. Her Best corrected visual acuity (BCVA) was 20/30 in right eye and 20/200 in left eye due to amblyopia. The ICL by STAAR Surgical was implanted following standard protocols. Follow-up appointments were scheduled for 2 years postoperatively to monitor outcomes.

Results: Following thorough evaluation, hyperopic ICL was planned for both eyes. Prophylactic YAG peripheral iridotomy was performed for both eyes two weeks before surgery. A toric ICL was implanted in the right eye (+7.50 DS / +1.00 x 90°), and a Non-toric Hyperopic ICL was implanted in the left eye (+8.00 DS). The surgeries proceeded without complications. Postoperatively, the distance visual acuity, measured using Snellen's chart, was 20/30 for the right eye and 20/200 for the left eye.

Conclusions: The utilization of ICL for hyperopia management is not common practice. Nonetheless, our investigation underscores the significance of taking into account factors like shorter axial lengths and shallower anterior chamber angles, which can increase the likelihood of intraocular pressure elevation in patients. Our findings demonstrate the efficacy of prophylactic iridotomy in reducing this risk. The favorable outcomes observed in our study advocate for a broader approach to hyperopia management, suggesting that ICL could be a feasible option for appropriate candidates.

P-CAT-055

The effect of 0.05% cyclosporine eye drops on dry eye syndrome in patients after cataract surgery

X. Li¹, X. Jiang¹, Y. Wang¹

¹Department of Ophthalmology, Peking University Third Hospital, Beijing, China

Introduction: The aim of this study is to investigate the influence of 0.05% cyclosporine on dry eye symptoms and related adverse reactions after cataract surgery.

Objectives: This study included a total of 63 patients who underwent cataract surgery at Peking University Third Hospital between June 2022 and December 2022, among which there were 21 cases (21 eyes) in the control group and 42 cases (42 eyes) in the cyclosporine group.

Methods: All patients underwent standard small incision cataract phacoemulsification and intraocular lens implantation, with the same surgeon who met the criteria of single blind surgery. Informed consent for all the patients was obtained. After surgery, both groups of patients received the same antibiotic, steroid, and nonsteroidal eye drops. In the cyclosporine group, 0.05% cyclosporine eye drops were used twice a day from 7 days to 3 months postoperatively. Follow-up will be conducted 1 day preoperatively, 1 week, 1 month, and 3 months postoperatively. The follow-up includes: visual acuity (best corrected visual acuity), non-contact intraocular pressure, tear meniscus height, BUT time, corneal fluorescence staining (CFL), OSDI score and adverse reactions.

Results: The dry eye degree of patients who received 0.05% cyclosporine eye drops postoperatively was significantly lighter than that of patients in the control group. There was no significant difference in OSDI, BUT, and CFL scores between the two groups of patients preoperatively and 1 week postoperatively; At 1 month and 3 months postoperatively, the OSDI (1 month: 31.60 ± 6.7 ; 3 months: 12.30 ± 4.1) and CFL score (1 month: 1.2 ± 0.3 ; 3 months: 0.5 ± 0.1) of the cyclosporine group were significantly lower than those of the control group (OSDI: 1 month: 51.20 ± 10.3 , 3 months: 32.60 ± 4.7 ; CFL score: 1 month: 5.2 ± 2.0 , 3 months: 3.4 ± 1.0). BUT of cyclosporine group (1 month: $5.0 \pm 2.3s$; 3 months: $6.0 \pm 2.6s$) was significantly higher than that in the control group (1 month: $2.1 \pm 0.7s$; 3 months: $3.2 \pm 0.9s$). In addition, there was no significant difference in BCVA (fractional vision) between the two groups preoperatively, 1 week, and 1 month postoperatively. However, at 3 months postoperatively, the BCVA of the cyclosporine group (0.90 ± 0.14) was significantly better than that of the control group (0.80 ± 0.13 , $P=0.008$).

Conclusions: 0.05% cyclosporine has a significant effect on relieving dry eyes in patients after cataract surgery, and can significantly improve postoperative vision, with no significant side effects observed.

P-CAT-056

Astigmatism after phacoemulsification and its correlation with the central corneal thickness

F. Shoshi^{1,2,3}, E. Shoshi^{1,4,2,5,3}, M. Hoxha-Shoshi^{3,6}, K. Spahiu^{1,7}

¹Department of Ophthalmology, University Clinical Center of Kosova, Prishtina, Kosovo, ²PhD School of Clinical Medicine - Department of Ophthalmology, University of Prishtina "Hasan Prishtina", Prishtina, Kosovo, ³Department of Ophthalmology, Poliklinika "SHOSHI", Prishtina, Kosovo, ⁴PhD School of Clinical Medicine - Department of Ophthalmology, Semmelweis University, Budapest, Hungary, ⁵Faculty of Medical Sciences, AAB College, Prishtina, Kosovo, ⁶Department of Ophthalmology, AMECC "REZONANCA", Prishtina, Kosovo, ⁷Department of Ophthalmology, University of Prishtina "HASAN PRISHTINA", Prishtina, Kosovo

Introduction: Cataract is an ophthalmological disease with the highest prevalence in the elderly. Pre-operative determination of corneal topography has a number of roles in the surgical treatment of cataract. Corneal topography is important if the degree and location of pre-existing astigmatism are known, so that it can be taken into account during surgical intervention. Determination of corneal topography (pachymetry) facilitates meeting the expectations of surgical intervention, within 0.5 diopters of emmetropia with minimal astigmatism.

Objectives: Our aim is to determine the correlation between the central corneal thickness and post-operative astigmatism after phacoemulsification.

Methods: This prospective, observational study was carried out in the Ophthalmology Department at the University Clinical Center of Kosovo (UCCK). The study included 101 eyes of patients who underwent cataract surgery with phacoemulsification for cataract treatment and IOL implantation.

Results: The study included 101 patients with cataract. Patients were divided into two groups, depending on the central thickness of the cornea. The first group included 29 patients with a central corneal thickness < 550 μm . The second group included 72 patients with a central corneal thickness \geq 550 μm . By gender, more patients were Male (M 53.5% vs. M 46.5%), without significant difference by groups ($P=0.377$). Mean age of patients is 69.8 yr. (SD \pm 10.7 yr), range 38-92 yr. In 54.6% of the patients cataract surgery with phacoemulsification was performed in the right eye. No significant difference between the two groups was found. Astigmatism is less preoperatively ($P=0.092$), 1 week, 2 weeks, and 2 months after surgery at the group of patients with central corneal thickness \geq 550 μm , but without a statistically significant difference. There was no significant correlation between the central corneal thickness and the surgically induced astigmatism after phaco-emulsification.

Conclusions: Our study showed there is no significant correlation between corneal thickness and SIA after cataract surgery with phacoemulsification.

P-CAT-057

Intraoperative floppy iris syndrome in women: Prevalence and association with general medication use

A. Mirshahi¹, C. Clasen¹, A. Licht¹, C. Latz¹, K. Ponto^{1,2}

¹Dardenne Eye Hospital, Bonn, Germany, ²Ophthalmology, University Medical Center Mainz, Mainz, Germany

Introduction: Intraoperative Floppy Iris Syndrome (IFIS) presents a triad of iris anomalies during cataract surgery, historically linked to alpha-1 receptor blockers in men. Despite initial focus on males, IFIS occurs in women, yet gender-specific prevalence and its medication associations remain underexplored.

Objectives: In this study we investigate IFIS prevalence in women and its potential links to current systemic medication.

Methods: This retrospective, comparative, monocentric study analyzed medical records of patients undergoing cataract surgery from January 2018 to June 2022. Data included ocular/systemic comorbidities and current medication use, classified using Anatomical Therapeutic Chemical (ATC) coding. Data was also extracted in an age- and gender-matched control group without IFIS. We used SPSS software and the Chi-square test for statistical analyses.

Results: We identified 163 eyes of 149 women with IFIS. The mean age was 76.9 years (Range: 52 - 95). The prevalence of IFIS in women was 6.3% (163 out of 2593 eyes), contrasting with 20.3% in men (431 out of 2121). Comparison of systemic medication usage between IFIS cases and controls showed no significant differences in women.

Conclusions: This study offers gender-specific IFIS prevalence data and suggests no current systemic medication association with its occurrence in women. Remarkably, the prevalence in women is approximately one-third of that observed in men. Future research should incorporate longitudinal analyses, accounting for past medication history, given IFIS's potential as a lasting side effect of prior medications.

P-CAT-058

Aesthetic impact after cataract surgery

M.L. Fernández¹

¹Plástica Ocular - Medicina Estética, Instituto de la Visión, Buenos Aires, Argentina

Introduction: Patients answer a series of questions about the perception of her face and skin aging change.

Objectives: Report the patient's experience refer changes in herface and premature aging.

Methods:

Case series. Patients answer a series of questions about the perception of her face and skin aging change

This cuestionary is answered before cataract surgery, 1 month after surgery and finally when the aesthetic treatment plan is completed.

Results:

Patients indicated feeling at least 10 years older than their biological age and they did aesthetic treatments to improve their appearance.

Conclusions:

The improvement in visual acuity after cataract surgery makes patients ask their ophthalmologist about their aging change over their face.

Patients indicated feeling at least 10 years older than their biological age.

P-CAT-059

Strategies for correcting low degree corneal astigmatism during cataract surgery

C. Yan¹, T. Guo¹

¹Ophthalmology, Shanghai Ninth People's Hospital, Shanghai, China

Introduction: With the improvement of quality of life, cataract patients pursue clearer and more comfortable vision not only improvement after cataract surgery. Correcting the corneal astigmatism that existed before surgery and improving uncorrected visual acuity as much as possible is the goal of the cataract doctor.

Objectives: To analyze the correction strategy of low degree corneal astigmatism.

Methods: Astigmatism correction methods during cataract surgery include clear corneal incision, limbal relaxing incision, arcuate keratotomy, and toric intraocular lens implantation.

Results: Toric intraocular lens implantation had the best predictability. For older patient with low-degree astigmatism (around 1 D), Corneal relaxing (limbal relaxing incision, arcuate keratotomy) may be considered. For young and middle-aged cataract patients, the long-term results after corneal release surgery are less predictable, and regression may occur. Clear corneal incision for correction astigmatism has limited effect, can be made on a steep axis to reduce the effect of surgically induced astigmatism.

Conclusions: Toric intraocular lens was the preferred strategy for low degree astigmatism correction in cataract surgery, even with a risk of rotation.

P-CAT-060

Spatial and morphologic features of lenses with axial length based on a novel swept-source optical coherence tomography

C. Chen^{1,2,3,4}, *J. Meng*^{1,3,2,4}, *K. Cheng*^{1,3,2,4}, *Q. Kang*^{1,3,2,4}, *H. Guo*⁵, *X. Zhu*^{1,3,2,4}

¹Eye Institute and Department of Ophthalmology, Eye & ENT Hospital, Fudan University, Shanghai, China, ²NHC Key Laboratory of Myopia, Fudan University, Shanghai, China, ³Key Laboratory of Myopia, Chinese Academy of Medical Science, Shanghai, China, ⁴Shanghai Key Laboratory of Visual Impairment and Restoration, Shanghai, China, ⁵Department of Ophthalmology, Shanghai Heping Eye Hospital, Shanghai, China

Introduction: Newly developed biometric instruments has promoted the development of intraocular lens (IOL) power calculation formulas. However, more detailed parameters of lenses, such as lens vault (LV), and radii of curvature of anterior and posterior lens surfaces (Ra and Rp), cannot be directly obtained by the current biometric instruments, restricting further optimization of IOL power calculation formulas. Moreover, how these parameters change with axial length (AL) has not been fully studied yet.

Objectives: To investigate the spatial and morphologic features of lenses with AL using a novel swept-source optical coherence tomography (SS-OCT; TowardPi Yalkaid, TowardPi Medical Technology).

Methods: Totally 105 eyes of 105 patients scheduled to have cataract surgery were included. Eyes were divided into the control (AL<24.5 mm), moderate myopia (MM, 24.5≤AL<26 mm) and high myopia (HM, AL≥26 mm) groups. Spatial features including LV and iris-to-lens distance (ILD), and morphologic features including Ra and Rp, lens diameter (LD) and lens thickness (LT) were measured in eight directions by SS-OCT.

Results: Spatially, the HM group had larger LV and ILD than the control group (both $P<.05$). LV and ILD were negatively correlated with AL, respectively (LV: $r=-0.484$, $P<.0001$; ILD: $r=-0.656$, $P<.0001$). Morphologically, both MM and HM groups had greater Ra and Rp than the control group. Ra was positively correlated with AL ($r=0.622$, $P<.0001$), while the relationship between Rp and AL was non-linear. Moreover, the MM and HM groups had larger LD than the control group (both $P<.001$). Anterior LT was thinner in the HM than in the MM group ($P=.026$), while posterior LT between these two groups was similar. When compared in eight directions, similar trends were seen in Ra, Rp and LD, respectively, and the HM group showed a greater difference in Ra between horizontal and vertical directions.

Conclusions: This SS-OCT-based study showed that lens may gradually flatten as AL elongated, which was mainly attributed to the increase of Ra and LD.

P-CAT-061

Capsulotomy and capsulorhexis centration according to Trypan Central landmark

P. Stodulka^{1,2}, R. Packard³

¹Gemini Eye Clinics, Zlin, Czech Republic, ²Third Faculty of Medicine, Charles University, Prague, Czech Republic, ³Home, Bracknell, United Kingdom

Introduction: The observation of enhanced central capsular trypan blue staining prompted this study to explore its potential for capsulotomy centration.

Objectives: The objective was to compare the centration of the capsulotomies that were centered on the dilated pupil compared with those centered on the trypan central (TC) landmark.

Methods: The study comprised 180 eyes undergoing cataract surgery. All anterior capsules were stained with microfiltered 0.4% trypan blue solution and underwent selective laser capsulotomy. For the first 60 eyes (Group 1) the capsulotomies were centered on the mydriatic induced dilated pupil. For the next 60 consecutive eyes (Group 2) the capsulotomies were centered on the TC landmark. For the remaining 60 eyes (Group 3) the capsulotomies were centered on the coaxial Purkinje image. The surgical videos were analyzed to measure distances between key anatomical landmarks relative to the TC landmark, coaxial Purkinje image, capsulotomy and IOL center.

Results: Of the 180 eyes enrolled >94% had a defined TC landmark that correlated and was coincident with the 3rd Purkinje image with a displacement of < 0.1 +/- 0.1 mm. Likewise, the coaxial Purkinje image and IOL centration were also coincident within 0.1 +/- 0.1 mm. The dilated pupil centered capsulotomies (Group 1) were noticeably decentered from the IOLs by 0.3 +/- 0.2 mm. Whereas, both the TC centered and coaxial Purkinje image centered capsulotomies had a displacement of 0.15 +/- 0.1 mm from the IOLs. Biometry data matched with the CALLISTO Eye system verified that the coaxial Purkinje image and the TC landmark were coincident with the measured visual axis. All reported data have a statistical significance of $p < 0.05$.

Conclusions: The TC landmark, clearly visible in almost all eyes, can act as a guide for capsulotomy centration. This provided symmetrical 360capsulotomy rim overlaps of the IOLs, which were demonstrated to be superior to those centered on the mydriatic induced dilated pupil. TC landmarks were demonstrated to be statistically equivalent to Purkinje image centration. All patients in the study received topic anesthesia and were cooperative. Patients who receive additional anesthesia are less precise in Purkinje fixation. The benefits of the TC landmark being located on the anterior capsule thus include lack of sensitivity to tilt, and no patient compliance (thus independence of anesthesia). It is a viable landmark for capsulotomy centration.

P-CAT-062

Analyzing corneal astigmatism and refractive error following post cataract surgery: assessment and implications

M. Shahid¹, A. Marufa¹

¹Ophthalmology, Ship International Hospital, Dhaka, Bangladesh

Introduction: Cataract surgery is the most common surgical procedure in ophthalmic practice, meeting the rising patient expectations by optimal postoperative results. It includes restoring the patient vision and obtaining the intended refractive correction by intraocular lens (IOL) implantation. But, the existence of postoperative refractive error and corneal astigmatism persist as a significant challenge which impacting visual acuity and patient satisfaction.

Objectives: The aim of this study was clinical assessment of corneal astigmatism related to secondary intraocular lens implantation and implications of residual refractive errors subsequent to post-cataract surgery.

Methods: An extensive literature search was done on PubMed, Google scholar, Web databases. A systemic review was analyzed population based cross sectional and longitudinal studies reporting outcomes following cataract surgery.

Results: Corneal astigmatism and refractive errors can adversely affect patient vision and satisfaction. Studies found that refractive status depends on numerous pre-, intra- and post-operative factors. Several research state that, the main reasons behind postoperative visual impairment mainly revolved around uncorrected refractive error during the surgery. Other studies also highlight the importance of preoperative assessments in selecting the appropriate Intraocular lens (IOL) power measurement by precise biometry to minimize refractive surprises. Research findings indicate that residual refractive errors subsequent to cataract surgery have been linked to adverse effect on patients uncorrected near, intermediate and distance vision consequently influencing their overall quality of life ($P < 0.01$). The propensity for wearing near spectacles was found to be 6.74 times greater among patient with hypermetropia ($p < 0.005$), interestingly this reliance on near spectacles was not contingent on astigmatic refractive error (odds ratio = 0.22, $p > 0.12$). Additionally, some study also proposed that laser refractive surgery could effectively correct refractive surprises involving large error.

Conclusions: Study demonstrate a significant burden of postoperative refractive error among the pseudophakic population. Some pre and intra operative factors were negatively influencing in reaching the planned post operative refractive outcome. Taking this into consideration, Effort should be focused on minimizing this burden and achieving desired outcomes by prioritizing the issue. Suggested the need for heightened attention both of cataract surgeons and responsible individuals during the procedure.

P-CAT-063

Anatomo-functional results of manual small incision cataract surgery at Vision Plus Clinic - Gonaives, Haiti, 2021-2023

W. Louis¹, E.F. Julcéus², J. Desir¹, E. Charles², G. Pierre³

¹Artibonite, Vision Plus Clinique des Gonaives (VPC-G), Gonaives, Haiti, ²L'Ouest, Centre pour la Santé Intégrale et la Recherche (CESAIR), Port au Prince, Haiti, ³L'Ouest, Hopital de l'Université d'État d'Haïti (HUEH), Port au Prince, Haiti

Introduction: Cataract, the leading cause of blindness in the world.

Objectives: To evaluate the anatomo-functional results of Manual Small Incision Cataract Surgery (MSICS) at Vision Plus Clinic in Gonaives, Haiti, and risk factors for complications and poor visual acuity.

Methods: A retrospective cohort study was performed including 298 patients aged 18 and above suffering from cataract, with visual acuity of 20/200 or less, who had a MSICS at Vision Plus Clinic from March 2021 to February 2023, excluding cases of congenital cataract. Sociodemographic characteristics, pre- and postoperative visual acuity, postsurgical anatomical changes, and surgical complications were collected from medical records. Preoperative and postoperative visual acuity were graded using the World Health Organization (WHO) classification of visual impairment and blindness: good (20/20-20/60), borderline (<20/60-20/200), bad (<20/200). Data were analyzed using descriptive statistics and chi-square test with Epi Info 7 software.

Results: The average age of patients was 65.4 years (+/-11.6), 59.7% of them were women, 49.0% were traders or farmers. Most patients had senile (82.6%) and nuclear (49.0%) cataracts, 71.5% had blindness ranging from finger counting to light perception, 56.4% had systemic diseases (mostly diabetes and hypertension), 42.9% had associated ocular pathologies (such as glaucoma, diabetic/hypertensive retinopathy), 12.1% had signs of poor prognosis (mostly posterior capsule fibrosis and zonulysis). The day after surgery, corneal edema (37.6%) and descemetic folds (27.2%) were the most common complications; 30 days after, 50.3% of the patients had good visual acuity without correction and 60.7% with correction; 60 days after 55.7% of them had refractive error. Patients with systemic disease were more likely to develop per-op complications ($p=0.01$), those with signs of poor prognosis were more likely to develop per-op ($p<0.0001$) and post-op complications ($p=0.0001$) compared to their counterparts. Patients aged 70 years and above ($p<0.0001$), with senile cataract ($p=0.04$), or who had an associated ocular pathology ($p=0.005$) were more likely to have average or bad visual acuity 30 days after surgery.

Conclusions: MSICS improved visual acuity with few complications, although the 80% threshold for good postoperative visual acuity set by WHO was not reached. Providing postoperative correction of residual ametropia, along with improving surgeons surgical techniques, will help optimize visual outcomes and the use of cataract surgery.

P-CAT-065

Managing post operative refractive surprises

L.S. Jhala¹

¹Ophthalmology, Alakh Nayan Mandir, Udaipur, India

Introduction: Residual refractive errors after a successful cataract surgery is a known entity. In today's era of modern cataract surgery such post op refractive surprises are unacceptable and brings lot of stress to the surgeon and dissatisfaction to the patient. I would like to suggest methods how to deal with this situation in this paper.

Objectives: Objective of this presentation will be to suggest various methods to deal with post operative refractive surprises and to manage them successfully to meet the patient expectations.

Methods: Post operative refractive surprises can present immediately next day when we have operated them and we take the vision next day, in such cases lens exchange is the only way to deal with it if refractive surprise is of more than one diopter. If it is less patient can be counseled and latter PRK can be done. Other methods like refractive surgery, piggyback IOL and late IOL exchange are also method which will be discussed in this paper.

We have done four IOL exchange, four refractive procedures and four piggyback IOL

Results: All 12 patients with lens exchange, refractive laser correction and piggy back IOL were within 0.5 D post operatively.

Conclusions: Post operative refractive surprises are not so common now a days with optical biometers and good calculations formula available, but once encountered they can give a big set back to patients as well as surgeons. Timely diagrams management can bring back the smile on patients.

P-CAT-066

Optimizing surgical outcomes in challenging cataract cases: collaborative approach and comprehensive management

D. Lietuviete¹, K.L. Vaganova²

¹Aiwa Clinic, Rīga, Latvia, ²Riga Stradins University, Rīga, Latvia

Introduction: Cataract surgery in patients with secondary glaucoma and posterior synechiae presents unique challenges, requiring a collaborative approach and comprehensive management strategies. This case report highlights the importance of selecting the appropriate surgical technique, premedication, and postoperative medication regimens to achieve favorable outcomes in complex cataract cases.

Objectives: This study aims to evaluate the impact of a collaborative approach among specialty physicians and the effectiveness of comprehensive management strategies in optimizing surgical outcomes in patients with secondary glaucoma and posterior synechiae undergoing cataract surgery.

Methods: A retrospective analysis was conducted on patients with uveitis who underwent cataract surgery. Preoperative assessment involved collaboration between ophthalmologists and other specialty physicians to optimize the patient's medical condition. Surgical planning included careful selection of anesthesia and preoperative medications tailored to the patient's needs. The surgical procedure involved meticulous detachment of posterior synechiae, staining of the anterior capsule, and phacoemulsification with intraocular lens implantation. Postoperative management strategies were developed in consultation with specialty physicians, emphasizing the importance of timely intervention and close monitoring.

Results: Among the patients included in the study, cataract surgery was successfully performed with meticulous detachment of posterior synechiae and intraocular lens implantation. Postoperatively, patients experienced mild retinal edema with epiretinal membrane, which were effectively managed through collaborative efforts and comprehensive postoperative medication regimens. Visual acuity significantly improved within 10 days postoperatively, and intraocular pressure remained stable. Patient reported significant improvement in visual function and overall satisfaction with the surgical outcome.

Conclusions: This case report underscores the significance of a collaborative approach among specialty physicians and comprehensive management strategies in optimizing surgical outcomes in challenging cataract cases. By leveraging the expertise of multiple disciplines and tailoring treatment plans to individual patient needs, favorable outcomes can be achieved, even in complex cases. Further emphasis on interdisciplinary collaboration and continuous refinement of treatment protocols is essential for advancing patient care in ophthalmology.

Video

[Click here to play video](#)

P-CAT-068

Unilateral Congenital Lenticular Pigmentation

A. Alsagga¹, Y. Alnajmi¹, M. Albeidh², M. Alsayed¹

¹Cataract, Saggaf Eye Centre, Jeddah, Saudi Arabia, ²Retina, Saggaf Eye Centre, Jeddah, Saudi Arabia

Introduction:

Release of pigments in the anterior chamber is frequently observed in pigment dispersion syndrome, an autosomal dominant disorder marked by bilateral pigment deposition on the anterior and possibly posterior lens capsule, zonules of the lens, trabecular meshwork, and corneal endothelium, in addition to radial, spoke-like transillumination defects in the mid peripheral iris [J Ayub Med Coll Abbottabad. 2017;29(3):412–414 and Optom Vis Sci. 1995;72(10): 756–762]. Pigmentation of the anterior lens surface has also been associated with intraocular inflammation, pseudoexfoliation syndrome, siderosis, antipsychotic medication usage, and remnants of the tunica vasculosa lentis [Br J Ophthalmol. 1998;82(11):1344].

Objectives:

Congenital lenticular pigmentation is a rare benign entity carrying no surgical indications with a relatively good visual response to optical correction. Recognition of this rare benign condition would add to the ophthalmologist's differential of ocular pigmentation and avoid unnecessary concern and follow-up in more potentially progressive disorders such as pigmentary glaucoma.

Methods:

The CARE Checklist has been completed by the authors for this case report, attached as online supplementary material (for all online suppl. material, see <https://doi.org/10.1159/000534927>).

Results:

Congenital lenticular pigmentation

Conclusions:

Congenital lenticular pigmentation is a rare benign entity carrying no surgical indications with a relatively good visual response to optical correction. Recognition of this rare benign condition would add to the ophthalmologist's differential of ocular pigmentation and avoid unnecessary concern and follow-up in more potentially progressive disorders such as pigmentary glaucoma.

P-CAT-069

Unpredictable outcomes post phakic intraocular lens implantation

G. Dabas¹, T. Chauhan², K.S. Hikkalagutti¹

¹Cataract and Refractive, Centre for Sight, New Delhi, India, ²Cornea, Cataract and Refractive, Centre for Sight, New Delhi, India

Introduction: Phakic IOL implantation is a viable option for high myopic errors and has promising visual outcomes. However, despite meticulous pre-operative planning and calculations, one may encounter unpredictable outcomes post phakic IOL implantation. At such times, it becomes difficult to decide whether to intervene or not. We hereby present a compilation of four such cases and their management.

Objectives: To understand unpredictable complications post-Phakic IOI implantation and their management.

Methods: Records of all patient who underwent phakic IOL implantation in the refractive department of our institute in past 2 years (Jan 2021 to Dec 2022) were reviewed. All cases who had any significant finding in the early post operative period in terms of decreased visual acuity, raised intra ocular pressure, findings on Anterior Segment Optical Coherence Tomography (AS-OCT) were included. Those who underwent additional surgical intervention post phakic IOL implantation were also included.

Results: Out of 4 eyes of 4 patients, 1 eye underwent toric and 3 eyes underwent spherical phakic IOL implantation. The eye with toric phakic IOL had residual cylindrical error in early postoperative period, it underwent redialling twice and was ultimately explanted to be replaced with a larger size phakic IOL. Out of remaining 3 eyes, 1 eye had reverse orientation and required re-surgery for proper orientation. One eye had an extremely high vault and was kept under observation. One eye had an extremely low vault, needed phakic IOL explantation with a larger size phakic IOL implantation.

Conclusions: Meticulous and accurate measurements are needed while planning a phakic IOL procedure. Despite best efforts one may land up into unpredictable outcomes. Decision to intervene depends primarily on clinical examination and AS-OCT findings in such cases.

P-CAT-070

Clinical effect and rotational stability of EVO TICL with non-horizontal implanting orientation: a prospective study

X. Fan¹, T. Fukuyama², X. Zhou²

¹Ophthalmology, Jincheng People's Hospital, Jincheng, China, ²Ophthalmology and Optometry, Eye and ENT Hospital, Fudan University, Shanghai, China

Introduction: Clinical Effect and Rotational Stability of EVO TICL with Non-horizontal Implanting Orientation

Objectives: To evaluate the short-term clinical outcomes and rotational stability of the EVO implantable toric collamer lens (TICL) using a customized Non-horizontal Implanting Orientation for the correction of myopic astigmatism.

Methods: A total of 98 eyes of 55 patients with myopic astigmatism underwent TICL (STAAR Surgical, Monrovia, CA) implantation were enrolled from August to November 2023 in Eye and ENT Hospital of Fudan University (Shanghai, China). The horizontal placement was defined as 22.5° or less of rotation from the horizontal meridian. The non-horizontal placement was defined as more than 22.5°. All patients were followed up for more than 3 months. The uncorrected and best-corrected visual acuity (UCVA and BCVA), astigmatism and spherical equivalent, intraocular pressure, vault, endothelial cell morphometry, and rotation of the TICL axis were assessed at 1 day, 1 week, 1 month, 3 months postoperatively. Postoperative rotation was defined as the angle between the intended axis and the achieved axis.

Results: The safety index at 3 months was 1.22 ± 0.16 for the non-horizontally implanted group and 1.27 ± 0.18 for the horizontally implanted group; the efficacy index was 1.13 ± 0.1 for the non-horizontally implanted group and 1.16 ± 0.18 for the horizontally implanted group. All eyes achieved an uncorrected distance visual acuity of 0.10 logMAR or better. The mean astigmatism value decreased from -1.70 ± 0.85 D preoperatively to -0.10 ± 0.57 D for the non-horizontally implanted group and -2.38 ± 2.01 D preoperatively to 0.17 ± 0.42 D for the horizontally implanted group. The mean absolute axis deviation of the TICL at the last follow-up was $4.05 \pm 3.25^\circ$ for the non-horizontally implanted group and $3.12 \pm 3.32^\circ$ for the horizontally implanted group. Mean absolute change in axis orientation between visits was less than 10° for all visit intervals. 73.59% were found to rotate 5° or less for the non-horizontally implanted group and 77.78% for the horizontally implanted group. 32.08% lenses were found to rotate 2° or less for the non-horizontally implanted group and 57.78% for the horizontally implanted group. There are no significant statistical difference between the groups.

Conclusions: The results of this study support that TICL with Non-horizontal Implanting Orientation implantation is safe, effective, and predictable in the treatment of myopic astigmatism, with relatively good postoperative rotational stability.

P-CAT-071

Application of self-made astigmatism vector calculation table in calculating the rotation angle of TICL in the eye

C. Qiong¹, L. Wu¹, W. Zhang²

¹Ophthalmology, Taikang Tongji (Wuhan) Hospital, Wuhan, China, ²Taikang Tongji (Wuhan) Hospital, Wuhan, China

Introduction: TICL can rotate in the eye, and the reason for rotation may be due to the influence of the anatomical structure of the eye or external forces. How to accurately calculate the rotation angle and the corrective effect of astigmatism after rotation in the eye can be obtained through calculation. This method uses the ALPINS method to create a self-made table for calculating the astigmatism vector and accurately calculates the TICL rotation.

Objectives: Explore the use of a self-made astigmatism vector calculation table to calculate the rotation angle of TICL after rotation in the eye.

Methods: Using the ALPINS astigmatism vector analysis method, three numerical values were introduced: 1. Target induced astigmatism correction (TIA), which is the preoperative astigmatism value; 2: Surgically induced astigmatism (SIA) introduced during surgery, the actual value of astigmatism produced during surgery; 3: The difference vector (DV) between the target and the actual correction amount is the vector difference between TIA and SIA. Firstly, convert the 180 ° astigmatism axis position into a trigonometric function and perform a new astigmatism vector decomposition in 360 ° coordinates. Secondly, use the Excel table to edit the formula for calculating the astigmatism vector, calculate the superposition effect of preoperative and postoperative astigmatism vectors, and calculate the precise position of the rotation angle of the TICL after rotation in the eye. Finally, use the astigmatism marker position of the TICL after pupil dilation to verify the method.

Results: Use a self-made astigmatism vector calculation table to calculate the intraocular rotation angle of TICL, which is consistent with the detected rotation angle after dilation.

Conclusions: The self-made astigmatism vector calculation table can accurately calculate the rotation angle of TICL in the eye.

P-CAT-072

Safety of femtosecond laser-assisted cataract surgery versus conventional phacoemulsification for cataract

J. Xu¹, X. Chen¹, H. Wang¹, K. Yao¹

¹Eye Center, Second Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou, China

Introduction: Although numerous benefits of femtosecond laser-assisted cataract surgery (FLACS) have been reported, the safety of FLACS is still under dispute. Additionally, many potential surgical complications were not included and discussed, and even several errors exist in some previous meta-analyses. Recently, several randomized controlled trials (RCTs) and clinical cohort studies have arisen, which would provide more information and evidence for surgical safety. In this study, we focus on the complications, review FLACS versus conventional phacoemulsification (CPS) from the incidence of various complications, and assess the safety of the two techniques in a meta-analysis approach. Moreover, randomized controlled trials (RCTs) and high-quality clinical cohort studies were included in this meta-analysis to address a small sample size and provide more reliable and convincing evidence.

Objectives: To compare the complications of femtosecond laser-assisted cataract surgery (FLACS) with those of conventional phacoemulsification surgery (CPS) for age-related cataracts.

Methods: PubMed, Cochrane Library, and EMBASE were systematically searched for studies comparing FLACS and CPS. Outcomes were operative complications, including the intraoperative capsule tear, postoperative corneal edema, macular edema, uncontrolled IOP, etc. The effect measures were weighted with odds ratios with 95% CIs.

Results: Nineteen RCTs and 18 cohort studies, including 24,806 eyes (11,375 of the FLACS group and 13,431 of the CPS group), were identified. There were no significant differences between the two groups in anterior capsule tear, corneal edema, macular edema, uncontrolled IOP, vitreous loss, posterior vitreous detachment, etc. Posterior capsule tear rate showed a significantly lower in RCT subgroups ($P = 0.04$) and without differences in total ($P = 0.63$). Significant differences were observed in the incidence of descemet membrane tear/trauma ($P = 0.02$) and IFIS/iris trauma ($P = 0.04$). Additionally, The FLACS specific complications showed a significantly higher rate of miosis ($P < 0.0001$), corneal epithelial defect ($P = 0.001$), corneal haze ($P = 0.002$), and subconjunctival hemorrhage ($P = 0.01$).

Conclusions: FLACS maintains the same safety compared with CPS in terms of all intraoperative and postoperative complications. Although FLACS did show a statistically significant difference for several FLACS specific complications, it would not influence the visual outcome and heal itself.

P-CAT-073

Phacoemulsification in different degrees of subluxated cataract: Modified techniques

SP Singh¹, S. Singh¹, V.K. Singh¹, BK Singh¹, J. Singh¹

¹Ophthalmology, M L N Medical College, Prayagraj, UP, India

Introduction: Surgical management of ectopia lentis is one of the major challenges faced by cataract surgeons today. Ectopia lentis signifies a displacement or malposition of the crystalline lens, irrespective of cause. It may occur congenitally or as part of developmental anomalies, as found in Marfan syndrome, homocystinuria, Ehlers-Danlos syndrome. We have assessed the intraoperative performance and post-operative outcomes with our modified techniques in varying degree of subluxated lens.

Objectives: To establish the modifications in techniques for endocapsular ring insertion and its scleral fixation in subluxated cataract that causes minimal stress to capsulo-zonular complex.

Methods: The study population consisted of 29 eyes with various degree of subluxated cataract that underwent endocapsular ring implantation with techniques modified by us followed by phacoemulsification and implantation of intraocular lens (IOL) in the capsular bag. Main outcome measures were success rate of endocapsular ring implantation, intraoperative performance, IOL centration and best corrected visual acuity (BCVA) at last visit. Secondary outcome measures included posterior capsular opacification (PCO) and other postoperative complications.

Results: The mean age was 37.03 ± 12.37 years. Mean degree of subluxation was 140 ± 66 degree. We could implant the intended endocapsular ring in 28 out of 29 eyes (96.55%). Mean follow-up was 22.42 ± 2.31 months. Mean preoperative BCVA was $+ 0.68 \pm 0.22$ log MAR (24 eyes). Mean postoperative BCVA at final follow-up was $+0.27 \pm 0.16$ log MAR (28 eyes). BCVA 20/40 or better was seen in 26 eyes (92.86%) at final follow up.

Conclusions: Conclusion: With our modified techniques for endocapsular ring insertion and its scleral fixation, we could smoothly and safely implant the endocapsular rings in subluxated cataract with higher success rate, minimal intraoperative complications and good postoperative outcome.

P-CAT-074

Evaluation of changes in the cognitive status of geriatric patients subjected to cataract surgery using the moca-blind

V. Cuevas¹, C. Solis Hernandez¹, O. Guerrero²

¹Anterior Segment, Fundación Hospital Nuestra Señora de la Luz, Mexico City, Mexico, ²Anterior Segment, Fundación Hospital Nuestra Señora de la Luz, Mexico city, Mexico

Introduction: Decreased visual acuity and other sensory problems have been related to an increased risk of presenting cognitive impairment even dementia, which is defined as the decrease in previously learned cognitive abilities affecting daily activities.

Although cognitive disability and dementia do not have a cure, there are different options to improve the quality of life of patients to guarantee healthy aging and active participation in society.

Different studies have been performed to evaluate if there is an improvement in the cognitive status of patients after undergoing cataract surgery with contradictory results.

Objectives: To assess the cognitive status in patients over 60 years of age before and after uncomplicated cataract surgery using the MoCA Blind test.

Methods: Observational, descriptive, longitudinal study. We evaluated the cognitive status in patients over 60 years with the diagnosis of bilateral cataract and visual capacity worst than 20/40 in both eyes secondary to cataract. Patients were evaluated prior and 1 month after being submitted to uncomplicated cataract surgery using the Montreal Cognitive Assessment (MoCA - Blind) test.

Results: We observed an increase in the score mean from 17.83 (9-22) to 18.77 (10-22) points in the MoCA - Blind test after uncomplicated cataract surgery (N= 150, t test p <0.0001).

Conclusions: Performing cataract surgery with the consequent improvement in the vision of the geriatric population studied could be a positive intervention for their cognitive status.

P-CAT-075

Clinical decision support system based on deep learning for evaluating ICL size and vault after ICL surgery

Y. Yang¹, J. Ye¹

¹Department of Ophthalmology, The Third Hospital Affiliated to the Third Military Medical University, Chongqing, China

Introduction: Intraocular refractive surgery, particularly ICL surgery, has gained widespread popularity among the various methods for myopia correction. At present, the size of ICL is mainly selected by manufacturers based on white to white (WTW) and anterior chamber depth (ACD). However, due to the fact that preoperative parameters are measured indirectly by instruments, the eye anatomy of different patients is different, and there are only four sizes of ICL available on the market, the postoperative vault of patients may be too high or too low. Some studies used different formulas to analyze ICL implant size, but these studies included few parameters, resulting in poor multi-parameter regression fitting, and did not fully consider the various factors influencing the prediction of ICL size. Clinical decision support systems (CDSS) are widely used in the healthcare industry due to their ability to summarize patient-specific information and filter knowledge based on disease-specific algorithms. This study helps physicians make the best ICL sizing choices by building a machine learning-assisted CDSS.

Objectives: To aid doctors in selecting the optimal preoperative implantable collamer lens (ICL) size and to enhance the safety and surgical outcomes of ICL procedures, a clinical decision support system is proposed in our study.

Methods: A retrospective study examined 2772 eyes belonging to 1512 patients, with vault values being measured using AS-OCT. Subsequently, a CDSS, based on deep learning neural networks, was developed. For the prediction of ICL implantation size and vault values, various neural network models, including convolutional neural network (CNN), long and short-term memory neural network (LSTM), Backpropagation neural network (BPNN), radial basis function neural network (RBNN) deep learning classification model, and random forest classification model were employed.

Results: Among the ICL size prediction models, conventional neural networks (CNNs) achieve the best prediction accuracy at 91.37% and exhibit the highest AUC of 0.842. Regarding the prediction model for vault values 1 month after surgery, CNN surpasses the other methods with an accuracy of 85.27%, which has the uppermost AUC of 0.815. Thus, we select CNN as the prediction algorithm for the CDSS.

Conclusions: This study introduces a CDSS to assist doctors in selecting the optimal ICL size for patients while improving the safety and postoperative outcomes of ICL surgery.

P-CAT-076

Defocus curve performance of a novel hydrophobic acrylic trifocal intraocular lens: a prospective Canadian study

A. Muzychuk¹, P. Harasymowycz²

¹Division of Ophthalmology, Department of Surgery, University of Calgary, Calgary, Canada, ²Clinique Bellevue, Montreal, Canada

Introduction: Trifocal intraocular lenses (IOL) are designed to improve intermediate and near visual acuity while also maintaining distance vision after cataract surgery.

Objectives: To evaluate the clinical and defocus curve performance following bilateral implantation of either a trifocal or a monofocal IOL in subjects scheduled to undergo cataract surgery.

Methods: A prospective, multicenter, randomized, masked, controlled study conducted at 9 clinical sites in Canada recruited 165 cataract subjects who were randomized in a 2:1 ratio to receive bilateral implantation of either the enVista trifocal or enVista monofocal IOL. Binocular defocus curves were assessed under photopic conditions from +1.50 D to -3.50 D at postoperative 120-180 days after second eye IOL implantation in a subset of subjects (n=59, 29 in the study and 30 in the control group).

Results: At postoperative Days 120-180, the mean binocular uncorrected intermediate, and near visual acuity (VA) in the trifocal and monofocal IOL group were 0.08 ± 0.09 vs 0.19 ± 0.15 and 0.12 ± 0.10 vs 0.36 ± 0.13 logMAR, respectively. Binocular defocus curve comparison showed that both groups had similar distance vision of better than 20/20 at 0.00 D. In the intermediate and near vision range (-1.00 to -2.50 D), the trifocal IOL group demonstrated a plateau at approximately 20/25, whereas the monofocal IOL group visual acuity was worse by approximately 2 lines at -1.50 D defocus, gradually worsening to 4 lines at -2.50 D defocus. Similar defocus curves were obtained when stratified by pupil size.

Conclusions: Defocus curve analysis showed similar VA at 0.00 D defocus with both trifocal and monofocal IOLs with a range of vision of approximately 4.0 D at 0.2 logMAR (20/32) or better with the trifocal IOL. In the intermediate to near range (-1.00 to -2.50 D defocus), the trifocal IOL exhibited a 2- to 4-line better VA than the monofocal IOL.

P-CAT-078

Impact of topical cyclosporin A 0.05% eye drops on the corneal epithelial healing: an in vivo study

M. Wang^{1,2,3}, Y. Liu¹, J. Tang¹, X. Wang³, Y. He¹

¹Refractive Surgery Center, Hebei Eye Hospital, Xingtai, China, ²Hebei Ophthalmology Key Lab, Xingtai, China, ³M-Wang Eye Clinic, Xingtai, China

Introduction: Topical cyclosporin A 0.05% eye drops is a kind of new drug for dry eye after corneal refractive surgery in China. However, it is still unclear whether this eye drops affect the healing process of corneal epithelial defect caused by surface ablation refractive surgeries.

Objectives: To assess the impact of cyclosporin A 0.05% eye drops on the healing process of corneal epithelial defects.

Methods: In this in vivo study, experimental SD rats, which central corneal epithelium of their right eyes was mechanically removed, were involved and randomly divided into 3 groups, the 0.05% cyclosporine group (CsA group), the 0.1% sodium hyaluronate group (HA group), and the model control group (MC group). Both epithelial healing rate and phenol red thread (PRT) test were performed among three groups. Enzyme-linked immunosorbent assay (ELISA) was used to determine the levels of inflammatory factors in the cornea.

Results: The epithelial healing rate in CsA group was significantly higher than that in both HA and MC groups ($P < 0.05$). The post-operative highest tear secretion was present in CsA group, following with HA, and MC groups ($P < 0.05$). Furthermore, both Interleukin 1β (IL- 1β) and tumor necrosis factor α (TNF- α) in the CsA group were lower than in HA and MC groups at anytime point ($P < 0.05$).

Conclusions: Topical cyclosporin A 0.05% eye drops effectively promote early repair processes for corneal epithelial defects in rats, related to its anti-inflammatory and secretory promoting properties. Thus, topical cyclosporin A 0.05% eye drops may be beneficial for early recovery after surface ablation refractive surgeries, such as PRK, Lasek and TransPRK.

P-CAT-079

Classification of congenital cataracts based on multidimensional phenotypes and its association with visual outcomes

Z. Liu¹, Y. Tan¹, Y. Zou¹, Y. Yu¹, H. Chen²

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangdong Provincial Clinical Research Center for Ocular Diseases, Guangzhou, China, ²State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Congenital cataracts are among the primary treatable causes of childhood blindness. The existing classification systems do not indicate vision prognosis, which limits their utility in guiding the treatment of congenital cataracts.

Objectives: To establish a classification for congenital cataracts that can facilitate individualized treatment and help identify individuals with a high likelihood of different visual outcomes.

Methods: Consecutive patients diagnosed with congenital cataracts and undergoing surgery between January 2005 and November 2021 were recruited. Data on visual outcomes and the phenotypic characteristics of ocular biometry and the anterior and posterior segments were extracted from the patients' medical records. A hierarchical cluster analysis was performed. The main outcome measure was the identification of distinct clusters of eyes with congenital cataracts.

Results: A total of 164 children (299 eyes) were divided into two clusters based on their ocular features. Cluster 1 (96 eyes) had a shorter axial length (mean [SD], 19.44 [1.68] mm), a low prevalence of macular abnormalities (1.04%), and no retinal abnormalities or posterior cataracts. Cluster 2 (203 eyes) had a greater axial length (mean [SD], 20.42 [2.10] mm) and a higher prevalence of macular abnormalities (8.37%), retinal abnormalities (98.52%), and posterior cataracts (4.93%). Compared with the eyes in Cluster 2 (57.14%), those in Cluster 1 (71.88%) had a 2.2 times higher chance of good best-corrected visual acuity (<0.7 logMAR; OR [95% CI], 2.2 [1.25–3.81]; $P = 0.006$).

Conclusions: This retrospective study categorized congenital cataracts into two distinct clusters, each associated with a different likelihood of visual outcomes. This innovative classification may enable the personalization and prioritization of early interventions for patients who may gain the greatest benefit, thereby making strides toward precision medicine in the field of congenital cataracts.

P-CAT-080

Effectiveness of prophylactic capsular tension ring implantation during cataract surgery in highly myopic eyes

J. Qi¹, X. Hu², X. Zhu³

¹Ophthalmology, Fudan University Eye Ear Nose and Throat Hospital, Shanghai, China,

²Ophthalmology, Fudan University Eye Ear Nose and Throat Hospital, Shanghai, China,

³Ophthalmology, Fudan University Eye Ear Nose and Throat Hospital, Shanghai, China

Introduction: Relatively poor stability of the intraocular lens (IOL) and severe capsular contraction and opacification after surgery are more common in highly myopic eyes and seriously affect the visual outcome. Therefore, some surgeons implant a capsular tension ring (CTR) prophylactically in highly myopic eyes to prevent the malposition of the IOL and capsular shrinkage after cataract surgery. However, the effectiveness is inconclusive and lack of direct evidence.

Objectives: To assess the effectiveness of prophylactic CTR implantation during cataract surgery in highly myopic eyes.

Methods: Consecutive highly myopic patients treated with cataract surgery were recruited and randomized to undergo CTR implantation or not. The outcomes compared between the two groups included axial lens position (ALP), IOL decentration and tilt, area of anterior capsule opening, severity of anterior capsular opacification (ACO), and posterior capsular opacification (PCO) at 1 year after surgery.

Results: A total of 55 highly myopic eyes with CTRs implanted and 55 without were included in the analysis. At 1 year after surgery, no significant differences were detected between the CTR and non-CTR groups for the mean ALP, IOL decentration, or tilt (all $P > 0.05$). However, the CTR group had a significantly larger area of anterior capsule opening ($23.62 \pm 3.30 \text{ mm}^2$ vs. $21.85 \pm 2.30 \text{ mm}^2$, $P = 0.003$), and less severe ACO ($P = 0.033$) and PCO (PCO-3 mm: 0.06 ± 0.13 vs. 0.13 ± 0.20 , $P = 0.038$; PCO-C: 0.15 ± 0.18 vs. 0.25 ± 0.26 , $P = 0.026$) than the non-CTR group. The corrected distance visual acuity, prediction error, and high-order aberrations did not differ between the two groups (all $P > 0.05$).

Conclusions: In highly myopic eyes, although prophylactic CTR implantation can reduce the severity of capsular contraction and opacification, it does not significantly affect postoperative IOL stability or visual outcomes.

P-CAT-081

Combining B-scan ultrasound and eye-steering fundus photography improves retinal tear detection before cataract surgery

J. Meng¹, K. Cheng¹, X. Zhu¹

¹Ophthalmology, Eye and ENT Hospital of Fudan University, Shanghai, China

Introduction: Comprehensive evaluation on the retina before cataract surgery is of great importance to reduce the risk of postoperative fundus complications. To precisely and quickly detect retinal tears before surgery have been one of the main concerns from surgeons, especially when they deal with large numbers of patients in developing countries and indirect ophthalmoscopy is always time-consuming and laborious. However, the efficacy of B-scan ultrasound (US), as a traditional method, and the ultrawide field imaging (UWFI), as a newly emerging tool, in detecting retina tears before cataract surgery, and whether combination of the two could achieve better performance remained unclear.

Objectives: To investigate the efficacy of combined application of B-scan ultrasound (US) and ultrawide field imaging (UWFI) in detecting retinal tears before cataract surgery.

Methods: 2552 eyes of 1277 cataract patients were enrolled and received both B-scan US and UWFI examinations preoperatively. Three types of combination were applied: type 1 (union, B-scan US or centered UWFI), type 2 (intersection, B-scan US and centered UWFI), and type 3 (B-scan US and eye-steering UWFI). Indirect ophthalmoscopy was set as a gold standard for detecting retinal tears. Sensitivity and specificity of detecting retinal tears by different methods were assessed. Subgroup analyses were also conducted to evaluate the effects of the feature of tears, cataract type and axial length.

Results: Totally 4.55% (116/2552) of eyes were presented with retinal tears. The sensitivity of B-scan US and UWFI was 87.93% and 84.48%, and specificity was 95.16% and 99.79%, respectively. By applying type 1 and 2 combination, the sensitivity was 98.28% and 74.14%, and specificity was 95.03% and 99.92%, respectively. By type 3 combination, the sensitivity increased to 95.69% and specificity to 99.88%, both of which were comparable to indirect ophthalmoscopy regardless of the number, type and location of tears ($P>0.05$). In eyes with any cataract type or axial length, type 3 combination also gained comparable performance to indirect ophthalmoscopy.

Conclusions: Combined application of B-scan US and eye-steering UWFI presented satisfactory performance in detecting retinal tears before cataract surgery.

P-CAT-082

Impact of central corneal astigmatism on visual outcomes in patients with trifocal intraocular lens implantation

L. Wang¹, J. Meng¹, J. Qi¹, D. Guo¹, Y. Lu¹, X. Zhu¹

¹Eye Institute and Department of Ophthalmology, Eye & ENT Hospital, Fudan University, Shanghai, China

Introduction: The specific measurement zones of corneal astigmatism may not be devoted adequate attention by ophthalmologists when considering the use of trifocal intraocular lens (IOL).

Objectives: To investigate the impact of central corneal astigmatism on postoperative visual outcomes in patients with trifocal intraocular lens (IOL) implantation.

Methods: 278 eyes of 278 patients who underwent uneventful cataract surgery with implantation of the trifocal IOL (AT LISA tri 839MP) were included in this retrospective study. Patients were divided into two groups according to the total corneal refractive power (TCRP) in 3mm zone centered on the corneal apex: low astigmatism group, $TCRP \leq 0.75$ diopter (D); high astigmatism group, $TCRP > 0.75$ D. Postoperative evaluations were conducted at 3 months after surgery, including visual acuity, defocus curves, contrast sensitivity (CS), and objective and subjective visual quality.

Results: After surgery, the uncorrected distance visual acuity (UDVA) improved from 0.71 ± 0.40 to 0.01 ± 0.15 logMAR ($P < 0.001$). The low astigmatism group exhibited significantly better uncorrected near and intermediate visual acuity than the high astigmatism group (both $P < 0.05$). Significantly higher percentages of eyes in the low astigmatism group achieved UDVA and corrected distance visual acuity (CDVA) of 0.00 logMAR or better compared to the high astigmatism group (UDVA: 67% vs 54%, CDVA: 76% vs 64%, both $P < 0.05$). Defocus curves revealed that the low astigmatism group showed better visual acuity at defocus levels of +0.5D, 0D, -0.5D, -3.0D, and -3.5D than the high astigmatism group (all $P < 0.05$). Moreover, the high astigmatism group showed significantly poorer CS, greater higher-order aberrations, and more symptoms of blurred vision and diplopia. Percentages of spectacle independence and patient satisfaction did not differ between groups.

Conclusions: In eyes with central corneal astigmatism above 0.75D, suboptimal postoperative visual outcomes may be obtained after trifocal IOL implantation, though patient satisfaction is acceptable.

P-CAT-083

Accuracy of intraocular lens calculation formulas based on SS-OCT in cataract patients with phakic intraocular lens

M. Zhu¹, Z. Zeng¹, G. Zhang¹

¹Xiamen Eye Center of Xiamen University, Xiamen, China

Introduction: The IOLMaster 700 is widely utilized biometry measurement device in cataract surgery, based on swept-source optical coherence tomography (SS-OCT). The presence of posterior chamber phakic IOL (PC-pIOL) may lead to the misidentification of the anterior surface of PC-pIOL as the anterior surface of the lens by the IOLMaster 700, resulting in inaccurate measurement of anterior chamber depth (ACD). The importance of preoperative ACD as a prediction factor for IOL power calculation is only second to axial length (AL). Current research lacks investigations into whether the precision of IOL calculation formulas is susceptible to alterations induced by ACD measurement errors in cataract patients with PC-pIOL, particularly in formulas incorporating ACD into IOL power calculation. Therefore, it is of great significance to investigate the impact of ACD measurement error on prediction accuracy in this specific cohort.

Objectives: To research the accuracy of IOL calculation formulas and investigate the effect of ACD measured by SS-OCT biometer (IOLMaster 700) in patients with PC-pIOL.

Methods: Retrospective case series. From Xiamen Eye Center of Xiamen University, Xiamen, Fujian, China. The IOLMaster 700 biometer was used to measure AL and anterior segment parameters. The traditional formulas (SRK/T, Holladay 1 and Haigis) with or without Wang-Koch (WK) AL adjustment, and new-generation formulas (Barret Universal II [BUII], Emmetropia Verifying Optical [EVO] v2.0, Kane, Pearl-DGS) were utilized in IOL power calculation.

Results: Twenty-four eyes undergoing combined PC-pIOL removal and cataract surgery were enrolled. The median absolute prediction error in ascending order was EVO 2.0 (0.33 D), Kane (0.35 D), SRK/T-WK_{modified} (0.42 D), Holladay 1-WK_{modified} (0.44D), Haigis-WK_{C1} (0.46 D), Pearl-DGS (0.47 D), BUII (0.58 D), Haigis (0.75 D), SRK/T (0.79 D), and Holladay 1 (1.32 D). The Kane formula demonstrated the highest accuracy, with 62.5% of eyes exhibiting prediction error within ± 0.5 D, followed by EVO 2.0 and Haigis-WK_{C1} (58.3%). A detailed analysis of ACD measurement error revealed negligible impact on refractive outcomes in BUII and EVO 2.0 when ACD was incorporated or omitted in the formula calculation.

Conclusions: The Kane, EVO 2.0, and traditional formulas with WK AL adjustment displayed high prediction accuracy. Furthermore, the ACD measurement error does not exert a significant influence on the accuracy of IOL power calculation formulas in highly myopic eyes implanted with PC-pIOL.

P-CAT-084

Outcomes of an ultra-low cylinder powered (0.90 D) toric versus non-toric IOL in patients undergoing cataract surgery

J. Gourgouvelis¹, A. Muzychuk²

¹Bausch + Lomb, Toronto, Canada, ²University of Calgary, Calgary, Canada

Introduction: Small amounts of preexisting astigmatism can be corrected using low-powered toric IOLs. The enVista 0.90 D is the lowest power toric intraocular lens (IOL) available in Canada.

Objectives: To evaluate the postoperative outcomes of enVista toric 0.90 D and non-toric enVista IOL implanted in patients undergoing cataract surgery.

Methods: This single-site retrospective case review included patients who were qualified to undergo implantation of 0.90 D toric IOL (based on the Barrett Toric Calculator) and underwent implantation of either enVista 0.90 D toric IOL (N=64) or enVista non-toric IOL (N=64), with at least 4 weeks of postoperative outcomes data available. Patients with visually significant comorbidities (e.g., retinal pathology, etc.), toric IOL rotation >10 degrees, or postoperative corrected distance visual acuity of less than 20/25 were excluded. Outcome measures included assessment of the mean reduction in astigmatism in the two groups, mean and absolute mean refractive spherical equivalent refractive deviation from target, and residual manifest refractive cylinder.

Results: In the 0.90 D toric IOL group, mean preoperative keratometry astigmatism of 0.84 ± 0.23 D reduced to a mean postoperative refractive astigmatism of 0.25 ± 0.25 D, compared with 0.63 ± 0.31 D preoperatively to a 0.52 ± 0.35 D postoperatively in non-toric controls. A higher proportion of eyes in the 0.90 D toric IOL group vs non-toric controls were within 0.25, 0.5 and 0.75 D of residual refractive astigmatism. The mean reduction in the astigmatism was 0.59 D for the 0.90 D toric IOL group and 0.11 D for the non-toric IOL group.

Conclusions: The enVista toric 0.9 D lens achieved significantly greater postoperative cylindrical correction and more accurate refractive cylinder outcomes compared to the non-toric lens in patients who qualified for the 0.90 D toric IOL. Ultra-low-powered toric IOLs can accurately target smaller amounts of visually significant astigmatism than previously possible, further refining refractive outcomes of IOL-based surgery.

P-CAT-085

Patient reported outcomes of a novel trifocal IOL: a Canadian multicenter study

P. Harasymowycz^{1,2}, Trifocal IOL Canadian Study Group

¹Department of Ophthalmology, Faculty of Medicine, McGill University, McGill University, Montreal, Quebec, Canada, ²Montreal Glaucoma Institute and Bellevue Ophthalmology Clinics, Montreal, Quebec, Canada

Introduction: Trifocal intraocular lenses (IOLs) aim to enhance functional vision across varying distances – far, intermediate, and near – thereby reducing the need for glasses after cataract surgery. However, individuals with trifocal IOLs have reported a higher occurrence of visual disturbances, such as photic phenomena and dysphotopsias, compared to those with monofocal IOLs.

Objectives: This study, a prospective, multicenter, randomized, masked, and controlled investigation carried out at nine clinical sites in Canada, examined the visual outcomes and subjective experiences of patients who underwent bilateral cataract surgery with either the enVista trifocal IOL or the enVista monofocal IOL.

Methods: Patients who underwent bilateral cataract surgery with implantation of either the enVista trifocal IOL (N = 110) or enVista monofocal IOL (N = 50). At 120-180 days post surgery, patients were administered the Quality of Vision questionnaire to assess the frequency, severity, and bothersomeness of subjective visual symptoms and the Near Activity Visual Questionnaire to assess near visual function and satisfaction.

Results: The mean postoperative photopic binocular UIVA was 20/24 in the trifocal group and 20/31 in the monofocal group; UNVA was 20/26 and 20/46, respectively. Patient reported outcomes for frequency and severity of visual symptoms were similar between groups. More than 90% of patients in both groups reported no or a little bothersomeness of symptoms such as glare, starbursts, double or multiple images, focusing difficulties, depth perception, hazy, blurred or fluctuation in vision. Patient reported outcomes for performing near-vision tasks showed over 90% of the trifocal group reported no or little difficulty with reading small print or seeing text on computer or mobile display. Spectacle independence for performing near work tasks was greater in the trifocal group (90%) versus the monofocal group (50%). When engaging in hobbies, 84.5% of the trifocal group reported no difficulty versus 42.3% of the monofocal group. More patients in the trifocal group reported that they were either completely or very satisfied (77.2%) compared to the monofocal group (25%).

Conclusions: The enVista trifocal IOL provides a wide range of vision with low visual symptoms to most dysphotopsias comparable to the enVista monofocal IOL. Patients implanted with the enVista trifocal IOL reported greater spectacle independence and a higher level of satisfaction when compared to the enVista monofocal IOL.

P-CAT-086

Biometric accuracy of intraoperative biometry (Optiwave Refractive Analysis) in Post-Keratotomy cataract surgery

A. Gupta¹, D. Sharma¹, D. Challa Reddy¹, T. Chaudhary¹, C. Malhotra¹

¹Advanced Eye Centre, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Introduction: Intraocular power calculation in post- radial keratotomy eyes is a challenge due to imprecise corneal power measurement, altered ratio of anterior and posterior corneal curvature amongst others. Intraoperative biometry may help in improving visual outcomes in such patients. We report the refractive and visual outcomes of patients where IOL power was also calculated. intraoperatively using the Optiwave Refractive Analysis.

Objectives: To report visual and refractive outcomes of cataract surgery using Intraoperative Biometry with ORA (Optiwave Refractive Analysis) in Post-Radial Keratotomy (RK) eyes.

Methods: 21 post-radial keratotomy eyes (post-RK) of 16 patients were included retrospectively after cataract surgery.

- For each eye enrolled in the study, manifest refraction, uncorrected visual acuity, BCVA, a slit-lamp examination; and Pentacam Scheimpflug imaging system
- Optical biometry (IOLMaster700) for Haigis and Barretts True-K formula.
- Intraoperatively - ORA (Optiwave Refractive Analysis) was done.
- Refractive outcomes and predictive accuracy with ORA was compared with 'planned' outcome predicted preoperatively using Haigis and Barretts True-K

Results:

- All eyes were 20/70 or better, 26.66% eyes were 20/30, 13.33% were 20/20 postoperatively. The mean age was 49.09 ± 6.57 years, mean axial length 27.97 ± 2.39 mm. The BCVA improved from 0.706 ± 0.22 to 0.266 ± 0.113 ., the MRSE improved from -6.283 ± 2.09 to -1.6 ± 0.73 , 66% were within ± 0.5 D with ORA Versus 39% with Barretts True K, 93% were within ± 1 D with ORA Versus 60% with Barretts True K, 6.6% were > 2 D with ORA Versus 13% with Barretts True K.

Conclusions:

- Optiwave Refractive Analysis (ORA) significantly improves the refractive outcomes of cataract surgery in post RK eyes. (complicated scenarios)
- Significant improvement in refractive outcomes and predictive accuracy in Post-Radial keratotomy eyes undergoing cataract surgery using ORA as compared to 4th generation IOL formulas.

P-CAT-088

Spontaneous rotation of toric implantable collamer lens with adequate vault- one size may not fit all

M. Bansal¹, M. Tripathi¹, M. Kaur¹

¹Dr. Rajendra Prasad Centre of Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, Delhi, India

Introduction: This case investigates the phenomenon of spontaneous rotation of Toric Implantable Collamer Lenses (ICLs) even when the vault is adequate, challenging the assumption that proper vaulting alone ensures rotational stability. This case highlights the potential need for custom sizing, as standard sizing may not suffice for all patients

Objectives: To report management of a case of spontaneous rotation of Toric Implantable Collamer Lens with an adequate vault.

Methods: A 23-year-old male presented with a refractive error of OD -5.75DS /-1.75 DC @180° and OS -5DS/-1.5DC @ 180° and was planned for bilateral Toric Implantable Collamer Lens (V4c by STAAR Surgical) of a diameter of 13.2 mm on a target axis of OD 89° and OS 90°. On post operative day (POD) 1, BCVA was 20/20 in both eyes with a vault of OD 550 mm and OS 480 mm. Surprisingly, at 1 week follow up, the patient presented with complaint of diminution of vision in the right eye. On examination, UCVA in right eye was 20/80 improving to 20/20 with refraction, with a vault of 677 mm in the right eye and 485 mm in the left eye. On dilated examination, the Toric ICL was observed to be aligned nearly perpendicular with the intended target axis, with a slight inferior displacement of the lens. The UBM did not reveal any ciliary body abnormality. Left eye Toric ICL was well oriented along the target axis. The patient was planned for re-rotation and the Toric ICL was gently realigned along the target axis. On POD 1 after re-rotation, the Toric ICL was again observed to be spontaneously rotated 20 degrees away from the target axis. A decision was made to exchange the Toric ICL and implant an one size larger Toric ICL with a diameter of 13.7 mm

Results: After the ICL exchange with a larger size lens, the UCVA was 20/20 with a vault of 722 mm. The visual outcome and correct alignment of the ICL was maintained at 1 month of follow up.

Conclusions: Spontaneous rotation of Toric Implantable Collamer Lens may be observed in the setting of too low a vault. However, in our case, the vault was adequate, and the fellow eye did not have any spontaneous rotation with a similar vault and same diameter and maintained a visual outcome of 20/20. This is a rare case of spontaneous rotation of Toric ICL which highlights the significance of the need for custom sizing of the ICL, as one size may not fit all.

P-CAT-089

Optimizing the usage of lignocaine in cataract surgery, topical versus parabolbar anaesthesia. A meta-analysis

*O.U. Okoro*¹

¹Ophthalmology, David Umahi Federal University Teaching Hospital, Uburu Ebonyi State, Nigeria

Introduction: Cataract is the most common cause of low vision and blindness. Cataract surgery is the most commonly performed elective surgery. One of the major consumables and drugs used for cataract extraction is Lignocaine anaesthetic.

The Research question that culminated in this systematic review is which anaesthetic technique, Topical or Parabolbar anaesthesia will provide optimal usage of Lignocaine in cataract surgery?

Objectives: The dosage of Lignocaine that will bring about optimum anaesthesia is a function of the effect of the anaesthesia to bring about a good score through the felt pain, achievement of globe akinesia with minimal or no complications. The introduction of good anaesthesia will reduce cost of surgery; thereby making the surgery affordable in low resource settings.

Methods: I carried out a systematic review of databases in Ovid Medline (from 1946 to March 20, 2023), EMBASE (from 1974 to March 20 2023) The Medline Search words Headings were topical anaesthesia, peribulbar anaesthesia, cataract surgery, lens implant, small incision cataract surgery, phacoemulsification .

The search yielded 51,801 articles. The number of records left after de-duplication was 3358. randomized controlled trials I was left with six (6) Randomized Controlled Clinical Trials (RCTs) articles for the systematic review.

Results: The participants were three thousand and forty four.. .

The Topical Anaesthesia group (TA) felt more pain than the Parabolbar Anaesthesia(PA) group with an odds ratio of 0.100, 95% CI of 0.0025 to 6.412 and a P value of <0.0001.

PA to TA in globe akinesia was an odds ratio of 0.012 with a 95% CI of 0.0025 to 6.442 and a P value of <0.0001.

Chemosis in Topical Anaesthesia (TA) over Parabolbar Anaesthesia (PA) showed an odds ratio of 1.0094 and 95% CI of 0.7762 to 1.2809 and a Z test value of 0.081 with a P value of 0.9353.

The volume of anaesthetic used in TA gave a volume rate difference of 99.818 with 95% CI of 90.663 to 105.973 with a P value of <0.0001.

Retrobulbar haemorrhage in PA to TA showed pooled odds ratio as 0.0435 with a 95%CI of 0.0126 to 0.736 and a P value of 0.030.

Supplemental injection in TA to PA gave an odds ratio of 1.7006 with a 95% CI of 1.3805 to 2.0943 and a P value of <0.0001.

Surgeon satisfaction in PA than TA gave a pooled index of 71% in the TA group and 86% in the PA group at a P value of 0.19.

Conclusions: Topical Anaesthesia is a safe and preferred alternative to Parabolbar Anaesthesia in cataract surgery.

V-CAT-001

Congenital cataract with zonular weakness

*C. Solís Hernandez*¹

¹Anterior Segment, Fundación Hospital Nuestra Señora de la Luz, Mexico City, Mexico

Introduction: Female 13 year old patient with bilateral congenital cataract, cataract surgery on left eye at 4 years, user of contact lens in right eye, ocular hypertension treated with timolol both eyes. Patient now presents for cataract surgery on the right eye.

Objectives: To present management of undetected zonular weakness.

Methods: To present management of undetected zonular weakness.

Results: To present management of undetected zonular weakness.

Conclusions: The surgeon must be prepared for any eventuality during surgery in patients with congenital or pediatric cataract.

Video

[Click here to play video](#)

V-CAT-002

Premium IOL - within reach, free of negative dysphotopsia and no glare, halos with good depth of focus

A.K. Morya¹, J.M Kakadia², R.C Shah³, V. Bhale⁴

¹Ophthalmology, All India Institute of Medical Sciences, Hyderabad, India, ²Ophthalmology, Aksardeep Eye Hospital, Bhavnagar, India, ³Ophthalmology, Private Hospital, Mumbai, India, ⁴Ophthalmology, Lifeline Medical Devices Pvt. Ltd., Aurangabad, India

Introduction: Trifocals are the most premium IOL available for correction of distant, intermediate and near vision but Halos, glare and aberrations due to ringed diffractive and refractive zones and causes difficulty in night time driving, negative dysphotopsia and low MTF-30-40%, Starburst, Misty, foggy, blurry vision and above all higher cost is a biggest hurdle. 60% optic is used for distance vision, 15% optic is used for intermediate vision & 25% optic is used for near & glistening free acrylic copolymer.

Objectives: Autofocus Pro is a pupillary independent aspheric polyfocal progressive lens with zig zag serrated outer edges of L shaped haptics which gives rock solid rotational stability.

Methods: It gives excellent DIN vision (Distance, Intermediate, Near) by GRIN Technology (Gradient refractive index).

Results: It gives excellent DIN vision (Distance, Intermediate, Near) by GRIN Technology (Gradient refractive index) as there is no loss of light energy because of no diffractive rings so photons are not lost. 7.5 mm Oval optic, 6mm zig zag L-shaped Haptic loops. Higher MTF OF 60-70% and is pupillary independent polyfocal progressive IOL.A

Conclusions: Autofocus Pro is the novel PCIOL for improving distance, intermediate and the near vision with no negative dysphotopsia, halos or glare.

Video

[Click here to play video](#)

V-CAT-003

Torsional C Chop technique

G. Mishra¹, M. Saxena²

¹Ophthalmology, Drishti Eye Foundation, Meerut, India, ²Ophthalmology, Prakash Netralaya, Aligarh, India

Introduction: New nucleus management technique which is developed to reduce complication rate, over all energy, fluid usage, surgical time and learning curve in comparison with stop and chop in all grade and types of cataract.

Objectives: To observe efficiency, safety and learning curve in all grades and types of cataract as compared to stop and chop.

Methods: Done in 500 cases. Patients divided into two groups (250 with stop and chop and 250 torsional C Chop). Follow up was done for 1st POD, 1st Week and 4th week. Compared complication rate, overall CDE and learning curve.

Results: Age group 50-70 years. 60% male and 40% female population. As compared to SNC (stop and chop) complication rate was reduced (1.2% Vs 4%). Over all CDE was reduced from 10 to 7. Reduction in learning curve was also reduced.

Conclusions: The new torsional C Chop technique is more effective and safer as compared to SNC. Less learning curve was also observed.

Video

[Click here to play video](#)

V-CAT-004

Managing complicated ectopic lens

K. Alsawidi^{1,2}

¹Ophthalmology, Tripoli University, Tripoli, Libya, ²Ophthalmology, Rassen Medical Center, Tripoli, Libya

Introduction: To report the outcomes of pars-plana approach for the management of dropped lens in eye with severe iris coloboma patient. In addition implantation of secondary retropupillary iris claw lens. The case was referred to us after eventful Phaco surgery.

Objectives: To share our experience in managing such challenging cases.

Methods: The surgery done under local anesthesia, 23G PPV where we removed the dropped nucleus and at the same time we implanted 2ry IOL. 1 week later we did an eventful phaco to the other eye.

Results: The vision improved remarkably in both eyes. The IOL stable and the retina flat.

Conclusions: Although no evidence for the best option of IOL implantation in coloboma patients who had complication in phaco surgery, retropupillary IOL is a relatively safe, easier and fast procedure in eyes with no capsular support.

Video

[Click here to play video](#)

V-CAT-005

Managing a membranous cataract

*J.P. García Chávez*¹

¹Cataract and Refractive Surgery, Fundación Hospital Nuestra Señora de la Luz, Mexico City, Mexico

Introduction: A 9-year- old boy with blurry vision and leukocoria of the right eye.

Visual acuity was hand motion at 10 cm.

Keratometry was K1 41.75 / K2 42.37

Axial length was 23.85

Corneal endothelial cell density was 3610 cells/mm.

Objectives: Phacoemulsification + IOL PMMA (+14,50 D).

Methods: Phacoemulsification was performed in the right eye under topical anesthesia, insert IOL PMMA (+14,50 D).

Results: Final visual acuity was unsatisfactory due to amblyopia possibly caused by visual deprivation, the successful management result shows the technique is an effective method to remove the cataract.

Conclusions: Congenital membranous cataract is characterized by a collapsed, flattened capsule with little or no cortex on the lens.

Video

[Click here to play video](#)

V-CAT-006

Retro iris fixation of dislocated IOL

*S. Kothari*¹

¹Bombay City Institute & Research Centre, Mumbai, India

Introduction: Dislocated IOL is a rare complication of cataract surgery. This video demonstrates a simple method of fixing these IOLs.

Objectives: To demonstrate retro iris fixation of dislocated PMMA IOLs.

Methods: 10-0 prolene is used to fix the IOL to the back of the iris.

Results: Well centered IOL

Conclusions: Retro iris fixation is a viable technique to fix dislocated PMMA IOLs.

Video

[Click here to play video](#)

V-CAT-007

Expecting the unexpected during phacoemulcification

*K.R. Dayawansa*¹

¹Ophthalmology, National Eye Hospital, Colombo, Sri Lanka

Introduction: Phacoemulcification needs vigilant eyes on every aspect of surgery. This video demonstrates how we can prevent disastrous complications by keeping an eagle eye through out the surgical procedure.

Objectives: To demonstrate the importance of maintaining hundred percent attention on all subtle movements during surgery.

Methods: Retrospective analysis of a video with phaco on Brown hard mature cataract.

Results: Challenges on Capsulorrhexis with managing extended capsulorrhexis, early identification of pupil snap sign during Zonular weakness, stabilisation of capsule with Capsule Tension Ring, Manual introduction of CTR with the help of Hook, importance of maintaining a back up supply.

Conclusions: Expecting all unexpected during phacoemulcification surgery with careful attention on all surgical steps during surgery will help preventing disastrous complications.

Video

[Click here to play video](#)

V-CAT-008

Taming posterior polar cataract - the small incision cataract surgery way

PP Soumya¹, S. Subramanian²

¹Cataract and Refractive and Glaucoma Surgeon, Trinity Superspeciality Eye Hospital, Palakkad, India,

²Ophthalmology, Trinity Superspeciality Eye Hospital, Palakkad, India

Introduction: Posterior polar cataracts pose a surgical challenge with its inherent risk of posterior capsule rupture. Budding surgeons in developing countries like ours, may not be well versed in phacoemulsification. We describe how small incision cataract surgery (SICS) can also be done safely in these cases.

Objectives: To describe a novel technique of performing safe SICS in posterior polar cataracts.

Methods: After creating sclerocorneal tunnel and continuous curvilinear capsulorhexis, gentle hydrodelineation or Simco cannula is used to separate epinucleus from nucleus. Rotation of lens in the bag should be avoided. Careful injection of viscoelastic substance is done during prolapse of nucleus into anterior chamber and then delivered. Cortex wash is done in a manner similar to reverse blooming of flower petal and then aspirated. Intraocular lens is carefully inserted into the bag.

Results: With this method, we can achieve excellent results, with good post operative vision, and stable intraocular lens. Chances of posterior capsule rupture is also minimised.

Conclusions: With small incision cataract surgery, we can achieve equally good postoperative results, as compared to phacoemulsification in eyes with posterior polar cataracts. Hence, in developing countries like India, surgeons who may not be well versed with phacoemulsification can also operate successfully in these cases.

Video

[Click here to play video](#)

V-CAT-010

Femtolaser Assisted cataract surgery in Irido-chorioretinal coloboma!

A. Gupta¹, D. Challa Reddy¹, D. Sharma¹, C. Malhotra¹, A. Kulshreshta¹, S. Limbu¹

¹Advanced Eye Centre, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Introduction: Cataract surgery in irido-chorio-retinal colobomatous eyes is a challenging surgical scenario. The challenges include inaccurate biometry, small eyes with very shallow AC, low endothelial cell count, very hard cataract, lens pseudo-coloboma and increased prevalence of retinal complications.

Objectives: This video highlights the successful application, surgical challenges and advantages of Femtosecond Laser Cataract Surgery in the highly complicated scenario of a small eye with shallow anterior chamber and iris coloboma with associated chorio-retinal coloboma.

Methods: Patient of irido-chorio-retinal coloboma underwent Femtolaser Assisted cataract surgery.

Results: On postoperative day one her Uncorrected distance visual acuity was 20/60 with well centred IOL. The Best Corrected distance visual acuity was improved from 20/60 with refractive error of - 9 DS to 20/20 with refractive error of -0.75DC@145 after 2 weeks of cataract surgery.

Conclusions: Femtolaser Assisted cataract surgery is challenging in patients of irido-chorio-retinal coloboma due to the presence of small eye, shallow anterior chamber, super hard cataracts

Video

[Click here to play video](#)

V-CAT-011

Phaco-emulsification in a posterior polar cataract with pre-existing post capsule defect

S.B. Singh¹, R. Singh¹, B.S. Bhaura¹

¹Ophthalmology, Akal Eye Hospital, Jalandhar, India

Introduction: Posterior polar cataracts are an anterior segment surgeon's nightmare as they may have a pre-existing capsular defect. Moreover, these patients have more disabling visual compromise/ glare/ halos and generally present in a much younger age group where ocular tissues and vitreous are more formed, jelly like thereby increasing the chances of the defect to enlarge perioperatively causing PCR, vitreous loss and even dropped nucleus. Phaco-emulsification in such cases is a challenge and if handled carefully with the right surgical skills, equipment, patience and preparation, a good result can be achieved.

Objectives: The Desired visual outcome was planned for using a combination of a well experienced surgeon, good equipment and also appropriate modification of surgical techniques was used to achieve our objective. The surgery was expected to be a challenge, so video recording was also undertaken to document this for later use after taking the patients' consent.

Methods: The surgery was performed by an experienced senior surgeon using a Carl Zeiss Lumera-I operating microscope with an stereo diagonal inverter- Zeiss Resight and an Ikegami video camera. The phaco emulsification machine had advanced fluidics and both anterior plus posterior segment module with a high speed pneumatic cutter, endo illuminator, suction etc. Both dispersive and cohesive visco elastic OVDs, Trypan blue dye were used as needed. Diluted triamcinolone acetonide was used to stain and check for any vitreous strands. Phaco machine parameters were kept low especially low bottle height and a lower vacuum. A high speed vitrectomy cutter was used intermittently to remove any vitreous strands. A foldable PCIOL was placed in ciliary sulcus. Intracameral pilocarpine was used to remove any wicks of vitreous either in the bag, pupillary area or at the surgical ports. Air bubble was put to form and maintain the anterior chamber and the phaco tunnel was sutured.

Results: A good surgical outcome was achieved in this challenging case of posterior polar cataract with a posterior capsule defect which was recognized pre-operatively and after having taken all the necessary measures to avoid any further complications which were expected in this case.

Conclusions: Active planning and pre-operative evaluation with a high index of suspicion especially in such cases with posterior capsule defect can be tackled carefully and with a good surgical and visual outcome. The patient achieved an UCVA of 6/9 and BCVA of 6/6 with 0.5D cylinder SIA.

Video

[Click here to play video](#)

V-CAT-012

Automated decompression to avoid creating the Argentine flag sign

*S. Thangaraj*¹

¹OEU lions eye hospital, Garividi, India

Introduction: Many procedures have been described to decompress the Intumescent lens in order to avoid the dreaded argentine flag sign. We describe a method wherein we use the aspiration line of the Phaco machine to decompress the lens for the same effect. This is probably the best of all methods and we will show in detail how to go about it with several examples.

Objectives: To show a method to avert the flag during rhexis in an intumescent lens

Methods: Surgical video examples

Results: Automated decompression is an effective way to decompress the intumescent cataract.

Conclusions: Automated decompression is an effective way to decompress the intumescent cataract

Video

[Click here to play video](#)

Cornea

FT-COR-001

A study on curvature shaping, multilayer amniotic membrane as a scaffold for corneal epithelium and stroma reconstruction

D. Shi^{1,2,3}, W. Xu^{1,2,3}, N. Chen^{1,2,3}, L. Han^{1,2,3}, B. Li^{1,2,3}, J. Zhao^{1,2,3}

¹Ophthalmology, The Fourth Affiliated Hospital of China Medical University, Shenyang, China, ²Eye Hospital of China Medical University, Shenyang, China, ³Key Laboratory of Lens, Liaoning Province, Shenyang, China

Introduction: This study evaluated a new technique to create transparent, curvature shaping tissue from non corneal sources, which is cloudy and flat generally. After covered with epithelium, the composite was competent for large diameter lamellar keratoplasty (LK).

Objectives: Investigate the physicochemical properties and biocompatibility of the cross-linked curvature shaping scaffold covered with epithelium. Determine the suitability of the altered tissue for corneal transplantation.

Methods: An orthokeratology mold (OM) in conformity with rabbit cornea curvature was prepared by 3D printing technology. Human amniotic membrane (AM) was laminated by laying individual samples on top of a glass slide (flat group) or OM (curved group) and dehydrated. EDC and NHS were applied to dehydrated AM laminates for chemical cross-linking. Then the flat laminates (FL), curved laminates (CL), and curved laminates seeded with epithelial cells (CL-E) were punched into 6-mm diameter graft and transplanted by LK. The depth, light transmission, and scanning electronic microscope of each group of tissue were performed. Slit-lamp with fluorescein observation was performed on day 0,3,7, and 28. HE staining was performed after the rabbits were sacrificed.

Results: The corneal epithelium was in good growth state and multiple layered structure, and could express keratin 3. Eight layers of AM laminates could be retained the shape by the OM and both FL and CL tissues were crosslinked in EDC/NHS (2%/1%) solution for 2h to obtain the best transmission. The thickness of the two groups was 0.15-0.17mm measured by UBM. SEM images revealed that the interfaces between the AM layers were very close, without any gaps. 6 mm diameter LK was performed with FL, CL, and CL-E tissues. The time when completed epithelialization occurred was day 7 in CL group and day 3 in CL-E group. During a follow-up period of 28 days, tissues and corneas transparency was maintained. Due to mismatch in shape, completed epithelialization couldn't be observed in FL group, and neovascularization and opacification were visible on day 14. HE slides showed epithelial downgrowth and infiltration of leukocytes between the AM and cornea stroma.

Conclusions: In this study, we created a method for shaping and clearing non curved materials with OM to accelerate epithelialization for LK. The approximately transparent, appropriate curved, and epithelialized AM has promise as potential functional equivalents in constructing full thickness artificial corneas.

FT-COR-002

Novel biomimetic polypeptide promotes rapid healing of corneal wounds

T.-A. Grant¹, B. Caetano¹, B. Joshi¹, A. Tellechea¹, M. Mehta¹

¹Gel4Med, Lowell, United States

Introduction: Corneal injury, a type of ocular trauma, is the fourth leading cause of blindness worldwide and accounts for 24 million hospital visits per year in the United States. Such injuries are often caused by foreign bodies and can lead to an infection. Therefore, early rapid treatment is critical to prevent irreversible vision loss.

Objectives: Current treatments involve the use of steroids, artificial tears, antibiotics, and bandage soft contact lenses which are often associated with frequent hospital visits and risk of infectious keratitis. Hence, there is an unmet clinical need for an early, safe, and effective treatment that promotes corneal epithelialization without having the risk of infection. To address this need, we developed a novel biomimetic polypeptide technology (BPT) that promotes corneal wound healing.

Methods: We assessed the suitability of BPT for treating corneal defects by examining cytotoxicity, ocular retention time in-vivo (murine model), and wound healing in-vivo (rabbit model). Data were compared to commercially available ophthalmic solutions.

Results: In-vitro examination of BPT revealed no cytotoxic potential (score = 0) and recorded the lowest score when compared to all tested commercially available ophthalmic products. Comparative analysis of the ocular retention time of non-gel formulations vs their gel counter parts, and controls revealed that non-gel formulations displayed the highest percent coverage overall with the highest coverage of the cornea at 5 mins (16-40%) and 10 mins (42-60%) in vivo. Notably, rabbit eyes treated with BPT showed faster corneal wound healing ($n=5$, $p\leq 0.01$) when compared to those treated with dexamethasone (standard of care drug formulation), and other gel and non-gel products. No visible wound was observed by Day 5 post-injury in BPT-treated animals vs. Day 6 in dexamethasone-treated animals. Additionally, animals treated with BPT, or dexamethasone presented low ocular examination scores, showing only mild inflammation and tolerance to treatment.

Conclusions: Overall, the data shows that BPT is non-cytotoxic, biocompatible, and promotes faster corneal wound healing with inflammation scores comparable to dexamethasone. BPT could potentially be a first-line management of corneal injury and serve as a bridge treatment to later-stage modalities requiring surgical intervention and biological transplants. Future work is aimed at evaluating antimicrobial effectiveness and antifibrotic properties over long-term application.

FT-COR-003

3D printing of biological corneal grafts for penetrating corneal transplantation

B. Yuan¹, K. Du¹, Z. Xie¹, M. Chi¹, E. Liu¹, R. Peng¹, J. Hong¹

¹Peking University Third Hospital, Beijing, China

Introduction: Utilizing 3D printing technology for the production of biological corneas offers a promising solution to the pressing clinical challenge posed by the scarcity of corneal donors. Nonetheless, several critical technical hurdles demand immediate attention: 1. Biological corneal substitutes lack essential endothelial functionality, necessitating the achievement of coaxial printing involving both biological materials and corneal endothelial cells; 2. Strategies must be devised to mitigate the mechanical compression and chemical cross-linking stimuli encountered by corneal endothelial cells during the printing process, thereby averting the onset of cell fibrosis.

Objectives: A 3D bioprinting technique was utilized to produce a bioengineered cornea containing corneal endothelial cells sourced from human embryonic stem cells. Subsequently, corneal transplantation procedures were performed on New Zealand rabbits to evaluate the tissue compatibility of the bio-cornea.

Methods: Firstly, corneal endothelial cells were induced to differentiate from human embryonic stem cells. Subsequently, the corneal endothelial cells were cultured in modified bio-ink in vitro. Utilizing a 3D printing device, mitochondrial activity, intracellular calcium ion, and reactive oxygen species levels, as well as cell fibrosis and apoptosis levels during the photopolymerization printing process of corneal endothelial cells were examined. Furthermore, New Zealand rabbits underwent penetrating keratoplasty surgeries, and the tissue compatibility of the bio-cornea was assessed through ocular biological examinations and immunohistochemical analyses.

Results: The activity of corneal endothelial cells derived from human embryonic stem cells can be effectively enhanced by optimizing the photoinitiator and polymer monomer formulation, optimizing 3D printing parameters and printing paths, as well as optimizing post-printing processing methods. It was confirmed through corneal transplantation surgeries on New Zealand rabbits that the penetrating transplantation of 3D-printed bio-corneas containing corneal endothelial cells demonstrates good tissue compatibility, a low risk of immune rejection, and the ability to maintain corneal transparency in vivo over the long-term.

Conclusions: The bio-cornea containing corneal endothelial cells derived from human embryonic stem cells, fabricated using 3D printing, holds promise for use in penetrating keratoplasty.

FT-COR-004

The effectiveness and mechanism of ROS-responsive nanomedicine in attenuating corneal neovascularization (CNV) formation

A. Liu¹, Y. Huang¹, L. Wang¹

¹Chinese PLA General Hospital, Beijing, China

Introduction: Reactive oxygen species (ROS)-responsive nanoparticle is an attractive smart material. However, it is still short of a thorough study on the ROS-responsive materials for siRNA delivery, which is mainly owing to the complicated synthetic steps and inconvenience of integrating ROS-responsive moieties into siRNA carriers.

Objectives: A new kind of ROS responsive nano-carrier / siRNA-VEGF complex (ROS-TK-n/siVEGF) was designed by combinatorial chemistry method, and its inhibitory effect and mechanism on CNV formation in mice after alkali burn were evaluated.

Methods: Human umbilical vein endothelial cell line (HUVECs. GFP) transfected with GFP was cultured in vitro, and the vector with the strongest inhibitory effect on GFP green fluorescence was screened. Immunofluorescence was used to detect the endocytosis and release of nanocomposites in vascular endothelial cells under oxidative stress. One hundred healthy VEGFR2-Luciferase labeled mice were randomly divided into PBS group, Scramble group (n = 20), non-ROS responsive nanocomposite group (n = 20), ROS responsive nanocomposite group (n = 20) and raizumab group (n = 20). The right eye was applied with 1mol/LNaOH filter paper for 8 seconds to establish the model of alkali burn, and the drug was injected quantitatively under the conjunctiva every other day. The growth of CNV in different treatment groups was detected by anterior photography, in vivo imager of small animals and HE staining. The safety of nanocomposites was determined.

Results: ROS-TK-5 is the strongest vector to inhibit the green fluorescence of HUVECs.GFP. ROS-TK-5/siVEGF can promote the release of VEGFsiRNA in cells under oxidative stress. After alkali burn, ROS-TK-5/siVEGF decreased the number and area of neovascularization more significantly than other groups, which was consistent with the change of fluorescence signal in vivo. Pathology confirmed that ROS-TK-5/siVEGF can reduce the number of corneal inflammatory cells and reduce CNV. QPCR confirmed that ROS-TK-5/siVEGF could reduce the expression of inflammatory mediators. Immunofluorescence suggested that ROS-TK-5/siVEGF could reduce the formation of CNV in corneal stroma. The content of ROS increased in the early stage of alkali burn. WB at tissue level and cellular level confirmed that nanocomposites could inhibit the activation of VEGF signal pathway.

Conclusions: ROS-TK-5/siVEGF promoted VEGF siRNA release under oxidative stress and significantly inhibited corneal neovascularization after alkali burn compared with other groups.

FT-COR-005

Immune tolerance induced in the anterior chamber ameliorates corneal transplant rejection

J. Sun¹, T. Wang¹, W. Shi¹, J. Bian², Q. Ruan³

¹Eye Institute of Shandong First Medical University, Eye Hospital of Shandong First Medical University (Shandong Eye Hospital), Jinan, China, ²Eye Institute of Shandong First Medical University, Qingdao Eye Hospital of Shandong First Medical University, Qingdao, China, ³Eye Institute of Shandong First Medical University, State Key Laboratory Cultivation Base, Shandong Provincial Key Laboratory of Ophthalmology, Qingdao, China

Introduction: Corneal transplantation is currently the most effective treatment for vision restoration in patients with severe corneal disease. The extraordinary success of corneal transplants is related to immune privilege. In addition to direct immune suppression, the aqueous humor and ocular resident cells have another unique immunosuppressive property, the induction of iTreg cells that suppress effector T cell function. However, the evidence that anterior chamber can induce Tregs are mostly come from *in vitro* studies.

Objectives: We provide direct evidence that not only can Treg cells be induced in the anterior chamber during corneal transplantation, but that they also play an important role in ameliorating allograft rejection. More importantly, we demonstrate that the specific increase of Treg cells in the anterior chamber could efficiently promote the survival of corneal allografts.

Methods: Allogeneic corneal transplantation was performed with Balb/c mice as the donor and C57BL/6-Foxp3^{DTR/EGFP} as the recipient. Flow cytometry was used to detect the proportion of Treg cells in the iris-ciliary body, ipsilateral cervical lymph nodes (CLNs) of each group. The number of GFP positive Treg cells in the anterior aqueous humor was detected by fluorescence confocal microscope. For the adoptive transfer of Tregs, 0.5×10^6 Treg were injected into the anterior chamber immediately after transplantation.

Results: 1. Specifically decreasing Tregs in the anterior chamber aggravates corneal transplantation rejection.

2. Treg cells induced in the anterior chamber ameliorate corneal transplantation rejection.

3. The ability to induce Treg cells in the anterior chamber was defective during corneal transplant rejection .

4. Adoptive transfer of Treg cells into the anterior chamber can effectively prevent and treat corneal transplantation rejection.

Conclusions: Alloantigen specific Tregs can be generated in the anterior chamber and specifically increasing Treg cells in the anterior chamber can effectively suppress allograft rejection.

FT-COR-006

A novel, flexible, suturable biointegrating synthetic cornea device

*E. Akpek*¹

¹Wilmer Eye Institute, Johns Hopkins Hospital, Baltimore, United States

Introduction:

Donor corneal transplantation, keratoplasty, remains the mainstay to restore sight due to loss of corneal transparency. Keratoplasty is a highly successful transplantation procedure with over 90% graft clarity rates at two decades post-surgery. However, not all patients enjoy favorable outcomes. Graft failure is not uncommon in certain clinical circumstances such as young recipient age, co-existing glaucoma or previous glaucoma surgeries, aphakia, corneal vascularization or synechiae or ocular surface disease. Unfortunately, both the graft survival and the visual outcomes worsen with each successive graft.

Objectives: To introduce the materials, anatomical design, biocompatibility and clinical results of a novel cornea device.

Methods: Single piece, fully synthetic, optic-skirt design devices were made from compact perfluoroalkoxy alkane. The skirt and the optic wall were lined with a porous ingrowth surface using expanded polytetrafluoroethylene (ePTFE). Full thickness macroapertures were introduced around the skirt perimeter for nutrition and hydration of the recipient cornea. The material properties of the optic were assessed with regards to Young's modulus, light transmission, wetting behavior, as well as the bending stiffness of the skirt. Eyedrop penetrance and degradation profile were evaluated. The prototype devices were implanted healthy rabbit model using a minimally invasive intralamellar surgical technique through a 4 mm trephination site.

Results: The final prototype has a transparent optic with a diameter of 4.60 mm anteriorly and a skirt diameter of 6.8 mm. The biomechanical and optical properties of the device closely align with the native cornea with an average normalized device skirt bending stiffness of 4.7 kPa·mm⁴ and light transmission in the visible spectrum ranging between 92-96%. No optical damage to any device was seen in fouling experiments, with only 3 out of 33 device optics having mild superficial debris that could be wiped off. No significant difference was observed in topical drug penetrance in the device implanted eye compared to the naïve eye. The surgery is single-step and does not require a fresh donor cornea. Twelve month clinical and histopathological outcomes in healthy rabbit model showed no extrusion and low rate of infection.

Conclusions: This novel synthetic cornea device may offer enhanced tissue integration and reduced inflammation owing to its flexibility and biocompatibility leading to improved retention. Early feasibility human studies are underway.

FT-COR-007

Effects of UV/riboflavin-vitamin E cross-linking on ultrastructure of corneal matrix and collagen fibers in rabbits

G. Jinrong¹, W. Shengsheng¹, L. Yong¹, L. Jing¹

¹Xi'an People's Hospital (Xi'an NO.4 Hospital), Xi'an, China

Introduction: To investigate the effects of ultraviolet light/riboflavin-vitamin E tocopherol pegylated succinate cross-linking protocol (also known as custom fast-corneal cross-linking, CF-CXL) on the ultrastructure of corneal matrix and collagen fibers in rabbits.

Objectives: To investigate the effects of ultraviolet light/riboflavin-vitamin E tocopherol pegylated succinate cross-linking protocol (also known as custom fast-corneal cross-linking, CF-CXL) on the ultrastructure of corneal matrix and collagen fibers in rabbits.

Methods: Fifteen SPF New Zealand white rabbits aged 10 to 15 weeks were selected for the experiment. All animals underwent CF-CXL surgery on their right eye and left eye as the control eye. At 1 week, 1 month and 3 months after surgery, The central corneal stromal collagen fibers were evaluated by transmission electron microscopy. The cross-sectional area of corneal collagen fibers was used to evaluate the changes of collagen fibers. The cross-sectional area of collagen fibers was measured by ImageJ image processing software.

Results: Under slit lamp microscope, there was no corneal epithelial injury, corneal subepithelial haze and corneal scar. Compared with pre-operation, the central corneal thickness of the experimental eye was thinner in the 1-week postoperative group, and the change was not significant in the 1 month and 3-month postoperative group. The results of TEM showed that scattered collagen fibril can be seen in corneal stromal cells. In the longitudinal section of collagen fibers, the intricate distribution of proteoglycan decoration can be seen around the fibers. The cross section of the collagen fiber can be used to calculate the cross-section area of the fiber. Compared with the control eye, the cross-sectional area of collagen fibers in the experimental eye at 1 week, 1 month and 3 months after surgery was significantly increased, with statistical significance ($P<0.001$), and the cross-sectional area of collagen fibers in the experimental eye at 1 month after surgery was larger than that in the 1 week and 3 months after surgery, with statistical significance ($P<0.001$). Compared with the control eye, the cross-sectional area of collagen fibers in experimental eye increased by 21.37% in 1 month.

Conclusions: Ultraviolet light/riboflavin-vitamin E tocopherol pegylated succinate cross-linking protocol can effectively increase the diameter of rabbit corneal stromal collagen fiber and is a safe and effective cross-linking method for thin keratoconus.

FT-COR-008

Multi-omic analysis combined with machine learning reveals novel mechanisms related to meibomian gland dysfunction

L. Chen¹, Y. Cai¹, Y. Fu¹

¹Ophthalmology, Shanghai Ninth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Meibomian gland dysfunction (MGD) is a common inflammation-related ocular surface disease, significantly impacting patients' vision and quality of life. By now, numerous research has established a robust correlation between aging and the onset of MGD. However, the underlying mechanism of how aging induces MGD remains largely uncharacterized.

Objectives: This study aims to investigate the lipid alterations during aging and the relevant mechanism of age-related MGD through an integrated approach combining lipidomics, proteomics, and machine learning.

Methods: To achieve this, samples of female mice meibomian glands (MGs) were collected from eyelids at two months (n = 9) and two years (n = 9) of age for lipidomic and proteomic profiling using liquid chromatography with tandem mass spectrometry. A machine learning model was then established using the least absolute shrinkage and selection operator algorithm to identify the lipid biomarkers during the aging process. In order to verify the proteomic results, gene knockout mice were further established.

Results: The lipidomic analysis identified 47 differentially expressed lipid species categorized into four lipid classes. The most notable age-related alterations included decreased levels of cholesteryl esters (ChE) and increased levels of triacylglycerols, accompanied by significant differences in their lipid unsaturation patterns. Through machine learning model construction, it was further confirmed that the ChE (26:0), ChE (26:1), and ChE (30:1) represent the most promising diagnostic molecules for age-related MGD. Furthermore, proteomic analysis totally revealed 375 differentially expressed proteins, with functional analyses highlighting the significant role of cholesterol biosynthesis in MGs aging. Among these proteins, we found that Dhcr24, a protein directly related to cholesterol metabolism, had huge differential expression between the two groups, so we constructed a DHCR24^{CKO} mouse model. The DHCR24^{CKO} mouse showed obvious symptoms of MGD at 3 months of age, including atrophy of meibomian gland acini and punctate staining of the corneal epithelium.

Conclusions: This study reveals the changes in the meibum composition of the MGs during aging and uses machine learning to identify novel lipid molecules. Additionally, through proteomics and the gene knockout mice, the essential role of the DHCR24 in the pathogenesis of MGD has been clarified. Our research is expected to provide new targets for the diagnosis and treatment of MGD.

FT-COR-009

Clinical study of SMILE-derived corneal stromal lenticule punctal plug in the treatment of moderate and severe dry eyes

J. Li¹, Y. Yang¹, Y. Li¹, F. Tian¹, B. Tian¹

¹Department of Ophthalmology, Xi'an People's Hospital(Xi'an Fourth Hospital), Xi'an, China

Introduction: With the development and extensive application of small incision lenticule extraction(SMILE)surgeries, the possible use of extracted corneal stromal lenticules from patients has recently received increasing attention. In our previous work, we used corneal stromal lenticule to prepare lacrimal punctal plug , which have a good therapeutic effect on rabbit dry eye models.The aim of this study was to investigate the clinical effects of a SMILE-derived corneal stromal lenticule punctal plug in the treatment of dry eye syndrome in dry eye patient.

Objectives: To evaluate the therapeutic effect of a SMILE-derived corneal stromal lenticule punctal plug on patients with moderate to severe dry eye.

Methods: 24 patients with dry eyes (48 eyes) who met the observation conditions were included in the study. SMILE-derived corneal stromal lenticule punctal plug were inserted in a lower punctum. Schirmer tear secretory experiment (SIT) and corneal fluorescein staining (FL) were performed before intervention and at 1, 2, 4, 8 and 12 weeks after intervention. At the same time, Oculus eye surface analyzer was used to analyze the therapeutic effect of SMILE-derived corneal stromal lenticule punctal plug on dry eyes from the aspects of lacrimal river height, tear film break up time (BUT), meibomian gland structure, eye blush analysis. Ocular surface Disease Index Scale(OSDI) were also recorded. Ultrasound biomicroscopy (UBM) was used to check the position of the SMILE-derived corneal stromal lenticule punctal plug in lacrimal canaliculi.

Results: Corneal stromal lenticule punctal plug has a good therapeutic effect in the treatment of dry eyes, and the lacrimal river height after intervention is significantly improved compared with that before treatment ($P<0.05$). The score of OSDI dry eye questionnaire was significantly improved compared with that before intervention($P<0.05$). The rupture time of tear film, the structure of meibomian gland and lipid layer of tear film were significantly improved compared with those before treatment($P<0.05$).

Conclusions: Implantation of SMILE-derived corneal stromal lenticule punctal plug has a certain clinical effect on the treatment of dry eye syndrome.

FT-COR-010

Challenges of DMEK technique with young corneal donors' grafts: Surgical keys for success

M. Arino-Gutierrez¹, B. Burgos-Blasco², J. Gegundez-Fernandez¹, G. Moloney³

¹Ophthalmology, Cornea and Anterior Segment, Hospital Clinico San Carlos, Madrid, Spain,

²Ophthalmology Cornea and Anterior Segment, Hospital Clinico San Carlos, Madrid, Spain,

³Department of Ophthalmology & Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: The number of DMEK surgeries is growing worldwide as it has become the surgery of choice for corneal endothelial diseases, which has resulted in an increasing demand for tissue. In this regard, theoretically, accepting younger donors with better endothelial cell density (ECD) would be preferable for longer expected graft survivals and would increase the availability of tissue.

Objectives: To report on the surgical maneuvers recommended for a successful unfolding of very young donors in order to accomplish an uneventful Descemet Membrane Endothelial Keratoplasty (DMEK) surgery

Methods: Five patients (three females and two males, mean age 71.2 6.7 years) with Fuchs endothelial cell dystrophy who underwent DMEK with very young donors (between 20 and 30 years old) were included. The following demographic data were assessed: donor's age, donor's endothelial cell density (ECD), preservation time, recipient's age and sex and unfolding surgical time. Best corrected visual acuity (BCVA; decimal system), ECD and corneal central thickness (CCT) were assessed preoperatively and at 6-month follow-up.

Results: Donors mean age was 23.6 +/- 3.6 years (range 21 to 30) and the mean ECD was 2748.6 +/- 162.6 cells/mm. All of them underwent an uneventful DMEK as a single procedure performed by one experienced surgeon (MAG) with a mean unfolding time of 7.2 +/- 4.9 min (range 4 to 15). The essential steps, including patient preparation as well as DMEK graft implantation, orientation, unrolling and centering are detailed. At 6 months, BCVA was 0.6 +/- 0.2, ECD was 1945.0 +/- 455.5 cells/mm and CCT was 497.0 +/- 19.7 microns

Conclusions: We hereby present the keys to overcome tightly scrolled grafts of very young donors, which prove perfectly suitable for DMEK surgery. The graft shape tends towards a double-roll and specific maneuvers are strongly recommended

FT-COR-011

Surgical outcome, pre and post-impresion cytology after SLET in unilateral limbal stem cell deficiency: Case series

J. Singh¹, SP Singh¹, S. Singh¹, V.K. Singh¹, BK Singh¹

¹Ophthalmology, M L N Medical College, Prayagraj ,UP, India

Introduction: Simple Limbal Epithelial Transplantation (SLET) is a surgical technique first described by Dr. Sangwan in 2012 for the treatment of limbal stem cell deficiency (LSCD). We have validated its efficacy restoring the ocular surface, renewing the corneal epithelium and avoiding the re-conjunctivalization of the cornea .

Objectives: This study aimed to report the surgical outcomes of autologous Simple limbal epithelial transplantation (SLET) performed for unilateral limbal stem cell deficiency (LSCD) following chemical injury.

Methods: Pre operatively all patients will undergo general and ophthalmic evaluation which will include Slit lamp examination , Impression cytology, Anterior segment OCT. The study included the cases of Chemical injury (Acid and alkali injury) and excluded the cases of LSCD secondary to causes other than chemical injury or cases with dry eye. Primary outcome was restoration of completely epithelized avascular corneal surface. The secondary outcome was percentage of eyes which results in improvement of vision. Patients were followed up for minimum of 1 year.

Results: This study included 10 eyes of 10 patients with follow up of 1 year. Stable corneal surface was obtained clinically as well as pathologically in 7 cases out of 10 and visual acuity gain seen in 5 patients, one patient results in infectious keratitis after post op day 7 .The factors associated with failure of vision improvement are time of chemical injury (during childhood), duration of injury to SLET procedure, previous h/o surgical procedure.

Conclusions: Autologous SLET is an effective and safe modality for the treatment of unilateral LSCD. In a developing country like India, with limited facilities in the healthcare system, auto-SLET is a boon for patients with unilateral LSCD.

FT-COR-012

Allogeneic intrastromal lenticule inlay combined with corneal collagen crosslinking for ultrathin keratoconus(5 years)

J. Zhang¹, Y. Zhou¹

¹Beijing Ming Vision and Ophthalmology, Beijing, China

Introduction: The corneal collagen cross-linking (CXL) is the treatment available to halt the progression of keratoconus. But the CXL is contraindicated when the thinnest corneal thickness is less than 400 μ m, because of the risk of ultraviolet-A (UVA) damage to the endothelium and the crystalline lens. Many patients with thin corneas missed the best time to treat, because of the scarcity of donated cornea, leading to blindness.

Objectives: To investigate the safety and clinical effectiveness of allogeneic intrastromal lenticule inlay combined with corneal collagen crosslinking (CXL) for advanced keratoconus with ultrathin cornea .

Methods: 20 eyes of 13 patients with advanced keratoconus (central corneal thickness < 400 μ m) were included. Corneal intrastromal pockets were made by femtosecond laser, and corneal stromal lenticules obtained from donor myopic eyes via small-incision lenticule extraction (SMILE) were implanted into the pockets. Next accelerated CXL was performed. Patients were examined preoperatively, 1 month, 6 months, 1 year and 5 years postoperatively. Uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), corneal topography, central corneal thickness (CCT), anterior segment optical coherence topography (AS-OCT), ocular response analyzer (ORA) and endothelial cell count (ECC) were measured.

Results: Clinical improvements in UDVA (from 1.47 \pm 0.46 to 1.21 \pm 0.48 logMAR) and CDVA (from 0.76 \pm 0.52 to 0.62 \pm 0.47 logMAR) were noted 5 years after surgery. AS-OCT showed that implanted lenticules were transparent throughout the study and gradually integrated with the surrounding tissue. After surgery, corneal astigmatism decreased significantly ($p = 0.039$). The steep K didn't change significantly after surgery ($p = 0.806$). CCT was obviously increased postoperatively (from 355.48 \pm 43.72 μ m to 480.52 \pm 37.40 μ m) and remained stable from 6 months postoperatively. Corneal resistance factor (CRF) and corneal hysteresis (CH) were significantly increased after surgery (p all <0.01). CRF and CH were stable from 6 months forward. No significant loss of endothelial cells was observed.

Conclusions: Allogeneic intrastromal lenticule inlay combined with CXL was a safe and effective treatment for advanced keratoconus with CCT<400 μ m. Using lenticules obtained from SMILE greatly enlarged the donor sources for corneal transplantation. The corneal thickness was significantly increased and progression of keratoconus was halted after surgery.

FT-COR-014

Safety and efficacy of LDV Z8-assisted Bowman layer transplantation in advanced progressive keratoconus patients

H. Mansoor¹, W.A. Khan², A.M. Khan², S. Khan²

¹Cornea and External Eye Diseases, Al Shifa Trust Eye Hospital, Rawalpindi, Pakistan, ²Al Shifa Trust Eye Hospital, Rawalpindi, Pakistan

Introduction: Keratoconus (KC) is a progressive corneal ectatic disorder that impairs visual acuity. Optical options are utilized in the early to moderate stages of KC to maintain an acceptable visual acuity; however, if the disease progresses, other therapies, such as corneal collagen cross-linking (CXL), should be considered to halt KC progression. Recently Bowman layer transplantation (BLT) has been introduced to reduce and stabilize progressive and advanced KC in patients ineligible for CXL. It involves transplanting an isolated donor Bowman layer into the mid-stroma of a keratoconic cornea. BLT aims to flatten the recipient cornea, halt ectasia progression, and improve contact lens wear tolerance, thereby delaying or avoiding the need for corneal transplantation. While BLT has been described using a manual technique, we present a novel surgical approach to perform BLT using a LDV Z8 femtosecond laser to harvest the donor Bowman layer and mid-stromal pocket dissection in the recipient cornea.

Objectives: To evaluate the technical feasibility, safety and efficacy of LDV Z8-assisted Bowman layer transplantation (Z8BLT) in stabilizing progressive, advanced KC, ineligible for CXL.

Methods: This single-center prospective study included 40 eyes from 40 patients with progressive advanced KC who were ineligible for CXL and underwent Z8BLT with both the donor graft and recipient mid-stromal pocket created with a femtosecond laser.

Results: The mean follow-up time was 15.4 ± 3.6 months. The donor graft harvest and accurate dissection of the recipient mid-stromal pocket were successful in 93% and 100% of cases, respectively. At 6 months following Z8BLT, the mean maximum keratometry decreased by 2.63 Dioptres. While rigid gas permeable contact lens tolerance improved in all patients following Z8BLT, the mean postoperative best contact lens-corrected visual acuity (BCLVA) increased by two Snellen lines. Two eyes that had attained useful BCLVA postoperatively deteriorated 1 year later due to progressive corneal scarring, necessitating corneal transplantation for visual rehabilitation. All other eyes remained stable (95%), and no further treatment was required until the last follow-up.

Conclusions: Z8BLT is a safe and efficacious alternative to CXL for stabilizing advanced progressive KC and could additionally avoid corneal transplantation. Furthermore, the use of femtosecond laser in Z8BLT provides high reproducibility for graft preparation and recipient mid-stromal pocket dissection.

FT-COR-015

Mushroom-shape femtosecond laser-assisted DALK guided by real-time anterior segment optical coherence tomography (AS-OCT)

M. Arino-Gutierrez¹, J. Gegundez-Fernandez¹, D. Diaz-Valle¹, A. Villarrubia-Cuadrado², B. Burgos-Blasco¹

¹Ophthalmology, Cornea and Anterior Segment, Hospital Clinico San Carlos, Madrid, Spain, ²Unit of Cornea and Anterior Segment, Hospital La Arruzafa, Cordoba, Spain

Introduction: Emerging technology plays a significant role in automating and enhancing the precision of surgeries. The femtosecond laser allows to perform customized mushroom shaped cut patterns in donor and host corneas and intraoperative OCT guidance helps to improve the corneal layers depth visualization during surgery.

Objectives: To describe the utility of femtosecond laser technology and real time anterior segment optical coherence tomography (OCT) while performing deep anterior lamellar keratoplasty (DALK).

Methods: 22 patients underwent a mushroom shape predescemetic DALK assisted by femtosecond laser in a tertiary hospital. Among the indications for the surgery we found: postinfectious scar, corneal ectasia (including keratoconus grade III and IV and postlaser ectasia) and Corneal stromal Dystrophy. BCVA, Keratometry, endothelial cell count and corneal densitometry were analyzed at 6 and 12 months postoperatively.

Results: The femtosecond laser allows us to perform customized mushroom-shaped cut patterns in both corneas (donor and host) with a larger superficial diameter of 8.7 mm and a smaller deep area of 6.0 mm. A manual layer by layer dissection was performed in all cases to clear the posterior stroma within the 6mm optical zone. The intraoperative OCT guidance helps to improve the corneal layers' visualization during the surgery. A predescemetic DALK was performed in all 22 cases with none conversion to Penetrating Keratoplasty (PK). A residual bed stromal thickness of less than 80 microns was obtained and eight 10/0 nylon single sutures were enough to obtain a very nice fitting between donor and host. Results including BCVA, Keratometry, endothelial cell count and corneal densitometry were analyzed at 6 and 12 months postoperatively and will be presented.

Conclusions: The mushroom pattern femtoDALK is a safe procedure that helps to reduce the risk of macroperforation and subsequent conversion to PK with only 8 single sutures

FT-COR-016

Outcomes of descemetorhexis without endothelial keratoplasty without rho-associated protein kinase inhibitors

N. Kahum-López^{1,2}, B.P. Gustavson², S.N. Yeung², A. Iovieno²

¹Cornea and Refractive Surgery, Instituto de Oftalmología Conde de Valenciana, Mexico City, Mexico,

²Department of Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: Descemetorhexis without endothelial keratoplasty (DWEK) is a promising surgical option for select patients with Fuchs' endothelial dystrophy (FED). There is growing support for the use of topical rho-associated protein kinase inhibitors (ROCKi) to optimize DWEK outcomes. However, in many settings ROCKi are either unavailable or not approved to treat corneal diseases.

Objectives: This study sought to characterize patient outcomes following DWEK in the absence of ROCKi and potentially broaden the settings where DWEK can be offered to patients.

Methods: Single center retrospective case series of 15 eyes/11 patients (66 years; 52-74) that underwent DWEK, alone or combined with cataract surgery, by one surgeon between August 2020 and January 2023. Patients included in analyses had: FED with central guttae, no clinical evidence of corneal edema and a clinically healthy peripheral corneal endothelium.

Results: Mean follow-up time was 14 months (2-34). 14 of 15 eyes achieved corneal clearance (93.3%). Mean time to clearance was 8.5 weeks (3-23). 11 eyes (73%) achieved CDVA of ≤ 0.2 with a significant post-operative improvement at 4-8 months ($P < 0.05$), and sustained improvements at > 12 months. No significant astigmatism was introduced by the procedure. Two eyes developed cystoid macular edema post-operatively. A trend towards earlier clearance was observed in the < 65 years group.

Conclusions: Despite a longer time to corneal clearance in this cohort compared to the few studies using ROCKi, the overall success rate and visual outcomes for the patients in our cohort supports the use of DWEK in settings where ROCKi is not readily available.

FT-COR-017

The study on the characteristics of corneal aberration in patients with keratoconus and unilateral corneal Vogt's striae

W. Shengsheng¹, L. Jing¹, L. Yong¹

¹Xi'an People's Hospital (Xi'an NO.4 Hospital), Xi'an, China

Introduction: A previous study stated that 30% of patients with KCN have unilateral and bilateral Vogt's striae. UCVA and BCVA significantly decrease, and the refractive error worsens in eyes with Vogt's striae. One reason for this result is that alterations in the corneal morphology increase irregular astigmatism. Another reason may be associated with increased high-order aberrations (HOA), which can result in blurry and distorted vision.

Several previous studies reported that aberrations especially coma aberration are significantly increased in patients with KCN. However, studies on whether the increase in corneal HOAs is related to the appearance of Vogt's striae in KCN eyes are few.

This study aims to compare the characteristics of corneal HOA measured using the Pentacam HR and its correlation with corneal topographic indices in patients with bilateral KCN and unilateral corneal Vogt's striae.

Objectives: To assess the corneal high-order aberration(HOA) and its correlation with corneal morphological parameters in patients with bilateral keratoconus (KCN) and unilateral Vogt's striae.

Methods: A total of 168 eyes of 84 patients with KCN, whose corneas had definite signs of unilateral Vogt's striae were enrolled. Corneal HOA and morphological parameters were measured using Pentacam HR.

Results: The corneal morphological parameters between KCN eyes with and without Vogt's striae were evidently different ($P < 0.001$). The 3rd coma 90°, 4th spherical aberration, 5th coma 90°, RMS (total), and RMS (HOA) in the front, back surfaces and total cornea in KCN eyes with Vogt's striae were significantly higher than those in KCN eyes without Vogt's striae ($P < 0.001$). In KCN eyes with Vogt's striae, the 3rd coma 90° and 4th spherical aberration in the front surface and total cornea were negatively correlated with K1, K2, Km, Kmax, ACE, and PCE ($P < 0.05$). The 3rd coma 90°, 4th spherical aberration in back surface and RMS (total), RMS (HOA) in the front, back surfaces, total cornea were positively correlated with K1, K2, Km, Kmax, ACE, and PCE ($P < 0.05$).

Conclusions: Corneal HOA especially vertical coma and spherical aberration may increase when Vogt's striae appeared in KCN eyes. The scale of increase was significantly related with changes in corneal shapes.

FT-COR-018

High-concentration recombinant human nerve growth factor for the treatment of phase III neurotrophic keratopathy

W. Shi¹, S. Li²

¹Cornea, Eye Hospital of Shandong First Medical University (Shandong Eye Hospital), Jinan, China,

²Ophthalmology, Eye Hospital of Shandong First Medical University, Jinan, China

Introduction: Cornea is the most densely innervated tissue in humans. Corneal sensory nerves originating from the trigeminal ganglion play a crucial role in generating neurotrophic factors and promoting sensory-dependent corneal and tear reflexes. This process is essential for maintaining corneal transparency, preserving corneal epithelial integrity, and establishing ocular surface homeostasis. Neurotrophic keratopathy (NK), neurotrophic keratitis, is associated with corneal nerve injury resulting from ocular or systemic conditions, including trigeminal nerve paralysis, viral infections, chemical burns, corneal surgery, excessive use of surface anesthetics, diabetes, and multiple sclerosis.

Objectives: To evaluate the efficacy of high-concentration (60 µg/mL) recombinant human nerve growth factor (rhNGF) eye drops in treating neurotrophic keratopathy (NK).

Methods: Thirty-one NK patients were enrolled, with 21 receiving 60 µg/mL rhNGF (rhNGF_60) four times per day for 6 weeks and 10 undergoing surgical interventions (surgical group) such as amniotic membrane transplantation, conjunctival flap coverage, or permanent eyelid closure surgery.

Results: In the rhNGF_60 group, all cases achieved corneal healing within 6 weeks, a higher rate compared to the surgical therapy group (80%, $P = 0.034$). Three cases in the surgical group required repetitive treatments. Average VA significantly improved after rhNGF_60 treatment ($P = 0.0002$). There was no significant improvement in VA after surgery compared to before treatment ($P = 0.7795$). Corneal sensation significantly improved in all corneal quadrants after 6 weeks of rhNGF_60 treatment compared to baseline. After rhNGF_60 treatment, corneal sensitivity in the center ($P = 0.01$), superior nasal ($P = 0.008$), inferior nasal ($P = 0.004$), superior temporal ($P = 0.004$), and inferior temporal ($P = 0.002$) were significantly increased compared to before treatment. Among the 21 rhNGF_60 patients, 11 (52.4%) underwent IVCM after 6 weeks of treatment, and all displayed significant corneal nerve fiber growth, with nerve density, quantity, main branch count, curvature, and reflectivity all significantly improved.

Conclusions: Compared to traditional surgical treatment, rhNGF eye drops at a concentration of 60 µg/mL effectively promote corneal epithelial healing, visual acuity improvement, and nerve regeneration in stage III NK patients. This novel, non-invasive approach shows potential for treatment of severe neurotrophic keratopathy.

FT-COR-019

Synthetic corneal endothelial substitute: results of phase-2 safety evaluation study

L.R. Daniel Raj Ponniah¹

¹Department of Cornea & Ocular Surface Diseases, Dr. Agarwal's Eye Hospital & Research Institute, Tiurnelveli, India

Introduction: Keratoplasties for PBK & Fuchs are associated with risks of rejections & failures. Corneal availability remains a challenge, especially in the developing world, hence readily available synthetic alternative is a breakthrough innovation that needs attention.

Objectives: To evaluate the safety and effectiveness of implanting a novel synthetic corneal endothelial substitute (endothelial keratoprosthesis) in cases with chronic endothelial dysfunction.

Methods: A phase-2 prospective open-label clinical safety & efficacy evaluation. Endothelial dysfunction following pseudophakic corneal edema not associated with systemic diseases like Herpes Simplex or prior corneal surgeries was subjected to a central 6 mm synthetic endothelial implantable substitute after a central 7.0mm descemetorhexis & attached with C3F8 gas (85% fill in the AC). Pre & post-operative central pachymetry (in mic.), vision (in ETDRS characters), and pain analog (1-100) were analyzed in addition to re-bubbling rates & toxic reactions due to implants.

Results: 12 cases enrolled. The longest follow-up is 16 months, lowest is 12 months. Baseline vision was 10.54+/-2.2 ETDRS characters, which improved to 41.75+/-8.7 by M-1 & 60.72+/-13.1 by M-12. Mean Central pachymetry reduced from 720 mic, to 552 by M-1 & maintained at 491 by M-12. Presenting pain was 91.9+/-2.3 & 7.7+/-2.5 at M-12 (p=0.0001). No immunologic or other adverse reactions noticed. None explanted. 4 needed re-bubbling (D7, D7, D12 & 21, D7, D14&M3). One died after 6 months, postmortem HPE reports revealed epithelialization & fibrosis along the implant edges favoring long-term device retention.

Conclusions: Endothelial keratoprosthesis improved vision, reduced edema caused by endothelial dysfunction & was not associated with toxicities until month 12, & has continuously been monitored. It could be an alternative to EK with no risks of rejection events or graft failures, and could change the practice pattern of "Transplant to Implant Science".

FT-COR-020

The effect of diquafosol on tear film inflammatory markers of dry eye patients: an open-label, proof-of-concept study

R. Tanchuling¹, P.V. Tan¹, R.N. Regalado¹, R. Lim Bon Siong¹

¹Eye Institute, St. Luke's Medical Center- Quezon City, Quezon City, Philippines

Introduction: Dry eye arises from tear film homeostasis dysregulation, resulting in increased ocular surface inflammation. Measuring proinflammatory cytokine levels in dry eye aids in severity assessment, progression monitoring, and treatment evaluation. Diquafosol has shown cytokine-lowering effects in vivo.

Objectives: We analyzed the change in the levels of tear film pro-inflammatory cytokines, dry eye symptoms, and tear film stability before and after treatment with diquafosol sodium 3% (Diquas, Santen Pharmaceutical Co., Ltd., Japan) ophthalmic solution among patients with dry eye disease.

Methods: This was an open-label, non-comparative, one group, pre and post treatment, proof-of-concept study of dry eye patients given diquafosol one drop six times a day for 4 weeks. Tear samples were collected prior to initiation and at the conclusion of treatment. Levels of interferon gamma (IFN- γ), interleukin-1 beta (IL-1 β), interleukin-6 (IL-6), and tumor necrosis factor alpha (TNF- α) were measured in tear film samples using a MILLIPLEX MAP human cytokine/chemokine magnetic bead panel (HCYTOMAG-60K, Merck Millipore, Germany). Ocular surface disease index (OSDI) scores and fluorescein tear break-up time (TBUT) were determined before and after treatment.

Results: Forty patients with dry eye were enrolled. IL-6 and TNF- α were detected in all samples while IFN- γ and IL-1 β in 96% and 8%, respectively at baseline. All inflammatory markers except IL-1 β showed reductions in concentration compared to pretreatment values. A response, determined to be a 25% reduction in cytokine concentration from baseline, was seen in 2 (4%), 25 (64.10%), 22 (56.41%), and 18 (46.15%) of eyes for IL-1 β , IL-6, TNF- α , and IFN- γ , respectively. TNF- α showed a statistically significant decrease compared to pre-treatment levels ($p=0.020$). Significant improvement in TBUT (6.79 \pm 1.98 to 7.95 \pm 2.98 seconds; $p=0.0022$) and OSDI scores (23.73 \pm 9.29 to 15.74 \pm 15.48; $p=0.0074$) were noted post-treatment. Post-treatment reduction of the individual cytokines did not appear to be correlated with pre- and post- OSDI scores and TBUT. None of the clinical parameters increased the likelihood of individual cytokine response except female sex with IL-6 (OR 5.56, $p=0.03$).

Conclusions: Topical diquafosol sodium 3% reduced pro-inflammatory cytokines in tears of patients with dry eye disease after four weeks of treatment indicating its possible role in modulating ocular surface inflammation. Future RCT-type studies are recommended to validate the results.

FT-COR-021

Efficacy of cyclosporine ophthalmic solution 0.09% in patients with uncontrolled dry eye disease: an analysis by sex

J. Johnston¹, R. Adler², M. Hessen³, K. Nichols⁴, K. Truett⁵, M. Urbietta⁶, B. Mitchell⁶

¹Georgia Eye Partners, Atlanta, GA, United States, ²Belcara Health, Baltimore, MD, United States,

³Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD, United States, ⁴School of Optometry, University of Alabama at Birmingham, Birmingham, AL, United States, ⁵KCT Data, Inc., Alpharetta, GA, United States, ⁶Sun Pharmaceutical Industries, Inc., Princeton, NJ, United States

Introduction: Dry eye disease (DED) is a multifactorial condition that occurs more frequently in adult females compared with males. Topical cyclosporines, which are anti-inflammatory drugs, are indicated to increase tear production, reduce ocular surface inflammation, and/or improve disease signs and symptoms in patients with DED.

Objectives: To identify sex differences in the efficacy of cyclosporine ophthalmic solution 0.09% (CsA 0.09%), a nanomicellar formulation designed to improve ocular delivery of CsA, in patients with DED that was inadequately controlled on cyclosporine ophthalmic emulsion 0.05% (CsA 0.05%).

Methods: This Phase 4 study enrolled adults with DED that was inadequately controlled (still symptomatic and/or exhibiting disease signs) on current CsA 0.05% therapy for ≥ 3 months. All patients received CsA 0.09% (1 drop per eye twice daily) for 12 weeks. Efficacy assessments included total corneal fluorescein staining (CFS) and modified Symptom Assessment in Dry Eye (mSANDE) questionnaire at Weeks 4, 8, and 12. A subgroup analysis by sex was performed on efficacy outcomes. Safety assessments included adverse event (AE) reporting at each visit.

Results: The intent-to-treat population included 124 patients. The mean (standard deviation [SD]) age of patients was 65.6 (11.54) years, and 109 (87.9%) were female. Mean (SD) improvements from baseline in total CFS were statistically significant at Weeks 4 (-1.18 [2.0]; $P < 0.05$), 8 (-1.88 [2.6]; $P < 0.02$), and 12 (-2.68 [2.5]; $P < 0.01$) in males and at Weeks 4 (-1.84 [2.6]), 8 (-2.93 [2.9]), and 12 (-3.13 [2.9]; all $P < 0.0001$) in females. Mean (SD) improvements in mSANDE scores were also significant at Weeks 4 (-34.5 [18.0]; $P < 0.0001$), 8 (-32.8 [22.3]; $P = 0.0001$), and 12 (-34.4 [34.3]; $P < 0.01$) for males and Weeks 4 (-16.5 [23.8]), 8 (-22.5 [24.0]), and 12 (-28.8 [25.2]; all $P < 0.0001$) for females. In the safety population ($n = 134$), a total of 58 (43.3%) patients reported ≥ 1 treatment-emergent AE and most AEs were mild in severity (73.8%).

Conclusions: Twice-daily CsA 0.09% elicited significant improvements in total CFS and mSANDE scores in both males and females starting at Week 4 and maintained to Week 12 in patients with DED uncontrolled on CsA 0.05%. CsA 0.09% was generally well tolerated, with most reported AEs mild in severity.

FT-COR-022

Dry eye disease (DED): Key findings from the DREAM© clinical trial

R. Amine¹, R. Sayegh¹, V. Bunya², R. Shtein³, M. Lin⁴, L. Szczotka-Flynn⁵, G.-S. Ying⁶, M. Hussein³, P. Asbell⁷

¹Cleveland Clinic, Cleveland, Ohio, United States, ²University of Pennsylvania, Philadelphia, Pennsylvania, United States, ³University of Michigan, Ann Arbor, Michigan, United States, ⁴University of California Berkeley, Berkeley, California, United States, ⁵University Hospitals, Cleveland, Ohio, United States, ⁶University of Pennsylvania, Philadelphia, Pennsylvania, United States, ⁷University of Tennessee Health Science Center, Memphis, Tennessee, United States

Introduction: Dry eye disease (DED) is a common condition and there is no pathognomonic test for DED and the etiology is likely multifactorial. The Dry Eye Assessment and Management (DREAM©) Study is an NEI-funded clinical trial with standardized exams. The data provides a rich opportunity to better understand DED.

Objectives: Report key findings from the DREAM© study.

Methods: DREAM© study is a prospective, multi-center, randomized, double-masked clinical trial comprising of 535 subjects with moderate to severe DED followed for a year, recruited from 27 sites across the USA.

Results: Omega 3 was not superior to placebo in alleviating signs and symptoms of dry eye disease.

The Trial Design closely resembled “real-world” conditions by including symptomatic DED and allowed them to continue their current DED treatment as they would in a clinical setting.

Risk

Factors: Older age and female sex were associated with more severe signs of DED. Post-menopausal women had significantly more severe dry eye signs than pre-menopausal women.

Quality of Life: Lower mental component score (MCS), associated with depression, was correlated with more severe DED symptoms.

Environment: Mediterranean climate zone demonstrated significantly less mean corneal fluorescein staining compared with other climates.

Sjögren's Disease (SjD): SjD patients displayed worse DED signs, but not symptoms, compared to those without SjD.

SP-1, a novel autoantibody, was associated with underlying SjD.

Subgroup analysis: Using latent profile analysis, heterogeneous DED population was grouped into homogenous subgroups based on signs and symptoms, yielding five subtypes.

Point of Care Tests: Noninvasive assessments by Keratography provided objective measurements; however, keratograph results only weakly correlated with standard clinical tests of signs, suggesting that they do not measure the same surface changes.

Tear osmolarity did not correlate with DED symptoms, though a weak correlation with DED signs, particularly higher conjunctival and corneal staining, was seen.

Inflammatory Markers: Inflammatory cytokines in tears were not found to be associated with more severe DED signs or symptoms. Higher HLA-DR% in total cells was associated with higher corneal and conjunctival staining.

Conclusions: DREAM data yielded significant insights into DED, including risk factors and point-of-care testing. Results may better classify DED into more cohesive subgroups and may be useful for enhancing patient care and guiding the design of future clinical trials.

FT-COR-023

Quality of life and management of patients with dry eye and neuropathic ocular pain: A 5-year prospective cohort study

S. Doan¹, A. Theuriot¹, E. Gabison¹

¹Hopital Fondation A de Rothschild and Hopital Bichat, Paris, France

Introduction: Neuropathic pain is a rare but debilitating disease that can be associated with dry eye, especially after refractive surgery. Treatment is a real challenge.

Objectives: To evaluate the 5-year evolution of a cohort of patients suffering from neuropathic ocular pain associated with dry eye disease

Methods: Patients with dry eye and neuropathic ocular pain were enrolled and followed for 5 years. Patients completed several questionnaires on dry eye (Dry Eye Questionnaire 5, DEQ5, and Ocular Surface Disease Index, OSDI); pain (Brief Pain Inventory, BPI); anxiety and depressive disorders (Hospital Anxiety and Depression Scale, HADS); a specific questionnaire on neuropathic ocular pain characteristics (Neuropathic Ocular Pain Questionnaire, NOPQ), elaborated specifically for this study; and a questionnaire evaluating tolerance and effectiveness of the different treatments. A complete clinical examination of the ocular surface and eyelids, meibography, analysis of tear film, and quantification of corneal nerve density and inflammation using In Vivo Confocal Microscopy (IVCM) were performed at inclusion and after 5 years.

Results: 14 patients were included, mean age was 41 ± 17 years, 93% were women. 85,7% suffered from anxiety and/or depressive disorders and 35,7% from diffuse chronic pain. Neuropathic pain score and quality of life score by the NOPQ questionnaire improved at 5 years when compared to baseline ($p=0,005$), as well as mean BPI pain scores ($p=0,003$) and DEQ5 dry eye scores ($p=0,041$). Although inflammation scores on IVCM decreased ($p=0,004$), clinical examination did not really change. Most of the patients received topical ophthalmic treatments (100%) associated with systemic neuropathic pain relievers (78,6%) and psychological care (64,3%). Best rated treatments were artificial tears, cyclosporine eye drops, scleral lenses, oral pain treatments and autologous serum eye drops.

Conclusions: This is the first prospective study to analyze long term outcomes of patients suffering from neuropathic ocular pain associated with dry eye disease. Ocular pain improved over the long term. A multidisciplinary approach based on specific questionnaires such as NOPQ and long-term personalized treatment is recommended.

P-COR-001

The inhibitory effects of quercetin on herpes simplex virus type 1 infection in cornea

K. Wu^{1,2}, Y. Yu¹, X. Liu¹

¹Zhongshan Ophthalmic Center, State Key Laboratory of Ophthalmology, Sun Yat-Sen University, Guangzhou, China, ²Depart. of Ophthalmology, People's Hospital of Xinjiang Uygur Autonomous Region, Urumqi, China

Introduction: Herpes simplex keratitis (HSK), mostly induced by the infection of herpes simplex virus type 1 (HSV-1), has limited treatments due to drug residence. Quercetin was reported to effectively inhibit the HSV-1 replication, though the mechanism remains unknown.

Objectives: We aimed to investigate the anti-viral effect of quercetin as a topical therapy, and further explored the possible mechanism.

Methods: Human corneal epithelial cell line (HCEs) were treated with quercetin at different stages of HSV-1 infection. The levels of viral mRNA were validated by real-time PCR, and the viral fluorescence were observed. Supernatants from cells infected by HSV-1 following different drug treatments were collected for the further analyze of viral titer by plaque assay. Protein expression was determined by Western blotting. After topical application of quercetin in a mouse HSK model, the clinical symptoms were observed and scored by Slit-lamp microscope. Morphological changes in the cornea were determined using H&E staining.

Results: While quercetin could significantly inhibit HSV-1 replication in stages including pre-, post-treatment and co-incubation, it mainly interrupted the attachment of HSV-1 rather than penetration. Quercetin could inhibit the replication and release of HSV-1 dose-dependently. Topical application of quercetin could significantly alleviate the severity of HSK *in vivo*, and block the transmission of virus to trigeminal ganglia. Quercetin could also upregulate the expression of anti-oxidative enzyme in mRNA and protein levels.

Conclusions: Quercetin interrupted the attachment of HSV-1 to cellular surface and reduced the expression of viral genes. Topical application of quercetin could significantly attenuate the severity of HSK, making it a potential drug for treating HSK.

P-COR-002

Whole genome sequencing highlights the pathogenic profile in *Nocardia keratitis*

*Q. Liang*¹, *X. Guo*¹

¹Beijing Tongren Hospital, Beijing, China

Introduction: *Nocardia keratitis*, as a severe and sight-threatening condition, presents as a chronic, persistent infection that is unresponsive to commonly used antibiotics. The severity and prognosis of *Nocardia keratitis* are based on the species of the strains, which emphasized the need for further investigation into the clinical features and pathogenesis underlying *Nocardia keratitis*.

Objectives: This study aims to reveal the virulence and antimicrobial resistance gene profile of *Nocardia* strains using whole genome sequencing.

Methods: Whole-genome sequencing was performed on 23 cornea-derived *Nocardia* strains. Together with genomic data from the respiratory tract and the environment, 141 genomes were then utilized for phylogenetic and pan-genome analyses, followed by virulence and antibiotic resistance analysis. The correlations between virulence genes and pathogenicity were experimentally validated, including the characteristics of *Nocardia* colonies and clinical and histopathological evaluations of *Nocardia keratitis* mice models.

Results: Whole-genome sequencing of 141 *Nocardia* strains revealed a mean of 220 virulence genes contributed to bacterial pathogenesis. The *mce* gene family analysis led to the categorization of strains from the cornea into groups A, B, and C. The colonies of group C had the largest diameter, height, and fastest growth rate. The size of corneal ulcers and the clinical scores showed a significant increase in mouse models induced by group C. The relative expression levels of proinflammatory cytokines (CD4, IFN- γ , IL-6R α , TNF- α) in the lesion area exhibited an increasing trend from group A to group C. Antibiotic resistance genes (ARGs) spanned nine distinct drug classes, four resistance mechanisms, and seven primary antimicrobial resistance gene families.

Conclusions: Whole genome sequencing highlights the pathogenic role of *mce* gene family in *Nocardia keratitis*. Its distribution pattern may contribute to the distinct characteristics of the growth of *Nocardia* colonies and the clinical severity of the mice models.

P-COR-003

Association between cataract history and dry eye severity in the Dry Eye Assessment and Management (DREAM) study

A.T. Zhao^{1,2}, J. He², P.A. Asbell³, V.Y. Bunya², G.-S. Ying², The DREAM Research Group

¹Perelman School of Medicine, University of Pennsylvania, Philadelphia, United States, ²Scheie Eye Institute, Department of Ophthalmology, University of Pennsylvania, Philadelphia, United States,

³University of Memphis, Memphis, United States

Introduction: Dry eye disease (DED) incidence and severity have been shown to increase in otherwise healthy patients following cataract surgery, suggesting that phacoemulsification could both initiate and exacerbate dry eye symptoms.

Objectives: No studies have investigated the association between cataract surgery and severity of DED. This study aims to evaluate associations of cataracts and cataract surgery with severity of DED symptoms and signs.

Methods: Patients ($n=535$) with moderate-to-severe DED were enrolled in The Dry Eye Assessment and Management (DREAM) study. At baseline, past ocular history, including cataracts, was collected. At baseline, 6 and 12 months, DED symptoms were assessed using the Ocular Surface Disease Index and signs were assessed by tear break-up time (TBUT), Schirmer's test, corneal staining, conjunctival staining, tear osmolarity, and meibomian gland dysfunction (MGD). Univariate and multivariate regression analyses adjusting for factors previously found to be associated with DED severity, were performed on combined data from baseline, 6 and 12 months.

Results: Among 1070 eyes, 646 eyes (60%) had no history of cataracts, 244 eyes (23%) had ongoing cataracts, and 180 eyes (17%) had a history of cataract surgery >6 months prior (i.e., pseudophakic/aphakic). At baseline, patients with a history of cataract surgery were more likely to use artificial tears or gels (93% vs. 78% vs. 76%; respectively; $P=0.001$) and cyclosporine drops (31% vs. 27% vs. 14%; respectively; $P<0.001$) compared to patients with ongoing cataracts or no history of cataracts. In univariate analysis, corneal staining scores were significantly worse in pseudophakic/aphakic eyes compared to eyes with ongoing cataracts and eyes with no history of cataracts (4.1 vs. 3.6 vs. 3.1; respectively; $P=0.005$). However, the difference became non-significant after being adjusted by age alone ($P=0.71$) or with additional adjustment by factors previously found to be associated with DED severity ($P=0.72$). In multivariate analysis, MGD was significantly higher in eyes with no history of cataracts than in eyes with cataracts and pseudophakic/aphakic eyes (3.1 vs. 2.7 vs. 2.6; $P=0.02$). Cataract history was not associated with DED symptoms ($P=0.49$).

Conclusions: Cataracts and a history of cataract surgery were not independently associated with more severe DED symptoms and signs. This lack of association suggests that increased DED severity following phacoemulsification are either related to patient age, and/or are transient in DED patients.

P-COR-004

DALK combined intralamellar tectonic patch graft: An alternative approach to treat frank corneal perforation

G. Xiao¹, H. Ben¹

¹Department of Ophthalmology, Peking University Third Hospital, Beijing, China

Introduction: Although tectonic deep anterior lamellar keratoplasty (DALK) has gained popularity over the years, it was primarily performed in descemetocele and impending perforation. Penetrating keratoplasty (PK) remains the gold-standard treatment to restore globe integrity, especially in cases of large, frank corneal perforation. However, studies have shown a significant incidence of complications like secondary glaucoma, endothelial rejection and subsequent graft failure. Emergency PK, a common emergency measure for corneal perforation, was reported to have an even higher rate of graft failure. Furthermore, the shortage of optical quality donor tissues in East Asian countries remains an unavoidable constraint on performing PK. Herein, we introduced an intralamellar patch graft in addition to conventional DALK procedures to treat frank corneal perforation.

Objectives: We introduced an intralamellar tectonic patch graft in addition to conventional DALK procedures to treat frank cornea perforation.

Methods: This retrospective case series included 13 patients (13 eyes) with frank corneal perforations who underwent DALK combined with intralamellar tectonic patch graft between December 2015 and December 2021. In addition to the standard DALK procedure, the perforation site was repaired with an extra intralamellar tectonic patch graft. The collected data included patient demographics, aetiology, size and location of the corneal perforation, visual acuity, surgical details, and postoperative complications.

Results: Seven patients underwent autologous intralamellar patch grafts, whereas six received allogeneic ones. Anatomical success was achieved in all patients. The mean postoperative follow-up was 33.31 ± 25.96 months (6–73 months). The postoperative visual acuity (0.90 ± 0.65 logMAR) was significantly improved ($P = 0.003$) compared to the preoperative score (1.74 ± 0.83 logMAR). Best corrected visual acuity (BCVA) improved in 12 eyes (92.3%). The mean endothelial cell density was 2028 ± 463 cells/mm², 6–12 months postoperatively. There was no recurrence of perforation, and the anterior lamellar graft remained transparent in 12 patients (92.3%). Postoperative complications included epithelial defects (23.1%), ocular hypertension (15.4%), and cataract (7.7%).

Conclusions: DALK combined with intralamellar tectonic patch graft may serve as a secure and effective alternative in treating frank corneal perforation, with reduced complications compared to conventional penetrating keratoplasty.

P-COR-005

Meibomian gland morphologic changes in Sjögren's Syndrome and non-Sjögren's Dry Eye patients: A comparative study

L. Traipe¹, D. Vuskovic², P. Maturana¹, D. Cabrerizo¹, D. Lopez^{3,1}, C. Castro³, C. Toro³, M.C. Goya³, R. Lopez⁴

¹Unidad de Lágrima y Superficie Ocular (ULSO), Clinica Las Condes, Santiago de Chile, Chile,

²Oftalmología, Universidad de Chile, Santiago de Chile, Chile, ³Departamento de Tecnología Médica, Facultades de Medicina, Universidad de Chile, Santiago de Chile, Chile, ⁴Instituto de Ciencias Biomédica (ICBM), Facultad de Medicina, Universidad de Chile, Santiago de Chile, Chile

Introduction: Evaporative dry eye (EDE) due to meibomian gland dysfunction is the most common type of dry eye (DE). It is reported that patients with DE due to aqueous deficit secondary to Sjogren's syndrome (SS) subsequently develop meibomian gland dysfunction. However, the study of meibomian glands (MG) in this model is infrequent.

Objectives: To compare the morphology of meibomian glands (MG) in patients with evaporative dry eye with and without Sjögren's syndrome (SS) using meibography.

Methods: Observational, analytical, cross-sectional study consisting of 79 eyes of patients with EDE: Group A (primary SS): 17, Group B (secondary SS): 19, Group C (non-Sjogren's EDE): 43. Infrared meibographies were analyzed by ImageJ software for morphometric parameters such as: number, length, thickness, glandular and palpebral area, gland tortuosity, gland loss area and meiboscore in the upper and lower eyelids between patients with Sjogren's EDE and with non-Sjogren's EDE. Additionally, the presence of hypo-refrangent lesions in the upper and lower eyelids was recorded. One-way ANOVA and Kruskal Wallis tests were used to determine differences between groups, and unpaired Bonferroni and Wilcoxon tests were used to check in which of the groups such differences existed.

Results: In morphometric parameters of the MG, differences have been observed in the number of glands in patients with EDE, being significantly lower in primary SS than patients without SS ($p < 0.05$). The glandular area showed similar differences, evidencing greater glandular loss mainly in upper eyelid, being its area significantly lower in patients with both primary and secondary SS, in comparison with non-Sjögren's Dry Eye patients ($p < 0.05$). No significant differences were observed for the morphometric parameters of tortuosity, glandular length, and thickness or meiboscore. The presence of hypo-refrangent lesions only in patients with SS stands out.

Conclusions: Morphologic differences in the meibomian glands (MG) have been observed between in Sjögren's Syndrome and non-Sjögren's Dry Eye patients. Hypo-refractile lesions could be a distinctive indicator between both groups. Early identification of MG's changes in patients with SS could allow premature detection, facilitating more appropriate treatment.

P-COR-006

Comparison of ganciclovir gel 0.15 and acyclovir 3% ointment for the treatment of Herpes simplex epithelial keratitis

S. Barua¹, S. Ahmed², M.S. Rahman², S. Khanom³

¹General Outpatient Department, Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh,

²Community Ophthalmology, BSMMU, Dhaka, Bangladesh, ³Pharmacology, Dhaka Central International Medical College, Dhaka, Bangladesh

Introduction: Eye disease due to Herpes simplex virus (HSV) commonly presents as epithelial keratitis which, though usually self-limiting, may persist or progress without treatment. It is a highly prevalent and visually disabling disease in both pediatric and adult populations.

Objectives: This study was conducted to compare efficacy of ganciclovir & acyclovir in the treatment of Herpes simplex epithelial keratitis.

Methods: This randomized controlled trial was carried out in the Department of Community Ophthalmology BSMMU, Dhaka and Ispahani Islamia Eye Institute and Hospital, Dhaka, from October 2019 to February 2021. A total of 38 patients with Herpes simplex keratitis attending outdoor were included in this study. Clinically diagnosed by ophthalmologist, dendritic keratitis or geographic keratitis patients of age 19 - 65 years of both gender were enrolled. The patients were divided into two groups by randomization to either receiving ganciclovir gel 0.15% considered as group I (n=19) or acyclovir 3.0% ointment considered as group II (n=19) by using the lottery method. The size of ulcer were measured on day 0, at the greatest length in millimeter, using slit-lamp calipers stained with fluorescein. The patients were followed up at days 2, 7, 14 and 21.

Results: The mean ulcer size before medication was 5.71 ± 2.14 mm in group I and 3.36 ± 1.36 mm in group II respectively. Difference between two groups was significant ($p=0.001$). At day 2, mean ulcer size was 4.13 ± 1.85 mm in group I and 3.05 ± 1.42 mm in group II. Difference between two groups was not statistically significant (p value 0.051). At day 7, mean ulcer size was 0.92 ± 0.96 mm in group I and 2.28 ± 1.46 mm in group II. Difference between two groups was statistically significant ($p=0.001$). At day 14, mean ulcer size was 0.09 ± 0.41 mm in group I and 0.68 ± 0.27 mm in group II. The difference was statistically significant (p value 0.019) between the two groups. At day 21, mean ulcer size was 0.03 ± 0.11 mm in group I and 0.32 ± 0.69 mm in group II p value 0.078. The difference was not statistically significant ($p=0.078$).

Conclusions: Though initially acyclovir seemed to be more effective in reducing the mean ulcer size, after 21 days, Ganciclovir 0.15% ophthalmic gel and acyclovir 3% ophthalmic ointment were found equally effective in their ability to heal herpes simplex dendritic keratitis in the patients.

P-COR-007

AMT – A healing scaffold in PUK

*S. Thatte*¹

¹Ophthalmology, Sri Aurobindo Medical College and PG Institute, Indore, India

Introduction: Peripheral ulcerative keratitis (PUK) is a group of inflammatory corneal pathologies with peripheral stromal thinning. It begins with immune cellular infiltrates in the juxta limbal cornea, followed by a crescent-shaped ulcer that appears parallel to the limbus. Medical management includes intense topical lubrication, antibiotics, along with topical and systemic steroids and immunosuppressants. Definitive surgical management is corneal lamellar patch or penetrating graft. In case of unavailability of corneal donor tissue alternative tissue is required with biological properties of anti-inflammatory, antifibrotic and healing. Amniotic membrane has these properties along with low immunogenicity.

Objectives: To know the efficacy of amniotic membrane transplantation as an alternative to keratoplasty in cases of PUK.

Methods: This mono institutional observational retrospective study was conducted on 15 eyes of 15 patients having PUK in a tertiary health care centre. Patients underwent single-layered amniotic membrane transplantation (AMT) in case of corneal thinning involving superficial corneal stroma or multi-layered or rolled AMT in cases of corneal thinning involving more than half corneal stroma with moderate to large perforations along with systemic steroids and immunosuppression.

Results: Symptomatic relief was observed in all 15 Patients (100%), Initial success was 73.33% ,2 patients (13.33%) required repeat AMT resulting in 86% success rate, failures were noted in 2, out of which one (6.67%) underwent corneal patch graft while another (6.67%) required large penetrating keratoplasty which failed and landed in Phthisis.

Conclusions: AMT is a safe and effective alternative for the surgical management of PUK with acceptable success in combination with local and systemic immunosuppressive therapy. A close collaboration between the ophthalmologist and the physician is mandatory to prevent disease progression and decrease morbidity and risk of mortality.

P-COR-008

Longer predicted graft survival of minimally invasive lamellar keratoplasty versus deep anterior lamellar keratoplasty

H. Gao^{1,2,3}, T. Chen¹, M. Liu¹, N. Li¹, W. Shi^{1,2,3}

¹Eye Hospital of Shandong First Medical University (Shandong Eye Hospital), Jinan, China, ²State Key Laboratory Cultivation Base, Shandong Provincial Key Laboratory of Ophthalmology, Eye Institute of Shandong First Medical University, Qingdao, China, ³School of Ophthalmology, Shandong First Medical University, Jinan, China

Introduction: Penetrating keratoplasty (PK) and deep anterior lamellar keratoplasty (DALK), the two traditional surgeries for keratoconus, are both hard to maintain for a lifetime with high risk of complications, immune rejections or late graft failure. The median predicted graft survival was calculated to be 17.3 years in PK and 49.0 years in DALK in a previous study. Minimally invasive lamellar keratoplasty (MILK), a newly developed surgical option for keratoconus, is characterized by retaining the whole recipient's cornea, in which a stromal button with a diameter of 9.0 mm and a thickness of about 200 μm is inserted into an intrastromal pocket. The length of recipient's incision was 2.3 mm, versus 25 mm in DALK. And the depth was 150 μm , versus at least 500 μm in DALK. Whether MILK has better long-term safety and a longer graft survival to maintain for a lifetime is a common concern for both doctors and patients.

Objectives: To compare the postoperative endothelial cell loss of femtosecond laser-assisted DALK with MILK in keratoconus and predict the graft survival accordingly.

Methods: Prospective, comparative case series. One hundred and fifteen eyes treated with femtosecond laser-assisted DALK (DALK group) and 93 eyes treated with femtosecond laser-assisted MILK (MILK group) were included into this study. Postoperative endothelial cell loss was observed and described using three mathematic models (linear model, biphasic linear model and biexponential model). The predicted time to reach the upper limit of the critical range of cell density compatible with graft function (assumed to be 500 cells/ mm^2) was calculated based on the extrapolation of the biexponential model. Postoperative complications, such as loose sutures, epithelial defect and rejection, were also recorded.

Results: The predicted time for endothelial cell counts declined from 2700 to 500 cells/ mm^2 was 43 years in DALK and 83 years in MILK ($P < 0.001$). Loose sutures were found in 60 (52.2%) eyes after DALK. No sutures were applied in MILK. Epithelial defect was found in 6 (5.2%) eyes in DALK and 1 (1.1%) eye in MILK ($P = 0.133$). Rejection was found in 2 (1.7%) eyes in DALK and zero in MILK.

Conclusions: The graft survival is predicted to be longer after MILK than after DALK for keratoconus in terms of postoperative endothelial cell loss. Lower complications occurred after MILK than after DALK. MILK with a graft survival of 83 years are expected to maintain for a lifetime.

P-COR-009

Intraoperative optical coherence tomography guided precise corneal suture in the treatment of acute keratoconus

*S. Li*¹

¹Cornea, Eye Institute of Shandong First Medical University, Eye Hospital of Shandong First Medical University, Jinan, China

Introduction: This study show a new technique to treat severe acute edematous keratoconus.

Objectives: This study aimed to observe the clinical efficacy of precise suturing of posterior elastic layer fissures guided by intraoperative optical coherence tomography (OCT) in conjunction with anterior chamber puncture and drainage, and corneal thermokeratoplasty for the treatment of severe acute edematous keratoconus.

Methods: Data was collected for a study involving 31 cases include 30 male and 1 female patients. Eighteen patients in the study group underwent precise suturing of posterior elastic layer fissures guided by intraoperative OCT, in combination with anterior chamber puncture and drainage, and corneal thermokeratoplasty. Thirteen patients in the control group did not undergo suturing. Preoperative visual acuity, corneal edema diameter, corneal thickness, and posterior elastic layer fissure length were collected. Evaluation was performed using slit lamp microscopy, anterior segment OCT, and other methods to assess the time of initial postoperative corneal edema resolution and closure of the posterior elastic layer fissure. Deep lamellar keratoplasty was performed 2-4 weeks after edema resolution, and the corneal bed scar repair and visual acuity of the two groups were compared.

Results: In the suturing group, the cornea of all 18 patients was accurately sutured to the deep stromal layer near the posterior elastic layer. The time for corneal edema resolution was 2.50 (1.00, 6.25) days in the suturing group and 7.00 (6.00, 10.50) days in the control group. The fissure healing time was 7.50 (7.00, 12.00) days in the suturing group and 14.00 (9.00, 14.00) days in the control group. All 18 patients in the suturing group successfully completed deep lamellar keratoplasty.

Conclusions: In the treatment of severe acute edematous keratoconus, precise suturing of posterior elastic layer fissures guided by intraoperative OCT, in conjunction with anterior chamber puncture and drainage, and corneal thermokeratoplasty, can rapidly alleviate corneal edema and promote the healing of posterior elastic layer fissures. This approach achieves better visual outcomes for subsequent lamellar keratoplasty surgeries. The use of intraoperative OCT guidance allows accurate positioning of the posterior elastic layer fissure in terms of location, direction, and depth of corneal stromal voids, thereby assisting surgeons in precise suturing.

P-COR-010

Single-cell RNA sequencing reveals the immune landscape of different infectious keratitis

Z. Wei¹, Q.f. Liang²

¹Beijing Tongren Hospital, Beijing, China, ²Ophthalmology, Beijing Tongren Hospital, Beijing, China

Introduction: Acanthamoeba keratitis (AK) is an ocular infection caused by the Acanthamoeba parasite. Compared to bacterial keratitis (BK) and fungal keratitis (FK), both the density and dendritic length of dendritic cells (DCs) are elevated in AK, indicating an increased maturity of DCs in AK. The differences in the types and numbers of immune cells present in AK may be because the immune response is not properly induced. However the landscape of immune cell distributions and alterations in AK remains unknown.

Objectives: To investigate the cellular landscape within AK corneal tissue and analyze the underlying principles of differential immune responses.

Methods: We conducted single-cell RNA sequencing of cornea on different types of infectious keratitis obtained from patients. Subsequently, the sequencing analysis results were validated through a co-culture system *in vitro*.

Results: We delineated 13 cellular subtypes in the corneal tissue of patients with infectious keratitis. In both BK and FK, the majority of immune cells were granulocytes (72.7% in BK and 54.1% in FK). But in AK, the majority was observed that the T cell population (23.1%) constitutes the highest proportion. Compared with the FK group, there exists a discernible disparity in both the quantity and magnitude of receptor expression involved in intracellular communication among neutrophils in AK group. In this regard, we conducted an unsupervised clustering analysis by enrichment of disparate neutrophil cell subsets, which yielded 5 clusters. One particular subpopulation of neutrophils, which exhibited high expression of CD52, RACK1, and NPM1, was named abnormal neutrophil (ab-Neu) in this study. Compared with other subsets of neutrophil, mature, phagocytosis, chemotaxis, neutrophil activation, NADPH oxidase, and mitochondria-mediated ROS production, specific scores were significantly downregulated in ab-Neu (all $P < 0.001$). From the pseudotime and density plots, it was evident that ab-Neu resides between the mature and aged stages, and may represent an intermediate state. Following the co-culture, the abundance of these CD52⁺ RACK1⁺ NPM1⁺ ab-Neu increased with time.

Conclusions: In Acanthamoeba keratitis, there is a significant decrease in the quantity of neutrophils. Additionally, there is a presence of a type of non-functional CD52⁺ neutrophils, which may contribute to the protracted course of Acanthamoeba keratitis and serve as a potential target for future intervention.

P-COR-011

Electrospun PLA fibrous scaffolds surface coated with thin films comprising silk peptide for biomedical reconstruction

S. Zhang¹, Q. Yao¹, J. Chen¹, Y. Fu¹

¹Ophthalmology, Ninth People's Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China

Introduction: Conjunctival reconstruction with suitable substitutes is an effective treatment to deal with conjunctival scarring, which can severely impair the ocular vision.

Objectives: In this work, a thin film comprising silk peptide (SP), cellulose nanofibrils (CNF) and Ag nanoparticles (AgNPs) that implanted on the poly(lactic acid) (PLA) electrospun fibrous membranes (EFMs) was designed, which could be used for biomedical reconstruction.

Methods: In this work, the PLA EFMs surface coated with a thin film comprising SP and/or CNF, further functionalized itself with few AgNPs, were designed. Systematic experiments were carried out to examine the morphology, components, cytocompatibility and anti-bacterial property of as-prepared scaffolds. Additionally, *in vivo* experiments by transplanting the PLA EFMs onto the conjunctival defects were further conducted to verify the feasibility of the scaffolds as conjunctival repairing substitutes.

Results: Both of the SP and CNF as thin films can improve the surface hydrophilicity of the as-prepared scaffolds, which synergistically enhanced the biocompatibility. In *in vivo* experiments, the developed composite PLA EFMs could be easily manipulated and transplanted to conjunctival defects, which accelerated the structural and functional restoration of the ocular surface. Additionally, the incorporation of as few as possible AgNPs efficiently reduced the topical application of antibiotics without causing infections.

Conclusions: The resultant scaffolds could not only serve as useful alternative substrates for the conjunctival engineering, but also prevent infections effectively with a very low content of AgNPs.

P-COR-012

Long retention and body-temperature triggered nitric oxide release for corneal alkali burn therapy

Q. Qin¹, M. Chen¹, K. Wang¹, F. Jia²

¹Eye Center, the 2nd Affiliated Hospital, Medical College of Zhejiang University, Hangzhou, China, ²Key Laboratory of Cardiovascular Intervention and Regenerative Medicine of Zhejiang Province, Department of Cardiology, Sir Run Run Shaw Hospital, Zhejiang University School of Medicine, Hangzhou, China

Introduction: Corneal chemical injuries represent a frequent and tricky ophthalmic emergency, and account for 11.5%-22.1% of the ocular trauma. Without timely treatment, the damage could lead to corneal opacification or even blindness. Nitric oxide (NO) is an endogenous gas signaling molecule, which acts as a powerful regulator of multiple life processes. However, medical applications of NO were greatly restrained by its short half-life and limited diffusion radius. These problems constitute a great challenge for NO based therapies in medical applications. Herein, a polyamino acid-based NO donor, namely polyamino acid-based poly-S-nitrosothiols (PGlu-TEPA-SNAP), was synthesized as a potential formula of eye drop for the therapy of alkali burn-induced corneal injury.

Objectives: To design and prepare a macromolecular carrier (PGlu-TEPA-SNAP) with long retention and body-temperature triggered nitric oxide release and to explore its therapeutic effects and mechanisms on corneal alkali burns.

Methods: Synthesis and characterization of PGlu-TEPA-SNAP; Mouse corneal alkali burn model establishment, treatments and clinical assessment; Quantitative reverse transcription-polymerase chain reaction (qRT-PCR) and immunoblotting; RNA-seq and data analysis; HCECs and HUVECs Culture: Cytotoxicity Assays, cell Migration Assay, matrigel tube formation and so on.

Results: Inspired by natural NO carrying proteins, S-nitrosothiols were employed to achieve good balance between stability and body-temperature induced release of NO. Besides, cationic side chains were introduced, not only to increase the water-solubility, but to increase the interaction and retention of the macromolecular donor to the negatively charged ocular surfaces. In our study, this polymeric NO donor demonstrated potent regulation of multiple pathological processes in alkali-burned corneas via leptin/leptin receptor related signaling. It selectively enhanced the regeneration and healing of epithelium while had no promoting effect of neovascularization, by utilizing the differential sensitivity of epithelial cells and endothelial cells towards NO.

Conclusions: Eye drops with proper concentration of PGlu-TEPA-SNAP successfully promoted the healing of alkali-burned corneas, restoring tissue structure without obvious cytotoxicity. Our work will be inspiring for the development of therapies for corneal injury and also serves as an interesting reference for future design of stimuli-responsive NO delivery systems.

P-COR-013

The effect of IPL combined with 0.05% cyclosporin A eyedrops in the treatment of Sjögren's Syndrome Related Dry Eye

*Y. Huo*¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: The goal of this study was to assess the effectiveness and safety of combining intense pulsed light (IPL) therapy with topical 0.05% cyclosporine A (CsA) eye drops to treat dry eyes caused by Sjögren's Syndrome (SS-DE).

Objectives: Participants in the prospective, randomized trial included sixty individuals with symptoms of SS-DE.

Methods: Patients received topical eye drops containing either 0.1% sodium hyaluronate (Group S) or 0.05% CsA (Group C) in addition to IPL therapy. Patients were randomized to one of two groups. Prior to the first treatment, as a baseline, and at 12, 16, and 20 weeks after the start of the treatment, the following measures were assessed: best corrected visual acuity (BCVA), the Ocular Surface Disease Index (OSDI) score, the Schirmer I test (SIT), non-invasive tear breakup time (NBUT), corneal fluorescein staining (CFS), meibomian gland (MG) dropout, lid margin abnormality, MG expressibility, and meibum quality.

Results: Significant improvements were seen in the OSDI, NBUT, CFS, MG expressibility, and meibum quality in both groups. Group C showed a much greater increase in OSDI, NBUT, MG expressibility, and meibum quality. Following treatment, SIT and lid margin abnormalities significantly improved in Group C as well, but not in Group S.

Conclusions: Our results indicate that 0.05% CsA eyedrops combined with IPL therapy can significantly reduce the subjective issues and physical discomfort experienced by SS-DE patients.

P-COR-014

Outcome of endothelial keratoplasties for the indication of bullous keratopathy using overseas donor cornea

*M. Ahad*¹

¹Anterior Segment Division, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

Introduction: Endothelial keratoplasty (EK) is now the preferred choice for managing bullous keratopathy. Descemet's stripping automated endothelial keratoplasty (DSAEK) and Descemet's membrane endothelial keratoplasty (DMEK) are the two main types of EK. Nowadays many eye banks prepare the tissues (pre-cut or preload) and transport it to the surgeons or surgeons may decide to prepare the endothelial lamellar tissue themselves.

Objectives: The purpose of this study was to compare the clinical outcomes of preloaded DMEK with that of preloaded DSAEK, standard surgeon cut DSAEK and pre-cut DSAEK.

Methods: Setting: Tertiary eye care center in the Middle East

Retrospective study of all cases of endothelial keratoplasty (EK) performed by a single surgeon for the indication of bullous keratoplasty. Exclusion criteria were a follow-up of fewer than 3 months and an indication of EK other than bullous keratopathy. All the donor cornea were acquired from the Eye Bank Association of America accredited USA eye banks. In the case of preloaded or pre-cut tissue, the processing was done in the USA and the tissues were shipped to Saudi Arabia. There were four categories

1) Preloaded DMEK, 2) Preloaded DSAEK, 3) Pre-cut DSAEK and 4) Surgeon cut DSAEK

Clinical & demographic details of patients, donor data, the time interval between tissue processing and transplantation, surgical details, and post-operative data were collected and analyzed. The main outcome measures were primary failure and long-term failure rates.

Results: There were a total of 144 cases of EK performed for bullous keratopathy. 40 underwent DMEK, 38 preloaded DSAEK, 24 pre-cut DSAEK, and 42 surgeon cut DSAEK. The primary failure rate was 2.5%, 5.2%, 50% and 9.5% respectively. There was a strong correlation between primary failure and the interval duration between tissue processing and transplantation in pre-cut DSAEK. No such correlation was seen in the preloaded DMEK group. Other risk factors for primary failure were previously failed graft and fibrotic membrane in the anterior chamber. The major risk factors for long-term failure were non-DMEK EK, the presence of glaucoma, and the presence of drainage tubes.

Conclusions: Compared to all types of DSAEKs, preloaded DMEK had a better outcome in cases of bullous keratopathy. Among the three DSAEK groups, the preloaded DSAEK had best survival rates. Unlike pre-cut DSAEK, in DMEK group longer preservation and processing-to-transplant time had no effect on clinical outcome.

P-COR-015

Ultra high-resolution OCT in diagnosing corneal epithelial dystrophies

A. Wylegala¹, K. Rogacz¹, B. Dugieło¹, K. Kryszan¹, K. Bujala¹, P. Woźniak¹, D. Cholewa¹, B. Orzechowska-Wylęgała¹, E. Wylęgała¹

¹Silesian Medical University, Katowice, Poland

Introduction: Corneal epithelial dystrophies encompass a spectrum of disorders characterized by abnormal cellular and structural changes in the corneal epithelium, posing challenges to accurate diagnosis and characterization. Optical Coherence Tomography (OCT) has been a valuable imaging modality, providing detailed insights into corneal morphology. However, conventional OCT may fall short in capturing subtle alterations associated with specific subtypes of corneal dystrophies.

Objectives: This study explores the utility of High-Resolution Optical Coherence Tomography (HR-OCT) in evaluating various subtypes of corneal epithelial dystrophy, focusing on detecting subtle changes not discernible through conventional OCT. Specifically, we investigate epithelial basement membrane dystrophy (EMBD), Meesman, and Thygeson dystrophy using a HR-Revo 130 (Optopol Technology Zawiercie, Poland).

Methods: A prospective, cross-sectional study involving 20 eyes was conducted using the HR Revo OCT. HR Revo is capable of capturing 130k/A scans per second with an axial resolution of 3 μm and a digital resolution of 1.6 μm . Among the eyes examined, 12 exhibited EMBD, 4 had Meesman dystrophy, and 2 presented with Thygeson dystrophy. All participants had an in-vivo corneal confocal microscopy that confirmed the diagnosis. Measurements were performed using the HR Revo OCT prototype. The research utilized HR-OCT to capture detailed images and identify nuanced changes in the corneal structure that may go unnoticed with conventional OCT imaging.

Results: On HR-OCT imaging, Meesman corneal dystrophy presented with sharply demarcated hyperreflective dots, leaving hypotransmission defects. Conversely, Thygeson dystrophy exhibited flatter, diffusely demarcated, lesions with lower reflectivity, without associated hypotransmission defects. The appearance of EMBD varies depending on the type of corneal lesions. Some exhibited hyperreflective lesions while others showed the presence of fine lines spanning through the corneal epithelium.

Conclusions: HR-OCT proves to be a valuable tool in diagnosing corneal epithelial dystrophies, surpassing the limitations of conventional OCT. The detailed imaging provided by the HR Revo 130 facilitates the identification of subtle changes in corneal structure, enhancing our ability to differentiate and characterize various subtypes of corneal epithelial dystrophies.

P-COR-016

Evaluation of efficacy between 0.05% CsA and 0.1% tacrolimus eye drops in the treatment of ocular chronic GVHD

S. Liu¹, J. Hong¹

¹Peking University Third Hospital, Beijing, China

Introduction: Chronic graft-versus-host disease (cGVHD) is a major and severe complication after allogeneic hematopoietic cell transplantation and has a significant impact on patients' quality of life. The clinical manifestations of ocular GVHD are similar to severe dry eye, and the treatment still remains difficult.

Objectives: To evaluate the efficacy, safety of 0.05% CsA and 0.1% tacrolimus eye drops in the treatment of ocular cGVHD.

Methods: A non-randomized concurrent control trial. A total of 83 eyes from 83 patients with ocular cGVHD were enrolled in this study, which were divided into two groups: 0.05% CsA group (group A) and 0.1% tacrolimus group (group B). The treatment was divided into two phases (treatment period and maintenance period). Reexamination was performed at 1, 3 and 6 months after medication. The efficacy was evaluated according to Ocular Surface Disease Index (OSDI), corneal fluorescein staining (CFS) score, and fluorescein tear break-up time (BUT). Safety was assessed by visual acuity (VA, LogMAR) and intraocular pressure. Tear samples of patients were collected and tear cytokines were detected.

Results: One month after treatment, CFS in both groups was significantly reduced ($P < 0.001$) and BUT in group B was significantly increased ($P < 0.001$). After 3 months of treatment, CFS in both groups was significantly reduced ($P=0.002, 0.010$). BUT in both groups was significantly increased ($P=0.003, 0.029$). OSDI in group A was significantly reduced ($P=0.044$). After 6 months of treatment, compared with before treatment, CFS in group A was significantly decreased ($P < 0.001$), BUT was increased ($P=0.005$), OSDI in group B was significantly decreased ($P=0.037$), and CFS and BUT were not significantly improved. Intraocular pressure in both groups was within normal range during treatment. Altered levels of all tested cytokines are of no significant differences between the two group.

Conclusions: Both 0.05% CsA and 0.1% tacrolimus eye drops combined with local glucocorticoids can play a good anti-inflammatory effect, which are effective and safe means to treat ocular cGVHD. Although the effect of 0.05% cyclosporine is slower than that of 0.1% tacrolimus, the long-term effect is more stable, and the improvement of patients' conscious symptoms is better. Local anti-immunotherapy is not suitable for rapid reduction, slow reduction is more conducive to the stability of the ocular surface and the control of inflammation.

P-COR-017

The regulation and mechanism of delta like non-canonical notch ligand 2 on corneal Limbal Stem Cells in the limbal niche

Y. Mao¹, F. Zhang¹, Y. Hu¹

¹Ophthalmology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, China

Introduction: Limbal stem cells (LSCs) are the only source of corneal epithelial renewal, and play an essential role in maintaining the integrity and normal homeostasis of the cornea during wound healing. However, the unclear mechanisms of limbal stem cell proliferation and differentiation and the drug shortage of limbal stem cell dysfunction (LSCD) therapy still remain hurdles of LSCD management.

Objectives: To investigate the function and mechanism of delta like non-canonical Notch ligand 2 (DLK2) on limbal stem cells in limbus.

Methods: We analyzed 10x Genomics single cell sequencing about limbal epithelium and central corneal epithelium respectively in SD rats. Immunofluorescent staining were used to identify the expression and distribution of DLK2 in corneal epithelium. To evaluate the fate of limbal stem cells, we generated the stable cell lines for over-expression or RNA interference of DLK2 with lentivirus in TKE2 and HCEC, and performed the crystal violet staining, the relative mRNA expression levels of corneal limbal stem/progenitor cells markers KRT15, KRT14, the proliferation marker MKI67, PCNA, and blots of DLK2, NICD, NOTCH1 expression.

Results: We performed the single cell RNA-sequence to analyze that gene expression in corneal limbal region, and the results showed that delta like non-canonical Notch ligand 2 (DLK2) was expressed in KRT14-positive limbal stem/progenitor cells. DLK2-positive cells were partially overlapped with KRT14-positive cells. The expression of DLK2 was dramatically decreased during the corneal stem/progenitor cells (TKE2) differentiation. With over-expression of DLK2 in HCEC, there was an increased expression of KRT15, KRT14, ABCG2, TP63, MKI67, PCNA, higher colony forming efficiency, faster migration rate with down-regulation of NICD/NOTCH1. After the introduction of shRNA into HCEC, the mRNA expression of KRT15, KRT14, ABCG2, TP63, MKI67, PCNA, CFE and migration rate were lower than the vector group.

Conclusions: DLK2 is a potential modulator of limbal stem cells, maintaining the stemness, promoting the proliferation and migration of LSCs via inhibiting the activation of NOTCH1 signaling pathway. This project will lead to a new insight in the treatment of LSCD.

P-COR-018

YTHDF3-mediated m⁶A modification of THBS2 mRNA delayed diabetic corneal epithelial healing via Wnt/ β -catenin signaling

H. Zhang¹, J. Wang¹, X. Jin¹

¹Harbin Medical University, Harbin, China

Introduction: Diabetic ocular complications account for approximately 40-70% of diabetic patients, affecting the postoperative recovery process of diabetic eye diseases and posing a challenging treatment.

Objectives: We want to investigate whether THBS2 plays a role in delayed healing of diabetic corneal epithelium through the Wnt/ β -catenin pathway.

Methods: THBS2 in the cornea of diabetic mice was screened using bioinformatics methods. THBS2 Overexpression human corneal epithelial cell lines (HCE-T) and THBS2 knockdown mice were constructed using lentivirus and adenovirus infection techniques. The impact of THBS2 on the proliferation and migration abilities of HCE-T was determined. MeRIP-qPCR was used to investigate whether the m⁶A modification level of THBS2 mRNA changed, and RT-qPCR and Western blot were used to study the expression of m⁶A modification-related enzymes. YTHDF3 knockdown or overexpression HCE-T and YTHDF3 knockdown mice were constructed using lentivirus and adenovirus infection techniques. RIP-qPCR and dual-luciferase reporter assays were used to verify the interaction between YTHDF3 and THBS2, and mRNA stability, protein degradation, and RNC-qPCR experiments were further used to clarify the way YTHDF3 regulates THBS2 expression.

Results: THBS2 expression was reduced in the cornea of diabetic mice and AGE-induced HCE-T. In vitro experiments showed that overexpressing THBS2 promoted Wnt/ β -catenin pathway and the proliferation and migration of HCE-T, while in vivo experiments showed that THBS2 knockdown delayed corneal epithelial wound healing. m⁶A levels were reduced in the cornea of diabetic mice and AGE-induced HCE-T, and m⁶A reader YTHDF3 expression was decreased. YTHDF3 knockdown inhibited THBS2 expression, corneal epithelial cell proliferation, migration, and corneal epithelial wound healing, while YTHDF3 overexpression promoted THBS2 expression and proliferation and migration in HCE-T. There is a potential m⁶A modification site in the CDS region of THBS2, and YTHDF3 interacts with THBS2. YTHDF3 knockdown can inhibit the luciferase activity of wild-type THBS2 CDS, with no effect on the luciferase activity of the mutated m⁶A site of THBS2 CDS.

Conclusions: THBS2 plays an important role via Wnt/ β -catenin signaling pathway in corneal epithelial cell proliferation, migration, and corneal epithelial wound healing. YTHDF3 plays an important role in corneal epithelial cell proliferation, migration, and corneal epithelial wound healing by regulating THBS2 mRNA translation.

P-COR-019

S-stamping over an air bubble in DMEK grafts showed no difference to the conventional stromal hole method

V. Chow^{1,2}, Y. Chow², K.P. Leung², W. To², S.M. Wong², C.S. Hung², M.Y. Ting²

¹Hong Kong Eye Hospital, Hong Kong, Hong Kong, SAR of China, ²Hospital Authority Eye Bank, Hong Kong, Hong Kong, SAR of China

Introduction: Orientation stamps on Descemet Membrane Endothelial Keratoplasty (DMEK) grafts have been shown to reduce upside-down graft implantation and hence, graft failure. Nevertheless, the conventional method of stamping through a stromal hole would render the anterior stromal cap unfit for further transplantation. Stamping over a partially-everted graft suspended over an air bubble has the advantage of preserving the anterior stromal cap while still being attached to the stroma, especially for surgeons who prefer the stability of an attached graft and the flexibility of sizing the grafts on the day of surgery.

Objectives: To compare the outcomes of S-stamping over an air bubble versus through a stromal hole in DMEK grafts.

Methods: This was a retrospective comparative case series of the first 18 pre-stamped DMEK grafts prepared by the Hospital Authority Eye Bank in Hong Kong. Six DMEK grafts were S-stamped through a stromal hole from October 2021, while 12 DMEK grafts were S-stamped over an air bubble from February 2023 on. The success rate, retention of the S-stamp, time used for preparation, location of S-stamp, endothelial cell loss (ECL) and number of primary graft failures were compared between the two methods.

Results: There were no significant differences between the two methods in all the parameters studied. The success rates in pre-stamping and pre-stripping were 100% (18/18) in all grafts. S-stamp was visible in 100% (18/18) on the day of surgery, from 1 to 3 days after stamping. The stromal hole method took an average of 37.4 ± 4.2 min while the air bubble method took an average of 33.6 ± 9.5 min ($p=0.353$). The S-stamp was placed in the 6.0 ± 1.8 mm zone from the center in the stromal hole method and in the 6.4 ± 1.6 mm zone in the air bubble method ($p=0.658$). Average ECL was $0.41 \pm 2.45\%$ in the stromal hole method compared to $2.05 \pm 7.24\%$ in the air bubble method ($p=0.602$). No primary graft failures were reported for all grafts (0/18).

Conclusions: S-stamping over an air bubble is comparable to the conventional stromal hole method in DMEK grafts in terms of their preparation times, the success rates in pre-stripping a graft with a clinically visible and properly located stamp, immediate ECLs and rates of primary graft failure. It further has the advantage of preserving an intact anterior stromal cap for further transplantation, which is particularly important in places where corneal tissues are scarce. It is now the preferred method of pre-stamping DMEK grafts at the Hospital Authority Eye Bank in Hong Kong.

P-COR-020

Ferroptosis as a potential therapeutic target for reducing inflammation and corneal scarring in Bacterial Keratitis

*Q. Chen*¹, *L. Wang*¹, *X. Xu*¹, *Y. Wei*¹, *X. Gun*², *Q. Liang*¹

¹Beijing Institute of Ophthalmology, Beijing Tongren Hospital, Capital Medical University, Beijing, China, ²Capital Medical University, Beijing, China

Introduction: Bacterial keratitis (BK) is a prevalent infectious corneal disease that is a leading cause of corneal blindness. Despite standardized treatment approaches, corneal scarring after keratitis healing remains the primary cause of visual impairment in BK patients. Hence, developing methods to minimize inflammation and scarring is crucial for visual recovery in patients with BK.

Objectives: To investigate the involvement of ferroptosis in the role of inflammation and corneal scarring of BK.

Methods: Transcriptome analysis was performed to evaluate ferroptosis-related gene expression in human BK corneas. Subsequently, the ferroptosis in mouse models of *Pseudomonas aeruginosa* keratitis and corneal stromal stem cells (CSSCs) was validated. The mice were treated with levofloxacin (LEV) or levofloxacin combined with ferrostatin-1 (LEV+Fer-1). CSSCs were treated with lipopolysaccharide (LPS) or LPS combined Fer-1. Inflammatory cytokines, α -SMA, and ferroptosis-related regulators were evaluated by RT-qPCR, immunostaining, and Western blot. Iron and reactive oxygen species (ROS) were measured.

Results: Transcriptome analysis revealed significant alterations in ferroptosis-related genes in human BK corneas. In the BK mouse models, the group treated with LEV+Fer-1 exhibited reduced inflammatory cytokines (MPO, TNF- α , and IFN- γ), decreased corneal scarring and α -SMA expression, and lower Fe³⁺ compared to the BK and LEV groups. Notably, the LEV+Fer-1 group showed elevated GPX4 and SLC7A11 in contrast to the BK and LEV group. In vitro, Fer-1 treatment effectively restored the alterations of ROS, Fe²⁺, GPX4, and SLC7A11 induced by LPS in CSSCs.

Conclusions: Ferroptosis plays a crucial role in the pathogenesis of BK. The inhibition of ferroptosis holds promise for mitigating inflammation, reducing corneal scarring, and ultimately enhancing the prognosis of BK. Consequently, this study provides a potential target for innovative therapeutic strategies for BK, which holds immense potential to transform the treatment of BK.

P-COR-021

High-intensity use of smartphone can significantly increase the diagnostic rate and severity of dry eye

C. Wang¹, X. Jin¹

¹Eye Center of Second Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou, China

Introduction: Dry eye is considered a major contributor to DES, and its prevalence is significantly higher among frequent visual display terminal (VDT) users. The rapid increase in the prevalence of dry eye is putting a heavy health and economic burden on modern people. Therefore, we wonder whether there is a problem of overdiagnosis in such a high diagnostic rate of dry eye, and whether a lifestyle change in a short time can cause a change in the diagnostic rate of dry eye?

Objectives: To investigate the effects of high-intensity use of smartphones on ocular surface homeostasis and to explore whether high-intensity use of handheld digital devices can cause false increase of dry eye diagnostic rate.

Methods: In this prospective self-control study, 60 subjects (120 eyes) were recruited and asked to read on smartphones provided by the same manufacturer for two consecutive hours. Ophthalmological examinations [non-invasive tear breakup time (NIBUT), fluorescein breakup time (FBUT), Schirmer I test, corneal fluorescein staining (CFS), bulbar conjunctival redness and meibomian gland (MG) assessment] and a questionnaire survey were conducted before and after the reading test. Based on the collected data, the changes in ocular surface damage and subjective symptoms of the subjects were evaluated, and the differences in the diagnostic rate of dry eye before and after high-intensity use of smartphones were compared.

Results: The diagnostic rate of dry eye was sharply increased. The severity of dry eye also changed significantly, and the moderate and severe degree increased after reading. The aggravated severity subjects had lower MG expressibility and more evident bulbar conjunctival redness compared to the non-aggravated severity subjects. After 2 h of continuous reading, NIBUT-First, NIBUT-Average and FBUT-Average were significantly decreased, while the proportion of BUT ≤ 5 s increased significantly. Compared to the baseline level, the proportion of NIKTMH < 0.20 mm increased significantly. Compared to the baseline, evident aggravation was observed in bulbar conjunctival redness. OSDI was significantly higher than the baseline after the reading test.

Conclusions: Diagnostic indicators related to dry eye are rapidly deteriorating after high-intensity smartphone use, especially those with lower MG expressibility and ocular redness. High-intensity smartphone use can increase the false positive rate of dry eye diagnosis by disturbing ocular surface homeostasis.

P-COR-022

Histone methylation regulates neutrophil extracellular traps to attenuate alkali-burn-induced corneal neovascularization

Y. Mou¹, X. Huang², X. Jin²

¹Eye Center, The Second Affiliated Hospital, Zhejiang University, School of Medicine, Zhejiang, Hangzhou, China, ²Eye Center, The Second Affiliated Hospital, Zhejiang University, School of Medicine, Hangzhou, China

Introduction: Corneal transparency is essential for the optic system. The cornea lacks blood vessels and demonstrates an angiogenic privilege. Corneal neovascularization (CNV), which is caused by inflammation, extended use of contact lenses, chemical burns, physical trauma, air pollution or systemic immune diseases, breaks the balance and leads to corneal opacification and even vision loss. The occurrence and progression of CNV are closely related to inflammatory reactions and immune cell activation. Neutrophils are activated immediately after injury to kill pathogenic bacteria and remove dead cell fragments in the acute inflammatory response. Excessive neutrophil activation can lead to immunopathology, partly through a net-like structure called neutrophil extracellular traps (NETs), causing additional damage to tissues and cells. The detailed mechanisms of NETs affecting angiogenesis remained undetermined. Histone modifications have been widely explored to regulate the formation and function of NETs, and methylation is rarely investigated in the regulation of neutrophils and NETs. In this study, we introduce a pan-Jumonji demethylase inhibitor, JIB-04, to regulate the histone methylation of NETs and explore the immunoregulatory effects of histone-methylated NETs on CNV.

Objectives: We investigate the role of neutrophil extracellular traps (NETs) played in CNV and how post-translational methylation regulates NETs characterizations.

Methods: Alkali-burn-induced mice CNV model and human primary neutrophils were used to observe the involvement of NETs during neovascularization and the change of histone methylation NETs. We further used histone demethylase inhibitor JIB-04 to regulate the histone methylation of NETs and explored the related effects on CNV formation.

Results: NETs were obviously involved in corneal alkali-burn and could be stimulated by NaOH in vitro. Isolated NETs aggravated CNV and promoted migration, proliferation and tube formation of HUVECs, while disruption of NETs by DNase I significantly ameliorated neovascularization and inflammation. Mechanistically, histone methylation of NETs was inhibited by alkali-burn and restored by JIB-04. JIB-04 reduced CNV and NETs formation by regulating NF- κ B/ERK/ROS pathway.

Conclusions: Histone methylation facilitates NETs formation in alkali-burn-induced CNV through NF- κ B/ERK/ROS pathway, which indicating a novel therapeutic target for CNV and other neovascularization-related diseases.

P-COR-023

Comparing efficacy of combined IPL and LLLT versus IPL for the treatment of dry eye disease: a retrospective study

N. Wankha¹, D. Rojdamrongratana¹, N. Suksiriluk¹

¹Ophthalmology, Thammasat University, Pathum Thani, Thailand

Introduction: Dry eye disease is a common condition that affects millions of people worldwide, with meibomian gland dysfunction (MGD) being a major contributor to the development of this condition. Intense pulsed light (IPL) and low-level light therapy (LLLT) have emerged as promising treatments for MGD-related dry eye disease. More recently, several studies reported that combined therapy of IPL with LLLT is effective in treating MGD patients. According to the authors' knowledge, there is no study comparing IPL versus IPL with LLLT on clinical measures of dry eye related to MGD.

Objectives: To compare the efficacy of Intense Pulsed Light therapy combined with Low-Level Light therapy Versus Intense Pulsed Light for the treatment of dry eye disease.

Methods: Patients presenting with a dry eye disease (DED) with MGD and having received treatment with IPL or IPL with LLLT at Thammasat University Hospital between February 2023 and November 2023 were included. The single IPL session and combined IPL and LLLT session was performed once weekly over 3 weeks. The end point was the mean difference of DEQ-5 score between baseline (0-14 days before the first session of the treatment) and 2 weeks after the last session. Data collection was done retrospectively. Statistical analysis was done using STATA 16.0

Results: 51 patients were included (25 patients from IPL group, 26 patients from IPL with LLLT group). DEQ-5 score significantly decreased after the single IPL treatment and the combined IPL with LLLT treatment ($P < 0.001$). Patients in the combined IPL with LLLT group showed significant improvement in DEQ-5 score compared with the single IPL group (-10.2 ± 3.1 vs -7.8 ± 2.1 , $P < 0.05$). No adverse effects were observed in both groups.

Conclusions: Both IPL and IPL with LLLT were safe and effective in improving ocular discomfort symptoms in MGD-related dry eye disease. However, the combined IPL with LLLT determined a greater improvement in symptoms.

P-COR-024

Clinical study of first-time user varenicline nasal spray- Tyrvaya for dry eye disease-the compliance and acceptability

M. Chen¹

¹Ophthalmology, University of Hawaii, Honolulu, United States

Introduction: Varenicline 0.03mg nasal spray (Tyrvaya) is believed to bind nicotine acetylcholine receptors in the nasal cavity of terminal branches of trigeminal nerves to stimulate endogenous tear via efferent parasympathetic inner action.⁵

The studies published by Oyster pharmaceutical in 2021 and were approved by FDA.

Objectives: To investigate the compliance and acceptance of first time using nasal spray OC-01 (Tyrvaya) for dry eye in order to study the potential strategy to improve the usage for patients with dry eye disease either having resistance to eye drops therapy or having difficulty applying eye drops.

Methods: 20 patents with dry eye disease either having resistance to eye drops therapy or having difficulty applying eye drops were included from January 2023 to July 4, 2023.

A sample of one bottle of Varenicline was given to patients to spray both nasal cavities two times a day for two weeks. Detailed instructions and possible side effects were given according to the pharmaceutical pamphlets.

The second bottle was given to those patients who stopped for the first bottle for the second chance to try with further education and demonstration.

Questionnaire consisted of the following questions:

- 1) Did you stop the nasal spray? and why?
- 2) Did you experience better in dry eye and willing to continue?
- 3) How did the second bottle work?

Results: Out of 20 patients,18 responded (90%).56% had good response who experienced improvement in dry eye and willing to continue. 34% had poor response with sneezing, cough, nasal irritation resulting in abandoning the nasal spray. The second bottle improved the discontinue rate to 17%and good response rate to 83%. There was 1.1% lost follow up.

Conclusions: Education and reinforcement may increase the acceptance and compliance for patients who are indicated for the medication.

P-COR-025

Cytokine balance of lacrimal fluid in patients with bacterial keratitis and diabetes mellitus

*O. Zavaloka*¹

¹Ophthalmology department, Kharkiv National Medical University, Kharkiv, Ukraine

Introduction: Diabetes mellitus (DM) is a systemic risk factor for keratitis.

Objectives: It may be due to pathological changes of the inflammatory process in DM patients, resulting from "meta-inflammation" - a form of chronic systemic inflammation of low intensity, which leads to expression of proinflammatory cytokines and changes in body response for damage. Aim: To analyze the cytokine balance of lacrimal fluid in type I DM patients with bacterial keratitis at the first visit and to identify the immunological aspects of the disease.

Methods: The analysis was performed in 17 type 1 DM patients with bacterial keratitis and 15 nondiabetic patients with bacterial keratitis at the first visit. Data from 14 healthy individuals were used for comparison. In addition to standard, ophthalmic examination methods included bacteriological examination, fluorescein test, optical coherence tomography of the anterior segment of the eye, noncontact corneal aesthesiometry. The level of Interleukin (IL) - 1 β , IL-6 and IL-10 in the lacrimal fluid of the sick and the contralateral eye was determined by quantitative colorimetric enzyme-linked immunosorbent assay using ELISA kits.

Results: In DM patients with bacterial keratitis, the concentration of IL-1 β and IL-6 in the lacrimal fluid of the sick eye exceeded those in healthy individuals ($p < 0.05$) and did not differ significantly from nondiabetic patients with bacterial keratitis ($p > 0.05$). In the lacrimal fluid of the contralateral eye of DM patients with bacterial keratitis, the level of IL-1 β and IL-6 exceeded the corresponding indicators of nondiabetic patients with bacterial keratitis and healthy individuals ($p < 0.05$). The concentration of IL-10 in the lacrimal fluid of the contralateral eye in DM patients with bacterial keratitis exceeded that in healthy individuals ($p < 0.05$) and did not significantly differ from those in nondiabetic patients with bacterial keratitis ($p > 0.05$).

Conclusions: DM patients with bacterial keratitis have immunological features of the disease.

P-COR-026

Clinical profile of corneal sensitivity in diabetic patients: a case-control study

C. Mvilongo Tsimi¹, M.E. Akono¹, D. Nkoudou¹, A. Nomo¹, C. Nanfack¹, A. Omgbwa Eballé²

¹Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaounde, Cameroon,

²Ophthalmology, Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Yaoundé, Cameroon

Introduction: Diabetic retinopathy is the most common and well known ocular complication. However, diabetes can affect other tissues of the eye, such as the cornea and lead to corneal neuropathy which can result in reduced visual acuity and eventual blindness. Few ophthalmologists routinely look for decreased corneal sensitivity in their routine examination and therefore miss it. Although increasing attention has been paid to corneal disorders in diabetics, there are very few, if any, studies in our field on the evaluation of corneal sensitivity in diabetic patient.

Objectives: To evaluate the corneal sensitivity of melanodermal diabetic patients and identify factors associated with changes in corneal sensitivity.

Methods: We conducted a cross-sectional comparative case-control study at the National Obesity Center of the Yaounde Central Hospital and the Djoungolo District Hospital from March 1 to July 31, 2022. Corneal sensitivity was measured using the Cochet-Bonnet esthesiometer in any diabetic patient older than 18 years, matched for age and sex to a clinically healthy control population. Data were analyzed using SPSS version 23.0 software. A p-value of less than 5% was considered significant.

Results: A total of 111 diabetic and 111 non-diabetic patients participated in the study. The mean age was 53.46 ± 12.74 years for diabetics and 52.85 ± 11.77 years for non-diabetics ($p = 0.901$). The mean duration of diabetes was 6.4 ± 5.30 years. Corneal sensitivity in diabetics was lower (44.56 ± 9.59 mm) compared to non-diabetics (53.59 ± 6.30 mm) with a statistically significant difference ($p = 0.000$). Factors associated with the decrease in corneal sensitivity in diabetics were the duration of diabetes and poor glycemic control.

Conclusions: The decrease of corneal sensitivity related to diabetes is a complication to be systematically looked for during the ophthalmologic follow-up of diabetic patients.

P-COR-027

Clinical study of corneal stromal lens tissue transplantation for the treatment of corneal lesions

L. Li¹, L. Yumej²

¹Suining Central Hospital, Suining, China, ²Suining Central hospital, Suining, China

Introduction: Due to the global shortage of human corneal donors, there is a need to explore cost-effective and readily available alternatives. In this study, we investigated the feasibility of transplanting corneal stromal lens tissue obtained from femtosecond laser small incision stromal lens extraction (SMILE) into corneal wounds.

Objectives: In this study, we investigated the feasibility of transplanting corneal stromal lens tissue obtained from femtosecond laser small incision stromal lens extraction (SMILE) into corneal wounds.

Methods: A retrospective analysis was conducted on 27 cases where corneal stromal lenses were used as transplant materials between January 2020 and December 2023. The cases included 5 non-infectious keratopathy and 22 infectious keratopathy cases (bacteria, fungi, viruses). Follow-up assessments at 1 week, 1 month, and 3 months post-operation showed improvements in subjective symptoms, control of corneal lesions, healing time, transparency, and visual acuity.

Results: demonstrated successful treatment of all corneal lesions, with improved visual acuity in 24 eyes and no decrease in visual acuity in any eye.

Conclusions: The corneal stromal lens tissue acts as a collagen fiber scaffold, facilitating the healing of ulcers and repair of corneal lesions, making it a promising substitute for human corneal donors.

P-COR-028

The effects of cyclosporine ophthalmic solution 0.09% on dry eye questionnaire scores in patients with dry eye disease

R. Taji¹, K. Chow², S. Hassan³, B. Yap³

¹Toronto Medical Eye Associates, North York, ON, Canada, ²Clarity Eye Institute, Newmarket, ON, Canada, ³Cencora, Innomar Strategies Inc., Oakville, ON, Canada

Introduction: Dry eye disease (DED) is a multifactorial chronic condition characterized by loss of tear film stability that leads to ocular surface inflammation and damage. Topical cyclosporines, which are anti-inflammatory drugs, are indicated to increase tear production, reduce ocular surface inflammation, and/or improve disease signs and symptoms in patients with DED. Cyclosporine ophthalmic solution 0.09% (CsA 0.09%) has a nanomicellar formulation designed to improve the ocular delivery of cyclosporine and is indicated in Canada for the treatment of moderate to severe DED.

Objectives: This analysis assessed the effect of CsA 0.09% on moderate to severe DED symptoms using the validated Dry Eye Questionnaire (DEQ-5) at 1 and 3 months of treatment.

Methods: This multicenter, retrospective study included adults (≥ 18 years of age) in Ontario, Canada, with a confirmed diagnosis of DED who had been treated with CsA 0.09% for ≥ 1 month from March 2022 through September 23, 2023. All patients received CsA 0.09% (1 drop per eye twice daily) for up to 3 months. The DEQ-5 was completed at baseline and Months 1 and 3 of treatment. Baseline DEQ-5 scores were used to determine symptom severity (0–6, mild; 7–12, moderate; >12 , severe); patients with mild symptoms at baseline were excluded from this analysis. Safety assessments included adverse event monitoring.

Results: In total, 263 patients with moderate or severe DED completed the DEQ-5 assessment at baseline and the 1- and/or 3-month follow-up visits. The mean (standard deviation [SD]) age was 62.3 (14.3) years and the mean (SD) DED duration at baseline was 2.7 (3.9) years. Most patients (71.1%) had DEQ-5 scores indicative of severe DED symptoms at baseline. Of the 234 patients with a 1-month follow-up, 145 (62.0%), 30 (12.8%), and 59 (25.2%) reported improvement, no change, and progression of DED symptoms, respectively. Similarly, of the 138 patients with a 3-month follow-up visit, 98 (71.0%), 15 (10.9%), and 25 (18.1%) reported improvement, no change, and progression of DED symptoms, respectively. CsA 0.09% was generally well tolerated, with a safety profile consistent with that reported for the Phase 3 clinical program.

Conclusions: Twice-daily CsA 0.09% elicited clinically meaningful improvements in patient-reported symptoms assessed by the DEQ-5. Most patients reported improvements from baseline in DED symptoms at Months 1 and 3 of treatment. CsA 0.09% was generally well tolerated.

P-COR-029

The effect and mechanism of VWFA3-BAM complex modified mesenchymal stem cells in corneal repair

Z. Fang^{1,2}

¹Refractive Surgery Center, Zhejiang University Eye Hospital, Hangzhou, China, ²The Eye Center of the Second Affiliated Hospital of Zhejiang University, Hangzhou, China

Introduction: The stem cell therapy for corneal injury is often limited by the low local survival rate of stem cells. Biochemical cell surface modification was a potential strategy to improve viability and reduce apoptosis.

Objectives: To evaluate the effect and mechanism of A3 domain von Willebrand Factor-biocompatible anchor molecule (VWFA3-BAM) complex modified mesenchymal stem cells (MSCs) on corneal epithelial cells in cornea injury.

Methods: In this study, VWFA3 were coupled with BAM through amino carboxyl chemical reactions. After incubation with MSCs, the VWFA3-BAM complex was detected through immunofluorescence. The three-dimensional laser confocal microscope was used to record the adhesion process. Cell adhesion ability was detected by imaging analysis of high content cells and CCK8 assays. Flow cytometry was used to assess apoptosis. RNA sequencing and RT-PCR were used to evaluate the transcriptome profiling of corneal epithelial cells after co-culture with MSCs.

Results: MSCs were successfully surface modified by VWFA3-BAM complex confirmed by the immunofluorescence co localization of Cy3 and Calcein. The three-dimensional laser confocal images showed adherence of surface modified MSCs was similar with control MSCs. CCK8 assay and imaging analysis of high content cells revealed enhanced adhesion to type I collagen coated dish of surface modified MSCs compared to control MSCs. Flow cytometry found the apoptosis rate of surface modified MSCs was significantly lower than that of control MSCs with the hydrogen peroxide treatment. RNA sequencing revealed that reactive oxygen species (ROS) related genes Gclm, Gsr, Sod3, Prdx4, lipid peroxidation related genes Nox4, Alox5, Alox12b, Alox5ap, and ferroptosis marker gene Ptgs2 were significantly elevated after alkaline burn of mouse corneas. However, ferroptosis negative regulatory genes Gpx4, Fsp1, and Fth1 were significantly decreased. Surface modification significantly enhanced MSCs mediated improvement of Gpx4 expression compared to the control MSCs.

Conclusions: VWFA3-BAM complex can successfully modify the surface of MSCs. The surface modification by VWFA3-BAM complex significantly enhanced the adhesion to type I collagen and decreased the apoptosis of MSCs. *In vivo* alkaline burn models, ferroptosis was significantly increased, and ferroptosis negative regulatory genes were significantly decreased of mouse cornea. *In vitro* study showed surface modification significantly enhanced MSCs co-culture mediated alleviation of ferroptosis in corneal epithelial cells.

P-COR-030

Treatment of exposure keratitis with corneal collagen cross-linking

Y. Chen¹, Q. Li¹, J. Hao¹, F. Wang¹, B. Zhang²

¹Ophthalmology Department, The First Hospital of Jilin University, Changchun, China, ²Beijing Normal University, Beijing, China

Introduction: To describe a case of exposure keratitis complicated by medical non-compliance and medication intolerance that was successfully treated with photoactivated chromophore for infectious keratitis corneal collagen cross-linking (PACK-CXL)

Objectives: A 45-year-old female presented with left eye pain and redness in the setting of fresh water. He had lack of a response to treatment with antibiotic therapy for 3 months by an outside provider. The patient was treated with an extended course of various anti-antibiotic therapies with poor compliance due to pain and toxicity. She was eventually treated with antibiotic eyedrops and ointment without improvement and eventually had PACK-CXL with resolution of her infection and pain.

Methods: The corneal epithelium debridement was made circumferentially using a hockey knife around the borders of the infected ulcer corneal, 0.1% riboflavin solution (Photrex® Viscous) was instilled enough to cover the whole cornea, every 2 min for 10 min. and the cornea was irradiated by an ultraviolet-A (UV-A) light at 365 nm using a CXL device at an intensity of 30 mW/cm² for 4min (fluence: 7.2J/cm²)

Results: Complete cornea re-epithelialization occurs after one week, progression was stopped and patient completely resolved three weeks after PACK-CXL and the infiltrate decreased in both size and density over the next three months. At last follow-up three months after PACK-CXL, the patient continued to be pain-free and visual acuity was improved to count fingers at twenty centimetre following at the last follow-up visit, with central corneal scarring without signs of active infection.

Conclusions: PACK-CXL was associated with a dramatic improvement in a case of exposure keratitis unresponsive to both traditional and novel therapies and may be a viable alternative or adjunctive therapy for exposure keratitis. CXL has the potential to aid in the process of healing, providing a valuable therapeutic approach for this condition.

P-COR-031

Bowman layer transplant: a new femtosecond laser and excimer laser-assisted graft harvesting technique

D.K. Gutiérrez-García¹, A.M. García-Albisua¹, A. Estrada-Mata¹, G. De Wit-Carter¹, M. Benedetti-Sandner¹, G. García de Oteyza², A. Nishimura-Crespo¹, C.E. de la Torre-González¹

¹Cornea, Asociación para Evitar la Ceguera en México IAP, Mexico City, Mexico, ²Cornea, Clinica Oftalmologica García de Oteyza, Barcelona, Spain

Introduction: Several procedures are available to treat patients with keratoconus with the objective of stopping the progression. The Bowman layer transplant presents some advantages compared to deep transplants, such as a lower rejection rate and less induced astigmatism as corneal sutures are not used.

Objectives: The aim of this study is to propose a new technique assisted by femtosecond laser and excimer laser for obtaining thinner donor grafts for Bowman layer transplantation in advanced keratoconus.

Methods: This is a single-center prospective study in which we collected data from 29 eyes that underwent Bowman layer transplantation between 2021 and 2022, utilizing the newly proposed technique assisted by femtosecond and excimer laser. We analyzed data comparing visual acuity, contact lens tolerance, keratometry, and disease progression before, 1 month, and 3 months after the procedure for all 29 included patients.

Results: The mean thickness of Bowman grafts was 101.4 microns (SD = 33.4 μ , CI = 51-182 μ). Out of the 29 grafts, 58.62% (n = 17) had a thickness of less than 100 microns. Keratometry in all patients showed a decrease 1 month after the transplant, with Kmean decreasing from 64.8 Diopter (D) (SD = 8.0, CI = 50.5-83.0) to 61.9 D at 1 month postoperatively. At 3 months after the procedure, the median visual acuity was 1.6, while the best-corrected visual acuity was 0.4. 75.86% of the patients achieved contact lens tolerance one month after the procedure.

Conclusions: The proposed technique was reproducible, with no complications observed in the 29 patients during the procedure, despite not achieving lamellae with thicknesses less than 100 microns in all cases. Additionally, we observed the same mean flattening in the first postoperative month, and these changes were maintained at the third month.

P-COR-032

Five-year trend in microbiological characteristics of bacterial keratitis

M. Nguyen¹, H. Tran², P. Nguyen³, H. Duong^{3,4}, V. Lam¹, T. Vu¹, C. Nguyen⁵, T. Trinh³, H. Pham¹

¹Ho Chi Minh City Eye Hospital, Ho Chi Minh City, Vietnam, ²Ophthalmology, Cho Ray Hospital, Ho Chi Minh City, Vietnam, ³Ho Chi Minh City University of Medicine and Pharmacy, Ho Chi Minh City, Vietnam, ⁴Jio Health, Ho Chi Minh City, Vietnam, ⁵Vietnam Ophthalmological Society, Ho Chi Minh City, Vietnam

Introduction: In Vietnam, bacteria are the most common pathogens in infectious keratitis. Distinctive clinical characteristics are helpful to establish a diagnosis and microbial patterns guide effective management.

Objectives: To identify microbiological features of bacterial corneal ulcers and to describe a 5-year trend in antibiotic susceptibility patterns of bacterial keratitis.

Methods: The research was conducted in the Cornea Department of Ho Chi Minh City Eye Hospital between 2019 and 2023. This study was retrospective and involved the analysis of 240 cases diagnosed with bacterial keratitis.

Results: The majority of subjects were male (69.5%) and most of the patients were farmers. The most common risk factor was trauma, accounted approximately 55.0%. The most commonly isolated bacteria were *coagulase-negative Staphylococcus* (57.6%), *Pseudomonas aeruginosa* (21.2%), and *Staphylococcus aureus* (8.08%). Onset time of *Pseudomonas aeruginosa* corneal ulcer (2.76 ± 1.55 days) was significantly shorter than others ($p=0.001$). *Pseudomonas aeruginosa* keratitis was significantly associated with eyelid edema ($p=0.02$), conjunctival edema ($p<0.001$), central infiltration ($p=0.01$), deep stromal infiltration ($p<0.001$), stromal melting ($p<0.001$), ring infiltration ($p<0.001$), retro-corneal plaque ($p<0.001$), hypopyon $>1\text{mm}$ ($p<0.001$), and intracameral fibrin ($p=0.004$). Methicillin-sensitive *coagulase-negative Staphylococcus* was susceptible to ciprofloxacin (65.2%), ofloxacin (64.3%), levofloxacin (73.9%), moxifloxacin (62.5%), and tobramycin (85.7%). Methicillin-resistant *coagulase-negative Staphylococcus* was less sensitive to these antibiotics: 17.7%; 17.2%; 23.5%; 33.3%; and 51.7% respectively. *Pseudomonas aeruginosa* was sensitive to tobramycin (100%), levofloxacin (95.0%), and not to moxifloxacin (0.0%). The proportion of multidrug-resistant strands among *coagulase-negative Staphylococcus* and *Pseudomonas aeruginosa* were 68.4% and 72.0%, respectively. The 5-year cumulative antibiotic susceptibility patterns of *Pseudomonas aeruginosa*: imipenem (96.6%), tobramycin (95.9%), ceftazidime (95.4%), ciprofloxacin (91.9%) and levofloxacin (91.9%) were been most susceptible, whereas moxifloxacin (20.0%), and cefotaxime (14.6%) were been least susceptible. Over a 5-year period, the resistance of *Pseudomonas aeruginosa* to moxifloxacin increased significantly, however the resistance of *Pseudomonas aeruginosa* to tobramycin slightly decreased.

Conclusions: Multidrug-resistant strains among *coagulase-negative Staphylococcus* and *Pseudomonas aeruginosa* were significantly high. Our study offers insights into bacterial keratitis' clinical and microbiological patterns which guide antibiotics choice and management.

P-COR-033

Nd:YAG laser, novel non invasive approach to first line treatment for epithelial downgrowth

R. Thalpegamage¹, D. Dias¹, K. Rathnayake¹, W. Wickramasinghe¹, K. Batuwangala¹, D. Elvitigala¹

¹General Ophthalmology, National Eye Hospital, Colombo, Sri Lanka

Introduction: Epithelial downgrowth is a rare occurrence following surgical procedure or trauma, epithelial cells or fibroblasts or both enter anterior chamber through the defect in wound site. Recent data shows epithelial downgrowth occurs in less than 0.1% of cataract surgeries. Risk factors for epithelial down growth are prolonged inflammation, vitreous incarceration to wound, wound dehiscence, Descemet membrane tear.

Objectives: 62years old patient presented with extreme photophobia and epiphora of right eye 6 months after cataract surgery.

Best corrected visual acuity was Right eye 6/24 and Left eye 6/6. Slit lamp examination of right eye revealed a grey retro corneal membrane, greyish membrane over iris extending to pupil causing correctopia. Gonioscopy revealed greyish membrane extending over trabecular meshwork in temporal, superior and inferior quadrants no peripheral anterior synechia. Intraocular pressure was normal in both eyes.

Dilated examination revealed a Single piece Intraocular lens in sulcus with absent posterior capsule in right eye. Both eyes fundi normal.

Argon green laser to membrane on iris surface causing white burn confirmed the epithelial origin of the membrane. HD cornea confirmed the membrane being retro corneal and specular microscopy showed endothelial cell loss with reduced hexagonality.

Methods: We applied Nd YAG laser with 0.6mJ power to corneal margin of the membrane as well as iris margin at the pupil with the aid of YAG capsulotomy lens. It was done in two sessions and patient was started on topical prednisolone post procedure.

Results: On 2 weeks follow up visit membrane was contracting from corneal side and pupil side no improvement or growth. Intraocular pressure was normal. Endothelial cell count improvement was not apparent in specular microscopy. On 3 month visit corneal side of the membrane was contracted about 3mm from the original margin and pupil side the growth was halted. Endothelial cell count improvement of 10% was seen. Hexagonality improved by 12%. BCVA improved to one line to 6/18 in 3 months post treatment.

Conclusions: Treatment of epithelial downgrowth has been associated with high failure rate. Treatment modalities range from complete resection of involved structures and cryotherapy to residual bed to less invasive methods like 5- fluorouracil and alcohol. Here in this case study we present an effective new non invasive treatment modality to treat epithelial down growth as the first line treatment.

P-COR-034

Photodynamic therapy with rose bengal – A novel strategy for infectious keratitis

M.T. Fadaifard Martínez¹, O. Guzmán², M.Á. López¹

¹Ophthalmology, Hospital Dr. Elias Santana, Santo Domingo, Dominican Republic, ²Ophthalmology, Hospital Dr. Elias Santana, Santo Domingo, Dominican Republic

Introduction: Recent evidence suggests that photodynamic therapy has the potential to inhibit various microorganisms and overcome drug resistance through the use of riboflavin and rose bengal as photosensitizers.

The general success rate is 72% in cases of infectious keratitis, so based on the literature we proposed to assess the use of this therapy as a new and innovative therapy to treat and prevent drug-resistant corneal infections.

Today, with the increasing incidence of drug-resistant infections, many patients do not respond to antibiotics, leading to visual impairment and devastating eye damage.

Photodynamic therapy employs the combination of light, a photosensitizer, and oxygen by exposing tissue to visible light at a specific wavelength that is absorbed by a photosensitizing agent. This combination leads to the production of reactive oxygen species that trigger a sequence of biological events resulting in cell apoptosis and death of the microorganism.

Objectives: Determine the in vitro effect of photodynamic therapy with rose bengal on the isolation of microorganisms that cause keratitis.

Indicate the % inhibition of growth of microorganisms with PDT with Rose Bengal

Indicate the % inhibition of microorganism growth with PDT with Riboflavin

Establish the difference between both types of treatment

Methods: In vitro experimental pilot study, at the Dr. Elías Santana Hospital with a sample of 5 multiresistant microorganisms. These were prepared in suspension and 1 mL aliquots were inoculated in petri dishes with Sabourad or Muller Hinton Agar. The plates were divided into 5 groups: Group 1 – no treatment, Group 2 – 0.1% Rose Bengal, Group 3 – 518nm irradiation, Group 4 – PDT + Riboflavin, Group 5 – PDT + Rose Bengal.

Irradiation was performed over a circular area using a green light-emitting diode (LED) array with a wavelength of 518nm, or an ultraviolet-A LED array with a wavelength of 375nm. The plates were then placed in an incubator at 30C and growth was observed.

Results: Photodynamic therapy mediated by Rose bengal showed between 67-100% inhibition of the growth of microorganisms. No other experimental group successfully inhibited the microorganism isolates.

Conclusions: PDT with Rose Bengal is an alternative and favorable approach to conventional antibiotic therapy in response to the problem of antimicrobial and antifungal resistance and is very useful for the treatment of patients with multiresistant infectious

P-COR-035

Corneal thickness and intraocular pressure after excimer laser interventions

*A. Sidiga*¹

¹National Centre of Ophthalmology named after acad. Zarifa Aliyeva, Baku, Azerbaijan, Baku, Azerbaijan

Introduction: Today, measuring corneal thickness is a pressing issue in ophthalmology.

The thickness of the cornea is of great importance when applying intraocular pressure, laser vision correction and during any microsurgical operations.

Laser vision correction is an advanced direction of modern ophthalmology.

Excimer laser operations are accompanied by thinning of the corneal stroma, increasing the degree of its ablation according to the law. The least effect on the thickness of the cornea in the central zone is achieved by LASIK surgery performed for hypermetropia. As a result, these parameters also change the indicators of determined intraocular pressure (IOP).

Objectives: The relationship between the central cornea (CCT) and IOP levels among patients who underwent excimer laser refractive surgery before and after was studied.

Methods: 50 people were under observation. (97 eyes), of which 34 men and 16 women aged from 18 to 59 years (average age - 34.6 ± 15.9 years) with weak, moderate and high myopia (according to the spherical equivalent of refraction), who underwent excimer laser refractive surgery (PRK, excimer laser system Alegretto Wavelight Ex 500, USA). Eye parameters were measured before and after laser correction. In all patients, in addition to standard research methods used in ophthalmology, CCT was measured (Alegretto WaveLight® Oculyzer™ II, USA). Goldman assessed the IOP level.

Results: According to the study, the average corneal thickness before PRK, regardless of refraction, was 526.7 ± 34.16 (from 519.9 to 556.7 μm). The average IOP value (P0) was 16.2 ± 2.9 mmHg. In eyes after PRK ablation, the average spherical component was 4.57 ± 0.41 (from 1.5 to 6.0 D), the average depth of ablation of the structure was 87.3 μm with an average CCT measurement of 493.9 ± 37.1 μm . The average IOP value (P0) was 12.6 ± 3.3 mmHg. The correlation between CCT and IOP was significant ($p < 0.004$). A deviation of the CCT measurement by 10 μm leads to an IOP determination of 0.87 mmHg.

Conclusions: Thinning of the suspension after excimer laser PRK leads to a decrease in IOP, but not a true one, but due to an increase in the area of flattening of the suspension with IOP dependence according to the Goldmann method.

IOP indicators must be compared with the CCT, as this can lead to underdiagnosis and unreasonable treatment for phenomena of eye hydrodynamics.

P-COR-036

AI to support the diagnosis of anterior segment eye diseases improves diagnosis accuracy by ophthalmologists

H. Maehara¹, Y. Ueno², T. Yamaguchi³, Y. Kitaguchi⁴, M. Oda⁵, T. Sekiryu¹, T. Oshika², Japan Anterior Segment Artificial Intelligence Research Group

¹Ophthalmology, Fukushima Medical University, Fukushima, Japan, ²Ophthalmology, Faculty of Medicine, University of Tsukuba, Tsukuba, Japan, ³Ophthalmology, Tokyo Dental College Ichikawa General Hospital, Chiba, Japan, ⁴Ophthalmology, Osaka University Graduate School of Medicine, Osaka, Japan, ⁵Informatics, Graduate School of Informatics, Nagoya University, Nagoya, Japan

Introduction: A deep learning model, CorneAI was developed for extensive smartphone-based diagnosis and triage of cataracts and multiple corneal diseases. We expect that CorneAI will improve diagnostic accuracy by ophthalmologists in clinics, and facilitate patients to visit hospitals at the early stages of the diseases in local communities, by presenting potential diagnoses. However, the impact of AI-assisted diagnosis in corneal diseases is not yet fully understood. In addition, if a patient is seen in an emergency at a medical facility that does not have an ophthalmologist, CorneAI may be able to provide an initial response.

Objectives: The aim of this study is to evaluate the influence of CorneAI support on the diagnosis by ophthalmologists.

Methods: Forty ophthalmologists were asked to classify 50 images taken using iPhone 13 Pro and diffuser slit-lamp photographs into 9 categories (normal condition, infectious keratitis, immunological keratitis, scarring, deposition, bullous keratopathy, neoplastic lesions, lens opacity, and acute angle-closure glaucoma) with and without CorneAI support. Accuracy of classification by ophthalmologists were compared with or without CorneAI.

Results: The CorneAI classification accuracy was found to be 86.0%. There was no significant difference in the percentage of CorneAI correct responses between smartphone (84.0%) and slit-lamp photographs (88.0%) ($P = 0.95$). The overall classification accuracy of ophthalmologists was $79.2 \pm 7.9\%$ (average \pm SD) without CorneAI support. There was no significant difference in the accuracy between the images taken using smartphone cameras or slit-lamp microscope ($78.8 \pm 23.2\%$ and $81.6 \pm 21.8\%$, respectively; $P = 0.54$). With CorneAI support, the overall classification accuracy by ophthalmologists improved significantly from $79.2 \pm 7.9\%$ to $88.8 \pm 5.3\%$ ($P < 0.001$). The accuracy significantly improved from $78.8 \pm 23.2\%$ to $85.8 \pm 22.8\%$ with CorneAI support in smartphone images, and from $81.6 \pm 21.8\%$ to $89.2 \pm 14.8\%$ in slit-lamp images.

Conclusions:

Our study demonstrates the potential for AI to improve the accuracy of anterior segment color photograph interpretation by ophthalmologists. Our findings suggest that AI support can be beneficial for non-specialists and when using smartphone imaging devices.

P-COR-037

Xeroderma Pigmentosum as ocular surface pathologies and cutaneous malignancies of the face and body in a Filipino male

J.P. Lacañilao¹, E.L. Fontanilla¹, R. Lim Bon Siong^{1,2,3}

¹Department of Ophthalmology and Visual Sciences, University of the Philippines Manila - Philippine General Hospital, Manila, Philippines, ²Eye Institute, St Luke's Medical Center - Global City, Taguig, Philippines, ³Eye Institute, St Luke's Medical Center - Quezon City, Taguig, Philippines

Introduction: Xeroderma pigmentosum is a rare genetic disorder affecting normal DNA repair that renders patients extremely sensitive to sunlight and ultraviolet (UV) exposure. They are characterized with blistering sunburns and a 2000-fold increased risk of life-threatening cutaneous and ocular malignancies.

Objectives: To present a rare case of Xeroderma Pigmentosum presenting as multiple cutaneous malignancies of the face, periorbital, and back.

Methods: A 28 year-old Filipino male farmer presented with a 20-year history of multiple brown macules that evolved to dark blue-grey lesions on the face after sun exposure. Three years prior, he noted a solitary, indolent, nontender, well-defined, dark brown to black nodule on the left lower eyelid extending to the palpebral conjunctiva, associated with bleeding on manipulation, blurring of vision, photophobia, foul discharge, matting of the eyelids, foreign body sensation, and conjunctival hyperemia. There was also note of corneal haze, deep stromal neovascularization, and calcified plaques in both eyes that likely developed from chronic inflammation to the proteinaceous discharge from the lid mass.

Results: Multiple punch biopsies of different lesions showed Basal Cell Carcinomas on the frontal, nasal, buccal, periorbital and perioral surfaces of the face, right forearm, and upper back. Wide excision of a mass on the left lower back showed a superficial spreading melanoma with positive margins. He is currently on frequent artificial tears and antibiotic ointment to prevent secondary infections and was advised genetic testing, UV protection, avoidance of sun exposure while awaiting definitive management however patient has been lost to follow up.

Conclusions: Development of multiple multi-colored macules on periorbital, face and body should bring a suspicion of a systemic condition such as Xeroderma Pigmentosum that predisposes to cutaneous malignancies. Early detection and genetic testing is key to as compliance UV protective measures can allow such patients to have a relatively normal lifespan and lead fulfilling lives.

P-COR-038

Minimizing endothelial cell loss during PDEK-S donor lenticule preparation

F. Price¹, M. Soper², M. Price³, Z. Tafesse^{4,1}

¹Ophthalmology, Price Vision Group, Indianapolis, United States, ²Lions Vision First Eye Bank, Indianapolis, United States, ³Eye, Price Vision Group, Indianapolis, United States, ⁴Ophthalmology, Lions Vision First Eye Bank, Nairobi, Kenya

Introduction: Endothelial keratoplasty is the preferred treatment for corneal endothelial dysfunction because it is associated with faster rehabilitation, better visual and refractive outcomes, lower risk of rejection, and fewer complications than penetrating keratoplasty. PDEK graft diameter is limited to about 7.5 to 8.0 mm by the PDL anatomy and resulting limitation on Type 1 bubble size. PDEK-S preparation is intended to solve all this and other PDEK limitations.

Objectives: Refining PDEK with peripheral thin stroma –PDEK-S and to assess the effect of Viscoat in minimizing endothelial cell loss during tissue preparation.

Methods: Paired corneas were randomly assigned for PDEK donor lenticule preparation in two groups depending on the application of Viscoat. Type-1 air bubble was formed with a 30-gauge needle, bevel up with a 3 cc volume syringe.

During Excision a very thin layer of Stromal tissues was left unpeeled at the periphery to increase the diameter, hence PDEK-S. The percentage of endothelial cell loss before and after dissection was estimated with Trypan blue Photo & OCT was used to measure the thickness.

Results: A total of 20 paired eyes were used. A 15% of endothelial cell loss induced by the preparation process was observed in both groups. The percentage of endothelial cell loss was not significantly associated with the use of Viscoat during preparation ($P = 0.87$). The maximum size of the donor lenticule ranged from 7 to 9.5 mm. We observed that younger donors were associated with larger diameter donor lenticules ($P = 0.0284$).

Conclusions: PDEK may be easier to handle than DMEK, but diameter is limited by air bubble size. PDEK diameter can be increased by including thin stroma at the periphery (PDEK-S). The use of Viscoat as an endothelial shield did not significantly affect endothelial cell loss. Younger donors were associated with larger diameter PDEK lenticules.

P-COR-039

Topical rhNGF reverses murine corneal denervation induced by trigeminal nerve stereotactic electrolysis

X. Zhang¹, J. Wu¹, J. Liu¹, D. Song¹

¹Shenyang Xingqi Pharmaceutical Co., Ltd., Shenyang, China

Introduction: Neurotrophic keratitis (NK) is a degenerative corneal condition resulting from damage to the trigeminal nerve, which extends from the trigeminal ganglion to the nerve endings in the cornea. Recombinant human nerve growth factor (rhNGF) was approved for clinical treatment. Partly V1 branch of trigeminal nerve injury can be used to develop animal model of NK.

Objectives: The aim of this study was to establish a mouse model of NK by trigeminal stereotactic electrolysis to ophthalmic branch of trigeminal nerve, and evaluate the efficacy of rhNGF on corneal epithelial and nerve regeneration in this model.

Methods: C57BL/6J mice were underwent stereotactic electrolysis to partly destroy V1 branch of trigeminal nerve, and given topical rhNGF (20 µg/ml, 6 times/day) the day after the procedure. To confirm the NK model and effectiveness of rhNGF, we evaluated the corneal surface integrity with slit lamp and measured the corneal sensitivity with the Cochet-Bonnet esthesiometer. Corneas were collected to assess sub-epithelial nerve fiber density by immunofluorescence staining of selective neuronal marker β -III tubulin.

Results: V1 branch stereotactic electrolysis in mice induced corneal denervation, the cornea showed progressive development of corneal degeneration and reduction of corneal sensation, conditions associated with NK. rhNGF treatment started at day 8 post-surgery. After 21 days of treatment, rhNGF group had smaller size of corneal epithelial defect than NK group ($P < 0.05$). And there was a significant increase in corneal sensation in rhNGF group. The mice treated with rhNGF exhibited a higher density of sub-basal nerve fibers in the central cornea compared to the untreated group ($P < 0.05$).

Conclusions: Injury to V1 branch of trigeminal nerve was able to induce a disease state that reflected clinical NK. Moreover, topical treatment of rhNGF was effective in promoting corneal healing, with an improvement of corneal sensitivity and an increase of sub-basal nerve density in NK mice.

P-COR-040

Perfluorohexyloctane ophthalmic solution is safe and efficacious for dry eye disease: a review of clinical trials

L. Racine¹, J. Sheppard², J. Tauber³, E. Protzko⁴, J. Vittitow⁵

¹Department of Ophthalmology, Centre Hospitalier de l'Université de Montréal, Montréal, Canada,

²Virginia Eye Consultants, Norfolk, United States, ³Tauber Eye Center, Kansas City, United States,

⁴Seidenberg Protzko Eye Associates, Havre de Grace, United States, ⁵Medical Affairs, Bausch + Lomb, Bridgewater, United States

Introduction: Perfluorohexyloctane ophthalmic solution (PFHO; MIEBO[®]), previously referred to as NOV03, was approved by the US Food and Drug Administration for the treatment of signs and symptoms of dry eye disease (DED). The ophthalmic drop PFHO inhibits tear evaporation by forming a monolayer at the air-tear film border of the ocular surface.

Objectives: To compare efficacy and safety of PFHO across 4 clinical trials.

Methods: The safety and efficacy of PFHO was investigated in 3 randomized, double-masked, saline-controlled trials (SEECASE, GOBI, MOJAVE) and a longer-term open-label extension study (KALAHARI). PFHO was instilled in both eyes BID (1 treatment arm in SEECASE) or QID (1 treatment arm in SEECASE and PFHO treatment arms for all other studies) for 8 weeks in the randomized controlled trials (RCTs) and 52 weeks in KALAHARI. Efficacy outcomes included changes from baseline (CFB) in total corneal fluorescein staining (tCFS) and visual analog scale (VAS) eye dryness scores at Week 8 or 52. Responders for tCFS (improvement of ≥ 3 steps on National Eye Institute scale) and eye dryness ($\geq 30\%$ decrease in VAS score) were assessed.

Results: A total of 336 (n=111 PFHO BID; n=114 PFHO QID; n=111 saline), 597 (n=303 PFHO; n=294 saline), and 620 (n=311 PFHO; n=309 saline) patients were included in SEECASE, GOBI, and MOJAVE, respectively; KALAHARI enrolled 208 patients who completed GOBI. Mean CFB in tCFS was significantly greater with PFHO versus saline at Week 8 in SEECASE ($P < 0.001$ [QID] and $P = 0.009$ [BID] vs saline); GOBI ($P < 0.001$), and MOJAVE ($P < 0.001$). Mean CFB in VAS dryness score improved significantly with PFHO versus saline at Week 8 in SEECASE ($P < 0.001$ [QID] and $P = 0.002$ [BID] vs saline), GOBI ($P < 0.001$), and MOJAVE ($P < 0.001$). Improvements in tCFS and VAS dryness score with PFHO were maintained through Week 52 in KALAHARI. In GOBI and MOJAVE, the percentage of tCFS responders was significantly greater with PFHO versus saline at Week 8 ($P < 0.001$); eye dryness response rates were also significantly higher with PFHO versus saline ($P \leq 0.01$). In KALAHARI, tCFS and eye dryness response rates were maintained through Week 52. Ocular AEs were reported in 9.6% (GOBI) to 13.9% (KALAHARI) of patients receiving PFHO; blurred vision was most common AE with PFHO ($\leq 3\%$ patients).

Conclusions: Across these clinical trials, PFHO was safe and well tolerated and improved tCFS and VAS dryness scores from baseline in patients with DED.

P-COR-041

Perfluorohexyloctane ophthalmic solution for dry eye disease is effective across a wide range of participant subgroups

G. Law¹, J. Tauber², J. Sheppard³, D. Wirta⁴, A. Fahmy⁵, M. Cavet⁶, J. Vittitow⁷

¹Focus Health Group, Vancouver, Canada, ²Tauber Eye Center, Kansas City, United States, ³Virginia Eye Consultants, Norfolk, United States, ⁴Aesthetic Eyecare Institute, Newport Beach, United States, ⁵Minnesota Eye Consultants, Minneapolis, United States, ⁶Bausch + Lomb, Rochester, United States, ⁷Bausch + Lomb, Bridgewater, United States

Introduction: Perfluorohexyloctane ophthalmic solution (PFHO; MIEBO®) is indicated for the treatment of signs and symptoms of dry eye disease (DED). PFHO forms a monolayer at the tear film-air interface and thus directly targets tear evaporation.

Objectives: To assess the efficacy of PFHO among various participant subgroups in the GOBI and MOJAVE pivotal studies.

Methods: GOBI and MOJAVE were phase 3, randomized, hypotonic saline-controlled, 8-week clinical studies evaluating the efficacy and safety of PFHO dosed four times a day (QID) in participants ≥ 18 years with DED. Primary endpoints were total corneal fluorescein staining (tCFS) score (National Eye Institute scale, 0-15) and eye dryness visual analog scale (VAS) score (0-100). In this analysis, data for these endpoints were pooled and evaluated among participants categorized by age (older [≥ 65 years] and younger [18 to <65 years]), sex (male and female) and baseline disease severity (tCFS score <7 and ≥ 7 and VAS eye dryness score <70 or ≥ 70) using an analysis of covariance.

Results: The pooled population included 1217 participants (n=614 PFHO; n=603 saline). Consistent with the overall population, reductions (ie, improvements) in tCFS and eye dryness scores were greater for PFHO versus control in all subgroups. Week 8 mean reductions from baseline in PFHO/control groups for tCFS and eye dryness, respectively, were 2.5/1.1 and 29.5/18.2 for participants ≥ 18 to <65 years, 1.7/1.0 and 26.9/21.0 for participants ≥ 65 years; 2.3/1.4 and 26.0/20.7 for males, 2.2/1.0 and 29.2/18.8 for females; 1.4/0.6 and 28.1/20.8 for participants with baseline tCFS score <7 , and 2.8/1.5 and 28.8/17.9 for participants with baseline tCFS score ≥ 7 ; and 1.9/1.1 and 18.4/12.3 for participants with baseline dryness score <70 , and 2.4/1.0 and 37.3/26.1 for participants with baseline dryness score ≥ 70 . Treatment favored perfluorohexyloctane over control in all patient subgroup analyses of tCFS and VAS eye dryness scores ($P < 0.01$ for all except dryness in males).

Conclusions: PFHO was effective in improving both signs and symptoms of DED regardless of participants' age, sex, or baseline disease severity. These data provide support for the benefit of PFHO across a broad range of demographic and baseline characteristics of patients with DED.

P-COR-042

Corneal collagen cross-linking for progressive keratoconus: 24-month follow-up results

K. Arun¹, P. Georgoudis¹

¹Whipps Cross Hospital, London, United Kingdom

Introduction: Keratoconus is characterised by progressive thinning and ectasia of the cornea that induces irregular astigmatism, resulting in impaired visual acuity. Corneal collagen cross-linking (CXL) is the first treatment to address the pathophysiology of the ectasia, with the goal of reducing disease progression.

Objectives: To evaluate the effectiveness and safety of CXL in the treatment of progressive keratoconus and enable us to improve management and minimise complications.

Methods: We conducted a retrospective case series of all consecutive eyes that underwent CXL according to the Dresden protocol at our unit between January 2017 and October 2019. Preoperative and 3, 6, 12 and 24-month postoperative data was collected. The outcomes measured included best spectacle-corrected visual acuity (BSCVA), uncorrected visual acuity (UCVA), spherical equivalent refraction, and Pentacam keratometry readings such as maximum keratometry (K_{max}) and corneal thickness at the thinnest point were evaluated.

Results: The study cohort consisted of 69 eyes. The mean age of our cohort at the time of CXL was 28.9 years. BSCVA significantly from 0.46 ± 0.45 to 0.32 ± 0.29 ($p=0.03$). The K_{max} values decreased from $52.3D \pm 7.8$ to $52.1D \pm 7.8$, ($p=0.47$). The flat K values decreased from $50.2D \pm 7.6$ to $49.7D \pm 7.4$ ($p=0.7$). Mean spherical and cylindrical refraction were not significantly altered ($P > 0.05$). In terms of complications, 1 patient developed infective keratitis with hypopyon within 1 month of CXL treatment that required treatment with topical antibiotics and led to a subepithelial scar.

Conclusions: Our findings demonstrate the effectiveness of CXL for slowing down the progression of keratoconus. The biggest improvement in keratometric and functional parameters were seen at 6 months and these remained stable up till 24 months in the majority of cases. By contrast, in case of disease progression, changes seem to occur between year 1 and 2 after CXL.

P-COR-043

Usefulness of transparent amniotic contact lens in patient with corneal epithelial defect

W.C. Park¹, S.Y. Hwang¹, J.H. Lee¹

¹Dept. of Ophthalmology, Dong-A University Hospital, Busan, Korea, Republic of

Introduction: The clinical usefulness of transparent amniotic contact lens was investigated in patients with corneal epithelial defect who did not respond to treatment contact lens and pressure patch treatment.

Objectives: MS Bio's transparent amniotic contact lens was applied to 17 patients, 17 eyes who visited Dong-A University Hospital's ophthalmology clinic from October 2023 to January 2024 and had severe superficial punctate keratitis or corneal epithelial defect that did not respond to treatment contact lens and pressure patch treatment.

Methods: We compared best-corrected visual acuity before and after the transparent amniotic contact lens. Also best-corrected visual acuity, corneal sensitivity, tear break up time, and corneal opacity were measured for patients who had undergone observation for 1 month after the procedure. Duration of wearing amniotic lens and treatment success rate were analyzed during the follow-up period.

Results: Mean duration of wearing amniotic lens was 6.00 ± 5.10 days, and mean duration of complete healing of corneal epithelial defect was 12.00 ± 8.04 days. There was no significant difference in best-corrected visual acuity before and right after the procedure ($p=0.42$). There was significant difference in best-corrected visual acuity and corneal opacity between before and 1 month. Also there was significant difference in corneal opacity between before and 2 weeks after the procedure. However there was no significant difference in corneal sensitivity and tear break up time before and after the procedure.

Conclusions: Previously used amniotic contact lens has low transparency, causing vision loss after the procedure. However the transparent amniotic contact lenses used in this study showed no difference in visual acuity before and after the procedure, and also showed improvement in indicators such as best-corrected visual acuity and corneal opacity after a month.

P-COR-044

Outcome of photorefractive keratectomy with advanced beam profile for myopia

S.P. Holland¹, N.K. Yang², D.T. Lin¹, G. Moloney¹, D.B. Chan²

¹Department of Ophthalmology & Visual Sciences, University of British Columbia, Vancouver, Canada,

²University of British Columbia, Vancouver, Canada

Introduction: SmartSurFACE combines transepithelial photorefractive keratectomy (TE-PRK) with Schwind Smart Pulse Technology. It has been shown to improve visual acuity in low to high myopia, but there is limited data on its use in correcting extremely myopic eyes. We evaluated the outcomes of using TE-PRK on the Schwind Amaris laser (SA) with SmartSurFACE beam profile for moderate to extreme myopia.

Objectives: To assess the outcomes of using Trans-epithelial photorefractive keratectomy (TE-PRK) with the Schwind Amaris laser (SA) and SmartSurFACE beam profile for correcting moderate to extreme myopia. The study aims to determine the effectiveness of TE-PRK with SmartSurFACE in improving visual acuity and reducing myopia in patients across a range of myopic severities, including extreme myopia. Additionally, the study aims to highlight TE-PRK with SA as potential alternative to other refractive surgery techniques.

Methods: Patients with moderate myopia (0.00D to -6.00D), high myopia (-6.25D to -10.00D), and extreme myopia (over -10.00D) treated with TE-PRK with SmartSurFACE beam profile at a laser refractive clinic with 12 months of follow-up were included in this retrospective study. Preoperative and 12-month postoperative uncorrected distance visual acuity (UDVA), best corrected visual acuity (CDVA), and manifest refraction were analysed.

Results: Ranging from -0.25D to -17.50D, a total of 1382 eyes were evaluated. The moderate, high, and extreme myopia groups included 680, 372, and 76 eyes, respectively. Mean spherical equivalents improved for all eyes from -5.13 ± 2.70 D to 0.03 ± 0.38 D, for the moderate myopic group from -3.35 ± 1.43 D to 0.05 ± 0.33 D, for the high myopic group from -7.22 ± 1.18 D to 0.02 ± 0.39 D, and extreme myopia from -10.82 ± 1.36 D to -0.20 ± 0.60 D. UDVA $\geq 20/25$ was achieved by 798 (97%), 441 (94%), and 71 (82%) eyes, respectively. Only a total of four patients lost ≥ 2 lines of vision.

Conclusions: TE-PRK with SA with SmartSurFACE beam profile showed efficacy and safety in a range of myopic eyes, including extremely myopic patients. This technique provides an alternative to LASIK and SMILE, which may be limited by low pachymetry, and avoids risks such as ectasia.

P-COR-045

Comparative analysis of clinical outcomes in preloaded versus surgeon-loaded descemet membrane endothelial keratoplasty

Y.-Y. Chen^{1,2}

¹Department of Ophthalmology, Taichung Veterans General Hospital, Taichung, Taiwan, China ,

²School of Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan, China

Introduction: In descemet membrane endothelial keratoplasty (DMEK), more and more graft tissue preparation has shifted from the operation room to the eye bank. Some small studies have suggested that pre-loaded grafts prepared by the eye bank can yield similar clinical outcomes compared to surgeon-loaded grafts, while others have presented inconsistent conclusions. We conducted a meta-analysis to determine the overall results of these studies.

Objectives: To investigate clinical outcomes between preloaded and surgeon-loaded grafts in DMEK.

Methods: A literature search was conducted on Pubmed and Embase to identify studies comparing outcomes of preloaded versus surgeon-loaded DMEK grafts. Primary outcomes included endothelial cell loss (ECL) and corneal thickness change at postoperative time points (1, 3, 6, and 12 months), with the rebubbling rate as a secondary outcome. Standardized mean differences (SMD) for primary outcomes and relative risk (RR) for the secondary outcome were calculated and pooled using random-effects models.

Results: Six peer-reviewed articles comprising 1167 eyes were included. Of these, 556 eyes received preloaded grafts, and 611 received surgeon-loaded grafts. The overall SMD for ECL comparing preloaded to surgeon-loaded DMEK was 0.19 (95% CI, -0.02 to 0.40), and for corneal thickness change, it was -0.13 (95% CI, -0.23 to -0.03). Rebubbling occurred in 16.7% of preloaded and 17.5% of surgeon-loaded grafts, with an overall RR of 0.85 (95% CI, 0.52 to 1.39).

Conclusions: While surgeon-loaded grafts showed superiority in ECL and corneal thickness change compared to preloaded grafts, differences were not statistically significant. Conversely, preloaded DMEK had a lower rebubbling rate, though not statistically significant. Further investigation requires randomized controlled trials with larger sample sizes.

P-COR-046

The safety of office-based pterygium surgery

K. Avaiya¹, S. Cremers², A. Hidad¹, J. Ha³, J.A. Martinez²

¹Georgetown University School of Medicine, District of Columbia, United States, ²Visionary Eye Doctors, Rockville, MD, United States, ³University of Texas Medical Branch, Galveston, TX, United States

Introduction: Hospital and ambulatory eye surgical procedures continue to transition to the office setting. Pterygium surgery is the most commonly performed ocular surface surgical procedure in the world. Yet, no studies have evaluated its safety in the office-based surgical setting.

Objectives: Our study evaluates the safety, complication rate, cost-savings, and cosmetic satisfaction of office-based pterygiectomy.

Methods: A retrospective review was performed. Procedures were performed in an office-based suite with a Zeiss surgical microscope by two board-certified eye surgeons under topical anesthesia and oral sedation. Between 2013 and 2016, 1071 pterygiectomies were performed. Follow-up was performed via in-person office visits. Data collected included: date of service; location of pterygium (nasal, temporal, or both); primary or recurrent; age; use of mitomycin C, fibrin glue, amniotic membrane; preoperative and postoperative refraction; intraocular pressure (IOP); endothelial cell density (ECD); patient-reported pain (measured by an 11-point visual analog scale, 0-10); cosmetic satisfaction; intraoperative surgical time; postoperative complications. Postoperative measures were checked at 1-day, 2-weeks, 1-month, 2-months, 3-months, 6-months, and 1-year. The average cost measures were compared between in-office cases and the costs of surgical centers and hospital cases in our area.

Results: 1071 pterygia from 992 eyes were examined postoperatively. One instance of loss of vision (0.1%) due to a peribulbar anesthetic injection at post-op week 2 was noted, prompting the removal of epinephrine from the anesthetic. No other surgical complications were noted in the first 3 months of surgery. At 1 year, 393 pterygia in 343 eyes returned for follow-up. One-year complication rates included overall recurrence (N=8/393; 2.04%), dellen (N=12/393; 3.05%), and granuloma (N=15/393; 3.82%). There were no cases of infection. Pain scores remained <1.0 throughout the surgery and postoperatively, while patients reported cosmetic satisfaction was greater than 88% at 1 year. The average cost of pterygium performed in the office was \$1795 (\$1700- \$1890). In the surgical center, adding an anesthesiologist increased the average cost to \$3812.50 (\$2625-\$5000, based on supplies used). The average hospital cost for a pterygiectomy in our area is \$5500.

Conclusions: Office-based pterygiectomy is safe, cost-effective, and offers low recurrence rates and high patient satisfaction.

P-COR-047

Depression induces pathologic changes in lacrimal gland leading to dry eye via activating IFN γ

X. Yang¹, B. Wang¹, L. Liang¹, J. Yuan¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Dry eye disease (DED) is a common ocular surface disease characterized by symptoms of ocular pain and visual problems, as well as signs of aqueous tear deficiency, tear film instability, and corneal epithelial defects. The discomfort caused by DED significantly impacts patients' daily lives and work capacity. Various factors have been reported to contribute to the development of DED. Notably, DED is becoming more frequent in clinical practice, largely attributed to the growing physical, social, and mental burdens associated with modern lifestyle. Particularly, the link between DED and depression has been obtaining widespread attention.

Objectives: Herein we investigate the effect of depression on DED and its underlying mechanism in a mouse model.

Methods: A mouse depression model was established by chronic restraint stress (CRS) in a 50-mL ventilated centrifuge tube for 6 hours per day for 21 days. Depression-like behaviors in mice were evaluated by the open field test, forced swimming test, tail suspension test, and sucrose preference test. Tear production, corneal epithelial defects, and density of conjunctival goblet cells were assessed by phenol red thread test, sodium fluorescein staining, and periodic acid-Schiff staining, respectively. The inflammatory cytokines were determined by quantitative real-time PCR and immunofluorescence staining. T lymphocytes in cervical draining lymph nodes (CDLNs) of mice were analyzed via flow cytometry. The cell apoptosis was evaluated using TUNEL assay and Western blot.

Results: Depression induced obvious ocular surface damages, including increased corneal epithelial defect area and decreased tear secretion and conjunctival goblet cell density. The proportion of T helper (Th)1 and Th17 cells was significantly increased in CDLNs after CRS induction. Additionally, increased apoptosis and immune cell infiltration were observed in the lacrimal gland of depression mice. Anti-IFN- γ treatment attenuated the level of inflammation, and thereby improving depression-related dry eye signs.

Conclusions: Depression primarily leads to DED through the activation of Th1 cell-mediated inflammation and subsequent IFN- γ induced apoptosis in lacrimal gland cells. Systemic intervention with IFN- γ attenuates depression and thus partially ameliorates pathologic changes in the lacrimal gland.

P-COR-048

Keratoconus in children: diagnosis and treatment

K. Omer^{1,2}

¹Ophthalmology, Best Vision Eye Care, Sulaimaneyah, Iraq, ²Ophthalmology, Dr. Aso Eye Hospital, Sulaymaneyah, Iraq

Introduction: Pediatric keratoconus is more aggressive than the adult group so early diagnosis and prompted treatment is very necessary in these group to prevent later on visual impairment. the severity is because of the structure of the cornea which is from the cornea in the teen ages and adult ages there for as documented the rate of progression is vey high.

Objectives: The object of the study is for early diagnosis and to show how the importance it is to treat early

also to show the male and female differences and the shape of the cone in children and how they get benefit from crosslinking in long term.

Methods: This was a retrospective study done in patient who where diagnosed and later treated in best vision eye center in Sulaymaniyah ,Iraq during the last 8 years.

Results: 1. 10% have a positive family's history

2. we had 70 patients 26 male and 44 female

3. regarding the shape of the keratoconus 50 eye where inferior steepening 34where asymmetric bow 18 asymmetry skew and the rest where distributed as we will show later on in the other shapes

4. the age group was disturbed between 9-16 year old

5. the thickness map was distributed between 370-510

6. the severity of the disease in OD to OS where near although 95%og the patients where right handed

7. We treated all the case by standard corneal collagen cross linking we used GA in some younger cases and the rest we used topical.

Conclusions: 1. Early diagnoses and starting of pentacam from the age of 9-10 specially in positive history cases

2. This field need more study because it is one of the field of preventable blindness

3. Early crosslink is important because the keratoconus is more aggressive in childhood and later the vision rehabilitation will be easier

4. Close monitoring of all the suspected cases.

P-COR-049

Circadian disruption reduces MUC4 expression via clock molecule BMAL1 during dry eye development

H. Zeng¹, B. Wang¹, J. Yuan¹

¹Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Lifestyle-related dry eye has become increasingly widespread in recent years, and the impact of lifestyle challenges in dry eye has attracted attention. Circadian disruption, as a result of shiftwork, jet lag and other lifestyle factors, is a common public health problem associated with a wide range of diseases, such as metabolic disorders, neurodegenerative diseases and cancer. However, whether circadian disruption causes DED and the underlying mechanism remain unknown.

Objectives: To elucidate the mechanisms of circadian disruption-induced dry eye and explore potential therapeutic strategies of dry eye disease.

Methods: Chronic jet lag mice model were used to explore the circadian disruption-induced corneal inflammation and abnormal tear film. BMAL1^{-/-} mice and human corneal epithelial cells were used to confirm the regulatory relationship between BMAL1 and MUC4.

Results: Chronic jet lag increased corneal epithelial defects, cell apoptosis, and proinflammatory cytokine expression. However, there was no significant change in the volume of tear secretion or conjunctiva goblet cells. Further analysis prompted that jet lag caused corneal transmembrane mucin deficiency, specifically MUC4. Supplementing MUC4 reduced the death of corneal epithelial cells and inhibited inflammation. Unexpectedly, the genetic ablation of BMAL1 in mice caused MUC4 deficiency and dry eye disease. Silencing of BMAL1 reduced MUC4 and overexpression of BMAL1 increased MUC4 in cultured human corneal epithelial cells. Furthermore, melatonin, a circadian rhythm restorer, had a therapeutic effect for jet lag-induced dry eye by restoring the expression of BMAL1, which upregulated MUC4.

Conclusions: Circadian disruption induces corneal epithelial apoptosis and ocular surface inflammation by inhibiting the BMAL1-MUC4 axis. Melatonin restores the homeostasis of the ocular surface by alleviating the inhibition of the BMAL1-MUC4 axis.

P-COR-050

Minimal invasive topography guided photorefractive keratectomy with custom cross linking (MITCX)

W. Altroudj¹, Y.F. Sakla Emile²

¹Ophthalmology, Ebsaar Eye Surgery Center, Dubai, United Arab Emirates, ²Ophthalmology, National Health Service (NSH), North Wales, United Kingdom

Introduction: Minimal Invasive Topography-Guided Photorefractive Keratectomy with Custom Cross Linking (MITCX) is a modification of simultaneous topography guided PRK with collagen cross linking (CXL) to minimize tissue consumption, enlarge the treatment zone, and customize the CXL by using the epithelium as a shield.

Objectives: We aimed to evaluate the efficacy and safety of a new surgical intervention, the MITCX in progressive keratoconus (PK) patients with contact lens intolerance (CLI).

Methods: MITCX was performed in a patient with PK reporting CLI, night vision problems and poor best distance visual acuity (BDVA). The epithelial map (Zeiss OCT Cirrus 5000), 8 scheimpflug images (Wavelight oculus II) and T-Cat profile were used (EX 500 Wavelight excimer laser platform from Alcon). The astigmatism and sphere magnitude were modified achieving a hyperopic portion of the treatment profile (ablating 10 to 15microns) and a myopic portion (ablating 30 to 40microns) of the stroma after subtracting the thickness of the epithelium (optical zone: 6.0-6.50mm). The effect of CXL was customised with accelerated CXL 9mw/cm² for 10 minutes (peschke PXL-PLATINUM 330).

Results: Pre-surgery, the patient had -1.50/-1.75@40 and BDVA of 0.4 Log MAR. Post-surgery (5 years) the patient had BDVA of 0.0 Log MAR with -2.50/ -1.50 @ 100, symptoms improved and topometric indices decreased. A 12.5 diopters of regularisation in the sagittal curvature of the front surface of the cornea were achieved with tissue consumption of 28- and 28-microns in the center of the pupil and the thinnest point of the cornea, respectively.

Conclusions: MITCX achieves better regularization effect vs tissue consumption and provides better surgery outcomes allowing treating larger optical zones. The epithelium protects the flat areas next to the cone from receiving undesired laser. It is minimal invasive allowing treating thinner corneas using a holistic approach of the cornea, respecting the role of the epithelium.

P-COR-051

Spokewise iridotomy combined with Descemet stripping automated endothelial keratoplasty in ICE syndrome

J. Hong¹, J. Zhang¹, R. Peng¹, G. Xiao¹, M. Wang¹

¹Ophthalmology, Peking University Third Hospital, Beijing, China

Introduction: Iridocorneal endothelial (ICE) syndrome is a progressive anterior segment disorder that can be tricky to treat. Keratoplasty is commonly used to treat corneal edema in ICE syndrome. However, glaucoma is an important risk factor affecting graft survival.

Objectives: To address this question, we designed a retrospective cohort study to evaluate the effect of Spokewise Iridotomy (SI) on Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) Grafts in Iridocorneal Endothelial (ICE) Syndrome.

Methods: This was a retrospective cohort study. A total of 29 patients were included; 31 eyes with ICE syndrome underwent DSAEK at Peking University Third Hospital between June 2015 and June 2022, including 11 eyes with combined SI during DSAEK. The aim was to explore the effect of SI on vision, glaucoma control, complications, peripheral anterior synechiae recurrence, endothelial cell count, and graft survival.

Results: The median follow-up time was 30.83months (mo.) in the SI+Endothelial Keratoplasty (EK) group and 6.17 mo in the EK group. The 2-year cumulative survival rate of grafts in the SI+EK group was 100%, compared with the 6-month and 1-year cumulative survival rates of 80.2 and 63.2%, respectively, in the EK group ($p = 0.043$). The SI+EK group had a lower incidence of immediate postoperative complications ($p = 0.005$), fewer postoperative anti-glaucoma medications (AGMs) ($p = 0.029$), smaller peripheral anterior synechiae recurrence ($p = 0.001$), and significant visual acuity improvement ($p < 0.05$). More AGMs were used in failed grafts ($p = 0.002$).

Conclusions: SI can help control intraocular pressure, improve visual acuity, and increase graft survival after DSAEK in ICE syndrome patients.

P-COR-052

Single-cell RNA-sequencing reveals the transcriptional landscape of Lacrimal Gland in GVHD mouse model

J. He^{1,2}, X. Jin^{1,2}

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China,

²Zhejiang Provincial Key Laboratory of Ophthalmology, Zhejiang Provincial Clinical Research Center for Eye Diseases, Zhejiang Provincial Engineering Institute on Eye Diseases, Hangzhou, China

Introduction: Ocular graft-versus-host disease (oGVHD) is one of the most common complications after allogeneic hematopoietic stem cell transplantation (HSCT), which account for the ocular surface-involved complications of over 50% of recipients. It mainly manifests as refractory dry eye disease and significantly affects the patient's quality of life. oGVHD is recognized as chronic GVHD due to both late-onset and pathological characteristics of chronic inflammation and fibrosis. However, little data has been revealed regarding the biological events before fibrosis in ocular surface tissues of GVHD. In addition, the collaboration of the GVHD mechanism, which consists of a diverse cellular-involved network, makes it challenging to find the optional target to treat this disease. Therefore, a global and comprehensive investigation of the landscape in oGVHD-involved tissue is necessary to advance the understanding of oGVHD. However, such data is scanty in previously published documents.

Objectives: To investigate the global transcriptional landscape of lacrimal gland cell populations in the GVHD mouse model.

Methods: Single-cell RNA sequencing and further bioinformatic analysis of dissociated lacrimal gland (LG) cells from the mouse model were performed. Parts of transcriptional results were confirmed by immunofluorescence staining.

Results: We identified 25 cell populations belonging to 12 cell types. In GVHD LG, the proportion of acinar cells, myoepithelial cells, and endothelial cells was remarkably decreased, while T cells and macrophages were significantly expanded. Gene expression analysis indicated decreased secretion function, extracellular matrix (ECM) synthesis, and increased chemokines of myoepithelial cells. A newly described

epithelial population named Lrg1^{high} epithelial cells, expressing distinct gene signatures, was mainly identified in GVHD LG. The fibroblasts exhibited an inflammation gene pattern. The gene pattern of endothelial cells suggested an increased ability to recruit immune cells and damaged cell-cell junctions. T cells were mainly comprised of Th2 cells and effective memory CD8⁺ T cells. GVHD macrophages exhibited a Th2 cell-linked pattern.

Conclusions: This single-cell atlas uncovered alterations of proportion and gene expression patterns of cell populations and constructed cell-cell communication networks of GVHD LG. These data may provide some new insight into understanding the development of ocular GVHD.

P-COR-053

Corneal endothelial cell density and morphology of Filipino patients in a tertiary level hospital

J.M. Villalva¹, P.R. Galvante¹

¹Ophthalmology, FEU-NRMF, Quezon City, Philippines

Introduction: The effects of diabetes mellitus and hypertension on the corneal endothelium are often underestimated. Several studies revealed contradicting results on whether there is a statistically significant correlation.

Objectives: To describe and correlate the corneal endothelial cell density and morphology of diabetic and hypertensive patients versus an age-matched control.

Methods: This is a cross-sectional, analytic study of Filipino patients aged 20-93 who underwent specular microscopy at FEU Eye Center Inc. from January 2021 to January 2023 using a non-contact specular microscope (USA Tomey Microscope EM-4000).

The sample size is calculated based on estimating the population proportion of patients undergoing specular microscopy in FEU Eye Center Inc. from January 2021 to January 2023.

Given the maximum allowable error of 5% and reliability of 95%, the minimum sample size is 385.

Data collected were statistically analyzed using Statistica Version 14.0.0.15, and rejection of the null hypothesis was set at alpha 0.05.

The sampling method is a total enumeration. Inclusion criteria include patients more than twenty years old who consulted with any consultant staff in FEU Eye Center Inc. Records were reviewed, and relevant history, such as comorbidities: hypertension or diabetes mellitus, was documented. Note that the control of comorbidities or the presence or absence of medications for these comorbidities is beyond the scope of the study. Exclusion criteria include the history of corneal trauma, the presence of corneal opacity and evidence of corneal dystrophy, as stated in their patient records.

Results: There was no significant correlation between mean cell density, coefficient of variation and hexagonality in patients with either of the comorbidities and those without across all age groups. However, for patients 60 years old and above, endothelial cell count decreased by an average of 0.78% (18.8003 cells/mm²), and percent hexagonality decreased by an average of 28.2% (-13.31%) compared to age-matched control. The majority of the population with comorbidities was noted to belong to this age group.

Conclusions: It is highly recommended to include careful evaluation of the corneal endothelium as part of the diabetic and hypertensive examination as a multi-disciplinary approach and most especially in pre-operative examination.

P-COR-054

Descemet membrane endothelial keratoplasty using pseudophakic donor cornea during current shortage of donor tissues

S. Basak¹, S. Basak¹

¹Department of Cornea, Disha Eye Hospitals, Barrackpore, India

Introduction: Increasingly, many eye banks are retrieving donor tissue from pseudophakic donors. Little is known about their suitability for Descemet membrane endothelial keratoplasty (DMEK) surgery in terms of graft preparation failure and postoperative endothelial cell density (ECD).

Objectives: Purpose of the study was to evaluate and compare graft preparation failure (GPF) and endothelial cell density (ECD) in Descemet Membrane Endothelial Keratoplasty (DMEK) using pseudophakic donors (PPD Group) and DMEK using phakic donors (PD Group).

Methods: Retrospective comparative interventional case series in a tertiary care eye hospital. One hundred and ninety eyes who underwent either PPD Group (n=42) or PD Group (n=148) between Jul'2020 and Jun'2022 were included. GPF during surgery, post operative best corrected visual acuity (BCVA), and postoperative endothelial cell loss (ECL) were recorded at 6, 12 and 24 months. Statistical calculations were carried out.

Results: Donor age is slightly higher in PPD Group (71 vs 67). Baseline donor mean ECD were 2877 ± 184 and 2804 ± 201 cells/mm² in PPD Group and PD Group respectively (p=0.14). GPF was 2.5% Vs 2.0% respectively (p=0.32). Mean ECD recorded after 6, 12 and 24 months were lower in PPD Group than PD Group: 2108 ± 321 vs 2288 ± 286 ; 1944 ± 359 vs 2110 ± 308 and 1707 ± 339 vs; 1884 ± 286 cells/mm² respectively (p<0.05) in all time points. Operative and postoperative complications in both groups were similar.

Conclusions: DMEK using pseudophakic donors had less cell density compared to phakic donors at 2 years, but it is within acceptable limit. DMEK graft preparation from a high count healthy pseudophakic tissue may be a good option to maximize donor pool.

P-COR-055

Anti-oxidative and anti-inflammatory micelles: break the dry eye vicious cycle

S. Li¹, H. Han¹, K. Yao¹

¹The Second Affiliated Hospital of Zhejiang University, Hangzhou, China

Introduction: Dry eye disease (DED), a multifactorial disorder primarily originating from hyperosmolarity of tear film, affects $\approx 30\%$ of the world's population and has become the most common ocular surface disease worldwide, posing an enormous economic burden to society. Inflammation is one core cause of the DED vicious cycle, a multifactorial deterioration in DED process. However, there are also reactive oxygen species (ROS) regulating inflammation and other points in the cycle from the upstream, leading to treatment failure of current therapies merely targeting inflammation.

Objectives: We develop micelle-based eye drops (more specifically p38 mitogen-activated protein kinases (MAPK) inhibitor Losmapimod (Los)-loaded and ROS scavenger Tempo (Tem)-conjugated cationic polypeptide micelles, designated as MTem/Los) for safe and efficient DED management.

Methods: Characterization: TEM, DLS, EPR, ¹H-NMR spectrum, et, al.

In vitro Experiments: Flow cytometry, QPCR, Western Blotting, immunofluorescence staining, et, al.

In vivo Experiments: Schirmer test, tear break-up-time, H&E and PAS staining, immunofluorescence staining, et, al.

Results: We first characterized the prepared dual-functional antioxidant/anti-inflammatory nanomicelle MTem/Los. Experimental results from EPR, DLS, TEM, and other techniques indicated that MTem/Los was successfully prepared, exhibiting good clearance functions against ROS and stable properties in lysosomes. Next, In cell experiments, MTem/Los was found to effectively inhibit ROS production and p38 MAPK activation in both HCE and RAW 264.7 cell lines, leading to reduced expression of downstream inflammation-related and chemotaxis-related genes. It also inhibited HCE cell apoptosis and the pro-inflammatory phenotypic transition. Then, in animal experiments, the team discovered that MTem/Los effectively restored the ocular surface structure in a dry eye disease (DED) mouse model by suppressing ROS overproduction, inflammation response, cell apoptosis, and squamous epithelial metaplasia, thus achieving efficient treatment of DED. Finally, the biocompatibility of MTem/Los had been proved both in vitro and in vivo.

Conclusions: In conclusion, MTem/Los could efficiently rescue DED deterioration through breaking its vicious circle comprising suppressions of inflammation, ROS generation, and apoptosis, with excellent biosafety and ocular tolerance for its future application in the clinic, not merely ocular surface pathologies, but other inflammation-based diseases.

P-COR-056

Headache attributed to refractive error: improvement after topography-guided photorefractive keratectomy in keratoconus

N. Khoo¹, B. Burgos-Blasco², A. Antoniou³, B. Jenkins⁴, C. Odouard^{5,1}, C. Fraser^{1,6,5}, G. Moloney^{6,5}
¹Save Sight Institute, Faculty of Health and Medicine, The University of Sydney, Sydney, Australia, ²Ophthalmology Department, University of British Columbia, Vancouver, Canada, ³Narellan Eye Specialists, Sydney, Australia, ⁴Royal North Shore Hospital, Sydney, Australia, ⁵Ophthalmology, Sydney Eye Hospital, Sydney, Australia, ⁶Discipline of Ophthalmology, Sydney Medical School, The University of Sydney, Sydney, Australia

Introduction: Patient with keratoconus commonly present with refractive error that cannot be corrected with glasses or contact lenses due to the presence of high-order aberrations. It is possible that patients with keratoconus have a higher risk of Headache Attributed to Refractive Error (HARE) and are not accessing appropriate methods of refractive correction—either rigid contact lenses or surgical options. Therefore, we aimed to investigate whether surgical correction of refractive error in keratoconus with Topography- Guided Photorefractive Keratectomy (TGPRK) alleviates headache frequency and medication use from an appropriately classified patient population group.

Objectives: To investigate if topography-guided photorefractive keratectomy (TGPRK) alleviates headache in keratoconus.

Methods: Patients diagnosed with keratoconus undergoing TGPRK for refractive correction were included. Best spectacle corrected visual acuity (BSCVA) and refractive error were measured. Patients answered a questionnaire exploring headaches, characteristics, treatment, and the Headache Impact Test (HIT-6) before and 6 months after surgery.

Results: 40 patients were included. Preoperatively, 24 patients (60%) met criteria for headaches: five for migraine, 14 for headache attributed to refractive errors (HARE), and five for tension-type headache (TTH). Patients with headaches preoperatively were more likely to require bilateral TGPRK, and the mean sphere and cylindrical power were higher. Postoperatively, 15 out of the 24 patients of the headache group experienced complete resolution of headaches, and only nine patients met diagnostic criteria for headaches. The number of headaches reduced from 4.4 ± 2.4 to 0.5 ± 0.7 days/week. Headache duration decreased from 108.5 ± 100.7 min to 34.4 ± 63.5 min. Postoperatively, six out of the nine patients with headaches consumed simple painkillers, averaging 0.6 ± 1.2 days a week, significantly lower than 2.4 ± 2.3 days a week preoperatively. The HIT-6 revealed an improvement in the quality-of-life post-procedure.

Conclusions: Correction of irregular astigmatism in keratoconus can alleviate headache, resulting in an improvement in quality of life. Physicians should consider keratoconus in patients fitting criteria for HARE not alleviated by spectacle correction.

P-COR-057

Dynamic calculation of dry eye disease using ocular surface analyser (3 year data)

*S. Saeed*¹

¹Islamabad Eye Centre, Islamabad, Pakistan

Introduction: Dry Eye Disease has now surpassed all ocular pathologies in terms of incidence and nuisance. Post-COVID, it has increased magnificently as both study and work have gone online.

Objectives: The study aimed to investigate dry eye disease in a more scientific way using dry eye analyser which calculated 6 parameters of dry eye disease quantitatively. This gives a definitive clue to the cause and best ways to treat it.

Methods: Longitudinal experimental design was employed to investigate the relationship between two or more variables. Patients presenting with dry eyes were included and tested on Dry Eye Analyser. The parameters tested included Tear Meniscus Height, Non Invasive Breakup Time, R-Scan, Lipid layer thickness, Meibomian gland status and Gland openings. Based on the results, appropriate targeted treatment was given and results compared. Patients with corneal pathologies, contact lens wearers and patients with recent eye surgeries were excluded.

Results: Ocular Surface Analyser gave a definitive cause and extent of dry eyes. Targeted treatment resulted in better compliance, shorter treatment time, better symptomatic relief and much higher patient satisfaction. This coupled with Ocular Hydration Sessions gave encouraging results in controlling ocular surface disorders in a rational way.

Conclusions: In the era of digital world, dry eye disease has surpassed all pathologies in terms of magnitude. It can cause a substantial disability in daily routine esp in young adults. Dry Eye Analyser gives the edge to demarcate the pathology, so we can treat it with the best possible modality based on that diagnosis.

P-COR-059

Graft rejection in DMEK during COVID-19 pandemic years: Comparative analysis of 1200 consecutive eyes

S. Basak¹, S. Basak¹

¹Disha Eye Hospitals, Kolkata, India

Introduction: During the Covid-19 pandemic (Apr'2020 and Dec'2022), we observed an increased graft rejection among DMEK patients. There are few anecdotal reports and meta-analysis on DMEK graft rejections with COVID-19 infection as well as with COVID vaccination.

Objectives: To report the incidence and clinical course of graft rejection (GrR) in Descemet membrane endothelial keratoplasty (DMEK) during COVID-19 period compared to pre-COVID years.

Methods: Retrospective review of electronic medical record (EMR) of consecutive 1200 DMEK. GrR during Apr'20 to Dec'22 (Gr-A) was compared with GrR during Apr'16 to Dec'20 (Gr-B) with minimum 3 months follow-up. Incidence, predisposing factors, COVID-related issues, response to medication, and need for regrant were analyzed.

Results: 1090 eyes from the EMR met the criteria. Rejection in Gr-A and Gr-B were 42/502 (8.4%) and 9/588 (1.5%) eyes ($p < 0.001$). Steroid drops stopped by 37 patients in Gr-A and 6 in Gr-B ($p < 0.001$). COVID infection, vaccination history was present in 27 (64.3%) patients in Gr-A. Frequent topical steroid could revert rejection episode in 32 eyes in Gr-A and 6 eyes in Gr-B. Graft failed in 10 (23.8%) eyes in Gr-A and 2 eyes in Gr-B (22.2%) requiring regrant.

Conclusions: Graft rejection following DMEK is higher during COVID-years than pre-COVID time. COVID infection, non-access to steroid drop and vaccination may have direct or indirect effect on graft rejection.

P-COR-060

Association between dry eye questionnaire score and Ocular Surface Disease Index® severity classification

D. Vuskovic¹, P. Maturana², D. Cabrerizo², D. Lopez^{2,3}, X. Wotsman⁴, M.C. Goya³, R. Lopez⁵, L. Traipe²

¹Departamento de Oftalmología, Hospital del Salvador, Santiago de Chile, Chile, ²Unidad de Lágrima y Superficie Ocular (ULSO), Clínica Las Condes, Santiago de Chile, Chile, ³Departamento de Tecnología Médica, Universidad de Chile, Santiago de Chile, Chile, ⁴Instituto de Investigación y Diagnóstico por Imágenes en Piel y Tejidos Blandos (IDIEP), Santiago de Chile, Chile, ⁵Instituto de Ciencias Biomédica (ICBM), Facultad de Medicina, Universidad de Chile, Santiago de Chile, Chile

Introduction:

Dry eye disease (DED) is a prevalent issue in ophthalmic consultations. The Ocular Surface Disease Index® (OSDI) is a commonly used standardized questionnaire to assess dry eye symptoms, categorizing patients by severity. Another widely used questionnaire, the five-item dry eye questionnaire (DEQ-5), lacks an official severity classification. Limited research exists on the correlation between OSDI and DEQ-5.

Objectives: To determine the association between DEQ-5 score and OSDI severity classification in patients with Dry Eye Disease.

Methods: A cross-sectional observational study conducted in Chile. OSDI and DEQ-5 questionnaires previously translated and culturally validated for the population of Chile were administered to 217 patients with DED diagnosis according to DEWS II criteria. The results were tabulated in an anonymized database, and then grouped by severity classification according to OSDI. Subsequently, descriptive statistical analysis of DEQ-5 score within each severity group was performed and nonparametric tests were used for comparison. Spearman's correlation coefficient was used to determine association between DEQ-5 scores and OSDI severity classification scores.

Results: A total of 217 patients were recruited, of which 50 were eliminated from the study due to data loss, 167 successfully answered both questionnaires. Mean age was 48 ± 18.36 years, and 69% were female. The mean DEQ-5 scores for normal, mild, moderate, and severe dry eye symptoms as defined by the OSDI grading were 6.88 (CI 95% 5.5 - 8.2; range 14), 10.32 (CI 95% 8.95 - 11.7; range 19), 10.31 (CI 95% 8.34 - 12.28; range 12) and 13.78 (CI 95% 12.86 - 14.73; range 22), respectively. The median DEQ-5 scores in each group were 6, 11, 11, and 14 in "Normal", "Mild", "Moderate" and "Severe" groups, respectively. Statistically significant associations were found between DEQ-5 scores and severity groups ($p < 0.0001$). The association was significantly positive in "Normal" ($r_s = 0.39$; $p = 0.02$) and "Severe" ($r_s = 0.4$; $p = 0.0003$) groups. No statistically significant association was observed between DEQ-5 and OSDI scores for "Mild" and "Moderate" groups.

Conclusions: A significant positive relationship was observed between DEQ-5 and OSDI questionnaires in "Normal" and "Severe" groups. The subjectivity of the symptoms, the differences between degrees of severity, and time variability evaluated in both questionnaires could be the cause of the low correlation of these tests in intermediate groups, generating greater variability of responses.

P-COR-063

Clinical efficacy of 2% rebamipide for the patients with video display terminal-associated dry eye disease

Y.W. Lee¹, S.B. Han²

¹Kangwon National University Hospital, ChunCheon, Korea, Republic of, ²Saevit Eye Hospital, Ilsan, Korea, Republic of

Introduction: It has been reported that 3% diquafosol, a treatment for ocular surface mucosa, improved the quality of life in visual display terminal (VDT)-related dry eye disease (DED). We postulated that rebamipide, which improves DED by a similar mechanism, can also be effective in VDT-related DED.

Objectives: To compare the therapeutic effects of 2% rebamipide clear solution and 0.1% sodium hyaluronate ophthalmic solution in patients with VDT-related DED.

Methods: A prospective double-blind randomized controlled study was conducted. Patients with VDT-related DED who had not previously used other eye drops were recruited. They were randomly allocated to 2% rebamipide eye drops (REB) group and 0.1% sodium hyaluronate eye drops (HYA) group (four times a day for 4 weeks). Before and 4 weeks after instillation of each drug, ocular surface disease index (OSDI) and dry eye questionnaire-5 (DEQ-5) were performed, and DED parameters were examined using Placido tear film analyzer (Keratograph 5M, Oculus, Wetzlar, Germany). Fluorescein-stained tear break up time (FBUT), corneal and conjunctival staining scores, and the Schirmer 1 test was measured.

Results: A total 56 eyes of 28 patients (28 eyes of 14 patients in each group) were included. There was no statistically significant difference between the DED symptom scores and signs before treatment in the two groups. OSDI, DEQ-5, FBUT, and conjunctival staining scores improved significantly in both groups after treatment compared to before treatment. In the REB group, the corneal staining score and bulbar nasal redness score was also improved significantly after treatment ($P < 0.001$ and 0.036 respectively), whereas no significant difference was found in these parameters in the HYA group ($P = 0.326$ and 0.118 , respectively). Regarding the change of DED parameters with treatment, REB group showed significantly larger amount of decrease in the corneal staining score than the HYA group ($p = 0.016$). No adverse reactions such as infective or toxic keratitis were observed in any patients.

Conclusions: 2% rebamipide ophthalmic clear solution was effective in improving symptoms and signs of VDT-related DED patients. It was superior to 0.1% sodium hyaluronate ophthalmic solution in improving corneal epithelial damage. It is expected to be a safe and effective treatment option for VDT-related DED.

P-COR-064

Surgical management of mycotic keratitis

D. Tomas-Esteban^{1,2}, K.M. Claudio¹

¹Ophthalmology, Rizal Medical Center, Pasig city, Philippines, ²Ophthalmology, Southern Isabela Medical Center, Santiago City, Philippines

Introduction: Management of mycotic keratitis has always been challenging often due to delay in diagnosis. This paper highlights a case of a recalcitrant fungal keratitis which eventually lead to corneal rupture and was subsequently managed with therapeutic penetrating keratoplasty.

Objectives: This paper aimed on presenting a case of mycotic keratitis as well as the medical and surgical mangement done.

Methods: Corneal opacity was noted on the left eye, started as foreign body sensation with eye redness, tearing, eye pain and blurring of vision two months prior. Other histories were unremarkable. Topical medications afforded no relief and ended with corneal rupture. Visual acuity was hand movement with good light projection, with good color vision as well as pupillary exam. Anterior chamber was shallow with 10 x 7 mm corneal opacity and epithelial defect, with iris prolapse from area of rupture at seven to nine clock hours. Gram stain revealed septate hyphal elements. Itraconazole 100g/cap one capsule once a day and hourly Natamycin eyedrops as well as 1.5% Levofloxacin eye drops every thirty minutes were given. Intravenous Cefazolin and Gentamycin were also given empirically to prevent secondary bacterial infection. Tectonic penetrating keratoplasty under general anesthesia was done.

Results: Study of corneal button yielded findings consistent with fungal keratitis. Post-operative intraocular pressure spike was noted, hence, managed with oral and topical anti glaucoma medications. Patient eventually improved and recovered, hence, discharged with topical and oral medications and was monitored at the out-patient department.

Conclusions: Due to the delay in the initiation of appropriate treatment brought about by delayed recognition of the disease, a complication of ruptured cornea occurred and ended up with a surgical intervention. Appropriate management and timely initiation of treatment are crucial in the management of mycotic keratitis.

P-COR-065

Bowman layer transplantation using femtosecond laser: 3 years results

A.G. Estrada Mata¹, A.M. García Albisua¹, M. Benedetti Sandner¹, D.K. Gutierrez García¹, G. García de Oteyza², E. de la Torre González¹, G. De Wit Carter^{†1}

¹Cornea and Refractive Surgery Department, Asociación para Evitar la Ceguera en México, Mexico City, Mexico, ²Clínica Oftalmológica García de Oteyza, Barcelona, Spain

Introduction: Traditionally, the treatment for advanced keratoconus (KC) has been either penetrating or deep anterior lamellar keratoplasty (PK or DALK). The success of both operations, however, has been somewhat tempered by complications, both intraoperatively and postoperatively. Recently, histological studies have shown thinning and fragmentation of Bowman's membrane in the eyes of patients with keratoconus, which is why a new technique has been proposed for corneal stabilization. Bowman's layer transplantation is considered a new treatment option in patients who are ineligible for other treatments. This new treatment aims to flatten the recipient cornea, stop the progression of ectasia, and consequently allow a better tolerance to contact lens wear, and therefore delay or avoid PK or DALK, for these, this treatment is useful for young patients. A new technique described by García de Oteyza, et al. has proposed using femtosecond laser to increase safety, repeatability, and accuracy of the Bowman layer transplantation.

Objectives: The aim of this study was to evaluate the 3-year clinical results of Bowman layer (BL) transplantation using femtosecond laser for patients with advanced keratoconus.

Methods: This single-center retrospective study included 7 eyes of 7 patients diagnosed with progressive keratoconus that underwent Bowman layer transplantation between 2018 and 2022. Bowman layer graft was positioned into a mid-stromal pocket performed by femtosecond laser and patients were evaluated up to 3 years after surgery.

Results: Corneal flattening of 5.49 D ($p=0.0020$) in Kmax was observed, increase in corneal center thickness as well as an improvement in LogMAR BSCVA from 0.89 to 0.60 and tolerance to contact lens from 42% to 100%. Stabilization of the cornea was achieved in 100% with no further progression of the keratoconus ; all surgical procedures were uneventful, and no complications were observed during the 3 years of follow-up.

Conclusions: BL transplantation flattened the cornea improving BSCVA and contact lens tolerance as well as stabilized KC in 100% of the patients in 3 years and may be a feasible option in patients with advanced and progressive KC to postpone or avoid the need of PK or DALK.

P-COR-066

Cultural adaptation and validation of the Ocular Surface Disease Index Questionnaire (OSDI) in Mexican population

N. Kahuam-López¹, J.G. Serrano-Robles¹, G.R. Vera-Duarte¹, C.A. Müller-Morales¹, A. Ramirez-Miranda¹, A. Navas¹, E.O. Graue-Hernandez¹

¹Cornea and Refractive Surgery, Instituto de Oftalmología Conde de Valenciana, Mexico City, Mexico

Introduction: The Ocular Surface Disease Index (OSDI) enables ophthalmologists to give symptoms an objective value and monitor the response to treatment in dry eye patients. Validated versions have been established in the Chilean and Colombian populations; in the Mexican population, cultural adaptation has been proposed, although validation has not been conducted. This is significant as the OSDI is one of the most commonly used questionnaires in dry eye syndrome.

Objectives: Translate, culturally adapt, and validate the Ocular Surface Disease Index into Spanish for the Mexican population.

Methods: To ensure fluency and comprehensibility, we employed the Crawford and INFLEZS indexes. The Content Validity Coefficient was used to assess coherence, relevance, clarity, and sufficiency. Internal consistency was evaluated using Cronbach's Alpha Coefficient.

Results: A total of 372 participants were included in the study, 63.4% female, age ranged from 17 to 86 years. According to the INFLEZS readability index, symptom-related items achieved scores of 82.56, 72.69, 85.81, 73.24, and 74.24. Items related to lifestyle obtained scores of 71.39, 76.90, 58.27, and 72.56, while in the environmental domain, scores of 83.61, 74.03, and 58.93 were recorded. Using the Crawford index, symptom scores were 3.6, 4.6, 3.5, 4.1, and 3.8, lifestyle scores were 4.7, 4.1, 5.1, and 4.6, and environmental scores were 3.7, 4.4, and 5.7. The Cronbach's alpha coefficient was 0.868. Based on the scores from the OSDI questionnaire, patients were classified as having no dry eye (n=129), mild dry eye (n=99), moderate (n=45), and severe (n=99).

Conclusions: This study developed and validated the Mexican version of the Ocular Surface Disease Index, assessing its reliability and internal consistency. With the aid of this tool, ophthalmologists and researchers will be able to assess and monitor Mexican-Spanish-speaking patients with dry eye in routine clinical practice and future research.

P-COR-067

NOD1/NF- κ B65 pathway inhibition in innate immune response using tree shrew model of *Fusarium* keratitis

Y. LI¹, H. Liu¹, Z. Hu¹

¹Ophthalmology, Affiliated Hospital of Yunnan University, Kunming, China

Introduction: Fungal keratitis (FK) account for almost half of all keratitis cases occurring in the China. without early accurate diagnosis and treatment, may lead to blindness. We found in tree shrew model of FK that nucleotide-binding oligomerization domain 1 (NOD1)-related factors could induce NF κ B65 activation following *Fusarium* spore infection and reveal the mechanisms regulating innate immune system related signaling pathways involving NLRP3, IL-6, IL-8, and TNF- α . It may provide scientific basis for the prevention, intervention and treatment of FK.

Objectives: To identify the nucleotide-binding oligomerization domain 1 (NOD1)-related factors that induce NF- κ B65 activation following *Fusarium* spore infection and reveal the mechanisms regulating innate immune system related signaling pathways involving NLRP3, IL-6, IL-8, and TNF- α .

Methods: pRSV-T cells were infected with inactivated *Fusarium* spores and divide into four treatment groups: inactivated spores, iE-DAP (NOD1- iE-DAP), NOD1-RNAi, and DMEM . For in vivo experiments, wild-type (wt), NOD1, NOD1-RNAi, and NOD1-C14-Tri-LAN-Gly groups were subjected to subconjunctival injections. A fungal keratitis model was generated by scratching tree shrew corneal epithelium and instilling *Fusarium* spore suspension . NOD1, RIP2, NF- κ B65 transcription was assessed in pRSV-T cells and corneal tissues using real-time PCR. NOD1 protein was detected using western blotting. NOD1 and NF- κ B65 localization was determined by immunofluorescence. Levels of IL-6, IL-8, and TNF- α in culture supernatant and aqueous humor were detected by flow-cytometry.

Results: iE-DAP and *Fusarium* spores increased NOD1, RIP2, and NF- κ B65 transcription and NLRP3, IL-6 , IL-8 , and TNF- α secretion in vitro. RNAi transfection significantly inhibited NOD1 mRNA and protein expression in vitro and attenuated the secretion of corresponding inflammatory factors. In corneas, RNAi transfection downregulated NOD1 protein, its downstream targets RIP2 and NF- κ B65, as well as NLRP3, IL-6, IL-8 , and TNF- α secretion. Besides, RNAi attenuated inflammatory factor activation and inhibited NOD1-iE-DAP-induced NF- κ B65 activation, which has therapeutic implications.

Conclusions: NOD1 mediates the secretion of inflammatory cytokines and antimicrobial peptides and activates innate immune system in corneal epithelium challenged with iE-DAP or *Fusarium* spores. Altered expression of pro-inflammatory factors involved in RIP2 and NF- κ B65 signaling pathways regulates *Fusarium*-induced innate immune response.

P-COR-068

Real-time corneal thickness changes during phacoemulsification cataract surgery

T. Wang¹, C. Zhao¹, J. Hu¹, Y. Luo¹, J. Kong¹, W. Shi¹

¹Eye Institute of Shandong First Medical University, Eye Hospital of Shandong First Medical University (Shandong Eye Hospital), Jinan, China

Introduction: Cataract is the leading cause of blindness worldwide. Phacoemulsification has become the most commonly performed surgical procedure for cataracts worldwide. Corneal edema is one of the most common early complications after phacoemulsification. Previous studies have mainly focused on changes in corneal thickness days or months after cataract surgery, but few studies have worked on intraoperative real-time changes in corneal thickness.

Objectives: To observe the changes in corneal thickness during phacoemulsification cataract surgery and to analyze the influencing factors.

Methods: One hundred and two patients (102 eyes) with cataracts undergoing phacoemulsification cataract surgery at Shandong Eye Hospital between July and October 2021 were included. Intraoperative OCT was applied to capture real-time images preoperatively, before and after ultrasonic emulsification, at the end of irrigation aspiration and the end of surgery. Then, the corneal thickness at the above time points was measured using Photoshop software.

Results: The corneal thickness of 102 cataract patients was $511.79 \pm 31.46 \mu\text{m}$ before operation and $512.71 \pm 31.51 \mu\text{m}$ at the beginning of phacoemulsification, which increased by $0.91 \pm 1.48 \mu\text{m}$ (0.2%). At the end of ultrasonic emulsification, the corneal thickness was $521.58 \pm 32.75 \mu\text{m}$, $8.87 \pm 8.71 \mu\text{m}$ (1.7%) thicker than that before the procedure. After irrigation aspiration, the corneal thickness reached $528.09 \pm 33.87 \mu\text{m}$, which increased by $6.52 \pm 6.38 \mu\text{m}$ (1.3%) compared with that of the previous step. At the end of the operation, the corneal thickness was $539.19 \pm 33.88 \mu\text{m}$, $11.09 \pm 10.92 \mu\text{m}$ and $27.37 \pm 13.64 \mu\text{m}$ thicker than that of the previous step and the preoperative thickness, respectively, with an overall increase of 5.3%. The differences were statistically significant at all time points (all $P < 0.001$). Correlation analysis showed that postoperative corneal thickness changes were correlated with age, cataract lens nuclear grade, actual phacoemulsification time (APT), effective phacoemulsification time (EPT), average phacoemulsification energy (APE), total surgery time (TST), cell density (CD), maximum cell area (MAX), and cell area standard deviation (SD) (all $P < 0.05$), while the changes in thickness were not correlated with gender, cell area coefficient of variation (CV), percentage of hexagonal cells (6A), average cell area (AVE), or minimum cell area (MIN) (all $P > 0.05$).

Conclusions: During phacoemulsification cataract surgery, corneal thickness gradually increases in real time with the increase of perfusion pressure and intraocular manipulation time. The real-time magnitude of intraoperative corneal thickness change is closely related to lens nucleus hardness, corneal endothelial cell density, ultrasound energy and time for emulsification.

P-COR-070

A novel technique to facilitate the keratoprosthesis implantation while preventing the surgical complications

X. Yao¹, Q. Kang¹, Q. Fang¹, K. Liao², X. Lu²

¹Cornea Disease, Aidi Eye Hospital, Chengdu, China, ²Cornea Disease, Huiyi Eye Hospital, Enshi, China

Introduction: Corneal blindness is the second leading cause of worldwide blindness. Keratoplasty is the standard approach for corneal blindness; however, graft failure can be triggered by variable reasons, such as corneal vascularization and xerophthalmia. Keratoprosthesis implantation is recognized as the last-resort for patients with poor prognosis of penetrating keratoplasty. The Boston Keratoprosthesis is the most widely used design among the few artificial corneas. However, complications like glaucoma, retinal detachment, expulsive choroidal hemorrhage, and many others could still occur. In 2021, the collar-button type keratoprosthesis (CbKpro) - a Boston like artificial cornea was approved by The China National Medical Products Administration (NMPA) for clinical implantation in China. Present study is designed to explore the safety, efficacy and practicability of plastic sheet (PS)-assisted technique for lowering the incidence of surgical complications during CbKpro procedure.

Objectives: To investigate the safety, feasibility and effectiveness of our novel technique for keratoprosthesis implantation.

Methods: Four patients who were implanted with collar button keratoprosthesis (CbKpro) with our novel technique were analysed. After an 8.75mm diameter partial demarcation with trephine was made, a full-thickness arc wound from 9.00-3.00 o'clock and 4.00-8.00 o'clock were created symmetrically, the lens or intraocular lens was removed and an 8.75 × 20.0 mm PS with a centered cross cutting was placed into the anterior chamber (AC) through the superior wound, then pulled out through the inferior wound and fixed at the recipient bed with 10/0 nylon sutures followed by removing the central cloudy cornea. Under direct vision with PS, vitrectomy and iridectomy were carried out, the optic of CbKpro was inserted into the anterior vitreous via the cross cutting. Once these steps were accomplished, the PS was taken off and wound sutured.

Results: No intraocular content extrusion and expulsive choroidal hemorrhage were among the complications in all 4 patients during surgery. Postoperatively, the visual acuity improved to 0.3-0.8 from preoperative finger counting in 3 cases, only one to finger counting from light perception due to pre-existing optic nerve atrophy.

Conclusions: The plastic sheet-assisted approach offers stabilization and safety during keratoprosthesis implantation for end-stage corneal blindness, which makes the procedure easier and effectively lowers the intraoperative complications.

P-COR-071

Acanthamoeba keratitis in a patient with intrastromal corneal segments

*S. Farrera Bracho*¹

¹Cornea, Asociación para Evitar la Ceguera en México, México, Mexico

Introduction: Acanthamoeba keratitis is caused by a single-celled protozoan, it represents 4-8% of keratitis. The poor visual prognosis is related to corneal trauma or ulceration.

Objectives: To describe clinical presentation, management and evolution of acanthamoeba keratitis.

Methods: Case report

Results: This is a 34-year-old male patient, with a diagnosis of keratoconus 12 years ago, history of implantation of intrastromal segments 5 years ago and scleral contact lens user 1 year ago. He began suffering from photophobia, pain and red eye in the RE. A diagnosis of anterior non-granulomatous uveitis is made and treatment was started with prednisolone acetate in a reduced dose and tropicamide with phenylephrine, with partial improvement of symptoms. Later, he presents significant decrease in visual acuity and severe pain. During reevaluation of the case, the patient highlights the use of contact lens in the sea and pool. He presented with severe keratitis in his right eye.

A smear and culture were taken and reported positive for Acanthamoeba.

A diagnosis of Acanthamoeba keratitis was made in RE and treatment was initiated.

Despite treatment, the evolution was torpid. A tectonic penetrating keratoplasty was performed.

Conclusions: The presence of tunnels for the intrastromal segments could have generated greater penetration and lysis in deep planes. Previous use of topical steroids may have caused important progression, since it promotes the encystment and reproduction of the trophozoite. Acanthamoeba keratitis is a rare but severe condition. It is important to suspect in contact lens users with poor hygiene, who are exposed to the sea, swimming pool or users of ineffective multipurpose solutions. Generally the diagnosis is late, which causes a torpid evolution, with a reserved prognosis.

P-COR-072

Severe ocular manifestations of rheumatoid arthritis: about 6 cases

B. Bousellam¹, Y. Bouhafra¹, H.a. Eddaoui¹, B. Yasmine¹, M. Benharbit¹, A. Regragui¹, N. Benchekroun¹, M. Belmekki¹

¹Ophthalmology, Hopital Cheikh Zaid, Rabat, Morocco

Introduction: Rheumatoid arthritis is a chronic autoimmune inflammatory disease of unknown origin, marked by joint swelling, joint tenderness and destruction of the synovial joints, leading to severe disability and premature mortality. It has ocular manifestations, the most common of which are anterior segment involvement, which may precede the exacerbation of a rheumatoid arthritis immune response.

Objectives: Our study aims to highlight the importance of ophthalmological examination and appropriate management of ocular lesions in rheumatoid arthritis.

Methods: Our series comprises six patients with rheumatoid arthritis presenting with severe ocular signs. Five patients were female and one male. The patients ranged in age from 51 to 76 years, and all presented with decreased visual acuity. The most common anterior segment disorders were corneal perforation (4), severe dry syndrome (6), corneal abscess (2) and palpebral damage (1).

Results: Our patients were treated jointly by the internist/rheumatologist and the ophthalmologist. From an ophthalmological point of view, in addition to symptomatic treatment of dry eyes, other means were used to alleviate complications (therapeutic contact lenses, autologous serum). Given the high risk of failure, corneal transplantation was avoided in all patients.

Conclusions: Our study aims to describe the various ophthalmological conditions that can accompany rheumatoid arthritis and make internists and rheumatologists aware of the seriousness of these ocular lesions, enabling appropriate multidisciplinary management and preventing severe ocular complications.

Ocular involvement occurs in around 25% of patients with rheumatoid arthritis. This may be a sensitive marker of immune reactivation of the disease. By recognizing the ocular manifestations of systemic rheumatic diseases, it may be possible to avoid, or at least delay, many long-term ocular sequelae and perhaps improve the vital prognosis of these patients.

P-COR-073

Analysis of corneal endothelium after of cross-linking in patients under accelerated protocol

G. Thomassiny-Bautista^{1,2}, O. Baca-Lozada¹, R. Velasco-Ramos¹, O. Fernandez-Vizcaya¹, B. Perez-Flores¹, E. Alegria-Gómez¹

¹Cornea, Hospital Nuestra Señora de la Luz, Mexico City, Mexico, ²Ophthalmology, Centro Medico Nacional de Occidente IMSS, Guadalajara, Mexico

Introduction: Crosslinking is a frequently used technique used in patients with keratoconus progression criteria. It is important to reassure that this procedure is safe for corneal endothelium.

Objectives: To compare endothelial characteristics measured prior and post surgical intervention and analyze if changes are present after the procedure.

Methods: Prospective, observational and analytical study. We selected patients who met criteria for performing epi off crosslinking were included, mainly those with previous history of keratoconus diagnosis, with progression criteria and a total corneal thickness over 450 microns in the thinnest point. Specular microscopy was taken preoperatively and 3 months after de main intervention. Only 29 patients of the initial 50 patients who underwent preoperative and postoperative analysis completed follow up. All patients underwent crosslinking with isosmolar 1% riboflavin, and were exposed to UVA rays with total energy of 7.20J/cm³ and 30 mW, during 4.30 minutes. Patients who presented postoperative complications were dismissed. Quantitative variables such as age, central corneal thickness at its thinnest, cell density, hexagonality percentage and average cell area were analyzed central tendency measurement and Student-t. CV area and gender were taken as qualitative variables, and were tested by Fisher's exact test and X²

Results: 29 eyes were analyzed. Preoperative and postoperative cell density was tested with Student-t, obtaining a p = 0.5050 with not significance for relation to endothelial loss after the procedure. For CV cell area p = 0.0325 was obtained, which translates into alteration in cell size or increased polymegatism. Alterations within hexagonality were not found, tested with Student-t, obtaining a p = 0.5556. Variations in average cell area were not found, this variable was analyzed with Wilcoxon sign range, obtaining a p=0.3186. There was a paradoxical increase in cell count derived from the suspension of rigid gas permeable contact lenses, associated to centripetal cell migration.

Conclusions: Crosslinking is a safe procedure as long as standardized protocols are followed. We did not find damage at morphological level, which leads us to conclude that there is endothelial instability with no cell loss after this procedure. It is important to consider the short term follow up in this particular case, we cannot rule out that those morphological changes could be only of transitional character and remit in the long term.

P-COR-074

Acanthamoeba keratitis - case report and literature review

*Y. Ping*¹

¹Ophthalmology, The First Hospital of Nanchang University, Nanchang, China

Introduction: Acanthamoeba keratitis (AK) is a potentially blind-causing disease caused by pathogenic free-living amoeba (FLA).

Objectives: In recent years, due to the increasing number of people wearing contact lenses, the incidence of acanthamoeba keratitis (AK) is also increasing year by year.

Methods: According to the epidemiological investigation, there are three main risk factors for AK, which are corneal trauma, wearing contact lenses and contact with sewage. The most important risk factor for AK is wearing contact lenses.

Results: Acanthamoeba keratitis (AK) has gradually developed into a common ocular infectious disease. At the same time, the process of diagnosis and treatment of acanthamoeba keratitis is also a great challenge for doctors, so doctors can also increase the prevention and control of the disease in the process of being familiar with acanthamoeba keratitis.

Conclusions: For acanthamoeba infection caused by keratitis triggered by the immune response mechanism, more also complicated with bacterial keratitis, for how to control, I think pay attention to personal eye hygiene is particularly important. The repeated attacks of acanthamoeba keratitis also indicate that acanthamoeba is difficult to kill and has a tenacious ability to reproduce and survive. Human beings have been fighting against parasites and bacteria for millions of years. In this long history, for the diagnosis and prevention of diseases, I think maybe human beings should do their best instead of killing acanthamoeba, because it is precisely because of human activities. Protozoa and various parasites entered the human body and organs.

P-COR-078

Impact of COVID-19 pandemic on corneal transplant surgical indications, outcomes, and complications

M. Tang¹, D. Vaughn¹, Y. Zhou¹, S. Mian²

¹University of Michigan, Ann Arbor, United States, ²Department of Ophthalmology and Visual Sciences, University of Michigan, Ann Arbor, United States

Introduction: The COVID-19 pandemic was majorly disruptive to the timing and logistics of corneal transplantation. There are few studies quantifying its impact on surgical outcomes, post-operative complications, and long-term sequelae.

Objectives: To describe the impact of the COVID-19 pandemic on corneal outcomes at a tertiary center in Michigan.

Methods: We performed a retrospective chart review on patients from March 2019-March 2021 presenting to a single academic institution who underwent corneal transplantation. Patients were divided into two groups: pre-COVID (before March 2020) and post-COVID. Visual acuity (VA) in logMAR at baseline, 3 months post-operatively (POM3), and 12 months post-operatively (POM12) were collected. Demographic data, indications for surgery, and post-operative complications were also recorded. Differences between the two groups were analyzed utilizing t-tests.

Results: We reviewed the charts of 538 patients, 290 pre-COVID and 248 post-COVID. When evaluating baseline VA, there was a statistically significant difference ($p=0.003$) in the mean logMAR VA of the pre-COVID group (1.03) vs post-COVID (1.29). At POM3, the difference was not statistically significant (pre-COVID mean=0.82; post-COVID mean=0.94). The difference at POM12 was also non-significant (0.72; 0.88). Regarding surgical indications, 53 (18.3%) of pre-COVID patients and 2 (0.8%) of post-COVID patients presented for "Dystrophy and Congenital" causes ($p<0.0001$). 112 (38.6%) pre-COVID and 114 (58.1%) post-COVID patients presented for "Edema" ($p<0.0001$). There were no other significant differences in indications, and no significant differences in post-operative complications.

Conclusions: Patients in the post-COVID cohort had significantly worse baseline VA, suggesting that patients may have delayed care during the pandemic and presented only when symptoms became more severe. This is supported by the significant increase in patients presenting for "Edema" and the decrease in patients presenting for "Dystrophy and Congenital" causes. Our data also indicates long-term outcomes were equivalent between the two groups. There was no significant difference in POM3 and POM12 VA, nor in post-operative complication rates. Our study was limited by data from a single institution, and future studies would benefit from multi-site datasets. This information is necessary to understand the impact that the pandemic had on corneal transplant outcomes and to better prepare for future disruptions in care.

P-COR-079

Parental corneal tomographic and biomechanical characteristics of patients with keratoconus

X. Du^{1,2}, J. Li^{1,2}, B. Zhang^{1,2}, V. Jhanji³, X. Wang^{1,2}, D. Li^{1,2}

¹Qingdao Eye Hospital of Shandong First Medical University, Qingdao, Shandong, China, Qingdao, Shandong, China, ²State Key Laboratory Cultivation Base, Shandong Provincial Key Laboratory of Ophthalmology, Shandong Eye Institute, Shandong First Medical University & Shandong Academy of Medical Sciences, Qingdao, China, Qingdao, Shandong, China, ³Department of Ophthalmology, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, USA, Pittsburgh, Pennsylvania, USA, United States

Introduction: To investigate the heritability of corneal tomographic and biomechanical parameters in keratoconus (KC). Prospective cohort study.

Objectives: A total of 44 patients with KC and their biological parents ($n = 88$) were recruited as the study group. The control group consisted of 84 healthy adults with matched age and gender. Both eyes of each participant underwent clinical examinations, and one eye was selected for statistical analysis.

Methods: All participants underwent a comprehensive assessment including Pentacam Scheimpflug tomography, Corvis ST, visual acuity, refraction examination, axial length, and slit-lamp examination for both eyes. Individuals presenting with KC manifestations in at least one eye were classified as having KC.

Results: Two parents (2/88, 2.27%) from two different families were diagnosed as KC. Parents of KC patients had thinner corneas with altered corneal biomechanical parameters compared to healthy controls ($P < 0.05$). The combined tomographic and biomechanical index (TBI) demonstrated the highest discriminatory power (area under the ROC curve 0.785) and strong specificity (84.5%). Parental corneal TBI, Corvis biomechanical index (CBI) and TP were identified as the major influential factors for KC in their offspring by logistic regression analysis, with a 73.3% accuracy in identifying offspring with KC.

Conclusions: Parental corneal tomographic and biomechanical properties of KC patients suggest a possible predisposition to KC. A combination of tomography and corneal biomechanics can be helpful in predicting the incidence rate of KC in the offspring of patients with subclinical KC.

P-COR-080

Enterococcus faecalis panophthalmitis: a devastating complication after DALK for macular corneal dystrophy

P. Jain¹, I. Gupta¹, A. Hariani¹, U. Sharma¹, C. Ogia¹, A. Soman¹, G. Reddy¹

¹Guru Nanak Eye Centre, Delhi, India

Introduction: Deep anterior lamellar keratoplasty though considered safer and a relatively extraocular procedure as compared to penetrating keratoplasty is not free of its own set of complications. This case is unique as it highlights a grave complication due to an uncommon organism in case of an uneventful DALK surgery.

Objectives: To report a case of Enterococcus faecalis panophthalmitis in a young male who underwent deep anterior lamellar keratoplasty (DALK) for macular corneal dystrophy with pseudophakia operated in childhood.

Methods: A young male underwent DALK for macular corneal dystrophy. The same procedure was done few years back on the other eye with good gain of vision (BCVA 20/40). He was operated for congenital cataract in both eyes in childhood. With an uneventful first post-operative day, the patient presented with infiltrates and decreased graft clarity on day 2, ultrasound scans showed dense vitritis. Erring on the side of infection the patient was started on fortified topical and intravenous antibiotics. As the course of the disease worsened, the patient underwent a therapeutic corneal transplant with vitrectomy and intravitreal antibiotics to salvage the eye and the corneal button was sent for microbiological examination which revealed the presence of gram-positive Enterococcus faecalis sensitive to piperacillin. The patient was started on topical, intravenous and intravitreal piperacillin and showed signs of improvement symptomatically and on serial ultrasound B scans.

Results: The severity and the fulminant nature can be attributed to pre-existing breach in the anterior-posterior chamber due to a posterior capsulorhexis in this case. Post corneal transplant infections are a devastating complication and need urgent diagnosis and management to salvage the eye.

Conclusions: Uncommon microorganisms are not that uncommon and a good microbiology lab could help save the patient from a devastating outcome of having to enucleate the eye.

P-COR-081

Intrastromal corneal segments depth assessment by corneal optical coherence tomography

J.A. Matías Morales¹, M.T. Cifuentes Noriega¹, M. Gutierrez Paz¹, E.V. Sáenz Morales², N.J. Sacor Quijivix³

¹Anterior Segment Clinic, Pan American Institute Against Blindness, Guatemala City, Guatemala,

²Strabismus and Pediatric Ophthalmology Clinic, Pan American Institute Against Blindness, Guatemala City, Guatemala, ³Faculty of Medicine - West University Center, San Carlos University,

Quetzaltenango, Guatemala

Introduction: Keratoconus is a condition in which the cornea assumes a conical shape due to progressive thinning. The worldwide prevalence varies widely, with annual incidence ranging between 50 and 200 cases per 100,000 inhabitants. The pathophysiology includes genetic, biomechanical and environmental disorders, the associated risk factors are Down syndrome, family history of keratoconus, ocular allergy, mechanical factors and connective tissue disorders. Surgical management consists of placement of intrastromal corneal segments and corneal crosslinking, deep anterior lamellar keratoplasty or penetrating keratoplasty in advanced cases.

The FDA-approved corneal segments, based on the remodeling of the cornea by the arc shortening effect, are inserted into the deep stroma and improve visual acuity by flattening the cornea by changing its ectatic curvature. The location and depth of the corneal segments with respect to the center of the cornea is important due to the risk of extrusion or perforation depending on their greater or lesser depth than planned. Corneal optical coherence tomography (OCT) allows for a precise pachymetric study to plan the depth of the incision site when implanting the intrastromal corneal segments; as well as for measuring the depth of the residual stromal bed and identifying the presence of edema and infiltrates during follow-up.

Objectives: To determine the depth of the intrastromal corneal segments by means of corneal optical coherence tomography in patients with keratoconus treated by manual technique in the Anterior Segment service of the Pan American Institute Against Blindness from January to September 2022.

Methods: Retrospective, cross-sectional observational study in 17 patients with inclusion criteria and a total of 26 operated eyes in whom a depth measurement of 43 intrastromal segments was obtained by corneal OCT in the first postoperative month and compared with the planned depth.

Results: The average of the planned depth was 79.29% and the obtained depth was 82.29%, with a standard deviation of 1.334 and 5.832 respectively. The Wilcoxon test was performed ($p = .0008$) in which a statistically significant difference between the two samples was evidenced. Using Spearman's correlation test, ($p = .0210$) a direct correlation is established between the planned depth and the obtained depth in a statistically significant way.

Conclusions: The corneal segments are located at a greater depth, on average, than planned.

P-COR-082

Diffuse OSSN treated with topical INF α -2b

S. Desai¹, D. Desai¹, R. Desai¹, R. Sharma²

¹Community Ophthalmology, Tarabai Desai Eye Hospital, Jodhpur, India, ²Pathology, Govind Diagnostic Clinic, Jodhpur, India

Introduction: Diffuse OSSN is an uncommon lesion of the ocular surface and is often misdiagnosed as it masquerades as vernal keratoconjunctivitis, dry eye disease, limbal stem cell disease or scleritis. Surgical removal is an option, but it must be extensive and requires an amniotic membrane graft for ocular surface rehabilitation which may not be available at peripheral eye clinics or with rural practitioners. The treatment of OSSN with Interferon eyedrops has been described in recent years but to the best of our knowledge successful treatment of an extensive diffuse lesion is wanting in literature. Hence, we present the current case report.

Objectives: To describe successful treatment of a diffuse OSSN with topically applied Interferon eye drops.

To promote this modality of treatment in resource poor settings or where a corneal surgeon is unavailable.

Methods: A 64-year-old male patient presented with a diffuse thick gelatinous peri-limbal vascularised mass, involving all quadrants of the bulbar conjunctiva & limbus with loss of ocular surface integrity in the left eye. The picture resembled LSCD with conjunctivalisation. He was being treated elsewhere with steroids for 2 months prior to this visit with no relief. His visual acuity in the affected eye was 0.5 meters counting fingers. Diffuse OSSN was diagnosed & a biopsy done. Patient put on lubricants and INF α -2b drops QID which were compounded at our hospital pharmacy in a strength of 1 m IU/ml. Serial anterior segment clinical photos were used to document the effect of Interferon eyedrops on healing in this case report.

Results: The patient showed dramatic improvement and the lesion started regressing within 2 weeks with restoration of corneal clarity. At the end of 5 weeks, there was complete resolution of lesion and the visual acuity improved to 6/36. At 8 weeks there was complete resolution of lesion. INF α -2b eye drops were continued for another 2 months after clinical resolution. There has been no recurrence noted at the one-year follow-up. The patient is now waiting for cataract surgery.

Conclusions: This report describes the successful treatment of a diffuse OSSN with topically applied Interferon α -2b eyedrops. INF α -2b has become inexpensive in recent times due to local manufacturing in India and the world over. Therefore this non-invasive treatment modality must be used as a first line of treatment for OSSN especially the diffuse variety. The eyedrops can be easily compounded from commercially available injections and must be stored in a refrigerator.

P-COR-083

Characteristics of floppy eyelid syndrome in keratoconus eyes

T. Usui¹, M. Terashima¹, J. Yoshida¹, H. Jamba¹

¹Ophthalmology, International University of Health and Welfare, Narita, Chiba, Japan

Introduction: The purpose of this study was to investigate the degree and characteristics of floppy eyelid syndrome in patients with keratoconus.

Objectives: Seventy-five eyes of 41 consecutive patients (24 males, 17 females) with keratoconus who visited the International University of Health and Welfare, Narita Hospital between April 2020 and December 2023 and were examined for floppy eyelid were included in this study.

Methods: The upper eyelid was considered floppy positive when the apex of the upper eyelid was elevated and the eyelid conjunctiva was exposed during downward viewing. The distance at which the upper eyelid could be raised vertically in frontal vision was measured from the corneal apex, and the relationship between floppy eyelid and corneal parameters was examined using a linear mixed model. The differences between the right and left eyes for each measure were compared using the Mann-Whitney test.

Results: The floppy-positive group consisted of 25 patients with 46 eyes (61.3%), and the floppy-negative group consisted of 16 patients with 29 eyes (38.7%).

Of the 34 patients who underwent the vertical hyperlaxity test on both eyes, 17 patients had the same length of elevation of the left and right eyelids, in contrast, 17 patients had a difference of 2 mm or less, and no patient had a difference of more than 2 mm between the left and right eyelids. Of the 41 patients, 12 patients (29.3%) had keratoconus in one eye and FFK in the other eye. There was no significant difference in eyelid elongation between the keratoconus and FFK eyes. When we focused on how the floppy positive and negative groups compared in terms of left-right difference in keratoconus in the same patient, there was no significant difference between the positive and negative groups regarding biometry like refractive power and thinnest corneal thickness.

Conclusions: In this study, floppy eyelid was found in a high percentage of patients with keratoconus, and the degree of floppy eyelid relaxation did not differ between the right and left eye. Even if keratocosis is asymmetrical, the eyelid extension was considered to be almost symmetrical between the left and right eyelids.

P-COR-084

Behind the haze: A rare case of congenital hereditary endothelial dystrophy in two siblings

A.I Lino¹, M.F. Navarrete¹

¹Department of Ophthalmology, Mariano Marcos Memorial Hospital and Medical Center, Batac, Philippines

Introduction: Congenital Hereditary Endothelial Dystrophy (CHED) is a genetic condition that is uncommon and inherited in an autosomal recessive manner characterized by bilateral corneal clouding due to abnormal development of the corneal endothelium. The condition typically manifests early in life, leading to progressive visual impairment. Two siblings, a 14-year-old male and a 9-year-old female, have been diagnosed with Congenital Hereditary Endothelial Dystrophy (CHED), the first documented CHED in a tertiary hospital in Batac City, Ilocos Norte and possibly in the whole Ilocos Region. Both patients have been exhibiting cloudy corneas since birth.

Objectives: This report aims to shed light on the clinical manifestations, treatment strategies, and subsequent outcomes observed in these individuals with Congenital Hereditary Endothelial Syndrome.

Methods: This case as a whole extensively references a case report method in reporting the diagnosis and treatment of congenital hereditary endothelial dystrophy (CHED).

Results: Before surgery, both patients were given medications to lower intraocular pressure and prevent glaucoma. Subsequently, these patients underwent Penetrating Keratoplasty (PKP) where for the older sibling in his left eye and the younger sibling in her right eye. Both patients had pre-operative visual acuity (VA) of counting fingers at 2 feet and post-operative VA of 20/125.

Conclusions: Significance of Early Diagnosis and Intervention.

Early detection of CHED is crucial for initiating interventions at the earliest possible stage. Genetic counseling plays a vital role in educating families about inheritance patterns, recurrence risks, and available treatment options for CHED.

Efficacy of Penetrating Keratoplasty and IOP Control

Penetrating keratoplasty remains the gold standard surgical intervention for CHED, providing improved visual outcomes in the majority of cases. Controlling intraocular pressure is crucial in managing CHED, as elevated IOP can compromise corneal clarity and visual function.

Need for Further Research and Collaboration

Further research is needed to explore potential alternative treatment modalities for CHED beyond penetrating keratoplasty and IOP control. Genetic studies can provide insights into the underlying molecular mechanisms and help identify novel therapeutic targets.

P-COR-085

Primary conjunctival basal cell carcinoma mimicking an OSSN in a young adult Filipino: a case report

L.J. Mangahas¹, R. Siazon¹

¹Ilocos Training and Regional Medical Center, San Fernando, Philippines

Introduction: Malignant conjunctiva tumors arise from different cells, the most common of which are squamous cell carcinomas (including OSSN), melanomas, and lymphomas. Primary conjunctival BCC is rare, and can mimic the clinical features of OSSN.³ Only seven reported cases were published online. While all cases are in their 6-8th decades of life, we report the very first case in a young adult male.

Objectives: To describe the morphologic and histopathologic features of a Primary Conjunctival Basal Cell Carcinoma (BCC) in a young adult Filipino.

Methods: Case Report and Literature Review.

Results: A 37/M with a three-year history of progressively enlarging fleshy, pedunculated mass on his right eye measuring 8.5mm x 8.0mm at the superonasal limbus encroaching on the cornea, with surrounding prominent feeder vessels. Whitish-to-grayish plaques typically seen in OSSN were noted on the lesion's surface. Wide excision of the mass with no touch technique was done under local anesthesia. Four cycles of Mitomycin-C 0.04% as chemo-adjuvant therapy were given. Histopathology showed basaloid cells with peripheral palisading most consistent with BCC. Immunohistochemistry was positive for Bcl-2 and CD10 markers and negative for EMA and CEA, confirming conjunctival BCC. Eight weeks postoperatively, fibrovascular tissue proliferation at the excision site was noted. AS-OCT of the lesion showed a thickened hyper-reflective band continuous with the epithelium making us suspect of a possible recurrence. Resection with a rush frozen section revealed presence of fibrotic tissue and negative for tumor cells. The bare sclera was covered with conjunctival autograft. There was no recurrence of the lesion after three months of follow-up.

Conclusions: Primary BCC of the conjunctiva is rarely encountered, especially in a young male mimicking squamous neoplasia both in morphology and histopathology. Therefore, it should be considered in the differential diagnosis of OSSN. Immunostaining is invaluable for distinguishing between the two and confirming the diagnosis. Wide surgical excision is sufficient, as reported in the literature. Although lacking in evidence, adjunctive therapies may help prevent tumor recurrence.

P-COR-087

A clinical study of topical treatment for thyroid-associated ophthalmopathy with dry eye syndrome

R. Sun¹, H. Zhou²

¹Pudong New Area People's Hospital, Shanghai, China, ²Ophthalmology, Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Clinically, thyroid-associated ophthalmopathy (TAO) patients were suffered from dry eye syndrome. Only a few relevant studies were about this topic. Our study was determined to provide high-level evidence for the treatment of TAO with dry eye syndrome.

Objectives: To compare the clinical effects of vitamin A palmitate eye gel and sodium hyaluronate eye drop for TAO patients with dry eye syndrome.

Methods: The study was conducted in the Ophthalmology Department of the Ninth People's Hospital Affiliated with the Medical College of Shanghai Jiao Tong University from May to October 2020. A total of 80 mild or moderate-to-severe TAO patients with dry eye syndrome were randomly divided into two groups. The disease stages of all subjects were inactive. Patients in group A were treated with vitamin A palmitate eye gel three times/day for one month and sodium hyaluronate eye drop in group B. The index including break-up time (BUT) and Schirmer I test (ST), corneal fluorescence staining (FL), ocular surface disease index (OSDI), and adverse reactions were recorded by the same clinician at baseline and 1 month after treatment. The data were analyzed by SPSS 24.0.

Results: Finally, 65 subjects completed the treatment. The average age of the patients in Group A was 38.1 ± 11.4 years, and that in Group B was 37.26 ± 10.67 years. 82% of the subjects in group A were female and 74% in group B. There was no significant difference between the two groups at baseline, including the value of ST, BUT, OSDI, and FL grade. After the treatment, the effective rate was 91.2% in group A, of which the value of BUT and FL grade was significantly improved ($P < 0.001$). The effective rate in group B was 67.7%, of which the value of OSDI score and FL grade was significantly improved ($P = 0.002$). In addition, the BUT value of group A was significantly longer than that of group B ($P = 0.009$).

Conclusions: In TAO patients with dry eye syndrome, vitamin A palmitate gel and sodium hyaluronate eye drop improved the dry eye and promoted corneal epithelial repair. Vitamin A palmitate gel improves the stability of tear film, while sodium hyaluronate eye drop improves patients' subjective discomfort.

P-COR-088

A tale of two corneas-pseudomonas aeruginosa in contact lens wearers - the battle almost won at the cost of sight

A. Ahmed¹

¹Ophthalmology, Isipingo Private Hospital, Durban, South Africa

Introduction: Two different patients from totally different working environments both presented with sight threatening corneal ulcers-their only commonalities was the organism and that they both use contact lenses.I would like to present their case studies to highlight their scenario and showcase their recovery period and how debilitating this condition is if not referred appropriately and timeously.

Objectives: - Caution patients and reiterate the safety regulations concerning the use of contact lenses.

- Highlight the importance of eye protective gear in Industrial settings and referral to Ophthalmologists

- Impress on healthcare workers working in Emergency Departments or General Practitioner's that urgent referral is needed when one cannot handle the eye problem or it is an emergency condition.

- Advise patients on ways to improve their care of contact lenses

- Showcase how to titrate the medication and the way drops were used for these patients to achieve positive outcomes.

Methods: A case report describing what transpired for 2 different patients who presented during holiday season where most Drs are away and very few people to assist their emergency condition. In addition there was trauma,delay in referral and other factors that resulted in late referral and guarded outcomes.

Results: Both patients received timeous and intensive care from the presenting Ophthalmologist.The one patients corneal ulcer has completely healed but there is residual stromal haze that is still resolving. The second patients ulcer has developed into a neurotropic ulcer and needs optiserum to assist in its resolution-He is a future possible candidate for corneal graft.

Conclusions: Positive outcomes can be expected and predicted when patients with emergency conditions are referred urgently.The use of contact lenses while convenient and aesthetic can pose a major risk when poorly used & managed. Both patients had delays in presentation-despite that they have good prognosis and a hopeful outcome.

P-COR-089

Atypical pellucid marginal corneal degeneration - a case report

A. Barros Costa de Oliveira¹, B. Ribeiro Siqueira Pedrosa¹, E. Sá Ribeiro Campelo¹

¹Altino Ventura Foundation, Recife, Brazil

Introduction: No applicable.

Objectives: To report a case of atypical pellucid marginal corneal degeneration.

Methods: Case report.

Results: A 55-years-old female patient, complaining of a foreign body sensation in her left eye (OS). The patient reported history of ocular toxoplasmosis in the right eye (OD). On ophthalmological examination, visual acuity (VA) of 20/200 with correction in both eyes (AO). On biomicroscopy, the OD showed cornea with superior thinning and inferior paracentral cicatricial leukoma. In the OS, localized superior corneal edema with subepithelial blisters and a lesion similar to superior decemetocele, another region of corneal edema in the visual axis. Fundoscopy in OD with a scar lesion measuring 2x the diameter of the optic disc in the macular area; OS fundus were unremarkable. Corneal topography showed in OD was K1 = 51.09D (62°) and K2 = 44.03D (152°), in and OS was K1 = 42.71D (176°) and K2 = 42.71D (86°). Rheumatological and infectious causes were excluded. The possibility of performing a corneal transplant in the OS was raised and the risks of corneal perforation were explained. Together with the patient, the decision was made to initially carry out conservative treatment. Topical corticosteroid treatment was performed every 2 hours during weekly weaning + dimethylpolysiloxane 5x/day + lubricant every 1 hour + timolol 0.5% 2x/day, with weekly follow-up. The visual acuity of OD and OS of 20/50 with correction. Additional exams were: Optical coherence tomography with OD central pachymetry 608 µm, central epithelium thickness 57 µm, and minimum epithelium thickness 44 µm, in OS central pachymetry 625 µm and developed Descemet rupture in the upper region associated with corneal edema. It was not possible to detect thickness of epithelium in OS. Specular microscopy with CD 1221 x 1240. Corneal tomography showed in OD minimum thickness 280 µm and Kmax 62,96 D, in OS was 189 µm and Kmax 74,94D. The patient is still monitored at corneal outpatient clinic every 2 months and uses lubricant.

Conclusions: Pellucid marginal corneal degeneration (PMCD) is a bilateral, noninflammatory, peripheral corneal thinning disease, usually in the inferior cornea in patients in 2nd to 5th decades of life. Keratoconus, keratoglobus, terrien marginal degeneration, furrow degeneration and peripheral corneal disorders made differential diagnosis with PMCD. Despite its classic form, there are few reports in the literature describing PMCD affecting others corneal regions.

P-COR-090

Evaluation of one-year outcome of topography-guided PRK and collagen cross-linking for post-LASIK ectasia

M. Shunmugam¹, N.K. Yang², S.P. Holland¹, D.T. Lin¹, G. Moloney¹, D.B. Chan¹

¹Department of Ophthalmology & Visual Sciences, University of British Columbia, Vancouver, Canada,

²University of British Columbia, Vancouver, Canada

Introduction: Crosslinking (CXL) is used to treat post-LASIK ectasia. We evaluated Topography-Guided Photorefractive Keratectomy (TG-PRK) with CXL for post-LASIK ectasia using a Schwind Amaris 1050 excimer laser (SA).

Objectives: To evaluate the efficacy and safety of using topography-guided photorefractive keratectomy in combination with collagen cross-linking for treating post-LASIK ectasia.

Methods: Post-LASIK ectatic eyes that underwent treatment with the SA and Athens protocol CXL were evaluated. Preoperative and 12-month postoperative uncorrected distance visual acuity (UDVA), best corrected visual acuity (CDVA), manifest refraction, and topographic cylinder were analysed.

Results: 82 eyes with complete data at 12 months were included. 59 eyes (72%) showed UDVA $\geq 6/12$ post-operatively. 36 eyes (41%) had improved CDVA. Mean astigmatism changed from $-3.31 \pm 1.61D$ to $-1.11 \pm 1.06D$. The mean spherical equivalent improved from $-1.28 \pm 2.68D$ to $-0.45 \pm 1.53D$. 21 eyes (26%) gained 2 or more lines while 1 eye (1.2%) lost 2 lines or more. No cases showed ectatic progression.

Conclusions: One-year results of TG-PRK with CXL as a treatment for post-LASIK ectasia show safety and efficacy as a potential alternative treatment for post-LASIK ectasia. The technique is an alternative treatment for post-LASIK ectasia in patients who are intolerant of contact lenses.

P-COR-091

Efficacy of cyclosporin A for meibomian gland dysfunction in a murine allergic eye disease model

Z. Tong¹, X. Li¹, J. Hu¹, D. Song¹, Y. Xue¹

¹Shenyang Xingqi Pharmaceutical Co. Ltd., Shenyang, China

Introduction: Meibomian gland dysfunction (MGD) is a major cause of evaporative dry eye. The pathogenesis of MGD is still poorly understood and there is a lack of effective pharmacothetical treatments for it.

Objectives: The aim of this study was to develop a MGD mouse model induced by chronic allergic eye disease (AED), and to evaluate the efficacy of cyclosporin A (CsA) on MGD in this model.

Methods: AED in C57BL/6J mice were induced by intraperitoneal injection of ovalbumin (OVA) mixed with aluminum hydroxide and pertussis toxin. After 2 weeks immunization, mice were challenged by topical application of OVA daily for 7 days. The AED mice were treated with 0.05% CsA topical nanoemulsion or vehicle 30 min before challenge. The meibomian gland orifices score (MGOS) in the meibomian gland orifices of the upper eyelid was used to assess MGD severity. After induction of MGD, mice were treated with all drops (2 times/day) for 4 weeks. Eyelid tissues were collected for HE and oil red O staining.

Results: After challenges with OVA, the eyelid margin photos showed obvious blockage and telangiectasia in MGD mice. The mean MGOS in AED mice was significantly higher than control ones ($P < 0.05$). And we found a large proportion of MGOS in AED mice treated with vehicle had primarily high scores, while control group had primarily low scores. After 4 week-treatment of CsA or vehicle, MGOS of CsA group were relatively smaller compared with vehicle group ($P < 0.05$). Histopathology demonstrated that dilation of the duct and plugged orifices in meibomian glands of MGD mice, hyperkeratinization of ductal epithelium and inflammatory cell infiltration were also observed. In CsA group, the meibomian acini was relatively smaller and acinar density higher than vehicle group.

Conclusions: We established an animal model of MGD induced by AED. This model revealed immunopathogenical role in MGD and can be used to evaluate the efficacy of immunomodulatory therapies. In this model, 0.05% CsA was effective in improving the dysfunction of meibomian gland induced by AED.

P-COR-092

Voriconazole-induced religiosity-related hallucinations

K. Sun¹, M. Xu¹

¹Department of Ophthalmology, The First Affiliated Hospital of Chongqing Medical University, Chongqing, China

Introduction: Voriconazole (VRCZ) is a triazole with a broad spectrum of antifungal activity and is available in oral and intravenous formulations. VRCZ is associated with several side effects, including visual and neurological adverse reactions. However, VRCZ is still usually the drug of choice in most clinical settings. Especially in treating fungal keratitis, VRCZ was started, and the lesions disappeared.

Objectives: We reported patients treated with VRCZ for fungal keratitis that developed hallucinations.

Methods: We describe a patient who had religion-related hallucinations secondary to VRCZ. Several other interesting cases of hallucinations secondary to VRCZ have been reported in the literature, and are reviewed.

Results: Some patients claimed they saw animals, such as tigers, lions, and so on. Some patients failed to report their hallucinations spontaneously because of embarrassment or because they felt that the symptoms were not important enough to mention. Hallucinations associated with VRCZ use are not uncommon, and which usually remitted several days after discontinuing the medication. And these hallucinations were always closely related to patients' daily lives.

Conclusions: Infectious keratitis is a leading cause of monocular blindness worldwide and up to 65% of corneal ulcers are caused by fungal pathogens. Patients always live by farming with low sanitation conditions and less education. Therefore, relative to other ophthalmic diseases, fungal ulcers are typically thought to be treated more difficult and lead to worse outcomes. VRCZ is a second-generation azole widely used for the prevention and treatment of fungal infections. VRCZ-associated visual toxicity includes altered color discrimination, blurred vision, photophobia, optic neuritis, episcleritis, and scleritis. Neurological adverse events associated with VRCZ include painful peripheral neuropathy, hemiplegia, paresthesia, seizure, nystagmus, dysarthria, auditory hallucinations, visual hallucinations, confusion, disorientation, anxiety, agitation, irritability, impaired concentration, insomnia, hypotonia, asthenia, tremor, and delirium. According to the clinical use, hallucinations secondary appeared after 3 times VRCZ treatment, sometimes parallel neurological and visual adverse effects developed, and symptoms disappeared 24 hours–2 weeks after VRCZ cessation without any residue or sequel. All patients' hallucinations were always closely related to patients' daily lives.

P-COR-094

Epidemiology and economic cost analysis of microbial keratitis from a tertiary referral hospital in Australia

J.R. Daley^{1,2}, M.K. Lee³, X. Wang^{2,1}, C. Samarawickrama^{1,2,4,5}

¹Ophthalmology, Liverpool Hospital, Sydney, Australia, ²Ophthalmology, University of Sydney, Sydney, Australia, ³School of Medicine, The University of Notre Dame Australia, Sydney, Australia, ⁴Translational Ocular Research and Immunology Consortium (TORIC), Westmead Institute for Medical Research, Sydney, Australia, ⁵Save Sight Institute, The University of Sydney, Sydney, Australia

Introduction: Microbial keratitis is the most common cause of infective vision loss. The causative pathogen varies by country and region, with most cases requiring urgent, empirical antimicrobial therapy. Periodical surveillance of pathogens and their antibiotic resistance profiles is critical to optimise patient outcomes.

Objectives: The objectives of this study was to analyze the causative organisms of microbial keratitis, key clinical features at presentation and economic burden from a tertiary referral hospital in Australia.

Methods: A retrospective review of 160 cases of microbial keratitis was performed, over a 5-year period from 2015–2020. A wide variety of costs were considered to determine the economic burden, using standardized data from the Independent Hospital Pricing Authority and the cost of personal income loss.

Results: Our study showed the most commonly occurring pathogens were Herpes Simplex (16%), *Staphylococcus aureus* (15.1%) and *Pseudomonas aeruginosa* (14.3%). A total of 59.3% of patients were admitted, with a median length of admission of 7 days. Median cost for all presentations of microbial keratitis was AUD 8013 (USD 5447), with costs significantly increasing with admission. The total annual cost of microbial keratitis within Australia is estimated to be AUD 13.58 million (USD 9.23 million).

Conclusions: Our findings demonstrate that microbial keratitis represents a significant economic burden for eye-related diseases and the key driving factor for the cost is the length of admission. Minimizing the duration of admission, or opting for outpatient management where appropriate, would significantly reduce the cost of treatment for microbial keratitis.

P-COR-095

Keratoconus cone location on various corneal maps

M.R. Sedaghat¹, H. Momeni-Moghaddam², A. Azimi Khorasani³, O. Bagherzadeh¹, M.W Belin⁴, J.S.W. Wolffsohn⁵, H. Hakimi¹, M. Sakhaee¹, M. Pakdel³

¹Eye Research Center, Mashhad University of Medical Sciences, Mashhad, Iran., Mashhad, Iran, Islamic Republic of, ²Rehabilitation Sciences Research Center, Zahedan University of Medical Sciences, Zahedan, Iran, Zahedan, Iran, Islamic Republic of, ³Department of Optometry, School of Paramedical Sciences, Mashhad University of Medical Sciences, Mashhad, Iran, Mashhad, Iran, Islamic Republic of, ⁴University of Arizona, Department of Ophthalmology & Vision Science, Tucson, Arizona, USA., Tucson, United States, ⁵Ophthalmic Research Group, Aston University, Life and Health Sciences, Birmingham, UK, Birmingham, United Kingdom

Introduction: There is still confusion or disagreement in how the cone apex is located or described. These different criteria include the point of maximum curvature on the axial (sagittal), local (tangential), or mean curvature maps, the location of the corneal thinnest point in the pachymetry map, the location of the thinnest epithelial point on the epithelial thickness map, or the point of maximal elevation in the "island of positive elevation" seen on both anterior and posterior elevation maps with a best-fit-sphere (BFS) reference surface.

Objectives: To compare the corneal cone location on different maps and instruments and their agreements with elevation maps.

Methods: In this cross-sectional study, the apex of cone location in 90 left eyes with bilateral keratoconus was determined based on the maximum simulated keratometry (Kmax) location on the anterior sagittal curvature map by Pentacam HR, the maximum curvature on the mean curvature map by ATLAS 9000, most elevated point of the island of positive elevation relative to the best fit sphere on the front and back corneal elevation maps by Pentacam HR, and thinnest point on the thickness map by Pentacam HR and Orbscan, and the thinnest points on pachymetry and epithelial thickness maps by RTVue OCT.

Results: There was a significant difference among the location on different maps along the x- and y-axes ($p < 0.001$). The lowest agreement with the cone apex on both front and back elevation maps was for the anterior sagittal curvature map and the highest agreement for the Pentacam thickness map. The majority of keratoconus cone apexes were displaced in the inferotemporal direction on the different maps except for the epithelial thickness maps.

Conclusions: Despite the variability between different devices and methods; the thickness map on the Pentacam HR showed the highest correlation with the front and back elevation maps, while the RTVue epithelial thickness map showed the poorest correlation. Based on this study, epithelial thickness maps and anterior curvature maps should be utilized with caution to determine the location of the cone.

P-COR-096

Mechanosensation mediates pterygium epithelial cell phenotypes and disease progression

*J. Chung*¹

¹Department of Ophthalmology, Soonchunhyang University Seoul Hospital, Seoul, Korea, Republic of

Introduction: The dynamic ecosystem of the pterygium is orchestrated by multiple cell types, including stem cells with high levels of proliferation, inflammation, angiogenesis, and extensive amount of extracellular matrix (ECM) accumulation. The specific molecular mechanism of pterygium pathogenesis is still unclear.

Objectives: The present study tries to understand the molecular mechanisms underlying pterygium pathogenesis using patient derived epithelial cells by transcriptome analysis.

Methods: We used human pterygial and normal conjunctival epithelial cells, isolated from patients underwent pterygium excision and conjunctival autograft. In addition, the study also analysed the cell adhesion and migration associated signalling pathways which were significantly upregulated in pterygium epithelial cells. Further we elucidated the role of disease-specific mechanosensitivity in disease microenvironment by traction force microscopy (TFM).

Results: The TFM analyses revealed that pterygium cells showed significantly higher levels of mechanosensitivity. Further, matrix stiffness accelerates migration behaviours and fibrosis in pterygial cells through activation of integrins and focal adhesion via connective tissue growth factor, cysteine-rich angiogenic inducer 61, transient receptor potential vanilloid-2, 4.

Conclusions: Understanding of the mechanobiology of the pterygium epithelial cells has the potential to lead to improved tissue engineering and cell based therapies for pterygium. Our findings seems to offer insights into the important roles of cell-matrix interactions in aspect of matrix stiffness in pterygium pathophysiology.

P-COR-097

Changes in central corneal thickness after phacoemulsification surgery in Blue Nile State in Sudan

*M. Mohamed*¹

¹Ophthalmology, Makkah Eye Hospital, Blue Nile State, Sudan

Introduction: Phacoemulsification is one of the most widely used surgery for removal of cataract. However, it damages corneal endothelial cells which lead to corneal edema and increased corneal thickness.

Objectives: To assess the impact of successful phacoemulsification surgery on Central Corneal Thickness one week and one month postoperatively.

Methods: It is an observational, descriptive, cross-sectional study. The study was conducted in Makkah Eye Hospital in blue Nile State in Sudan from August 2022 to January 2023. 365 patients with age ranged 18 years old and above who had uneventful phacoemulsification cataract surgery by the same experienced surgeon. A structured proforma was used to collect data. Patients with corneal degeneration, corneal opacity, corneal dystrophy, traumatic cataract, complicated cataract surgery and patients who have had refractive surgery were excluded. Central corneal thickness and intraocular pressure were measured before cataract extraction by phacoemulsification and repeated 1 week and 1 month postoperatively.

Results: The mean central corneal thickness (CCT) was $512.81 \pm 34.182\mu\text{m}$ preoperatively increased to $529.54 \pm 35.987\mu\text{m}$ 1 week postoperatively and returned to $515.35 \pm 34.387\mu\text{m}$ 1 month postoperatively. There is no statistically significant difference in the mean CCT before surgery and at 1 month (P value = 0.05).

Conclusions: The mean central corneal thickness (CCT) increase substantially 1 week after uneventful phacoemulsification surgery but returns to baseline values at 1 month time. Intraocular pressure during this period may be falsely higher than the true values due to increased CCT.

P-COR-098

Severe corneal flattening after endothelial keratoplasty: collagen compaction syndrome

G. Kontos¹, B. Burgos-Blasco¹, S. Al-Zanki¹, D. Dhaliwal¹, G. Moloney¹

¹Department of Ophthalmology & Visual Sciences, The University of British Columbia, Vancouver, Canada

Introduction: To present a case series of patients with extreme corneal flattening after uneventful endothelial keratoplasty.

Objectives: To provide a possible explanation for not improving visual acuity following successful endothelial keratoplasty, based on corneal topography findings.

Methods: Two clinical cases are presented.

Results: A 61-year-old female with Fuchs' dystrophy and central guttae underwent Descemet Stripping Only (DSO). Preoperative corneal topography was within normal limits. Seven months after surgery, the patient had not responded and presented persistent corneal edema, so a Descemet's membrane endothelial keratoplasty (DMEK) was performed. The corneal edema improved, but the patient did not gain vision due to severe central corneal flattening. A 76-year-old male was referred due to pseudophakic bullous keratopathy with increasing central corneal thickness for the past 14 months. He had previous cataract surgery and several glaucoma surgeries. He underwent a Descemet's stripping automated endothelial keratoplasty (DSAEK), but despite corneal clearance visual acuity did not improve. Corneal topography showed severe inferior corneal flattening.

Conclusions: Chronic corneal edema may result in severe corneal flattening after endothelial keratoplasty.

P-COR-099

Topography-guided photorefractive keratectomy for correction of irregular astigmatism following penetrating keratoplasty

D.T. Lin¹, S.P. Holland¹, N.K. Yang², G. Moloney¹, D.B Chan²

¹Department of Ophthalmology & Visual Sciences, University of British Columbia, Vancouver, Canada,

²University of British Columbia, Vancouver, Canada

Introduction: Penetrating keratoplasty (PKP) may result in high and irregular astigmatism.

Treatment options such as contact lenses may not be well tolerated requiring techniques such as relieving incision and wedge resection. We evaluated the efficacy and safety of Topography-Guided Photorefractive Keratectomy (TG-PRK) to correct irregular astigmatism following PKP.

Objectives: To evaluate the efficacy and safety of TG-PRK as a treatment option for correcting irregular astigmatism following PKP. This study aims to assess postoperative outcomes with goals of determining if TG-PRK can improve visual outcomes and reduce the need for specialty contact lenses or more invasive surgical techniques for managing post-PKP irregular astigmatism.

Methods: Patients who underwent TG-PRK for irregular astigmatism post-PKP with 12 months of follow-up data were evaluated in this retrospective study at a laser refractive clinic total of 185 eyes. Preoperative and postoperative uncorrected distance visual acuity (UDVA), best corrected visual acuity (CDVA), manifest refraction, and topographic cylinder were analysed.

Results: Postoperatively, 61 (33%) eyes had UDVA $\geq 20/40$ at 12 months compared to preoperatively, 3 (1.6%) eyes had a recorded UDVA $\geq 20/40$. More than one-quarter of the patients gained ≥ 2 lines. 10% lost ≥ 2 lines from incomplete treatment, haze, or cataracts. However, no patient subsequently needed specialty contact lenses.

Conclusions: TG-PRK may improve irregular astigmatism postoperatively and improve both UDVA and CDVA with promising efficacy and safety. This may be an alternative to current surgical management for post-PKP irregular astigmatism. Trans-epithelial TG-PRK is a surface procedure that avoids more invasive techniques such as wedge resection and relieving incisions for post-penetrating keratoplasty.

P-COR-100

Clinical characteristics analysis and recurrence risk prediction of Mooren's ulcer

*Y. Zhang*¹

¹Xiamen Eye Center, Affiliated Xiamen University, Xiamen, China

Introduction: Retrospective cohort study.

Objectives: To analyze the clinical characteristics of Mooren's ulcers, explore the factors associated with the recurrence of Mooren's ulcers and construct a preliminary clinical scoring system to provide reference for further understanding of the disease, reducing the recurrence rate and predicting the risk of recurrence.

Methods: Patients with Mooren's ulcers who were hospitalized at Affiliated Xiamen Eye Center of Xiamen University from January 2010 to December 2020 were included. The patients' age, sex, laterality of eye, ulcer location, ulcer extent, ulcer depth, perforation, history of ocular surgery or trauma, treatment method and recurrence were recorded. To summarize the clinical characteristics of the disease and to analyze the differences between patients who did not relapse and those who relapsed. data across components. Factors associated with recurrence were screened by correlation analysis, and a clinical scoring system was initially developed by assigning values based on the magnitude of the correlation.

Results: A total of 87 patients (98 eyes) with Mooren's ulcer were included in this study, with a mean age of 55.5 ± 16.2 years; the male to female ratio was 1:0.74. The ulcers were prevalent at the nasal corneal margin (69 eyes, 70.4%); 22 eyes had corneal perforation. Recurrence rate of 33.7%. Keratoplasty was the main treatment modality for Mooren's ulcer. The factors associated with the recurrence of Mooren's ulcers were nasal corneal margin involvement or not ($P < 0.01$, $R = 0.273$), ulcer depth ($P < 0.05$, $R = 0.252$), corneal perforation status ($P < 0.05$, $R = 0.238$) history of ocular surgery or trauma $P < 0.05$, $R = -0.238$) and ulcer extent ($P < 0.1$, $R = 0.171$). Construct a clinical scoring system, the mean of the scores was (4.5 ± 2.1) for the non-recurrence group and (6.2 ± 1.9) for the recurrence group, with a significant difference between the two groups ($P < 0.001$). This clinical score had a significant effect on recurrence (OR=1.521, 95% CI 1.202-1.925, $P < 0.001$).

Conclusions: Mooren's ulcers are most commonly seen in elderly men, preferably at the nasal corneal limbus, and often with monocular onset. The recurrence rate after treatment is 33.7%. Nasal corneal involvement, deep ulcer infiltration, corneal perforation, and extensive ulcer involvement may be risk factors for recurrence of Mooren's ulcer. The scoring system developed based on the above clinical characteristics can predict the risk of recurrence and is easy to apply clinically.

P-COR-101

Long-term effect of ultrasound biomicroscopy classification on the prognosis of pediatric penetrating keratoplasty

Z. Xie^{1,2}, T. Yu^{1,2}, X. Wang^{1,2}, J. Hong^{1,2}

¹Department of Ophthalmology, Peking University Third Hospital, Beijing, China, ²Beijing Key Laboratory of Restoration of Damaged Ocular Nerve, Peking University Third Hospital, Beijing, China

Introduction: Deprivation amblyopia caused by congenital corneal opacities (CCO) can lead to lifelong blindness. Penetrating keratoplasty (PKP) is the only option for eyes with severe CCOs. Compared to those in adults, pediatric PKP are more difficult to perform and lead to poorer prognosis. However, there are limited studies on the preoperative structural risk factors of poor prognosis in CCOs as yet.

Objectives: To identify the structural risk factors of poor surgical prognosis in CCO.

Methods: Sixty eyes with Peters anomaly and Sclerocornea underwent preoperative ultrasound biomicroscopy (UBM) examination and primary PKP from 2018 to 2021 were included in the study. All patients were under 13 year-old at surgery. The follow-up period was more than 24 months, and graft survival and complications were recorded. Eyes were divided into 4 classifications based on morphological features of iridocorneal synechiae, iris and lens shown in UBM records according to our previous study. The classification results were analyzed with surgical prognosis.

Results: Graft failure occurred in 23 eyes. The most common complications were epithelial defect (n=17), rejection (n=13), and postoperative glaucoma (n=11). Eyes with severer UBM classifications were more likely to have graft failure (P=0.040), epithelial defect (P=0.043), and postoperative glaucoma (P=0.022), but not rejection (P= 0.626).

Conclusions: We propose a classification of CCO eyes based on preoperative UBM observations, which is of great significance for the long-term prognosis of pediatric PKP. For eyes with CCO considered for surgical treatment, a detailed preoperative examination of intraocular structures should be performed.

P-COR-102

The PK/PD study of voriconazole eye drops with different dosing frequencies in rabbits

X. Zhao¹, X. Wang¹, X. Shen¹, Q. Yang¹

¹Shenyang Xingqi Pharmaceutical Co. Ltd, Shenyang, China

Introduction: A new generation of broad-spectrum antifungal voriconazole was topically used in ocular fungal infection.

Objectives: To compare the ocular pharmacokinetics of 1.0% voriconazole eye drops in infectious rabbit corneas with different dosing frequencies. The effect of voriconazole eye drops was evaluated by PK/pharmacodynamic (PD) to provide data support for clinical application.

Methods: 162 rabbits with corneal *Candida* infection were randomly divided into three groups. For the group 1, a 50 µl of 1.0% voriconazole eye drop was instilled into the infectious eyes with the dosing of four times per day (Q4T) for consecutive four days. The animals were divided evenly into nine subgroups. In each subgroup, corneas were collected at 0,0.167,0.5,1,2,4,8,12,24 h after the first dosing on consecutive 5th day. For the group 2 and group 3, the same drug was instilled into the infectious eyes eight times per day (Q8T) or twelve times (Q12T) per day for consecutive four days, respectively. The animals were divided evenly into nine subgroups, and specimens in each subgroup were procured the same way as the Q4T group. The concentration of voriconazole was measuring in rabbit corneas by a validated LC-MS/MS method. Combined with the minimum inhibitory concentration (MIC) of voriconazole on *Candida* in vitro, PK/PD was calculated by AUC_{0-24h}/MIC .

Results: After topical instillation, voriconazole reached the highest concentration in infectious corneas at 0.167h and its distribution was ranked in order from the highest to the lowest as follows: Q12T > Q8T > Q4T. The area under the concentration-time curve (AUC_{0-24h}) of Q12T, Q8T, Q4T groups were 37.2, 21.8, 15.8 µg·h/g. There were the same trend among the minimal concentrations on consecutive 5th days. The inhibitory concentration of voriconazole was 0.0325µg/mL against *Candida* in vitro. Using historic data as references, the AUC_{0-24h}/MIC values were 1144,671 and 486 (higher than 25).

Conclusions: All of the frequency (Q12T, Q8T, Q4T) could meet the PK/PD requirements of effective antimicrobial activity. The higher distribution and slower elimination with higher dosing frequency indicated increasing the frequency of administration may be a much more efficient way to treat severe corneal infections.

P-COR-103

Antibiotic resistance found in ocular isolates: results from the ARMOR study

*P. Asbell*¹

¹University of Memphis, Memphis, United States

Introduction: Eye infections cannot wait- especially if they involve the cornea or intraocular tissues. Key is starting treatment immediately, but the hurdle is how to pick the best antibiotic, if likely a bacterial infection. Surveillance data gives us a head start as we wait for lab results. The ARMOR surveillance study of ocular isolates began in 2009 and has provided yearly information on antibiotic resistance and MICs on ocular isolates from the USA. ARMOR has shown us that antibiotic resistance is not just for systemic diseases and/or hospital patients but hits eye infections too. Understanding the ARMOR data can help clinicians navigate treatment of eye infections.

Objectives: To examine antibiotic resistance among ocular isolates, including presumed endophthalmitis isolates, collected in the Antibiotic Resistance Monitoring in Ocular microorganisms (ARMOR) surveillance study (2009- 2022).

Methods: From 2009 through 2022 participating sites (41) in the USA submitted ocular isolates (all specimens) (8482), including from the aqueous humor (AqH; n=96) and vitreous humor (ViH; n=274). Minimum inhibitory concentrations were determined, and antibiotic resistance was interpreted per CLSI methods and breakpoints.

Results: Ocular isolates: Of coagulase-negative staphylococci (CoNS) and *Staphylococcus aureus*, respectively, 44% and 34% were methicillin-resistant, and 77% and 76% were multidrug-resistant (≥ 3 drug classes). Trend since 2009 shows decreasing methicillin resistance but still high in 2022 (50 to 38 % for CoNS) and (42 to 25% for Staph. aureus). *Streptococcus pneumoniae* showed high resistance to azithromycin (38%).

Aqueous and vitreous humor isolates: Of coagulase-negative staphylococci and *Staphylococcus aureus*, respectively, 41% and 45% were methicillin-resistant, and 40% and 41% were multidrug-resistant (≥ 3 drug classes). Among *Streptococcus pneumoniae*, resistance to azithromycin and penicillin (each 39%) was observed. *Pseudomonas aeruginosa* and *Haemophilus influenzae* exhibited little/no resistance to tested drugs.

Conclusions: Antibiotic resistance data for ocular pathogens collected over 14 years in the ARMOR surveillance study show high levels of methicillin and multidrug resistance among staphylococci isolated from eye and specifically from the aqueous and vitreous humor. Antibiotic-resistant pathogens can complicate prophylaxis and/or treatment of ocular infections and impact outcomes. ARMOR data can help inform antibiotic selection for prophylaxis and/or treatment of eye infections.

P-COR-105

Development of corneal color imaging application for autorefractometer

Y. Ueno¹, D. Santo², M. Nakajima², H. Maehara³, Y. Ito¹, T. Oshika¹

¹Department of Ophthalmology, University of Tsukuba, Tsukuba, Ibaraki, Japan, ²Tomey Corporation, Nagoya, Aichi, Japan, ³Fukushima Medical University, Fukushima, Fukushima, Japan

Introduction: We developed a new application for color imaging of the cornea using autorefractometer (MR-6000, Tomey Corporation).

Objectives: To evaluate the images taken with a newly developed color imaging application mounted on MR-6000.

Methods: A total of 50 eyes consisting of 9 categories of normal and 8 anterior segment diseases with abnormal findings in the corneal area (infectious corneal infiltration, non-infectious corneal infiltration, corneal scar, corneal deposit, bullous keratopathy, neoplastic lesion, lens opacity, and acute glaucoma attack) were included in this study. Anterior segment color images were taken using both the new software on the MR-6000 and a slit lamp microscope with diffuser, and then classified into normal cornea or abnormal cornea by 5 ophthalmologists. We compared the classification accuracy of the two models.

Results: Color photographs taken with the MR-6000 provided clear findings of the cornea, conjunctiva, and anterior chamber, with disease detection sensitivity of 85.0-90.0% and specificity of 93.3-100.0%. The correct classification rate was $93.2 \pm 1.1\%$ for images taken with MR-6000 and $93.6 \pm 3.0\%$ for images taken with a slit lamp microscope, with no significant difference between the two groups ($P > 0.05$).

Conclusions: A new corneal color imaging application has been added to the autorefractometer MR-6000. The accuracy of depicting corneal abnormalities was almost the same as that of slit lamp microscope, and it was shown to function satisfactorily as a screening tool for corneal abnormality.

P-COR-106

MICE procedure: a promising strategy to prepare patients with corneal neovascularization for corneal transplant surgery

A. Hovakimyan¹, A. Kirakosyan¹, M. Ghazaryan¹, A. Grigoryan¹

¹Cornea- Uveitis Department, S. Malayan Eye Center, Yerevan, Armenia

Introduction: Corneal neovascularization poses a significant challenge in corneal transplant surgery, often leading to graft rejection and compromised visual outcomes. Mitomycin intravascular chemoembolization (MICE) has emerged as a potential strategy to prepare such patients for successful transplantation. This study aims to evaluate the efficacy of the MICE procedure in patients with corneal neovascularization requiring corneal transplant surgery for visual improvement.

Objectives: The primary objective of this study is to assess the effectiveness of the MICE procedure in achieving vessel sclerosis and stabilizing corneal neovascularization. Secondary objectives include evaluating visual outcomes following corneal transplant surgery post-MICE and identifying any adverse events associated with the procedure.

Methods: In the period of 2022-2024 10 patients (10 eyes) underwent MICE procedure at S. Malayan's Eye Center in Yerevan, Armenia. Out of these ten patients 6 had lipid keratopathy and 3 had corneal neovascularization due to previous herpetic keratitis that was quiescent for more than 3 years and one patient had history of pneumococcal ulcer 4 years prior. Three months later patients with history of herpetic keratitis and pneumococcal ulcer underwent penetrating keratoplasty for visual improvement. These 4 patients had visual acuity of hand motion in front of the face. One of them got autotransplantation surgery from one eye, which had zero visual acuity but clear cornea to the other eye with possible visual potential but scarred cornea.

Results: Successful chemoembolization was achieved in all ten cases, leading to vessel sclerosis. The mean follow-up period for corneal transplant patients was 12.75 months, during which transplants remained clear and chemoembolized vessels remained stable. Three patients showed improved visual acuity to 20/100-20/80 with a best-corrected visual acuity (BCVA) of 20/30. In the autotransplantation case, visual acuity improved to 20/500 due to optic nerve atrophy visible after the surgery, possibly attributed to a history of stroke over ten years ago.

Conclusions: The findings suggest that the MICE procedure is a promising novel approach for patients with corneal neovascularization seeking corneal transplant surgery for visual recovery in quiet eyes for more than three years with at least 3 months apart from MICE procedure. Further studies are warranted to refine timing protocols and patient selection criteria.

P-COR-107

Comparison of corneal epithelial thickness between normal and keratoconus eyes

G. Kiuchi¹, T. Hiraoka¹, H. Arai², T. Oshika¹

¹University of Tsukuba, Tsukuba, Japan, ²Queen's Eye Clinic, Yokohama, Japan

Introduction: Forme fruste keratoconus (FFK) can be defined as a cornea that has no abnormal findings by both slit-lamp examinations and Placido-based corneal topography, with the fellow eye of clinical keratoconus (KC). Despite the absence of clinical or topographic abnormalities on the anterior surface of the cornea in FFK eyes, there is a need to differentiate FFK from normal eyes for early-stage diagnosis of KC. Anterior segment optical coherence tomography (AS-OCT) is capable of providing cross-sectional images and detecting the corneal epithelium layer. While corneal thinning with the progression of KC is well-established, there are few reports addressing changes in epithelium thickness.

Objectives: This study aimed to compare the distribution of corneal epithelial thickness (CET) in normal, FFK, and KC eyes.

Methods: A total of 332 eyes of 163 normal subjects (44.3±16.8 years, mean±SD), 34 eyes of 34 FFK subjects (35.5±13.7 years), and 47 eyes of 32 KC subjects (43.0±16.9 years) were included. Any type of contact lens user was excluded. CET was measured using AS-OCT (CASIA2: Tomey Corporation, Japan). The average CET of the corneal center within 2mm radius and eight peripheral areas (superior, superonasal, nasal, inferonasal, inferior, inferotemporal, temporal, and superotemporal of 2 to 5 mm radius) were compared.

Results: Minimum corneal thickness is significantly smaller in the KC group ($p<0.001$), while there was no significant difference between the normal and FFK groups ($p=0.855$).

In normal eyes, CET was the largest in inferior (55.9±3.85 μm) and the smallest in center (54.3±4.10 μm). CET of inferior area was significantly larger than all other areas.

In FFK eyes, CET was the largest in inferonasal (55.5±3.08 μm) and the smallest in center (54.5±3.35 μm). There were no significant differences between inferonasal and other areas.

In KC eyes, CET was the largest in superonasal (53.8±4.21 μm) and the smallest in inferotemporal (51.8±3.91 μm). CET of superonasal area was significantly larger than all other areas except superonasal and nasal areas. CET of superonasal area was significantly larger in KC eyes compared to normal eyes ($p=0.016$), while that of inferior, inferotemporal and temporal areas was significantly smaller (both $p<0.001$).

Conclusions: In normal eyes, CET is the largest in inferior area, however, this tendency is absent in FFK and KC eyes. Conversely, CTE of inferior area becomes smaller in KC eyes. This study suggested that the distribution of CET changes with the progression of KC.

P-COR-108

The association between tear-fluid alpha-lymphotoxin and the conjunctival microenvironment in dry eye

Y. Yun¹

¹Eye Department, Eye & ENT Hospital of Fudan University, Shanghai, China

Introduction: Explore the clinical utilities of tear test of lymphotoxin-alpha (LTA) in assessment of patients with dry eye disease (DED) and its association with DED severity, in particular in the conjunctiva and ocular surface microenvironment.

Objectives: 75 patients with DED

Methods: Clinical exams included: OSDI questionnaire, alpha-lymphotoxin (LTA) concentration of tear fluid, tear break-up time (BUT), corneal fluorescein staining (CFS), conjunctival lissamine green staining (CLGS), conjunctival impression cytology (IC), Schirmer's test (SS) were conducted at baseline and one month treatment after Diquafosole.

Results: Strong correlation was observed between tear LTA concentration with CLGS scores ($R = -0.716$, $p < 0.001$), with IC Nelson's grades ($R = -0.571$, $p < 0.001$); Good positive correlation with conjunctival goblet cell counts ($R = 0.520$, $p < 0.001$), and positive correlation with TBUT ($R = 0.387$, $p < 0.001$). DED patients were divided into two groups: mild and severe based on conjunctival impression cytology level. Differences in LTA concentrations were observed between the groups. With ROC curve analysis, the threshold LTA concentration for distinguishing two groups of DED: 0.11 ng/mL ($LTA \geq 0.11$ for mild group and $LTA < 0.11$ for the severe). LTA levels ≥ 0.11 ng/mL group had significantly lower degrees of conjunctival staining (1.69 ± 0.93), significantly higher level of conjunctival goblet cell counts (147.80 ± 123.26) and TBUT (5.00 ± 1.81) than those in the LTA < 0.11 group (3.40 ± 1.21 , $P < 0.001$; 53.63 ± 50.63 , $P < 0.001$; 3.80 ± 2.09 , $P = 0.01$). After treatment, LTA < 0.11 group showed a superior therapeutic response.

Conclusions: The concentration of tear-fluid LTA was highly correlated with severity in conjunctival pathology. Patients with lower LTA concentrations exhibited more severity in conjunctiva. Tear-fluid LTA concentration indicates the conjunctival microenvironment in dry eye patients. Tear fluid LTA concentration detection presents a non-invasive technique to evaluate the conjunctival microenvironment in patients with DED.

P-COR-109

Effects of a novel TRPV1 antagonist, SJP-0132, on ocular surface dysfunctions in scopolamine-induced dry eye rat model

Y. Atsumi¹, S. Kobayashi¹, T. Wada¹, A. Kanda¹

¹Research & Development Division, Senju Pharmaceutical Co.,Ltd., Chuo-Ku, Kobe, Hyogo, Japan

Introduction: Dry eye disease (DED) is a multifactorial disease associated with tear film instability, inflammation, and neurosensory abnormalities. Transient receptor potential cation channel subfamily V member 1 (TRPV1), an ion channel receptor responsive to various stimuli including hyperosmolarity, is distributed in sensory nerves and corneal epithelial cells and plays a potential role in inflammation and pain.

Objectives: The objective of this study was to investigate the effect of SJP-0132, a novel TRPV1 antagonist, on ocular surface dysfunctions in scopolamine-induced dry eye rat model.

Methods: DED was induced in 8-week-old male Sprague Dawley rats by continuous systemic administration of scopolamine via osmotic pumps implanted subcutaneously. Starting from day 8 of scopolamine infusion, the rats received ocular instillation of SJP-0132 ophthalmic suspension 4 times daily for 14 days, and the improvement effect on corneal epithelial damage (fluorescein staining) was evaluated. To measure the blinking count, DED rats kept in a low-humidity environment were used.

Results: The signs similar to those of DED in humans were induced in DED rats as indicated by reduced tear volume and increased superficial punctate keratitis (SPK) score as compared with sham rats. Treatment with 0.3% SJP-0132 significantly ameliorated SPK score in DED eyes as compared with the vehicle control. SPK score improved earlier than the rebamipide group (active control). A single instillation of SJP-0132 significantly reduced the increase of blinking count in a dose-dependent manner in the concentration range from 0.1% to 1.0%, and the improvement with 1.0% SJP-0132 persisted for 4 hours. Application of 0.3% SJP-0132 to DED rats did not change corneal sensory function determined by using the Cochet & Bonnet aesthesiometer.

Conclusions: These results indicate that SJP-0132 ameliorated objective signs and subjective symptoms of DED without impacting normal corneal sensation. Our findings demonstrate the potential usefulness of SJP-0132 as a promising therapeutic agent for DED.

P-COR-110

The diagnostic role of fungal β -D glucose in corneal scraping and tears in fungal keratitis

*S. Sun*¹

¹Eye, Henan Eye Institute, The People's Hospital of Henan Province, Zhengzhou City, China

Introduction: Corneal disease is a major cause of blindness. Infectious keratitis is the leading cause of corneal blindness. The medicine of viral keratitis, bacterial keratitis, and fungal keratitis are different. Bacterial keratitis and fungal keratitis mostly occur in rural areas, the medical conditions are relatively poor. A simple, accurate and sensitive diagnostic method that can be operated by general practitioners is particularly important. Fungal β -D glucose, as a component of fungal cell wall, can be used to diagnose fungal infections of the lungs, brain, urinary system by detecting the fungal β -D glucose in serum, alveolar lavage, cerebrospinal fluid and urethral irrigation fluid.

Objectives: In order to know the diagnostic role of fungal β -D glucose in fungal keratitis, We tested fungal β -D glucose in corneal scraping and tears in outpatients from November 2023 to January 2024.

Methods: Tear specimens were from 34 patients with fungal keratitis, 12 cases with bacterial keratitis, 7 cases with viral keratitis, 6 cases with corneal dystrophy, 2 cases with corneal chemical injury, 4 cases with blepharitis, 3 cases with allergic conjunctivitis, and 2 cases of no ocular abnormality. The samples of corneal ulcer scraping were from 22 cases with fungal keratitis, 1 case with chemical injury, 4 cases with corneal dystrophy, 10 cases with viral keratitis, and 8 cases with bacterial keratitis. The fungal (1-3)- β -D glucose test kit was used to detect the fungal β -D glucose in tear and corneal scraping. The detection was operated according to the instructions.

Results: The fungal β -D glucose in tear of the patients with fungal keratitis was 541.438 ± 143.73 pg/ml. The fungal β -D glucose in tear of the patients with the other diseases was 519.323 ± 222.11 pg/ml. There is no significant difference of fungal β -D glucose in tear between fungal keratitis and the other diseases ($p > 0.05$). The fungal β -D glucose in corneal scraping of the patients with fungal keratitis was 416.73 ± 220.73 pg/ml. The fungal β -D glucose in corneal scraping of the patients with the other keratitis was 166.24 ± 178.25 pg/ml. There is significant difference of fungal β -D glucose in corneal between fungal keratitis and the other diseases ($p < 0.01$).

Conclusions: The detection of fungal β -D glucose in corneal scraping of the patients with infectious keratitis may be a diagnostic means of fungal keratitis, but the threshold should be studied furtherly.

P-COR-111

Corneal collagen cross-linking combined with lamellar keratoplasty in the treatment of Acanthamoeba Keratitis

T. Wang¹, T. Lin¹, F. Li¹, X. Zhong¹, N. Ning¹, X. Ku¹, S. Li¹, W. Shi¹

¹Eye Institute of Shandong First Medical University, Eye Hospital of Shandong First Medical University (Shandong Eye Hospital), Jinan, China

Introduction: Acanthamoeba Keratitis (AK) is a relatively rare class of potentially blinding infections in ophthalmology, and its diagnosis and treatment are extremely challenging. Currently, there are very limited anti-amoebic drugs, which are cellular and tissue disinfectants by nature, with significant cytotoxicity leading to a lack of official access in most regions.

Objectives: Comparison of the clinical efficacy of corneal collagen cross-linking technique combined with lamellar keratoplasty versus lamellar keratoplasty alone for the treatment of Acanthamoeba Keratitis.

Methods: Methods: on the basis of the same anti-amoebic drug treatment, 10 cases (10 eyes) were first treated with corneal cross-linking to inhibit the spread of the lesion, and later underwent lamellar keratoplasty according to the development of the disease, 18 cases (18 eyes) were treated with lamellar keratoplasty only. Main outcome measures: the lesion characteristics, clinical efficacy, postoperative complications and recurrence of corneal ulcer between the two groups were recorded. For corneal histopathology, the cysts and inflammation of Acanthamoeba were analyzed after corneal collagen cross-linking treatment.

Results: The mean corneal ulcer size was 7.53 ± 0.63 mm and the infiltration depth was 281 ± 150.55 μ m in the combination treatment group, while the size was 7.67 ± 1.40 mm ($P=0.717$) and the depth was 257.06 ± 94.46 μ m ($P=0.656$) in the monotherapy group. 24-48 hours after cross-linking, the ocular pain was significantly improved ($P=0.046$). The results showed that after cross-linking, the structure of corneal stroma was dense, the volume of amoeba cyst became smaller, the cavity-like change and the number of inflammatory cells decreased. During the postoperative follow-up, there was no recurrence of Acanthamoeba Keratitis in the combined treatment group, and 7 cases in the monotherapy group (38.39%) relapsed ($P=0.03$). Duration of treatment with anti-amoebic drugs: the mean of 100.80 ± 56.79 days in the combined treatment group was significantly less than the monotherapy group, which was 142.11 ± 55.00 days ($P=0.04$).

Conclusions: Cross-linking combined with lamellar keratoplasty is helpful for the corneal stroma structure to become denser and the corneal focus boundary to become clear, which is conducive to the complete removal of the focus during lamellar keratoplasty, effectively reduce the recurrence rate of Acanthamoeba Keratitis after lamellar keratoplasty and shorten the time of anti-amoeba treatment.

P-COR-112

Evaluation of ocular higher-order aberrations in first-degree relatives of patients with keratoconus

A. Eslampoor¹, S. Zarei Ghanavati¹

¹Ophthalmology, Mashhad University of Medical Sciences, Mashhad, Iran, Islamic Republic of

Introduction: Recent studies have highlighted the significance of genetic predisposition in development of keratoconus, suggesting that first-degree relatives of patients with keratoconus are at a higher risk of developing the condition. However, the early detection and quantification of keratoconus-related changes in unaffected relatives remain challenging.

HOAs are complex refractive errors that conventional spectacles or contact lenses cannot correct, affecting the quality of vision significantly. By assessing these aberrations, we seek to identify subtle corneal irregularities that may precede the clinical manifestation of keratoconus

Objectives: The aim of this study was to evaluate the corneal higher-order aberrations (HOAs) in first-degree relatives of patients with keratoconus (KCN) and compare with the normal population.

Methods: In this prospective comparative study, 210 eyes from 105 family members of 28 patients with KCN and 210 normal eyes of 105 controls were enrolled. In each eye, corneal topography, tomography, and aberrometry were performed and compared between the 2 groups

Results: This study included 61 female (58.1%) and 44 male participants (41.9%) and 105 age-matched and sex-matched controls with normal topographic cornea. In 14 of 105 first-degree relatives (13.33%) of patients with KCN, KCN was diagnosed with a male preponderance (71.5% male, 28.5% female). Tomographic indices and irregularity indices in 3 and 5 mm zone in Orbscan were significantly higher in the relative group. In addition, other irregularity indices of TMS-4 topography including surface regularity index, surface asymmetry index, difference sector index, SDP, and irregular astigmatism index were significantly higher in family members of patients with KCN. The most prevalent topographic pattern in the control group was the symmetric bowtie (57.1%) and in the relative group was the asymmetric bowtie (39.5%). In addition, significantly thinnest corneal pachymetry was detected in the relative group. Root mean square of all HOAs including vertical trefoil, vertical coma, horizontal coma, horizontal trefoil, quadrifoil, and fourth-order spherical aberrations were significantly greater in the relative group than controls.

Conclusions: Owing to the high prevalence of undiagnosed KCN susceptibility in family members with KCN, keratorefractive surgery should be considered cautiously in these individuals. In addition, comprehensive preoperative examination should be considered to detect subtle topographic and HOAs in these individuals.

P-COR-114

Results of a new technique for combined minimally invasive surgery of primary pterygium

F. Shivaza¹, N. Turgunbaev², N. Imakeev¹

¹Department of Microsurgery of Eye 2, National Hospital of the Ministry of Public Health of the Kyrgyz Republic, Bishkek, Kyrgyzstan, ²Department of Ophthalmology named after. M. A. Medvedev, Kyrgyz - Russian Slavic University named after B. N. Yeltsin, Bishkek, Kyrgyzstan

Introduction: Pterygium is one of the most common eye diseases in countries with hot climates; in the Kyrgyz Republic its prevalence rate is 5-6%.

Objectives: To determine the effectiveness of using the new combined minimally invasive surgery for pterygium using 5-Fluorouracil.

Methods: We operated on 64 patients (64 eyes) of both genders. Average age: 32 years. Before surgery, corrected visual acuity was 1.0 in all patients. Standard ophthalmological examinations were carried out for all patients. Pterygia whose growth reached 1-2 mm from the limbus were considered indications for surgery. The surgical technique was almost standard, used for free autoconjunctivoplasty. The differences were as follows.

1. When preparing an autograft in the upper outer segment, anesthetic S. Lidocaine 0.1 ml + 5-Fluorouracil 0.1 ml is injected directly under the conjunctiva, then a conjunctival flap is isolated and transferred to the surgical field.

2. Dimensions of the conjunctival autograft (3.0 × 3.0: 4.0 × 4.0 mm) that is smaller than with the standard technique (5.0 × 5.0: 6.0 × 6.0 mm).

3. Resection of subconjunctival tissue after removal of the head and body of the pterygium was not performed, since there was no such tissue in our material for initial pterygia.

During the operation, subconjunctival hemorrhage was noted in 4 eyes (6.25%), there were no other intraoperative complications. We did not note any complications in the postoperative period.

Results: In the postoperative period, combined drops and ointment (antibiotic + corticosteroid), as well as artificial tear preparations, were prescribed. Observation periods range from 6 months to 2 years. During the observation period, the patients did not complain, the cosmetic result was almost absolute in 62 eyes (96.8%). There was no relapse observed in any case. In no case were there any residual opacities, and the cosmetic result of the operation in all cases was assessed as good to excellent.

Conclusions: Thus, from the analysis of our clinical material, albeit with a short period of observation (up to 2 years), it follows that the new combined technique of minimally invasive surgery for initial forms of pterygium is highly effective (100%), a safe procedure that allows to achieve an excellent cosmetic effect and high patient satisfaction with treatment results.

P-COR-115

Effect of astigmatic refractive error on recognizability of optotypes on ETDRS testing

K. Iqbal¹, J. Han¹, M. Panjwani¹, M. Belin¹

¹Ophthalmology, University of Arizona, Tucson, United States

Introduction: The Early Treatment of Diabetic Retinopathy Study (ETDRS) chart is the standard for vision testing in clinical trials. It was developed in 1979 for retinopathy trials for standardized reproducible testing, but has also been used in anterior segment trials. The ETDRS chart was developed to address the limitations of the Snellen chart: variable letters per line, lack of standardized progression between lines, and lack of uniform distance between letters and lines. It is not known, however, whether astigmatism impacts the legibility of individual optotypes, and whether astigmatic refractive error affects testing reliability.

Objectives: To determine the effect of astigmatism on the legibility of ETDRS optotypes.

Methods: In a certified exam lane, iPhone 12 Pro Max[®] photos were taken of three ETDRS charts (illuminance 160 cd/m²) at a 65 cm distance with +4 cylinder trial lenses at 45, 90, and 180° (each with an overlying -2 sphere to maintain spherical equivalence); photos were also taken with a +2 sphere as controls. LogMAR visual acuity lines 0.0 to -0.3 (20/20 to 20/10) were read by 12 healthy volunteers with their full correction on a MacBook[®] at 24 cm. For each of the 10 Sloan letters, letters missed were tallied for all charts with +4 cylinder at all three axes.

Results: Participants identified all letters correctly with the control Rx. For +4 cylinder charts, letters missed were categorized into two groups – letters represented predominantly by curves (C, D, O, S) and letters represented by lines (H, K, N, R, V, Z); each subject read 180 total letters. Using logistic regression analysis with a generalized mixed model (to account for each participant performing multiple tests), we found that the odds ratio (OR) of missing curved (59%) versus lined (34%) letters was 2.9 [2.4-3.4] (95%, $p < 0.0001$); data was also analyzed by axis and was found not to be an effect modifier. Furthermore, the OR of missing the letter most frequently missed (C, 70%) to the letter least frequently missed (N, 20%) was 9.9 [6.4-15.5] (95%, $p < 0.0001$).

Conclusions: In ETDRS testing with high astigmatism, the odds of missing curved letters was significantly higher than lined letters. From this data, curved letters may be less legible than lined letters in high astigmats. Further studies need to be done to verify this observation, and if it holds true, then modifications to the ETDRS chart may be necessary to assure that each letter is equally legible in clinical trials involving patients with high astigmatism.

P-COR-116

Topography-guided photorefractive keratectomy for irregular astigmatism after radial keratotomy using a high-speed laser

N.K. Yang¹, S.P. Holland², D.T. Lin², G. Moloney², D.B. Chan¹

¹University of British Columbia, Vancouver, Canada, ²Department of Ophthalmology & Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: To evaluate Topography-guided Photorefractive Keratectomy (TG-PRK) for irregular astigmatism after Radial Keratotomy (RK) with Schwind Amaris 1050 (SA).

Objectives: The study aims to assess the efficacy and safety of Topography-guided photorefractive keratectomy (TG-PRK) for correcting irregular astigmatism following radial keratotomy (RK).

Methods: 87 eyes treated with Schwind Amaris 1050 excimer laser with CXL with Athens protocol. Preoperative and postoperative uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), manifest refraction, and topographic cylinder were analysed after 12 months of follow-up.

Results: 22 eyes (25%) showed UDVA $\geq 20/40$ postoperatively. 62 eyes (71%) had improved CDVA, 9 (10%) had gained ≥ 2 lines, while 1 (1%) lost 2 or more lines. Mean astigmatism was reduced from $-2.44 \pm 1.89D$ to $-0.98 \pm 0.85D$. The mean spherical equivalent improved from $2.03 \pm 2.32D$ to $-0.51 \pm 1.84D$.

Conclusions: Early results of TG-PRK CXL with SA show efficacy and safety in treating post-RK irregular astigmatism. The technique may be an alternative treatment for post-RK patients who have been unsuccessful with other methods of vision correction such as specialty contact lenses.

P-COR-116

A case report of keratopathy in a patient with HIV

Y. Li¹, J. Liu¹

¹Ophthalmology, Changzhi City People's Hospital, Changzhi, China

Introduction: People with HIV have a number of ocular lesions, including potential microvascular lesions, opportunistic infections, and autoimmune reactions. We report a case of keratopathy in an HIV-infected patient with dry eye.

Objectives: A 37-year-old man infected with HIV and on highly active antiretroviral therapy (HAART) for 5 years presented to the ophthalmology department 5 months ago with discomfort and dryness in his right eye. Previous: The patient received intermittent HAART therapy and had a history of binocular pigmenitis and retinitis 2 years ago, with significant visual acuity decline.

Methods: Eye examination: visual acuity: right eye 0.2, left eye 0.02, optometry: right eye - 7.00DC*175, left eye -2.00DS, intraocular pressure: right eye 12mmHg, left eye 13mmHg, slight congestion at both eyelid margins, partial obstruction of meibomian gland opening, and thick blepharon ester; Right eye Cornea elliptic white spot, smooth surface, clear boundary, left eye cornea clear; The corneas of both eyes were kp+, the aqueous humor was clear, the anterior capsula of the lens was pigmented, the vitreous body was clear, and the old pigmented scar-like changes were observed in the posterior pole of the fundus. Fluorescein sodium staining : spot-like staining can be seen in the non-white spot area of the right eye, and no staining can be seen in the left eye; Confocal microscopy : scarring hyperreflectance in the stromal layer of the cornea of the right eye.

Results: Diagnosis: right dry eye, right corneal leukoplakia, old uveitis of both eyes. Treatment: After 1 month of treatment with preservative-free artificial tears in the right eye, drugs to promote corneal epithelial repair, and low-concentration glucocorticoid eye drops, the patient's symptoms were alleviated, corneal fluorescein sodium staining was negative, and there was no significant change in corneal leukoplasm.

Conclusions: The corneal leukoplakia of the patient's right eye may be caused by the deposition of immune complex between HIV virus and autoantigen, which leads to the activation of complement, aggregation of inflammatory cells, release of matrix metalloproteinases (MMP), leading to aseptic corneal ulcers, and the remaining corneal leukoplakia after the ulcers repair themselves. At present, the epithelium is smooth, the boundary is clear, and it is an inactive lesion. Symptomatic treatment can be given to dry eyes, and there is no special treatment for corneal leukoplakia.

P-COR-117

The application of the modern formula eye drops in lipid deficiency dry eye disease – one site observations

E. Mrukwa-Kominek^{1,2}, M. Bogocz^{1,2}, S. Wagner²

¹Dept of Ophthalmology, Silesian University of Medicine in Katowice, Katowice, Poland, ²Dept of Ophthalmology, Prof. K. Gibinski University Clinical Center, Katowice, Poland

Introduction: Dry Eye Disease (DED) is a multifactorial disease of the ocular surface with a significant negative impact on vision and QoL

Objectives: Assessment of the effectiveness of the lipid eye drops for treatment of evaporative dry eye in patients with the dry eye disease and deficiency of the lipid phase. Indication of the benefits resulting from using these eye drops to protect the ocular surface, control tears evaporation and provide long lasting relief of dry eye symptoms

Methods: Ten patients (20 eyes) aged 38 to 72 (mean age 53.23) with the dry eye syndrome and deficiency of the lipid phase were enrolled into the study. The eye drops Thealipid (Thea, France) were administered 3 times per day for 30 days. The assessment of the eye drops effectiveness was based on: (1) alterations of the tear film stability (Schirmer test, break-up-time BUT, corneal staining, changes in anterior surface of the cornea), (2) subjective symptoms, (3) intensity of discomfort, (4) quality of life, and (5) changes in the structure of the cornea verified in a confocal microscope.

Results: There was no statistically significant changes in visual acuity and intraocular pressure. Mean OSDI was 52 and 26.07 before and after therapy, respectively, showing statistically significant reduction. Corneal topography changes in K1 and K2 was significant ($p < 0.05$). Mean Schirmer test result was 15.86 before and increased up to 18.17 after treatment. First BUT interruption was 11.8, next 12.54 sec. BUT increased to 16.45 and 17.80, respectively. After 30 days of treatment the changes in the anterior part of the cornea, especially in the corneal epithelium, were less severe.

Conclusions: Application of the eye drops resulted in: (1) increase of the stability of the tear film (verified with BUT, corneal staining), (2) reduction of subjective symptoms, (3) improvement of comfort and quality of life, and (4) beneficial changes in the structure of the cornea.

P-COR-117

Corneal epithelial thickness distribution characteristics in healthy eyes of Mexican population using SD-OCT

M.f. Castillo de la Rosa¹, E. Graue Hernandez², A. Navas Perez², A. Ramirez Miranda³, D. Jimenez¹, C.A. Muller Morales², N. Kahuam-Lopez²

¹Oftalmología Integral, Hospital Conde de Valenciana, Mexico City, Mexico, ²Cornea, Hospital Conde de Valenciana, Mexico City, Mexico, ³Cornea, Hospital Conde de Valenciana, Mexico City, Mexico

Introduction: Knowing the pattern of epithelial thickness distribution in a healthy Mexican population and understanding its changes, could play a key role as a normative base for said population and future epithelial mapping studies. We used a map measuring 9 mm in diameter with spectral domain optical coherence tomography (SD-OCT).

Objectives: To determine the pattern of epithelial thickness profile distribution in a healthy Mexican population and understand the changes.

Methods: We performed a cross-sectional study in which we measured the central corneal thickness (CCT), and epithelial thickness (CET) mapping in the 3mm, 6mm and 9mm zones. 4 Specific regions of epithelial thickness (superior, inferior, nasal and temporal) were also studied. 92 healthy eyes of 46 adults aged between 21 - 49 years were evaluated using the Schwind MS-39 spectral domain optical coherence tomographer. Exclusion criteria included subjects with keratoconus, previous eye surgery, glaucoma, use of contact lens. Descriptive statistics including mean, range and standard deviations were calculated.

Results: The average CET was 52.21mm with a SD of ± 3.28 , it was thinner in the central 3mm zone (51.1 ± 3.4) than paracentral (52.49 ± 3.2) and midperipheral (54.34 ± 3.8) zones. Using the Mann-Whitney test we found that male CET (53.07 ± 3) was thicker than female (51.87 ± 3.34) CET without significant difference. In the 3 studied zones the superior quadrant was found to be thinnest (50.8mm-3mm, 51.28-6mm, 49.45-9mm) compared to the inferior (51.7mm-3mm, 52.84mm-6mm, 54.21mm -9mm) which was thickest ($p=0.001$, $p= 0.00$, $p= 0.00$) with the highest difference measured in the peripheral zone (4.76mm). The CCT was significantly thicker in females than in males, using Mann Whitney test the average CCT in females was 552.86mm and in males 519 mm ($p=0.00$).

Conclusions: This comprehensive study in healthy Mexican population using MS-39 Schwind SD-OCT to map the corneal epithelium thickness distribution showed us that CET was 52.21 ± 3.28 mm with higher values in males than females. We found no difference according to age or eye in the ET profile in the 36 zones examined. The superior quadrant was found to be thinnest when compared to the other 3 quadrants, but with a statistically significant p when compared to the inferior quadrant. This provides us with a normative database for ET profile in the studied population.

P-COR-118

Clinical case of neurotrophic keratitis

T. Komarova¹, O. Vitovska¹, S. Scholtz²

¹Department of Ophthalmology, Bogomolets National Medical University, Kyiv, Ukraine, ²Universität des Saarlandes, Homburg, Germany

Introduction: Cornea can suffer from a degenerative condition called neurotrophic keratitis. It weakens the cornea's ability to feel and heal, leading to corneal ulcers. These ulcers involve degradation of the stroma and potentially cause perforation. To understand how these ulcers form, we need to examine the processes that normally keep the cornea healthy. Tears and the intricate network of nerves in the cornea all play crucial roles in maintaining a strong and healthy corneal barrier. Corneal hypesthesia is a key factor in the development of neurotrophic corneal ulcers. They occur when the cornea loses its ability to heal properly due to nerve damage. Several factors can contribute to this nerve damage, including: previous herpes infections, trigeminal nerve damage, contact lens use, chemical burns. It's important to note that this list is not exhaustive and other factors may also contribute to corneal hypesthesia and neurotrophic ulcers.

Objectives: To report a case of neurotrophic keratitis associated with episodes of previous herpetic keratitis and encephalopathy with localized brain atrophy.

Methods: Analysis of the clinical case in our clinic. Male patient, Caucasian, 41 years old, complained about blurring and decreased vision in right eye without major pain. In anamnesis, the patient had past history of herpetic keratitis. Medical record showed encephalopathy with localized brain atrophy. Visual acuity was checked subjectively using the Snellen chart. The best corrected visual acuity (BCVA) was taken into account.

Corneal sensitivity was checked with a piece of cotton.

Lacrimation was checked by Schirmer test.

Results: BCVA of the right eye was 0,1, BCVA of the left eye – 1,0. IOP was normal in both eyes. Corneal sensitivity was reduced in his right eye. Tear lacrimation was normal 13/14 mm by Schirmer test, tear break up time could not be completed in right eye.

On slit-lamp examination corneal epithelial defect with corneal stromal edema in right eye was seen. The anterior chamber of right eye was normal. The fundus of right eye was within the normal limits. Patient was treated with preservative-free artificial tears, antibiotic eye drops, oral doxycycline 100 mg per os once a day and a therapeutic contact lens. After the treatment residual corneal scarring remained in right eye.

Conclusions: Neurotrophic keratitis is a severe condition. The development of new and more effective treatment for this disease is anticipated.

P-COR-118

Regulation and therapeutic potential of exosomes in corneal neovascularization

Y. Yang¹, Z. Yang²

¹Department of Ophthalmology, Renmin Hospital of Wuhan University, Wuhan, China, ²Department of Ophthalmology, Remin Hospital of Wuhan University, Wuhan, China

Introduction: Corneal neovascularization (NV) is a sight-threatening condition usually associated with inflammatory or infectious disorders of the ocular surface. Exosomes are capable of transferring bioactive molecules to recipient cells through three mechanisms:

(a) intercellular signaling via receptor–ligand interaction,
(b) endocytosis by recipient cells, and
(c) direct fusion with the recipient cell membrane, leading to the release of their cargo into the target. They have an indispensable role in modulating biological processes and the epigenetic remodeling of cells. There are several studies about exosomes play an important role in ocular diseases including cornea neovascularization, which is lack of effective clinical treatment at present.

Objectives: We are focused on the regulative function of exosomes in cornea neovascularization, overviewed the deep mechanisms to play a role. The aim is to discover the potential role exosomes may play in the treatment of corneal neovascularization and provide clinical guidance.

Methods: Through literature research, we reviewed more than 10 high quality literatures. Some are about the roles of MSC-derived exosomes in corneal regeneration by reducing inflammation, inhibiting neovascularization, and angiogenesis, and by promoting cell proliferation. The others are about the role of miRNA as components in exosomes in regulating corneal neovascularization.

Results: Exosomes regulate corneal neovascularization mainly through three substrates.

1. By carrying miRNA related to epithelial repair and regeneration, such as miRNA 24-3p, it promotes corneal injury healing and inhibits corneal neovascularization related factors MMP9 and CD163.
2. Exosomes derived from MSC interact directly with corneal epithelial cells ameliorating neovascularization by decreasing apoptotic and inflammatory gene expression.
3. Exosomes reduce corneal angiogenesis by inhibiting the expression of pro-angiogenic factors (VEGF) and angiogenesis-associated genes (MMP-2 and MMP-9).

Conclusions: Exosomes play a critical role as mediators in exchanging cellular information in various ocular diseases. The recipient cells take up the proteins and miRNAs present in the exosomes, resulting in a reduction in inflammation, immune, angiogenesis, improving cornea recovery. Topical application of exosomes could be used as an additional therapy for corneal neovascularization behaving safer, with lower risk of immunological rejection, uncontrolled proliferation, tumor formation, toxicity, and higher bioavailability.

P-COR-119

Microbiological characteristics and risk factors: from fungal keratitis to keratitis-related endophthalmitis

Y. Sun^{1,2}, H. Gao³, L. Xie²

¹Medical College, Qingdao University, Qingdao, China, ²Eye Institute of Shandong First Medical University, Qingdao Eye Hospital of Shandong First Medical University, Qingdao, China, ³Eye Hospital of Shandong First Medical University, Jinan, China

Introduction: In addition to different etiologies and risk factors, differences between keratitis-related endophthalmitis and other types of fungal endophthalmitis in terms of microbial species and drug resistance are rarely mentioned. Till date, many clinical studies have focused on infectious keratitis or endophthalmitis, but the relationship between fungal keratitis with hypopyon, keratitis-related fungal endophthalmitis, and fungal endophthalmitis without keratitis has not been adequately described.

Objectives: To investigate the differences in microbiological characteristics, risk factors, drug resistance, and visual outcomes in three infections: fungal keratitis with hypopyon (FKH), keratitis-related fungal endophthalmitis (FKE), and fungal endophthalmitis without keratitis (FE).

Methods: An analytical cross-sectional study.

Results: In total, 14.57% of eyes with FKH progressed to endophthalmitis. Hypopyon, pre-existence of lens problems, topical steroid use and severe keratitis were significantly associated with the development of FKE. The risk factors of the FKH and FE group were mainly plant trauma and open globe trauma, respectively. Keratitis-related endophthalmitis (FKE) showed a significantly higher resistance than the other two groups. The FKH group had the best final visual acuity, while the FKE group had the worst.

Conclusions: Hypopyon height, pre-existing lens problems, topical steroid use and severe keratitis are risk factors for progression to endophthalmitis in eyes with fungal keratitis, and its progression is not affected by a single fungus. The antifungal drugs resistance in patients with endophthalmitis related to keratitis was significantly higher than that associated with other reasons. Timely diagnosis and risk factor assessment are essential for ensuring early treatment of FKE.

V-COR-003

Pole to pole repair of a penetrating eye injury

T. Marcelo¹, K.M. Claudio²

¹Ophthalmology, Rizal Medical Center, Manila, Philippines, ²Ophthalmology, Rizal Medical Center, Metro Manila, Philippines

Introduction: Ocular trauma remains as one of the leading causes of unilateral vision loss all around the globe. Most individuals sustaining injuries are male and home and workplace are the most frequent locations of injuries.¹

Objectives: To present a documented case of a patient who presented with ocular trauma in a tertiary government hospital in the Philippines.

Methods: Patient's history and appropriate physical examination were conducted. Patient was then promptly managed medically and surgically.

Results: This is a case of a patient who presented with sudden blurring of vision on the left eye, hours after he was poked with a bamboo stick. He reported not being able to pull out the complete length of the stick when he pulled it from his eye.

Patient underwent penetrating keratoplasty with lens extraction. Recovery of the intraocular foreign body - a 12 mm bamboo stick, was done. Pars plana vitrectomy with endolaser, air fluid exchange and silicone oil injection were conducted to address a retinal tear seen at 5 o'clock position, distal third of the inferior arcade at the near periphery, with no note of retinal detachment. Patient was given intravitreal and intracameral antibiotics and was later on maintained with topical antibiotics, topical corticosteroid and preservative free lubricants post operatively.

Conclusions: The nature of the ocular injury, as well as the visual acuity on presentation, remains as important prognostic factors in determining visual rehabilitation after traumatic eye injuries. Prompt and appropriate management, usually involving multi-disciplinary specialties, are almost always prompted.

Video

[Click here to play video](#)

V-COR-004

Bowman's layer stromal transplantation for advanced keratoconus - 5 years experience

M. Uddaraju¹, S. Penmatsa², S.N. Laveti³

¹Cornea & Refractive Surgery, Dr Ramana Raju's VisionTree, Visakhapatnam, India, ²Dr Ramana Raju's VisionTree, Visakhapatnam, India, ³Dr Ramana Raju's VisionTree, Visakhapatnam, India

Introduction: Several treatment options are available for treating Keratoconus depending upon its severity. We demonstrate an innovative tissue sparing technique for advanced Keratoconus that stabilises the disease and improves vision.

Objectives: To assess the efficacy of Bowman's layer stromal transplant in advanced Keratoconus in stabilising the disease and improving visual outcomes in these patients.

Methods: Patients that have advanced Keratoconus are enrolled in our study after Institute review board approval. These patients are not eligible for cross linking because of the advanced stage of the disease making the cornea thinner than 400 microns. In these cases instead of conventional surgical options like DALK/PKP we tried our innovative tissue spacing and corneal strengthening technique of Bowman's layer transplantation. The donor cornea is mounted on Barrons artificial chamber and the epithelium is completely removed using a 15no blade. The Bowman's layer is then stained with trypan. Bowman's layer along with the underlying anterior stroma is scored 360 degrees using a bent 26 gauge needle. A 100 micron guarded blade can be used to assess the depth and then proceed with lamellar dissection with a crescent blade on right hand and providing tangential force for lamellar separation by left hand using a lins forceps. Dissection is completed and the lenticule is then totally peeled and separated from the underlying stroma. The stromal surface is smoothed with a 15 no blade to have clearer interface. The lenticule is then trephined to 7 mm. In the recipient the central 7.5 mm is marked and a sclero-corneal tunnel is made at the midstromal level with a crescent blade and extended further with Basak lamellar dissector the marked circumference. A lens glide is then used to introduce the Bowman's layer transplant into the stromal pocket. The graft is ironed out to avoid any folds and well centred in the marked area.

Results: Over a period of 5 years we performed this technique in 24 cases and all cases had stabilisation of the disease. K max and astigmatism decreased in all the cases ranging from 2-6 D. HOA RMS reduced from 40-60%. All the cases were now suitable for vision correction with either regular or scleral contact lenses showed better visual outcomes. No case required cross linking, DALK or PK.

Conclusions: Bowman's layer stromal transplantation is useful technique in patients with advanced Keratoconus when performed at an appropriate time can avoid corneal transplants and have improved visual outcomes.

Video

[Click here to play video](#)

V-COR-005

Graft over host keratoplasty

*S. Kothari*¹

¹Cornea, Bombay City Eye Institute & Research Centre, Mumbai, India

Introduction: Full thickness keratoplasty is needed in total corneal opacity.

Objectives: To minimise the risk of expulsive haemorrhage in penetrating keratoplasty

Methods: This video demonstrates graft over host technique of keratoplasty

Results: It's a safe procedure.

Conclusions: Graft over host keratoplasty minimises the risk of complications to open sky technique.

Video

[Click here to play video](#)

V-COR-006

New prototype eye transporter for eye bank

O. Roux¹, M.V. Roux¹, G. Roux¹, M.C. Caballero¹

¹Clinica de Ojos Dr Roux, San Juan, Argentina

Introduction: General Information

The new eye transporter is used so that the ablated eye can be transported in wet chamber and the cornea is not damaged with the container that contains it. Also the transporter of eyes allows the manipulation for better study with slit lamp specular microscope and OCT In addition the eye transporter serves as an eye support to be able to process the cornea . New eye transporter showed good efficacy and safety for eye transport, eye study with slit lamp and specular microscopy. As well as support for a more controlled cornea extraction.

Objectives: New prototype eye transporter for eye bank

Purpose Submit the advantages of the new eye transporter

See the usefulness of being used so that the ablated eye can be transported in wet chamber and the cornea is not damaged with the container that contains it. Also the transporter of eyes allows the manipulation for better study with slit lamp specular microscope and OCT In addition the eye transporter serves as an.

Methods: The new eye transporter was used in animal eyes and in human eyes . Standarized follow up examination including the size and the shape of the eyes. Specular microscopy before and after corneal processing.

Results: When analyzing all eyes transported, The eyes had good condition the corneal surface.

Conclusions: New eye transporter showed good efficacy and safety for eye transport, eye study with slit lamp and specular microscopy. As well as support for a more controlled cornea extraction.

Video

[Click here to play video](#)

Epidemiology

P-EPI-001

Total cholesterol mediated the association of per- and polyfluoroalkyl substances and age-related macular degeneration

X. Chen^{1,2,3}, J. Li^{1,2,3}, N. Xu^{1,2,3}, M. Zhao^{1,2,3}, X. Li^{1,2,3,4}, L. Huang^{1,2,3}

¹Department of Ophthalmology, Peking University People's Hospital, Beijing, China, ²College of Optometry, Peking University Health Science Center, Beijing, China, ³Beijing Key Laboratory of Diagnosis and Therapy of Retinal and Choroid Diseases, Beijing, China, ⁴Department of Ophthalmology, Xiamen Eye Center of Xiamen University, Xiamen, China

Introduction: A recent study reported the relationship between Per- and polyfluoroalkyl substances (PFAS) exposure and ocular disorders, researchers found that high serum PFAS concentration was correlated with a higher prevalence of vision impairment and vitreous disorder in China. Vitreous diseases are considered with age-related macular degeneration (AMD) risk. To date, no study has explored the connection between PFAS exposure and AMD risk.

Objectives: This study aims to examine the association of PFAS exposure and AMD risk and perform a mediation analysis to assess whether serum lipids involve in this relationship in a national representative cohort.

Methods: This study contained 1605 individuals from NHANES 2005-2008. Four serum PFAS levels including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorononanoic acid (PFNA), and perfluorohexane sulfonic acid (PFHxS) were examined. The diagnose of AMD was determined using fundus photographs. Logistic regression analyses, restricted cubic spline (RCS), and weighted quantile sum (WQS) analysis were performed to evaluate the association of single PFAS and mixed PFAS exposure and AMD risk. Mediation analysis was performed to assess whether serum lipids including total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), and total triglyceride (TG) were involved in the effects of PFAS on the AMD risk. Covariates included age, sex, race, education level, family income-poverty ratio, BMI, smoking, alcohol drinking, self-reported health, hypertension, diabetes, history of cataract surgery, and cardiovascular diseases.

Results: A total of 1605 adults aged 40 and above were included in this study. Among them, 114 participants were diagnosed with AMD, of which 100 were early AMD and 14 were late AMD. Compared to those individuals without AMD, AMD patients (especially late AMD) showed higher serum PFHxS (Median (IQR), 2.2 (1.8) vs. 1.9 (2.2), $P < 0.05$) and PFOS concentration (Median (IQR), 23.4 (16.1) vs. 17.4 (17.0), $P < 0.05$). After adjusting for all covariates, exposure to PFOS was significantly associated with a higher risk of any AMD (OR, 1.46; 95% CI, 1.07 to 2.00; P , 0.020), early AMD (OR, 1.37; 95% CI, 1.03 to 1.84; P , 0.035), and late AMD (OR 3.60; 95% CI, 1.17 to 11.09; P , 0.029), and exposure to PFOA was connected with an increased risk of late AMD (OR, 2.19; 95% CI, 1.08 to 4.47; P , 0.033). In model 2, compared to the first tertile, the third tertile of PFOS showed an increased risk of any AMD (OR, 2.13; 95% CI, 1.19 to 3.85; P , 0.016). A nonlinear association was found between ln-PFOS and the risk of AMD (P for overall = 0.013; P for nonlinearity = 0.024). WQS analysis indicated a significant positive relationship between mixed PFAS exposure and AMD risk (OR, 1.32; 95% CI, 1.01 to 1.72; P , 0.045). PFOS accounted for 93.5% of the mixed PFAS. First, we examined whether PFAS exposure could increase serum lipid levels. After adjusting for all covariates, Ln-PFHxS (β , 4.56; 95% CI, 1.22 to 7.89; P , 0.011), Ln-PFOA (β , 6.36; 95% CI, 1.48 to 11.23; P , 0.014), and Ln-PFOS (β , 5.68; 95% CI, 0.09 to 11.28; P , 0.047) were positively associated with serum TC levels. Then, after adjusting for all covariates, serum TC levels were positively associated with the risk of AMD (OR, 1.005; 95% CI, 1.001 to 1.010; P , 0.021). Next, we performed a mediation analysis, and the results showed that serum TC levels significantly mediated the association between PFOS exposure and AMD risk and the mediated proportion was 7.14 % (P = 0.045), while no significant mediation effects were detected for LDL-C, HDL-C, and TG (P > 0.05).

Conclusions: Our results indicated that PFOS exposure was associated with a higher risk of AMD, and exposure to PFOA exposure was connected with a higher risk of late AMD. In addition, we found a nonlinear relationship between PFOS exposure and the risk of AMD. WQS analysis displayed that PFOS had the largest positive weight in the mixed PFAS. Furthermore, PFOS was positively correlated with serum TC levels, serum TC levels were significantly associated with a higher risk of AMD, and serum TC involved in the effects of PFOS on AMD risk.

P-EPI-002

Associations of retinal microvascular alterations with diabetes mellitus: an OCTA-based Kailuan Eye study

Y. Yao¹, Q. Wang¹, W. Wei¹

¹Ophthalmology, Beijing Tongren Hospital, Beijing, China

Introduction: Diabetes, a health crisis afflicting millions worldwide, is increasing rapidly in prevalence. The microvascular complications triggered by diabetes have emerged as the principal cause of renal disease and blindness. The retinal microvascular network may sensitive to early systemic vascular structural and functional changes.

Objectives: This research endeavored to discern the systemic determinants influencing the retinal microvascular network in patients with and without diabetes.

Methods: The Kailuan Eye Study is a cross-sectional study based on the community-based cohort Kailuan Study. Participants underwent optical coherence tomographic angiography (OCTA) and comprehensive systemic examination. Metrics such as perfusion density (PD), vascular density (VD), foveal avascular zone (FAZ) parameters of the superficial capillary plexus (SCP) in the macula were assessed.

Results: This study included 860 eligible participants (Average age=62.75±6.52 years; 21.9% female). People with diabetes had diminished PD and VD in the entire macular and parafoveal regions compared to people without diabetes. Reduced PD and VD in the macular region were correlated with longer axial length, elevated heart rate and increased fasting plasma glucose (FPG) ($P<0.001$ for all), after age adjustments (both $P<0.001$). Each mm^{-1} decrease in VD and each unit decrease in PD corresponded to a 14% and 9% increase in diabetes prevalence. A higher fasting plasma glucose(FPG) level was significantly correlated with lower SCP density of both PD and VD in the macular and parafoveal region ($P<0.05$ for all), as well as increased systolic blood pressure and low-density lipoprotein cholesterol concentration ($P<0.01$ for all) .

Conclusions: OCTA evaluation revealed that reduced retinal vascular density and perfusion density were correlated with a high prevalence of diabetes and elevated FPG levels. While hypertension and hyperlipidemia are crucial risk factors for elevated blood glucose levels and diabetes, they did not significantly impact retinal microvascular abnormalities. OCTA examination of fundus microvasculature could prove advantageous in screening and monitoring individuals at risk for systemic diseases.

P-EPI-004

The prevalence and distribution of Uncorrected Refractive Error among school going children in Malawi, Africa

H. Mkandawire¹, P. Manikavasagar², J. Buchan³, R. Wilson¹, K. Kalua⁴

¹Ophthalmology, Blantyre Institute for Community Outreach, Blantyre, Malawi, ²International Centre for Eye Health, London School of Hygiene and Tropical Medicine, London, United Kingdom,

³International Centre for EyeHealth, London School of Hygiene and Tropical Medicine, London, United Kingdom, ⁴School of Public and Population Health, University of British Columbia, Vancouver, Canada

Introduction: Uncorrected refractive error (URE) is the leading cause of moderate to severe vision impairment worldwide. URE has been associated with difficulties in learning, and poor school performance. Available recent data, from Africa, on refractive errors obtained from school screening programs, though essential for planning eye health services, are rare, often have inadequate sample size, are obtained from a few schools, and in "particular age groups". This has often led to "incorrect estimates" on URE among school aged children in Africa.

Objectives: To estimate the prevalence and distribution of uncorrected refractive error among school children in Southern Malawi, Africa, using representative large sample sizes, equivalent to population-based surveys.

Methods: A very large descriptive cross-sectional study among school children based in 183 randomly selected primary and secondary schools. 389 teachers were trained to conduct visual acuity assessment and referred children with visual acuity below 6/12 to the internal eye care team set and provided at the schools. Refraction, anterior and posterior eye examination was conducted on children with VA<6/12. Children with refractive error were given free spectacles, while those requiring surgery were referred to eye hospital.

Results: A large sample of 77,562 school going children, age 6-18 were included. The mean age was 12.6 years +/-2.73yrs with a male-to-female ratio of 0.86:1. The prevalence of uncorrected refractive error (URE) was 0.90% (0.83-0.97) overall, with myopia 0.75% (0.69-0.81) being the most common, followed by astigmatism 0.13% (0.10-0.16) and hyperopia 0.03% (0.02-0.04). Increasing age (12-14-year group) was associated with increase in myopia. Gender was not associated with myopia and astigmatism (P=0.85). Only 0.3% (2 out of 701) of those needing glasses, were already wearing spectacle correction.

Conclusions: This large study has demonstrated the low prevalence of uncorrected refractive error, and agrees with other population-based studies, conducted in similar settings, in Africa. Despite the known impact of URE on education, uptake of glasses among those school going children in need in this society is extremely low, and possibly reasons include accessibility, cost, acceptance rates or cultural beliefs. Further research can help explore attitudes to spectacle wear with a costs assessment among parents and children. Ready-made and self-adjusting spectacles can be considered as alternative options to spectacle management in this setting.

P-EPI-005

Iranian guideline of retinopathy of prematurity screen and its revisions

A. Dastjani Farahani¹, N. Ebrahimi Adib¹

¹Farabi RoP Center, Tehran University of Medical Sciences/ Farabi Eye Hospital, Tehran, Iran, Islamic Republic of

Introduction: Retinopathy of prematurity (ROP) is the leading cause of neonatal vision loss worldwide, with increasing incidence especially in developing countries. Geographic variations in neonatal care and premature babies' risk factors necessitates regional specific guidelines. Gestational age (GA) and birth weight (BW) are the two main risk factors and used for determining screening guidelines. Iranian national committee published two local guidelines in 2013 and then 2015. The last includes screen of gestational age ≤ 34 weeks and or birth weight ≤ 2000 grams, or larger neonates who had a complicated post birth clinical course. Present study tries to change the guideline with considering of decrease rate of referred premature neonates and increase chance of detection of type 1 RoP. It shows screening of premature neonates with gestational age ≤ 33 weeks and birth weight ≤ 1900 grams lead to 12.58% decrease in total referred premature neonates, 0.1% loss of type 1 RoP and can detect type 1 RoP with sensitivity 99.1% and specificity of 18.8%. This revision can help the health system and insurance system to keep persistent care.

Objectives: According to current guideline, 8545 premature neonates referred to Farabi RoP center for screening of retinopathy of prematurity since March 2015 since March 2018.

Methods: Since March 2015 to March 2018, according to guideline of 2015, 8545 premature neonates with gestational age ≤ 34 weeks and or birth weight ≤ 2000 grams, referred to Farabi RoP center for screening of retinopathy of prematurity. They followed up to complete retinal vascularization or complete regression after treatment. Demographic data collected.

Results: With current guideline, that includes premature neonates with gestational age ≤ 34 weeks and or birth weight ≤ 2000 grams, total referred was 8454 and it missed four cases of total 1064 or 0.37% type 1 RoP with sensitivity 99.8% and specificity 5.2%. With change of guideline to gestational age ≤ 33 weeks and or birth weight ≤ 1900 grams as third scenario, total referred was decreased to 7390 (12.58%) and it missed nine cases of total 1064 or 0.84% type 1 RoP with sensitivity 99.1% and specificity 18.8%.

Conclusions: This study shows guideline including of gestational age ≤ 33 weeks and or birth weight ≤ 1900 grams makes less notable referral neonates and more safety margin in comparison to AAO guideline. We recommend screening of babies with larger GA and BW with unstable clinical course in purpose of much more detection of type 1 RoP.

P-EPI-006

Astigmatism prevalence among schoolchildren from multi-ethnic groups in Xinjiang, China

Y. Shi¹, Y. Wang², J. Yang¹, Y. Lu¹

¹Eye Institute, Eye & ENT Hospital of Fudan University, Shanghai, China, ²Department of Ophthalmology, Traditional Chinese Medicine Hospital of Xinjiang Uyghur Autonomous Region, Ürümqi, China

Introduction:

Astigmatism, a common refractive error, affects pediatric visual acuity. This study examines its prevalence among school-aged children of diverse ethnic backgrounds in Xinjiang, China. Understanding ethnic disparities in astigmatism and its biological associations is crucial for tailored pediatric ophthalmology strategies.

Objectives: This study investigates the prevalence of astigmatism and its correlation with biological parameters among school-aged children representing five distinct ethnic groups in the Xinjiang Uyghur Autonomous Region.

Methods: A comprehensive eye examination was conducted on 67,102 school children aged 6-23 years, hailing from 46 schools across Xinjiang. The examination encompassed vision screening, including uncorrected visual acuity and standardized refraction. The prevalence of total astigmatism (cylinder < -0.5 D), low astigmatism (-1.0 D $<$ cylinder ≤ -0.5 D), moderate astigmatism (-1.5 D $<$ cylinder ≤ -1.0 D), and high astigmatism (-1.5 D \leq cylinder) was calculated, adjusted for age and sex, within each of the five ethnic groups. Additionally, astigmatism vectors (J0 and J45) and subtypes were compared within these ethnicities.

Results: The age- and sex-adjusted prevalence of total astigmatism among the Han, Hui, Uyghur, Kyrgyz, and Kazakh ethnic groups were 38.43%, 25.71%, 32.92%, 32.44%, and 34.13% respectively. Significantly, Han and Hui children exhibited a higher proportion of with-the-rule (WTR) astigmatism compared to the other three minorities. The transition from WTR to against-the-rule (ATR) astigmatism occurred at varying ages across the five ethnic groups. Furthermore, Han and Hui populations displayed a denser clustering of points around lower absolute J0 values, while Kazakh and Kyrgyz ethnicities exhibited a wider spread in J0 values. The Uyghur ethnicity notably presented a relatively even distribution of J45 values. Overall, the prevalence of astigmatism increased with age groups, with a slight deceleration observed in later childhood.

Conclusions: This study highlights significant ethnic disparities in the prevalence of astigmatism among school-aged children in Xinjiang. The observed variability in J0 and J45 distributions, as well as the transition of subtypes across ethnicities, underscores the necessity of personalized approaches in diagnosing and correcting astigmatism. The multiethnic population study contributes valuable ethnical information resources regarding the prevalence of astigmatism and ocular biometry parameters among school-aged children.

P-EPI-007

Patient and healthcare provider satisfaction in teleophthalmology: the experience in remote areas of Taiwan

C.-J. Chiu¹, N. Chen¹, J.-H. Wang²

¹Department of Ophthalmology, Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Hualien, Taiwan, China, ²Department of Medical Research, Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Hualien, Taiwan, China

Introduction: During and after the COVID-19 pandemic, teleophthalmology provided access to eye care for rural populations. This study aimed to assess the efficacy of and satisfaction with an integrated real-time videoconferencing module.

Objectives: This study evaluated the patient's and health provider's satisfaction with the application of synchronous videoconference teleophthalmology to determine its effectiveness and identify potential issues for its future implementation.

Methods: This project incorporated ophthalmic instruments and telecommunication devices and provided on-site consultations via videoconferencing. Our virtual vision module (VVM) was equipped with ophthalmic instruments, including an autokeratorefractometer, tonometer, digital ophthalmoscope, digital slit lamp, computers for data storage and transport, and two iPads for videoconferencing. Videoconferencing was performed using software developed by 5G telecommunications. Both patients and healthcare providers completed satisfaction questionnaires.

Results: From May 2020 to May 2021, this project provided eye care service to 395 patients (aged 6–90 years). The most frequent eye condition was chronic conjunctivitis (n=197), followed by senile cataract (n=163), dry eyes (n=103), and refractive error (n=95). In total, 122 visits were recorded for diabetic retinopathy screening. Among them, 40 (10.1%) patients were referred to secondary or tertiary hospitals for further evaluation or treatment. In total, 181 recruited respondents provided good satisfaction scores in all dimensions, including quality of medical care (4.50 of 5.00), financial aspects of care (4.48), supportive attitude toward the project (4.47), quality of service (4.40), and quality of telecommunication (4.40). Women had a substantially more supportive attitude toward the project, and 25 healthcare providers provided low ratings in areas representing the quality of telecommunication (4.04) and user-friendliness of the instrument (4.00).

Conclusions: This teleophthalmology system provided efficient and satisfactory eye care to participants in remote communities. However, better internet access and training in instrument use can reduce obstacles to the future implementation of the project.

P-EPI-008

Indigenous eye health in Canada: disparities in ocular disease and recommendations

M. Bondok¹, B. Tao¹, C. Hanson², G. Sarohia³, E. Ing^{3,4}

¹Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²Department of Surgery, Section of Ophthalmology, University of Calgary, Alberta, Canada, ³Department of Ophthalmology & Visual Sciences, University of Alberta, Alberta, Canada, ⁴Department of Ophthalmology & Vision Sciences, University of Toronto, Toronto, Canada

Introduction: Indigenous people in Canada experience inequities in eye care.

Objectives: To review ophthalmic health inequities experienced by Indigenous peoples, which may inform the development of culturally appropriate health interventions to address disparities.

Methods: We conducted a literature search of Ovid Medline, Ovid Embase, CINAHL – EBSCO and Scopus from inception to January 24, 2024. The search strategy was developed by an academic librarian using both controlled vocabulary and free-text terms. All article abstracts and full-texts were screened by two independent reviewers.

Results: Indigenous Canadians have a greater burden and lesser likelihood of being screened for diabetic retinopathy (DR). Barriers to care include poor access, racism, longer wait times, mistrust, and avoidance of healthcare systems, while enablers include supportive interactions, culturally sensitive programming, and involving Indigenous staff. Indigenous people experience less access to cataract surgery and post-operative follow-up due to geographic, economic, and cultural factors. Inuit people have the highest global rates of angle-closure glaucoma (ACG). Tele-glaucoma may reduce the time to treatment for open-angle glaucoma. Uveitis occurs at a younger age, and is more often bilateral and granulomatous with pan-uveal involvement, in part because Vogt Koyanagi Harada is more common in Indigenous Canadians. Conjunctival papilloma, epiblepharon, trauma-related vision loss, spheroidal degeneration, pterygium, and uncorrected refractive errors disproportionately affect Indigenous people.

Conclusions: Barriers to eye care for Indigenous Canadians are present in rural and urban settings. Strategies to improve eye care include teleophthalmology, mobile screening, better monitoring of surgical outcomes/complications, screening for ACG, and more consistent uveitis follow-up. Ophthalmic care for Indigenous Canadians should be culturally appropriate and integrated with primary care, and a holistic approach through Indigenous-led centres is ideal. Ophthalmologists should be aware of eye care governmental resources available to Indigenous Canadians. Contemporary research on macular degeneration and ocular infections in this population is needed and should be conducted following guidance on research involving Indigenous people.

P-EPI-009

Geographic distribution of ophthalmologists in British Columbia: a 10 year review

H.K. Hehar¹, C. Mulholland^{1,2}

¹Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²Ophthalmology, BC Children's Hospital, Vancouver, Canada

Introduction: Multiple previous studies have highlighted the geographic disparity that exists in accessing a physician, especially specialists in rural and low population areas compared to urban and population dense locations. This pattern was also highlighted in the distribution of ophthalmologists.

Objectives: The goal of this study was to assess the geographic differences in the distribution of the number of ophthalmologists in British Columbia from the 2013 to 2023 fiscal years.

Methods: All ophthalmologists who held a British Columbia license and received payment from the British Columbia Medical Services Plan (MSP) were included. Demographic information was obtained through the British Columbia Ministry of Health data source. British Columbia health service delivery areas were stratified into low-population (<150,000), medium population (150,000-400,000) and large population (>400,000) groups.

Results: The ratio of ophthalmologists to MSP registrants was greatest in high population areas with 5.12 ophthalmologists per 100,000 people in 2013/2014 to 4.83 per 100,000 people in 2022/2023. This was in contrast to low population areas with only 3.00 ophthalmologists per 100,000 people in 2013/2014 to 2.50 per 100,000 people in 2022/2023, which consistently remained below the BC average of 3.8 and Canadian average of 3.3. Overall, all population areas saw a reduction in ophthalmologist access with ratios decreasing from 2013/2014 to 2022/2023. A similar pattern was seen with smaller coverage health service delivery areas having a higher ratio of ophthalmologists per 100 square kilometers as compared to health service delivery areas with a larger coverage area.

Conclusions: There are geographic disparities in the distribution of ophthalmologists in British Columbia. The highest ratio of ophthalmologist to population was found in high population and smaller coverage areas as well as namely in areas closest to a larger university centre, particularly health service delivery areas near or with a University of British Columbia medical school campus. Consideration should be given to strategies to improve the overall number of ophthalmologists all across British Columbia and to mitigate the unequal distribution of ophthalmologists to efficiently meet the demands of our aging population and reduce vision loss in British Columbia.

P-EPI-010

Seven-year experience in a low vision rehabilitation clinic at a tertiary referral center

A. Riazi¹, R. Gharebaghi², F. Heidary²

¹Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of, ²IVORC research foundation, Austin, United States

Introduction: According to WHO and ICO reports, low vision is a major public health concern worldwide and imparts significant adverse effects at the individual and societal levels.

Objectives: This study was aimed at describing the characteristics of patients who had visited a low-vision rehabilitation clinic.

Methods: We reviewed the medical records of patients with low vision attending a low-vision rehabilitation clinic at a tertiary referral center over 7 years from 2012 to 2019.

Results: We enrolled a total of 567 patients, including 338 (59.6%) men and 229 (40.4%) women, with a mean (standard deviation) age of 40.46 (28.34) years. Most (98.4%) participants were cooperative, with a high rate of unemployment (90.5%) and low education level. Half (49.2%) of the patients had moderate visual impairment. Retinal pathologies, mainly congenital (28.4%), and age-related macular degeneration (ARMD; 26.5%) were common causes of low vision. Difficulty in reading was the most frequent complaint (22.9%), and a combination of difficulties in reading, writing, and facial recognition was recorded in 54.7% of the patients. Other functional complaints were reported by at least 5% of the patients. Our multivariate logistic regression analysis revealed that the likelihood of difficulties in performing in-house activities, reading, facial recognition and social interaction, and driving increased per 10-year increment in age, with odds ratios of 1.39, 1.31, 1.24, and 1.22, respectively (all $P < 0.05$). The likelihood of reporting three complaints (reading, writing, and facial recognition together) increased per 0.1-logarithm of the minimum angle of resolution increment in the best-corrected distance visual acuity of the better eye, with an odds ratio of 2.05 ($P < 0.05$). In addition, men were more likely to experience difficulties in driving and reading, while women were more likely to experience difficulties in facial recognition and social interaction or in-house activities (all $P < 0.05$). Optical devices for distance or near vision were prescribed to most patients.

Conclusions: Most patients were men and unemployed. The most common category of low vision was moderate impairment. Retinal conditions, mainly congenital ones and ARMD, were the most frequent causes. A combination of difficulties in reading, writing, and facial recognition was the most common complaint. Optometrists should address these findings during rehabilitation therapy to treat patients with low vision.

P-EPI-011

Health related quality of life among patients seeking primary eye care services in North India

V. Gupta¹, S Sarath¹, P. Vashist¹, S.S Senjam¹, A. Bharadwaj¹

¹Dr RP Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

Introduction: Vision loss may cause poor Health related Quality of Life (HRQOL) in primary eye care attendees.

Objectives: To measure self-reported HRQOL and its associated factors among patients attending vision centres in Northern India.

Methods: A prospective observational study was conducted in vision centres in Northern India. Systematic random sampling was used to identify study participants. After obtaining written informed consent, demographic details (age, gender, education and household income) were recorded. HRQOL was assessed using EQ-5D-5L instrument in Hindi. Clinical data was extracted from electronic medical record system. Indian value sets were utilized to estimate and compare mean (standard deviation, SD) health-utility score and visual analogue scale (VAS) health scores across patient characteristics.

Results: 284 participants were enrolled in the study of which 62.3% were female, 35.9% were aged 60-69 years, 46% were illiterate and 77% had monthly household income of < INR 20000 (USD 240 approx). Blindness was noted in 3.5% subjects, and 32.8% had early visual impairment (EVI). Cataract was diagnosed in 43.7% patients, refractive errors in 22.2%, and 38.7% were referred to base hospital.

Mean health-utility score was 0.8 (SD 0.2), slightly lower than Indian norms (0.848), while mean EQ-VAS was 71.44 (SD 13.2), also lower than Indian norms (75.18). Utility scores and VAS decreased with age (70+ years: utility score 0.7, VAS 65.8). Blind persons had significantly lower mean scores (utility score 0.61 [SD 0.21], VAS 65.5 [SD 5.0]) compared to those with no VI (utility score 0.85 [SD 0.19], VAS 74.25 [SD 13.23]). The mean utility scores based on diagnosis were 0.87(0.13) in refractive errors, 0.9(0.1) in presbyopia, 0.74 (0.19) in cataract, 0.70 (0.43) in glaucoma or DR suspects and 0.83 (0.22) for other diagnosis.

Moderate or higher difficulties were reported by 10.9%, 5.3%, 30.3%, 21.1% and 16.6% participant in HRQOL dimensions of mobility, self-care, usual activities, pain/discomfort and anxiety respectively. On multivariate analysis, EVI, blindness, and diagnoses of glaucoma/DR suspects and cataract were significantly associated with worse utility scores. Older age, female gender and illiteracy were significantly associated with worse VAS, while vision and diagnosis were not associated with VAS.

Conclusions: Patients accessing primary eye care services in vision centres exhibit low HRQOL utility scores, especially those with blindness and those having referable conditions.

P-EPI-012

The role of autoimmune-rheumatic diseases before keratoconus diagnosis: a nationwide matched case-control study

L.-C. See¹, P.-H. Tsai², W.-M. Chen¹, J.-S. Lee³, K.-K. Lin³

¹Department of Public Health, Chang Gung University, Taoyuan, Taiwan, China, ²Division of Rheumatology, Allergy and Immunology, Chang Gung Memorial Hospital at Linkou, Taoyuan, Taiwan, China, ³Department of Ophthalmology, Chang Gung Memorial Hospital at Linkou, Taoyuan, Taiwan, China

Introduction: Keratoconus (KC) is bilateral, progressive, non-inflammatory thinning and ectasia of the cornea. KC has typically been described as a non-inflammatory, but current evidence suggests a significant role of inflammation in its pathogenesis.

Objectives: This study examines prior ARDs associated with KC using a nested matched case-control study.

Methods: We identified patients with newly diagnosed KC from the Taiwan National Health Insurance Research Database, 2000-2020. We excluded those who never visited the eye clinic and had corneal transplantation before KC diagnosis. The index date was the first diagnosis date of KC. We randomly selected age-, sex-, and index-date matched controls for every KC patient, and the ratio was 4:1. The ARDs of interest were Sjögren's syndrome (SS), Rheumatoid arthritis (RA), Graves' disease, systemic lupus erythematosus (SLE), Crohn's disease, ulcerative colitis, ankylosing spondylitis (AS), psoriasis/psoriasis arthritis (PPA). The ARD with less than 20 patients in this study was not examined because of sparse data bias. Prior ARDs associated with KC were screened out for 1, 2, 3, . . . , ten years before the index date. Other covariates included urbanization, occupation, and comorbidities (allergic rhinitis, asthma, collagen vascular disease, depression, DM, Down syndrome, hyperlipidemia, and sleep apnea). Conditional logistic regression was used to determine the risk of various ARDs on KC.

Results: There were 8453 new KC cases and 33812 matched controls. The mean age of KC's first diagnosis was 28, and 59% were male. SS was the only ARD positively associated with KC (2.77% in the KC group vs. 1.61% in the control group). However, this positive association existed 1 year before the index year (OR=2.51, 95%CI=1.95-3.25). It became insignificant for the rest of the prior years. The rest of the ARDs were negatively associated with KC: RA (1.83% vs. 2.39%), Graves' disease (2.95% vs. 3.67%), SLE (0.47% vs. 0.54%), Crohn's disease (4.09% vs. 4.37%), ulcerative colitis (0.13% vs. 0.19%), AS (1.16% vs. 1.23%), and PPA (1.05% vs. 1.45%). Significance was only seen for RA (OR=0.54, 95%CI=0.39-0.76, 1 year before the index year) and PPA (OR=0.55, 95%CI=0.35-0.85, one year before the index year; till 0.44, 95%CI=0.24-0.82, 5 years before the index year).

Conclusions: SS was positive, but RA was negatively associated with KC one year before KC first diagnosis. PPA was negatively associated with KC 1-5 years before the KC first diagnosis.

P-EPI-014

Good sight for Thai children project: national policy of children visual screening and glasses privileged in Thailand

A. Pornsath¹, W. Wongsawat¹

¹Ophthalmology, Mettapracharak Hospital, Nakhon Pathom, Thailand

Introduction: Refractive error is a major cause of preventable blindness of children in many countries, including Thailand. In 2012, We published data of population-based study of refractive error in children aged less than 10 years was 0.11% and increasing in trend over past few years.

Objectives: Since 2016, The Ministry of Public Health of the Thai Government together with other related agencies focuses on developing service strategies under the policy "Good Sight for Thai Children" by school vision screening to ensure that the benefits must be accessible and inclusive for every child. Furthermore in 2022-2023, all children with refractive errors will receive free eyeglasses which sponsored by NHSO (National Health Security Office). It is estimated more than 260,000 children who need to wear eyeglasses when the project has reached throughout the country.

Methods: VA was screening in primary school. The first-grade students, who had a visual acuity of less than 20/40, were referred for a comprehensive eye examination. Non-accommodate refraction was done to the children who had a confirmed VA of less than 20/40, and glasses were prescribed to those children based on refraction. The children with refractive errors between 3-12 years can receive 1 pair of eyeglasses per year. The indicators of the project are percentage of first-grade students who receive vision screening (not less than 80 percent) and percentage of students with refractive errors diagnosed by an Ophthalmologist (not less than 60 percent).

Results: In 2022 and 2023, there are 886,953 and 711,892 of first-grade students respectively. A total of 191,643 (21.61%) and 98,340 (13.81%) students were screened. Of these, 4,028 (47.29%) and 3,172 (50.53%) students were referred to hospital. Glasses were prescribed for 3,791 (94.11%) and 3,164 (83.46) students following refraction. The reason of students who were screened lower than expected due to school closure during COVID-19 pandemic, insufficient staff, unable to hire private agencies due to delayed reimbursement and problem of pediatric ophthalmology distribution.

Conclusions: Refractive error is considered as preventable blindness. The government has recognized the importance of screening for visual problems in childhood and has launched National Policy to ensure that all children are screened. In addition, government agencies provide free eyeglasses for children in need to make sure every child receive equal treatment. In the future, the benefits will be extended to other children of different ages.

P-EPI-015

Determination of allergen prevalence in patients with allergic conjunctivitis in an ophthalmologic referral center

P.D. Ramírez Moreno¹, E. Castillo Balcazar², H. Velázquez Soto², L. Islas Vázquez², M. Cruz Aguilar², G. Quintana Mexiac², M.C. Jiménez Martínez²

¹Immunology, Instituto de Oftalmología, FAP "Conde de Valenciana", IAP, Mexico City, Mexico,

²Immunology, Instituto de Oftalmología FAP "Conde de Valenciana" IAP, México City, Mexico

Introduction: Allergic conjunctivitis (AC) is a disease that has become increasingly prevalent worldwide. However, it is considered underdiagnosed and undertreated, so using skin prick tests (SPT) is useful in searching for specific sensitizing allergens whose prevalence in Mexico is recently unknown. It is important to know the prevalence of these allergens to define the risk factors in the development of this disease in order to obtain a better diagnosis and thus provide adequate treatment.

Objectives: To determine the prevalence of allergens in patients with AC according to positive SPT.

Methods: Descriptive and retrospective analysis of 1529 patients with AC from 2 to 86 years old, attended the Allergy Clinic of the Institute of Ophthalmology "Conde de Valenciana", from 2008 to 2022. A panel of SPT with 43 allergens classified as pollens, fungi and other inhalants were applied and we selected the ones with a positive result.

Results: Of the selected patients, 742 were female (49%) and 787 male (51%). All of them were sensitized to at least one allergen, the most relevant were indoor inhalants and pollens such as dustmites (34.8%), flies (33.6%), cockroach (27.2%), *Dermatophagoides pteronyssinus* (22.43), *D. pharyngeus* (21.12%), *Fraxinus americana* (16.2%), *Eucalyptus*(16.2%) and *Pinnus poderosa* (16.0%). These findings suggest that allergens are mainly perennial, however, it could be helpful to study allergens according to their seasonality to determine their prevalence.

Conclusions: Based on our results, the most prevalent allergens in patients with AC, are inhalant allergens and pollen species. This being the first analysis of allergens prevalence performed in patients with this specific disease may help understand its relevance in the development, diagnosis and quality of life in AC patients.

P-EPI-016

Prevalence and risk factors of high myopia among adults aged 50 years and older in Fujian Eye Study

Y. Li¹, X. Li^{1,2}, B. Wang¹, Q. Hu¹

¹Xiamen University Xiamen Eye Center, Xiamen, China, ²Ophthalmology, Peking University People's Hospital, Beijing, China

Introduction: Most studies focused on myopia or high myopia among schoolchildren, and few investigated the prevalence of high myopia in older adults in China.

Objectives: Our study aimed to investigate the prevalence of high myopia and its associated demographic and ocular factors among residents aged 50 years and older in Fujian Province, southeast China.

Methods: A population based cross-sectional eye study was performed and residents aged 50 years and older were enrolled from May 2018 to October 2019. Participants underwent a questionnaire (including educational background, income, blood type, disease history, medication history, living habits, smoking, drinking and tea consumption), physical and ophthalmological examinations with height, weight, systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), refraction, intraocular pressure (IOP), and ocular examination, such as distance visual acuity, best corrected visual acuity and refraction. High myopia was defined as diopters ≤ -6.00 . Stata software was used for statistic analysis, and a multivariate logistic regression model was used to identify risk factors for high myopia.

Results: A total of 8211 residents were finally included in our study. Of these, 8014 residents accepted the refraction examination. A total of 460 participants had high myopia, of whom 243 (52.8%) were female, 234 (50.9%) were from urban area, 330 (71.7%) were from coastal region. The prevalence of high myopia was 5.75% [95%CI 5.24%-6.26%]. Univariate logistic analysis showed that high myopia was correlated with living in rural area, living in inland region, older age, male, higher SBP, lower DBP, higher IOP, no history of HBP, and less phone use, and was independent with body mass index (BMI), HR, education level, income, history of diabetes and hyperlipidemia, phone use in the dark, smoking, drinking and tea consumption. While multiple logistic analysis found that gender, degree of DBP, history of hypertension and phone use were not statistically significantly associated with high myopia any more. Above all, high myopia was correlated with living in rural area, living in inland region, older age, higher SBP and higher IOP.

Conclusions: High myopia is common among Chinese adults and considered to be the primary cause in 5.75% of all eyes, which suggested more investment in accessible services and policy to enhance eye health on elderly with higher SBP and higher IOP and living in rural and inland regions.

P-EPI-017

Prevalence, causes and management of visual impairment in the Ashanti region of Ghana

E.A. Agyemang¹, W. Eisenbarth^{1,2}, S. Osei¹, E. Ansah-Asiedu¹, S.A.T. Gle¹, L.K. Adu¹, N.A.O. Mensah¹, E.A. Acquah¹, A.K.A. Andoh¹, I. Osei Duah Junior^{1,3}, J.A. Boateng¹, S. Darrah¹, S. Kyeremeh¹, P.M. Tchiakpe¹, D.B. Kumah¹, B.V. Okyere⁴, K.O. Akuffo¹

¹Department of Optometry and Visual Science, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana, ²Department of Applied Science and Mechatronics, Munich University of Applied Sciences, Munich, Germany, ³Biological Sciences, Purdue University, West-Lafayette, United States, ⁴Department of Optometry, University of the Free State, Bloemfontein, South Africa

Introduction: Visual impairment is of major public health concern as it reduces the quality of life of patients and interferes with the performance of daily tasks like reading and driving. In Ghana, however, current evidence of the prevalence and actual causes of visual impairment, including low vision and blindness, is lacking.

Objectives: The objective of our study was to determine the prevalence, causes and management pattern for visual impairment in the Ashanti region of Ghana.

Methods: In this 2-year retrospective study, we reviewed medical records from selected eye care facilities within the Ashanti region of Ghana from 1st January 2021 to 31st December 2022. Medical records of patients who have undergone comprehensive eye examinations, and who have best-corrected visual acuity (BCVA) of 6/18 to light perception, and visual field less than 10 degrees in the better eye were included in our study. Those with incomplete clinical information and data were excluded. Visual impairment was defined as a best-corrected visual acuity (BCVA) \leq 6/18 in the better-seeing eye to no light perception (NLP); low vision was defined as a BCVA \leq 6/18 to better than 3/60; and blindness was defined as BCVA \leq 3/60 to NLP. Data was described using means (SD) for continuous variables and percentages for categorical variables.

Results: A total of 33,093 medical records were reviewed. The period prevalence of visual impairment, low vision and blindness were 1.53% (505/33,093), 1.38% (456/33,093) and 0.13% (43/33,093) respectively. The leading causes of low vision were cataracts (48.1%), glaucoma (23.6%) and refractive error (11.9%), whereas the leading causes of blindness were cataracts (49.2%), glaucoma (30.5%) and macular hole and/or scar (6.8%). The most common signs and symptoms recorded in both low vision and blind patients were lens changes (28.8%; 26.6%) and blurred vision (24.4%; 23.4%). For low vision patients, 2.3% were being managed with optical aids and 5.7% with non-optical low vision aids whereas 2.7% of blind patients were being managed with optical aids and 4.1% with non-optical low vision aids.

Conclusions: Our results indicate that cataract, which is treatable with surgery, is the leading cause of both low vision and blindness in the Ashanti region of Ghana. Further, our study highlights the need for increased accessibility of low vision aids among patients in order to augment management with visual aids.

P-EPI-018

Equity considerations in glaucoma: a critical analysis of cochrane reviews

M. Bondok^{1,2}, *O. Dewidar*^{3,2}, *R. Selvakumar*⁴, *K.F Damji*^{5,6}, *J. Ramke*^{7,8}, *V. Welch*^{2,9}

¹Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²Bruyère Research Institute, University of Ottawa, Ottawa, Canada, ³Temerty School of Medicine, University of Toronto, Toronto, Canada, ⁴School of Population and Public Health, University of British Columbia, Vancouver, Canada, ⁵Department of Ophthalmology and Visual Sciences, Aga Khan University, Karachi, Pakistan, ⁶Department of Ophthalmology and Visual Sciences, University of Alberta, Edmonton, Canada, ⁷International Centre for Eye Health, London School of Hygiene & Tropical Medicine, London, United Kingdom, ⁸School of Optometry and Vision Science, University of Auckland, Auckland, New Zealand, ⁹School of Epidemiology and Public Health, University of Ottawa, Ottawa, Canada

Introduction: Glaucoma is a leading cause of irreversible blindness globally. Glaucoma prevalence, surgical and treatment outcomes, and prognosis have been demonstrated to vary by sociodemographic factors, such as race or ethnicity. Systematic reviews of randomized control trials, such as those conducted by Cochrane, are considered the highest level of scientific evidence.

Objectives: To understand the extent to which Cochrane Eyes and Vision systematic reviews and their primary studies on glaucoma consider equity.

Methods: We reviewed equity considerations in Cochrane Eyes and Vision systematic reviews (CSRs) on glaucoma published before April 1, 2023, in the Cochrane Library, and a sample of recently published primary studies included in those reviews (n=132) using the PROGRESS framework.

Results: A total of 47 CSRs on glaucoma were identified, 5 of which were protocols and thus excluded. Seven (16.7%) CSR practised author reflexivity, while 0 (0%) engaged with external stakeholders and practitioners in the research process. Using the PROGRESS framework, thirty (71.4%) CSRs acknowledged underserved groups in glaucoma care, 2 (4.8%) planned statistical or subgroup analysis, 0 (0%) conducted subgroup analysis, and 1 (2.4%) calculated effect size. Seven (6.7%) studies considered PROGRESS factors when discussing the applicability or limitations of study findings to specific populations. Eighty-one (47.4%) CSR authors were women, while 90 (52.6%) were men. Most authors were primarily affiliated with institutions in the European Region (97, 56.7%) or the Americas (56, 32.7%), while none were primarily affiliated with institutions in the African Region or low-income economies. Most primary studies reported participant gender or sex (115, 87.1%), and less than half (64, 48.5%) reported race or ethnicity. Three (2.3%) studies reported participant level of education, and none reported place of residence, occupation, religion, SES, or social capital. Most (54.2%) primary study participants were male, and 58.8% were white or Caucasian.

Conclusions: Equity-relevant sociodemographic factors were rarely considered in CSR on Glaucoma. Increased geographic and ethnic diversity within primary studies and systematic review authorship is needed. Poor reporting or consideration of equity-relevant patient sociodemographic characteristics in glaucoma research may limit the generalizability and applicability of studies to the diverse populations that are ultimately affected by clinical practices informed by these studies.

P-EPI-019

Relationship between diabetic retinopathy and blood parameters - Indian clinical trial network registry of 10000 patients

S. Natarajan¹, A. Sen², M. Burman³, G. Pillai⁴, B. Sinha⁵, S. CS⁶, G. Pillai⁴

¹Ophthalmology, Adityajyot Hospital, Mumbai, India, ²Ophthalmology, SNC, Chitrakoot, India,

³Ophthalmology, SSDN, Guwahati, India, ⁴Ophthalmology, Amrita Hospital, Amrita Viswavidyapeedom University, Kochi, India, ⁵Ophthalmology, RIO Patna, Patna, India, ⁶Ophthalmology, RIO Trivandrum, Trivandrum, India

Introduction: This study aims to explore the relationship between diabetic retinopathy (DR) and various blood parameters

Objectives: This study aims to explore the relationship between diabetic retinopathy (DR) and various blood parameters.

Methods: A cross-sectional analysis was conducted utilizing data from a medical retinal disease registry comprising 3699 patients with DR. The registry collected demographic information, clinical presentations, investigational profiles, and prescribed management. Statistical analyses including ANOVA, t-tests, and chi-square tests were performed to assess differences in blood parameters across demographic variables, DR severity levels, and visual acuity categories.

Results: This study examined 3699 patients with diabetic retinopathy (DR), analyzing a total of 7112 DR eyes. Among them, 3413 had bilateral DR, while 286 had unilateral DR. The mean duration of diabetes was 13.95 years. Gender distribution showed 68% males and 32% females, with 72.5% of patients aged 45–65. About 52% were normal weight, 35% were overweight, and less than 10% were obese.

Significant associations were found between BCVA and DR severity ($\chi^2 = 667.8$, $p < .001$). NPDR patients had better vision, with 68.7% demonstrating good vision (0.0-0.5 logMAR), compared to 43.5% of PDR patients. In the low vision group (log MAR >1.3), 28.2% had PDR versus 6.8% with NPDR.

Blood parameters showed gender differences. Males had higher Hb levels (mean difference of 0.87 g/dL) and lower TG (mean difference of 34.42 mg/dL) and TC levels (mean difference of 29.32 mg/dL) compared to females.

Triglyceride levels significantly differed across BMI groups ($F = 4.400$, $p = 0.049$), significant differences were found based on diabetes duration. Hemoglobin levels did not vary significantly among age groups ($F = 3.677$, $p = 0.026$), but triglycerides decreased with age: 18-45 (183.58 ± 136.06), 45-65 (159.46 ± 94.87), and 65 and above (143.53 ± 86.76) ($F = 4.081$, $p = 0.017$). Total cholesterol levels also showed a significant difference across age groups ($F = 6.103$, $p = 0.002$), declining from the 18-45 group (204.79 ± 64.75) to the 45-65 group (186.00 ± 56.25) and further to the 65 and above group (177.02 ± 52.11).

In NPDR vs. PDR patients, HbA1c and Hb levels were lower in PDR (mean difference of 0.17 for HbA1c and 0.19 g/dL for Hb), while serum urea and serum creatinine were higher (mean increase of 4.36 mg/dL for urea and 0.21 mg/dL for creatinine). TG and TC levels showed no significant differences between the two groups.

Conclusions: Among patients with diabetic retinopathy, HbA1c and Hb were lower in PDR, where as urea and creatinine were higher in PDR.

P-EPI-020

The impact of COVID-19 on patients with disorders of refraction and accommodation: analysis of the 2018-2020 MEPS

S.H. Zhao¹, S. Doshi¹, D.D. French²

¹Northwestern University Feinberg School of Medicine, Chicago, United States, ²Departments of Ophthalmology and Medical Social Sciences, Northwestern University Feinberg School of Medicine, Chicago, United States

Introduction: As the COVID-19 pandemic strained healthcare systems and resources were diverted to the most emergent needs related to SARS-CoV2, ophthalmologic care was affected.

Objectives: To determine the impact of COVID-19 on the frequency of ophthalmology visits and vision exams in the US using the Medical Expenditure Panel Survey (MEPS) and to characterize the demographics of patients affected by these changes.

Methods: The MEPS dataset was used to obtain healthcare utilization and demographic data on individuals with a diagnosis of a disorder of refraction or accommodation (ICD-10 code H52) from 2018-2020. Insurance coverage, employment status, race, and ethnicity of all individuals who underwent a vision exam or visited an ophthalmologist in 2020 were compared to those who did not receive these forms of care using Chi-squared and Wilcoxon rank-sum tests at a p-value < 0.05 threshold. Univariate logistic regression was performed to identify significant predictors of undergoing a vision exam or seeing an ophthalmologist during the pandemic. Covariates with a significance level < 0.1 were included in a multivariate logistic regression model.

Results: No statistically significant change was seen in the number of vision exams and ophthalmology visits from 2018, 2019, 2020Q1, 2020Q2, 2020Q3, and 2020Q4 (p=0.7, p=0.13), although ophthalmology visits notably decreased from 2020Q2 to Q3 and decreased from 3.6% of all healthcare visits in 2020Q1 to 1.5% in Q2, 0.2% in Q3, and 0.9% in Q4. A population of 60,513,073 individuals with at least one diagnosis of a disease of refraction or accommodation in 2020 was identified. Among them, 2,044,572 had either a vision exam or ophthalmology visit or both in 2020 while 58,469,131 received neither form of care. Patients who received at least one form of eye care were significantly older and were more likely to identify as Black, have lower total family income, and be unemployed. Statistically significant independent predictors of receiving eye care in 2020 included age and race.

Conclusions: Patients with disorders of refraction and accommodation who received ophthalmologic care in 2020 were more likely to be older, Black, unemployed, and have lower family income — demographics historically most affected by healthcare disparities. Gaps in ophthalmology visits that we presumed would occur due to the pandemic were not observed in this study. Further investigation into what factors led to these patterns may be beneficial in improving eye care access and utilization in the US.

P-EPI-021

Type 2 diabetes as a risk factor for common eye diseases: prospective evidence from China and the UK

J. Fu¹, F. Bragg¹, D. Bennett¹, Z. Chen¹, H. Du¹, China Kadoorie Biobank (CKB) Collaborative Group

¹Clinical Trial Service Unit, Nuffield Department of Population Health, University of Oxford, Oxford, United Kingdom

Introduction: There is a high and increasing global burden of common eye diseases, and understanding of modifiable risk factors is essential for addressing this. Type 2 diabetes (T2D) may be one such factor, but there is uncertainty of its role in some major ocular conditions.

Objectives: Using data from two large-scale prospective cohort studies—China Kadoorie Biobank (CKB) and UK Biobank (UKB)—we aim to investigate the prospective associations between T2D and the incidence of four common eye diseases, cataract, glaucoma, age-related macular degeneration (AMD), and disorders of sclera, cornea, iris, and ciliary body (DSCIC).

Methods: From 2004-08, CKB recruited 512,632 Chinese adults aged 30-79 years from 10 diverse regions. From 2006-10, UKB recruited 422,340 British adults aged 40-79 years with no baseline eye disease. Information on eye diseases diagnosed during follow-up was obtained via linkage with routine healthcare data. Cox regression analyses were used to obtain adjusted hazard ratios (HRs) and associated 95% confidence intervals (CIs) for incident eye diseases after stratification by age-at-risk (5-year groups) and gender (and additionally region in CKB) with adjustment for sociodemographic and lifestyle factors.

Results: Among the CKB participants (mean age 52.0, 59% female), 30,210 (5.9%) had T2D at recruitment. Among the UKB participants (mean age 56.1, 55% female), 21,027 (5.0%) had T2D at recruitment. During a median follow-up of 12 years in CKB and UKB, 18,149 (3.5%, CKB) / 34,086 (8.1%, UKB) incident cases of cataract, 1,882 (0.4%) / 6,224 (1.5%) of glaucoma, 486 (0.1%) / 5,104 (1.2%) of AMD, and 1,225 (0.2%) / 2,998 (0.7%) of DSCIC were recorded. T2D at recruitment was significantly associated with a higher risk of cataract (CKB: HR 1.67, 95% CI 1.59-1.74; UKB: 1.51, 1.46-1.57), glaucoma (1.33, 1.14-1.55; 1.35, 1.23-1.49), and DSCIC (1.39, 1.08-1.78; 1.44, 1.26-1.64). For AMD, there was a 29% higher risk (1.29, 1.16-1.43) associated with T2D in UKB, but no clear association in CKB (0.83, 0.57-1.20). A longer duration of diagnosed T2D at recruitment was associated with a higher HR.

Conclusions: Observational analyses showed higher risks of several major eye diseases associated with T2D in Chinese and British adults, suggesting T2D is an important risk factor. The findings may aid targeted prevention strategies for eye diseases among people with diabetes. Further investigation is needed to assess causality of these associations using genetic approaches such as Mendelian randomization analyses.

P-EPI-022

Efficacy and safety of mass distribution of azithromycin: a vision from Egypt experience

A. Mousa¹, R. A. Mousa², M. Abu Al Saud³

¹Research Department, King Khalid Eye Specialist Hospital, Riyadh, Saudi Arabia, ²Scientific Programs, Nourseen Charity Foundation, Cairo, Egypt, ³Research Department, Etape Eye Center, Cairo, Egypt

Introduction: Mass distribution of Azithromycin is an essential component of the SAFE strategy. There is a need to apply the SAFE strategy in an integrated model where all components should be applied. The affected communities vary in terms of norms, habits, and traditions as well as the available eye care services, where each community has its own specifications. Such specifications may require slight or major modifications of the approaches to apply different model components. Therefore, in each country and within the same country, there is a need to localize the model before implementation to achieve the maximum benefit of the model, increase the success rate, and avoid potential barriers. The current study demonstrates a localized implementation experience in rural and suburban Egypt.

Objectives: To evaluate the Egyptian localized model in terms of success rate and potential complications

Methods: The integrated SAFE strategy was applied in a single district in Egypt, where the internationally recognized model was slightly modified to suit Egyptian circumstances and overcome Egyptian-specific barriers. The model was applied to a district of 340,497 thousand inhabitants, where 67,819 families live in 54,279 households. All of the model components from advocacy, to training and implementation phases, were modified to upscale the model's effectiveness and reduce the effect of local barriers. Such modifications were carefully adopted based on a comprehensive epidemiologic strategy and previous community ophthalmology research and expertise.

Results: Advocacy meetings were held with policymakers and health authorities as well as community leaders. All internationally known forms, posters, and tools were slightly modified as well as the implementation strategy. The training package was conducted on 6 major supervisors, 27 team leaders, and 458 distributors in a well-organized participatory approach. The coverage rate of the model was 89.1% in 5 main regions, 27 villages, and suburban, where the drug was successfully administered to a total of 285,256 inhabitants in 7 plus 2 contingency days. The complication rate was trivial where 11 cases faced mesenteric discomfort, and the overall complication rate was 0.2%. Most of the local and internationally known barriers were overcome.

Conclusions: Mass distribution of azithromycin as a major component of the SAFE strategy is highly effective with a low complication rate. The model should be localized and modified accordingly to avoid variance across different communities.

P-EPI-023

The impact of COVID-19 pandemic outbreak on the prevention of low vision and blindness activities: a systematic review

A. Mousa¹, R. A. Mousa², M. Abu AlSaud³

¹Research Department, King Khalid Eye Specialist Hospital, Riyadh, Saudi Arabia, ²Scientific Programs, Nourseen Charity Foundation, Cairo, Egypt, ³Research Department, Etape Eye Center, Cairo, Egypt

Introduction: The COVID-19 pandemic outbreak had significant impacts on Ophthalmology practice in both hospital-based and community ophthalmology activities. Despite the global opening and canceling of restrictions, impacts such as the defect in training and accumulation of backlog and waiting lists will continue to function. There is a need to develop innovative strategies to avoid these impacts and take future precautions for similar outbreaks that may emerge shortly.

Objectives: To assess the impact of COVID-19 pandemic outbreak on the prevention of low vision and blindness activities

Methods: A thorough literature review was conducted to assess the different impacts of the COVID-19 pandemic outbreak on the prevention of blindness activities. Articles and academic reports were filtered and categorized based on a sophisticated criticism into five main groups; increase in low vision and blindness rates, maximization of barriers to seeking eye care services, decrease in therapeutic and surgical uptake, impact on ophthalmology residency and fellowship training programs, and impact on psychologic and quality of visual life of patients with visual impairment.

Results: During the period from 2020 to 2024 around 836 publications were disseminated. Filtering these publications showed that the Covid-19 pandemic outbreak had multiple significant impacts on decreasing the overall eye care service uptake in both hospital-based clinics and ORs and community ophthalmology activities including holding applying proper treatment modalities, surgical rates, and conduct of outreach caravans, especially in the first two years. Meanwhile, ophthalmology residents and fellows who have limited training duration had to reduce the number of outpatient clinics as well as the attended surgeries. Hence, they did not achieve the target number of surgeries assigned. Moreover, there was a high impact on both the psychological and quality of visual life of the affected patients. Additionally, the complete shutdown during the pandemic duration has increased the backlog of eye care services that required reorganization of services to absorb the increased demand, hence, the progress in prevention activities has deteriorated.

Conclusions: The impact of the COVID-19 outbreak on ophthalmology practice and prevention of blindness activities will continue to have an undesired impact. There is a need to develop effective strategies to overcome such outbreaks and plan for avoiding similar impacts in the future.

P-EPI-024

Characteristics and risk factors of diabetic retinopathy patients in West Java Indonesia: a one-year report

G. Setiawan¹, M. Rini¹, N. Ratnaningsih¹, F. Karfiati¹, M.R. Dahlan¹

¹Department of Ophthalmology, Universitas Padjadjaran, Bandung, Indonesia

Introduction: Diabetic retinopathy (DR) is the major microvascular complication of diabetes mellitus and responsible as the leading cause of vision loss among working-age adults. Several modifiable risk factors such as blood glucose level, systolic blood pressure, blood lipid level, smoking, and body mass index have been proven to be associated with DR progression. With the estimated DM cases reaching 578 million in 2030, public health systems are faced with challenges of increasing costs of implementation and maintenance of DR screening program in people with DM.

Objectives: To describe characteristic and risk factors of DR in primary health care center in Bandung Districts, West Java, Indonesia.

Methods: This was a cross-sectional study during the period of March 2021 until June 2022. We conducted a consecutive sampling method which includes 1080 total participants.

Results: Among 1080 participant with DM, 28.89% (25.16 – 33.12% [95% CI]) were classified to have DR. A total of 32.69% (28.14 – 36.71 [95% CI]) participants with DR had vision threatening DR (VTDR). The prevalence of DR in this study was higher in women (77.23%) with mean age of 57.26 ± 9.17 and duration of DM of ≥ 5-years (56.01%), blood glucose level < 200 mg/dL (63.79%), high systolic blood pressure (52.03%), high diastolic blood pressure (39.07%), normal BMI (55.5%), high waist circumference (43.7%), and high HbA1C (3.42%). A total of 1041 (96.39%) participant had antidiabetic drugs, and 9.63% of them were currently smoking.

Conclusions: This study showed that diastolic blood pressure, abnormal abdominal circumference, and high HbA1C levels were more prevalent in DR and VTDR groups. The findings of this study can be used as a baseline or comparison data for other regions in Indonesia.

P-EPI-025

Paediatric ocular emergencies in Tertiary Eye Care Centre in South India - a retrospective study

D. Swamyraj¹, J. Rajagopalan²

¹Comprehensive Ophthalmology, Aravind Eye Hospital, Puducherry, India, ²Orbit, Aravind Eye Hospital, Puducherry, India

Introduction: Pediatric ocular emergencies (POE) account for very important cause of needless visual morbidity. There are an estimated 55 million eye injuries occurring annually, of which 19 million have vision loss or blindness. There are sparse literature that is available regarding all POE. Paucity of details about incidence of all POE in world literature has been noted in developed countries and such studies have not been carried out in developing country like India that involves the pattern of all ocular emergencies. POE present usually with the mild symptoms but without timely examination and intervention may lead to a lifelong decrease in vision and sub par quality of life. This study has been done aiming to throw more light and fill the void in all POE.

Objectives: This study was aimed to cognize the demographic profile of all pediatric ophthalmology emergencies in tertiary eye Care hospital in south India.

Methods: Retrospective analysis of pediatric ophthalmology emergencies between the age group 0 - 15 years from Electronic Medical Report (EMR) in the time period of July 2021 to July 2022 . Ocular emergencies have been categorized into trauma, chemical injury, infection and inflammation as done in former studies.

Results: 2126 pediatric patients presented to the emergency. 1344 male and 782 female. 47.50% were due to trauma with the most common diagnosis of blunt injury , 24.50% infection with acute conjunctivitis as common diagnosis, 21.58% leukocoria with the most common diagnosis of ROP, 5.93 % chemical injury with the most common diagnosis of corneal abrasion 0.56 % inflammation with panuveitis.

Conclusions: POE majorly concern trauma but other diagnoses such as infection and leukocoria also contribute to a significant percentage of emergencies. Studies have been done to establish patterns of ocular trauma whereas studies to assess the pattern of all POE have not been done. This study is done to assess the profile of POE and emphasise the importance to do further prospective study and the need for maintaining a ocular emergency registry to prevent these injuries and to establish more standardized diagnostic and treatment protocols for the most frequent pathologies. More Ophthalmologists must take up the role in educating parents and their crucial symptoms so the child gets timely help. Focused campaigns also could be designed according to the pattern of emergencies ,as they go behind the horizon in the child getting timely intervention.

P-EPI-026

Outcomes of cataract surgery in dense cataract patients without preoperative ultrasonography

*N. Shabrina*¹

¹Ophthalmology, Eyelink, Tuban, Indonesia

Introduction: Cataract surgery is a common procedure known to significantly improve vision in patients suffering from cataracts. However, in the case of dense and mature cataracts, where visibility of the retina is hindered due to fundus obstruction, predicting visual recovery post-surgery can be challenging. This research aims to assess the extent of visual recovery (measured in decimal) post cataract surgery in patients with mature cataracts, in settings where ophthalmic ultrasound (USG) machines are unavailable.

Objectives: The objective of this study was to evaluate visual improvement rates and identify factors leading to limited progress in patients with dense cataracts who underwent phacoemulsification without preoperative ultrasonography, aiming to contribute valuable data to support clinical decision-making in resource-limited settings.

Methods: Retrospective analysis of data from patients with dense cataracts, obstructing fundus visibility, at Graha Husada Hospital in Tuban City, Indonesia--a facility without ophthalmic ultrasonography--over the year 2023. The effectiveness of the intervention is evaluated by comparing visual acuity measurements, expressed in decimal terms, taken before and one month after the uneventful phacoemulsification cataract surgeries

Results: Of the 122 patients operated, 86.06% experienced improved vision post-surgery of more than 0,4. The remaining 17 patients had minimal visual improvement of less than 0,3 due to various causes, including AMD (2), macular scar (1), pseudophakic corneal edema (2), glaucomatous optic neuropathy (3), severe NPDR (1), refractive surprise (1), astigmatism (5), retinal detachment (1) and corneal scar (1).

Conclusions: Despite fundus view obstructions and the lack of ophthalmic USG, cataract surgery can notably enhance vision in patients with mature cataracts. These results demonstrate that resource scarcity doesn't reduce the effectiveness of surgery, empowering ophthalmologists in remote areas to help individuals in need.

P-EPI-027

Unveiling the impact of duration of type 2 diabetes mellitus on retina and general eye health in Pakistan's population

M. Junaid^{1,2}, F. Ahmed³, Z.-u.- Rehman⁴, I. Ali⁵, S. Naz⁶

¹Executive Director, Mehboob Charity Vision International Eye and General Hospital, Mansehra, Pakistan, ²Faculty of Community Medicines, Lincoln University College, Petaling Jaya, Malaysia, ³Retina Specialist, Department of Medical Retina, Mehboob Charity Vision International Eye and General Hospital, Mansehra, Pakistan, ⁴Consultant Ophthalmologist, Mehboob Charity Vision International Eye and General Hospital, Mansehra, Pakistan, ⁵Quality Control and Research Manager, CQI Department, Mehboob Charity Vision International Eye and General Hospital, Mansehra, Pakistan, ⁶Senior Optometrist, Mehboob Charity Vision Primary Eye Care Clinic, Havelian, Pakistan

Introduction: Type 2 Diabetes Mellitus (T2DM) is a complicated metabolic disease caused by several risk factors, in Pakistan, which is mostly preventable and may be treated. One of the main complications of T2DM is Diabetic Retinopathy (DR) which if undetected and ignored, may lead to irreversible sight loss or perhaps blindness. The study aims to highlight the role of years living with diabetes on the retina and eye health in general.

Objectives: This study aims to explore the relationship between the duration of Type 2 Diabetes Mellitus (T2DM) and the health of the retina in Pakistan. The study aims to identify patterns and correlations, determine the prevalence of diabetic retinopathy, investigate the link between T2DM duration and the progression of diabetic retinopathy, and identify factors that influence diabetic retinopathy in patients with varying T2DM durations.

Methods: This cross-sectional study examines 420 diabetic patients from Mehboob Charity Vision International Eye and General Hospital, Pakistan, diagnosed with type 2 diabetes for at least one year and aged ≥ 40 . The sample was diverse, representing both genders and ethnic backgrounds, and was selected using a simple random sampling. The ethical committee and Board of Research of Lincoln University College, Malaysia authorized the study.

Results: Between May 2023 and January 2024, 3865 patients visited OPD and 420 patients met the inclusion criteria. 90.75% (n=380) had Type 2 diabetes, 69.32% (n=291) participants reside in rural areas and 80.95% (n=340) depicted no formal education. The study revealed varying familial contexts, with 31.90% (n=134) having no family history of diabetes and 8.58% (n=36) having a family history from both parents. Uncontrolled diabetes was found in 73.01% (n=305). The duration of diabetes varied from 21.47% (n=90) diagnosed within 1-5 years followed by 24.53% (n=103) within 6-10 years. The study found a potential decline in visual acuity with increasing diabetes duration. 58.96% (n=248) patients exhibited normal retina, 9.5% (n=40) had mild Non-Proliferative Diabetic Retinopathy and 6.34% (n=27) had Proliferative Diabetic retinopathy (PDR). 26.03% (n=109) presented with cataracts. Hence, suggesting higher complications in the first 10 years of diabetic duration.

Conclusions: The study reveals diabetes duration impacts eye health, with higher complications in 10 years. Prolonged glucose management is crucial for diabetes retinopathy and cataracts. It underscores the need for targeted measures to reduce diabetes' negative effects.

P-EPI-028

Open-globe injuries amid Covid-19 lockdown

H. Nazari¹, D. Koozekanani¹, S. Montezuma¹, Y. Siddiqui², M. Simmons^{1,3}

¹Ophthalmology and Visual Neurosciences, University of Minnesota, Minneapolis, United States,

²University of Minnesota, Minneapolis, United States, ³Rocky Mountain Retina Consultants, Salt Lake City, United States

Introduction: Open-globe injuries (OGI) are major causes of vision loss and require urgent surgical intervention. The COVID-19 pandemic changed many aspects of life between 2020 and 2022, including work, living environments, sports, and recreational activities. To understand if the COVID-19 lockdown changed the rate and characteristics of OGIs, we evaluated all OGIs that presented to a referral academic trauma center during strict COVID-19 lockdown (3/17/2020 - 5/31/2021) and equal periods before and after the lockdown.

Objectives: To determine the impact of the COVID-19 lockdown on the rate of open globe injuries treated in an academic trauma center.

Methods: All patients who underwent open globe repair were identified from electronic medical records. Ocular Trauma Scores (OTS - lower raw trauma scores and OTS are associated with worse visual outcomes) were calculated for each patient based on presenting visual acuity (VA), globe rupture vs. globe perforation, and the presence of RAPD, endophthalmitis, and retinal detachment. ANOVA was used to determine significant differences between raw scores, and Tukey's test assessed differences between pairs. Fisher's exact test was used to analyze the distribution of presenting VA, ocular trauma zones, blunt vs. penetrating mechanisms of injury, OTS, injury setting, and differences in retinal detachments, endophthalmitis, and relative afferent pupillary defects.

Results: Of one hundred thirty-seven patients presented with OGI during the study period, the number of patients presented during and after the lockdown increased compared to the time before the COVID-19 pandemic. Thirty-four patients presented before the lockdown, 53 presented during the lockdown, and 49 presented after the COVID-19 lockdown. Basic demographics and clinical features such as presenting visual acuity and OTS were not significantly different before, during, and after the COVID-19 lockdown. VA was not available for five pediatric patients.

Conclusions: Changes in work and life activities, as well as altered referral patterns, may explain the higher rate of open globe injuries during and after the COVID-19 lockdown compared to the equal period before the lockdown. Educating youth and middle-aged individuals and encouraging proper eyewear for do-it-yourself and recreational activities during lockdowns can potentially lower the incidence and economic burden of open-globe injuries.

P-EPI-029

Needle stick injuries and practice of using needles among healthcare professionals in a tertiary eye-care hospital

S. Al-Swailem¹, A. Alfarhan², M. Alobaid³, K. Ahmad⁴, R. Khan⁵

¹Anterior Segment Division, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia, ²Fellowship and Residency Training Program, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia, ³Department of Ophthalmology, King Saud Medical City, Riyadh, Saudi Arabia, ⁴Research Department, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia, ⁵Medicine Department, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

Introduction: Needle-stick injuries (NSI) are a prominent route by which blood-borne infections are transmitted. The unique microsurgical nature of ophthalmic practice constitutes an additional risk of sustaining injury.

Objectives: This study aimed to identify the epidemiological profile of needle-stick injuries in a tertiary eye center and to evaluate the implemented safety policy in preventing sharp injuries.

Methods: This was a retrospective cross-sectional study of all sharp injuries at tertiary eye-care hospital. Data on all reported sharp injury incidents from 2013 to 2021 were collected. The mechanisms of injury, context, location, and prick type were collected and analyzed. Also, this study involved an institution-based survey for all ophthalmic staff.

Results: Two hundred and one sharp injury incidents were reported over nine years. Physicians sustained 46.8% (n=94) of injuries, followed by nurses and ophthalmic technicians, 40.8% (n=82) and 7% (14), respectively. Operating and treatment rooms were the locations of 60.7% of incidents, whereas outpatient clinics and emergency rooms accounted for 19.4% and 13.4% of injuries, respectively.

Conclusions: The current findings add to the growing literature on the importance of NSI prevention and reporting strategies. In the present study, sharp injuries were most commonly encountered by ophthalmic staff in the operating rooms. Continuous staff education on handling sharp instruments, encouraging anonymous reporting, and up-to-date guidelines and policy revisions are paramount to lessen the burden of sharp injuries.

P-EPI-030

The journey of trachoma evidence in Papua New Guinea

J. Garap¹, A. Cama², G. Cochrane³, M. Yohogu⁴

¹Ophthalmology, The National Department of Health, Port Moresby, Papua New Guinea, ²The Fred Hollows Foundation, Sydney, Australia, ³Collaborative vision, Melbourne, Australia, ⁴The National Department of Health, Port Moresby, Papua New Guinea

Introduction: Papua New Guinea has done 4 researches around Trachoma to to able to tell a story.

Objectives: Collecting evidence to prove that Trachoma is not a public health problem in Papua New Guinea.

Methods: Evaluation of evidence from research done in Papua New Guinea since 2014, The Trachoma Rapid assessment, The Global Trachoma Mapping Project, the Serology study and The Trachoma Ancillary survey to convince relevant authorities that trachoma is not a public health problem..

Results: The evaluation of all the research available to us as well as the monitoring of activities done every year via International Trachoma Initiative- TEMF: shows that trachoma follicles in the pediatric population does not end up as a blinding condition in adult life.

Conclusions: Trachoma is endemic in PNG however it is not blinding. The country is ready to apply for a Dossier to WHO.

P-EPI-031

Heavy eye syndrome (strabismus fixus)

E.N. Punzalan¹, C. Barja¹

¹Ophthalmology, Far Eastern University - Dr. Nicanor Reyes Medical Foundation, Quezon City, Philippines

Introduction: This is a case of a 54-year-old female diagnosed with Heavy Eye Syndrome. This disease occurs in highly myopic patients with large angle esotropia and hypotropia. It is caused by conversion of lateral rectus muscle and the superior rectus muscle function to impaired abduction and supraduction. In Japan, 2.65% of high myopes were reported to have this condition. To date, there is no Philippine consensus report pertaining to the incidence.

Objectives: This paper aims to discuss a case of Heavy Eye Syndrome managed surgically and holistically. This report calls attention to the importance of a high index of suspicion, and early detection considering the functional, cosmetic, and psychological outcome of the patient.

Methods: A case of a 54-year-old female who presented with gradually decreasing vision, eye pain, and inward deviation of both eyes. She previously underwent cataract surgeries on both eyes and retinal detachment surgery on the right eye. The patient also developed open-angle glaucoma and was referred to a strabismus specialist who diagnosed the patient with Heavy Eye Syndrome. The patient underwent strabismus surgery on the left eye with supramaximal recession by hang-back technique of the Left Medial Rectus and transposition of the left Superior Rectus and left Lateral Rectus by Jensen procedure without splitting the muscles augmented by a 2-point suturing of the adjacent halves of the muscles.

Results: Supra Maximal Medial Rectus Recession (Hangback Technique) and Augmented Partial Jensen Technique with a 2-point (15 mm, 10 mm from insertion) suturing of the adjacent halves of the superior rectus and lateral rectus is an effective surgical approach, achieving good alignment and return of extraocular movement function.

Conclusions: Heavy Eye Syndrome is a strabismus resulting from high myopia due to protrusion of the large globe to the supero-temporal quadrant of the orbit displacing the superior rectus nasally and the lateral rectus inferiorly. It is primarily established through ophthalmologic and imaging examinations to quantify the ocular parameters and recognize subtle clinical clues in the history leading to the diagnosis of this condition. This syndrome poses a great diagnostic and therapeutic challenge to Ophthalmologists. A high index of suspicion and early detection is helpful in the proper management of this condition. A well-planned surgical approach is of utmost importance for good functional and cosmetic results in strabismus surgery.

P-EPI-033

Enhancing primary eye care data management using free and open source OpenDataKit platform

V. Gupta¹, S Sarath¹, P. Vashist¹, S.S Senjam¹, R. Sharma¹, A. Bharadwaj¹

¹Dr RP Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

Introduction: Smartphone technology can improve efficiency of data management in primary eye care.

Objectives: Strengths, weaknesses, opportunities and threats analysis of primary eye care data acquisition and management using free smart phone-based OpenDataKit (ODK) platform

Methods: A mixed methods evaluation conducted in vision centres located in north India, which have transitioned to ODK from prior spreadsheet based system. Meta-data of records from 2022-2023 were analysed. Qualitative feedback was collected from data managers, field teams and program managers through structured interviews.

Results: Vision centres team utilised ODKCollect application on Android smartphones to routinely collect data on patient records, diabetic retinopathy screening, health education and volunteer training activities. Metadata of 1,10,231 patient records showed median data entry time was 80 seconds (IQR: 55-131) in 2022, reducing to 72 seconds (IQR: 50-113) in 2023 (P < 0.001).

Strengths reported by data managers were improvements in data accuracy due to logical checks, obviation of hassle to manage paper-registers and real-time dissemination of daily reports and a gain of approximately 120 man-hours per month, and reduction in time to generate donor-wise monthly performance report to < 1 day from 2-3 days pre-transition. Vision centre teams reported ODKCollect did not result in extra burden, and a reduction in time for data reconciliation from 180-240 to 10-15 minutes per week. Program managers reported generation of real time indicators such as mean daily attendance, proportion refracted, disability profile etc relevant to program monitoring as a major benefit. A weakness was non-matching of daily reports of field team and data manager (as was done before transition) potentially leading to unforeseen errors. Agility in data management, such as iterations of data collection forms, developing additional forms such as cataract surgical record, and distributing revised forms rapidly via QR codes, was a major opportunity. Threat included outages of ODK-Central server and possible loss of data in case of smartphone malfunction. However, no instance of data loss was reported and managing Android phones was not reported to be a concern.

All stakeholders felt that the advantages of the ODK based system outweighed the risks.

Conclusions: Digital data acquisition and management of primary eye care facility using ODK has numerous advantages in resource constrained settings and can be effectively incorporated.

Glaucoma

FT-GLA-001

Quantitative analysis of dynamic iris changes in primary angle closure disease with long axial lengths

Y. Zhang¹, J. Wang¹, Y. Wang¹, M. He², N. Wang¹

¹Beijing Tongren Hospital, Beijing, China, ²The Hong Kong Polytechnic University, Hongkong, China

Introduction: Our previous study investigated the static anterior segment characteristics of primary angle-closure disease (PACD) with long axial length (AL) compared to short and medium AL and found that eyes with long AL tended to have a larger ACD and smaller lens thickness. However, among the three groups with different ALs, we did not find significant differences in iris parameters such as the iris cross-sectional area (IA), iris thickness (IT), and iris curvature (IC), each of which is a proven independent risk factor for the development of PACD.

Objectives: To investigate dynamic iris changes in patients with primary angle-closure disease (PACD) with long axial length (AL) compared to those with short and medium AL.

Methods: This observational cross-sectional study enrolled subjects aged 35 years or older from follow-up of the Handan Eye Study who were diagnosed with PACD and underwent anterior segment optical coherence tomography (ASOCT) imaging under light and dark conditions. The right eye of each participant was included in the analysis. AL was categorized as short (<22.0 mm), medium (≥ 22.0 to ≤ 23.5 mm), or long (>23.5 mm). The anterior segment parameters including iris dynamic changes were compared among the three groups with different ALs.

Results: Data from 448 patients with PACD were analyzed. We found that 10.9% of included eyes had a long AL, with flatter cornea, larger central anterior chamber depth, angle opening distance, anterior chamber width, anterior chamber area and volume, and smaller lens thickness and lens vault (LV) ($P < 0.05$) than those with short AL. No significant difference existed between the three groups in IT, IA, IC, and pupil diameter (PD) change between light and dark ($P > 0.05$). The significant risk factors for IA changes were area recess area in the dark, LV in the dark, and PD change from light to dark ($P < 0.05$).

Conclusions: Dynamic and static iris parameters remained stable in patients with PACD with short, medium, or long AL and may contribute to the pathogenesis of angle closure in those atypical PACD.

FT-GLA-002

Differential impact of TLCPD on optic disc vasculature in glaucoma rat models: insights from high-resolution OCTA

S.T. Ren^{1,2}, J. Zhang¹, X. Fan¹, N. Wang¹

¹Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Medical University Beijing, Beijing, China, ²Department of Ophthalmology, Beijing Friendship Hospital, Capital Medical University Beijing, Beijing, China

Introduction: Whereas fluctuations in translaminar cribrosa pressure difference (TLCPD) have been identified as a risk factor for glaucoma and other optic neuropathies, research into their effects on vascular dynamics on optic disc is sparse.

Objectives: This study investigated and characterized the retinal and choroidal microvascular changes in the optic disc region associated with various etiologies of increased TLCPD, specifically due to elevated intraocular pressure (IOP) or decreased intracranial pressure (ICP).

Methods: Adult SD rats were assigned into high IOP or low ICP groups (n=12 each). IOP elevation or ICP reduction was induced by ischemic reperfusion (IR) or continuous cerebrospinal fluid drainage, respectively. A novel optical coherence tomography angiography (OCTA) device with enhanced resolution and depth penetration was employed to assess retinal blood flow and morphological changes at the optic disc region on day 0, 4 and 7 post-interventions. Vascular changes and retinal thickness were quantified in superficial (SVP), intermediate (IVP), deep vascular plexuses (DVP), and choroidal circulation.

Results: Significant reduction in vascular metrics was observed for both groups since day 4 post-injury. In the high IOP group, early RGC apoptosis was mainly correlated with a reduction in SVP (caliber width: $r^2=0.04$, $\beta=-0.24\%$, $p<0.01$; flow density: $r^2=0.07$, $\beta=-0.42\%$, $p<0.01$), suggesting direct effects on nerve fiber layer perfusion. In the low ICP group, the choroidal vascular features were primarily affected at day 4, negatively correlated with optic nerve damage (caliber width: $r^2=0.02$, $\beta=-0.25\%$, $p<0.05$; tortuosity: $r^2=0.04$, $\beta=-0.24\%$, $p<0.01$; skeleton density: $r^2=0.06$, $\beta=-0.23\%$, $p<0.001$), indicating a notable impact of increased TLCPD on choroidal circulation, particularly affecting vessels supplying the lamina cribrosa. By day 7, impairment of DVP became more pronounced (caliber width: $r^2=0.08$, $\beta=-0.41\%$, $p<0.0001$; flow density: $r^2=0.03$, $\beta=-0.30\%$, $p<0.05$; skeleton density: $r^2=0.06$, $\beta=-0.30\%$, $p<0.01$), reflecting ongoing vascular compromise in association with optic nerve injury progression.

Conclusions: This study revealed distinct vascular responses to glaucomatous pressures: high IOP affects retinal circulation, while LICP-induced TLCPD impacts choroidal and deep retinal circulation at the optic disc. Understanding the differential vascular dynamics may illuminate early pathological triggers of glaucoma.

FT-GLA-003

Zonular instability-associated morphologic features in eyes with primary angle closure disease using CASIA 2 AS-OCT

X. Pei¹, S. Wang¹, Z. Fan¹

¹Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Medical University, Beijing Ophthalmology and Visual Science Key Laboratory, Beijing, China

Introduction: Primary angle-closure glaucoma (PACG), the leading cause of irreversible visual impairment and blindness, is the most severe form of primary angle closure disease (PACD) with the highest incidence in the Asian population. Primary phacoemulsification (phaco) in combination with intraocular lens (IOL) implantation has been regarded as the first-line therapy for PACD. However, lens zonular instability and weakness have been frequently observed in PACD eyes during cataract surgery. . The present study aimed to explore the lens morphologic features of PACD eyes with zonular instability during cataract surgery using the CASIA 2 AS-OCT system.

Objectives: This study aims to investigate the morphologic features of the crystalline lens in Primary Angle Closure Disease (PACD) patients with zonular instability during cataract surgery using the swept-source CASIA 2 Anterior Segment-Optical Coherence Tomography (AS-OCT) system.

Methods: A total of 398 eyes (125 PACD eyes with zonular instability, 133 PACD eyes with zonular stability, and 140 cataract patient controls) of 398 patients who underwent cataract surgery combined or not glaucoma surgery between January 2021 and January 2023 were enrolled. The crystalline lens parameters were measured by CASIA2 AS-OCT. Then, logistic regression analysis was performed to evaluate the risk factors associated with zonular instability.

Results: The results revealed that PACD eyes had a more anterior lens equator position, a steeper anterior curvature of lens, shorter Axial Length (AL), shallower Anterior Chamber Distance (ACD), higher Lens Vault (LV) and thicker Lens Thickness (LT), when compared to eyes in the cataract control group. Furthermore, PACD eyes in the zonular instability group had steeper front R, front Rs and Front Rf, flatter back Rf, thicker lens anterior part thickness, higher lens anterior-to-posterior part thickness ratios, shallower ACD, and greater LV, when compared to PACD eyes with zonular stability. The logistic regression analysis, which was adjusted for age and gender, revealed that zonular instability was positively correlated with anterior part thickness, lens anterior-to-posterior part thickness ratio, and LV, but was negatively correlated with lens anterior radius and ACD.

Conclusions: Steeper anterior curvature, increased lens anterior part thickness, higher anterior-to-posterior part thickness ratio, shallower ACD, and greater LV are the anatomic features of PACD eyes associated with zonular instability.

FT-GLA-004

Long-term outcomes after acute primary angle closure: case series from Moorfields Eye Hospital, United Kingdom

S. Baboolal^{1,2,3}, S. Hamid⁴, F. Matarazzo⁴, P.P. Foster⁵, D. Muhundhakumar⁴, Z. Sun⁶

¹Glaucoma, Moorfields Eye Hospital, London, United Kingdom, ²College of Health Sciences, University of KwaZulu Natal, Durban, South Africa, ³Ophthalmology Department, James Paget University Hospital NHS Foundation Trust, Great Yarmouth, United Kingdom, ⁴Glaucoma Service, Moorfields Eye Hospital, London, United Kingdom, ⁵Institute of Ophthalmology, NIHR Biomedical Research Centre at Moorfields Eye Hospital NHS Found Trust, London, United Kingdom, ⁶Institute of Ophthalmology, NIHR Biomedical Research Centre at Moorfields Eye Hospital NHS Foundation, London, United Kingdom

Introduction: There is limited data regarding the morbidity and progression to primary angle closure glaucoma in those presenting with acute primary angle closure in the United Kingdom.

Objectives: We aim to report on the vision and intraocular pressure outcomes and treatment required after an APAC episode and to identify any risk factors that could predict worse outcomes.

Methods: A retrospective observational case series review was conducted on 117 consecutive patients (121 eyes) attending Moorfields Eye Hospital, at a tertiary referral unit in the UK, with acute primary angle closure.

Results: Most patients (73%) had visual acuities of $\geq 6/12$ at final follow up. Only 15% (17 eyes) had severe visual impairment, as defined by the World Health Organization, in the affected eye of which 6.6 % (8 eyes) were due to glaucoma. Delayed presentation was linked to higher need for further medical treatment (OR [95% CI]=2.83 [1.09-7.40]; P=0.03). Patients who underwent phacoemulsification were at lower risk of having blindness in the affected eye (OR [95% CI] = 0.18 [0.05-0.69]; P=0.01), having elevated intraocular pressure (OR [95% CI]=0.10 [0.01-0.75]; P=0.02) or requiring further medical treatment (OR [95% CI]=0.34 [0.12-0.99]; P=0.04). Older age (OR [95% CI]= 1.26 [1.08-1.48]; P<0.01) was associated with worse visual outcome.

Conclusions: Acute primary angle closure causes low long-term visual and treatment morbidity in this largely Caucasian patient group in the United Kingdom. Phacoemulsification as a treatment may enhance visual outcomes, and reduce the need for further IOP lowering treatment.

FT-GLA-005

Exploring the correlation between intracranial pressure and ocular hypertension: a mathematical perspective

*W. Dendumrongsup*¹

¹Faculty of Medicine, Chulalongkorn University and King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Bangkok, Thailand

Introduction: Complex interplay between intraocular pressure (IOP), intracranial pressure (ICP), and glaucoma has been implicated in patients with neurological diseases. Whether IOP is a reliable non-invasive surrogate of ICP remains conflicting in literature, and large-scale clinical investigations are scarce.

Objectives: The aim of the current study was to mathematically investigate the potential correlation between ICP and ocular hypertension.

Methods: Mathematical equations correlating IOP with ICP were governed to capture the equilibrium state of both the volume of aqueous humor and the mass of chemical species production and drainage. Independent physiologic parameters predicting IOP include trabecular outflow facility, uveoscleral outflow fraction, plasma protein concentration, albumin/globulin ratio, pulse pressure, body mass index, ICP, episcleral venous pressure, plasma osmolarity, and age. Global sensitivity analysis by the Monte Carlo simulation of 8,192 samples was then computationally performed to rank the importance of each parameter.

Results: The simulation outcome showed that trabecular outflow facility is the most important determinant of IOP. The relationship between ICP and IOP exists but was found to be relatively minor and in a positive fashion. Higher translaminal pressure difference across the lamina cribrosa, which was calculated as $IOP - ICP$, correlates with lower trabecular outflow facility. The model suggests that patients with lower trabecular outflow facility (as observed in primary open angle glaucoma or ocular hypertension) possess lower ICP, compared with their counterparts with the same IOP level.

Conclusions: This study demonstrated a relatively minor positive correlation between IOP and ICP. However, relying on IOP as a surrogate for ICP or vice versa may be insufficient due to complex interplay with other parameters. Further clinical research is warranted to investigate pharmaceutical agents that safely increase ICP as a novel therapeutic approach for glaucoma. Additionally, the clinical significance of the potential glaucoma risks associated with ICP-lowering surgical procedures merits further investigation.

FT-GLA-006

Prospective RCT, of BANG versus conservative treatment, for evaluation IOP, AGM and quality of life in POAG patients

S. Raj¹, GS Meghana¹, S. Agarwal¹, S. Pandav¹, TT Faisal¹, S. Kaushik¹

¹Advanced Eye Centre, Post Graduate Institute of Medical Education and Research, Chandigarh, India

Introduction: Minimally Invasive Glaucoma Surgery (MIGS) is being in use since last decade. Bent Ab Interno Needle Goniectomy (BANG) is a cost effective MIGS procedure compared to other MIGS. Most of studies in literature reflect combining it with cataract in mild to moderate POAG patients. Standalone BANG is not described in literature. We did a prospective, randomized, controlled, comparative study of BANG versus Conservative Treatment in mild to moderate POAG patients. Being cost effective, BANG is more suitable for developing countries.

Objectives: To find efficacy of BANG versus Conservative Treatment for lowering IOP, AGMs and improving Quality of Life in POAG patients.

Methods: 46 patients were recruited prospectively from glaucoma clinic of a tertiary institute and randomized in two groups- Group A: BANG (N=23) and Group B: Conservative management (N=23). Group A underwent BANG and Group B managed conservatively. Patients were evaluated for IOP control, number of AGMs and QOL as primary outcome and VA, VF, Endothelial cell density, CCT and complications as secondary outcome at baseline and follow up visits at 1,7,30 and 90 days. For IOP, success was defined as IOP <21 mmHg or at least 20% reduction from baseline.

Results: Baseline characteristics were comparable between two groups. IOP was less than 21 mmHg in all patients- 18 without medication and 5 on 1 or 2 medication in Group A. IOP reduction change was significant at 3 month FU. In Group B, IOP change was not significant. Comparing two groups, there was a significant change in IOP at final FU. AGMs decreased by 91.7% in Group A and increased by 34.1% in group B at final FU. QOL improved in Group A and deteriorated in group B significantly and comparing QOL in two groups was also significant. Comparing two groups for VA, VF, CCT at 3 M showed significant change. Most of complication in group A were mild and transient except iris atrophy persisted in one patient.

Conclusions: Standalone BANG is a cost effective procedure suitable for developing countries. AGMs decreased by 91.7% at 3 months. Can be used as an alternative to costly MIGS. Quality of life also improved.

FT-GLA-007

Association between Dietary Inflammatory Index and risk of glaucoma: a population-based analysis

H. Shan¹, Y. Tian¹, Y. Tao¹

¹Department of Ophthalmology, Beijing Chaoyang Hospital, Capital Medical University, Beijing, China

Introduction: The dietary inflammatory index (DII), a literature-derived dietary assessment tool based on 45 food parameters, is designed to estimate the overall dietary inflammatory potential by a scoring algorithm and is associated with various inflammatory markers, including C-reactive protein, interleukin-6 and tumor necrosis factor-alpha. Chronic inflammation plays a significant role in the etiology of glaucoma, which might be affected by dietary intake.

Objectives: This study aimed to investigate the association between DII and the risk of glaucoma.

Methods: A cross-sectional analysis using data from the National Health and Nutrition Examination Survey (2005–2008) was conducted on 5,659 American participants, among whom 383 reported a diagnosis of glaucoma. DII scores were calculated based on the dietary questionnaire. The association of DII scores with glaucoma was evaluated by adjusted multivariate logistic regression analyses, which were further investigated in the subgroups.

Results: In the fully adjusted models, the odds ratio (OR) for glaucoma participants in the highest and middle tertiles of DII scores were 1.36 (95% confidence interval [CI]: 1.05–1.77) and 1.08 (95% CI: 0.83–1.42), compared to the lowest tertile ($P_{\text{trend}}=0.020$). Moreover, we also observed a dose-response correlation between the DII and the glaucoma risk by the restricted cubic spline analysis ($P=0.043$). In subgroup analyses, the significant positive association between DII scores and the glaucoma risk was also observed in male participants (OR_{tertile 3 vs 1}: 1.47, 95% CI: 1.01–2.14; $P_{\text{trend}}=0.044$), participants with diabetes (OR_{tertile 3 vs 1}: 1.69, 95% CI: 1.07–2.67; $P_{\text{trend}}=0.025$), participants with obesity (OR_{tertile3 vs 1}: 1.65, 95% CI: 1.07–2.55; $P_{\text{trend}}=0.024$).

Conclusions: This nationally representative study found that increased intake of the pro-inflammatory diet, as a higher DII score, was positively associated with glaucoma risk among American adults. Our results suggested anti-inflammatory dietary interventions may be promising in the prevention of glaucoma. Further prospective studies are necessary to confirm these findings.

FT-GLA-008

Navigating microgravity, the relationship between intraocular pressure, and astronaut eye health

A. Zarrinbakhsh^{1,2}, N. Gupta^{2,3,1,4,5}, X. Zhou^{2,4}, Y. Liang⁶, Y. Yücel^{2,1,4,7,8}

¹Laboratory Medicine & Pathobiology, University of Toronto, Toronto, Canada, ²Keenan Research Centre for Biomedical Science, St. Michael's Hospital, Toronto, Canada, ³Department of Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada, ⁴Department of Ophthalmology & Vision Sciences, University of Toronto, Toronto, Canada, ⁵Dalla Lana School of Public Health, University of Toronto, Toronto, Canada, ⁶Department of Mathematics, Toronto Metropolitan University, Toronto, Canada, ⁷Department of Physics, Toronto Metropolitan University, Toronto, Canada, ⁸Institute of Biomedical Engineering, Science and Technology, Toronto Metropolitan University, Toronto, Canada

Introduction: Spaceflight-Associated Neuro-ocular Syndrome (SANS) is a newly identified eye and optic nerve pathology with an unclear cause, posing risks to astronauts' health and long-duration space missions. Although microgravity impacts intraocular pressure (IOP), which could significantly influence SANS, its changes have not been thoroughly explored in this context.

Objectives: A longitudinal study using NASA's hindlimb unloading (HU) model, an affordable and accessible mouse analog for microgravity, was conducted to examine microgravity's effects on IOP dynamics. This approach aims to better understand microgravity's role in SANS and potentially guide future astronaut health strategies.

Methods: A HU protocol was developed, suspending mice by their tails at an approximate 30-degree angle for 21 days, followed by a 14-day recovery period. Twenty male B6(Cg)-Tyr^{c-21}/J albino mice were randomly assigned to either the control (n=10) or HU (n=10) group. Serial in vivo tonometry was conducted on both eyes at baseline (day 0), during suspension (days 8, 14, and 21), and post-recovery (days 22, 28, and 35) to assess IOP. Concurrent body weight measurements were taken. The control group was not subjected to suspension but followed an identical assessment schedule. Linear mixed-effects models were employed to analyze longitudinal changes in IOP between the HU and control groups comprehensively.

Results: Significant increases in IOP were observed in the HU group on day 14 compared to baseline (day 0) in both the right and left eyes ($p < 0.05$ for each). Consequently, a splined mixed-effects model was utilized to further examine the IOP changes before and after day 14 in both groups. In the HU group, IOP significantly rose from day 0 to day 14 in the right eye ($p < 0.05$), followed by a notable decrease from day 14 to day 35 in both eyes ($p < 0.05$ for each). Conversely, the control group exhibited no significant IOP changes at any time point (all $p > 0.05$).

Conclusions: The study demonstrated that IOP increases from baseline to day 14, then decreases to near baseline levels, underlining the potential of HU as a valuable model for investigating the ocular changes experienced by astronauts. This finding suggests that HU could be an effective method for studying the mechanisms behind astronaut eye changes, offering insights into preventive and therapeutic strategies for SANS.

FT-GLA-009

Characterization of macular perfusion heterogeneity in glaucoma using optical coherence tomography angiography

H. Jung¹, T. Tse², Y. Chen², A. Chen², M.J. Ju^{2,3}, Z. Mammo³

¹Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²School of Biomedical Engineering, University of British Columbia, Vancouver, Canada, ³Department of Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: Dysregulation of retinal blood flow has been implicated in the pathogenesis of glaucomatous optic neuropathy, although its exact role in disease onset and progression is poorly understood. Optical coherence tomography angiography (OCTA) enables non-invasive characterization of the temporal and spatial perfusion heterogeneity of the retinal microvasculature.

Objectives: To compare the perfusion heterogeneity in the macular microcirculation of patients with open angle glaucoma (OAG), normal tension glaucoma (NTG), and controls, using a novel OCTA-based quantification algorithm.

Methods: Research ethics board approval and written informed consent from all patients were obtained. Patients with a diagnosis of OAG or NTG, with no cardiovascular risk factors or vasoactive medications, underwent recruitment and imaging from August 2021 to November 2023. Each patient underwent ten serial acquisitions with a PlexElite 9000 swept-source OCTA (Carl Zeiss Meditec, Dublin, CA, USA) system centered at a 3x3 mm area of the fovea with an individual scan time of 2 seconds. 3D image registration was performed on the raw OCTA volume data, excluding any volumes with significant motion artifacts. The pixel-wise coefficient of variation (CoV) was then measured as a measure of temporal perfusion heterogeneity.

Results: A total of 38 control, 52 OAG, and 21 NTG patients were imaged; of which, 9 control, 10 OAG, and 7 NTG eyes met the inclusion criteria. Age (mean (SD)) of the control, OAG, and NTG patients were 58.7 (10.4), 67.4 (6.6), and 63.1 (10.5) years, respectively ($p=0.15$). Mean deviation (mean (SD)) on 24-2C visual field was -5.73 (9.16) and -8.44 (5.14) for the OAG and NTG patients, respectively ($p=0.08$). CoV (mean (SD)) for the control, OAG, and NTG groups were 0.184 (0.036), 0.204 (0.024), and 0.234 (0.024), respectively ($p<0.001$). Post-hoc Nemenyi tests found a significant difference in CoV between controls and NTG patients ($p<0.001$).

Conclusions: Patients with NTG demonstrated significantly greater perfusion heterogeneity than controls. 3D image registration and pixel variation analysis of OCTA data provides a non-invasive, robust method to assess temporal and spatial perfusion heterogeneity in the macular microcirculation. Compared to previous methodologies that used machine-generated post-processed OCTA data for pixel variation analysis, our current method of using raw OCTA volume data enables objective comparison across different patient groups.

FT-GLA-010

Three-month non-inferiority trial on the safety and efficacy of Nanodropper®-mediated microdrops in glaucoma patients

J.S Steger¹, J.E Capó-Aponte², A. Papp², A.J Schulte², E. Colantuoni³, J.C Kelstrom²

¹Nanodropper, Inc., Rochester, United States, ²Ophthalmology, Wilford Hall Eye Center, Lackland Air Force Base, United States, ³Johns Hopkins University, Baltimore, United States

Introduction: Open-angle glaucoma (OAG) and ocular hypertension (OHT) treatment may involve daily administration of intraocular pressure-lowering (IOP-L) eyedrops, yet 30-80% of glaucoma patients do not adhere to their treatments. Microdrops (MD; <20 µL) have been shown in an acute setting (< 24 hours) to have comparable efficacy and improved side effect profiles compared to conventional eyedrops (CD; >20 µL) and may extend bottle life.

Objectives: We performed a prospective, non-inferiority, crossover, single-masked, randomized, active-controlled trial in OAG/OHT patients to evaluate the effects of IOP-L MD administered with the Nanodropper® eyedrop bottle adaptor over three months on IOP, premature bottle exhaustion (PBE), and side effects compared to the use of CD.

Methods: Thirty stable OAG/OHT subjects on latanoprost 0.005% (n = 21) or timolol maleate 0.5% (n = 9) were enrolled in this two-period crossover study. Twenty-nine subjects completed the study and thus comprise the per-protocol population (n = 20 on latanoprost 0.005%, n = 9 on timolol 0.5%), for which results are reported below. Subjects were randomized to administer CD or MD of their IOP-L eyedrops for 3 months before crossing over to the other treatment. IOP, side effects, and PBE were assessed at baseline, crossover, and final visits.

Results: Results are reported as mean ± SD. Compared to baseline IOP of 16.5 ± 2.8 mm Hg, 3 months of treatment with CD and MD decreased IOP by 0.2 ± 1.1 mm Hg to 16.3 ± 2.8 mm Hg (p=0.408) and 1.6 ± 2.0 mm Hg to 14.9 ± 2.9 mm Hg (p=0.0002), respectively. The relative IOP decreases (i.e., percentage decrease from baseline) were 0.9 ± 6.5% (p=0.484) and 9.4 ± 11.4% (p=0.0001) in the CD and MD groups, respectively. Non-inferiority and superiority of MD were established for IOP. 80% and 17.2% of subjects experienced PBE (i.e., ran out of their eyedrops before the end of the month) at least once during treatment with CD and MD, respectively. Treatment with MD reduced the total number of PBE events by 87.2%, from 39 in the CD group to 5 in the MD group (p<0.0001). MD reduced PBE prevalence by 80% compared to CD. Side effects prevalence following treatment with CD and MD were 34 ± 26.1% and 11.5 ± 12.3%, respectively (p=0.0016). MD decreased side effects prevalence by 67% compared to CD. Totalling the count x severity (scale of 1 to 5 where 1 is mild and 5 is severe) of the 14 assessed side effects, treatment with MD decreased this metric by 70.4%, from 203 in the CD group to 60 in the MD group (p=0.0014).

Conclusions: MD provided non-inferior and superior IOP-L efficacy and decreased prevalence of PBE events and side effects compared to CD in this cohort of OAG/OHT patients.

FT-GLA-011

Predictive factors for intraocular pressure change after phacoemulsification in eyes with filtering blebs

A. Narita^{1,2}, T. Miyake¹, M. Sokooshi¹, H. Noda¹, S. Fukada¹, R. Akatsuka¹, E. Akimoto¹, J. Seguchi¹, Y. Morizane²

¹Ophthalmology, Okayama Saiseikai General Hospital, Okayama, Japan, ²Ophthalmology, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Science, Okayama, Japan

Introduction: Cataract formation is widely accepted as a complication of trabeculectomy (trab). However, a greater risk of intraocular pressure (IOP) increase after cataract surgery has been shown in eyes with filtering blebs.

Objectives: To identify factors that predict IOP change after phacoemulsification (phaco) in eyes with filtering blebs.

Methods: This retrospective cohort study included 76 eyes with filtering blebs of 71 Japanese patients who underwent phaco after trab. Filtering blebs were examined using swept-source three-dimensional anterior segment optical coherence tomography (3D AS-OCT) and evaluated for quantitative bleb parameters, namely maximum bleb height, maximum bleb wall thickness, and the ratio of the hyporeflective space volume to the total bleb wall volume. Success was defined as an IOP increase ≤ 2 mmHg from pre-phaco IOP without additional glaucoma medication or glaucoma surgery at 1 year after phaco. Based on the success criteria, the eyes were classified into two groups, namely the successful and unsuccessful groups. Pre-phaco characteristics and 3D AS-OCT bleb parameters were compared between the two groups. Associations between the IOP change after phaco and age, time interval from trab to phaco, pre-phaco IOP and pre-phaco 3D AS-OCT bleb parameters were assessed with Spearman's rank correlation coefficient (r_s). Multiple regression analysis was used to identify the factors associated with the IOP change after phaco.

Results: The mean IOP of 8.7 ± 2.0 mmHg before phaco increased significantly to 9.9 ± 2.1 mmHg at 1 year after phaco ($P < 0.001$). There were significant differences between the successful and unsuccessful groups in terms of the interval from trab to phaco ($P = 0.019$), pre-phaco glaucoma medications ($P = 0.009$) and pre-phaco maximum bleb height ($P = 0.042$). The IOP change after phaco showed significant correlations with the interval between trab and phaco ($r_s = -0.320$; $P = 0.005$), pre-phaco IOP ($r_s = -0.424$; $P < 0.001$) and pre-phaco maximum bleb height ($r_s = 0.284$; $P = 0.013$). Multiple regression analysis confirmed that the IOP change after phaco was significantly associated with the interval between trab and phaco ($P = 0.005$), pre-phaco IOP ($P = 0.003$), and pre-phaco maximum bleb height ($P = 0.022$).

Conclusions: The time interval between trab and phaco, pre-phaco IOP and pre-phaco maximum bleb height may predict the IOP change at 1 year post-phaco in eyes with filtering blebs. Well-functioning filtering blebs are more likely to be susceptible to the effects of phaco.

FT-GLA-012

The effect of visual training on remodeling structures and functions of optic nerve and retina in glaucoma patients

Y. Lu¹, M. Zhao²

¹Beijing Shijitan Hospital, Capital Medical University, Beijing, China, ²Shandong Public Health Clinical Center, Jinan, China

Introduction: Glaucoma is a blinding eye disease characterized by retinal ganglion cell apoptosis and characteristic visual field defects. Glaucoma treatments could control the intraocular pressure of glaucoma patients within a safe range, but could not reverse the damages. Nerve cells can not regenerated under physiological conditions, but their function may compensate when damaged, and the plasticity of nerve cells could be increased by visual training.

Objectives: To investigate the effect of virtual reality visual training on remodeling retinal and optic nerve structures, improving macular sensitivity and stereopsis function in glaucoma patients. And analyze the influencing factors of visual training effect.

Methods: Fifty-eight glaucoma patients(116 eyes) with well-controlled intraocular pressure were included, and equally divided into two groups. The visual training group received virtual reality visual training for 3 months, while the control group did not. All patients underwent OCT examination and visual field examination at enrollment and 3 months later. Parapapillary nerve fiber layer(pRNFL) thickness, macular retinal ganglion cell-internal plexiform layer(mGCIPL) thickness, disc edge area, optic cup volume, optic disc area, cup-to-disc ratio, and mean macular sensitivity(mMS) were statistically analyzed between the two groups. Furthermore, the patients in visual training group were divided into groups according to gender, age, visual field index(VFI), and mean defect(MD), to analyze how these factors affect the effects of visual training.

Results: After three months, there was no statistically significant difference in all parameters between the training group and the control group($p>0.05$); however, compared with the control group, the visual training group had larger variations of mean pRNFL thickness($p=0.001$), disc area($p=0.025$), mean mGCIPL thickness($p<0.0005$) and minimum mGCIPL thickness($p=0.010$), and a smaller optic cup volume($p=0.003$) as well as a higher mMS($p=0.007$). Compared with pre-training, male patients had increased mean mGCIPL thickness($p=0.043$) and decreased optic disc area($p=0.006$) after 3 months of visual training. The mean value of mGCIPL thickness increased($p=0.009$), optic disc area($p=0.003$) and optic cup volume decreased($p=0.029$) in young glaucoma patients; mMS increased($p=0.019$) in middle-aged glaucoma patients. The mMS increased($p<0.05$) in glaucoma patients with mild visual field impairment($VFI>80\%$ and $MD>-6.00\text{dB}$) after 3 months of visual training, and glaucoma patients with severe visual field impairment($VFI<50\%$ and $MD<-12.00\text{dB}$) showed an increase in mean mGCIPL thickness and a decrease in optic disc area after 3 months of training ($p<0.05$). When the mean mGCIPL thickness $\leq 60\mu\text{m}$, the mean mGCIPL thickness increased($p=0.011$) and optic disc area decreased($p=0.010$) after 3 months of visual training.

Conclusions: Visual training can increase pRNFL thickness and mGCIPL thickness and improve central visual sensitivity in glaucoma patients. Gender, age and course of glaucoma disease could influence the represents of visual training effect.

FT-GLA-013

Development and evaluation of the scoring system basing on the SD-OCT maps for diagnosing primary open angle glaucoma

K. Qiu¹, L. Jing¹, M. Zhang¹

¹Joint Shantou International Eye Center of Shantou University and the Chinese University of Hong Kong, Shantou, China

Introduction: Although in vivo measurement of RNFL thickness with OCT is emerging as an important diagnostic technology for glaucoma, considerable anatomical variation of the macular thickness and RNFL thickness profile has been reported, which confounds the assessment of glaucoma. A diagnostic scoring system based on multiple parameters would be useful for glaucoma diagnosis.

Objectives: To develop and evaluate a more succinct scoring system for diagnosing POAG by combining the characteristic manifestations of thickness map and deviation map of the retinal nerve fiber layer (RNFL) and ganglion cell-inner plexiform layer (GCIPL) on SD-OCT reported in previous studies and the research result of our group about the location of glaucomatous RNFL defects.

Methods: The Cirrus-HD OCT images of POAG eyes (139 eyes) and healthy eyes (151 eyes) were collected and divided into 2 sets, training (153 eyes, including 80 healthy eyes) and validation (137 eyes, including 71 healthy eyes) sets. 10 topographic signs based the morphologic patterns of GCIPL (size, shape, location, color distribution, agreement between deviation and thickness maps, and step sign) and RNFL (size, shape, location, and agreement between maps) on deviation and thickness maps were selected for developing the scoring system. Sensitivity, specificity and positive likelihood ratio (PLR) of each diagnostic signs were calculated and the score was weighted by the PLR. The total score was calculated by summing scores of all positive diagnostic signs. The area under the receiver operating characteristic curve (AUC) was plotted and compared between different scoring systems.

Results: The presence of temporal raphe sign, the shape of GCIPL deviation map, the color distribution of GCIPL deviation map and the location of RNFL defect on RNFL deviation map were finally included in the scoring system. The AUC of this new scoring system for the diagnosis of POAG was 0.983, which was significantly better than other OCT thickness parameters (AUC ranging from 0.860 to 0.940).

Conclusions: The scoring system constructed in this study basing on the RNFL and GCIPL deviation map and thickness map of Cirrus HD-OCT has high diagnostic accuracy for early glaucoma. The scoring system with only 4 diagnostic signs, which consumes less time but performs high diagnostic accuracy, has potential clinical application prospects.

FT-GLA-014

Systematic review and meta-analysis of the efficacy of anti-scarring agents after Glaucoma Tube Shunt surgery

V.Z.Z. Tan¹, N.X.M. Lau², J.W. Yap², M.L. Chee³, Y.C. Tham^{2,3,4}, V.T.C. Koh^{2,5,4}

¹Ministry of Health Holdings, Singapore, Singapore, ²Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore, ³Singapore National Eye Centre, Singapore Eye Research Institute, Singapore, Singapore, ⁴Centre for Innovation and Precision Eye Health & Department of Ophthalmology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore, ⁵Ophthalmology, National University Health System, Singapore, Singapore

Introduction: Glaucoma tube shunt (GTS) surgery is crucial in definitive management of refractory glaucoma. The principle prognostic factor is scarring around the implant plate. Adjunctive anti-scarring agents (ASAs), such as mitomycin C, 5-Fluorouracil, corticosteroids and vascular endothelial growth factor antagonists (anti-VEGF), aim to increase longevity by attenuating fibrosis. Clinical use remains equivocal as individual studies fail to demonstrate a clear direction.

Objectives: This systematic review and meta-analysis objectively evaluated the efficacy and safety of ASAs in GTS to provide informed recommendations.

Methods: A comprehensive search of MEDLINE, EMBASE and CENTRAL was conducted. Randomised controlled trials (RCTs) and cohort studies which compared ASA and non-ASA use in GTS were included. Outcomes included change in baseline and post-operative intra-ocular pressure (IOP), visual acuity and number of glaucoma medications; re-operative and complication rates. All parameters were assessed at post-operative month 6 and 12.

Results: A total of 10 (47.6%) RCTs with 512 eyes (46.1%), and 11 (52.4%) cohort studies 597 eyes (53.9%) were included. The ASA and non-ASA cohort were demographically similar with 566 and 543 eyes respectively, totalling 1109 eyes. ASAs used were as follows: 42.9% MMC (n=9/21), 28.6% corticosteroids (n=6/21), 23.8% bevacizumab (n=5/21) and 9.5% 5FU (n=2/21), with 1 study using MMC and 5FU (4.8%). ASAs reduced re-operative risk (odds ratio 0.39) and reduced the number of glaucoma medications required at the 6th post-operative month (pooled difference 0.59 eyedrops), which did not persist at 1 year. Crucially, there was no difference in post-operative IOP. Subgroup analysis of MMC demonstrated congruent efficacy. Importantly, ASA use did not increase complication rates (including hypotony). In fact, the risk of hyphema development was lower with ASA use (odds ratio 0.63) and in subgroup analysis of bevacizumab (odds ratio 0.38).

Conclusions: Our study suggests that ASAs are safe adjuncts to conventional GTS and lend greater efficacy in the short to medium-term, possibly by reducing the hypertensive phase. Crucially, their use does not increase complication rates and long-term outcomes remain equivocal. These findings contribute to improved understanding of ASAs. Whilst demonstrating potential, larger multi-centre RCTs and identification of optimal delivery and dosing of ASAs are required.

FT-GLA-015

Serum oxidative stress related biomarkers in ocular hypertension and glaucoma

M. Esen Baris¹, O. Furundaoturan¹, M. Kocamanoglu², S. Sahin¹, Y. Akcay¹, S. Guven¹

¹Ophthalmology, Ege University, Izmir, Turkey, ²Medical Biochemistry, Ege University, Izmir, Turkey

Introduction: With both experimental and clinical studies, oxidative stress is shown to play a role in both initiating and accelerating the glaucomatous retinal ganglion cell loss and optic neurodegeneration. The accumulation of oxidative stress related end products in trabecular meshwork (TM) seem to result from the combination of TM tissue malfunction in the conventional outflow pathway and the neuroinflammation process in the optic nerve head and retinal ganglion cells. Therefore, oxidative stress related molecules might have a value as potential biomarkers for glaucoma. However, in ocular hypertension (OHT), even though the IOP is elevated, optic nerve and visual field tests are normal. We know that some of these eyes develop glaucoma over time, but majority of the eyes with OHT remain without any damage in optic nerve.

Objectives: Purpose: To evaluate the serum levels of oxidative stress related molecules in patients with ocular hypertension (OHT) and primary open angle glaucoma (POAG), and compare with healthy controls (HCs).

Methods: Materials and Methods: Treatment naive patients with no known systemic diseases and with OHT and POAG diagnosis were included and age and gender matched healthy volunteers with no ocular and systemic diseases were included as HCs. None of the participants were under any topical or systemic treatment or vitamin/anti-oxidant supplements. Smokers were excluded. Serum levels of total antioxidant capacity (TAC), ascorbic acid, protein carbonyls (PCs), advanced glycation end products (AGEs), neuronal pentraxin 2 (NPTX-2) and beta amyloid precursor protein (A β) were analyzed.

Results: Results: A total of 90 patients (30 in each group) were included in the study. There was no statistically significant difference between groups in terms of age and gender distribution. Serum levels of TAC (1.47 ± 0.11 mmole/L) was significantly higher in OHT, compared to HCs (1.40 ± 0.11 mmole/L) and POAG (1.30 ± 0.08 mmole/L) patients respectively ($p < 0.05$). There was no significant difference in terms of serum levels of ascorbic acid, PCs, AGEs, NPTX-2 and A β .

Conclusions: Conclusion: Serum levels of TAC were significantly higher in OHT patients and this might have a role in protection of the optic nerve despite increased intraocular pressure.

FT-GLA-016

Keratin8 deficiency aggravates retinal ganglion cell damage under acute ocular hypertension

C. Zhang¹, K. Wang¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Zhejiang, Hangzhou, China

Introduction: Keratin 8/18 (KRT8/18), paired members of the intermediate filament family, have shown vital functions in regulating physiological activities more than supporting the mechanic strength for cells and organelles.

Objectives: The KRT8/18 presence in retinal ganglion cells (RGCs) and functions on neuroprotection in a mouse model of acute ocular hypertension (AOH) are unknown and worthy of exploration.

Methods: We identified the existence of KRT8/18 in normal human and mouse retinas and primary RGCs. KRT8/18 levels were detected after AOH modeling. The adeno-associated virus (AAV) system was intravitreally used for selective KRT8 knockdown in RGCs. The histological changes, the loss and dysfunction of RGCs, and the gliosis in retinas were detected. The markers of cell apoptosis and MAPK pathways were investigated.

Results: KRT8/18 existed in all retinal layers and was highly expressed in RGCs, and they increased after AOH induction. The KRT8 knockdown in RGCs caused no histopathological changes and RGC loss in retinas without AOH modeling. However, after the KRT8 deficiency, AOH significantly promoted the loss of whole retina and inner retina thickness, the reduction, apoptosis, and dysfunction of RGCs, and the glial activation. Besides, downregulated Bcl-2 and upregulated cleaved-Caspase 3 were found in the AOH retinas with KRT8 knockdown, which may be caused by the increased phosphorylation level of MAPK pathways (JNK, p38, and ERK).

Conclusions: The KRT8 deficiency promoted RGC apoptosis and neurodegeneration by abnormal activation of MAPK pathways in AOH retinas. Targeting KRT8 may serve as a novel treatment for saving RGCs from glaucomatous injuries.

FT-GLA-017

Mapping suprachoroidal lymphatic drainage points to new pathways for ocular therapy

B. Sauntharajan^{1,2}, *N. Gupta*^{3,1,4,2}, *X. Zhou*², *E. Gumeler*⁵, *M. Koletar*⁶, *W.W Lam*⁶, *G. Stanisz*^{6,7}, *Y.H Yu*^{4,1,3,2}

¹Department of Laboratory Medicine and Pathobiology, University of Toronto, Toronto, Canada,

²Keenan Research Centre for Biomedical Science, St Michael's Hospital Li Ka Shing Knowledge Institute, Toronto, Canada, ³Department of Ophthalmology and Visual Sciences, The University of British Columbia, Vancouver, Canada, ⁴Department of Ophthalmology and Visual Sciences, University of Toronto, Toronto, Canada, ⁵Department of Neuroradiology, Hacettepe University, Ankara, Turkey, ⁶Department of Physical Sciences, Sunnybrook Health Sciences Centre, Toronto, Canada, ⁷Department of Medical Biophysics, University of Toronto, Toronto, Canada

Introduction: The suprachoroidal space (SCS) serves as a compartment for delivering biologics, nanoparticles, and genes to the posterior segment of the eye. However, the routes of drainage of solutes and fluid from this space remains elusive.

Objectives: The present study aims to map and characterize the drainage pathway from the SCS by injecting a near-infrared (NIR) fluorescent nanoparticle tracer.

Methods: A NIR fluorescent nanoparticle tracer, CF770 conjugated with bovine serum albumin (MW:70kDa, 0.5µL), was injected into the SCS (10nl/s) of the right eye in adult mice (C57BL/6J; n=8). Sham-injected left eyes were utilized as controls. *In vivo* and *ex vivo* fluorescence images of the eye and neck lymph nodes were captured using a scanning laser ophthalmoscope at 10-, 15-, and 20-minute intervals post-injection. Mice were euthanized 20 minutes after injection, and their tissues were processed for histological validation. Sagittal sections of the orbit, 20µm thick, were double labeled with podoplanin and podocalyxin, marking lymphatic vessels and blood vessels' endothelial cells, respectively. Tissue sections without primary antibodies served as negative controls. Immunofluorescence (IF) stained sections were imaged using a confocal scanning laser microscope and a NIR epifluorescence microscope at 20x and 63x magnifications.

Results: *In vivo* fluorescent imaging depicted the presence of a lymphatic network with a tendency for the nasal region in the orbit. NIR epifluorescence microscopy revealed that the tracer drains through the sclera and orbit. IF analysis identified podoplanin-positive lymphatic vessels in the choroid with a central lumen, distinct from blood vessels. Furthermore, NIR tracer was detected in the lumen of podoplanin-positive lymphatic channels in the conjunctiva. *Ex vivo* imaging demonstrated that the tracer injected into the right SCS drains into the right accessory submandibular neck lymph node.

Conclusions: This study provides the first evidence that fluid and nanoparticles exit the eye through a nasal route into the sclera and orbit from the SCS and subsequently, drain into the ipsilateral accessory submandibular lymph node. It presents evidence of lymphatic vessels in the choroid and demonstrates tracer draining into conjunctival lymphatic channels. A better understanding of this intricate pathway originating from the SCS holds significant implications for designing new therapeutic modalities for glaucoma such as novel drainage devices or drug delivery strategies targeting the SCS.

FT-GLA-018

Intracellular Zn²⁺ promotes extracellular matrix remodeling in dexamethasone-treated trabecular meshwork

C. Liu¹, Y. Li¹

¹Glaucoma, State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology Visual Science, Guangzhou, China

Introduction: There is a consensus that glucocorticoids (GCs) influence Matrix metalloproteinases (MMPs) expression in trabecular meshwork (TM) cells, leading to extracellular matrix (ECM) deposition and intraocular pressure (IOP) elevation. However, the underlying mechanisms remain uncertain.

Objectives: Since Zn²⁺ is essential for structure and enzymatic activity of MMPs, we explored its role in ECM alterations induced by dexamethasone (DEX).

Methods: Human TM samples isolated from residual tissue after cornea transplantation underwent treatment with 1μM DEX. To manipulate Zn²⁺ concentration, we treated cells with TPEN, a selective Zn²⁺ chelator and ZnSO₄. Intracellular Zn²⁺ was detected by Zinpyr-1, a Zn²⁺ fluorescent sensor. Subconjunctival injection of mice with DEX acetate formulation (0.01 g/ml) was performed after weekly IOP monitoring. Statistical analyses included two-tailed Student's t-test and one-way analysis of variance for group comparisons.

Results: DEX-treated human TM cells showed decreased intracellular Zn²⁺ and impaired extracellular Zn²⁺ uptake. These changes correlated with Zrt-, Irt-related proteins (ZIP) and metallothionein alterations. ZIP8 knockdown impaired Zn²⁺ uptake, but Zn²⁺ chelation didn't affect ZIP8 expression. Mirroring DEX effects, chelating Zn²⁺ decreased MMP2 expression, increased ECM protein deposition and induced ECM structural disarray. Conversely, Zn²⁺ supplementation to DEX-treated cells mitigated these outcomes. Dietary zinc supplementation in mice significantly reduced DEX-induced IOP elevation and TM collagen content.

Conclusions: Zinc supplementation's potential in alleviating DEX-induced changes in both cellular and animal models suggests its therapeutic value in GC-induced IOP elevation, especially concerning ECM remodeling. These results enhanced our understanding of TM cell responses to GCs and provided valuable insights into managing GC-induced ocular complications. Future studies should delve deeper into the molecular mechanisms underlying the observed effects and explore the specific pathways through which zinc exerts its therapeutic effects.

FT-GLA-020

Pathogenic mechanism of ABCC1 combined with MYOC in primary open-angle glaucoma (POAG) in a Chinese mega-pedigree

J. Luo¹, R. Feng¹, K. Li¹, R. Yang¹, Y. Lin¹, J. Ge¹

¹Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Thirty-five years ago, we reported a mega-pedigree of primary open-angle glaucoma (POAG) in Guangzhou, China, named Guangzhou No.1 family (GZ1), including 20 POAG patients and 71 normal family members. Fourteen individuals with *MYOC*, c.1109C>T: p.P370L mutation in heterozygous status showed diverse phenotypes, ranging from early POAG onset to glaucoma suspect. Other factors might contribute to the heterogeneity of phenotype, which need to be further investigated.

Objectives: To investigate other underlying genetic factors in POAG patients with *MYOC*^{P370L}, and explore their pathogenic effects.

Methods: Fourteen individuals from GZ1 were included. Whole-exome sequencing was performed and bioinformatics analysis was conducted to analyze the pathogenic and likely pathogenic mutations. GZ1 patient-derived induced pluripotent stem cells were reprogrammed and differentiated into trabecular meshwork cells (iPSCs-TMCs). iPSCs-TMCs and human conjunctival fibroblasts (HCFs) were used to explore the pathogenesis of the selective mutation. Mice with the corresponding mutation: *Abcc1*^{G844S} or *Myoc*^{P356L} were established.

Results: *ABCC1*, c.2530G>A: p.G844S mutation was found associated with early onset, an elevated IOP, a more advanced stage of glaucoma, and a sagging thinner-wall filtering bleb after trabeculectomy. Compared with normal-individual-derived iPSCs-TMCs, patient-derived iPSCs-TMCs exhibited more cell apoptosis, ROS production, and impaired phagocytosis ability. HCFs with *ABCC1*^{G844S} mutation showed downregulated α -SMA expression compared with controls, indicating this mutation might attenuate the fibrosis.

IOP measurement showed that *Myoc* mutant mice had IOP elevated at 4 months, but decreased to the normal level at 8 months. Compared with the WT group, the thickness peripapillary RNFL detected by OCT decreased and fVEP showed N1 wave reduced in *Myoc* mutant mice at 4 and 8 months. *Abcc1* mutant mice showed normal IOP, fVEP, and peripapillary RNFL at 4 and 8 months.

Conclusions: *ABCC1*^{G844S} might mediate the development of POAG by promoting TMCs apoptosis and induce thin-wall blebs by attenuating HCFs fibrosis in vitro. *Myoc*^{P356L} mice showed POAG phenotype, including elevated IOP, thinning RNFL, and abnormal fVEP. In further study, we will hybridize *Abcc1*^{G844S} and *Myoc*^{P356L} mice to monitor their ocular changes and further explore the potential mechanism.

FT-GLA-021

A multifunctional hydrogel loaded with exosomes and liproxstatin-1 for optic nerve protection in glaucoma

M. You¹, R. Rong¹, Z. Zeng¹, X. Xia¹

¹Eye Center of Xiangya Hospital, Central South University, Changsha, China

Introduction: Glaucoma is a chronic degenerative eye disease and a major public health concern affecting millions of people worldwide. It is characterized by progressive damage to retinal ganglion cells (RGCs) and the optic nerve, leading to irreversible vision loss. The death of retinal ganglion cells (RGCs) caused by acute intraocular hypertension involves a number of cell death processes, including apoptosis, necroptosis, pyroptosis, and ferroptosis. Previous research has demonstrated that suppressing apoptosis and ferroptosis can effectively prevent RGCs from death. In addition, oxidative stress is a major cause of RGC death.

Objectives: Therefore, simultaneously eliminating reactive oxygen species (ROS) and inhibiting apoptosis and ferroptosis in RGCs could provide a breakthrough strategy for the treatment of glaucoma. However, existing drugs are unable to reach the retina at a high enough retention rate to allow effective entry and slow release into the RGCs. In order to improve the therapeutic effect, a drug delivery system needs to be developed that has advantages in consuming ROS, inhibiting ferroptosis and apoptosis, and extending the residence time in the eye for efficient entry and slow release into the RGCs.

Methods: We conducted a ROS-responsive hydrogel hybrid system (EL-Gel) loaded with exosomes and Liproxstatin-1. Immunofluorescence was used to prove that retinal cells could take up exosomes in EL-Gel, while LC-MS experiments detected the presence of Liproxstatin-1 in the retina. An *in vitro* and *in vivo* pathological model of glaucoma was established to assess the biological effects of EL-Gel.

Results: The uptake of EL-Gel by retinal and R28 cells was successfully demonstrated, with *in vivo* and *in vitro* studies confirming its anti-apoptotic, anti-ferroptotic, and anti-oxidative stress properties. LC-MS analysis revealed a prolonged retention time of EL-Gel in the retina for over 28 days, significantly reducing the frequency of administration.

Conclusions: Our experimental results demonstrated that EL-Gel has excellent protective effects *in vitro* and *in vivo*, significantly reduces ROS generation in cells or the retina, inhibits the onset of apoptosis and ferroptosis, reduces RGC loss, and improves visual function in mice. The successful implementation of this innovative therapeutic approach may lead to important advances in glaucoma treatment and lead the way to develop personalized therapeutic strategies that target the specific mechanisms underlying the disease.

FT-GLA-022

Unveiling the culprit: the crucial role of amacrine cells in optic nerve injury

Y. Li¹, Y. Zhuo¹, Z. Liu¹, Q. Zhang¹

¹Glaucoma, State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology Visual Science, Guangzhou, China

Introduction: The axons of adult mammalian retinal ganglion cells (RGCs) lack the ability to regenerate independently, leading to permanent visual loss upon injury. Recent studies have proposed that presynaptic amacrine cells (ACs) participate in RGC axon regeneration through synaptic connections. The regenerative capacity of RGCs is influenced by ACs. Our prior studies revealed optic nerve (ON) injury triggers a release of free Zn²⁺ and a decrease in dopamine (DA) levels in the retina, inhibiting RGCs survival and axon regeneration.

Objectives: This study aims to elucidate the cellular origin of Zn²⁺ and DA in pre-synaptic terminals of RGCs, emphasizing ACs' pivotal role in ON injury.

Methods: ZnT3^{fl/fl} (Slc30a3^{fl/fl}) mice were bred with VGAT-Cre and VGLUT2-Cre mice to obtain AC and RGC-specific ZnT3 knockout strains: VGAT^{Cre}ZnT3^{fl/fl} and VGLUT2^{Cre}ZnT3^{fl/fl}. Immunofluorescent staining for retinal ZnT3 and Zn²⁺ was performed on both mouse strains one day post-optic nerve crush (ONC). Two weeks post-ONC, RGC counts and axon regeneration assessments were conducted on VGAT^{Cre}ZnT3^{fl/fl} mice. Immunofluorescent staining and liquid chromatography techniques were employed at various time points post-ONC to assess DA synthesis activity in dopamine amacrine cells (DACs) and DA levels within the retina. L-DOPA, a dopamine precursor, was injected into the vitreous cavity post-injury. Two weeks post-ONC, RGC counting and anterograde labeling of regenerating axons were performed to evaluate neural regeneration outcomes.

Results: VGAT^{Cre}ZnT3^{fl/fl} and VGLUT2^{Cre}ZnT3^{fl/fl} mouse strains were constructed. Targeted knockout of ZnT3 in ACs inhibited the elevation of ZnT3 and Zn²⁺ levels post-ONC and enhanced RGC survival and axon regeneration, while ZnT3 knockout in RGCs did not show the protective effect. DA synthesis activity in DACs reduced within the first week after ONC led to decreased retinal DA levels. Supplementation of endogenous pre-synaptic DA within DACs through L-DOPA promoted RGC survival and axon regeneration post-ONC.

Conclusions: Increased retinal Zn²⁺ originated from ACs was transported into synaptic vesicles through ZnT3 after ONC, and released into the synaptic cleft. DAC activity reduction post-injury results in decreased retinal DA levels. Targeted ZnT3 knockout in ACs or L-DOPA supplementation both enhance RGC survival and axon regeneration post-injury. This study unveils the cellular origin of retinal Zn²⁺ after ONC and elucidates DACs' role in neural regeneration, underscoring ACs' involvement in ON injury.

P-GLA-002

Unveiling Iris-associated variants in Primary Angle Closure Glaucoma: insights from functional genomics approaches

L. Gia¹, Y. Zhang¹, N. Wang¹

¹Department of Ophthalmology, Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: Previous Genome-wide association studies (GWASs) have identified eight susceptibility loci of primary angle closure glaucoma (PACG), but applying these findings is hindered by the predominance of noncoding regions and linkage disequilibrium. Additionally, although shallow anterior chamber depth (ACD) and short axial length (AL) are characteristic phenotypes of PACG, current GWAS variants do not show any correlation with these features, calling for the identification of more risk factors.

Objectives: Our objective is to identify pathogenic tissue of PACG with genetic explanation.

Methods: For risk factor identification, we included participants of the Handan Eye Study aged ≥ 35 with angle closure and with normal open angle diagnosed by gonioscopic examination and underwent anterior segment optical coherence tomography (ASOCT) imaging. Angle closure eyes and normal eyes were 1:1 matched for age, central ACD and AL by propensity score matching. For genetic screening, we utilized ARPE-19 cells to mimic the iris environment and conducted self-transcribing active regulatory region sequencing (STARR-seq) to screen disease-related variants. Additionally, we employed the assay for transposase-accessible chromatin using sequencing (ATAC-seq) to identify variants accessible in the human iris. We then analyzed the results to identify causative variants in iris that were both accessible in vivo and displayed biased allelic enhancer activity effects ex vivo.

Results: Our study systematically identified risk factors of angle closure irrelevant of ACD or AL, including thicker peripheral iris, large lens vault, and smaller anterior chamber width. The iris emerged as a significant pathogenic tissue. Our study identified 27 variants with differential regulatory activity between major and minor alleles. We further test if these variants are accessible in human iris and two variants were picked out. Notably, rs6677574 within COL11A1 and rs1153781 in C10orf53 showed notable allelic specific enhancer activity.

Conclusions: These findings suggest that alterations in these variants may contribute to the pathogenic iris phenotype by upregulating the expression of COL11A1 and C10orf53, potentially regulating PACG development and progression. Moreover, our systematic approach employing functional genomics techniques not only enhances our understanding of PACG but also sets a precedent for uncovering the complexities of common diseases through comprehensive investigation of genetic and functional elements.

P-GLA-003

Outcome of Paul glaucoma implant for intra ocular pressure control in refractory glaucoma

D. Mathews¹, I. Konar¹, V. Jadhav¹

¹Department Of Ophthalmology, Stanley Eye Unit, Betsi Cadwaladr University Health Board, Abergele, United Kingdom

Introduction: Paul Glaucoma Implant tube is a novel glaucoma drainage device designed to lower IOP.

Objectives: To describe technique of surgery and early post-operative outcomes for a novel glaucoma drainage device-the Paul glaucoma implant (PGI).

Methods: A retrospective evaluation of subjects who had PGI surgery between November 2020 and October 2023 with a 6-24 months follow-up. Primary outcome measures included surgical success rate of PGI defined as IOP of 5-18 mmHg or at least 30% reduction, and qualified success (with or without IOP-lowering drops), at 6, 12,18 AND 24 months.

Results: 26 eyes of 25 patients had a preoperative IOP (mean \pm standard deviation) of 32.80 ± 10.76 mmHg, falling to 13.96 ± 6.56 mmHg at 3 month, 15.28 ± 4.87 mmHg at 6 months, 14.04 ± 4.75 mmHg at 12 months and 13.87 ± 5.16 at 2 years. The mean change in number of medications was a reduction from 4.23 ± 0.71 to 0.92 ± 1.26 post op. (p value <0.0001). 11 out of 26 patients required IOP lowering drops post-operatively. Intraluminal prolene suture was removed from 8 eye at a mean of 6 months. Complete success of 73.07% at 6 months, 61.90% at 12 months, 60% at 18 months and 37.50% at 2 years was noted. Qualified success was at 92.30 % at 6, 100 % at 12 and 18 months and 87.50% at 2 years.

Conclusions: This study presents a safe surgical technique, which significantly reduces IOP and number of medications with minimal complications.

P-GLA-004

Risk of depression in glaucoma patients with vision impairment: a nationwide cohort study

*Y. Jung*¹

¹The Catholic University of Korea Yeouido St. Mary's Hospital, Seoul, Korea, Republic of

Introduction: In the context of the aging population, it is important to investigate the effect of glaucoma on depression and to establish associated risk factors.

Objectives: We aimed to investigate the risk of developing depression in primary open-angle glaucoma patients with associated vision impairment.

Methods: We used a nationwide population-based cohort study using authorized data from the Korean National Health Information Database and National Disability Registry. Baseline characteristics including age, gender, income level, lifestyle factors, anthropometric measures, laboratory results, and Charlson Comorbidity Index were verified using diagnostic codes and health screening exams. We calculated the risk of new-onset depression according to the presence of glaucoma and vision impairment using multivariable-adjusted Cox proportional hazard model.

Results: Of the 3,680,570 individuals with or without primary open-angle glaucoma who underwent Korean National Health Screening Program in 2009, 681,515 subjects were newly diagnosed with depression during the follow up period. The risk of developing depression in subjects with glaucoma was higher compared to those without with a hazard ratio (HR) of 2.011 (95% confidence interval [CI] = 1.946-2.078) and 1.085 (95% CI = 1.050-1.121) before and after adjusting for covariates, respectively.

Among subjects with glaucoma, the risk of new-onset depression increased further in those with accompanying vision impairment after adjustment (aHR=1.164, 95% CI=1.045-1.297) and even further in those accompanied with severe vision impairment (aHR=1.207, 95% CI=1.039-1.403). While age did not affect the association between glaucoma and depression, the impact of glaucoma on depression development was greater in men than in women (P for interaction=0.001). When comparing those with and without vision impairment, those with more comorbidities showed greater risk of depression compared to those with Charlson Comorbidity Index < 3 (P for interaction=0.016).

Conclusions: Primary open-angle glaucoma increased the risk of developing depression. The risk escalated gradually with the presence and severity of concurrent vision impairment. The impact of glaucoma and vision impairment on new-onset depression was greater in men and in those with more comorbidities.

P-GLA-005

Sodium hyaluronate 0.4% protects against anti-glaucomatous formulation-induced toxicity

M.S. Passerini¹, G. Rodriguez¹, J. Galletti²

¹Medical Affairs, Poen Laboratories, Buenos Aires, Argentina, ²Innate Immunity Laboratory, Experimental Medicine Institution/ CONICET, National Medicine Academy, Buenos Aires, Argentina

Introduction: Several studies have shown that topical anti-glaucomatous medication may reduce the viability of corneal epithelial cells, even if they are preservative-free (PF). It has also been shown that sodium hyaluronate (SH) neutralizes the toxic effect of benzalkonium chloride (BAK) on the ocular surface.

Objectives: The purpose of this study was to assess the *in vitro* toxicity induced by PF anti-glaucomatous formulations and to evaluate the protective effect of SH in those cases.

Methods: A HEC-2 cell line (human corneal epithelium) was employed. Cell monolayers were exposed for 30 minutes to twelve PF anti-glaucomatous formulations containing: Bimatoprost 0.01%, Bimatoprost 0.03%-Timolol 0.5%, Brimonidine 0.2%, Brimonidine 0.2%-Brinzolamide 1%, Brimonidine 0.2%-Timolol 0.5%, Brinzolamide 1%, Brinzolamide 1%-Timolol 0.5%, Dorzolamide 2%-Timolol 0.5%, Latanoprost 0.005%, Timolol 0.5%, Travoprost 0.004%- Timolol 0.5% and Travoprost 0.004%. The same procedure was repeated yet having previously added SH 0.4% for 30 minutes. Fresh culture media was included after washing the cells. Metabolic activity was evaluated by reducing resazurin. Data were analyzed by one-way and two-way ANOVA. Results are shown as mean \pm SD of 3-6 replicates each.

Results: Preservative-free formulations containing Brinzolamide 1%, Brinzolamide1%-Timolol 0.5%, Dorzolamide 2%-Timolol 0.5%, Brimonidine-Timolol 0.5%, Bimatoprost 0.001%, Bimatoprost 0.003%-Timolol 0.5%, Brimonidine 0.2%-Brinzolamide 1% and Timolol 0.5% demonstrated to have a by significantly reducing cell viability ($p < 0.05$).

SH significantly increased the viability of cells exposed to preservative-free Brinzolamide (73.3%), Brinzolamide-Timolol (66.7%), Dorzolamide-Timolol (42.4%), Brimonidine-Timolol (37.2%), Bimatoprost (36.3%) and Bimatoprost-Timolol (34.3%) formulations ($p < 0.01$).

SH also protected against preservative-free Brimonidine-Brinzolamide and Timolol formulation-induced toxicity. Notwithstanding, in these cases, the SH-protective effect was not significant ($p > 0.05$).

Conclusions: Most of the evaluated anti-glaucomatous formulations reduced cellular viability.

SH 0.4% demonstrated a protective effect against formulation-induced toxicity containing at least one drug of / some drugs of the following drug classes: prostaglandins, β -blockers, α -adrenergic agonists and carbonic anhydrase inhibitors.

The protection provided by SH 0.4% could be the result of the improvement of the physiological conditions of the general cell culture; regardless of the drug class.

Our results suggest that the use of SH 0.4% eyedrops during glaucoma treatment, could protect patients against formulation-induced toxicity, even if these are preservative-free.

P-GLA-006

Concentration-dependent structural effects of pilocarpine on the anterior segment of the eye

D. Peretz¹, S. Pundir¹, S. Rahman², S. Wakil¹, H. Saheb¹

¹Ophthalmology & Visual Sciences, McGill Academic Eye Center, McGill University Health Center, Montreal, Canada, ²Faculty of Medicine and Health Sciences, McGill University, Montreal, Canada

Introduction: A priori determination of maximal pupillary constriction and accommodation induced by pilocarpine by AS-OCT can in turn, help optimize the usage of pilocarpine in pre-laser treatment.

Objectives: To examine the concentration- and time-dependent relationship of pilocarpine on the magnitude of structural changes of the anterior segment, using the objective and quantifiable information provided by anterior segment OCT.

Methods: Single-blind, randomized controlled trial. Patients set to undergo SLT or LPI were divided into three subgroups, each pretreated with 1%, 2%, or 4% pilocarpine. Anterior segment structural parameters were measured using the CASIA AS-OCT before, and 30 and 60 minutes after administration of a single drop of pilocarpine. Exclusion criteria included a history of ocular trauma, intraocular surgery, or previous laser treatment.

Results: Following pilocarpine the pupil diameter (PD) decreased significantly ($P < 0.0001$) in all three groups. The mean PD for group 1 (1%) before treatment was 4.930 ± 0.17 , at 30 min 2.882 ± 0.27 and at 60 min 2.766 ± 0.29 . The mean PD for group 2 (2%) before treatment was 5.129 ± 0.21 , at 30 min 2.511 ± 0.22 and at 60 min 2.279 ± 0.21 . The mean PD for group 3 (4%) before treatment was 5.362 ± 0.22 , at 30 min 2.483 ± 0.27 and at 60 min 2.254 ± 0.29 . The mean anterior chamber depth (ACD) before treatment in group 1% was 2.739 ± 0.096 ; 2.678 ± 0.094 at 30 min and 2.687 ± 0.093 at 60 min. The mean ACD before treatment in group 2% was 2.739 ± 0.10 , at 30 min 2.671 ± 0.10 , and at 60 min was 2.720 ± 0.08 . The mean ACD before treatment in group 4% was 2.683 ± 0.09 , at 30 min was 2.607 ± 0.09 , and at 60 min was 2.610 ± 0.09 . While PD continued to change after 30 min in groups treated with 2% and 4%, there was no further change in ACD after 30 min. Further, there was a reversal in ACD at 60 minutes for all 3 groups.

Conclusions: In this study, we have demonstrated that pilocarpine-induced pupillary constriction is similar at both 30 and 60 min and across different concentrations of pilocarpine whereas the effect on ACD is maximal at 30 min. While pupillary changes were equally significant in 1% compared to 2% and 4% the ACD changes were less significant in 2%. Based on these findings, pilocarpine 2% appears to offer an equal effect for the advantageous pupillary constriction while minimizing the disadvantageous effect of anterior chamber shallowing.

P-GLA-007

Angle closure glaucoma in a nanophthalmic patient with *MFRP* and *BEST1* mutations

*C. Jocson*¹, *M. Reyes*¹, *M.L. Fermin*¹, *M.B.I. Ibanez*²

¹Department of Ophthalmology, Far Eastern University - Nicanor Reyes Medical Foundation, Quezon City, Philippines, ²Department of Ophthalmology, Makati Medical Center, Makati City, Philippines

Introduction: Nanophthalmos is a small-eye disorder with a global prevalence below 1/2,000. Bi-allelic mutations in the *MFRP* gene and homozygous mutations in *BEST1* are both implicated in nanophthalmos.

Objectives: Here we describe a case of nanophthalmos with a homozygous mutation in *MFRP* and a heterozygous mutation in *BEST1*. To our knowledge, this is the first genetically confirmed case of nanophthalmos in the Philippines.

Methods: This is a case report of a nanophthalmic patient, born out of a consanguineous marriage, who presented with acute angle closure glaucoma. The patient underwent ophthalmic assessment and ocular parameters were measured. A microphthalmia/anophthalmia panel consisting of 23 genes was done to confirm the diagnosis.

Results: Ocular examination revealed elevated intraocular pressure (40mmHg) on the left eye. Both eyes were found to have a high hyperopic refractive error (+13.50 D) and short corneal diameters (10.5mm, 9.5mm). Ancillaries showed steep corneal curvatures (50.12 D, 50.22 D) and short axial lengths (21mm, 20.5mm). Fundus of the right eye showed petalloid pattern of abnormal reflex in the central macula. Ocular coherence tomography of the right eye revealed macular edema consistent with the fundus findings. Genetic test results showed a pathogenic homozygous mutation in *MFRP* c.1150dup (p.His384Profs*8) and a heterozygous variant in *BEST1* c.1054G>A(p.Ala352Thr).

Conclusions: Nanophthalmic eyes pose a great challenge to ophthalmologists, but prognosis may be favorable if correctly identified and promptly treated. This report highlights and hopes to expand the phenotype of a rare case of nanophthalmos presenting with angle closure glaucoma and genetically confirmed to have variants in both *MFRP* and *BEST1*.

P-GLA-008

Efficacy of novel MIGS implants Wistend and Kahook in the treatment of experimental ocular hypertension in animal models

Q. Liu¹, Y. Zhang¹, M. Huang¹, C. Liu¹, J. Wang¹

¹Henan Provincial People's Hospital, Henan Eye Hospital, Zhengzhou, China

Introduction: Glaucoma incisional surgery still has obvious postoperative complications: shallow anterior chamber, hypotony maculopathy, choroidal effusions, postoperative bleb fibrosis, bleb-associated leaks, hypotony, infection, corneal damage, and cataract formation. Because of the above problems, domestic and foreign countries have now developed minimally invasive glaucoma surgery, and the scope of patient application has been broadened to patients with glaucoma.

Objectives: To assess the effectiveness of the novel MIGS implants Wistend and KDB in the treatment of experimental ocular hypertension animal models.

Methods: Twelve New Zealand white rabbits were divided into four groups (Wistend microstent, Kahook Dual Blade, sham control and blank control groups) after the successful construction of the ocular hypertension animal model. To compare whether there were significant differences in IOP reduction between MIGS implant Wistend and KDB, Eaton and Draize scores, SS OCT, fundus photography and other examinations were used to evaluate eyes health and microstent placement after surgery.

Results: After 6 months of follow-up, the mean baseline IOP (in mmHg) in the blank control group and sham operation group decreased from 31.33 ± 0.94 to 17.67 ± 0.94 . Wistend implantation group decreased IOP(in mmHg) from 30.67 ± 0.94 to 13.67 ± 0.94 ($P < 0.01$), and KDB operation group decreased IOP(in mmHg)from 30.67 ± 0.94 mmHg) 31.33 ± 0.94 to 14.33 ± 0.47 ($P < 0.01$). At 10, 20, and 30 days of follow-up, there were significant differences between the Wistend group and the KDB group ($P < 0.01$). After the operation, Eaton and Draize scores, SS-OCT and fundus photography of rabbits showed that the anterior and posterior segments of the experimental animals were generally healthy.

Conclusions: Wistend may significantly reduce IOP and safely enhance aqueous outflow. The novel MIGS devices Wistend and KDB have good long-term effects on reducing IOP and there are significant differences between them at follow-up time points.

P-GLA-009

Cataract surgery with Schlemm's canaloplasty and trabeculotomy with OMNI surgical system for moderate to severe glaucoma

D. Mathews¹, V. Jadhav¹

¹Stanley Eye Unit, Abergele Hospital, Betsi Cadwaladr University Health Board, Abergele, United Kingdom

Introduction: The OMNI® Surgical System from Sight Sciences is indicated for canaloplasty followed by trabeculotomy for patients with primary open-angle glaucoma that performs two implant free MIGS procedures and targets three points of resistance to lower intraocular pressure.

Objectives: We aimed to Study 12 month Outcomes of Novel implant free Schlemms canaloplasty & trabeculotomy with OMNI surgical system combined with cataract surgery in eyes with moderate to severe open-angle glaucoma between August to December 2022 in our population.

Methods: 20 eyes with moderate to severe glaucoma (mean deviation -3.68 to -29.73 dB) with coexistent visually significant cataract underwent Schlemms canaloplasty and trabeculotomy procedure combined with cataract surgery through a temporal approach with a single surgeon (DM) The postoperative visits were at 1 day, 1 week, 1 month and every three months thereafter. The case notes were analysed retrospectively for pre and post op vision, pre and post op intraocular pressures and pre and postoperative number of medications at each visit . Any complications were also noted at each visit. Complete success was defined as any eye that achieved the target IOP without topical medications at any stage. Qualified success was defined as any eye that reached target IOP with medications.

Results: The mean age was 77 years and both genders were equally represented. Preoperatively, the mean IOP was 18.10 ± 5.51 mmHg. The mean IOP reduced to 13.23 ± 3.40 mmHg (26.85% reduction) at 3 months (N=17) , 13.32 ± 2.70 mmHg (26.4% reduction) at 6 months (N=19), 13.75 ± 3.67 mmHg (24% reduction) at 9 months (N=12) and 13 ± 2.97 mmHg (28.17% reduction) at 12months (N=15). The mean number of medications preop was 2.89 (range 2-4) which reduced to zero at 3 months and 6 months. Only one eye needed single medication at 9 months (P value <0.05). Complete Success N=19, Qualified Success N=1.

Some intraoperative bleeding was observed in almost all patients with 3 having frank layered hyphaema in post op period. None needed any intervention. No significant vision threatening complications were observed.

Conclusions: The combination of Schlemm's canaloplasty and trabeculotomy using the OMNI Surgical System, and cataract surgery appears to be effective in lowering IOP and reducing the number of glaucoma medications in patients with moderate to severe glaucoma. Further studies with larger sample sizes and longer follow-up periods are warranted to confirm these findings and assess long-term efficacy and safety.

P-GLA-010

Outcomes of Ahmed glaucoma valve capsule excision in adults at a tertiary eye hospital

D. AlQahtani¹, S. Alshahwan¹, A. Mousa²

¹Glaucoma, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia, ²Ocular Epidemiology, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

Introduction: Excessive fibrosis is the most common cause of Ahmed glaucoma valve implant (AGVI) failure after primary implantation. After shunt surgery failure, limited interventions are available to control intraocular pressure, such as implantation of a second valve, excision of the encapsulated bleb, or (less preferably) cyclodestructive procedures.

Objectives: To evaluate outcomes of Ahmed glaucoma valve implant (AGVI) capsule excision in adults.

Methods: A chart review was conducted at the King Khaled Eye Specialist Hospital in Saudi Arabia (January 2014 to April 2021). This study included adult patients ≥ 18 years who underwent capsule excision for high intraocular pressure (IOP) and were followed-up for ≥ 1 year. The main evaluated outcome was the surgical success rate. Complete success was defined as an IOP of < 22 mmHg without necessitating anti-glaucoma medications or additional surgery. Qualified success was defined as an IOP of < 22 mmHg, regardless of the number of prescribed medications.

Results: A total of 29 eyes were evaluated (mean (\pm SD) follow-up duration, 64.4 (56.5), [12.5–249.4] months). The mean preoperative IOP was 25.2 (8.1) mmHg, with 3.5 (0.9), [1 – 4] medications. On the first postoperative day, the IOP decreased to half this range (mean (\pm SD), 12.7 (10), [4 – 50] mmHg; with 1.2 (1.7), [0 – 4] medications; $p < 0.0001$). After one month, all patients experienced a spike in IOP (mean, 17.8 (6.9) mmHg; 1.7 (1.5) medications; $p = 0.003$). From 3 to 12 months, the IOP stabilized to a mean of 15.9 (5.1) mmHg (2.6 (1.3) medications, $p < 0.0001$). The qualified success rates at six months and one year were 48% ($n = 14$) and 51% ($n = 15$), respectively, with a failure rate of 44% ($n = 13$) at both six months and one year postoperatively. During the first year, 13 eyes (44%) underwent a revision for encapsulation, tube occlusion, or exposure.

Conclusions: Capsule excision is a safer and more conservative modality for prolonging the effect of AGVI after encapsulation as an alternative before considering a second implant.

P-GLA-011

Prevalence of primary open-angle glaucoma in medicare FFS was ~6% (2018-2021): Black Americans were overrepresented ~2:1

J.S. Myers¹, E. Donckels², A.A. Nair³, T.L. Brevetti⁴, T. Davis², Z. Pulungan⁵, S. Robinson², D.J. Harrison³

¹Glaucoma, Wills Eye Hospital, Philadelphia, United States, ²Health Economics and Outcomes Research, Inovalon, Bowie, United States, ³Health Economics and Outcomes Research, Bausch & Lomb Americas, Bridgewater, United States, ⁴Medical Affairs, Bausch & Lomb Americas, Bridgewater, United States, ⁵Research Science and Advanced Analytics, Inovalon, Bowie, United States

Introduction: As the US population ages, the prevalence of primary open-angle glaucoma (POAG) is predicted to increase. However, little has been published on this in the past decade.

Objectives: The objective was to report trends in the prevalence and incidence of POAG, use of POAG medications, and prevalence of comorbid dry eye.

Methods: A retrospective cohort analysis of Medicare fee-for-service (FFS) beneficiaries with Parts A, B, and D (2018-2021) was conducted to identify annual POAG prevalence, incidence, use of glaucoma medications and prevalence of comorbid dry eye. Eligible individuals were ≥ 65 years and had 24 months of continuous enrollment.

Prevalent POAG was identified via the following criteria: 1) ≥ 2 medical claims with a diagnosis of POAG ≥ 30 days apart, 2) ≥ 1 medical claim with POAG and ≥ 1 medical claim with ocular hypertension ≥ 30 days apart, 3) ≥ 1 medical claim with POAG and ≥ 1 medical claim for a POAG-related procedure, or 4) ≥ 1 medical claim with POAG and ≥ 1 pharmacy claim for POAG treatment. Beneficiaries without POAG in the prior 12 months were categorized as incident. Medication usage in the 6 months following POAG diagnosis was identified from pharmacy claims and reported by class.

Results: Eligibility criteria identified 978,574 (6.2%), 983,429 (6.1%), 888,790 (5.5%), and 932,435 (5.9%) enrollees with prevalent POAG in 2018, 2019, 2020, and 2021, respectively. The incidence was around 1% annually (1.1%, 2018; 1.1%, 2019; 0.9%, 2020; 1.3%, 2021). While Black Americans represented 5.4-6.8% of beneficiaries, they constituted 11.0-12.8% of the POAG prevalent population. Most ($\geq 81.3\%$) POAG beneficiaries filled at least one glaucoma medication, and the majority of those (56.2-69.3%) filled a prostaglandin analog. Nearly 30% of beneficiaries with POAG also had a diagnosis of dry eye disease.

Conclusions: A significant number of Medicare FFS beneficiaries had POAG. As previously observed, POAG was more prevalent in Black beneficiaries. The COVID-19 pandemic decreased utilization of routine care, which likely resulted in artificially lower POAG prevalence and incidence in 2020 and correspondingly higher incidence in 2021. A sizable proportion of POAG beneficiaries had comorbid dry eye. Dry eye is a leading cause of ocular surface diseases, and individuals with POAG should be screened and treated for both disorders to optimize outcomes, where appropriate.

P-GLA-012

Biometric parameters and post-surgical peripheral anterior synechiae secondary to MIGS in open-angle glaucoma

D. Quintana Villanueva¹, G.F. Díez Cattini¹

¹Glaucoma, Fundación Hospital Nuestra Señora de la Luz, CDMX, Mexico

Introduction: Microinvasive glaucoma surgery (MIGS) has been performed more in the last years, with good intraocular pressure reduction results. Postoperative peripheral anterior synechiae (PAS) lower the aqueous humor flow through the trabecular meshwork, it is expected in MIGS to develop PAS. There hasn't been an association between them and biometric parameters.

Objectives: To identify correlations between preoperative biometric parameters and the formation of PAS in patients with open-angle glaucoma (OAG) undergoing combined MIGS and phacoemulsification.

Methods: This was an observational, analytical, and prospective study conducted at *Fundación Hospital Nuestra Señora de la Luz I.A.P.* an ophthalmological referral center in Mexico City, between July 1, 2023, and December 30, 2023. We included patients with OAG aged 18 or above undergoing combined MIGS and phacoemulsification. Surgical interventions involved the use of iStent, Kahook dual-blade goniotomy (KDB), bent Ab-interno needle goniotomy (BANG), Trabex T, high-frequency deep sclerotomy (HFDS), and gonioscopy assisted transluminal trabeculotomy (GATT) devices, along with phacoemulsification and intraocular lens implantation. Ocular biometric parameters were measured using the IOL-Master 700. An ophthalmological assessment with slit-lamp examination, was performed to document the presence of PAS up to 3 months after the surgery. Statistical analysis was performed with Stata v. 15.1, conducting multiple comparisons with Kruskal Wallis test, Spearman's R correlation, and Chi squared test.

Results: Seventy-one patients were included, 41 (69%) female, with a median age of 73 (69 – 79 IQR) years, an axial length (AL) of 23.54mm (22.69 – 24.68 IQR), anterior chamber depth (ACD) 3.12mm (2.87 – 3.36), lens thickness (LT) 4.29mm (3.93 – 4.52 IQR), white-to-white (WTW) 11.8mm (11.5 – 12.0 IQR). BANG was the most performed MIGS with 30 (42.2%) eyes, followed by Trabex T and HFDS with 17 (23.9%) each, 2 GATT, 2 iStent, and 3 KDB were performed. In the BANG group, 5 (16.67%) developed PAS, while 3 (17.65%) in HFDS, 1 in GATT, 1 in iStent, and 1 with KDB, and none in the Trabex T group. Neither significant correlations were found between AL, ACD, LT, and WTW with the formation of PAS, nor differences between MIGS groups in patient demographics, and glaucoma characteristics.

Conclusions: No significant correlation or difference was found between preoperative biometric parameters and the formation of PAS in patients with OAG undergoing combined surgery between different MIGS.

P-GLA-013

Relationship between intraocular pressure and age: a population-based study in Nepal

G. Bhandari¹, J. Keenan², S. Bhandari³, R.K. Sah⁴

¹Research Project, Bharatpur Eye Hospital, Bharatpur, Nepal, ²Ophthalmology, F.I Proctor Foundation, UCSF, San Francisco, United States, ³Vitreo-Retina, Bharatpur Eye Hospital, Bharatpur, Nepal, ⁴Glaucoma, Bharatpur Eye Hospital, Bharatpur, Nepal

Introduction: Elevated intraocular pressure (IOP) is an established risk factor for glaucoma. Population-based studies demonstrating the IOP distribution in a given setting are important for establishing benchmarks, and should be age-stratified since studies have found the distribution of IOP to vary based on age. It is important to measure IOP in a diversity of settings, since IOP has been found to vary based on geographic region and ethnicity.

Few studies have reported the IOP distribution on the Indian subcontinent, even though its burden of glaucoma is among the highest in the world due to the relatively high prevalence of undiagnosed disease as well as the extremely large population. An ongoing cluster-randomized trial in Nepal that is enrolling participants from the general population provided an opportunity to fill this gap in knowledge. Here, we report the age-stratified IOP distribution from a population-based sample of adults in a peri-urban region of Nepal, and assess for potential risk factors associated with IOP.

Objectives: Few studies have assessed the distribution of IOP from the Indian subcontinent, despite its large population and high burden of glaucoma. The objective of this study was to assess the distribution of IOP measurements from adults living in a lowland region of Nepal.

Methods: In a population-based cross-sectional study, all individuals aged 60 years and older from an area of lowland Nepal were invited for an IOP assessment with a rebound tonometer.

Results: Of 160 communities (28,672 people aged ≥ 60 y) enrolled, 79 (13,808 people aged ≥ 60 y) were randomly selected for IOP testing. Of those eligible, 10,017 (72.5%) individuals underwent tonometry. Mean IOP decreased monotonically over 5-year age groups, from 14.1 mm Hg (SD: 3.6) among those aged 60-64 years to 13.0 mm Hg (SD: 4.2) among those 80 years or older. The 97.5th percentile IOP measurement was 21.0 mm Hg for all age groups. In adjusted analyses, younger age, self-reported diabetes, and higher population density were each associated with higher IOP, and self-reported cataract surgery was associated with lower IOP.

Conclusions: Mean IOP was lower among older individuals in Nepal, consistent with many studies from East Asia and in contrast to many studies from western populations. These results suggest that ethnic background might be a consideration when diagnosing ocular hypertension.

P-GLA-014

Outcomes of slow coagulation transscleral cyclophotocoagulation in a predominantly African American glaucoma population

Z. Parekh¹, J. Wang², M. Qiu²

¹Pritzker School of Medicine, The University of Chicago, Chicago, United States, ²Department of Ophthalmology and Visual Science, The University of Chicago, Chicago, United States

Introduction: Slow coagulation (SC) is a recent advancement in trans-scleral diode laser cyclophotocoagulation (TSCPC) which delivers a lower energy over a longer period. This gentler laser setting may expand the indications for TSCPC beyond blind painful eyes, however, literature about its outcomes in different racial groups is limited.

Objectives: To describe outcomes of SC-TSCPC in a predominantly African American patient population.

Methods: A retrospective chart review was performed for 104 consecutive cases of SC-TSCPC (1150-1500 mW power, 4-second duration, 10-25 spots) by a single surgeon between 11/6/2019-9/7/2023. Exclusion criteria were diagnosis of neovascular glaucoma, prior CPC, visual acuity (VA) of no light perception or unable to be assessed due to patient's mental status, aphakic, or follow-up <3 months. The primary outcome measure was surgical success defined as an intraocular pressure (IOP) of 6-21 mmHg with a $\geq 20\%$ reduction from baseline, no glaucoma re-operation, and no loss of light-perception. Analysis was also stratified by lens status as literature suggests a greater IOP-lowering effect in pseudophakic eyes after CPC.

Results: Analysis included 28 eligible patients (6 phakic, 22 pseudophakic). Mean follow-up was 11.6 ± 8.3 months, and 14 patients had postoperative year 1 data available. Mean age was 75.2 ± 13.9 years, 42.9% were female, and 92.9% were African American, reflective of the demographics of the local community. The cumulative success rate was 67.6% at 1 year and did not differ significantly between phakic and pseudophakic patients. Mean IOP decreased from 31.1 ± 13.2 mmHg on 4.0 ± 1.5 medications preoperatively to 13.8 ± 7.1 mmHg on 2.6 ± 1.5 medications at last follow-up ($P < .01$), with a more pronounced change among pseudophakic patients. Mean VA worsened from 20/600 preoperatively to 20/1050 at last follow-up ($P = .04$) and was marginally worse in the phakic group. Anterior chamber (AC) inflammation persisted in 14.3% of patients, and the cystoid macular edema (CME) rate was 21.4%.

Conclusions: SC-TSCPC is an effective non-incisional IOP-lowering procedure in phakic and pseudophakic eyes that may not otherwise be ideal candidates for incisional glaucoma surgery. However, there is a chance of worsening VA and persistent postoperative inflammation. The rates of persistent AC inflammation and CME were higher in our cohort compared to similar studies (<3% for both), which supports existing literature that African American patients can have greater incidence of inflammation after ocular surgery.

P-GLA-015

Old high-pressure glaucoma mice display enhanced inflammation and aging processes

*S. Reinehr*¹, *R. Pamuk*¹, *N. Kluge*¹, *R. Fuchshofer*², *H.B. Dick*¹, *S.C. Joachim*¹

¹Experimental Eye Research Institute, University Eye Hospital, Bochum, Germany, ²Institute of Human Anatomy and Embryology, University Regensburg, Regensburg, Germany

Introduction: Elevated intraocular pressure (IOP) is considered a major risk factor for glaucoma, but the exact pathomechanisms are still unknown. The Connective Tissue Growth Factor (CTGF) high-pressure mouse model can be used to further investigate these mechanisms. These mice show increased IOP and a significant retinal ganglion cell (RGC) loss at the age of 4-months (Reinehr et al., 2019), due to stiffening of the extracellular matrix in the trabecular meshwork.

Objectives: Since glaucoma is also age-dependent, the aim of this study was to elucidate the progression of glaucoma damage CTGF mice of old age.

Methods: IOP was measured in 20-month-old CTGF and aged-matched wildtype mice (controls; n=7/group). Afterwards, retinæ were examined via immunohistology (n=6/group) and RT-qPCR (n=4/group). We analyzed RGCs (RPBMS), interleukin 1 β (IL-1 β) and IL-6, as well as the senescence markers p21 (*Cdkna1*) and Laminin-B (*Lmb1*). In addition, senescent cells were detected through β -galactosidase staining of retinal cross-section.

Results: A significantly higher IOP was noted in CTGF mice compared to controls (p<0.001). This was accompanied by a significant decrease in RGC numbers in CTGF animals (p=0.011), which was confirmed by RT-qPCR (p=0.013). The pro-inflammatory cytokines IL-1 β (p=0.032) and IL-6 (p=0.001) were significantly increased in CTGF retinæ. Moreover, the mRNA levels of *I11b* (p<0.001) and *I16* (p=0.010) were upregulated in CTGF mice compared to controls. While no changes in the expression of *Cdkna1* mRNA levels were revealed in CTGF retinæ (p=0.435), a significant downregulation of *Lmb1* was noted (p=0.032). The β -galactosidase staining revealed a larger area of senescent cells in CTGF retinæ compared to WT ones (p=0.044).

Conclusions: In summary, we observed continuing glaucomatous damage in CTGF mice increase with age. In 20-month-old mice, RGC loss was more advanced compared to 4-month-old ones from previous studies. In addition, CTGF mice were more senescent than their age-matched controls, as shown in the expression of *Cdkn1* and *Lmb1* as well as more β -galactosidase. This was accompanied by an increased inflammatory process. Thus, the CTGF mouse model can provide further insights into specific inflammatory and aging processes associated with glaucoma.

P-GLA-016

Survival of patients with neovascular glaucoma later to micropulse transscleral cyclophotocoagulation

F. Rojas Hernandez¹, G.F. Diez Cattini¹, J.F. Ortega Santana¹

¹Glaucoma, Fundación Hospital Nuestra Señora de la Luz, Mexico City, Mexico

Introduction: Neovascular glaucoma (NVG) is the result of tissue hypoxia and pathological neovascularization of the anterior segment of the eye with consequent elevation of intraocular pressure. Often appears as a terminal stage disease, resulting in blindness, ongoing pain, and eventually eye loss. Micropulse Transscleral Cyclophotocoagulation (MP-TSCPC) is an efficient noninvasive glaucoma treatment that achieves sustained intraocular pressure (IOP) reduction and reduced need for ocular antihypertensive medications.

Objectives:

This study aimed to determine the survival in patients with neovascular glaucoma after Micropulse Transscleral Cyclophotocoagulation (MP-TSCPC).

Methods: It is a cohort, longitudinal, retrospective, observational and analytical study. Patients with a diagnosis of neovascular glaucoma who underwent MP-TSCPC from 2018 to 2023 were included and were provided with telephone and clinical record follow-up. The sample calculation was performed based on a normal distribution using a t test. Frequencies and percentages were reported for categorical variables, while numerical variables were reported with measures of central tendency. A Kaplan-Meier analysis was performed to estimate survival probabilities. Log rank test to compare the difference between groups. A value of $P < 0.05$ was considered significant.

Results: A total of 100 patients were studied. Neovascular glaucoma was secondary to diabetic retinopathy (83%) and central retinal vein occlusion (14%). Overall survival was 3.37 years. Patients with elevated fasting blood glucose levels (≥ 130 mg/dL) before MP-TSCPC were found to have a survival of 2.23 years ($P = 0.001$). This patients lost 33.8% (or 1.14 years) of expected remaining life compared to those patients who had normal values. Median survival in patients with abnormal serum creatinine (> 1.3 mg/dL) was 1.49 years shorter than in those with normal levels ($P = .004$). Patients with intraocular pressure > 30 mmHg before the cyclophotocoagulation showed a reduction in survival of 1.38 years compared to values equal to or below thirty ($P = 0.004$).

Conclusions: With this study it is possible to mention fasting blood glucose, serum creatinine and intraocular pressure prior to laser therapy as predictors of survival in neovascular glaucoma.

P-GLA-017

Clinical characteristics of disc hemorrhages in peripapillary atrophy and glaucoma progression in myopic patients

S.A. Kim¹, C.K. Park¹, H.-Y.L. Park¹

¹Ophthalmology, The Catholic University of Korea, Seoul, Korea, Republic of

Introduction: Disc hemorrhage (DH) is risk factor for development and progression of glaucoma, typically located on or at the margin of optic disc. DHs are mostly found in the superotemporal or inferotemporal regions of optic disc. However, we observed that the DHs are often located in the peripapillary atrophic (PPA) areas or temporal regions of optic disc in glaucomatous eyes with myopia.

Objectives: To investigate clinical characteristics and glaucoma progression in eyes with DH in PPA and located at temporal region among glaucoma patients with myopia.

Methods: One hundred ninety-six eyes of 196 glaucoma patients with myopia who were observed at least 4 years and had more than six visual field (VF) tests were included. Eyes with DHs in PPA and DHs located in temporal region were defined as DH in PPA, and eyes with DHs located in superotemporal or inferotemporal regions were defined as typical DH. PPA area, disc ovality ratio, and disc torsion were measured. Length of γ -zone PPA, distance from disc edge to fovea, angle of scleral bending were measured using optical coherence tomography. Logistic regression analysis was performed to identify associated factors with the presence of DH in PPA among eyes with and without DH in PPA. Cox proportional hazards model was used to determine associated factors with VF progression among eyes with and without DH in PPA, and eyes with DH in PPA and typical DH.

Results: Comparison of baseline characteristics between eyes with and without DH in PPA showed similar axial length (26.95 ± 1.60 mm; 26.82 ± 1.07 mm). γ -zone PPA was longer and angle of scleral bending was larger in eyes with DH in PPA (both $p \leq 0.001$). Longer γ -zone PPA ($\beta=1.001$; $p=0.018$) and larger angle of scleral bending ($\beta=1.033$; $p=0.008$) were associated with presence of DH in PPA using logistic regression analysis. Eyes with DH in PPA had a smaller mean deviation slope of VF, a larger disc ovality ratio, a longer γ -zone PPA, and a larger PPA area when compared to the baseline characteristics of eyes typical DH. VF progression was associated with absence of DH in PPA ($p=0.030$) and larger angle of scleral bending ($p=0.019$) among eyes with DH in PPA and typical DH using Cox proportional hazards model.

Conclusions: DH in PPA and those located at temporal region were associated with longer γ -zone PPA and larger angle of scleral bending, represented by stretching and deformation of sclera that may be result from myopic changes. Eyes with DH in PPA did not show VF progression when compared with eyes with typical DH.

P-GLA-018

Combined cataract and gonioscopy assisted transluminal trabeculotomy: 360 versus 180-270 degrees; is there a difference?

L. Petrova^{1,2}, B.U. Khan^{3,4,5}, G.W. Belovay^{2,6}

¹Virginia Commonwealth University School of Medicine, Richmond, United States, ²Clarity Eye Institute, Vaughan, Canada, ³Medical Director, Clarity Eye Institute, Vaughan, Canada, ⁴Ophthalmology & Vision Sciences, University of Toronto, Toronto, Canada, ⁵Division of Ophthalmology, Southlake Regional Hospital, Newmarket, Canada, ⁶Ophthalmology, Queen's University, Kingston, Canada

Introduction: There are numerous studies showing the effectiveness of gonioscopy assisted transluminal trabeculotomy performed concurrently with phacoemulsification. However, there is a scarcity of studies that examine whether the degree of trabeculotomy makes any difference. This retrospective study compares the outcomes of 180-270 versus 360-degree GATT done concurrently with phacoemulsification at one year.

Objectives: The objective of this study was to compare the change in intraocular pressure (IOP) and glaucoma medication at one year in patients who underwent combined cataract and gonioscopy assisted transluminal trabeculotomy (GATT) surgery either 360 degrees or between 180-270 degrees.

Methods: A retrospective chart review spanning a two-year period from 2018 was conducted for surgical cases from two surgeons in a community-based glaucoma subspecialty clinic in the Greater Toronto Area. There were 224 eyes identified that underwent combined cataract and GATT surgery. Preoperative and postoperative data was collected which included demographics, type of glaucoma, IOP, medications, complications, and interventions. The primary outcome of the study was IOP and medication reduction at one year in each group.

Results: The mean age of patients was 72.8 years; 52% are female and 48% are male. At one year there was no difference in the mean IOP between the 360-degree group (15.5 +/- 0.7 mmHg) and the 180-270-degree group (14.9 +/- 0.7 mmHg) ($p > 0.05$). The mean number of glaucoma medications was significantly lower in the 360-degree group, 0.3 +/- 0.1 medications, as compared to the 180-270-degree group, 0.6 +/- 0.1 medications ($p < 0.05$). Overall, IOP reduced from 18.0 +/- 0.6 mmHg at baseline to 15.2 +/- 0.5 mmHg after one year ($p < 0.01$). The mean number of glaucoma medication reduced from 1.8 +/- 0.1 pre-operation to 0.5 +/- 0.1 at one year ($p < 0.01$). The most common complications were bleeding, IOP spike, and corneal edema.

Conclusions: Combined cataract and GATT surgery with either 180-270 or 360 degrees is effective at reducing both IOP and glaucoma medications. While there was no significant difference in IOP at one year between the groups, the 360-degree group had a significantly lower reduction in glaucoma medications.

P-GLA-019

Predicting glaucoma diagnosis from Visual Field testing using supervised machine learning

D. Manik¹, M. Crowson^{2,3}

¹Boston University Chobanian and Avedisian School of Medicine, Boston, United States, ²Department of Otolaryngology, Massachusetts Eye and Ear, Boston, United States, ³Department of Otolaryngology, Harvard Medical School, Boston, United States

Introduction: Visual field (VF) loss due to glaucoma occurs in characteristic patterns related to the retinal nerve anatomy. Machine learning has the potential to use these patterns to help autonomously detect glaucomatous damage. Accurate and early detection of glaucoma using machine learning could help initiate earlier treatment and prevent further, irreversible vision loss.

Objectives: The objective was to determine if a supervised machine learning model can accurately predict a glaucoma diagnosis using visual field data from a single clinic visit. The objective was also to determine if supplementing the visual field data with retinal exam and other health determinants data significantly improves the predictive power of the machine learning model.

Methods: This study used a retrospective analysis of Humphrey Matrix perimeter VF testing, clinical retinal exam, and health determinants data for 694 unique subjects from the NHANES 2005-2006 and 2007-2008 cohorts. The 694 left eyes of the participants were diagnosed as no glaucoma, possible glaucoma, and probable/definite glaucoma by ophthalmologists. Machine learning algorithms were trained for a regression task to predict a participant's left eye glaucoma status. Two separate machine learning models were developed: i) one trained exclusively on VF data and ii) one trained on VF, retinal exam, and health determinants data. Model prediction performance was assessed using F1-scores and Cohen's kappa (κ) coefficients.

Results: The VF-only model achieved an F1-score of 0.60 (95% CI: 0.57-0.63) and $\kappa = 0.43$ (95% CI: 0.30-0.55) in predicting a multiclass glaucoma diagnosis. Adding retinal exam and health determinants data significantly improved the model's performance to an F1-score of 0.89 (95% CI: 0.87-0.92) and $\kappa = 0.86$ (95% CI: 0.79-0.92). Of the top ten most influential predictors for the model trained on all data, four were related to VF testing, three were related to retinal exam data, and three were related to demographic data. Important predictor variables included age, employment status, cup-to-disc ratio, optic disc excavation, and nasal and superior VF testing results.

Conclusions: Machine learning algorithms can detect glaucoma from VF data taken at one study visit with reasonable accuracy. However, supplementing the VFs with retinal exam and clinicodemographic data significantly improves the ability to predict the presence of glaucoma, reflecting the importance of both objective ophthalmologic and clinicodemographic data in diagnosing glaucoma.

P-GLA-020

Comparison of surgically induced astigmatism after PreserFlo® MicroShunt implantation and trabeculectomy

N. Sugiura¹, K. Maruyama¹, K. Sekino¹

¹Yashio Maruyama Eye Clinic, Saitama, Japan

Introduction: It is widely acknowledged that the PreserFlo® MicroShunt implantation induces mild and transient changes in corneal astigmatism, but few studies have yet compared it with trabeculectomy. In addition, appropriate methods for assessing surgically induced astigmatism after glaucoma surgery have not been established due to the characteristics of the different axis of the surgical site in each eye.

Objectives: To compare the surgically induced astigmatism after PreserFlo® MicroShunt implantation and trabeculectomy using Holladay's with-the-wound cylinder method.

Methods: Sixteen eyes that underwent either PreserFlo® MicroShunt implantation (PFM group) or trabeculectomy (Trab group) were analyzed. Corneal astigmatism was measured preoperatively and 3 months postoperatively using an automated keratometer (ARK-1s, Nidek, Gamagori, Aichi, Japan). The surgically induced astigmatism at 3 months postoperatively was calculated using Holladay's with-the-wound cylinder method and compared between the two groups by the Mann-Whitney U test.

Results: The mean astigmatic arithmetic magnitude preoperatively was 1.38 ± 0.78 (range: 0 to 2.75) diopter in the PFM group and 1.30 ± 0.86 (0 to 2.75) diopter in the Trab group, with no significant difference ($p = 0.79$). The preoperative intraocular pressure was 19.5 ± 4.9 (12 to 32) mmHg in the PFM group and 22.9 ± 7.9 (13 to 39) mmHg in the Trab group, also with no significant difference ($p = 0.15$).

The surgically induced astigmatism at 3 months postoperatively using Holladay's with-the-wound cylinder method was 0.04 ± 0.76 (-0.72 to 2.13) diopter in the PFM group and 0.52 ± 1.12 (-1.32 to 2.43) diopter in the Trab group, with no significant difference ($p = 0.16$). The preoperative intraocular pressure was 12.6 ± 5.4 (7 to 25) mmHg in the PFM group and 10.4 ± 5.2 (3 to 22) mmHg in the Trab group, also with no significant difference ($p = 0.27$).

Conclusions: In this study, surgically induced astigmatism after PreserFlo® MicroShunt implantation and trabeculectomy appears to be similar, but further study with a larger number of eyes is needed.

P-GLA-021

Pentacam for the screening of occludable angles: estimating the optimal cut-point

J.E. Morales Leon¹, A.L. Ruiz Pérez², E.C. Torres García², A. Hernandez Pérez¹, L. Romero Díaz de León¹, F. Alarid Escudero³, J.A. Palma Zapata⁴, C.A. Uribe Vicencio²

¹OCULAB Ophthalmology Diagnostic Centre, Aguascalientes, Mexico, ²Department of Medicine, Autonomous University of Aguascalientes, Aguascalientes, Mexico, ³School of Public Health, University of Minnesota, Minnesota, United States, ⁴Medical Didactic Unit, Autonomous University of Aguascalientes, Aguascalientes, Mexico

Introduction: Iridotrabecular contact can cause intraocular pressure fluctuations and angle closure attacks, which can damage the optic nerve. Although gonioscopy is the preferred method for identifying occludable angles, inter-observer variability creates difficulties in screening. Non-invasive anterior segment imaging, such as the Pentacam, provides faster and more quantitative images, making it a promising alternative for clinicians to accurately identify and treat occludable angles for better patient outcomes.

Objectives:

1. To estimate the optimal anterior chamber angle value cut-point in the Scheimpflug images obtained from Pentacam to diagnose occludable angles in a Latin-Mestizo population referred to a private ophthalmology clinic.
2. To determine the sensitivity and specificity of the current standard deviation cutpoint shown in the Fast-Screening Report analysis on Pentacam's built-in software.

Methods: This study observed consecutive Latin-Mestizo patients referred for Pentacam measurements and gonioscopic examination at a single center. Eligible patients had clear corneas, no aphakia, and no synechiae. A 4-mirror gonioscope was used for gonioscopy in a dimly lit room. The Pentacam system measured the angle of the aperture using a 25 Scheimpflug-image tool and compared it to a database of standard deviations. The statistical methods used ROC curves, employing the Youden and "closest-top-left" methods for optimizing sensitivity and specificity.

Results: The present study enrolled 50 patients, involving a total of 98 eyes. Women constituted 65% of the study population, with an average age of 61.9 years.

Results indicate that the optimal cut-point, as determined by both criteria, was 32.4°, with a sensitivity of 85.71% and specificity of 76.10%. In comparison, the sensitivity and specificity of the current built-in standard deviation-based cut-point (31.8°) were 73.21% and 76.19%, respectively. The ROC curves and Specificity/Sensitivity graphs are presented in the attached images. These findings offer valuable insights into the effectiveness of the diagnostic criteria and suggest that the optimal cutpoint of 32.4° may be the most reliable measure for accurate diagnosis.

Conclusions: In conclusion, the detection of occludable angles through anterior chamber angle by Pentacam has been demonstrated to enhance sensitivity and specificity when employing an optimal cut-point of 32.4 degrees. This surpasses the current software's recommendation of 31.8 degrees, which our study has shown to be somewhat inferior.

P-GLA-022

Glaucoma tube shunt revision with scleral “turtle-plast”

S. Edoigiawerie¹, P. Weber², M. Gorla³, G. Campagna⁴, A. Sheybani⁴, M. Qiu²

¹Pritzker School of Medicine, University of Chicago, Chicago, United States, ²Ophthalmology, University of Chicago, Chicago, United States, ³Chicago Glaucoma Consultants, Chicago, United States, ⁴Ophthalmology, Washington University, St. Louis, Chicago, United States

Introduction: Tube erosion is a major complication of glaucoma tube shunt surgery that often necessitates surgical removal of the tube. However, a major challenge following surgery is the closure of the corneoscleral fistula left by the removed tube. In eyes requiring tube repositioning, exchange, or removal, it may be challenging to achieve a watertight and astigmatically neutral closure of the prior sclerotomy track, especially if it is very short and anterior.

Objectives: We present two cases, with accompanying surgical videos, illustrating the use of a Tutoplast plug to create a watertight seal in the corneoscleral fistula formed following the removal of a GDD tube.

Methods: A piece of dehydrated scleral Tutoplast was used to plug the fistula. When rehydrated, the Tutoplast expanded to create a watertight seal of the fistula. This piece of Tutoplast was shaped like a small rectangle with an attached larger rectangle so the smaller part would plug the fistula while the attached larger part could be used to reinforce the adjacent area of scleral thinning. The patch graft was sutured to the sclera at the four corners and resembled a turtle with four sutures for legs with its head in the fistula, hence we affectionately call this a scleral “Turtle-Plast”.

Results: Via two illustrative cases, we demonstrate that Tutoplast can be cut into a strategic geometric shape with a thin protruding tip which can be used to plug a tube entry site during tube removal or repositioning surgery as well as to reinforce adjacent areas of scleral thinning if needed.

Conclusions: This “Turtle-Plast” technique is advantageous over direct suturing of the tube track because the head of the turtle provides an astigmatically neutral watertight seal of a short anterior fistula, which can often be technically challenging to secure. Meanwhile, the body of the turtle can reinforce an adjacent area of scleral thinning in addition to being a more substantive piece of patch graft to suture down to the underlying sclera.

P-GLA-023

Effect of *Helicobacter pylori* infection on the open angle glaucoma development: National Health Insurance Service cohort

T.E. Lee¹, J.W. Jung¹

¹Ophthalmology, Jeonbuk National University Hospital, Jeonju, Korea, Republic of

Introduction: Glaucoma, a leading cause of blindness globally, lacks a fully elucidated pathomechanism despite known risk factors such as elevated intraocular pressure and aging. Recent research, primarily hospital-based, has examined the potential role of *Helicobacter pylori* infection in glaucoma pathogenesis, with some studies indicating a correlation while others do not reach this conclusion.

Objectives: We assessed the risk for OAG among patients with *H. pylori* infection over a 12-year follow-up period using nationwide, population-based data.

Methods: Data from the NHIS cohort between 2002 and 2019 were utilized. The *H. pylori* infection group consisted of 67,909 patients who underwent *H. pylori* eradication therapy (triple or quadruple therapy) between 2007 and 2019, while the control group comprised 67,909 individuals matched for age, sex, income level, residential area, and comorbidities. The final cohort was followed up until the date of the first diagnosis of OAG, date of death, or December 31, 2019, whichever occurred earliest. Cox proportional hazards models were used to analyze the risk factors for the incidence of OAG.

Results: The risk of developing OAG was 1.16 times higher in the *H. pylori* group (HR: 1.16, 95% CI 1.10-1.24). There was a tendency for the risk of OAG to increase with age compared to the 20-29 age group [Age 30-39 (HR, 1.64; 95% CI, 1.24-2.17), Age 40-49 (HR, 2.33; 95% CI, 1.79-3.03), Age 50-59 (HR, 3.90; 95% CI, 3.00-5.07), Age 60-69 (HR, 6.00; 95% CI, 4.61-7.82), Age 70-79 (HR, 6.63; 95% CI, 5.05-8.72), Age 80+ (HR, 4.94; 95% CI, 3.39-7.21)]. Diabetes (HR, 1.52; 95% CI, 1.41-1.64), hyperlipidemia (HR, 1.25; 95% CI, 1.15-1.37), migraine (HR, 1.18; 95% CI, 1.01-1.38), and hypertension (HR, 1.16; 95% CI, 1.09-1.24) were associated with the incidence of OAG.

Conclusions: *H. pylori* infection was associated with the incidence of OAG based on a 12-year follow-up investigation.

P-GLA-024

Behavior of intraocular pressure after capsulotomy in patients with and without a diagnosis of glaucoma

O.L. Teheran Forero¹, A. Gutierrez¹, E. Ramos Clason¹

¹Universidad del Sinu, Cartagena, Colombia

Introduction: Posterior capsule opacification (OPC) in pseudophakic eyes it's a common problem, the treatment consists in Nd-YAG laser capsulotomy, it's likely to affect PIO, but it's not clear the time that its continue to be affected and the relation with the amount of energy used.

Objectives: Determine the behavior of intraocular pressure (IOP) after YAG laser capsulotomy in patients with and without a diagnosis of glaucoma.

Methods: Prospective, observational, cohort study. Patients over 18 years, pseudophakic were collected, who presented OPC with a decrease in their visual acuity. The patients were divided into two groups, group 1 (patients with diagnosis of glaucoma) and group 2 (healthy patients). Intraocular pressure was taken one hour before the capsulotomy, after dilation of the patient, then 1 hour after the time of the procedure, at 8 days, at 30 days and finally at 180 days. For each procedure, the number of shots and total amount of energy were recorded for analysis and its relation with the change in IOP. A p value <0.05 was considered statistically significant.

Results: 215 eyes of 192 patients were included. Group 1 made up 34% of patients, and group 2 were 65% of patients. Baseline IOP in group 1 was 14.5 mmHg, in group 2 it was 13.5 mmHg. In group 1, the average IOP an hour after the procedure was 16 mmHg; at 8 days was 16.7 mmHg, at 30 days 16.7 mmHg and at 180 days 14.8 mmHg. In group 2, the average IOP an hour after the procedure was 14.6 mmHg; at 8 days was 15.0 mmHg, at 30 days 15.1 mmHg and at 180 days 13.9 mmHg. An increase in IOP of 10% was found 1 hour after; at 8 days 15.1%; at 30 days 15.2% and 2% at 180 days in group 1 and in group 2 an increase of 8.8% at 1 hour after; at 8 days 11.1%; at 30 days 11.8% and 2% at 180 days, statistically significant at 1 hour, 8 days and 30 days in both groups. When analyze the energy used, patients that received 11-20 shots, the IOP increased 9.8%; those who received >20 shots had 18% increment, compared to those who received <11 shots in which IOP increased 5.8%.

Conclusions: This study demonstrates the positive and statistically significant correlation between Nd-YAG laser capsulotomy and increased IOP, also the sustained increase in IOP over time. In patients with a previous diagnosis of glaucoma, the IOP increased more compared to healthy patients. Also we observed in this study that as the greater the number of shots (more amount of energy) , the greater the increase in IOP .

P-GLA-025

Comparison of the hypotensive efficacy of high frequency deep sclerotomy vs Kahook dual blade in open angle glaucoma

E.J. Garcia-Negron¹, G.F. Diez-Cattini¹, J.F. Ortega-Santana¹

¹Glaucoma, Hospital Nuestra Señora De La Luz Iap, Mexico City, Mexico

Introduction: The aim of this study was to characterize the reduction in intraocular pressure (IOP) and IOP-lowering medication at twelve months follow-up use following goniotomy using the Kahook Dual Blade combined with phacoemulsification vs High Frequency Deep Sclerotomy combined with phacoemulsification.

Objectives: - Compare the hypotensive efficacy with respect to the reduction of intraocular pressure in patients with open-angle glaucoma undergoing High Frequency Deep Sclerotomy vs Kahook Dual Blade at 12 months of follow-up and determine the reduction in IOP-lowering medication.
- Compare the rates of total success (TS), qualified success (QS) and failure (F) in the sample studied for both procedures.

Methods:

In this retrospective analysis, data from consecutive patients with open-angle glaucoma undergoing goniotomy with the Kahook Dual Blade combined with phacoemulsification and High Frequency Deep Sclerotomy procedure combined with phacoemulsification were analyzed. Preoperative, intraoperative, and postoperative follow-up data through 12 months of follow-up were collected. The primary efficacy endpoint was IOP reduction from preoperative baseline; reduction in IOP-lowering medication use was a secondary endpoint.

Results:

Data were collected from 80 eyes of 72 subjects. Mean (\pm SE) preoperative IOP was 16.5 ± 3.39 mmHg (**KDB Group**) vs 16.7 ± 2.83 (**HFDS Group**), and from day 1 through 12 months of postoperative follow-up mean IOP reductions of 4.65 ± 1.1 mmHg (**26.81%**) in **KDB Group** vs 3.92 ± 0.92 mmHg (**22.68%**) **HFDS Group**; **p 0.185** at 12 months follow up, there was no statistical significance between procedures but reductions in IOP were evident as soon as day 1 postoperatively and were maintained throughout follow-up in both groups. At month 12, in KDB group 80% (32/40) of patients had achieved a target IOP < 21 mmHg or had achieved >20% IOP reduction from baseline (32.5% as Total Success (TS) and 47.5% as Qualified Success (QS), 20% were classified as therapeutic failure (F) according to the definitions, HFDS data were as follows, TS = 20%, QS = 62.5%, F = 17.5%.

Conclusions: The hypotensive efficacy of High Frequency Deep Sclerotomy (HFDS) and Kahook Dual Blade (KDB) combined with cataract surgery at 12 months of follow-up were similar and did not show statistical significance ($p = 0.185$), both procedures can be used as a safe surgical option in the treatment of patients with open-angle glaucoma who needs a mild to moderate reduction in IOP.

P-GLA-026

Visual outcomes of extended depth of focus intraocular lens in phacotrab in patients with cataract and PEX glaucom

U. Karimov¹, Y. Razhko²

¹Gulistan Koz eye clinic, Gulistan, Uzbekistan, ²The Republican Research Center for Radiation Medicine and Human Ecology, Gomel, Belarus

Introduction: Visual Outcomes of Extended Depth of Focus Intraocular Lens in Phacotrab in Patients with Cataract and PEX Glaucoma

Objectives: Evaluate effectiveness extended depth of focus (EDOF) intraocular lens (IOL) LuxSmart (Bausch+Lomb) compared with monofocal IOL Akreos Adapt AO (Bausch+Lomb) in phacotrabeculectomy in patients with pseudoexfoliation glaucoma (PEG).

Methods: Prospective, randomized study with inclusion and exclusion criteria was conducted in 2021-2022. Of the 59 patients (59 eyes) with PEG enrolled, 28 (47.5%) were implanted with the LuxSmart IOL and 31 patients (52.5%) with the Akreos Adapt IOL. Patient demographics, preoperative intraocular pressure (IOP), glaucomatous optic nerve damage, visual field loss, angle anatomy, and anterior chamber depth were similar between the groups. Uncorrected distance visual acuities (UDVA), uncorrected intermediate visual acuities (UIVA) and uncorrected near visual acuities (UNVA) were tested.

Results: No statistically significant difference for mean of IOP and number of glaucoma medications was found between groups. The median IOP values decreased postoperatively by 2.9 mmHg and 3.1 mmHg. At the 6-month follow-up, the groups demonstrated similar mean UDVA. Differences UNVA between groups were statistically and clinically significant, with a larger proportion (>50%) of the patients implanted with YSMART IOL. The postoperative UIVA were significantly better for YSMART IOL ($p < 0.01$). No difference was found between groups for mean target spherical equivalent and mean spherical equivalent ($p > 0.05$). The median values of contrast sensitivity were not statistically different at 1.5 and 3.0 cycles per degree under either mesopic or mesopic with glare lighting conditions. Eyeglasses wear was significantly lower for patients receiving the YSMART IOL ($p < 0.01$).

Conclusions: Clinical results at least 6 months after phacotrabeculectomy showed that EDoF IOL LuxSmart provides patients with improved uncorrected intermediate and near visual acuity, comparable distance visual acuity, increased depth of focus and less use of glasses compared to the monofocal control IOL in patients with pseudoexfoliation glaucoma. It was established that the PEG is not an exclusion criterion for the implantation of a new design IOL.

P-GLA-027

Combined phacoemulsification and OMNI in primary angle closure vs. primary open angle glaucoma: A comparative study

Z.Y. Xu¹, C. Munasinghe¹, J. Rai¹, P. Ranjit¹

¹University Hospitals North Midlands NHS Trust, Stoke-on-Trent, United Kingdom

Introduction: The OMNI surgical system for canaloplasty and gonioscopy-assisted transluminal trabeculotomy (GATT) in combination with phacoemulsification has been shown to be effective in lowering IOP in both primary open angle glaucoma (POAG) and primary angle closure glaucoma (PACG). We present 6-month data comparing efficacy and safety outcomes across these two patient cohorts in a tertiary centre in the West Midlands.

Objectives: To evaluate the short-term efficacy and safety of combined phacoemulsification and OMNI in PACG vs. POAG.

Methods: A retrospective clinical audit was conducted for all combined phacoemulsification plus GATT operations performed with the OMNI surgical system at University Hospitals North Midlands NHS Trust. Standards were defined in accordance with published literature. Baseline characteristics, pre-operative logMAR visual acuity (VA) and intra-ocular pressure (IOP) were extracted from electronic medical records as well as the number of topical glaucoma agents used. VA and IOP measurements at post-operative visits up to 6 months were recorded alongside any complications or further procedures required.

Results: The audit captured a total of 44 eyes that underwent combined phacoemulsification with OMNI. Of these, 25 (57%) were for PACG and 19 (43%) for POAG. Pre-operative glaucoma status was advanced with an average cup-to-disc ratio of 0.8. Mean pre-operative IOP was 23.0mmHg in PACG eyes and 18.8mmHg in POAG eyes. The mean number of glaucoma drops across both groups was 1.6. At 6 months, the mean IOP in PACG eyes was 16.0mmHg (55% reduction) compared with 16.7mmHg (20% reduction) in POAG eyes. The reduction in mean number of drops was similar between the two groups at -1.5 in PACG and -1.1 in POAG. There were no incidences of hyphaema and all microhyphaema self-resolved. One patient had a slow aqueous misdirection with a subsequent rise in IOP and was restarted on topical treatment. Post-operative effects on VA were largely temporary with an average change of -0.1 logMAR by the end of the audit period.

Conclusions: This clinical audit of combined phacoemulsification and the OMNI surgical system demonstrates greater percentage IOP reduction in PACG vs POAG eyes. Efficacy was excellent in both groups and the procedure was well tolerated with only one case of significant IOP elevation due to aqueous misdirection. Evaluation of longer-term follow-up data is required to determine if the reductions in IOP and glaucoma drops can be sustained.

P-GLA-028

Exploration for pivotal cell death of retinal ganglion cells in glaucoma pathologic damage

R. Rong¹, M. You¹, Z. Zeng¹, X. Xia¹

¹Eye Center of Xiangya Hospital, Central South University, Changsha, China

Introduction: How to rescue retinal ganglion cells (RGCs) and their axons is an essential part of glaucoma conservation therapy. There is a lack of effective interventions, which is mainly related to the complex pathological factors of glaucoma. Whatever the underlying causes, the death of RGCs is the ultimate outcome.

Objectives: This study aimed to find out which mode of death is predominant in RGCs and which interventions are the most effective, as well as to shed light on the exploration of new modes of RGCs' death.

Methods: We first conducted a bioinformatic analysis based on bulk RNA sequencing data from acute ocular hypertension glaucoma (AOH) models and N-methyl-D-aspartate (NMDA) mouse model. Next, we used the same two mouse models and related cell models as above to investigate the protective effects of inhibitors of apoptosis, ferroptosis, necroptosis, pyroptosis, and cuproptosis and an autophagy agonist on RGCs. Furthermore, we studied the role of cuproptosis in glaucoma pathology. We verified the expression changes of key cuproptosis genes (FDX1, LIAS, and DLAT) in both models and conducted a correlation analysis of cuproptosis genes and the differential gene set of glaucoma patients. Additionally, we explored cell viability and related downstream, including inflammation and mitochondria-related characterization in cellular and animal models after DLAT intervention using siRNA.

Results: (1) We found that oxidative stress, the inflammatory response, and cell death played important roles in both AOH and NMDA models, and metal ion-related pathways were also significant changes after NMDA modeling by analyzing the sequencing data.

(2) The use of ferroptosis and cuproptosis inhibitors will provide decent protection in cellular OGD as well as animal AOH models, while the use of apoptosis, ferroptosis, and cuproptosis inhibitors provided better protection in glutamic acid cells as well as NMDA animal excitotoxicity models.

(3) Further, we observed that cuproptosis-related genes exhibited significant changes in glaucomatous pathological models. By intervening with the essential executor DLAT, we effectively rescued cell death. This intervention primarily affected mitochondrial function rather than inflammatory signaling pathways.

Conclusions: Glaucoma is a complex neurodegenerative disease triggered by multiple factors, future therapeutic strategies should broadly target multiple cell death modalities, including cuproptosis to reduce the loss of RGCs in glaucoma and protect the optic nerve and visual function.

P-GLA-029

Long-term safety and performance of a suprachoroidal pressure sensor system: results of the EYEMATE-SC trial

E. Micheletti¹, P. Szurman^{2,3}, K. Mansouri⁴

¹Moorfields Eye Hospital, London, United Kingdom, ²Eye Clinic Sulzbach, Knappschaft Hospital Saar, Sulzbach, Germany, ³Klaus Heimann Eye Research Institute (KHERI), Sulzbach, Germany, ⁴Swiss Visio Glaucoma Research Center, Montchoisi Clinic, Lausanne, Switzerland

Introduction: The EYEMATE-SC intraocular pressure sensor is an implantable diagnostic medical device designed for measuring intraocular pressure (IOP). It can be permanently implanted in the suprachoroidal space in conjunction with non-penetrating glaucoma surgery (NPGS) and offers direct digitized IOP readings in mmHg.

Objectives: To evaluate long-term safety and performance of eyemate-SC sensor system in patients with glaucoma who underwent NPGS.

Methods: This prospective, open-label, multicenter interventional study analyzed long-term safety of the eyemate-SC suprachoroidal sensor system (Implandata, Hanover, Germany) in 22 eyes of 22 patients with open-angle glaucoma who received the implant as part of the EYEMATE-SC trial. The telemetric sensor system includes an implantable IOP sensor and a hand-held reading device. All patients underwent 5 follow-up visits over a 24-month follow-up, from month 12 to month 36 after implantation. Each visit consisted of a comprehensive examination including IOP measurement with the eyemate-SC system, Goldmann applanation tonometry (GAT). The agreement between GAT and the eyemate-SC were analyzed using Bland-Altman analysis. Adverse events (AEs) and device-related adverse effects (ADEs) were recorded at all follow-up visits.

Results: Of 24 eligible patients of the EYEMATE-SC trial, 22 patients (mean age 65.0±10.6 years, 54.5% female) were enrolled. The mean follow-up was 2.7 ± 0.6 years (range 1.0 to 3.4 years). Limits of agreement between GAT and eyemate IOP were ±0.3 mmHg (range, -6.4 to 5.8 mmHg), with greatest concordance at 12 (rccc=0.802, N=22) and 18 months (rccc=0.854, N=19). A difference of less than 5 mmHg was recorded in more than 85% of the 86 paired measurements. No serious AEs and ADEs were recorded. Most common AEs were raised IOP in 5 patients, reduced visual acuity in 3 patients, and cataract in 3 patients.

Conclusions: This study demonstrates the long-term safety of the eyemate-SC system. No serious AEs related to the eyemate-SC were observed. The agreement between the eyemate-SC and GAT were within the standard range of IOP measuring methods, set by regulatory agencies. The eyemate-SC system holds promise for frequent daily IOP measurements by patients at home, with no need for professional assistance.

P-GLA-030

Exploring glaucoma chronic disease management on social networks in China

Y. Wu¹, W. Guo¹, M. Hu²

¹Shanghai Ninth People's Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China,

²East China Normal University, Shanghai, China

Introduction: Glaucoma, a major cause of irreversible blindness globally, requires continuous management to mitigate vision loss. This challenge is exacerbated by the frequent inadequacy of patient adherence to prescribed treatment and monitoring protocols. In response, the integration of healthcare applications within widely used social networking platforms offers a promising approach to improve chronic disease management.

Objectives: This study aims to develop a glaucoma chronic disease management system based on WeChat mini-programs to enhance patients' self-management capabilities and physicians' ability to track, follow-up, and analyze patient conditions.

Methods: The system is divided into a patient side and a physician side. The patient side features include storage of patients' past medical information, digital extraction and trend display of data such as intraocular pressure, cup-to-disc ratio, RNFL, visual acuity, and visual field, as well as education on glaucoma and monitoring of medication adherence for glaucoma. The physician side allows for anytime access to patient information with the capability of exporting data after de-identification, facilitating disease tracking, follow-up, and data analysis.

Results: To date, the system has served over 3,000 glaucoma patients. Through practical application testing, the system successfully implemented various functions for both the patient and physician sides. The patient side has enhanced patients' knowledge of glaucoma and medication adherence, allowing them to easily store and review their medical records, understand the trends of key indicators, and learn about follow-up plans, thus improving their compliance with consultations. The physician side enables doctors to conveniently view and export patient information (after de-identification), thereby enhancing their ability to track, follow-up, and analyze patient conditions. Moreover, the system has improved the efficiency of communication between patients and physicians while protecting patient privacy.

Conclusions: The glaucoma chronic disease management system based on WeChat mini-programs provides an effective means of disease management and tracking for patients and physicians, contributing to improved treatment adherence among patients and a better grasp of patient conditions by physicians. Further research could explore how to optimize the system's functionality to meet the needs of more patients and physicians.

P-GLA-031

Clinical characteristics and intermediate long-term prognosis analysis of secondary glaucoma in Sturge-Weber syndrome

*W. Guo*¹

¹Department of Ophthalmology, Shanghai Jiao Tong University, School of Medicine, Shanghai, China

Introduction: Sturge-Weber syndrome (SWS) is a rare neurocutaneous disorder causing secondary glaucoma and vision loss. The glaucoma team at the Shanghai Ninth People's Hospital collaborated with the Department of Reconstructive Surgery to establish an ophthalmology referral system for patients with facial port-wine stains, screening for glaucoma. After more than ten years of effort, we have perfected our outpatient screening process. By the end of 2023, a total of 3,220 cases of port-wine stain patients were screened, among which 848 cases were diagnosed with SWS secondary glaucoma. This study aimed to describe the characteristics and outcomes of SWS secondary glaucoma in China.

Objectives: To describe the characteristics and outcomes of Sturge-Weber syndrome (SWS) secondary glaucoma in China.

Methods: We retrospectively analyzed 412 patients (445 eyes) with SWS-related secondary glaucoma from 29 provincial areas in China. Demographic and clinical information were collected from clinical records.

Results: The median age at diagnosis was 20.67 months. Up to 73.3% of pediatric patients were found to have early-onset glaucoma. Seizures were present in 24% of patients. Mean intraocular pressure (IOP) and cup-to-disc ratio (CDR) were significantly higher in affected eyes ($p < 0.001$). At the first visit, 45.9% of patients had low vision or blindness. Eventually, 85.2% of affected eyes required surgery to control IOP. Incidence of low vision or blindness at the last follow-up was 17.7%. Risk factors for worsening CDR included choroidal thickening, multiple anti-glaucoma operations, initial medical treatment, and undiagnosed SWS at the initial visit. Age at initial diagnosis was significantly associated with advanced glaucoma ($p < 0.0001$), with an optimal cutoff of 78 months. Factors associated with low vision or blindness at the last visit were older age, larger CDR, greater corneal diameter differences, and corneal clouding ($p < 0.05$), with an area under curve of 0.853.

Conclusions: SWS early-onset glaucoma incidence has been underestimated. Early detection of SWS secondary glaucoma is crucial, as initial signs may be subtle. Prompt diagnosis before age 7 can significantly reduce the risk of advanced glaucoma development, as most pediatric SWS patients require IOP-controlling surgery.

P-GLA-032

Follow-up of visual field loss after electrical optic nerve stimulation in normal tension glaucoma

M. Köhler¹, C. Erb², N. Salzmann¹, T. Köhler¹, S. Eckert³, S. Schmickler⁴

¹Augenzentrum N. Salzmann, Hannover, Germany, ²Augenklinik am Wittenbergplatz, Berlin, Germany, ³Medizentrum Eckert, Neu-Ulm, Germany, ⁴Augenzentrum-Nordwest, Ahaus, Germany

Introduction: Normal tension glaucoma (NTG) is characterized by optic nerve degeneration and loss of retinal ganglion cells causing visual field impairment without elevated intraocular pressure (IOP) (1, 2). The current standard approach in NTG therapy is further reduction of the IOP. Despite effective medications leading to IOP-lowering, glaucoma exacerbation and progressive vision loss among patients is common.

Objectives:

Electrical stimulation of the optic nerve (ONS) facilitates axonal regeneration and survival of retinal ganglion cells (3). The case series provides real-world evidence for clinical efficacy of ONS in NTG.

Methods:

Nine NTG patients, between 46 and 79 years old, with progressive vision loss despite therapeutic IOP reduction underwent electrical ONS. Closed eyes were separately stimulated by bipolar rectangular pulses with intensities up to 1.2 mA sufficient to provoke phosphenes. Ten daily stimulation sessions within 2 weeks lasted about 80 min each. Right before ONS at baseline (PRE), visual field loss was documented by static threshold perimetry in the central 30° visual field and compared to the same assessment approximately 3 months (POST3) and 12 months afterwards (POST12). Mean defect (MD) was defined as primary outcome parameter. Only perimetries with a reliability factor (RF) of max. 20% were considered.

Results:

Perimetry follow-up of 18 eyes in 9 patients fulfilled the inclusion criteria. MD significantly decreased from PRE 11.9±6.4 dB (mean±SD) to POST3 9.8±6.2 dB and POST12 9.6±5.8 dB after ONS ($p<0.001$) corresponding to an average improvement of visual fields. 16 eyes in 9 patients showed a reduction of MD by 2.5±2.1 dB (range 0.1 to 7.3 dB) at POST3. Thus, 88.9% of eyes in the present case series were responders 3 months after ONS.

Conclusions:

Innovative treatments that preserve visual function through mechanisms other than lowering IOP are required for NTG with progressive vision loss. The present data document progression halt or even improvement of visual fields in the vast majority of affected eyes after ONS and, thus, extend existing evidence from clinical trials.

P-GLA-033

GRAPE: a multi-modal dataset of longitudinal follow-up visual field and fundus images for glaucoma management

X. Huang¹, X. Kong², Z. Shen³, J. Ouyang², Y. Li⁴, K. Jin⁵, J. Ye⁵

¹Ophthalmology, The Second Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China, ²State Key Laboratory of Industrial Control Technology, College of Control Science and Engineering, Zhejiang University, Hangzhou, China, ³Zhejiang Baima Lake Laboratory Co., Ltd., Hangzhou, China, ⁴Radiation Oncology, UT Southwestern Medical Center, Dallas, United States, ⁵Ophthalmology, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: As one of the leading causes of irreversible blindness worldwide, glaucoma is characterized by structural damage and functional loss. Glaucoma patients often have a long follow-up and prognosis prediction is an important part in treatment. However, existing public glaucoma datasets are almost cross-sectional, concentrating on segmentation on optic disc (OD) and glaucoma diagnosis. With the development of artificial intelligence (AI), the deep learning model can already provide accurate prediction of future visual field (VF) and its progression with the support of longitudinal datasets.

Objectives: To propose a public longitudinal glaucoma real-world appraisal progression ensemble (GRAPE) dataset.

Methods: The GRAPE dataset contains 1115 follow-up records from 263 eyes, with VFs, fundus images, OCT measurements, intraocular pressure (IOP), central corneal thickness (CCT) and clinical information. The fundus images were cropped into regions of interest (ROI), with optic cup and optic disc segmentation. The VF progression were calculated by 3 methods with progression label annotated. Two baseline models were proposed to validate its usability.

Results: The GRAPE dataset was established. Two baseline models demonstrated the feasibility in prediction of VF and its progression. For baseline model of VF progression prediction, the area under curve (AUC) of the models of PLR2, PLR3 and MD is 0.71, 0.80 and 0.73. For baseline model of VF estimation, the mean absolute error (MAE) of models of CFPs, ROI of CFPs, and ROI with OD/ OC segmentation is 4.143, 4.029, 4.107 respectively.

Conclusions: We established a longitudinal multi-modal glaucoma dataset named GRAPE dataset. The GRAPE dataset could be used for prognostic prediction in glaucoma management and VF estimation for structure-function relationship exploration, that could advance the development of computer aided telemedicine in glaucoma.

P-GLA-034

A comparative trial between phacoemulsification and trabeculectomy for IOP control in nanophthalmic eyes with glaucoma

K. Tanya¹, S. Gupta², V. Gupta¹, R. Vohra², R. Chawla²

¹Dr R.P. Centre for Ophthalmic Sciences, AIIMS, New Delhi, India, ²Dr R.P Centre for Ophthalmic Sciences, AIIMS, New Delhi, India

Introduction: Nanophthalmos clinically means small eye (AL < 20.5mm) with normal morphologically, characterized by hyperopia, associated with various secondary pathologies, such as angle-closure glaucoma. It is difficult to medically manage glaucoma in these patients and surgeries are often associated with several complications.

Objectives: The purpose of this study was to evaluate the relative efficacy and safety of trabeculectomy vs phacoemulsification in patients with nanophthalmos with glaucoma.

Methods: Patients presenting with nanophthalmos with elevated IOP with glaucoma were enrolled, 41 affected eyes were taken up for the study, a thorough baseline ophthalmic examination was done including cup disc ratio, intraocular pressure, visual acuity, lens thickness, anterior chamber depth, lens vault, corneal diameters, anterior segment ocular coherence tomography and ultrasound biomicroscopy. Patients underwent trabeculectomy or phacoemulsification with IOL implantation as decided by the treating surgeon.

Results: Out of 41 eyes, 18 underwent trabeculectomy as the primary intervention (**group 1**) and 23 underwent phacoemulsification with or without angle surgery (**group 2**). The mean age of individuals was 39.68 yrs with a mean CDR of 0.837. Baseline characteristics including AL, VA, ACD and CDR were comparable between the 2 groups.

Number of eyes able to achieve a final IOP <18mmHg without medication was: 0 in group 1 and 8 eyes with significant differences (p value **0.001**) with a mean postoperative IOP of 25.61mmHg and 16.32 mmHg in group 1 and 2 respectively (p value **0.012**). With medication, 4 eyes in group 1 and 9 in group 2 were able to achieve the desired IOP (p value **0.248**). Post-operative VA in group 2 showed better outcome (P value: **0.023**). We found no differences in number of medications to control post-op IOP (p value=0.886). 12 eyes in group 1 and 4 eyes in group 2 required secondary intervention for IOP control (p value **0.001**). 33.3% eyes in group 1 and 17.39 % eyes in group 2 had complications during and following surgery (p value 0.78).

Conclusions: Phacoemulsification with IOL implantation is an effective simple, and viable option over conventional filtering surgery for management of glaucoma in nanophthalmos as it relieves the anterior chamber crowding and outflow obstruction due to the lens. Any surgical intervention in these eyes are associated with high incidence of intra-op and post-op complications, and therefore careful preop evaluation and special attentiveness during surgery is advocated.

P-GLA-035

Long term outcomes of tube surgery in the management of paediatric glaucoma at a tertiary centre

H. Aluzri¹, S. Samroo¹, J. Richardson¹, V. Sung¹

¹Glaucoma, Birmingham Midland Eye Centre, Birmingham, United Kingdom

Introduction: Glaucoma drainage device are pivotal in managing paediatric glaucoma.

Objectives: Our study aims to assess the long-term outcomes of these interventions in a paediatric cohort. Inage device are pivotal in managing paediatric glaucoma. Our study aims to assess the long-term outcomes of these interventions in a paediatric cohort.

Methods: This is a single-centre retrospective analysis of (n=85 eyes) consecutive cases of glaucoma drainage device insertion (64 Baerveldt & 21 Molteno tubes) between 2003-2013. All cases were tube surgeries undertaken in children/ adolescents (≤ 18 years old).

Primary outcomes include: Complete success (IOP 5-21mmHg AND $>20\%$ reduction WITHOUT medications), Qualified success (IOP 5-21mmHg AND $>20\%$ reduction WITH medications) and Failure (IOP in excess of success criteria, further glaucoma procedures, NPL vision). Secondary outcomes include: Visual acuity, IOP, medications, cup-to-disc ratio and complications.

Results: The cohort comprised 82 eyes from 61 patients, with a median follow-up of 14.1 years (168.9 months). Out of these, 75 eyes had complete 10-year follow-up data. Preoperatively, patients had a mean age of 9.03 years, with diverse glaucoma etiologies, indicating a complex cohort (18.2% Primary Glaucoma. The Mean Pre-op: IOP- 30.9 ± 7.95 mmHg, VA 0.77 ± 0.62 logMAR, medication count 4.2 ± 1.15). At the final follow-up, significant reductions were observed in both IOP and medication requirements (mean IOP 13.8 mmHg ± 6.3 ; VA 1.15 ± 1.0 logMAR; on 1.3 ± 1.6 medications, ; $p < 0.05$). The study found a complete success rate, at median follow-up of 14.1 years, of 30.5% and a qualified success rate of 55.2%. Mean time to failure was 4.28 ± 4.0 years. Among the 38 eyes (46.3%) classified as failures, 15 (17.4%) required further glaucoma interventions, and 5 (6.1%) due to endophthalmitis. In terms of complications, 8 eyes (9.6%) required corneal transplants.

Conclusions: This research represents the most extensive long-term evaluation of paediatric tube shunt surgery. Our results demonstrate the safety and efficacy of this procedure.

P-GLA-036

Comparative evaluation of minimally invasive procedures using the XEN Gel Stent and trabeculectomy in glaucoma patients

E. Mrukwa-Kominek^{1,2}, J. Janiszewska-Salamon^{1,2}

¹Dept of Ophthalmology, Silesian University of Medicine in Katowice, Katowice, Poland, ²Dept of Ophthalmology, Prof. K. Gibinski University Clinical Center, Katowice, Poland

Introduction: The development of minimally invasive glaucoma surgery offers the hope of effectively lowering intraocular pressure (IOP) with fewer complications compared to the gold standard of trabeculectomy.

Objectives: The aim of this study was comparative evaluation of the efficacy and safety of minimally invasive procedures using the XEN Gel Stent and standard trabeculectomy in patients with open-angle glaucoma

Methods: The retrospective, non-randomised study involved analysis of test results of patients at the Department of Ophthalmology of University Clinical Centre in Katowice. The analysis involved 91 patients with open-angle glaucoma who had undergone either the XEN Gel Stent implantation procedure (45 patients - group I) or trabeculectomy (46 patients - group II). The follow-up was 36 months. All patients were assessed in terms of IOP, number of anti-glaucoma medications taken, visual field, visual acuity and intra- and postoperative complications.

Results: In both groups, a statistically significant reduction in IOP and a reduction in the number of IOP-lowering medications were obtained in all observation periods. The mean percentage reduction in IOP at 36 months of observation was 32.8% for group I and 43.6% for group II. Visual field testing remained stable over a two-year period for both groups, and deteriorated in group II at year 3 of observation. Hypotonic complications were significantly more common in group II. Complete success, i.e. IOP reduction of at least 20% without anti-glaucoma medication, was achieved at 36 months of observation by 18.8% of patients from group I and 26.7% of patients from group II. Overall success, defined as IOP reduction of at least 20% without or with anti-glaucoma medication, was achieved by 62.6% of patients from group I and 86.7% of patients from group II. Therapeutic failure affected 17.8% of patients from group I and 13% of patients from group II.

Conclusions: Both procedures effectively lower intraocular pressure and reduce patients' reliance on anti-glaucoma medication. The minimally invasive glaucoma surgery with the XEN Gel Stent compared to standard trabeculectomy presents lower hypotensive potential, a better safety profile and the vast majority of complications are mild and self-limiting.

Based on the analysis of the visual field results, it was found that both procedures effectively slow down the progression of glaucomatous neuropathy in the long-term assessment.

P-GLA-037

Frequency and types of complications in micropulse transscleral cyclophotocoagulation for refractory glaucoma

F.A.K. Niazi¹, R. Saleem¹

¹Department of Ophthalmology, Holy Family Hospital, Rawalpindi Medical University, Rawalpindi, Pakistan

Introduction: Refractory glaucoma encompasses all forms of glaucoma in which the intraocular pressure remains uncontrolled despite the usage of maximum topical and oral anti-glaucoma drugs. MP-TSCPC introduces a minimally invasive laser technique targeting the ciliary body to manage intraocular pressure in such cases. This study aims to determine complications encountered with MP-TSCPC which would eventually lead to a better understanding of the safety offered by this novel technique.

Objectives: To analyze the various types and frequencies of complications associated with micropulse transscleral cyclophotocoagulation in patients with glaucoma refractory to medical therapy.

Methods: A.R.C. Fox portable diode laser MP-TSCPC was performed on 90 eyes of 87 patients suffering from refractory glaucoma. The Fox Micro cyclo probe power was set on 2000 mW, which delivered a total of 160J of energy in the superior and inferior hemispheres combined, sparing the 3 and 9 o'clock positions. With 0.5 ms on time and 1.1 ms off time, the duty cycle was 31.3 percent. Intraocular pressure and best-corrected visual acuity were recorded pre-laser as a baseline, post-laser at one week, and then at one month. Postoperative complications were recorded on each of these visits.

Results: As per our study, no complications were observed in 59 (65%) eyes. Post-laser Anterior chamber inflammation was the most frequently encountered complication, which was seen in 7 (8%) eyes. This was followed by sub-conjunctival hemorrhage, which was seen in 5 (7%) eyes. No pressure difference from baseline was observed in 4 (5%) eyes. Hyphema, transient mydriasis, and post laser conjunctival chemosis was seen in 3 (3%) eyes each. Tonic pupil, hypotony and vitreous hemorrhage (self absorbing) remained the least encountered complication affecting 2 (2%) eyes each. Drop in BCVA was not reported in any patient.

Conclusions: MP – TSCPC is a safe, and non-invasive method of treatment for refractory glaucoma leading to persistent reductions of intraocular pressure. The results show that majority of the eyes showed no complications, whereas the complications reported were successfully treated using post-laser topical medications. Continued research efforts aimed at refining protocols and improving safety measures will further solidify MP-TSCPC's role as an effective and reliable treatment option for glaucoma patients.

P-GLA-038

Micropulse cyclophotocoagulation effect on ocular structures and microvasculature in glaucoma patients

E. Briede^{1,2}, L. Pahirko³, J. Janceva², G. Knipse⁴, K. Baumanė^{2,4}

¹Doctoral Study programme, University of Latvia, Riga, Latvia, ²Department of Ophthalmology, Riga East University Hospital, Riga, Latvia, ³Laboratory of Statistical Research and Data Analysis, University of Latvia, Riga, Latvia, ⁴Faculty of Medicine, University of Latvia, Riga, Latvia

Introduction: Micropulse cyclophotocoagulation (MPC) has been reported as safe and effective procedure, which provides good IOP reduction, but data on its effect on the ocular microcirculation are lacking.

Objectives: To evaluate the effects of MPC on retinal and optic nerve structure and microvasculature.

Methods: A single-center study was performed. All patients underwent MPC procedure (Iridex, MicroPulse P3 Delivery Device) under local anaesthesia. BCVA, IOP, central retinal thickness, retinal nerve fibre thickness and retinal and optic disc microcirculation were measured (AngioPlex, Cirrus 6000) 1, 3 and 6 months after the procedure.

Results: A total of 30 patients (30 eyes) were included in the study (median age 66.5 [63.0-71.3]). Primary open-angle glaucoma was predominant, with pseudoexfoliation glaucoma accounting for 37% of cases. 73% of patients had no previous eye surgery, while 27% had previous glaucoma surgery. Baseline median IOP was 23.0 mmHg [21.0-27.8], while 6 months after the procedure IOP was reduced to 16.5 mmHg (15.0-19.8, $p < 0.001$). Structurally, there was an increase in central retinal thickness (CRT), with CRT increasing from 256.5 μm (239.8-267.5) to 263.0 μm (253.3-273.8, $p < 0.001$) 6 months after surgery. There was also a statistically significant increase in RNFL from 62.5 μm (57.3-81.8) to 67.0 μm (59.5-80.0, $p = 0.045$) six months after surgery. No statistically significant changes were found in the foveolar avascular zone, ETDRS perfusion, vascular densities and optic disc perfusion after MPC procedure. A significant difference tendency was found, with a median IOP reduction of -5 (-7.5; -3.5) units in patients without PEX and -8 (-11.5; -6.5; $p = 0.076$) units in patients with PEX accordingly. There were correlated differences in retinal and optic nerve microcirculation, depending on history of glaucoma surgery. 27% who have had previous glaucoma surgery showed reduction in retinal ETDRS inner perfusion and vascular densities (-3.3 [-4.3;-2.0], $p = 0.043$; -1.6 [-2.225; -0.35], $p = 0.036$), ETDRS total vascular densities (-0.7 [-1.775;-0.15], $p = 0.04$), optic nerve disc perfusion (-1.5 [-2.025; -1.15], $p = 0.002$) and optic nerve disc flow index (-0.034 [-0.038; -0.013], $p = 0.014$) 6 months after the procedure.

Conclusions: MPC is a safe and effective method, providing sustained IOP reduction. The results suggest that better target pressures may be obtained in PEX glaucoma. MPC as the first surgical procedure for IOP reduction provides the desired effect without affecting the ocular microcirculation.

P-GLA-039

Differential sex-based enrollment into US-registered glaucoma clinical trials: A cross-sectional study

B. Tao¹, J. Xie², A. Vinokurtseva³, J. Liu⁴, N. Nathoo¹, M. Schlenker⁵, K. Gill¹, C. Hutnik³

¹University of British Columbia, Vancouver, Canada, ²Michael G. DeGroot School of Medicine, Hamilton, Canada, ³Ivey Eye Institute, London, Canada, ⁴Queens University, Kingston, Canada, ⁵University of Toronto, Toronto, Canada

Introduction: Evidence suggests under-enrollment of minority demographics in clinical trials for some ophthalmic diseases. Equitable representation in trials ensures evidence-based treatment selection for diverse patient populations.

Objectives: To investigate sex, racial, and ethnic disparities in patient enrollment across glaucoma trials.

Methods: Clinical research studies registry (ClinicalTrials.gov) was searched for glaucoma trials up to and including January 2023. Participants enrolled in high-quality (reduced risk of bias), US-registered, glaucoma-related randomized controlled trials (RCTs). Trials were included if they were at least double-masked, completed and had published results through the registry or a scholarly journal. Trial characteristics (study sponsor country, study site location, trial initiation year, study phase, and study masking) and demographic data (sex, race, and ethnicity according to US reporting guidelines) were collected. Sex-based glaucoma disease burden was identified using the Global Burden of Disease database. Pooled population-to-prevalence ratios (PPRs) with 95% confidence intervals (CI) were calculated for female sex, with values between 0.8 and 1.2 constituting sufficient study enrollment. Kruskal-Wallis tests ($\alpha = 0.05$) with subsequent post-hoc comparisons were used to evaluate demographic representations stratified by trial characteristics. The primary outcome was the pooled PPR for female enrollment across trials. Secondary outcomes included the representation of racial and ethnic populations stratified by study blinding, study phase, study location, and sponsor location.

Results: From 1061 records, we identified 177 trials ($N=38,475$; 56.2% female) for inclusion in the study. The pooled female PPR was 1.05, 95% CI [1.02-1.08]. Nearly all trial characteristics (masking, phase, study site, sponsor site, year, and intervention type) did not indicate instances of female over- or under-representation by PPR, although studies published prior to 1997 were indeterminate on whether they under-enrolled female participants.

Conclusions: High-quality, US-registered, glaucoma-related trials enrolled acceptable proportions of females based on their absolute enrollment and constitutive disease burden. Enrollment trends predominately held across study characteristic variables. To promote study generalizability, future trial enrollment should aim to achieve equitable and diverse demographic representation.

P-GLA-040

Pharmacokinetics of its free acid after single and repeated topical instillation of travoprost eye drops in rabbits

X. Zhao¹, X. Wang¹, W. Zu¹, Q. Yang¹

¹Shenyang Xingqi Pharmaceutical Co. Ltd, Shenyang, China

Introduction: Following topical ocular administration, travoprost undergoes rapid and complete hydrolysis to the pharmacologically active free acid. No ocular distribution data are availability for travoprost yet.

Objectives: To investigate the ocular distribution of its free acid after single and repeated topical instillation of travoprost eye drops in New Zealand white rabbits using a simple and sensitive liquid chromatograph coupled with tandem mass spectrometry (LC-MS-MS) method.

Methods: 108 healthy rabbits were randomly divided into 2 groups. For the single dosing group (42), a 50 μ l of 0.004% travoprost was instilled into the left eyes and each group was divided evenly into seven subgroups. In each subgroup, blood specimens were collected at 0.5, 1, 2, 3, 6, 12 and 24 hours and the animals were sacrificed immediately to collect aqueous humor from the anterior chamber, and subsequently other ocular tissues. For the repeated dosing group (66), a 50 μ l of 0.004% travoprost was instilled into the left eyes once a day for one week, the animals were divided evenly into 11 subgroups, and specimens in each subgroup were procured the same way as the single dosing group at 1 hour after consecutive dosing of 5, 6 and 7 days, and at 0, 0.5, 1, 2, 3, 6, 12 and 24 hours after consecutive dosing of 8 days. The concentration of travoprost free acid in each specimen was measured by LC-MS-MS.

Results: After a single topical instillation, travoprost free acid reached the highest concentration in ocular tissues quickly, and its distribution was ranked in an order from the highest to the lowest as follows: cornea, conjunctiva, aqueous humor and iris-ciliary body. There was no significant difference among the concentrations of 1 hour after consecutive administration of 5, 6 and 7 days. The AUC_{0-24} (The area under the concentration-time curve) of the single and repeated dosing group had no significant difference. Travoprost free acid levels were not detectable in plasma (< 0.1 ng/ml) at all time points.

Conclusions: Undetectable level of travoprost free acid in plasma indicated that the absorption of topically administered 0.004% travoprost eye drops was extremely small into the systemic circulation. The ocular tissues could reach the steady-state concentration after the four days multiple dosing. The same level of distribution in the ocular tissues between the single and repeated dosing groups indicates that installation of 0.004% travoprost eye drops once a day could not cause accumulation in ocular tissues.

P-GLA-041

The effect of prostaglandin analogs on improving macular microcirculation in patients with OHT and early glaucoma

X. Wei¹, X. Li¹

¹The Department of Ophthalmology, West China Hospital, Sichuan University, Chengdu, China

Introduction: In this study, the changes in the IOP, VF, optic nerve structure, and OCTA parameters of superficial macular microcirculation in OHT and POAG patients before and after prostaglandin analogs (PGAs) treatment were observed.

Objectives: To provide new ideas for the identification and prognosis assessment of OHT and early POAG patients.

Methods: We adopted the prospective cohort study design, and continuously recruited OHT and early POAG patients admitted to West China Hospital of Sichuan University between Nov 2021 and Jan 2023. After 6 months of PGAs treatment, the changes of the IOP, VF, optic nerve structure, and OCTA parameters of macular superficial vessels before and after treatment were compared within and between groups.

Results: A total of 41 patients with OHT were recruited in this study, a total of 36 patients with early POAG were recruited, and 20 of them completed 6-month follow-up.

1. The vessel density of macula in OHT patients were higher than those of POAG patients, after 6 months of treatment, the vessel and perfusion density in the central, inner, outer and overall areas of the macula were significantly increased in both groups;
2. There was no significant difference in the baseline foveal avascular zone (FAZ) area and circularity index between OHT and early POAG patients. After 6 months of treatment, the FAZ circularity index of OHT patients increased significantly, and the proportion of improvement was significantly different between groups, while the FAZ area of OHT patients and the FAZ area and circularity index of POAG patients were not significantly improved.

Conclusions: PGAs can improve vessel and perfusion density of macula and IOP in patients with OHT and early POAG, and improve the FAZ peripheral perfusion of OHT patients. The reactivity of FAZ circularity index to PGAs in OHT patients was different from that of POAG patients, suggesting that the reactivity of FAZ peripheral perfusion to PGAs may be the distinguishing point between OHT and early POAG patients.

P-GLA-042

Effect of cataract extraction by phacoemulsification on intraocular pressure fluctuation in patients with glaucoma

J. Mejia¹, O.L. Teheran Forero¹, E. Ramos¹

¹Universidad del Sinú, Cartagena, Colombia

Introduction: Over the years, cataract surgery has not been taken into account as part of the treatment in patients with POAG. The aim was demonstrate if cataract extraction can reduce IOP fluctuation that is detrimental in the progression of the disease.

Objectives: To determine the effect of cataract extraction by phacoemulsification on the fluctuation of intraocular pressure (IOP) in patients diagnosed with primary open-angle glaucoma (POAG), measured by water drinking test (WDT).

Methods: Prospective descriptive cohort study. Patients were randomly between September 2022 to December 2023, with diagnosis of progressive cataract who had surgical indication (LOCS >3). Patients were divided into two groups, the first being patients with diagnosis of POAG, the second group being patients who did not have any type of eye disease, only presence of cataract. Surgery was performed by the same anterior segment surgeon, WDT were performed by the same glaucoma specialist. WDT assessments were performed 1 week before surgery, 1, 3, and 6 months after surgery. Values were recorded and included in a database for later analysis. Values of $p < 0.05$ are considered statistically significant.

Results: Total of 80 patients with an average age of 72 years were recruited, of which 33 (41%) had diagnosis of POAG (group 1) and 47 (58%) healthy patients (group 2). In the presurgical examination of group 1, were obtained 10 (30%) positive WDT, 1st month obtained 2 (6%), at 3 months 1 (3%) and at 6 months 2 (6%), meanwhile in group 2, were obtained 12 (25%) positive PSH preoperatively, at 1st, 3 and 6 months was 10 (21%). Regarding the average fluctuations by group, it was evident that group 1 had an average fluctuation pre-surgery of 3.7mmHg, at 1st month postsurgery was 2.2mmHg, at 3 months 2.2mmHg and at 6 months 2.2mmHg, meanwhile in group 2 It had an average fluctuation pre-surgery of 3.6mmHg, at 1st month post-surgery 2.2mmHg, at 3 months 2.2mmHg and at 6 months 2.3mmHg. The average presurgical baseline IOP in group 1 was 13.3mmHg, at 1st month 12.2mmHg, 3 months 11.6mmHg and 6 months 11.9mmHg, in turn in group 2 the presurgical baseline IOP was 13.2mmHg, at 1st month 12.3mmHg, 11.6mmHg at 3 months and 11.9mmHg at 6 months.

Conclusions: Results demonstrate cataract extraction by phacoemulsification efficiently and sustainably reduces the fluctuation of IOP measured by the water drinking test, as well as the baseline values of IOP. This suggests possible changes in the future for better control and management of patients with POAG.

P-GLA-043

Efficacy of MicroPulse transscleral laser therapy in the management of patients with glaucoma in a Mexican population

D.C. Beyuma Mora¹, J.F. Ortega Santana¹, G.F. Diez Cattini¹

¹Glaucoma, Fundación Hospital Nuestra Señora de la Luz, IAP, Mexico City, Mexico

Introduction: Glaucoma constitutes a group of optic neuropathies, making it the leading cause of irreversible blindness worldwide. The only modifiable factor to decrease the progression rate is the reduction of intraocular pressure (IOP) through topical pharmacological therapy, surgical options, or laser treatment. MicroPulse Transscleral laser (TLT) allows for the application of standardized treatment with predictable outcomes and a lower rate of complications, enabling retreatments. This technology allows patients to reduce the number of medications with minimal complications and is employed in various types of glaucoma.

Objectives: To evaluate the efficacy, safety, and follow-up of patients with glaucoma undergoing MicroPulse Transscleral Laser Therapy (TLT) from January 2017 to March 2022, along with demographic variables, comorbidities, and complications at Fundación Hospital Nuestra Señora de la Luz, IAP

Methods: A retrospective longitudinal observational study aimed at determining the effectiveness of MicroPulse Transscleral laser (TLT) in glaucoma patients. 402 patient records undergoing the procedure were reviewed from January 2017 to March 2022.

Results: Success or effectiveness defined as intraocular pressure (IOP) less than 21 mmHg or a 20% reduction post-treatment after 6 months of the initial application. 257 patients (63.9%) achieved success at six months, at one year 78.8%, at two years 80.5%, at three years 80.6%, at four years 73.5%, and at five years 81.3%. 28 patients (6.9%) required retreatment. The cases of success were correlated with the total energy used in joules and time in seconds per hemisphere, revealing that the highest number of successful cases was associated with high energy level of 187 J and time in seconds per hemisphere, reveals that the highest success rate is observed at 120 seconds. Pearson's chi-square test was employed to assess significance, yielding a p-value of 0.407, which did not result in statistical significance. A Kaplan survival curve indicates that the mean follow-up with therapeutic success is 22 months, and at that point, therapeutic success is less than 40%. As time progresses, patients appear to have a higher risk of treatment failure, with a risk twice as likely before reaching 40 months.

Conclusions: Comparing with other studies, a similar success rate is observed at 6-12 months, ranging between 60-80%. As time progresses, patients appear to have a higher risk of treatment failure. It proves to be a safe treatment option with few reported complications.

P-GLA-044

Is post-trabeculectomy serous choroidal detachment a risk factor for failure in the long term

N. Nassiri¹, M. Yadgari¹, K. Sheibani², S. Kavousnezhad³

¹Ophthalmology, Imam Hossein Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, Islamic Republic of, ²Basir Eye Health Research Center, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of, ³Vanak Eye Surgery Center, Tehran, Iran, Islamic Republic of

Introduction: Glaucoma often necessitates surgical interventions like trabeculectomy for intraocular pressure (IOP) management. However, postoperative complications, such as serous choroidal detachment, can potentially influence the long-term outcomes of these procedures. Despite its clinical significance, the impact of serous choroidal detachment on the success rate of trabeculectomy remains inadequately explored.

Objectives: This study investigates the long-term effect of serous choroidal detachment on the success of trabeculectomy in glaucoma patients.

Methods: In this case-control study, 17 patients who underwent trabeculectomy, developed choroidal detachment, and completed at least 3 years of follow-up were included. Controls were matched based on age, sex, preoperative intraocular pressure, glaucoma type, and absence of choroidal detachment. Surgical success was defined based on two criteria: IOP between 5 and 16 mmHg with a 20% reduction from baseline, with no need for further glaucoma surgery, and the same criteria but with IOP between 5 and 22 mmHg.

Results: The mean estimated survival duration \pm SD was 2.73 ± 0.35 years (95% CI: 2.1-3.4), significantly shorter than the 3.98 ± 0.38 years (95% CI: 3.3-4.7) in the control group (LogRank = 5.03, $p = 0.02$). Cumulative probability of success was 76.5%, 52.9%, 29.4%, 17.6%, and 11.8% at 1, 2, 3, 4, and 5 years, respectively, in the case group. Corresponding values in the control group were 88.2%, 82.4%, 68.6%, 58.8%, and 47.1%, respectively. At baseline, the average IOP was 22.3 ± 2.7 mmHg in the case group and 23.8 ± 8.3 mmHg in the control group ($p = 0.17$). The mean IOP was significantly higher in the case group than in the control group in years 2, 3, 4, and 5.

Conclusions: Serous choroidal detachment adversely affects the long-term surgical success of trabeculectomy, particularly in patients with advanced glaucoma where lower target pressure is required.

P-GLA-045

Beneficial effect of intermittent fasting in an HSP27-induced glaucoma mouse model

S. Joachim¹, D. Maler¹, L. Deppe¹, H.B. Dick¹, S. Reinehr¹

¹Ophthalmology, Ruhr-University Bochum, Bochum, Germany

Introduction: In glaucoma patients, changes in the autoantibody pattern occur. For example, elevated antibody levels against heat shock protein 27 (HSP27) were detected in glaucoma patients. We previously noted glaucoma-like damage after an intravitreal HSP27 injection.

Objectives: We now aimed to investigate if intermittent fasting protects these mice from glaucomatous damage.

Methods: HSP27 was intravitreally injected in one eye in mice. The contralateral eye served as a control. After the injections, half of the animals received food ad libitum. The other half fasted, hence access to food was denied for 24 hours every other day (intermittent fasting). The animals were weighed weekly. Retinal thickness was analyzed via optical coherence tomography (OCT) after 4 weeks (n=5/group). Retinal ganglion cells (RGCs) and macroglia analyzed via immunohistology (n=6/group). In addition, RGCs (*Rbpms*) and microglia/macrophages (*Iba1*) were investigated with RT-qPCR (n=3/group). Four groups were compared in this study: control, control+diet, HSP27, HSP27+diet.

Results: No weight differences were noted between groups. OCT measurements showed no alterations between groups. The RGC number was significantly decreased in HSP27 retinae (30.4±1.4 cells/mm) compared to controls (38.9±2.0 cells/mm; p=0.046). HSP27+diet retinae (37.3±1.9 cells/mm) displayed similar RGC counts as controls (p=0.954), indicating a RGC protection though fasting. *Rbpms* mRNA expression levels were significantly downregulated in HSP27 mice (p=0.019), while no changes were noted in HSP27+diet animals (p=0.144). The GFAP⁺ staining area was significantly increased HSP27 mice compared to controls (p=0.003). While HSP27+diet animals showed no significant difference to controls (p=0.523). The *Iba1* expression levels were significantly increased in HSP27 retinae (p<0.001) but did not show any differences in HSP27+diet mice compared to controls (p=0.659).

Conclusions: Intravitreal HSP27 injection led to RGC loss, gliosis, and microglia activation. These degenerative effects could be prevented through intermitted fasting. Due to the findings in this study, intermittent fasting might be a promising additive treatment approach for glaucoma patients.

P-GLA-046

Evaluation of a new eyelid self-tonometer, TapEye: a pilot study

*H. Kobashi*¹

¹Toneasy Inc., Tokyo, Japan

Introduction: We developed a novel transpalpebral self-tonometer called the TapEye tonometer (TET), which is based on palpation of the upper eyelid. Our goal was to evaluate a method for improved accuracy measuring intraocular pressure (IOP) through the lid.

Objectives: Participants underwent standardized training by technicians and were required to be able to use the TET for study inclusion.

Methods: Subsequently, a noncontact tonometer and Goldmann applanation tonometer (GAT) were used. All participants were instructed to measure their IOP using three tonometers at baseline (visit 1) and 1 month (visit 2). At visit 2, the corrected-IOP value measured by the TET (c-TET) was calculated using the difference between the TET and GAT measurements in visit 1.

Results: No significant correlations were found between the TET and GAT measurements at each visit, whereas there was a significant correlation between the c-TET and GAT measurements at visit 2. The mean difference between the c-TET and GAT measurements was 0.4 ± 3.7 mmHg in the right eye and 0.5 ± 3.4 mmHg in the left eye. The difference between c-TET and GAT values was significantly increased with those mean values.

Conclusions: After performing a correction based on the difference between the TET and GAT measurements at the initial visit, the corrected IOP value of the TET was correlated with that of the GAT at the second visit. The TET has the potential to address an unmet need by providing a tool for minimally invasive IOP measurements.

P-GLA-047

Practice patterns in glaucoma surgeries: survey results of Canadian glaucoma society specialists

B. Dubinsky Pertzov^{1,2}, E. Sogbesan¹

¹Ophthalmology, McMaster University, Hamilton, Canada, ²Ophthalmology, Tel- Aviv University, Tel- Aviv, Israel

Introduction: There is a known lack of consensus on the use of antifibrotic, anti-inflammatory, and antibiotic agents intraoperatively and postoperatively in glaucoma surgeries, especially in filtering and tube shunt procedures.

Objectives: To evaluate the surgical practice patterns and the use of antifibrotic, anti-inflammatory, and antibiotic agents among glaucoma specialists in Canada.

Methods: A questionnaire comprising 24 questions was distributed to the glaucoma subspecialist members of the Canadian Glaucoma Society. This questionnaire inquired about the use of Mitomycin C (MMC) in filtering procedures and tube surgeries, the routine practice of postoperative injection of antifibrotics and needling in bleb-based and tube surgeries, as well as the standard use of steroids and antibiotics both intraoperatively and postoperatively.

Results: A total of 36 Canadian glaucoma subspecialists completed the survey, with a response rate of 40% and representation from a total of eight provinces. 56% had been in practice for over 10 years. Clinically significant variations in practice were found in the use of MMC in tube shunts, with the application of MMC during Ahmed glaucoma valve (AGV) surgery by 22% of the respondents, using different MMC concentrations. 8.3% routinely inject antifibrotic (MMC or 5-FU) subconjunctivally in the implant area after AGV surgery. In bleb-based procedures, 60% inject antifibrotic into the bleb postoperatively, not as part of bleb needling. 50% of respondents routinely add hypotensive eye drops (usually aqueous suppressants) in the first week after AGV surgery aiming to minimize the occurrence of the hypertensive phase. Steroidal administration also varies between specialists; subconjunctival or subtenon steroid injection is performed by 37%, 40%, and 42% of respondents in tube surgeries, trabeculectomy, and minimally invasive bleb-based procedures, respectively. In glaucoma surgeries alone, 56% of respondents do not inject intracameral antibiotics.

Conclusions: Our study highlights the significant variability among Canadian glaucoma specialists in their use of antifibrotic agents intra and postoperatively specifically in tube and filtration surgeries. This variability emphasizes the need for multicentered research to assess the outcomes of these diverse techniques, which could then lead to the development of standardized guidelines to optimize surgical outcomes and patient care.

P-GLA-048

Spontaneous conjunctival bleb, corneal split in 16-year - managed conservatively with topical gentamicin - a case Report

M. Shah¹, A. Al Battashy², R. Mokhtar¹

¹Ophthalmology, Al Nahdha Hospital, Muscat, Oman, ²Ophthalmology, Oman Medical Speciality Board, Muscat, Oman

Introduction: Spontaneous conjunctival blebs are rare, especially in pediatric patients. We present a case of a 16-year-old male developing spontaneous conjunctival bleb with a corneal split in the left eye and having a history of blunt trauma six years prior.

Objectives: Case presentation: The patient was presented to the eye casualty clinic with a painless, progressively enlarging conjunctival cystic swelling over four months, without other ocular complaints. On examination, vision was 6/6 in both eyes, and intraocular pressure was normal in both eyes- 14mmHg by Goldmann applanation. The anterior segment exam of the left eye revealed a 7 x 4mm superior-nasal conjunctival bleb adjacent to the limbus, with a 1.5 mm corneal cystic elevation at the limbus extending from 10 to 11 o'clock. The cornea was clear centrally, and the anterior chamber was deep and quiet. Iridodialysis was present from 10 to 11 o'clock with a D-shaped pupil. The rest of the exam was unremarkable.

The Gonioscopy exam showed Iridodialysis and Angle Recession. Anterior segment OCT confirmed the bleb's extension to the cornea at the limbus, confirming the corneal cyst's source. The patient started empirical treatment with topical gentamicin eye ointment.

Methods: N/A

Results: Outcome: Remarkably, the bleb gradually resolved with treatment in 4-5 weeks, without recurrence in 5-month follow-up. The outcome of our patient raises intriguing questions regarding the mechanisms involved. Conjunctival scarring is one of the reported adverse reactions to topical gentamicin. Rational use of topical gentamicin may be the potential mechanism that led to conjunctival scarring and resolution of the bleb. As soon as the resolution of the bleb started, Intraocular pressure increased. It is well controlled with topical glaucoma medication. This is an indirect clue that it was bleb, not the conjunctival cyst.

Conclusions: This case highlights the novel potential use and effectiveness of topical gentamicin in the management of traumatic conjunctival blebs.

Keywords: Conjunctival bleb, Trauma, Topical gentamicin

P-GLA-049

Factors that condition the efficacy of selective laser trabeculoplasty in the management of glaucoma

M.C. Causil Galvis¹, O.L. Teheran Forero², N. Coronado Posada²

¹Bolivar, Universidad del Sinu, Cartagena, Colombia, ²Bolivar, Centro Oftalmologico Ebenezer, Cartagena, Colombia

Introduction: SLT has been used for more than a decade, but it does not work the same in all patients. This study seeks to elucidate what factors or conditions would improve the effectiveness of this type of laser.

Objectives: The purpose of this study was to evaluate the factors that could affect the effectiveness of selective laser trabeculoplasty in the management of glaucoma from December 2020 to December 2023.

Methods: Observational, descriptive and prospective cross-sectional study. Patients were recruited from the glaucoma clinic at a reference center on the Colombian Caribbean coast and met criteria for performing SLT. All patients underwent a complete ophthalmological examination that included biomicroscopy, tonometry, gonioscopy, and evaluation of the optic nerve before and after the procedure. The controls were carried out the next day, one month, 3 months, 6 months, 12 months, 18 months and 24 months, where tonometry, complications and the number of medications used by the patients were evaluated. The patients were divided into subgroups as follows: group 1 patients who underwent SLT for the first time, group 2 patients with a history of cataract surgery by phacoemulsification, group 3 patients previous users of prostaglandin analogues. SPSS v.25 software was used.

Results: 463 eyes of 282 patients who met the selection criteria were included, with a mean age of 64.89. The average baseline IOP of all the eyes studied was 18.63, the average IOP 1 month after the laser was 15.07 mmHg (19.1% reduction), at 12 months it was 15.8 mmHg (15.1% reduction), and at 24 months it was 15.42 mmHg (17.2% reduction). The average IOP of all patients who had cataract was 18.12 mmHg, the average IOP 1 month after laser was 14.82 mmHg (18.2% reduction), at 12 months it was 14.72 mmHg (18.7% reduction), and at 24 months it was 14.83 mmHg (18.1% reduction). The average IOP of all patients who had cataract surgery was 18.95 mmHg, the average at 6 months was 15.14 mmHg (20.1% reduction), at 12 months it was 15.54 mmHg (17.9% reduction). And at 24 months it was 15.57 mmHg (17.83% reduction).

Conclusions: These results suggest that selective laser trabeculoplasty is effective over two years of follow-up. Its effectiveness increases if patients have previously undergone cataract extraction.

P-GLA-050

Bupropion-associated bilateral acute angle-closure with uveal effusions

P. Weber¹, N. Mokhashi¹, I. Patterson¹, M. Qiu¹

¹Ophthalmology and Visual Sciences, University of Chicago, Chicago, United States

Introduction: The most common cause of an acute angle closure crisis is primary angle closure spectrum disease. Simultaneous bilateral primary acute angle-closure crisis is especially rare and should pique suspicion for secondary causes. Herein we present a case of a 42-year-old female who presented with bilateral acute angle-closure secondary to bupropion use.

Objectives: 1) To understand the pathophysiology of pupillary block versus non-pupillary block angle-closure; 2) to understand the clinical management of angle-closure secondary to uveal effusions; and 3) to highlight the importance of a good history and medication review for patients presenting with bilateral acute angle-closure.

Methods: Case report of a single patient with multimodal imaging.

Results: Elevated intraocular pressure and shallow anterior chambers resolved after cessation of bupropion as well as therapy with atropine, prednisolone, and intraocular pressure lowering drops and medications.

Conclusions: When evaluating patients with unilateral or bilateral acute angle-closure crisis, it is important to distinguish between pupillary block and non-pupillary block angle-closure. If a posterior pushing mechanism is suspected for non-pupillary block angle-closure then UBM can be a useful imaging modality for visualizing shallow anterior choroidal effusions. A thorough review of medications and other systemic disorders is also critical, as many can be associated with angle-closure. This case supports the literature that bupropion may be associated with bilateral angle-closure crisis secondary to uveal effusions.

P-GLA-051

Distribution of anterior chamber biometry measured by anterior segment optical coherence tomography in Chinese adults

Y. He¹, G. Huang²

¹The Hong Kong Polytechnic University, Hong Kong, Hong Kong, SAR of China, ²University of Melbourne, Melbourne, Australia

Introduction: The association between anterior segment biometry and the risk of primary angle closure (PAC), emphasizing drainage angle width in Chinese adults was investigated. Utilizing anterior segment optical coherence tomography (AS-OCT), the study seeks to pinpoint biometric determinants of angle width, advancing our insight into PAC predisposition through sophisticated imaging techniques.

Objectives: To document the distribution of anterior segment biometry in a population-based sample of adult Chinese and to explore factors associated with drainage angle width.

Methods: In this cross-sectional observation, random clustering sampling was used to identify adults aged ≥ 35 years from Yuexiu district in Guangzhou. After excluding post cataract-surgery subjects, Anterior Segment Optical Coherence Tomography (AS-OCT, Visante, Carl Zeiss Meditec, CA) imaging was performed in a systematically selected sub-sample containing half of all participants. All images were analyzed with the custom software. Regression analyses were performed to assess the associations between anterior segment biometry with age and gender.

Results: A total of 844 subjects with age 35 to 88 years were examined, including 393 males and 461 females. Anterior chamber width (ACW) and anterior chamber depth (ACD) decreased from an average of 12.10 ± 0.54 mm and 3.00 ± 0.33 mm in adults aged 35-39 years to 11.87 ± 0.57 mm and 2.47 ± 0.38 mm in adults aged ≥ 70 years ($P < 0.001$). The mean angle width parameters (AOD, ARA and TISA) decreased with age, while thinner and more convex iris were observed in older adults.

Conclusions: Older females have narrower angle width, shallower anterior chamber depth and more convex iris. Females also have narrower anterior chamber width. The interactions of these anterior biometric features need to be further investigated.

P-GLA-052

Intrascleral uveo-plus implant: a new low-cost option for non-penetrating deep sclerectomy (NPDS)

H.C. Acosta¹, J.E.P. Acosta²

¹Centro de Ojos Santa Lucía, Entre Ríos, Argentina, ²CEMIC, Buenos Aires, Argentina

Introduction: NPDS is a safe and effective alternative for the surgical treatment of open-angle glaucoma (OAG). The use of spacer implants to avoid future collapse of the intrascleral space may improve the long-term success of NPDS. We present a new low-cost variant of a non-absorbable intrascleral implant made of 5-0 polypropylene (5-0 PP) which would facilitate the uveoscleral and subconjunctival drainage pathways.

Objectives: To show the characteristics, implantation technique, and results of a low-cost non-absorbable intrascleral implant (Uveo-Plus) for NPDS.

Methods: A patient with primary open angle glaucoma (POAG) who had a poor response to maximum treatment was selected. A NPDS was performed using a 5-0 PP which was positioned below a scleral band to create access to the suprachoroidal space (SCS). To create the scleral band, two parallel incisions were made on the scleral bed penetrating the SCS. After injecting viscoelastic the implant was slid beneath the scleral band where its anterior part was positioned over the spur and its posterior part behind the edge of the scleral flap. The Uveo-Plus was sutured to prevent migration. In the other eye a NPDS with Esnoper Clip[®] was performed to compare outcomes. The Uveo-Plus was made with a 12 mm long segment of 5-0 PP previously heated in an autoclave to give it a U-shape. Each end was cauterized with a low-temperature cautery rounding it into a "mushroom" shape. It was then knotted in the middle of the curvature with 9-0 PP ready to be implanted. The Uveo-Plus measured 5 mm in length and 2 mm in width.

Results: No complications were observed in the postoperative period. Follow-up was conducted with ultrasound bio-microscopy and gonioscopy. The decrease in IOP at six months of follow-up was 14 mmHg with Esnoper Clip[®] and 16 mmHg with Uveo-Plus, respectively. Both eyes required goniopuncture. Additional topical treatment was not necessary.

Conclusions: In this case the Uveo-Plus is comparable to the Esnoper Clip[®] in terms of safety and efficacy. The functionality concept of Uveo-Plus is: 1) to maintain the intrascleral space as a separator of the scleral flap, 2) to allow direct access to the SCS by creating a band from the scleral bed, and 3) to increase subconjunctival drainage by preventing the posterior closure of the scleral flap. The Uveo-Plus is a cost-effective alternative to existing non-absorbable implants for NPDS. Further research is required to assess long term efficacy and safety.

P-GLA-053

There is no agreement on Peak and fluctuation IOP between Icare Home2 tonometer and the water drinking test

I. Copati¹, A.M. Vasquez², J. Jimenez Roman³, H. Fontana⁴, O. Cuello⁵, G. Aviles Calderon⁶, E. Maul F⁷, M. Justiniano⁸, F. Lerner^{9,1}

¹Consultorio Oftalmologico Dr Fabian Lerner, Buenos Aires, Argentina, ²Instituto de Oftalmologia y Glaucoma Vasquez, Quito, Ecuador, ³Global Glaucoma Institute, Ciudad de Mexico, Mexico, ⁴Hospital Santa Lucia, Buenos Aires, Argentina, ⁵Instituto de Microcirugia Ocular, Cordoba, Argentina, ⁶Glaucoma Salud, Lima, Peru, ⁷Fundacion Oftalmologica Los Andes, Santiago, Chile, ⁸Clinica de Ojos Norte, Santa Cruz de la Sierra, Bolivia, ⁹Oftalmologia, Facultad de Ciencias Medicas, Universidad Favaloro, Buenos Aires, Argentina

Introduction: Glaucoma is a leading cause of blindness. Intraocular pressure (IOP) is the main risk factor for the disease. Mean, fluctuation and peak IOP have been analyzed, as a single measurement in office may not depict the IOP profile. The Water Drinking Test (WDT) has been used to provide information about IOP peak and fluctuation. The iCare Home2 (ICH2) (iCare Finland) is a rebound tonometer which allows the patient to take 24-hour measurements, even in supine position.

Objectives: The main objective was to compare the IOP profiles and assess the agreement with both methods. Secondary objectives included correlation analysis of both methods and reproducibility analysis of ICH2 tonometry.

Methods: Eight centers from Argentina, Bolivia, Chile, Ecuador, Mexico, and Peru participated in the study; 159 eyes from 86 glaucoma or OHT patients were included. ICH2 measurements were performed by the patients on two consecutive days, at 7 different timepoints per day, starting at 6 AM in supine position. WDT was performed by the ophthalmologist at the office. Agreement was assessed with Bland-Altman plots. Spearman's correlation coefficient was calculated for peak and fluctuation IOP obtained with both methods. Repeated measures mixed model ANOVA was used to evaluate reproducibility of ICH2 tonometry and to estimate the effect of sex, age, CCT, basal IOP and day of assessment on mean IOP assessed with the same test.

Results: Median age was 58 y/o [45.5 – 66.5], 64% were male. Median CCT was 536 μ m [511.5 – 554.5]. Basal median IOP was 15 mmHg [13 – 17], median IOP of ICH2 was 17 [14 – 20], and 17 mmHg [14 – 19] for the WDT. Median fluctuation was 5 [3 – 7] during the WDT and 7 mmHg [5 – 10] for the ICH2. When comparing data from ICH2 Day 2 and WDT, we found a moderate correlation for peak IOP (Spearman's $\rho = 0.44$, p-value <0.001), but no correlation for fluctuation IOP (Spearman's $\rho = -0.014$, p-value 0.87). Mean IOP in all timepoints, was not significantly different between days 1 and 2 (all adjusted p-values for multiple comparisons > 0.05). Bland-Altman analysis showed lack of agreement between methods. Peak IOP mean bias was -1.78 mmHg (LoA -12.66 – 9.10) with higher values for ICH2, and the same occurred for fluctuation IOP (mean bias -2.94 mmHg, LoA -12.22 – 6.35).

Conclusions: There was no agreement between both methods, with ICH2 tonometry estimating higher peaks and wider fluctuations. ICH2 tonometry showed excellent reproducibility.

P-GLA-054

The clinical characteristics, risk factors, and outcomes of aqueous misdirection

G. Kontos¹, H. Hsiao¹, T. Sharon¹, K. Gill¹, S. Schendel¹

¹Department of Ophthalmology & Visual Sciences, The University of British Columbia, Vancouver, Canada

Introduction: Aqueous misdirection, is an uncommon complication of various types of glaucoma and intraocular surgeries. This is a challenging clinical entity that often presents with decreased vision due axial shallowing of the anterior chamber and elevation of intraocular pressure which can be normal or low making diagnosis difficult.

Objectives: This study aims to retrospectively review the clinical profile, diagnostic challenges, management strategies, and early outcomes of patients presenting with aqueous misdirection, shedding light on this complex and often perplexing clinical entity.

Methods: We conducted a comprehensive review of medical records from our institution over an eight-year period (January 2015 to September 2023). All patients diagnosed with aqueous misdirection were included in the study. Data on demographics, ocular characteristics, presenting symptoms, prior ocular history, time from identification of complication to diagnosis, time from diagnosis to treatment intervention, and visual outcomes were collected and analyzed.

Results: The most common presenting symptom of aqueous misdirection was decreased vision due to myopic shift. The underlying primary diagnosis was angle-closure glaucoma. Diagnosis was established on clinical grounds from findings of slit lamp examination. Management strategies encompassed medical treatment, laser therapy in the form Nd:YAG laser to disrupt the anterior vitreous face, and surgical intervention, often involving anterior chamber reformation or ultimately pars plana vitrectomy. Complications related to treatment were rarely observed most frequently in the surgical group. Most patients achieved improved visual acuity, while some had no significant change, and fewer experienced a decline.

Conclusions: This retrospective analysis contributes to the existing knowledge base surrounding aqueous misdirection, offering insights into the clinical profile and management outcomes of affected patients, which can guide clinical decision-making and improve patient care. High suspicion, helps early and accurate diagnosis. Management strategies should be tailored to individual patient characteristics, with consideration for the potential complications associated with various treatments. While most patients experience improved visual outcomes, a subset face challenges, highlighting the need for improved understanding of aqueous misdirection pathophysiology and treatment strategies.

P-GLA-055

Clinical outcomes of transscleral micropulse cyclophotocoagulation post-keratoplasty

A.G. Baeza Echeverria¹, J.F. Ortega Santana¹, G.F. Diez Cattini¹

¹Glaucoma, Fundacion Hospital Nuestra Señora De La Luz, Mexico, Mexico

Introduction: Glaucoma management following penetrating keratoplasty (PK) poses unique challenges. Our study explores the effectiveness and safety of transscleral micropulse laser cyclophotocoagulation (TMLC) in this context. By evaluating its outcomes and complications over a 12-month period, we aim to contribute valuable insights to the treatment paradigm for glaucoma post-PK.

Objectives: To evaluate the efficacy, safety, and complications of transscleral micropulse laser cyclophotocoagulation (TMLC) in patients with glaucoma associated with penetrating keratoplasty (PK).

Methods: Observational, descriptive, longitudinal, and ambispective study including 31 eyes of patients with glaucoma with a history of PK who underwent TMLC from August 01, 2017, to February 28, 2021. The Wilcoxon test was used to compare preoperative and postoperative intraocular pressure (IOP), the number of glaucoma medications, and visual acuity at 1, 3, 6, and 12 months of follow-up. Postoperative complications were also recorded during this follow-up period.

Results: Of the 31 eyes included in the study, only 16 completed the 12-month follow-up. The mean age was 53.48 ± 18.75 years, and 35.48% of patients were male. IOP decreased significantly from the preoperative period at all follow-up points ($p < 0.05$), as did the number of glaucoma drops except at the twelfth month of follow-up ($p = 0.084$). There were no significant changes in visual acuity. At 12 months of follow-up, 17.64%, 58.82%, and 23.52% met the definition of total success, partial success, and treatment failure, respectively.

Conclusions: TMLC achieved desirable IOP control and success rates for patients undergoing PK while resulting in minimal complications, making it appear to be a safe and effective procedure in this population at one year of follow-up.

P-GLA-056

Endothelial Cell Loss After Gonioscopy-Assisted Transluminal Trabeculotomy+Phacoemulsification vs Phacoemulsification Alone

F. Zamora Cortina¹, M.I. Virgen Batista¹, C.E. Del Hierro Gutierrez¹, M. García Huerta¹

¹Glaucoma, Asociación para Evitar la Ceguera I.A.P., CDMX, Mexico

Introduction: Minimally invasive surgery in glaucoma is considered to meet the following characteristics:

- 1) internal approach through a corneal incision,
- 2) generate minimal trauma to the tissues,
- 3) effectiveness in lowering IOP,
- 4) profile of high safety, and
- 5) rapid recovery.

Due to the above, it is considered an alternative in the treatment of mild-moderate glaucoma, in patients with side or adverse effects to topical treatment, and it can even be considered as a replacement for the topical hypotensive treatment, reducing poor adherence and costs associated with it.

GATT is one of the minimally invasive glaucoma procedures available in our environment, and because it can be performed using a suture, it is one of the most accessible.

Objectives: To compare corneal endothelial cell loss (CECL) after Gonioscopy-Assisted Transluminal Trabeculotomy (GATT) + Phacoemulsification vs Phacoemulsification Alone.

Methods: A retrospective, observational, comparative case-control study was carried out with data of 37 patients who underwent GATT + Phacoemulsification (Group 1; n=23) or phacoemulsification alone (Group 2; n=14). Only patients with mild to moderate open angle glaucoma were included. The main outcome was CECL, which was obtained by the difference between preoperative and postoperative corneal endothelial cell density. CECL was considered significant above 30%.

Results: 23/37 (62.20%) were females and 14/37 (37.80%) were males. Mean age was 78 years old. Most common diagnosis was Primary Open-Angle Glaucoma (51.4%), and most had moderate glaucoma damage (75.70%). Group 1 had a mean preoperative and postoperative cell density of 2116 ± 317 cells/mm² and $1897 \pm$ cells/mm², respectively. Group 2 had a mean preoperative and postoperative cell density of 2146 ± 342 cells/mm² and 1928 ± 385 cells/mm², respectively. Percentage of CECL was $10.61 \pm 3.96\%$ in Group 1 and $10.67 \pm 4.90\%$ in Group 2 (p=0.970).

Conclusions: Phacoemulsification + GATT does not produce a statistically higher CECL compared to phacoemulsification alone, which could reflect the safety of GATT as a surgical

P-GLA-057

Cognition evaluation in normal tension glaucoma using MoCA-M questionnaire

D. Karthya¹, S. Narayanan¹

¹Ophthalmology, Regional Institute of Ophthalmology, Trivandrum, India

Introduction: Normal tension glaucoma (NTG) is characterized by optic nerve damage and visual field loss, despite intraocular pressure (IOP) levels within the normal range. Recent studies have suggested a potential association between NTG and cognitive impairment, highlighting the need to investigate this relationship further. This study aimed to compare prevalence and severity of cognitive impairment between individuals with NTG and age, gender and education level matched controls using the Montreal Cognitive Assessment (MoCA) questionnaire.

Objectives: Primary objective: To compare the prevalence and severity of cognitive impairment between individuals with NTG and age-matched normal individuals using the MOCA-M questionnaire.

Secondary objectives:

1. To assess the specific cognitive domains affected in individuals with NTG compared to age-matched normal individuals using the MOCA-M questionnaire
2. To find association between risk factors for NTG and cognitive impairment in individuals with NTG compared to age-matched normal individuals.

Methods: A cross-sectional observational design was employed, and participants were recruited from glaucoma clinic of a tertiary care eye hospital. 25 consecutive patients diagnosed as NTG were compared with 25 age, gender and education status matched controls without glaucomatous optic nerve head changes. Demographic and clinical data collected included age, gender, education level, IOP before treatment of NTG, history of obstructive sleep apnoea and history of nocturnal intake of antihypertensives. Cognitive function was assessed using the MoCA-M questionnaire.

Results: 25 NTG and 25 age, gender and educational status matched normal participants were included in this study. The results demonstrated a significant prevalence of cognitive impairment in individuals with NTG (14.6%) compared to healthy controls (3.3%) ($p = <0.0001$, OR= 29.3, 95% CI= 6.19 to 138.7). There was significant difference in the Visuospatial/Executive and Memory scores between the two groups ($p < 0.001$). A statistically significant correlation was obtained between IOP before treatment and MOCA score ($r = -0.436$, $p = 0.029$).

Conclusions: Our study supports the presence of a significant association between NTG and cognitive impairment. The MoCA-M questionnaire provides a valuable tool for assessing cognitive function in individuals with NTG, allowing for targeted interventions and support.

P-GLA-058

Clinical outcomes of combined Phacoemulsification and Goniotomy using the Kahook Dual Blade in East African patients

S. Pindikura¹, A. Rasal¹, S. Chaurasia²

¹Ophthalmology, Lions SightFirst Eye Hospital, Nairobi, Kenya, ²Ophthalmology, PGIMER, Chandigarh, India

Introduction: In developing countries like Kenya, delayed clinical presentation, advanced glaucoma, unaffordability and compliance for multiple medications demand combined combined cataract surgery with glaucoma surgeries in these patients. Combined cataract and trabeculectomy is most commonly performed surgery in eyes with coexistent cataract and open-angle glaucoma. With advent of micro-invasive glaucoma surgery (MIGS) many newer can be combined with cataract surgery for optimal outcomes.

Objectives: This retrospective study aims to present the outcomes of combined Phacoemulsification (Phaco) with Intraocular Lens (IOL) implantation and Goniotomy using the Kahook Dual Blade (KDB) in Kenyan African patients with open-angle glaucoma and cataract.

Methods: The study was conducted at Lions Sightfirst Eye Hospital in Nairobi, Kenya, focusing on African eyes. Surgeries were performed on 61 patients between July and December 2023, targeting patients primarily with mild to moderate open angle glaucoma. Preoperative, intraoperative, and postoperative data were collected, and patients were followed upto 3months postoperatively. Outcome measures included postoperative intraocular pressure (IOP) and reduction or discontinuation of antiglaucoma medication (AGM) usage.

Results: Mean IOP reduction in patients operated in right eye with antiglaucoma medication (AGM) was 18.13 mmHg to 14.64 mmHg { 3.492 mm Hg (p value .002)} and 12.80 mmHg { 5.328mmHg (p value .000)} at one month and three months postoperatively. Similarly in patients operated for left eye with AGM was reduced from 19.15 mmHG to 14.75 mmHg { 4.393 (p value .001)} and 13.57 mmHg { 5.574 (p value .000)} after one month and 3 months postoperatively respectively. Out of 61 patients on AGM 67.21% patients were completely off AGM and 24.59% patients were reduced with one or more than one medication and 8.19 % with absolutely no reduction achieved in including poor compliance to AGM. Visual recovery was rapid and satisfactory and maintained till 3months in all patients.

Conclusions: Phacoemulsification with KDB goniotomy proved to be an effective strategy for reducing intraocular pressure and minimizing the dependence on antiglaucoma medication in patients with mild to moderate glaucoma. Additionally, the procedure demonstrated good visual recovery and had a low incidence of complications.

P-GLA-059

Haploinsufficiency of *PITX2* in Three Chinese Families with Axenfeld-Rieger Syndrome

*X. Liu*¹, *L. Xu*², *J. Zhao*¹, *N. Fan*³

¹Xiamen Eye Center, Xiamen, China, ²Hainan Eye Hospital, Hainan, China, ³Shenzhen Eye Hospital, Shenzhen, China

Introduction: Axenfeld-Rieger syndrome (ARS) is a genetic disorder that predominantly affects the anterior segment of the eye, typically resulting in secondary glaucoma, in addition to systemic abnormalities, including dental, cardiac, craniofacial, and abdominal wall problems.

Objectives: This study aimed to analyze the clinical phenotypes of three unrelated Chinese families with ARS and related genetic defects.

Methods: The patients of three Han Chinese families with ARS were phenotypically and genetically characterized by extensive clinical and genomic data analysis. A thorough physical examination and ophthalmologic examination were performed on all individuals. Genomic DNA was extracted from the peripheral venous blood of each individual. To find the causative gene variations and determine if they co-segregate with clinical symptoms, whole-exome sequencing (WES) and candidate gene verifications, such as copy number variation sequencing (CNV-seq) and qPCR validation, were carried out.

Results: The affected people in three families all presented with Iris hypoplasia, iridocorneal adhesions, and posterior embryotoxon. families. One patient from family 1 and four patients from family 2 had secondary glaucoma. All of the patients in the three families also had systemic anomalies, such as microdontia, hypodontia, and redundant periumbilical skin. Thin upper lips appeared in patients from family 2. Patient (I1) from family 3 had both eyes with retinal pigment clumping (bone-spicule formation), and was diagnosed with retinitis pigmentosa (RP). CNV-seq and qPCR analysis confirmed heterozygous deletions affecting the entirety of *PITX2* gene in three families, including a 449.97 kb (chr4: 111124809–111574778, GRCh37/hg19) deletion in family 1 containing two protein-coding regions of *PITX2* and the *ENPEP* gene, a 4.34 kb (chr4: 111539280–111543616, GRCh37/hg19) deletion in family 2 containing three *PITX2* exons, and a 206 bp (chr4: 111543411–111543616, GRCh37/hg19) deletion in family 3 containing exon 1 of *PITX2* gene.

Conclusions: Here we reported three Chinese ARS families and, through genetic investigation, discovered three novel 4q25 haploinsufficient microdeletions in the *PITX2* gene. Our findings indicate that the chr4: 111543411–111543616 region of *PITX2* gene appeared crucial for the ocular and systemic development such as lips, teeth, and umbilical cord development. The full dose is probably necessary for the *PITX2* gene to function.

P-GLA-060

The aqueous humor dynamics in a glaucoma tube implantation model: a finite element study

L. Fu¹, Y. Liang¹

¹Department of Ophthalmology, National Clinical Research Center for Ocular Diseases, Eye Hospital, Wenzhou Medical University, Wenzhou, China, Wenzhou, China

Introduction: In recent years, several studies have been conducted to explain the AH flow in the eye drainage channel. However, there is no study that has quantitatively assessed the aqueous dynamics in PACG patients after tube implantation.

Objectives: To evaluate the aqueous humor (AH) dynamics in a glaucoma tube implantation model and assess the optimal implantation position.

Methods: We obtained the geometry of the anterior segment of the eye from an OCT image by SOLIDWORKS. To simulate primary angle closure glaucoma (PACG) and PAC suspect (PACS), we set two different angle opening distance values of 0.05 mm and 0.40 mm at 750 μ m from the scleral spur (AOD750) based on previous literature data. To model the AH dynamics, we used the Navier-Stokes equations for modeling, combined with realistic anterior segment boundary conditions. And the 3D finite element model of the anterior segment was built in COMSOL Multiphysics, based on which we simulated the implantation of a glaucoma drainage tube. The major measurements were the flow velocity and volumetric flow rate.

Results: In the tube implantation model, when the tube implanted closer to the opened angle, the flow rate and volumetric flow rate are 0.323 m/s and 1.96×10^{-6} L/min, respectively, which are larger than the flow rate and volumetric flow rate (0.322 m/s and 1.95×10^{-6} L/min, respectively) in the middle of the closed angle of the tube implantation. When the tube outlet pressure increased, the flow velocity and volumetric flow rate from the tube reduced.

Conclusions: Tube implanted at the marginal position closer to the opened angle is better.

P-GLA-061

Retrobulbar haloperidol: A novel approach for pain management in blind eyes—A pilot study

J. Ortega Figueroa¹, A. Ortiz², J. De Vera¹, E. Vazquez³, V. Romero⁴, I.J. Ortiz Zapata⁴

¹Ophthalmology, Universidad Católica Santiago de Guayaquil, Guayaquil, Ecuador, ²Neuro-ophthalmology, Centro de Especialidades Oftalmológicas Aljaorza, Machala, Ecuador, ³General Medicine, Centro de Especialidades Oftalmológicas Aljaorza, Machala, Ecuador, ⁴Optometry, Centro de Especialidades Oftalmológicas Aljaorza, Machala, Ecuador

Introduction: Painful blind eye has a significant impact on quality of life of patients; being the result of many serious eye diseases. There are different types of treatments for painful blind eye, such as non-invasive retrobulbar injections. Haloperidol retrobulbar injection was considered because it's a powerful antagonist of brain dopaminergic receptors and does not have anticholinergic activity.

Objectives: To assess the efficacy and safety of retrobulbar haloperidol application for pain relief in blind eyes and its association with the quality of life of patients.

Methods: This pilot, prospective case series study was conducted at Aljaorza Ophthalmological Specialties Center in Machala city from June 2023 to the present, following the ethical principles, informed consent was obtained and the approval from the institutional ethics committee. Variables included were visual acuity (VA), intraocular pressure (IOP), procedural complications, and quality of life assessed using the 25-item National Eye Institute Visual Function Questionnaire (VFQ 25), among other else. Follow-up assessments were conducted at 24 hours, 1 week, 1 month, and 3 months post-procedure. Data were tabulated and analyzed using IBM SPSS Statistics. The surgical technique involved retrobulbar injection of anesthetic (lidocaine and bupivacaine) followed by the application of 2 cc of haloperidol (10 mg).

Results: Ten eyes from 10 patients with painful blind eye were included, ages were from 32 to 89 years (mean age: 59 years). Neovascular glaucoma was the most common etiological cause (42%). Visual acuity ranged from no light perception in 9 cases to light perception in 1 case. Pain decreased from 8/10 on the Visual Analogue of Pain (EAD) scale to 2/10 within the first 24 hours post-procedure, sustaining it even a month after treatment. Baseline IOP was 43 mmHg, reducing to 29.14 mmHg at one month follow-up. Side effects were 1 case of dizziness and nausea, resolved with antiemetic, and 2 patients had postoperative eyelid edema and ecchymosis, spontaneously resolving. In the VFQ 25 questionnaire, significant improvements were noted in personal social interaction, a better self-perception and independence in daily activities.

Conclusions: Retrobulbar haloperidol appears to be a promising therapeutic option for managing patients with painful blind eyes of various etiologies. While it shows apparent effectiveness and safety in this preliminary study, further research is needed to validate it in a larger population before widespread clinical adoption.

P-GLA-062

Trabeculectomy outcomes among patients with glaucoma at Jimma University, from 2020 to 2023 in Jimma, Ethiopia

E. Haile^{1,2}, S. Adugna¹, D. Kifle¹, J. Kedir¹

¹Ophthalmology, Jimma University, Jimma, Ethiopia, ²Ophthalmology, Arba Minch University, Arba Minch, Ethiopia

Introduction: Glaucoma is the second most common cause of blindness and has been the burden of the health sector for the past few years with its vision- and life-related threats. The presentation can be different based on its stage, and the most common means of treatment is medical, though surgical treatment like trabeculectomy can also be the best alternative with different indications that lead to variable success rates.

Objectives: The purpose of the study is to present the outcome of trabeculectomy at Jimma University Medical Center and its intraoperative and postoperative complications.

Methods: A hospital-based, retrospective analytic study was conducted among patients who had undergone trabeculectomy in 2020–2023. A structured questionnaire was used to collect data, which was coded and entered into epidata and then exported to SPSS version 27 for statistical analysis. A descriptive statistical analysis, cross tabulations, linear logistic regression, chi-square test, and Fisher exact test were performed. $P < 0.05$ is considered statistically significant.

Results: A total of 79 patients were studied, with a mean age of 54.2 years and a male-to-female ratio of nearly 4:1. In this study, 30 (38%) surgeries were done by glaucoma surgeons, 39 (49.4%) of them by general ophthalmologists, and 10 (12.7%) of them by residents. In all cases, MMC was used, and in 43 (54.4%) of cases, MMC was soaked in subconjunctiva space, and in 36 (45.6%) of cases, MMC was given a subconjunctiva injection. Preoperatively, the mean IOP was 30.72 ± 10.941 mmHg, and the mean postoperative IOP at least six months after surgery was reduced to 12.68 mmHg ± 5.360 mmHg, $p = 0.001$. The preoperative mean VA was 0.11 ± 0.165 , and the mean VA postoperatively at six months was 0.103 ± 0.112 , $p = 0.048$. Complete success was found to be 83.5%, qualified success was 3.8%, failure was seen in 11.4%, and hypotony in 1.3%. The overall success (both complete and qualified success) was 88.5% based on IOP.

Conclusions: Based on the IOP level, the success rate of trabeculectomy after six months of the surgery was 87.3%, which is good. The mean preoperative VA was dropped by one line, and there was a significant improvement in IOP six months after surgery. To explore predictors for surgical failure and increase efficacy, it is better to assess a long-term multicenter prospective follow-up study regarding the outcome of trabeculectomy.

P-GLA-063

Efficacy and safety of Paul glaucoma implant surgery in patients with refractory glaucoma

D. Cabrerizo¹, P. Maturana¹, D. López^{1,2}, M.C. Goya², R. López³, L. Traipe¹

¹Unidad de Lágrima y Superficie Ocular (ULSO), Clínica Las Condes, Santiago, Chile, ²Departamento de Tecnología Médica, Facultad de Medicina, Universidad de Chile, Santiago, Chile, ³Instituto de Ciencias Biomédicas (ICBM), Facultad de Medicina, Universidad de Chile, Santiago, Chile

Introduction: Glaucoma is a cause of irreversible blindness that requires pharmacological and/or surgical treatment. In refractory glaucoma, aqueous tube shunts are becoming a promising surgical option. Paul[®] glaucoma implant is a novel valveless device that attempts to optimize the efficacy of other tube shunts, but with still limited literature evaluation of the outcomes.

Objectives: To examine the safety, efficacy, and complications of Paul[®] Glaucoma Implant (PGI) surgery in patients with refractory glaucoma.

Methods: A prospective case review of 35 eyes (31 patients) subjected to PGI surgery. Demographic characteristics of the study population and postoperative complications were recorded. Intraocular pressure (IOP) and number of glaucoma medications were evaluated preoperatively and postoperatively. Complete success was defined as unmedicated IOP \leq 21 mmHg in the absence of complications, qualified success if IOP \leq 21 mmHg with \geq 1 medications, and failure if IOP $>$ 21 mmHg or \leq 5 mmHg on 2 consecutive visits.

Results: Mean follow-up was 6.7 months (range: 1 to 12 months). Postoperative last follow-up visit IOP improved in 31 of 35 eyes (89%) ($P < 0.01$). IOP was reduced from a mean of 23.4 to 14.6 mmHg at the last follow-up visit ($P < 0.01$). The number of IOP-lowering medications was reduced from a median of 4.0 preoperatively to 1.0 at the last follow-up ($P < 0.01$). Overall, there were 4 eyes (11.4%) as complete success, 23 eyes (65.7%) classified as qualified success and 3 eyes as failure (8.6%). The most common postoperative complication was a hypertensive phase in 7 eyes (20%).

Conclusions: Paul[®] Glaucoma Implant surgery seems to be a safe and effective surgical option, providing good control of IOP for patients with refractory glaucoma.

P-GLA-064

To compare rates of visual field progression of pseudo exfoliation (PXF) vs primary open angle glaucoma (POAG)

N. Karupiah¹, R. George¹

¹Ophthalmology, Sankara Nethralaya, Chennai, India

Introduction: Rate of disease progression is a clinically important parameter in glaucoma for disease management. Several guidelines recommend assessment of rate of progression in routine glaucoma care.¹If we could accurately detect progression of glaucomatous disease, we would be able to identify patients who are at high risk of significant decline in their quality of life. This would enable intervention at the correct time to prevent further progression.

Objectives: To compare rates of progression and to investigate specific factors associated with visual field progression in PXF and POAG. Furthermore we investigated whether risk factors associated with rapid progression differ between PXF and POAG eyes within the same population.

Methods: 85 PXF with 5 reliable visual fields were compared with 85 POAG patients. Demographics, intraocular pressure (IOP), inter-visit IOP fluctuation, mean deviation (MD), pattern standard deviation, visual field index, anti-glaucoma medications (AGM) and rates of progression by trend analysis and event-based analysis were compared. Progression was defined as a rate of progression >-1dB/year on trend analysis or likely and possible progression on event analysis or both on the guided progression analysis (GPA).

Results: Mean baseline IOP (17.2mmHg PXF vs. 16.7mmHg POAG, $p = 0.503$) and mean baseline MD (-11.19 PXF vs -10.51 POAG, $p = 0.625$) were not significantly different. Mean IOP fluctuation across visits was significantly greater (PXF 3.06 (SD 1.74) vs. POAG 2.41(SD: 1.23), $p = 0.005$). PXF had a higher change in MD (4.02 PXF vs. 0.72POAG, $p < 0.01$) and at the final visit PXF had worse MD (-15.21 vs -11.23, $P = 0.004$). Rate of progression trend (-2.14 %/year PXF vs. -0.08 %/ year POAG, $p < 0.001$) was statistically significant. More PXF eyes showed progression 54 (63.5%) compared to POAG ($P < 0.005$). After adjusting age, duration and AGM, multivariate analysis showed PXF (OR: 4.734, 95% CI: 2.303-9.729) was a risk factor for progression. The mean IOP fluctuation was 2.41 ± 1.74 POAG vs. 3.06 ± 1.74 PXF, significant statistically ($p = 0.005$).

Conclusions: PXF had a higher rate of progression compared to POAG possibly related to greater IOP fluctuation. Hence PXF needs closer follow up and more aggressive therapy

P-GLA-065

Effects of Sahaj Samadhi Meditation on health-related quality of life of glaucoma patients: a feasibility study

M. S. Malvankar-Mehta^{1,2}, M. Huang², B. Yu³, M. Fong², C. M.L.Hutnik^{1,4}

¹Ophthalmology, University of Western Ontario, London, Canada, ²Epidemiology and Biostatistics, University of Western Ontario, London, Canada, ³Schulich School of Medicine, University of Western Ontario, London, Canada, ⁴Pathology and Lab Medicine, University of Western Ontario, London, Canada

Introduction: Glaucoma is a leading cause of irreversible blindness, afflicting an estimated 60.5 million people worldwide and 400,000 in Canada. Globally, 111 million people will be plagued by glaucoma in 2040. Further, there is a growing body of literature linking glaucoma with mental disorders. For example, glaucoma is significantly associated with symptoms of depression, altered mood, disturbed sleep, and anxiety. Meditation, may help reduce depression, anxiety, stress, and may improve sleep and quality of life.

Objectives: Our objective was to investigate the effects of Sahaj Samadhi Meditation (SSM) on depression, anxiety, sleep quality, and community integration in patients with glaucoma.

Methods: A prospective feasibility study was conducted. Twenty-eight patients with mild to severe glaucoma and glaucoma suspects over the age of 18 were recruited. Participants received either usual care or usual care with SSM. Participants in the SSM, a structured 4-day group received instructions for SSM and were asked to meditate regularly by themselves. Visual Function Questionnaire (VFQ-25), Center for Epidemiological Studies Depression Scale (CES-D), Community Integration Questionnaire (CIQ), and Pittsburgh Sleep Quality Index (PSQI) were administered at baseline and week-24 follow-up. A response-feature analysis was conducted. Box plots of the individual regression slopes for participants in the intervention and control were drawn. These slopes were analyzed using the Wilcoxon-Mann-Whitney rank-sum test. STATA 14.0 was used to conduct statistical analysis.

Results: Significant reduction in depression and improvement in sleep quality were seen in the SSM group compared to controls. Further, a reduction in anxiety symptoms was experienced in SSM group compared to controls. Differences in community integration and visual function quality of life were not significant between the two groups.

Conclusions: SSM could improve depressive symptoms and sleep dysfunction in patients with glaucoma. SSM may reduce anxiety symptoms in patients with glaucoma. Future studies on meditation with bigger sample sizes and long-term follow-ups need to be conducted.

P-GLA-066

The efficacy and safety of a primary tenectomy during Preserflo® microshunt implantation

S. Seddigh¹, M. Bhalla¹, G. Kontos¹, F. Ghaseminejad¹, S. Schendel¹, K. Gill¹

¹Ophthalmology, University of British Columbia, Vancouver, Canada

Introduction: Preserflo® microshunt (PMS) (Santen, Miami, Florida, USA), is a glaucoma drainage device, which is gaining popularity worldwide. The common protocol in the implantation of the PMS is to cover the device with two layers of tissue - tenon and conjunctiva.

Objectives: This is a retrospective chart review aimed at assessing the efficacy and the safety profile of a limited sectoral resection of tenon tissue during implantation of a preserflo® microshunt for the treatment of glaucoma

Methods: This retrospective chart review included consecutive eyes of patients who underwent PMS implantation with primary sectoral tenectomy, between January 2022 and Sep 2023, in Vancouver General Hospital, Canada. Primary outcomes for safety were the proportion of eyes without 2 or more consecutive hypotonic intraocular pressure (IOP) measurements (IOP < 6 mmHg) after post-operative month (POM)¹, the proportion of eyes without the need for salvage surgical treatment (i.e. exposed implant coverage or other filtration surgery). For efficacy, primary outcomes were the proportion of eyes with IOPs between 6 mmHg and 18 mmHg, and IOP reduction of 20% or more without (complete) or with (qualified) glaucoma medications. Secondary outcomes were rates of eyes with IOP lower than 14 mmHg and 21 mmHg with or without treatment, number of medications needed, exposure rate, failure rate, complications and re-operation rates.

Results: Our preliminary data from 17 eyes with mean follow-up time of 4.8 ± 2.6 months, shows complete success rates of 58.8% and qualified success rates of 70.6%. No eyes had persistent hypotony; one eye (5.88%) needed salvage filtration surgery. No PMS was exposed throughout the follow-up. IOP lower than 14 mmHg and 21 mmHg, were documented in 64.7% and 82.4% of the eyes at the final follow-up, respectively. IOP reduction rate was $35.84 \pm 21.3\%$ (from 22.6 ± 7.3 mmHg at baseline to 14.7 ± 0.8 mmHg), and medication usage reduced from 3.5 ± 0.9 medications, with 5 patients needing oral treatment, on average at baseline, to 0.8 ± 1.3 at the end of follow-up, with no patient using oral medication. Five patients (29.41%) needed needling of the bleb, and 5 (35.29%) underwent surgical revision of the bleb.

Conclusions: Primary tenectomy during the implantation of PMS implantation is a novel unreported technique which needs to be further studied to assess its safety and efficacy.

P-GLA-067

A novel approach to glaucoma bleb revision when managing bleb-related endophthalmitis

*P. Hou*¹, *X. Li*², *Y. Hu*³

¹Shanghai Bright Eye Hospital, Shanghai, China, ²Ophthalmology, Jinshan Hospital of Shanghai 6th People's Hospital, Shanghai Jiao Tong University, Shanghai, China, ³Guangdong Provincial People's Hospital, Guangzhou, China

Introduction: Bleb-associated endophthalmitis is characterized by marked intraocular inflammation and purulence in the area of the bleb with anterior chamber hypopyon after glaucoma filtering surgery. Inappropriately using of mitomycin C may result in thin, cystic, avascular blebs, which incurs growing concern about an increased risk of bleb-associated endophthalmitis. We report a case of a 52-year-old male with delay-onset bleb-associated endophthalmitis, who underwent trabeculectomy surgery 8 years prior. The treatment included phacovitrectomy and a novel approach to bleb reconstruction using stromal lenticule allograft obtained from femtosecond laser refractive surgery - Small Incision Lenticule Extraction (SMILE). The outcome is good regarding the visual outcome, intraocular pressure control and the morphology of the bleb.

Objectives: To report a case of delay-onset bleb-associated endophthalmitis 8 years after primary trabeculectomy due to traumatic glaucoma, and a novel treatment approach to bleb reconstruction.

Methods: The patient was treated with emergent phacovitrectomy and bleb reconstruction using stromal lenticule allograft obtained from femtosecond laser refractive surgery - Small Incision Lenticule Extraction (SMILE), apart from conventional management. The visual outcome, the intraocular pressure (IOP), and the bleb morphology were observed on scheduled follow-up for 6 months thereafter.

Results: The intraocular infection was controlled after surgery and antibiotics applied. The best corrected visual acuity was 20/40 on the last follow-up. IOP was well controlled without medications during each visit. The newly formed bleb appeared to be morphologically optimal. UBM indicated an irregular space within the bleb and the corneal stromal graft was in place.

Conclusions: Corneal stromal lenticule harvested from SMILE refractive surgery appears to be a promising material for assisting glaucoma filtering bleb reconstruction.

P-GLA-068

Retrospective case series of 38 patients with acute primary angle closure glaucoma managed during COVID pandemic

A. Gaikwad¹, V. Chelerkar¹, V. Kalyani¹

¹Glaucoma, PBMA's H.V. Desai Eye Hospital, Pune, India

Introduction: Glaucoma has been estimated to affect 60.6 to 79.6 million people from 2010 to 2020 Worldwide. Angle-closure glaucoma accounts for approximately 25% of all cases of glaucoma but is responsible for about 50% of blindness due to glaucoma. We saw and managed many patients with acute angle closure crises with early and late presentation during the COVID pandemic.

Objectives: To study the presentation, management, and outcome of 38 consecutive patients presenting with acute primary angle closure glaucoma attack, and also to know the reasons for delayed presentation and lost to follow up.

Methods: Retrospective observational analysis of medical records of 38 patients presented with acute primary angle closure glaucoma who were managed with medical, laser and surgical treatment at a tertiary eye care hospital in western Maharashtra during March 2020 to December 2021 (COVID pandemic).

Results: Out of these 38 patients, 26(68.43%) presented immediately and 12 (31.57%) had delayed presentation. Out of 38 patients, 22 patients (57%) were controlled with medical and laser therapy alone, 10 patients (26%) required combined cataract and trabeculectomy surgery after control of the acute attack, 4 patients (10%) underwent cataract surgery alone in presenting eye, 2 patients required cyclodestructive procedure to control intraocular pressure, 6 patients (15%) were lost to follow up after initial medical and laser management after 4 weeks of follow up. Vision was saved in 35 patients (92.10%) (improved in 33 patients, was stable in 2 patients), while vision could not be salvaged in three patients (7.89%), and out of these 2 patients required a cyclodestructive procedure to control Intraocular pressure. The patients whose vision could not be saved were found to have delayed presentation due to difficulty in reaching healthcare due to the pandemic. The fellow eye of all patients was evaluated in detail for the risk of angle closure glaucoma and treated as required.

Conclusions:

Acute primary angle closure glaucoma presented early can be managed successfully with good visual recovery and control of intraocular pressure. Training the optometrists and eye care providers at the vision centers/periphery might help in managing and referring such patients early.

P-GLA-069

Scavenge ROS and inhibit PANoptosis by Azo/Thioketal-Containing Polymers Delivering Melatonin for glaucoma treatment

X.-b. Xia¹, W. Fang¹, X. Zhou¹

¹Eye Center of Xiangya Hospital, Central South University, Changsha, China

Introduction: Glaucoma is an irreversible blinding disease characterized by progressive loss of retinal ganglion cells (RGCs). PANoptosis, a newly identified programmed cell death mode comprising apoptosis, necroptosis and pyroptosis, plays a crucial role in RGCs death during glaucoma.

Overexpression of reactive oxygen species (ROS) regulates both oxidative damage of RGCs and abnormal activation of key regulators in PANoptosis. Therefore, simultaneously removing ROS and inhibiting PANoptosis within RGCs may become an effective strategy for glaucoma.

Objectives: To study the neuroprotection effect of Azo/Thioketal-Containing Polymers Delivering Melatonin in glaucoma treatment

Methods: A biodegradable polymer dual-responsive to hypoxia and ROS is designed. It encapsulates melatonin (MT), a PANoptosis inhibitor, into nanoparticles (MT-NPs). Once internalized by RGCs, the azo bonds and thioketal bonds in MT-NPs are broken for relieving hypoxia and consuming ROS. This process leads to the release of MT, which inhibits PANoptosis of RGCs.

Results: Compared with MT, MT-NPs with superior bioavailability show the pronounced ability to restrain PANoptosis and ameliorate RGCs damage both *in vitro* and *in vivo* of glaucomatous injury models.

Conclusions: MT-NPs dual-responsive to hypoxia and over-accumulated ROS facilitate inhibition of PANoptosis in RGCs, providing a new strategy for glaucoma treatment.

P-GLA-070

Pressure induced interlamellar keratitis, uveitis and glaucoma after LASIK (case report)

U. Karimov¹, R. Karimov², S. Nizamkhadjjev³, F. Saitqulov²

¹Gulistan Koz Eye Clinic, Gulistan, Uzbekistan, ²Ophthalmology, Sirdarya Regional Branch of Republic Eye Microsurgery Center, Gulistan, Uzbekistan, ³Vedanta Ophthalmology Clinic, Tashkent, Uzbekistan

Introduction: LASIK is the most common method for correcting refractive errors. The method is becoming more and more widespread and is even used for complicated non-standard types of refractive error. There are several cases of intrallemellar keratitis after LASIK reported in the literature, but such a complicated case has not yet been described in the literature.

Objectives:

To describe a case of interlamellar keratitis induced by elevated intraocular pressure (IOP) and uveitis in a patient after LASIK surgery.

Methods:

Case report and review of the literature.

Results: The patient is a 47-year-old man. Unilateral moderate myopic astigmatism (OS). Sph (-)3.0 cyl (-)2.0 90° Reverse profile of the iris. CCT 476 µm. BCVA = 0.6. Rheumatic test is weakly positive, ESR 16 Patient was underwent LASIK surgery. 20 days after surgery VA was 0.6. IOP 11 mm Hg. 23 day after surgery patient came with complaints of blurred vision and severe pain. Was diagnosed pressure-induced interlamellar stromal keratitis (PISK). Despite the prescription of antiglaucoma (Azopt, Timolol, Brimonidine) and NSAID (Nevanac) drops IOP could not be normalized within 40 days. A month later, normalization of IOP and normal refraction result was achieved, the pain subsided. But during this period glaucomatous optic neuropathy developed.

Conclusions: Refractive surgeons should be aware of PISK as a potential complication of LASIK. If there are conditions such as a reverse iris profile, the risk of developing glaucoma or uveitis, it is better to refrain from refractive surgery or give preference to the PRK method.

P-GLA-071

Intraocular pressure outcomes with glaucoma drainage device implants at a skill training program in South West Nigeria

A. Ezenwa¹, C. Onochie-Olubobokun²

¹Ophthalmology, Nnamdi Azikiwe University, Awka, Nigeria, ²Ophthalmology, St Edmund's Eye Hospital, Lagos, Nigeria

Introduction: In Nigeria, glaucoma is the leading cause of functional low vision, irreversible blindness, and a significant public health burden. Intraocular pressure is a modifiable risk factor that slows or halts glaucoma progression. Glaucoma Drainage Devices recommended for refractory glaucoma is relatively new in Nigeria.

Objectives: To evaluate the intraocular pressure lowering effects of Glaucoma Drainage Device (GDD) in eyes with refractory glaucoma in a surgical skill transfer training program.

Methods: The Cure Glaucoma Foundation and Kunle Hassan Eye Foundation Academy organized a GDD implantation skill transfer training program. The sessions were held on 24/04/2023 and 13/07/2023. The medical records of the patients with GDD implants were reviewed. The preoperative data retrieved were the type of glaucoma, number of anti-glaucoma medications and intraocular pressures. Also obtained were the postoperative data on intraocular pressures and anti-glaucoma medication. Paired sample T-test was used to compare preoperative and postoperative means. A $p < 0.05$ was considered statistically significant.

Results: Twelve patients had GDD implants, with 9 receiving Ahmed Glaucoma Valve Model FP7 and 3 ClearPath GDD Model 250. The mean age was 57.1 ± 15.3 years (range of 16 – 76 years). Eight of the recipients had primary open angle glaucoma, others had Juvenile open angle glaucoma, primary angle closure glaucoma, uveitic glaucoma and neovascular glaucoma. The preoperative mean intraocular pressure was 28.2 ± 7.3 mmHg with a range of 16.2 – 41.0 mmHg. The mean postoperative intraocular pressures for weeks one, two and four weeks were 13.3 ± 11.1 mmHg, 18.2 ± 8.5 mmHg and 17.4 ± 4.9 mmHg respectively. The mean intraocular pressures at three months, six months and nine months were 16.0 ± 3.1 mmHg, 15.7 ± 5.9 mmHg and 15.5 ± 4.0 mmHg respectively. The decrease in intraocular pressures during postoperative periods compared to preoperative intraocular pressures was statistically significant with $p < 0.05$ except for the four weeks postoperative intraocular pressure where $p = 0.11$. The mean number of drugs to lower intraocular pressure preoperative was 3 ± 1 with a range of 2 – 5 medications and this reduced postoperative to 2 ± 1 with a range of 1 – 3 and was statistically significant with $p = 0.025$.

Conclusions: The intraocular pressures and the number of medications postoperative were reduced in our patients. These benefits justify the importance of the GDD surgical skill transfer program. We recommend GDD for patients with refractory glaucoma in Nigeria.

P-GLA-072

Management of dislocated IOL and uncontrolled pseudoexfoliation glaucoma with iTrack Advance Canaloplasty: a case report

L. Ghouti¹, N. Shoham-Hazon²

¹Faculty of Medicine, Dalhousie University, Halifax, Canada, ²Department of Ophthalmology and Visual Sciences, Dalhousie University, Halifax, Canada

Introduction: Glaucoma is an optic neuropathy characterized by optic nerve damage and visual field loss. A key treatment modality is the reduction of intraocular pressure (IOP), shown to slow the progression of the disease. First-line therapies, such as eye drops, may not always be sufficient in controlling IOP. In cases where medical therapy is insufficient, surgical intervention may be necessary. In recent years, Minimally invasive glaucoma surgery (MIGS), has become more widespread but somewhat controversial in combination with advanced anterior segment surgery as we present herein. One such surgical option is ab-interno canaloplasty with viscodilation, a minimally invasive procedure aimed at enhancing aqueous outflow through the eye's natural drainage system.

The iTrack Advance Microcatheter Canaloplasty is a new technique that has gained popularity in the management of glaucoma. This procedure involves using a microcatheter to circumferentially dilate Schlemm's canal, restoring natural aqueous outflow and reducing IOP. It offers the advantage of being less invasive compared to traditional glaucoma surgeries while providing sustained IOP reduction.

Objectives: To demonstrate the efficacy and safety of canaloplasty with iTrack Advance (Nova Eye, Fremont, USA) microcatheter in managing a patient with uncontrolled pseudoexfoliation glaucoma (PXG) and dislocated posterior chamber intraocular lens (IOL).

Methods: A 77-year-old female with a history of PXG, bilateral trabeculectomy, and bilateral cataract extraction with IOL implantation, presented with worsening vision and discomfort in her right eye (OD). Intraocular pressure (IOP) was elevated and uncontrolled with maximal tolerated medical therapy. Surgical intervention involved IOL exchange with anterior chamber IOL implantation, peripheral iridectomy, vitrectomy, and iTrack Advance ab-interno canaloplasty.

Results: Preoperative best-corrected visual acuity (BCVA) was 20/200 OD with elevated IOP of 35 mmHg. Postoperatively, BCVA improved to 20/30+ and IOP decreased to 15 mmHg on one medication (OD). Optic nerve evaluation showed stabilization, and visual field deficits improved over 6 months of follow-up. Patient tolerated the procedure well with no postoperative complications.

Conclusions: iTrack Advance canaloplasty offers a minimally invasive and effective approach for managing uncontrolled PXG with associated IOL complications. This case highlights its potential to achieve sustained IOP reduction and improved visual outcomes in challenging glaucoma cases.

P-GLA-073

Primary open angle glaucoma is reversible!: a retrospective observational study

*J. Kandagadla*¹

¹Ophthalmology, Malla Reddy Institute of Medical Sciences, Hyderabad, India

Introduction: Primary open angle glaucoma which

- A neurological disorder characterised by triad of increased IOP, optic disc affliction and visual field affliction,
- If 2 of 3 criteria are true, we make a diagnosis of glaucoma.

Objectives: to prove that Primary open angle glaucoma is reversible with adequate treatment as proved by increase in RNFL thickness measured using spectral domain OCT during repeated visits.

Methods: retrospective observational study was carried out on 58 eyes of 31 patients previously diagnosed as Primary open glaucoma by comparing the RNFL thickness during repeated visits to the clinic using a spectral domain Zeiss 5000 OCT , the observed data was tabulated and analysed using paired t test, all cases of glaucoma other than POAG were excluded from the study.

Results: it was observed that there was a significant improvement in the retinal nerve fibre thickness. this was statistically significant.

Conclusions: This is a unique study which provides hope to glaucoma patients which previously thought to be irreversible and the existent theory was that that only progress can be retarded but no cure exists for glaucoma.

P-GLA-074

Efficacy & Tolerance of Netarsudil Latanoprost Fixed dose combination (NLFC) in a 24 month switch study

S.S. Gollamudi¹, S. Sonty¹, N. Kandamuri¹

¹Glaucoma, Midwest Eye Center, Calumet City, United States

Introduction: Netarsudil Latanoprost Fixed dose combination is a new medication with significant efficacy and minimum side effects in the treatment of Glaucoma.

Objectives: To study the Efficacy and Tolerance of Netarsudil-Latanoprost Fixed Dose Combination (NLFC) in a switch study in Glaucomatous Eyes with inadequate IOP control in 24 Patients (24 OD & 24 OS).

Methods: 24 of 34 Glaucoma Patients (POAG 20 PACG 1 (S/P LPIS) SOAG 3) 17 Black 6 White & 1 Hispanic; 16M: 8F; Ages < 50 (1) 50-69 (12) 70-89(11) with 24 OS & 24 OS (2 OD & 2 OS Only) with inadequate OP Control on Current Anti Glaucoma medications & Switched to NLFC 23 Pts (20 OU, 2 OD & 1 OS) complete 48 wks (44-52 Wks) mean 12 mths were studied. 6 pts who completed 3 - 9 mths were exceeded 5/34 pts discontinued due to side effects - Corneal Edema (3) Intolerance - Redness-Irritation(1) & Body aches (3) Pre switch Glaucoma Medications switched to NLFC included Netarsudil (4) PGAs (7) Netarsudil & PGAs (8) Other Medications (4) IOPs in mm Hg were measured at Visit 0 (Initial) Visit 1 @ 2wks (1-3 wks) Visit 2 @ 1 mth(3-5 Wks) Visit 3 @ 13 Mths (10-14 wks) Visit 4 @ 26 mths(22-26 wks) & Visit 5 @ 12 Mths (44 - 52 wks) Visit 6 @ 24 mths(102-106 wks) after switch.

Results: IOPs in mm Hg Visit 0: 24.6 (12-40) OD 21.9 (10-46) OS Visit 1: 20.9 (14-34) OD (P 0.004) 19.8 (12-45) OS (P:0.002) Visit 2: 21 (12-31) OD (P:001) 19.6(12-40) OS (P:002) Visit 3: 20.5 (11-31) OD (P:0.001) 19.1 (12-40) OS (P:0.003) Visit 4: 20.5 (11-31) OD (P: 0.001) 20.1 (12-40) OS (P: 0.002) Visit 5: 18.4 (11-26) OD (P:0.001) 16.95 (10-24) OS (P: 0.02) Visit 6: 17.7 (11 - 38) OD (P: 0.0003),16.8 (12-23) OS (P:0.003) Preswitch Hyperemia : 0 (11) +0.5-1 (9) +2 (3) +3 (1) Post Switch Hyperemia : 0 (12) +0.5-1 (6) + 2 (4) + 3 (2) Reduction in No. of Bottles: 3.2 Pre vs 2.7 Post Switch. No.Meds: 2.8 Pre vs 2.4 Post Switch.

Conclusions: 1.) Netarsudil Latanoprost Combination (NLFC) is better than most Single & Combination Glaucoma Medications and equal to Netarsudil and Latanoprost used separately together. 2.) The Safety profile is comparable to the other Glaucoma Medications except for Corneal Edema in a few patients with few exceptions where Hyperemia increased.

P-GLA-075

Bleb revision using posterior L-shaped conjunctival flap in eyes with failure after PreserFlo MicroShunt implantation

K. Maruyama¹, N. Sugiura¹, K. Sekino¹

¹Yashio Maruyama Eye Clinic, Saitama, Japan

Introduction: Increasing intraocular pressure (IOP) due to bleb encapsulation is one of the major complications following PreserFlo MicroShunt implantation in the first few months after surgery. Although the most commonly used surgical technique to restore filtration is bleb needling, this procedure is challenging. If the IOP reduction is not achieved by needling, bleb revision is attempted. However, there are few published reports of bleb revision for bleb failure after PreserFlo MicroShunt implantation.

Objectives: To evaluate the efficacy and safety of bleb revision using a posterior L-shaped conjunctival flap in eyes with bleb failure after PreserFlo MicroShunt implantation in the short term postoperatively.

Methods: We retrospectively analyzed 4 consecutive eyes with bleb failure after PreserFlo MicroShunt implantation. All cases were treated with needling prior to bleb revision. Before bleb revision, IOP was 30.4 +/- 10.0 (range: 18 to 41) mmHg, best-corrected visual acuity (logMAR) was 0.2 +/- 0.2, corneal endothelial cell density was 2373.5 +/- 230.3 cells/mm², and the time between PreserFlo MicroShunt implantation and bleb revision was 8.8 +/- 3.2 (6 to 12 weeks) weeks. None of the eyes were treated with glaucoma medications.

The surgical technique was as follows: an L-shaped conjunctival flap was created radially and parallel to the limbus at 3mm. Tenon's capsule and connective tissue were dissected together from the sclera, and the distal extremity of the device was released from the connective tissue. After application of mitomycin C, the posterior edge of the shunt was sutured to the sclera, and the conjunctival flap was closed.

Demographic data, such as IOP before and after bleb revision, intra and postoperative complications, and reoperations were analyzed.

Results: The IOP was lowered to 5.5 ± 2.1 (3 to 8) mm Hg (t-test, p = 0.02) one day after the revision, to 7.0 ± 1.8 (5 to 9) mm Hg after one week (p = 0.02), and 9.8 ± 3.6 (5 to 13) mm Hg at the last visit (3.5 ± 3.0 months, p = 0.03). At the last visit, visual acuity (logMAR) was 0.2 +/- 0.2, and corneal endothelial cell density was 2330.8 +/- 362.8 cells/mm². One patient had a transient choroidal detachment for 3 weeks which improved without treatment. No patient required additional interventions during the follow up period.

Conclusions: Bleb revision using a posterior L-shaped conjunctival flap in eyes with bleb failure after PreserFlo MicroShunt implantation is effective and safe in the short term postoperatively.

P-GLA-076

Knowledge, attitude and practice of glaucoma patients in Cambodia

*D. Seiha*¹, *P. Ny*²

¹Ophthalmology, Khmer-Soviet Friendship Hospital, Phnom Penh, Cambodia, ²Ophthalmology, Preah Ang Duong Hospital, Phnom Penh, Cambodia

Introduction: Cambodia population is increasingly suffering from glaucoma. It is responsible of 2% of blind eyes. Many cases are relatively undiagnosed and may go blind desperately. Therefore, it is essential for patients to fully aware of nature of disease and the importance of therapy adherences in order to prevent huge damage.

Objectives: This study aims to assess level of knowledge related to glaucoma among glaucoma patients, their attitude and practice as regards their condition and management

Methods: This study is a multicenter prospective study of knowledge, attitude and practices (KAP). Four hospitals were included: 2 hospitals based in Phnom Penh and 2 hospitals in provinces. 100 patients were asked to complete in questionnaire. Data were then imported into SPSS version 25 for analysis

Results: The interview were conducted with 100 glaucoma patients, 52 were male and 48 were female. Age ranged from 18 to 79 years old with the age group of 50-59 were the highest (n=28). 85% of those patients had some level of formal education. Nearly half of patients had income less than 100 USD per month. 71 eyes were blind (VA less than 3/60) according to WHO classification at the presentation. The mean intraocular pressure was 22.5 (SD±12). Average VCDR was 0.7 (SD± 0.2) in both eyes. Majority of cases were open angle glaucoma and primary type. Most of the patients (83%) had less than 5 years of glaucoma. 75% of participants had poor knowledge about their disease, only 4% had good knowledge and 21% had fair knowledge. 87% of patients got their glaucoma awareness only from ophthalmologists, while only 2% had heard of it in social media. Most of patients had bad feeling of having glaucoma. However, 52% known the important of putting eye drops regularly and 50% known the important of follow-up regularly. Only 65% met their doctor regularly and the main challenge no to come were time/convenience and financial factors. In overall, 75% of patients had only fair to poor practice related to how and when to use anti-glaucoma, where to keep and when to follow up.

Conclusions: Low KAP about glaucoma of Cambodian patients is the matter of concern. Very small amount of patients well understood their disease and its management. Patients with low social economic conditions or having low education tend to have malpractice of their disease and as well as, get a lower treatment success. Moreover, there was not enough source to spread awareness to population. Therefore, it is time for efficient measure to prevent blindness from glaucoma.

P-GLA-077

ECP as a primary alternative treatment in patients who are at risk of ocular hypotony

A. Daniel¹, R. Pujari²

¹West Middlesex Hospital, London, United Kingdom, ²Moorfields Eye Hospital, London, United Kingdom

Introduction:

We describe a case report of ocular hypotony following preserflo surgery in a patient with severe coughing from Covid-19 and successful outcome of Endoscopic cyclophotocoagulation (ECP) in the alternate eye to avoid similar complication.

Objectives: Case study

Methods: Case study

Results: Case study

Conclusions:

In conclusion, our case report highlights ocular hypotony as a possible complication of Preserflo surgeries and the risk factors that contribute to it. Consideration of alternative treatments should be done based on the risk factors and to tailor treatment modality which is least likely to be affected by them. ECP is therefore a good option in patients who are at risk of ocular hypotony related to valsalva-like activities such as coughing and straining, as seen with covid-19 infections. This case further emphasizes the importance of adhering to the post-operative follow-up schedule which is paramount in detecting potential complications. It is important to consider the possibility of a Covid infection post trabeculectomy surgery and patients should be safety-netted accordingly. The practice of recommending codeine linctus in patients at risk of coughing or straining, such as seen in cataract surgeries, can be considered.

P-GLA-078

Association of vitamin B3 deficiency and primary open-angle glaucoma from a referral ophthalmology hospital in Mexico

M.F. Mendoza¹, G.F. Diez¹, C.A. Macario¹

¹Fundación Hospital Nuestra Señora de la Luz I.A.P., México City, Mexico

Introduction: Glaucoma, representing the first cause of irreversible blindness in the world, allows the creation of several strategies for the prevention of its progression. Taking into account the existing evidence regarding the deficit and its relationship with the disease in non-human biological models, it is imperative to measure vitamin B3 in control patients and patients with the disease in order to verify this correlation.

Objectives: To identify if there is a correlation between the presence of Primary Open Angle Glaucoma and decreased serum levels of vitamin B3 in patients from a referral ophthalmology hospital in Mexico.

Methods: A prospective, comparative, cross-sectional and analytical study will be conducted under the ethical principles of the Declaration of Helsinki.

Results: Samples from 82 patients were analyzed: 40 patients diagnosed with glaucoma and 42 healthy patients. When comparing the means of serum vitamin B3 values, it is observed that in the group of patients with glaucoma these values are lower than in the group of healthy patients, but this difference is not statistically significant ($p=0.097$). When comparing the means of serum vitamin B3 values in glaucoma patients according to severity, there was also no statistically significant difference between the groups ($p=0.883$).

Conclusions: Samples from 82 patients were analyzed. When compare the means of serum vitamin B3 values, it is observed that in the group of patients with glaucoma these values are lower than in the group of healthy patients. In the means of serum vitamin B3 values in glaucoma patients according to severity, there was also no statistically difference between the groups ($p=0.883$).

P-GLA-079

Choroidal detachment dilemmas: integrating medical and surgical strategies

*M.K. Aly*¹

¹Ophthalmology, Magrabi Hospital KSA, Jeddah, Saudi Arabia

Introduction: Choroidal detachment poses a significant clinical challenge, requiring a nuanced approach that integrates both medical and surgical interventions for optimal management. Despite advancements in treatment modalities, dilemmas persist in achieving favorable outcomes and preserving visual function.

Objectives: This study aims to explore the complexities surrounding choroidal detachment management and to propose an integrated approach that combines medical therapies with surgical techniques to address the diverse presentations and underlying etiologies effectively.

Methods: A retrospective analysis was conducted on a cohort of patients with choroidal detachment treated at our institution over a specified period. Medical records were reviewed to assess the effectiveness of various medical interventions, including pharmacological agents and conservative measures, alongside surgical interventions such as drainage procedures and scleral buckling.

Results: Our findings revealed the multifactorial nature of choroidal detachment, with diverse etiologies ranging from ocular trauma to inflammatory conditions. Analysis of treatment outcomes demonstrated the necessity of tailored approaches, with successful resolution achieved through a combination of medical and surgical strategies in select cases. Factors influencing prognosis and visual recovery were also identified.

Conclusions: In conclusion, the management of choroidal detachment necessitates a comprehensive understanding of its pathophysiology and a multidisciplinary approach that integrates medical and surgical interventions. By addressing the complexities inherent in this condition, clinicians can optimize treatment outcomes and improve visual prognosis for affected patients.

P-GLA-080

Comparison of Intraocular Pressure between Air Puff Tonometer and Goldmann Applanation Tonometer at a Tertiary Eye Care

U.S. Akbar¹, S. Biswas²

¹Glaucoma, Chittagong Eye Infirmary and Training Complex, Chattogram, Bangladesh, ²Surgical retina, Chittagong Eye Infirmary and Training Complex, Chattogram, Bangladesh

Introduction: Glaucoma is the second leading cause of irreversible blindness worldwide. In the developed and developing countries, a significant proportion of glaucoma usually presents to eye care facilities in the advanced stages when the optic nerve is already damaged.

Objectives: The purpose of this study was to evaluate the role of air puff (AP) tonometer by comparing the measurements of intraocular pressure (IOP) made using this device with those made using a Goldmann applanation tonometer (GAT) at Chittagong Eye Infirmary and Training Complex.

Methods: An observational and comparative study was carried out at Chittagong Eye Infirmary and Training Complex from January 2016 to January 2017. Two techniques for IOP measurements using the standard GAT and the non-contact tonometer (NCT) were compared. A total of 400 eyes from 200 patients were included in the study.

Results: The mean IOP as measured by GAT in the right eye was 14.50 ± 5.59 mmHg and in the left eye was 14.87 ± 7.03 mmHg while that as measured by NCT in the right eye was 15.97 ± 6.12 mmHg and in the left eye was 15.94 ± 6.98 mmHg. The mean difference between the two methods of measurement in the right eye was 1.47 ± 0.53 mmHg and the left eye was 1.07 ± 0.05 mmHg. The readings obtained by NCT were higher than those obtained by GAT. There was no statistically significant difference found in IOP measurements between GAT and NCT according to patient's age, gender or laterality of eyes.

Conclusions: There was a significant difference in the measurement of IOP between GAT and NCT. Goldmann applanation tonometry remains the most suitable and reliable method for measuring IOP.

P-GLA-081

Color vision and contrast sensitivity in primary open angle glaucoma

*N. Ayed*¹

¹Glaucoma, Makkah Eye Complex, Khartoum, Sudan

Introduction: Glaucoma is the second irreversible cause of blindness, so early diagnoses and mangment is important to improve the quality of life for glaucoma patients. Color vision and contrast sensitivity tests are important parameter of visual function . despite their normal or near normal snellen acuity test , patients with glaucoma complain of poor vision.

Objectives: To study color vision and contrast sensitivity changes in glaucoma in relation to VA ,IOP, vertical C/D ratio , NFL and GCL thickness.

Methods: A cross sectional descriptive study carried out at Makka Eye Complex Hospital .Sexitey two patients with 108 eye , diagnosed as primary open angle glaucoma . The study was conducted in Glaucoma clinic . The patients was seen by Glaucoma ophthalmologist and the investigator. Patients with intraocular surgery , retinopathy and significant opacity on the media (cornea, lens, vitrious) were excluded from the study. OCT for glaucoma was asked , Farnsworth D-15 panel test and Peli-Robson contrast sensitivity test were performed by the investigator and recorded in a data collection sheet.

Results: A total of 108 eyes were examined .Thirty three percent had titan deficiency and 58 % had abnormal contrast test. No significant correlation existed between color vision and contrast sensitivity tests with age . No significant correlation existed between color vision and VA , IOP , RNFL , GCL thickness ,while significant with verical C/D ratio ($p= 0.5$) . Patient with VA 6/12- 6/18 showed a high percent of tritan dificiency(37%). IOP above 20 showed higher percent of tritanopia (57%).There was high significant correlation between contrast sensitivity and VA ($p=0.009$),and significantly with RNFL , GCL thickness ,but not significant with IOP and C/D ratio . Hundred percent of patients of VA 6/24- 6/36 showed abnormal contrast test.

Conclusions: Contrast sensitivity and color vision tests are important parameters in assessing the visual function in glaucoma patients.

Contrast sensitivity was significantly decreased with glaucoma and more sensitive in assessment of vision than visual acuity.

P-GLA-082

A retrospective study: Five-year outcomes after Ahmed or Baerveldt valve implantation in a Tertiary-care center

L. Bussi eres¹, A. Xu², R. Tolba², M. H ebert¹, C. Lajoie¹

¹Centre universitaire d'ophtalmologie, CHU de Qu ebec - Universit  Laval, Qu ebec, Canada, ²Facult  de m decine - Universit  Laval, Qu ebec, Canada

Introduction: The Ahmed Baerveldt Comparison study and the Ahmed versus Baerveldt study yielded important results in randomized controlled trials.

Objectives: To compare glaucoma reoperation rates and the risk of corneal decompensation requiring corneal graft in Ahmed and Baerveldt valve implants in a tertiary-care center.

Methods: All patients with a glaucoma drainage device at the CHU de Qu ebec – Universit  Laval between 2000 and 2021 were considered for inclusion. Exclusion criteria included a postoperative follow-up of less than 6 months. Primary outcomes were reoperation rates (i.e., new glaucoma drainage device, trabeculectomy, implant revision, or cyclophotocoagulation) and incidence of corneal decompensation leading to corneal graft. Secondary outcomes were intraocular pressure (IOP) <21 mmHg, >20% reduction of IOP from baseline, IOP-lowering drops use, and oral medication use (e.g., acetazolamide or methazolamide)

Results: This study included 275 eyes that completed the five-year follow-up, of the initially included 914 eyes. Most frequent diagnosis was open angle glaucoma (48%), followed by uveitic glaucoma (12%). Patients were on 3 [2, 4] different topical medications.

At five-years follow-up, 43 Ahmed eyes (42%) and 69 Baerveldt eyes (40%) required a glaucoma reoperation ($p=0.71$). Time to glaucoma reoperation did not significantly differ between both cohorts ($p=0.79$). In both cohorts combined, 35% of eyes that underwent implantation of more than one valve in the same eye suffered corneal decompensation requiring a graft compared to 18% with only one valve ($p=0.017$).

In the Ahmed group, 19 eyes (19%) required a corneal graft compared to 39 eyes in the Baerveldt group (23%) ($p=0.44$). Time to onset of corneal decompensation requiring graft did not differ between both groups ($p=0.30$).

Five-year results showed IOP below 21 in 94% of the Ahmed group versus 98% of the Baerveldt group ($p=0.06$), as well as 20% IOP reduction from baseline in 78% versus 79% of the respective groups ($p=0.81$). Diamox use was 5% versus 7% ($p=0.50$). Patients used 2 [1, 3] topical medications, while median IOP was 12 [9, 14] in the Ahmed, compared to 11 [8, 14] mmHg in the Baerveldt group ($p=0.179$).

Conclusions: Reoperation rates and corneal decompensation rates requiring graft were similar in the Ahmed and Baerveldt groups at five-years follow-up.

Both valves reached similar success outcomes. However, the Baerveldt implant was associated with a higher rate of decrease in IOP below 21mmHg.

P-GLA-083

A comparison of trabeculectomy outcomes by intratenon injection mitomycin C versus sponge-applied mitomycin-C

S. Ananprasert¹, N. Lertkusol¹, L. Pas-arj¹

¹Ophthalmology, Thammasat University, Pathumthani, Thailand

Introduction: Glaucoma is the 2nd most common blindness nowadays. The treatment are consist of medications, lasers and surgeries. The variant technique of surgery in trabeculectomy is crucial for improvement the final outcome. The author want to share the results from my study.

Objectives: To compare the efficacy and safety of intratenon injection of mitomycin C (MMC) with that of conventional application of sponge-applied mitomycin C in trabeculectomy.

Methods: We retrospectively reviewed 90 patients with primary and secondary glaucoma diagnoses who received trabeculectomy surgery with MMC in Thammasat Hospital, Thailand from 2018 to 2021. The MMC was administered to the subjects via either a sponge-applied or an intratenon injection. Postoperative intraocular pressure (IOP) level was the primary outcome measure, with survival rates for IOP control, number of glaucoma medication used, complication rates, and vision serving as secondary outcomes.

Results: The 90 eyes were available for analysis; 54 eyes had MMC delivered via sponge and 36 eyes via injection. Mean preoperative IOP in group 1 was 28.44 ± 12.87 mmHg and group 2 was 26.83 ± 6.51 mmHg, which reduced to 14.72 ± 10.08 and 11.63 ± 3.76 mmHg at final visit with *P* value of 0.373, respectively. Mean preoperative number of antiglaucoma medications was 3.64 ± 0.54 in group 1 and 3.70 ± 0.54 in group 2, which reduced to 0.78 ± 1.07 and 0.30 ± 0.82 with *P* value of 0.007, respectively. The complete success rate was 69.0% in the injection group and 88.5% in the sponge group, Overall, success rate (complete + qualified) was 80.6% and 96.3% in group 1 and group 2 at final visit with *P* value of 0.030, respectively. There was no difference between groups in postoperative complications including choroidal effusion, overfiltration, hypotony, malignant glaucoma, revised bleb and bleb leak ($p > 0.05$). No patients in either group had a devastating complication, such as endophthalmitis. Time to failure for postoperative IOP control was significantly different between MMC treatment groups. The higher survival rate in the sponge-applied group suggests that this MMC delivery methods is associated with better IOP control at the end of the first year compared to the Intratenon route.

Conclusions: Both MMC delivery methods are effective in reducing IOP and the number of antiglaucoma medications, but the sponge-applied group demonstrated superior success rates without an increased risk of complications.

P-GLA-084

Biomarkers between POAG and systemic lupus erythematosus: novel insights into pathogenesis and therapeutic targets

X. Xia¹, Y. Liu¹, M. You¹, R. Rong¹

¹Eye Center of Xiangya Hospital, Central South University, Changsha, China

Introduction: Glaucoma is the leading cause of irreversible blindness worldwide. The pathogenesis of primary open-angle glaucoma (POAG) is associated with inflammation and immune dysfunction, while systemic lupus erythematosus (SLE) is an autoimmune disease that can involve multiple systems and organs. Recent studies have suggested a potential correlation between these two diseases; however, the mechanism underlying this association remains unclear.

Objectives: To study correlation between the pathogenesis of SLE and POAG.

Methods: The GSE27276, GSE50772, and GSE148371 datasets were acquired from the Gene Expression Omnibus (GEO) database. Integrated analysis of these datasets was performed to identify diagnostic biomarkers and comprehensively analyze their biological functions and molecular networks of action through differential expression analysis, weighted gene co-expression network (WGCNA), Kyoto Encyclopedia of Genes and Genomes (KEGG), Gene Ontology (GO) enrichment analysis, machine learning, miRNA and transcription factor analyses, immune infiltration analyses, and single-cell transcriptome analysis. Finally, RT-qPCR was performed in human trabecular meshwork stem cells to validate the five hub genes.

Results: The 10 key genes identified from differential expression and WGCNA analyses were mainly enriched in immune-, inflammatory-, and autophagy-related pathways. Five hub genes were further identified by machine learning, related transcription factors and miRNA regulatory networks were constructed, and the expression distribution of the hub genes in trabecular meshwork tissues was analyzed by single-cell transcriptomic analysis. Immune infiltration analysis suggested that immune cells, such as macrophages, T cells, and B cells, had a high infiltration abundance in both diseases. In addition, 10 potential targeted therapeutic agents were obtained from the DSigDB database. The RT-qPCR results showed that the gene expression trend was generally consistent with our initial predictions.

Conclusions: This study revealed a correlation between the pathogenesis of SLE and POAG and provided new targets and directions for further research and treatment of SLE-related POAG.

P-GLA-085

Pretreatment with frequent topical betamethasone in Ahmed Glaucoma Valve implantation

M. Yadgari¹, N. Nassiri¹, K. Sheibani², S. Kavousnezhad³

¹Ophthalmology, Imam Hossein Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, Islamic Republic of, ²Basir Eye Health Research Center, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of, ³Vanak Eye Surgery Center, Tehran, Iran, Islamic Republic of

Introduction: Topical corticosteroids are vital components in alleviating symptoms of intraocular inflammation through inhibition of phospholipase A2 synthesis, which is responsible for the transformation of phospholipids into arachidonic acid.

Objectives: To evaluate the efficacy of pretreatment with topical betamethasone in Ahmed Glaucoma Valve (AGV) implantation.

Methods: In this randomized clinical trial, sixty-two eyes from 62 patients undergoing AGV implantation were randomly assigned to two arms of the study. The case group received AGV implantation with preoperative betamethasone eye drops, while the control group did not receive preoperative betamethasone. Follow-up examinations were conducted on postoperative day 1, at least weekly for 4 weeks, and then every 1 to 3 months. Our main outcome measure was the success rate, defined as intraocular pressure (IOP) < 15 mm Hg or IOP ≤ 18 mm Hg.

Results: We analyzed 62 eyes divided into case (n = 33) and control (n = 29) groups. The success rate was significantly higher in the intervention group than in the control group at 12 months postoperatively when considering either IOP < 15 mm Hg or IOP ≤ 18 mm Hg as criteria for success (p < 0.001), and also at 6 months when considering IOP ≤ 18 mm Hg as the success criterion (p = 0.041). The reduction in the number of antiglaucoma medications used postoperatively was significantly greater in the betamethasone group at 1 and 3 months follow-up and at 1 year.

Conclusions: Pretreatment with topical betamethasone in AGV implantations increases the success rate and reduces the necessity for postoperative medications.

P-GLA-086

Canaloplasty performed with the iTrack microcatheter to reduce IOP in uncontrolled glaucoma eyes

J. Liu¹, P. Harasymowycz², D. Lubeck³, K. Barton⁴, N. Kerr⁵

¹University of Montreal, Montreal, Canada, ²Centre universitaire d'ophtalmologie, University of Montreal, Montreal, Canada, ³University of Chicago, Chicago, United States, ⁴Moorfields Eye Hospital, London, United Kingdom, ⁵Royal Victorian Eye and Ear Hospital, Melbourne, Australia

Introduction: Ab interno canaloplasty is a minimally invasive glaucoma surgery aimed to lower intraocular pressure (IOP) in patients with glaucoma. The iTrack microcatheter (Nova Eye Medical) aims to treat both the proximal and distal portions of the conventional pathway by disrupting the trabecular meshwork adhesions, and expanding the Schlemm's canal and collector channels through 360-degree cannulation and viscodilation. A few small studies have examined the effect of this procedure on glaucoma control and medication reduction as a standalone procedure. We present the efficacy results of a large registry of glaucoma patients having undergone canaloplasty using the iTrack microcatheter.

Objectives: To evaluate intraocular pressure (IOP) control and medication reduction in uncontrolled glaucoma eyes undergoing canaloplasty with the iTrack microcatheter.

Methods: Eyes which received canaloplasty performed with an ab-interno approach with the iTrack microcatheter (Nova Eye Medical) with a preoperative IOP above 18mmHg (defined as uncontrolled IOP) were collated from the International Glaucoma Surgery Registry - IGSR. Primary endpoints were IOP reduction, control of IOP equal or below 18mmHg, and medication reduction.

Results: 162 eyes with a mean preoperative IOP (mmHg) of 23.8 ± 5.5 and on 1.8 ± 1.2 medications were recruited. IOP and medications were reduced to 14.7 ± 4.3 and 15.5 ± 4.8 and 1.2 ± 1.4 and 1.0 ± 1.3 at the 6- (n=82) and 12-month (n=54) follow-ups ($p < 0.001$), respectively. 81.5% of the eyes were controlled (IOP equal or below 18 mmHg) at the 12-month follow up. Mean IOP decreased in 94.4% of the eyes, while the number of medications decreased in 59.3% of the eyes, stayed the same in 31.5%, and increased in 9.3% of the eyes. Potentially related adverse events were: cystoid macular edema (2/162); hyphema >10% anterior chamber (3/162), and intraocular inflammation/uveitis (1/162).

Conclusions: Canaloplasty performed via an ab-interno technique resulted in a generic decrease of IOP in uncontrolled glaucoma eyes. The majority of baseline uncontrolled glaucoma eyes were IOP controlled following the canaloplasty procedure.

P-GLA-087

Clinical features of concave iris and the effect of Nd:YAG laser iridotomy treatment

Z. Zhang¹, Z. Liang¹, Y. Bao¹

¹Ophthalmology and Ophthalmology Center of Peking University People's Hospital, Beijing, China

Introduction: Concave iris denotes a backward bowing of peripheral iris. Reverse pupillary block happens when the posterior surface of the iris closely approximates the lens, thereby elevating intraocular pressure.

Objectives: This study aims to examine the clinical characteristics of concave iris and assess the effects of Nd:YAG laser iridotomy treatment and morphological changes of iris.

Methods: In this prospective observational study, a total of 34 patients (34 eyes) displaying concave iris via slit lamp examination were enrolled. They were divided based on UBM measurements into Group A (19 eyes with iris concavity ≥ 0.03 mm) and Group B (15 eyes). Data collected contained main complaints, gender, age, uncorrected and corrected distance visual acuity (UDVA, CDVA), subjective manifest refraction, and intraocular pressure (IOP). IOL Master was utilized to measure axial length (AL), anterior chamber depth (ACD), corneal diameter (CD) and pupil diameter (PD). UBM was utilized for iris concavity (IC), concavity ratio (CR), iris thickness (IT), iris-lens contact (ILC), angle-open distance (AOD) and anterior chamber angle (ACA). 7 patients from Group A with an IOP ≥ 21 mmHg underwent Nd:YAG laser peripheral iridotomy (LPI). Pre- and post-operative measurements of the same parameters were collected. The data were analyzed using t-tests and Logistic linear regression.

Results: Mean ages in Group A and Group B were 29.05 ± 6.57 and 30.53 ± 6.33 years, respectively ($P=0.511$), with gender ratios (M: F) of 12:7 and 8:7 ($P=0.114$). No significant differences were found in UDVA, CDVA, CD, and subjective manifest refraction between groups ($P>0.05$). Asthenopia was reported by 89.5% (17/19) of Group A and 33% of Group B. Group A exhibited higher IOP ($P=0.042$), longer AL ($P=0.021$), bigger pupil ($P=0.016$) and significantly greater values for IC, CR, AOD, ACA, and ILC ($P<0.001$) compared to Group B. IC had a linear relationship with ILC, AOD and IT. In Group A, pre-LPI IOP was significantly higher in patients undergoing LPI (24.83 ± 6.88 mmHg) compared to non-operative patients (20.38 ± 3.38 mmHg, $P<0.05$). The mean follow-up period was 17.6 ± 3.2 weeks. Post-LPI, there was notable relief in asthenopia and reductions in IOP, IC, CR, IT, and ILC ($P<0.05$). No significant postoperative differences were noted between the surgical group and Group B.

Conclusions: Concave iris patients often present with elevated IOP and asthenopia. Nd:YAG laser iridotomy proved significantly effective in treating concave iris, with marked improvements in clinical and morphological outcomes.

P-GLA-088

Impact of anxiety and depression in quality of life of patients with glaucoma in a referral center in Mexico

L.D. Muñoz Fernandez¹, G.F. Diez Cattini¹

¹Glaucoma, Fundacion Hospital Nuestra Señora de la Luz, Mexico City, Mexico

Introduction: The diagnosis of glaucoma can confront patients with psychological and emotional alterations. The prevalence and treatment of these psychiatric diseases in patients with glaucoma must be identified and included as part of non-traditional treatment.

Objectives: Find the prevalence of depression and anxiety in patients diagnosed with primary open-angle glaucoma, primary angle-closure glaucoma and secondary glaucoma. Assess quality of life of patients with glaucoma and depression or anxiety.

Methods: The study included patients with a confirmed diagnosis of glaucoma in the age group of 40-80 years old, with regular follow-up and good adherence to treatment.

Each subject will receive a complete ophthalmological examination. Two surveys will be used, the Glaucoma Quality of Life (GQOL-15) and the Hospital Anxiety and Depression Scale (HADS), these surveys will be translated into Spanish and validated.

Results: A total of 204 patients were included, most patients were men (62.3%), with a median age of 68 years. Among the diagnoses, POAG was the most frequent (50%) followed by NVG (25%). The median drug use was 2 drugs. Regarding the severity of glaucoma, the highest proportion of patients were classified as severe (46.1%).

In the HADS-Anxiety test, the diagnosis was made in 23.5% of the patients. Regarding the HADS-Depression test the diagnosis was made in 31.9% of the patients. The presence of both conditions occurred in 21.5% of the patients. Finally, the comparison of the score obtained in the GQOL-15 questionnaire was made depending on the presence of depression or anxiety. The presence of anxiety and depression was shown to present significantly higher scores GQOL-15 compared to people who didn't have these comorbidities ($p < 0.001$). Since all variables were statistically relevant, the Z score was obtained, depression was more significantly related to the increase in the score obtained compared to anxiety (Z score anxiety -4.75 vs Z score depression - 5.51) and the presence of both conditions generated a slight additional increase in the score (Z score depression+anxiety -5.53).

Conclusions: The presence of anxiety and depression is associated with a worse quality of life evaluated by the GQOL- 15 questionnaire, we recommend a psychological health approach to glaucoma care due to its impact on quality of life, further studies are required to identify whether it contributes to other aspects such as poor pharmacological adherence or worse clinical outcomes.

P-GLA-089

Positive three-year safety and efficacy results of a supraciliary drainage device in open angle glaucoma patients

K. Mansouri¹, A.M. Fea², P. Denis³, C. Hirneiss⁴, B. Flowers⁵, I.P. Singh⁶, I.I.K. Ahmed⁷

¹Swiss Visio Clinic Monchoisi, Lausanne, Switzerland, ²Dipartimento di Scienze Chirurgiche, Clinica Oculistica, University of Turin, Torino, Italy, ³Department of Ophthalmology, Hôpital de la Croix-Rousse, Lyon, France, ⁴Klinikum der Universität München, Ludwig-Maximilians-Universität, Munich, Germany, ⁵Ophthalmology Associates, Fort Worth, United States, ⁶The Eye Centers of Racine and Kenosha, Racine, United States, ⁷John Moran Eye Center, University of Utah, Salt Lake City, United States

Introduction: Minimally invasive glaucoma surgery (MIGS) devices are a new class of glaucoma drainage devices which provide a safer and less invasive treatment option for patients to reduce intraocular pressure with minimal complications, and thus delay the need for traditional more invasive treatment such as trabeculectomy with its associated risks. Long term results are needed in this relatively new class.

Objectives: To describe the 3-year safety and efficacy profile in patients with medically uncontrolled primary open-angle glaucoma of a novel, minimally invasive glaucoma surgery (MIGS) device implanted ab interno into the supraciliary space (MINIject®; iSTAR Medical, Wavre, Belgium).

Methods: The MINIject device was implanted as a standalone procedure in phakic and pseudophakic eyes in 3 prospective trials (STAR-I,II,III). The trials with no medication washout were completed in 66 patients in 11 sites in Europe, Asia and Central America for 2 years. The STAR-GLOBAL study then continued follow-up annually from 3 until 5 years. Outcome measures were intraocular pressure (IOP), IOP-lowering medications, adverse events and corneal endothelial cell density (ECD).

Results: There were 48 patients who completed 3-year follow-up (72.7% of patients who completed the STAR I-III studies). Mean baseline diurnal IOP prior to implantation was 23.6±3.4 mmHg with a mean of 2.2±1.1 IOP-lowering medications (n=48). At two-years mean diurnal IOP was 13.5±3.8mmHg (-10.2mmHg, -42.2%; p<0.0001) on 1.1±1.3 medications. At three-year follow-up, mean diurnal IOP was 15.1±4.1mmHg (-8.5mmHg, -35.6%; p<0.0001) on 1.4±1.5 medications. There were 90% of patients who achieved an IOP reduction of ≥20% from baseline, an IOP ≤18 mmHg was achieved in 85% of patients, and 42% of patients were medication-free at three years. The most frequent adverse events since baseline in these 48 patients included: anterior chamber inflammation (22.9%) and visual acuity loss, hyphema, conjunctival haemorrhage, and cataract development (each 6.3%). The mean per-protocol reduction in central ECD since baseline was 4.7% at the 3-year follow-up, with only 1 patient having >30% loss.

Conclusions: The MINIject achieved a significant reduction in IOP and hypotensive medications up to three-years post-implantation as a standalone procedure in an ethnically diverse cohort of patients. This supraciliary MIGS device offers a potential bleb-free treatment option for patients with medically uncontrolled primary open angle glaucoma requiring low target IOPs, irrespective of lens status.

P-GLA-090

Inhibiting ferroptosis promotes retinal ganglion cell survival in glast knockout mouse model of normal tension glaucoma

H. Ye¹, Y. Xu¹, J. Huang¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: GLAST knockout (GLAST^{-/-}) in mice has been shown to induce Retinal Ganglion Cells (RGCs) degeneration without elevated intraocular pressure (IOP), mimicking the pathology of Normal tension glaucoma (NTG). Ferroptosis is a new type of regulated cell death dependent on iron and characterized by iron accumulation and lipid peroxidation, its identification has shed light on the mechanisms in glaucoma with pathologically high IOP. However, the association between ferroptosis and GLAST deletion-induced pathological condition remains unknown.

Objectives: The aim of this study is to investigate the involvement of ferroptosis in GLAST deletion-induced RGCs loss and to explore potential therapeutic approaches for this pathological condition.

Methods: RNA-sequencing was used to compare the differential gene expression in the retinal tissues of normal mice and GLAST^{-/-} mice, the expression changes of key ferroptosis markers in retinas were further confirmed via Western blot (WB) and Immunofluorescence (IF). Intraperitoneal injection of Ferrostatin-1 (Fer-1) was employed to investigate whether inhibiting ferroptosis exerts a protective effect on retinal damage induced by GLAST deletion.

Results: We conducted RNA-sequencing in mouse retinas with or without GLAST knockout, revealing significant effects of GLAST-deletion on lipid and antioxidant metabolism pathways, while also increasing the expression of ferroptosis-related genes. WB and IF were further used to confirm that the deletion of GLAST resulted in decreased protein expression levels of GSH and DHE, and increased levels of 4-HNE in the retina, indicating elevated levels of oxidative stress and lipid peroxidation in GLAST^{-/-} mice. Moreover, an increase in Fe²⁺ was observed in the retinal tissues of GLAST^{-/-} mice, and the protein expression levels of ACSL4, a key indicator of ferroptosis, were significantly elevated, while GPX4, SLC7A11, and FTH1 were decreased. As expected, the administration of the ferroptosis inhibitor Fer-1 effectively attenuated retinal ferroptosis, reduced the loss of RGCs, ameliorated retinal morphological defects, and preserved visual function induced by the deletion of GLAST.

Conclusions: This study revealed the involvement of ferroptosis in GLAST^{-/-} mice and demonstrated the protective effects of ferroptosis inhibitor on the retinal damage caused by GLAST deletion, providing new insights for the clinical treatment of NTG.

P-GLA-091

Age and Gender Disparities in Anterior Chamber Angle: Insights from ANTERION SS-OCT Imaging

K.-Y. Chen¹, C.-M. Chan^{2,3}

¹School of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan, China ,

²Department of Ophthalmology, Cardinal Tien Hospital, New Taipei City, Taiwan, China , ³School of Medicine, Fu Jen Catholic University, New Taipei City, Taiwan, China

Introduction: This study utilized novel ANTERION anterior segment swept-source optical coherence tomography (SS-OCT) to explore the correlation between age, sex and anterior chamber angle (ACA).

Objectives: This study aimed to evaluate the association between age, sex, and changes in anterior chamber angle (ACA) parameters to understand their potential roles as glaucoma risk factors.

Methods: This study evaluates healthy Chinese adults in a teaching hospital from October 2021 to January 2024. A total of 374 eyes of 187 individuals was involved. Exclusions were made for individuals with a history of previous glaucoma. Utilizing the ANTERION from Heidelberg Engineering, which unites the power of high-resolution SS-OCT images and precise measurements, anterior segment analysis was performed. Data from all subjects were employed to investigate aging differences; age-matched male and female subjects were chosen from all subjects to study sex difference and aging.

Results: The study cohort, with an average age of 43.4 ± 11.2 years, exhibited a slight female predominance, with 109 females (58.3%). Pearson's correlation coefficient demonstrated a statistically significant negative correlation between age and all measured ACA and scleral spur angle (SSA) parameters ($p < 0.05$). Specifically, ACA 500 ($r = -0.67$), ACA 750 ($r = -0.72$), SSA 500 ($r = -0.69$), and SSA 750 ($r = -0.74$) displayed high correlation coefficients across all age groups, indicating a decrease in ACA dimensions with advancing age. Multiple Linear Regression demonstrated decreasing rates as follows: ACA 500 ($-0.061^\circ/\text{year}$), ACA 750 ($-0.074^\circ/\text{year}$), SSA 500 ($-0.082^\circ/\text{year}$), and SSA 750 ($-0.091^\circ/\text{year}$). Additionally, age-matched comparisons revealed that ACA narrowing was more pronounced in females than in males, particularly in subjects older than middle age. This gender difference, especially among elderly females, may contribute to the higher incidence of angle-closure glaucoma in this demographic. No significant differences were observed between right and left eyes for all measurements at any age ($p > 0.05$).

Conclusions: This study reveals the narrowing of ACA parameters with aging and female, and highlights the importance of considering both age and sex in glaucoma risk assessment.

P-GLA-092

Gonioscopic angle evaluation and its correlation with graft survival and Postop OHT in pts of DSEK

*R. Shakya*¹

¹Department of Cataract and Glaucoma services, Sadguru Seva Sangh Trust, Jankikund, Chitrakoot, India

Introduction: Post-operative ocular hypertension (OHT) remains an important complication after Descemet's stripping endothelial keratoplasty (DSEK). Although DSEK is a less invasive lamellar surgical technique, The reported incidences of IOP elevation are 28% to 39% after DSEK surgery during the first post-operative year. The presence of peripheral anterior synechiae (PAS) has been hypothesized to be an independent risk factor for post-surgery OHT,^[7] but there is paucity of literature which highlights such angle structures seen on gonioscopy in post-DSEK patients. In the present study, we have evaluated incidence and management of OHT after DSEK surgery.

Objectives: To evaluate the gonioscopic changes in patients receiving Descemet's stripping endothelial keratoplasty (DSEK) without pre-existing ocular hypertension (OHT) and to report its correlation with post-surgery OHT, graft survival, and visual outcomes.

Methods: Adult patients who underwent DSEK surgery from April 2014 to March 2018 with at least 2 years of follow-up were analyzed in this retrospective study. Demographic details, indication of DSEK, necessary anterior and posterior segment findings, and the post-DSEK OHT details were documented.

Results: A total of 58 patients (23 males and 35 females) with a mean age of 61.44 ± 8.8 years were included in the study. The most common etiology for DSEK surgery was pseudophakic bullous keratopathy in 47 eyes (81.03%). A total of 22.41% (13/58) eyes showed elevated intra-ocular pressure (IOP) following DSEK surgery. The most common cause of IOP elevation was steroid-induced OHT in seven eyes (12.06%). Gonioscopy examination revealed areas of peripheral anterior synechiae (PAS) in 17 (29.3%) eyes. OHT was found in 4/17 (23.5%) eyes having PAS. Three of these cases required trabeculectomy + goniosynechiolysis (GSL), and the fourth case required GSL alone to control IOP. These four cases also required repeat DSEK for failed grafts. The mean pre-operative best corrected visual acuity was 1.62 logMAR (range 1.17-1.77), which gradually improved to 0.79 logMAR (range 0.3-1.77) after 2 years ($p < 0.00001$).

Conclusions: PAS was found to be an important factor associated with post-DSEK ocular hypertension in our study. OHT in PAS cases required definitive surgical treatments to control IOP. It adversely affected the graft survival and in turn affected visual outcomes also.

P-GLA-093

Effect of anti-vascular endothelial growth factor on the surgical outcome of neovascular glaucoma

N.Y. Lee¹, Y.j. Lee¹

¹Ophthalmology, Eunpyeong St.Mary's Hospital, The Catholic University of Korea, Seoul, Korea, Republic of

Introduction: NVG is a secondary glaucoma caused by retinal ischemia; therefore, anti-VEGF treatment could potentially influence both the underlying cause of the disease and the secondary elevation in IOP. However, there is no consensus on adjuvant anti-VEGF in eyes with NVG undergoing Ahmed glaucoma valve implantation (AGVI).

Objectives: To evaluate the effect of anti-vascular endothelial growth factor (VEGF) on the surgical outcome of Ahmed glaucoma valve implantation (AGVI) in neovascular glaucoma (NVG).

Methods: The Medline database was used for the literature search in this study. An extensive search of PubMed, EMBASE, and the Cochrane Library was carried out in January 2021 to select relevant studies. The weighted mean difference of the intraocular pressure reduction percentage (IOPR%) from baseline to endpoint was used for the primary efficacy estimate. Mantel-Haenszel odds ratios (ORs) and 95% confidence intervals (CIs) for success rate were employed as secondary efficacy estimates. The number of postoperative interventions and the tolerability estimate for adverse events were also measured using ORs. We conducted meta-analyses of fixed effects models using comprehensive meta-analysis software to pool the results of the included studies. Heterogeneity was assessed using Q-value and I² measures.

Results: Nine studies were included in the analysis, encompassing a total of 410 eyes. There was no significant difference in IOPR% between the AGVI-only group and the AGVI with adjuvant bevacizumab group (estimate 0.324; 95% CI, -0.278-0.926; p = 0.244). However, the success rate favored the AGVI with adjuvant bevacizumab group (estimate 0.561; 95% CI, 0.097-1.025, p = 0.018).

Conclusions: AGVI with adjuvant bevacizumab had no significant effect on lowering IOP in patients with NVG compared with AGVI alone. However, the final success rate was higher for AGVI with adjuvant bevacizumab treatment than with AGVI alone.

P-GLA-094

Increased risks of open-angle glaucoma in untreated hypertension

*J.S. Lee*¹

¹Ophthalmology, Yonsei University College of Medicine, Seoul, Korea, Republic of

Introduction: Hypertension (HTN) has been associated with open-angle glaucoma (OAG), but whether elevated blood pressure (BP) alone is associated with OAG is unknown.

Objectives: To identify whether stage 1 hypertension, as per the 2017 American College of Cardiology/American Heart Association (ACC/AHA) BP guidelines, increases the risk of OAG.

Methods: A total of 360,330 subjects who were ≥ 40 years of age and not taking antihypertensive or antiglaucoma drugs at the time of health examinations between January 1, 2002, and December 31, 2003, were included in this retrospective, observational, cohort study. Subjects were categorized based on their untreated BP, into normal BP (systolic BP [SBP] < 120 and diastolic BP [DBP] < 80 mm Hg; $n = 104,304$), elevated BP (SBP 120-129 and DBP < 80 mm Hg; $n = 33,139$), stage 1 HTN (SBP 130-139 or DBP 80-89 mm Hg; $n = 122,534$), or stage 2 HTN (SBP ≥ 140 or DBP ≥ 90 mm Hg; $n = 100,353$). Cox regression analysis was performed to calculate hazard ratios (HR) of OAG risk.

Results: The mean age of the subjects was 51.17 ± 8.97 years, and 56.2% were male. During a mean follow-up period of 11.76 ± 1.37 years, 12,841 subjects (3.56%) were diagnosed with OAG. Multivariable-adjusted HRs (95% CIs) were 1.056 (0.985-1.132) for elevated BP, 1.101 (1.050-1.155) for stage 1 HTN, and 1.114 (1.060-1.170) for stage 2 HTN with normal BP as the reference.

Conclusions: The risk for OAG becomes greater with increases in untreated BP. Stage 1 HTN per the 2017 ACC/AHA BP guidelines is a significant risk factor for OAG.

P-GLA-095

Systemic arterial stiffness is associated with structural progression in early open-angle glaucoma

S.Y. Lee¹

¹Ophthalmology, Yonsei University College of Medicine, Seoul, Korea, Republic of

Introduction: Our previous examinations of optical coherence tomography (OCT) angiography in patients with NTG also supported this theory as macular vessel density was found to be significantly reduced in patients who exhibit abnormal systemic arterial stiffness, in the form of elevated pulse wave velocity (PWV).

Objectives: The purpose was to identify association between systemic arterial stiffness predicted by brachial-ankle pulse wave velocity (PWV) and initial location of structural progression in early open-angle glaucoma.

Methods: Patients with early open-angle glaucoma who underwent PWV measurements were subjected to a retrospective review of medical records. A total of 160 eyes of 160 patients were subjected to analyses. Patients were categorized into three PWV groups. Structural progression was determined using event-based analysis of the Guided Progression Analysis software of Cirrus optical coherence tomography.

Results: Thirty-eight patients had a PWV of 1400 cm/s or less on both the left and right sides (low PWV, 39.5% females, 53.9 ± 8.8 years old), and 46 patients showed a PWV of 1800 cm/s or more on either side (high PWV; 54.3% females, 71.3 ± 5.8 years old). The rest of the patients had an intermediate PWV (n = 76, 50.0% females, 59.8 ± 8.6 years old). Among patients who showed progression in 69.3 ± 41.5 months, macular ganglion cell-inner plexiform layer (mGCIPL) loss preceded peripapillary retinal nerve fiber layer (ppRNFL) loss in 86.7% of high PWV group (n = 15, 60.0% females, 70.0 ± 6.0 years old) in comparison with 26.7% of the low PWV group (P = 0.002). The PWV was significantly higher in patients whose structural progression was first observed at mGCIPL (1744.1 ± 347.7 cm/s) than patients whose initial location was ppRNFL (1452.0 ± 201.0 cm/s; P = 0.012). A high PWV was associated with increased likelihood of structural progression at mGCIPL (odds ratio, 7.484; 95% confidence interval, 1.212-49.196; P = 0.030) among patients who showed progression.

Conclusions: PWV is a significant predictor of the location of structural progression in open-angle glaucoma. Vascular insufficiency may be an important aspect in the pathogenesis of glaucoma.

P-GLA-096

12-month outcomes of MicroPulse Transscleral Laser Therapy under varied treatment parameters

R. May¹, I. Wagner², C. Lentz¹, N. Boopathiraj², P. Vasu³, A. Ahuja⁴, L. Checo², D. Miller², S. Dorairaj²

¹Mayo Clinic Alix School of Medicine, Jacksonville, United States, ²Mayo Clinic, Jacksonville, United States, ³Creighton University School of Medicine, Phoenix, United States, ⁴Casey Eye Institute, Portland, United States

Introduction: Laser therapy is an alternative to traditional incisional surgery but may produce more complications. MicroPulse Transscleral Laser Therapy (MicroPulse TLT) targets the ciliary body using repeated pulses of the infrared diode Cyclo G6 Laser to decrease the production of aqueous humor and lower intraocular pressure (IOP) in glaucoma patients. In 2020, the first generation 700-micron fiberoptic handheld P3 probe was revised to have a 600-micron fiber diameter and no-ball tip to increase coupling and energy delivery. There are few peer-reviewed publications which report on the safety and efficacy of the newly designed MicroPulse P3 Delivery Device.

Objectives: This is a prospective study evaluating 12-month safety and efficacy outcomes of MicroPulse TLT performed with the Revised P3 Delivery Device under varied treatment conditions in adults with uncontrolled glaucoma.

Methods: Sixty-two eyes with uncontrolled glaucoma were randomly assigned to receive MicroPulse TLT with the Revised P3 Delivery Device (810nm wavelength, 31.33% duty cycle) for 240s with 8 sweeps (G1; n=20), 300s with 10 sweeps (G2; n=22), or 200s with 10 sweeps (G3; n=20). Changes in ciliary body and angle were evaluated using ultrasound biomicroscopy at 3-months. Changes in IOP, antiglaucoma medication (AGM) burden, and best corrected visual acuity (BCVA) were assessed via paired t-tests at 1-, 3-, and 6, and 12-months. Eyes which achieved an IOP \leq 21 mmHg or \geq 20% IOP reduction on the same/fewer medications with no glaucoma surgical reinterventions at 12-months were considered a success.

Results: Success was achieved in 94%, 92%, and 80% of eyes in G1, G2, and G3, respectively. Mean IOP was reduced ($p < 0.001$) by 43% (G1), 56% (G2), and 39% (G3) and AGM burden was reduced ($p < 0.05$) by 23% (G1), 16% (G2), and 27% (G3). BCVA was maintained in all eyes and no changes in ciliary body and angle were observed throughout the follow-up period. Failures included two eyes (G1, G3) receiving an MicroPulse TLT reintervention at 12 months, one eye (G2) receiving glaucoma drainage device implantation at 3 months, and one eye (G3) receiving XEN gel stent implantation at 6 months.

Conclusions: For up to 12 months, MicroPulse TLT performed under varied treatment parameters appears safe and effective in eyes with uncontrolled glaucoma. Longer treatment times appeared to produce greater IOP reductions, with a comparable safety profile observed across all subgroups.

P-GLA-097

Analysis of microvasculature recovery after glaucoma surgery by dividing the ONH into lamina and peripapillary sclera

H.J. Shin¹, H.-Y.L. Park¹

¹Ophthalmology, The Catholic University of Korea/Seoul St.Mary's Hospital, Seoul, Korea, Republic of

Introduction: Glaucoma is a progressive optic nerve condition marked, in part, by significant rearrangement of cells within the lamina cribrosa (LC) and the peripapillary sclera (ppScl). The ppScl plays a significant role in the biomechanics and structural integrity of the optic nerve head (ONH). As glaucoma progresses, structural changes in ONH occur, and a decrease in the microvasculature of LC and ppScl is observed.

Objectives: In this study, by dividing the area into LC and ppScl and comparing the trend of VD change after glaucoma surgery, we would like to investigate the characteristics of ONH remodeling in glaucoma. In addition, we evaluated how the location of vessel density (VD) recovery after glaucoma surgery affects the visual field (VF) progression.

Methods: The ONH were imaged using an OCT-A device at one day before surgery and at one month after surgery. VD measurements were made in the lamina area and within the region of β -zone peripapillary atrophy (PPA) in deep vascular layers. A mean deviation (MD) slope value of < -1.0 decibel/y was considered to be indicative of VF progression.

Results: Changes in lamina VD were observed in 12 of the total patients, and shorter axial length, thinner central corneal thickness, and less changes of PPA VD showed significant association compared to patients without lamina VD changes (all $P < 0.05$). Changes in PPA VD were observed in 14 of the total patients, and lower spherical equivalent, longer axial length, and lower preoperative PPA VD were significantly related to PPA VD changes (all $P < 0.05$), and also borderline significant differences were observed in less changes in lamina VD ($P = 0.065$). After glaucoma surgery, 12 eyes exhibited an increase in the Lamina VD in the non-progression group, compared with 0 eyes in the progression group ($P = 0.012$). Significant increase in the PPA area was observed in 7 eyes in the non-progression group, compared with 7 of the eyes in the progression group. The recovery of PPA VD was not significantly related to VF progression.

Conclusions: The recovery of deep lamina VD after glaucoma surgery can be seen as a good signal for glaucoma prognosis. In contrast, recovery of peripapillary VD resulted in further glaucoma progression because it seems that ischemic damage had already influenced to axons in LC. In ONH, LC and ppScl appear to respond structurally complementarily to high intraocular pressure, and this could present new possibilities in embodying the pathophysiology of glaucoma.

P-GLA-098

Evaluating the efficacy and safety of Bent Angle Needle Goniotomy (BANG) across the glaucoma spectrum

B.K.d. Sarker¹, Q.S. Iftekhar², M. Mahatma³

¹Glaucoma, Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh, ²Paediatric Ophthalmology, Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh, ³Pathology, Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh

Introduction: Minimally invasive glaucoma surgery (MIGS) is being increasingly adopted by ophthalmologists due to its effectiveness and lower risk of complications. An inexpensive alternative is the Bent Angle Needle Goniotomy (BANG), and our study evaluates its outcome in combination with cataract surgery across the spectrum of glaucoma cases.

Objectives: To assess the effectiveness and safety of Bent Angle Needle Goniotomy (BANG) in conjunction with cataract surgery, we examine its performance across various types of glaucoma.

Methods: All glaucoma sub types with visually significant cataracts and intraocular pressure (IOP) of less than 30mmHg were included. The procedure consisted of performing goniotomy with a bent needle at the end of phacoemulsification. The value of IOP reduction and complications were studied over a 6-month follow-up period.

Results: A total of 84 eyes from 58 patients were studied (44 with open-angle glaucoma, 30 with angle-closure glaucoma, and 10 with pseudoexfoliative glaucoma). The mean pre-intervention IOP was 18.52 ± 3.56 mmHg, which decreased postoperatively at all visits except for one week when there was a slight spike in IOP. At the last follow-up at six months, the IOP was 13.57 ± 2.92 mmHg. There was a significant decrease in the number of anti-glaucoma medications ($p < 0.005$). Eight patients experienced an IOP spike, mainly around the first week, and only two patients had hyphema, which resolved with conservative management.

Conclusions: Phacoemulsification with BANG is an effective procedure for reducing IOP and the medication burden across the spectrum of glaucoma patients. BANG Surgery is a low-cost MIGS technique that also demonstrates a favorable safety profile.

P-GLA-099

Revisiting V H method of anterior chamber depth assessment in light of gonioscopy and AS OCT for primary angle closure

D. Mukhopadhyay¹, R. Agarwalla²

¹Ophthalmology, BKG Eye Hospital PVT Ltd, Malda, India, ²Ophthalmology, Malda Medical College, Malda, India

Introduction: Primary Angle Closure Glaucoma constitutes nearly 50% of all primary glaucomas. In Suspect stage of this disease during initial clinical examination it can only be suspected by Anterior Chamber Depth Assessment by VH Method as it is impractical to perform gonioscopy in all cases.

Objectives: Missing to pick up narrowness of angle by VH method, gonioscopy will be not be indicated though it is the main stay of its diagnosis and grading. But gonioscopy is often neglected. We propose a novel method of Angle Occludibility Probability Assessment by Limbal Anterior Chamber Depth Assessment compared with gonioscopic evaluation and Anterior Segment Spectral Domain Ocular Coherence Tomography and its Changes after Pilocarpine Drop.

Methods: Pilocarpine stretches iris and opens narrow angles. Gonioscopy can assess the change subjectively but SD-OCT can detect and document these pilocarpine-induced angle changes. We hypothesized that the amount of angle increase is directly proportionate to occludibility. Our prospective cross-sectional single-masked observational study evaluated pilocarpine-induced changes in angle parameters detected by SD-OCT. All eyes were graded by VH method, gonioscopy and SD-OCT chamber angle measurement. Pre-pilocarpine OCT was done in complete darkness and with far-fixation. Post-pilocarpine OCT was done in bright room light and with near fixation. All angle measurements were noted and reassessed after pilocarpine drops.

Results: 539 eyes were graded by VH method, gonioscopy and SD-OCT. Pearson's correlations were 0.81, 0.72, and 0.70 between VH and gonioscopy, gonio and SD-OCT angle and VH and SD-OCT. The ROC curve for gonio and angle OCT measurements showed AUC of 0.85. After pilocarpine drop, an increase in angle OCT values was significant in eyes with gonioscopically narrower angles. H0 was rejected in Two-sample t-test considering increases of angle opening in 'open-angle group (more than 30°)' vs 'closed angle group (0°-10°)'. The number of eyes found to be eligible for Laser Peripheral Iridotomy varied with methods of assigning the disease state.

Conclusions: Failing to appreciate angle occludibility by Van Herick method in primary angle closure suspects could be disastrous particularly where access to ophthalmic facilities are meagre. Van Herick Method with SD-OCT angle assessment could complement gonioscopy. Pilocarpine-induced SD-OCT angle changes offers additional support for selection of peripheral iridotomy candidates in borderline cases.

P-GLA-100

Role and mechanism of TXNDC5 in promoting extracellular matrix protein accumulation in the trabecular meshwork

T. Guo¹, D. Song¹

¹Ophthalmology, Shanghai Ninth People's Hospital Affiliated to Shanghai Jiao Tong University, School of Medicine, Shanghai, China

Introduction: Excessive accumulation of ECM proteins in the TM of patients with POAG leads to an increased resistance to outflow of aqueous humor, which in turn leads to an increase in IOP. Currently, there is no effective treatment to address the pathogenesis of TM ECM protein accumulation. Therefore, it is crucial to screen for key proteins targeting TM ECM protein accumulation and further develop drugs targeting these mechanisms. We analysed and screened the significant up-regulation of thioredoxin-containing structural domain protein 5 (TXNDC5) in TM cells induced by TGF β 2 by non-tagged quantitative proteomics mass spectrometry.

Objectives: To thoroughly investigate the role and mechanism of TXNDC5 in TM ECM protein accumulation and elevated IOP.

Methods: (1) A TGF β 2-induced human TM cell model was established. Label-free protein profiling, Western Blot, RT-PCR and ICC were used to detect the differences in the expression of ECM proteins such as TXNDC5, COL-IV, fibronectin (FN) and laminin (LN) in TGF β 2-induced TM cells; (2) A cell model of TXNDC5 knockdown was constructed by small interfering RNA, and the protein expression of TXNDC5, ECM and its downstream TGF β R2 was detected by Western Blot, RT-PCR and ICC; (3) siRNA targeting silenced TXNDC5 in mouse tissues, and the protein expression of TXNDC5 and its ECM in TM tissues of mice was detected by RT-PCR, ICC.

Results: Our results by Label-free mass spectrometry showed that TXNDC5 and LN, FN, and COL-IV protein expression levels were increased. Further studies revealed that the accumulation of TXNDC5 and FN, COL-IV, and LN was significantly increased in the TGF β 2-induced mouse model of IOP. Targeted silencing of TXNDC5 significantly reduced the protein expression of ECM. In vitro experiments TXNDC5 is involved in the regulation of human TM ECM and contributes to the accumulation of human TM ECM by increasing TGF β R2 expression. Knockdown of TXNDC5 significantly reduced the expression of LN, FN and COL proteins in human TM induced by TGF β 2 stimulation. Knockdown of TGF β R2 reduced extracellular matrix FN protein expression, but had no effect on TXNDC5 expression.

Conclusions: The above results suggest that TGF β 2 induces the accumulation of ECM in the TM. TXNDC5 is a key mediator of TM fibrosis and consequently IOP increase, and TXNDC5 contributes to the accumulation of TM ECM through the increase in the expression of TGF β R2. TXNDC5 may serve as a new therapeutic target for the improvement of ECM proteins of the TM and for the reduction of the IOP in POAG.

P-GLA-101

Association between peripapillary intrachoroidal cavitation and primary open-angle glaucoma in eyes with myopia

N. Luo¹, J. Huang¹, J. Huang¹

¹Glaucoma, State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangdong Provincial Clinical Research Center for Ocular Diseases, Guangzhou, China

Introduction: Peripapillary intrachoroidal cavitation (PICC) appears as a hyporeflective space within the choroid below the intact retinal pigment epithelium layer on optical coherence tomography (OCT). PICC is mainly found in high myopia and may related to the peripapillary scleral bowing and the traction exerted by the optic nerve sheath during eye movement. PICC can increase the diagnostic uncertainty of coexisting glaucoma. Visual field defects occurred in 73.3% of eyes. And thinner retina and decreased peripapillary perfusion can be found in PICC. However, few studies focused on the PICCs in myopic eyes with glaucoma. Therefore, we investigated the clinical characteristics of eyes with PICC in patients with myopia and coexisting POAG, to better understand the association between PICC and glaucoma.

Objectives: To investigate the association between PICC and primary open-angle glaucoma (POAG) in myopia.

Methods: In this retrospective cross-sectional study, consecutive patients were divided into the myopia group and the myopia with POAG group. PICC was assessed with optic disc-centered radial OCT scans. Myopic maculopathy and optic disc morphology indices were also documented. The prevalence of PICC was compared between the two groups. PICC-free eyes were selected as control and compared to eyes with PICC to evaluate the differences in clinical characteristics. In addition, the risk factors for PICC and the association between PICC and POAG were examined.

Results: 775 myopic eyes of 755 consecutive patients were enrolled, where 353 eyes were diagnosed with myopia and 422 eyes were diagnosed with myopia with POAG. Compared to the myopia group, the myopia with POAG group had a significantly higher prevalence of PICC (10.4% [44/422] vs. 4.0% [14/353]). Eyes with PICC in the myopia with POAG group had worse visual field, and thinner RNFL thickness compared to that in the myopia group (both $P \leq 0.001$). And in the myopia with POAG group, eyes with PICC had older age, longer axial length, worse vision, more severe myopic maculopathy, higher prevalence of posterior staphyloma compared to eyes without PICC (all $P \leq 0.001$). Multivariate regression analysis showed that older age ($P=0.02$), inferior disc rotation, larger peripapillary atrophy area, and staphyloma were the risk factors for PICC (all $P < 0.05$), but POAG was not.

Conclusions: PICC was more prevalent in patients with myopia and coexisting POAG compared to patients with myopia alone and was associated with aging and more severe myopic fundus changes, but not with POAG.

P-GLA-102

5-year follow-up on efficacy and safety of posterior Endoscopic Cyclophotocoagulation in refractory glaucoma

Y. Fang¹, P. Zheng¹, X. Tang¹, Q. Li¹

¹Ophthalmology, Beijing Tongren Hospital, Beijing, China

Introduction: Endoscopic cyclophotocoagulation (ECP) has been effective in the management of glaucoma in various types and stages both in adult and pediatric patients. ECP via a pars plana approach offers a comprehensive view of the ciliary processes and facilitates easier access to the ciliary processes root, thereby enhancing photocoagulation accuracy and ultimately achieving superior IOP control. The present study aims to analyze the clinical outcome of ECP via a posterior approach by the same team in a large cohort of refractory glaucoma with at least 5-year follow-up in a tertiary institution. In addition, the factors associated with the favorable outcome from ECP were also investigated both in adults and pediatric patients.

Objectives: To evaluate the long-term efficacy of endoscopic cyclophotocoagulation (ECP) via a pars plana approach in a large cohort of refractory glaucoma patients

Methods: This study recruited patients who underwent ECP and consecutively visited and followed up at least 5 years at Beijing Tongren Eye Center from January 2013 to December 2017. All patients underwent a complete ophthalmic examination. Treatment success was defined as $6\text{mmHg} \leq \text{IOP} \leq 21\text{mmHg}$ with or without anti-glaucoma medications.

Results: A total of 121 eyes of 105 patients including 51 children and 54 adults were enrolled. The mean follow-up was 7.2 ± 1.3 years. The most common glaucoma diagnoses were secondary glaucoma (74 eyes, 61.1%) and primary congenital glaucoma (19 eyes 15.7%). The mean extent of the first ECP was 259 degrees. After 1 or more ECP, the IOP was reduced to 20.5 ± 7.5 mmHg at either final follow-up or at the time of failure. There was an overall decrease in IOP of 38.3% after surgery, and the difference was statistically significant ($P < 0.001$). After adjusting for sex, number of prior TCP surgeries and the extent of ECP degree, the failure of ECP was associated with being children (adult as compared; $P = 0.028$; $OR = 2.549$) and higher preoperative IOP ($P = 0.001$; $OR = 1.084$).

Conclusions: Our study represents the largest cohort of glaucoma treated by ECP via the pars plana approach who followed up for more than 5 years in both adults and children and in a variety of etiologies. ECP is an effective procedure for lowering IOP in refractory glaucoma, particularly in patients who are also candidates for vitreoretinal interventions. Hence, a collaborative approach between glaucoma and retinal specialists is of utmost importance in devising an optimal management strategy for glaucoma treatment.

P-GLA-103

Angiotensin II-related activation of scleral fibroblasts and their role on retinal ganglion cell death in glaucoma

M.A. Koo¹, H. Park¹

¹The Catholic University Of Korea, Seoul, Korea, Republic of

Introduction: The renin–angiotensin–aldosterone system (RAAS) is vital for maintaining arterial blood pressure (BP), retaining extracellular fluid volume and systemic vasoconstriction. Low arterial BP leads to increased production of renin, which hydrolyzes the liver protein angiotensinogen to angiotensin I and II (AngII). Recent reports have demonstrated that increases in AngII levels, particularly through the AngII type 1 receptor (AT-1R), induce tissue fibrosis in the heart, kidneys, liver, and vessels. Therefore, the role of the sclera in the pathogenesis of glaucoma is emerging, and there have been attempts to identify the relationship between the tissue properties of the sclera and the loss of RGCs.

Objectives: We identify the angiotensin II (AngII)-associated changes in the extracellular matrix (ECM) and the biomechanical properties of the sclera after systemic hypotension.

Methods: Systemic hypotension was induced by administering oral hydrochlorothiazide. AngII receptor levels and ECM components in the sclera and biomechanical properties were evaluated based on the stress-strain relationship after systemic hypotension. The effect of inhibiting the AngII receptor with losartan was determined in the systemic hypotensive animal model and the cultured scleral fibroblasts from this model. The effect of losartan on retinal ganglion cell (RGC) death was evaluated in the retina.

Results: Both AngII receptor type I (AT-1R) and type II (AT-2R) increased in the sclera after systemic hypotension. Proteins related to the activation of fibroblasts (transforming growth factor [TGF]- β 1 and TGF- β 2) indicated that transformation to myofibroblasts (α smooth muscle actin [SMA]), and the major ECM protein (collagen type I) increased in the sclera after systemic hypotension. These changes were associated with stiffening of the sclera in the biomechanical analysis. Administering losartan in the sub-Tenon tissue significantly decreased the expression of AT-1R, α SMA, TGF- β , and collagen type I in the cultured scleral fibroblasts and the sclera of systemic hypotensive rats. The sclera became less stiff after the losartan treatment. A significant increase in the number of RGCs and decrease in glial cell activation was found in the retina after the losartan treatment.

Conclusions: These findings suggest that AngII plays a role in scleral fibrosis after systemic hypotension and that inhibiting AngII could modulate the tissue properties of the sclera, resulting in the protection of RGCs.

P-GLA-104

Three letter codes for Humphrey visual fields for faster documentation in the electronic health records

M. Gollamudi¹, S. Sonty¹

¹Midwest Eye Center, Calumet City, United States

Introduction: Three Letter Short Codes for Visual Field results for Glaucoma Patients to facilitate faster documentation in Electronic Health Records in busy Glaucoma practice.

Objectives: To design Three Letter Short Codes for Visual Field results for Glaucoma Patients to facilitate faster documentation in Electronic Health Records.

Methods: Visual Field Defects on Humphrey Visual Fields (Perimetry) can be designated with Three Letter Codes NFD : No Field Defects EBS : Enlarged Blind Spot. SSS : Superior Seidel Scotoma, ISS: Inferior Seidel Scotoma, PCS : Para Central Scotoma SNS: Superior Nasal Step , INS : Inferior Nasal Step, SAS: Superior Arcuate Scotoma, IAS : Inferior Arcuate Scotoma, CIM : Central Island with Macular Sparing ,RHH : Right Homonymous Hemianopia, LHH: Left Homonymous Hemianopia, BTH: Bitemporal Hemianopia, RSQ : Right Superior Quadrantinopsia, Quadrantinopsia, RIQ : Right Inferior Quadrantinopsia ,LIQ: Left Inferior Quadrantinopsia , NFL : No Field Left .

Results: :200 Visual Fields of 100 Patients were analyzed.

36 No Field Defects (NFD) 34 Double Arc. Scotomas (DAS);

25 Inf. Arc. Scotomas (IAS); 22 Para Central Scotomas (PCS) ;

13 Sup.Arc. Scotomas (SAS) ; 12 Double Nasal Steps (DNS)

9 Central Island No Macula Sparing (CIN); 8 Sup.Alt. Defect (SAD)

7 No Field Left (NFL) ; 7 Central Island with Macular Sparing (CIM);

7 Inf. Nasal Step (INS) ; 7 Inf. Alt Defect (IAD)

6 Sup.Nasal Step (SNS) ; 3 Peripheral Contraction (PCN) ;

3 Inf, Seidel Scotoma(ISS) 1 Sup.Seidel Scotoma

No.of Characters: No Field Loss(NFL) 11 to Right

Homonymous Hemianopia (RHH) 26 save - 8 ltrs with NFL & 23 with RHH .

Total Characters : 3682 (mean 18) for 200 Eyes. with 3 Letters

(600) Saving 3082 (Mean 15) for 200 Eyes.

Daily 8 HVFs Done 8 X 30 = 240 Ltrs Saved

1200 for 5 Days Work week 60,000 for 50 X 5 Day Work Weeks

Conclusions: Three Letter Short Codes for Visual Field results for Glaucoma Patients facilitate faster documentation in Electronic Health Records

P-GLA-105

Topographic analysis of macular choriocapillaris flow deficits in neovascular glaucoma secondary to PDR

X. Li¹, J. Zhang², DR Study Group

¹School of Clinical Medicine, Shandong Second Medical University, Weifang, China, ²Ophthalmology, School of Clinical Medicine, Shandong Second Medical University, Weifang, China

Introduction: To quantitatively analyze choriocapillaris changes in various zones in eyes with neovascular glaucoma (NVG) secondary to proliferative diabetic retinopathy (PDR).

Objectives: To quantitatively analyze choriocapillaris changes in various zones in eyes with neovascular glaucoma (NVG) secondary to proliferative diabetic retinopathy (PDR) and compared with PDR patients without NVG.

Methods: A cross-sectional study. From January 2022 to June 2023, Thirty-one patients with PDR (33 eyes) and 28 patients with NVG (30 eyes) diagnosed at the Eye Center of Affiliated Hospital of Weifang Medical College were included in this study. OCTA images of patients' 6*6mm volume scans were acquired using The BMizar 400KHz full-range SS-OCTA manufactured by the TowardPi (Beijing) Medical Technology Co. Ltd. to divide the choroidal capillary layer (Bruch Membrane (BM0)-Bruch Membrane (BM29)) into different circular regions with the central fovea of macular as the center of the circle: a circle with a central diameter of 1mm as C1, diameter 1-<2.5mm as R1.5, the circle with a central diameter of 2.5mm as C2.5, diameter 2.5mm-<5mm as R2.5, and the circle with a central diameter of 5mm as C5. choriocapillaris flow deficits (CC FD) were analyzed in each subregion, and the total area of CC FD (total area of CC FD), number of CC FD (CC FDn), average area of CC FD (CC FDa), and percentage of CC FD (CC FD%) after removal of retinal projection artifacts were calculated. The distribution characteristics of CC FD in each partition were analyzed.

Results: The total area of CC FD in the NVG group was larger than that in the PDR group in all regions except C1, and the difference was statistically significant ($P < 0.05$), and the total area of CC FD in the NVG group and the PDR group showed an increasing trend in C1, R1.5, C2.5, R2.5, and C5 ($P < 0.001$). CC FDn in NVG and PDR groups showed an increasing trend in C1, R1.5, C2.5, R2.5, and C5 ($P < 0.001$), while the difference in CC FDn between NVG and PDR groups was not statistically significant in each region ($P > 0.05$). CC FDa in NVG group was greater than that in PDR group in the subregions of R1.5, R2.5, and C5, and the difference was statistical significance ($P < 0.05$), and no statistical significance in other regions ($P > 0.05$). There was no statistical significance in the two-by-two comparison of FDa in each region in the NVG group ($P > 0.05$), the FDa in the C1 region of the PDR group was greater than that in the other regions ($P < 0.05$), the FDa in the C2.5 region was greater than that in the R2.5 ($P < 0.05$), and there was no statistical significance in the two-by-two comparison of the remaining regions ($P > 0.05$). CC FD% in the NVG group was greater than that in the PDR group in all regions except C1, and the difference was statistically significant ($P < 0.05$), CC FD% in the NVG and PDR groups was greatest in the C1 region, followed by C2.5 and R1.5 ($P < 0.001$), and the difference between the two regions was not statistically significant ($P > 0.05$), and C5 and R2.5 were the smallest ($P < 0.005$), and the difference between the two regions was not statistically significant ($P > 0.05$).

Conclusions: The topographic distribution of CC FD in PDR eyes is uneven, with the C1 region more susceptible to hyperglycemia and the periphery least affected, and CC FD in eyes with PDR secondary to NVG is greater than in eyes with PDR without NVG.

P-GLA-106

Intraoperative application of biodegradable sponge sheet to prevent scar formation after trabeculectomy in rabbit eyes

Y. Okamoto^{1,2}, S. Hoshi¹, M. Arai³, Y. Gen⁴, S.-H. Hyon⁴, T. Oshika¹

¹Ophthalmology, University of Tsukuba, Tsukuba, Japan, ²Ophthalmology, Mito Kyodo General Hospital, Mito, Japan, ³Ophthalmology, Arai Eye Clinic, Fukuoka, Japan, ⁴BMG Incorporated, Kyoto, Japan

Introduction: Trabeculectomy with mitomycin C (MMC) is regarded as the gold standard for glaucoma surgery. However, many studies reported MMC-related complications such as prolonged wound leaks, hypotony with choroidal effusions and maculopathy, thin avascular blebs, and/or bleb leaks with late infection. Therefore, safer anti-adhesion agents are expected to replace MMC in the future.

Objectives: The aim of this study was to assess the efficacy of a chemically defined biodegradable (CDB) LYDEX™ sponge sheet in maintaining blebs in rabbits undergoing trabeculectomy.

Methods: In fourteen rabbit eyes, trabeculectomy using MMC was performed with a 3×3-mm scleral flap and fornix-based conjunctival incision. In seven of these eyes, CDB LYDEX™ sponge sheet was placed under the conjunctiva and scleral flap (CDB group), while the remaining seven eyes served as the control group (non-CDB group). Slit-lamp examination, intraocular pressure (IOP) measurement, and anterior segment optical coherence tomography (AS-OCT) were performed at day 7, and 1, 2, and 6 months postoperatively. At 21 months postoperatively, trypan blue was injected into the anterior chamber to check for migration into the bleb, and histological evaluation was performed in one eye.

Results: Both the CDB and non-CDB groups formed smooth blebs without significant inflammation or adhesions. The AS-OCT revealed bleb formation over 6 months after surgery. Although the postoperative IOP in the CDB group tended to be lower than that in the non-CDB group, the difference was not statistically significant. Histological examination did not reveal excess connective tissue or collagen fibers in the CDB group compared with the non-CDB group.

Conclusions: The LYDEX™ CDB sponge sheet appears to be a potential candidate as an adhesion-preventing material in order to maintain filtration bleb in glaucoma surgery.

P-GLA-106

Evaluation of peripapillary perfusion density measured by OCT-A in the early diagnosis of glaucoma

G.S. Suárez Chagüi¹, O.L. Teherán Forero¹, S. Ortega Buelvas¹, E.C. Ramos Clason¹, M. Ochoa¹
¹Bolívar, Universidad del Sinú, Cartagena, Colombia

Introduction: Over the years, the prognosis of primary open-angle glaucoma (POAG) has been linked to the timely diagnosis of the condition, making it of great interest for the ophthalmologist to search for more clinical data that can aid in early diagnosis and prevent irreversible blindness due to glaucoma.

Objectives: To determine the clinical relevance of Peripapillary Perfusion Density (PPD) measured by Optical Coherence Angiotomography (OCTA) and its correlation with ocular perfusion pressure (OPP) in the evaluation of glaucoma suspect (GS) POAG patients.

Methods: Cross-sectional, prospective cohort study. Patients were randomly selected from an ophthalmology clinic in Colombia. Patients were divided into three groups: Group 1: patients without ocular pathology; Group 2: patients meeting GS criteria, and Group 3: patients diagnosed with mild to moderate POAG. Participants underwent evaluation by a glaucoma specialist, including a exhaustive ophthalmic examination, anterior segment and optic nerve evaluation, tonometry, and measurement of blood pressure. Ocular perfusion pressure (OPP) was calculated prior to OCTA and optical coherence tomography of the optic nerve (OCT-ON). Statistical analysis was performed using Epi Info v.7.2.6.0.

Results: The study included 128 eyes from 64 patients, with a mean age of 56.5 years. The number of participants per group was as follows: Group 1: 44 eyes, Group 2: 44 eyes, and Group 3: 40 eyes. The average PPD in Group 1 was 44.9%, in Group 2 it was 44.5%, and in Group 3 it was 41.2%, which was statistically significant between Group 1 and Group 3. The average PPD by quadrants was statistically significant in the upper and lower quadrants (Groups 2 and 3) and correlated positively with the decrease in retinal nerve fiber layer (RNFL) thickness in the same quadrants. The average PPD in the superior and inferior quadrants in Group 1 was 45.1% and 46.4%, in Group 2 it was 43.9% and 45.2%, and in Group 3 it was 39.1% and 40.2%, respectively. No correlation was observed between PPD and clinically measured OPP.

Conclusions: We conclude that PPD measured by OCT-A in the upper and lower sectors could be useful as an early diagnostic marker in GS and POAG patients before structural and functional alterations of the disease become evident. Further studies with larger populations are needed to determine its relevance in GS patients.

P-GLA-107

Influence of the type of anesthesia on the efficacy of trabeculectomy in patients with glaucoma at 1-year follow-up

L.S. Gamboa Jerez¹, O. Teheran Forero¹, N.I. Coronado Posada², E. Ramos Classon¹

¹Bolivar, Sinu University, Cartagena, Colombia, ²Bolivar, Ebenezer Ophthalmology Center, Cartagena, Colombia

Introduction: For decades, anesthesia has played a decisive role in the success and prognosis of trabeculectomy (TB), but it has not been possible to demonstrate which technique is the most convenient for the patient.

Objectives: To determine the influence of the type of anesthesia used in patients diagnosed with primary open angle glaucoma (POAG) on the success of primary trabeculectomy

Methods: Prospective descriptive cross-sectional cohort study. Patients with a diagnosis of GPAA were randomized and evaluated by a single glaucoma specialist, who underwent TB in two institutions on the Colombian Caribbean coast. Patients were divided into 3 groups according to the type of anesthesia used (general anesthesia (GA), sedation (SA) and peribulbar block (PBA). A complete ophthalmologic examination was performed including tonometry before and after performing TB. Follow-up was performed at 24 hours, 1, 3, 6 and 12 months, where tonometry information, average number of medications used and evidence of complications inherent to the surgery were obtained. The percentage of IOP reduction, total success (TS), qualified success (CS), global success (GS) and failure of the procedure (F) were analyzed according to the type of anesthesia used. SPSS V.25 software was used for statistical analysis and a $p < 0.05$ was considered statistically significant.

Results: 160 eyes of 147 patients with a mean age of 61.2 years were included. 63 eyes received AS (Group 1), 48 eyes AG (Group 2), 47 eyes by peribulbar anesthesia ABP (Group 3). Mean baseline IOP was: Group 1 (26.7 mmHg), Group 2 (27.9 mmHg) and Group 3 (27.9 mmHg). IOP at 1 year follow-up Group 1 (13.6 mmHg) with 53.17% reduction rate, group 2 (14.5 mmHg) with 47.49% reduction rate and group 3 (13.3 mmHg) with 50.38% reduction rate. As for ET for group 1 (24.59%), group 2 (79.59%), group 3 (42%); EC group 1 (60.65%), group 2 (30.61%), group 3 (36%), F group 1 (26.22%), group 2 (20.40%), group 3 (22%), EG group 1 (73.77%), group 2 (79.59%), group 3 (78%), none of the groups had chemosis, bleeding, suture dehiscence.

Conclusions: This study demonstrates that general anesthesia is the best alternative in TB surgery, as it helps to have a better EG with fewer hypertension eyedrops, and with a lower rate of long-term complications.

P-GLA-108

Uses of Anti-VEGF in Trabeculectomy

*A. Grezda*¹, *E. Murati*²

¹Ophthalmology, Mother Teresa University Hospital, Tirana, Albania, ²Ophthalmology, Klinika e Syrit ART, Tirana, Albania

Introduction: This study investigates the applications of Anti-Vascular Endothelial Growth Factor (Anti-VEGF) agents in trabeculectomy, a surgical procedure commonly employed in glaucoma management. The introduction outlines the rationale behind incorporating anti-VEGF agents, emphasizing their potential impact on intraocular pressure (IOP) control and postoperative outcomes.

Objectives: The primary objectives of this research are to assess the efficacy of Anti-VEGF agents in trabeculectomy, analyze their influence on wound healing processes, and evaluate any significant differences in surgical outcomes compared to conventional procedures. Additionally, the study aims to identify optimal dosing regimens for maximizing therapeutic benefits.

Methods: A comprehensive methodology involves a systematic literature review, encompassing relevant studies published up to the present date. The selection criteria prioritize randomized controlled trials and observational studies, ensuring a robust analysis of diverse patient populations and surgical techniques. Data extraction focuses on key outcomes, including IOP reduction, complications, and patient-reported experiences.

Results: The findings reveal a spectrum of outcomes related to the use of Anti-VEGF agents in trabeculectomy. Analysis of IOP control demonstrates variations in effectiveness, with some studies indicating enhanced pressure modulation compared to controls. Wound healing dynamics and complication rates are also examined, shedding light on potential benefits and concerns associated with Anti-VEGF integration.

Conclusions: In conclusion, the study underscores the potential advantages of incorporating Anti-VEGF agents in trabeculectomy, emphasizing their impact on IOP control. However, variations in outcomes across studies highlight the need for further investigation and standardization. The findings contribute to the ongoing discourse on refining trabeculectomy protocols and optimizing glaucoma surgical strategies.

V-GLA-001

Bleb transposition

*S. Alshamrani*¹

¹Ophthalmology, PSMC, Riyadh, Saudi Arabia

Introduction:

- Bleb transposition
- This is a new technique to treat thin, leaking bleb.

Objectives: This is a new technique to treat thin, leaking bleb.

Methods:

- We fashion a rectangular conjunctival flap
- We mark the conjunct at the bleb site
- we take a clear healthy conjunctiva nasally and temporal Then we measure from the limbus to the posterior edge of the bleb.
- Then we double the size so if it's 6 mm will double the size so it will be 12 mm from the limbus
- then conjunctival periotomy start near fornex to ward libmbus
- then we rotate the flap making healthy conj at limbus and thin conj at fornex with interrupted 9/0 vicryl suture

Results: Bleb transposition is alternative technique to mange leaking a vascular bleb.

Conclusions: This is a new technique to treat a leaking bleb.

Video

[Click here to play video](#)

V-GLA-002

A novel method of using the OMNI surgical system to control IOP post a failed recent Visco canalostomy surgery

D. Mathews¹, V. Jadhav¹

¹Stanley Eye Unit, Abergele Hospital, Betsi Cadwaladr University Health Board, Abergele, United Kingdom

Introduction: Visco canalostomy unroofs and dilates Schlemm canal without penetrating the trabecular meshwork or anterior chamber. The success of visco canalostomy hinges on unimpeded fluid flow across the trabeculodescemets (TD) membrane. This membrane is at risk of perforation at every step in the surgery. Undetected or unsuspected perforation can lead to iris incarceration at the TDW site with failure to control IOP. The option then is to restart glaucoma medications and/or have another glaucoma surgery.

Objectives: To describe a technique to liberate the surgical site of a recent visco canalostomy and simultaneously manage intraocular pressure (IOP) using the OMNI Surgical system. Initially, careful dissection is performed to separate the adherent iris from the Trabeculodescemet's window (TDW). Subsequently, the OMNI Surgical system is utilized to perform Ab interno Schlemm's canaloplasty, and trabeculotomy facilitating the aqueous outflow through the canal to help lower the IOP.

Methods:

We present the case of an 82-year-old man with uncontrolled intraocular pressure (IOP) despite four medications and visual field deterioration in the right eye. He underwent uncomplicated right eye visco canalostomy on 18/12/2023. A perforation was suspected however no PI was done as there was no Iris presentation at the surgical site. Postoperative day 1 revealed an IOP of 2mmHg with a deep anterior chamber. However, at 4 weeks, he presented with blurred vision and an IOP of 50mmHg. Gonioscopy indicated iris adherence along the entire length of the Trabeculodescemet's window (TDW). Considering uncertainties regarding iris adhesion release and IOP control, a plan was made for adhesion release and Ab interno Schlemm's canaloplasty with trabeculotomy using the Omni Surgical system.

Results: The patient tolerated the procedure well. At four weeks his unmedicated IOP was 14mmHg and unaided vision was restored to preop vision of 0.22 logmar. The surgical site of the original visco canalostomy revealed pigments but was free from any iris adhesion.

Conclusions: In cases of advanced glaucoma where traditional surgical procedures may fail, a creative out-of-the-box approach involves combining two distinct techniques to control intraocular pressure (IOP) and halt disease progression. This innovative strategy might entail merging 2 different procedures in succession or simultaneously.

Video

[Click here to play video](#)

International Eye Care

FT-EYE-001

Low effective Cataract Surgical Coverage (eCSC) and poor surgical outcomes seen from RAAB studies in Uganda and Malawi

K. Kalua¹, M. Kasadhakawo², S. Mdala³

¹School of Public and Population Health, University of British Columbia, Vancouver, Canada,

²Ophthalmology, Mulago Hospital, Kampala, Uganda, ³Ophthalmology, Lions Sightfirst Eye Hospital, Blantyre, Malawi

Introduction: Among the many causes of vision impairment can be prevented or treated, cataract and refractive errors are most common, as detected through Rapid Assessment of Avoidable Blindness (RAAB) studies. Effective cataract surgical coverage (eCSC) is a cataract service indicator that measures the number of people who have received good quality cataract surgery as a proportion of all people having received surgery or still requiring it. The Seventy-fourth World Health Assembly, endorsed the global targets to achieve a 30-percentage point increase in eCSC, by 2030.

Objectives: To estimate the recent prevalence of vision impairment due to cataract in Malawi and Uganda and determine effective cataract surgical coverage.

Methods: RAAB studies were conducted in Southern Malawi and Northern Uganda, using standard methodology, during the second half of 2023. All residents aged 50 and above, meeting inclusion criteria were included.

Results: In Malawi, 3,142 people were examined from the 77 clusters. Overall prevalence of blindness in persons aged 50 and above was 2.4% (CI 1.8-3.0), slightly greater in females than males (2.5 versus 2.2%). The commonest cause of blindness was unoperated cataract (64.6%), twice as common in females than males, followed up by glaucoma (16%). Cataract surgical coverage (CSC) at VA <6/18 was 10.8%. eCSC was only 4.3% at VA<6/18 and increased to 17% at VA<3/60. Postoperatively, poor outcomes (VA<6/60), contributed to 27% of all cases. Commonest reason for not accessing surgery was need not felt (41.4%).

In Uganda, 3,662 people were examined from the 76 clusters. Overall prevalence of blindness in persons aged 50 and above was 2.5% (CI 1.7-3.4), slightly greater in females than males (2.8 versus 2.2%). The commonest cause of blindness was unoperated cataract (51.3%), slightly more in females than males, followed up by glaucoma (13%). Cataract surgical coverage (CSC) at VA <6/18 was 13.0%. eCSC was only 4.0% at VA<6/18 and increased to 16.3% at VA<3/60. Postoperatively, poor outcomes (VA<6/60), contributed to 38.2 % of all cases. Commonest reason for not accessing surgery was unaware that treatment was possible (50.0%).

Conclusions: RAAB results between Malawi and Uganda are comparable, confirming that Cataract contributes to >50% of all cases of blindness. There is very low cataract surgical coverage, low eCSC, and poor surgical outcomes. This calls not only for the need to increase mobilization of clients to access surgeries, but also the urgent need to improve "Ophthalmologists" skills.

FT-EYE-002

Evaluating quality of care and post-operative outcomes for Inuit patients in Nunavik

S. Rahman¹, J. Coblenz², A. Baiad³, B. Arthurs², C. El-Hadad²

¹Faculty of Medicine and Health Sciences, McGill University Health Center, Montreal, Canada,

²Ophthalmology & Visual Sciences, McGill Academic Eye Center, McGill University Health Center, Montreal, Canada, ³Faculty of Medicine and Health Sciences, McGill University, Montreal, Canada

Introduction: Indigenous patients in Nunavik face numerous challenges in accessing healthcare services, including limited access to cataract surgery, which requires extended leaves from their communities. There is a substantial need for more research and quality improvement measures for Indigenous populations in Quebec.

Objectives: We aim to examine current practices in place for Nunavik.

Methods: Records of all Inuit patients undergoing cataract surgery at the McGill University Health Centre, the primary service center for Inuit health, were reviewed from 2018 until 2023. Number of patients and timing of pre- and post-op visits were recorded. Baseline parameters, such as pre- and post-op best corrected visual acuity (BCVA), intraocular pressure (IOP), ocular or systemic comorbidities, and intra-op or post-op complications were collected.

Results: 150 patients (252 eyes) were included. 97% of patients had a post-op day 1 (POD1) visit, while 95% and 8% of patients had post-op week 1 (POW1) and post-op month 1 (POM1) visits, respectively. 27 patients had bilateral cataracts, while 198 patients had unilateral cataract surgery. The mean time for the first post-op visit was 1 ± 0.0 days, the second post-op visit was 7.12 ± 2.43 days, the third post-op was 36 ± 14.44 days. Patient compliance with scheduled appointments was 100% for POD1, 97% for POW1, and 85% for those scheduled for POM1. Patients saw a mean improvement of BCVA from 0.35 ± 0.29 (LogMAR) at PO visit 1 to 0.14 ± 0.19 (LogMAR) at the latest post-op visit ($n=168$ eyes). No post-op complications were observed for any of the patients. No difference in safety or efficacy outcomes was observed between POD1 and POW1 visits. Furthermore, there was no difference in BCVA or complication rates between patients who underwent unilateral vs. bilateral cataract surgery. Patients traveled at least 1572.5 KM from their homes to stay in Montreal for surgery and PO visits.

Conclusions: Our data shows no significant difference in outcomes between POD1, POW1, and POM1 visits, with a nearly 100% compliance rate for Inuit patients. This may suggest that it may be useful to reduce the timing of POW1 visits, (e.g., to 3 days) and promote follow-up through telemedicine or local optometrists located in Nunavik to minimize the time patients spend away from home. Ultimately, shorter postoperative stays in urban centers may significantly improve patient well-being and potentially save costs that can be reinvested in addressing healthcare disparities for patients from Nunavik communities.

FT-EYE-003

Barriers women eye health professionals face: Practical ways to address gender inequity in ophthalmic spaces

C. Szalay Timbo¹, G. Cubias², M. Montero³, F. Kherani⁴, E. Shriver⁵, S. Wester⁶, H. Chase⁷

¹Orbis Canada, Toronto, Canada, ²Orbis International, New York, United States, ³Flying Eye Hospital, Orbis International, Puebla, Mexico, ⁴Ophthalmology, University of British Columbia, Vancouver, Canada, ⁵Ophthalmology, University of Iowa, Iowa, United States, ⁶Ophthalmology, Bascom Palmer Eye Institute, University of Miami, Miami, United States, ⁷Seva Foundation, Berkeley, United States

Introduction: Globally, women make up 70% of the global health workforce but account for only 25% of the leaders. In 2021, Women In Ophthalmology, Seva Foundation and Orbis International created a global virtual space for women eye professionals – “Women Leaders in Eye Health” (WLEH) to strengthen women leadership in eye health. The sessions (beginning with more formal presentations and followed by informal coffee hours) bring together global women leaders to share real life experiences and advice on relevant topics and issues. Over the three years, due to combined efforts, the overall audience for marketing and publicizing each event has reached a total global audience of over 1,150 people.

Objectives: WLEH virtual events and surveys from 2021-2023 have indicated women face significant barriers as leaders in the space, and a survey in 2024 to follow will also collect solutions that can be shared for transformative change.

Methods: Global data to be collected during a survey in early 2024 with WLEH audiences from over 25 countries with female eye health professionals will indicate both the barriers and solutions to gender inequities in the ophthalmic sector and be presented at WOC. Survey data will be compared with findings from previous webinar survey data from 2021-2023, panel discussions with female leaders at AAO 2023, and a detailed literature review.

Results: Former surveys through WLEH found women indicate cultural gender bias (25% avg), education levels (18.5% avg), leadership skills (54.25% avg) and networking (52% avg) impact promotion to leadership roles. The literature review found similar factors affecting women in medicine with limited data specific to ophthalmology. Cultural gender bias experienced at work most affected women’s career advancement and academic involvement. The survey conducted in 2024 will breakdown specific barriers faced globally by female eye health professionals and prioritize the top five solutions to address systematic gender bias for relevant stakeholders and change makers.

Conclusions: Efforts such as WLEH must be done in conjunction with systemic changes that address cultural gender biases, including those this research indicates are most important. Practical solutions provided by female eye health professionals demonstrate tangible opportunities for transformation in the ophthalmic space. There is also demand for more global initiatives supporting women to build leadership skills, network, and access higher educational opportunities specifically in eye health.

FT-EYE-004

Climate change and ocular health: a scoping review

Y.L. Wong¹, S.W. Wong², D.S. Ting³, A. Muralidhar⁴, S. Sen⁵, O. Schaff⁶, B. Erny⁷

¹Cornea, Manchester Royal Eye Hospital, Manchester, United Kingdom, ²Uveitis, Manchester Royal Eye Hospital, Manchester, United Kingdom, ³Cornea, Birmingham and Midland Eye Centre, Birmingham, United Kingdom, ⁴Dr Muralidhar Eye Hospital, Bhubaneswar, India, ⁵Retina, Moorfields Eye Hospital NHS Foundation Trust, London, United Kingdom, ⁶Trust library Services, Manchester University NHS Foundation Trust, Manchester, United Kingdom, ⁷Stanford University School of Medicine, Stanford, United States

Introduction: Climate change represents a significant global health crisis that has given rise to a multitude of health implications, notably impacting ocular health. Our comprehensive review delineates a spectrum of eye conditions associated with variables related to climate change.

Objectives: 1) To identify the scope of studies available in relation to the impact of climate change and climate change hazards on ocular health.

2) To identify gaps in the current literature and contribute to mapping directions for future studies on this association.

Methods: We formulated research questions and devised a search strategy employing subject headings and keywords across bibliographic databases. The search focused on studies published in English from 2008 onwards, specifically targeting human subjects and original articles only. Exclusion criteria covered non-original articles, such as reviews, conference abstracts, editorials, and those unrelated to climate change and ocular health. Data extraction was facilitated using the Covidence systematic review software.

Results: The study included 130 articles. Higher-income countries (HICs) made up 50% of the original research articles, compared to 39% (MIC) and 9% (LIC). The research categorized studies into climate change variables and anatomical variables. Extremes in temperature and weather events impact the ocular surface, leading to increased incidences of various conditions. Additionally, the review demonstrates a correlation between climate change and the prevalence of cataracts, glaucoma, periocular tumors, and infections. Prolonged food insecurity due to droughts is associated with nutritional optic neuropathies. Elevated temperatures are linked to a heightened risk of retinal detachments. The review also emphasizes the influence of climate-warming pollutants on a range of eye conditions, including ocular surface infections, degenerative changes, refractive errors, blepharitis, meibomian gland infections, glaucoma, and vascular retinal occlusions.

Conclusions: This review emphasizes climate change's diverse impacts on ocular health, noting a growing trend in publications. Disparities exist, with affluent countries contributing more. Global collaborations are essential for a comprehensive understanding of unseen effects. Addressing the climate crisis necessitates a collaborative approach involving clinicians, researchers, public health officials, and policymakers to efficiently recognize and mitigate consequences on ocular health and overall well-being.

FT-EYE-005

Empowering communities: how vision centers bridge the gap in eye care

K. Ramasamy¹, A. Venugopal², R. Rajaraman¹

¹Retina and Vitreous, Aravind Eye Hospital, Madurai, India, ²Cornea Services, Aravind Eye Hospital, Tirunelveli, India

Introduction: Across the globe, millions lack access to basic eye care. This often leads to preventable blindness, impacting their education, livelihood, and overall well-being. This is where vision centers step in, acting as lifelines of hope. They bridge the gap in eye care by bringing accessible, affordable, and quality services directly to the heart of communities.

Objectives: To highlight the impact of Vision Centres in delivering comprehensive and complete primary eye care to rural populations, particularly in India, where universal eye care remains a largely unmet need.

Methods: The advent of broadband internet has paved the way for establishing Vision Centres in rural areas. Patients at these centres undergo comprehensive eye examinations conducted by allied ophthalmic personnel or vision technicians. Findings are documented in a cloud-based electronic medical record system, including images, enabling remote ophthalmologists to provide immediate teleconsultation. Furthermore, the centres ensure complete care by providing affordable eyeglasses, ocular drugs, and clear patient referrals when necessary. Vision Centres also monitor and ensure continued care for patients with chronic conditions. Each Vision Centre serves a population of 70,000-100,000, with 82% coverage of those in need.

Results: Aravind Eye Hospitals' 107 South Indian vision centers facilitated 929,098 teleconsultations in 2022-23, proving their reach and impact. This success sparks replications across the Indian subcontinent, including partnerships with state and national governments. Their efficiency in handling minor cases, as observed in Tripura, optimizes resource allocation by reserving tertiary facilities for complex issues.

Conclusions: Vision Centres have emerged as a transformative solution to address the eye care needs of rural populations. Their proximity to communities, comprehensive care, and integrated telemedicine capabilities make them highly effective in delivering patient-centric care. With appropriate resources such as staff training, telemedicine consultations, affiliations with referral hospitals, and consistent monitoring, Vision Centres hold the promise of significantly bridging the gap in universal eye care coverage, especially in challenging terrains and today appears to be the best for the last mile connectivity in health care.

FT-EYE-006

The future of eye care in Canada: Demographic shifts and service disparities

A. Tasnia^{1,2}, *N. Gupta*^{1,2,3,4,5}

¹Department of Ophthalmology and Visual Sciences, Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²Keenan Research Centre for Biomedical Science, St. Michael's Hospital, Unity Health Toronto, Toronto, Canada, ³Department of Ophthalmology and Vision Sciences, Faculty of Medicine, University of Toronto, Toronto, Canada, ⁴Dalla Lana School of Public Health, University of Toronto, Toronto, Canada, ⁵School of Population and Public Health, Faculty of Medicine, University of British Columbia, Vancouver, Canada

Introduction:

Equitable access to ophthalmological care is a cornerstone of effective healthcare delivery. By understanding ophthalmologist distributions and its effect on services, this study seeks to guide enhancements in eye care delivery amidst changing healthcare demands in Canada.

Objectives:

To identify potential disparities in access to ophthalmological care and service delivery in regions of Canada.

Methods:

The College of Physicians and Surgeons of BC directory was used to identify and map active ophthalmologists by their health authority of practice (July 3, 2023). Population data (Statistics Canada, June 2023) was used to calculate ophthalmologist-to-population ratios. BC Surgery Wait Times (July 7, 2023) was used to calculate the number of weeks to complete 90% of cases, for cataract and vitreo-retinal surgeries in each health authority. Demographic data on workdays and the number of patients/physician were collected from the 2022 Medical Services Plan Report, and used to compare ophthalmologists to the average of all other medical specialties, including GPs, (2021 Canadian Health Institute's Physician's Workforce Report). The Government of BC population estimates were utilized to project ophthalmologist-to-population ratios until 2045 (July 9, 2023).

Results:

Ophthalmologist to population ratios, according to health authorities, were as follows: Vancouver Coastal (1:12,744), Vancouver Island (1:17,506), Fraser (1:25,650), Northern (1:31,219) and Interior Health (1:35,205). Wait times, in weeks, for cataract surgeries were highest in Northern (36.0), Vancouver Coastal (23.0), Vancouver Island (21.7), Interior (19.0), and Fraser (18.0) health authorities, exceeding the 16 week recommended target. Wait times for vitreo-retinal surgeries were highest in Vancouver Island (42.4), Fraser (28.9), Interior (22.8), and Vancouver Coastal (15.7) health authorities, exceeding the 12 week recommended target. Ophthalmologists worked an average of 212 days/year, seeing 2808 patients each. In contrast, other specialties worked an average of 173 days/year, seeing 1714 patients each. Population projections indicate a 34% increase in BC by 2045.

Conclusions:

This study highlights disparities in ophthalmological care with an imbalance in ophthalmologist-to-population ratios and surgery wait times. Current service delivery falls short of meeting needs, especially in light of a growing population. The findings underscore the necessity for strategic healthcare planning to enhance access to ophthalmological services in Canada.

FT-EYE-007

Development and evaluation of a rural diabetic training workshop for health care workers in Kilimanjaro region Tanzania

A.B. Hall¹, C. Hall², G. Kok², J. Mallya³

¹Hunter Eye Surgeons, Waratah, Australia, ²Psychology, Maastricht University, Maastricht, Netherlands, ³Kilimanjaro Centre for Community Ophthalmology, Moshi, Tanzania, United Republic of

Introduction: Intervention Mapping was the protocol used by the Kilimanjaro Diabetic Program to plan, develop, and implement a theory and evidence-based diabetic retinopathy screening program. The Working Committee developed annual health care worker training workshops based on needs assessments of health care workers and people with diabetes.

Objectives: The objectives were to build capacity and train facilitators to educate health care workers in comprehensive diabetes care and management for the target population.

Methods: Findings of a qualitative health care worker needs assessment were triangulated with qualitative and quantitative findings from a diabetes needs assessment; this data informed the development, delivery and evaluation of training workshops for health care workers.

Results: The non-specialist diabetes health care workers were aware of significant barriers facing adherence to recommended diabetes regimens and provision of care. Training workshops were delivered annually for three years. In year two of the program, 59 health care workers demonstrated pre- and post- test improvement of knowledge with a two-tailed t test 17.27 df=58, std error of difference =1.35, ($p < 0.0001$). The mean difference was $t = 23.39$ (95% CI 20.68-26.10). Overall facilitator evaluation ratings were a mean of 87.5, SD 2.18 and overall satisfaction ratings were a mean of 90.0, SD 2.35.

Conclusions: Provision of educational training material and resources aided diabetes care and management. A positive change in clinical practice was reported by 33/43 health care workers because of the training; and the Kilimanjaro Diabetic Program supported implementation of weekly rural diabetic clinics in Kilimanjaro region.

FT-EYE-008

Development of ophthalmology residency training in Mongolia

H. Parsons¹, A. Giligson¹, C. Tuano², J. French³

¹Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada, ²Laurel Surgical Foundation, Vancouver, Canada, ³Cornerbrook, Newfoundland, Canada

Introduction: Low population density is a key obstacle to healthcare delivery in Mongolia. Mongolia, the most sparsely populated country in the world, struggles to meet the eye care needs of the 1.4 million people living outside of the capital Ulaan Baatar (UB).

Mongolia trains 36 ophthalmologists per year, yet this has not addressed the issue of limited access to cataract surgery. A major hurdle is insufficient surgical training.

Objectives: Develop a sustainable program which graduates residents with the skills to provide comprehensive care for all Mongolians. The timeline, graduating 6-8 per annum, to provide care to 19 provinces is 5-7 years.

Methods: Evaluation of the current ophthalmology programs led to the development of the following plan:

The program is based at Mongolia's major ophthalmology teaching program.

The implementation of a locally deliverable curriculum based on ICO training guidelines that meet the resources and specific needs of Mongolia.

Establishment of a wet lab will allow for training in both computerized and biologic tissue surgical simulation.

The educational and clinical environment will be optimized to enable more resident participation in surgical experiences when working with local faculty.

Results: Achievements to date

Established a functioning wet lab

Secured dedicated teaching/seminar space

The curriculum has been rewritten to include deliverable goals and objectives within the ICO framework

Established a designated residency program director

Faculty are more directly responsible for didactic and seminar teaching

Resident input/feedback into program development

English language instruction has been made available to the residents. Improving English skills greatly enhances learning opportunities

Donation of diagnostic equipment

Cataract Sx experience has been made more "resident friendly" with the support of a retinal surgeon, "Hands on" surgical exposure remains a significant challenge

The first cohort will graduate in 2025. Statistics re the number of graduates returning to the provinces, surgical procedures and patients seen will be collected by the Ministry of Health.

Conclusions: The cornerstone to providing access to care for all Mongolians is the development of a sustainable residency. Providing comprehensive ophthalmologists for each province will greatly reduce the barriers to care.

FT-EYE-009

Addressing eye care inequities and health disparities among Indigenous communities in Canada

D. Toameh^{1,2}, *N. Gupta*^{1,2,3,4,5}

¹Department of Ophthalmology and Visual Sciences, Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²Keenan Research Centre for Biomedical Science, St. Michael's Hospital, Unity Health Toronto, Toronto, Canada, ³School of Population and Public Health, Faculty of Medicine, University of British Columbia, Vancouver, Canada, ⁴Department of Ophthalmology and Vision Sciences, Faculty of Medicine, University of Toronto, Toronto, Canada, ⁵Dalla Lana School of Public Health, University of Toronto, Toronto, Canada

Introduction: Indigenous communities in geographically diverse regions may encounter distinctive eye health challenges stemming from restricted access to specialized providers and the influence of comorbidities. This study aims to illuminate these disparities and enhance our comprehension of eye care provision for Indigenous populations in Canada.

Objectives: To investigate access to eye care services and comorbidities of Indigenous communities in British Columbia (BC), Canada, compared to non-Indigenous populations.

Methods: BC Stats was used to collect information on all 203 Indigenous communities in BC (accessed July 1, 2023). Using boundary and population data, communities were mapped to cities, and categorized by health authority (Fraser, Interior, Northern, Vancouver Coastal, and Vancouver Island). The total city population for Indigenous/non-Indigenous residents was aggregated per health authority (Canadian Census 2021, Statistics Canada). The College of Physicians and Surgeons of BC and the College of Optometrists BC were accessed (July 17, 2023) to determine the numbers of active ophthalmologists and optometrists and were mapped by health authority. Provider-to-population ratios per 100,000 were calculated. Latest comorbidity data on obesity, diabetes, hypertension, and smoking habits were obtained for Indigenous/non-Indigenous populations (Canadian Community Health Survey 2015-2016, Statistics Canada) and analyzed using ANOVA tests.

Results: Indigenous people represent 5.9% of BC's population, located in the Interior (24.8%), Fraser (22.3%), Vancouver Island (22.2%), Northern (19.4%), and Vancouver Coastal (11.4%) Health Authorities. Ophthalmologists per 100,000 were Vancouver Coastal (7.68), Vancouver Island (5.95), Fraser (3.75), Northern (3.2) and Interior (2.84) Health. Optometrists per 100,000 were Vancouver Island (20.1), Interior (17.91), Vancouver Coastal (17.59), Northern (17.45), Fraser (14.32) Health. Significant comorbidity disparities between Indigenous/non-Indigenous groups included obesity (37.1% vs. 15.3%; $p < .05$), smoking (28.5% vs. 10.9%; $p < .05$), diabetes (8.6% vs. 5.8%; $p < .05$), and hypertension (20.2% vs. 19%; $p < .05$).

Conclusions: Indigenous communities face significant eye care disparities and higher comorbidity rates that are known to increase the risk of eye disease. Greater evidence-based attention is needed to develop and implement targeted, culturally sensitive solutions to prevent vision loss in this population.

P-EYE-001

To improve international eye care quality by establishing a global network of post-op follow-up after refractive surgery

C. Shen¹, Y.L. Neoh²

¹International Communication and Cooperation Department, Aier Eye Hospital Group, Shanghai, China, ²ISEC Penang, International Specialist Eye Centre, Penang, Malaysia

Introduction: Aier Eye Hospital Group is the largest eye care chain provider in the world with 875 professional institutions in Asia, Europe and US, seeking to deliver world class medical services to patients from China and abroad by leveraging its global network.

Objectives: To increase patients' compliance on regular post-op follow-up after refractive surgery, especially for young individuals who study abroad or relocate after surgery, Aier has established a global post-op examination network in 2018 to achieve this.

Methods: China ranks first in the world for abroad study and it's third largest destination country for international students. From the high number of international immigrants, we found that relocation and logistic are the pivotal reasons for defaulted follow-up. Therefore as soon as Aier Group entered European market, we worked on establishing a secure platform to expand our post-op examination network by incorporating our European branches into the system. We provide 6 times free post-operative examinations within a year for patients who had refractive surgery in any Aier Eye hospitals based on our hospital chain and effective systems like AHIS, AEMR, APACS etc.

Inconsistency of post-op examination items, cost expenses, different appointment system and examination flow between China and Europe were the main challenges encountered. We conducted meticulous comparison of these differences to identify areas for improvements and through careful analysis and consideration of the actual needs for patients, we successfully formulated a new process tailored to the unique requirements of this special group. Our findings underscore the importance of adapting healthcare practice to local contexts and patient preferences, persistently enhancing the quality and effectiveness of post-op care delivery.

Results: As of 2024, we provided 164 patients to have their post-op checks done abroad and received 100 foreign patients for post-op follow-up, covering 9 countries and regions.

In 2019, we successfully launched the mini-app of "Aier Global Refractive Surgery Post-Op Network" on WeChat - which is China's largest social media platform, to facilitate local patients to check for the nearest locations for follow-up.

Conclusions: Aier's global network of post-op care has proven invaluable in enhancing international eye care quality by minimizing default rate following refractive surgery. It enables patients to experience the concept of a "global village", where medical services transcend national boundaries.

P-EYE-002

Cataractous IOL's !

S. Desai¹, D. Desai¹, R. Sharma², J. Keenan¹, R. Desai¹

¹Community Ophthalmology, Tarabai Desai Eye Hospital, Jodhpur, India, ²Pathology, Govind Diagnostic Clinic, Jodhpur, India

Introduction: Outreach eye camps for mass screening and treatment of eye diseases are a boon for reducing avoidable blindness in India. However, there may be times where one cannot pick up pathologies on-site due to lack of a portable slit lamp and the examiner relies on a flashlight. Often times the camp is conducted in rooms or make-shift tents where the ambient light is very strong and hinders examination of the eye. In such situations diagnostic errors can be made. We report here three cases of opacified IOL's that were diagnosed as cataract in eye camps and admitted for cataract surgery.

Objectives: To highlight the diagnostic challenges in rural eye outreach missions.

To recognize that opacification of IOL's is not uncommon and can masquerade as cataract.

To present the absorption spectrum, electron microscopic study and chemical analysis of opacified lenses.

Methods: Two patients presented in eye camps with complaints of decreased vision. A third patient complained of "cataract that has grown again after cataract surgery". They were admitted for cataract surgery by the optometrist after flashlight examination. The first two were discovered to be opacified IOL by the operating surgeon on the table and the last one was identified pre-operatively when a slit lamp examination was performed. All three cases underwent a successful IOL exchange. The explanted hydrophilic lenses were subjected to UV-Vis spectroscopy, scanning electron microscopy [SEM], Energy Dispersive X-ray Spectroscopy [EDS] and Alizarin Red staining to determine the nature of the opacification.

Results: In a redressal meeting after the IOL exchange surgeries, the outreach team was asked to improve the diagnostic accuracy by using a portable slit lamp and taking careful patient history when in doubt. The Data from UV-Vis Spectroscopy of the explanted IOL's showed that the maximum transmission was near 400nm but the visible wavelengths are not fully absorbed implying that some useful vision may be retained in spite of opacification. SEM photos showed white surface deposits of 10 to 14 micron particles covering both surfaces of the IOL's. The EDS study revealed a calcium peak in the samples, suggesting that the opacification has been created by calcium deposits on the IOL surface.

Conclusions: The case report underscores the importance of accurate diagnosis in outreach eye camps which can be achieved by deploying a portable slit lamp. Opacified IOL's have calcium deposits on both surfaces which greatly reduced their transmission spectra.

P-EYE-003

The experience of Nigerian ophthalmology trainees preparing for independent practice

E.U. Ani¹, H. Church²

¹Ophthalmology, The Ophthalmic Specialists, Port Harcourt, Nigeria, ²Medical Education, University of Nottingham, Nottingham, United Kingdom

Introduction: The field of ophthalmology is constantly evolving with the advancement of medical technology and surgical techniques. Proper and structured training is crucial for doctors to transition to independent clinical practice effectively. Medical postgraduate training programs have changed, but resource limitations may hinder the development of adequate curricula.

In Nigeria, where there is a shortage of ophthalmologists and limited training resources. It is important to understand the training experience of ophthalmologists, particularly in maintaining quality assurance within the medical profession, reducing burnout, and improving healthcare outcomes.

By gaining insights into their training backgrounds, strategies can be devised to bridge existing gaps and promote a more equitable distribution of skilled eye care professionals. Additionally, understanding the experiences of ophthalmologists enhances career satisfaction and drives enhancements in teaching and learning practices. Ultimately, these efforts lead to better eye care services and improved patient outcomes.

Objectives: To explore the experiences of Nigerian ophthalmology trainees as they prepare for independent practice.

Methods: Graduates of the Nigerian ophthalmology training program were interviewed using semi-structured interviews using video-conferencing software. Participants were encouraged to speak about their experiences, training, and reflections as well as their level of preparedness for independent practice. Data collected was transcribed and anonymised before undergoing thematic analysis.

Results: 81.8% expressed a lack of confidence in their ability to practice independently at the end of their initial training. However, they acknowledged an improvement in their confidence levels after undergoing additional training. All participants agreed that the training program should be revised to include more practical components and emphasised the importance of mentorship as a valuable tool in the program. Some participants highlighted the need to balance quality training with service provision, while others stressed the importance of integrating research and management training.

Conclusions: Nigerian ophthalmologists have expressed a desire for a more practical approach to the current training program. This can be achieved by incorporating simulation laboratories and mentorship programs into their training. More research is required to determine the appropriateness of the ophthalmology curriculum to develop the required competencies.

P-EYE-004

Glocal health

*M. Lichter*¹

¹Ophthalmology, University of Toronto, Toronto, Canada

Introduction: Think globally – act locally”. This is the message of “glocal” health. In the mosaic of global health, the importance of vision cannot be overstated. Our ability to see profoundly influences our ability to function and be productive in society. Yet, thousands of people in the developed world have poor access to healthcare and suffer disproportionately from visual impairment.

Our group at University of Toronto and Saint Michael’s Hospital in Toronto, Canada, has launched a program to deliver eye care to homeless individuals, refugees, victims of torture, and our Indigenous urban population.

Objectives: Our objective is to look at disparity in eyecare delivery to marginalized populations. Our study has looked at eyecare delivery to homeless adults, youth, families living in shelters, refugees (Syrian and Afghan) as well as Indigenous homeless adults and children. This study will demonstrate the need for more initiatives to address these inequities and provide care to some of society’s most vulnerable.

This study will also illustrate some of the methods used to address these inequities.

Methods: Using portable testing equipment including vision charts, autorefractor, portable slit lamp, portable fundus camera, portable perimetry, and I-Care tonometry, the group has visited over 30 homeless shelters: examined patients in tents during COVID; examined homeless in church basements, and Drop-In centres. During the course of these visits, (REB approval was granted for each study), informed consent was obtained, a detailed history pertinent to the study was taken, and physical exam using the portable equipment was done. Fundus photographs were uploaded and analyzed through Teleophthalmology Ontario. Perimetry (when available) was performed with the Toronto Portable Perimeter.

Over 1000 homeless adults were tested and over 650 Syrian newcomers and over 350 Afghan refugees. Data was analyzed and compared to the general population of Canada.

Results: Among the adults examined, 25% had visual impairment (compared to 6% of the general population). While mostly refractive, there was a large percentage of people with cataracts, glaucoma, trauma. Among the youth, the incidence was 19%; among refugees the incidence of visual impairment was 22%. This represents only a small portion of vulnerable individuals.

Conclusions: Marginalized populations represent a very underserved group. More commitment to their care should be a priority.

P-EYE-005

Using the Chinese characters to differentiate hordeolum/stye and chalazion

Y. Diao¹, S. Zhang², T. Liu²

¹School of Ophthalmology, Shandong First Medical University, Jinan, China, ²Eye Hospital of Shandong First Medical University, Jinan, China

Introduction: In daily life, hordeolum (or stye) and chalazion are often indistinguishable for both doctors and other people. Wrong differentiation may lead to wrong treatment and care, causing serious complications and even life threatening. It is very necessary to find simple and scientific ways to distinguish between them.

Objectives: “麦”^{mài} and “霰”^{xiàn} in 麦粒肿^{mài lì zhǒng} (hordeolum or stye) and 霰粒肿^{xiàn lì zhǒng} (chalazion) were analyzed to interpret clinical characteristics so as to differentiate the diseases simply and scientifically for taking the right treatment and care measures.

Methods: The origin, evolution, and meaning of ideographic “麦”^{mài} and “霰”^{xiàn} were explored and connected with the etiology and clinical characteristics of 麦粒肿^{mài lì zhǒng} and 霰粒肿^{xiàn lì zhǒng} to reveal the essential differences.

Results: In China, the Hanzi “麦”^{mài} evolves from “来”^{lái}. “麦”^{mài} (wheat) is not a native crop in China, but comes from the western region, so it means "foreign", corresponding to 麦粒肿^{mài lì zhǒng} that is caused by bacterial invasion; 麦粒肿^{mài lì zhǒng} as an acute inflammation showing redness, swelling, warmth, and pain, is corresponding to human body "shanghuo (heatiness)" when the Small Full arrives with temperature rising and wheat grains maturing. 麦粒肿^{mài lì zhǒng} in shape looks like wheat grains. 霰^{xiàn} (graupel) is a small ice particle by vapor deposition (vapor changed into solid at low temperature) when or before snowing, corresponding to obstruction of meibomian and moll gland of chalazion with noninfection. 霰^{xiàn} is relatively round unlike wheat grains having a sharp top. After distinguishing “麦”^{mài} and “霰”^{xiàn}, it is especially helpful to take correct care and treatment measures in the early stage of 麦粒肿^{mài lì zhǒng}, such as local cold compress and application of antibiotics to limit the infection; no extrusion to prevent periocular and intracranial spread (eyelid vein reflux into the cavernous sinus).

Conclusions: The culture of Chinese characters is extensive and profound, which gives the precise connotation of the disease characteristics and very useful to differentiate diseases for all the people.

P-EYE-006

Characteristics of surgical retina cases of a general eye unit at the national center in a low-middle income country

S.C. De Silva¹, K. Dayawansa¹

¹National Eye Hospital, Colombo, Sri Lanka

Introduction: The National Eye Hospital (NEH), Sri Lanka is the premier referral center for ophthalmology in a country with a population of 22 million. The majority of patients treated have a low socioeconomic status. General ophthalmology units at this hospital provide comprehensive ophthalmic coverage free-of-charge with specialized units including for vitreoretinal surgery providing the bulk of subspecialist care. However, due to limited resources and high volume of patients, general ophthalmology units provide an important adjunct to specialized units to manage patients efficiently and effectively.

Objectives: To describe the clinical characteristics of surgical retina patients whom were treated at a non-specialized ophthalmology unit at NEH.

Methods: A descriptive cross-sectional study was carried out using records of patients who presented to the RD unit at NEH and underwent ocular surgery from 1st January to 31st December 2023.

Results: A total of 194 patients who underwent surgery for surgical retinal diseases were included in the study. This represented 6.7% of the total surgical ophthalmology cases. All surgeries were performed by a single general ophthalmologist with vitreoretinal training. The commonest surgery performed (23%) was trans-pars plana three port vitrectomy and fragmentation of the crystalline lens for traumatic or iatrogenic dropped lens into the vitreous cavity. Rhegmatogenous retinal detachments represented 18.1% of the case volume with a re-detachment rate of 14%. Surgery for diabetic retinopathy represented 18.8% of cases for which the commonest indications were persistent vitreous haemorrhage and tractional retinal detachment involving the macula. Vitreomacular interface disorders comprised 16.2% of cases which included macular holes and epiretinal membranes of which 12% were recurrent macular holes. All macular holes operated on (number=11) had a base diameter in excess of 400µm. Twenty three percent were miscellaneous cases including one case of post-cataract surgery endophthalmitis.

Conclusions: Non-specialized comprehensive ophthalmology units play an important role in treating surgical retina patients and preventing blindness especially in resource poor low-middle income countries. This allows for a reduction in surgical waiting times and provides for a better prognosis in vitreomacular interface disorders. Identification of the case workload and clinical characteristics is useful to guide efficient resource allocation and appropriate patient referral.

P-EYE-007

Refractive changes and associated asthenopia observed after COVID 19 infection: case reports from two continents

T. Panicker^{1,2}, P. Satgunam³, M. Thakur³

¹Oasis Mall, Eye Light Optometrists, Tlokweng, Gaborone, Botswana, ²Private Practice, EyeLight Optometrists, Gaborone, Botswana, ³Hyderabad Eye Research Foundation, Brien Holden Institute of Optometry & Vision Sciences, Hyderabad, India

Introduction: COVID-19 infection has been linked to various ocular complications and complaints, but not to refractive errors. In this case report, we present ethnically diverse patients who reported asthenopic symptoms shortly after recovering from COVID-19 infection. The hyperopic shift in the refractive error, post-COVID could indicate the ciliary body muscle's inability to sustain accommodation, resulting in asthenopia. Hence, refractive errors should also be considered as a post-COVID complication, even if the magnitude is small, especially when patients have a headache and other asthenopic symptoms. Performing dynamic retinoscopy and cycloplegic refraction will also aid in the better management of these patients.

Objectives: Patients with asthenopia and headache during/after the COVID-19 infection, who were examined in two different clinical settings (an institutional-based clinic [India] and a private practice clinic [Botswana]), who demonstrated a change in refractive error post-COVID. Informed consent was received from the patients to report clinical details for this case report.

Methods: The comprehensive examination included dynamic retinoscopy and binocular vision assessment, including accommodation and convergence in the three reported cases. The lag of accommodation was evaluated by the monocular estimation method. Near point of convergence, near point of accommodation, and accommodation facility were also evaluated. Level of symptomatic relief of asthenopia compared before after refractive correction in all three cases with a past history of COVID-19 infection.

Results: Discussion :The emergence of asthenopic symptoms and changes in refractive error (facultative hyperopia) in individuals with a history of COVID-19 infection is highlighted in these case reports. These symptoms occurred only after/during COVID-19 infection and were not present before. Although these patients visited different clinical settings, the treatment outcomes of these individuals were comparable. These cases suggest that post-COVID fatigue can affect the eyes regardless of race and that even a low magnitude of refractive error, particularly hyperopia, might exacerbate the symptoms.

Conclusions: In conclusion, COVID-19 infection can cause asthenopic symptoms involving the visual system. Even though the amount of refractive error is minimal, with normal VA, the refractive correction should be considered to alleviate the asthenopia symptoms following COVID-19 infection.

P-EYE-008

Work life integration of eye health care employees in Nepal

*K. Prithu*¹

¹Administration, Biratnagar Eye Hospital, Biratnagar, Nepal

Introduction: The stakeholders of the eye health care systems are endeavoring to render effective, efficient, and equitable care in an environment that is enduring transitions in business, clinical, and operating models. In this scenario, the performance of the Eye health care organizations is largely dependent on the knowledge, skills and motivation of the employees. However, health care organizations worldwide, including Nepal are facing an acute shortage of skilled Eye health care employees, which is further intensified by high employee turnover rates.

Objectives: General Objective:

To understand the relationship between employees' job stress and their quality of Work Life(QWL), and their impact on turnover intention.

Specific Objectives:

1. To describe the quality of Work Life in Nepalese eye health care institutions
2. To assess the association between quality of Work Life with job stress among eye health care employees of Nepal
3. To determine the factors responsible for retention of eye health care employees of Nepal
4. To confirm employee commitment as an effect of perceived degree of quality of Work Life of eye health care employees of Nepal

Methods: A population-based cross-sectional study was conducted in 7 eye hospitals and 24 eye care centers of Nepal. Employees in different ranks working in those organizations constitute the population where the 460 respondent data has been collected. This research was tested a comprehensive model that links the study variables of job dimensions, Job Stress, HR interventions, quality of work life, employee commitment and turnover intention.

Results: The results highlight that the redesigning of job dimensions and formulation of HR interventions can lead to robust quality of work life, increased commitment levels, and lower turnover intention of eye health care employees. This study contributed to the pool of research knowledge from a diverse culture and eye health care system. When the improved job dimensions and attuned HR interventions are coupled with augmented quality of work life, it may create a progressive effect on employee attitudes (commitment and turnover intention) and organizational outcomes (employee retention).

Conclusions: The study may also provide substantial evidence to the eye health care managers for improving structures and planning appropriate remedial measures to build employee-friendly workplaces as well as ensure meaningful and value driven working lives for the employees.

P-EYE-009

The consequences of traditional medicines in ophthalmology

S. Ndekezi¹, K. Samuel²

¹Ophthalmology, Hope Africa University/Clinic Van Norman Bujumbura, Bujumbura, Burundi,

²Ophthalmology, Wenzhou Medical University, Wenzhou, China

Introduction: The present Item reviewed the ocular complications resulting from the use of traditional medication in Central and East Africa.

the following keywords : "herbal medicine," "traditional medicine ", "ocular injuries," and "visual impairments," covering all years available for peer-reviewed full-text articles, letters, and review chapters of books.

An additional, All published materials were in English. Several ocular symptoms and disorders, including conjunctival cicatrization, symblepharon formation, obliteration of the fornices and the canaliculi, keratinization of the cornea, dryness, central corneal thinning, and corneal epithelial defect, have been associated with the use of traditional medicine in Central and East Africa.

In addition, the use of traditional medicines in the eyes may result in corneal opacity, edema, cornea ulcer, and perforation. Early recognition of ocular injuries could avoid or at least delay long-term sequelae. Ophthalmologists should be aware of the side effects of traditional remedies.

Objectives: 1. To Reduce the prevalence of the preventable blindness caused by the use of traditional medicines in the eyes in the developing countries which is more 19.75 higher than developed countries.

2. To prevent the visual impairment can be caused by the above use of traditional medicines.

Methods: We must prevent the use of Traditional eye treatment by using the 80.9% of Community Education outreaches etc...

Results: Ophthalmologist Officer and Ophthalmologist specialists well trained may serve the community in the prevention of visual impairment which can be cause by the traditional eye treatment.

Conclusions: Traditional medicine harm than benefit to the patient. This review describes most common traditional eye medications with potential to cause ocular morbidity in our community. Healthcare workers, including ophthalmologists, should be well aware of the harmful effects of traditional eye medicines. Therefore, Awareness programs and education of the public on sigh of dangers of the use of traditional medication are strongly recommended. More studies are required on different traditional eye medications as these are used in some areas of central and East Africa. Intensive health education is needed to encourage the use of eye care services to reduce the use of traditional eye treatment that could result in high eyes problems which can result to the visual impairment and End to TOTAL BLINDNESS.

P-EYE-010

Improvement of eye drops instillation technique through evaluation and education: a quality improvement project

M. Saif¹, F. Shabbeer¹, H. Ilyas¹, S. Saif¹, U. Imtiaz²

¹Central Park Teaching Hospital, Lahore, Pakistan, ²Ophthalmology Department, Central Park Teaching Hospital, Lahore, Pakistan

Introduction:

Ophthalmologists are advising eye drops without demonstrating the method for correct eye drop instillation because of shortage of time and this leads to certain factors in which improper techniques is used i.e. instilling more drops than the capacity of the conjunctival sac, also tapping the eye or tissues around it with the tip of eye drop bottle. The patient has to follow proper technique to administer eye drops in order to get the best results. Recently a study was done on patients of an eye disease and more than 50% of them were unable to introduce a single drop properly onto the surface of the eye on their first try.⁷

Compliance with the treatment is a determinant of treatment success, failure to comply is a major problem that affects the whole health care unit. Non-compliance further worsens the disease and also adds more cost to treatment procedures. The obstacle to non-compliance can be overcome by interaction with the patients. The effectiveness of topical ocular pharmacotherapy entirely depends on the patient's compliance with the given regimen.

Objectives: The purpose of this study is to evaluate the instillation of eye drops in the general population and see the differences after instructing and educating them about proper eye drop instillation and their importance.

Methods: A cross-sectional study of 341 patients who had been self-administering eye drops, due to any disorder were evaluated at Central Park Teaching Hospital Lahore. The patients were instructed to instill the drop by using a 5ml Systane bottle, as they would do at home. Two observers standing at a reasonable distance from the patient were assessing the technique. Patients were then educated about all the required steps by demonstrating the whole technique and they were then re-evaluated.

Results: Only 310 (89.3%) patients were able to successfully apply eye drops without the bottle tip touching their eye or eyelid, while 331 (95.4%) patients correctly applied the drops after receiving the information. The majority of patients did not wash their hands prior to installing drops, but results improved after guidance (p -value=0.021). After the instillation of eye drops, only 23 patients (6.6%) touched the bottle's tip as compared to 174 patients before the education (p =0.137). The eye drops missed the eye in 20 (5.8%) of the patients and fell on the cheeks or the eyelid as compared to 79(22.8%).

Conclusions: The study highlights the need for better patient education on correct drop instillation technique.

P-EYE-011

Survey of the surgical practice of eye surgeons and trainees in Tanzania

L. Park^{1,2}, S. Xing³, N. Ravi³, A. Ndyamkama⁴, A. Serrano⁵, S. Mtenga⁶

¹Ophthalmology, Columbia University Vagelos School of Physicians & Surgeons, New York, United States, ²Vision Care USA, New York, United States, ³Columbia University Vagelos School of Physicians & Surgeons, New York, United States, ⁴Muhimbili University of Health and Allied Science, Dar es Salaam, Tanzania, United Republic of, ⁵Columbia University Harkness Eye Institute, New York, United States, ⁶Vision Care Tanzania, Dar es Salaam, Tanzania, United Republic of

Introduction: Cataract is the leading contributor of blindness and visual impairment in Sub-Saharan Africa.

As of 2016, there were 55 ophthalmologists and 81 assistant medical officers in ophthalmology (AMO-O) in Tanzania.

Phacoemulsification cataract extraction (phaco) and manual small incision cataract surgery (MSICS) are both safe and effective procedures.

Vision Care is an international NGO conducting a Phaco Training Course (PTC) dedicated to teaching the surgical technique of phacoemulsification in Tanzania.

Objectives: To understanding the following in Tanzania:

- what is the level of training of providers performing cataract surgery.
- what is the level of surgical experience during ophthalmology residency training.
- what is the level of interest in learning phacoemulsification.
- what are the barriers to adopting phacoemulsification.

Methods: • Self-administered questionnaires were distributed to all attendees at the 2023 Tanzanian Ophthalmology Society 4th Eye Health Workers Congress.

- Data on demographics, surgical practice, use of materials such as viscoelastic and intraocular lenses, patient population and interest in and barriers to learning phacoemulsification were collected.
- Optometrists, optometric nurses, and other allied health personnel were excluded from the study.
- Descriptive statistics were computed using Microsoft Excel.

Results: • 19 eye surgeons and 26 ophthalmology residents responded.

- Of the 19 surgeons, 4 have been trained in phacoemulsification.
- Of the 4 phaco trained surgeons, 2 were confident in their skills, and 2 were slightly or not at all confident.
- Of the 2 confident surgeons, 1 performs only 1-2 phaco surgeries per year, the other reports 400-500 surgeries annually.
- Phacoemulsification is not taught during residency training.
- 65% of surveyed residents are between the age of 30-39.
- Both Tanzanian eye surgeons and residents express strong interest in acquiring phacoemulsification skills but report a wide range of barriers including access to machines and supplies, cost of training, lack of mentors, patient ability to pay for surgery.

Conclusions: • Few eye surgeons in Tanzania have access to phacoemulsification training.

- Those who are trained encounter multiple barriers to using or improving their surgical skills.
- Addressing these challenges will be crucial to improving visual outcomes for cataract patients in Tanzania.

P-EYE-012

Revisiting global health education: the engagement of medical students

C. Lei¹, M. Qu¹, H. Zhou¹

¹Department of Ophthalmology, Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: In the face of global public health crises, health literacy plays a crucial role in implementing effective public health policies. However, the current state of health education is insufficient, particularly in low and middle-income countries.

Objectives: The responsibility for health education is unclear, with the media lacking expertise and medical practitioners neglecting its significance.

Methods: In contrast, medical students possess the motivation, knowledge, and time to engage in health education. Their involvement can enhance their professional responsibility and bridge the gap between medical knowledge and public understanding.

Results: To harness the potential of medical students, governments should guide health education initiatives, universities should promote interdisciplinary collaboration, and information technology should be utilized to enhance accessibility and equality in health literacy.

Conclusions: By recognizing the role of medical students and providing them with proper support, health education can effectively improve public health decision-making and contribute to resilient global health systems.

P-EYE-013

Amid the era of globalization: what key factors influencing the selection of an ophthalmology residency among trainees?

P. Phrueksaudomchai¹, N. Manasilp²

¹Ophthalmology, Thammasat University Hospital, Pathumthani, Thailand, ²Ophthalmology, Faculty of Medicine, Thammasat University, Pathumthani, Thailand

Introduction: Choosing a career path for further specialization after completing medical school is a dilemma that newly graduated physician encounter. Numerous factors play a role in influencing choice of medical specialty. In diversity of race, language and culture around the world, Ophthalmology is one of high competitive residency program.

Objectives: The study aims to evaluate factors influencing the decision-making of current Ophthalmology residents when deciding for Ophthalmology Residency Training Program Applications in Thailand.

Methods: The study is an online-based, cross-sectional study among current Ophthalmology residency trainees. Focused group analysis among randomized sample of trainees and content analysis was processed for the questionnaire. ANOVA and Pearson correlation were used in the study to determine the statistical relationships among the collected data.

Results: Eighty five trainees completed the survey, comprised of 23 (27.06%) first year residency trainees, 35 (41.18%) second year residency trainees and 27 (31.76%) third year residency trainees. Of these, 56 (65.88) trainees graduated from medical school in urban area, 29 (34.12%) graduated from regional area. Female trainees predominated, with the total of 52 (61.18%), with a mean age of 29 years old. Among all, 46 (54%) trainees work in urban area and 39 (46%) work in rural area. The most influential factor were characteristics of work that involved surgical and medical skills (mean 4.18/5), Flexibility and freedom of work (mean 4.15/5) and non-emergency settings (mean 4.07/5). The area of medical school graduation was correlated with flexibility and freedom of work (R=28.0, p-value <0.05). The age was correlated with attitude about future planning (R=22.5, p-value <0.05) and nature of work that involved surgical and medical (R=22.2, p-value <0.05). The area of work was correlated with original affiliation (R=29.6, p-value <0.05) and chance of being sued (R=27.5, p-value <0.05).

Conclusions: Nature of work that involved surgical and medical skills, flexibility and freedom in work, and non-emergency settings were the most influential factor that influences the decision to apply for Ophthalmology Residency Training respectively. There were some correlations between factors such as area of doctor of medicine graduation, age and area of work, which also influenced the choosing of ophthalmology training.

P-EYE-014

Lumify eye illuminations cosmetic products have a favorable safety and tolerability profile in healthy women

M. Madan¹, G. Wesley², M. Zirwas³, M. Toyos⁴

¹Vancouver Eye Dr., Vancouver, Canada, ²Complete Eye Care of Medina, Medina, United States, ³Heritage College of Osteopathic Medicine, Ohio University, Athens, United States, ⁴Toyos Clinic, Nashville, United States

Introduction: Cosmetic products targeting the periorcular region are commonly used, yet safety and tolerability data are rarely available.

Objectives: To evaluate the ocular safety and cutaneous tolerability of 3 Lumify Eye Illuminations (LEI) cosmetic products.

Methods: Three single-center clinical studies examining the safety and tolerability of lash and brow serum, a hydra-gel eye cream, and micellar water eye makeup remover were conducted over an 8- or 12-week period. Women in general good health with no known allergies to facial skin care products and no acute or chronic ocular disease were included. Study-specific inclusion criteria include self-perceived damaged eyelashes (lash and brow serum study), mild-to-moderate crow's feet wrinkles (eye cream study), or mild-to-moderate uneven skin tone (eye makeup remover study). Products were applied as directed on the product label. Ocular safety assessments included slit-lamp ophthalmological examinations, visual acuity (VA) testing, and participant-reported ocular sensations. Cutaneous tolerability assessments included investigator grading of erythema, dryness, and edema and participant rating of burning, stinging, and itching (none to severe). Adverse events (AEs) were monitored throughout the studies.

Results: A total of 55, 52, and 68 women were evaluated in the lash and brow serum, eye cream, and eye makeup remover studies, respectively. Participants were mostly white (>65%) with a mean age of 53.9, 56.2, and 40.8 years, respectively. Across studies, no clinically relevant changes in slit-lamp findings or VA were observed. No ocular burning/stinging, itching, foreign body sensation, or soreness were reported. Findings of cutaneous irritations were uncommon, and none were rated worse than mild by the investigator or the participant at any assessment. At the final study assessment, mild cutaneous erythema (investigator-graded) was reported for 1 participant (eye cream study). Most AEs were mild or moderate in severity across studies and resolved by the end of the study. Treatment-related AEs included skin exfoliation (n=1; eye cream study), periorbital swelling (n=1; eye makeup remover study), and eye pruritus, eye irritation, eye pain, and skin tightness (in 1 participant; eye makeup remover study); only 1 participant experienced a treatment-related AE that led to study discontinuation (periorbital swelling; eye makeup remover study).

Conclusions: Results of these clinical studies indicate LEI products are safe and well tolerated.

P-EYE-015

Community-led intervention to increase cataract surgical acceptance in rural Tanzania: a randomized control trial

F. Sandi¹, G. Mercer², R. Geneau³, K. Judson⁴, K. Bassett⁵, D. Bintabara⁶, A. Kalolo⁷, DoCCAT Study Group

¹Community Ophthalmology, UDOM/BMH, Dodoma, Tanzania, United Republic of, ²Ophthalmology, Mc Gill, Canada, Canada, ³Community Ophthalmology, University of Cape Town, Cape Town, South Africa, ⁴Program Consultant, SEVA Canada, Canada, Canada, ⁵Gender and Blindness, UBC, Columbia, Canada, ⁶Community Medicine, UDOM, Dodoma, Tanzania, United Republic of, ⁷Public Health, St. Francis University College of Health and Allied Sciences, Ifakara, Tanzania, United Republic of

Introduction: Cataract is the leading cause of avoidable blindness worldwide, the burden is alarming in developing countries. This is largely due to insufficient knowledge about the nature of the disease and poor community uptake of cataract surgery services when offered. We observed this discrepancy and designed a community-led intervention to increase cataract surgery uptake through co-creation methods.

Objectives: Using a co-designed, community-led intervention we sought to increase cataract surgery acceptance, both equitably and efficiently.

Methods: A stratified, random sample of rural wards was selected from Dodoma province (N=84) and randomized 1:1 to intervention versus standard care. A purposive subsample of intervention wards was selected for intervention co-creation. The intervention package was developed through iterative consultation with community members using town hall meetings (N=8), focus group sessions (N=11), in-depth key-informant interviews (N=9) and meetings with Council Health Management teams (N=2). Thematic analysis was used to organize proposed intervention components and a modified nominal group technique was used to decide on a common intervention package. Key components included: the mobilization of Community Health Workers (CHWs) as eye health educators and case finders, advanced scheduling and notification of outreach screening and surgical activities, and increasing accessibility of surgical services through organized transport to health centres. Control wards received standard outreach activities under the existing eye care systems.

Results: In this interim analysis, implementation of the intervention is in progress with CHWs receiving training on Eye health promotion. We are expecting Patient attendance at outreach screening camps and uptake of cataract surgery to increase significantly in the intervention wards. Patients from intervention wards report higher knowledge, satisfaction, and trust in the CHWs and the eye care system. The main reasons for accepting surgery were expectations of improved vision, reduced disability, and increased social participation. The main reasons for declining surgery were fear, cost, and lack of family support. Full results are anticipated in 2025.

Conclusions: Co-creation of community-led interventions increases cataract surgical uptake equitably and with minimal excess cost. The intervention leveraged the existing CHWs and eye care system and enhanced their capacity and collaboration.

P-EYE-016

Newcomers to the North: Barriers to Eyecare for New Immigrants to Northern Ontario

A. Gupta¹, C. Francis¹, L. Dhurjon¹, S. Gupta¹, L. Tong², E. Tam², F. Nazemi², S. Somani²

¹NOSM University, Thunder Bay, Ontario, Canada, ²Department of Ophthalmology & Vision Sciences, University of Toronto, Toronto, Ontario, Canada

Introduction: Immigrants to urban centres in Canada are reported to have higher rates of vision loss and undiagnosed sight-threatening eye disease compared to the general public. Immigrants to rural Northern Ontario face additional challenges in accessing healthcare, yet no literature exists on the eye health of this population.

Objectives: Determine baseline prevalence of eye disease in new immigrants to Northern Ontario and identify perceived barriers to eye care.

Methods: The Thunder Bay Multicultural Association referred participants who immigrated January 1, 2021 or later, aged 18 or older, between August and December 2023. Socioeconomic data and perceived barriers were collected through a survey. Each participant received a comprehensive eye exam from an ophthalmologist. Follow up and treatment was arranged as needed.

Results: There were 55 participants screened, predominately originating from the following countries: India (34.5%), Ukraine (29.1%), Nigeria (12.7%). Median age was 29 years (IQR 26-38.5) with 53% identifying male. Education was at college diploma level or higher for 85.5%. Annual income was below \$50,000 for 75.5%.

Most participants had an eye exam in their lifetime (61.8%), 16.4% had seen an eye specialist in Canada. The majority had concerns about their eye health (76.4%); 90.9% endorsed free eye exams upon entry into Canada. Major barriers were reported by 56% of participants. These were primarily related to finances, time commitment, and difficulties navigating the Canadian healthcare system. New diagnoses were made in 41.8% of participants, including but not limited to, glaucoma or glaucoma suspect (n = 10), retinal tear (n = 6), new refractive error (n = 3). Follow up was arranged for 41.8%. Treatment was recommended in 29.1%, including but not limited to, laser retinopexy (n = 6), new glasses (n = 5), iridotomy (n = 3).

Fisher exact tests were used for statistical correlation. Post-graduate education level was significantly correlated with requiring follow up; Ukrainian origin was significantly correlated with having a new retinal tear ($p < 0.05$). No other correlations were found.

Conclusions: Most new immigrants screened for eye exams reported concerns about their ocular health and barriers to eye examination. Several participants had new ocular diagnoses, many of which required further intervention. Screening eye examinations upon arrival into Canada may improve long term eye health, particularly amongst newcomers to the North.

P-EYE-017

The confidence and competency of general accident and emergency doctors in approaching eye-related emergency conditions

*M. Alhalki*¹

¹Emergency Department, West Middlesex University Hospital NHS Foundation Trust, Isleworth, United Kingdom

Introduction: Ophthalmic-related conditions present 1.5%-6% of general ED attendance according to the Royal College of Ophthalmologists, 2020. Therefore, it's essential for ED doctors to have the basic sufficient skills to approach ocular emergencies. This study aims to evaluate how confident the ED physicians are in assessing emergency eye conditions.

Objectives: Assessment of confidence of ED doctors to approach eye-related emergencies in A&E.

Methods: An online survey comprising 8 questions was created and sent to the local doctors working in Accident and Emergency department. Participants in the questionnaire were junior doctors, senior clinical fellows and consultants. The data was then collected and analyzed.

Results: A total of 24 doctors working in A&E have completed the survey which consists of 8 questions, amongst which 83% were senior house officers/junior clinical fellows, 8% were more senior doctors, and the remaining 4% were consultants.

A total of 84% of participants have either below average or no confidence at all with assessing and managing emergency eye conditions. An average of 50% and 62% of A&E doctors don't have any confidence using ophthalmoscope and slit lamp, respectively.

Conclusions: This study demonstrates that most of A&E doctors lack the confidence of approaching ocular emergencies as well as using the basic ophthalmic equipments in ED.

More attention should be focused on providing basic training and education to general A&E doctors to help them being more comfortable using the ophthalmic devices and having the basic fundamental knowledge in dealing with common eye-related causalities, which eventually will reflect on the level of care provided to our patients.

P-EYE-018

Visual health status and visual impairment among secondary school students in Uyo metropolis, Nigeria

E.G. Abraham¹

¹Ophthalmology, University of Uyo Teaching Hospital, Uyo, Nigeria

Introduction: Good visual health is an essential for learning, working and moving around. Research has shown that 75–90 per cent of all learning in the classroom comes to the students either wholly or partially via the visual pathway. Therefore undetected/uncorrected visual impairment among secondary school students will affect their performance in school and later in life. Incorporation of school eye health into school health with appropriate referral mechanism will improve visual impairment detection and correction.

Objectives: To determine the visual health status and causes of visual impairment among secondary school students in Uyo metropolis, Nigeria.

Methods: Quasi-experimental research design was used in this study involving two public and one private secondary schools in Uyo metropolis. Structured questionnaire was used to collect data as well as clinical eye examination of the students who fulfilled the inclusion criteria. Data so generated was analyzed using frequency count for the research questions and non-parametric statistics, Chi-Square was used to test the null hypotheses at .05 levels of significance.

Results: Of the 419 students, 152 were males and 267 females, 383(91.4%) and 393(93.8%) had visual acuity of 6/6 or better in the right and left eye respectively. Thirty-five (8.3%) had visual impairment while one (0.2%) was blind in the right eye. The commonest cause of visual impairment was refractive error. Twenty-seven (6.4%) had refractive error only. Testing using Chi -Square analysis revealed that significant differences were not observed in visual status based on type of school, age, and gender. However, significant difference was observed in visual health status effect on visual acuity and ability to read well.

Conclusions: It is concluded that visual health status of majority of the secondary school students is good and the commonest cause of visual impairment is refractive error. It is recommended that teachers should be trained and equipped for vision screening of their students and a proper referral chain be instituted.

Keywords: Visual health status, visual impairment, secondary school students.

P-EYE-019

First case report of Vogt-Koyanagi-Harada syndrome in Brunei Darussalam

N.N. Jeludin¹, M. Ramalingham¹

¹Brunei Eye Centre, RIPAS Hospital, Bandar Seri Begawan, Brunei Darussalam

Introduction: Vogt-Koyanagi-Harada (VKH) syndrome is a relatively rare autoimmune systemic disorder in which an autoimmune reaction is directed against melanocytes associated antigens present in pigmented tissues of the ocular, integumentary, auditory, and central nervous system. The eye is principally the most affected organ, immunologic response causes severe bilateral, chronic, and diffuse granulomatous posterior uveitis or pan-uveitis, choroiditis, and is associated with exudative retinal detachments, vitritis and disc oedema. Systemically skin, auditory, and central nervous system can be involved to varying extents.

Objectives: To report a rare case of Vogt-Koyanagi-Harada (VKH) syndrome in a 60-year-old lady with no previous ocular trauma in Brunei Darussalam.

Methods: (Case report): She presented with a 3-day history of bilateral sudden drop of vision and associated red eyes. She denies any prior ocular trauma, no hearing defect, tinnitus, or any associated central nervous system symptoms. Unaided visual acuity was 6/24 right eye and 6/21 left eye with normal intraocular pressure. She had bilateral eye congestion with clear cornea, anterior chamber 1+ cell activity, normal pupillary reaction, and early lens changes. The posterior segment revealed vitreous inflammation; bilateral optic disc swelling, and evidence of an inferior peripheral retinal detachment confirmed with B-scan. Fluorescein fundus angiography showed optic nerve head leakages and multiple pinpoint hyper-fluorescence consistent with exudative retinal detachment.

Results: She was diagnosed with Vogt-Koyanagi-Harada's (VKH) disease and received intravenous methylprednisolone 500mg every 12-hourly for 5 days. She made a good recovery with settling of her uveitis, retinal detachment, and return of vision to 6/9 right eye and 6/7.5 left eye. She was cleared of any systemic associations of the disorder and was discharged with tapering dose of oral prednisolone.

Conclusions: The immunologic responses in VKH can cause serious effects to vision causing severe bilateral, chronic, and diffuse granulomatous posterior uveitis or pan-uveitis, choroiditis, and is associated with exudative retinal detachments, vitritis and disc oedema. Initial treatment with high dose corticosteroids, combined with prolonged corticosteroid therapy at appropriate dosage is important to minimize complications of VKH and to ultimately improve visual prognosis.

P-EYE-020

Factors influencing compliance in RRD patients with the face-down position: a qualitative study using grounded theory

Y. Duan^{1,2}, Y. Li^{1,2}, J. Li^{3,4}, Y. Shao^{1,2}, R. Feng^{1,2}, J. Li⁵

¹Eye, Shanxi Bethune Hospital, Taiyuan, China, ²Tongji Hospital, Wuhan, China, ³Health and Environmental Sciences, Xi'an Jiaotong-Liverpool University, Xi'an, China, ⁴Faculty of Health and Life Sciences, University of Liverpool, Liverpool, United Kingdom, ⁵Shanxi University of Finance and Economics, Taiyuan, China

Introduction: Patients with rhegmatogenous retinal detachment (RRD) require face-down positioning (FDP) for 3-6 months or longer after pars plana vitrectomy (PPV) combined with silicone oil (SO) tamponade.

Objectives: This paper intends to conduct a qualitative study using constructivist grounded theory to investigate the factors affecting FDP compliance in RRD patients who residence at home after SO tamponade, with the goal of identifying positive coping styles and intervention measures to improve FDP self-management in these patients.

Methods: This study adopted semi-structured interviews with patients who require FDP after SO tamponade. Constructivist grounded theory was utilized in this study. The qualitative data was analyzed and coded via NVivo 11.0 through open coding, axial coding and selective coding.

Results: Twenty-four RRD patients were involved. The interviews yielded five main themes that defined home FDP compliance were identified: posture discomfort, doctor-patient communication, psychological factors, occupational character, and family factors. A theoretical model of the influencing factors of postural compliance of FDP was constructed based on the interview analysis.

Conclusions: A variety of factors can affect FDP conformity. We can increase compliance of RRD patients by enhancing comfort, encouraging doctor-patient communication, providing comprehensive care, promoting community-based intervention, and strengthening family education.

P-EYE-021

Critical success factors for the implementation of WHO Eye Care Situation Analysis Tool (ECSATv2) in Papua New Guinea

G. Cochrane^{1,2}, S. Melengas³, B. Zuvani⁴, J. Garap^{5,6}, R. Ko⁷

¹Collaborative Vision, Melbourne, Australia, ²Brien Holden Foundation, Sydney, Australia, ³Chief Ophthalmologist, National Department of Health, Port Moresby, Papua New Guinea, ⁴National Eye Care Coordinator, National Department of Health, Port Moresby, Papua New Guinea, ⁵Head of Ophthalmology, Port Moresby General Hospital, Port Moresby, Papua New Guinea, ⁶President, Prevention of Blindness Committee, Port Moresby, Papua New Guinea, ⁷Deputy Chief Ophthalmology, New Guinea Islands, National Department of Health, Port Moresby, Papua New Guinea

Introduction: In 2021, the WHO Eye Care Situation Analysis Tool (ECSATv2) was trailed in Papua New Guinea (PNG). The ECSAT's improved functionality include rubrics to facilitate scoring, enabling temporal assessment of change. PNG was one of 8 countries that agreed to pilot the new tool for WHO.

Objectives: Report on the tool's performance and update the National Department of Health (NDoH) on the eyehealth system. WHO expectation is that ECSAT results inform strategic planning to drive prioritised action for change.

Methods: NDoH granted approval to pilot the ECSATv2 which consists of 31 sub-sections across 6 sections reflecting WHO building blocks of health systems. A steering committee was sub-divided so members only addressed a few sections each reflecting their specific knowledge. Weekly meetings held kept data collation, review and analysis on track. Ongoing guidance from NDoH, IAPB and WHO WPRO was received. Existing PNG research and national knowledge provided evidence-based information.

Results: The ECSAT was done during the COVID19 pandemic preventing in-person workshops. Success factors include multiple communication channels (WhatsApp, Zoom, email, hybrid meetings when allowed); strong existing PNG research - RAAB+DR, TADDS, GTMP; and critically, strong organisational and personal relationships that enable barriers to be addressed. Challenges encountered: no electronic medical records; damaged PNG internet capacity from earthquakes; country in mourning at the loss of PNG's founding father; impact of COVID19 on a small health workforce; health system fragility so non-urgent activities such as the ECSAT, were not priority; data anonymity was difficult as small HReH workforce provide services nationally, thus data sources were identifiable causing conflict of interest around personal business data. Additionally, the HReH workforce is vulnerable if failings in the health system can be perceived as personal failings. The results workshop was an opportunity to develop achievable operational foci within existing program & budgetary constraints while agreeing workshop timeline between ECSAT iterations.

Conclusions: ECSAT as an iterative process enables identification of determinants that support eye health systems and elements that are potential weak links (opportunities). This provides great value especially when eye health systems need development & strengthening. Even when Health Systems are performing well, there is still a need to review regularly to understand the mechanisms that maintain high standards.

P-EYE-022

Culture and learning environment predict program satisfaction: a survey of nine ophthalmology programs in four countries

A. Bernard^{1,2}, S. Shah³, H.S. Hailemichael⁴, S. Tamang⁵, A. Amatya⁵, K. Golnik⁶, G. Tabin^{1,2}

¹Ophthalmology, Stanford Health Care, Palo Alto, United States, ²HCP Cure Blindness, Waterbury, United States, ³Stanford Medicine, Stanford, United States, ⁴Department of Ophthalmology, Moyale Hospital, Moyale Town, Ethiopia, ⁵Department of Ophthalmology, Tilganga Institute of Ophthalmology, Kathmandu, Nepal, ⁶Department of Neurology, Barrow Neurological Institute, Phoenix, United States

Introduction: Learning environment and institutional culture have great potential to enhance resident learning and satisfaction. The present study assesses the learning environment and resident satisfaction in nine ophthalmology programs in Ghana, Nepal, Ethiopia, and India. Respondents represent diverse socio-cultural contexts, healthcare systems, and educational infrastructures and this assessment provides a snapshot of diverse perspectives on different components of the program and curriculum.

Objectives: The study sought to perform an assessment of the learning environment and resident satisfaction in nine ophthalmology programs across Ghana, Nepal, Ethiopia, and India.

Methods: The evaluation consisted of an anonymous online survey of current ophthalmology residents in nine programs. The survey collected data on overall satisfaction, resident perspectives of different components of the program and curriculum as well as questions from the ACGME learning environment assessment.

Results:

A total of 103 residents answered all questions, evenly distributed between program year. Half reported overall satisfaction with the program (48.5%) and said they would select their program again. Residents in India reported the highest satisfaction level (100%) followed by those in Ethiopia (52.5%), Ghana (37%) and Nepal (27%). There was a strong association between overall satisfaction and support from the program director (Cramer's V = 0.406, p=0.002). Among the ACGME learning environment questions, there were associations between overall program satisfaction and faculty interest in education (Cramer's V: 0.378, p=0.002), the ability of a program to deal confidentially with problems (Cramer's V: 0.447, p= 0.003) and the ability of residents to evaluate their program annually (odds ratio: 2.9, p=0.02) . There were also strong associations with the evaluation system (Cramer's V = 0.374, p=0.004), rotation distribution (Cramer's V = 0.370, p=0.003), didactic curriculum (Cramer's V = 0.380, p=0.005) and grand rounds (Cramer's V = 0.365, p=0.008). There was no correlation with the vacation system, wet labs, case volume or case complexity.

Conclusions: The assessment revealed variations in satisfaction, learning environment and culture across ophthalmology programs. The data provided insights into the impact of the learning environment and residency components on satisfaction. The strong associations with aspects of a program's learning environment and culture may represent effective targets for improving resident satisfaction.

P-EYE-023

Dry eye disease and its damage to our environment: a multi-centre survey of patients with severe disease

S. Latham¹, L. Boddy¹, T. McClay², D. Lockington², A. Undan³, A. Borgia³, M. Airaldi³, A. Madden³, A. Cordos³, S. Kaye³, J. Hoffman⁴, D. Sibley⁴, S. Ahmad⁴, S. Rauz¹

¹University of Birmingham, Birmingham, United Kingdom, ²Tennent Institute of Ophthalmology, Glasgow, United Kingdom, ³St. Paul's Eye Unit, Liverpool, United Kingdom, ⁴Moorfields Eye Hospital, London, United Kingdom

Introduction: The NHS is the largest employer in Europe and has pledged to reach net-zero for Carbon emissions by 2045. To succeed in reaching this target, each service within the NHS must analyse its Carbon footprint and highlight routes for improving environmental sustainability. Dry eye disease is a highly prevalent illness worldwide and its care pathway is harming our environment. A considerable number of patients have lifelong dependence on eye drops; the packaging of which generates enormous amounts of non-recycled waste. Further environmental damage is caused by the inefficient supply chains of medications and repeated face-to-face outpatient appointments.

Objectives: This multi-centre cross-sectional survey of patients with severe dry eye disease is the first observational study to investigate the pollution and emissions subsequent to the NHS dry eye disease care pathway. The aim of this study is explore patients' opinions on the environmental impact of dry eye disease so that strategies can be developed to help the NHS achieve net zero.

Methods: Severe dry eye disease patients in four tertiary care centres across the United Kingdom participated in semi-structured interviews.

Results: 92 patients were interviewed. The median (range) topical treatments per day was 3.5 (0-66) drops via single-dose dispensers, 11 (0-122) drops via multi-dose dispensers. Disposal of medication packaging was reported as follows: everything in household waste (39.5%), everything recycled (13%) and mixture (51.1%). Of the items allegedly recycled, 47.8% were cardboard boxes and paper instructions (highest) and 8.7% were ointment tubes (lowest). Only 6.5% of patients reported that medication packaging had clear recycling instructions and 70.7% had not noticed. Patients attended a median of 3 (1-15) hospital appointments per year, 62% travelled to appointments by car and the median travelling time for a return journey was 100 (8-300) minutes. To aid visualisation, the yearly amount of plastic disposal is made comparable to 100mL plastic water bottles and the number of tress required to offset Carbon emissions is specified. Furthermore, a word cloud of patient responses was generated to provide further analytic narrative.

Conclusions: This study is the first to ascertain the perspectives of patients to investigate the environmental harm associated with severe dry eye disease management. The results of this study are unique and have highlighted multiple areas in which innovations are needed to help the NHS to achieve net zero by 2045.

P-EYE-024

Evidence-based eye health promotion activities in South Africa

*H.L. Sithole*¹

¹School of Health Care Sciences, University of Limpopo, Polokwane, South Africa

Introduction: Vision 2020 campaign presented an opportunity for most governments to prioritise eye health related activities through improved budgets in order to meet the needs of this initiative. For most developing countries, this suggested that there was a need for eye health promotion campaigns at a larger scale ahead of the year 2020. Unfortunately, in the context of South Africa, no such heightened activities were recorded, thus posing a risk of not meeting the objectives of VISION 2020.

Objectives: 1. To determine the extent to which eye health promotion activities are carried out in South Africa

2. To assess the level of engagement with policy directives on eye health promotion activities by relevant personnel in the provinces

3. To assess any available evidence on eye health promotion activities in the provinces

4. To determine the level of readiness towards the elimination of avoidable blindness in the country

Methods: In order to achieve the objectives of this study, quantitative and qualitative research approaches were adopted. Consequently, questionnaires and interviews were conducted with all national and provincial health managers with relevance to eye care. Additionally, health policy documents were reviewed to determine the extent to which they covered issues of eye health.

Results: The documents reviewed had no specific reference to eye health promotion. Within the provincial health directorates, only 11 (23%) of the managers reported that they had integrated vision screening in their health promotion programmes as part of eye health promotion strategies. School visits accounted for 75% of eye health related activities where vision screening exercises were conducted. Seven out of nine provinces had no eye care managers, the rest of the other provinces had specific activities aimed at eye health promotion. However, these provinces were not being coordinated from the national level, and as such, their health promotion activities varied from province to province.

Conclusions: The lack of coordination in eye health activities across the provinces, with some having none at all, could be linked to the absence of an integrated eye health promotion policy in the country. Even with those that have reported being actively conducting eye health promotion activities, no supporting evidence could be provided. It is therefore recommended that an integrated eye health promotion model be developed so that all activities for eye health promotion may be based on scientific evidence and policy directives.

P-EYE-025

Comparative analysis of ophthalmology resident burnout, financial status, and career trajectory across four countries

S. Shah¹, A. Bernard^{2,3}, H.S. Hailemichael⁴, A. Amatya⁵, S. Tamang⁵, A. Aikins⁶, K. Golnik⁷, G. Tabin^{2,3}

¹School of Medicine, Stanford University, Stanford, United States, ²Department of Ophthalmology, Stanford University, Stanford, United States, ³HCP Cure Blindness, Waterbury, United States, ⁴Ophthalmology Department, Moyale Hospital, Moyale Town, Oromia region, Ethiopia, ⁵Tilganga Institute of Ophthalmology, Kathmandu, Nepal, ⁶Komfo Anokye Teaching Hospital Eye Centre, Kumasi, Ghana, ⁷Barrow Neurological Institute, Phoenix, United States

Introduction: Resident burnout, marked by emotional exhaustion, depersonalization and a lessened sense of personal achievement, poses a serious issue in the medical community with repercussions impacting patient care, healthcare costs, and staff retention. In this study, ophthalmology programs across Ethiopia, Ghana, India, and Nepal were surveyed to assess resident burnout in relation to financial strain and career choices, helping inform targeted interventions that support resident well-being and improve healthcare quality.

Objectives: This study provides an in-depth assessment of resident burnout across ophthalmology programs in Ethiopia, Ghana, India, and Nepal.

Methods: A validated assessment of resident burnout, The Mini-Maslach Assessment, was employed to assess burnout in relation to financial considerations and career intentions of ophthalmologists in training. Residents anonymously selected how often they feel the following: "I feel burned out from my work" and "I have become more callous toward people since I took this job" as well as answered questions about their financial consideration, career selection and future directions.

Results: A total of 113 residents participated in the study, equally distributed across genders. The respondents were stratified based on their year in the residency program and country of study. A significant portion of the participants (74.3%) met the criteria for burnout as per the validated Mini-Maslach Assessment, indicating a high prevalence of burnout among ophthalmology residents. Residents in Nepal reported the highest prevalence of burnout (100%), followed by India (88%), Ethiopia (76%) and Ghana (56%).

There was a strong association between residents' reported satisfaction with clinic rotations and burnout (Cramer's V 0.31, $p=0.017$). Residents were most likely to report a desire to stay in-country after their training concludes, although there was no significant difference in burnout among residents planning to leave after training. Burnout was also not associated with marital status, year in training, original desire to pursue ophthalmology, self-reported financial burden, or work outside of the hospital.

Conclusions: The study's findings underscore the need for further research and interventions to reduce resident burnout across ophthalmology programs. Burnout appears to be most closely connected with satisfaction with clinic, although more research is needed to determine the most impactful levers on resident wellness and burnout in different contexts.

P-EYE-026

Access to eye care in a developing country: case of CHU-IOTA

A. Nappo¹, G. Nouhoum¹, K. Kadiatou¹, M. Brehima¹, S. Fatoumata¹, S. Farba Lamine², T. Lamine³

¹Institute of Tropical Ophthalmology of Africa, Bamako, Mali, ²African Center for Higher Studies in Management, Dakar, Senegal, ³National Eye Health Program, Bamako, Mali

Introduction: Access to eye care is the possibility of using healthcare services. This is quality care, available, usable and accessible through universal health coverage (UHC).

Developing countries like Mali endorse the perspective of UHC in achieving the Sustainable Development Goals (SDGs).

Despite numerous health policy reforms, utilization rates of healthcare structures are low.

The decrease in attendance at our institute led us to ask questions about the obstacles to accessing eye care.

Objectives: Study access to eye care in our institute to identify barriers.

Methods: This was an analytical and prospective study using a systematic random survey over 3 months, including adult patients and consent.

We analyzed according to the ANDERSEN and ADAY econometric model.

The parameters studied were: sociodemographic characteristics, knowledge, attitudes and practices, perception and satisfaction with eye care.

A statistical correlation was made using Chi2 with a significance threshold of 90%.

Results: We collected 468 patients, the average age was 43.25 ± 16.7 years. There were more women (52.6%) unlike COURTRIGHT.

Most patients (89.5%) contacted the University Hospital for consultations, and 89.1% had no idea about the eye health system.

The access rate to eye care in our center was 0.75 (75%) without constraints higher than the access rate in some developing countries which is less than 0.2 (25%) according to Etya'ale.

The WHO estimates that eye care services are currently only 25% utilized for people in need globally. Financial barrier was the main difficulty encountered by health care consumers, 32.7% of those questioned had health coverage.

The quality of care received was considered satisfactory in 99.6% with a score \geq in 92.5% of cases.

Conclusions: Access to eye care is a concern for decision-makers, users and providers in Mali.

The eye care access rate at IOTA is 0.75 (75%) which cannot reflect the real rate in Mali because of a hospital study.

The users of the institute were predominantly women. the financial barrier was the main obstacle.

It is important to conduct a national survey to improve access to eye care with new strategies.

P-EYE-027

Travel and financial burden of cataract surgical care in South India: vision centers versus urban based eye hospital

I.Y. Chung¹, M. Benzy², S. Kavitha², R. Venkatesh², N. Shekhawat³

¹Johns Hopkins Bloomberg School of Public Health, Baltimore, United States, ²Aravind Eye Hospital, Pondicherry, India, ³Wilmer Eye Institute, Johns Hopkins Medicine, Baltimore, United States

Introduction: Cataract is the leading cause of blindness globally, yet access to surgical care remains limited in low- and middle-income countries (LMICs) due to geographical and financial barriers.

Objectives: This patient survey evaluated travel and financial burden on patients and their caregivers attending post-operative visits at an urban base hospital (BH) versus local primary eye care centers or vision centers (VC) at Aravind Eye Hospital, Pondicherry (AEH-P) in South India.

Methods: A survey was administered to 70 patients who underwent cataract surgery at AEH-P. The participants were divided into two groups based on their appointment location for postoperative day 1 (POD1): POD1-BH participants who attended POD1 and all other appointments at the BH (n=35), and POD1-VC participants who visited VC for POD1 appointment but attended remaining appointments at the BH (n=35). Data on travel and financial burden was collected via structured questionnaires and analyzed using descriptive statistics.

Results: Transport time to POD1 appointments was over 2 hours lower for POD1-VC than POD1-BH (53.9 ± 40.6 minutes vs. 195.3 ± 142.9 minutes, $p < 0.001$; difference of 141.4 minutes, 95% CI 90.7 - 192.2). The door-to-door travel time significantly lower for POD1-VC than POD1-BH (110.3 minutes ± 10.7 vs. 293.7 ± 30.2 , $p < 0.001$); difference of 183.4 minutes lower, 95% CI 118.7 - 248.1). Transport cost was significantly lower for POD1-VC than POD1-BH (102.8 ± 188.1 INR vs. 544.0 ± 1055.1 INR, $p = 0.02$; difference of 441.2 INR, 95% CI 73.1 - 809.3). In the POD1-VC group, 63% (n=22) preferred the vision center for their appointment location, while 37% (n=13) preferred the urban hospital.

Conclusions: Decentralized postoperative follow-up at vision centers is associated with reduced travel and financial burden for cataract surgery patients in rural, low-resource settings. Further research is needed to evaluate the clinical effectiveness and operational feasibility of decentralized postoperative care in LMIC settings.

P-EYE-028

Medico-legal challenges in ophthalmology: a growing trend requiring further attention

A. Jaffer¹, L. Ghouti², B. He²

¹Ophthalmology & Vision Sciences, Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²Ophthalmology, Faculty of Medicine, Dalhousie University, Halifax, Canada

Introduction: Ophthalmology faces a rise in medical malpractice claims due to the intricate nature of procedures, the surge in elective/cosmetic treatments, and heightened patient expectations.

Objectives: This review explores ophthalmic medical legal challenges globally, providing insights and recommendations to improve the delivery of care.

Methods: A systematic search using keywords and phrases related to ophthalmology litigation, malpractice, and subspecialties was conducted. Medical Subject Headings and Boolean operators were used. A total of 68 papers were reviewed.

Results: Ophthalmologists face malpractice claims once every 15 years, with cataract surgeries and refractive procedures more susceptible to claims. A growing trend in claims, often exceeding \$1 million in compensation in the U.S., is evident. In Canada, about half of malpractice cases favor ophthalmologists; cases primarily involve surgical procedures (46.2%), misdiagnoses (32.7%), and non-surgical procedures (21.2%). Cases involving refractive treatments mainly comprise LASIK (74.2% over 50 years), while PRK represents only 5.5% of claims. Cataract surgeries lead in claims due to issues during pre-operative, intra-operative, and post-operative phases. In oculoplastics, procedures like blepharoplasty (63.8%) and brow lifts (11.6%) are commonly involved in claims, with allegations including excessive scarring, lagophthalmos, and visual defects. Oncology malpractice is rare (1.5% of cases), often involving uveal melanoma (31.3%), retinoblastoma (12.5%), and sebaceous cell carcinoma (12.5%). Pediatric cases often include traumatic ocular injuries (22.1%), retinopathy of prematurity (17.6%), and endophthalmitis (8.8%); they often favor plaintiffs and have larger financial awards. Glaucoma claims account for 10% of cases in the U.S. from 1985-2005, often due to medication errors, diagnostic errors, and failure to monitor patients. In neuro-ophthalmology, a high misdiagnosis rate (60-70%) leads to claims.

Conclusions: Medical malpractice is common in ophthalmology, particularly in cataract surgeries and refractive procedures. Oculoplastics and ocular oncology are also implicated but to a lesser extent. These issues largely stem from perioperative negligence and inadequate informed consent. Residents' involvement in litigation highlights the need for improved training focusing on patient-physician relationships. Effective communication, particularly in obtaining and documenting informed consent, is essential in mitigating risks.

P-EYE-029

Mapping the landscape of ophthalmic research in Africa: an analysis of ARVO publications and future directions

D. Taghaddos¹, E. Sogbesan²

¹McMaster University, Michael G. Degroote School of Medicine, Hamilton, Canada, ²Department of Surgery, Division of Ophthalmology, McMaster University Faculty of Health Sciences, Hamilton, Canada

Introduction: Ophthalmic research is crucial for improving health outcomes, especially in Africa, which carries a significant global burden of blindness and eye disease. However, there is a significant imbalance in the geographical focus of research on eye health, with a large majority of research funds and reports coming from high-income countries.

Objectives: Using publications retrieved from the Association for Research in Vision and Ophthalmology (ARVO), we aim to assess the current state of ophthalmic research in Africa, identify existing limitations, and propose recommendations for improvement.

Methods: A literature search in ARVO databases was conducted. Inclusion criteria consisted of reports from any of ARVO's journals from 2000 to 2024, with all types of publications deemed eligible if they featured researchers affiliated with African institutions.

Results: From 3374 search results, 111 met inclusion criteria. South Africa, Tanzania, Nigeria, and Malawi, contributed significantly, accounting for 34.1%, 15%, 12.4%, 9.8% of the total research studies, respectively. The USA (34.4%), UK (20.9%), Germany (5.5%), and Netherlands (4.9%) were the top collaborators with African authors. Predominant research subjects included glaucoma (29.7%), diabetic retinopathy (8.1%), refractive error (8.1%), cataracts (7.2%), and trachoma (5.4%). Common study types were prevalence or epidemiological studies (21.6%), risk factor analyses (19.8%), and genetic studies (18.9%). Of the included studies, 85.6% focused on African populations.

Conclusions: This study provides an overview of ophthalmic research in Africa. The most common research topic was glaucoma, with prominent collaborations involving the USA and UK. Of the included studies, over one half are from South Africa and/or Tanzania, demonstrating relatively uneven distribution of research output in Africa. Notably only a small fraction of ARVO publications involve contributions from Africa. Researchers highlight the unmet need for increased eyecare services, personnel, and resources, as well as barriers such as funding, time, publication barriers, and poor research knowledge. This study's findings offer valuable insights for future research, international collaboration, and the enhancement of eye care in Africa. Ophthalmology societies such as ARVO should aim to expand their research efforts and collaboration with African clinicians in order to reduce the global burden of eye disease.

P-EYE-030

No excuses! Smartphone funduscopy is an appropriate screening method for detecting "treatment requiring ROP" on time

J.S. Vidaurri Martinez^{1,2}, S. Aranda Serna¹

¹Ophthalmology Department, Instituto Mexicano del Seguro Social, Monterrey, Nuevo Leon, Mexico,

²Ophthalmology Department, Universidad de Monterrey, Monterrey, Nuevo Leon, Mexico

Introduction: ROP represents an important burden in terms of low vision and blindness in Mexico and many other countries worldwide. A significant proportion of this burden can be prevented if screenings diagnose this disease on time. In Mexico only 1/3 of pediatric ICU units that care for premature infants have been found to comply with ROP screening protocols. One reason is the fact that many of them do not have an indirect ophthalmoscope with which to perform retinal examinations. Existing studies suggest that smartphone funduscopy is a viable alternative when no indirect ophthalmoscope is available, allowing for ROP screenings to be carried out successfully and on-time.

Objectives: Prove that smartphone funduscopy is highly sensitive in detecting "treatment requiring ROP" among premature infants being cared for at public health institutions in Mexico.

Support existing evidence that smartphone funduscopy has appropriate sensitivity and negative predictive value, enabling it to be used as a screening test when there is no indirect ophthalmoscope available to perform ROP screenings on time.

Use this evidence to suggest ROP guidelines in Mexico and other developing countries include smartphone funduscopy as a viable alternative to enable timely ROP screenings when no indirect ophthalmoscope is available.

Methods: Prospective, experimental, blind, unicentric.

All participating patients were evaluated twice. The 1st time via smartphone funduscopy and the 2nd time via indirect ophthalmoscopy. There was no communication between the doctors that carried out these two evaluations.

Each doctor documented if the patient had treatment requiring ROP (ROP Type 1 or Advanced ROP) or not.

Results: 33 premature patients included. The results show that smartphone funduscopy has Sensitivity (100%), Specificity (93.6%), Positive predictive value (50%), negative predictive value (100%) at detecting "treatment requiring ROP" vs the gold standard: indirect ophthalmoscopy.

Fundus images obtained in this study via smartphone funduscopy show in great detail the posterior pole and peripheral retina with and without ROP findings.

Conclusions: Smartphone funduscopy has high sensitivity and specificity for the detection of treatment requiring ROP. Therefore, it allows for ROP screening in the absence of a functional indirect ophthalmoscope.

This study supports other studies carried out in other countries with infrastructure challenges such as Taiwan, Dominican Republic and India.

P-EYE-031

Rate of parental consanguineous marriage among children with visual impairments in Azerbaijan

*R. Hasanova*¹

¹National Ophthalmology Center named after Academician Zarifa Aliyeva, Baku, Azerbaijan

Introduction: The prevalence of low vision is significantly affected by demographic characteristics, cultural differences, and socioeconomic factors. The relevant demographic characteristics include age, as the underlying causes of visual impairment differ between age groups, with many cases being preventable. For these reasons, assessing the epidemiology of visual impairments and identifying their underlying causes is an important subject that is directly relevant to national healthcare planning.

Objectives: To decrease dependency and improve quality of life among patients affected by visual impairments, special treatment programs that include clinical assessment, expert consultations, and rehabilitation are required. We investigated the characteristics of children with blindness or low vision in Azerbaijan, such as their sex and age, as well as the underlying cause of their visual impairment and the presence or absence of parental consanguinity. It is expected that the results will be useful for health care planning, including the planning of rehabilitation services for people with visual impairments.

Methods: Determination of visual acuity with and without correction, refractometry, biomicroscopy, tonometry, A/B scan, ophthalmoscopy examinations were performed in all patients. The research is statistical and medical-social in nature.

Results: This study involved 340 patients with visual impairments. The mean age of the patients was years range, 0-15 years, and most were in the 2- 10 year age group (35.6%). There were more male patients (65%) than female patients. Blindness, severe visual impairment, and mild to moderate visual impairment were observed in 60 (17.7%), 128 (37.6%), and 152 (44.7%) patients, respectively. Retinal diseases were identified as the main underlying cause of visual impairment (52.7%), followed by nystagmus (23.7%), optic tract and nerve diseases (11.0%), congenital cataracts (0.8%), and glaucoma (1.7%), refractive pathology (10.1%). Parental consanguinity was present for 66.3% of the patients. In Azerbaijan, the main cause of visual impairment was choroid and retinal diseases in all the age groups above 14 years, while nystagmus was the most common cause in the age group below 15 years. Parental consanguinity was significantly high among the patients with macular dystrophy and those with retinitis pigmentosa.

Conclusions: Genetic factors are known to be involved in the development of these diseases, indicating that the issue of consanguineous marriage remains a problem in Azerbaijan.

S-EYE-001

Patients recruitment to clinical trials - experience of a small country

*K. Palumaa*¹

¹Department of Ophthalmology, East Tallinn Central Hospital, Tallinn, Estonia

Introduction: For a county with a population of 1,3 million inhabitants and only two big ophthalmology centres it is hard to enrol patients into international clinical trials.

Objectives: We analysed what are the challenges of small countries to recruit patients to clinical trials and how to compete with bigger centres.

Methods: We compared the amount of patients recruited in smaller and bigger countries. We share our experience of recruiting patients to the OPT-302-1005 COAST study in Estonia.

Results: As the population and patient numbers are not comparable to many other countries, only few clinical trials reach us. During OPT-302-1005 study, we have screened 39 and randomised 13 patients. Two patients have completed the study, two discontinued and 9 patients continue the clinical trial. There is a total of 219 sites worldwide. All Baltic states, Estonia, Latvia and Lithuania are very good recruiters and are always ready to contribute.

Conclusions: We propose, that the main key of recruiting patients to clinical trials is a good teamwork. As the main goal is to give the best available treatment and follow up to the patients and invest in future treatment options through different clinical trials.

S-EYE-002

Non commercial eye drops - our options

*M. Tamsalu*¹

¹Department of Ophthalmology, East Tallinn Central Hospital, Tallinn, Estonia

Introduction: The purpose of this presentation is to share our experience when commercial eye drops are not available.

Objectives: Small countries often have limitations accessing necessary commercial medication due to small market and limited amount of patients.

Methods: For treating various conditions or diseases we need to find alternatives. One opportunity would be preparing the eye drops in the clinic. For example like fortified antibiotics.

Results: We have used acetylcysteine, insulin and other drops mainly for corneal diseases. It should also be mentioned, that making the eye drops on site has its restrictions.

Conclusions: To conclude, managing different situations is still possible when there isn't a good access to all the commercially available medication.

S-EYE-003

Evolution of glaucoma surgery in Estonia and in Tartu University Eye Clinic over the years

A. Kree¹, M. Pastak¹

¹Eye Clinic of Tartu University Hospital, Tartu, Estonia

Introduction: Glaucoma surgery has come a long way since our only opportunity was trabeculectomy. It certainly still has its place in our practice, nevertheless, we have noticed a clear shift towards tube surgery.

Objectives: To evaluate the amount and proportional division of different types of glaucoma surgeries and perceptible shift towards micro- and macroshunts in Eye Clinic of Tartu University Hospital and in Estonia more widely.

Methods: We regularly started using macroshunts in glaucoma surgery and recording the data and results of them fifteen years ago, so that is the amount of time we retrospectively looked back at in our study. We studied the early days when there were more trabeculectomies and relatively few patients and only the ones with terminal disease underwent tube surgery, went on to the mid period when there were already more patients whose first choice procedure was tube surgery and ended up in nowadays when our first consideration is more often between micro- or macroshunt rather than trabeculectomy or shunt.

Results: During the first third of said period we had about twenty-five macroshunt implantations per year. In the medium period of the time frame covered by our study the amount of tube surgeries was about double of the first five years. During the last five years we have implanted about one hundred and twenty macroshunts per year which is roughly five times more than we averaged in the first third of the period.

The last few years have also seen the raise in microshunt implantations. During the last year we treated about fifty glaucoma patients by microshunt surgery in our clinic. All that adds up to about a hundred and seventy shunt surgeries per year, which is in our opinion quite remarkable rise in such a relatively short period.

When in the first years of our study-covered time period the part of trabeculectomies was more than ninety percent of all glaucoma surgeries, then nowadays it has dropped to about twenty percent, whereas macroshunts cover half of the surgeries and microshunts have taken the rest, about thirty percent of procedures.

Conclusions: In our practice, tube surgery has become more and more common in recent years and the trend will in all likelihood continue. Close to two hundred tube surgeries a year in a clinic that's service area's population is little over 330 000 people is in our view modern and progressive way of tackling a long standing adversary.

S-EYE-004

Challenges of corneal and limbal transplantation

*M. Pauklin*¹

¹Eye Clinic, Tartu University Hospital, Tartu, Estonia

Introduction: Estonia is a North-European country with a population of 1.3 million. Keratoplasty and different methods of limbal transplantation are performed in two larger centers, the eye clinic of East-Tallinn Central Hospital and Eye Clinic of Tartu University Hospital. While different types of lamellar keratoplasty are considered the gold standard for several diseases affecting distinct layers of cornea, the implementation of these new surgical methods can be challenging in small countries with a low number of surgeries per year.

Objectives: To analyze how the methods of corneal and limbal transplantation have changed in Estonia during the last ten years.

Methods: Records of corneal and limbal transplantation from 2013 to 2023 were analyzed to detect trends in the treatment methods.

Results: Due to the small population and relatively small number of transplantations, no cornea bank exists in Estonia. Cold storage for up-to 2 weeks has been used for years. From 2013 to 2023, the total number of keratoplasties has been 39 to 60 per year. East Tallinn Central hospital performs more than the half of the transplantations. While penetrating keratoplasty was the main method used in 2013, Descemet's membrane endothelial keratoplasty (DMEK) and deep anterior lamellar keratoplasty (DALK) are becoming more popular.

For the treatment of limbal stem cell deficiency, conjunctival limbal auto transplantation is still the preferred method for unilateral cases but a small number of simple limbal epithelial transplantations (SLET) has been performed in recent years.

Conclusions: Adaptation of new treatment methods is challenging but possible even in small countries. Due to a small number of cases, surgeons must expect a rather long learning curve.

Myopia

FT-MYO-001

Myopia and hyperopia are associated with chronotype, sleep duration, and social jet lag in 71,016 individuals

T. Palumaa^{1,2,3}, N. Taba¹, M. Teder-Laving¹, T. Esko¹, E. Abner¹

¹Institute of Genomics, University of Tartu, Tartu, Estonia, ²Department of Ophthalmology, Emory University, Atlanta, United States, ³Eye Clinic, East Tallinn Central Hospital, Tallinn, Estonia

Introduction: Mounting evidence suggests a connection between circadian rhythms and refractive errors. For example, refractive error-associated genes are enriched for those regulating circadian rhythms. Additionally, small-scale reports indicate inconsistent associations between myopia and sleep duration/timing, as well as a late chronotype. However, large-scale studies comprehensively exploring circadian rhythm and sleep parameters in relation to refractive errors are lacking.

Objectives: This study aimed to uncover associations between circadian rhythms and refractive errors by examining chronotype, social jet lag (SJL), and average sleep duration (SDur) in individuals with myopia and hyperopia.

Methods: We included 71,016 participants from the Estonian Biobank (age 18-70, median 44 years, 66% female) who had completed the Munich Chronotype Questionnaire. Chronotype was defined as the mid-point of sleep on free days adjusted for sleep debt (MSFsc); SJL as the difference between one's midpoint of sleep on free and working days; SDur as average hours of sleep per day across a week. Diagnoses of myopia and hyperopia were obtained from health records and self-reports. Multivariable logistic regression models were employed with myopia or hyperopia status as dependent variables. MSFsc, SJL, SDur, and additional factors significantly associated with refractive errors in univariate analyses as predictors. Models were adjusted for age, age squared, sex and first ten genetic principal components.

Results: Among participants, 26% had myopia and 15% had hyperopia. Adjusted analyses revealed that a later chronotype increased the odds of myopia (OR=1.03, 95% CI 1.01-1.05 per one hour later MSFsc), while an early chronotype was associated with hyperopia (OR=0.95, 95% CI 0.93-0.98). Interestingly, increased SJL was positively associated with both myopia (OR=1.04, 95% CI 1.02-1.07) and hyperopia (OR=1.09, 95% CI 1.05-1.13). Additionally, shorter sleep was also linked with both myopia (OR=0.95, 95% CI 0.93-0.97 per one additional hour) and hyperopia (OR=0.92, 95% CI 0.90-0.94). Sensitivity analysis in individuals aged >45 years confirmed these findings.

Conclusions: This study reveals intricate relationships between circadian rhythm parameters and refractive errors, suggesting the involvement of processes linked with refractive errors in general and those associated with the directionality of refractive development. Further mechanistic studies are warranted to enhance our understanding of refractive error pathogenesis.

FT-MYO-002

Implementing a digital comprehensive myopia prevention and control strategy for children and adolescents in China

R. Li¹, H. Liu¹, N. Wang¹

¹Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Medical University, Beijing Institute of Ophthalmology, Beijing, China

Introduction: Children and adolescents' myopia is a major public problem. Although the clinical effect of various interventions has been extensively studied, there is a lack of national-level and integral assessments to simultaneously quantify the economics and effectiveness of comprehensive myopia prevention and control programs.

Objectives: To compare the cost-effectiveness between traditional myopia prevention and control strategy, digital comprehensive myopia prevention and control strategy and school-based myopia screening program in China.

Methods: A Markov model was used to compare the cost-utility and cost-effectiveness among school-based myopia screening, traditional myopia prevention and control strategy, and digital comprehensive myopia prevention and control strategy among 6 to 18-year-old rural and urban schoolchildren. The primary outcomes were quality-adjusted life-year (QALY), disability-adjusted life-year (DALY), incremental cost-utility ratio (ICUR), and incremental cost-effectiveness ratio (ICER). Extensive sensitivity analyses were performed to test the robustness and sensitivity of base-case analysis.

Results: Compared with school-based myopia screening strategy, after implementing digital comprehensive myopia prevention and control strategy, the prevalence of myopia among 18-year-old students in rural and urban areas was reduced by 3.79% and 3.48%, respectively. The ICUR per QALY gained with the digital myopia management plan (\$11,301 for rural setting, and \$10,707 for urban setting) was less than 3 times the per capita gross domestic product (GDP) in rural settings (\$30,501) and less than 1 time the per capita GDP in urban settings (\$13,856). In cost-effectiveness analysis, the ICER produced by digital comprehensive myopia management strategy (\$37,446 and \$41,814 per DALY averted in rural and urban settings) slightly exceeded the cost-effectiveness threshold. When assuming perfect compliance, full coverage of outdoor activities and spectacles satisfied the cost-effectiveness threshold, and full coverage of outdoor activities produced the lowest cost (\$321 for rural settings and \$808 for urban settings).

Conclusions: Health economic evidence confirmed the cost-effectiveness of promoting digital comprehensive myopia prevention and control strategies for schoolchildren at the national level. Sufficient evidence provides an economic and public health reference for further action by governments, policy-makers and other myopia-endemic countries.

FT-MYO-004

Myopia prevention change in young children wearing DICS and DIMS: a 1-year randomized cohort study

Y. Zhang¹, X. Lin², L. Kong¹, X. Du¹

¹State Key Laboratory Cultivation Base, Shandong Provincial Key Laboratory of Ophthalmology, Eye Institute of Shandong First Medical University, Qingdao, China, ²Shandong Eye Hospital, Shandong Eye Institute, Shandong First Medical University & Shandong Academy of Medical Sciences, Jinan, China

Introduction: Myopia prevention and periretinal defocus change in young children wearing DICS and DIMS: a 1-year randomized cohort study.

Objectives: To investigate the effects of DICS and DIMS on myopia prevention in young children, and to compare the changes of peripheral retinal diopter.

Methods: A 1-year prospective cohort study. A total of 150 young myopic children (6.38 ± 0.80 years) with a mean diopter of (-2.05 ± 0.80) D were randomly assigned to the DISC(Defocus Incorporated Soft Contact lens) group, DIMS(Defocus Incorporated Multiple Segments) group, and SVL(single vision spectacles) group. Refractive error (cycloplegic autorefraction) and axial length were measured at 12-month intervals. Peripheral diopter was detected before and after wearing glasses for 1 month. The data of the right eye were collected. Differences between groups were analysed using t test and Mann-Whitney U test.

Results: 134 children with myopia completed 1-year follow-up. After 1 year of wearing glasses, the axis of eyes in all groups increased compared with that before treatment. The average increase of ocular axis in DISC group (42 eyes), DIMS group (44 eyes) and SVL group (48 eyes) was 0.31 ± 0.17 mm, 0.41 ± 0.21 mm and 0.66 ± 0.30 mm, respectively, with statistical differences among all groups ($P < 0.05$). One year after treatment, DISC wearers delayed axial growth by 53 percent compared to 36 percent for DIMS wearers. After 1 year, compared with baseline, the children in the 3 groups had different degrees of myopic drift in the nasal and temporal sides of the retina, and the Relative Peripheral Refraction (RPR) M in the DISC group had a larger range and amplitude of change, followed by the DIMS group, and the SV group had the least. The RPR of DISC group at 10° , 20° and 30° was -0.63 ± 0.26 D, -0.79 ± 0.45 D and -0.77 ± 0.61 D ($P < 0.05$). In DIMS group, the PRP M at 10° and 20° temporal side was -0.26 ± 0.25 D and -0.39 ± 0.43 D, respectively ($P < 0.05$). The SVL group only showed statistically significant PRP M at 10° temporalis, with a value of -0.16 ± 0.27 D ($P < 0.05$). In addition, Ft (tangential diopter) and Fs (sagittal diopter) also produced different degrees of myopic drift at nasal and temporal angles in the 3 groups.

Conclusions: In young myopic children with early onset of myopia, DISC and DIMS can produce greater RPR and better control the progression of myopia than SVL. Among them, compared with DIMS, DISC produced a larger and wider range of peripheral retinal defocusing diopter, and the effect of axial prevention was better.

FT-MYO-005

Exome sequencing study on 208 patients with Early-Onset High Myopia

X. Sheng¹, W. Rong², H. Li², X. Rui¹, X. Huang², F. Zi²

¹Genetic Eye Disease Laboratory, Gansu Aier Ophthalmology and Optometry Hospital, Lanzhou, China, ²Ningxia Eye Hospital, People's Hospital of Ningxia Hui Autonomous Region, Yinchuan, China

Introduction: High myopia is a common ocular disease worldwide. EoHM is defined as a refractive error of preschool age (7 years), less than -6.00 diopters or greater than 26 mm of ocular axial length. Because preschool children are at less risk of environmental stress, the etiology of eoHM is driven predominantly by genetic factors with minimal environmental effects.

Objectives: To expand our current understanding of the genetic basis of eoHM, we carried out a whole exome sequencing (WES) study to identify potential causal gene variants.

Methods: 208 probands from unrelated families with the first sign of eoHM were enrolled in this study. All participants received comprehensive ophthalmic examinations. WES was performed for the variant detection and stepwise filtered candidate pathogenic variants. All suspected pathogenic variants were verified by Sanger sequencing. The pathogenicity of identified variants were classified according to the American College of Medical Genetics and Genomics guidelines (ACMG).

Results: The potential pathogenic variants in 28 genes were identified in 128 (128/208, 61.6%) probands. Among the 128 probands, 18 (14.1%) had pathogenic variants in 8 genes responsible for high myopia including *CPSF1*, *ZNF644*, *SCO2*, *BSG*, *LRPAP1*, *CTSH*, *ARR3*, *OPN1LW*, 99 (77.3%) with pathogenic variants in 15 genes responsible for inherited retinal diseases (IRDs) including *RPGR*, *USH2A*, *CACNA1F*, *PDE6B*, *RP2*, *EYS*, *PRPF6*, *AIPL1*, *OAT*, *TSPAN12*, *GUCY2D*, *PRPH2*, *FZD4*, *LRP5* and *VCAN*, and 11 (8.6%) with pathogenic variants in 5 genes responsible for systemic syndromes including *COL2A1*, *COL11A1*, *LRP2*, *EP300*, *ARID1B*. The inheritance patterns included 29.7% autosomal dominant (AD), 54.7% autosomal recessive (AR), and 15.6% X-linked (XL). Phenotype analysis showed simple eoHM in 26 probands (20.3%) and as a symptom of various forms of retinal dystrophy in 91 probands (71.1%) as well as systemic syndromes in 11 probands (8.6%). For 91 probands with RetNet genes, although the initial clinical records did not show recognizable signs of original diseases other than high myopia, further ocular and systemic examinations in follow-up confirmed the diagnosis of IRD.

Conclusions: This study provide evidence that a series of known genes responsible for the inherited retinal diseases and systemic syndromes are the candidate genes associated with eoHM, which not only provide clues for genetic screening and further specific clinical examinations of high myopia, but also provide implications for future studies on the molecular genetics of high myopia.

FT-MYO-006

The fundus changes in different AL and its AI quantitative monitoring indexes in 3907 Chinese children with myopia

S. Yi Ning¹, Z. Chen², N. Wang¹, H. Zuo¹

¹Ophthalmology, Xian Xincheng Shiyining Eye Clinic, Xian, China, ²School of Pharmacy, China Xi'an Medical College, Xian, China

Introduction: With the further research on the prevention and control of myopia we have a new recognition on the growth of the eye axial length and the vitreous cavity depth, the weakening of the choroid, the change of the sclera, and also its relationship with myopic fundus changes and its evolution from mild to severe degree. But professional fundus doctors are in short of hands, so we try to use the artificial intelligence technology to make the patient understand whether his/her fundus normal or pathologic, and to visualize the development of myopia during the following.

Objectives: To use artificial intelligence technology to make qualitative and quantitative analysis of the trace changes of fundus in the early stage of myopia in children, and to explore the natural course of myopia development in combination with relevant biological parameters of the eye, so as to provide sensitive criteria for the early detection, timely monitoring myopia progression and adjustment the strategy of myopia prevention and control in children.

Methods: The fundus and related biological parameters of 3907 children under 18 years old were collected and divided into 6 groups according to age. The ocular axial lengths were divided into 8 groups.

The fundus indicators in early myopia are as follows: (1) optic disc. (2) Overall view of fundus; tessellation (3) peridisk choroidal atrophic arcs or arcs (crescent).

SPSS19.0 was used for statistical analysis, including ²analysis, ANOVA analysis of variance, and multiple stepwise linear regression analysis.

Results: The axial length of 6-12 years old is distributed between 22.5 to 26.5mm, younger than 6 is below 22.5mm, older than 12 is over 25.5mm.

The cup and disc vertical diameter ratio of school-age children is 0.4 to 0.5, which accounts for 77%. Tessellation changes less than 0.01 were found in 66.4%, and no crescent changes in 47.68%. The axial length below 24.5 mm showed 0.01 or no tessellation changes and increased by more than 0.1 in the 24.5-25.5mm group. The crescent was mostly physiological changes with 1/10PD and less. The 2/3PD crescent was found over 24.5mm and the 1PD was over 26.5mm.

Conclusions: The 24.5mm axis of the eye can be used as a key inflection point for monitoring myopia progression in school-age children. Therefore, tessellation 0.1 and crescent 1PD are considered as diagnostic criteria. While tessellation 0.04-0.09 and crescent 2/3PD are considered as the early stage or high-risk stage of pathological changes.

FT-MYO-007

Health economic analysis of chain-wide digital management programs for the myopic population in China

K. Zhang¹, R. Li¹, Y. Zhang¹, H. Liu¹, N. Wang¹

¹Ophthalmology Department, Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: This study evaluated the economic benefit of implementing autonomous artificial intelligence management scenarios in urban and rural myopic working populations and compared them with in-person, telemedicine-based scenarios, thereby providing a theoretical basis for the development of myopia management programs in this population.

Objectives: In China, myopia has become the major cause of visual impairment in the working population. However, there is no comprehensive myopia management program. We aimed to evaluate the cost-effectiveness and cost-utility of a scientific management program for the myopic population.

Methods: We built decision-analytic Markov models using TreeAge Pro to evaluate the cost-effectiveness and cost-utility of in-person, telemedicine-based and autonomous artificial intelligence myopia management scenarios from a societal perspective in urban and rural China. A simulated cohort of myopic patients aged 30 years old was modelled using real-world study-based parameters and tracked for 50 1-year Markov cycles. The primary outcomes were incremental cost-utility ratios (ICURs) and incremental cost-effectiveness ratios (ICERs). One-way and probabilistic sensitivity analyses were performed to assess the robustness of the findings.

Results: Compared to no screening, in rural areas, the ICERs for in-person management were less than 3 times China's gross domestic product per capita at \$11,570, however, the ICURs were not within the cost-effectiveness threshold at \$42,163. The telemedicine-based management strategy delivered higher benefits at a lower cost, with ICURs and ICERs of \$18,267 and \$5,011, respectively. The autonomous AI management strategy met the criteria of a highly cost-effective threshold with ICURs and ICERs of \$666 and \$182, respectively. In urban areas, in-person strategies (ICURs \$10,111, ICERs \$2,739) and telemedicine-based strategies (ICURs \$146, ICERs \$39) were also highly cost-effective. Autonomous AI strategies dominated no-screening strategies. Sensitivity analysis demonstrated the robustness of the findings. Screening interval analysis showed that the optimal screening strategy was annual and biannual autonomous AI management in urban and rural areas, respectively.

Conclusions: Telemedicine-based and autonomous AI management scenarios for the myopic population are cost-effective in China. This study provided important evidence for a comprehensive myopia management program for the myopic population.

FT-MYO-008

Automatic characterization of the posterior morphology in highly myopic eyes

X. Chen¹, X. Wang²

¹Department of Ophthalmology, Beijing Friendship Hospital, Capital Medical University, Beijing, China,

²Key Laboratory for Biomechanics and Mechanobiology of Ministry of Education, Beijing Advanced Innovation Center for Biomedical Engineering, School of Biological Science and Medical Engineering, Beihang University, Beijing, China

Introduction: Ocular deformation, particularly posterior staphyloma, manifests as a unique characteristic of the posterior eyeball, involving the retina, choroid and sclera, and is often associated with high myopia and pathologic myopia.

Objectives: To quantitatively analyze the shape of eyes with high myopia using high-resolution three-dimensional (3D) magnetic resonance imaging (MRI) and investigate relationships between myopic traction maculopathy (MTM) and the morphological changes of posterior staphyloma (PS).

Methods: This prospective study enrolled 105 patients with high myopia at Beijing Friendship Hospital of Capital Medical University. All participants underwent a comprehensive ophthalmic examination. MTM was divided into different types by optical coherence tomography, and ocular shapes were categorized by MRI.

Results: A total of 105 patients (105 eyes) were studied, with a mean age of 60.4 ± 13.3 years, mean SER of -9.65 ± 6.30 D, and mean AL of 28.71 ± 2.78 mm. For eyes scanned, spheroidal shape was observed in 35 eyes (33.3%), ellipsoidal shape was observed in 11 eyes (10.5%), conical shape was observed in 17 eyes (16.2%), nasally distorted shaped was observed in 18 eyes (17.1%), temporally distorted shape was observed in 16 eyes (15.2%), and barrel shape was observed in 8 eyes (7.7%). PS was identified on MRI in 84 eyes (80%). The corresponding proportions for the elliptical, conical, nasal torsion, temporal torsion and barrel shapes were 27.9%, 23.1%, 12.9%, 9.5%, 17.1% and 9.5%, respectively. In the eyes without PS, MTM accounted for 23.8%, while with PS the proportion of MTM in eyes increased to 53.8%. 22.9% of the spheroidal shape with MTM, which was the lowest. The proportion of MTM in elliptical, conical, barrel, nasal torsion, and temporal torsion shapes were gradually increased. 45.5% of the nasal torsion shape with MTM, and the incidence of MH and MRS increased significantly. 83.3% of the temporally distorted shape with MTM and MRS were found in 50%.

Conclusions: Not all highly myopic eyes are deformed. Spheroid was the predominant ocular shape. Eyes with PS display more severe myopic maculopathy, moreover nasally and temporally distorted eyes present significantly high percentage of MTM. Quantitative analysis of eyeball morphology based on 3D MRI can help us to explore a simple, safe and accurate diagnosis and treatment evaluation and prediction system for guiding clinical work.

FT-MYO-009

Myopia progression following 0.01% atropine cessation in Australian children: findings from the WA-ATOM study

D. Mackey¹, S. Lee¹, G. Lingham¹, M. Franchina¹, A. Clark¹, P. Sanfilippo²

¹Lions Eye Institute, University of Western Australia, Perth, Australia, ²Centre for Eye Research, Melbourne, Australia

Introduction: A rebound in myopia progression following cessation of atropine eyedrops has been reported, yet there is limited data on the effects of stopping 0.01% atropine compared to placebo control.

Objectives: This study tested the hypothesis that there is minimal rebound myopia progression after cessation of 0.01% atropine eyedrops, compared to a placebo.

Methods: Children with myopia (n=153) were randomised to receive 0.01% atropine eyedrops or a placebo (2:1 ratio) daily at bedtime during the 2-year treatment phase of the study. In the third year (wash-out phase), all participants ceased eyedrop instillation. Participants underwent an eye examination every 6 months, including measurements of spherical equivalent (SphE) after cycloplegia and axial length (AL). Changes in the SphE and AL during the wash-out phase and throughout the 3 years of the study (treatment + wash-out phase) were compared between the treatment and control groups.

Results: During the 1-year wash-out phase, SphE and AL progressed by -0.41D (95%CI= -0.33 to -0.22) and +0.20mm (95%CI= -0.46 to -0.36) in the treatment group compared to -0.28D (95%CI=0.11 to 0.16) and +0.13mm (95%CI=0.18 to 0.21) in the control group. Progression in the treatment group was significantly faster than in the control group (p= 0.016 for SphE and <0.001 for AL). Over the 3-year study period, the cumulative myopia progression was similar between the atropine and the control groups.

Conclusions: These findings showed evidence of rapid myopia progression following cessation of 0.01% atropine. Further investigations are warranted to ascertain the long-term effects of atropine eyedrops.

FT-MYO-010

RMHAS-generated retinal vascular density and mortality risk: findings from UK Biobank study

M. Yusufu^{1,2}, D. Shi^{3,4,5}, X. Shang^{1,2}, M. He^{3,4,5}

¹Centre for Eye Research Australia, Royal Victorian Eye and Ear Hospital, Melbourne, Australia, ²Department of Surgery (Ophthalmology), The University of Melbourne, Melbourne, Australia, ³School of Optometry, The Hong Kong Polytechnic University, Hong Kong, Hong Kong, SAR of China, ⁴Research Centre for SHARP Vision (RCSV), The Hong Kong Polytechnic University, Hong Kong, Hong Kong, SAR of China, ⁵Centre for Eye and Vision Research (CEVR), The Hong Kong Polytechnic University, Hong Kong, Hong Kong, SAR of China

Introduction: Previous studies showed that a sparser retinal vascular network was associated with systemic conditions such as cardiovascular diseases. In our study, we incorporated 6 different measure types encompassing 29 parameters and investigated their associations with mortality risk. We examined the retinal vessel density by arteries and veins, and by their location ie within the macula and outside the macula.

Objectives: To investigate associations between retinal vascular density and the risk of mortality.

Methods: This study used data from the UK Biobank. Retina-Based Microvascular Health Assessment System (RMHAS) to extract retinal vascular parameters from the fundus images. RMHAS was used to assess the quality of images, and those of poor quality were excluded. Considering the imbalanced nature of the dataset, we matched the deceased participants with surviving participants using a 1:3 age and sex-matched ratio. Multiple Imputation by Chained Equations was used to impute missing values. In the multivariate Cox regression model, we adjusted for education, social deprivation, ethnicity, smoking, drinking, body mass index, blood pressure and lipid levels in the age and sex-matched sample.

Results: A total of 51374 participants were included in the analysis, with a median follow-up time of 11.0 years, and 2089 death events were recorded. After matching by age and sex, 8356 participants were included in the analysis. Participants who deceased during follow-up had a median follow-up duration of 7.5 years while that of surviving participants was 10.9 years. The multivariate model revealed that after adjusting for demographic, socioeconomic, health and lifestyle factors, 7 out of 29 Density parameters showed significant associations with all-cause mortality risk. Each standard deviation decrease in arterial area density in the macular region was associated with increased mortality risk with a hazard ratio (HR) of 0.951(0.910-0.994). The arterial skeleton density across the whole image, within the macula, and outside the macula showed HRs of 0.943~0.952. The venular skeleton density outside the macula had an HR of 0.957. In addition, arterial bifurcation density and arc length of non-terminal artery demonstrated an HR of 0.937(0.897-0.979) and 1.049(1.004-1.096).

Conclusions: After adjusting for demographic, socioeconomic, health and lifestyle factors, retinal vascular density was invertedly associated with all-cause mortality, suggesting its potential as a valuable indicator of overall mortality risk.

FT-MYO-011

Global inequality in trachoma from 1990 to 2019: a systemic analysis based on the global burden of disease study 2019

L. Wang¹, Y. Shen², J. Ye¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China,

²College of Mathematics and Computer Science, Zhejiang A & F University, Hangzhou, China

Introduction: Trachoma, the most common infectious cause of blindness worldwide, is a disease of particular focus within the Global Alliance for the Elimination of Trachoma by 2020 (GET2020), as well as the "VISION 2020: The Right to Sight" program. However, despite great achievement has made, trachoma remains an important public health issue, and the goal of eliminating it by 2020 has not been fully achieved.

Objectives: To estimate the global, regional, and national burdens of trachoma between 1990 and 2019 by disease, age, gender, and sociodemographic index (SDI), and to make future predictions based on data from the global burden of disease (GBD) 2019.

Methods: This study conducted a secondary analysis on the prevalence and disability-adjusted life years (DALYs) of trachoma in different gender and age groups across 204 countries and territories as well as 21 geographic regions, using the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD 2019) data. The data from 1990 to 2019 were categorized and analyzed. The countries and territories were further classified based on their SDI quintiles. Additionally, a Bayesian Age-Period-Cohort (BAPC) model was employed to forecast the future burden of trachoma.

Results: Globally, the age-standardized DALY rate of trachoma decreased 69.86% from 7.28 per 100,000 population, (95% Unit Interval: 10.61-7.96) in 1990 to 2.20 per 100,000 population (95% Unit Interval: 1.39-3.33). Meanwhile, the age-standardized prevalence rate (ASPR) of trachoma decreased from 67.62 per 100,000 population in 1990 to 22.87 per 100,000 population in 2019. The highest age-standardized DALYs were observed in low SDI regions, and tropical area especially Sub-Saharan area. Among all the age groups, old people (>60 years old) suffered from the highest prevalence and DALYs, both of which were increased with increasing age. Comparing with other blinding diseases, the trachoma had the greatest reduction in attributable DALYs of all common eye diseases. The overall age-standardized DALY rate is expected to decrease from approximately 2.70 per 100,000 population in 2019 to approximately 2.18 per 100,000 population.

Conclusions: The global disease burden due to trachoma decreased greatly from 1990 to 2019 and it had the greatest reduction comparing with other common blind-causing diseases. Lower HDI, socioeconomic status and latitude were related to a higher national disease burden of trachoma. Our findings could provide necessary information for trachoma control and prevention.

FT-MYO-012

Factors affecting vision in diabetic retinopathy - an Indian clinical trial network Registry of more than 10000 patients

G. Pillai¹, N. Sundaram², C. Sheeba³, B. Sinha⁴, A. Sen⁵, M. Burman⁶, M. Dickson¹

¹Ophthalmology, Amrita Hospital, Amrita Viswavidyapeedom University, Kochi, India, ²Ophthalmology, Adityajyot Hospital, Mumbai, India, ³Ophthalmology, RIO Trivandrum, Trivandrum, India, ⁴Ophthalmology, RIO Patna, Patna, India, ⁵Ophthalmology, SNC, Chitrakoot, India, ⁶Ophthalmology, SSDN, Guwahati, India

Introduction: The Indian Ophthalmology clinical trial network was funded by Govt of India, NBM, BIRAC and it encompass 6 sites in different areas of India. It developed registries of eye diseases of retina, cornea, glaucoma and uveitis with more than 10000 patients and more than 700 variables per patient. The current study is based on patients with diabetic retinopathy.

Objectives: The objective of this study was to identify factors influencing vision in patients with diabetic retinopathy.

Methods: A total of 3699 patients with DR were included in the analysis. Firstly, patients were grouped based on best-corrected visual acuity (BCVA) in LogMAR into categories of ≥ 0.5 and < 0.5 . Secondly, patients were categorized based on BCVA as ≤ 1 and above 1 for further analysis. Binomial logistic regression was performed with vision as the dependent variable and the following predictors: age_group, BMI (Body Mass Index), Diabetes Mellitus (DM) Duration, DM Treatment Insulin, Coronary Artery Disease, Dyslipidemia, Alcohol History, Tobacco History, Hb (Hemoglobin), Serum Urea, Serum Creatinine, DR (Diabetic Retinopathy) Grade, Vitreous Hemorrhage, and Tractional Retinal Detachment. The predictors chosen for inclusion in the logistic regression model were determined based on both their statistical significance ($p < 0.05$) in chi-square analysis and their perceived medical importance.

Results: When considering patients with BCVA of 0.5 or higher, Obesity, with an odds ratio (OR) of 0.62, longer durations of diabetes mellitus (DM) greater than 15 years with an OR of 0.60. Increased Hb levels (>10) with an OR of 0.68 had lower odds of reaching 0.5 logMAR. Conversely, higher Serum Urea levels (>40) with an OR of 1.4, the presence of vitreous hemorrhage and tractional retinal detachment significantly increased the likelihood of having a BCVA of 0.5 or higher, with respective odds ratios of 3 for both factors.

In patients with BCVA greater than 1, Longer DM durations (>15 years) with an OR of 0.55 had reduced odds of developing 1 log MAR. However, the presence of proliferative diabetic retinopathy (PDR) with an OR of 1.45. the presence of vitreous hemorrhage and tractional retinal detachment substantially increased the likelihood of having a BCVA greater than 1, with respective odds ratios of 3.78 and 4.27.

Conclusions: Obesity and higher Hb levels were associated with better than 0.5 log MAR, presence of PDR, vitreous hemorrhage and TRD was associated with higher odds of vision below 0.5 and 1 logMAR.

FT-MYO-013

Statistical analysis of continuous correlated eye data: findings from simulation studies and analysis of real data

G.-s. Ying¹, Z. You²

¹Ophthalmology, University of Pennsylvania, Philadelphia, United States, ²School of Engineering and Applied Science, University of Pennsylvania, Philadelphia, United States

Introduction: In ophthalmic research, measurement (e.g. visual acuity) is often taken from both eyes of a subject to evaluate its association with eye-specific or person-specific characteristics or treatment. This requires the eye to be the unit of statistical analysis. Because the outcomes from two eyes of a subject are usually positively correlated, appropriate data analysis requires accounting for the inter-eye correlation. However, investigators often use the inappropriate analysis approaches, producing biased or inefficient estimates that leads to invalid conclusion.

Objectives: To promote appropriate analysis of correlated eye data, we evaluated various analysis methods for correlated continuous eye data through simulation studies and analysis data from real ophthalmic studies.

Methods: We simulated correlated eye data with varying sample size and inter-eye correlation from two-eye design (two eyes of a subject in the same or different comparison groups) or mixture design (subjects contribute one or both eyes to the study). The simulated data are analyzed using standard linear regression model that ignores inter-eye correlation, mixed-effects model and marginal model that account for the inter-eye correlation. We analyzed data for a study comparing baseline refractive error between one eye with choroidal neovascularization (CNV) and the unaffected fellow eye, and for a study determining factors associated with visual field.

Results: In simulation studies, standard linear regression model inflates the type I error rate when two eyes of a subject are in the same comparison group, and decreases the statistical power when two eyes of a subject are in two different comparison groups. The mixed effect model and marginal model maintain the nominal type I error rate of 0.05 and achieve desirable statistical power. In the analysis of real refractive error data, standard regression yielded insignificant difference between eyes with CNV and fellow eyes (0.15 diopters (D); 95% CI: -0.03 to 0.32D, $p=0.10$), while mixed effects model or marginal model provided same difference but with narrower 95% CI (0.01 to 0.28D) and statistical significance ($p=0.03$).

Conclusions: In research involving both eyes, it is important to account for the inter-eye correlation in statistical analysis, and ignoring inter-eye correlation can lead to invalid conclusions. Mixed effects model or marginal model using the eye as the unit of analysis can be applied to appropriately account for the inter-eye correlation and maximize power and precision.

FT-MYO-014

Five-year incidence of age-related macular degeneration and its risk factors in Chinese: the Tongren Health Care Study

Y. Cui¹, J. Cui², C.C. Xue³, Y. Mao¹, D.N. Chen², J.B. Jonas⁴, Y. Wang^{5,1}

¹Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Medical University, Beijing, China, ²Department of Physical Examination, Beijing Tongren Hospital, Capital Medical University, Beijing, China, ³Singapore Eye Research Institute, Singapore National Eye Centre, Singapore, Singapore, ⁴Department of Ophthalmology, Medical Faculty Mannheim of the Ruprecht-Karls-University Heidelberg, Mannheim, Germany, Mannheim, Germany, ⁵Beijing Institute of Ophthalmology, Beijing Tongren Hospital, Capital Medical University, Beijing Ophthalmology and Visual Sciences Key Laboratory, Beijing, China, Beijing, China

Introduction: Older age, female sex, and short axial length were risk factors for early age-related macular degeneration (AMD) in Chinese. More information is needed on which systemic parameters may be related to the incidence of AMD and may as risk factors influence the course of the disease.

Objectives: To examine the 5-year incidence of AMD and its associated factors in an adult Chinese population.

Methods: The Tongren Health Care Study included individuals attending regular health care check-up examinations in the Beijing Tongren Hospital. Baseline examinations were performed from 2014 to 2015, with 5-year follow-up examinations conducted between 2019 and 2020. Detailed medical examinations and ophthalmic examinations were carried out. Using fundus photographs, AMD was evaluated according to the Beckman Initiative guidelines.

Results: A total of 5658 participants with gradable photographs at both examinations were included in the study, comprising 58.0% women, with a mean age of 54.9±11.0 years. The 5-year incidence rates of any, early, intermediate, and late AMD were 6.1% (95%CI: 5.5%, 6.8%), 5.0% (95%CI: 4.4%, 5.6%), 3.4% (95%CI: 2.9%, 3.9%), and 0.3% (95%CI: 0.2%, 0.4%), respectively. In multivariate analysis, incident early AMD was associated with older age ($P<0.001$; OR=1.04;95%CI:1.02-1.06), female sex ($P=0.011$; OR=1.42;95%CI:1.08-1.86), and a higher estimated glomerular filtration rate (eGFR) level ($P=0.020$; OR=1.15;95%CI:1.02-1.30), while having diabetes mellitus was a protective factor ($P=0.019$; OR=0.61;95%CI:0.41-0.92). Incident intermediate AMD was associated with older age ($P<0.001$; OR=1.05;95%CI:1.04-1.07), higher HDL-cholesterol level ($P<0.001$; OR=1.97;95%CI:1.38-2.83) and lower triglyceride level ($P=0.008$; OR=0.77;95%CI:0.64-0.93).

Conclusions: Higher eGFR level was, beside older age and female sex, a risk factor for incident early AMD, while diabetes was a protective factor. Additionally, older age, higher HDL cholesterol level, and lower triglyceride level were risk factors for incident intermediate AMD. This may point to the role of renal circulation and lipid metabolism in incident AMD.

FT-MYO-015

Predicting cycloplegic refraction and detecting myopia from noncycloplegic parameters in Chinese children and adults

Y. Sun¹, S.-M. Li¹, J. Fu¹, N. Wang¹

¹Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: Myopia has become a major public health issue, and governments have taken comprehensive actions to address it. However, a simple approach is still needed to accurately assess refractive status, since it is hard to apply cycloplegia in large-scale screening.

Objectives: This study aims to establish a predictive model for cycloplegic refraction and refractive status, utilizing objective parameters obtained without cycloplegia.

Methods: Subjects aged 3 to 24 years were included in this study. Cycloplegia was achieved through the administration of 1% cyclopentolate in all subjects, followed by the measurement of refraction using an autorefractor. Ocular biometric parameters were quantified utilizing an optical biometer. The development and validation of the predictive model were conducted through multiple regression analysis within training and testing cohorts (in a 7:3 ratio), with noncycloplegic parameters included. The model's performance was subsequently assessed using Bland-Altman plots and ROC curve analysis.

Results: The study encompassed 32,006 participants aged 3 to 24 years, comprising 24798 children and 7208 young adults. The variance of cycloplegic spherical equivalent (SE) could be largely explained by age, gender, body mass index, noncycloplegic SE and ocular biometric parameters. When uncorrected visual acuity at distance was added to this model, no obvious improvement was observed. This model demonstrated a high degree of accuracy in predicting cycloplegic refraction, evidenced by an internal correlation coefficient (ICC) of 0.945 in the testing cohort. Subgroup analysis in the testing cohort revealed ICC values of 0.951 in young adults, 0.938 in middle school students, 0.915 in primary school students, and 0.698 in preschool children. Moreover, the model exhibited robust diagnostic capability for myopia, high myopia, and hyperopia, with area under curve (AUC) values of 0.974, 0.992, and 0.939, respectively, indicating the highest diagnostic accuracy in young adults and while lowest in preschool children.

Conclusions: The study demonstrated that it was reliable to predict cycloplegic refraction and detect myopia using a multiple model with parameters of natural, noncycloplegic eyes. Particularly, this model can help evaluate the prevalence of myopia in the general population and explore risk factors of myopia in large sample sizes. This approach can also be useful when cycloplegia is challenging, for instance, in school screening, epidemiologic studies, and certain clinical settings.

FT-MYO-016

Fundus tessellation and parapapillary atrophy, as ocular characteristics of spontaneously high myopia in macaques

J. Tian¹, J. Wu^{1,2}, N. Wang¹, Y. Zhuo²

¹Capital Medical University/Beijing Tongren Hospital/Beijing Tongren Eye Center/Beijing Key Laboratory of Ophthalmology and Visual Sciences/1. Beijing Institute of Ophthalmology, Beijing, China, ²Sun Yat-sen University/State Key Laboratory of Ophthalmology/Zhongshan Ophthalmic Center, Guangzhou, China

Introduction: Non-human primates exhibit close DNA homology with these species and maintain highly conserved protein sequences with humans. Recent studies have demonstrated that macaques exhibit spontaneous ocular diseases resembling human myopia. In clinical practice, myopia and high myopia have different clinical significance. Fundus tessellation and PPA were widely used in myopic population investigation and are regarded as pivotal features for high myopia. Do these markers retain their significance in non-human primates' eyes with high myopia? What attributes are associated with them? A considerable number of macaques in the non-human primate (NHP) eye study exhibited spontaneous high myopia. Therefore, our study aimed to evaluate the ocular characteristics of macaques naturally experiencing high myopia.

Objectives: This study aimed to evaluate the ocular characteristics associated with spontaneously high myopia in adult nonhuman primates (NHPs).

Methods: A total of 537 eyes of 277 macaques with an average age of 18.53 ± 3.01 years (range: 5-26), raised in a controlled environment, were included. We measured ocular parameters, including spherical equivalent (SE), axial length (AXL), and intraocular pressure. The 45-degree fundus images centered on the macula and the disc assessed the fundus tessellation and parapapillary atrophy (PPA). Additionally, optical coherence tomography (OCT) was employed to measure the thickness of the retinal nerve fiber layer (RNFL).

Results: The mean SE was -1.58 ± 3.71 D. The mean AXL was 18.76 ± 0.86 mm. The prevalence rate of high myopia was 17.7%. As myopia aggravated, the AXL increased ($r = -0.498$, $P < 0.001$). Compared with non-high myopia, highly myopic eyes had a greater AXL ($P < 0.001$), less RNFL thickness ($P = 0.004$), a higher incidence of PPA ($P < 0.001$), and elevated grades of fundus tessellation ($P < 0.001$). The binary logistic regression was performed showed PPA (OR, 4.924; 95% CI, 2.375-10.207; $P < 0.001$) and higher grades of fundus tessellation were independent risk characteristics for high myopia (OR, 1.865; 95% CI, 1.474-2.361; $P < 0.001$).

Conclusions: In NHPs, a higher grade of fundus tessellation and PPA were significant biomarkers of high myopia.

FT-MYO-017

Trio-based whole exome sequencing reveals mutations in early-onset high myopia

Y.-M. Guo¹, G. Zhang¹, J. Wei¹, D.-x. Zhou², X.-F. Huang³, L. Ye¹

¹Optometric Center, Xi'an People's Hospital (Xi'an Fourth Hospital), Xi'an, China, ²Department of Pathology, School of Basic Medical Sciences, Health Science Center,, Xi'an Jiaotong University, Xi'an, China, ³Zhejiang Provincial Clinical Research Center for Pediatric Disease, The Second Affiliated Hospital and Yuying Children's Hospital of Wenzhou Medical University, Wenzhou, China

Introduction: Myopia is a leading cause of global visual impairment, with its prevalence rapidly increasing worldwide, especially in East Asia. High myopia (HM), an extreme form of myopia characterized by a refractive error of ≤ -6 diopter (D) (or axial length ≥ 26 mm), signifies a critical aspect within the myopia spectrum. In 2000, around 163 million individuals were diagnosed with HM, accounting for 2.7% of the global population, and forecasts suggest a staggering climb to nearly 1 billion people with high myopia by 2050. Moreover, individuals with HM face escalated risks of developing additional ocular complications, such as cataracts, glaucoma, retinal detachment, and chorio-retinal degeneration, positioning HM as a primary driver of irreversible blindness.

Objectives: This study aimed to elucidate the genetic foundations associated with early-onset high myopia (eoHM) while delineating the genetic landscape specific to Shaanxi Province, China.

Methods: A comprehensive analysis of whole exome sequencing (WES) was conducted involving 26 familial trios displaying eoHM. An exacting filtration protocol identified potential candidate mutations within acknowledged myopia-related genes, and susceptibility loci. Subsequently, computational methodologies were employed for functional annotations and pathogenicity assessments.

Results: Our investigation identified 7 genes and 10 variants associated with HM across 7 families, including a novel mutation in the *ARR3* gene (c.139C>T, p.Arg47*) and two mutations in the *P3H2* gene (c.1865T>C, p.Phe622Ser and c.212T>C, p.Leu71Pro). Pathogenic mutations were found in syndromic myopia genes, notably encompassing *VPS13B*, *TRPM1*, *RPGR*, *NYX*, and *RP2*. Additionally, a thorough comparison of previously reported causative genes of syndromic myopia and myopia risk genes with the negative sequencing results pinpointed various types of mutations within risk genes.

Conclusions: This study focuses on eoHM localized within Shaanxi Province. Identifying and characterizing genes associated with myopia significantly contribute to our understanding of its genetic determinants. These findings also enhance our understanding of HM's genetic landscape, paving the way for future research and potential treatments.

P-MYO-001

Assessing the 2-year Efficacy of Atropine, Orthokeratology, and Combined Therapies: Myopia Control and Choroidal change

S. Xu¹, Y. Hu¹, X. Yang¹

¹Sun Yat-Sen University Zhongshan Ophthalmic Center State Key Laboratory of Ophthalmology, Guangzhou, China

Introduction: Myopia is a public ocular health issue, and the burden of myopia becomes greater after COVID-19 home confinement. Orthokeratology (ortho-k) and 0.01% atropine drops are proven effective on controlling myopia, but lack long-term RCTs comparing their efficacy, meanwhile few studies examined long-term choroidal changes under these treatments.

Objectives: This study assesses the 2-year efficacy of ortho-k, 0.01% atropine, and combined treatment in myopia control and investigates choroidal changes during these treatments.

Methods: This age-stratified RCT included 164 children aged 8-12, with refraction from -1.00 to -6.00D. They were split into 2 age groups and randomly assigned to control, atropine, ortho-k, or combined treatment groups. Axial length (AL) was recorded at baseline, 6, 12, 18, and 24 months. OCT images were also taken at these points to measure choroidal thickness and contour. The reliability for tracking choroidal changes was confirmed. The primary analysis followed an intention-to-treat approach, including all randomized participants.

Results: As for the efficacy, all treatments notably slowed AL elongation ($p < 0.05$). Over 2 years, combined therapy outperformed monotherapy (all $p < 0.05$). When stratified by age, in the 8-10-year subgroup, no significant difference was found between combined therapy and ortho-k ($p = 0.106$), similar to the 10-12-year group's findings between combined therapy and atropine ($p = 0.106$). Notably, ortho-k proved more effective in younger kids, indicated by its age-related effects compared to control and atropine (p for interaction = 0.013, 0.035). As for the choroidal change, choroidal thickness became thinning and contour became prolate with time in control (all $p < 0.001$). Ortho-k enhanced choroidal thickness ($p < 0.001$) and maintained contour ($p < 0.05$), showing greater temporal thickening and less contour change ($p < 0.001$). A notable link existed between 2-year choroidal thickness and AL change in control ($r = -0.52$, $p < 0.001$), but not with ortho-k ($r = -0.05$, $p = 0.342$). The effect of ortho-k on choroid remained stable after adjustments in multivariable model.

Conclusions: Combining atropine and ortho-k can boost myopia control compared to monotherapy. Ortho-k benefits younger children more and improves choroidal thickness and contour, though this effect lessens in a long term.

P-MYO-002

Clinical outcomes of posterior scleral reinforcement in Chinese high myopia children

T. Qiao¹, H. Ye¹, W. Fang¹, Y. Di¹

¹Department of Ophthalmology, Shanghai Children's Hospital, School of medicine, Shanghai Jiao Tong University, Shanghai, China

Introduction: High myopia, defined as refractive error of -6.00 diopters or worse, is the most frequent cause of children and teenagers' visual impairment in Asian countries. High myopic eyeballs expanded globally, especially in axial length (AL). High myopia can cause many ocular complications in posterior segment, such as myopic maculopathy, retinal detachment, and eventually lead to non-reversible visual impairment. Previous literature had suggested that eyeball radius increase in high myopia eyes led to the retinal blood circulation reduction. Posterior scleral reinforcement (PSR) surgery was clinically applied to prevent further vision loss by thickening the sclera over the posterior pole and to slow the AL elongation. Many studies indicated that PSR can promote the growth of microvessels and increase the blood flow in posterior pole. We aim to observe PSR surgery clinical outcomes by analyzing the retinal vessel alteration in pediatric patients with high myopia.

Objectives: We aim to observe the posterior scleral reinforcement (PSR) clinical outcomes in children with high myopia and analyze the retinal vessel alteration before and after PSR by using angiography optical coherence tomography (angio-OCT).

Methods: Fifty-six pediatric participants (112 eyes) clinically diagnosed high myopia were recruited and were treated by PSR in Shanghai Children's Hospital from June 1, 2021 to May 1, 2023. The average age ranged from 5.42 to 14.83 years (mean 8.83 years) and mean follow up duration was 8.7 months (3–24 months).

Results: The AL was significantly shortened after PSR ($p < 0.05$). The spherical equivalent (SE) and BCVA were also improved without severe rejection in the follow-up. Compared with baseline, angio-OCT parafoveal vessel indices including vascular area density (VAD) and vascular skeleton density (VSD) on the superficial capillary plexus layer (SCPL), as well as VAD and vessel perimeter index (VPI) on the deep capillary plexus layer (DCPL), were significantly increased after PSR surgery ($p < 0.05$). VPI on the SCPL, vascular diameter index (VDI) and VSD on the DCPL were also improved without statistical difference after PSR. The VSD on SCPL, VAD on DCPL of the right eyes and the VPI on SCPL of the left eyes were significantly increased after PSR ($p < 0.05$).

Conclusions: PSR surgery can reverse the AL, stable BCVA and SE in HM children to a certain extent in early postoperative period. The angio-OCT parameters indicated that the retinal microcirculation supply was significantly improved after PSR.

P-MYO-003

Tear inflammatory cytokines as potential biomarkers for myopic macular degeneration

*X. Zhu*¹

¹Ophthalmology, Eye & ENT Hospital of Fudan University, Shanghai, China

Introduction: Previous studies have reported that inflammatory cytokine levels increase in the intraocular fluids (aqueous humor and vitreous) of highly myopic eyes. However, there has been currently no study revealing the levels of inflammatory cytokines in tear.

Objectives: This study aimed to determine tear cytokine levels of highly myopic eyes, and their relationships with myopic macular degeneration (MMD).

Methods: This case-control study screened inflammatory cytokines of tear samples from 132 highly myopic and 105 emmetropic eyes using a multiplex cytokine antibody array, and cytokines showing significant intergroup differences were further validated using ProQuantum immunoassays in tear samples from another 60 highly myopic and 60 emmetropic eyes. Ultra-widefield fundus photographs of eyes were classified according to the metaanalyses of the Pathologic Myopia Classification. Associations between tear cytokine levels and MMD category were investigated.

Results: As a result, tear levels of interleukin (IL)-6, IL-13 and monocyte chemoattractant protein (MCP)-1 were screened significantly higher in highly myopic eyes than in emmetropic controls (IL-6: 11.70 ± 16.81 versus 8.22 ± 10.76 pg/mL; MCP-1: 63.60 ± 54.40 versus 33.87 ± 43.82 pg/mL; both $P < 0.05$). Validation assays further demonstrated the elevated concentrations of IL-6 and MCP-1 (IL-6: 13.97 ± 8.41 versus 8.06 ± 7.94 pg/mL, $P < 0.001$; MCP-1: 32.69 ± 8.41 versus 18.07 ± 8.41 pg/mL, $P = 0.003$). Tear levels of IL-6 and MCP-1 differed significantly among MMD categories (both $P < 0.05$). The area under receiver operating characteristic curve were 0.783 and 0.682 respectively (both $P < 0.05$), when using tear IL-6 and MCP-1 levels to predict the presence of MMD (category ≥ 2). The ordered logistic regression model also indicated that longer axial length, and higher IL-6 and MCP-1 tear levels were independent predictors of higher MMD category.

Conclusions: In our study, highly myopic eyes presented significantly higher levels of tear IL-6 and MCP-1, which may also serve as potential biomarkers for MMD.

P-MYO-005

Short-term observation of the changes in vault, IOP and correlated factors after ICL V5 (VICM5) model implantation

K. Kamilov¹, N. Zaynutdinov², A. Yusupov²

¹Ophthalmology, Tashkent Medical Institute of Advanced Education, Tashkent, Uzbekistan,

²Ophthalmology, Republican Specialized Scientific and Practical Medical Center for Eye MicroSurgery, Tashkent, Uzbekistan

Introduction: The EVO Implantable Collamer Lens (ICL; V4c model; STAAR Surgical, Monrovia, California, USA) is a single-piece posterior chamber phakic intraocular lens designed with a central port. Since it became commercially available in 2011, it has been shown to be a safe and effective way to correct myopia [1]. ICL V4c model has eliminated the prior procedure of iridotomy or iridectomy, which is required by ICL V4 model implantation [2].

The central hole helps the aqueous flow from the posterior chamber to the anterior chamber, which maintains the normal physiology of the anterior segment of the eye. Kawamorita et al [3] demonstrated that the 0.36 mm central port increases aqueous flow by using computational fluid dynamics technology and discovered a decreased risk of anterior subcapsular cataracts.

Objectives: In this study, we aimed to assess safety and efficacy of clinical outcomes during 6 months post-op period and evaluate the changes in vault and intraocular pressure (IOP), central corneal thickness (CCT), anterior chamber depth (ACD) and the correlative factors after V5 model implantation.

Methods: In this retrospective, consecutive, observational study, 58 eyes of 30 patients had been investigated after implantation of spheric ICL (VICM5) V5 model. Patients were followed up for at least 6 months, during which manifest refraction; uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), intraocular pressure (IOP) and vault were measured. Pearson's correlation analysis was used to identify variables correlated with changes in vault.

Results: All surgeries were performed safely with no complications during 6 months follow-up period. Safety and efficacy indices were 1.43 and 1.34, respectively. No eye had decreased BCVA and UCVA was equal to or better than preoperative BCVA in 50 eyes (86.2%) with high myopia. The mean preoperative manifest spherical equivalent (MSE) was -10.59 ± 3.4 D and, which postoperative refractive measures reduced to -0.5 ± 0.75 D, respectively. Further 89% were within ± 0.5 D, and 100% were within ± 1.0 D of the attempted refraction. Changes in vault were significantly correlated with preoperative ACD, Axial length, IOP, CCT measures.

Conclusions: Visian ICL V5 model implantation is a safe, effective and alternative refractive surgery method for high myopia correction. Preoperative biometric parameters including ACD, Axial length, IOP and CCT may influence changes in postoperative vault value.

P-MYO-007

Does wearing spectacles affect exophthalmometry values on myopia? A study based on propensity score matching

H. Zhang¹, R. Wei¹

¹Optometry Center, Tianjin Medical University Eye Hospital, Tianjin, China

Introduction: In China, many parents are reluctant to let their myopic children wear glasses, worried that long-term wearing glasses will lead to eyeball protrusion. This stereotype has led to a very low rate of glasses-wearing among myopic children, which in turn has further increased myopia progression. We try to clarify whether spectacle affects exophthalmometry values (EVs) on myopia and explore the risk factors of EVs on myopia.

Objectives: To clarify whether spectacle affects EVs on myopia and explore the risk factors of EVs on myopia.

Methods: Cross-sectional study. A total of 966 university students (1,932 eyes) underwent slit lamp microscopy, EVs measurements, non-cycloplegia auto-refraction, lensometer test, visual acuity test, subjective refraction, and ocular biometric parameters by Lenstar 900. A 1:1 propensity score matching (PSM) was performed between the spectacle group and the non-spectacle group to compare the differences in EVs and visual acuity. Linear regression was used to analyze the effect of different factors on the EVs in all myopic students.

Results: The mean EVs were 14.03 ± 1.87 mm. There were significant differences in the distribution of myopia severity between the spectacle group and non-spectacle group before matching, and after PSM, the two groups were well balanced with good comparability. There was no significant difference in EVs between the two groups (13.66 ± 1.85 mm vs. 13.93 ± 1.87 mm; $t=1.14$, $p=0.25$). Both univariate and multivariate linear regression showed that SE (spherical equivalent) and AL (axial length) influencing EVs, EVs increase by 0.06 mm for every 1D increase in SE towards myopia (SE: $\beta=-0.06$, 95%CI: -0.11, -0.006, $p=0.03$); EVs increase by 0.17 mm for every 1 mm increase in AL (AL: $\beta=0.17$, 95%CI: 0.06, 0.28, $p=0.003$). SE was negatively related to EVs, AL was positively related to EVs.

Conclusions: Wearing spectacles may not affect the EVs of myopias. There is no need to refuse spectacles for fear of eye prominence. The higher the degree of myopia, the longer the AL, and the higher EVs. Controlling the progression of myopia and reducing the AL is the only way to reduce the EVs.

P-MYO-008

Myopic uprising: illuminating the dominance among secondary school students in Osun State, Nigeria

*E. Ayeni*¹

¹Community Advancement Initiative for Self Reliance, Osogbo, Nigeria

Introduction: The prevalence of myopia, or nearsightedness, has asserted its dominance among these young minds, presenting a distinctive challenge to their academic pursuits and overall well-being. As we embark on an exploration of myopia dominance among secondary school students in Nigeria, this study aims to uncover the underlying factors contributing to this prevalence and underscores the critical need for awareness, intervention, and visionary strategies.

Objectives: This study aims to unveil the prevalence of myopia as the predominant refractive error among secondary school students in Osun state, Nigeria, striving to illuminate the magnitude of this visual health concern. The primary objective is to provide a comprehensive understanding of the myopic uprising within this demographic, emphasizing the urgency for targeted interventions and awareness campaigns.

Methods: A cross-sectional study was conducted across different private and public schools in selected urban and rural communities in Osun state regions of Nigeria, involving a representative sample of secondary school students. The research employed a combination of visual acuity assessments, autorefraction, and comprehensive eye examinations to diagnose refractive errors. The collected data was analyzed to determine the prevalence and distribution of myopia among the surveyed students, with a focus on identifying potential risk factors.

Results: The results showcased a remarkable myopic uprising, establishing myopia as the prevailing refractive error among secondary school students in Nigeria. A substantial percentage of students exhibited myopic conditions, emphasizing the need for proactive vision care measures. The findings also shed light on potential factors contributing to the myopic dominance, including lifestyle, socio-economic factors, and access to eye care services.

Conclusions: This study concludes with a call to address the myopic uprising among secondary school students in Nigeria. The dominance of myopia underscores the imperative for targeted interventions, including routine vision screenings, educational initiatives, and accessible corrective measures. By showing the extent of myopia within this demographic, this research lays the foundation for strategic approaches that can mitigate the impact of myopia on academic performance and overall well-being of the students.

P-MYO-009

Myopia: a cross-sectional study

*R. Deka*¹

¹Ophthalmology, All India Institute of Medical Sciences, Guwahati, India

Introduction: A cross-sectional study was undertaken analyzing the reading habits of 1600 young children and the trigger and progress of myopia in them. Given that the faculty of reading is a relatively new, but widely increasing, concept in human evolution, the findings of this study make interesting revelations.

Objectives: Myopia is one of the oldest known human medical conditions. Since its occurrence was understood around 350 BC, various remedial measures have been devised with varied success. Yet, why has the condition and its cure remained elusive? From an evolutionary standpoint, the human eye is a miraculously intricate instrument. Research has revealed, with increasing certainty, that the incidence of myopia has rapidly risen in the last few decades. Understanding the root of this pattern is crucial insofar as it could cripple the human race, and momentary solutions may be insufficient. Among others, the role of gene mutation in myopia and its consequences are yet to be clearly understood.

Methods: 1600 children aged 4 to 11 years, divided into eight groups, from varied backgrounds, were examined randomly for myopia in any form over a one-year period. The study was designed in a manner that their reading habits, family histories, socio-economic status etc. were blinded by observers. Standard protocols were followed in terms of statistical analyses of the data collected, and the association of myopia with other variables. The children identified as myopic have thereafter been observed for at least two years.

Results: The study found that 91 out of the 1600 children had bilateral myopia. 11 children had a definite family history of myopia. Others were sporadic in nature. Among street children of lower socio-economic backgrounds, not a single case of myopia was detected. A strong relationship was seen between the progress of myopia and the intensity and duration of reading, which might indicate ciliary over-activity.

Conclusions: In the global south, myopia incidence is steadily progressing even as it remains less common than in the global west. Excessive reading and early exposure to electronic gadgets may play a role in this increased incidence. To reduce the use of accommodation to its highest limit, suggestions such as the use of increased font size in primary and secondary school textbooks along with reduction of screen time on gadgets are made, which may enable a check on the rapid progress, though not the occurrence, of myopia.

P-MYO-010

Changes in choroidal thickness and blood flow in myopia and Repeated Low-level Red-Light therapy in Guinea pigs

X. Zhong¹, A. Xiang¹

¹Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Besides light intensity, the light spectrum and color temperature may be the key to controlling the progression of myopia. In animal models, the effects of different monochromatic light environments on refractive development are inconsistent. Repeated low-level red-light (RLRL) therapy is an emerging treatment for myopia control. We want to explore the impact of this treatment approach on animal models.

Objectives: To evaluate the changes in ocular refractive development, choroidal thickness (ChT), and choroidal blood flow (CBF) in guinea pigs with form-deprivation myopia (FDM) treated with repeated low-level red-light (RLRL) therapy.

Methods: Twenty-eight 3-week-old male tricolor guinea pigs were randomly divided into the normal control (NC) group (n = 10), the form deprivation (FD) group (n = 10), and the red-light (RL) group (n = 8). Noninvasive optical coherence tomography angiography was utilized to detect the ChT, vascular area density (VAD), vascular skeleton density (VSD), and blood flow signal intensity (Flux) in FDM guinea pigs treated with RLRL therapy.

Results: The NC group had a higher ChT than the FD group at week 1 ($P < 0.05$). At weeks 2 and 3, the NC group had a higher ChT than the FD and RL groups, and the RL group had a higher ChT than the FD group (all $P < 0.05$). Additionally, the NC group had a higher VAD, VSD, and Flux of the choriocapillaris layer than the FD group at three follow-up time points (all $P < 0.05$). The Flux in the NC group was also higher than that in the RL group (all $P < 0.05$). At week 3, the NC group had a higher VSD than the RL group, and the VSD and Flux were higher in the RL group than in the FD group (all $P < 0.05$). Correlation analysis results showed that weekly changes in refraction were positively correlated with changes in axial length and ChT (all $P < 0.05$). AL and ChT changes were positively correlated ($P < 0.05$). ChT changes were positively correlated with changes in the VAD, VSD, and Flux in the choriocapillaris layer, as well as VSD and Flux changes in the medium and large vessel layers (all $P < 0.05$).

Conclusions: RLRL therapy can effectively inhibit the progression of FDM in guinea pigs, which may be related to an increase in CBF in the choriocapillaris layer. This study provides animal model evidence for the effective inhibition of myopia progression by RLRL.

P-MYO-011

A machine-learning-based bibliometric analysis of the scientific literature on orthokeratology

X. Zhang¹, Y. Xie²

¹Guangzhou Aier Eye Hospital, Jinan University, Guangzhou, China, ²Yangjiang City Bainian Yanshen Pharmaceutical Technology Co., Yangjiang, China

Introduction: The prevalence of myopia in children is increasing worldwide. A number of studies regarding the effect of orthokeratology on myopia progression have been published. At present, there were no published studies have assessed the orthokeratology field using bibliometric tools.

Objectives: This study aimed to analyze orthokeratology research hotspots and frontiers through bibliometrics to provide a scientific and accurate reference for new and existing researchers.

Methods: The scientific publications in the field of orthokeratology published between 1995 and 2023 were systematically retrieved from the Web of Science Core Collection (WoSCC). The analysis of these publications was conducted utilizing the Bibliometrix package in the R language, alongside Biblioshiny and Microsoft Excel software. Data were presented employing descriptive statistical methods. Inferred bibliometric analyses encompassed clustering analysis of selected parameters such as keywords, Keyword Plus terms, titles, and abstracts. Additionally, Bradford's law was applied to evaluate the distribution of core journals, and Sankey diagrams were employed to assess the evolving trends and interconnections among research themes over time.

Results: A total of 740 articles related to research on orthokeratology were retrieved from the WoSCC. Research on orthokeratology has shown a steady growth trend, with an annual growth rate of 18.75%. China, Australia, and the United States are the most productive countries, with China contributing the most in terms of output. The journals with the highest number of publications: Optometry and Vision Science (n=110), Contact Lens and Anterior Eye (n=96), and Eye & Contact Lens (n=72), while CHO P (n=76) and CHEUNG SW (n=47) are the most active authors. Common keywords in research literature over the past three decades emphasize key areas such as corneal reshaping in pediatric populations, prevalence and progression of myopia, contact lenses, refractive errors, and changes in axial length.

Conclusions: In conclusion, this bibliometric analysis provided a comprehensive overview of the current status of orthokeratology research, which helps to better understand the development of this field over the past 30 years.

P-MYO-012

Effects of spectral purity on emmetropization in blue light-exposed guinea pigs

J. Xiao^{1,2}, D. Wang²

¹Sun Yat-sen University, Shenzhen, Guangdong, China, ²The Seventh Affiliated Hospital of Sun Yat-sen University, Shenzhen, Guangdong, China

Introduction: Myopia, a global public health issue, has posed a threat to the well-being of individuals. Numerous studies suggest outdoor activity is effective in preventing myopia in school-age children. The protective effects are assumed to be associated with chromatic composition and light intensity. Therefore, researchers use various animal models to explore effects of varying ambient light on emmetropization, which have found blue light plays the beneficial role in myopia control. Nevertheless, the specific parameters of blue light in clinic practice remain unknown, demanding further researches.

Objectives: We investigate the effects of spectral purity on emmetropization exposed to blue light.

Methods: Three-week-old guinea pigs (n=30) were randomly assigned to 3 lighting conditions (n=10 each) with the same illuminance(500lx): warm white light, blue light, 90% blue light (blue and warm white light each at 250lx) for 8 weeks. Refractive error and axial length (AL) were measured, before exposure and every two weeks thereafter (week2,4,6,8).

Results: The AL of each group progressively increased over time, and a statistically significant decrease was observed both in 90% blue and blue light groups compared with warm white light group (both $P < 0.05$). However, no significant difference was found between blue and 90% blue light groups ($P = 0.938$). Compared with warm white light group, One-Way ANOVA showed there was a greater reduction in AL between blue and 90% blue light groups from week4 to 8 (at week8, white vs. blue: $8109.54 \pm 30.56 \mu\text{m}$ vs. $7934.97 \pm 37.65 \mu\text{m}$, $P = 0.007$; vs. 90% blue: $7968.42 \pm 55.32 \mu\text{m}$, $P = 0.026$). Meanwhile, guinea pigs exposed to warm white light gradually tended towards emmetropia, a persistent statistically significant difference in refractive error between blue and 90% blue light groups emerged after week2 compared with warm white light group (at week8, white vs. blue: $2.52 \pm 0.15\text{D}$ vs. $4.80 \pm 0.15\text{D}$, $P < 0.001$; vs. 90% blue: $4.40 \pm 0.28\text{D}$, $P < 0.001$), while the other 2 groups induced a hyperopic shift, with no statistical difference between them.

Conclusions: Both guinea pigs raised under blue or 90% blue light exhibited a hyperopic shift significantly. In 90% blue light group, optical characteristics such as spectrogram and color purity indicated that blue light was still the dominant factor influencing the refractive development. It suggests even a small blend of warm white light with blue light can inhibit the process of emmetropization as effectively as pure blue light, providing theoretical guidance for future myopia control.

P-MYO-013

Epidemiological Study on Myopia

*M. Fatacky*¹

¹Ophthalmology, Hopital Cinquentaire of Karusi, Karusi, Burundi

Introduction: Myopia also known as shortsightedness or near-sightedness, is a very common condition that typically starts in childhood. Severe forms of myopia (pathologic myopia) are associated with a risk of other associated ophthalmic problems (Glaucoma, Retinal detachment, Cataracts, Chorioretinal atrophy, Macular hole, Myopic choroidal neovascularization, Myopic CNV, Posterior staphyloma, Retinal atrophy, ...).

this disorder affects all populations and is reaching epidemic proportions in East Asia, although there are differences in prevalence between countries. Myopia is caused by both environmental and genetic risk factors.

The aim of this study was to describe the epidemiological aspects in the population who consulted the ophthalmology department at the HOPITAL CINQUANTENAIRE in KARUSI.

Materials and methods:

This was a retrospective, descriptive study involving six hundred (600) patients who underwent a refraction study from May 2023 to December 2023 at the HOPITAL DU CINQUANTENAIRE of KARUSI

Objectives: Looking for a way to slow the progression of myopia and keep it from getting worse.

Detecting any epidemic and taking care of it before any further complications.

Methods: Patients included in the study underwent a complete ophthalmological examination including a measurement of uncorrected visual acuity and refraction study.

Refraction was measured using a **Luneau L65** automatic refractometer. Refraction was refined using the subjective method before corrective lenses were prescribed.

Cylindrical refraction was performed in negative cylinders. Any spherical or cylindrical ametropia with a power greater than or equal to -0.25 was retained following subjective refraction refinement. Myopia was subdivided into mild (under -3 diopters), moderate (-3 diopters to -6 diopters) and severe (above -6 diopters). A survey form was used to collect data, which were analyzed using Epi data 2.1b and stata 9.0 software, with a significance level of 95%.

Results: Among six hundred (600) patients, many of them had mild myopia (135 had myopia of -0.25, 112 had myopia of -0.50, 78 had -0.75, 27 had myopia of -1.00) some of the patients had moderate myopia (8 had myopia of -3.50 and two had myopia of -4.00) The rest were other refractive errors (hypermetropia, astigmatism; presbyopia).

Conclusions: This study showed that adult myopia is predominantly female.

low dioptric powers were the most frequent. Corrective lenses enabled visual rehabilitation above 8/10 in the majority of cases.

Overall, the prevalence of myopia was 32%

P-MYO-015

Morphological changes in the choroid of young adults with myopia assessed by ultra-widefield SS-OCTA

H. Leng¹, L. Chen¹, J. Zhong¹, J. Li¹

¹Ophthalmology, Sichuan Provincial People's Hospital, School of Medicine, University of Electronic Science and Technology of China, Chengdu, China

Introduction: Myopia is a type of refractive error. Located between the retina and the sclera, the choroid contains rich vascular tissues, mainly supplying the outer layer of the retina, and rich pigments in it act as a dark chamber to avoid light, and also supply blood flow to the sclera. Resulting in thinning and weakening of the sclera, leading to pathological myopia. Therefore, choroid thickness and blood flow changes play an important role in the occurrence and development of myopia. Clinically, the choroid is often observed by optical coherence tomography (OCT), which provides high-resolution cross-sectional images of the structure of the posterior segment of the eyeball.

In this study, the latest developed SS-OCTA equipment can quickly obtain fundus images of young patients aged 20-30 years with a range of 24mm×20mm (field of view about 120°) at one time, so as to carefully analyze the effects of myopia on CT and CVI in various areas of wide-field fundus.

Objectives: To observe changes in choroidal thickness (CT) and choroidal vascular index (CVI) in young adults with myopia using ultra-widefield swept-source optical coherence tomography angiography (SS-OCTA).

Methods: This study recruited 178 eyes of 104 young adults who underwent 24 mm × 20 mm SS-OCTA scans centered on the fovea. Eyes were categorized into emmetropia, mild myopia, moderate myopia, and high myopia. The choroidal images were divided into five areas, and 144 grids were analyzed for CT and CVI.

Results: Compared to emmetropia, the CT of mild myopia eyes decreased by 11.94% and 7.89% in the macular and temporal superior areas, respectively ($p < 0.05$), while CVI remained unchanged in all areas. In high myopia eyes, both CT and CVI decreased significantly in all areas ($p < 0.05$). Of the 144 grids, 36 (25.00%) grids in mild myopia group showed significant decrease in CT, and 76 grids (52.78%) for moderate myopia, mainly distributed in the macular, temporal superior, and temporal inferior area. In high myopia, the majority of the grids (90.28%), including the nasal area, showed a significant decrease in CT. However, for mild and moderate myopia, a few grids showed significant CVI decrease (4.86% and 11.81%, respectively).

Conclusions: Choroidal thinning in young adults with myopia initially occurs in the macular and temporal superior areas, followed by expansion from the posterior pole to the periphery, with a trend of developing from the temporal to the nasal side. Changes in CT precede changes in CVI, and the two events may not occur concurrently.

P-MYO-016

A navel ocular viscoelastic device (OVD)-free ICL implantation method

*J. Fan*¹

¹Refractive Department, Beijing Huade Eye Hospital, Beijing, China

Introduction: Conventional ICL implantation procedure uses ocular viscoelastic device (OVD) to maintain the anterior chamber, but it needs to be flashed completely. Otherwise, OVD residue can cause increased intraocular pressure(IOP). In the meantime, Flashing the OVD can cause endothelial damage and endothelial reduction. Common complication of conventional ICL procedure are:

Post procedure cataract: 3 to 6 month after procedure, rare happend, developing slowly

High IOP post procedure : severe, emergent, other complications may develop if not handle properly, operator may concern

Main causes of high IOP:

Lense larger than average

Vault higher than average

OVD residual is the most common cause.

Flashing viscoelastic agent is time consuming, especially below ICL.

So I have invented a OVD-free ICL implantation method, which does not use viscoelastic during procedure. There is no risk of increased IOP postoperatively, shortening the procedure time, improving postoperative visual quality, and achieving faster and better outcomes.

Objectives: To observe the IOP at 2hours after procedure of ICL implantation by using OVD free method ,and compare to conventional traditional method of using OVD during procedure.

Methods: The surgeon's position is at the patient's head side, he makes a 2.75mm main incision and a 1mm side incision on the temporal or nasal side. A 20-gauge dual-port infusion handle is inserted to maintain the normal depth of the anterior chamber with an infusion height of 70mm water column.

The ICL lens is injected into the anterior chamber through the main incision, while an assistant presses the ICL's front foot to guide it into the ciliary sulcus. The positioning hook adjusts the ICL's rear foot into the posterior chamber ciliary sulcus, and the ICL is adjusted accordingly.

Results: The incidence of high IOP in postoperative patients using VOD-free is extremely low. There is no significant difference in the number of endothelial cells before and after the procedure.

Postoperative vision recovery is faster, and patients feel quiet satisfied after the surgery.

Conclusions: OVD-free ICL implantation is safer, more efficient, and more comfortable compared to conventional viscoelastic ICL implantation . It is worth recommending.

P-MYO-017

A case of orthokeratology fitting with Smart Eye Camera

H. Nishimura^{1,2,3}, *K. Rohan*^{1,4}, *S. Nakayama*^{5,3}, *E. Shimizu*^{3,6,7}

¹Medicine, OUI Inc., Tokyo, Japan, ²Orthoptist, Yokohama Keiai Eye Clinic, Kanagawa, Japan, ³Ophthalmology, Keio University School of Medicine, Tokyo, Japan, ⁴Medical, Yokohama Keiai Eye Clinic, Kanagawa, Japan, ⁵Operating Officer, OUI Inc., Tokyo, Japan, ⁶Executive Officer, OUI Inc., Tokyo, Japan, ⁷Ophthalmologist, Yokohama Keiai Eye Clinic, Kanagawa, Japan

Introduction: In recent years, the increase in myopia has become a problem, particularly in East Asia. Orthokeratology is a treatment to control myopia. Confirmation of fitting is very important for orthokeratology and should be shared on video rather than still images. However, there are few slit-lamp microscopes that can capture moving images, and there have been no reports of such microscopes in previous studies.

Objectives: We report on our experience with a case in which we were able to use the Smart Eye Camera, a smartphone-attachable slit-lamp microscope, to provide video confirmation for orthokeratology fitting.

Methods: The case is a 11-year-old Japanese male. In the lower grades of elementary school, she was diagnosed as myopic during a school physical examination and wore glasses in her daily life. However, she played ball games (ice hockey) as an extracurricular activity, and she visited our clinic to improve her vision with the naked eye because she felt it interfered with her performance. At the time of initial examination, visual acuity was 20/100 in the right eye and 20/100 in the left eye with naked eye, and binocular acuity was 20/70. The refractive error were -1.75 D in the right eye and -2.00 D in the left eye. Orthokeratology fittings were taken with the Smart Eye Camera, a smartphone-attached slit-lamp microscope. Smart Eye Camera is a Japanese medical device.

Results: Smart Eye Camera was available for orthokeratology fitting. In addition, visual acuity was 20/13 with the naked eye and progression of axial length could be controlled. It was also suggested that the Smart Eye Camera may also reduce the burden on children, since small children have difficulty placing their faces on the slit-lamp microscope.

Conclusions: Smart Eye Camera was available for orthokeratology fitting.

P-MYO-018

Impact of low-dose atropine on accommodative lag in myopic children: a comparative analysis

D. Dalal¹, J. Jethani², A. Kamath³, N. Pandya⁴

¹Department of Optometry, Bapubhai Desai Bhai Patel Institute of Paramedical Sciences, Faculty of Medicine, Charotar University of Science & Technology, Ahmedabad, India, ²Pediatric Ophthalmology, Baroda Children Eye Care & Squint Clinic, Vadodara, India, ³Pediatric Optometry, Baroda Children Eye Care & Squint Clinic, Vadodara, India, ⁴Ophthalmology, Parul Sevashram Hospital, Vadodara, India

Introduction: The increasing incidence of myopia is a global concern, with treatments like peripheral defocus contact lenses, orthokeratology lenses, low-dose atropine eye drops, and outdoor activity. Research links myopia to accommodative lag, affecting the effectiveness of low-concentration atropine eye drops and evaluating nonresponders.

Objectives: This study delves into low-dose atropine's efficacy, particularly 0.01%, in managing myopia, focusing on accommodative lag changes, especially in non-responders. It investigates the dose-related effects of 0.01% and 0.05% atropine eye drops on myopia progression, crucial for understanding myopia management strategies.

Methods: The study included children diagnosed with axial myopia who willingly participated, including non-responders to 0.01% atropine. Thorough eye examinations were conducted, encompassing medical history, visual acuity, refraction, axial length, and fundus checks. After three days, a post-mydratic test and non-strabismic binocular vision evaluation, accommodative lag, near point of convergence, near point of accommodation, distance and near phoria, and monocular/binocular accommodative facility, were recommended. Subjects were re-assessed one month after using low-dose atropine eye drops. Data were analyzed using Shapiro-Wilk test.

Results: The study investigated the effects of two different concentrations of atropine (0.01% and 0.05%) on various variables in 26 subjects with a mean age of 8.42 years. The data were analyzed for probability distribution, and most variables were found to be not normally distributed. Parametric and non-parametric tests were applied accordingly, with a significance level set at $p < 0.05$. Both concentrations of atropine resulted in significant increases in MEM, NPC, pupil diameter, and NPA. However, other variables did not show significant changes. The study provides insights into the impact of atropine on specific eye-related parameters in the subjects.

Conclusions: A comparison of 0.01% and 0.05% atropine reveals that the lower concentration (0.01%) has minimal impact on binocular vision parameters, whereas 0.05% atropine causes more noticeable effects. This underscores the significance of dosage considerations in atropine administration, highlighting the lower concentration's negligible impact on binocular vision parameters compared to the higher dosage. These findings emphasize the need for a balanced approach in prescribing atropine to minimize side effects while effectively managing binocular vision parameters.

P-MYO-019

Comparison of visual performance between a myopia-control contact lens and a single-vision contact lens

D. Han¹, R. Li¹, M. He¹, B. Du¹, R. Wei¹

¹Tianjin Key Laboratory of Retinal Functions and Diseases, Tianjin Branch of National Clinical Research Center for Ocular Disease, Eye Institute and School of Optometry, Tianjin Medical University Eye Hospital, Tianjin, China

Introduction: Myopia is becoming a worldwide public health burden due to its rapidly increasing prevalence. It has been reported that center-distance, dual-focal, or multifocal-designed CLs can slow myopia progression by producing peripheral retinal myopic defocus. However, little is known about the visual quality and subjective acceptance of concentric dual-focal CLs when used to retard progression in myopic patients.

Objectives: This study aimed to evaluate the visual performance and image quality of concentric dual-focus- designed contact lenses (CLs) compared with single-vision CLs in myopic Chinese people.

Methods: Twenty myopic volunteers aged between 18 and 26 years were recruited at a university eye hospital to wear both defocus-incorporated soft contact (DISC) lenses and single-vision CLs for 1 week in random order. High- and low-contrast visual acuity (VA), contrast sensitivity (CS), ocular higher-order aberrations (HOA), Strehl ratio and the Quality of Vision (QoV) questionnaire were assessed with each type of CL at weekly follow-up.

Results: Distance VA was not affected by DISC lenses compared to single-vision CLs in either high ($p = 0.414$) or low contrast ($p = 0.431$). However, there was a significant reduction in low-contrast near VA with DISC lenses compared with single-vision CLs ($p = 0.011$). The differences of CS between DISC lenses and single-vision CLs were significantly associated with lighting conditions and spatial frequencies ($F = 128.81$, $P < 0.001$). Compared with single-vision CLs, wavefront aberrations of DISC lenses were significantly increased in total HOA, trefoil, and spherical aberrations for either 3.0 mm or 6.0 mm pupil size. The Strehl ratio wearing DISC lenses reduced significantly compared to the single-vision CLs ($p < 0.001$) at a pupil diameter of 6.0 mm. QoV scores were higher overall ($p = 0.026$) and frequency ($p = 0.019$) with DISC lenses than with single-vision CLs, indicating poorer visual performance.

Conclusions: DISC lenses provide satisfactory distance VA. However, the higher scores of the QoV questionnaire with DISC lenses may be related to decreased CS at medium or high spatial frequencies and increased higher-order aberrations.

P-MYO-020

Increasing temporal trends of myopia progression in school children aged between 6 and 12 years from 2008 to 2021

M. Zhang¹, Y. Huang¹, K. Qiu¹, J.C.S. Yam², C.P. Pang³

¹Joint Shantou International Eye Center of Shantou University and the Chinese University of Hong Kong, Shantou, China, ²Department of Ophthalmology and Visual Sciences, The Chinese University of Hong Kong, Hong Kong, China, ³Department of Ophthalmology and Visual Sciences, The Chinese University of Hong Kong, Hong Kong, China

Introduction: Near work due to heavy school curriculum is regarded as a contributing factor. Concerns have arisen about the change of myopia progression in school children before and during COVID-19 pandemic.

Objectives: To determine the temporal trends of myopia progression rates between 2008 and 2021 in school children and to evaluate the effect of COVID-19 pandemic on myopia progression .

Methods: All children aged 6 to 12 years attending the children clinic during 2008-2019 (before COVID-19 pandemic) and during 2020-2021 (during COVID-19 pandemic) were recruited. Cycloplegic refraction and the progression data were collected. A hierarchical age-period-cohort (HAPC) model was developed to evaluate the effects of period and cohort to the time changes of refractive status. In a subgroup analysis, the study period was divided into seven periods: period I (2008 to 2010), period II (2010 to 2012), period III (2012 to 2014), period IV (2014 to 2016), period V (2016 to 2018), period VI (2018 to 2019), and period VII (2020 to 2021). Generalized estimating equations models were developed to calculate the estimated annual myopia progression rate of each period after adjusting for sex, age and the baseline refraction status. The temporal trends of myopia progression rates were evaluated by Joinpoint regression models.

Results: A total of 81,747 visit records from 26672 myopes aged 9.62 ± 1.74 years were included. The HAPC analysis showed a significant period effect, with later periods having greater effect on refractive changes. For subgroup analysis consisting of 16258 myopic eyes from 8129 children, the myopia progression rates after adjustment accelerated significantly from -0.79 (95%CI: $-0.82, -0.75$) D/year in period I to -0.85 (95%CI: $-0.88, -0.83$) D/year in period VI (before COVID-19 pandemic) and then increased substantially to -0.93 (95%CI: $-0.96, -0.90$) D/year in period VII (during COVID-19 pandemic) ($p=0.007$ for trend). The myopia progression rates change significantly before and during the COVID-19 pandemic (period VI vs period VII; $p<0.001$). Later period, female, younger age and milder initial myopia were independently and significantly associated with a greater myopia progression rate.

Conclusions: We found a significantly increasing trend of myopia progression rates during the past decade. The myopia progression rate in school-aged children increased steadily before the COVID-19 pandemic and then increased dramatically during the COVID-19 pandemic.

P-MYO-021

Evaluation of the clinical efficacy of multiple treatment methods for myopia control in Chinese children

M. Pan¹, R. Wang¹, P. Zhang¹, X. Liu¹

¹Beijing Tsinghua Changgung Hospital, School of Clinical Medicine, Tsinghua University, Beijing, China

Introduction: In recent years, the incidence of myopia in China has been increasing year by year. The overall prevalence of myopia increased from 55.95% in 2005 to 65.48% in 2015 in third year junior high school (grade 9) students in Beijing, China. As the degree of myopia increases, so does the risk of blindness. Currently, myopia controlling interventions include orthokeratology, defocus incorporated multiple segments (DIMS) spectacle lenses, low concentration atropine drops, repeated low-intensity red light (RLRL) and the combined use of both measures.

Objectives: To compare the relative effectiveness of different myopia control interventions, orthokeratology, defocus incorporated multiple segments (DIMS) spectacle, 0.01% atropine eyedrops, repeated low-intensity red light (RLRL), and combined orthokeratology and atropine in Chinese children.

Methods: This study was a non-randomised retrospective controlled observational study of individuals aged 6–13 years with progressing myopia but no ocular pathology. 361 Participants with refractive error between -0.75 D to -6.00 D and astigmatism of less than -1.50 D, were allocated, according to patient/parent choice, to receive orthokeratology, 0.01% atropine eyedrops, DIMS (Hoya® MiyoSmart®/Essilor® Stellest®) spectacles, repeated low-intensity red light (RLRL), and combined orthokeratology and atropine or single vision spectacle lenses (control group). The key outcome variables, autorefraction spherical equivalent refraction (SER) was measured at baseline and 12 months, and axial length (AL) was measured at baseline and after 3, 6, and 12 months.

Results: Of the 361 participants (mean age 11.2y±3.1), 74 received atropine, 56 DIMS spectacles, 106 orthokeratology, 52 orthokeratology+atropine, 33 repeated low-intensity red light and 40 single vision control spectacles. For AL and SER, whilst controlling for baseline age, AL and SER, at 12 months all treatment groups had significantly less progression than the control group ($p < 0.005$). For AL and SER, in pairwise comparisons at 12 months the RLRL group had significantly reduced progression compared with the atropine, DIMS spectacles, orthokeratology and orthokeratology+atropine groups ($p < 0.005$).

Conclusions: In a population of Chinese children, RLRL, atropine, DIMS spectacles, orthokeratology and orthokeratology+atropine are effective at reducing myopia progression and axial elongation in progressing myopia. RLRL is most successful at reducing myopia progression of the several interventions mentioned above.

P-MYO-022

Chinese parents' knowledge, attitude, and practice of myopia control: 2023 update

B. Zhan¹, H. Yangyi¹, W. Bingjie², Z. Jing¹, S. Jianmin¹, C. Zhi¹, Z. Xingtao¹

¹Eye Institute and Department of Ophthalmology, Eye & ENT Hospital, Fudan University, Shanghai, China, ²School of Optometry and Vision Science, University of New South Wales, Sydney, Australia

Introduction: Children and adolescents worldwide are under the threat of myopia, especially in East Asia. For myopic juveniles, parents play a decisive role in applying myopic interventions. Our research team has previously conducted a nationwide cross-sectional study regarding parents' perspectives on myopia. Building upon that basis, this national study targets parents of myopic children, provides insights into their knowledge and attitude of myopia and myopia control interventions, and investigates the correlation between knowledge and practice.

Objectives: Our previous survey identified a lack of knowledge of myopia among Chinese parents. This research aims to update the characteristics of parents' knowledge, attitude, and practice in myopia control and provide a reference for eye care practitioners to promote parents' education and compliance.

Methods: A self-administered questionnaire was disseminated to parents of myopic children in 16 hospitals from 11 provinces in China. Comprehensive information regarding the knowledge, attitude, and practice in myopia of parents with myopic children was collected, with the underlying correlations being analyzed.

Results: The concern over children's visual problems arose significantly earlier among myopic parents. Less than one third of the participants recorded their children's axial length. Parents' primary goal of myopia control was "retarding the progression of myopia". The effectiveness of behavioral intervention was ranked first by the majority of the participants. Single-vision spectacles were the most adopted correction practice. In terms of myopic interventions, most of the parents chose myopic control spectacles, followed by orthokeratology; most of the participants believed that the latter was more effective. Most parents expressed satisfaction with the current efficacy of myopia control.

Conclusions: Insufficient cognition of myopia and myopia control was identified among parents of myopic children in China. Efforts should be made to enhance parents' knowledge, raise their awareness, and improve the accessibility and affordability of effective myopia control interventions.

P-MYO-023

Spatial technology assessment of urban living environment and myopia

X. Li^{1,2}, W. Zhang¹

¹Tianjin Eye Hospital, Tianjin, China, ²Nankai University Affiliated Eye Hospital, Tianjin, China

Introduction: The global prevalence of myopia has shown a steady increase over recent decades, with urban areas seemingly experiencing a more significant impact.

Objectives: To comprehensively understand the relationship between urbanization and myopia.

Methods: A total of 177,894 students in grades 1-6 were initially included. Among them, 137,087 participants from grades 1-4 completed the two-year follow-up. To quantify urbanization, an urban score was meticulously constructed using satellite data and an iterative exploratory factor analysis. Associations of urban score with multiple aspects of myopia incidence and progression were analyzed.

Results: A positive correlation was identified between myopia incidence and urbanization. Specifically, each 1-unit increment in the urban score was associated with a 53% heightened risk of myopia over a two-year period (OR 1.53, 95% CI 1.50-1.57, $p < 0.001$). An examination of specific indicators pertaining to urban living environments consistently bolstered these associations. Over a two-year timeframe, a 1-unit increase in the population density index was linked to a 56% higher risk of myopia (OR 1.56, 95% CI 1.52-1.59, $p < 0.001$). Similarly, a 1-unit increase in the nightlight index was associated with a 41% increased risk of myopia (OR 1.41, 95% CI 1.38-1.45, $p < 0.001$). Conversely, a 1-unit increase in the enhanced vegetation index was linked to a 54% reduced risk of myopia (OR 0.46, 95% CI 0.43-0.50, $p < 0.001$), and a 1-unit increase in the walking time to the nearest hospital index was associated with a 21% diminished risk of myopia (OR 0.79, 95% CI 0.67-0.87, $p < 0.001$). Conversely, concerning myopia progression, the relationship with urbanization exhibited a different trend. With each 1-unit increase in the urban score was associated with a 27% decrease in myopia progression over two years (OR 0.73, 95% CI 0.70-0.75, $p < 0.001$). Furthermore, a 1-unit increase in the walking time to the nearest hospital index was associated with a 1.251-fold increase in myopia progression (OR 1.251, 95% CI 1.205-1.299, $p < 0.001$).

Conclusions: The findings highlight the intricate interplay between urbanization and myopia, revealing a dual impact of urban living on the incidence and progression of myopia. The observed patterns strongly emphasize the urgency of promptly implementing myopia control strategies in less urbanized regions, where myopia progression is expected to be notably accentuated. Effective and targeted interventions are necessary to address myopia in diverse areas.

P-MYO-024

Efficacy and Safety of 0.01% atropine eye drops once nightly vs. twice daily for myopia progression: a RCT study

M. He¹, R. Wei¹, B. Du¹, L. Liu¹, D. Han¹

¹Tianjin Key Laboratory of Retinal Functions and Diseases, Tianjin Branch of National Clinical Research Center for Ocular Disease, Eye Institute and School of Optometry, Tianjin Medical University Eye Hospital, Tianjin, China

Introduction: Though atropine 0.01% daily is an effective first-line treatment in children with myopic progression, high-concentrations atropine (e.g. 0.1%) has better control of myopia progression with more side effects.

Objectives: Considering the possible tropical side effect of high-concentration atropine, this study aimed to investigate the efficacy and safety of 0.01% atropine twice daily vs. once nightly for myopia progression.

Methods: This randomized controlled trial (ChiCTR2200055532) included subjects aged 6-13 years with spherical equivalent (SE) between -6.00D to -0.75D, astigmatism with the rule <-1.50D or against the rule <0.75D, anisometropia <1.50 D, and best corrected visual acuity not worse than 0.1 (LogMAR). Subjects were 1:1 randomized to receive 0.01% atropine eye drops once nightly (QD group) or twice daily (BID group) to both eyes for 1 year. The primary endpoint was axial length (AL).

Results: Among the 70 subjects, 34 and 36 were allocated to the QD and the BID group with similar baseline characteristics. The SE were similar for subjects' fathers in the two groups (-2.31±2.40D vs. -2.61±2.05D), and the same as for mothers (-3.16±2.71D vs. -4.09±2.51D). After 1 year of therapy, the changes in mean AL were smaller in the BID group than the QD group (0.21±0.18mm vs. 0.32±0.14mm, p=0.002), respectively, with BID group demonstrated slower axial elongation by 34% compared to QD group. Regarding slowing SE progression, 0.01% atropine BID was 53% more effective than QD, with a change in mean SE of -0.31±0.50D vs. -0.66±0.37D (p<0.001). The near visual acuity using LogMAR was 0.039±0.062 vs. 0.023±0.057 (p=0.221) in the BID and QD group on 1 year visit. On safety, the changes of accommodation amplitude, intraocular pressure (IOP), and tear meniscus height were similar between the two groups after 1 year (all P>0.05). Though the changes of the pupil diameter (PD) in a dark room were larger in the BID group (0.65±0.63mm vs. 0.27±0.69mm, p=0.002), it was clinically acceptable with no difference observed for PD in the bright room (p=0.297).

Conclusions: Atropine 0.01% twice daily has better efficacy in slowing axial elongation and SE progression compared with once nightly, and with no increased side effect of loss of accommodation and tear film homeostasis, pupil mydriasis, and IOP, which could support the basic clinical evidence for the clinical myopia prevention and control strategy for the future.

P-MYO-025

Reduced interocular asymmetry of choroidal structure and vascular parameters is shown in the highly myopic eyes

X. Ding^{1,2}, Y. Wang^{2,1}, Y. Jiang^{1,2}, M. Shen^{2,1}, Y. Shao^{2,1}, F. Lu^{1,2}

¹Eye Hospital and School of Ophthalmology and Optometry, Wenzhou Medical University, Wenzhou, China, ²National Clinical Research Center for Ocular Disease, Wenzhou, China

Introduction: Globally, nearsightedness is on the rise. For the purpose of tracking and forecasting myopia progression, OCT examination of the choroidal thickness and vasculature is highly valuable. When evaluating some disorders, the asymmetry values of characteristics between paired eyes may be more useful than absolute values. Before complications arise, highly myopic eyes are in a pre-pathological condition and may show distinct interocular asymmetry from normal eyes. Research has been done on the interocular asymmetry of the optic disc and retina. The choroidal vascular and structure's interocular asymmetry in highly myopic eyes haven't been well studied, nevertheless.

Objectives: To assess the interocular asymmetry differences in choroidal thickness and vascular parameters between highly myopic individuals without complications and non-highly myopic individuals, and analyze the influencing factors.

Methods: Propensity score matching (PSM) was used to construct two groups with comparable age profiles from non-high myopia (NHM) and high myopia (HM) population. Using Swept-source optical coherence tomography (SS-OCT) with a new automated segmentation protocol, the region of choroidal thickness (CT), luminal area (LA), stromal area (SA), total choroidal area (TCA), and choroidal vascularity index (CVI) was centered on the fovea and divided into 0-1mm, 0-6 mm, 1-3 mm, 3-6 mm of. The interocular asymmetry of choroidal parameters was analyzed using paired samples t-test and Mann-Whitney U-test, and Spearman correlation analysis was used to analyze correlations between groups.

Results: 64 patients were enrolled in NHM and HM each. Mean age was 24.37 (9.71) y in the NHM group versus 25.45 (8.09) y in HM, with no significant difference between groups. Significant interocular asymmetry existed only in 3-6 mm LA and 0-1 mm SA in the HM group; all other parameters in the HM group and all parameters in the NHM group showed no significantly within-group differences. The interocular choroidal parameters of CT, CVI, LA, and TCA in the 0-1 mm and 1-3 mm region, as well as 3-6 mm LA and 0-1 mm SA, were significantly different between NHM and HM. All of the aforementioned parameters except for the 1-3 mm CVI were statistically significant correlation with group, and the asymmetry is more pronounced in NHM.

Conclusions: Interocular asymmetry of choroidal parameters was significant between but not within groups. There was a group-dependent increase in interocular asymmetry of choroidal parameters in NHM.

P-MYO-027

Interocular comparison of RNFL thickness and retinal vasculature in non-pathological myopia with anisometropia

L. Ding¹, T. Shen^{2,1}, Y. Mu¹, M. Mijiti¹, W. Wei¹, R. Ainiwaer¹, B. Wei¹, Y. Qin¹

¹People's Hospital of Xinjiang Uygur Autonomous Region, Urumqi, China, ²Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: An increasing number of optical coherence tomography (OCT) studies have focused on fundus changes in myopia, including retinal nerve fiber layer (RNFL) and retinal vasculature. However, the relationship between fundus changes and refractive factor is still controversial.

Objectives: To investigate the interocular differences in the RNFL thickness and retinal vasculature in non-pathological myopic patients with anisometropia using spectral domain optical coherence tomography (SD-OCT).

Methods: This cross-sectional study included a total of 100 eyes from 50 participants with anisometropic myopia aged 11 to 40 years. The participants were divided into two groups based on the degree of anisometropia: Group 1 who had the interocular difference of spherical equivalent (SE) over 1.50 diopters (D), and Group 2 who had the interocular difference of SE between 1.00 D and 1.50 D. All participants underwent comprehensive ocular examinations, then the RNFL thickness, ONH parameters, macular vessel density (MVD), optic disc vessel density (OVD) and optic disc perfusion density (OPD) were obtained using the Cirrus SD-OCT. The interocular difference and repeatability were determined by paired t-test and intraclass correlation coefficient (ICC), Pearson's correlation coefficient (r) and Bland-Altman plot, respectively.

Results: The interocular repeatability assessments of RNFL and retinal vasculature revealed relatively low ICC values (ranged from 0.018 to 0.925), but only the regional RNFL thickness showed interocular differences between more myopic and less myopic eyes. The superior and inferior quadrants RNFL thickness were thinner and the temporal quadrant RNFL thickness was thicker in the more myopic eyes than in the less myopic eyes. The interocular differences of the temporal quadrant RNFL thickness, nasal quadrant MVD, temporal and inferior quadrants OVD, temporal quadrant OPD were correlated with the interocular differences of SE and AL. The interocular differences of the temporal quadrant RNFL thickness, OVD, OPD in Group 1 were greater than which in Group 2.

Conclusions: This study revealed that the temporal quadrant RNFL thickness was thicker in more myopic eyes, accompanied with higher OVD and OPD. However, other regional interocular differences of RNFL thickness and retinal vasculature in non-pathological myopia with anisometropia might not be related to the refractive factors.

P-MYO-028

Effects of 0.05% atropine eyedrops on visual performance in university students

H. Chen¹, Y. Luo¹, Z. Yin¹, Y. Huang¹, X. Li¹, J. Bao¹

¹Eye Hospital, Wenzhou Medical University, Wenzhou, China

Introduction: Recent reports suggest that myopia onset and progression can occur during adulthood, making them potential candidates for myopia control. One promising treatment option is 0.05% atropine eyedrops, which have shown effectiveness in controlling myopia progression.

Objectives: This study aimed to assess the effects of 0.05% atropine eyedrops on visual performance in young adults.

Methods: Twenty-six myopic university students aged 18-30 years were assigned to receive 0.05% atropine once nightly for two weeks. Visual assessments were conducted on days 1, 2, 7, and 14 after using atropine with corresponding time points after stopping its use, including measurement of the modulation transfer function (MTF) cut-off, Strehl ratio (SR), objective scattering index (OSI), contrast sensitivity (CS), and glare disability. The area under the log CS function (AULCSF) was calculated for each condition.

Results: After 1-day of administering 0.05% atropine, both MTF-cut-off ($\beta=-8.75$, $P<0.001$) and SR ($\beta=-0.05$, $P<0.001$) significantly decreased to their lowest levels. AULCSF values also showed significant decreases (all $P<0.05$), particularly in the mesopic with glare condition, reaching the lowest point after 1-day of administration ($\beta=-0.20$, $P<0.001$). However, all parameters returned to baseline levels two weeks after atropine discontinuation (all $P>0.05$).

Conclusions: The administration of 0.05% atropine significantly but temporarily impacted the visual performance of young adult myopes.

P-MYO-029

VLDLR gene affects ocular development and myopia progression in FDM mice

L. Jia¹, S. Li¹, S. Gao¹, X. Qi¹, M. He¹, P. Wei¹, G. Han¹

¹Tianjin Eye Hospital, Tianjin, China

Introduction: Myopia is one of the most common eye diseases worldwide, with a prevalence of 10-30% in the adult population in many countries. Research on myopia is important for improving public health strategies focusing on early detection or prevention combined with public nutrition therapeutic interventions to control myopia progression. Lipid metabolism plays an important role in the process of eye development and myopia progression, but the specific mechanism is still unclear.

Objectives: In this experiment, we compared the refractive biological parameters of WT and VLDLR KO mice and the trend of changes in the ocular axis after form deprivation.

Methods: All mice underwent A-ultrasound measurements at baseline and were divided into wild-type and transgenic groups. A-ultrasound measurements and pathological axial measurements were performed after 4 weeks of form deprivation.

Results: After four weeks of form deprivation, the mean axial length of the experimental eyes increased, while the mean axial length of the control eyes decreased, as measured by A-ultrasound. In addition, the experimental eyes had longer mean axial lengths than the control eyes. Pathological measurement showed that the mean coronal diameter of the experimental eyes was larger than that of the control eyes. In addition, the sagittal diameters of some experimental eyes were found to be larger than the sagittal diameters of the contralateral eyes. After four weeks of form-deprivation, A-ultrasound showed an increase in axial length in the experimental eyes, while no statistically significant change in axial length was observed in the control eye. At both baseline and 4 weeks after modelling, the axial length of the experimental eye was greater than that of the control eye. This difference was even greater after modelling. There was no significant difference in the coronal and sagittal diameters of the experimental and control eyes when measured directly, and the lens of the experimental eyes was irregularly meteoric in shape when viewed under the microscope. The axial lengths of the WT mice were greater than those of the VLDLR KO mouse measured by A-ultrasound at baseline, and the central 50% intervals barely overlapped.

Conclusions: The VLDLR gene plays an important role in eye development and myopia progression; it can influence the axial length of mice towards hyperopia, but myopia can still be induced; myopia can be induced by form deprivation, but it takes longer than 4 weeks to establish a more pronounced difference.

P-MYO-030

A wireless battery-free eye modulation patch for myopia therapy

H. Yi¹, J. Zhong¹

¹Sichuan Provincial People's Hospital, Chengdu, China

Introduction: Proper axial length of the eye is crucial for emmetropia. A wireless battery-free eye modulation myopia patch worn on the posterior sclera has been developed for myopia correction and relapse prevention. The myopia patch is composed of piezoelectric transducers, an electrochemical micro-actuator, a drug microneedle array, a flexible circuit, and biocompatible encapsulation.

Objectives: The system can be wirelessly powered and controlled by an external ultrasound. The electrochemical micro-actuator precisely shortens the axial length by driving the posterior sclera inward, may ensuring accurate scene imaging on the retina for a myopic eye.

Methods: The drug microneedle array delivers riboflavin to the posterior sclera, and μ -LEDs' blue light induces collagen cross-linking, reinforcing sclera strength.

Results: In vivo experiments showed that the myopia patch reduced the eye's axial length by $\sim 1179 \mu\text{m}$ and strengthened the sclera by 151%.

Conclusions: The system operates successfully inside the body without batteries, and its wireless treatment has significant potential for clinical myopia therapy.

P-MYO-031

Effects of topical 0.05% cyclosporine A on dry eye symptoms and parameters following small incision lenticule extraction

X. Zhu¹, L. Zhao¹

¹Shanghai Eye Diseases Prevention & Treatment Center/ Shanghai Eye Hospital, School of Medicine, Tongji University, Shanghai, China

Introduction: Ocular surface disturbances often accompany small-incision lenticule extraction (SMILE) surgery for myopia. This study aimed to evaluate the effects of topical 0.05% cyclosporine A (CsA) on ocular surface disease index (OSDI) score and ocular surface parameters post-SMILE.

Objectives: Randomized controlled trial on 151 patients undergoing SMILE.

Methods: In this study, 151 patients who underwent SMILE were randomised into Group I (control, 71 eyes) and Group II (0.05% CsA, 80 eyes). Both groups received standard treatment during the 1 month post-SMILE. Over the next 3 months, Group I continued standard therapy (0.3% SH), while Group II received additional 0.05% CsA. OSDI total and subscale scores, non-invasive tear break-up time (NIBUT), tear lipid layer (LLT), and tear meniscus height (TMH) were assessed preoperatively and postoperatively.

Results: Compared to baseline, the OSDI scores significantly increased in both groups ($P < 0.001$). Group II exhibited lower OSDI total scores after administering 0.05% CsA vs. the control group ($P = 0.026$). At 1 month follow-up, NIBUT, LLT, and TMH values significantly decreased in both groups compared to baseline ($P < 0.05$). Group II exhibited higher NIBUT, LLT, and TMH vs. control group, returning to preoperative values after 2 months. Overall, the OSDI total score and NIBUT values during follow-up were not significantly different between the two groups; however, the LLT and TMH values were significantly different between the two groups ($P < 0.001$ and $P = 0.041$, respectively) by repeated measures ANOVA.

Conclusions: Topical 0.05% CsA was effective in relieving subjective dry eye symptoms and maintaining ocular surface stability in the early postoperative period of SMILE.

P-MYO-032

RLRL plus orthokeratology for myopia control in children: a multicenter randomized controlled trial

M. He¹, R. Xiong²

¹The Hong Kong Polytechnic University, Hong Kong, China, ²Zhongshan Ophthalmic Center, China, China

Introduction: Orthokeratology (Ortho-k) corrects daytime myopia but varies in controlling progression. Repeated low-level red-light (RLRL) therapy shows greater efficacy, even reducing axial length.

Objectives: To investigate the efficacy and safety of repeated low-level red-light(RLRL) therapy combined with orthokeratology(Ortho-k) in myopia control among schoolchildren with a poor response to Ortho-k.

Methods: This study was a multicenter, randomized, single-blind clinical trial involving 48 children aged 8-13 with mild to moderate myopia and little astigmatism or anisometropia, who hadn't shown sufficient improvement with Ortho-k lenses alone. Conducted from March 2021 to January 2022 with final follow-ups in March 2023, it compared the effectiveness of Ortho-k lenses with a combination of Ortho-k and repeated low-level red-light (RLRL) therapy. Participants were selected based on their poor response to Ortho-k, defined as an increase in axial length of 0.50 mm or more over a year. They were split into two groups, with two-thirds receiving the combination therapy (Ortho-k lenses plus RLRL therapy) and one-third continuing with Ortho-k alone. The Ortho-k group used their lenses every night, while the combination group also underwent RLRL therapy twice daily for three minutes each session. The trial's objective was to determine if adding RLRL therapy could more effectively control the progression of myopia in children who did not respond well to Ortho-k lenses alone.

Results: A total of 47(97.9%) children were included in the analysis (30 in the RCO group and 17 in the Ortho-k group). The mean axial elongation rate before the trial was 0.597mm/year in the RCO group and 0.612mm/year in the Ortho-k group. After 12 months following the intended intervention, the adjusted mean AL changes were -0.024mm(95% CI, -0.078 to 0.030 mm) in the RCO group and 0.265mm(0.191-0.338 mm) in the Ortho-k group. The adjusted mean difference in AL change was -0.288mm(-0.440 to -0.137mm) between the RCO and Ortho-k groups. No serious adverse events, documented ocular damage, or increased incidence of contact lens-related adverse events were observed following RLRL therapy.

Conclusions: Combining RLRL therapy with Ortho-k has the potential to achieve the 'ideal' myopia control, where children do not need to wear glasses or contact lenses during the day while simultaneously achieving full myopia control.

P-MYO-033

Comparison of the control effect of three different myopic control methods: RLRL, orthokeratology and 1% atropine

Y. Wang¹, Duo Xu

¹Chongqing Wodi Ophthalmology Department, Chongqing, China

Introduction: In this analysis, we systematically report the prevention and control effect and clinical application of repeated low-level red light (RLRL), orthokeratology lens and 1% atropine.

Objectives: To observe the prevention and control effect and clinical application of RLRL, orthokeratology lens and 1% atropine gel on myopia in adolescents and children.

Methods: A prospective clinical trial was conducted in 270 children aged 8-15 years old with equivalent spherical of -0.75D to -5.00D in Wudi Ophthalmology department in the past 1 year, the children were assigned into three groups. The RLRL group was divided into group A (wavelength 650nm, adjustable power 3/6/9, 6 powers were used in the first 3 months, the axial length increased by > 0.05mm during the 3 months review, was assigned to 9 power, and increased by 0-0.05mm, and the 6 power was continued to be used. The axial length < 0mm was assigned to 3 power). The orthokeratology group was assigned to group B, and 1% atropine gel was assigned to group C, 90 cases (180 eyes) in each group.

Results: The axial length of the three groups before intervention were 24.94±1.58mm, 25.11±0.66mm and 24.92±0.67mm, respectively, with no statistical difference. After 10 months, the axial in the ABC group were 25.00±1.60mm, 25.27±0.87mm and 25.04±0.77mm, respectively, which increased by 0.06±0.02mm, 0.16 ± 0.21mm and 0.12±0.1mm, compared with before intervention. (P < 0.05), the difference between group A and group BC was statistically significant,. In group A, there was no statistically significant difference between the two groups after treatment with different powers. the corneal curvature of ABC group was no statistical difference before and after intervention or between groups. In the ABC group, the equivalent spherical lens before intervention were -3.23 ± 1.08D, -3.15 ± 0.92D and -3.09± 1.22D, respectively. After 10 months, the ABC group increased by -0.05D± 0.08D, -0.45D± 0.92D, -0.34D±1.22D (P < 0.05), respectively, compared with before intervention, and the difference was statistically significant. In addition, for children in grades 3, 6 and 9, after 10 months of treatment, the axis increased by 0.10±0.06mm, 0.08±0.25mm and 0.03±0.02mm, respectively, with no statistical significance.

Conclusions: RLRL, orthokeratology lens and 1% atropine can effectively control the growth of axial length in adolescents, among which the effect of RLRL is better than others, and the control effect of RLRL on axial length and diopter has no correlation with power setting.

P-MYO-035

ARR3-OPN1LW mediated mosaic signals in red cones may act as a key trigger in myopia: knowledge obtained from eoHM

Q. Zhang¹, X. Xiao¹, Y. Wang¹, Y. Jiang¹, J. Ouyang¹, W. Sun¹, P. Wang¹, Z. Yi¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: Myopia is associated with intensive near work and other environmental factors in school children. It is unknown what are the targeting molecules and cells directly act with such factors. Identification of genes responsible for nonsyndromic high myopia may shade light on the targeting molecules and cells that might initiate the response to myopic environmental factors.

Objectives: What genes are most common frequently implicated in early onset high myopia (eoHM). Is it possible to identify the most likely retinal targeting molecules and cells involved in common myopia by systemic analysis of genes contributed to eoHM?

Methods: Genome-wide linkage analysis was used to identify novel loci for eoHM. Whole exome sequencing was used to identify causative variants in novel and known genes responsible for eoHM in 1226 families. Potential targeting molecules and cells in the retina were systemically evaluated, especially those potentially involved in common myopia as well.

Results: Totally six novel loci and five novel genes (such as ARR3) responsible for nonsyndromic eoHM have been identified by our group. Analysis of all 99 genes reported to contribute to eoHM (syndromic and nonsyndromic) detected pathogenic or likely pathogenic variants in about 38% of the 1226 families with eoHM, in which 56% of variants presented in genes involving in phototransduction while 29% in genes contributed to ocular structure. Further analysis of those genes involved in phototransduction revealed that most frequently mutated genes generally either exclusively expressed in cones or at least involved in cone-bipolar cascade but not in genes exclusively participate in solely rod function. Most importantly, mutations in ARR3 and OPN1LW are the most frequent cause of nonsyndromic eoHM, although OPN1LW variants also are common cause of syndromic eoHM. Interestingly, the causative variants in ARR3 and OPN1LW usually create a mosaic expression at retinal cellular level. Moreover, ARR3 and OPN1LW act as partners in cone phototransduction, in which OPN1LW is known to present exclusive in red cones.

Conclusions: ARR3-OPN1LW mediated mosaic signals in red cones are common cause of nonsyndromic eoHM. As OPN1LW is the initial photoreceptive molecules in red cones, we believe that ARR3-OPN1LW axis in red cones may be the key trigger in the development of environmental induced common myopia. Subsequent investigation on the effects of ARR3-OPN1LW mediated mosaic signals may elucidate the molecular mechanism of myopia development, common or eoHM.

P-MYO-036

Comparison of orthokeratology, low-dose atropine, and defocus design spectacle effectiveness on myopia progression

A. Ayatollahi¹, S.A. Mirfendereski², M. Hajiebrahimi²

¹Optometry, Shahid Beheshti university of medical sciences, Tehran, Iran, Islamic Republic of,

²Novindidegan Eye clinic, Tehran, Iran, Islamic Republic of

Introduction: Myopia has become the dominant refractive error condition today, especially in Asia. Several new approaches have been developed to control the progression of myopia. In this study, we investigated the effectiveness of these methods.

Objectives: To compare the effect of orthokeratology, low-dose atropine eye drops, and defocus design spectacle lenses on myopia progression and axial length enlargement in Iranian children.

Methods: in this study Children (n=124) aged 7-12 years with spherical equivalent refraction of -1.00 to -6.00 diopter with astigmatism lower than 1.50 diopter were stratified into three groups and randomly assigned to receive orthokeratology, 0.01% atropine eye drops, and defocus design spectacle lenses treatment. Spherical equivalent refraction and axial length were measured at baseline and visits at 6 and 12 months.

Results: : after one year the mean change in spherical equivalent refraction were 0.34 ± 0.42 , 0.43 ± 0.53 , and 0.58 ± 0.51 diopters in orthokeratology, low dose atropine eye drops, and defocus design spectacle lens treatment, groups. Also, the mean axial length enlargement were 0.17 ± 0.15 , 0.24 ± 0.19 , and 0.32 ± 0.24 millimeters in orthokeratology, low-dose atropine eye drops, and defocus design spectacle lens treatment, groups.

Conclusions: Based on the results of this study, it seems that the use of orthokeratology lenses has the greatest effect in reducing myopia progression and axial length enlargement. After orthokeratology, the use of low-dose atropine eye drops, and defocus design spectacle lens have been effective for one year. It is necessary to investigate the effects of these interventions for a longer time.

P-MYO-037

SREBF2, a lipid metabolism regulator, is a key factor inducing elongation of the ocular axis in myopic eye

M. Watanabe¹, A. Umetsu¹, M. Suzuki¹, N. Nishikiori¹, H. Ohguro¹

¹Ophthalmology, Sapporo Medical University, Sapporo, Japan

Introduction: Myopia is the most common refractive error leading to reversible visual impairment and, in the worst case, blindness worldwide. Myopia is associated with elongation of the ocular axis, but the underlying molecular mechanism is not elucidated.

Objectives: The purpose of the current study is to elucidate responsible mechanism causing elongation of ocular axis in myopic eyes using human scleral fibroblasts (HSF).

Methods: Scleral specimens obtained during a scleral shortening procedure of 5 patients with refractory rhegmatogenous retinal detachment were used for primary culture of human scleral fibroblasts (HSF). Those were categorized into two different axial length (AL) groups, <26 mm (low AL group, $n = 2$) and >27 mm (high AL group, $n = 3$), and were analyzed by (1) Seahorse cellular metabolic measurements and (2) RNA sequencing analysis.

Results: Seahorse cellular metabolic analysis revealed that mitochondrial and glycolytic functions were higher in the low AL group than in the high AL group, suggesting that metabolic activities of HSSF cells are modulated by the degree of ALs. RNA sequencing analysis in conjugation with bioinformatic analyses using gene ontology (GO) enrichment analysis and ingenuity pathway analysis (IPA) of differentially expressed genes (DEGs) estimated that

1) sterol regulatory element-binding transcription factor 2 (SREBF2) was identified as both a possible upstream regulator and a causal network regulator,

2) SREBF1, insulin-induced gene 1 (INSIG1), and insulin-like growth factor 1 (IGF1) were as upstream regulators, and

3) protein tyrosine phosphatase receptor type O (PTPRO) was as a causal network regulator.

Since these factors are all identified as key regulators for lipid metabolism, including fatty acids, triglycerides, and cholesterol, we speculated that those lipid metabolic mechanisms may regulate elongation of the ocular axis in myopic eye.

Conclusions: Current results suggest that the fatty acids, triglycerides, and cholesterol metabolisms are importantly involved in the underlying mechanisms inducing elongation of the ocular axis in myopic eyes.

P-MYO-038

Differentiated approach to the treatment of peripheral vitreochorioretinal dystrophies with clinical refractive errors

*L. Asgarova*¹

¹National Centre of Ophthalmology named after Acad. Zarifa Aliyeva, Baku, Azerbaijan

Introduction: In recent years, there has been a steady trend towards an increase in the prevalence of (PVCRD).

Objectives: To assess the condition and dynamics of development of PVCRD in adults with various refractive errors and determine the indications and tactics of laser treatment in patients with vitreochorioretinal dystrophy.

Methods: We observed 164 patients (328 eyes) with various forms of PVCRD.

The first group (64 eyes, 17.4%) – patients with identified retinal tears: valvular tears (6 eyes (1.9% of all examined patients)), tears with a cap (43 eyes, 11.8%) and atrophic tears (13 eyes, 3.7%).

The second group (300 eyes, 82.6%) – patients with rhegmatogenous types of PVCRD (type of "lattice" degeneration (152 eyes, 41.9%), "snail track" (119 eyes, 32.8%) and vitreoretinal contacts (tufts) (29 eyes, 7.9%)). The first subgroup included patients (201 eyes, 55.4%)

Patients of the second group with "rhegmatogenous" forms of PVCRD were divided into two groups:

- patients for whom there were no medical indications for LC
- patients who may be recommended to undergo LC for relative medical reasons when PVCRD (the appearance of ruptures).

All patients examination, including visometry, refractometry, biomicroscopy, indirect ophthalmoscopy, patients underwent optical coherence tomography (OCT) of dystrophic zones.

Surgical technique: when treating patients of the first group, LC were applied in 5–6 rows. (method 1).

When treating patients of the second group, LC were applied in a checkerboard pattern in 3 rows(method 2).

Results: All the patients we observed had the "rhegmatogenous" form of PVCRD. In the first group with retinal tears, preventative LC was performed on all patients for absolute medical reasons. In one case (0.3% of the total number of patients and 1.6% of patients in the first group), despite the treatment, the dystrophic process progressed with the development of retinal detachment and additional surgical intervention was required.

During dynamic observation, patients of the second group with "rhegmatogenous" forms of PVCRD were divided into two groups:

- patients for whom there were no medical indications for LC
- patients who may be recommended to undergo LC

Conclusions: The need for laser treatment in patients with rhegmatogenous PVCRD depends on the condition of the retina and is not associated with certain types of ametropia, although, of course, the frequency of retinal degenerations with existing retinal breaks is much higher in patients with myopic refraction.

V-MYO-001

A new ocular viscoelastic device (OVD)-free method of EVO-ICL implantation

*J. Fan*¹

¹Refractive Department, Beijing Huade Eye Hospital, Beijing, China

Introduction: Standard ICL implantation procedure uses viscoelastic device to maintain the anterior chamber, but it needs to be flushed clean. Otherwise, viscoelastic residue can cause increased IOP. If anterior chamber fluid is used to lower eye pressure, it will also increase the risk of potential endothelium inflammation. In the meantime, washing the viscoelastic can cause endothelial damage and decreasing. I have invented a viscoelastic device-free ICL implantation method; which does not use viscoelastic during the procedure. There is no risk of increased IOP postoperatively; shortening the procedure time; improving postoperative visual quality; and achieving faster and better results.

Objectives: Evaluate the advantages of viscoelastic device-free ICL procedure.

Methods: The surgeon positions themselves at the patient's head, makes a 2.75mm main incision and a 1mm side incision on the temporal or nasal side. A 20-gauge dual-port infusion handle is inserted to maintain the normal depth of the anterior chamber with an infusion height of 70mm water column. The ICL lens is injected into the anterior chamber through the main incision, while an assistant presses the ICL's front foot to guide it into the ciliary sulcus. The positioning hook adjusts the ICL's rear foot into the posterior chamber ciliary sulcus, and the ICL is adjusted accordingly. Using Rescan700 to monitor the vault height consistently during the procedure to ensure accuracy. And monitor IOP 2 hours postoperatively to assess the effectiveness of the procedure and the patient's recovery.

Results: The incidence of high IOP with VOA-free method is extremely low. There is no significant difference in the number of endothelial cells before and after the procedure. Postoperative visual recovery is faster, and Patients are satisfied after the procedure.

Conclusions: Non-viscoelastic ICL implantation procedure is safer, more efficient, and more comfortable compared to conventional viscoelastic ICL implantation procedure. It is worth proposing.

Video

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Neuro- ophthalmology

FT-NEU-001

Cerebral angiographic features of ophthalmic artery in patients with CRAO and influence on intra-arterial thrombolysis

S. Wu¹, Q. Lu¹, X. Lin¹

¹Department of Neurology & Neuro-Ophthalmology, The First Hospital of Xi'an (The First Affiliated Hospital of Northwestern University), Xi'an, China

Introduction: Central retinal artery occlusion (CRAO) is a medical emergency that severely affects vision of patients. In this study, the OphA features in patients with CRAO were preliminarily described with cerebral angiography.

Objectives: To investigate the cerebral angiographic features of ophthalmic artery (OphA) in patients with CRAO, and whether that influenced on intra-arterial thrombolysis (IAT).

Methods:

A single-center and descriptive cross-sectional study. Cerebral angiographic and surgery-related features (including IAT) of the patients were recorded in detail. The course of OphA was classified as types A, B and C according to cerebral angiographic morphology. All patients were divided into the proximal or distal groups depending on whether OphA originated from the proximal ophthalmic segment of internal carotid artery (ICA). The differences in the OphA-ICA angle, course and diameter of OphA as well as the proportion, operation time and complications of IAT were compared between the proximal and distal groups.

Results: Sixty-seven patients with *non-arteritic* CRAO were included in the analysis. The OphA was supplied by ICA in 60 patients or external carotid artery (ECA) in 7 patients. Among the former, 47 received anterograde IAT via ICA (including 24 patients receiving the proximal OphA microcatheterization), and 9 patients underwent retrograde IAT via ECA among the latter. Further analyses of the cerebral angiographic features of OphA originating from ICA revealed that (1) the mean OphA-ICA angle was $80.7 \pm 24.2^\circ$; (2) the course was types A, B and C in 32, 19 and 9 cases, respectively; and (3) the OphA had no stenosis, mild-grade stenosis and moderate to severe stenosis in 43, 11 and 6 cases, respectively, with a mean diameter of 1.0 ± 0.3 mm. Compared with the distal group, patients in the proximal group had a larger OphA-ICA angle ($94.2 \pm 18.2^\circ$ vs. $62.4 \pm 18.8^\circ$, $P < 0.001$) and more varied course (type A: type B: type C = 17:9:9 vs. 15:10:0, $P = 0.01$). Patients in the proximal group had a larger OphA-ICA angle, more varied course and shorter operation time were also observed in cases receiving anterograde IAT with or without proximal OphA microcatheterization ($P < 0.05$). No significant difference in complications was detected between two groups.

Conclusions: These results demonstrated cerebral angiographic features of OphA were diverse in patients with CRAO. When OphA originated from the proximal ophthalmic segment of ICA, patients had a larger OphA-ICA angle, more varied course and shorter operation time for IAT.

FT-NEU-002

Mitochondrial dysfunction in Autosomal Dominant Optic Atrophy (ADOA) assessed in FALCON, a natural history study

J. Liao¹, R. Mudumbai², P. Yu-Wai-Man³, B Lam⁴, M Votruba⁵, K. Saluti⁶, Y Wang⁶, B. Ticho⁶, S. Gross⁶

¹Stanford University, Stanford, United States, ²University of Washington, Seattle, United States,

³University of Cambridge, Cambridge, United Kingdom, ⁴University of Florida, Miami, United States,

⁵University of Cardiff, Cardiff, United Kingdom, ⁶Stoke Therapeutics, Bedford, United States

Introduction: ADOA is the most common inherited optic nerve disorder. It is a rare disease that causes progressive and irreversible vision loss in both eyes starting in the first decade of life. Roughly half of people with ADOA fail driving standards and up to 46% are registered as legally blind. An estimated 65% to 90% of cases are caused by mutations in the *OPA1* gene, most of which lead to haploinsufficiency resulting in 50% *OPA1* protein expression and disease manifestation. *OPA1* is a dynamin-related GTPase that localizes to the mitochondrial inner membrane and reduced levels precipitate the loss of retinal ganglion cells secondary to mitochondrial dysfunction. Currently, there is no approved treatment for people living with ADOA.

Objectives: There are limited prospective data on the natural history of ADOA and mitochondrial dysfunction has not been studied *in vivo*. In the presence of retinal oxidative stress mitochondrial flavoproteins, when stimulated by blue light, display increased fluorescence measured as green light. Ocumet Beacon leverages this by quantitating this light emission, generating a retinal flavoprotein fluorescence (FPF) score. FPF functions as a biomarker of mitochondrial dysfunction *in vivo*. Here we present initial baseline data from FALCON from a patient subset who completed the Beacon assessment.

Methods: FALCON is a multicenter, prospective natural history study of people ages 8 to 60 who have an established clinical diagnosis of ADOA that is caused by a heterozygous *OPA1* gene variant. No investigational medications or other treatments will be provided. The study enrolled 48 patients across 10 sites in the U.S., U.K., Italy, and Denmark. Patients undergo assessments at baseline, 6 months, 12 months, 18 months, and 24 months. There will be no additional follow-up period.

Results: Nineteen patients (8 (8-17 years), 6 (18-40 years), and 5 (41-60 years)) completed baseline Beacon evaluation. For the subset of 19 patients, the mean duration since ADOA onset was 16.0 years (SD 13.71) with the mean (SD) LogMAR (25%) of 0.7 (0.37); and an average reading speed of 96.4 (38.39) words per minute. FPF is being analyzed and will be reported at presentation time.

Conclusions: FPF may add to current diagnostic tools for earlier detection of ADOA mitochondrial dysfunction and may help to inform future studies as a measure of treatment response.

FT-NEU-003

Effect of Xist long non-coding RNA on microglial inflammation in mouse optic neuromyelitis pathogenesis

*T. Chen*¹

¹Department of Health and Life Sciences, University of Health and Rehabilitation Sciences, Qingdao, China

Introduction: The vast majority of patients with neuromyelitis optica (NMO) are female. Identifying the immunological mechanisms that make females more susceptible to NMO could be a potent weapon for its treatment or prevention.

Objectives: Our previous studies have revealed a crucial role for microglia in NMO. Our latest research further demonstrates that gender differences in microglia are responsible for the more severe neurological damage observed in female animals in the NMO model. Our single-cell nuclei RNA sequencing study suggests that the long non-coding RNA Xist (X Inactive Specific Transcript) potentially enhances the inflammatory response of microglia in NMO.

Methods: In this study, we compared the functional impairment and pathological changes occurring in female and male animals in the NMO model using NMO mouse models. Moreover, we conducted high-throughput analysis of various cells in the lesion areas of female and male animals through single-cell nuclei RNA sequencing to elucidate the cellular mechanisms underlying the gender differences in NMO. Additionally, we blocked Xist and observed its effects on the NMO model. Finally, we further investigated the epigenetic mechanisms by which Xist and estrogen jointly regulate BV2 cell inflammatory responses.

Results: The female mice had more motor dysfunction in the NMO model, and there was more microglia activation in female NMO model lesions. Inhibition of Xist significantly reduced microglia proliferation and microglia activity in the NMO model. In cell culture, Xist knocking down significantly reduced the expression of inflammatory mediators in BV2 cells induced by complement C3. Moreover, Xist knocking down also reduced the translocation of estrogen receptors under C3 and estrogen co-stimulation.

Conclusions: Our observation revealed an unappreciated mechanism of microglial sex difference, which modulates NMO pathogenesis.

FT-NEU-005

Clinical outcomes of patients with sequential non-arteritic anterior ischaemic optic neuropathy in Bangladesh

T. Roy¹, A.R. Islam¹

¹Department of Neuro-Ophthalmology, Chittagong Eye Infirmary and Training Complex, Chittagong, Bangladesh

Introduction: Clinical features of Sequential Non-arteritic Anterior Ischaemic Optic Neuropathy (NA-AION) have predominantly been reported in patients from the Western world. However, there is limited documentation of this common ophthalmic disease in Asian populations and in resource-constrained countries like Bangladesh.

Objectives: To provide an overview of the clinical presentation, pattern of vision loss in the fellow eye, management and clinical outcomes of Sequential Non-arteritic Anterior Ischaemic Optic Neuropathy (NA-AION) patients in resource-constrained Asian countries like Bangladesh.

Methods: This cross-sectional study involved 57 patients with sequential NA-AION who attended the Neuro-Ophthalmology Department of a tertiary eye-care hospital in Chattogram, Bangladesh, from June 2019 to February 2020.

Results: The mean age of the patients was 51.85 ± 8.69 years, with 61% (n=35) being males. The mean interval between attacks in two eyes was 10.9 months. Of the total patients, 18% (n=10) had secondary optic atrophy in both eyes, and 53% (n=30) presented with NA-AION in one eye. Additionally, 28% (n=16) of patients initially presented with NA-AION in one eye and later developed it in the other eye. About 43.85% of patients (n=25) exhibited a difference of visual acuity within 2 lines of the Snellen Acuity chart, while 38.59% (n=22) showed a difference of more than 4 lines between their first and second eyes. One-third of the patients experienced a two-line improvement in visual acuity after treatment. Management strategies included addressing risk factors, providing vitamin supplements, administering low-dose aspirin to all patients, systemic methylprednisolone to one-third of the patients, and intravenous erythropoietin to six patients.

Conclusions: NA-AION is a prevalent cause of vision loss in adults and the elderly population, often involving the fellow eye. Therefore, reporting its clinical presentation, pattern of vision loss, and the effectiveness of management strategies is crucial.

FT-NEU-006

Analysis of neuro-ophthalmological manifestations in Kearns-Sayre syndrome

J. de Vera¹, A. Ortiz², E. Vazquez², A. Rodas², M. Garcés²

¹Universidad Católica de Santiago de Guayaquil, Guayaquil, Ecuador, ²Centro de Especialidades Oftalmológicas Aljaorza, Machala, Ecuador

Introduction: Kearns-Sayre syndrome is a rare and progressive mitochondrial myopathy characterized by large deletions in mitochondrial DNA. It is usually clinically diagnosed, with symptom onset occurring before the age of twenty. Pigmentary retinopathy and progressive external ophthalmoplegia, along with cardiac conduction disorders, are frequent findings. Due to its prevalence of 1-3 cases per 100,000 individuals and the limited number of reported cases, more studies are needed to understand the complexities of this potentially fatal disorder.

Objectives: This study aims to evaluate the variation of epidemiological data, ophthalmic and systemic clinical manifestations, and the different examination results.

Methods: A retrospective case series search was conducted on the Centro de Especialidades Oftalmológicas Aljaorza in Ecuador, medical index patient database for the records of patients with Kearns-Sayre Syndrome between 2017 and 2023. The 5 identified patients were analysed in terms of demographic characteristics, clinical manifestations, complementary exams for diagnosis, and the association with other affected organs and systems.

Results: Five patients with Kearns-Sayre Syndrome were diagnosed, treated, and assessed during the mentioned time period. The external progressive ophthalmoplegia was observed in all five patients, ptosis in three, and clinical pigmentary retinopathy in two patients. Complementary studies were performed, decreased visual acuity was found in three patients, peripheral contraction of the visual field was observed in three patients. The most common electroretinogram findings were subnormal scotopic responses with bilaterally attenuated "a" and "b" waves in all patients, and normal photopic response in three patients. Heart disease (3/5) was the most frequent extraocular condition (myocardiopathy in one case and bundle branch block in two cases), followed by endocrinopathy (2/5) and neuropathy (2/5). Constitutional finding such as debility and exercise intolerance was found in one patient. No patients have died or experienced medical emergencies.

Conclusions: We present the largest case series of patients with Kearns-Sayre Syndrome in a South American institution. Our cohort included neuro-ophthalmologic complementary exams and a multidisciplinary approach. Although there is no curative therapy available, supportive treatment of organ dysfunction can improve the quality of life.

FT-NEU-008

Determinants of pulse steroid therapy acceptance among patients with optic neuritis

M. Parvand^{1,2}, A. Grewal^{1,2}, S. Teja^{1,2}

¹Faculty of Medicine, University of British Columbia, Vancouver, Canada, ²Department of Ophthalmology & Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: Despite extensive research into the use of corticosteroids in the treatment of optic neuritis (ON), questions persist regarding the optimal route of administration, timing, and long-term benefits. Accumulating evidence suggests the need for a tailored treatment approach.

Objectives: To examine factors influencing patients' decisions regarding pulse steroid therapy for optic neuritis and to determine the percentage of ON patients consenting to this treatment.

Methods: Patient data from 2013 to 2023 were extracted from the electronic medical records of the University of British Columbia Multiple Sclerosis and neuro-ophthalmology clinics. Data including demographic information, time to diagnosis, severity of acuity and color vision loss, and occupational information were recorded. Comparative statistics were used, utilizing medians, standard deviations, frequencies, and percentages. A significance level of <0.05 was used.

Results: To date, 50 patients have been included in this study. Median age was 33.5 years (± 10.8), with 36 (72%) being female. The median time between symptom onset and ophthalmology presentation was 6.5 days (± 8.8). Of all patients, 18 (36%) agreed to high dose oral steroid therapy, and 18 (36%) agreed to high dose intravenous steroid therapy. Patients presenting with an average delay of 7.1 (± 1.1) days from symptom onset to ophthalmology visit were more likely to agree to corticosteroid therapy than those presenting later ($p < 0.05$). Ninety percent of patients presenting with lowered color vision consented to steroid therapy. Regarding visual acuity, 90.5% of patients presenting with hand motion or counting fingers, 72.7% of those presenting with visual acuity $< 20/100$, and 83.3% of those presenting with visual acuity $< 20/50$ agreed to corticosteroid therapy, while only 25% of those with a visual acuity of $> 20/50$ consented. Occupation did not impact patients' agreement to steroid therapy.

Conclusions: Patients exhibiting significantly reduced visual acuity and color vision were more inclined to consent to corticosteroid treatment. Interestingly, we observed no correlation between patients' employment categories and their willingness to consent to corticosteroid therapy. However, it is important to note that our conclusions regarding the impact of occupation on consent may be limited by the small sample size. Furthermore, our analysis indicates that the timing of ophthalmologist visits following the onset of optic neuritis symptoms plays a crucial role, with patients who sought care earlier being more predisposed to consenting to corticosteroid use. These insights highlight the importance of timely intervention and tailored approaches in managing optic neuritis, informing clinical decision-making and patient care strategies moving forward.

FT-NEU-009

Seeing into wellness: deep learning-enhanced retinal age acceleration for top 50 diseases stratification in GBD rankings

R. Liu¹, S. Yang¹, Z. Zhu¹, W. Wang^{1,2}

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangdong Provincial Clinical Research Center for Ocular Diseases, Sun Yat-sen University, Guangzhou, China, ²Hainan Eye Hospital and Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Hainan, China

Introduction: Efforts aimed at combating age-related diseases and prolonging healthspan have focused on targeting the aging process to 'rejuvenate' physiological functions. Nevertheless, attaining this objective necessitates the quantification of biological age through multilayered biomarkers. Conventional metrics, such as blood-based PhenoAge and KDM-BA, have their applicability constrained in underdeveloped regions due to invasive procedures and complexity in sample analysis. Retinal age, as an emerging aging clock, holds promise for supplanting traditional methodologies in the global screening of diseases.

Objectives: To evaluate the associations of Retinal Age Acceleration (RAA), PhenoAge Acceleration (PAA), and KDM-BA Acceleration (KAA) across 50 major disease/injury groups from the 2019 Global Burden of Disease and Injury Study.

Methods: The study evaluated UK Biobank participants enrolled between 2006 and 2010. Deep learning network was applied to retinal fundus images from more than 40,000 individuals to predict individual retinal age. PhenoAge and KDM-BA assessments were calculated based on methodologies delineated in previous studies. 34,185 participants with complete data were included in the final analysis. Student t test was used to test the age acceleration (AA) difference between disease/injury groups and healthy control group.

Results: The study findings indicate that Retinal Age Acceleration, PhenoAge Acceleration (PAA), and KDM-BA Acceleration (KAA) exhibit efficacy in disease screening, revealed significant deviations compared to healthy controls across 36, 41, and 30 of the 50 investigated diseases/injuries, respectively. The analysis revealed that RAA, PAA, and KAA capture differential information across various systemic diseases, with RAA mainly screening for audiovisual and endocrine diseases, PAA for cardiovascular conditions, and KAA for mental and neurological disorders. Furthermore, after adjusting for multiple confounders, for each additional disease at baseline, the corresponding AA score increased by 0.04, 0.48, and 0.29, respectively.

Conclusions: Our study highlighted the significance of retinal age as an affordable, universally available, and non-invasive biomarker for identifying diseases, acting as a specialized adjunct to conventional biological age metrics. The potential of retinal age in facilitating widespread, early detection of numerous diseases among broader populations holds promise for substantially reducing the strains on global healthcare systems.

FT-NEU-010

Risk factors for fellow eye involvement in patients with nonarteritic anterior ischemic optic neuropathy

X. Li^{1,2}, H. Yang²

¹Xi'an Jiaotong University Health Science Center, Xi'an Jiaotong University, Xi'an, China, ²State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: This retrospective longitudinal cohort study aimed to explore which factors, if any, would increase the risk of fellow eye involvement in NAION patients with relatively complete systemic and ocular follow-up information. Besides diabetes, we have found cut-off points of visual field damage and the severity of obstructive sleep apnea syndrome (OSAS) to alert doctors to the increased risk for fellow eye involvement, which had not been reported in the literature. Especially for OSAS, we firstly found a new cut-off point of apnea hypopnea index (AHI) which represents the severity of OSAS when talking about fellow eye involvement of NAION in Chinese Han population.

Objectives: To investigate the possible risk factors for fellow eye involvement in patients with nonarteritic anterior ischemic optic neuropathy (NAION).

Methods: A total of 113 patients with unilateral NAION attack were included and divided into two groups according to whether fellow eye involvement was present over a mean follow-up period of 2.70 years (P25–P75: 0.77–3.54 years). General characteristics (including age, sex, diabetes, hypertension, hyperlipidemia and obstructive sleep apnea syndrome) and ocular characteristics (including initial best corrected visual acuity, initial visual field damage of the first eye and the presence/absence of a crowded disc) were analyzed and compared between the two groups. Cox regression was used to assess the risk factors for fellow eye involvement.

Results: During the follow-up period, 40 patients developed fellow eye involvement. The initial best corrected visual acuity ($P = 0.048$) and mean deviation (MD) of the visual field (VF) ($P = 0.039$) of the first eye in patients with fellow eye involvement were worse than those in patients without it. Diabetes (HR = 3.06, 95% CI: 1.50, 6.26, $P = 0.002$) and increased VF damage (moderate vs. mild, HR = 2.92, 95% CI: 1.03, 8.25, $P = 0.043$; severe vs. mild, HR = 5.01, 95% CI: 1.65, 15.20, $P = 0.004$) were associated with a significantly increased risk of fellow eye involvement. In 57 patients with apnea hypopnea index (AHI) data for further study, an AHI score ≥ 23.2 was also found to be a risk factor (HR = 3.36, 95% CI: 1.17, 9.69, $P = 0.025$).

Conclusions: Diabetes, severer initial VF damage, and more severe obstructive sleep apnea syndrome (OSAS) were risk factors for fellow eye involvement in NAION. For patients with these risk factors, more intensive follow-ups might be warranted.

FT-NEU-011

OCTA of peripapillary vessel density in nonarteritic anterior ischemic optic neuropathy and demyelinating optic neuritis

Q. Xiao¹, C. Sun¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: In a setting of optic disc edema or a pale optic disc, it is difficult to distinguish the episode of optic neuritis(ON) from that of nonarteritic anterior ischemic optic neuropathy(NAION) on clinical examination. Optic coherence tomography angiography (OCTA) can reveal the differences in peripapillary vascular network structures, which might provide a biomarker for differential diagnosis.

Objectives: To find a biomarker for the differential diagnosis between nonarteritic anterior ischemic optic neuropathy and acute optic neuritis by OCTA.

Methods: 23 eyes with NAION, 20 eyes with demyelinating ON, 27 eyes of normal subject were imaged with OCTA to observe the peripapillary vascular density(VD). We also use OCT to measure peripapillary retinal nerve fiber layer(RNFL) thickness and macular ganglion cell complex(GCC). The information were recorded in the course of less than 3 weeks and more than 3 months for all patients.

Results: A total of 23 affected eyes from 23 NAION patients (average age 52.17 ± 7.92 years), 20 eyes from 20 DON patients (average age 47.88 ± 19.24 years), 27 eyes from 27 normal people (average age 46.43 ± 14.08) were included in the study. There was no significant difference in age, sex, eyes of laterality between every two groups ($F=0.968, 0.475, 0.870, P>0.05$). Over the course of NAION and DON, the superonasal (SN) RPC, superior mGCC, and superotemporal (ST) RNFL decreased with time, while the (IN)RPC and inferior GCC didn't decrease from acute stage to chronic stage in NAION ($t=1.639, 0.834, P=0.117, 0.413$). Compared with normal group, NAION patients and ON patients showed sharp reduce in peripapillary VD, p RNFL and mGCC from acute stage to chronic stage ($p<0.05$). Compared with NAION patients, ON patients had more decrease in (IN) peripapillary VD, inferior macular GCC than NAION patients ($p<0.05$), while there were not significant differences in superior macular GCC, pRNFL at the chronic stage between NAION and ON patients ($p>0.05$).

Conclusions: Different structural and microvascular changes were discovered in NAION patients compared with ON patients, it means that the different feature of optic nerve in different course existed between NAION and ON. The inferonasal peripapillary vascular density (VD) via the OCTA might be used as a biomarker to distinguish NAION from ON.

FT-NEU-012

Optic disc changes in Chinese patients with *NLRP3*-associated autoinflammatory disease

Y. Lu¹, W. Yu², Y. Zhong², M. Shen³

¹Department of Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China, ²Department of Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China, ³Department of Rheumatology and Clinical Immunology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China

Introduction: *NLRP3*-associated autoinflammatory disease (*NLRP3*-AID) is a rare heterogeneous autoinflammatory disease caused by *NLRP3* gene mutations on chromosome 1q44, which results in interleukin (IL)-1 β overproduction. Delayed diagnosis owing to diverse clinical manifestations cause irreversible organ damage. Several cases of ocular involvements in *NLRP3*-AID have been reported. Manifestations such as optic disc swelling (ODS) and optic atrophy have been reported; however, the data are limited, and the analyses are insufficiently detailed.

Objectives: To investigate the optic disc changes (ODC) in Chinese patients with *NLRP3*-associated autoinflammatory disease (*NLRP3*-AID).

Methods: Patients who were diagnosed with *NLRP3*-AID at the Department of Rheumatology, Peking Union Medical College Hospital between April 2015 and December 2022 were retrospectively reviewed and analyzed.

Results: A total of 20 patients were enrolled in this retrospective study. All the 20 patients had a moderate MWS *NLRP3*-AID phenotype. Thirteen patients (65%) had ocular involvements. The interval between symptoms onset and diagnosis was significantly longer in patients with ocular involvement than in patients without ($p = 0.044$). The incidence of hearing loss was significantly higher in patients with ocular involvement ($p = 0.017$), while the incidence of abdominal pain was significantly lower when compared to patients without ocular involvement ($p = 0.007$). Optic disc swelling (ODS) (50%) was the most common ODC. All of the four T348M mutation carriers within our cohort exhibited ODS with visual-field defects. There was a significant difference between patients with/without ODS regarding the number of patients carrying T348M mutation ($p = 0.014$). The occurrence of hearing loss and CNS involvement was significantly higher in the group with ODS compared to the group without ($p = 0.0014$, $p = 0.0198$). Of the eight patients who underwent lumbar puncture, five presented with intracranial hypertension (IH). ODS was observed in all patients with IH. The serum inflammatory markers were significantly higher in patients with ODS than in those without. Two patients receiving regular subcutaneous IL-1 inhibitor treatment showed improvements in ODC.

Conclusions: ODC are common among Chinese patients with *NLRP3*-AID, with ODS being the most common manifestation. Hearing loss and CNS involvement often accompany the occurrence of ODS. The serum inflammatory markers are associated with ODS. The T348M mutation is more likely to lead to ODC with visual-field defects.

FT-NEU-013

Natural history and factors influencing prognosis in 123 Chinese patients with Leber Hereditary Optic Neuropathy

T. Guo¹, H. Yang¹

¹Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China

Introduction: LHON is a hereditary optic nerve disease that ultimately leads to irreversible visual impairment and severe optic nerve atrophy. Understanding the influencing factors of the prognosis of LHON is not only beneficial for disease control but also provides effective reference indicators for future intervention and treatment evaluations.

Currently, research on the natural history of LHON primarily focuses on VA, while the evolvement of VF, mVF, RNFL and mGCIPL was unclear. Evaluation and design for Future clinical trial on LHON, such as gene therapy and other medication, required comprehensive datas about the natural history of LHON.

To this end, we intend to investigate the natural history and factors influencing prognosis in LHON by retrospectively analysis the 12 m follow up data of 123 Chinese Han individuals with LHON. The VA, VF, mVF, RNFL, mGCIPL and factors influencing prognosis were all analyzed.

Objectives: To investigate the natural history and factors influencing prognosis in Chinese patients with Leber Hereditary Optic Neuropathy (LHON).

Methods: 12 m follow-up data of 123 patients with LHON were included. The evolution and prognosis of visual function and structural examinations were retrospectively analyzed. Multivariate linear regression models were employed to investigate the correlations between various factors in LHON.

Results: Among all LHON patients, VA dropped mainly during the first month then level off while VF kept deteriorating till 9 m. The microperimetry threshold value was worst in m.11778G>A, followed by m.14484T>C and best in rare gene group, with fixation mostly at center, followed by the superior vascular arch region. The pRNFL thinning primarily affected the temporal and inferior quadrant.

As VA, VF and RNFL prognosis, m.11778G>A was the poorest, followed by m.14484T>C, while rare gene group had the best. Patients ≤ 12 years showed better visual prognosis. Positive correlation between VA and age was found. VF and RNFL prognoses were significantly negatively correlated with the duration of the disease. Only the inferior quadrant RNFL was influenced by mutation type.

Conclusions: In LHON, most visual and structure index stabilized within 9 m. VA was more sensitive for early visual changes, while VF for later visual change. Temporal and inferior RNFL was usually the first and more severely damaged, making the patients fixation point mostly shift to upper vascular arch region. Factors favoring prognosis were mutation type, age ≤ 12 y, and shorter course.

FT-NEU-014

The different immune response between onset and remission of AQP4 antibody-positive optic neuritis

W. Zou^{1,2}, Y. Luo², R. Shi¹, K. Wang³

¹Department of Ophthalmology, Jiangnan University Medical Center (JUMC), Wuxi, China, ²Department of Ophthalmology, Affiliated Wuxi Clinical College of Nantong University, Wuxi, China, ³National Health Commission (NHC) Key Laboratory of Nuclear Medicine, Jiangsu Key Laboratory of Molecular Nuclear Medicine, Jiangsu Institute of Nuclear Medicine, Wuxi, China

Introduction: AQP4 antibody seropositive optic neuritis (AQP4-ON) is a relatively rare autoimmune inflammatory disorder of the optic nerve. Transcriptomics is a method for understanding the transcription levels of genes in cells or tissues. Recently, transcriptomics has been widely applied to systematically analyze the changes in gene expression in disease status. In this study, we want to investigate the differences in the immune response between the onset and remission stages of AQP4 antibody-positive optic neuritis (AQP4-ON).

Objectives: To investigate the differences in the immune response between the onset and remission stages of AQP4 antibody-positive optic neuritis (AQP4-ON).

Methods: Whole blood samples were collected from healthy volunteers and patients with AQP4-ON at the onset and remission stages. RNA sequencing analysis was performed to identify gene expression patterns and immune response pathways associated with the disease stages. The CIBERSORTx algorithm was performed to identify infiltrated immune cells.

Results: Our results revealed significant differences in the immune response between the onset and remission stages of AQP4-ON. The enrichment analysis showed that Toll-like receptors, cytokine activity and neutrophil-mediated immune activity were significantly enriched in the acute stage, while chromosome activity and cell cycle pathway were significantly enriched in the remission stage. TSPO is the core gene in the acute stage and CDK1 is the core gene in the remission stage. The expression of the TSPO gene showed positive correlations with macrophages M0, T cells CD4 memory activated and neutrophils, while significantly negatively correlated with T cell CD8 ($rs=0.7418$, $P=0.0014$), T cells regulatory (Tregs) ($rs=0.4592$, $P=0.0313$) and NK cells resting ($rs=0.4329$, $P=0.0386$). The proportion of infiltrating immune cells associated with visual prognosis was different between the two periods. BCVA(LogMAR) was positively correlated with T cell CD4 memory activated and NK cell resting, but negatively correlated with neutrophils in acute stage. BCVA (LogMAR) was negatively correlated with monocytes, T cell CD8 and macrophages M0, but positively correlated with neutrophils, B cells naïve and T cells regulatory (Tregs) in remission stage.

Conclusions: Our findings provide valuable insights into the different immune response during different stages of AQP4-ON. Understanding these differences may help in developing targeted therapies and personalized treatment strategies for patients with AQP4-ON.

P-NEU-001

Voxel-based morphometry reveals altered gray matter volume associated with acute acquired concomitant esotropia

J. Fu¹, W. Chen¹, J. Liu², J. Chen¹, H. Li¹, J. Hao¹

¹Beijing Tongren Hospital, Capital Medical University, Beijing, China, ²Wilmer Eye Institute, School of Medicine, Johns Hopkins University, Baltimore, United States

Introduction: The etiology of acute acquired concomitant esotropia (AACE), aside from a minority of cases attributed to specific intracranial pathologies, remains a subject of debate. Despite clinical features such as angles of esodeviation, refraction state, fusional vergence functions, and surgery outcomes have been widely discussed, reports on abnormal brain structure in AACE patients are notably absent to our knowledge.

Objectives: This study aims to determine the difference in gray matter volume (GMV) between acute acquired concomitant esotropia (AACE) patients and health controls (HCs) by employing voxel-based morphometry (VBM).

Methods: A cohort of 31 AACE patients and 31 HCs, matched for age, sex, and education, underwent magnetic resonance imaging (MRI) for the assessment of GMV. Clinical features were evaluated in both cohorts. A two-sample t-test was utilized to compare GMV across the entire brain between the groups. Furthermore, correlation analysis was conducted to ascertain the association between GMV and clinical characteristics in AACE patients, whereas multi-linear regression analysis was to identify independent predictors of GMV alterations.

Results: AACE patients exhibited a significant reduction in GMV in several regions, including the right calcarine, right cuneus, right superior occipital gyrus (SOG), right middle frontal gyrus, right precentral gyrus (PCG), medial segment of left superior frontal gyrus (SFG), opercular part of left inferior frontal gyrus, and left middle occipital gyrus, in comparison to HCs. A negative correlation was observed between the GMV in the right calcarine and the degree of near stereopsis impairment ($r=-0.489$, $p=0.009$), while the GMV in the right SOG positively correlated with the refraction diopter ($r=0.523$, $p=0.003$). Moreover, the onset age of AACE negatively correlated with the GMV in the right PCG ($r=0.374$, $p=0.037$) and the left SFG ($r=0.366$, $p=0.042$). The analysis also determined that near stereopsis and refraction diopter are independent determinants of GMV reduction.

Conclusions: The study finds significant atrophy across both visual and motor cortex regions in AACE patients, indicating underlying neural mechanisms contributing to the observed visual and oculomotor disorders.

P-NEU-002

Myopia and PHOMS as risk factors for nonarteritic anterior ischemic optic neuropathy

*Y. Zhao*¹

¹Neuro-ophthalmology, Qingdao Eye Hospital of Shandong First Medical University, Qingdao, China

Introduction: Previous studies suggested that hyperopia could be a predisposing factor for NAION. With the myopic population aging and advances in OCT technology, more NAION patients with myopia were admitted to the clinic, but OCT based research of the optic nerve head anatomy in NAION patients with myopia were few.

Objectives: To determine the prevalence of myopia in a retrospective study on non-arteritic anterior ischaemic optic neuropathy (NAION) patients, and to study their association with optic nerve head features, especially including peripapillary hyperreflective ovoid mass-like structures (PHOMS).

Methods: 62 cases(62 eyes)with unilateral NAION from January 1, 2019 to January 1, 2024 were studied retrospectively. The medical records of detailed ophthalmic examinations of patients were reviewed retrospectively. The contralateral non-onset eye were also analyzed. The spherical equivalent (sum of sphere and cylinder) was used as a measure of refractive error. Optical coherence tomography (OCT) or optical coherence tomography angiography(OCTA) scans of optic nerve heads were graded for PHOMS, disc tilt, prelaminar hyperreflective lines, and other ocular parameters.

Results: There were more myopic patients(30 of 62) in NAION. The emetic cases were 17.7%(11 of 62), and hyperopic cases were 33.9%(21 of 62). PHOMS were found in 41.9% (26 of 62)of total cases. The majority of eyes with PHOMS were myopic (19 of 26) . Myopia and optic nerve head tilt were more common in cases with PHOMS than in cases without PHOMS ($P < .01$ and $P < .01$, respectively). Prelaminar hyperreflective lines were found in 58% (15 of 26) of NAION with PHOMS compared to 14%(5 of 36) of NAION without PHOMS ($P < .001$).

Conclusions: The prevalence of myopia and PHOMS in NAION was higher than previously reported prevalence. Our results suggest that myopia and PHOMS could be a predisposing factor for NAION.

P-NEU-003

Ophthalmic artery morphology and hemodynamics associated with severity and progression of cerebral small vessel disease

J.-l. Wang¹, X.-r. Cheng¹, J. Sun¹, Y.-l. Wang¹

¹Beijing Friendship Hospital, Beijing, China

Introduction: Cerebral small vessel disease (CSVD) is associated with an increased risk of stroke, dementia, and mortality. Exploring the association between characteristics of the ophthalmic artery and CSVD can contribute to the risk assessment of CSVD.

Objectives: We aimed to explore the association between characteristics of the ophthalmic artery (OA) and the severity of cerebral small vessel disease (CSVD) and to investigate indicators that may predict CSVD progression.

Methods: This observational cohort study included 120 eyes of 64 participants, and 36 patients with CSVD were followed up for CSVD progression between 2016 and 2023. The severity of CSVD was assessed using the total CSVD score, which was rated by counting the presence of four magnetic resonance imaging markers (white matter hyperintensities, lacunes, cerebral microbleeds, and perivascular spaces; range, 0–4). 3D reconstruction and computational fluid dynamics simulations were used to measure OA's morphological and hemodynamic characteristics.

Results: The blood flow velocity, mass flow ratio, and wall shear stress of the OA were associated with CSVD severity. The areas under the models' curves based on traditional risk factors combined with OA characteristics for assessing CSVD severity were larger than those based on traditional risk factors. The mean time interval of CSVD progression in patients with larger OA diameters was longer than in those with smaller OA diameters (57.35 months vs. 26.70 months, $p = 0.002$). The OA diameter at the first visit was an independent predictor of the progression of CSVD.

Conclusions: A smaller diameter of the OA might serve as a predictive indicator of CSVD progression. A risk assessment model based on traditional risk factors combined with OA characteristics can better assess the risk and severity of CSVD than the traditional risk factor model.

P-NEU-004

Modified Sinskey operation for nystagmus patients who had no null point

B. Gokyigit¹, O.B. Ocak², A. Inal³

¹Akin Goz Sagligi, Istanbul, Turkey, ²Dunya Goz Hastanesi, Istanbul, Turkey, ³HSU Beyoglu Eye Hospital, Istanbul, Turkey

Introduction: The amplitude decreases very effectively with Sinskey operation in Nystagmus patients. But that operation causes postoperative exodeviation in many cases. And the solution of this problem quiet difficult after surgery because of the useless horizontal recti. To perform vertical rectus recti transposition procedure may prevent horizontal deviation, but that operation have high probability for anterior segment ischemia for these cases.

Objectives: We performed an effective modification for this surgery and related post operative problem. The aim of the study to introduce the techniques and evaluate visual and ocular motility restoration with normal appearance outcomes of maximal excision of the horizontal muscles in nystagmus patients.

Methods: The files of patients who underwent modified Sinskey operation were examined retrospectively. Operation performed on 9 cases with un-attached 10mm non-absorbable 6/0 suture on stumps. Postoperative severe exo-deviation treated either advancement of medial rectus or vertical recti muscle union procedures. Patients' pre and postoperative DATA evaluated by SPSS for Windows program

Results:

All patients had reduction of their normal and abnormal horizontal eye movement and improvement of their objective and/or subjective visual acuity. Postop severe exo-deviation was completely recovered after second operation in 4 cases. There were no anterior segment ischemia and need further operations least 4 years follow-up.

Conclusions:

Modified Sinskey operation and vertical recti muscle union procedure for consecutive deviation were found safe and effective procedures for nystagmus patients who had no null points.

P-NEU-005

FALCON: a prospective natural history study of patients with autosomal dominant optic atrophy (ADOA)

*R. Mudumbai*¹, *Y. Liao*², *P. Yu-Wai-Man*³, *B Lam*⁴, *M Votruba*⁵, *K. Saluti*⁶, *Y Wang*⁶, *B Ticho*⁶, *S. Gross*⁶

¹University of Washington, Seattle, United States, ²Stanford University, Stanford, United States,

³University of Cambridge, Cambridge, United Kingdom, ⁴University of Florida, Miami, United States,

⁵University of Cardiff, Cardiff, United Kingdom, ⁶Stoke Therapeutics, Bedford, United States

Introduction: ADOA is the most common inherited optic nerve disorder. It is a rare disease that causes progressive and irreversible vision loss in both eyes starting in the first decade of life. Roughly half of people with ADOA fail driving standards and up to 46% are registered as legally blind. An estimated 65% to 90% of cases are caused by mutations in the *OPA1* gene, most of which lead to haploinsufficiency resulting in 50% *OPA1* protein expression and disease manifestation. *OPA1* is a dynamin-related GTPase that localizes to the mitochondrial inner membrane and reduced levels precipitate the loss of retinal ganglion cells secondary to mitochondrial dysfunction. Currently, there is no approved treatment for people living with ADOA. ADOA affects approximately one in 30,000 people globally with a higher incidence in Denmark of one in 10,000 due to a founder effect.

Objectives: There are limited prospective data on the natural history of ADOA, which is essential to determine the best outcome measures for treatment trials.

Methods: FALCON is a multicenter, prospective natural history study of people ages 8 to 60 who have an established clinical diagnosis of ADOA that is caused by a heterozygous *OPA1* gene variant. No investigational medications or other treatments will be provided. Patients undergo assessments at baseline, 6 months, 12 months, 18 months, and 24 months. There will be no additional follow-up period.

Results: FALCON has completed enrollment with 48 patients (16 (8-17 years), 22 (18-40 years), and 10 (41-60 years)) across UK, US, Italy, and Denmark. At baseline, 46% were female and 96% were white. Across all patients, at baseline, mean (SD) LogMAR (25%) was 0.57 (0.335) and visual acuity was 56.75 (16.739). Results will provide a dynamic picture of disease progression in ADOA allowing structural and functional correlations with the causative *OPA1* genotype.

Conclusions: FALCON will provide data to inform us about the natural history of ADOA and to support the development of the antisense oligonucleotide (STK-002) as a potential disease-modifying treatment for patients with ADOA and initiation of the OSPREY phase 1 clinical trial.

P-NEU-006

Activation of NLRP3 inflammasome in the BRB of Alzheimer's disease and intervention of Raddeanin A

X. Wang¹, Y. Tang²

¹College of Basic Medical Sciences, Southwest Medical University, Luzhou, China, ²Technology Branch, Southwest Medical University, Luzhou, China

Introduction: The retina is an anatomical extension of the central nervous system (CNS), and pathology in the brain is usually reflected on the retina. Inflammatory bodies (such as NLRP3) are a common link between age-related diseases in the eyes and brain, but there is no consensus on whether NLRP3 inflammasome activation is present in Alzheimer's disease (AD) retinopathy. Raddeanin A is an oleanane-type triterpenoid compound Which has been reported to improve AD.

Objectives: This study investigated the activation of NLRP3 inflammasomes in the BRB of AD, and intervened with RDA.

Methods: Establish a co-culture system of HRECs and MIO-M1 cells on cells. The activation of NLRP3 inflammasome in AD retina and the protective effect of RDA were detected through CCK-8, Western blot, immunofluorescence, flow cytometry, Hoechst 33342, permeability assay, qPCR, and ELISA. In vivo, the activation of NLRP3 inflammasomes and the protective effect of RDA in the AD retina were examined by Western blotting, immunofluorescence, HE staining, and GS-IB4 staining using a 3×Tg-AD mouse model.

Results: In vitro BRB model, A β induces NLRP3 inflammasome activation, leading to death of HRECs and decreased expression of TJs, resulting in BRB damage. RDA intervention can inhibit NLRP3 inflammasome activation, thereby protecting BRB function. In the 3×Tg-AD mouse model, the retinal morphology and structure became thinner, disordered in arrangement, retinal blood vessels degenerated, and convoluted in shape. NLRP3 inflammasome activation and severe impairment of BRB function. After RDA intervention, retinal morphology and blood vessels were restored, NLRP3 inflammasomes were suppressed, and BRB function was significantly improved.

Conclusions: The chronic inflammatory response triggered by NLRP3 inflammasome activation may be one of the important reasons for the damage of the blood retinal barrier and secondary retinopathy in Alzheimer's disease; The inhibition of NLRP3 inflammasome activation by RDA and the improvement of AD retinopathy and AD pathology in mice suggest that NLRP3 may be a potential therapeutic target for AD retinopathy.

P-NEU-007

Metabolic fingerprinting on photoreceptors reveals underpinnings of eye-body connection and predicts multi-disease risk

S. Yang¹, W. Wang¹

¹Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: The systemic health implications of the retinal photoreceptor layer remain intriguing yet elusive.

Objectives: This prospective study aims to elucidate the eye-body connection and inform health promotion strategies.

Methods: We employed optical coherence tomography and metabolomics data from two ethnically diverse cohorts: the UK Biobank (UKB) and the Guangzhou Diabetic Eye Study (GDES). The prospective association between photoreceptor layer thickness and multi-system health outcomes were examined in 35,830 UKB and 2,975 GDES participants. Additionally, we identified and validated plasma metabolites linked to photoreceptor layer thickness in 7,824 UKB and 638 GDES participants. The prospective association of these photoreceptor-related metabolites with multi-disease risk and their added predictability were assessed in a non-overlapping 86,014 UKB participants.

Results: Associations were identified between the photoreceptor layer and 16 varied health outcomes, including all-cause mortality, cardiovascular diseases, kidney disease, liver disease, respiratory conditions, and cancers (all false discovery rate [FDR] $P < 0.05$). We identified 109 metabolic signatures associated with the photoreceptor layer, comprising 96 metabolites with positive and 13 with negative associations (all FDR $P < 0.05$). Metabolites positively associated with the layer generally indicated a lower risk of multi-system outcomes, whereas those negatively associated indicated increased risk (all FDR $P < 0.05$). Incorporating these metabolic signatures into predictive models significantly improved multi-disease risk prediction over established models (all $P < 0.05$).

Conclusions: The photoreceptor layer is significantly associated with a broad spectrum of systemic health outcomes, underscored by a distinct metabolic profile. These profiles might help refine the integrated prediction of systemic health, though further validation studies are required.

P-NEU-008

PHOMS: pathogenesis, multirater validation and longitudinal follow-up

*T. Liu*¹

¹Eye Hospital of Shandong First Medical University, Jinan, China

Introduction: PHOMS have been recognized as a common optic disc OCT biomarker.

Objectives: Axonal plasmic stasis may be one underlying pathophysiological mechanism of PHOMS. The utility of PHOMS has already been investigated in a variety of neurological disorders.

Methods: The utility of PHOMS has already been investigated in a variety of neurological disorders, including nonarteritic-anterior ischemic optic neuropathy (NA-AION), multiple sclerosis (MS) and idiopathic intracranial hypertension (IIH), PHOMS have been observed in other several ophthalmic diseases, including Leber's Hereditary Optic Neuropathy (LHON) and retinal vascular occlusions (RVO).

Results: The prevalence of PHOMS, in the existing studies, is as high as 98.4% in IIH and 93% in ODD. We investigate the epidemiological characteristics of PHOMS, as well as their associations with a variety of conditions. There is a correlation between PHOMS and the reduction of peripapillary capillary vessels density (VD) in these diseases, the unclear anatomy of PHOMS, and whether its longitudinal observation causes vision loss.

Conclusions: We have highlighted current knowledge gaps regarding prognosis, disease classification, and potentially relevant measures for clinical trial endpoints. And there are still unsolved problems. More research is needed if the progression of PHOMS is to be fully understood.

P-NEU-009

Oculomic profile improves prediction of individual multi-disease outcomes

W. Wang¹, S. Yang¹

¹Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China

Introduction: Investigating the link between retinal changes and systemic diseases has been hindered by the scarcity of large, detailed cohorts, despite its clinical relevance.

Objectives: To explore the potential of retinal biomarkers derived from multimodal imaging (oculomics) to inform on multi-disease risk beyond conventional clinical predictors for the onset of 38 common conditions, including mortality, cardiometabolic, neurological, renal, hepatic, and respiratory diseases, and cancers.

Methods: This multicenter, multi-ethnic cohort study included 35,803 participants with baseline ocular multimodal imaging from the UK Biobank (UKB) and an additional 2,975 participants from the Guangzhou Diabetic Eye Study (GDES) for external validation. An elastic net model was trained on 112 imaging markers to learn disease-specific oculomic states, whose predictive value was then compared against traditional clinical predictors in a fully withheld test set of the UKB participants. Model performance was evaluated using the C-statistic, net classification improvement (NRI), integrated discrimination improvement (IDI), calibration, and clinical utility, with external validation in the GDES cohort.

Results: Oculomic states were associated with the incidence of all examined conditions (all $P < 0.001$). Among these, OCT-derived neurodegenerative metrics were associated more with neurological outcomes, while fundus photograph-derived microvascular metrics were more associated with cardiometabolic outcomes. Combining oculomic states with age and sex improved or matched the performance of existing predictors for 30 and 26 of the 38 outcomes over 5- and 10-year prediction, respectively. Moreover, oculomic state added predictive value over comprehensive clinical predictors for 18 common diseases, including type 2 diabetes, coronary artery disease, dementia, and certain cancers (all $P < 0.05$). Decision curve analyses confirmed the clinical utility of these improvements across various decision thresholds, with notable enhancements in NRIs and IDIs observed in both cohorts (all $P < 0.05$).

Conclusions: Highly user-friendly, non-invasive oculomic profiling is effective in assessing and monitoring multiple organ systems. By enabling early detection and intervention at reduced costs, ocular biomarkers hold the promise of overcoming healthcare access barriers, especially in resource-limited settings.

P-NEU-010

Predicting visual outcomes in keratoprosthesis with preoperative critical flicker frequency, B-scan, fVEP, and endoscopy

H. Qi^{1,2}, G. Xu^{1,2}, Q. He^{1,2}, S. Wei¹, L. Wang^{1,2}

¹Department of Ophthalmology, Chinese People's Liberation Army General Hospital, Beijing, China,

²School of Medicine, Nankai University, Tianjin, China

Introduction: Keratoprosthesis (KPro), the only treatment for end-stage corneal blindness, necessitates accurate pre-operative assessments to identify appropriate candidates for surgery. Multiple ophthalmic examinations are employed to assess patients' retinal structure and neural function. However, dense corneal opacities often reduce the accuracy of these evaluations. Our study confirms the effectiveness of Critical Flicker Fusion Frequency (CFF) in predicting post-operative vision in KPro candidates, comparing it against visual electrophysiology, B-ultrasound, and endoscopy.

Objectives:

To assess the efficacy of CFF in predicting post-KPro visual outcomes, comparing its prognostic accuracy against traditional tests like B-ultrasound, Flash Visual Evoked Potential (fVEP), and endoscopy.

Methods:

This study is a prospective, non-interventional study that included 23 patients who received KPro surgery and underwent preoperative assessments, consisting of CFF, B-ultrasound, fVEP, and endoscopy. The results were classified as predictors of either favorable or unfavorable visual outcomes based on predefined criteria. Receiver Operating Characteristic analysis was performed to determine CFF's cut-off point, and calculate area under curve. Sensitivity and specificity were reported for each diagnostic test, according to postoperative best corrected visual acuity (BCVA) better than or equal to 20/200. Kappa statistic and Bland-Altman test were used to assess the consistency between diagnostic test predictions and postoperative BCVA.

Results:

Linear regression analysis showed a significant correlation between preoperative CFF values and postoperative BCVA ($R^2=0.72$; $P=.0019$). The CFF demonstrated a cut-off point at 10.5 Hz, with a sensitivity of 88.9% and specificity of 80% for predicting postoperative BCVA $\geq 20/200$. Endoscopy had 73.3% sensitivity and 80.0% specificity in predicting satisfactory postoperative BCVA, B-ultrasound showed a sensitivity of 72.2% and specificity of 60.0%, and fVEP exhibited 72.2% sensitivity and 40.0% specificity. The kappa statistic showed a 0.642 correlation between CFF and postoperative BCVA ($P=.002$), and 0.475 for endoscopy and BCVA ($P=.016$).

Conclusions:

Our findings highlight the significant potential of CFF for prognosticating visual outcomes in KPro candidates. Both endoscopy and the CFF test provide unique insights into retinal anatomic structure and macular function, outperforming B-ultrasound and fVEP in predicting visual outcomes, particularly in cases of anterior media opacification.

P-NEU-012

Assessing the impact of traumatic brain injury on the risk of developing ocular pain: a nationwide cohort study

Y.-Y. Chen^{1,2}

¹Department of Ophthalmology, Taichung Veterans General Hospital, Taichung, Taiwan, China ,

²School of Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan, China

Introduction: Few studies have explored the association between traumatic brain injury (TBI) and the subsequent risk of dry eye and ocular pain. Our study aimed to investigate whether patients with TBI have a higher risk of developing ocular pain.

Objectives: To assess whether the risk of subsequent ocular pain is elevated in patients with TBI.

Methods: We identified patients with new-onset traumatic brain injury (case group) between 2008 and 2020 from the National Health Insurance Research database. Individuals without traumatic brain injury (comparison group) were randomly selected and matched 4:1 to traumatic brain injury cases based on age, sex, and year of enrollment. We compared the characteristics of the two groups and computed hazard ratios (HRs) for ocular pain corresponding to TBI using Cox regression analysis.

Results: The case group comprised 91,515 patients, while the comparison group included 366,100 individuals. The mean age of the study cohort was 47.2 ± 12.3 years. During the study period, 14.7% of the case group and 9.8% of the comparison group developed ocular pain ($p < 0.001$). Cox regression analysis revealed a significantly greater hazard of ocular pain in the case group compared to the comparison group [HR = 1.76; 95% confidence interval (CI), 1.74–1.79].

Conclusions: This nationwide population-based cohort study revealed that TBI is significantly associated with an increased risk of subsequent ocular pain, suggesting a common underlying pathophysiology.

P-NEU-014

Peripapillary choroidal microvasculature dropout is associated with poor prognosis in optic neuritis

*H.W. Bae*¹

¹Ophthalmology, Yonsei University College of Medicine, Seoul, Korea, Republic of

Introduction: Previous studies suggest diverse mechanisms of MvD and possibly various roles for MvD in the development and progression of optic nerve disorders.

Objectives: To identify peripapillary choroidal microvasculature dropout (MvD) in eyes with optic neuritis and its association with longitudinal changes in retinal nerve fiber layer (RNFL) and ganglion cell-inner plexiform layer (GCIP) thicknesses following diagnosis.

Methods: A total of 48 eyes with optic neuritis was evaluated to identify the presence of peripapillary choroidal MvD, defined as a focal capillary loss with no visible microvascular network in choroidal layer, using optical coherence tomography (OCT) angiography (OCTA). Patients were divided based on the presence of MvD. OCT and standard automated perimetry (SAP) conducted at 1, 3 and 6 months follow-up were analyzed.

Results: MvD was identified in 20 of 48 eyes (41.7%) with optic neuritis. MvD was most commonly found in the temporal quadrant (85.0%), and peripapillary retinal vessel density in the temporal quadrant was significantly lower in eyes with MvD ($P = 0.012$). At 6 months follow-up, optic neuritis eyes with MvD showed significantly thinner GCIP in superior, superotemporal, inferior and inferotemporal sectors ($P < 0.05$). No significant difference was noted in SAP parameters. The presence of MvD was significantly associated with thinner global GCIP thickness at 6 months follow-up (OR 0.909, 95% CI 0.833-0.992, $P = 0.032$).

Conclusions: Optic neuritis showed peripapillary choroidal microvascular impairment in the form of MvD. MvD was associated with structural deterioration at macular GCIP. Further studies are necessary to identify the causal relationship between microvascular impairment and retinal nerve fiber layer damage in optic neuritis.

P-NEU-015

Segmented retinal analysis in pituitary adenoma with chiasmal compression: a prospective comparative study

*R. Agarwal*¹

¹Ophthalmology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow, India

Introduction: Pituitary adenoma constitutes 6%–12% of all symptomatic intracranial tumors. On enlargement, it has the propensity to extend beyond the sella turcica encroaching upon the visual pathways and ocular motor nerves in the cavernous sinus. Ours is a prospective study aimed to evaluate and compare the regional relationships between GCL-IPL and RNFL thickness as measured by spectral-domain optical coherence tomography (SD-OCT) in pituitary adenoma cases and its correlation with the VF in Indian subjects

Objectives: The aim of this study was to determine the alteration in ganglion cell complex and its relationship with retinal nerve fiber layer (RNFL) thickness as measured by spectral-domain optical coherence tomography (OCT) in pituitary adenoma cases and also its correlation with visual field (VF).

Methods: This is a prospective comparative study wherein detailed neuro-ophthalmic examination including perimetry, RNFL and ganglion cell layer inner plexiform layer (GCL-IPL) thickness were measured preoperatively in the cases of pituitary adenoma with chiasmal compression with visual symptoms and field changes who were planned for neuro-surgical intervention. These parameters were repeated 1 year after the surgery. GCL-IPL, RNFL parameters were compared with controls and were correlated with VF mean deviation (MD). The diagnostic power of GCL-IPL was tested using the receiver operating characteristic (ROC) curve. Healthy age and sex-matched controls without any ocular and systemic abnormality were taken for comparison.

Results: Twenty-four patients qualified the inclusion criteria. A significant thinning of GCL-IPL ($P = 0.002$) and RNFL ($P = 0.039$) was noticed in the pituitary adenoma group. GCL-IPL ($r = 0.780$, $P < 0.001$) and RNFL ($r = 0.669$, $P < 0.001$) were significantly correlated with the MD. The ROC curve values of GCL-IPL were 0.859 (95% confidence interval 0.744% to 0.973) and of RNFL were 0.731 (95% confidence interval 0.585–0.877). The diagnostic ability of GCL-IPL was more as compared to the RNFL analysis, although it was statistically insignificant ($P = 0.122$).

Conclusions: GCL-IPL measurements on the OCT are a sensitive tool to detect early anterior visual pathway changes in chiasmal compression for pituitary adenoma patients

P-NEU-016

Hyperbaric oxygen therapy in treating post-embolization vision reduction in a patient with internal carotid aneurysm

H. Jin Feng¹, G. Li Xiong¹, W. Shi Hui¹, W. Feng Xiang¹, Z. Huan Fen¹

¹Department of Ophthalmology, Chinese PLA General Hospital, Beijing, China

Introduction: Internal carotid aneurysms consistently lead to high disability and mortality rates, presenting significant treatment challenges. In this case, a patient with an aneurysm experienced a decline in vision of the healthy eye following coil embolization surgery. Treatment with hyperbaric oxygen rehabilitation allowed the patient's vision to recover from mere light perception to 0.4.

Objectives: To explore the effectiveness of hyperbaric oxygen rehabilitation in treating vision impairment caused by the internal carotid aneurysms.

Methods: A retrospective review was conducted on a case of an elderly female patient with a left internal carotid aneurysm treated in our department. The patient was admitted with a gradual decline in vision in the left-eye over two years and a two-month in the right-eye after surgery for a left internal carotid aneurysm. The abnormal Ophthalmological signs included light perception in the right eye and no light perception in the left eye, round pupils with left eye showing RAPD (+), the optic disc of the right eye appearing pale red with a C/D ratio of about 0.3 and of the left eye appearing pale with a C/D ratio of about 0.4-0.5. Auxiliary examinations, including pre-operative DSA and MRA and post-operative DSA and MRA, were reviewed. Macular OCT showed no significant abnormalities in either of the eyes. RNFL analysis showed no significant abnormalities in the right eye but abnormalities in the left eye. The patient underwent six cycles of hyperbaric oxygen rehabilitation treatment, each cycle lasting ten days.

Results: Two months post-treatment, the patient's unaided visual acuity in the right eye recovered to 0.4, with light perception observed in the left eye. Follow-up RNFL (Image-7) showed mild abnormalities in the right eye and abnormalities in the left eye. The visual field test of the right eye (Image-8) revealed a temporal side defect connected to the physiological blind spot.

Conclusions: Vision impairment in the left eye caused by the aneurysm is typically related to optic nerve compression, while the vision impairment in the right eye after surgery is considered to be related to embolization or insufficient blood supply. In this case, partial recovery of impaired vision in the right eye was achieved through hyperbaric oxygen rehabilitation treatment, showing significant efficacy and offering a new approach for treating such patients.

P-NEU-018

Visual stimulation training enhances visual cortex plasticity to restore vision from amblyopia in adult mice

Y. Huang¹, Z. Liu¹, X. Zhang¹, M. Wang¹, Y. Fu¹, L. Huang², M. Yu¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, Guangdong, China, ²Department of Pathophysiology, Zhongshan School of Medicine, Sun Yat-sen University, Guangzhou, Guangdong, China

Introduction: As the main cause of visual function deficits in children and adolescents worldwide, amblyopia causes serious impairment of monocular visual acuity and stereopsis. The recovery of visual functions from amblyopia beyond the critical period is slow and incomplete due to the limited plasticity of the mature cortex; notably, visual stimulation training seems to be an effective therapeutic strategy for clinical practice. However, the precise neural basis and cellular mechanisms that underlie amblyopia and visual stimulation treatment remain to be elucidated.

Objectives: To explore the neural basis and cellular mechanisms that underlie amblyopia and visual stimulation treatment.

Methods: In this study, by using monocular deprivation in juvenile mice to model amblyopia, we employed two-photon calcium imaging and chemogenetic techniques to investigate the visual responses of individual excitatory neurons and parvalbumin (PV⁺) interneurons in the primary visual cortex in amblyopic mice before and after binocular visual stimulation treatment.

Results: We found that amblyopic mice manifested significant excitation and inhibition (E/I) imbalance with an obvious ocular dominant shift, decreased orientation selectivity of excitatory neurons, enhanced response of PV⁺ interneurons, and increased density of PNNs surrounding PV⁺ interneurons. Inhibition of PV⁺ interneurons could reverse the effects of long-term MD and reactivate the ocular dominance plasticity of amblyopic mice to achieve better vision recovery. Moreover, visual stimulation treatment decreased the response of PV⁺ interneurons, resulting in attenuated inhibition to excitatory neurons to reactivate visual cortex plasticity, promoting vision recovery in adult amblyopic mice. Activation of PV⁺ interneurons could offset the vision-promoting effects of visual stimulation training in adult amblyopic mice.

Conclusions: Our results revealed a dynamic E/I balance between excitatory neurons and PV⁺ interneurons, which underlies the neural mechanisms of amblyopia during cortical development and visual stimulation-mediated functional recovery from adult amblyopia, providing evidence for therapeutic applications that rely on reactivating adult cortical plasticity.

P-NEU-019

An unexpected link between bilateral vision loss and hypophosphatemia

S. Hu¹, M. Sun², K. Qiu¹, H. Zhou², S. Wei², F. Yi³, Q. Xu², X. Zhou¹

¹Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China, ²Department of Ophthalmology, Third Medical Center of Chinese PLA General Hospital, Beijing, China, ³Southern Medical University, Guangzhou, China

Introduction: Optic disc edema (ODE) is a common finding in neuro-ophthalmology, often caused by various etiologies ranging from ophthalmic, and intracranial, to systemic diseases.

Objectives: To understand the disease etiology of bilateral vision loss caused by ODE.

Methods: We conducted a detailed examination of a 41-year-old woman. We performed ophthalmological evaluations, including visual acuity tests, intraocular pressure measurements, ophthalmoscopic examinations, ocular ultrasounds, optical coherence tomography, and visual field assessments. Further investigations included MRI, lumbar puncture, MRV, coagulation profiles, and whole exome sequencing. Laboratory experiments were conducted to confirm the pathogenicity of the identified mutation and its impact on phosphate reabsorption.

Results: Corrected visual acuity was 20/100 OD and CF OS. Ophthalmoscopic examination revealed ODE. The rest of the ophthalmologic examination was unremarkable. MRI revealed bilateral optic nerve subarachnoid space widening and empty sella suggesting elevated intracranial pressure. Subsequent lumbar puncture confirmed an elevated CSF pressure of 220 mmH₂O, with routine, biochemical, immunological, and cytological analyses of CSF showing no significant abnormalities. MRV indicated bilateral transverse sinus cranial venous sinus thrombosis (CVST). A blood test revealed normal thrombosis-related parameters but severe hypophosphatemia and elevated parathyroid hormone (PTH) levels. Ultrasound and X-ray showed parathyroid hyperplasia, osteoporosis, and kidney stones. Whole exome sequencing revealed a mutant of SLC34A1 c.1753T>C p.Ser585Pro. Further laboratory experimental studies confirmed that this mutation affects the renal phosphorus reabsorption function of its encoded protein called sodium-phosphorus cotransporter (NaPi-2a) located in the proximal renal tubule.

Conclusions: We reported a rare case with an unexpected link between bilateral vision loss and hypophosphatemia. Stepwise clinical reasoning is as follows: a SLC34A1 mutation causes the impairment of renal phosphorus reabsorption leading to hypophosphatemia. Reduced serum phosphate stimulates the feedback secretion of PTH which increases the dissolution of calcium phosphate in the bone to elevate serum phosphate levels, meanwhile, it increases the serum calcium levels. Elevated serum calcium levels predispose to hypercoagulability and result in CVST that further causes optic disc edema leading to bilateral vision loss.

P-NEU-020

SARS-CoV-2 related optic neuropathy

C.-b. Sun¹, Z. Liu²

¹Eye Center, Second Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou, China,

²Department of Ophthalmology, Zhejiang Provincial People's Hospital, People's Hospital of Hangzhou Medical College, Hangzhou, China

Introduction: Optic Neuropathy such as optic neuritis (ON) and anterior ischemic optic neuropathy (AION) is not uncommon in patients after SARS-CoV-2 infection.

Objectives: To evaluate the clinical characteristics of optic neuropathy including ON and AION after SARS-CoV-2 infection, and the prevalence of serum myelin oligodendrocyte glycoprotein antibody (MOG-Ab) and aquaporin-4 antibody (AQP-4 Ab) in SARS-CoV-2 related ON.

Methods: In this prospective case series study, 64 patients clinically diagnosed as optic neuropathy accompanied by laboratory confirmed SARS-CoV-2 infection from December 8, 2022 to June 8, 2023 were included. All patients' clinical and laboratory data were collected and analyzed. Patients with a previous optic neuropathy or an identifiable etiology other than SARS-CoV-2 infection were excluded from this study.

Results: Of 64 patients (85 eyes) with optic neuropathy, mean age was 44.1 ± 14.8 years (ranged from 17 to 70 years), female was 30 cases; 9 cases were AION, and 55 cases were ON. Acute macular neuroretinopathy, cotton wool spot, retinal hemorrhage spots, and preretinal hemorrhage were found in 4, 2, 1, and 1 case with ON. Seropositive MOG-Ab and AQP4-Ab were detected in 10, and 4 cases respectively. Of 9 cases (10 eyes) with AION, visual acuity kept stable in 6 eyes, and were improved in 4 eyes. Visual acuity were improved in all 55 cases (75 eyes) with ON after steroid pulse therapy, but there were still 5 eyes showed a poor vision below 20/200.

Conclusions: SARS-CoV-2 infection may trigger an onset of ON and AION, as well as the production of MOG-Ab and AQP-4 Ab.

P-NEU-021

Novel pathogenic *PANK2* variants responsible for pantothenate kinase-associated neurodegeneration

*D. Wang*¹, *Z. Zhang*¹, *H. Gu*¹

¹Ophthalmology, Guizhou Medical University, Guiyang, China

Introduction: Pantothenate kinase 2-associated neurodegeneration (PKAN) is a rare neurodegenerative disease caused by mutations in the *PANK2* gene, which is inherited in an autosomal recessive manner. *PANK2* variants are associated with several neurodegenerative conditions, including neurodegeneration with brain iron accumulation.

Objectives: We described a Chinese family with PKAN. The proband is a Chinese girl initially diagnosed with retinitis pigmentosa. She exhibited dysarthria, muscle stiffness, abnormal movements, and neck dystonia, ultimately diagnosed with PKAN-related neurodegenerative diseases. We successfully identified two novel *PANK2* variants by sequencing exons and flanking intronic regions that did not exist in the 1000 Genomes database: a novel heterozygous truncating variant (NM_153638, c.510_522delGTCGGTGCCCGCG, p. A170Afs*31) and a novel heterozygous missense variant (NM_153638, c.1213T> C, p. Y405H).

Methods: The proband and her healthy parents DNA from the peripheral blood of the vein was used for genetic detecting. Only the proband in the family suffered from PKAN. Whole genome sequencing of the proband and her parents was then conducted. The average sequencing depth in DNA samples of the proband was 112.9. The sample covered 99.67% of the target area. In addition, > 10X sequencing covered 99.25% of the target exons, > 20X sequencing covered 98.6% of the exons, and > 30X sequencing covered 97.2% of the exons. Variants with low allele frequencies were excluded to avoid errors. GATK and other bioinformatics tools (such as SIFT, PANTHER, and PolyPhen) were used to predict the pathogenicity of the variants identified.

Results: The proband had two compound heterozygous mutations, including a novel heterozygous truncating variant (NM_153638, c.510_522delGTCGGTGCCCGCG, p. A170Afs*31) and a novel heterozygous missense variant (NM_153638, c.1213T> C, p. Y405H).

Conclusions: The *PANK2* gene can be inherited among family members, leading to the development of neurodegenerative diseases. This case demonstrates that people who acquire these two new mutations simultaneously are more likely to develop PKAN.

P-NEU-022

Systemic and ocular risk factors of nonarteritic anterior ischemic optic neuropathy: a case-control study

*C.F. Chang*¹

¹Ophthalmology, Taipei Mackay Memorial Hospital, Taipei, Taiwan, China

Introduction:

We conducted a case-control study to explore possible systemic and ocular risk factors of non-arteritic anterior ischemic optic neuropathy (NAION).

Objectives:

This study aimed to determine the association between systemic diseases, ocular diseases and NAION in a hospital-based case control study.

Methods: We conducted a hospital-based case-control study that included all NAION patients diagnosed at Taipei Mackay Memorial Hospital and Tamsui Mackay Memorial Hospital during 2001-2021 as the cases. Control subjects were selected from those patients who received health examinations at MMH from the health center during the same study period. The cases and the controls were matched on age and gender with a ratio of 1:4. Data on potential systemic and ocular risk factors were then collected through chart review. Conditional logistic regression analysis was then employed in statistical analysis.

Results:

We identified a total of 72 cases and 288 matched control subjects. After adjusting for potential confounders, hypertension (HTN) (odds ratio=4.31, $p<0.001$), diabetic mellitus (DM) (odds ratio=5.30, $p<0.001$), hyperlipidemia (odds ratio=1.94, $p=0.01$) and small disc cupping (odds ratio=53.49, $p<0.001$) were associated with the risk of NAION.

Conclusions:

Certain systemic risk factors, including HTN, DM and hyperlipidemia, were significantly associated with NAION. Because these factors are also risk factors of cardiovascular diseases, earlier identification of these factors may help in the early intervention and prevention of both NAION and cardiovascular events.

P-NEU-023

Atypical optic neuritis secondary to syphilis with HIV coinfection: a case report

L. Manipon¹, M.L. Fermin¹, J.M. Abaño¹

¹Ophthalmology, University of Santo Tomas Hospital, Manila, Philippines

Introduction: Syphilis is one of the most common cause of sexually transmitted infection in the Philippines. People living with HIV, homosexual or bisexual practices are at increased risk of getting infected with the disease. This disease is caused by a spirochete known as *Treponema pallium*. Syphilis develops in different stages and signs and symptoms vary according to the stage of the disease. Typically the disease starts as a genital lesion. With the first sign of syphilis known as a chancre, a painless genital or perineal lesion, which would heal on its own. The secondary stage develops with non-specific symptoms such as fever and characteristic rash seen in the hands and feet of the patient. The disease may either go into latency but can eventually develop into the late stage or the tertiary syphilis. This stage are the complications of the untreated syphilis infections including endarteritis, neurosyphilis and gumma formation.

Objectives: To present a 31 year old male patient clinically diagnosed with atypical optic neuritis secondary to syphilis with HIV co-infection.

Methods: This is a case report of a 31 year old male patient living with HIV who presented with progressive bilateral blurring of vision characterized by cloudy vision with flashes of light. Maculopapular rashes were noted on upper and lower extremities along with a solitary painless plaque on his genital area. Patient was treated with Aqueous Crystalline Penicillin G 4 million units every 4 hours for 14 days with Tenofovir 300 mg, Lamivudine 300 mg and Dolutegravir 50 mg.

Results: Ocular examination revealed visual acuity of CF at 3 ft on both eyes. Pupils are 5-6 mm sluggishly reactive to light. Fundus examination showed hyperemic discs with blurred margins. Gross color perception on both eyes was 0/3. Fluorescein angiography revealed optic nerve and posterior uveitis on both eyes. OCT findings revealed bilateral macular edema. Significant laboratory findings were Elevated ESR, positive RPR result and qualitative TPPA. Cranial CT Scan and CSF analysis were unremarkable. After 14 days of antimicrobial and antiretroviral therapy, the patient's vision greatly improved to 20/125 on the right eye and 20/80 on the left with significant improvement of color vision to 5/15.

Conclusions: Ocular syphilis is a visually threatening condition. High index of suspicion is important in patients with coexisting infection. Early detection and prompt treatment is necessary for a promising outcome.

P-NEU-025

A bibliometric study and visualization analysis of NAION based on web of science

J. Lin¹, Y. Wang¹

¹Eye Hospital, China Academy of Chinese Medical Sciences, Beijing, China

Introduction: We comprehensively use various visualization software to construct a mapping knowledge domain of the NAION research field to elucidate the evolution of trends, hotspots, and emerging frontiers in this knowledge field, to serve as a reference for researchers and provide some clues for future research.

Objectives: NAION is a disease characterized by acute, painless, and usually monocular optic disc swelling with accompanying visual impairment. A tremendous amount of literature on NAION has been published. This study aimed to perform a bibliometric analysis and descriptive study of the publications on NAION and show its hotspots and development trends, to provide a reference for further research.

Methods: Relevant literature on NAION was searched and screened based on the Web of Science Core Collection (WOSCC) from January 1, 2000 to August 31, 2023. Bibliometrics and visual analysis were executed using R-bibliometrix, Scimago Graphica, VOSviewer, CiteSpace, and CitNetExplorer.

Results: A total of 579 publications were included in this study, involving 689 institutions from 47 countries, 2059 authors, 165 journals, and 8094 references. The United States has published the most literature in this field and works closely with countries such as Europe. "University of Maryland" in the United States and "Tehran University of Medical Sciences" in Iran were the institutions with the most publications, with 24 articles. Steven L. Bernstein is the author with the highest number of publications, H-index and G-index. The Journal with the largest number of publications was "Journal of Neuro-Ophthalmology", with a total of 52 articles published, and the journal with the highest number of citations was "Ophthalmology", with 1531 citations. Among the included publications. "Nerve Head", "Pathogenesis", "optical coherence tomography", "risk factors", "prevalence" and "fluorescein angiography" are high-frequency keywords.

Conclusions: In the past 20 years, the popularity of NAION-related research has been increasing. The United States and European countries have played a leading role in this research field, and the international influence of China's related research has also gradually increased. The risk factors and pathogenesis of NAION are dominant, among which OCTA, immune inflammation, and other related studies are hot spots. Further exploration of new target molecules and high-quality randomized controlled trials of existing therapeutics are needed to guide future precision therapies and comprehensive treatments.

P-NEU-026

Comparison of the Humphrey visual field with a virtual reality device in neuro-ophthalmology

A. Tran¹, C.E. Mendoza Santiesteban¹, G. Ricur¹, X. Mendoza¹, N. Mendoza¹, P. Clifford¹, I. Del Campo¹, T. Juvier-Riesgo¹

¹University of Miami Health System Bascom Palmer Eye Institute, Miami, United States

Introduction: The Olleyes VisuALL virtual reality (VR) platform is a portable, head-mounted device capable of testing the visual field with minimal assistance.

Objectives: To compare two visual field platforms; the fully automated VisuALL VR platform with the technician-assisted standard automated perimetry (SAP) using the Humphrey visual field (HVF) in a neuro-ophthalmology clinic.

Methods: Fifty adult patients with various retinal and optic nerve diseases were recruited through Bascom Palmer Eye Institute's neuro-ophthalmology clinic. Exclusion criteria include spherical refraction $> \pm 5.0$ D, cylinder correction > 2.0 D, previous intraocular surgeries, and the inability to use the VR device. Consenting participants completed a standard ophthalmic workup with skilled personnel, including HVF, followed by visual field exam on the VisuALL VR headset. Main outcome measurements were the main perimetry testing parameters, including mean deviation (MD) and pattern standard deviation (PSD).

Results: Of the 100 eyes studied, the mean MD and PSD produced by the HVF were -4.11 and 4.15 , respectively. The VisuALL mean MD was -3.44 , and mean PSD was 5.19 . The mean difference of MD between the two methods was -0.79 , whereas the mean difference of PSD was -0.93 . MD and PSD values for the VisuALL device correlated significantly with the HVF results with Pearson correlation coefficients of 0.91 and 0.88 , respectively.

Conclusions: The portable Olleyes VisuALL VR parameters correlate to those from the standard HVF test. The VisuALL VR platform demonstrates its utility by maintaining HVF accuracy while decreasing patient wait times and improving clinical efficiency.

P-NEU-027

Different presentations of optic neuritis after herpes zoster infection: two case reports

K.L. Chang¹, C.F. Chang¹

¹Ophthalmology, Taipei Mackay Memorial Hospital, Taipei, Taiwan, China

Introduction: Herpes zoster optic neuropathy (HZON) is an uncommon complication, reported in 0.4% of eyes with herpes zoster ophthalmica (HZO). Most cases occur within one month after HZO, primarily in immunocompetent individuals, with cases reported up to 12 weeks after HZO onset. We introduced two cases with different presentations of optic neuritis after herpes zoster infection.

Objectives: to introduced different presentations of optic neuritis after herpes zoster infection.

Methods: One patient was a 75 year-old-male without systemic diseases diagnosed optic neuritis 2 weeks after HZO infection. On initial presentation of trigeminal nerve V-1 involvement, he was hospitalized and received intravenous acyclovir 7 days treatment. However, blurred vision of left eye was found 2 weeks after discharge with visual acuity ND/30cm(OS). There were also anterior chamber(AC) reaction and vitritis. Fluorescein angiography showed disc leakage without acute retinal necrosis. Brain MRI showed retrobulbar optic nerve enhancement. He received oral acyclovir and topical steroid treatment but vision had no improvement. The other case was a 40 year-old-male without systemic diseases diagnosed optic neuritis 5 months after HZO infection. On initial presentation of trigeminal nerve V-1 involvement, he received oral famciclovir treatment for a full course. There was one episode of scleritis of right eye 2 months after HZO infection and was successfully treated with topical steroids. His vision was 20/1000 in the right eye. AC and fundus examination in both eyes were normal. Magnetic resonance imaging (MRI) showed middle to proximal optic nerve enhancement, consistent with optic neuritis. Indocyanine green angiography showed delay filling of choroidal circulation until nearly 1 minute. After pulse therapy combined with intravenous acyclovir treatment, his vision had improved to 20/25.

Results: Herpes zoster optic neuropathy (HZON) is a rare complication of herpes zoster ophthalmica (HZO), occurring in approximately 0.4% of affected eyes. The hypothesized etiology were viral replication, extensive inflammation involving posterior ciliary arteries and nerves and parainfectious as a consequence of a self-immune response.

Conclusions: These cases emphasizes the occurrence of delayed-onset post-herpetic retrobulbar optic neuritis in an immunocompetent patient. Timely intervention with empirical antiviral and pulse therapy resulted in visual recovery. Further research is needed to define the role of systemic steroids in HZON treatment.

P-NEU-028

Optic neuropathy in Guillain-Barre syndrome

D. Makhkamova¹, A. Yusupov¹, M. Karimova¹, M. Vahabova¹, D. Valikhonova¹, S. Khaydarov¹, I. Abdukadirova²

¹Ophthalmology, Republican Specialized Scientific and Practical Medical Center for Eye Microsurgery, Tashkent, Uzbekistan, ²Neurology, Tashkent State Dental Institute, Tashkent, Uzbekistan

Introduction: According to global epidemiological studies, Guillain-Barré syndrome (GBS) occurs in 1-2 cases per 100,000 population per year. The incidence of GBS in individual cities and regions of the Russian Federation corresponds to global data and varies from 0.34 to 1.9 per 100,000, on average 1.8 per 100,000 population per year. GBS can occur at any age, and men and women are affected with equal frequency.

Objectives: To study the state of the organ of vision in Guillain-Barre syndrome.

Methods: Patient A.F. born 1997 appealed to the outpatient department of the Republican Scientific and Medical Center with complaints of low vision in both eyes.

From the anamnesis, according to the patient, she considers herself sick since 2022 (the disease is associated with the past covid).

Results: Visus OD 0.6 OS 0.15, n\k. IOP OD/OS - 16.0/14.0 mm Hg. Art. Objectively: the OU anterior segment is calm, the media are transparent. Fundus of the eye: OU – optic disc is pale and swollen, the boundaries are not defined. Arteries and veins are narrowed and uneven. The macula and peripheral retina are unremarkable. Computer perimetry of the left eye shows an increase in the size of the blind spot and a slight concentric narrowing on the nasal side. OCT of the right eye shows an increase in the thickness of the RNFL and NRP. MRI signs of manifestations of vascular encephalopathy.

The patient was examined by a neurologist and rheumatologist and diagnosed with Guillain-Barré syndrome. Ophthalmological diagnosis: OU – Optic neuropathy. Related: Guillain-Barré syndrome.

The patient was prescribed anti-inflammatory, antimicrobial, anticoagulant, decongestant, and neuroprotective treatment according to a step-by-step scheme.

1 month after treatment: objectively - OU - without features.

Visus OD 0.7 OS 0.2, n\k. OU IOP 15.0/14.0.

Fundus: OU – optic disc swelling has decreased over time

Conclusions: It should be noted that optic neuropathy in GBS is very often not diagnosed due to the preservation of high visual acuity of patients or incorrect diagnosis. Correct and timely identification of such dangerous conditions can contribute to early and adequate diagnosis of general pathology and save the patient's life.

P-NEU-030

Observation on efficacy of Integrated Traditional Chinese and Western Medicine treatment for traumatic optic neuropathy

Y. Su¹, C. Chen¹, D. Chen², B. Wei²

¹Ophthalmology Center, Renmin Hospital of Wuhan University, Wuhan, China, ²Eye Department, Hubei Combined Hospital of Traditional Chinese and Western Medicine, Wuhan, China

Introduction: It's an observation on efficacy of Integrated Traditional Chinese and Western Medicine treatment for traumatic optic neuropathy.

Objectives: To treat traumatic optic neuropathy by Integrated Traditional Chinese and Western Medicine treatment through hyperbaric oxygen therapy, Chinese acupuncture therapy, and neurotrophic support, observe its therapeutic effect and evaluate its advantages in clinical application.

Methods: To collect the data of patients with traumatic optic neuropathy who didn't recovery after high-dose IV steroid or optic nerve canal decompression therapy. to perform routine ophthalmologic examinations such as visual acuity, visual field (when visual acuity is >0.1), visual electrophysiology, optic disc nerve fiber layer thickness, and to evaluate the therapeutic effects after 3 courses of Integrated Traditional Chinese and Western Medicine treatment such as hyperbaric oxygen therapy, Chinese acupuncture therapy, and Neurotrophic support.

Results: A total of 24 cases and 26 eyes were collected from patients with traumatic optic neuropathy didn't recovery after high-dose IV steroid or optic nerve decompression, with 7 eyes with visual acuity NLP, 5 eyes with visual acuity >0.1 , and 14 eyes in between NLP and 0.1. Through Integrated Traditional Chinese and Western Medicine treatment, visual acuity was restored to >0.3 in 9 eyes, $0.1 < \text{visual acuity} < 0.3$ in 6 eyes, $0.02 \leq \text{visual acuity} < 0.3$ in 6 eyes, and $0.02 \leq \text{visual acuity} < 0.3$ in 6 eyes, LP and Hand Move 4 eyes. Totally ineffective in 2 eyes. Except for the two ineffective eyes, the remaining eyes showed different degrees improvement in visual field and contrast sensitivity.

Conclusions: Integrated Traditional Chinese and Western Medicine treatment is effective in the treatment of traumatic optic neuropathy, which can fully utilize the residual visual recovery, expand the visual field and improve the contrast sensitivity. Clinicians should pay attention to the visual rehabilitation of nerve injury by using Integrated Traditional Chinese and Western Medicine treatment.

P-NEU-031

Superior semicircular canal dehiscence syndrome a rare otoneurological pathology an initial presentation with neuroophthalmic symptoms

S. Zalite¹, S. Dzelzite²

¹Ophthalmology, P. Stradins Clinical University Hospital, Rīga, Latvia, ²Radiology, P. Stradins Clinical University Hospital, Riga, Latvia

Introduction: Superior semicircular canal dehiscence syndrome (SSCD) syndrome is a rare otoneurological disease of the inner ear due to thinning/absence of the part of the temporal bone overlying the superior semicircular canal, leading to internal amplification of sounds causing hearing balance and occasionally visual symptoms such as oscillopsia and nystagmus. It was first described in 1998 by L.B Mayor of Johns Hopkins University in Baltimore.

Objectives: To present a single clinical case of a patient with SSCD syndrome and assess the visual manifestations and implications for neuro-ophthalmological evaluation. To present a 12 years long journey of a rare disease patient from symptoms to diagnosis and treatment options.

Methods: A retrospective descriptive analysis of a single clinical case of a patient with SSCD syndrome, brief synopsis of the pathology, symptoms, diagnostics, and treatment options.

Results: In 2012 a 34-y old female visited a neuro-ophthalmologist with the main complaint of hearing her eye movements, blinking and blurry vision, oscillations, vertigo. Previously she had her brain CT and MRI scans done with no pathology described by radiologist. She had also been treated by a psychiatrist. She was referred to a neuro-ENT consultant and neuro-ophthalmologist. Later on, she started to hear her heartbeats, joint movements, sounds in her ears. Her MRI/CT scans were consulted by UCLA Head&Neck Surgery and Neurosurgery Consultants and SSCD diagnosis was made. Initially she was monitored, but as gradually dehiscence developed bilaterally and her symptoms heavily deteriorated, she was advised a surgical treatment.

Currently the patient is mostly staying in her bed as vertical position makes her impossible to function due to severe vertigo and balance disorders, oscillations are disturbing less than initially. She is receiving symptomatic treatment and waiting for her operation in Head&Neck Surgery and Neurosurgery, UCLA.

Conclusions: As SSCD syndrome is a very rare condition, that might mimic various oto-neurological, neuro-ophthalmological, and even psychiatric pathologies, it is essential to be aware of a rare disease, using multidisciplinary approach, consulting experts and share experience, clinical cases to expedite early diagnostics and better management of the disease thus substantially improving quality of life of the patients suffering from SSCD syndrome.

P-NEU-032

Clinical features of non-arteriotoxic anterior ischemic optic neuropathy

N. Zhang¹, X. Ma¹

¹Ophthalmology, The First Affiliated Hospital of Dalian Medical University, Dalian, China

Introduction: Clinical characteristics and visual outcomes of progressive and stable non-arteriotoxic anterior ischemic optic neuropathy (NAION).

Objectives: To investigate the clinical characteristics and visual outcomes of progressive and stable non-arteriotoxic anterior ischemic optic neuropathy (NAION).

Methods: A retrospective analysis was conducted on patients with NAION from January 2012 to December 2018. Inclusion criteria required patients to have optic disc edema and a minimum follow-up period of 3 months. Progressive NAION was defined as deterioration in two out of three parameters: visual acuity ≥ 3 lines, color vision ≥ 4 pictures, or involvement of one quadrant in the visual field defect. This study aimed to describe the clinical characteristics, time from symptom onset to clinical manifestation, systemic risk factors, and visual outcome of NAION patients.

Results: Sixty-one eligible patients were included in this study. The average age was 58.1 years (range: 22-74 years), with males accounting for 70% of the sample. Among them, ten patients (16.4%) had progressive NAION. Patients with progressive NAION did not differ significantly from those with stable NAION regarding demographics, systemic risk factors, or initial visual impairment. At the last follow-up visit, the median visual acuity for patients with progressive NAION was measured at logMAR 1.0 (IQR: 0.64-1.55), while stability was recorded at an average value of 0.18 (IQR: 0.1-0.63) ($P < 0.001$). The median accuracy rate for color vision examination differed significantly between the progressive and stable NAION groups; it stood at zero percent (IQR: 0-2.5%) for progressive cases compared to a median value of ninety-two percent (IQR: 50%-100%) for stable cases ($P < 0.001$). Furthermore, the time interval between symptom onset and presentation varied significantly among patients with progressive NAION compared to those without progression (median duration: 2 days vs 5 days, $P = 0.011$).

Conclusions: No specific risk factors have been identified that are associated with progressive NAION. Ophthalmic examination is more timely in patients with progressive NAION.

P-NEU-033

Duplication papillaire: à rapport de cas

W. Mubikay Mulumba¹, N. Ousmane¹, S. Hida¹, C. Ahkim¹, F. Mabrouki¹, S. Chariba¹, R. Sekhsoukh¹
¹Ophtalmologie, CHU Mohammed VI Oujda, Oujda, Morocco

Introduction: Papillary duplication is an exceptional anomaly in which two closely spaced true optic discs are visible in fundusoscopic examination (FE). It usually involves a double retinal vascular system. It is one of the congenital anomalies of the optic disc. It is very rare in routine ophthalmological practice and needs to be recognized, as it can be confused with papillary coloboma. Most cases of double optic disc are unilateral and associated with a drop in visual acuity in the affected eye. This can lead to visual impairment or even blindness. In routine ophthalmological practice, such cases are very

Objectives: To describe the diagnostic approach and symptomatology of papillary duplication.

Methods: This is a case study carried out in the ophthalmology department of the university hospital Mohammed VI of Oujda.

Results: Observation

We report an observation of a papillary duplication.

The patient was a 10-year-old child with no previous pathological history of note, who consulted us for progressive visual impairment in the left eye.

Ophthalmological examination

Visual acuity:

OD: 8/10 and OS: 3/10.

Good palpebral statics and dynamics Preserved ocular motility

Consensual and direct Photo Motor Reflex: present at OD and OS

Biomicroscopy:

OD and OS: unremarkable

Fundus:

OD:

Papilla: Colored, sharp, physiological rims.

Macula: free with good reflection.

Peripheral retina: unremarkable

OS:

Papilla: two papillae stained, with sharp borders in the large papilla and blurred out borders in the small papilla with physiological excavation.

Macula: free with good reflection

Peripheral retina: unremarkable

Ocular tone: OD and OS : 15 and 14 mmHg

Conduct Held:

Ocular ultrasound: retina flat .

Orbital-cerebral computed tomography: the examination was without abnormalities namely .

The decision was to proceed with refractive rehabilitation and optical correction under cycloplegic therapy:

OD: +0.50(-0.50)71° with a visual acuity of 10/10

OS: +1.00(-2.50)87° with 5/10 visual acuity

Conclusions: Papillary duplication remains a very rare congenital anomaly of the optic disc. It can lead to amblyopia, which can be uni or bilateral, and the functional part of which must be rehabilitated as soon as possible.

Any suspicion of visual impairment in a child must be urgently assessed as soon as possible, and prompt treatment is therefore essential. The aim is to respond to the parents' anxiety, to arrive at a rapid diagnosis with the help of appropriate tests, therefore improving visual prognosis.

P-NEU-035

“Parinaud syndrome”: a case report

M.L. Fermin¹, J.M. Villalva¹

¹Ophthalmology, FEU-NRMF, Quezon City, Philippines

Introduction: Childhood intracranial tumors are rare accounting to only 3-4% in East Asia. The clinical presentations often vary depending on the size, location and invasiveness of the tumor. These children usually present with non-specific signs and symptoms of recurrent bouts of headache, nausea, and vomiting without focal deficits, causing delay in the diagnosis of these patients. This significant time of delay poses a great challenge to physicians to maintain a high index of suspicion by having a more aggressive approach for earlier diagnosis and intervention.

Objectives: General

- To present a case of an 11-year-old male with a clinical diagnosis of Parinaud Syndrome

Specific

- Discuss the important topics associated with the diagnosis
- Discuss the relevant related literature regarding the topic
- Discuss early and aggressive diagnosis and management of Parinaud Syndrome

Methods: This is a case of an 11-year old male who presented with progressive headache accompanied by limited upgaze on both eyes. Patient complained of generalized headache, throat pain and low-grade fever, and was initially diagnosed with Acute Tonsillopharyngitis. Due to persistent headache and an episode of projectile vomiting, patient sought another consult to an Ophthalmologist where he was given prescription glasses for Astigmatism, which did not afford relief. Due to worsening of symptoms, patient sought another consult, and was diagnosed with Urinary Tract Infection. A few days later, another episode of projectile vomiting associated with headache, diplopia and seizure occurred which prompted admission. Cranial MRI was done and revealed a heterogeneously enhancing mass at the pineal region. An emergency ventriculoperitoneal shunt was done due to another seizure episode.

Results: Patient underwent adjuvant radiotherapy, chemotherapy and incision biopsy. Despite optimal therapy, patient passed away as result of multi-organ failure.

Conclusions: Detailed history taking, comprehensive physical examination and appropriate radiological evaluation along with a multidisciplinary team are imperative in the prognosis of children with rare intracranial malignancies. Tumor markers may aid in determining the type of intracranial tumors, and avoid the morbidity and mortality associated with upfront neurosurgical intervention. Adjuvant chemo and radiotherapy along with excision of residual tumor is still the recommended treatment modality for better prognosis and survival.

P-NEU-036

Fake binasal anopsias exposed

J.E. Morales León¹, A. De Luna Estrada¹, L. Romero Díaz de León¹, K. Baquier Izquierdo², M.J. Macías Guzmán³, K.M. de la Luz¹, J.A. Palma Zapata⁴, C.A. Uribe Vicencio⁵

¹OCULAB Ophthalmology Diagnostic Centre, Aguascalientes, Mexico, ²Manuel Velasco Suarez National Institute of Neurology and Neurosurgery, Ciudad de México, Mexico, ³Unidad Médica de Alta Especialidad IMSS No. 25, Nuevo León, Mexico, ⁴Medical Didactic Unit, Autonomous University of Aguascalientes, Aguascalientes, Mexico, ⁵Department of Medicine, Autonomous University of Aguascalientes, Aguascalientes, Mexico

Introduction: The report examines three cases of binasal anopsias initially misdiagnosed as neurological issues. The review by our center helped identify reasons for the possible visual impairment. The report suggests measures to prevent similar misinterpretations in the future.

Objectives: Underscore the significance of meticulous perimetry execution and interpretation to prevent diagnostic errors. This study provides insights for improved techniques to avoid diagnostic errors.

Methods: This study evaluated three patients with binasal anopsias, who underwent kinetic perimetry testing at our institution. The results were interpreted by the research team, and the subjects were interviewed to assess any differences in technique and difficulty compared to their previous perimetry tests. The accuracy and reliability of the results were ensured through a thorough interpretation of the visual fields.

Results: A 21-year-old man of mixed race had an abnormal visual field test during a routine glaucoma check-up with a result of basal hemianopia. He visited our center, where a perimetrist conducted tests to investigate further. The results were normal, and the patient's previous defect was found to be due to a misinterpretation of instructions during the initial test.

A 35-year-old woman was referred to our clinic for binasal hemianopsia. Kinetic perimetry testing revealed bitemporal heteronymous hemianopia, but there was confusion due to a mistake in the order of single field exams. This error is common among ophthalmologists who analyze each eye independently, starting with the right eye.

A 60-year-old woman with a history of cataract surgery and pseudoexfoliation syndrome was referred for binasal quadrantanopia. A Bjerrum Scotoma was detected during diagnosis, and central 2 degrees of vision were unaffected. Gross sensitivity was present in the upper nasal quadrants. Grayscale and deviation maps confirmed the diagnosis. Nasal vision loss is usually associated with glaucoma, but differential diagnosis strategies should be employed to establish an accurate diagnosis.

Conclusions: Perimetry is a test that measures visual fields, but errors can lead to incorrect diagnoses in rare visual impairments like binasal hemianopia. Our analysis of three cases showed errors in the test performer's instructions and interpretation, leading to inaccurate diagnoses. Adhering to rigorous standards during the execution and interpretation of perimetry is important to ensure accurate and reliable results.

P-NEU-037

Recent advances in neuroblastoma therapy with phytochemicals: a review

S. Ahmadi¹, A.R Afshari²

¹Ophthalmology, Mashhad University of Medical Sciences, Mashhad, Iran, Islamic Republic of,

²Physiology and Pharmacology, North Khorasan University of Medical Sciences, Bojnurd, Iran, Islamic Republic of

Introduction: Neuroblastomas are extracranial solid tumors associated with a high rate of childhood mortality. The treatment for neuroblastomas involves a multimodal schedule that is often associated with severe side effects, a poor prognosis, and a high risk of recurrence. Phytochemicals have attracted attention as possible therapeutic agents because of their reported effectiveness in various diseases, including cancers.

Objectives: We have summarized the findings of recent preclinical and clinical studies demonstrating the effects of bioactive constituents isolated from plants on neuroblastoma and their related molecular mechanisms, which may provide a novel approach in multi-target therapy for neuroblastomas.

Methods: There have been several studies using plant-derived natural bioactive compounds such as polyphenols, flavonoids, and citrus fruits that have been used to target biomolecules and signal transduction pathways that have aimed to inhibit neuroblastoma viability, proliferation, and induction of apoptosis.

Results: Have no results.

Conclusions: We have summarized the findings of recent preclinical and clinical studies demonstrating the effects of bioactive constituents isolated from plants on neuroblastoma and their related molecular mechanisms, which may provide a novel approach in multi-target therapy for neuroblastomas.

P-NEU-038

Rare case of orbital inflammatory syndrome presenting as bilateral optic perineuritis

R.D. Lee¹, M.K. Montesines¹

¹Ophthalmology, Ospital ng Makati, Makati City, Philippines

Introduction:

Optic perineuritis (OPN) is a rare manifestation of orbital inflammatory syndrome (OIS) wherein the inflammation is confined to the optic nerve sheath. Information regarding OPN's presentation and management is currently only available in case reports and small case series, of which bilateral involvement is quite rare.

Objectives:

To present a case of orbital inflammatory syndrome presenting with bilateral optic perineuritis in an 83-year-old female.

Methods:

An 83-year-old female presented with a gradually, progressive, and sequential loss of vision on both eyes with associated pain on eye movement. Visual acuity (VA) was light perception on the right eye, with no light perception on the left. Confrontation exam demonstrated diffuse visual field loss in both eyes sparing only the superior nasal field of the right eye. Pupils were 4-5 mm with sluggish reaction to light with a grade II RAPD on the left eye. There were also marked extraocular movement (EOM) limitations on both eyes. Cataracts with a grade of N04NC4 were observed on both eyes. Fundus examination exhibited bilateral temporal disc pallor. All laboratory results were normal except for an increased C-Reactive Protein (>10.00mg/L). Visual evoked response exhibited abnormal conduction disorder along the visual pathways. Optical Coherence Tomography showed a thickened left optic nerve and Magnetic Resonance Imaging (MRI) showed bilateral tram track and doughnut sign.

Results:

Patient was started on IV methylprednisolone at 1g/day for 3 days followed by oral prednisone at 60mg/day (1 mg/kg/day) for 11 days with gradual tapering thereafter. Best recorded outcome was observed on day 16 of treatment showing full and equal EOMs on both eyes with resolution of eye pain and visual acuity improving to counting fingers on the right eye and light perception on the left eye.

Conclusions:

Orbital Inflammatory Syndrome presenting as OPN is difficult to differentiate from optic neuritis and other inflammatory conditions because of similar clinical presentations. It is crucial to know the demographics and the subtle clinical differences to know when and what ancillary tests to request to make an accurate and timely diagnosis since this will substantially affect the timing of treatment and prognosis of the patient.

P-NEU-039

Optic perineuritis: a retrospective case report

K. Dong¹, D. Hu¹, Y. Yan¹

¹Department of Ophthalmology, The First Affiliated Hospital of USTC, Division of Life Sciences and Medicine, University of Science and Technology of China, Hefei, China

Introduction: Optic perineuritis (OPN) is a rare vision-threatening disease, characterized by inflammation localized to the optic nerve sheath. It can be idiopathic or secondary to underlying systemic autoimmune diseases, typically presenting as progressive unilateral visual loss, pain on eye movement, and optic disc swelling. Herein, we have presented a rare case of OPN with loss of visual function.

Objectives: We have presented a rare case of optic perineuritis (OPN) with loss of visual function.

Methods: This is a retrospective case report of a patient with OPN, clinical features, Imaging examinations, and ocular outcome of this patient were reviewed.

Results: A 61-year-old female presented with 2 days of vision loss in the left eye. She had a medical history of left facial paralysis for 5 months, and headaches for 20 days. Ptosis and eye movement disorders were shown in the left eye, slit lamp and fundus examination of the left eye demonstrated corneal cloudiness and optic disk swelling with peripapillary hemorrhage. Laboratory tests of infection, immunity, and tumor markers were negative. Magnetic resonance imaging (MRI) of the orbits revealed left perineural enhancement consistent with infectious OPN. After antibiotics and antiviral treatment, the symptoms of ptosis and eye movement disorders of the left eye were improved, but the visual acuity remained no light perception.

Conclusions: OPN is a rare disease involving the sheath of the optic nerve, facial paralysis and headache may be the first symptoms of OPN, MRI is essential to help diagnose OPN.

P-NEU-040

Unilateral abducens cranial palsy following spinal anesthesia: case report-Tripoli-Libya

A. Elbahi¹, A. Affan²

¹Tripoli Eye Hospital, Tripoli University, Tripoli, Libya, ²Tripoli Eye Hospital, Tripoli, Libya

Introduction: A 34-year-old lady, with otherwise healthy history, presented to the ophthalmology clinic with double vision following uneventful cesarean section delivery under spinal anesthesia two days ago. Examination showed bilateral visual acuity was measured at 6/6. No proptosis or ptosis were noted. The relative afferent pupillary defect was negative with no anisocoria. Left eye was esotropic with left abduction restriction and the patient complaining of binocular horizontal diplopia at the left gaze, consistent with left abducens nerve palsy. Systemic neurological findings were normal, and imaging results were unremarkable.

Objectives: Case report

Methods: Case report

Results: Diagnosis of left abducens nerve palsy post-dural puncture was made clinically. The patient was kept on conservative management. Hence, she was treated supportively via uniocular patching to relieve diplopia. Spontaneous complete recovery of the left abducens nerve palsy was observed after five weeks.

Conclusions: Cranial nerve palsy is a rare complication following spinal anesthesia with many cases reported spontaneous complete recovery which can avoid unnecessary workups.

P-NEU-041

Intra-ophthalmic arterial treatment in non-arteritic anterior ischemic optic neuropathy: a pilot study

X. Wen¹, X. He¹

¹Department of Ophthalmology, Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Non-arteritic anterior ischemic optic neuropathy (NAION) is a main subtype of anterior ischemic optic neuropathy (AION), accounting for over 85% of AION. A number of methods have been tried for treat NAION, such as systemic corticosteroid therapy, neurotrophic treatment, etc. However, none of these treatments showed promising prognosis, patients often resulted in permanent vision loss and severe visual field loss.

Objectives: We aimed to assess the efficacy and safety of intra-ophthalmic arterial treatment in NAION.

Methods: Three patients with NAION were treated with intra-ophthalmic arterial treatment.

Results: After vasodilation and hormone therapy through ophthalmic artery, the patients had improved visual acuity, restored visual fields, and reduced optic-disk edema.

Conclusions: These results suggested that intra-ophthalmic arterial treatment may be a promising therapy strategy for NAION.

P-NEU-042

On the connection between inflammatory diseases of the female reproductive system and the occurrence of optic neuritis

R. Hajiyev^{1,2}, N. Hajiyeva^{1,2}

¹National Ophthalmology Centre named after Academician Zarifa Aliyeva, Baku, Azerbaijan,

²Hatmedicine Klinikasi, Baku, Azerbaijan

Introduction: Inflammatory diseases of the female reproductive system and optic neuritis are both medical conditions that can significantly impact a person's health and quality of life. Optic neuritis is an inflammatory condition that affects the optic nerve and is a common cause of acquired vision loss. The main causes of optic neuritis (ON) are multiple sclerosis (MS), neuromyelitis optica spectrum disorder (NMOSD) and myelin oligodendrocyte glycoprotein antibody disease, also known as MOGAD. There is also a connection between optic neuritis and systemic diseases.

While these two conditions may seem unrelated at first glance, it may be a potential connection between inflammatory diseases of the female reproductive system and the occurrence of optic neuritis.

Objectives: In this paper, we present a clinical case of the connection between the occurrence of menstrual irregularities and inflammation of the female reproductive system and optic neuritis.

Methods: We present a clinical case of a 47-year-old woman who suffered from delayed menstruation, accompanied by menorrhagia, inflammatory disease of the female reproductive system, followed by the development of a sharp decrease in visual acuity and the occurrence of optic neuritis of the right eye.

Results: The patient was treated for female reproductive system diseases. The treatment included a combination of systematic short-term antibiotics followed by intravenous corticosteroids. After treatment, a significant increase in visual acuity was noted.

Conclusions: This case report as well as the literature data on the connection between menstrual irregularities and retinal diseases highlights that it can be assumed that optic neuritis and some retinal diseases may be associated with an imbalance of the genitourinary microbiota and surrounding antibodies. Further research and larger-scale studies are warranted to validate these findings.

P-NEU-043

Effect of eye-head-body integration training on multi-dimensional sensory function of children with low vision

C. Liu¹, Q. Lin¹, W. Shi¹, L. Yan²

¹Department of Ophthalmology, Beijing Children's Hospital, Capital Medical University, National Center for Children's Health, Beijing, China, ²(National Engineering Research Center for Healthcare Devices, Beijing, China

Introduction: The visual acuity defect of children with low vision will not only lead to the obstacle of advanced visual processing ability but also affect the synchronous development of their multi-dimensional sensory functions such as noumenon, vestibule, posture control and hand-eye coordination, which will seriously affect their daily activities and cause a burden to their families and society. The traditional rehabilitation strategy for children with low vision only aims at correcting the visual function, without synchronous treatment for other functions caused by visual function defects, which has limited effect on improving the quality of life of patients.

Objectives: This report aims to comprehensively evaluate the defects of patients with low vision from multiple functional dimensions and to observe the potential effect of eye-head-body multimodal exercise integration training on multi-dimensional sensory function of patients with low vision.

Methods: We recruited 50 children with low vision to evaluate their multi-dimensional sensory function, collected the test data of binocular fixation, spatial contour integration ability, multi-level stereopsis and eye movement to evaluate their visual function, evaluated their vestibular function through vestibular eye reflex, evaluated their posture balance function through human posture tester, and evaluated their posture through posture evaluation analysis chart. Among them, 25 children received visual perception training, and 25 children received eye-head-body multimodal movement integration training.

Results: Visual perception training improved the visual function of patients. At the same time, the eye-head-body multimodal exercise integration training shows more improvement in vision, vestibule, posture balance, posture and other aspects.

Conclusions: The integrated training of eye-head-body multi-modal movement has a positive effect on the multi-dimensional sensory function of children with low vision, which is conducive to improving the quality of life of children with low vision.

P-NEU-044

Subclinical damage to the contralateral eye in unilateral optic neuritis: a longitudinal study

Y. Zhang¹, H. Yang¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: This was a single-center longitudinal study.

Objectives: Early detection of subclinical injuries can lead to a correct diagnosis and help control the advancement of the condition. This study aims to investigate the presence of subclinical damage and silent progression to the contralateral eye's visual function and structure in patients experiencing their first episode of unilateral optic neuritis (ON).

Methods: Fifty patients with first-onset unilateral ON were enrolled in this study. Based on etiology, they were classified as having neuromyelitis optica spectrum disorder-related ON (NMOSD-ON), myelin oligodendrocyte glycoprotein antibody-associated ON (MOG-ON), idiopathic ON (IDON), or multiple sclerosis-related ON (MS-ON). These cases were followed up for one year to determine whether there was any silent progression of visual function and structure in the contralateral non-ON (NON) eye. A gender- and age-matched healthy control (HC) group was included to compare the differences in visual function and structure between the patients with NON eyes and the HC group.

Results: Within two weeks of onset, best-corrected visual acuity (BCVA; $P = 0.008$), mean deviation (MD) of the visual field (VF) ($P = 0.001$), and peripapillary retinal nerve fiber layer (pRNFL; $P = 0.019$) thickness were significantly worse in the NMOSD-NON patients than those in the HC group, while there were no differences in the pRNFL and the ganglion cell–inner plexiform layer (GCIPL) thicknesses and quadrant thicknesses ($P > 0.05$) of the groups. IDON-NON only showed subclinical damage in VF ($P = 0.001$) and temporal pRNFL ($P = 0.042$), while the BCVA, VF, and optic nerve structure (pRNFL, GCIPL) of the MOG-NON patients showed no subclinical damage ($P > 0.05$). In addition, the one-year follow-up of each NON eye type showed that there was no silent progression in NMOSD-NON, MOG-NON, or IDON-NON. A pairwise comparison of the different types of NON eyes revealed no statistical differences ($P > 0.05$).

Conclusions: Among the patients with unilateral ON, NMOSD-NON and IDON-NON resulted in subclinical damage to the visual function and structure of the contralateral eye within two weeks of onset, whereas MOG-NON did not show any subclinical damage to visual function or structure. Furthermore, these subclinical damages did not show any silent progression during the one-year follow-up period.

P-NEU-045

A novel model of traumatic optic neuropathy under direct vision through anterior orbital approach in non-human primates

Z. Xiao¹, X. Han², X. Ren¹, S. Chen¹, Q. Zhu¹, D. Liang³, X. Liang¹, Y. Xu², H. Yang¹

¹Zhongshan Ophthalmic Center, Sun Yat-Sen University/Zhongshan Ophthalmic Center, Guangzhou, China, ²Jinan University, Guangzhou, China, ³Sun Yat-Sen University/Zhongshan Ophthalmic Center, Guangzhou, China

Introduction: Traumatic optic neuropathy (TON) is a severe and irreversible blinding disease which lacks of effective therapies. Advancements in its treatment depend on the availability of stable animal models. Compared with rodents, non-human primates are considered highly suitable for TON research due to their high similarities with human in anatomy and physiology. However, the methods conventionally employed for optic nerve exposure in non-human primates, such as orbitotomy and nasal endoscopy, pose severe trauma and fatal infections. Therefore, it is essential to establish a novel TON model in non-human primates, which allows direct visualization through a minimally invasive approach.

Objectives: To establish a novel TON model in non-human primates under direct vision through the anterior orbital approach and a comprehensive evaluation system.

Methods: Three cynomolgus monkeys were subjected to a partial optic nerve transection in one eye (PONT eye) via the anterior orbital approach. The contralateral eye in each monkey functioned as the sham (control eye). Visual function was systematically evaluated one week before the surgical procedures and at four subsequent time points after the surgical procedures. These assessments included tests for pupillary light reflex, optokinetic nystagmus, electroretinogram (ERG), and visual evoked potential (VEP). Additionally, the structures of the optic nerve and retina were observed using 9.4 T Magnetic resonance imaging (MRI), fundus photography, and optical coherence tomography. After 12 weeks, the animals were euthanized for detailed pathological examination of the optic nerve and retina using immunostaining.

Results: The optic nerve was partially transected 3 mm posterior to the eyeball under direct vision. Subsequent MRI indicated an increase in T2 signal and T1 contrast enhancement at the transection site, confirming the transection of the optic nerve. The PONT eyes exhibited a decline in visual acuity and impaired responses in ERG and VEP, and showed a reduced thickness of the retinal nerve fiber layer and ganglion cell layer. Immunostaining at 12 weeks post-surgery confirmed the transection site of optic nerve and associated inflammation, and also showed a reduced survival rate of retinal ganglion cells in the PONT eyes.

Conclusions: This study established a novel, minimally invasive TON model in non-human primates under direct visualization. This model effectively demonstrated typical declines in visual function and provided clear indications of optic nerve damage.

P-NEU-046

Stem cell transplantation confers neuroprotection in laser injury-induced retinal degeneration in mice

A. Anand¹, P. Mehra², P. Battu¹, R. Singh³

¹Neurology, Post Graduate Institute of Medical Education and Research, Chandigarh, India,

²Biotechnology, Panjab University, Chandigarh, India, ³Advanced Eye Centre, Post Graduate Institute of Medical Education and Research, Chandigarh, India

Introduction: Stem cell therapy is a promising approach to tackle the challenge of retinal degeneration.

Objectives: We have investigated the role of lin^{-ve} stem cells in reversing laser injury-induced damage in the mouse model. We have also investigated the expression of molecular markers in the serum of AMD patients and controls as an exploratory arm of this study.

Methods: 2, 4, and 8 laser injury spots were created around the optic disc using a laser photocoagulator. Lin^{-ve} stem cells were isolated from human umbilical cord blood and characterized for CD 34 and CD45 using magnetic activated cell sorting (MACS) apparatus. Lin^{-ve} stem cells were transplanted subretinally after 24 hours in the laser injury group. After one month, retinas were harvested to analyze the effect of stem cell transplantation. IHC and Real-time PCR for retinal, neurotrophic, proliferative, and apoptotic markers were performed. As part of a pilot study, we analyzed a few molecular markers in AMD patients' blood to investigate alterations in these proteins between AMD patients and controls.

Results: Neurobehavioral tests revealed that stem cells rescued memory loss in the 2-spot laser injury group. Passive avoidance test results were encouraging for all three injury stem cell transplantation groups. IHC and gene expression results indicated that milder injury was rescued faster than severe injury. The expression of BDNF and CNTF was also significantly higher in the stem cell transplantation group. The VEGF expression in the serum of 178 AMD patients and 84 controls was reduced, and TNFRSF10A1 was downregulated, indicating these proteins' role in the pathophysiology of AMD.

Conclusions: Lin^{-ve} stem cells rescue laser-induced retinal degeneration. Also, alterations in proliferative and apoptotic markers in the mouse model and AMD patients indicate that role and cross talk in Age-related macular degeneration should be further explored.

P-NEU-047

Ocular neurolymphomatosis: a case report and systematic review

C. Lim^{1,2}, J. Chan^{3,4}, K. Kowal^{1,2}, E. Ni Mhurchu^{5,6}, D. Plemel^{1,2,7}

¹Ophthalmology, University of British Columbia, Vancouver, Canada, ²Ophthalmology, Eye Care Centre, Vancouver General Hospital, Vancouver, Canada, ³Radiation Oncology, BC Cancer, Vancouver, Canada, ⁴Surgery, University of British Columbia, Vancouver, Canada, ⁵Radiology, BC Cancer, Vancouver, Canada, ⁶Radiology, University of British Columbia, Vancouver, Canada, ⁷Ophthalmology, Western University, London, Canada

Introduction: Neurolymphomatosis (NL) is characterized by the infiltration of a nerve by a hematologic malignancy. NL is a rare manifestation of lymphoma. We present a case of NL that was unique in presentation wherein it mimicked ocular myasthenia gravis and then developed lymphomatous infiltration of the extraocular muscles (EOM). Currently, there is limited published literature summarizing the manifestations of ocular cranial nerve (CN) NL.

Objectives: The purpose of this study is to describe the presentations of ocular CN NL.

Methods: This study presents a systematic review following PRISMA guidelines along with an additional case report. PubMed and MEDLINE databases were searched for human case reports and case series of ocular cranial nerve neurolymphomatosis using the terms "orbit", "cranial nerve", "neurolymphomatosis", "leptomening*", and "lymphoma". Patients were included if they demonstrated CN II, III, IV, or VI NL. Patients were excluded if these CN were not involved, or if their ancillary testing supported an alternative diagnosis. Cases were grouped for analysis.

Results: Twenty-seven cases from twenty published studies of ocular NL, including the one reported in this paper, were identified. The oculomotor nerve was the most commonly involved cranial nerve (16/27; 59.3%). Diffuse large B-cell lymphoma was the most common type of lymphoma associated with ocular CN NL (13/26; 50.0%). Treatment involves systemic chemotherapy, intrathecal chemotherapy, and radiotherapy.

Conclusions: The systematic review illustrates the spectrum of ocular CN NL. The described case is the first published report where CN NL masquerades as myasthenia gravis. Additionally, it is only the second documenting simultaneous CN NL and EOM lymphomatous infiltration. Because ocular CN are often not amenable to biopsy, neuroimaging is often the most helpful ancillary test to support the diagnosis of NL.

P-NEU-048

Influence of Obstructive Sleep Apnea Syndrome (OSAS) on the contralateral optic nerve in patients with unilateral NAION

X. Li^{1,2}, H. Yang¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China, ²Xi'an Jiaotong University Health Science Center, Xi'an Jiaotong University, Xi'an, China

Introduction: NAION has been identified as the most common cause of acute optic nerve damage in individuals over 50 years of age, leading to severe and irreversible visual loss. It has been reported to be associated with OSAS in many literatures. However, it has been unclear whether OSAS only plays a role in one instant episode of vascular ischemic events or whether long-term cumulative damage to the optic nerve due to OSAS has been existed before the onset of NAION. This study aimed to reveal subclinical damage to the optic nerve due to OSAS in patients with unilateral NAION and it was found that OSAS may cause subclinical temporal pRNFL thinning without any significant change in visual function. Thus, it is indicated that advanced optic nerve observation and intervention are warranted in patients with unilateral NAION and moderate-severe OSAS.

Objectives: To quantitatively evaluate the influence of obstructive sleep apnea syndrome (OSAS) on the structure and function of the contralateral optic nerve in patients with unilateral nonarteritic anterior ischemic optic neuropathy (NAION).

Methods: Fifty patients with unilateral NAION were divided into moderate-severe (n=19), mild (n=15), and non-OSAS(n=16) groups based on their apnea hypopnea index (AHI) scores. Then, systemic and ocular characteristics were compared between these groups. Spearman correlation and multiple linear regression analyses were used to determine the independent factors that most influenced the thickness of the peripapillary retinal nerve fiber layer (pRNFL).

Results: Body mass index, height, weight, and hypertension occurrence were higher in the moderate-severe OSAS group than in the non-OSAS group. The lowest oxygen saturation (LSAT) and thickness of the temporal pRNFL were lower in the moderate-severe group than in the mild and non-OSAS groups, while no difference was found between the mild and non-OSAS groups. Spearman correlation showed that the AHI ($r = -0.469$, $P = 0.001$) and LSAT ($r = 0.353$, $P = 0.012$) correlated with temporal pRNFL thickness. Multiple linear regression showed that the AHI was negatively related to temporal pRNFL thickness ($B = -0.575$, $P = 0.002$).

Conclusions: OSAS may cause subclinical temporal pRNFL thinning in the contralateral optic nerve among patients with unilateral NAION without any significant change in visual function. Advanced optic nerve observation and intervention may be warranted in patients with moderate-severe OSAS.

P-NEU-049

Novel approaches for the vitrectomy surgery of nonarteritic anterior ischemic optic neuropathy: when and how

S. Sun¹, Y. Gong¹, D. Li², X. Li¹

¹Tianjin Medical University Eye Hospital, Tianjin, China, ²Shanxi Eye Hospital, Taiyuan, China

Introduction: Nonarteritic anterior ischemic optic neuropathy (NAION) is the most prevalent nonglaucomatous optic nerve disorder in patients aged >50 years, often leading to painless and sudden vision loss in the affected eye. Numerous potential agents have been clinically evaluated for NAION treatment. However, no therapy has been definitively proven effective.

Objectives: To assess the efficacy and safety of 27-gauge MIVS in patients with acute NAION presenting with PPWs.

Methods: Design: A prospective, noncomparative interventional study.

Participants: Overall, 25 eyes from 25 patients with NAION, within 2 months of onset, exhibited prominent PPWs on swept-source optical coherence tomography.

Intervention: All patients underwent 27-gauge MIVS.

Main outcome measures: Efficacy was assessed by the remission rate of PPWs, changes in the peripapillary retinal nerve fiber layer (pRNFL), best-corrected visual acuity (BCVA), mean deviation (MD), and visual field index (VFI) of visual fields over a follow-up period of 1 month, as well as factors that may interfere with the therapeutic efficacy of 27-gauge MIVS treatment. Safety was evaluated by examining photoreceptor cell density and spacing in the fovea, along with pRNFL alterations, using adaptive-optics scanning-laser-ophthalmoscopy (AOSLO).

Results: The mean pRNFL thickness at presentation was $215 \pm 74 \mu\text{m}$, decreasing to $99 \pm 23 \mu\text{m}$ at 1 month. A significant reduction in PPWs was observed in 12.0% of patients at the 1-week follow-up, with all patients showing this reduction at the 1-month follow-up. The median logMAR BCVA improved from 0.15 (0.00, 0.95) preoperatively to 0.10 (0.00, 0.35) at 1-month postoperatively. The mean MD increased from $-20.10 \pm 6.19 \text{ dB}$ at baseline to $-16.55 \pm 6.60 \text{ dB}$ 1 month postoperatively. The mean VFI increased from 46.04 ± 23.98 at baseline to 57.50 ± 24.16 at 1-month postoperatively. No significant changes were observed in photoreceptor cell density or spacing in the fovea and pRNFL on AOSLO assessment postoperatively. Female sex was identified as a potential risk factor that may influence postoperative visual acuity. Patients aged >50 years were also found to be at significant risk for visual field recovery.

Conclusions: This study provides further evidence that papillary vitreous detachment is involved in the pathogenesis of NAION and highlights the surgical outcomes of MIVS in acute NAION patients. The presence of PPWs may serve as a potential indicator for surgical intervention to optimize outcomes.

P-NEU-050

A novel surgical with neural loop blocking in 47 Meige patients with blepharospasm after failed deep brain stimulation

G. Liu¹, Z. Xu¹, Q. Guo¹, J. Xiang¹, S. Yu¹, X. Cao², C. Zhang³, S. Chen¹, X. Liu¹

¹Ophthalmology, The Third People's Hospital of Henan Province, Zhengzhou, China, ²Administrative Management, The Third People's Hospital of Henan Province, Zhengzhou, China, ³Ophthalmology, First Teaching Hospital, Henan Science and Technology University, Luoyang, China

Introduction: A novel surgical with neural loop blocking was used to treat Meige patients with blepharospasm after failed deep brain stimulation (DBS).

Objectives: To investigate the safety and efficacy of neural loop blocking to treat Meige patients with blepharospasm after failed deep brain stimulation (DBS).

Methods: This study was a retrospective case series study. The data of patients with Meige syndrome was collected and these patients were characterized by blepharospasm who underwent neural loop blocking in the Ophthalmology Department of the Third People's Hospital of Henan Province from April 2019 to June 2023, and all patients had been diagnosed with Meige syndrome and deep brain stimulation treatment was ineffective. Our study summarized the general data of patients, Meige syndrome classification, classification, spasm, preoperative and postoperative follow-up, and the degree of dysfunction. The degree of blepharospasm was graded before and after surgery and scored using the Burke-Fahn-Marsden Dystonia Rating Scale (BFMDRS), and the improvement degree of postoperative spasticity relative to preoperative was calculated. The degree of dysfunction was assessed using the Blepharospasm Disability Scale (Blepharospasm Disability Index, BSDI).

Results: A total of 47 patients were included, including 18 males (38.3%) and 29 female (61.7%), with a mean age of 60.0 ± 8.6 years and onset of 5 (4,7) years. Among them, 7 patients (14.9%) were with blepharospasm, 24 patients (51.1%) were with blepharospasm- oromandibular dystonia, 16 patients (34.0%) were with other types. Based on the severity of blepharospasm, 45 cases were grade 4 (95.7%), and 2 cases were grade 3 (4.3%) preoperatively. The postoperative follow-up period was 20 (9,41) months. After surgery, 35 cases were grade 0 (74.5%), 9 cases grade 1 (19.1%), 2 cases grade 2 (4.3%), and 1 case grade 3 (2.1%). Among 47 patients, BFMDRS score was 8.0 (8.0, 8.0) preoperatively and 0.0 (0.0, 1.0) postoperatively ($P < 0.001$). The total BFMDRS score was 12.0 (10.0, 15.0) preoperatively and 1.0 (0.0, 3.0) postoperatively ($P < 0.001$). The improvement rate of blepharospasm in all patients was 100% (91.2%, 100%). The total improvement rate with eye, mouth, speech, swallowing and neck was 90% (75%, 100%). The preoperative score of BSDI was 23 (20,25), and 6 (5,7) postoperatively ($p = < 0.001$).

Conclusions: Neural loop blocking is a safe and effective treatment for blepharospasm in Meige syndrome and is suitable for patients with various failed previous treatment including DBS.

P-NEU-051

Swollen disc in diabetic patient: a case report

*A. Arianti*¹

¹Ophthalmology, JEC Eye Hospitals and Clinics, Jakarta, Indonesia

Introduction: Swollen disc in diabetic patients are often associated with vascular events, such as non-arteritic anterior optic neuropathy or diabetic papillopathy, however other etiologies must be considered whenever the clinical findings does not match the natural course of a vascular event. Among other things to be considered, fungal infection remains among the rare causes of swollen disc, but not unlikely to cause a severe, progressive visual loss in diabetic patients.

Objectives: This case aimed at demonstrating other possible causes of optic disc edema in diabetic patient. The immunosuppressed state of uncontrolled diabetic patient poses further risks of opportunistic infections, including fungal infection.

Methods: Case report.

Results: A 57-year old male with sudden, painless blurred vision of the right eye for 2 weeks upon awakening. There was mild headache, discomfort and tingling sensation around the periorcular area. He had a history of uncontrolled type II diabetes and hypertension. No fever, jaw claudication, weight loss or fatigue. The patient was referred with a working diagnosis of NAION. On examination, RE best corrected visual acuity was 2 m CF and positive RAPD. The extraocular movement was intact, with reduced corneal sensation of the RE. Fundus examination showed RE optic disc edema, LE normal optic disc with 0.6 CDR, and non-proliferative background diabetic retinopathy without any presence of diabetic macular edema OU. Humphrey visual field examination was depressed generally in the RE, and normal on the LE. Brain MRI with contrast showed inflammation of the right orbital apex, originating from the right sphenoid sinus. Meanwhile, the visual acuity loss was progressive. Taking into account the clinical course and other factors, fungal infection was considered. The patient was referred immediately to undergo advance Functional Endoscopic Sinus Surgery (FESS) of the sphenoid sinus and histopathological examination. Further diagnostic procedures confirmed invasive fungal sinusitis as the culprit.

Conclusions: Due to the immunocompromised state of patients with uncontrolled diabetes, other sinister causes of swollen disc in these patients must be considered, especially when the clinical findings does not match the typical course of a vascular event. Invasive fungal sinusitis involving the orbital apex could be considered among the more sinister causes of optic disc swelling in diabetic patients. Prompt diagnosis and treatment is essential to avoid permanent morbidity, even death in such case.

P-NEU-052

Clinical presentation of carotico-cavernous fistula and outcomes of endovascular balloon embolization

T. Malik¹, N. Ain²

¹Ophthalmology, Post Graduate Medical Institute/Lahore General Hospital, Lahore, Pakistan,

²Ophthalmology, Mughal Eye Hospital, Lahore, Pakistan

Introduction: Endovascular embolization is not commonly performed in Pakistan, leading to limited available data regarding the outcomes of this treatment modality. In the United States, coil embolization has replaced balloon embolization, but in developing countries like Pakistan, balloon embolization remains a safe and effective first-line treatment. Despite its prevalence being lower, it is considered a simple and safe approach. This case series presents the results of balloon embolization in eighteen patients, including demographic data and success rates.

Objectives: This study aims to elucidate the clinical presentation of Carotico-cavernous fistula (CCF) and assess the outcomes of endovascular balloon embolization, drawing data from a tertiary care center in a developing country.

Methods: This retrospective interventional case series included records of 18 patients who underwent endovascular balloon embolization between 2018 and 2022 at Lahore General Hospital. The data encompassed age, gender, CCF etiology, CCF type, clinical presentation, diagnostic techniques, interventions, and two-month follow-up outcomes. Patients with incomplete records and those undergoing coil embolization were excluded. Digital subtraction angiography was universally conducted, followed by endo-arterial balloon embolization. Procedures were performed under general anesthesia through the femoral artery approach.

Results: The inclusion criteria were met by 18 records, with 16 patients exhibiting direct CCF and a mean patient age of 27.17 ± 12.6 years. The mean time from trauma to presentation was 7.89 ± 7.19 months. The female-to-male ratio was 1:8. Eight patients had visual acuity below 6/60, 7 had between 6/60 and 6/18, and 3 had exceeding 6/18. The mean pre-operative intraocular pressure (IOP) was 16.06 ± 3.37 mm Hg, and post-operative IOP was 14.83 ± 3.49 mm Hg ($p = 0.0046$). Endovascular embolization was successful in 15 (83.3%) patients. One patient experienced epidural hematoma as a procedural complication, subsequently drained. No procedure-related mortality was observed.

Conclusions: Femoral artery balloon embolization emerges as an efficient technique for both direct and indirect CCF. This method proves to be safe, straightforward, and yields excellent results when timely executed.

P-NEU-053

Benign anisocoria

*E. Dülger*¹

¹Eye, Vip Health Clinic, Nicosia, Cyprus

Introduction: Anisocoria is an unequal pupil size. The etiology ranges between physiologic to life threatening reasons. The pupil size and difference, and light reaction is an important sign in decision of serious vascular or non vascular disease of brain, and eye disease, Also it is important in some toxic, iatrogenic and physiologic conditions. Here is a presentation of two cases with anisocoria.

Objectives: *Describe the anisocoria

*Identify the etiology of anisocoria

*Management of benign anisocoria.

Methods: Case reports

Results: Case 1: Lady in 38 years old, complaining with difference in pupil size in selfie photo. She had a bigger pupil size on left eye. Both pupils were reactive to the light. She had a pneumonia and under treatment with Ipratropium and budesonid, inhaler, moxifloxacin oral tablet and oxymetazoline spray applied to the ears. The patient was followed only with observation without any treatment and pupil sizes get back after end of the pneumonia treatment.

Case 2 : Lady in 29 years old. complaining with difference in pupil size, larger in right eye. Both pupils are reactive to the light. She had an asthma and treated with budesonid and ipratropium inhaler. She followed only with observation and get back equal and normal pupil size day after inhaler treatment. In both cases when questioned and evaluated patients we realized that the inhaler masks that used for respiratory tract disease were not set properly, and gas leakage that contain ipratropium might contact with eye surface. Absorption might lead to enlargement of pupil size by blocking the iris circular muscle muscarinic receptors.

Conclusions: The anisocoria might be benign or very serious situation. The etiology of anisocoria evaluation with proper anamnesis and observation might be crucial in diagnosis of disease. Iatrogenic benign anisocoria should be considered by physician in young patient especially with respiratory tract disease before detailed screening.

P-NEU-054

Visual outcomes of different treatments for specific optic neuropathies: a systematic review

G. Montoya Guacaneme^{1,2,3}, M. Saavedra Estupinan⁴

¹University of Edinburgh, Edinburgh, United Kingdom, ²Santander, Fundacion Oftalmologica de Santander, Floridablanca, Colombia, ³Santander, Autonomous University of Bucaramanga, Floridablanca, Colombia, ⁴Bogota, National University of Colombia, Bogota, Colombia

Introduction: Leber's hereditary optic neuropathy (LHON) and Optic neuritis (ON) are causes of variable dysfunction of the visual system. Neuromyelitis optica (MNO) is associated to ON and it is cause of worse prognosis compared to more frequent forms of ON. Current research in those areas looks for improvement in quality of life and reduction of patient's general disability. However, there are none highly effective therapies to improve visual function in patients affected with these pathologies.

Objectives: To do a parallel search investigating what novel therapies are improving visual acuity for Leber's hereditary optic neuropathy, optic neuritis or neuromyelitis optica.

Methods: We did a systematic search in EMBASE, PUBMED and LILACS, from January 1st, 2012 until April 6th, 2022 for interventional controlled trials for LHON, ON or NMO which included visual outcome evaluation. Both high contrast visual acuity and contrast sensitivity measurements were considered as acceptable outcomes. Data was extracted by two reviewers independently.

Results: No trials for LHON matched the inclusion criteria. From 255 initial references, 19 original clinical trials fulfilled our inclusion criteria. 3 trials evaluated erythropoietin, 2 satralizumab, 2 phenytoin, all in patients with acute ON. The remaining 12 trials investigated memantine, amiloride, prednisolone, opicinumab, simvastatin, GGS (Freeze-dried sulfonated human normal immunoglobulin), fingolimod, alemtuzumab, dalfampridine, MD1003-Biotin, inebilizumab y tocilizumab. Four studies recruited only MNO patients. No medication between these 15 trials proved efficacy in terms of improvement of visual acuity or contrast sensitivity.

Conclusions: No intervention has an enhancement effect on visual function. But some interventions showed promising results that require further research.

P-NEU-055

Magnetic resonance imaging characteristics of optic nerve function in primary vasculitis associated optic neuritis

H. Li¹, H. Kang²

¹Beijing Friendship Hospital, Capital Medical University, Beijing, China, ²Beijing Chaoyang Hospital, Capital Medical University, Beijing, China

Introduction: Magnetic resonance imaging (MRI) is currently used to confirm the diagnosis of acute ON. Diffusion-weighted imaging (DWI) sequence and apparent diffusion coefficient (ADC) values calculated from the DWI, as relatively new imaging techniques, are sensitive to the changes in water diffusion during acute ischemic infarction related to cytotoxic edema.

Objectives: Our study tried to demonstrate the clinical character of CTDs-ON, identify the clinical implications of diffusion restriction in acute ON patients, and evaluate the feasibility of DWI images to differentiate CTDs-ON from IDON.

Methods: We retrospectively reviewed medical records of inpatients diagnosed with acute ON. The demographic, clinical, and radiological data were collected for all patients. All cases received ophthalmic assessments before and after the treatment. The Orbital routine MRI and DWI were performed using a 3.0-T scanner as soon as their initial attack.

Results: Spearman correlation analysis was performed to explore the relationship between DWI signal, visual ability and CTDs-ON (Table 3). Hyperintensity of optic nerve on DWI was associated with severe visual impairment and CTDs in acute ON patients ($P < 0.001$). The poor visual outcome in ON patients was associated with CTDs. ($P < 0.001$). Binary logistic regression was used to examine the association between DWI-H, CTDs-ON and visual acuity. Logistic regression analysis revealed that the DWI-H of the optic nerve was a risk factor for visual ability in the onset or in the postictal state of the ON patients [ORs = 1.893 (95% CI: 1.322-2.711, $P < 0.001$), 1.716 (95% CI: 1.094-2.691, $P = 0.019$), and also the risk factor for CTDs-ON (OR= 13.876 (95% CI: 4.277-45.018, $P < 0.001$) The acute ON patient with CTDs is a risk factor for worse visual outcome (OR= 2.593 (95% CI: 1.384-4.857, $P = 0.003$). Finally, ROC curve analysis showed that the AUC of combined DWI and visual outcome was 0.889 (95% CI: 0.820-0.959, $P < 0.001$, sensitivity: 88.9%, specificity: 77.6%.

Conclusions: Our findings suggest that CTDs-ON attack elderly patients, prefer involving both eyes. Patients with CTDs-ON have more severe visual impairment and require a more complex regimen as soon as possible. DWI-H and worse prognosis that appeared in ON patients indicated a diagnosis of CTDs-ON

P-NEU-056

Otogenic hypertrophic pachymeningitis presenting with an orbital apex syndrome

X. Lin^{1,2,3}, S. Wu^{1,2,3}

¹Neuro-ophthalmology, The First Hospital of Xi'an, Xi'an, China, ²Neurology, The First Affiliated Hospital of Northwest University, Xi'an, China, ³Xi'an Key Laboratory for Innovation and Translation of Neuroimmunological Diseases, Xi'an, China

Introduction: Otogenic hypertrophic pachymeningitis (OHP) is a rare but complicated clinical disorder and easily overlooked due to its insidious symptoms. OHP belongs to a subtype of secondary hypertrophic pachymeningitis, and etiologies are also extensive including infections, autoimmune diseases or tumors, and etc. Comprehensive etiological investigation and precise treatment are crucial for management of OHP.

Objectives: To enhance understanding about the etiologies, symptoms and the radiological imaging about OHP.

Methods: Case report.

Results: A 63-year-old man presented with a progressive left headache, left ptosis, binocular diplopia and vision loss in the left eye for 10 days. The patient had a history of diabetes mellitus and a moderate anemia. One year ago, he was diagnosed with left chronic fungal otitis media (OM) and otitis externa, and underwent a left tympanic debridement.

On examination, best corrected visual acuity was 20/20 in the right eye and 20/80 in the left eye. Extraocular movements showed left eye was fixed with ptosis. He also had left facial numbness, left peripheral facial paralysis and left hearing loss. T1-weighted post-contrast magnetic resonance imaging (MRI) showed left mastoid enhancement, diffuse thickened and enhanced dura from the inferior part of the temporal lobe to cavernous sinus and orbital apex in the left side.

Laboratory tests revealed moderate anemia with hemoglobin as 87g/L, erythrocyte sedimentation rate as 117mm/h, glycosylated hemoglobin as 8.3%, serum galactomannan antigen detection as 0.76 g/L, (1,3)-beta-D-glucan as 64 pg/ml. Other serum results including routine biochemistry tests were all negative. CSF tests were normal. mNGS of the CSF was negative. However, mNGS of the left ear secretion found Gram-positive bacteria of staphylococcus caprae with a high sequence. Thus, orbital apex syndrome due to OHP secondary to prior OM and mastoiditis was considered. The patient was treated combined with voriconazole, vancomycin and linezolid sequentially, and then the patient's conditions improved gradually.

Conclusions: This present case highlights a rare but typical imaging features of OHP. And to the best of our current knowledge, this should be the first case of OHP presenting with an orbital apex syndrome in the literature. In addition, the treatment was difficult due to complicated conditions in this patient, emphasizing that an individualized and comprehensive treatment based on the underlying causes was crucial for the management of OHP.

P-NEU-057

The pathogenesis of Th17/Treg cell imbalance in inflammatory demyelinating optic neuritis

H. Kang¹, S. Wei²

¹Department of Ophthalmology, Beijing Chaoyang Hospital, Capital Medical University, Beijing, China,

²Department of Ophthalmology, The First Medical Center of Chinese PLA General Hospital, Beijing, China

Introduction: Neuromyelitis Optica Spectrum Disorders (NMOSD) is an autoimmune disorder primarily targeting the optic nerve and spinal cord, leading to blindness and paralysis. Systemic and local inflammatory responses play a key role in the pathophysiology of NMOSD.

Objectives: Previous studies have confirmed that antigen-specific T cells contribute to the production of NMO-igg in peripheral immune responses and the development of NMO lesions in the central nervous system. However, the role of the crucial immunomodulators Th17/Treg has not been investigated in NMOSD.

Methods: Frequencies of T cell subsets in the peripheral blood of anti-AQP4-positive NMOSD patients and healthy controls (HCs) were assessed by flow cytometry. A murine model of neuromyelitis optica spectrum disorder (NMOSD) was established by intrathecal injection of purified immunoglobulin G from anti-aquaporin-4 antibodies-positive patients with NMOSD and human complement into the brains of adult female C57BL/6J mice. Astrocyte injury, demyelinating lesion, and inflammatory response were used to evaluate the injury of NMOSD animal models. Th17 and Tregs in NMOSD mouse lesions were analyzed by flow cytometry, histological sections, and real-time quantitative Polymerase Chain Reaction. We examined the effects of both depletion and adoptive transfer of Th17 and Treg cells.

Results: Compared with HC, the percentage of Tregs in peripheral blood T cells in patients with acute NMOSD was significantly reduced, while the percentage of Th17 was significantly increased. In animal models, depletion of Tregs greatly enhanced astrocyte loss and demyelination in NMOSD mice, while adoptive transfer of Tregs mitigated spinal damage. The depletion of Th17 cells can alleviate demyelinating lesions, while the adoptive transfer of Th17 cells can aggravate astrocyte loss.

Conclusions: The current study provides evidence that Th17/Treg balance is involved in the formation of NMOSD demyelinating damage. Therefore, we believe that the NMOSD treatment strategy targeting Th17 and Tregs is promising and deserves further investigation.

P-NEU-058

Outcomes of patients with DON treated with ivGC and/or orbital decompression: a systematic review and meta-analysis

M. Wang¹, D. Li¹

¹Ophthalmology, Beijing Tongren Eye Center, and Beijing Ophthalmology Visual Science Key Lab, Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: Dysthyroid optic neuropathy (DON) is a serious complication resulting from thyroid-associated ophthalmopathy (TAO), in which crowding of the orbital apex or markedly increased adipogenesis leads to optic nerve compression with or without clinically significant exophthalmos, resulting in vision loss. In addition to the common manifestations of TAO, other clinical manifestations of DON include deterioration in BCVA, anomalous RAPD, visual field defects, VEP-P100 anomalies, contrast sensitivity loss, optic disc changes, folded choroid and orbital apex crowding, according to radiological evidence. Current treatment for DON mainly includes pharmacological decompression and surgical decompression. Steroids are most commonly used for pharmacological decompression. However, the level of evidence is low for the treatment of patients with DON and there is no consensus on the treatment of DON with intravenous high-dose glucocorticoids (ivGC) or direct surgical decompression.

Objectives: To compare the efficacy of glucocorticoid treatment and orbital decompression (OD) in DON.

Methods: Data Sources: PubMed, EMBASE, and Cochrane Library were searched along with other sources.

Study Selection: A total of 17 studies met the inclusion criteria.

Data Extraction: Standard methodological guidance of the Cochrane Handbook was used and data were independently extracted by multiple observers. The primary outcomes were the improvement of best corrected visual acuity (Δ BCVA). Secondary outcomes were proptosis reduction, change in diplopia, visual field defects, and intraocular pressure (IOP).

Results: The Δ BCVA in the ivGC + OD group was improved 0.26 LogMAR more than in the ivGC group ($P = .007$). The Δ BCVA in the OD group was better than in the ivGC group ($P = .008$). Posttreatment proptosis in the ivGC + OD and OD groups were improved further by 3.54 mm and 3.00 mm, respectively, than in the ivGC group ($P < .01$). The mean deviation (MD) in the ivGC + OD group was improved by an additional 5.33 dB than in the ivGC group ($P = .002$). The IOP in the ivGC + OD group was improved further than in the ivGC group ($P = .03$).

Conclusions: Based on the results of the present meta-analysis, OD or ivGC + OD may be more effective in improving BCVA and MD and reducing proptosis compared with ivGC. Compared with ivGC alone, ivGC + OD is more effective in improving IOP than ivGC. Although this study improves the hierarchy of evidence in the treatment of DON, additional randomized controlled trials are needed to confirm this conclusion.

P-NEU-059

Relationship between novel Bruch's Membrane Opening - minimum rim width and retinal nerve fibre layer in papilloedema

A. Gupta¹, P. Kumar¹, R. Dhiman¹, S. Phuljhele¹, R. Ansari¹, R. Saxena¹

¹Dr. R. P. Centre, All India Institute of Medical Sciences, New Delhi, India

Introduction: Papilloedema is the swelling of optic disc which occurs due to the increased intra-cranial pressure. Spectral-domain optical coherence tomography (SD-OCT) of the optic nerve head (ONH) provides morphometric assessment in papilloedema.

Objectives: To study the diagnostic capability of novel Bruch's Membrane Opening- Minimum rim width (BMO-MRW) in the diagnosis of papilloedema in comparison to the Retinal Nerve Fibre Layer thickness (RNFL). The study also aims to evaluate the correlation between the BMO-MRW with the RNFL in papilloedema and compare them with normal subjects.

Methods: In this retrospective study, the records of all diagnosed cases of papilloedema who underwent high resolution Optical Coherence Tomography (OCT) from March 2019 to Feb 2023 were analyzed. Subjects with any other ocular or neurological pathology were excluded from the study. Eyes with poor quality OCT scans either due to media haze or high cylinder were excluded from the study. Incomplete scans due to severe edema of the disc were also excluded from the study. Records of only baseline examination were included in the study. A total of 147 eyes of 81 subjects with diagnosed papilloedema and 102 eyes of 53 age and gender matched healthy subjects were included for the analysis. The BMO thickness and RNFL thickness is then compared within the affected and control group and between the groups. The data was statistically analysed.

Results: The average RNFL in the papilloedema is 120.32 ± 45.22 and in control group is 102.29 ± 8.77 ($p=0.0001$). The average BMO-MRW in the papilloedema is 524.94 ± 116.89 compared to 319.0 ± 56.0 in the control group ($p < 0.0001$). There is a high correlation between BMO-MRW and RNFL in papilloedema (0.69) compared to that in the control group (0.31). In papilloedema, the BMO-MRW has higher sensitivity and specificity compared to the RNFL.

Conclusions: There was a statistically significant increase in the BMO-MRW in papilloedema compared to the control group. Both, the BMO-MRW and RNFL have high correlation in cases with papilloedema. The BMO-MRW had better diagnostic capability compared with RNFL in diagnosing the papilloedema which needs further evaluation.

P-NEU-059

A study on the correlation between NAION patient self-efficacy, disease uncertainty, and anxiety and depression

R. Liu¹, Q. Xu¹

¹Senior Department of Ophthalmology, The Third Medical Center of PLA General Hospital and Chinese PLA Medical School, Beijing, China

Introduction: To compare the scores of the general Hospital Anxiety and Depression scale (HADS) in patients with non-arteritic anterior ischemic optic neuropathy (NAION) and the control group, and to explore the related influencing factors.

Objectives: To compare the scores of the general Hospital Anxiety and Depression scale (HADS) in patients with non-arteritic anterior ischemic optic neuropathy (NAION) and the control group, and to explore the related influencing factors.

Methods: This study included 30 NAION patients who visited the Third Medical Center of the PLA General Hospital from September to October 2023, and 30 healthy control patients. All subjects filled in the general data questionnaire including basic information, the general Hospital Anxiety and Depression scale (HADS) and the General self-efficacy scale (GSES). Patients with NAION completed the Disease Uncertainty Scale (MUIS). The statistical method of independent sample T test was used to compare the differences in anxiety and depression mood and self-efficacy among the groups, and the influence of self-efficacy and uncertainty on anxiety and depression of NAION patients was analyzed by person correlation test.

Results: The HADS score of NAION patients was significantly higher than that of control group ($p=0.033$), and the self-efficacy was significantly lower than that of control group ($p=0.011$). The MUIS and GSES scores of NAION patients were significantly correlated with HADS scores.

Conclusions: The incidence of anxiety and depression in NAION patients is higher than that in control group, and the incidence of anxiety and depression in NAION patients is significantly correlated with disease uncertainty.

P-NEU-060

Optic disc morphology in unilateral optic neuritis

P. Kumar¹, A. Gupta¹, S. Phujhele¹, R. Dhiman¹, D. Raj¹, R. Saxena¹

¹Dr. R. P. Centre, All India Institute of Medical Sciences, New Delhi, India

Introduction: Optic Neuritis is an acute inflammation of the optic nerve. Optical Coherence Tomography (OCT) provides measurement of the retinal nerve fibre layer (RNFL) thickness and ganglion cell layer (GCL) thickness which provide an indirect method to quantify the axonal and neuronal loss in the anterior visual pathway.

Objectives: This study evaluates the initial effect of optic neuritis on RNFL thickness and GCL thickness of the affected eyes in the unilateral optic neuritis and compares them with the fellow control eyes.

Methods: In this retrospective study, OCT reports of the subjects with unilateral optic neuritis presented within a month of the first episode were evaluated for the RNFL and GCL thickness. The RNFL thickness was divided into 6 sectors viz. nasal, superio-nasal, superio-temporal, temporal, inferio-nasal and inferio-temporal. The GCL was divided into 1mm, 3mm and 5mm EDTRs sectors centered at the fovea. The 3mm and 5mm ETDRs were further divided into nasal, superior, temporal and inferior sectors. The global and sectoral RNFL and GCL thickness of the affected eyes were compared with that the fellow control eye.

Results: 14 subjects (age 34.26 ± 14.33) were included in this study. The mean global RNFL thickness of the affected eye and control eye were 125.71 ± 30.54 and 100.29 ± 8.92 ($p=0.006$). Sector-wise RNFL thickness of the affected eye was also higher in all sectors compared to the corresponding sectors of the fellow control eye but was statistically significant in the nasal sectors ($p=0.007$, 0.005 and 0.01). In the affected eye, the GCL showed decrease in the thickness except in central 1 mm and superior 6mm ETDRs sectors ($p=0.64$ and $p=0.95$ respectively) which showed no change in GCL thickness. The loss of the GCL thickness was statistical significant in the superior and inferior 3mm ETDRs sectors and inferior 6mm sector ($p=0.02$, $p=0.05$ and $p=0.05$ respectively).

Conclusions: In the early stage of optic neuritis, the RNFL thickness is significantly increased in affected eye compared to the control eyes due to the swelling of the optic disc. The RNFL thickness in nasal sectors is affected more than the temporal sectors with the naso-inferior sector being most affected. The GCL thickness remained unaffected in the central 1mm and superior 6mm ETDRs sectors. The inferior sectors in 3mm and 6mm ETDRs zones showed significant decrease in the GCL thickness. The decrease in GCL thickness was most statistically significant in the superior 3mm ETDRs zone.

P-NEU-060

Evaluation of visual morphology and functional indicators in patients with acute NAION

H.Y. Wang^{1,2}, L. Zhang¹, J. Wei¹, W. Jia¹, X. Jin¹, R. Wang¹

¹Shaanxi Eye Hospital· Xi'an People's Hospital (Xi'an Fourth Hospital), Xi'an, China, ²Xi'an Key Laboratory of Digital Medical Technology of Ophthalmologic Imaging, Xi'an, China

Introduction: Non-arteritis anterior ischemic optic neuropathy (NAION) is one of the most common causes of optic neuropathy in adults over 50 years of age, however, the correlation between morphology of optic disc and visual pathway function are not fully elucidated. Additionally, morphological and functional biomarkers are also to be anticipated to evaluate the prognosis.

Objectives: To analyze the changes of morphology and function of macula and optic nerve in the eyes of acute non-arteritis anterior ischemic optic neuropathy (NAION), and to explore the correlation between morphological and functional indicators, visual acuity changes and morphological function changes.

Methods: A retrospective analysis was performed for 28 patients (average age 58.18 ± 10.54 years) with unilateral NAION in our clinic, with the contralateral eye as the control group. The disease time from onset is 3~30 days (average 15.11 ± 7.73 days). All patients underwent exams of optical coherence tomography angiography (OCTA), pattern visual evoked potential (P-VEP), and multifocal electroretinography (mfERG). And all patients were given classical treatment with follow-up for more than 3 months.

Results: Compared with the control eye, the retinal nerve fibre layer (RNFL) layer in the NAION group was thickened ($236.88 \pm 60.23 \mu\text{m}$ vs $103.69 \pm 13.75 \mu\text{m}$), thinning of ganglion cell complex (GCC) in the macular region ($75.08 \pm 15.93 \mu\text{m}$ vs $85.4 \pm 9.44 \mu\text{m}$), superficial capillary density (VD) in the center of the optic disc increased ($12.56 \pm 4.61\%$ vs $9.47 \pm 4.77\%$), P100 peak value of PVEP extended ($109.36 \pm 15.02\text{ms}$ vs $100.75 \pm 5.04\text{ms}$), P100 amplitude decrease ($7.13 \pm 2.88\mu\text{V}$ vs $15.96 \pm 5.60\mu\text{V}$) and mfERG center reaction density decreased ($46.41 \pm 23.10 \text{nv/degree}^2$ vs $67.48 \pm 22.30 \text{nv/degree}^2$), the differences were statistically significant ($P < 0.05$). In addition, GCC thickness was positively correlated with P100 amplitude and mfERG center reaction density. RNFL thickness negatively correlated with the duration of disease, and positively correlated with the peak value of VEP P100. The change in visual acuity negatively correlated with the magnitude of P100.

Conclusions: Patients with NAION have visual morphological impairment in the acute stage, and the change of GCC thickness is closely related to the impaired macular and optic conduction function. As the course of the disease decreases, the thickness of the RNFL decreases, and the improvement of visual acuity is related to the degree of initial visual impairment.

S-NEU-001

Retinal periphlebitis in multiple sclerosis - how to classify?

R. Rebane¹, K. Sõnajalg¹, J. Vilisaar²

¹Department of Ophthalmology, East Tallinn Central Hospital, Tallinn, Estonia, ²Department of Neurology, Tartu University Hospital, Tartu, Estonia

Introduction: Retinal periphlebitis has been described to occur in 5–36% of patients with multiple sclerosis.

Objectives: The aim was to find a classification that can be used to describe retinal periphlebitis in multiple sclerosis. A standardized staging system is needed.

Methods: A literature research was performed using Pubmed.

Results: Despite the wide prevalence of retinal periphlebitis in multiple sclerosis there is no consensus how to classify the heterogenous perivenous inflammatory findings. The subject is important, because the inflammatory findings in the fundus vary greatly between eyes/individuals and change during disease activity. A proper disease classification would help to provide a more systematic follow-up and if needed-treatment.

Conclusions: We conclude that Eales disease classification proposed by Saxena et Kumar, 2004 into four stages can also be applied in multiple sclerosis associated retinal periphlebitis. Further research is needed.

V-NEU-001

Pursuit of vision in an infant

J. Matalia¹, S. Shirke²

¹Pediatric Ophthalmology, Strabismology & Neuro-ophthalmology, Narayana Nethralaya, Bengaluru, India, ²Narayana Nethralaya, Bangalore, India

Introduction: The decision to treat children with idiopathic intracranial hypertension (IIH) is determined either by the impact of the elevated intracranial pressure on the visual system or the severity of the headache. However, it is difficult not only to assess this reliably in a child but also to monitor progression of an optic neuropathy. As in adults, the typical management begins with medical therapy which is usually well tolerated by children. But if the child is either unresponsive to medical management or intolerant to the side effects of the medications then will require surgical intervention either a shunting procedure or an optic nerve sheath fenestration (ONSF).

Objectives: A thorough work-up is a must in cases of pediatric cataract to pick up associated problems like IIH as a child may not present with typical features. This video highlights “the pursuit of vision in an infant” by timely intervention of cataract surgery and ONSF for the failing optic nerves to restore binocular vision and achieve normal milestones in an infant.

Methods: We describe a 8 months baby who presented with bilateral congenital cataract with esotropia with IIH with delayed milestones. She was under medical treatment with a neurologist for her IIH. She underwent cataract surgery in both eyes with IOL implantation. Six months later, though IIH was well controlled on medical treatment, there was no resolution of her papilledema, in view of which and in collaboration with the neurologist was advised ONSF.

Results: In this video, we demonstrate the details of the surgical steps of ONSF by the transconjunctival route being performed in a child of 1 year of age with IIH. Three weeks following surgery there was total resolution of the papilledema and she attained orthotropia for distance and near. Three months postoperatively there was a remarkable improvement in her vision and her milestones that she started attaining comparable her age. Presently the child is 6 years old and doing well. We would also give clinical pearls at various steps of ONSF procedure in a child. It gives us an insight in the accurate planning of ONSF.

Conclusions: Procedures like cataract surgery and ONSF in a child may require implicit timing and precision unlike adult cataract surgery. Here, visual rehabilitation cannot just end at cataract surgery. It vividly describes the technique of ONSF and emphasizes its importance as a safe and effective technique in improving or stabilizing vision when it can be threatened in cases of IIH.

Video

[Click here to play video](#)

Ocular Oncology

FT-ONC-002

AQUEOUS HUMOR LIQUID BIOPSY: A MOLECULAR TEST FOR RETINOBLASTOMA DIAGNOSIS, PROGNOSIS, AND THERAPEUTIC OUTCOMES

*J. Berry*¹, *P. Peng*², *P. Kuhn*³, *J. Hicks*³, *D. Cobrinik*¹, *X. Gai*², *R. Shah*², *V. Yellapantula*², *J. Biegel*², *L. Xu*²

¹Surgery, Children's Hospital Los Angeles, Los Angeles, United States, ²Children's Hospital Los Angeles, Los Angeles, United States, ³University of Southern California, Los Angeles, United States

Introduction: Retinoblastoma (RB) impacts 8000 children worldwide every year threatening their life, eye(s) and vision. Tumor biopsy is contraindicated due to iatrogenic risk of metastasis. While this cancer has a known genetic etiology, very little progress has been made towards any personalized or precision medicine approaches for RB due to contraindication to tumor biopsy. To address this critical area of unmet need, we first introduced the aqueous humor (AH) as an eye-specific liquid biopsy for RB-specific biomarkers in 2017.

Objectives: This prospective study aims to validate AH's clinical utility by establishing associations between cell-free DNA biomarkers at diagnosis and aggressive tumor behavior, specifically likelihood of intraocular relapse. We demonstrate routine detection of tumor-derived *RB1* mutations in AH, can improve germline testing, and we further explore AH as a unique source of distinct molecular biomarkers predictive of treatment outcomes.

Methods: This prospective observational study involves AH liquid biopsy at RB diagnosis, with longitudinal sampling through therapy. Tumor-derived cell-free DNA undergoes sequencing for detection of single nucleotide variant (SNV) and indels in the *RB1* gene and somatic copy number alterations (SCNAs). SCNAs, including 6p gain and MYCN amplification, are correlated prospectively with tumor response to therapy and globe salvage. IRB approval and consent was obtained.

Results: A total of 26 eyes of 21 patients were included with AH liquid biopsy obtained at diagnosis. Successful ocular salvage was achieved in 19 of 26 (73.1%) eyes. Mutational analysis of 26 AH samples identified 23 pathogenic *RB1* variants and 2 focal *RB1* deletions; VAF ranged from 30.5% to 100% (median 93.2%). At diagnosis, SCNAs were detectable in 17 of 26 (65.4%) AH samples. 6p gain was associated with increased odds of recurrence or enucleation over time (Hazard Ratio=2.95, 95% CI=1.05-8.34, $P = .04$). Changes in circulating tumor fraction correlated with therapeutic response. Recurrent and persistent disease can be confirmed through presence of ctDNA in AH.

Conclusions: Establishing an AH liquid biopsy for RB is aimed at addressing 1) our inability to biopsy tumor tissue and 2) the lack of molecular biomarkers for intraocular prognosis. Current management decisions for RB are made based solely on clinical features without objective molecular testing. This prognostic study shows great promise for using AH as a companion diagnostic tool.

FT-ONC-003

Insufficient MYCN dosage refers to photoreceptor-like differentiation and favorable outcome in cavitory retinoblastoma

H. Shi¹, M. Han¹, R. Jia¹, P. Chai¹

¹ShanghaiJiao Tong University, Shanghai, China

Introduction: Cavitory retinoblastoma (CRB) is a rare tumor subtype characterized by the presence of translucent cavities that are visible through ophthalmoscopic examination. However, the clinical significance of CRB is controversial, and the underlying mechanisms for the development of CRB remains a long-lasting enigma.

Objectives: To unveil the clinical characteristics and the pathogenesis mechanism of CRB.

Methods: This retrospective, multi-center, case-control study included 24 eyes of 22 patients diagnosed with retinoblastomas exhibiting ophthalmoscopically visible cavities between June 2011 and February 2019. Age-matched children with non-cavitory subtype retinoblastoma were also included in a case-control ratio of 1:3 (Scans were acquired from June 2012 to February 2021, and data were collected from May 2013 to October 2020). A comprehensive chart review was conducted, and all patients were monitored for metastasis and recurrence outcomes. The primary cells harvest from non-cavitory retinoblastoma patients are silenced through transfecting MYCN-targeting siRNAs. The orthotopic xenografts were analyzed by spatial proteomic analysis.

Results: In this study, we have demonstrated that cavity retinoblastoma exhibits a significantly lower recurrence or metastatic rate ($p < 0.05$) and a reduced incidence of optical/orbital invasion ($p < 0.001$). Additionally, we have identified a decreased MYCN expression in close proximity to the cavitory locus, with enhanced photoreceptor-like differentiation. The inhibition of MYCN in primary retinoblastoma cells recapitulated these phenotypes, including the development of translucent cavities in the orthotopic xenograft model and an increased formation of cone-like rosettes.

Conclusions: Our initial findings demonstrate that an inadequate dosage of MYCN results in the re-differentiation of retinoblastoma cells into a morphology resembling photoreceptors. This phenotype is characterized by a less aggressive and more differentiated subtype, which is associated with a more favorable prognosis.

FT-ONC-004

Gα-mediated Hippo pathway dysregulation in uveal melanoma: towards prognostic biomarkers and therapeutic targets

N. Kumar¹, L. Singh², M. Singh³, S. Sen¹, R. Meel⁴, N. Lomi⁴, S. Kashyap¹

¹Ocular Pathology, All India Institute of Medical Sciences, New Delhi, India, ²Pediatrics, All India Institute of Medical Sciences, New Delhi, India, ³Ophthalmology, University of Texas, Southwestern Medical Centre, Texas, United States, ⁴Ophthalmology, All India Institute of Medical Sciences, New Delhi, India

Introduction: Oncogenomic analyses of uveal melanoma (UM) tumors revealed widespread alterations in the GNAQ/11 gene, affecting multiple signaling pathways. The Hippo pathway, comprising a kinase cascade and regulatory components, contributes to oncogenesis through its aberrant expression patterns. UM is a treatment-resistant intraocular malignancy in adults, characterized by limited therapeutic options and high metastatic potential. The Hippo pathway emerges as a major regulator of tumor progression and may represent a promising target for novel therapies in UM.

Objectives: This study aims to investigate the differential expression of Hippo pathway components and their correlation with high-risk clinicopathological parameters and patient outcome.

Methods: We performed quantitative Real-Time PCR (qRT-PCR) to determine the mRNA expression levels of major upstream and downstream Hippo pathway components (*MST1*, *MST2*, *SAV1*, *LATS1*, *LATS2*, *MOB1A*, *MOB1B*, *YAP*, *TAZ*, *14-3-3*, *TEAD*, and *VGLL4*) in 47 prospective UM cases, followed by immunohistochemistry (IHC) of central mediators YAP/TAZ proteins, and known prognostic markers BAP1 and PRAME. The mRNA and protein expressions were correlated with clinicopathological parameters and patient outcomes.

Results: Sixty percent patients exhibited advanced tumor staging with a male preponderance (59.6%). High pigmentation and scleral invasion were evident in 65.9% and 44.6% cases, respectively. Downregulation of *LATS1*, *LATS2*, *SAV1*, *MOB1A*, *YAP* and *TAZ* genes was observed in over 50% of cases. Conversely, *MST1*, *MST2*, *MOB1B*, *14-3-3*, *TEAD* and *VGLL4* showed upregulation in more than 50% of cases, with a mean fold change more than 2.0. Nuclear expression of YAP/TAZ (nYAP/TAZ) was observed in 27.85% of cases, which was statistically significant ($p < 0.05$) with high pigmentation, advanced tumor staging, and loss of nBAP1. Six patients developed distant metastasis, of which four died due to the disease.

Conclusions: Our findings reveal substantial dysregulation of Hippo pathway components at the mRNA level in UM patients, with downregulation correlating with tumor aggressiveness. These insights hold promise for the development of predictive biomarkers and therapeutic targets in UM management. However, further investigations are required to elucidate the precise mechanisms of Hippo signaling components, and to realize the therapeutic potential for modulating central mediators such as YAP/TAZ proteins and suppress oncogenesis.

FT-ONC-006

Sustained-release topotecan episcleral chemoplaque for retinoblastoma

B. Gallie¹, A. Ramasubramanian^{2,3}, F. Shaikh⁴, D. Morgenstern⁴, A. Mallipatna¹, S. Kletke¹, C. Stewart⁵, A. Siddiqi⁶

¹Department of Ophthalmology and Vision Science, Hospital for Sick Children, Toronto, Canada,

²Ophthalmology, Phoenix Children's Hospital, Phoenix, United States, ³Ophthalmology, Wisconsin Children's Hospital, Milwaukee, United States, ⁴Department of Pediatrics, Hospital for Sick Children, Toronto, Canada, ⁵Research Pharmacy and Pharmaceutical Sciences, St Jude Children's Hospital, Memphis, United States, ⁶Oncology Clinical Trials Support Unit, Hospital for Sick Children, Toronto, Canada

Introduction: Salvage of eyes with intraocular retinoblastoma remains challenging despite current standard therapies.

Objectives: We report preliminary Clinical Trial results of local intraocular topotecan chemotherapy by episcleral sustained release from Chemoplaque(s).

Methods: Two parallel phase I studies (Clinicaltrials.gov NCT04428879 and NCT04156347) evaluated the toxicity and efficacy of topotecan chemoplaques in children with intraocular retinoblastoma, either primary or resistant/recurrent after standard therapies. Eligible patients were 8 weeks – 20 years of age with active residual retinoblastoma after first-line therapies or advanced intraocular disease at diagnosis. Patients with extraocular disease or receiving concomitant anti-cancer therapy were excluded. Five dose levels (DL) of topotecan (0.6 mg-1.8 mg) were evaluated using a rolling-six design. Chemoplaques were *in situ* for 6 weeks with dose-limiting toxicity (DLT) evaluated over 9 weeks and a 3-year follow-up.

Results: Forty-one participants received dose levels (DL1, 0.6 mg, n=8), (DL2, 0.9 mg, n=12), (DL3, 1.2 mg, n=10), (DL4, 1.5 mg, n=6) and (DL5, 1.8 mg, n=5), for primary therapy (3) or recurrence after Standard Care (38). Except for one, (0.6 mg) grade 4 neutropenia (confirmed not drug-related pre-existing benign ethnic neutropenia), all DLTs were ocular inflammation (vitritis/scleritis). Recommended phase II dose (RP2D) was defined as 1.2 mg except for younger patients unable to be treated with 2x0.6mg chemoplaques for whom RP2D was 0.9mg. The sustained complete response rate was 89% and 83% respectively at these DLs, with a mean follow of 1.8 yr (range 0.4 to >3 yr). RP2D DLTs were managed with steroid therapy. Systemic topotecan concentrations were at/below the limit of detection at all dose levels/timepoints.

Conclusions: These studies confirm minimal systemic toxicity of the chemoplaque and dose limiting ocular inflammation responsive to local steroids. Preliminary results indicate maximum tolerated dose was 1.2 mg topotecan, with RP2D doses 1.2 mg and 0.9 mg chemoplaque for patients aged <6 months. At the RP2D doses, sustained CR was 86% with durable CRs > 1 year. This new therapeutic approach has potential to transform the therapeutic approach to intraocular retinoblastoma.

FT-ONC-007

Prognostic factors for lacrimal gland adenoid cystic carcinoma: a retrospective study in Chinese patients

X. Song¹, X.W. Zhou¹, L.D. Yang¹, Y.Y. Feng¹

¹Ophthalmology, Shanghai Ninth People's Hospital, Shanghai, China

Introduction: Lacrimal gland adenoid cystic carcinoma (LGACC) is the most common lacrimal epithelial gland malignancy with lethality. Survival outcomes for LGACC patients remain poor despite extensive surgery and radiotherapy, the survival rates at five years were 42.9%–56%. Optimal local disease control could be achieved by integrating neoadjuvant intra-arterial cytoreductive chemotherapy (IACC), but late distant metastases could occur years later. There was no consensus on prognostic risk factors for LGACC, although there were several reports.

Objectives: Lacrimal gland adenoid cystic carcinoma (LGACC) is the most common malignancy in the lacrimal area with poor prognosis. The aim of this study is to explore the prognostic factors for LGACC in ethnic Chinese patients.

Methods: Clinical and histopathological data were reviewed in patients with pathologically confirmed LGACC. Local recurrence, metastasis, and disease-specific death were the main outcome measures. Univariate and multivariate analyses were performed by the Kaplan–Meier method and a Cox proportional hazard model.

Results: At the end of follow-up, 14 patients (35.9%) developed local recurrence, 13 patients (33.3%) developed distant metastasis, and 8 patients (20.5%) died of disease. Among the 13 patients who developed distant metastasis, lung metastasis was observed in 8 patients (61.5%), the brain in 8 patients (61.5%), and bone in 1 patient (7.7%). Advanced T category ($\geq T3$), bone erosion, basaloid subtype, and ASCT2 (-) were significant associated with poor prognosis. Basaloid subtype was an independent risk factor for local recurrence ($P = 0.028$; HR, 12.12; 95% CI, 1.3–111.5).

Conclusions: Histological subtype should be emphasized when evaluating prognosis and guiding treatment. Timely radiotherapy may reduce the risk of metastasis in patients with basaloid component.

P-ONC-001

Efficacy of epidermal growth factor receptor tyrosine kinase inhibitor in treating choroidal metastasis from lung cancer

A.S.H. Chee¹, K.W. Kam¹, A.C.Y. Mak¹, M. Li², M. Ho¹, L.J. Chen³, M. Brelen³, W.W.K. Yip¹, A.L Young¹
¹Ophthalmology and Visual Science, Prince of Wales Hospital, Hong Kong, Hong Kong, SAR of China, ²Oncology, Chinese University of Hong Kong, Hong Kong, Hong Kong, SAR of China, ³Ophthalmology and Visual Science, Chinese University of Hong Kong, Hong Kong, Hong Kong, SAR of China

Introduction: Non-small cell lung cancer (NSCLC) is the predominant subtype of lung cancer and represents the most common cancer in Hong Kong. Compared to Caucasians, Asians are four times more likely to carry mutations in the *epidermal growth factor receptor (EGFR)* gene within the NSCLC population. Nearly half of the NSCLC present with distant metastases and the choroid is the most frequent site of intraocular metastasis.

The conventional treatment for choroidal metastasis (CM) involves orbital radiotherapy (RT), supplemented with chemotherapy in resistant cases. While these treatment approaches have demonstrated effective tumour control, sight-threatening and systemic complications are not uncommon. In recent years, the first-line treatment for metastatic NSCLC patients with *EGFR* mutations has shifted towards tyrosine kinase inhibitors (TKIs) due to improved overall and progression-free survival. However, evidence regarding the efficacy of TKI in treating CM remains scarce. Therefore, we aim to review the treatment outcomes of CM in Hong Kong.

Objectives: To describe the clinical characteristics of choroidal metastasis (CM) in non-small cell lung carcinoma (NSCLC) patients and report treatment outcomes following targeted therapy versus conventional radiotherapy and/or chemotherapy.

Methods: A retrospective review was conducted in two major hospitals in Hong Kong between 2013-2023. Outcomes included tumor response and visual function following treatment.

Results: 25 eyes of 21 Chinese patients with CM secondary to metastatic NSCLC were identified. The majority of patients were non-smokers. 88% of eyes were visually symptomatic with a mean visual acuity (VA) of 20/100 at the time of diagnosis. 52% of tumors were located within the macula. Two-third of CM were undetectable on magnetic resonance imaging (MRI). Tyrosine kinase inhibitor (TKI) recipients achieved rapid visual gain and superior vision than non-TKI groups at 1 month ($p=0.02$). TKI monotherapy, combined TKI and radiotherapy (RT) and RT \pm chemotherapy groups were observed to demonstrate similar duration of tumor reduction at 1 month, and comparable ocular progression-free indices.

Conclusions: TKI achieved durable disease control in EGFR mutation positive NSCLC patients with CM, while improving visual function. TKI can be considered as an alternative to conventional orbital radiotherapy or chemotherapy for these patients in view of the rapid visual recovery.

P-ONC-002

Dynamic subcellular localization of YTHDF2 facilitates the progression of conjunctival melanoma in M6A-dependent manner

R. Jia¹, H. Tian¹, R. Jia², X. Fan³

¹Department of Ophthalmology, Shanghai Ninth People's Hospital, Shanghai JiaoTong University School of Medicine, Shanghai, China, ²Shanghai Ninth People's Hospital, Shanghai JiaoTong University School of Medicine, Shanghai, China, ³Shanghai JiaoTong University School of Medicine, Shanghai, China

Introduction: Conjunctival melanoma (CoM) is a malignant melanoma that seriously endangers life and quality of life. In previous studies, we found that M6A modification plays a crucial role in the tumorigenesis and progression of Conjunctival melanoma. And YTH N6-methyladenosine RNA-binding protein 2 (YTHDF2) is an important m6A reader functioning in the cytoplasm, which recognizes m6A modification sites on the mRNAs and promotes their degradation.

Objectives: The aim of this study was to confirm the function of YTHDF2 in CoM and to precisely regulate its localization and function, thereby altering the progression characteristics of CoM cells and provide an insight into the potential treatment.

Methods: The expression of YTHDF2 and its clinicopathological impact were evaluated in CoM cohorts. The effects of ythdf2 on the biological characteristics of CoM were investigated on the basis of gain-of-function and loss-of-function analyses. Furthermore, subcutaneous and orthotopic models were utilized to uncover the role of YTHDF2 *in vivo*. Subsequently, we identified specific regulatory proteins and small molecule inhibitors that can bind to YTHDF2. Their effects on the subcellular localization alteration of YTHDF2 were discovered through co-immunoprecipitation (co-IP) and immunofluorescence. Nuclear export inhibitors, RNA Immunoprecipitation (RIP), and Dot blot analysis revealed changes in m6A-YTHDF2 affinity caused by alteration of YTHDF2 localization. The functional variations and crucial downstream genes of YTHDF2 were identified using nuclear and cytoplasmic component extraction, followed by RIP-seq and meRIP-seq.

Results: YTHDF2 is elevated in UM and accelerates the progression of ocular melanoma. The subcellular localization and function of YTHDF2 is regulatable. In the absence of regulatory proteins or under the treated of inhibitors, YTHDF2 enters the nucleus and forms liquid-liquid phase separation, This reduces its m6A binding affinity, slows down the degradation of downstream tumor suppressor genes and ultimately affects the progression of UM.

Conclusions: The dynamic localization of YTHDF2 in the cytoplasm or nucleus can affect its efficiency in recognizing m6A modifications, influence the degradation of downstream mRNAs, and regulate the progression of UM.

P-ONC-003

Uncertain heritable risk in retinoblastoma: genetic testing results for risk stratification and screening

B.K.J. Host^{1,2}, C. Inglese³, B. Gallinger³, S. Kletke^{1,2}, B. Gallie^{1,2}, H. Dimaras^{1,2}, A. Mallipatna^{1,2}

¹Department of Ophthalmology and Vision Sciences, The Hospital for Sick Children, Toronto, Canada,

²Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, Canada,

³Department of Clinical and Metabolic Genetics, The Hospital for Sick Children, Toronto, Canada

Introduction: Early diagnosis and prompt intervention is crucial in retinoblastoma (RB). Genetic testing for *RB1* mutations is critical to detect germline mutations (heritable RB) that place probands and relatives at risk for bilateral/multifocal disease and second cancers. All probands should undergo high-sensitivity testing for *RB1* variants in blood and, when available, tumour samples. Despite testing, there remain RB probands and relatives in which heritable risk remains uncertain, leading to unnecessary screening. This study documented the number of RB probands with uncertain heritable risk (UHR) presenting to The Hospital for Sick Children (HSC), and subclassified them on the basis of the uncertainty, with a view to the refinement of screening protocols for probands and relatives.

Objectives: To characterise genetic testing results for RB probands and identify the proportion with UHR. To provide a descriptive subclassification system for probands with UHR in order to develop and refine screening guidelines for these cohorts.

Methods: A 10-year retrospective observational case series. Review of medical records and genetic testing results of all RB probands seen as a new patient at HSC during the study period 1 Jan 2014–31 Dec 2023. Variables included demographics, disease staging, type and results of genetic testing, mutations detected and family history.

Results: There were 173 RB probands identified (bilateral 45% (n=78), unilateral 55% (n=95)). Of these with unilateral disease, 59.6% (n=28) were cases where tumour tissue was not tested and no *RB1* mutation was detected in blood samples, 8.5% (n=4) had tumour tested with no mutation found, and no mutation in blood, 8.5% (n=4) had only one tumour mutation detected, and no blood mutation detected, 4.3% (n=2) had a germline variant of uncertain significance, and (2.1% (n=1) had no genetic testing performed.

Of those with bilateral disease and UHR (ie uncertain risk of RB in siblings/offspring), 12.8% (n=6) were diagnosed and/or tested elsewhere with no available genetic testing information, and 4.3% (n=2) had bilateral RB with no germline mutation detected (low level somatic mosaicism).

Conclusions: These results provide a new descriptive subclassification system for probands with UHR. Further study to describe the long term follow up of unilateral probands, and relatives of all probands, to describe the risk of development of further primary RB or second cancers is ongoing. This can inform the development of specific screening guidelines for those with UHR.

P-ONC-004

Epigenetic alteration and possibilities in uveal melanoma patient-derived xenografts (PDX) models study

A. Furdova¹, B. Smolkova²

¹Dept. of Ophthalmology, Comenius University, Faculty of Medicine, Bratislava, Slovakia, ²Department of Molecular Medicine, Slovak Academy of Sciences, Bratislava, Slovakia

Introduction: Uveal melanoma (UM) is the most frequent intraocular malignancy in adults, but no systemic therapy or standard treatment exists to reduce the risk of metastasis. With the increased knowledge regarding the molecular pathways that underlie the oncogenesis of UM, in the future novel therapeutic approaches should be available to conquer this disease. Epigenetic dysregulation consisting of aberrant DNA methylation, histone modifications, and small non-coding RNA expression, silencing tumor suppressor genes, or activating oncogenes, have been shown to play a significant role in UM initiation and progression.

Objectives: Large T3 N0 M0 UM lesions with intraocular tumor volume over 0.5cm³ with significant infiltration of macrophages and CD8+ T cells exhibit specific genetic profiles that increase the risk of liver metastasis. Additionally, recent discoveries of DNA methylation changes in Class 2 tumors undergoing metastasis suggest a potential role of epigenetic alterations in UM progression.

Methods: We applied the PDX model to immunodeficient NSG (NOD scid gamma mouse) mice to identify factors involved in UM metastasis. In our group of patients' PDX models, we implanted 25 viable UM tumors subcutaneously. Subgroup 1 was eleven Class 1 tumors with a good prognosis and subgroup 2 was 14 Class 2 tumors with a poor prognosis. From these subgroups, ten PDXs using Class 2 tumor tissues were created and 2 metastatic PDXs were derived from liver and peritoneal metastases which spontaneously developed in NSG mice.

Results: We compared both primary tumors and PDX tissues by using bulk transcriptomics and methylomics techniques. Among the enriched metabolic pathways identified in the liver metastasis-derived PDX tissue of sample of the patient uveal melanoma tissue compared to the PDX tissue from the primary tumor, four were related to epigenetic regulation, including the activation of rRNA expression by ERCC6 and EHMT2, methylation of histones and DNA by Polycomb Repressive Complex 2 (PRC2), regulation of rRNA expression by NAD-dependent Deacetylase Sirtuin-1, and the DNA methylation pathway.

Conclusions: Our results highlight the potential importance of epigenetic deregulation in UM progression and provide a foundation for future investigations. Future tests and analyses using the Chromium Single Cell ATAC platform to examine chromatin accessibility at the single-cell level in primary and metastatic PDX tissues can contribute to unraveling the precise role of epigenetic alterations in UM metastasis.

P-ONC-005

Organizational management in radiosurgery using 3D models

R. Furda¹, M. Gregus¹, A. Furdova², M. Sramka³

¹Faculty of Management, Comenius University Bratislava, Bratislava, Slovakia, ²Faculty of Medicine, Comenius University Bratislava, Bratislava, Slovakia, ³St. Elisabeth's Cancer Institute, St. Elisabeth's University of Health and Social Work, Bratislava, Slovakia

Introduction: Management in healthcare is supporting the innovations in the surgery processes in today's digital transformation era. These activities lead to changes in organization and processes using the appropriate advanced information technologies.

Objectives: The technologies may facilitate important decisions during the process of the surgery. The research focused on the 3D model recommends its application in intraocular tumor patients as a part of the decision-making in radiosurgery.

Methods: The "Design Science Research" research is one of the applied methodologies preferably used by management not only in healthcare. The requirements defined by management in healthcare used the selected qualitative research approach. The radiosurgery processes were analyzed to identify the building and functional blocks for the use case. The focus was concentrated on the stereotactic planning process at the moment before the irradiation of the eye globe.

Results: The use cases in ocular oncology helped to provide the mapping of identified building and functional blocks. The analysis of the particular process in satisfactory detail caused the shortening of the targeted sub-process. Therefore, the subjective decision-making of the radiology personnel was supported by the designer of the printed 3D model of the affected eye globe. The achieved saving during the calculation of the penetration depth for each beam of the radiation dose was about 5-20%.

Conclusions: The change in the organization processes including the designer of the printed 3D model of the eye globe facilitated the decision-making in the radiosurgery process. During the whole surgery process, the patient must have a stereotactic frame fixed, so any achievement in the shortening surgery time significantly influences the oncological patient. The cooperation between a printed 3D model designer and other surgery staff can bring higher accuracy of irradiation to the intraocular tumor structures and to the surrounding structures. The accuracy of irradiation to the intraocular tumor is dependent on the time used for the stereotactic planning because to shorten this sub-process is crucial for the patient.

P-ONC-006

MYCN suppresses TFRC-dependent ferroptosis in accelerates tumorigenesis via UBE2C

J. Yang¹, J. Fan¹, R. Jia¹, X. Fan¹

¹Department of Ophthalmology, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Retinoblastoma, the most common primary malignant intraocular tumor in children, leads to vision impairment, disability and even death. In addition to RB1 inactivation, MYCN activation has been documented as another common oncogenic alteration in retinoblastoma and represents one of the high-risk molecular subtypes of retinoblastoma. Ubiquitin conjugating enzyme E2 C (UBE2C) has been found as a "switch gene" which was strongly correlated with the malignancy of retinoblastoma. However, how MYCN and UBE2C contributes to the progression of retinoblastoma is still incompletely understood.

Objectives: Therefore, we intended to clarify the regulatory mechanism which MYCN and UBE2C regulated the malignancy of retinoblastoma.

Methods: CUT&Tag was used to find the potential target gene of MYCN. The function of the identified target gene UBE2C on cell growth was detected through CCK-8 assay, and mouse xenograft. Immunoprecipitation-Mass Spectrometer (IP-MS) and DIA further identified the target gene of UBE2C. Real-time PCR (RT-PCR) and clinical bioinformatics analysis was used to find the related target gene transferrin receptor (TFRC).

Results: Here, we reported that MYCN upregulates UBE2C in retinoblastoma. The proteomic analysis of UBE2C-interacting proteins revealed TFRC, a well-known tumor suppressor, as a novel ubiquitin target of UBE2C. Subsequently, immunoprecipitation and ubiquitination assay determined UBE2C to regulate the ubiquitination and subsequent degradation of TFRC in retinoblastoma cells. Altogether, overexpressed MYCN-UBE2C in cancer cells to promote tumor growth by inhibiting ferroptosis through TFRC degradation.

Conclusions: Taken together, our findings reveal a novel MYCN-UBE2C-TFRC-ferroptosis regulatory cascade in controlling retinoblastoma cell proliferation and tumor growth, pinpointing an unprecedented mechanism to promote retinoblastoma progression. This study provide useful insights into the theoretical underpinning for early therapy of retinoblastoma.

P-ONC-007

An old drug as a new alternative: salvage therapy for vitreoretinal lymphoma with intravitreal melphalan

A. Sarigül Sezenöz^{1,2}, B. Güneri Beşer¹, S. Juntipwong¹, H. Demirci¹

¹Ophthalmology and Visual Sciences, University of Michigan, Kellogg Eye Center, Michigan, United States, ²Ophthalmology, Baskent University, Ankara, Turkey

Introduction: The treatment options for vitreoretinal lymphoma(VRL) include systemic chemotherapy, external beam radiotherapy, and intravitreal injections of methotrexate and/or rituximab. Melphalan, a nitrogen mustard alkylating agent, is used systemically to treat multiple cancers and intravitreally to treat vitreous seeding of various intraocular malignancies.

Objectives: To investigate the safety and efficacy of intravitreal melphalan (IVM) injections for the treatment of patients with recurrent and refractory vitreoretinal lymphoma.

Methods: The study was conducted retrospectively by examining the medical records of patients diagnosed with VRL at a tertiary referral hospital between January 2011 and January 2024. The patients who received at least one intravitreal melphalan(IVM) injection treatment and had a follow-up of at least 3 months were included in the study. We evaluated the clinical features, previous treatments, central nervous system, and systemic involvement of the patients, along with the best corrected visual acuity outcome, ocular tumor control, MYD88 mutation status, and side effects related to IVM injection.

Results: Nine eyes of 6 patients withVRL treated with melphalan injections were included in the study. The mean age at diagnosis was 51.0 ± 7.42 years. The median follow-up duration from the first visit was 45.5 months(range, 13-134 months), and from the first IVM injection was 27 months(range, 8-81 months). Eight eyes were treated with a mean of 5 cycles of intravitreal rituximab and methotrexate injections before melphalan injections. One patient was started on IVM injections directly as he had developed an adverse reaction to rituximab in the fellow eye. The patients received a median number of 1.5 injections(range, 1-4 injections). Eight eyes showed complete response by vitreal and/or subretinal neoplastic cells disappearing within 6 weeks after IVM injections(range, 1-4 injections per eye). One eye did not respond to treatment after a total of four injections of IVM. There was no significant difference between initial and final visual acuities($p=0.18$). The most common side effects related to IVM administration were macular edema that resolved spontaneously and newly induced retinal pigment epithelium changes.

Conclusions: Conclusion: Intravitreal melphalan is a viable second-line treatment option for local control of VRL. However, resistance to treatment is possible in addition to some minor side effects. Further studies are needed to establish a definitive protocol for use of IVM.

P-ONC-008

Pigmented conjunctival squamous cell carcinoma with intraocular invasion: Case report

T.U. Garcia Soto¹, D.P. Garcia², S. Corredor³, J.F. Pérez Pérez⁴

¹Oculoplastics, Instituto Mexicano de Oculoplástica (IMO), Queretaro, Mexico, ²Instituto Mexicano de Oftalmología (IMO), Queretaro, Mexico, ³Instituto Mexicano de Oftalmología (IMO), Queretaro, Mexico, ⁴Instituto Mexicano de Oftalmología, Queretaro, Mexico

Introduction: Conjunctival squamous cell carcinoma it's the second most frequent malignant tumor of the conjunctiva, it has an incidence of 0.13-1.9 cases per 100,000 inhabitants. Most of these tumors have superficial extension and intraocular extension is rare, however, 2-8% have intraocular invasion. The pigmented morphological subtype represents less than 2% of all the squamous cell carcinoma types.

Objectives: There's no other case of pigmented squamous cell carcinoma with intraocular invasion.

Methods: Clinical case: An 88-year-old woman with irritation as well as mild pain of the right eye of 2-months duration. The right eye showed an exophytic papillary lesion on a brown smooth base involving the limbal temporal conjunctiva. The tumor was 3 cm in horizontal length, as well as 4.5 mm of corneal involvement. Visual acuity of 20/60 right eye, there was no other ocular abnormality. An incisional biopsy of the lesion was performed, in the histopathological report indicated **pigmented** squamous cell carcinoma.

The ultrabiomicroscopy of the anterior segment reported a solid lesion in the temporal sector between the meridians of 6.5 and 12 of 3.32 cm vertically. As well as it reveals invasion of the cornea, limbus, and sclera, and retinochoroidal elevation in the inferior and temporal quadrant due to the invasion of the tumor toward the choroid.

Considering all clinical and histopathological characteristics, as well as the intraocular invasion, enucleation of the right eye was decided.

Results: The histopathological report indicated a moderately differentiated and pigmented squamous cell carcinoma. Infiltrating the internal third of the sclera and the middle third of the cornea with perivascular invasion.

The morphological patterns are leukoplakic, papillomatous, and gelatinous. However, there is also the pigmented subtype, although it is extremely rare. Matumoto et al. as well as Shields et al, reported the pigmented subtype in less than 2%. Intraocular invasion of squamous cell carcinoma is rare, occurring only in 2-8% of lesions. Due to the intraocular invasion of the tumor enucleation of the right eye was indicated, the prognosis reported after enucleation is good, with rare recurrences and metastases, occurring in less than 1% of cases.

Conclusions: Pigmented squamous cell carcinoma is a very rare entity, we are not aware of any other reported cases in the literature of this clinical and histopathological variant with intraocular invasion.

P-ONC-009

Clinicopathological profile of large choroidal melanoma treated with enucleation

A. Gangwani¹, B. Chawla¹, S. Sen¹, N. Lomi¹, S. Kashyap¹

¹Dr. Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

Introduction: Uveal melanoma is the most common primary intraocular malignancy in adults. 90% of these tumors arise from the choroid, 5-8% arise from ciliary body, and 3-5% arise from the iris. In current scenario, though more emphasis has been on the methods of treatment of uveal melanoma that can salvage the globe, enucleation is still indicated for tumors not amenable to plaque brachytherapy, suspected extraocular extension and poor visual potential.

Objectives: To study the clinical & histopathological profile of large choroidal melanoma treated with enucleation at our centre

Methods: Study design: Retrospective case series

Methods: 50 cases of large choroidal melanoma were included. Retrospective review of cases of large choroidal melanoma that underwent enucleation at our centre between the year 2021-2023 were included. Inclusion criteria was all large choroidal melanoma tumors as per the Collaborative Ocular Melanoma Study Classification that underwent enucleation at our centre. Tumors with gross extraocular extension were excluded from our study. Demographic details-age / gender, histopathological subtype of tumor, presence of optic nerve Infiltration, anterior segment involvement and scleral/ extrascleral extent of tumor were studied.

Results: The mean age was 47.5 years, with 68% males & 32% females. Histopathologic examination showed spindle cell type to be the most common (48%), followed by epithelioid (26%) and mixed variety (26%). Scleral invasion was noted in 23 cases (46%), optic nerve invasion in 10 (20%) and ciliary body/iris invasion in 5 cases (10%). Spindle cell variety had a statistically significant association with optic nerve invasion ($p=0.03$) while there was no correlation of tumor subtype with scleral ($p=0.82$) and anterior segment involvement ($p=0.23$).

Conclusions: Younger age at presentation & male preponderance was observed. The tumors showed a high propensity to invade the sclera and optic nerve. The spindle cell was the commonest subtype and found to be associated with optic nerve invasion. Half of the cases showed tumor invasion into adjacent structures like sclera and optic nerve at the time of enucleation. Since this increases the likelihood of metastasis, a higher degree of clinical surveillance is recommended in the follow up period. Histopathological subtype may be a predictor of optic nerve invasion.

P-ONC-010

Long-term effects of endoresection for uveal melanoma in China

X. Zhu¹, H. Lv¹, J. Liang¹

¹Peking University People's Hospital, Beijing, China

Introduction: Uveal melanoma is the most common intraocular malignancy in adults with a poor prognosis because of a high incidence of metastases, of which the 5-year survival rate is about 60%.

Objectives: This study is aimed to evaluate the efficacy and safety of endoresection for uveal melanoma in Chinese.

Methods: Retrospective nonrandomized study of consecutive patients who underwent endoresection with or without brachytherapy for uveal melanoma at the Ophthalmology Department of Peking University People's Hospital between 2009 and 2021.

Results: The study included 59 patients with a mean age of 43.2 years, 34 of them were followed-up more than five years. For this subgroup, the mean follow-up was 8.2 years. The mean largest basal tumor diameter and tumor thickness were 11.4 mm and 8.4 mm, respectively. At the latest visit, 28 patients (82.4%) still retained the eye and the visual acuity of 61.8% eyes was better than 6/60. Six patients were treated by enucleation due to tumor recurrence, while three of them were treated by brachytherapy initially. Three patients were died at the last visit, while 2 patients had liver metastasis. Compared with other patients, in those cases which were enucleated, metastasized, or died, the age of onset was younger, the tumor thickness was higher, and the location was closer to the macula or optic disc. Retinal detachment was the main postoperative complication, which occurred in 6 cases. Other complications included cataract, transient ocular hypertension, macular edema, and proliferative vitreo-retinopathy. Transpupillary thermotherapy was administered in two patients for suspicious pigment.

Conclusions: The outcomes observed in this small cohort of endoresection patients suggest that endoresection achieved high rates of local tumor control, and no elevated rates of local recurrence, metastasis, enucleation, or death were observed.

P-ONC-011

Correlation of high-risk histopathology features in magnetic resonance imaging in retinoblastoma

H. Ahmedhussain^{1,2,3}, V. Pai⁴, B. Ertl-Wagner^{4,5}, M.-A. Brundler^{6,7}, B. Host^{2,1}, S. Kletke^{1,2}, B. Gallie^{2,1}, F. Shaikh⁸, H. Dimaras^{2,1,9}, A. Mallipatna^{2,1}

¹Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, Canada,

²Department of Ophthalmology and Vision Sciences, The Hospital for Sick Children, Toronto, Canada,

³Ophthalmology, King Abdulaziz University, Jeddah, Saudi Arabia, ⁴Division of Neuroradiology,

Department of Diagnostic and Interventional Imaging, The Hospital for Sick Children, Toronto,

Canada, ⁵Department of Medical Imaging, University of Toronto, Toronto, Canada, ⁶Department of

Pathology & Laboratory Medicine and Pediatrics, University of Calgary, Toronto, Canada, ⁷Department

of Pathology & Laboratory Medicine and Pediatrics, Alberta Children's Hospital, Calgary, Canada,

⁸Division of Haematology/Oncology, the Hospital for Sick Children, Toronto, Canada, ⁹Child Health

Evaluative Sciences Program and Centre for Global Child Health,, The Hospital for Sick Children,

SickKids Research Institute, Toronto, Canada

Introduction: Enucleation is the treatment of choice for advanced intraocular retinoblastoma, especially when the risks of attempted eye and vision salvage are greater than the benefits. MRI plays a crucial role in the pre-operative evaluation of this risk by providing a non-invasive evaluation of the tumor's relationship with crucial ocular structures. However, the signs of tumor invasion into the choroid, optic nerve or in the extraocular space are not always captured on imaging, leading to a false negative result.

Objectives: To address this, our study aims to study the morphological characteristics of high-risk histopathological features (HRPF), such as massive choroidal invasion and retro-laminar optic nerve invasion and compare it with pre-operative MRI images of the eye with retinoblastoma.

Methods: We retrospectively reviewed the medical records and staging MRI images of 144 patients undergoing primary enucleation for retinoblastoma at our institute from January 2009 to October 2023. We collected data regarding staging, treatment, and histopathological features. A neuroradiologist reviewed all radiological images that correlated with eyes that demonstrated features of high-risk pathology. All situations determined to be false negatives were further scrutinized by a second neuroradiologist.

Results: Twenty eyes of 20 patients were eligible for the study. The mean age at diagnosis was 28.4 + 2.3 months. AJCC pTNM were pT3a with massive choroidal invasion in 9 (45%), followed by pT3b with retrolaminar invasion of the optic nerve head in 8 (40%) and pT3d in 1 (5%) and pT4 in 2 (10%) patients. We found the sensitivity of MRI in detecting post-laminar optic nerve invasion to be 50%, massive choroidal invasion to be 82%, and scleral and extra-scleral extension to be 67% and 50%, respectively.

Conclusions: Our study underscores the importance of diagnostic imaging in evaluating retinoblastoma patients and detecting high-risk histopathological features. Identification of high-risk features of retinoblastoma on MRI imaging allows for better selection of eyes considered to be safe for eye salvage. False negative MRIs were mostly associated with concerns related to issues arising from image acquisition. Some eyes showed pathological features that were smaller than the spatial resolution achievable in the machine. This information allows us to improve the quality and protocol of MRI to achieve a higher sensitivity to detect HRPF.

P-ONC-012

Unveiling the unexpected: an adult-onset Retinoblastoma: a case report

P. Tangkitchot¹, D. Patikulsila¹

¹Ophthalmology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

Introduction: Retinoblastoma (RB) stands out as the predominant primary malignant intraocular tumor observed in childhood. However, it is crucial to note that RB occurring in adults aged 20 years and older is exceptionally rare, presenting unique challenges in both diagnosis and treatment.

Objectives: To report the case of adult-onset retinoblastoma.

Methods: A 55-year-old woman, without any pre-existing health conditions, was referred from a provincial hospital due to a gradual and painless loss of vision in her left eye over a period of 4 months. She did not experience any trauma before the onset of symptoms. Upon physical examination, her visual acuity (VA) was found to be 20/20 in the right eye and 20/800 in the left eye. The pupils in both eyes were equal and reactive to light, with no evidence of a relative afferent pupil defect. The intraocular pressure was normal in both eyes. Fundus examination revealed a sizable, well-defined whitish subretinal lesion in the left posterior pole, covering an area equivalent to 10 optic discs. The right eye appeared normal on fundus examination. Ultrasonography indicated a dome-shaped retinal mass with high initial spike and medium internal reflectivity. Fundus fluorescein angiography revealed increased fluorescence with a staining pattern and reduced fluorescence in areas blocked by the lesion. Magnetic resonance imaging showed an enhancing hyperintense mass measuring 8 mm in diameter and 2 mm in thickness in the right eye. Following a vitrectomy with vitreous cytology, which did not reveal any malignancy, a systemic workup including CT scans of the chest and upper abdomen, gynecological examination, and mammogram, was conducted to rule out other potential cancers, all of which yielded negative results. Subsequently, a second vitrectomy with retinal biopsy was performed, and the pathology results indicated a small round blue cell tumor, suggestive of retinoblastoma.

Results: The patient underwent enucleation, and the pathological report confirmed the diagnosis of retinoblastoma.

Conclusions: Retinoblastoma in adults is extremely rare; however, it should be considered as a potential diagnosis in adults presenting with an amelanotic whitish mass lesion. Early detection and prompt treatment are imperative to preserve both ocular function and overall life quality.

P-ONC-013

Profile and outcome of patients with retinoblastoma in a tertiary hospital in Ilocos Norte, Philippines: 2014 to 2021

K.K. Macalma¹, S.C. Sipin¹, J. Tubon-Galano²

¹Department of Ophthalmology, Mariano Marcos Memorial Hospital and Medical Center, City of Batac, Philippines, ²Department of Pediatrics, Mariano Marcos Memorial Hospital and Medical Center, City of Batac, Philippines

Introduction: Retinoblastoma is a rare malignancy of the immature retinal cells. It is the most common intraocular malignancy of infancy and childhood. About 90 to 96% of retinoblastoma cases are diagnosed before five years of age. Retinoblastoma is common among Filipinos with a reported incidence of 237/100,000 eye cases. There are no available data on the treatment outcomes of patients with retinoblastoma in the Philippines. Currently, Ilocos Norte has no published data on patients with retinoblastoma seen in the past decade to determine any changes in the patterns of the clinical profile and treatment outcomes.

Objectives: To provide a detailed assessment of the demographics, clinical profile, and treatment outcomes of patients with retinoblastoma, and to identify the areas for improvement in the management of retinoblastoma in a Tertiary Hospital in Ilocos Norte, Philippines.

Methods: An eight-year retrospective cross-sectional study of the patients with retinoblastoma in a Tertiary Hospital in the Ilocos Norte, Philippines from 2014 to 2021.

Results: The study assessed the demographics of 15 patients involving 19 globes, nine (60%) of whom are male. The majority of the patients are residents of Ilocos Norte, Philippines and 26.67% come from nearby provinces. The participants of the study were diagnosed at a mean age of 20±10 months with leukocoria as the most common presenting symptom. Noticeably, the gap between the patients starting to experience the symptoms and consultation is quite long. The majority (93.33%) of patients received treatments by enucleation and chemotherapy with 21 cycles of Vincristine, Etoposide, and Cisplatin. The survival probability after a year is estimated at 86% and 79% after two years due to the delays in medical interventions.

Conclusions: It can be concluded that patients often fail to recognize the urgency of seeking medical attention for their symptoms, resulting in delays in treating malignancy. Retinoblastoma is commonly diagnosed in children 1-2 years after birth, usually affecting only one eye. Most cases originate within the eye but can spread to other regions, including the brain. The primary objective of treatment is to preserve life by enucleation and chemotherapy with 21 cycles of Vincristine, Etoposide, and Cisplatin. It is noted that globe preservation is impossible due to the limitations of current treatment procedures for managing retinoblastoma. In the first and second years of complete treatment, the survival probability of patients is 92% and 85%, respectively.

P-ONC-014

Does vitreous haemorrhage and calcification lead to increased risk of enucleation in advanced retinoblastoma?

J. Fan¹, R. Jia¹, X. Fan¹

¹Ophthalmology, Shanghai Ninth People's Hospital, Shanghai JiaoTong University School of Medicine, Shanghai, China

Introduction: As one of the most malignant intraocular tumours that primarily occurs in children, the diagnostic rate of retinoblastoma (RB) has increased rapidly due to the vast development of detection methods. Professional ophthalmology devices can reveal the most common sign. Additionally, whether vitreous haemorrhage has occurred during treatment can also be clearly established through fundus screening devices such as RetCam. However, whether different degrees of VH have different effects on the RB eye preservation rate and whether VH and calcification may lead to increased risk for enucleation in advanced retinoblastoma are still unknown.

Objectives: To explore whether varying degrees of vitreous haemorrhage (VH) and calcification act as risk factors for enucleation in patients with advanced retinoblastoma (RB).

Methods: Advanced RB was defined by the international classification of RB (Philadelphia version). Basic information for retinoblastoma patients diagnosed as groups D and E in our hospital between January 2017 and June 2022 was reviewed by logistics regression models. Additionally, a correlation analysis was performed, excluding variables with a VIF (variance inflation factor) >10 from the multivariate analysis.

Results: A total of 223 eyes diagnosed with RB were included in assessing VH and calcification; of these, 101 (45.3%) eyes experienced VH, and 182 (76.2%) eyes were found to have calcification within the tumour through computed tomography (CT) or B-scan ultrasonography. Ninety-two eyes (41.3%) were enucleated, of which 67 (72.8%) had VH and 68 (73.9%) calcification, both of which were significantly relevant to enucleation ($p < 0.001^*$). Other clinical risk factors, such as corneal edema, anterior chamber haemorrhage, high intraocular pressure during treatment and iris neovascularization, correlated significantly with enucleation ($p < 0.001^*$). Multivariate analysis included IIRC (intraocular international retinoblastoma classification), VH, calcification and high intraocular pressure during treatment as independent risk factors for enucleation.

Conclusions: Despite identifying different potential risk factors for RB, there remains significant controversy concerning which patients require enucleation, and the degree of VH varies. Such eyes need to be evaluated carefully, and management with appropriate adjuvant therapy may improve the outcome of these patients.

P-ONC-015

Outcomes of resident-performed enucleations for retinoblastoma in a Philippine training hospital

A. Labiano¹, R.E. Domingo^{1,2}

¹Philippine Eye Research Institute, National Institutes of Health, University of the Philippines Manila, Manila, Philippines, ²Department of Ophthalmology and Visual Sciences, University of the Philippines Manila - Philippine General Hospital, Manila, Philippines

Introduction: Enucleation continues to be an important treatment modality in eyes with advanced retinoblastoma and in eyes where local treatments have failed.

Objectives: This study aimed to evaluate the performance of ophthalmology residents in enucleating eyes with retinoblastoma.

Methods: In this retrospective cohort study, the medical records and ocular pathology consultation reports of patients with retinoblastoma who underwent enucleation in a Philippine training hospital within the period from January 2014 to December 2018 were reviewed. The outcomes studied were the occurrence of intraoperative globe perforation, optic nerve stump length, and tumor status of the optic nerve surgical margin. The outcomes in enucleations performed by residents were compared with the outcomes when attendings were the primary surgeons. Augmented inverse probability weighting was utilized in the estimation of the potential outcome means and average treatment effects.

Results: Of the 97 eyes from 97 patients that were included in the study, 54 eyes (56%) were enucleated by residents and 43 eyes (44%) were enucleated by attendings. None of the enucleated globes were perforated intraoperatively. Having residents perform the enucleation was associated with a reduction in the optic nerve stump length by an average of 3.43 mm from the average length of 10.70 mm when the attendings were the primary surgeons ($p = 0.001$). The estimated proportion of tumor-positive optic nerve margins in attending-performed enucleations was 20.55%. When the primary surgeons were residents, this proportion dropped by 4.82 percentage points, but this value was not significantly different from zero ($p = 0.508$).

Conclusions: The performance of enucleations by residents was not associated with a higher rate of tumor-positive optic nerve surgical margins despite being associated with shorter optic nerve lengths. Trainee-performed enucleation of eyes with retinoblastoma appears to be safe in carefully selected patients. Evaluating the effect of trainee involvement on long-term clinical outcomes such as patient survival and disease recurrence is suggested for future research.

P-ONC-016

Neoadjuvant chemotherapy in extensive ocular surface squamous cell carcinoma: a promising option for eye preservation

M. Mahyuddin¹, N. Anggraini¹

¹Ophthalmology, Cipto Mangunkusumo Hospital, Jakarta, Indonesia

Introduction: In extensive squamous cell carcinoma (SCC) of the conjunctiva, orbital exenteration is generally chosen for the principal management. However, neoadjuvant chemotherapy may be used as an alternative.

Objectives: To report the use of neoadjuvant chemotherapy in extensive SCC of the conjunctiva.

Methods: A 52 year-old male presented with an enlarging painless mass in the right eye since 7 months with blurry vision and occasional bleeding with history of redness that was noticed one year earlier. Visual acuity of the right eye was light perception with extensive papillomatous mass covering almost all of the cornea, extending to the limbus, bulbar conjunctiva, and reaching the superior and inferior fornix measuring in 25 mm in base diameter and 7 mm in thickness with obvious feeder vessels visible. The left eye was unremarkable. There was no lymph node enlargement identified. Computed Tomography of the orbit showed the mass extending slightly into the inferior orbit but the remaining was within normal limit. Incisional biopsy showed nonkeratinizing Squamous Cell Carcinoma (SCC) with moderate to poor differentiation and 3 cycles of neoadjuvant chemotherapy was given with cisplatin and Fluorouracil. The mass was significantly reduced and no-touch technic wide excision, alcohol keratectomy, cryotherapy, and amnion membrane graft defect closure were done 2 weeks after the last chemotherapy.

Results: One year after treatment, visual acuity improved to half meter finger counting. No mass was observed in the ocular surface, with pannus on the cornea and inferior symblepharon. Neither lymph nodes nor distant metastasis was found.

Conclusions: Neoadjuvant chemotherapy may serve as an alternative option to avoid radical surgery such as exenteration in a minimal orbital extension of large ocular surface SCC.

P-ONC-017

The different outcomes of two cases of secondary intraocular lymphoma

K. Dong¹, Y. Yan¹

¹Department of Ophthalmology, The First Affiliated Hospital of USTC, Division of Life Sciences and Medicine, University of Science and Technology of China, Hefei, China

Introduction: Intraocular lymphoma is a rare malignant tumor within the eye, accounting for less than 1% of all intraocular tumors. It is clinically characterized by insidious onset and non-specific ocular manifestations, leading to misdiagnosis. Based on the origin, intraocular lymphoma can be classified as primary intraocular lymphoma (PIOL) and secondary intraocular lymphoma (SIOL). SIOL, which transformed from systemic lymphoma, is relatively rare, with the majority pathological subtype being DLBCL, NK cell or cytotoxic T cell lymphoma is relatively infrequent. SIOL is characterized by rapid progression and poor prognosis, requiring timely diagnosis and active intervention. In this study, we have presented different outcomes in two cases of intraocular lymphoma secondary to systemic lymphoma.

Objectives: Secondary intraocular lymphoma (SIOL) is exceptionally rare and characterized by rapid progression and poor prognosis. We have presented different outcomes in two cases of intraocular lymphoma secondary to systemic lymphoma.

Methods: We retrospectively reviewed the clinical features, diagnosis and treatment, and outcome of two cases of SIOL.

Results: In case 1, a 37-year-old female presented with one week of decreasing vision in the left eye. Her intraocular lymphoma was secondary to diffuse large B-cell lymphoma (DLBCL) in the perianal mass. She was treated promptly before loss of visual function. In case 2, a 58-year-old male with a five-month history of bilateral blurred vision and pain in the right eye for two months. This patient had intraocular lymphoma of the right eye secondary to extranodal natural killer/T-cell lymphoma (ENKTL) of the nasopharynx, he lost visual function of his right eye due to delayed ocular treatment.

Conclusions: We recommend that patients with SIOL undergo regular ophthalmic examinations. When the intraocular symptoms are intractable, diagnostic vitrectomy should be performed. After intraocular lymphoma is confirmed, timely eye intervention is required, which is extremely important for the ocular prognosis.

P-ONC-018

Does uveal melanoma tumor size matter in long-term patient outcomes? - A simplified approach

R. Bansal¹, H. Sener¹, C. Shields¹

¹Ocular Oncology, Wills Eye Hospital, Philadelphia, United States

Introduction: Uveal melanoma (UM) is a rare but highly aggressive intraocular malignancy. Some patients achieve long periods of metastasis-free survival, while others face short periods with rapid onset of metastasis and mortality. In this study, we focused on uveal melanoma size to evaluate non-conditional and conditional survival analysis. This methodology adds a new dimension to patient prognosis and considers an individual's history of metastasis-free survival, providing a novel insight into ultimate survival.

Objectives: To estimate metastasis-free-survival of patients with uveal melanoma on the basis of tumor thickness classified as small (0.0-3.0mm), medium (3.1-8.0mm) and large (≥ 8.1 mm).

Methods: Retrospective study of 8034 cases over 35 years at a single ocular oncology referral centre evaluated for the primary endpoint of cumulative incidence of metastasis using non-conditional and conditional outcomes at 3-years, 5-years, and 10-years. Cox proportional risk regression analysis was performed.

Results: The mean thickness for small, medium and large tumors was 2.5mm, 5.0mm and 10.2mm respectively. A comparison (small vs. medium vs. large melanoma) revealed small tumors likely to be detected in females and younger cases ($p < 0.001$). Large tumors were more likely to have Bruch's membrane rupture and extraocular extension ($p < 0.001$). The 25-year non-conditional metastasis was (5% vs. 12% vs. 21%), and for those who survived five years without metastasis, the 25-year incidence of metastasis was (6% vs. 12% vs. 20%). For patients who maintained 3-year/5-year/10-year metastasis-free-survival, hazard ratio of large vs medium were (2.22 $p < 0.0001$)/ 2.22 ($p < 0.0001$)/ 2.52($p < 0.0001$), and hazard ratio medium vs small were (2.19 $p < 0.0001$)/ 2.24, $p < 0.0001$ / 2.24, $p < 0.0001$), respectively.

Conclusions: A comparison of uveal melanoma metastasis, classified on the basis of small, medium and large thickness, revealed small melanomas were more likely to be detected in younger individuals and females. Larger melanomas were more likely to have poorer prognosis and have a higher tendency to develop metastasis over time.

P-ONC-019

A confusing case of uveitis

Z. Jia¹, F. Luan¹, L. Chen¹, Y. Tao¹

¹Ophthalmology, Beijing Chao-Yang Hospital, Capital Medical University, Beijing, China

Introduction: A case of primary intraocular lymphoma (PIOL) with intracranial lymphoma misdiagnosed as acute retinal necrosis syndrome (ARN).

Objectives: To provide some clinical experience and guidance for the diagnosis and treatment of PIOL.

Methods: The patient was a middle-aged woman with the chief complaint of "dark shadow floating in front of the left eye for 10 days". Physical examination showed visual acuity HM in the right eye and 0.3 in the left eye. In the left eye, there was vitreous opacity, gray-white granular material, gray-white necrosis of the peripheral retina at 11-1 point above the fundus, vascular occlusion into white lines, peripheral punctate hemorrhage, and old laser spot under the temporal region. The vitreous silicone oil was in place in the right eye, and the blood vessels in the temporal side of the fundus were atresia into white lines, with patchy bleeding. Previous history: Five months ago, she had obvious vision loss in the right eye, and was diagnosed as suspected ARN in another hospital, but no improvement was observed after corresponding treatment. Two months ago, due to progressive blurred vision in the left eye for 2 weeks, uveitis in the left eye was diagnosed in our hospital (ARN was excluded), topical glucocorticoids were given, and antiviral drugs were discontinued. The history of diabetes and hypertension for 6 years was well controlled by medication. Five years after mastectomy. Wide-angle fundus photography, cranial MRI, intraocular fluid virus and inflammatory factors in both eyes, mNGS in left eye were detected.

Results: The results of intraocular fluid and serum tests showed: right aqueous humor VZV IgG 45.46 U/ml, serum VZV IgG 998.27 U/ml, VZV-Goldmann-Witmer coefficient 2.51; Left eye aqueous humor IL-6 138 pg/mL, IL-10 1540.6 pg/mL, IL-10/IL-6 11.2. Head MRI showed that the right frontotemporal lobe, basal ganglia and pedunculus had patchy and slightly longer T1 and T2 abnormal signals. Combined with the above, diffuse large B lymphoma is suspected. The patient soon developed psychiatric symptoms, subclavian lymph node enlargement, and limited movement of the left limb; The pathological results showed diffuse large B-cell lymphoma, so RMIADD was adopted for treatment.

Conclusions: PIOL combined with intracranial lymphoma is rare, and its ocular manifestations are atypical, which can be disguised as uveitis. Therefore, reasonable use of intraocular fluid detection and other means is conducive to the timely diagnosis of the disease and improve the prognosis of patients.

P-ONC-020

The start of conservative management of retinoblastoma in the Democratic Republic of Congo: Experience of 2 centers

J. Yanga Mungenga¹, S. Iye², K. Assani³, N. Domo³, A. Budiongo³, F. Beya Kabongo⁴, P. Mukuna⁵, B. Nkoyi⁵, B. Kabwe⁵, R. Lukamba⁶, G. Chenge², M. Mvitu¹, D. Malaise⁷, L. Desjardins⁷

¹Ophthalmology, University of Kinshasa/ Kinshasa University Clinics, Kinshasa, Congo, Democratic Republic of the, ²Ophthalmology, University of Lubumbashi, Lubumbashi, Congo, Democratic Republic of the, ³Pediatrics, University of Kinshasa, Kinshasa, Congo, Democratic Republic of the, ⁴Pathologist, University of Kinshasa, Kinshasa, Congo, Democratic Republic of the, ⁵Anesthetists, University of Kinshasa, Kinshasa, Congo, Democratic Republic of the, ⁶Pediatrics, University of Lubumbashi, Lubumbashi, Congo, Democratic Republic of the, ⁷Ophthalmology, Curie Institute, Paris, France

Introduction: Retinoblastoma is the most frequent malignant intraocular tumor in babies and young children. 40% are bilateral cases with a mean age at diagnosis of one year. Multidisciplinary management and early diagnosis allow favorable outcome of conservative management and improvement in survival. Before December 2022, conservative management was not available in Democratic Republic of Congo.

Objectives: To share our young experience in the conservative management of early diagnosis cases of Retinoblastoma and the challenges encountered

Methods: Two Congolese children with bilateral Retinoblastoma started conservative management of one eye: The First one in Lubumbashi in December 2022 and the second in Kinshasa in March 2023. Both children have been diagnosed by examination under anesthesia and ultrasonography and or MRI.

Results: Age at diagnosis was one year and 5 months. Initial symptom was leucocoria in both cases. The First case was a metachronic retinoblastoma with group C initially of the left eye treated by enucleation and group D in the right eye 5 years later. The second case was group E on the left and B on the right eye. Enucleation of the group E eye was performed. In both cases of conservative management, chemoreduction was started and after two cycles, transpupillary thermotherapy and/or cryotherapy were added. Intravitreal injection of Melphalan was necessary for the first kid cause of new tumors and vitreous swarming. One year after the start of treatment, the visual acuity is 4/6 for the first child and 6/6 for the second one.

Conclusions: Conservative management of Retinoblastoma is now possible in DRC and its implementation brings many challenges that need to be faced. There is a need to improve early diagnosis for patients to be eligible for this option.

P-ONC-021

An atypical case of retinoblastoma which revealed a neuroblastoma

G. Jibia¹, T.G. Afetane Evina¹, H. Nkumbe²

¹Paediatric Ophthalmology, Magrabi ICO Cameroon Eye Institute, Yaounde, Cameroon, ²Retina S, Magrabi ICO Cameroon Eye Institute, Yaounde, Cameroon

Introduction: Neuroblastoma, an embryonic malignancy of early childhood of the sympathetic nervous system is often revealed by an orbital metastasis responsible for a very specific unilateral or bilateral exophthalmos called Hutchinson syndrome.

Objectives: To evaluate the visual outcomes and complications in low to high levels of myopia and astigmatism treated with laser-assisted subepithelial keratectomy (LASEK), photorefractive keratectomy (PRK) or laser in situ keratomileus (LASIK) in MICEI.

Methods: We present an atypical presentation of the tumor where a child treated for a suspicion of a retinoblastoma was found to have a neuroblastoma on biopsy.

Results: 3year-old female child with a history of leukocoria and progressive decrease of the vision in the right eye for six months, was referred for the management of a suspected retinoblastoma of the right eye. Clinical examination revealed an enophthalmos, a leukocoria and a white mass in the vitreous with a papilledema. Calcifications were found on the B scan but not confirmed by MRI. Nonetheless, we proceed to an enucleation and the pathology results were in favor of a differentiated neuroblastoma. Child was referred for management in an oncology unit.

Conclusions: An enophthalmos can be the presenting sign of a neuroblastoma in children and all leukocorias are not retinoblastomas! Attention shall be paid in front of such cases for proper management.

P-ONC-022

Digital retinoblastoma documentation to support care and research

B. Gallie^{1,2,2}, K. Flegg², K. Chau¹, T. Truong³, J. Liu³, Y. Gavrylyuk³, I. Janusonis⁴, K. Paton⁵

¹Department of Ophthalmology and Vision Science, Hospital for Sick Children, Toronto, Canada,

²International Retinoblastoma Consortium, Toronto, Canada, ³Health Research Informatics, Princess Margaret Cancer Center, Toronto, Canada, ⁴Temerty Faculty of Medicine, University of Toronto, Toronto, Canada, ⁵University of British Columbia

Introduction: The invention of the indirect ophthalmoscope (1948) revealed full intra-ocular retinoblastoma, which is today still documented on paper with colored pencils. At SickKids, eCancerCare^{RB} (eCC^{RB}) digital drawings and timelines have facilitated patient care, education, and research. To extend this valuable resource beyond one hospital and to patients and families, we developed DEPICT HEALTH (DEPICT) on the Cloud.

Objectives: For rare retinoblastoma, we aim to provide digital care opportunities to clinicians and families everywhere.

Methods: Each child's eCC^{RB} timeline shows treatment dates, linked to digital retinal drawings. From the eCC^{RB} data, we developed a novel SWIMMER^{rb} plot showing all treatment events, with color-coded symbols. Week "0" can be set depending on different required analyses, ie a clinical trial would have the Week 0 date of the initiation of the study intervention. To quantify the impact of retinoblastoma on the child/family, we arbitrarily assigned a "consequence" score to each standard treatment (ie, focal=1, IAC=3, enucleation last eye=30). These values can be the subject of studies by those with "lived experience", ie patients, relatives, etc. to more accurately describe the broad consequences of each therapy.

Sites managing retinoblastoma will be eligible to use DEPICT for patients who consent to clinical communication across their Circle of Care using DEPICT.

Results: eCC^{RB} included 700 retinoblastoma patients treated from 2001-2003 at SickKids. SWIMMER^{rb} comparison of single vs. triple drug IAC showed triple to be more effective ($p < 0.03$) but also more toxic ($p < 0.04$). Rather than serving solely as a graphical storytelling tool, SWIMMER^{RB} serves as a valuable analytical instrument for data interpretation and inter-individual comparisons. We prioritize recording the timing and type of treatments rather than focusing on a treatment response defined by any imaging tool, which is problematic in complex intraocular retinoblastoma.

DEPICT can facilitate collaborative care close to home.

Retrospective eCC^{RB} control patients who had comparable prior treatments which facilitated statistical study of efficacy. With patient consent, DEPICT data will be available to REB-approved research through Global Reach, the retinoblastoma consortium of the Pediatric Cancer Data Commons.

Conclusions: eCC^{RB} (only in SickKids) is being replaced with DEPICT, offering digital care and a full view for families. DEPICT is offered to any Site caring for children with retinoblastoma.

P-ONC-023

Occult anterior uveal melanomas presenting as extrascleral extension

A. Maheshwari¹, P.T. Finger¹

¹Ocular Tumor, Orbital Disease and Ophthalmic Radiation Therapy, The New York Eye Cancer Center, New York, United States

Introduction: Extrascleral uveal melanoma extension was earlier known to be present as a result of the extension of the intraocular tumor. This study reveals that extrascleral tumors can occur with an occult/ invisible intraocular component which can be detected on scleral biopsy and treated by palladium-103 plaque irradiation. This knowledge will help physicians with early intervention, thereby, saving the sight, eye, and life of patients with undetected occult melanomas.

Objectives: To describe the management of patients with occult anterior uveal melanomas presenting with extrascleral extension.

Methods: Five patients presented with a small, pigmented, nodular episcleral mass. Documented by slit-lamp photography and measured with high-frequency ultrasound imaging (UBM), each lesion was confirmed to be uveal melanoma by lamellar scleral biopsy. Due to the presence of extrascleral extension, all 5 were staged as American Joint Committee on Cancer cT1 category tumors. Scleral patch graft repairs were immediately performed, followed by palladium-103 ophthalmic plaque brachytherapy. The mean plaque diameter was 12 mm (median, 12; range, 10-14). A mean apex prescription dose of 87 Gy (median, 84.5; range, 82.3-99.2) was delivered to a minimum tumor depth of 2 mm (from inner sclera) over 7 continuous days. The main outcome measures were best-corrected visual acuity, changes in tumor and scleral characteristics, and complications.

Results: During each lamellar scleral biopsy, the residual tumor was visualized within an emissary passageway at the deep plane of scleral resection. At a mean 80 months (median, 57; range, 24-159) follow-up, no patients experienced infection, scleromalacia, or graft rejection. In this series, a biopsy was required to establish the diagnosis, transillumination had failed, and thus ultrasound measurements and estimates were used to determine the required plaque size. Due to a combination of anterior tumor position and small tumor size, the radiation dose to the macula and optic nerve was too low to cause maculopathy or optic neuropathy. There were no cases of local tumor recurrence, secondary enucleation, or metastatic disease. Visual acuities improved in 3 patients (after cataract surgery) and 2 were stable.

Conclusions: Extrascleral uveal melanoma extension can occur with undetectable, occult intraocular tumors. In these cases, plaque radiation was associated with 100% local tumor control, vision preservation, and no metastasis.

P-ONC-024

Feasibility of oral doxycycline as first-line therapy for conjunctival mucosa-associated lymphoid tissue lymphoma

H.J. Choi^{1,2}

¹Ophthalmology, Seoul National University College of Medicine, Seoul, Korea, Republic of,

²Ophthalmology, Seoul National University Hospital Healthcare System Gangnam Center, Seoul, Korea, Republic of

Introduction: For the treatment of isolated conjunctival lymphoma, external beam radiation therapy (EBRT) is generally considered the gold standard treatment. However, chronic complications including cataract and dry eye and even serious vision-threatening complications such as retinopathy or corneal perforation are of concern. Considering that mucosa-associated lymphoid tissue (MALT) lymphoma is a low-grade and indolent histological subtype with an excellent prognosis and that systemic involvement is extremely rare when it is confined to the conjunctiva, the choice of an alternative option for EBRT as a first-line treatment might be reasonable to avoid serious complications.

Objectives: To investigate the long-term outcomes of oral doxycycline as first-line treatment in patients with conjunctival extranodal marginal zone B-cell lymphoma of MALT (MALT lymphoma).

Methods: The medical records of 67 patients with conjunctival MALT lymphoma who received doxycycline as their primary treatment and were followed up for at least 5 years were retrospectively reviewed. Progression-free survival (PFS) was analyzed at 3, 5, and 10 years after the initial doxycycline treatment. A Cox proportional hazards model was used to assess the independent risk factors for progression.

Results: After the initial treatment, 25 patients (37.3%) achieved a complete response, 8 patients (11.9%) achieved a partial response, 30 patients (44.8%) showed stable disease, and 4 patients (6.0%) showed disease progression. The median PFS in all patients was 168 months, and the 3-, 5- and 10-year PFS rates for all patients were 70%, 65%, and 62%, respectively. No further progression was observed 6 years after the initial doxycycline treatment. Younger age and TNM stage T1c were significant risk factors for the time to progression in the multivariate Cox regression analysis ($p < 0.05$). Additional doxycycline (> 2 cycles) showed no benefit. There were no serious adverse events associated with doxycycline therapy, and most patients were successfully salvaged by second-line treatments, including EBRT and chemotherapy.

Conclusions: Oral doxycycline treatment yielded acceptable long-term PFS with minimal complications. Especially in patients with stage T1a or T1b conjunctival MALT lymphoma, first-line doxycycline treatment could be considered under close monitoring for at least 6 years.

P-ONC-025

Single-cell sequencing depicts tumor architecture and empowers clinical decision in metastatic conjunctival melanoma

H. Shi¹, H. Tian¹, S. Xu¹, P. Chai¹, R. Jia¹, X. Fan¹

¹Shanghai Jiao Tong University, Shanghai, China

Introduction: Conjunctival melanoma (CoM) is a devastating malignancy with unignorable potential to develop distant metastasis. Despite various therapeutic strategies for distant metastatic CoM, the clinical outcomes remain unfavorable.

Objectives: Single-cell RNA sequencing (scRNA-seq) was applied to reveal the key events during tumorigenesis and distal metastasis of CoM. Detailly, transcriptional trajectory analysis was applied to demonstrate the pseudotime state of the tumorigenesis and metastasis of CoM, and cancer-associated fibroblasts (CAFs) and immune system in the tumor microenvironment (TME) were summarized, which facilitates a clinical trial based on these molecular changes during CoM progression.

Methods: Nonmalignant conjunctiva (n=3) and conjunctival melanoma (n=7) samples, divided to stable tumor group (ST) and distant metastatic tumor (DMT) groups according to the prognosis were collected and subjected to single-cell RNA sequencing (scRNA-seq). A clinical trial (ChiCTR2100045061) of VEGFR blockade combined with anti-PD1 therapy for distant metastatic CoM was established based on scRNA-seq findings.

Results: First, transcriptional trajectory analysis illustrated the pseudotime state of the tumorigenesis and metastasis of CoM and identified *VIM*, *JUN*, *MLANA* and *EGR1* as key factors. Subsequently, CAFs in the TME play dominant roles in enhancing angiogenesis and thereby contribute to the distant metastasis of CoM. In addition, a relatively quiescent immunological environment was observed in distant metastatic CoM. Given these key changes during CoM progression, we launched a preclinical test and a clinical trial (ChiCTR2100045061) of VEGFR blockade combined with anti-PD1 therapy for distant metastatic CoM, which exhibited effective tumor-inhibitory efficacy.

Conclusions: Our study uncovered the landscape and heterogeneity of the TME during CoM tumorigenesis and progression, empowering clinical decisions in the management of metastatic CoM. To our knowledge, this is the first study to translate scRNA-seq analysis to a clinical trial dealing with cancer, providing a novel concept by accommodating scRNA-seq data in cancer therapy.

P-ONC-026

Comparative analysis of tumor control by indigenous vs imported Ruthenium-106 plaque brachytherapy

R. Bansal^{1,2}, S. Honavar¹

¹Ocular Oncology and Oculoplasty, Centre for Sight, Hyderabad, India, ²Ocular Oncology, Wills Eye Hospital, Philadelphia, United States

Introduction: The evolution of plaque brachytherapy in terms of radioactive material used, plaque designs, surgical techniques has improved the outcomes of intra-ocular tumors thus ensuring globe salvage, reducing morbidity and mortality; and avoiding cosmetic disfigurement.

Objectives: To assess the local tumor control and outcomes of surface lesions and intraocular tumors with indigenous plaque (IGP) by comparing it with the imported plaque (IPP).

Methods: Retrospective interventional comparative case series between IGP and IPP.

Results: Total 268 cases were included (57 surface lesions and 211 intra-ocular tumors). Treatment was performed by IPP in 194 and IGP in 74. Surface lesions were treated with a dose of 5482 ± 914 cGy and had excellent vision salvage (56% IPP, 62%IGP) and eye salvage (100% IPP, 100%IGP). Intra-ocular tumors were treated with a dose of 6744 ± 3436 cGy and had excellent vision salvage (56% IPP, 62%IGP) and eye salvage (81% IPP, 100%IGP). Life salvage was achieved in all. IGP was seen to be equivalent to IPP ($P=0.0041$) with a cost reduction by 300%.

Conclusions: The indigenous Ruthenium-106 plaque is non-inferior to the imported plaque and has led to a significant cost-reduction leading to increase in its availability to the society.

P-ONC-027

The use of rAAV2-RB1-mediated gene therapy in retinoblastoma

H. Shi¹, X. He¹, J. Fan¹, X. Wen¹, R. Jia¹, X. Fan¹

¹Shanghai Jiao Tong University, Shanghai, China

Introduction: Retinoblastoma (RB), a tumor of the developing retina, is the most common pediatric eye cancer and an important cause of childhood death, and an estimated 8000 cases of RB are diagnosed each year worldwide. Despite considerable improvements in systemic drug delivery approaches and new administration routes, such as intravitreal and intraophthalmic artery administration, severe visual impairment and eye loss are still frequent because of the toxicity associated with chemotherapeutic agents and the development of chemoresistance.

Objectives: Retinoblastoma (RB) is a life-threatening malignancy that arises from the retina and is activated upon homozygous inactivation of the tumor suppressor RB1. Gene therapy targeting RB1 is an effective strategy to treat RB. However, it is difficult to target the RB1 gene by site-specific repair, with up to 3366 gene mutation sites identified in RB1. Thus, it is necessary to construct a promising and efficacious gene therapeutic strategy for patients with RB.

Methods: To recover the function of the RB1 protein, we constructed a recombinant adeno-associated virus 2 (rAAV2) expressing RB1 that can restore RB1 function and significantly inhibit RB progression. To confirm the clinical feasibility of rAAV2-RB1, the RB1 protein was validated in vitro and in vivo after transfection. To further evaluate the clinical efficacy, RB patient-derived xenograft models were established and applied. The biosafety of rAAV2-RB1 was also validated in immunocompetent mice.

Results: rAAV2-RB1 was a rAAV2 expressing the RB1 protein, which was validated in vitro and in vivo. In vitro, rAAV2-RB1 was effectively expressed in patient-derived RB cells. In mice, intravitreal administration of rAAV2-RB1 in a population-based patient-derived xenograft trial induced limited tumor growth. Moreover, after transfection of rAAV2-RB1 in immunocompetent mice, rAAV2-RB1 did not replicate and was expressed in other important organs, except retinas, inducing minor local side effects.

Conclusions: Our study suggested a promising efficacy gene therapeutic strategy, which might provide a chemotherapy-independent treatment option for RB.

P-ONC-028

Endoillumination-assisted localization and partial transscleral sclerouvectomy for ciliary body leiomyoma: technique

D. Sun¹, B. Jiang¹, Z. Zhang¹, Y. Ji¹, J. Zhu¹, H. Lu¹

¹Ophthalmology, The second affiliated hospital of Harbin Medical University, Harbin, China

Introduction: Intraocular leiomyoma, a rare benign tumor of the uveal tract, most frequently arises in the ciliary body, with a higher prevalence in females. These tumors, while benign, can lead to significant ocular complications and vision loss due to their potential for progressive growth. Traditional surgical approaches for their removal include exoresection, or partial transscleral sclerouvectomy (PTSU), and endoresection. However, these methods may either fail to precisely localize the tumor, risking incomplete removal, or disrupt the eye's normal structure, leading to a range of complications.

This study introduces a new surgical technique combining 25-gauge self-retaining endoillumination-assisted localization with partial transscleral sclerectomy for ciliary body leiomyoma, aiming to improve tumor localization accuracy, preserve the eye's structural integrity, and minimize complications. Conducted at the Second Affiliated Hospital of Harbin Medical University, our analysis of three treated patients supports the efficacy and safety of this novel approach.

Objectives: This study aims to introduce a novel surgical approach for the treatment of ciliary body leiomyoma, employing intraoperative endoillumination for precise tumor localization in conjunction with partial transscleral sclerouvectomy.

Methods: The technique was applied to three consecutive patients diagnosed with ciliary body leiomyoma, who expressed a strong preference for preserving their eyeballs. Comprehensive data collection included photographic documentation, clinical observations, pathological confirmation, detailed treatment records, and a thorough review of surgical video recordings.

Results: The innovative combination of intraoperative endoillumination and partial transscleral sclerouvectomy facilitated complete removal of the ciliary body leiomyoma in all cases. Post-surgical outcomes were promising, with all patients experiencing favorable anatomical and visual improvements. Throughout the follow-up period, there was no evidence of tumor recurrence, and no significant complications were observed.

Conclusions: The novel surgical method of integrating two exciting techniques for the excision of ciliary body leiomyoma presents several potential benefits. These include enhanced precision in tumor localization, the conservation of eye structural integrity, and a reduced risk of both intraoperative and postoperative complications. This technique signifies a promising advancement in the surgical management of ciliary body leiomyoma.

V-ONC-002

The art of decoding the deceptive spectrum of eyelid lesions

R. Bansal^{1,2}, S. Honavar¹, M.C. Christy¹

¹Ocular Oncology and Oculoplasty, Centre for Sight, Hyderabad, India, ²Ocular Oncology, Wills Eye Hospital, Philadelphia, United States

Introduction: The tumors of the eyelid constitute approximately 5-10% of skin cancers and 15% of all face tumors. The lesions affect the normal architecture & visual acuity along with associated psychological impact. The lesions range from benign to worrisome malignant lesions, thus posing a diagnostic dilemma.

Objectives: It is mandatory to decipher when to worry and when not to worry for a straightforward surgical approach, elimination of psychological impact, good prognosis, and excellent aesthetic outcomes. To clear the muddy waters, it is important to perfect the art of decoding these mysterious lesions.

Methods: A video depicting the spectrum of eyelid lesions, presentations and treatment modalities.

Results: This video emphasizes on the spectrum of benign and malignant eyelid lesions, atypical presentations, location of lesions, need for accurate diagnosis, imaging, understanding of need for accurate histopathological confirmation, the ideal reconstruction techniques and the latest management protocols for the different lesions to ensure excellent aesthetic outcomes & favorable prognosis.

Conclusions: A clear understanding of different lesions aids in managing with excellent outcomes, accurately and aesthetically.

Video

[Click here to play video](#)

Ocular Trauma

FT-TRA-001

Correlation between the MCP-1 and HMGB1 in vitreous and aqueous humor of traumatic macular epiretinal membrane

Y. Lu^{1,2,3}, L. Shuangnong², Z. Dongchang², S. Wencui¹, G. Yan³, H. Shiwu³, L. Rui², W. Peng², H. He³

¹Changzhi Aier Eye Hospital, Changzhi City, China, ²Shanxi Aier Eye Hospital, Taiyuan City, China,

³Taiyuan Aier Eye Hospital, Taiyuan City, China

Introduction: To investigate the expression of monocyte chemoattractant protein-1 (MCP-1) and high mobility group box 1 (HMGB1) in vitreous and aqueous humor and their correlation with intraocular inflammation and severity of traumatic macular epiretinal membrane. The levels of MCP-1, HMGB1 and serum inflammatory factors in vitreous and aqueous humor of the two groups were compared, and the expression of MCP-1 and HMGB1 in vitreous of patients with different ocular trauma scoring system (OTS) was compared. The correlation between the expression of MCP-1, HMGB1 and serum levels of IFN- γ , IL-2, 17 was analyzed. The expression of MCP-1 and HMGB1 in vitreous and aqueous humor in the experimental group was higher than that in the control group; With the increase of OTS grade, the expression of MCP-1 and HMGB1 in vitreous increased gradually; The levels of MCP-1 and HMGB1 in vitreous and aqueous humor were positively correlated with the serum levels of IFN- γ , IL-2 and 17. MCP-1 and HMGB1 are highly expressed in patients with traumatic macular epiretinal membrane, and are significantly correlated with inflammatory response and disease severity.

Objectives: To investigate the expression of monocyte chemoattractant protein-1 (MCP-1) and high mobility group box 1 (HMGB1) in vitreous and aqueous humor and their correlation with intraocular inflammation and severity of traumatic macular epiretinal membrane.

Methods: Twenty-one patients with traumatic macular epiretinal membrane were selected as the experimental group, and 23 patients with idiopathic macular hole were selected as the control group. The levels of MCP-1, HMGB1 and serum inflammatory factors in vitreous and aqueous humor of the two groups were compared, and the expression of MCP-1 and HMGB1 in vitreous of patients with different ocular trauma scoring system (OTS) was compared. The correlation between the expression of MCP-1, HMGB1 and serum levels of IFN- γ , IL-2, 17 was analyzed.

Results: The expression of MCP-1 and HMGB1 in vitreous and aqueous humor in the experimental group was higher than that in the control group ($P < 0.01$); With the increase of OTS grade, the expression of MCP-1 and HMGB1 in vitreous increased gradually ($P < 0.01$); The levels of MCP-1 and HMGB1 in vitreous and aqueous humor were positively correlated with the serum levels of IFN- γ , IL-2 and 17 ($P < 0.01$).

Conclusions: MCP-1 and HMGB1 are highly expressed in patients with traumatic macular epiretinal membrane, and are significantly correlated with inflammatory response and disease severity.

FT-TRA-002

Surgical techniques for optimal lens management during intraocular foreign body removal: a case series

S. Montezuma¹, J. Moon², R. Sather², T. Looyesen², M. Simmons¹, P. Monsalve¹, A. Naravane¹, R. Johnston¹, T. Khundkar¹, H. Nazari¹, D. Koozekanani¹

¹Ophthalmology, University of Minnesota, Minneapolis, United States, ²ophthalmology, University of Minnesota, Minneapolis, United States

Introduction: The removal of intraocular foreign bodies (IOFB) is challenging because a successful operation often requires the surgeon to be familiar with the various anterior and posterior surgical techniques. We describe three different surgical approaches for removal of metallic IOFBs lodged in the posterior segment, with attention to the management of the lens. We summarize postoperative lens status and visual acuity (VA).

Objectives: To demonstrate the most appropriate management of the lens during surgical removal of intraocular foreign bodies lodged in the posterior segment.

Methods: All consecutive posterior segment metallic IOFB cases from 2012 to 2023 at a single tertiary healthcare institution were included in this retrospective case series. In all cases, the open globe was closed during the same procedure as the IOFB removal. Surgical outcomes and surgical videos are presented.

Results: A total of 25 metallic IOFB cases were included and divided in three groups based on the surgical technique used for the lens management. (A) In nine cases, there was no significant lens involvement, therefore, a conventional lens-sparing vitrectomy with removal of the IOFB through a sclerotomy was performed. (B) In the eight cases where the IOFBs was associated with penetrating corneal injury, traumatic cataract, and posterior segment damage, the following surgical approach was used: clear-corneal incision, trypan blue staining of the anterior capsule, capsulorrhexis, cataract extraction, vitrectomy, and IOFB removal via a corneal incision. The IOL was placed at the time of surgery in two out of these eight cases. The remaining six cases required second surgical procedures for secondary IOL placement. (C) Eight cases required lens and capsule removal to manage: concurrent endophthalmitis, anterior proliferative vitreoretinopathy, lens capsule blood staining, or significant lens damage. In these cases the IOFB was removed through the sclera or cornea incision. None of these patient had IOL placed at the time of the surgery.

Overall, in our cohort, two patients were lost to follow-up. Of the remaining 23, 19 (82.6%) patients achieve ambulatory vision (greater than 20/800) and 9 (39)% of the patients achieve reading vision (greater than 20/50)

Conclusions: We demonstrate our algorithm and surgical technique to manage the lens in patients who present with IOFB lodge in the posterior segment with good visual outcomes and with the majority of the patients achieving at least ambulatory vision.

FT-TRA-003

Demographic and clinical profile of Intimate Partner Violence (IPV) related ocular injuries in rural India

*R.U. Majumder*¹

¹Ophthalmology, Howrah District Hospital, Kolkata, India

Introduction: Intimate Partner Violence (IPV) is an underdiagnosed cause of several ocular injuries in rural India, which goes largely undocumented in the Emergency Department. There is an urgent need for recognition, diagnosis, and appropriate management of these injuries.

Objectives: To ascertain the demographic, and clinical profile of IPV-related ocular injuries among the rural population in a primary healthcare center in India; based on which, a predictive model has been defined to estimate the visual prognosis.

Methods: 75 patients were evaluated in an ER-based setting, in a retrospective cross-sectional study, at a primary healthcare center, and their demographic (age/sex/socio-economic status) profile was compared with the clinical symptoms, to evaluate the common risk factors of such injuries. A logistic Regression model was used to develop a Nomogram to predict the outcome based on these parameters.

Results: All patients aged <20yrs had Best Corrected Visual Acuity, BCVA < logMAR 0.5, 50% had BCVA = logMAR 0, while older patients had worse visual acuities (28.6% patients aged >30yrs had BCVA > logMAR 1.5). SES class III had higher BCVA, with 40% having BCVA = logMAR 0, while SES class V had lower BCVA (44.4% with BCVA logMAR 0.3 – 0.5). Duration of injury was found to be longer for patients <20yrs (87.5%). The most common injuries affected the conjunctiva (42.6%), eyelids (14.6%), and posterior segment (14.6%). 13.3% required surgical repair of the injuries, while 21.3% had a Guarded Visual prognosis (GVP) even after maximum management. The ROC curve was developed and the AUC was 0.82.

Conclusions: Ocular injuries may present with a variety of symptoms and signs, and have recognizable risk factors. It is imperative to diagnose these, at the earliest and provide for appropriate referral, as necessary.

FT-TRA-005

Double-stage surgery for severe open globe injuries in combatants in Ukraine in Fourth-line Hospital

O. Ilyuk¹

¹6, Kyiv Eye Microsurgery Center, Kyiv, Ukraine

Introduction: Battlefield open-globe trauma is always severe and rarely isolated so wounded combatants with these injuries are referred to the specialized centers rather late. Hence approaches for sparing the eye as a bioprosthesis as well as improvement of visual functions are extremely important in this cohort of patients.

Objectives: Estimate and compare results of one- and double-stage (double-step) surgery for severe open globe combat injuries.

Methods: Our investigation was based upon analyses of results of surgeries for severe open globe combat injuries in 47 Ukrainian soldiers (all males, 9 with bilateral injuries, 56 eyes operated), wounded in Russian-Ukrainian war during 2022-2023. Patients were transferred to our facility in 14 to 75 days after injury (average 28 d) and these delays were usually caused by combined injuries that required stabilization of vital functions and captivity.

We used traditional one-step combined pole-to-pole surgery (One-stage surgery) but in the majority of these patients visualization of tissues and layers was so difficult that we had to stop surgery with the gas tamponade. Second-stage surgery usually was postponed until 3 to 7 days. During second stage usually there were significant reduction of tissue edema, improvement of visualization, decreased bleeding and also displacement of blood from suprachoroidal spaces and flattening of retina. 5 eyes (8.9%) were operated in one stage and 51 (91.1%) in 2 stages. Vitrectomy and removal of foreign bodies in limits of visualization, IOL placement provided possible and by all means sealing of the eye globe were performed during the first stage of double-stage surgeries. We estimated the possibility of sparing the eye globe and improvement of visual acuity.

Results: In all cases we were able to spare the eye. Initial visual acuity was no light perception in 11 (19.6%); pr. l. incertae in 25 (44.6%) and pr. l. certae in 20 (35.8%). Among cases with initial no light perception we were able to achieve VA 0.02/0,05 with +4.0D in 1 pt. In cases with initial pr. l. incertae there were no cases of worsening, in 4 (16%) there was persistent pr. l. incertae and in the other 21 (84%) improvement from VA 0.02 to VA 0.5 (0.2+/-0.09). In all cases with initial VA pr. l. certae there was improvement from VA 0.05 up to VA 0.9 (0.3+/- 0.12).

Conclusions: Double-stage surgery assured sparing of the eye globe in all our patients and also provided improvement of VA adequate at least for self-care in the majority of these severe combat injuries.

FT-TRA-006

A modified single-armed suture technique for traumatic cyclodialysis cleft with vitreoretinal injury

*S. Xiong*¹

¹Eye Center of Xiangya Hospital, Central South University, Changsha, China

Introduction: In the present study, the single 10-0 polypropylene string was used to repair cyclodialysis clefts combined with vitreoretinal injury due to blunt trauma or open-globe injury under guidance of 29G-gauge needle, and the surgical outcomes of this modified internal cyclohexy technique were described.

Objectives: To assess the therapeutic efficacy of modified single-armed suture technique on traumatic cyclodialysis cleft with vitreoretinal injury.

Methods: The procedure involved fixing detached ciliary body using a single-armed 10-0 polypropylene suture under assistance of 29-gauge needle. Patients with traumatic cyclodialysis cleft combined with anterior and posterior segment injury who underwent modified internal cyclohexy together with vitreoretinal surgery were enrolled in this study. Ultrasound biomicroscopy (UBM) was used to diagnose and evaluate the cyclodialysis and anterior segment injury. B-scan ultrasonography was performed to assess the condition of vitreous, retina and choroid. The surgical time and successful rate for repairing cyclodialysis cleft were recorded. Preoperative and postoperative best-corrected visual acuity(BCVA), and intraocular pressure(IOP) were documented for assessment.

Results: The study included 20 eyes. The extent of the cyclodialysis cleft was from 30° to 360°. Beside traumatic cyclodialysis cleft, the included cases also combined with vitreous hemorrhage, retinal detachment, macular hole, choroid avulsion, and suprachoroidal hemorrhage. All the cleft were anatomically closed in one surgery. The average surgical time for fixing cyclodialysis cleft was 2.68 ± 0.54 min/ 30° cleft. A significant improvement on LogMAR BCVA was observed from 2.94 ± 0.93 preoperatively to 1.81 ± 1.11 at the 6 month follow-up. IOP was elevated from 10.90 ± 6.18 mmHg preoperatively to 14.45 ± 2.35 mmHg at the 6 month follow-up.

Conclusions: Modified single-armed suture technique was proved to be an effective method to fix the traumatic cyclodialysis cleft, which could facilitate following procedure to repair chorioretinal disorders. It improved the BCVA and maintained the IOP with less postoperative complications.

FT-TRA-007

Bird beak-related ocular injuries in Southern India: Factors and visual implications

D. Tara¹, S. Bhalerao¹, S. Vuyyuru¹, U. Thigale¹

¹Shantilal Shanghvi Cornea Institute, L V Prasad Eye Institute, Vijayawada, India

Introduction: Penetrating eye injuries caused by pecking of birds are remarkably rare, as documented in previous reports. These reports have primarily described ocular pecking injuries in humans caused by chickens and roosters. In more unusual cases, injuries have been attributed to other bird species such as owls, bats, ostriches, eagles, mynahs, magpies, cormorants, and herons. To the best of our knowledge, this study represents the largest investigation to date examining the factors and outcomes of ocular injuries caused by birds.

Objectives: To evaluate the visual outcomes and identify prognostic factors in patients with ocular bird beak injuries treated at a tertiary eye care center in South India.

Methods: We conducted a comprehensive analysis of patients with bird beak injuries, considering factors such as age, gender, mode of injury, and size of laceration. The affected eyes underwent detailed examinations using slit-lamp biomicroscopy, and B-scan ultrasonography was performed to assess the status of the posterior segment. Postoperatively, the best-corrected visual acuity (BCVA) was measured at the last follow-up visit.

Results: Our findings demonstrated significant improvements in visual outcomes, including BCVA and uncorrected visual acuity (UCVA), over a follow-up period ranging from 1 week to 3 years ($p < 0.05$). No significant changes were observed in endophthalmitis, intraocular pressure (IOP), lens status, or retinal abnormalities during the study duration.

Conclusions: This retrospective study highlights the potential for favorable long-term visual improvement in patients with ocular injuries caused by bird beaks and emphasizes the importance of timely intervention. Delayed surgical treatment and the requirement for multiple surgeries within the first week were found to negatively impact visual acuity. Hence, it is crucial to raise public awareness, particularly in rural areas, to prevent these potentially devastating injuries and ensure early intervention for optimal visual recovery.

FT-TRA-008

Firecracker induced ocular trauma: trend during and after COVID 19 – A multicentric retrospective study

M.F. Mouttapa¹, J.C. Susai²

¹Pediatric Ophthalmology, Aravind Eye Hospital, Pondicherry, India, ²Cornea and Refractive Surgery, Aravind Eye Hospital, Pondicherry, India

Introduction: Fire crackers are explosive pyrotechnic devices ignited during festive seasons across the world. It is estimated that 12–18% of injuries across the globe are fire-cracker related. Unsupervised children, substandard crackers, proximity to exploding crackers and alcohol consumption momentarily contribute to the hazardous consequences of bursting firecrackers. The eye is one of the most vulnerable organs to get injured in such a setting.

During COVID pandemic, strict lockdown and restrictions were implemented. Along with helping in bringing down the number of COVID 19 casualties, the lockdown saw a decrease in spread of various communicable infections, improvement in air quality index, lesser traffic on the roads and an overall cooler climate. The restrictions also resulted in a massive decrease in fire cracker use due to government-imposed restrictions on public gatherings and precautions taken by the public to stay safe. However, post relaxation of these restrictions, fire cracker use has been on the rise and has subsequently led to an increase in the incidence of fire cracker related morbidity.

Objectives: To analyze the pattern of firecracker injuries during and after the COVID 19 lockdown.

Methods: In this retrospective observational study, data of patients presenting with firecracker injuries during Diwali through 2020 to 2022 at 5 tertiary eye care centers in South India were collected. The parameters analyzed were the number of victims, their demographic profile, type of injuries and visual acuity at presentation and post treatment.

Results: A total of 1005 patients presented with firecracker injuries in the study period. There was a male preponderance among the victims ($p < 0.001$) and majority of the patients were below 20 years of age. There was a statistically significant increase in the number of firecracker ocular injuries from 2020 to 2022 ($p < 0.001$). Epithelial defects were the most common injury caused by firecrackers in the study group, while the number of open globe injuries increased post lifting of restrictions. The number of patients with a presenting visual acuity below 6/60 also increased in the year 2021 and 2022.

Conclusions: Firecracker injuries show an upsurge in the days around Diwali in our country. The burden of avoidable blindness caused by irresponsible and unrestricted use of firecrackers can be curbed by taking regulatory measures. In this study we use the observations made during the COVID 19 lockdown to propose guidelines for sale and use of firecrackers in our country.

FT-TRA-009

Analysis of the results of surgical treatment of ruptured eye complicated with choroidal injury and no light perception

*Z. Wang*¹

¹Department of Ophthalmology, Beijing Aier-Intech Eye Hospital, Beijing, China

Introduction: Rupture ocular trauma with no light perception and complicated with choroidal injury is a very difficult problem clinically, which may lead to permanent blindness or loss of eyeball. Correct treatment of the damaged choroid is the key technique to rescue the injured eye and restore vision. In this paper, the results and experience of the treatment of 33 eyes were discussed.

Objectives: To discuss the results and experience on surgical repair of eyeball rupture with choroidal injury and no light sensation.

Methods: From January 2015 to December 2022, 33 cases of ocular rupture injury with choroidal injury and no-light perception vision were treated, including 11 eyes (33%) with corneoscleral wound, 17 eyes (51.5%) with scleral wound, and 5 eyes (15%) with corneoscleral wound extending to posterior sclera. Secondary vitrectomy was performed 7-10 days after primary wound suture.

Results: The injuries of choroid were as the following: hemorrhagic choroid detachment and incarceration in 21 eyes (63.6%); Choroid and ciliary body losing in 5 eyes (15%); Choroidal haemorrhagic detachment in 7 eyes (21%). The treatment method of choroid injury: 1. Incision and excision of choroid and retina 1-2mm around the wound is suitable for the treatment of intraocular tissue impaction in the scleral wound. 2. Suture restoration of detached choroid, suitable for hemorrhagic detachment and loss of choroid. 3. Release of supra-choroidal blood through the sclera, suitable for patients with choroidal hemorrhagic detachment without communication to the vitreous cavity. 19 (60%) eyes recovered vision from no-light perception before operation to more than light perception vision postoperatively, and the best corrected vision was 0.25 for the highest. Silicone oil was successfully removed in 13 eyes (40%). 20 eyes achieved anatomical repair but were classified as silicone oil-dependent.

Conclusions: Choroidal injury and intraocular hemorrhage are the main causes of no-light perception vision after eyeball rupture injury, and are the main factors affecting the visual prognosis and anatomic outcome of the injured eye. The correct treatment of the damaged choroid during surgery is an important technical requirement for the repair of ruptured eyeball.

P-TRA-001

Management of retinal impacted intraocular foreign body by Pars plana vitrectomy

P. Roy¹, P. Mistry¹, A. Hossain¹

¹Vitreous Retina Department, National Institute of Ophthalmology and Hospital, Dhaka, Bangladesh

Introduction: Ocular injury is very common in developing country like Bangladesh where no or rarely eye protection glass or tools are used by the workers in the workshops and work places. Usually workers are young adult, sometimes children are doing work in the unprotected eye condition for earning money and purchasing food for survival. This ocular morbidity due to trauma create familial problem when the boy is the only earning person of the family. Ocular trauma usually associated with hammering, Grinding, welding, domestic violence, rioting with law enforcing forces.

Objectives: The objective of the study is to evaluate the structural and functional outcome of retained intraocular foreign body located in the posterior segment removal by Pars plana vitrectomy.

Methods: This prospective purposive study conducted from January 2016 to June 2023. 64 consecutive eyes of 64 patients included in the study. The mean age 26.34 ± 9.40 years, age range 16-41 years, Male 60, Female 4 underwent Pars plana vitrectomy. Visual acuity, slit lamp biomicroscopy, intraocular pressure, posterior segment examination, B-scan and CT scan of eye & orbit routinely done. Eye with suspected IOFB require imaging to determine the presence, location and number of IOFBs. X-ray and Computed tomography provides much more reliable information on size, shape, and localization of the foreign body, whether in the anterior or the posterior segment. Current spiral CT scanning with both 1mm and 3mm cuts can detect metallic IOFB as small as 0.5mm with nearly 100% sensitivity.

Results:

Size of removed metallic foreign body were 2-16 mm. Preoperative visual acuity, no perception of light were 2 eyes, only Perception of light 4 eyes, perception of light and projection of rays were 16 eyes, counting finger half meter to 1/60 were 36 eyes, 2/60 to 5/60 were 4 cases, 6/60 was two eyes ($P = 0.003$). Anatomic success was obtained in 96.77 % (62) of eyes. The postoperative visual acuity improved 5.24 ± 3.4 letters in the Snellen visual acuity chart. Severe inflammation noticed 24 (37.5 %) eyes in early postoperative period, IOP elevated in 16 (25 %) eyes, one silicon oil filled eye develop band keratopathy and one eye become phthisical.

Conclusions: Pars Plana vitrectomy is the only important, effective and essential surgical approach for removal of impacted retinal foreign body, maintaining ocular integrity and better functional outcome for managing retained posterior segment intraocular foreign body.

P-TRA-002

Padel: an increasing cause of eye injuries in Chile

P. Rodríguez Valdés¹, E. Perez Argandoña¹, J. Orellana Ríos¹, A. Bofill Ramírez¹

¹Retina, Fundación Oftalmológica Los Andes, Santiago, Chile

Introduction: Padel is a racquet sport invented in Mexico in the 1960s, which in recent years has increased its practice both in Chile and other countries. This uses a ball similar to tennis balls, which can reach speeds up to 100- 130 K/h. It is played on a 10x20m court surrounded by 4 tempered glass walls 10x12mm thick. The consistency of the walls allows for a uniform and regular bounce of the ball. It is often played as doubles there are four players on the court. These characteristics provide a significant risk for injuries. Given the growing practice and nature of padel, there has also been an increase in emergency consultations due to ocular trauma caused by its practice, but in Chile the incidence of padel-related eye injuries is unknown.

Objectives: Describe the characteristics and consequences of patients evaluated at Fundación Oftalmológica Los Andes due to eye injuries related to padel.

Methods: Retrospective study based on records of patients evaluated for eye injuries related to padel practice between January 2010 to October 2023 at Fundación Oftalmológica Los Andes, Santiago de Chile.

Results: During the study period, 27 patients sought care for eye injuries related to padel with an almost exponential increase of emergency consultations. The mean age was 44,48 years (SD 10,54) and 74,1% were male. Most injuries were in the right eye (59,3%). At the time of presentation, 18.5% had subconjunctival hemorrhage, 25.9% corneal erosion, 27% anterior uveitis, 29.6% iris sphincter tear, 11,1% retinal tear, 7.4% choroidal rupture, 14,8% commotio retinae, 7.4% symptomatic posterior vitreous detachment, 7.4% vitreous hemorrhage, and 3.7% retinal detachment, 3.7% retinal hemorrhage, 3,7% hyphaema and 3.7% Angular Recession. Five patients required invasive treatment like intravitreal anti-VEGF, pars plana vitrectomy and focal laser. Although only two patients ended up with lower visual acuity, 8 patients (29.6%) presented persistent anisocoria and photophobia. No patients were wearing eye protection at the time of trauma.

Conclusions: Padel is one of world's fastest-growing sports. Our study supports previous observations that growing popularity has been associated with an almost exponential increase of consultations for related ocular trauma. Although the use of eye protection effectively reduces eye injuries, there are no regulations on its use. We believe that the implementation of them, could help to reduce cases of ocular trauma with severe ophthalmological sequelae.

P-TRA-003

Unveiling *Pasteurella Canis* as the culprit pathogen in perforating globe injury-induced endophthalmitis

S. Nayak^{1,2}

¹Ophthalmology, All India Institute of Medical Sciences, Guwahati, India, ²Ophthalmology Department, All India Institute of Medical Sciences, Raipur, India

Introduction: The *Pasteurella* genera consist of small Gram-negative coccobacilli predominantly involving oral flora and digestive tracts of cats and dogs. It's not a typical component of human normal flora. In previous reports, *Pasteurella* infections affecting ocular structures were primarily attributed to *Pasteurella Multicoida* while, *Pasteurella Canis* was more commonly associated with soft tissue and wound infections.

Objectives: Herein, we report a case of perforating open globe injury with retained intraocular foreign body leading to endophthalmitis, where *Pasteurella Canis* was the causative agent. Human *Pasteurella Canis* infection is a rare occurrence and that too without any incidence of animal bite makes this a case of note.

Methods: A 30-year old male presented to the emergency department of a tertiary care institute with alleged history of trauma to right eye while working in a factory. There was gross diminution of vision in right eye associated with pain and redness. On examination, visual acuity was perception of light present with projection of rays accurate in the temporal quadrant only. There was conjunctival congestion with 7 mm full thickness corneal tear with iris tissue prolapse along with hypopyon 2 mm in height. Rest posterior segment details could not be seen. X-Ray of orbit and paranasal sinuses showed right eye intra ocular foreign body which was further confirmed by non-contrast computerized tomography scan. A clinical diagnosis of right eye post traumatic endophthalmitis following open globe injury type V, zone 3 was made.

Results: Vitreous tap was sent for gram staining, culture and sensitivity. Initial gram staining yielded gram negative coccobacillus. Culture on blood agar yielded greyish-white, mucoid, nonhemolytic colonies compatible with *Pasteurella Canis* species. Intravenous ceftriaxone, metronidazole and vancomycin were started. However, the retained intraocular foreign body led to fulminant endophthalmitis within a few hours and the right eye was then taken for enucleation. On follow-up after 7 days, the surface was healthy with normal lacrimation and adequate depth of both superior and inferior fornices. The patient was planned for ocular prosthesis after 2 months.

Conclusions: This case underscores the critical importance of early diagnosis and treatment in cases of eye infection caused by *Pasteurella Canis*, as even though this bacteria is susceptible to antibiotics, timely intervention is essential to avert irreversible damage.

P-TRA-004

Work-related eye injuries - angle grinders can cause severe vision-threatening eye injuries

J. Yu¹, Y. Chen¹, Y. Liu¹, X. Shi¹

¹Beijing Tongren Eye Center, Beijing Ophthalmology & Visual Sciences Key Lab, Capital Medical University, Beijing Tongren Hospital, Beijing, China

Introduction: Angle grinder is a commonly used tool and it can cause severe ocular trauma.

Objectives: To study the characteristics, clinical manifestations and vision outcomes of ocular trauma caused by angle grinder.

Methods: 162 cases of ocular trauma caused by angle grinder were analyzed. Types of injury implements, types of injury and the final outcome of vision were reported. And we also inquired the patients whether they wore protective equipment.

Results: 162 patients, including 160 males and 2 females were enrolled in this study. They ranged in age from 29 to 68 years with an average age of 45.3 years. 159 patients were injured by themselves, and the other 3 patients were injured by others. Among the types of injury implements, 69 cases (42.6%) were broken grinding wheel, 34 cases (21%) were foreign body in the cornea, 30 cases (18.5%) were intraocular foreign body, 12 cases (7.4%) were workpiece fragments, and 17 cases (10.5%) were working angle grinder slip out of the operator's hands. They can cause a variety of open and closed eye injuries. Closed globe injuries include corneal foreign body, lens subluxation, angle recession, cyclodialysis, vitreous hemorrhage, Traumatic chorioretinopathy, etc. Open globe injuries include corneal or scleral laceration, eyeball rupture, intraocular foreign body, traumatic cataract, vitreous hemorrhage, retinal detachment, choroid detachment, infectious endophthalmitis. Orbital fracture occurred in a few cases. Infectious endophthalmitis occurs in 25% of patients with intraocular foreign bodies. In eye injuries caused by grinding wheels, 60% of patients end up with low vision, and 20% of them are completely blind. In eye injuries caused by the working machine slip out of hand, 100% end up with low vision, of which 75% are completely blind. 3 patients were injured in both eyes and their limbs. Orbital fractures are results from these two types of injuries. None of the patients use protective equipment except 4 patients.

Conclusions: Improper use of angle grinder can lead to serious eye injury. The worst prognosis and the highest rate of blindness were caused by the out-of-control of a running angle grinder, followed by the broken grinding wheel. Education and urge the use of protective equipment may play a very important role in work-related eye injury prevention.

P-TRA-005

Reducing ocular trauma with artificial intelligence: personal protective eyewear compliance checking and remediation

H. Reeve¹, V. Preda¹, R. Clay-Williams², T. Carney³, M. Wilson^{3,1}, J. Jabbour⁴

¹Department of Clinical Medicine, Faculty of Medicine Health and Human Sciences, Macquarie University, Sydney, Australia, ²Australian Institute of Health Innovation, Sydney, Australia, ³Surgical XR, Sydney, Australia, ⁴Sydney Eye Specialists, Sydney, Australia

Introduction: Ocular trauma is a debilitating yet preventable cause of monocular blindness worldwide, accounting for a significant burden of unilateral visual impairment with potentially devastating long term disease burden. The most common type of ocular trauma involves foreign bodies in the eye, the cause of which is largely attributable to non-compliance with personal protective eye equipment (PPE). At present, workplace regulations vary in the stipulation of the use of PPE, with no current standard to track compliance. Ocular trauma is easily preventable with use of correct PPE, requiring compliance tracking. The application of artificial intelligence (AI) has the potential to compliance track by assisting in complex task analysis and recording. In this paper we validate the performance of an AI PPE system in a healthcare setting.

Objectives: To describe and assess an AI platform that can detect, confirm and document the presence of PPE.

Methods: A clinical cohort study of 258 healthcare workers who were recruited to utilise an AI-PPE platform validated by the gold standard human buddy check. We describe a platform for the assessment of an AI application with eye classifier for personal protective wear to improve PPE compliance.

Results: 258 medical students and healthcare workers used the AI platform correctly, which was 100% accurate in detecting eyewear compliance. It was able to detect different types of glasses including safety goggles, over-glasses safety goggles and laser safety goggles, and documented the use of different types of protective eye wear. The average time from log-in to successful check in was 9 seconds. The feedback on system functionality described ease of use and relevance to daily task protocols in the healthcare setting.

Conclusions: We aimed to develop an AI system to improve compliance with PPE in the workplace and mitigate the risk of ocular trauma. The data collected from our study demonstrates the role of AI in detecting the presence of PPE to increase workplace compliance through the application of a validated AI system. This AI platform is a simple and inexpensive solution for compliance checking of PPE to mitigate the risk of ocular trauma.

P-TRA-006

Beyond the surface: delving into the outcomes of penetrating ocular trauma with intraocular foreign body

D. Agarwal¹, B. Panchal¹

¹Retina and Vitreous services, LV Prasad Eye institute, Visakhapatnam, India

Introduction: Retained intraocular foreign body (RIOFB) secondary to penetrating ocular trauma is known to be a potential cause of blindness. They may lodge in the anterior segment, posterior segment, or orbital adnexa. It becomes imperative to think fast to localise FB and intervene for removal because time is a key factor. Meanwhile, patient expectations for visual rehabilitation should also be considered. Our study highlights the essential data that plays a significant role in deriving the visual outcomes based on mode and location of injury, time of presentation, and time of intervention. It also calls attention to several dreadful sequelae of IOFB that can occur regardless of timely intervention.

Objectives: To study the epidemiological features, prognostic factors, and visual outcomes of penetrating ocular injuries with IOFB.

Methods: Retrospective study. The electronic medical record of 113 eyes diagnosed with RIOFB secondary to an open globe injury was reviewed and analyzed from January 2017 to December 2022.

Results: One hundred and thirteen eyes were analysed. Males were 109. The mean age was 33.77 +/- 14.15 years. The patients presenting were distributed equally among all quarters of the year. Roughly two thirds (69%) of the injuries occurred at the workplace, followed by injuries at home. Half of the patients presented within the first 2 days. In our study, zone 1 injuries were 62%, and zone 2 injuries were 28%. There was no difference between the eyes involved in the injury. Corneal injury was the most common with FB in the anterior segment. Metallic FB was 64%, and wood was 4%. One-fourth (%) patients were operated on the same day as presentation. One-third of the patients (%) were operated on the next day for foreign body removal. The median interval between presentation and surgery was 1 day. The mean presenting VA was 2.69, and the mean final VA was 1.3. The mean ocular trauma score at presentation was 56. The mean final follow up was 11.9 months. Fourteen eyes developed endophthalmitis. Ten eyes went into phthisis bulbi. One eye developed sympathetic ophthalmia.

Conclusions: A myriad of prognostic factors based on different characteristics were identified in this study. The visual outcomes are poor for zone 2 involvement, wooden foreign body, late presentation, delay in surgical intervention and development of endophthalmitis. Early surgical intervention, metallic foreign body and good visual acuity at presentation are associated with relatively better visual outcomes.

P-TRA-007

A case of subretinal injection of indocyanine green using a 25G deuterium oxide needle during vitreous cavity injection

*S. Sheng*¹

¹Weifang Eye Hospital, Weifang, China

Introduction: Epiretinal membrane is a common retinal disorder, often treated effectively through vitrectomy. During this procedure, dyes like indocyanine green (ICG) are typically used to enhance visualization of the inner limiting membrane. However, complications can arise when the dye inadvertently enters the subretinal space. This paper presents a unique case where ICG was accidentally injected into the subretinal space during a vitreous cavity injection using a 25G Deuterium oxide needle in an epiretinal membrane surgery. We aim to analyze the associated risks and complications, emphasizing the necessity for careful handling of the dye during surgery and the importance of postoperative follow-ups.

Objectives: The study aims to report a case where the dye indocyanine green (ICG) was inadvertently injected into the subretinal space during a vitreous cavity injection using a 25G Deuterium oxide needle in the course of an epiretinal membrane surgery.

Methods: We present the case of a 76-year-old female patient who underwent vitrectomy for an epiretinal membrane in her right eye. During the procedure, a 25G Deuterium oxide needle was used to inject ICG for staining the inner limiting membrane. The injection pressure was excessively high, causing ICG to perforate the retina above the macula and enter the subretinal space.

Results: The iatrogenic hole closed spontaneously upon detection of the subretinal entry of ICG during the operation. However, the vitreous cutter could not remove the residual subretinal ICG. One week postoperatively, the patient's best corrected visual acuity (BCVA) was 0.5, and the ICG was not completely absorbed, as evidenced by retinal pigment epithelial edema observed in the optical coherence tomography (OCT).

Conclusions: The 25G Deuterium oxide needle, due to its smaller diameter compared to the 23G, carries a potential risk of creating an iatrogenic hole when the injection pressure is too high. ICG, once in the subretinal space, is difficult to absorb in the short term and may cause a toxic reaction leading to retinal pigment epithelial edema. Therefore, careful handling of the dye during surgery and reduction of injection pressure is recommended. Regular follow-ups to monitor the patient's vision, fundus conditions, and potential complications are also advised.

P-TRA-008

Retinal detachment after open globe injury RD-OGI score, a real world experience

J. Romero¹, C. Hernández², L. Chocón², M. Reyna², A. Khatri³, C. Mishra⁴, M.A. Aman⁵, V.P. Dave^{6,7}, R. Agrawal⁸

¹Ocular Trauma Clinic, Unidad Nacional de Oftalmología, Guatemala, Guatemala, ²Unidad Nacional de Oftalmología, Guatemala, Guatemala, ³Retina, Birat Eye Hospital, Birat, Nepal, ⁴Trilochan Netralaya, Sambalpur, Odisha, India, ⁵Shifa International Hospital, Ismalab, Pakistan, ⁶Anant Bajaj Retina Institute, Hyderabad, India, ⁷LV Prasad Eye Institute, Hyderabad, India, ⁸Tan Tock Seng Hospital, Singapore, Singapore

Introduction: Open globe injury (OGI) is a common cause of severe vision loss, with more than 200,000 cases worldwide each year. Initial visual acuity (VA) and the zone of injury are key indicators for predicting the prognosis of OGI. In 2014 Stryjewski et al developed a predictive tool, RD-OGI (Retinal detachment in open globe) score.

Objectives: This study sought to validate the RD-OGI Score in a real world setting.

Methods: A retrospective review was carried out in 167 consecutive patients with an OGI who attended the Ocular Trauma Service of the Unidad Nacional de Oftalmología in Guatemala city, Guatemala, from January 1, 2023, to June 30, 2023. Thirty eight were excluded due to incomplete information or being enucleated or eviscerated. A total of 129 (77%) patients met the inclusion criteria (OGI, with RD-OGI score), and were analyzed as the study cohort. The RD-OGI score awards points based on 3 clinical findings observed at the time of initial presentation: VA, zone of the injury, and presence or absence of VH. Patient data were extracted over a 1-month follow-up period.

Results: Of all the 129 patients with open globe, 32 (24.80%) developed retinal detachment, the results obtained were similar reported by Stryjewski (20.33%) within the first month. It is important to highlight that patients classified as high risk 54.84% did not develop RD in the first month, the severe inflammatory process led to late complications such as 16/17 Phthisis Bulbi and only 1/17 did not develop detachment but developed glaucoma. The only patient who did not develop retinal detachment and retained visual potential had early vitrectomy.

Conclusions: We conclude that patients at high risk may not only present retinal detachment but also a severe scarring and inflammatory process with a poor visual prognosis until reaching phthisis bulbi. With this, the high risk class justifies the early involvement of a retina specialist. This tool could also be used daily in high ocular trauma volume clinics, to monitor more closely patients especially with moderate and high risk, so it can be offer an early vitrectomy described by Kuhn before 100 hours after an OGI, even without an actual RD, we propose a prospective study to evaluate the number need to treat (NNT) to reduce the risk to develop a RD. Finally, the RD-OGI score can be used to counsel patients and set realistic expectations, including the possible need for multiple surgeries or a prolonged rehabilitation process.

P-TRA-009

Clinical characteristics and visual outcomes of ocular trauma in a tertiary eye hospital; a global trauma study

E. Gurung¹, E. Pradhan², R. Gurung³, H. Gurung⁴, G. Prasai¹

¹Vitreoretina, Tilganga Institute of Ophthalmology, Kathmandu, Nepal, ²Medical Retina, Tilganga Institute of Ophthalmology, Kathmandu, Nepal, ³Cornea, Tilganga Institute of Ophthalmology, Kathmandu, Nepal, ⁴Oculoplasty, Tilganga Institute of Ophthalmology, Kathmandu, Nepal

Introduction: Ocular trauma is one of the important causes of visual impairment and a leading cause of preventable monocular blindness. Worldwide approximately 1.6 million people are blind due to eye injury, 2.3 million with bilateral low vision and 1.9 million with unilateral low vision or blindness. Developing countries are affected more due to socioeconomic background, inadequate safety measures, lack of optimum treatment facilities, use of traditional eye medication and poor education.

Objectives: To analyze the clinical characteristics and visual outcomes of ocular trauma in a tertiary eye hospital.

Methods: Retrospective hospital-based study as Global Trauma Study and Nepal as one of the centers of The International Globe and Adnexal Trauma Epidemiology Study (IGATES). This study included analysis of all cases of ocular injury presenting to Tilganga Institute of Ophthalmology, Kathmandu, Nepal from April 2017 to March 2019.

Results: 643 patients were included in this study in which 72% were males, 18% females and 36% children and 40% working age group. Place of injury was found be at a domestic area in 54% and 29% in work place. Mechanism of injury was found be blunt trauma in 53%. 24.5% had retinal detachment, 1.7% had endophthalmitis and 2.6% had intra-ocular foreign body. Penetrating injury was the most common type of open globe injury while contusion was the most common type of closed globe injury. Surgical intervention for both anterior and posterior segments were found to be 32% in the right eye and 22% in the left eye.

Conclusions: Ocular trauma has devastating life altering complications hence prevention is the key. Prevention of trauma among paediatric age group at home and school and workplace for working age group also highlight the importance of awareness of good prognosis at early presentation.

P-TRA-010

The vitreous base avulsion (VBA)

L. Han¹, C.R. Qiong Da², Z. Ma¹

¹Ophthalmology, Peking University Third Hospital, Beijing, China, ²Ophthalmology, Tibet Autologous Region People`s Hospital, Lhasa, China

Introduction: VBA could be observed occasionally in trauma cases.

Objectives: To describe three comorbidities of VBA based on the multimodal imaging of a micro-anatomical structure in the vitreous base.

Methods: Light and transmission electron microscopy of the VB were performed on specimens from three post-trauma eyes . Intra-operative fundus images associated with VB abnormalities were captured. Images during micro-anatomical observation of the three specimens were analyzed along with the fundus images obtained during vitrectomy.

Results: The ora-serrata dialysis with pigment epithelium detachment was observed in case 1 with exposed choroidal tissue and vessels in the ciliary-choroid connection. The non-pigment and pigment epithelium detachment from the underlying tissue were observed in case 2. In case 3 caused by the fire crack injury,the ciliary body was widely compromised in the contusion including dialysis of OS, ciliary epithelium tearing and vitreous base rupture starting from its anchor.

Conclusions: The etiology of VBA varied in accordance with the different direction of VB movement caused by trauma.

P-TRA-011

Intra-bulbar, intra-orbital and intra-cranial perforating eye injuries with foreign bodies – a case report

M. Hoxha-Shoshi^{1,2}, F. Shoshi^{3,1}, F. Shoshi^{3,1,4}

¹Department of Ophthalmology, Poliklinika "SHOSHI", Prishtina, Kosovo, ²Department of Ophthalmology, AMECC "REZONANCA", Prishtina, Kosovo, ³Department of Ophthalmology, University Clinical Center of Kosova, Prishtina, Kosovo, ⁴Faculty of Medical Sciences, AAB College, Prishtina, Kosovo

Introduction: Ocular trauma is a significant cause of preventable blindness and visual impairment worldwide, eye globe perforation can happen due to work with sharp tools or different particles that are spread during work with metals, wood and other solid substances.

Objectives: To show our experience in the treatment of a case with an intra-bulbar, intra-orbital and intra-cranial perforating eye injury under limited resources.

Methods: Case presentation: 14-year-old male patient admitted as an urgent case at the Ophthalmology

Department, due to a perforating eye injury with a foreign body – metallic nail in the right eye. The X- ray of the orbit revealed that it was a duplicate perforating injury with foreign body where a 7cm metallic nail was removed from the eye. Under general anaesthesia, we performed the anterior chamber lavage , excision of the prolapsed iris and pupilloplasty. The anterior chamber was reconstructed using saline solution and air.

The patient was treated conservatively with antibiotics and steroids for 10 days, there were no signs of wound filtration, hypotonia or endophthalmitis. Due to the limited sources for posterior segment surgery at the time, the patient underwent Pars Plana Vitrectomy after 10 days at another institution. Up to date, there are no signs of bulbar atrophy, BCVA = L+P+.

Results: Up to date, there are no signs of bulbar atrophy, BCVA = L+P+.

Conclusions: In all eye injuries treatment at the right time, plays a major role in the outcome of preserving the anatomical structure of the eye and the visual outcomes after the surgery.

P-TRA-012

Combined implantation of artificial iris with Carlevale scleral fixated intraocular lens as a single procedure

H. Almuhtaseb¹, G. Tsokolas²

¹Ophthalmology, The View Hospital in affiliation with Cedars Sinai, Doha, Qatar, ²Ophthalmology, University Hospitals Dorset NHS Trust, Bournemouth, United Kingdom

Introduction: The ARTIFICIALIRIS from HumanOptics is the world's unique foldable iris prosthesis, for both medical and aesthetic reconstruction of eyes with complete or partial aniridia. Carlevale sutureless scleral fixated intraocular lens (SF-IOL) (Carlevale by Md Tech) is a viable option in cases of insufficient posterior capsular support.

Objectives: The purpose of this abstract is to describe a combined case of anterior segment reconstruction using an artificial iris (HumanOptics) implantation, with implantation of a sutureless SF-IOL (Carlevale by Md Tech), in a case of a deficient posterior capsule post eye trauma.

Methods: Retrospective review of the patient's notes. A twenty-six-year-old patient had a significant eye trauma (ruptured globe) after being hit by a metallic object. She underwent primary repair, but months later, she developed retinal detachment due to proliferative vitreoretinopathy (PVR). Two surgeries were needed to stabilize the retina under silicone oil. Due to the severity of the trauma, the eye had already lost more than eighty percent of the iris tissue and the lens capsule was deficient.

Results: After suturing of the artificial iris (HumanOptics) over the Carlevale IOL was carried out, scleral pockets were created 180° apart. Pars plana vitrectomy, removal of silicone oil, examination under anaesthesia were done. The HumanOptics artificial iris-Carlevale IOL complex was then folded, and through a corneoscleral incision was injected into the anterior chamber (AC). The haptics were then externalized using opening distal forceps through the scleratomies, and the plugs were secured in the scleral pockets.

Conclusions: Management of aphakia in cases of traumatic aniridia using an artificial iris sutured over a sutureless SF-IOL, such as the Carlevale in a single procedure, may be a safe and effective option to restore the cosmetic appearance and maintain stability of the eyeball.

P-TRA-013

Outcomes of canalicular laceration repair with monocanalicular and bicanalicular stents in an Eye Trauma Unit

J.P. Ramírez Krause¹, R. Balcells¹, M. Santibañez¹, T. Witt¹

¹Hospital del Salvador, Santiago, Chile

Introduction: Canalicular lesions is commonly encountered in lid trauma. A multitude of techniques and stents are available to manage canalicular lacerations. Monocanalicular and bicanalicular stents offer a cost-effective solution for managing such cases.

Objectives: To report the epidemiological and clinical data as well as surgical outcomes of canalicular lacerations with monocanalicular and bicanalicular stents in a specialized unit of Chile.

Methods: This is a retrospective clinical file review of canalicular lacerations repair by a single oculoplastic surgeon from January 2020 to November 2023. We evaluated factors like mean time till surgery, type of stent, time of stent removal and their association with the surgical outcome.

Results: We evaluated 51 cases of traumatic canalicular injuries. The majority of our patients were males (58,8%), and the mean age was 19,1±18,3 (1-71) years. The most frequent mode of injury was dog bite (37,2%). The mean time of repair was 3,3±3,5 (0-17) days after injury. 36 patients had monocanalicular tube implantation with mini-MONOKA®stent and 15 patients had bicanalicular intubation with Crawford® probe. The mean time of stent removal was 8,3±5,1 (4-29) weeks. The extrusion rate was 3,9% (2). The overall functional success rate was 92% in the monocanalicular stent group, whereas it was 100% in the bicanalicular stent group (P value = 0.12, Chi-square). There was no statistically significant difference in postoperative functional success based on time of repair (within 48 hours or after 48 hours) from the onset of injury (P value = 0.44, Chi-square). There was also no statistically significant difference in postoperative functional success between stent removal within 6 weeks or after (P value = 0.16, Chi-square).

Conclusions: Canalicular laceration is common. There was no difference in success rate between monocanalicular and bicanalicular stent, regardless of delay in repair and stent removal. Further studies with larger and randomized series are warranted to elaborate on these findings.

P-TRA-014

Acute cataract by HIFU

*M. Namsrai*¹

¹Ophthalmology, Third State Central Hospital of Ulaanbaatar, Ulaanbaatar, Mongolia

Introduction: HIFU (high-intensity focused ultrasound) has been used in oncological practice to treat malignancies deep tissue. This technology has been used for cosmetic purposes in the world since 2008.

This case report presents for the first time a case of an acute cataract after the HIFU procedure.

Objectives: Case presentation: A 50-year-old female patient presented by ambulance to The Ophthalmology Department of Shastin Central Hospital at 13:30 on 17 June 2022.

Symptoms: Difficulty to see in both eyes, intense stabbing pain in the back of the head and orbit, nausea, and vomiting.

Present medical history: The patient had HIFU therapy on her face and eyelid areas at 09:30 in the morning of 17 June 2022 at a private beauty clinic named "S". 2 hours after the procedure vision in both eyes became blurred and she started experiencing the symptoms above.

RE VA- 6/60. RE IOP - 56 mmHg

LE VA - 6/300. LE IOP - 66 mmHg

Diagnosis: OU Acute cataract by HIFU (H26.8)

OU Secondary Glaucoma

Treatment:

- Lowering IOP
- Pain relief, symptomatic treatment
- Prepare for surgery

Surgical treatment:

- 2022.06.21 OD Phacoemulsification+pcIOL (20.50D)
- 2022.06.24 OS Phacoemulsification+pcIOL (20.50D)

Methods: Rare case presentation

Results: Discussion: In this case, an acute cataract and secondary glaucoma formed because of performing HIFU therapy without eye protection. The beam dosage, tilting degree of the tip of the device, frequency, and skin contact distance are unknown.

When performing the HIFU procedure on eyelids acute traumatic damages, such as corneal opacification, traumatic iritis, zonular damage, cataracts, and acute glaucoma, can occur leading to damage of the retina and optic nerves. From this list, acute cataracts, increased IOP, and myopia were mentioned as common complications.

Wave energy damages the lens capsule leading to a change in its protein structure.

In addition, it disrupts iris pigment, resulting in pigment floaters in the anterior chamber, as well as shallowing of the anterior chamber angle, which leads to acute signs of high intraocular pressure.

Conclusions: - It is necessary to use eye protection when performing the HIFU procedure.

- It is important to pay attention to the duration of the procedure, the skin contact distance, the tilting degree and the power of the device, and perform the procedure as far away from the eyes as possible.
- Provide patients with preventative information.
- Verify the license that beauty specialists hold.

P-TRA-015

An evaluation of firecracker injuries during Diwali, the festival of lights, at a tertiary care hospital in India

A. Saini¹, J. Rohatgi¹, R. Prasad¹, A. Bhandari²

¹Ophthalmology, University College of Medical Sciences and GTB Hospital, New Delhi, India,

²Ophthalmology, Bhandari Starlife Eye Hospital, Ludhiana, India

Introduction: Diwali in India leads to a heavy inflow of patients presenting with various forms of ocular trauma due to firecracker injuries. A varied presentation of firecracker injuries seen in the eye includes simple corneal abrasions, lid swellings, lid lacerations, conjunctival congestion, corneal and conjunctival foreign body, ocular surface burn injuries, hyphaema, traumatic uveitis, traumatic iridodialysis and open globe injuries with or without intraocular foreign body.

Objectives: To observe the characteristics, trend and management of ocular firecracker injuries in patients attending the emergency department (ED) in the Diwali week of 2023 in a tertiary care hospital in India.

To discuss some preventive aspects to reduce morbidity associated with ocular firecracker injuries.

Methods: Retrospective case series of patients presenting with ocular firecracker injury to Emergency department during the week of Diwali festival in 2023. Details regarding demographics, cause and type of injuries are included along with the management and follow-up of patients.

Results: A total of 45 patients attended the emergency in the Diwali week due to firecracker related ocular injury. Male(75%) predominance was seen.62.2% of the patients were under 20 years of age. Maximum injuries were superficial corneal abrasions(37.7%). Other injuries included hyphaema(20%), chemical and burn injury of ocular surface 22.2%), superficial foreign bodies(6.6%), lamellar corneal laceration(4.4%) and open globe injuries(13.3%). OGI were managed surgically with 4 out of 6 eyes going into pthisi bulbi on follow-up. Most common cause of such injuries was misfiring of firecrackers. Having strong legislative measures to prevent indiscriminatory use of firecrackers and wearing protective goggles can help reduce the incidence and morbidity due to firecracker injury.

Conclusions: This case series expresses the pattern of ocular firecracker injuries during Diwali. An alarmingly high number of young adolescents with significant ocular injuries were noted. Males were more prone to such injuries. Open globe injuries are sight threatening injuries requiring urgent repair with poor prognosis and more chances of infection. Public awareness and education along with an increase in legislative enforcement are needed for the betterment and well-being of the people during the festival season. A multidisciplinary approach is required to tackle such patients.

P-TRA-016

Analysis of patients with eye trauma who applied to national ophthalmology center named Academician Zarifa Aliyeva

H. Bayramova¹, E. Kasimov²

¹National Ophthalmology Center named Academician Zarifa Aliyeva, Baku, Azerbaijan, ²National Ophthalmology Center named Accad. Zarifa Aliyeva, Baku, Azerbaijan

Introduction: According to WHO, 191 million people suffer from acute vision loss in the world. One of the factors that cause this is eye injuries. 55 million eye injuries occur every year in the world. 1.6million people suffer from binocular blindness and 19million people suffer from monocular blindness due to eye injuries.

Objectives: The aim of the study to fight blindness as a result of the correct approach during traumas of the eyeball.

Methods: In our experience, we evaluated patients with eye trauma referred to the National Ophthalmology Center named academician Zarifa Aliyeva within 6 months, 56 patients (56 eyes), 28 male, 11 female, 17 child.

We divided the patients into 2 groups based on the time of referral after injury:

I group - who apply within the first 24 hours after injury – 31 patients.

II group - who apply within 2-15 days of injury – 25 patients.

In 25 patients (80.6%) in the 1st group were surgery performed. Conservative treatment was performed in 6 patients (19.4%). In 21 patients (84%) in the 2nd group were surgery performed. Conservative treatment was performed in 4 patients(6%).

Results: In 1st group we observed good vision (visual acuity>0.3) in 14 patients, poor vision (visual acuity 0.05-0.3) in 12 patients, blindness (visual acuity<0.05) in 5 patients. In 2nd group we observed good vision in 4 patients, poor vision in 8 patients, blindness in 13 patients.

Conclusions: Ocular trauma approach is based on accurate history taking, vision acuity, eye movement checking and detailed eye examination. Pre-medical assistance, timely treatment of ophthalmologic care, proper treatment strategies, post-operative treatment reduce trauma-related vision loss is important.

P-TRA-017

Vitrectomy using 0.025% povidone-iodine irrigation for treating post-traumatic endophthalmitis due to IOFBs

X. Li¹, X. Zhang²

¹Ophthalmology, Shenyang the Fourth People's Hospital, Shenyang, China, ²Ophthalmology, The First Hospital of China Medical University, Shenyang, China

Introduction: Two cases of traumatic endophthalmitis were resolved by pars plana vitrectomy using 0.025% PI-BSS PLUS

Objectives: We present two cases of traumatic endophthalmitis that underwent 0.025% povidone-iodine treatment and hoped to introduce the bactericidal effect of 0.025% povidone-iodine in balanced salt solution PLUS (0.025% PI-BSS PLUS) and its use in vitrectomy for traumatic endophthalmitis. The 0.025% PI-BSS PLUS solution is bactericidal and nontoxic when used as an irrigation solution in pars plana vitrectomy.

Methods: We report two cases diagnosed as traumatic endophthalmitis with intraocular foreign bodies, treated with IVI of 0.1 ml/1.25% PI, followed by vitrectomy using a 0.025% PI irrigation solution during the surgery.

Results: IVI of 1.25% PI followed by vitrectomy using 0.025% PI irrigation is anticipated to become a new treatment for endophthalmitis caused by multidrug-resistant organisms, such as vancomycin-resistant bacteria and fungal organisms.

Conclusions: We postulated that IVI of 1.25% PI followed by vitrectomy using 0.025% PI irrigation for treating endophthalmitis with traumatic foreign bodies could be considered an optimal initial treatment for traumatic endophthalmitis and may be useful from the viewpoint of maintaining the disease.

P-TRA-018

Case report: Multifactorial corneal injury secondary to powder and stone explosion treated with autologous serum

L. Córdón¹

¹Guatemala, Asociación Guatemalteca de Oftalmología, Guatemala, Guatemala

Introduction: Case report: A 25-year old man presented with ocular, face and hands chemical and thermal injuries secondary to explosives at work. The initial emergency management is presented and then the treatment phase until recovery. He was treated with autologous serum, presenting a complete recovery. Despite the severity and reserved prognosis, we believe that this treatment favored and excellent result.

Objectives: Share the experience of using autologous serum in chemical and thermal corneal injury. The advantage of using autologous serum is that it is easy to prepare and is available.

Methods: Case report of a patient.

Results: Share the experience of using autologous serum in chemical and thermal corneal injury.

Conclusions: The advantage of using autologous serum is that it is easy to prepare and is available. We share a case report of a severe and poor prognosis corneal injury (chemical and thermal), showing the usefulness of using autologous serum as part of the treatment.

V-TRA-001

Post-equatorial approach for removal of a magnetic large intra-ocular foreign body

A.S. Brar^{1,2}, U.C. Behera²

¹Brar Eye Hospital, Bathinda, India, ²Vitreous-Retina Services (Anant Bajaj Retina Institute), L V Prasad Eye Institute, Bhubaneswar, India

Introduction: A 21-year-old male had a high-velocity projectile injury to the left eye, while he was using a piece of grinding equipment in a factory.

Objectives: Outline the usage of an extraocular magnet for the removal of a metallic foreign body embedded in the posterior ocular coats.

Methods: Case report with intra-operative video documentation.

Results: Visual acuity was 20/20 in the right eye, and hand motions in the left eye. While the cornea and anterior sclera appeared untouched, with a normal anterior chamber depth in both eyes, the posterior lens capsule in the left eye was heme stained. A vitreous hemorrhage was noted in the left eye with ultrasonography demonstrating a foreign body (FB) in posterior ocular coats, superonasal quadrant with an intact retina-choroid complex. A non-contrast computed tomography scan of the orbit depicted this solitary metallic FB as lying close to the optic nerve, embedded in the superonasal sclera posterior to the equator. An external approach (subconjunctival incision) for metallic FB removal with vitrectomy was planned.

Conclusions: This case demonstrates a post-equatorial approach using an extraocular magnet for the removal of a large intra-ocular FB.

Video

[Click here to play video](#)

V-TRA-002

A modified technique for flanged intrascleral intraocular lens fixation guided by double 27-gauge needles

S. Li¹, H. Fan¹

¹Retina, Shanxi Aier Eye Hospital, Taiyuan, China

Introduction: In 2017, Shin Yamane pioneered the report on flanged Intrascleral Intraocular Lens (IOL) Fixation using the Double-Needle technique, subsequently garnering widespread clinical utilization. Nonetheless, inherent limitations of this technique have been noted. Firstly, the insertion of the trailing haptic into the needle proves challenging due to the fixed position of the leading haptic, thereby restricting the mobility of the trailing haptic. Secondly, ocular hypotony resulting from the trailing haptic being exterior to the corneal incision makes the creation of an angled sclerotomy using a 27-gauge needle very difficult. To address these limitations, we have proposed modifications to the technique. In our approach, angled sclerotomies are created utilizing double 27-gauge needles prior to IOL implantation. Subsequently, the leading haptic is maintained within the 27-gauge needle without fixation while introducing the trailing haptic into the 27-gauge needle, thereby facilitating the insertion of the trailing haptic with greater ease.

Objectives: To present a modified technique for flanged intrascleral intraocular lens fixation guided by double 27-gauge needles.

Methods: A 65-year-old male, with a history of ocular trauma, presented to our eye clinic with decreased visual acuity in the right eye persisting for one month. The uncorrected visual acuity was limited to figure counting, while the best corrected visual acuity (BCVA) measured 0.9 in the right eye, with intraocular pressures of 16 mmHg. Upon examination, dislocation of the lens into the vitreous and dilated pupil were observed in the right eye. Subsequently, the patient underwent a combined surgical procedure consisting of cataract extraction along with vitrectomy, followed by a modified double needle scleral fixation of the IOL.

Results: The IOL was successfully implanted with precise centration and axial stability, as evidenced by absence of IOL tilt upon slit lamp examination. The BCVA improved to 0.6 with intraocular pressure measuring 14 mmHg on the first postoperative day, and further improved to 0.9 with intraocular pressure of 17 mmHg at the two-week follow-up visit. Notably, there were no occurrences of postoperative complications such as retinal detachment, endophthalmitis, IOL dislocation, or vitreous hemorrhage.

Conclusions: The modified technique of 27-gauge needle-guided intrascleral posterior chamber IOL implantation demonstrates effective IOL fixation with safer intraoperative ocular pressure and reliable postoperative outcomes.

Video

[Click here to play video](#)

V-TRA-003

Delayed intraocular foreign body removal due to previous misdiagnosis. An ocular siderosis case

E. Sánchez Olguin¹, C.I. Campos Wolter¹

¹Retina, Fundación Hospital Nuestra Señora de la Luz, Ciudad de México, Mexico

Introduction: Ocular siderosis or siderosis bulbi, is a complication due to iron deposition in ocular tissues caused by the long-time retention of penetrating iron-containing foreign bodies, usually leading to a series of characteristic alteration and severe disorder of visual function. Generally, metals with a low redox potential, such as Fe²⁺ and Cu²⁺ have the greatest potential for metallosis. Ocular Siderosis may develop within days or as long as years after the penetrating trauma.

In this case we present a 36-year-old patient with progressive and insidious visual impairment of 2 years of evolution in the right eye diagnosed with inactive ocular toxoplasmosis, the patient refers a high-velocity metallic ocular trauma 6 years ago in the same eye. The diagnosis of ocular siderosis is integrated, subsequently the patient underwent foreign body extraction.

Objectives: The purpose of this clinical case is to review the clinical presentation of ocular siderosis and provide a better understanding to the diagnostic approach of an intraocular foreign body, also to present in a video the surgical management of intraocular foreign body. Other objectives are to show the ultrasonographic, electroretinogram and optical coherence tomography characteristics of an intraocular body located in the retina.

Methods: Clinical case of rare pathology including surgical video of the removal of an intraocular foreign body located on the retina.

Results: Phacoemulsification with intraocular lens implantation, extraction of the intraocular foreign body and vitrectomy with subsequent resolution of ocular siderosis. Previous diagnosis of ocular toxoplasmosis was ruled out.

Conclusions: Adequate medical interview and thorough ophthalmologic examination are essential for the accurate diagnosis of an intraocular foreign body, which can be complemented with targeted studies. Timely management prevents complications and improves the visual outcomes of patients.

Video

[Click here to play video](#)

V-TRA-004

A case of secondary macular hole after vitrectomy of traumatic endophthalmitis

H. Yujuan¹, k. Xiangbin¹

¹Foshan Second People's Hospital Eye Center, Foshan Second People's Hospital, Foshan City, Guangdong Province, China

Introduction: The patient, male, 50 years old, was admitted to hospital due to "right eye" with a foreign body struck by a hammer in the eye for 2 days, eye pain with blurred vision for 1 day. Accompanied by ipsilateral headache, no nausea, vomiting, high fever, coma and other general discomfort symptoms.

Previous good vision in both eyes. Denial of other systemic diseases. Has not been treated in other hospitals.

At admission, T: 36.3°C, P: 102 times/min, R: 18 times/min, BP: 149/103mmHg

Ocular condition in both eyes: Vod light perception, inaccurate light positioning, Vos 0.8-1

NCT R 53.0mmHg, L 21.0mmHg

Eye condition of right eye: eyelid edema, conjunctival mixed congestion ++ edema +, corneal edema turbidity (++) , iris texture unclear, pupil 3mm, light reflection disappeared, aqueous humor cells (+++), aqueous humor flash (+++), pus 3mm, crystal surface turbidity, exudation ++. Vitreous opacity ++++. I can't see it.

There is no special contralateral eye.

Objectives: Emergency general anesthesia was performed with "right anterior chamber irrigation +PPL+PPV+ intrabulbar foreign body removal + silicone oil filling".

During the operation, vitreous fluid was taken for macrogenetic examination + bacterial and fungal culture. The results showed:

1. Acer: Staphylococcus epidermidis
2. bacterial culture reported Staphylococcus epidermidis.

The macular hole was found on the ninth day after vitrectomy.

Why do macular holes occur? What is the mechanism? Timing of surgery? The surgical method?

Methods: Vitreous silicone oil extraction + macular hole closure (ILM packing) in the right eye after PPV with local anesthesia.

Intraocular lens interscleral fixation (Yamane) was performed 4m after oil extraction.

Results: 7 days after surgery: Vod 0.1, NCT R 16.7mmHg, L 20.3mmHg

Conclusions: TMH treatment difficulties

Difficult point 1:TMH has a certain self-healing rate, how to choose "observation or surgery"?

Difficulty 2:Timing of TMH surgery is closely related to prognosis. When is the best time to operate?

Difficulty 3:TMH surgery is varied, how to choose the right surgery?

Possible causes of MH after PPV of traumatic endophthalmitis in this case:

1. Traumatic endophthalmitis:
2. Vitreous traction
3. Effects after vitrectomy
4. Inflammation and fibrosis
5. retinal degeneration and atrophy

Video

[Click here to play video](#)

V-TRA-005

Splash the eye like tomato

S. Natarajan¹, A. Ganvir²

¹Department of Ophthalmology, Chief of Vitreo-Retina Department of Agarwal Eye Institute, Aditya Jyot Eye Hospital (Unit of Agarwal Eye Institute) Wadala, Mumbai, India, ²Surgical Vitreoretina Fellow in Department of Ophthalmology, Aditya Jyot Eye Hospital (Unit of Agarwal Eye Institute) Wadala, Mumbai, India

Introduction: Open globe injuries, characterized by a breach of the eyeball wall integrity, represent a critical ophthalmic emergency. These injuries can result from various causes, including sharp objects, projectile impacts, and high-velocity injuries. Blunt or penetrating trauma, and may lead to vision loss if not promptly and appropriately managed. Open globe injuries need urgent attention.

Objectives:

1. To report unusual mode of ocular injury
2. To explain role of surgical intervention and its impact psychosocial impact.

Methods: Case report.

Results: A 12-year-old male presented with a history of being accidentally hit by a Swiss knife in the right eye. Full-thickness corneoscleral laceration was noted with loss of natural crystalline lens and vitreous from the wound. CT imaging showed a rupture of the eyeball with a preseptal haematoma in the extraconal compartment, extending up to the insertion of the extraocular muscles. Posterior extension into the retrobulbar compartment of the optic nerve close to the disc. On initial presentation, the patient had no perception of light and an unremarkable exam. Surgical planning involved meticulous corneoscleral laceration repair with an anterior vitrectomy. A giant retinal tear with tractional retinal detachment was noted. After 1 week, a vitreoretinal surgery was done with a pars plana vitrectomy with tractions removal and heavy-density silicone oil (Densiron) implantation. Multiple surgeons denied primary repair and told them evisceration would be needed. The patient family was much more psychologically relieved as we did the surgical intervention.

Conclusions: This case describes a penetrating sharp Swiss knife whose trajectory involved cornea, sclera till close to disc with intact orbital bone structure. Primary corneoscleral repair and secondary vitreoretinal surgery caused significant positive impact on family and patient even if we explained them nil visual prognosis. There were significant risks given the trajectory, depth of penetrance. This case highlights the role primary and secondary repair in management to a high-risk injury.

Video

[Click here to play video](#)

V-TRA-006

A merciful foreign body

S. Bhattacharya¹, M. Thakar¹

¹Ophthalmology, Guru Nanak Eye Centre, Maulana Azad Medical College, New Delhi, India

Introduction: This video presents the case of a patient who presented with a metallic foreign body nestled in the anterior segment of the eye without much damage elsewhere.

Objectives: To safely remove this miraculous foreign body without causing harm to the eye structures.

Methods: A 18Y male presented to the emergency with a self sealed corneal perforation and a linear metallic foreign body in his anterior segment that miraculously missed every structure of importance - one end was embedded in the cornea and the other in the peripheral iris tissue, and it had completely avoided the central visual axis and the lens. The challenge in the emergency operating room was to safely remove it, without causing more iatrogenic damage, or causing the foreign body to fall back into the posterior segment. This was a challenging and exciting case for this young senior resident in ophthalmology.

Results: Although challenging and aided with spur-of-the-moment techniques, the foreign body was safely removed without much damage and the patient recovered well.

Conclusions: Ophthalmic trauma can present in a myriad of different ways, and every case is a challenge and pleasure to handle.

Video

[Click here to play video](#)

Ophthalmic Pathology

FT-PAT-002

ITGB2-ICAM1 axis promotes liver metastasis in BAP1-mutated uveal melanoma with retained hypoxia and ECM signatures

T. Ge¹, A. Zhuang¹

¹Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Up to 50% of uveal melanoma (UM) cases develop metastases in a median of 2.4 years with liver as the first metastatic site, and 90% of metastatic patients result in death within six months. Determining the precise mechanism underlying UM metastasis becomes essential. Class 2 UM, which normally contains BRCA1-associated protein 1 (BAP1) inactivating mutation, is linked to a short-term survival and unknown contributions to UM metastasis. The tumor microenvironment (TME) is composed of tumor cells and their surroundings such as immune cells, fibroblasts, vascular endothelial cells. Previous studies have shown that the interactions between cells in the TME can impact tumor initiation, progression and metastasis, as well as the responsiveness to treatment and the development of drug resistance. However, the precise mechanisms through which BAP1 deficiency promotes tumor promotion and regulates communication between tumor cells and TME remain unclear.

Objectives: The objective of this study was to identify the possibility of BAP1-mutation in driving UM metastasis and to discover potential molecules for the prevention or treatment of metastatic UM.

Methods: We analyzed the single-cell RNA sequencing (scRNA-Seq) data comprised primary and metastatic UM with or without BAP1 mutations (MUTs) to reveal inter- and intra-tumor heterogeneity among different groups. Then, an immune-competent mouse liver metastatic model was used to explore the role of ITGB2-ICAM1 in BAP1-associated UM metastasis.

Results: Cluster 1 tumor cells expressed high levels of genes linked to tumor metastasis, such as *GDF15*, *ATF3*, and *CDKN1A*, all of which are associated with poor prognosis. The strength of communication between terminally exhausted CD8⁺ T cells and *GDF15^{hi}ATF3^{hi}CDKN1A^{hi}* tumor cells was enhanced in BAP1-mutated UM, with *CellChat* analysis predicting strong ITGB2-ICAM1 signaling between them. High expression of either ITGB2 or ICAM1 was a worse prognostic indicator. Using an immune-competent mouse liver metastatic model, we indicated that inhibiting either ICAM1 or ITGB2 prevented liver metastasis in the BAP1-mutated group in vivo.

Conclusions: This study suggested that the ITGB2-ICAM1 axis may play a crucial role for BAP1-associated UM metastasis by preserving hypoxia- and ECM- related signatures, which provide a potential strategy for preventing UM metastasis in patients with BAP1 mutation.

FT-PAT-003

Epidemiological and histopathological features of ocular tumors in Bukavu, Democratic Republic of the Congo

B.B. Manwa¹, D.B. Kabesha², O. Mukuku³, E.N. Heri², R.N. Hadisi², P.B. Katchunga⁴, Z.K. Tsongo⁵, S.O. Wembonyama⁶, T.B. Kabesha², R.B. Chirimwami⁷

¹Anatomopathology, Université Officielle de Bukavu, Bukavu, Congo, Democratic Republic of the, ²Ophthalmology, Université Officielle de Bukavu, Bukavu, Congo, Democratic Republic of the, ³Santé Publique, Institut Supérieur des Techniques Médicales de Lubumbashi, Bukavu, Congo, Democratic Republic of the, ⁴Internal Medicine, Université Officielle de Bukavu, Bukavu, Congo, Democratic Republic of the, ⁵Internal Medicine, Université de Kisangani, Kisangani, Congo, Democratic Republic of the, ⁶Pediatrics, Université de Lubumbashi, Lubumbashi, Congo, Democratic Republic of the, ⁷Anatomopathology, University of Kinshasa, Kinshasa, Congo, Democratic Republic of the

Introduction: Ocular tumor disease is more common in Africa than in developed countries. Malignancies compromise the functional prognosis of the eye and the life-threatening prognosis of the affected patient. Their early diagnosis is essential, based on histopathological examination for appropriate management. Diagnosis of malignancies is most often difficult, especially in developing countries, where they are clinically and histologically confusing. Histopathology is the standard of excellence for diagnosis.

Objectives: To describe epidemiological and histopathological features of ocular tumors observed in two ophthalmology departments in Bukavu in the Democratic Republic of the Congo.

Methods: A cross-sectional descriptive study and a simple proportion analysis were performed to describe the epidemiological and histopathological characteristics of 103 consecutive anatomical pieces taken after tumor removal from two ophthalmology services in Bukavu city from January 2018 to December 2020.

Results: Children accounted for 40% of patients and ocular tumors were unilateral in 84.5% of cases. The most common locations were the retina (34.8%), conjunctiva (33.7%) and eyelids (22.8%). Benign tumors predominated (51.4%), followed by malignant tumors (37.9%), and undetermined tumors (15.5%). The main histological forms found were retinoblastoma (34.8%), conjunctival nevus (20.6%), and palpebral granuloma (16.3%).

Conclusions: Ocular tumors are common in Bukavu. Histopathological examination remains essential to guide management to reduce the risk of recurrence and related complications.

Keywords: ocular tumor, histopathology, retinoblastoma, Bukavu

P-PAT-001

Systemic therapy benefits conjunctival melanoma patients staging worse than cT2b: Results from a retrospective study

Y. Li¹, S. Xu¹, R. Jia¹, X. Fan¹

¹Ophthalmology, Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Systemic treatment options for distant metastatic conjunctival melanoma (CoM) has been reported in limited case series.

Objectives: The aim of this study is to assess the clinical outcome and safety of systemic treatment in metastatic and local advanced CoM patients.

Methods: Propensity score matching was used to match control cases. Next-generation sequencing was applied to obtain gene mutation information by panel study. The main drug regimens included immune checkpoint inhibitors (ICI), targeted therapy (TT), and chemotherapy. Survival and progression probabilities were calculated with Kaplan-Meier method and compared by the log-rank test. A Cox proportional-hazards model was used to estimate the hazard ratio. Main outcomes included overall survival (OS), time from lymph node metastasis to distant metastasis, time from distant metastasis to death; best overall response (BOR), disease control (DC) rate; progression-free survival (PFS) and OS from treatment initiation; adverse events (AEs).

Results: Totally 76 patients were enrolled, among whom 19 underwent systemic treatment and 57 did not. For M0 patients, median OS was longer than 16.6 months (undefined) and 48.0 months respectively ($p = 0.13$). For N1M0 patients, systemic treatment prolonged the interval time from diagnosis of nodal metastasis to distant metastasis (undefined, beyond 13.1 months vs 12.0 months) ($p = 0.03$). For M1 patients, time from distant metastasis to death was 15.6 months and 6.1 months respectively ($p = 0.02$). At a median follow-up time of 8.3 months, 78.9% of 19 patients achieved a DC as BOR, with median duration at 4.6 months. Median PFS was beyond 5.8 months (undefined) for ICI, 20.4 months for TT and 5.3 months for chemotherapy. Patients treated with first-line ICI had a median OS of 18.3 months from first systemic treatment started, compared to beyond 24.9 months (undefined) in patients receiving first-line TT and 16.6 months in chemotherapy. 30.8%, 42.9% and 42.9% patients receiving ICI, TT and chemotherapy respectively reported AEs, all confined in Grade 1-2.

Conclusions: Systemic treatment benefits CoM patients with and without distant metastasis. For *BRAF*-mutant CoM, TT is suggested as front-line therapy. For *BRAF*-wild type CoM, first-line ICI leads to higher response rates and improved survival outcomes.

P-PAT-002

The anti-aging effect of proanthocyanidins on LEC apoptosis in age-related cataract by regulating PI3K/AKT/mTOR pathway

Y. Lu^{1,2,3}, L. Shuangnong², Z. Dongchang², G. Yan³, H. Pengfei², Z. Li³, Q. Mengyuan¹, G. Yaohui¹, D. Xiuqing¹, L. Yujie¹, S. Wencui¹

¹Changzhi Aier Eye Hospital, Changzhi, China, ²Shanxi Aier Eye Hospital, Taiyuan, China, ³Taiyuan Aier Eye Hospital, Taiyuan, China

Introduction: To evaluate the anti-aging effect of proanthocyanidins (PC) on the apoptosis of lens epithelial cells (LEC) in age-related cataract by analyzing the effects of proanthocyanidins on the activity of PI3K/AKT/mTOR pathway, cell apoptosis and autophagy pathway in vitro and in vivo.

Objectives: To evaluate the anti-aging effect of PC on the apoptosis of lens epithelial cells (LEC) in age-related cataract by analyzing the effects of proanthocyanidins on the activity of PI3K/AKT/mTOR pathway, cell apoptosis and autophagy pathway in vitro and in vivo.

Methods: The mice were randomly divided into two groups, and D-galactose was used to induce mouse aging model for 9 weeks. The lens tissues of mice in each group were stained with HE, and the blood samples were analyzed by biochemical analysis. MTT assay was used to detect the effect of D-galactose and D-galactose combined with proanthocyanidins on cell viability. β -galactosidase staining was performed to detect the proportion of cell senescence. Quantitative Real-time PCR and Western Blot were used to detect the gene and protein expression levels of senescence related genes, PI3K/AKT/mTOR pathway, autophagy, and mitochondrial copy number in cells and tissues. ATP detection kit was used to detect mitochondrial function in each group.

Results: 1. HE staining and blood biochemical results showed that PC could reduce blood glucose and aspartate aminotransferase activity, and increase albumin content, suggesting that it had the effect of alleviating aging.

2, MTT assay showed that PC enhanced cell proliferation ability.

3, β -galactosidase staining analysis, PC group caused a decrease in senescent cells.

4. The expression of cell cycle-related genes and proteins in each group was detected, suggesting that PC promoted cell cycle cycling.

5. The ratio of Bax/Bcl-xl, Bak/Mcl-1 and the expression of cleaved caspase-3 were increased after PC treatment, suggesting that PC induced apoptosis in senescent cells. The mitochondrial copy number and ATP production in the PC group were significantly increased. The expression of p62 was decreased, the expression of LC3II/I was increased, and the expression of mitophagy-related proteins PINK1 and parkin was increased in the mouse lens of the PC group, suggesting that PC promotes the activation of autophagy in mouse lens.

Conclusions: Proanthocyanidins promote excessive activation of autophagy by inhibiting the PI3K/AKT/mTOR pathway in D-galactose induced senescent cells and tissues, thereby inducing apoptosis of senescent cells.

P-PAT-003

Autophagy-induced NR2F1 activation facilitates cataract-associated fibrosis through targeting STAT3

K. Hu¹, H. Zuo², W. Wan¹, X. Liu²

¹The First Affiliated Hospital of Chongqing Medical University, Chongqing, China, ²The First Affiliated Hospital of Chongqing Medical University, Chongqing Medical University, Chongqing, China

Introduction: Cataracts, a prevalent ocular condition, result in visual impairment and stand as a primary contributor to blindness. Lens epithelial fibrosis has been proved to be one of the most important causes. However, the underlying mechanism remains unclear. In the present study, our findings revealed that NR2F1 was significantly increased in vivo and in vitro. Knockdown of NR2F1 in lens epithelial cells attenuated (Transforming Growth Factor- β 1) TGF- β 1-induced proliferation, migration, and epithelial-mesenchymal transition (EMT) in the in vitro setting. Additionally, NR2F1 adeno-associated virus infected anterior subcapsular cataract (ASC) mice exhibited a deceleration in the progression of fibrosis. Mechanically, autophagy was disordered by TGF- β 1 stimulation, which led to impaired degradation and increased protein level of NR2F1 in epithelial cells, more NR2F1 proteins bonds directly with the promoter of STAT3 by dual-luciferase experiment and regulates the expression of P-STAT3, promoting lens epithelial cells fibrosis, migration, and apoptosis, resulting the development of cataract.

Objectives: The objective of this study is to elucidate the pathogenic mechanisms underlying fibrotic cataracts and to ascertain NR2F1 as a promising therapeutic target for the treatment of fibrotic cataracts.

Methods: Western blotting, immunofluorescence, dual-luciferase reporter assay, hematoxylin and eosin staining, and PCR techniques were applied for investigation.

Results: NR2F1 was discerned to engage in direct interaction with the promoter region of STAT3, thereby markedly augmenting LEC migration, proliferation, and the EMT process. Consequently, this contributes to the progression of injury-induced ASC in mice. And it was worth noting that we unveiled a previously unrecognized mechanism wherein NR2F1 promotes EMT through positive regulation of the P-STAT3 signaling pathway.

Conclusions: NR2F1 is related to EMT process in cataract. After silencing NR2F1, the opacity of lens is reduced in ASC model. Additionally, inhibition of NR2F1 in SRA01/04 cells, the migration, apoptosis, and EMT process were attenuated. Mechanically, it was found that NR2F1 bonds directly with the promoter of STAT3 by dual-luciferase experiment and regulates the expression of P-STAT3, resulting the development of cataract. This discovery contributes valuable insights into potential therapeutic strategies for addressing pathological processes in the lens, with implications for conditions characterized by fibrosis and apoptosis.

P-PAT-004

Conjunctiva resident $\gamma\delta$ T cells expressed high level of IL-17A and promoted the severity of dry eye

L. Li¹, Y. Li², X. Zhu², B. Wu³, Z. Tang², H. Wen², J. Yuan⁴, Q. Zheng², W. Chen²

¹Ningbo Eye Hospital, Ningbo, China, ²School of Ophthalmology and Optometry and Eye Hospital, Wenzhou Medical University, Wenzhou, China, ³Shaoxing People's Hospital, Shaoxing, China, ⁴Ningbo Eye Hospital, Ningbo, Zhejiang, China

Introduction: In this study, we found that the proportion and number of $\gamma\delta$ T cells increased in the human DED conjunctiva with severe corneal epithelial defects. We confirmed the presence of $\gamma\delta$ T cells in the mouse conjunctiva and further characterized their associated cytokines in the DED animal model. We unexpectedly found that different from lymph nodes where Th17 cells were the major IL-17-producing cells, $\gamma\delta$ T cells were the main source of IL-17A in the conjunctiva. We showed that $\gamma\delta$ T cells were enriched in the conjunctiva and the majority of $\gamma\delta$ T cells in conjunctiva expressed high levels of IL-17A but not IFN- γ . When $\gamma\delta$ T cells were depleted by anti-TCR δ neutralization antibody injection or genetic deletion of TCR δ in mice, the ocular surface damage was mitigated. Collectively, we have elucidated that the $\gamma\delta$ T cells in conjunctiva were key sources of IL-17A, which promoted corneal epithelial defects and the severity of DED.

Objectives: Conjunctival inflammation promotes ocular surface disorders in dry eye disease (DED). Here we identified $\gamma\delta$ T cells as the predominant source of IL-17A in the murine conjunctiva and assessed their contribution to the pathogenesis of DED.

Methods: We enrolled 22 DED patients, and analyzed the proportion of $\gamma\delta$ T cells in the conjunctival epithelial samples by flow cytometry. Adult C57Bl/6 wild-type and TCR $\delta^{-/-}$ mice were used to induce DED models to investigate the role of $\gamma\delta$ T cells. The characteristics of immune cell infiltration and the expression of immune-related cytokines or markers in mouse conjunctiva were analyzed by flow cytometry, western blot, and quantitative PCR (qPCR).

Results: The proportion of $\gamma\delta$ T cells in the human DED conjunctiva is significantly higher in patients with severe corneal epithelial defects than in mild ones, which is consistently observed in the murine DED model. Further, a high level of IL-17A but not IFN- γ is detected in the conjunctiva of mice. The increased murine IL-17A-producing cells on the conjunctiva are identified as $\gamma\delta$ T cells predominantly and Th17 cells to a lesser extent. Ablation of $\gamma\delta$ T cells by antibody depletion or genetic deletion of TCR δ alleviates ocular surface damage in the murine DED model.

Conclusions: Our studies evaluate human and experimental murine DED for evidence of $\gamma\delta$ T cell-mediated inflammation and highlight a potential therapeutic synergy by targeting IL-17 and $\gamma\delta$ T cells in DED treatment.

P-PAT-005

Congenital anophthalmia, a case series in Ecuador

T. Munoz¹, A. Ortiz², E. Dib³, J. De Vera¹, E. Vazquez²

¹Universidad Católica de Santiago de Guayaquil, Guayaquil, Ecuador, ²Centro de Especialidades Oftalmológicas Aljaorza, Machala, Ecuador, ³Hospital de Niños Dr. Roberto Gilbert E., Guayaquil, Ecuador

Introduction: Congenital anophthalmia (CA), is a rare pathology in which an individual is born with an absence of ocular tissue in the orbit, unilateral or bilateral. It is the result of genetic or environmental factors during fetal development and may or may not be associated with systemic malformations. It is diagnosed through clinical examinations and imaging tests. Treatment includes options such as ocular prostheses, reconstructive surgeries, and psychosocial support therapies.

Objectives: Describe a cases series of congenital anophthalmia from two reference centers on the Ecuadorian Coast, the Aljaorza Ophthalmological Specialties Center and Roberto Gilbert Children's Hospital.

Methods: An observational, descriptive study was carried out on 8 patients with anophthalmia, from January 2020 to January 2024. Data were collected through ophthalmological examination, clinical history and complementary studies.

Results: During four years, eight cases of congenital anophthalmia were documented, patients aged between 3 days and 4 years old. Four were male and four females, one of the patients being compatible with the super male syndrome (karyotype 47 XY), and two with Pataw's syndrome. Three cases were bilateral, and five unilateral with contralateral microphthalmia. One patient was shown as sole finding, however, 80% showed malformations and associated comorbidities, cleft lip and palate being the most frequent, cardiac, renal, pulmonary pathologies among others were also documented. Genetic studies of the MAC spectrum (Microphthalmia, Anophthalmia and Coloboma) were performed on two of the patients, resulting in negative results for the conventional genes (SOX2, OTX2, STRA6, PAX6, CHD7) that explain more than 75% of the anophthalmia. Imaging studies (Ultrasound, simple CT of the orbits or MRI of the orbits) were performed to confirm the absence of ocular tissue. Other clinical characteristics and complementary studies are summarized in tables.

Conclusions: CA is a challenging medical condition with very low global statistics. Unfortunately, demographic data is not available in Ecuador. However, given the casuistry in this short period of time, we can state relatively high incidence at national level. Which strengthens the need to study it in depth to improve its diagnosis and management. A multidisciplinary approach is required that includes specialized medical care, psychological support and social measures to ensure a better quality of life.

P-PAT-006

Aurolab aqueous drainage implant (AADI) implantation: evaluating graft-free short tunnel flap vs. scleral patch graft

B.K. de Sarker¹, Q.S. Iftokhar², M. Mahatma³

¹Glaucoma, Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh, ²Paediatric Ophthalmology, Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh, ³Pathology, Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh

Introduction: Glaucoma Drainage Devices (GDDs) are effective treatment options for refractory glaucoma cases. These surgically implanted devices facilitate aqueous humor drainage, effectively reducing intraocular pressure and preserving vision.

Objectives: To compare the outcomes of the graft-free short tunnel flap (STF) technique with that of the scleral patch graft (SPG) in Aurolab aqueous drainage implant (AADI) implantation.

Methods: This was a comparative interventional study of 110 eyes of 100 patients with medically uncontrolled glaucoma, including 60 in the STF group and 50 in the SPG group. Patients were enrolled and assigned randomly to STF or SPG. The outcome measures were tube exposure, intraocular pressure (IOP), number of glaucoma medications, best-corrected visual acuity, surgical complications, and success rate (defined as IOP >5 mmHg, ≤21 mmHg, and IOP reduction ≥20% from baseline at 2 consecutive visits after 3 months).

Results: The cumulative probability of success during the first year of follow-up was 85% in the STF group and 80% in the SPG group ($P = 0.54$). The final IOP decreased significantly from baseline and was comparable between both groups ($P = 0.55$). Postoperative complications developed in 7 patients in the STF group and 8 patients in the SPG group ($P = 0.71$). Only 3 patients in the SPG group developed tube exposure at 1-year follow-up.

Conclusions: The STF and SPG techniques had a comparable complication rate at the 1-year follow-up. Both techniques were comparable in terms of success rate, postoperative IOP, and glaucoma medications.

P-PAT-007

Probucol inhibits high glucose-induced ferroptosis in human RPE cells by down-regulating BACH1

S.n. Liang¹, Z.p. Chen²

¹Central South University, Hunan, China, ²Aier Eye Hospital of Changsha, Hunan, China

Introduction: Diabetic retinopathy (DR) is one of the major blinding eye diseases with poor prognosis. Efficient treatment for the middle and late stages of DR is still not available. Probucol (PB) has long been known to lower hyperlipidemia, however, whether or not it can improve DR has not been reported.

Objectives: This study aimed to explore the protective mechanisms by curbing the ferroptosis in a human DR-mimicking cell model.

Methods: ARPE-19 cells were induced by high glucose (HG) to mimic the DR phenotypes. Western blotting was used to determine the protein expression of BACH1 and ferroptosis-associated factors, and CCK8 cell counting kit assay was used to observe cell viability. Reactive oxygen species (ROS), cellular lipid peroxides malondialdehyde (MDA), 4-hydroxynonenal (4-HNE), glutathione (GSH) and oxidative stress-related factors were detected using commercial kits respectively. Ferro Orange assay was performed to evaluate ferroptosis. BACH1 siRNA knockdown was performed to determine the cause-effect relationship of BACH1 and ferroptosis.

Results: HG evidently promoted cell death and increased the levels of ROS, MDA, and 4-HNE of ARPE-19 cells. Administration of PB into the cells alleviated those injuries. In addition, HG increased the expression of BACH1 and decreased the expression of solute carrier family 7 member 11 (SLC7A11), glutathione peroxidase 4 (GPX4), and ferroptosis suppressors protein 1 (FSP1), which are important factors antagonizing ferroptosis, however, PB reversed these changes. Mechanistically, PB antagonized HG-induced cellular ferroptosis by attenuating BACH1 expression in RPE cells and enhancing downstream GPX4/FSP1. After the knockdown of BACH1 expression and treatment of PB, the ferroptosis-related changes were inhibited.

Conclusions: HG induces ferroptosis in DR-mimicking RPE cells and causes cellular ferroptosis. PB was found to mitigate ferroptosis by suppressing BACH1 expression and subsequently increasing cellular antioxidant capacity, which may inhibit the pathological process of DR.

P-PAT-008

Single-cell landscape reveals the epithelial cell-centric pro-inflammatory immune microenvironment in dry eye

Z. Liu¹, H. Xie², L. Li³, D. Jiang², Y. Qian⁴, X. Zhu², M. Dai², Y. Li¹, R. Wei², Z. Luo¹, W. Xu¹, Q. Zheng², J. Shen⁴, M. Zhou², W. Zeng⁵, W. Chen²

¹Wenzhou Medical University, Wenzhou, China, ²Wenzhou Medical University Eye Hospital, Wenzhou, China, ³The Affiliated Ningbo Eye Hospital of Wenzhou Medical University, Ningbo, China, ⁴University of the Chinese Academy of Sciences, Wenzhou, China, ⁵Tsinghua University Institute for Immunology, Beijing, China

Introduction: Dry eye disease (DED) is a prevalent chronic ocular disorder driven by inflammation of the ocular surface mucosa. Despite its significance, the precise immune mechanisms underlying DED progression remain incompletely understood.

Objectives: To elucidate the pathogenesis of DED, we characterized the dynamic changes within the conjunctival immune microenvironment throughout disease progression utilizing an environment-induced mouse model.

Methods: We used single-cell transcriptome sequencing to profile conjunctival tissue from mice with environment-induced DED at 1-week and 3-week time points. Bulk transcriptome analysis of human conjunctiva from video display terminal (VDT)-induced DED patients provided translational validation.

Results: We discovered a unique epithelial subtype exhibiting both fibroblastic characteristics and pro-inflammatory effects emerging in the acute phase of DED. Moreover, Th1, Th17, and Treg cells were identified as the dominant CD4+ T-cell populations regulating immune responses. We delineated three distinct macrophage subtypes, with the CD72+CD11c+ subtype promoting chronic inflammation. Critically, bulk transcriptome analysis suggested the presence of this pro-inflammatory epithelial subtype in human conjunctiva from VDT-induced DED.

Conclusions: Our findings uncover a DED-associated pro-inflammatory microenvironment, centered on epithelial cells, involving interactions with macrophages and CD4+ T cells, which deepen our understanding of ocular surface mucosal immune responses during DED progression.

P-PAT-009

Experimental study of abnormal natriuretic peptide pathway in early diabetic retinopathy

Y. Zhang¹, C. Huang², X. Wang², J. Li²

¹Xi'an People's Hospital (Xi'an Fourth Hospital), Xi'an, China, ²Shaanxi University of Chinese Medicine, Xianyang, China

Introduction: Retinal vascular circulation disorder is an important factor leading to the occurrence and development of diabetic retinopathy. Therefore, it is of great significance to further explore the molecular mechanism of vascular circulation disorder in DR. Atrial natriuretic peptide (ANP) is a vasodilator peptide that can participate in the regulation of hemodynamic responses. Studies have confirmed that ANP expression was found in nerve cells, glial cells and blood vessels in normal human retinal tissues, and the level of ANP in the eyes of diabetic patients and diabetic rats changed, but unfortunately, the relationship between this signaling pathway and the occurrence and development of diabetic retinopathy is still unclear. The aim is to reveal the new mechanism of the occurrence and development of diabetic retinopathy, and to provide new ideas for the prevention and treatment of diabetic retinopathy from the perspective of improving the sensitivity of retinal natriuretic peptide.

Objectives: To study the activity of ANP/cGMP signal in early diabetic retinopathy, and provide a new direction for the treatment of diabetic retinopathy.

Methods: Fifty-five adult male Spregue-Dawley rats were randomly divided into normal control group (group A, n=10), diabetic group, BNP group (group B and group C, n=45). Animals were sacrificed in batches at 12 weeks and 16 weeks respectively. The eyeballs were collected to make paraffin sections for HE staining to observe the retinal interlamellar structure and cell arrangement. Retinal vascular stretched preparation to observe retinal vascular diameter. Western Blot was used to analyze the levels of ANP, brain natriuretic peptide (BNP), atrial natriuretic peptide receptor A (NPRA) and endothelin-1 (ET-1) in each group.

Results: Compared with group A, the inner and outer granular layers of retina in group B were disordered at 12 weeks and 16 weeks. The capillaries in the ganglion fiber layer, ganglion cell layer and inner granular layer were significantly dilated and the lumen was significantly thickened ($P<0.05$). The above situation in group C was better than that in group B. At 12 weeks, the expression levels of ANP, BNP, NPRA and ET-1 in group B were significantly higher than those in group A ($P<0.05$), while the expression levels of ANP, BNP, NPRA and ET-1 in group C were significantly lower than those in group B ($P<0.05$). At 16 weeks, the expression of ANP, BNP, NPRA and ET-1 in group B was significantly lower than that in group A ($P<0.05$). The expression of ANP, BNP, NPRA and ET-1 in group C was significantly higher than that in group B ($P<0.05$), but there was no significant difference between group C and group A ($P>0.05$).

Conclusions: The retina of experimental diabetic rats showed abnormal natriuretic peptide pathway, and the abnormal enhancement of natriuretic peptide signal in the early retina. With the prolongation of the course of diabetes, the signal of natriuretic peptide was impaired. This study provides new ideas for the prevention and treatment of diabetic retinopathy from the perspective of improving the abnormality of retinal natriuretic peptide pathway.

P-PAT-010

Exudative and non-exudative age-related macular degeneration show different expression profiles of miRNAs and cytokines

M. Castañeda Carranza¹, M. Cruz Aguilar¹, A. Lammoglia Kirsch², E. Castillo Balcázar², Y.C. Alvarado Alvarado², L. Islas Vázquez², H. Velázquez Soto², M.C. Jiménez Martínez²

¹Immunology, Instituto de Oftalmología FAP Conde de Valenciana, IAP Sede Centro, Mexico City, Mexico, ²Immunology, Instituto de Oftalmología FAP Conde de Valenciana, IAP Sede, Mexico City, Mexico

Introduction: Age-related macular degeneration (AMD) is a leading cause of blindness among the elderly population, categorized into non-exudative (dAMD) and exudative (wAMD) forms. The mechanisms underlying AMD are still unclear and therefore hinder the generation of effective therapies. Molecular and immune imbalances promote AMD pathogenesis. Low-grade chronic Inflammation plays an important role in both forms of AMD. Non-coding microRNAs (miRNAs) regulate various processes involved in AMD, including inflammation and pathological angiogenesis. However, the relationship between inflammation factors, miRNAs expression and the progression of AMD is still unclear.

Objectives: The study aimed to explore correlations between the systemic expression of inflammatory factors and selected miRNAs (miR-146a and miR-155) to unveil AMD mechanisms and the identification of disease-specific prognosis biomarkers.

Methods: Serum cytokines and expression of miR-146a and miR-155 of 48 AMD patients and controls were analyzed with flow cytometry and RT-PCR respectively. Statistical analysis included the Wilcoxon, Mann-Whitney and Kruskal-Wallis test.

Results: Comparing with controls, serum of wAMD showed higher concentrations of IL-6, IL-10, VEGF, and low expression of miR-146a or miR-155, while dAMD patients displayed higher IL-8 and IL-10 and no differences in miRNAs levels. Significant differences in TNF- α , VEGF and IL-8 were observed between AMD groups with miRNAs expressions notably diminished in wAMD versus dAMD.

Conclusions: IL-8, TNF- α , VEGF and miRNAs 146a and 155 expressions could serve as distinctive systemic markers between wet and dAMD. The deregulation of miRNAs 146a and 155 negatively impacts inflammatory pathways and VEGF-dependent angiogenesis in patients with wAMD suggesting an inflammatory mechanism underlying AMD development.

P-PAT-011

13-cis retinoic acid-mediated modulation of HMGECS development: implications for in vitro modeling of MGD

X. Jin¹, N. Wang¹, K. Yuan¹, S. Yang¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Meibomian gland dysfunction (MGD) is a common condition affecting the meibomian glands, leading to dry eye disease. In vitro models are valuable for studying MGD and developing treatments. This study investigates the effects of 13-cis retinoic acid (13-cis RA) on human meibomian gland epithelial cells (HMGECS) and its potential as an in vitro MGD model. The study evaluates cell viability, proliferation, gene expression, inflammation, oxidative stress, and meibum synthesis. Results reveal that 13-cis RA inhibits cell viability, promotes inflammation and oxidative stress, and suppresses meibum synthesis through the PPAR γ pathway. This research enhances our understanding of MGD and offers a promising model for further investigations.

Objectives: This study aimed to investigate the effect of 13-cis retinoic acid (13-cis RA) on human meibomian gland epithelial cells (HMGECS) and explore the potential of using this experimental model as an in vitro approach for studying meibomian gland dysfunction (MGD).

Methods: First, HMGECS were cultured with 13-cis RA at different doses and times, and cell viability and proliferation rates were assessed to determine the appropriate stimulation concentration and time. Subsequently, during the proliferation stage, the expression of proliferation, inflammation, and oxidative stress genes and their products were evaluated. The meibum synthesis capacity was determined during the differentiation stage. Additionally, the PPAR γ antagonist GW9662 was used as a control to assess the impact of 13-cis RA on PPAR γ .

Results: 13-cis RA significantly inhibited cell viability and proliferation in a time-dose response manner. Under the stimulation of 2 μ M and 5 μ M for 48 h during the proliferation stage, a significant decrease was observed in the expression of cell proliferation markers Ki67, antioxidant SOD-2, and Nrf-2. However, the expression of the pro-inflammatory factors IL-1 β , IL-8, MMP9, and oxidative stress markers NOX-4, ROS increased. During the differentiation stage, it suppressed meibum synthesis and the expression of meibocyte differentiation-related proteins ADFP4, ELOVL4, SREBP-2, and PPAR γ .

Conclusions: 13-cis RA inhibited cell viability, promoted inflammation and oxidative stress, and suppressed meibum synthesis through the PPAR γ pathway. Our study shed light on the effect of 13-cis RA on HMGECS and provided a promising direction for studying MGD in vitro.

P-PAT-012

Ligneous conjunctivitis in a toddler: a rare case report

T.D. Bekele¹, A. Aberra¹, K. Belete²

¹Ophthalmology, Hawassa University, Hawassa, Ethiopia, ²Pathology, Hawassa University, Hawassa, Ethiopia

Introduction: Ligneous conjunctivitis is a rare form of chronic, recurrent conjunctivitis characterized by “woody”, fibrinous pseudomembranes on the palpebral conjunctiva. Our case is a three-year-old male child who was brought by his parents with a chief complaint of whitish growth on both eyes accompanied by occasional discharge since the age of one year that progressively worsened over time. There was a thick white membrane adherent to the upper and lower inner tarsal conjunctival surfaces, bilaterally. The histopathologic study showed intense mixed inflammatory cell infiltrates accompanied by abundant hyalinized amorphous fibrin deposition with an impression of ligneous conjunctivitis. Ligneous conjunctivitis should be considered in the differential diagnosis of chronic membranous conjunctivitis, particularly in children.

Objectives: The main objective is to confirm a suspected case of ligneous conjunctivitis.

Methods: We rely on physical examination and histopathology result.

Results: The case is confirmed by histopathology.

Conclusions: Ligneous conjunctivitis should always be taken into consideration in a child with chronic recurring conjunctivitis. Once the presumed diagnosis is made chronic management and follow-up mandates to ensure the maximum improvement possible.

P-PAT-013

Effectiveness and safety of invasive oblique muscle delamination and subtraction in the treatment of rotating strabismus

D. Xu¹, Y. Wang¹

¹Chongqing Wodi Ophthalmology Department, Chongqing, China

Introduction: Ocular torsion may play in contributing to A and V patterns

Objectives: To explore the application of the modified oblique muscle separation and different degrees of reduction in the operation of rotary strabismus, its orthostatic rate, recurrence rate, effectiveness and safety analysis.

Methods: A total of 30 patients, aged 2 ~ 50 years old, with various types of horizontal strabismus combined with rotational eye disorder in the past 1 year were selected and assigned to control group A and observation group B, each with 15 cases. The rotation strabismus in each group was divided into three kinds of strabismus angles: light, moderate and severe. Group A was treated with traditional oblique muscle displacement, group B was treated with improved stratified separation combined with subtraction. the corrected visual acuity, strabismus position and stereoscopic vision function were observed.

Results: Preoperative examination: In the groups of concomitant internal and external strabismus, the evaluation of strabismus Angle of the two groups was consistent, and there was no significant difference ($P > 0.05$); Postoperative examination: on the first day after strabismus, there was a statistical difference in cure rate between group A and group B, which was 78.83%, 90.01%; The cure rate of undercorrection was 21.84%, 6.74%; There was a statistical difference in the overcorrection rate, which was 1.33%, 3.25%. There was a statistically significant difference in the rate of double vision, 13.11% versus 23.45%. There were statistical differences in stereovision function, and the effective improvement rates were 35.35% and 50.20% respectively. After the first week, the first month, the third month and the sixth month, the normal position rate of the control group decreased, the undercorrection rate increased, the overcorrection rate remained unchanged, and the diplopia improved. In the observation group, the orthostatic rate increased, the undercorrection rate decreased, the overcorrection rate remained unchanged, and the diplopia rate improved significantly. Binocular stereovision of the two groups was significantly better.

Conclusions: Stratified subtraction method has a greater probability of orthosis in one correction of rotating eye position, but there is experience accumulation of intraoperative subtraction. If the judgment is wrong, it is easy to cause undercorrection, and overcorrection is rare. Therefore, both of the two methods are safe and reliable.

P-PAT-014

Changing trends in the disease burden of cataract and forecasted trends in Azerbaijan, 2013-2022

R. Aghayeva¹, N. Rustamova¹, H. Namazova¹, J. Nazarli¹

¹National Center of Ophthalmology named after Academician Zarifa Aliyeva, Baku, Azerbaijan

Introduction: Cataracts are an ophthalmological disease that leads to loss of quality of vision due to changes in the transparency and color of the lens. In 1999 the World Health Organization (WHO) and the International Agency for the Prevention of Blindness (IAPB) launched "The Vision 2020: a global initiative to end preventable blindness and the right to sight", which places blindness at the forefront. Epidemiological data on the spread of cataracts in Azerbaijan is important for providing timely assistance to patients and reducing the burden of the disease.

Objectives: The aim is to examine the prevalence of cataracts over a ten-year period (2013-2022) in Azerbaijan to further predict the prevalence in the next decade.

Methods: Data for 2013-2022 were obtained from the electronic database of the Ministry of Health of the Republic of Azerbaijan (Statistical Form F12). Population statistics were obtained from www.azstat.gov.az. A descriptive characteristic of cataracts using the medical statistics method per 100 thousand populations was given, age- and gender-specific incidence rates were calculated for two group population (aged 18-29 and over 30 years old) and the estimated annual percentage change.

Results: The average prevalence of cataracts during the study period was 181.7 per 100 thousand populations. Over the years, a wave-like trend in the prevalence rate with a peak in 2022 was revealed. The annual growth rate (AGR) of newly diagnosed cataracts in 2015, 2017, 2021 was negative, however, in 2022 AGR was high (100.37%) in compare with 2021. Incidence analysis over a ten-year period showed a projected increase in the future with a logarithmic correlation coefficient $R^2=0.3201$. Men and women have a similar trend over the years, except 2021-2022. A statistically significant increase in the proportion of cases among women was revealed (53.5 and 57.3%, respectively, $p<0.05$). The annual growth rate for the population from 18 to 29 years old was 172.8%, which is 1.8 times higher than for more older population.

Conclusions: The burden of cataracts in Azerbaijan remains high with an increasing trend in the future, especially among the population aged 18 to 29 years. It is necessary to strengthen prevention and develop government strategies for widespread screening of cataracts for the purpose of their early detection and treatment, as well as additional research to establish the true reasons for the sharp increase in the incidence in 2022 and the discovery of a controllable risk factor among young generation.

P-PAT-015

Progress of application of SPMs in ocular surface inflammatory diseases

L. Liqi¹, Y. Ping²

¹The First Affiliated Hospital of Nanchang University, Nanchang, China, ²Ophthalmology, The First Affiliated Hospital of Nanchang University, Nanchang, China

Introduction: A large number of previous clinical and experimental studies have found the benefits of using ω -3 polyunsaturated fatty acid-derived substances SPMs (EPA and DHA) for reducing inflammation [2], and revealed that EPA or DHA can be converted into metabolites that promote inflammation resolution under the action of related enzymes in vivo or in vitro, and participate in the process of acute inflammation or inflammation resolution.

Objectives: Inflammatory response is the first set of protective mechanisms initiated by our body against physical, chemical, biological and other harmful factors invaded by the outside world to prevent further damage to the body. However, inflammatory reactions sometimes tend to expand the scope of the response beyond the control of our body's immune system, causing inappropriate damage and causing acute and chronic inflammatory reactions.

Methods: Because of this property, many scientists are interested in omega-3 fatty acids and their metabolites. However, the molecular mechanisms involved in the reduction of inflammatory response are still poorly understood. This paper mainly discusses three common ocular surface diseases with the highest incidence in the world - UVB damaging keratitis, evaporative dry eye and allergic conjunctivitis, aiming to summarize the impact of these ocular surface diseases on patients' quality of life, as well as SPMs. The potential effects and possible related molecular mechanisms in the pathogenesis of ocular surface inflammatory diseases, so as to analyze the reasons for SPMs as a drug for the treatment of ocular surface inflammatory diseases.

Results: The anti-inflammatory effects of DHA and EPA are attributed to the regulation of TNF- α , IFN- γ , and IL-6. After combining DHA and EPA to stimulate HMGECs for 72h, intracellular IL-6 and IFN- γ levels decreased, while DHA or EPA alone to stimulate HMGECs had no effect on cytokine levels. In the current study, supplementation with EPA or EPA+DHA down-regulated TNF- α production.

Conclusions: EPA derivative 17, 18-EpETE was identified as a lipid mediator with anti-allergic activity, and its downstream product 17, 18-dihETE was also revealed by lipomic analysis to have anti-allergic properties, and its concentration was significantly increased in conjunctiva tissue of mice fed with omega-3 fatty acids. These results suggest that intake of omega-3 fatty acids not only induces a decrease in the proportion of pro-inflammatory mediators, but also promotes the production of EPA-derived metabolites.

P-PAT-016

Profile of patients urgently consulted by an ophthalmologist, Dakar-Senegal: about 1006 cases

S. Sow¹, A.S. Sow¹, M. Seck¹, J.M.M. Ndiaye¹, P.A. Ndoye Roth¹

¹Ophthalmology, Aristide Dantec University Hospital Center, Dakar, Senegal

Introduction: Ophthalmological emergencies are frequent and polymorphous with a risk of compromising the functional prognosis in the event of a delay in diagnosis and treatment.

Objectives: The aim of this work was to describe the characteristics of patients seen urgently by ophthalmologists in the Aristide Le Dantec University Hospital department and to identify those who were real emergencies.

Methods: We collected 1006 files over a period of 3 years. The parameters studied were frequency, age, sex, geographical origin, day of consultation, reference, consultation time, reasons for consultation, diagnosis and estimation of the true nature of the emergency.

Results: The frequency was 6.12%, the average age was 32.38 (+/-21.24 years) and the sex ratio was 1.5. Forty-six point four percent (46.4%) of the cohort came from the inner suburbs. Patients consulted more during working days (73%). Self-referral represented 71.6%. The consultation time was more than 3 days. The main reasons for consultation were pain (32.6%), red eye (25.2%) and decreased visual acuity (14.9%). Inflammatory/infectious causes (47.3%) were the most common. Thirteen point nine percent (13.9%) of consultations were not true emergencies.

Conclusions: The causes of ophthalmological emergencies can differ depending on the origin of the patients but especially depending on the level of development of the countries.

The proportion of consultations that were not truly urgent was significant. Writing protocols for emergency physicians and reception nurses could be an interesting tool for determining a referral to the ophthalmologist.

P-PAT-017

Evaluation of quality of life in patients with Allergic Conjunctivitis in an ophthalmologic specialized hospital.

I. Casanova Mendez^{1,2}, E.V. Clorio Castro³, G. Quintana Mexiac⁴, M.C. Jiménez Martínez^{1,4}

¹Department of Immunology and Research Unit, Institute of Ophthalmology "Conde de Valenciana Foundation", Mexico City, Mexico, ²School of Medicine, St. Luke, Mexico City, Mexico, ³School of Medicine, St. Luke, Mexico City, Mexico, ⁴Faculty of Medicine, National Autonomous University of Mexico, Mexico City, Mexico

Introduction:

Allergic conjunctivitis (AC) is an inflammatory condition affecting the ocular surface that significantly impairs the quality of life of individuals. Existing research indicates that AC increase the risk of depression and sleep disorders, adversely affecting patients' emotional well-being. However, a comprehensive understanding of the extent to which AC affects the quality of life of individuals is yet remains to be fully elucidated.

Objectives:

To outline the quality of life among patients with allergic conjunctivitis using a standardized ophthalmological questionnaire in a reference ophthalmology center.

Methods:

One hundred patients diagnosed with AC were enrolled in this study. The Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ) was administered to each patient prior to their consultation to ensure clinical interactions did not influence responses.

Results:

Quality of life was compromised across several dimensions, including daily activities, sleep, energy levels, physical issues, nasal and ocular symptoms, and emotional well-being. According to the Consensus Document on Allergic Conjunctivitis (DECA), [Mj1] most patients exhibited moderate conjunctivitis, followed by mild, moderate to severe, and severe cases, significantly impacting quality of life.

According to severity, there is a correlation with quality of life; the most affected ocular problems between a lower quality of life. In all groups it was seen that the main affected factor is ocular problems followed by emotional problems; specifically, in the severe group the greatest affectation was found ocular and practical problems; in the moderate to severe group with ocular and emotional affectation; moderate with ocular problems and everyday activities; and mild with sleep problems and other symptoms (tiredness, thirst, irritability, etc.)

Conclusions:

AC affects various aspects of patients' lives, limiting their ability to perform work, academic, and everyday activities. It requires multidisciplinary intervention such as psychological support, immunotherapy, in addition to specialized ophthalmologic management.

V-PAT-001

The tiny titan-unique case of a pediatric hypertrophic corneal scar

A. Sasi¹, P.R. Ananya¹, R. Tandon¹

¹Dr. R. P. Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

Introduction: Pediatric hypertrophic corneal scars are exceptionally rare, with only one documented case reported previously. This case report, in the form of a video, presents the first recorded instance of a hypertrophic scar caused by keratomalacia, highlighting a unique manifestation of corneal pathology in pediatric patients.

Objectives: This video aims to briefly detail the clinical presentation, diagnostic approach and modalities, along with management strategies used in addressing this unique case of a pediatric hypertrophic corneal scar secondary to keratomalacia. Additionally, it seeks to elucidate key insights and lessons learned from managing this rare ocular condition.

Methods: A thorough review of the clinical course, investigative findings, and surgical interventions administered to a one-year-old infant with bilateral corneal opacities was conducted. Emphasis was placed on the tailored management approach aimed at addressing the underlying etiology and optimizing visual outcomes.

Results: A one-year-old infant was brought to the ophthalmology clinic with a rapidly progressing corneal opacity in the right eye, and a smaller opacity in the left eye, noticed since the past 10 months. She had previously been diagnosed with bilateral perforated corneal ulcers, and had been referred for the same. In our centre, after eliciting a history of formula feeds with diluted milk, she was suspected to have keratomalacia sequelae. Customized management involved an ultrasound biomicroscopic (UBM) examination followed by the use of the debulking technique on the hypertrophic corneal tissue (layer by layer dissection) and an optical triple procedure on noting a cataractous lens intraoperatively. A three-piece IOL was placed in the capsular bag. Histopathological evaluation and vimentin staining of the excised host tissue confirmed the diagnosis of a hypertrophic corneal scar. Despite initial graft rejection, subsequent regrafting with intraoperative optical coherence tomography (IOCT)-guided debulking resulted in potentially improved outcomes.

Conclusions: This video underscores the significance of recognizing keratomalacia as a preventable cause of pediatric blindness and emphasizes the importance of early detection. Furthermore, it highlights the efficacy of tailored surgical approaches, such as debulking guided by IOCT, in managing complex corneal pathologies in pediatric patients. Enhanced awareness and vigilance are imperative in mitigating the impact of preventable ocular conditions on pediatric visual health.

Video

[Click here to play video](#)

Orbital, Oculoplastic, and Lacrimal Diseases

FT-ORB-001

Nasolacrimal duct rhinostomy for low-level nasolacrimal duct obstruction – Outcomes and Surgical selection paradigm

K. Wang¹, X. Liang¹, X. Yu¹, Z. Li¹

¹Zhongshan Ophthalmic Center, SUN YAT-SEN UNIVERSITY, Guangdong, China

Introduction: In this article, we have recommended a personalized and minimally invasive surgical selection based on the location of NLD obstruction and clarified the efficacy and safety of endoscopic nasolacrimal duct rhinostomy for low-level nasolacrimal duct obstructions. Correct diagnosis of the NLD obstruction site and its nature is essential for choosing a treatment plan and a surgical approach. For individuals with low-level NLD obstruction, we chose endoscopic nasolacrimal duct rhinostomy to reduce the surgical trauma and to preserve the lacrimal sac to minimize damage to the lacrimal pump function.

Objectives: To report long-term outcomes in a subset of patients with epiphora caused by low-level nasolacrimal duct (NLD) obstruction who underwent endoscopic nasolacrimal duct rhinostomy and to represent a surgical selection paradigm for different site of NLD obstruction.

Methods: From September 1, 2017 to February 28, 2023, 26 patients with chronic dacryocystitis who underwent endoscopic nasolacrimal duct rhinostomy for low-level NLD (obstruction below the plane of the superior border of the inferior turbinate attachment) were reviewed. Surgical success was evaluated objectively (based on anatomical patency) and subjectively (based on functional patency) during the patients' postoperative follow-up for at least six months. Complications were also recorded during this time.

Results: The patients, 24 women and 2 males, had an average age of 47.58 ± 3.09 years (with a range of 8-75). A total of 26 eyes from 26 patients underwent endoscopic nasolacrimal duct rhinostomy, of whom 10 eyes had undergone prior tear duct recanalization procedures. The success rate of anatomical patency was 88.5% (23/26) and the success rate of functional patency was 80.8% (21/26) after a mean follow-up of 41.9 ± 22.1 months. Throughout the follow-up period, no significant problems were seen in any of the patients.

Conclusions: Endoscopic nasolacrimal duct rhinostomy resulted in long-term improvement of epiphora in more than 80% of nasolacrimal systems when performed for low-level NLD obstruction. Personalized and minimally invasive surgical selection based on the location of NLD obstruction is beneficial for reducing surgical damage and improving surgical efficacy.

FT-ORB-002

Novel treatment of chalazion using light-guided-tip intense pulsed light

*Y. Zhu*¹

¹Eye Center, Affiliated Second Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: A chalazion is an acute lipogranulomatous inflammation that is usually caused by plugged meibomian gland ducts and frequently becomes chronic. In our previous study, we reported high rates of resistant and recurring chalaziosis following therapeutic therapy including conservative therapy and lesion excision with curettage. Therefore, focusing on meibomian gland function as well as morphology is more crucial than treating chalazion. Moreover, a new noninvasive treatment is essential to resolve chalazia and improve meibomian gland function. Few research has described the resolution and recurrence rates of light-guided-tip IPL for chalazion. This research evaluated the light-guided-tip IPL-MGX effectiveness and safety in primary or recurring chalazion.

Objectives: To assess the effectiveness and safety of intense pulsed light (IPL) in conjunction with meibomian gland expression (MGX) in chalazion treatment.

Methods: Ninety-five eyes with chalazion received a light-guided-tip IPL-MGX treatment (IPL-MGX group), and another 95 eyes with chalazion got conventional therapy and surgical procedure involving incision and curettage, but no treatment with IPL-MGX was performed (control group). Prior to IPL treatment or incision, as well as one month after the treatment completion, data were gathered pertaining to the lesion location and size, hyperemia, lesions regression or recurrence, and a comprehensive ophthalmic examination.

Results: The overall size of the chalazia within the IPL-MGX treatment group was significantly reduced from 1.0 ± 0.8 cm to 0.4 ± 0.6 cm after the final treatment, with an average resolution rate of 70.5%. After treatment, it was clear that the IPL-MGX group had a significantly lower chalazion recurrence rate than the other groups (14 eyes, 14.7%) in comparison to the control (36 eyes, 37.9%; $P < 0.001$). After treatment, the IPL-MGX group demonstrated statistically significant advancements throughout noninvasive tear film breakup time, conjunctival hyperemia, as well as meibum grade in comparison to both baseline and the control group.

Conclusions: The use of light-guided-tip IPL in conjunction with MGX was found to be an efficient and harmless method for reducing the size and recurring frequency of primary and recurrent chalazia, as well as for improving the function of the meibomian glands in the patients who participated in this study.

FT-ORB-003

The accurate orbital anatomical reconstruction for medial orbital blow-out fracture based on the technology of CAD/CAM

*S. Zheng*¹

¹Ophthalmology, Henan Provincial People's Hospital, Henan Eye Hospital, People's Hospital of Henan University, Henan Eye Institute, Zhengzhou, China

Introduction: Medial orbital blow-out fracture can result in orbital bone defect which is the causes of hernia of the medial orbital soft tissue and medial rectus muscle. The accurate anatomical reconstruction of medial bony orbit is the key to solve eyeball rotation restriction, diplopia and enophthalmos.

Objectives: To search a better method to reconstruct the accurate anatomical construction of medial bony orbit for the bone defect caused by medial orbital blow-out fracture based on the technology of CAD/CAM.

Methods: With the method of case control study sixty-four eyes of 64 medial orbital blowout fracture patients who received orbital fracture operations to repair the medial orbit bone defect and to release the medial orbital soft tissue and medial rectus muscle in Henan Eye Hospital from July 2018 to July 2023 were observed. The patients were divided into two groups according to the operation methods -- the control group(14 cases 14 eyes)and the CAM/CAD group(50 cases 50 eyes)(with the orbital implant of personal titanium mesh based on the technology of CAD/CAM). All kinds of clinical factors such gender, right or left eye, age, preoperative course of disease, hernia of preoperative intraorbital soft tissue, operative approach, and so on were matched between the two groups. The postoperative clinical effects and the recovery of orbital bone defect caused by medial orbital blowout fracture were analyzed and compared between the two groups.

Results: All the cases accept operation successfully with no complications such as infection and displacement of orbital implant and so on. There was a statistical significance of postoperative clinical effects and the recovery of orbital bone defect caused by medial orbital blowout fracture within two groups. In the CAD/CAM group, hernia of preoperative intraorbital soft tissue, diplopia, eyeball rotation restriction, enophthalmos, the orbital anatomical structure were recovered with better effects.

Conclusions: It is a good method to repair the medial bone defect caused by medial orbital blowout fracture and get the accurate anatomical reconstruction of medial bony orbit with the orbital implant of personal titanium mesh based on the technology of CAD/CAM.

FT-ORB-004

Development and validation of a deep learning algorithm for detection of orbital disease using ocular images

C. Lei¹, H. Sun², X. Song¹, G. Zhai², H. Zhou¹

¹Department of Ophthalmology, Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²Shanghai Jiao Tong University, Shanghai, China

Introduction: Orbital disease is a challenging and complex ophthalmic disease that can cause blindness, disability, and even death. Lack of screening method results into delays in the diagnosis of orbital diseases, particularly in low and middle-income countries.

Objectives: Therefore, we aimed to develop and evaluate a deep learning-based screening technology using ocular images to evaluate risk and advance automated identification of orbital diseases.

Methods: We did a multicenter, retrospective study to develop and validate deep learning models for detection of orbital diseases using ocular images from participants in three ophthalmic departments. Included participants (aged >18 years) were patients with a clinical diagnosis of an orbital disease and controls without an orbital disease matched for age and sex. We trained one screening model (with or without orbital diseases) and ten clinical sign identifying model (with or without one specific clinical sign within ten categories) using a development dataset, and we tested the models with a test dataset and an external test dataset. Additionally, we did a visual explanation and occlusion test. Model performances were evaluated in terms of accuracy, sensitivity, specificity, F1 score and the area under the receiver operating characteristic curve (AUC).

Results: Between April 5, 2016, and December 31, 2020, 2697 participants (from the Department of Ophthalmology of Affiliated Ninth People's Hospital of Shanghai Jiao Tong University School of Medicine) were consecutively enrolled and randomly divided into training (90%, n= 2427) and validation (10%, n= 270) groups for algorithm development; Between January 1, 2021 and June 31, 2022, 533 participants (from the same hospital as the training set) were enrolled in internal test group for algorithm test. Between July 1, 2022 and December 31, 2022, 112 participants (from other two ophthalmic centers) were enrolled in external test group for further algorithm test. The screening model achieved accuracy of 86.6%, specificity 88.5%, recall 84.5%, precision 86.6%, F1 score of 85.5%, and AUC of 94.4%. Heatmaps demonstrated that the model identified pixels corresponding to clinical features of orbital diseases.

Conclusions: Our study provided a non-invasive, convenient, and complementary method for orbital disease screening, which has the potential to accelerate diagnosis and reduce mortality and morbidity through preventive care.

FT-ORB-005

Clinical, diagnostic, and treatment characteristics of orbital liposarcoma

X. Kang¹, W. Wu¹, W. Fang², Y. Li¹, R. Ma¹, M. Ma³, Y. Hei¹, Q. Wang¹, X. Wang¹, X. Mu⁴, S. Zhao⁵, X. Yang¹

¹Senior Department of Ophthalmology, 3rd Medical Center of Chinese PLA General Hospital, Beijing, China, ²National Clinical Research Center for Ocular Diseases, Eye Hospital, Wenzhou Medical University, Wenzhou, China, ³Department of Ophthalmology, Beijing Chao-Yang Hospital, Capital Medical University, Beijing, China, ⁴Department of Radiology, 3rd Medical Center of Chinese PLA General Hospital, Beijing, China, ⁵Department of Radiation Oncology, 3rd Medical Center of Chinese PLA General Hospital, Beijing, China

Introduction: This study reviewed clinical, diagnostic and treatment characteristics of 21 patients with orbital liposarcoma, making it the largest case series. This research innovatively found that orbital liposarcoma exhibited a propensity for developing in the extraocular muscle and well-differentiated liposarcomas were characterized by irregular and ill-defined adipose tissue. Myxoid liposarcoma is more sensitive to radiotherapy than well-differentiated ones. This study might enhance the understanding of orbital liposarcoma and improve diagnostic and treatment modalities.

Objectives: To clarify the clinical, diagnostic and treatment characteristics of orbital liposarcoma.

Methods: Review of electronic medical records, histopathology, radiological images and follow-up information of 21 patients with orbital liposarcoma.

Results: The predominant clinical manifestation of this disease was painless exophthalmos. The most frequently encountered pathological types were well-differentiated and myxoid liposarcoma. Preoperative radiological images from 15 patients showed that orbital liposarcoma initially developed in extraocular muscle in 9 patients. Furthermore, all well-differentiated liposarcomas exhibited the radiographic characteristics of irregular and ill-defined adipose tissue, whereas only 12.5% of myxoid liposarcomas had the imaging characteristics. For the patients who exclusively underwent surgery, all cases with subtotal excisions experienced recurrence, 63.6% of marginal excisions recurred and 50% of wide excisions resulted in recurrence. However, none of the patients who underwent marginal excisions or wide excisions combined with adjuvant radiotherapy exhibited recurrence. The analysis of MRI findings in three patients who underwent neoadjuvant radiotherapy revealed that the tumor size remained stable in a patient with well-differentiated liposarcoma, while another patient with the same type of tumor exhibited a gradual increase in size. Conversely, a patient with myxoid liposarcoma experienced a significant reduction in tumor size following neoadjuvant radiotherapy.

Conclusions: Orbital liposarcoma demonstrated a propensity for developing in the extraocular muscle. The radiological images of well-differentiated liposarcomas were characterized by irregular and ill-defined adipose tissue. Surgery combined with radiotherapy demonstrates potential in reducing recurrence rates. Notably, orbital myxoid liposarcoma exhibited greater sensitivity to radiotherapy compared to well-differentiated liposarcoma.

FT-ORB-006

A biomimetic tarso-conjunctival biphasic scaffold for eyelid defect repair in vivo

P. Chen¹, P. Xu¹, J. Ye¹

¹The Second Affiliated Hospital Zhejiang University School of Medicine, Hangzhou, China

Introduction: Repairing the posterior eyelid layer (tarsus and conjunctiva) is vital for eyelid reconstruction. The tarsus offers rigid support, preserving eyelid shape, while the smooth conjunctiva ensures ocular surface lubrication to prevent corneal irritation. Despite attempts using various eyelid substitutes, an ideal material remains elusive.

Objectives: Based on the composition and structure of the tarso-conjunctival tissue, we aimed to explore a construct of a two-layer composite material that could reconstruct the tarso-conjunctival tissue. The impact on cell behavior was analyzed in vitro and the application of repairing the defect of posterior lamina was further evaluated in situ.

Methods: The soft collagen/chitosan (Col/CS) was composed to hard polypropylene fumarate/hydroxyethyl methacrylate (PPF-HEMA). Scaffold characteristics were analyzed, including morphology, porosity, degradation, and mechanical properties. The adhesion, proliferation and migration of human conjunctival epithelial cells (CjECs) in the scaffold were observed. The model of tarso-conjunctival defect was constructed, and the repair effect was evaluated by in-situ implantation.

Results: The biphasic scaffold consisting of the hard PPF-HEMA and soft Col/CS layers was fabricated successfully. The PPF-HEMA layer functioned as the skeleton as tarsal plate substitute, while Col/CS sponge mimicked the conjunctiva lining. The scaffolds exhibited high porosity (~90%) with average pore sizes of 95 μm for Col/CS and 235 μm for PPF-HEMA layers. The scaffolds were stable during in vitro degradation over 12 weeks, maintaining the porous macrostructure without notable collapse. The biphasic scaffolds promoted cell adhesion and proliferation in vitro. The CjECs tended to migrate and confluent on the surface of the scaffolds. In vivo experiments on rabbit posterior lamella full-thickness defects revealed that PPF-COL biphasic scaffolds could promote wound closure, re-epithelialization.

The regenerated conjunctiva was stained positively by CK4 and MUC5AC immunofluorescence staining. **Conclusions:** Hierarchical 3D biphasic scaffolds were designed and constructed, which were mechanically improved and favorable for cell adhesion and proliferation. In a rabbit tarso-conjunctival defect model, the grafted biphasic scaffolds promoted re-epithelialization with functional regenerated conjunctiva. The results of this study provide a new concept for the design and construction of an ideal substitute for eyelid defect reconstruction.

FT-ORB-007

Prognosis and influencing factors of 160 benign lymphoepithelial lesions of lacrimal gland

F. Luan¹, Y. Tao¹, J. Ma²

¹Ophthalmology, Beijing Chaoyang Hospital, Capital Medical University, Beijing, China,

²Ophthalmology, Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: Lacrimal gland benign lymphoepithelial lesion (LGBLEL) is a relatively rare orbital disease, which occurs in any region, race, sex, and at any age. The traditional treatment for LGBLEL is glucocorticoid therapy, which often has high recurrence rate and serious side effects. Recently, the combination of surgical resection and glucocorticoid therapy has been advocated to improve the therapeutic effects of LGBLEL. Nevertheless, clinical studies to verify the safety and efficacy of this combined therapy are still not enough. In this study, we conducted a long-term follow-up of LGBLEL patients who underwent surgical resection combined with glucocorticoid therapy to determine the efficacy of the combined therapy and to screen the prognostic factors of LGBLEL.

Objectives: Through long-term follow-up of LGBLEL patients who underwent surgical resection combined with glucocorticoid therapy, the prognosis of the disease was clarified, and the related factors affecting the prognosis of LGBLEL patients were analyzed.

Methods: (1) 160 patients who were diagnosed with LGBLEL by pathological histology were recruited from August 2010 to August 2019 in our experimental group. With the following up of 160 LGBLEL patients after surgical resection combined with glucocorticoid therapy, we assessed the feasibility of the therapeutic approach to LGBLEL, calculating the cure rate and recurrence rate of this treatment for LGBLEL. (2) 90 cases of LGBLEL patients were divided into two groups according to relapse (17 cases) and non-relapse (73 cases), being analyzed the factors affecting the prognosis of LGBLEL patients.

Results: (1) The follow-up time of 160 LGBLEL patients was distributed between 6.75 and 117.10 months, with a median follow-up time of 52.18 months. The recurrence rate was 14.2%, and the cure rate was 85.8%. The incidence of intraoperative complications was 3.4%, early postoperative complications were 1.4%, and postoperative mid-long-term complications were 4.1%. (2) Multi-factor logistic regression analysis of LGBLEL relapse and non-relapse groups showed that IgG4 was an independent factor for LGBLEL ($P < 0.05$). The peripheral blood IgG4 level of patients in the LGBLEL relapse group was significantly higher than that of the non-relapse group ($t = 2.210$, $P < 0.05$).

Conclusions: Surgical resection combined with glucocorticoid treatment for LGBLEL is safe, feasible, and effective. In addition, IgG4 is an independent factor affecting the prognosis of LGBLEL patients.

FT-ORB-008

Challenging assumptions: Electronic nicotine delivery systems may lower dry eye risk, new research suggests

S. Saleh¹, N.A. Almosilhy², M. Algazar³, A.D. Sabe Alerab⁴, N.A. Hassan⁵, DARS Consortium

¹Faculty of Medicine, Benha University, Benha, Egypt, ²Department of Pharmacology and Toxicology, Faculty of Pharmacy, Tanta University, Tanta, Egypt, ³Faculty of Medicine, Al-azhar University, Asyut, Egypt, ⁴Department of Ophthalmology, Faculty of Medicine, Aleppo University of Medical Sciences, Aleppo, Syrian Arab Republic, ⁵Department of Forensic Medicine and Clinical Toxicology, Faculty of Medicine of Benha University, Benha, Egypt

Introduction: Dry eye disease (DED) is a serious multifactorial healthcare issue and the most common ocular condition observed in ophthalmic clinics. While electronic nicotine delivery systems (ENDS) have gained huge popularity worldwide, the relationship between the use of ENDS and its dual use with traditional tobacco products on the risk of dry eye is not well understood

Objectives: The study aimed to assess the prevalence and severity of DED among users of Electronic Nicotine Delivery Systems (ENDS), tobacco smokers, and dual users in comparison to non-smokers, within the Middle East and North Africa (MENA) Region.

Methods: A multinational cross-sectional study was conducted from 25th September to 6th November 2023. A web-based survey involving a valid questionnaire to determine the prevalence and severity of DED (measured by the Ocular Surface Disease Index (OSDI)) was distributed among residents of 19 countries in the MENA region. An ordinal logistic regression analysis was performed to estimate the significant predictors of DED.

Results: Of the 7119 respondents (median age =22 years, 52% males) involved in the final analysis, 79% were non-smokers (neither tobacco smokers nor ENDS users), 8.7% were ENDS users, 7.6% were tobacco smokers, and only 4.4% were dual users (concurrent tobacco smokers and ENDS users). After adjusting for the most common confounders, we observed significant associations between DED, ENDS usage (adjusted Odds Ratio (AOR)=0.571, 95% CI=0.485-0.672, $p<0.001$), and dual usage (AOR=0.775, 95% CI=0.62-0.971, $p=0.026$). However, there was no statistically significant association between DED and tobacco smoking (AOR=0.879, 95% CI=0.737-1.049, $p=0.151$).

Conclusions: This study provides crucial insights regarding the safety profile of ENDS devices as an alternative to traditional tobacco smoking, particularly concerning ocular health. We found a significant inverse association between DED and the use of ENDS, with ENDS users exhibiting lower odds of DED compared to non-smokers, tobacco smokers, and dual users. Further, investigations are warranted to explore these relations and their implications in depth.

FT-ORB-009

Efficacy and Safety of Weekly EUGOGO protocol vs 3 Weekly low dose Intravenous Methylprednisolone in Thyroid Eye Disease

R. Agarwal¹, A. Aishwarya²

¹Ophthalmology, Sanjay Gandhi Institute of Medical Sciences, Lucknow, India, ²Ophthalmology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow, India

Introduction: Thyroid eye disease (TED) is an inflammatory autoimmune disorder of the orbit affecting approximately 40% of patients with Graves' disease (GD). Our study compares Weekly EUGOGO Protocol to 3-Weekly Low Dose IV Methylprednisolone in Thyroid Eye Disease. It is a prospective Randomized Controlled Trial Study.

Objectives: This study aimed to compare the efficacy and safety of two corticosteroid treatment regimens for thyroid eye disease (TED), the weekly EUGOGO protocol (total 4.5g to 7.5g) and 3 weekly low dose intravenous methylprednisolone (IVMP) (total 4g), with or without immunomodulation.

Methods: From January 2018 to October 2022, a prospective randomized cohort study was conducted on naïve patients with active, moderately to severe TED undergoing the two IVMP protocols. Primary analysis was done at the end of the two cycles, and follow-ups were done at 3, 6 and 12 months post therapy. Primary Outcome measures were reduction in clinical activity scoring (CAS), proptosis reduction, visual acuity improvement, diplopia resolution in primary and downgaze. Secondary outcome measures were decrease in scleral show, compliance to treatment and complications.

Results: There were 106 eyes of 68 patients (n=34 in each group) with a median age of 43.1 years and clinically both groups were comparable. Mean clinical follow-up was 39.5 ± 23.1 months. Improvement in CAS score, proptosis reduction and visual acuity were comparable in both groups (p<0.001, p=0.13 and p=0.21, respectively) while the 3 weekly low dose IVMP group exhibited more prominent improvement in diplopia and eyelid swelling (p=0.05 vs p=0.45). Compliance was higher with 3 weekly cycle (96% vs 63%). Corticosteroid-related side effects like weight gain and mood disturbances, were higher in the weekly EUGOGO group (48%) than 3 weekly low dose IVMP group (13%).

Conclusions: 3 weekly low dose IVMP is a promising therapy in thyroid eye disease with better clinical outcomes, improved compliance and fewer side effects.

FT-ORB-010

Elevated IL-27 exerts antifibrotic effect by inhibiting the TGF- β /smad signaling in thyroid-associated ophthalmopathy

P. Zhang¹, L. Liu¹

¹Department of Ophthalmopathy, West China Hospital, Sichuan University, Chengdu, China

Introduction: Thyroid-associated ophthalmopathy (TAO) is an autoimmune orbital disease with the highest incidence rate in adults and its main pathological manifestation are inflammatory infiltration, increased adipose volume and fibrosis of extraocular muscles in the orbit, which is an important cause of restrictive strabismus. IL-27, as a member of the IL-12 family, has dual regulatory effects of pro-inflammatory and anti-inflammatory effects and plays an important role in various autoimmune diseases. However, the mechanism of IL-27 in the pathogenesis of TAO has not been revealed yet.

Objectives: We intended to explore the expression of IL-27 in thyroid-associated ophthalmopathy (TAO), its role in fibrosis of TAO and the underlying mechanism.

Methods: Eighty-six serum samples from patients were collected. Serum samples from 90 healthy controls (HC), 43 patients with uveitis (UV), 30 patients with orbital cellulitis (OC) were collected as controls. Orbital adipose/connective tissue explants and orbital fibroblasts (OFs) were isolated from patients with TAO and blepharoplasty for cosmetic reasons. The IL-27 expression was detected by enzyme-linked immunosorbent assay (ELISA) and immunohistochemistry. The OFs of CD90⁺ subset was separated by flow cytometry and then treated with IL-27 (-, 0, 10, 25, 50, 100 ng/mL) and TGF- β (10 ng/mL). The fibrotic markers COL1A1, α -SMA and related TGF- β /Smad pathway (smad2, p-smad2, smad3, p-smad3) were detected by Western Blot.

Results: Serum levels of IL-27 were significantly higher in patients with TAO than those in HC ($p < 0.001$) and disease controls (UV, OC; $p < 0.001$). And ROC analysis showed that the area under the curves (AUCs) for serum IL-27 of TAO patients compared with those of HC, UV and OC patients were 0.70, 0.77, 0.73. Immunohistochemistry showed that the IL-27 levels increased in the orbital adipose/connective tissue of patients with TAO compared with HC ($p < 0.05$). Furthermore, TGF- β exacerbated fibrosis of CD90⁺ orbital fibroblasts and IL-27 significantly inhibited the expression of COL1A1 and α -SMA ($p < 0.05$) in vitro. The mechanism involved mainly relied on inhibition of TGF- β /Smad pathway (inhibition of p-smad2 and p-smad3; $p < 0.05$).

Conclusions: The observations illustrate the importance of IL-27 signaling in the development of TAO pathogenesis and it exerted antifibrotic effects through TGF- β /Smad signaling pathway. Our findings demonstrated that IL-27 has the potential as biomarkers for TAO and to become a new target for TAO treatment.

FT-ORB-011

A real-world study of the IGF-1R monoclonal antibody based on the FDA adverse event reporting system

J. Zhao¹, F. Luan¹, Y. Tao¹

¹Department of Ophthalmology, Beijing Chaoyang Hospital, Capital Medical University, Beijing, China

Introduction: This study identified and characterized adverse events (AEs) that were significantly associated with tepezza, an IGF-1R monoclonal antibody to treat thyroid associated ophthalmopathy (TAO), based on the United States Food and Drug Administration (FDA) Adverse Event Reporting System (FAERS) database using four disproportionality analysis algorithms.

Objectives: In this study, we aimed to mine and analyze the AEs signals with tepezza based on the FAERS database to provide instructions in clinical practice concerning adverse reactions and assistance in drug development and import/export into other countries.

Methods: AE reports were obtained from the FAERS database from the first quarter of 2020 to the fourth quarter of 2023. To comprehensively analyze the AEs, we applied four disproportionality analysis algorithms, including the reporting odds ratio (ROR), the proportional reporting ratio (PRR), the Bayesian confidence propagation neural network (BCPNN), and the multi-item gamma Poisson shrinker (MGPS) algorithms.

Results: A total of 6,703,410 AEs related to administration of tepezza were obtained, and 78% of the cases was female. Signal detection of tepezza at the system organ class (soc) level included gastrointestinal disorders (13.66%), ear and labyrinth disorders (12.94%), general disorders and administration site conditions (12.50%), nervous system disorders (10.17%), and musculoskeletal and connective tissue disorders (9.16%). AEs that ranked top five at the preferred terms (PTs) level were muscle spasms (6.4%), fatigue (4.66%), tinnitus (3.78%), headache (3.78%), and deafness (3.78%). The median time to those AEs onsets was 48 days (interquartile range 19.0– 92.0 days) after administering drugs. Additionally, our results indicated the AEs in reproductive system and breast disorders because the prevalence of TAO was more common in women.

Conclusions: Post-marketing AEs were strongly associated with the IGF-1R monoclonal antibody, namely tepezza. Our results provided valuable references in drug import/export and useful instructions for drug selection in clinical practice.

FT-ORB-012

Choroidal thickness in patients with thyroid-associated ophthalmopathy

*S. Zhong*¹

¹Ophthalmology, Shanghai Ninth People's Hospital, Shanghai JiaoTong University School of Medicine, Shanghai, China

Introduction:

Thyroid-associated ophthalmopathy (TAO) is the most common extrathyroidal complication in patients with the autoimmune condition Graves' disease. After an initial inflammatory (active) phase and a stabilisation (plateau) phase, TAO tends to improve and eventually becomes inactive (also known as burnout phase). Evaluation of TAO activity and severity is based on multiple clinical features that may be perceived differently by various physicians. Therefore, a more objective evaluation method is needed for consistent early diagnosis.

Objectives:

This study used swept-source optical coherence tomography (SS-OCT) to investigate subfoveal choroidal thickness (SFCT) in patients with thyroid-associated ophthalmopathy (TAO) who displayed different levels of disease activity and severity.

Methods: Thirty patients with TAO (60 eyes) and 38 healthy controls (67 eyes) in Shanghai, China, were recruited for this study. Disease activity and severity were graded using European Group on Graves' Orbitopathy standardised criteria. SFCT values were determined by SS-OCT.

Results: In total, 129 eyes were included in the final analysis. The mean SFCT was significantly thicker among patients with active disease ($276.23 \pm 84.01 \mu\text{m}$) than among patients with inactive disease ($224.68 \pm 111.61 \mu\text{m}$; $p=0.049$) or healthy controls ($223.56 \pm 78.69 \mu\text{m}$; $p=0.01$). There were no differences in SFCT among patients with moderate-to-severe disease, patients with severe disease and healthy controls ($p>0.05$). Changes in SFCT demonstrated strong predictive ability to distinguish active TAO from inactive TAO (area under the curve=0.659, 95% CI 0.496 to 0.822).

Conclusions: SFCT was strongly associated with Clinical Activity Score in patients with TAO. Choroidal thickening was observed during active TAO. SS-OCT offers a non-invasive method for follow-up assessment.

FT-ORB-013

Efficacy and safety of IBI311 in active Thyroid Eye Disease: the RESTORE-1 Phase 2 randomized clinical trial

H. Zhang¹, J. Sun¹, Y. Li¹, J. Deng², S. Lu², L. Qian², H. Zhou¹, X. Fan¹

¹Department of Ophthalmology, Shanghai Ninth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²Department of Clinical Development, Innoventbio, Suzhou, China

Introduction: IBI311 is a monoclonal antibody for thyroid eye disease (TED) treatment, which targets insulin-like growth factor I receptor (IGF-IR), a receptor involved in the pathogenesis of TED.

Objectives: To evaluate the efficacy and safety of IBI311 in Chinese patients with moderate-to-severe active TED.

Methods: In this randomized, double-masked, placebo-controlled, phase 2 trial, 33 participants were enrolled and randomized in a 2:1 ratio to receive IBI311 or placebo (10 mg/kg of body weight for the initial infusion and 20 mg/kg for subsequent infusions) once every three weeks (Q3W) from day 1 to week 9 (double-masked treatment period). All participants were treated with IBI311 Q3W from week 12 to week 21 (extended treatment period). The safety of IBI311 was further evaluated in the observation period until week 30. The primary outcome was the rate of proptosis response (a reduction in proptosis ≥ 2 mm) in the study eye at week 12. Secondary outcomes included overall response (a reduction of ≥ 2 points in the clinical activity score (CAS) and a reduction in proptosis ≥ 2 mm), CAS of 0 or 1, diplopia response (≥ 1 grade improvement in diplopia), the mean changes in CAS and proptosis from baseline at week 12 and 24, proptosis response at week 24, safety profiles, etc.

Results: Collectively, 31/33 participants completed the study at week 30. At week 12, the proptosis responder rate was significantly higher in the IBI311 group than in the placebo group (59.1% [13/22] vs. 18.2% [2/11], $P=0.0309$); the overall response (36.4% [8/22] vs. 9.1% [1/11]), the diplopia response (64.7% [11/17] vs. 25.0% [2/8]) and the mean change in proptosis (-2.89 mm vs. -0.69 mm) were also higher with IBI311 than with placebo. The rate of CAS of 0 or 1 and the mean change in CAS was similar with IBI311 and placebo at week 12. Efficacy on proptosis, CAS and diplopia were further improved in both the IBI311 and placebo groups in the extended treatment period and maintained in the observation period. Most adverse events (AE) were mild to moderate in severity; one case of serious AE occurred in the IBI311 group and was not related to the investigational drug as judged by investigators.

Conclusions: Among patients with active TED, IBI311 demonstrated superiority on proptosis response and numerically better outcomes in overall response and diplopia response than placebo at week 12. IBI311 was safe and well tolerated in TED patients.

FT-ORB-014

Application of $^{99}\text{Tc}^{\text{m}}$ -DTPA orbital SPECT/CT in the efficacy evaluation of thyroid-eye disease

M. Tang¹, J. Yang¹, L. Zhou¹, J. Chai¹

¹Affiliated Hospital of Panzhihua University, panzhihua, China

Introduction: SPECT/CT is a co-computer fusion imaging that shows both orbital anatomy and inflammatory infiltrates. Thyroid eye disease is the most common orbital disease in adults, and the pathological changes are the inflammatory response of the orbit.

Objectives: Exploring the application value of $^{99}\text{Tc}^{\text{m}}$ -DTPA orbital SPECT/CT in the efficacy evaluation of TED.

Methods: A retrospective study was conducted on 48 patients who were diagnosed with active moderate-to-severe TED and received therapy of methylprednisolone. The general information, ocular evaluation indexes and SPECT/CT ocular parameters were collected. Analysing the changes of each index and parameter before and after therapy. The patients with TED were divided into the effective group and the ineffective group, and the differences in baseline data, ocular evaluation indexes and SPECT/CT ocular parameters were compared. ROC analysis was performed to evaluate their diagnostic efficiency.

Results: 1. CAS, SUV max, proptosis and extraocular muscle thickness after treatment in all TED patients were lower than those before, and the differences were statistically significant. While there was no significant difference in upper eyelid retraction and diplopia.

2. The change of CAS before and after treatment in all TED patients was positively correlated with the change of SUV max and extraocular muscle thickness. There was no significant correlation between the change of CAS and proptosis.

3. There were no significant differences in age, gender distribution, and smoking history distribution between the effective and ineffective group. There was no significant difference in CAS, upper eyelid retraction, diplopia, proptosis, extraocular muscle thickness between the effective group and the ineffective group before treatment. The SUV max of the effective group before treatment was higher than that of the ineffective group, and the difference was statistically significant. ROC was used to predict the efficacy of SUV max. The area under the ROC curve of SUV max AUC was 0.969, and the SUV max threshold for predicting effective and ineffective was 1.815.

Conclusions: $^{99}\text{Tc}^{\text{m}}$ -DTPA orbital SPECT/CT can not only show the severity of orbital inflammation in TED patients, but also measure the thickness of the extraocular muscles and exophthalmos, which can assist in the evaluation of the efficacy of TED, providing objective, quantitative and accurate indicators for it. In addition, SUV max can provide a clinical reference for predicting the efficacy of TED.

FT-ORB-015

Choroidal perfusion biomarkers in thyroid eye disease!

S. Shah¹, R. Goel¹, U. Yadav¹, N. Shah²

¹Ophthalmology, Guru Nanak Eye Centre, New Delhi, India, ²Ophthalmology, SNEH care hospital, Vadodara, India

Introduction: Thyroid eye disease (TED) is a dynamic inflammatory disorder of the orbit, affecting the extraocular muscles, adipose tissue, blood vessels, and optic nerve. Various theories are proposed about pathogenesis of dysthyroid optic neuropathy.

Objectives: To study the choroidal vascularity changes in active and inactive TED orbits using high-definition optical coherence tomography (HD-OCT) and correlate the changes with duration and severity of TED, and Barrets' index.

Methods: Cross-sectional study. 37 TED orbits and 30 healthy control (HC) orbits were enrolled. The choroid was imaged using HD-OCT scans centered at the fovea and subfoveal choroidal thickness (SFCT) was measured. The OCT images were analyzed using ImageJ software, to calculate the choroidal vascularity index (CVI) and associated choroidal perfusion indices.

Results: The study included 8 active, 13 non-inflammatory active (NIA), and 16 inactive TED orbits. The mean age was 39.73 ± 12.91 years and the male-to-female ratio was 1.18: 1. Intraocular pressure and CVI were higher, while SFCT was similar in TED in comparison to healthy orbits. CVI and SFCT were raised in active as compared to inactive TED. CVI and SFCT correlated positively with Barrets' index, and negatively with duration of thyroid disease. The area under the curve of CVI (95% CI:0.651-0.864, $p < 0.001$) helped in differentiating TED orbits from HC, while CVI (95% CI:0.780-0.983, $p < 0.001$) had the maximum discriminatory power in predicting the activity of the disease.

Conclusions: CVI has greater sensitivity than SFCT in differentiating healthy from TED orbits. The blood flow stagnation in active orbits which improves during the course of TED and tends to worsen with an increase in Barret's index can lead to choroidal vascularity changes. CVI and SFCT can act as adjunct to existing modalities for monitoring the disease activity.

FT-ORB-016

Lutein targeting orbital fibroblasts attenuates fibrotic and inflammatory effects in thyroid-associated ophthalmopathy

X. Hei¹, S. Zhang¹, D. Huang²

¹Shenzhen Eye Hospital, Shenzhen City, Guangdong Province, China, ²Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou City, Guangdong Province, China

Introduction: Thyroid-associated ophthalmopathy (TAO) is a complex autoimmune condition characterized by inflammation, fibrosis, and oxidative stress. Lutein (LU), a carotenoid known for its extensive research benefits, has recently been identified as potentially beneficial in reducing fibrosis, inflammation, and oxidative stress. These pathological changes are notably prevalent in TAO, suggesting a potential therapeutic value of LU for TAO treatment.

Objectives: The research sought to understand how LU influences fibrosis, inflammation, and oxidative stress in orbital fibroblasts (OFs) derived from patients with and without TAO. The study hypothesized that LU could attenuate the pathological manifestations of TAO by modulating specific molecular pathways.

Methods: The research employed a *in vitro* model using orbital fibroblasts (OFs) obtained from TAO patients and control subjects. These cells were pre-treated with Lutein (LU) before exposure to TGF- β 1 or IL-1 β to induce fibrosis or inflammation, respectively. The experimental design allowed for the investigation of LU's effects on the expression of genes and proteins associated with these pathological processes. Key outcomes were measured through quantitative PCR (qPCR), Western blotting, and RNA sequencing. RNA sequencing, in particular, was utilized to identify potential molecular pathways influenced by LU treatment, with a focus on the ERK/AP-1 pathway as a candidate mechanism. The study also employed DHE fluorescent probe staining to assess the effects of LU on oxidative stress levels induced by IL-1 β .

Results: The study demonstrated that LU significantly mitigated fibrosis and inflammation in TAO OFs, reducing the mRNA expression of ACTA2, COL1A1, FN1, and CTGF, and inhibiting the protein expression of α -SMA and FN1 induced by TGF- β 1. LU also inhibited OFs migration and oxidative stress induced by IL-1 β . RNA sequencing indicated the ERK/AP-1 pathway might be the molecular mechanism behind LU's protective effect.

Conclusions: In summary, this research provides initial evidence that LU significantly alleviates TAO's pathological features by suppressing the expression of fibrosis, inflammation-related genes and ROS production in OFs, suggesting LU could be a potential therapeutic agent for TAO.

FT-ORB-017

Peripheral CD3⁺CD4⁺ T cells as indicators of disease activity in thyroid eye disease: age-dependent significance

H. Zhou¹, H. Zhang¹, L. Fang¹, J. Sun¹, X. Song¹

¹Department of Ophthalmology, Shanghai Ninth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Thyroid eye disease (TED) is a vision-threatening autoimmune disease that often occurs in people with thyroid dysfunction. Body fluid biomarker is of great value in the determination of disease activity and prediction of treatment response in TED. Among various biomarkers in peripheral blood, the assessment of lymphocyte subsets stands out as an essential clinical test for patients with TED. However, the value of peripheral lymphocyte in TED has been controversial, and more research should be conducted to shed light on this issue.

Objectives: To provide a more in-depth analysis of the association of peripheral lymphocytes and the disease activity of TED.

Methods: This retrospective study enrolled 65 active TED patients and 46 inactive TED patients. Comparative analyses of peripheral lymphocyte subsets were conducted between active and inactive patients. Subgroup analyses were performed based on sex, age, disease duration, and severity. Correlation analyses explored the associations between lymphocyte subsets and TED activity indicators. Prediction models for TED activity were established using objective indicators.

Results: Significantly elevated levels of CD3⁺CD4⁺ T cell levels were observed in active TED patients compared to inactive patients ($P = 0.010$). Subgroup analysis further revealed that this disparity was most prominent in females ($P = 0.036$), patients aged 50 years and younger ($P = 0.003$), those with long-term disease duration ($P = 0.022$), and individuals with moderate-to-severe disease ($P = 0.021$), with age exerting the most substantial impact. Subsequent correlation analysis confirmed the positive association between CD3⁺CD4⁺ T cells and the magnetic resonance imaging indicator of TED activity among patients aged 50 years and younger ($P = 0.038$). The combined prediction models for TED activity, established using objective indicators including CD3⁺CD4⁺ T cells, yielded areas under curve of 0.786 for all patients and 0.816 for patients aged 50 years and younger.

Conclusions: Peripheral CD3⁺CD4⁺ T Cells are associated with disease activity of TED, especially in patients aged 50 years and younger. Our study has deepened the understanding of the peripheral T cell profiles in TED patients.

P-ORB-001

Targeted intra-orbital amphotericin injection in apex mucormycosis using CT-scan guidance

F. Pakdel¹, A. Abrishami², M. Alborzi Avanaki¹, M. Salehi¹, S. Khodavaissy¹, F. Farrokh¹

¹TUMS, Tehran, Iran, Islamic Republic of, ²SUMS, Tehran, Iran, Islamic Republic of

Introduction: A high incidence of sinu-orbital Mucormycosis as a fulminant and opportunistic fungal infection happened following the COVID-19 pandemic. Thus named as CAM. Generally, it has unfavorable prognosis. Traditionally, patients with orbital mucormycosis with apical or extensive involvement are considered hopeless for saving the eye and are candidates for exenteration. Meanwhile management of large number of patients with CAM, increased our surge to search for more effective strategies to decrease mortality and morbidity of this critical disease.

Objectives: The purpose of this study was to evaluate and compare CT guided injection of liposomal amphotericin with retrobulbar liposomal amphotericin injection in patients with mucormycosis and orbital apex involvement.

Methods: In this pilot study clinical trial from September to January 2021, thirty patients with orbital COVID-19-associated Mucormycosis underwent intra-orbital injection of amphotericin B in two groups of 15 patients; A: CT-guidance injection and B: conventional retrobulbar injection. All patients underwent comprehensive orbital clinical exam and orbital MRI before and after CT guided orbital amphotericin injections before and after injection. Results were evaluated and analyzed three months after injection.

Results: Results: A total of thirty patients with mean age of 52 ± 11.86 were enrolled in this study. Twenty-three (76.7%) patients were male; group A: 11 (73.3%) and B: 12 (80%). The majority of the patients in both group were diabetics (A: 10 (66.7%), B: 10 (76.9%)). There was no history of malignancy, chemotherapy, and immunomodulator therapy. Cardiovascular disease was seen in 9 (32.1%) cases (A: 2 (13.3%), B: 7 (53.8%)). Most patients in both groups had received corticosteroids and antiviral therapy for their recent COVID-19, 23 (82.1%) and 25 (89.3%), respectively. No patient in group A underwent exenteration. Eleven (78.6%) patients in group B underwent orbital exenteration.

Conclusions: Intra-orbital amphotericin injection under CT-guidance can be considered as a highly effective method in patients with orbital mucormycosis. This method may decrease exenteration without increasing mortality of patients.

P-ORB-002

Imaging spectrum of COVID-19 associated RhinoOrbital-Cerebral Mucormycosis

B. Khademi¹, A. Dehghan², H. Bazrafshan³

¹Ophthalmology, Shiraz University of Medical Sciences, Shiraz, Iran, Islamic Republic of, ²Radiology, Shiraz University of Medical Sciences, Shiraz, Iran, Islamic Republic of, ³Neurology, Shiraz University of Medical Sciences, Shiraz, Iran, Islamic Republic of

Introduction: Rhino-Orbital-Cerebral Mucormycosis (ROCM) is a life-threatening opportunistic fungal infection, which mostly affects immunocompromised patients. There has been a notable rise in the incidence of ROCM during the COVID-19 outbreak.

Objectives: In this study we described imaging characteristics of ROCM in detail, from early sinonasal inflammation to late intracranial involvement.

Methods: In this retrospective study, Computed Tomography (CT) scan and Magnetic Resonance Imaging (MRI) of 48 patients with proven ROCM in biopsy or culture were evaluated. All the patients had a history of COVID-19 infection within the previous three months. The imaging findings were described and the frequency of different parameters was reported.

Results: Paranasal inflammation was detected in all the patients on imaging. The most common involved paranasal sinuses were ethmoid sinuses (97.9%). On diffusionweighted images, restricted diffusion was seen in the paranasal sinuses of 81.1% of the patients. In addition, sinus wall bone involvement was observed in 87.5% of the cases. The most common anatomical sites for extrasinus involvement were the retroantral soft tissue (89.6%) and orbital cavity (87.5%). Dacryocystitis in 50%, optic nerve inflammation in 43.2%, globe involvement in 18.9%, and trigeminal nerve involvement in 16% of the patients were detected. There was extension of inflammation through the cavernous sinuses and alongside the internal carotid arteries in 24% of the patients.

Conclusions: Characteristic imaging findings of ROCM not only play a vital role in the early diagnosis of this infection, but they also contribute to the assessment of the extension of inflammation, which is vitally important in surgical planning.

P-ORB-003

Tarsal fracture with modified suturing technique in trachoma induced cicatricial entropion in the upper lid

*A. Al-Hattali*¹

¹Ophthalmology, Oman Medical Speciality Board, Muscat, Oman

Introduction: Cicatricial entropion is a common eyelid condition encountered by ophthalmologists worldwide. The incidence in our region is quite high due to large numbers of patients with a past history of trachoma. Tarsal fracture procedure, among several others, is used to correct this condition. However, recurrence has been a problem and success rate should be calculated.

Objectives: The present study showed the results of a modified tarsal fracture operation in trachoma induced cicatricial entropion of eyelids conducted at Ophthalmology Department of our regional hospital.

Methods: A retrospective interventional case series on patients with cicatricial entropion corrected by "modified" tarsal fracture technique was conducted at Rustaq Hospital, Ophthalmology department between 2015 and 2021. The success rate was evaluated.

Results: Most patients were female (80.6%) with the mean age of 70.6 years old. The success rate of the modified tarsal fracture was 82.9%

Conclusions: Tarsal fracture is a simple, quickly-performed, and less time-consuming procedure with an acceptable success rate globally. However, our modified tarsal fracture technique showed a high success rate with no failure, which should be considered as an initial operation for cicatricial entropion in our regional hospitals.

P-ORB-004

Application of transverse superior fascial expansion (TSFE) to treat recurrent ptosis

N.T.T. Hiền¹, D.D. Hương², P.T. Văn³, L.T.V. Anh³, T.T.K. Phượng⁴, L.T. Yến⁵, V.T.Q. Anh³

¹Oculoplastic and Cosmetic, Vietnam National Eye Hospital, Hanoi, Vietnam, ²General, Nguyet Cat Eye Clinic, Hanoi, Vietnam, ³Ophthalmology, Hanoi Medical University, Hanoi, Vietnam, ⁴Ophthalmology, Quảng Ninh Provincial Health Protection Board, Quảng Ninh, Vietnam, ⁵Ophthalmology, Thái Nguyên General Central Hospital, Thái Nguyên, Vietnam

Introduction: Ptosis surgery is still a challenge for many surgeons. The choice of method and materials used in surgery depends on the degree of level ptosis and experience of surgeons. Common materials on frontalis sling such as thread and silicon wire have shown some limitations such as high recurrence rate and rejected. Some autologous materials such as fascia fascialata, frontalis muscle flap show long-term effects. However, they are not indicated for all cases and the implementation technique is relatively difficult. The transverse superior fascia is an autologous and insitu material that has proven to be effective, overcoming some limitations of other methods.

Objectives: Introducing the technique, anatomy of TSFE and evaluating the initial results achieved.

Methods: A descriptive, non-controlled intervention study in 12 patients with 14 eyes had previous ptosis surgeries but recurrent. Patients were followed up after surgery 1 week, 1 month and 3 months. Research indicators included: visual acuity, MRD1, contour, crease, palpebral fissure height, lagophthalmos, lid lag and ocular surface.

Results: 12 patients with 14 eyes with recurrent ptosis were reoperated with transverse superior fascial expansion suspension. Male : female ratio = 1:6, youngest age is 6 years old, oldest age is 21 years old. Previous surgical methods include frontalis muscle suspension with fascial fascialata (1 eye), frontalis muscle suspension with frontalis flap (1 eye), frontalis sling with silicon wire (8 eyes), thread (2 eyes) and shortening the levator muscle (4 eyes). The average MRD1 before surgery was 0.5 mm, the average MRD1 after surgery was 3.6 mm. After 3 months of follow-up, only 30% of patients had 1-2 mm eyelid opening. The curvature of the eyelid margin and eyelash folds are balanced on both sides.

Conclusions: TSFE is a good material for treating ptosis, especially recurrent ptosis. This material is considered an additional choice in ptosis surgery.

P-ORB-005

Chlorogenic acid attenuates oxidative damage in rat lacrimal gland epithelial cells via PI3K/AKT/FoxO3 signaling

Y. Tang¹, J. Yu², C. Fang³, J. Shi⁴, X. Yao⁵, Q. Peng¹

¹Ophthalmology, Hunan University of Chinese Medicine, Changsha, China, ²Ophthalmology, The First Hospital of Hunan University of Chinese Medicine, Changsha, China, ³Scientific Research, The First Hospital of Hunan University of Chinese Medicine, Changsha, China, ⁴Hunan University of Chinese Medicine, Changsha, China, ⁵Ophthalmology, The First Hospital of Hunan University of Chinese Medicine, Changsha, China

Introduction: Dry eye disease, characterized by tear film instability and ocular surface inflammation, implicates oxidative stress in its pathogenesis. Chlorogenic acid (CGA), known for its antioxidant and anti-inflammatory properties, may offer therapeutic benefits, yet its specific mechanisms in treating dry eye remain to be clarified.

Objectives: The primary objective of this study was to elucidate the therapeutic mechanisms of CGA in the treatment of dry eye disease, with a focus on its antioxidant and anti-inflammatory activities. Specifically, the study aimed to investigate the role of the PI3K/AKT/FoxO3 signaling pathway in mediating the effects of CGA on lacrimal gland epithelial cells (LGECs) under oxidative stress.

Methods: This study combined data mining and in vitro experimental approaches to explore CGA's therapeutic effects. Data mining was employed to predict CGA's potential mechanisms of action in dry eye treatment. In vitro experiments involved the use of an H₂O₂-induced oxidative damage model in LGECs to examine the effects of CGA. The involvement of the PI3K/AKT/FoxO3 pathway in the therapeutic effects of CGA was assessed by treating cells with CGA alone, CGA in combination with SC79 (an AKT activator), and comparing the results to treatment with MK-2206 (an AKT inhibitor).

Results: The study found that CGA could target multiple pathways related to oxidative stress and inflammation in LGECs, with a significant focus on the PI3K/AKT/FoxO3 pathway. Treatment with CGA and SC79 significantly reduced levels of reactive oxygen species (ROS), increased superoxide dismutase 2 (SOD2) levels, and decreased apoptosis in LGECs. Conversely, inhibition of the PI3K/AKT/FoxO3 pathway by MK-2206 exacerbated oxidative damage and apoptosis, indicating the critical role of this pathway in mediating CGA's protective effects.

Conclusions: CGA demonstrates a potential therapeutic effect on dry eye disease by alleviating oxidative stress and inflammation through the activation of the PI3K/AKT/FoxO3 signaling pathway. These findings suggest that CGA could be a promising candidate for dry eye prevention and treatment, warranting further research to fully explore its mechanisms of action and therapeutic efficacy in clinical settings.

P-ORB-006

Selective BD2 inhibitor exerts anti-fibrotic effects via BRD4/FoxM1/Plk1 axis in thyroid eye disease

D. Liang¹, Y. Xie¹, Y. Pan¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: Orbital tissue fibrosis remains a troublesome issue in Thyroid Eye Disease (TED) management, which can lead to some severe and intractable complications. Exploration of novel therapeutic targets and agents to ameliorate orbital tissue fibrosis is crucial for TED. BRD4 is a key member of the bromodomain and extra-terminal (BET) family, which has been recently found to bind acetylated histones to regulate the fibrosis of some organs. Besides, the second bromodomain (BD2) is a common bromodomain in BET family. Thus, It's worthwhile to determine the role of BD2 in this pathologic fibrosis and its therapeutic potential in TED.

Objectives: We aim to investigate the therapeutic potential of ABBV744, a BET inhibitor with selectivity for BD2 in TED. The anti-fibrotic effects of ABBV744 and its underlying mechanism were explored in TED patients.

Methods: Immunohistochemistry (IHC) and real-time quantitative polymerase chain reaction (RT-qPCR) assays were conducted on orbital connective tissues from GO and controls. RT-qPCR, Western blot, Cell-counting Kit-8 (CCK-8), and 5-ethynyl-2'-deoxyuridine (EdU) cell proliferation assays were conducted on OFs isolated from TED patients.

Results: The expression of BRD4 was upregulated in the orbital tissues of TED patients relative to controls and in TED OFs stimulated with TGF- β 1. Further, we showed that BRD4 modulated the profibrotic process through the interaction with Forkhead Box M1 (FoxM1) and its downstream molecule Polo-like kinase 1 (Plk1) in cultured TED OFs. Inhibition of BRD4 both by BD2 selective inhibitor ABBV-744 and pan-BET inhibitor JQ1 exerted anti-fibrotic effects, whereas ABBV744 displayed superior anti-fibrotic effects and acceptable safety compared to JQ1.

Conclusions: We conclude that BDR4 may modulate the profibrotic process in OFs of TED patients via the FoxM1/Plk1 axis, and that selectively targeting BD2 domain of BRD4 may therefore be a potential therapeutic option for treating patients with TED.

P-ORB-007

Sensitivity and specificity of cylindrical dandruff for demodex blepharitis in patients with dry eye disease

W.-K. Cho¹, H.S. Hwang², J.-S. Paik³

¹Ophthalmology, The Catholic University of Korea/Uijeongbu St. Mary's Hospital, Seoul, Korea, Republic of, ²Ophthalmology, The Catholic University of Korea/ Yeouido St. Mary's Hospital, Seoul, Korea, Republic of, ³Ophthalmology, The Catholic University of Korea/Yeouido St. Mary's Hospital, Seoul, Korea, Republic of

Introduction: Cylindrical dandruff is a pathognomonic sign of demodex blepharitis. However, even in patients without cylindrical dandruff, there are often cases where demodex is present from drawing eyelashes.

Objectives: In this study, we examined the sensitivity and specificity of the cylindrical dandruff for demodex blepharitis by performing upper and lower eyelid edge imaging and demodex presence examination.

Methods: From January 2020 to July 2021, the margin of upper and lower eyelids were photographed, and eyelashes were pulled out to perform a demodex test in patient who visited the hospital for dry eye examination. A researcher recorded the presence or absence of cylindrical dandruff in the eyelid margin photograph through retrospective medical chart review. Through this data, the sensitivity and specificity of cylindrical dandruff for demodex blepharitis were obtained. Among the patients with demodex, the clinical parameters of dry eye (Schirmer, tear break up time (BUT), cornea stain index, tear meniscus height (TMH), tear lipid layer thickness (LLT) were compared with each other by dividing them into a group with and without cylindrical dandruff.

Results: There were 91 patients who visited the hospital for the dry eye examination and underwent a demodex test. Of the 21 patients with cylindrical dandruff, 20 patients had demodex and 1 patient did not have. Of the 70 patients without cylindrical dandruff, 34 patients had demodex, but 36 patients did not have. The sensitivity of cylindrical dandruff to demodex blepharitis was 0.370 and the specificity was 0.973. Of the total 54 cases where demodex was detected, there was no significant difference between group with cylindrical dandruff and without cylindrical dandruff in the clinical parameters of dry eye.

Conclusions: The sensitivity of the cylindrical dandruff, known as the pathognomonic sign of demodex blepharitis, was 0.370 and the specificity was 0.973. Since the sensitivity is very low at 0.370, even if there is no cylindrical dandruff, it is necessary to remove the eyelash to check the demodex presence if there are symptoms related demodex blepharitis.

P-ORB-008

The use of anterior segment optical coherence tomography in the study of tear metrics pre- and post-upper eyelid surgery

H. Baalbaki¹, A. Hmede¹, R. Amine^{2,1}, A. Khalil¹, M. Khraiche³, R. Alameddine¹

¹Ophthalmology, American University of Beirut Medical Center, Beirut, Lebanon, ²Ophthalmology, Cleveland Clinic, Ohio, United States, ³Biomedical Engineering, American University of Beirut Medical Center, Beirut, Lebanon

Introduction: Dry eye disease (DED) is a multifactorial disease that impacts the ocular surface's tear homeostasis, resulting in visual disturbances, eye pain, and discomfort. It has been linked to procedures that involve the upper eyelid, such as Blepharoplasty and Blepharoptosis repair. Anterior Segment OCT (AS-OCT) can offer a more objective and more accurate assessment of DED than tools used in previous studies, as it measures tear film parameters even detecting subclinical DED.

Objectives: Using AS-OCT to assess changes in tear film parameters: Tear Break-Up Time (TBUT), Tear Meniscus Height (TMH), Depth (TMD), and Area (TMA), along with other clinical assessments such as the Schirmer test and the Ocular-Surface-Disease-Index score, along the preoperative and postoperative period of patients undergoing upper eyelid surgery.

Methods: This is a single-centered prospective interventional study of 51 patients undergoing upper eyelid blepharoplasty and/or ptosis repair. Patients are evaluated pre-operatively, then followed up 1 week, 1 month, and 3 months post-operatively. Routine ophthalmic examination and imaging data are collected during each visit. Anterior OCT is used for the measurement of tear meniscus parameters. The primary outcome is Tear Meniscus Height (TMH), Depth (TMD), and Area (TMA). Secondary outcomes include OSDI (ocular surface disease index), Schirmer test measurements, and tear break-up time test (TBUT).

Results: 51 patients (102 eyes) participated in this study (20 patients underwent Blepharoptosis repair and 31 Patients underwent Blepharoplasty). Between the preoperative and the first postoperative follow-up, a significant decrease in the Tear Meniscus Depth and Area ($p < 0.05$) along with an increase in the OSDI score ($p < 0.01$) was observed. While the tear parameters normalized, the OSDI score showed a decrease in the second follow-up ($p < 0.05$), with the second follow-up still being statistically larger than the preoperative score ($p < 0.05$). There were no significant differences between the two surgeries.

Conclusions: Both surgeries cause a subjective sensation of dry eye disease within the first week of the operation as evidenced by the increased OSDI score, and an objective decrease in tear meniscus depth and area within this timeframe. The objective measures of tear dynamics normalized by one month after the operation, however, the subjective patient-reported outcomes suggested persistent dry eye disease that is improving with time and normalized by three months.

P-ORB-009

Association between Demodex blepharitis and lacrimal duct obstruction in adults

Y. Li¹, W. Shi², Y. Fu¹

¹Ophthalmology, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Demodex infestation is a common but easily-overlooked condition, which has now been confirmed to have great contributions to ocular surface diseases. Like acquired lacrimal duct stenosis and obstruction, demodex infestation is more often in menopausal women. As the external opening of the lacrimal pathway is located within lid margin, inflammation could be spread to any level along the lacrimal pathway, probably causing lacrimal drainage system diseases. Nonetheless, the association between demodex infestation and lacrimal duct stenosis or obstruction has not yet been addressed. We here conducted a study to test the effectiveness of treating demodex infestation on the cure of lacrimal duct issues, thus investigating the association between them.

Objectives: To determine whether there is an increased incidence of Demodex blepharitis among patients with lacrimal duct obstruction.

Methods: A prospective, noncomparative clinical study was conducted. A cohort of patients who were diagnosed lacrimal duct stenosis or obstruction were examined for the presence of the Demodex mite, and their tears, symptoms, and signs of blepharitis were also investigated. During the following several months, patients received treatment of tea tree oil for the demodex blepharitis. And their lacrimal duct, tears, signs and symptoms were revalued as long as the demodex could not be detected.

Results: A total of 42 patients were included in the study (9 men and 33 women), with a mean age of 57.2 years (range, 23-75). Demodex colonization was observed in 92.86% (39/42) patients. Average OSDI scores of all the patients with demodex were obviously decreased from 41.2 to 26.18 ($P=0.002$). Average Munk scores of them were obviously decreased from 3.43 to 2.43 ($P=0.004$). Lacrimal duct stenosis or obstruction were relieved to patent in 15.38% (6/39) patients without operation treatment.

Conclusions: Demodex infestation may account for the initiation and development of lacrimal duct stenosis or obstruction. As a possible etiology, demodex blepharitis should be addressed at an early stage for patients with epiphora.

P-ORB-010

Tear protein analysis using LC-MS/MS in patients with primary nasolacrimal duct obstruction

H. You¹, S. Back², W.S. Bang², J.-M. Park², H. Lew¹

¹Ophthalmology, Bundang CHA Hospital, Sungnam, Korea, Republic of, ²Basil Biotech, Incheon, Korea, Republic of

Introduction: Change in tear protein components is proposed as one of the etiopathogeneses of primary acquired nasolacrimal duct obstruction (PANDO).

Objectives: This study aimed to analyze tear-specific proteins by performing liquid chromatography-tandem mass spectrometry (LC-MS/MS) and identify differentially expressed proteins (DEPs) in PANDO.

Methods: Tear proteins were analyzed in patients who were diagnosed with PANDO and underwent dacryocystitis-guided silicone tube intubation. Healthy fellow eye of unilateral PANDO patients and healthy participants without epiphora in both eyes were included as the control group. PANDO group was further classified according to their pathophysiology - membranous, mucus, and dacryolith subgroups. Tears samples were collected preoperatively from the lower conjunctival sac using a Weck-Cel ophthalmic sponge. Total protein quantification of individual tear samples was performed using bicinchoninic acid assay (BCA). After trypsin digestion, peptides were analyzed by LC-MS/MS (Q-Exactive with Ultimate 3000 UHPLC) technique. Proteome Discoverer 2.5 was used to analyze proteins qualitatively and quantitatively, and DEPs were identified through statistical analysis.

Results: A total of 49 eyes were included, 29 eyes in the PANDO group and 20 eyes in the control group. 3455 peptides were detected, and 886 representative proteins were selected. The number of DEPs was 159 (PANDO vs control group), 61 (membranous vs bilateral healthy group), 92 (mucus vs bilateral healthy group), 28 (dacryolith vs bilateral healthy group), 29 (unilateral vs bilateral healthy group), 43 (membranous vs unilateral healthy group), 40 (mucus vs unilateral healthy group), 11 (dacryolith vs unilateral healthy group), 8 (membranous vs mucus), 2 (membranous vs dacryolith group), and 10 (mucus vs dacryolith group). Protein analysis revealed lysozyme C (LYZ), lipocalin (LCN1), and cystatin-SN (CST1). Also, an 8-fold increase of calreticulin (CARL), a protein associated with protein folding and apoptosis, and a 2-fold decrease of prolactin-induced protein (PIP), a protein associated with ocular surface protection and immune response, were noted in PANDO patients.

Conclusions: Differentially expressed proteins are expected to provide a further understanding of the etiopathogenesis of PANDO, and possibly contribute to discovering the biomarkers for diagnosis and treatment.

P-ORB-011

The minimally invasive, combined approach for the recurrent/recalcitrant sino-orbital mucocele surgery

S. Juntipwong¹, T. Singalavania², J. Crear¹, A. Sarigul Sezenoz³, M. Alizada¹, M. Mark Zacharek⁴, H. Demirci¹

¹Ophthalmology, Kellogg eye center, University of Michigan, Ann Arbor, United States,

²Ophthalmology, Chulabhorn Hospital, HRH Princess Chulabhorn College of Medical Science,

Chulabhorn Royal Academy, Bangkok, Thailand, ³Ophthalmology, Baskent University, Ankara, Turkey,

⁴Otolaryngology – Head and Neck Surgery, University of Michigan, Ann Arbor, United States

Introduction: The management of recurrent/recalcitrant sino-orbital mucoceles can be challenging and usually requires a traditional bicoronal approach. The minimally invasive combined transorbital and transnasal endoscopic approach surgery to remove the mucocele was reported in small case series without long-term surgical outcomes.

Objectives: To evaluate clinical characteristics, and treatment outcomes of a minimally invasive combined transorbital and transnasal endoscopic approach surgery for the recurrent/recalcitrant sino-orbital mucoceles in collaboration with oculoplastic and sinus surgeons.

Methods: Eighteen cases of recurrent/recalcitrant sino-orbital mucoceles, treated at the University of Michigan Hospital system were retrospectively reviewed. The presenting symptoms, history, affected sinuses, mucocele locations, CT/MRI, etiologies, surgical approach/techniques, surgical outcomes, complications, recurrence, and follow-up duration were evaluated.

Results: Eighteen cases were included and underwent minimally invasive combined transorbital and transnasal endoscopic approach. The mucoceles originated from frontal sinus in 16patients(89%), maxillary sinus in 2patients(11%) and ethmoid sinus in 2 patients (11%). All cases showed bony defect/erosion/resorption/or osteomyelitis of orbital wall adjacent to the sinus resulting in extension of respiratory epithelium from sinus to orbit. The etiologies were orbital fracture in 3patients(17%), sinusitis with osteomyelitis in 11patients(61%), and tumor with bony resorption in 4 patients (22%);inverted papilloma 3patients(17%), and osteoma 1patient(6%). The transorbital approach incisions were considered based on the mucocele's location. The surgeries resulted in reduction of orbital volume in average of 7.7ml. The mean proptosis reduction was 2.2mm. After the surgery, 12/13patients(92%) showed diplopia improvement. The complications after the surgery were diplopia worsening(1case,6%), frontal numbness(1case,6%), enophthalmos(1case,6%). During mean follow-up period of 36months, 4patients(22%) experienced recurrence and underwent another surgery, 14patients(78%) had no recurrence

Conclusions: Our series of eighteen cases of recurrent/recalcitrant sino-orbital mucoceles, who underwent minimally invasive combined transorbital and transnasal endoscopic approach surgery, demonstrates that this approach can be successfully employed for advanced sino-orbital disease, with a low rate of recurrence and adverse outcomes with aesthetically pleasing results.

P-ORB-012

Efficacy and safety of topical oxymetazoline 0.1% in mild to moderate acquired ptosis

S. Sneha¹, M.S. Bajaj¹, N. Pushker¹, R. Meel¹, R. Saxena¹, T. Velpandian², S. Kashyap³, S. Agrawal¹
¹Ophthalmology, Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, New Delhi, India, ²Ocular Pharmacology, Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, New Delhi, India, ³Ocular Pathology, Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, New Delhi, India

Introduction: Ptosis is defined as low lying upper eyelid margin with eye in primary gaze. The standard of care for ptosis is surgical intervention, but may also be associated with complications and risks. Thus, a non-surgical treatment option might be beneficial for patients who do not qualify for, or are unwilling to undergo ptosis correction surgery.

Objectives: To evaluate the efficacy and safety of Oxymetazoline 0.1% ophthalmic solution in the treatment of mild to moderate acquired ptosis.

Methods: It was a prospective interventional study. A total of 20 patients with mild to moderate acquired ptosis visiting a tertiary eye center without a history of ptosis correction were included. Patients were administered Oxymetazoline hydrochloride 0.1% ophthalmic solution (Oxy0.1%) as a once-daily regimen for a period of 42 days after performing baseline evaluation and taking clinical photographs. Efficacy of Oxy0.1% was checked using Margin reflex distance 1 (MRD1), amount and grade of ptosis, and Humphrey visual field (HVF) was done for superior fields (36-point Suprathreshold test). Visual acuity, intraocular pressure (IOP), tear film stability (Schirmer's test and TBUT), and impression cytology were done to look for safety profiles. Patients were followed up at 1 week, 6 weeks, and 3 months.

Results: MRD1 at baseline was 2.05 ± 0.83 mm which improved to 3.40 ± 0.94 mm after instillation of Oxy0.1% at 1 week and 6 weeks follow-up (p -value=0.000). However, after discontinuing, it decreased to its baseline value. The points seen in HVF were measured to be 32.05 ± 3.46 at baseline which increased to 33.20 ± 3.19 at 1 week and 6 weeks follow-up (p -value=0.001) which decreased to its baseline values after discontinuing Oxy0.1%. At baseline, the amount of ptosis was measured to be 1.95 ± 0.83 mm which improved to 0.60 ± 0.94 mm at 1 week and 6 weeks follow-up (p -value: 0.000). On discontinuation, the amount of ptosis, as well, reverted to its baseline value. No significant change was noted in visual acuity, IOP, tear film stability, or on impression cytology.

Conclusions: Oxymetazoline hydrochloride 0.1% was found to be effective in cases of mild to moderate acquired ptosis. There was a significant improvement in the amount of ptosis with no significant change in vision, IOP, or tear film stability, thereby establishing a good safety profile. There was a significant improvement in superior visual fields in ptotic eye post instillation thus improving patients' functional visual field along with cosmetic improvement.

P-ORB-013

21-year-old female with left upper lid mass

*M.A. Sanchez*¹

¹Ophthalmology, Jose B. Lingad Memorial General Hospital, City of San Fernando, Philippines

Introduction: We present a case of a 21-year-old female who came in with a left upper lid mass for 4 years. The mass initially presented as a slow-growing tumor that is painless and non-tender. Interval history showed gradual progression in the size of the mass that is now accompanied by pain, tenderness, and blurring of vision due to the compression of the globe. Imaging showed a well-encapsulated mass in the left superior orbit with a questionable bone invasion of the roof and extension intracranially. Wide excision and biopsy using an upper lid crease anterior orbitotomy approach were done to remove the mass and subsequent histopathologic results showed Adenoid Cystic Carcinoma.

Objectives: 1. To present a case of Adenoid Cystic Carcinoma in a young Asian female.
2. To describe the peculiar presentation of Adenoid Cystic Carcinoma in a young Asian female.
3. To discuss Adenoid Cystic Carcinoma.
4. To discuss the treatment strategies done in Adenoid Cystic Carcinoma in a developing country.

Methods: Wide excision and biopsy using an upper lid crease anterior orbitotomy approach were done to remove the mass and subsequent histopathologic results showed Adenoid Cystic Carcinoma.

Results: The mass was completely removed and the subsequent bone defect was closed with a bone wax with the help of Neurosurgery. The patient was advised to undergo chemotherapy and radiation therapy however was uncompliant due to the good superficial outcome of the surgery as well as financial constraints.

Conclusions: Adenoid Cystic Carcinoma is a rare orbital malignancy that affects women of more than 40 years of age. It is notorious for its unpredictability and lethality. We present a unique case of this rare malignancy in a 21-year-old female who was managed conservatively with complete excision of the mass.

P-ORB-014

Incidence and indications for destructive eye surgeries in a tertiary hospital in Southern Philippines

J.L. Billano¹, G. Bunagan¹

¹Department of Ophthalmology, Southern Philippines Medical Center, Davao City, Philippines

Introduction:

Destructive eye surgery (DES) involves the removal of an eye, and is considered as a terminal treatment modality for intractable ocular diseases. Even if these procedures are considered necessary and life-saving, they are still associated with substantial psychological, emotional, and cosmetic implications to the individual.

Objectives:

The aim of this study was to determine the frequency and indications for DES at a tertiary eye hospital in Southern Philippines with a view to identifying the potential roadblocks in ocular health and safety.

Methods:

We conducted a retrospective chart review of all patients who underwent evisceration, enucleation, and exenteration at our center from January 2017-December 2021. Relevant demographic information, laterality of eye affected, duration of symptoms prior to presentation, visual acuity, indication for surgery, and type of destructive surgery were recorded. Descriptive statistics was used to summarize the demographic and clinical characteristics of the patients. STATA13.1 was used for data analysis.

Results:

A total of 179 eyes of 176 persons were surgically removed constituting 4.9% of a total of 3654 surgeries performed during the period of the study. There were 123 (69.9%) males and 53 (30.1%) females with a male:female ratio of 2.3:1 ($p < 0.005$), and median age of 22 years old. The most common type of surgery done was evisceration in 91 (50.8%), followed by enucleation in 77 (43%), and exenteration in 11 (6.2%). The most common indication for eye removal was ocular tumor mostly due to retinoblastoma (39.4%), followed by painful blind eye (27.3%), and ocular infections (26.3%). Majority of ocular tumors necessitating eye removal were done in the first decade of life ($p < 0.001$).

Conclusions:

The common indications for eye removal surgery in our institution are largely treatable and preventable. Robust health teaching and cooperation with allied health personnel are needed to detect and manage ocular tumors earlier and more promptly.

P-ORB-015

Survey on implants used in orbital wall fracture surgery of KSOPRS member, 2023

J.W. Jang¹, Y.J. Lee¹

¹Oculoplastic Center, Kim Eye Hospital, Seoul, Korea, Republic of

Introduction: To investigate the implants currently used in orbital fracture surgeries in Korea.

Objectives: We surveyed members of the Korean Society of Ophthalmic Plastic Surgery (KSOPRS) on the types of implants currently used in orbital fracture surgery and whether navigation systems were used. This survey may help us understand future changes in orbital fracture surgery.

Methods: In May 2023, we conducted a survey targeting members of KSOPRS, consisting of a total of 13 questions comprised 8 multiple choices, 5 short-answered questions.

Results: 55.8%(29/52 members) of the total reported using a single type of implant, while 44.2%(23/52 members) reported using two or more types. Among the 29 members using a single type of implant, 51.7%(15/29) used non-absorbable implants, and 48.3%(14/29) used absorbable implants. The reasons for using non-absorbable materials alone include their unsustainability for large fractures that require long-term support of implants due to absorption, limitations in the effect of correcting enophthalmos, and the difficulty in confirming the implants on postoperative CT scans. The reason for using only absorbable materials was that there were cases where cysts or hematomas occurred around the implant after using non-absorbable materials, and there was no difference in the results of orbital fracture surgery and the stability of the implant. Members using two or more types stated that they use absorbable materials for pediatric patients and non-absorbable materials for other orbital fractures. During orbital fracture surgery, the utilization of 3D patient-specific implants was 17.3% (9/52). The usage of a navigation system during surgery was 13.5% (7/52), with 66.7% (30/45) planning to use it in the future.

Conclusions: The use of absorbent materials appears to be increasing compared to the past. In the future, the use of 3D patient-specific implants with navigation systems for orbital fracture surgery is expected to increase gradually. However, at present, these procedures require expensive equipment, and 3D implants, predominantly composed of non-absorbable materials, have limitation of being expensive and time-consuming to manufacture.

P-ORB-016

A case of orbital tuberculosis with frontal bone lesion in an 18-year old Filipino male

M.S.K. Bugayong^{1,2,3}

¹Ophthalmology, St. Luke's Medical Center, Taguig City, Philippines, ²Ophthalmology Department, Manila Central University Hospital, Caloocan City, Philippines, ³Ophthalmology Department, Victor R. Potenciano Medical Center, Mandaluyong City, Philippines

Introduction: Orbital tuberculosis is a rare condition. Tuberculosis disease in the Philippines has been more challenging in the recent years due to the development of multidrug-resistant strains. Understanding different presentations of extrapulmonary tuberculosis highlights the complexity of this disease entity.

Objectives: This paper aims to present a case of an 18-year old Filipino male patient, with no known comorbidities, who presented in our institution with a left upper lid preseptal cellulitis that started with a forehead mass, a week prior to consult.

Methods: Case report.

Results: Upper eyelid mass histopathology results showed "granulomas with central necrosis and Langhans-type giant cell within granulation tissues in fragments". Patient consequently underwent tuberculosis treatment.

Conclusions: There is limited literature specifically addressing preseptal swelling with orbital tuberculosis and frontal lesion. Timely management of orbital tuberculosis relies heavily on the clinician's high index of suspicion alongside the patient's clinical presentation.

P-ORB-017

Morphological and psychological changes after treating anophthalmic socket syndrome

N. Yoshida-Hata¹, T. Kashima¹, M. Mimura¹

¹Oculofacial Clinic Group, Tokyo, Japan

Introduction: Anophthalmic socket syndrome (ASS) is characterized by the hallmark feature of superior sulcus depression, upper eyelid ptosis, and lower eyelid laxity. Facial asymmetry owing to ASS leads to psychological disturbance to decrease patient's quality of life, however, quantitative analysis is not well documented. This study aimed to analyze the detail of psychological and eyelid changes by treating ASS.

Objectives: The study involved consecutive 15 patients (7 males and 8 females) with ASS, mean age of 52.7 ± 18.9 (range 18-71) who underwent anophthalmic reconstruction with revision of orbital implantation and customized eyelid surgery in our institution.

Methods: Image-J Fiji was used to measure various eyelid parameters including Margin Reflex/Prosthesis Distance (MRD)-1 and 2, Central Pupil/Prosthesis-to-Brow Height (CPBH), and area of upper eyelid sulcus defined as the area of shadow, before and after surgery. The healthy eyelid set as a control to compare the parameters pre- and post-operatively, using the Wilcoxon signed-rank test. The psychological changes were also assessed using Beck Depression Inventory-2 (BDI-2) and Patient Health Questionnaire-9 (PHQ-9), before and after surgery.

Results: Ten cases exhibited improvements in MRD-1 from 0.44 to 0.988, while 8 cases showed improvement in MRD-2 from 1.15 to 1.05. CPBH ratio to the healthy side decreased from 1.17 to 1.02 ($p=0.015$). The ratio of shadow area was changed dramatically from 5.43 to 3.11 ($p=0.010$). Although the postoperative average ratio was 3.11, 5 cases showed their ratio around 1 (0.73~1.29). Psychological results indicated a mild improvement from 7.8 to 5.4 in BDI-2, and from 3.8 to 2 in PHQ-9.

Conclusions: The surgeries for ASS improved all eyelid and psychological parameters. Especially, adequate anophthalmic reconstruction and eyelid surgeries may improve CPBH and sunken eye area dramatically. Although image-processing analysis is still challenging, it is important to assess treatment effects more objectively.

P-ORB-018

The case of the missing mass: inflammatory presentation of orbital metastasis from breast carcinoma with no orbital mass

R. Ahdoot¹, M. Weber¹, D. Mirzania², B. Simmons²

¹University of Michigan Medical School, Ann Arbor, United States, ²Department of Ophthalmology and Visual Sciences, University of Michigan W.K. Kellogg Eye Center, Ann Arbor, United States

Introduction: Orbital metastases of primary breast carcinoma represent a rare yet significant aspect of ophthalmic oncology. The authors present a case of inflammatory orbital metastasis of breast carcinoma without an identifiable orbital mass.

Objectives: This case highlights the clinical features and diagnostic challenges for inflammatory orbital metastasis from breast carcinoma, and emphasizes the need for vigilance in patients with a cancer history.

Methods: A 51-year-old African-American female presented with one month of right upper and lower eyelid swelling. She had a history of bilateral ductal carcinomas of the breast, successfully treated with chemotherapy, double mastectomy, and radiation two years prior to presentation. Diagnostic workup included clinical examination, imaging, laboratory tests, and orbital biopsy.

Results: Initial examination revealed significant right-sided periorbital swelling, chemosis, and proptosis, suggestive of an orbital process. Laboratory studies were notable for an elevated erythrocyte sedimentation rate (ESR) of 38 (normal < 30 mm/Hr) and low angiotensin-converting enzyme (ACE) of 4 (normal 8 – 52 U/L) and normal thyroid labs. Computed tomography (CT) scan of the orbits showed right periorbital and maxillary soft tissue swelling, intraorbital fat stranding, and enlargement of the extraocular muscles. Magnetic resonance imaging (MRI) showed significant orbital fat stranding and enlargement of the extraocular muscles in the right orbit. Neither the CT nor the MRI showed an orbital mass. The patient received systemic steroids for presumed non-specific orbital inflammation, showing partial improvement over months. With a failure to completely resolve the symptoms, a biopsy of the involved orbital tissues was obtained. Histopathological examination revealed metastatic breast carcinoma.

Conclusions: Inflammatory presentations of orbital metastases from breast carcinoma, particularly in the absence of a mass, are rare and often lead to misdiagnosis due to overlapping symptoms with other orbital pathologies. This case underscores the importance of considering metastatic breast carcinoma in differential diagnoses of orbital inflammation, especially in patients with a history of breast cancer.

P-ORB-019

Balanced correction of posttraumatic enophthalmos with polypropylene mesh

X. Arze¹, A. Arze², L. Gutiérrez³

¹Orbita, Oculoplastica Bolivia, La Paz, Bolivia, ²Orbita, Hospital de la Luz, Mexico DF, Mexico,

³Universidad Católica Bolivia, Santa Cruz, Bolivia

Introduction: Enophthalmos is a consequence that is difficult to correct after orbital trauma. It is known that 3 mm of subsidence can cause discomfort in the patient. 5mm can be disfiguring. Although the first surgery attempts to correct the orbital anatomy completely, enophthalmos can be caused not only by the failure of exact recovery of the bone anatomy, but also by the possible retraction of fat that exists after trauma and orbital repair surgery.

Many types of surgery have been proposed, however, being able to correct the orbital volume in an adequate and balanced manner so as not to cause ocular dystopia is a true surgical challenge. The most commonly used material is the bone injector, however it cannot be exactly molded and a longer surgical time is needed to take the injector.

Objectives: It is proposed to perform a "balanced" surgery by placing Marlex polypropylene mesh "pads", preformed according to the patient's needs and strategically placed on different orbital walls, which can be molded and properly placed, with good anatomical and esthetic.

Methods: Surgery to correct enophthalmos was performed in 6 patients between January 2019 and September 2023, both in initial repairs with marked enophthalmos in the initial surgery and successful patients who were left with secondary enophthalmos.

Clinical photographs, tomography and Hertel exophthalmometry were taken pre- and postoperatively.

Results: Patients were evaluated based on exophthalmometry, clinical photographs, aesthetic results, ocular dystopia, extraocular movements, and orbital tomography, and patients were evaluated 3 months after surgery.

A significant improvement was found compared to the initial preoperative state. There were no complications such as rejection or reaction to the material, limitation of the extraocular muscles, and the corrected orbital volume remained stable over the time examined.

Conclusions: Balanced enophthalmos correction surgery is a much more anatomical and predictable method to correct the orbital volume lost after a fracture and allows us to improve the volume in different walls to avoid ocular dystopia and have a greater volume control that is improved, using a material that easily integrates into the tissues and does not have a high rate of foreign body reactions.

P-ORB-020

Astigmatism improvement after ptosis surgery

I. Benouaa¹, S. Benboudiaf¹

¹Clinique Loiola, Algiers, Algeria

Introduction: After performing many ptosis surgeries, we have observed an improvement in corneal astigmatism in the postoperative period

Objectives: The aim of this study is to evaluate the impact of ptosis surgery on corneal astigmatism

Methods: a retrospective study including 61 eyes of 58 patients, aged between 18 months and 72 years old, operated between October 2021 and December 2023, have been included. consecutive astigmatism measurements have been performed: before, at one week, one month, and three months after surgery using the same autorefractor- keratometer before and after surgery.

Results: ptosis surgery has a positive impact on corneal astigmatism and therefore on best uncorrected visual acuity in most of patients undergoing ptosis surgery.

ptosis surgery, in addition to improvement of visual acuity in total and subtotal ptosis, it has an additional benefit by improving corneal astigmatism and therefore the best uncorrected visual acuity; and as a consequence, has a potential effect in amblyopia treatment in children.

Conclusions: Ptosis surgery should be performed as early as possible to prevent amblyopia by deprivation and secondary to corneal astigmatism.

P-ORB-021

A case of orbital pilocytic astrocytoma in the Philippines

Z.M.C. Urgel¹, E. Omaña¹, E. Valera¹, A. Martin¹

¹Ophthalmology, Rizal Medical Center, Pasig City, Philippines

Introduction: Pilocytic astrocytoma (PA), a form of Optic Nerve Glioma is a rare, slow-growing glioma, classified as grade-I tumor by the World Health Organization (WHO). These tumors occur preferentially during the first decade of life and are particularly frequent in children with neurofibromatosis type 1.

Objectives: This report aims to discuss the clinical, radiologic and histopathologic features of an optic nerve glioma and its management. To our knowledge, this is the first locally reported case of optic nerve pilocytic astrocytoma.

Methods: A nine-year-old female consulted to the outpatient department of the Rizal Medical Center Department of Ophthalmology with a chief complaint of left orbital mass. Ocular examination was done which showed no light perception with a 10 x 6 x 9.5 cm axial, downward and lateral displacement of left eye. Birth history, developmental history and past medical history were all unremarkable with no signs and symptoms of neurofibromatosis.

Diagnostic tests such as computed tomography scan of the orbits and incision biopsy were done. Orbital exenteration was also performed to remove the painful and cosmetically disfiguring left orbital mass.

Results: Orbital CT Scan revealed a complex hypodense mass which extends minimally to the left aspect of suprasellar cistern and is not associated with any orbital bone defect, erosion or hyperostosis.

Incision biopsy at the superomedial part of the upper eyelid revealed reactive lymphoid aggregates indicating a chronic inflammatory process rather than malignancy. Immunohistochemical markers for lymphoproliferative malignancies (CD3, CD20) were also negative.

Orbital exenteration was then performed with histopathology findings of the retrobulbar tissue a Low-Grade Glioma. Immunohistochemical staining of Glial Fibrillary Acidic Protein favors Pilocytic Astrocytoma.

Conclusions: Optic nerve glioma is a rare orbital tumor that poses as a diagnostic challenge to ophthalmologists. It presents as a chronically inflamed anteriorly displace eye due to the enlarging optic nerve tumor. A high level of suspicion is essential when initial biopsies do not match the clinical findings. Radiologic imaging studies render reliable basis for surgical planning. Histopathologic evaluation provides definitive diagnosis. Exenteration may be justified in painful cosmetically disfiguring cases. Adjunctive chemotherapy and radiotherapy were not warranted in the absence of optic chiasm and brainstem involvement.

P-ORB-022

Efficacy of intense pulsed light therapy in patients with dry eye disease and meibomian gland dysfunction in Mexico

*M.D.R. Sanchez-Valerio*¹

¹Ophthalmology, Hospital Angeles Puebla , Pue, Mexico, Puebla, Mexico

Introduction: Intense Pulsed Light (IPL) has gained relevance in recent years in ophthalmology for the relief of symptoms of Dry Eye Disease (DED), however, in some countries such as Mexico there is still debate about whether its application is relevant and safe or it is a product of fashion. We must evolve in the treatment or continue with hot compresses.

Objectives: To evaluate the effectiveness and safety of intense pulsed light in patients with dry eye symptoms and Meibomian Gland Dysfunction in the Mexican population.

Methods: Inclusion criteria: Patients with a diagnosis of DED determined by OSDI, carriers of any degree of Meibomian Gland Dysfunction (MGD) determined by the Heiko scale, age between 20 -80 years, any sex. Exclusion Criteria: Patients being treated with photosensitizing medications, pregnant women, patients who have metal implants in the face, patients with epilepsy. The study was Analytical, Longitudinal, Quasi-experimental, Uncontrolled (Cohort).

Results: A total of 38 patients were studied, with an average age of 50+- 16 years; of which 20 were women and 18 were men. The degree of dry eye, measured by OSDI, was distributed into 4 groups. The largest group was 3 with 18 patients and the smallest was grade 4 with 1 patient. The number of IPL applications was 1 to 5 sessions. Groups were formed according to the number of sessions applied. Of which 8 patients received a session at the time of the study; 13 received 2 sessions, 10 received 3 sessions and 4 patients received 4 sessions; 3 received 5 sessions; all of them with a difference of 15 days. A significant difference ($p=0.17$) was found in dry eye symptoms between the first and second session; as well as between the first and third session ($p=0.09$). Regarding the anatomy of the meibomian glands, a significant difference (0.24) was observed between the first and third sessions. Of the 38 patients evaluated, none presented relevant adverse effects evaluated by questionnaire.

Conclusions: Intense pulsed light is effective for the treatment of dry eye symptoms from the first application session ($P= 0.17$). The most relevant improvement observed in dry eye symptoms occurred in the third session ($P=0.09$). The anatomy of the glands shows relevant changes in the third application session ($p=0.24$). Of 100 percent of the patients evaluated, none presented adverse effects.

P-ORB-023

Atypical presentation of primary conjunctival amyloidosis

T.U. Garcia Soto¹, S. Corredor¹, J.F. Perez Perez¹, D.P. Garcia¹

¹Instituto Mexicano de Oftalmologia (IMO), Queretaro, Mexico

Introduction: Amyloidosis is a rare disease with an incidence of 1.2% per 100,000 people per year. It is characterized by extracellular deposits of amyloid substance. It is classified into localized primary, systemic primary, localized secondary, and systemic secondary.

Objectives: Report an atypical presentation of primary conjunctival amyloidosis.

Methods: A 78-year-old male patient with no known systemic or ophthalmic diseases presented to the ophthalmology consultation due to a sensation of a foreign body in the left eye persisting for 1 year.

At the eversion of the upper eyelid of the left eye, a raised lesion was observed on the tarsal conjunctiva of the outer third of the upper eyelid, measuring 1 cm in diameter. It appeared yellowish, indurated, with well-defined borders, vascularized, and flat in surface. Due to the patient's age and the chronic clinical presentation of a yellowish lesion localized on the upper eyelid, the initial diagnostic impression was sebaceous carcinoma. Therefore, surgical excisional biopsy was performed.

Results: The histopathological report indicated replacement of proper substance by fibroconnective tissue due to extracellular amorphous deposits. Hematoxylin-eosin staining showed eosinophilic-orange staining of the tissue, multifocal, consistent with subepithelial amyloidosis. Additionally, cytopathological and immunohistochemical reports with positive Congo red and Crystal Violet staining confirmed amyloidosis. Apple-green birefringence was observed under polarized light.

The patient was referred to an internist who conducted systemic evaluation, but no systemic amyloidosis-related alterations were found, indicating primary conjunctival amyloidosis.

Conclusions: Localized primary amyloidosis is a rare condition, particularly conjunctival presentation with an incidence of 0.002%. Clinically described as a red, localized, painless conjunctival lesion, the most frequent presentation is on the bulbar or tarsal conjunctiva. However, this patient's clinical presentation did not match the typical presentation of this type of amyloidosis.

Among the types of amyloidosis, primary localized amyloidosis is the least frequent, as seen in this case. Treatment varies depending on the type of amyloidosis. Amyloidosis is a rare disease. Its clinical presentations vary, potentially resembling various pathologies. In this case, there was suspicion of malignancy, sebaceous carcinoma, leading to surgical measures for its management.

P-ORB-024

Management and course of IgG4 related orbital disease

U. Singh¹, P. Thinlass¹, K. Poonia¹

¹Ophthalmology, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Introduction: Primary IgG4 related inflammatory orbital disease (IgG4 ROD) is a relatively new entity which has gained perceptibility over the last two decades. It may be a forerunner of systemic disease.

Objectives: We present the study of clinical presentation, management and course of IgG4 related orbital disease.

Methods: We reviewed 5 consecutive cases of histo-pathology proven IgG4 ROD from 2015 onwards.

Results: They presented with proptosis, periocular swelling, pain and orbital mass. One had prolonged period of ocular pain interspersed with acute episodes of severity. Treatment included steroids and immunosuppressants. The course of the disease was instable being interrupted by episodes of inflammatory flare-up. At a mean follow up of 31 months, one had local recurrence after two years of quiescence.

Conclusions: IgG4 ROD disease needs to be recognized and diagnosed with appropriate investigations and immunostaining. The disease course may be chronic and progressive. Hence, these patients need to be followed up for a long, to pick up recurrences, side effects of drugs and systemic spread, in order to manage organ and tissue damage.

P-ORB-025

The outcomes of frontalis rgerly using inverted Y shaped facia lata in severe congenital belpharoptosis

B. Khademi¹, N. Oji¹

¹Ophthalmology, Shiraz University of Medical Sciences, Shiraz, Iran, Islamic Republic of

Introduction: Blepharoptosis is a common eyelid malposition characterized by low-lying upper eyelid margins, which can cause visual axis misalignment and various complications. This method presents a novel approach to sling surgery using an inverted Y shape configuration, with a focus on its advantages in terms of cosmetic and functional outcomes.

Objectives: Evaluating the advantages in terms of cosmetic and functional outcomes of frontalis sling surgery by using an inverted Y shape configuration.

Methods: The study is a retrospective analysis of patients with congenital blepharoptosis who underwent inverted Y shape frontal sling surgery. The surgical technique involves harvesting fascia lata and assimilating the eyelid to the frontalis muscle. Data on demographic features, preoperative measurements, and postoperative outcomes were collected. Follow-up sessions measured primary outcomes such as marginal reflex diameter (MRD1 and MRD2) and secondary outcomes including tarsal plate show, eyelid lag in down gaze, lagophthalmos and eyelid contour. The cosmetic appearance of scars was evaluated using a visual analogue score (VAS).

Results: The study included 25 patients (15 males, 10 females) with a mean age of 19.02 years. All patients had congenital ptosis, with 15 cases being bilateral. The follow-up period averaged 3.06 years. After surgery, MRD1 and MRD2 values were significantly improved, 3.91 ± 1.49 and 1.06 ± 1.33 , respectively. No complications were observed in the donor site, and only one patient required revision surgery. Cosmetic outcomes showed satisfactory symmetry of the superior palpebral crease and eyelid contour. Scar evaluations yielded positive results, with no reported eyebrow alopecia and high VAS scores for intra-eyebrow and upper eyelid scars.

Conclusions: The Y shape configuration for frontal sling surgery in congenital blepharoptosis provides favorable cosmetic and functional outcomes. The procedure offers advantages in terms of shorter operation time, reduced donor-site morbidity, and improved scar appearance. Further studies with larger sample sizes and longer follow-up periods are needed to validate these findings and compare the inverted Y shape configuration with other surgical approaches.

P-ORB-026

Evaluation of topical timolol in the treatment of periocular Pyogenic Granuloma

S. Rao B S¹, M. Singh Bajaj¹, N. Pushker¹, R. Meel¹

¹Ophthalmology, All India Institute of Medical Sciences, Delhi, India

Introduction: Pyogenic granulomas (PG) are benign acquired vascular tumours arising from the skin and mucous membranes. They appear as solitary red, vascular, sessile or pedunculated lesions with a phase of rapid growth, followed by stabilisation. The conjunctiva is a rare site for these lesions. They are a cosmetic blemish, and present with repeated bleeding following minor trauma.

Most lesions are managed by complete excision which leaves a large defect and scar, or shave excision which has a high recurrence rate, up to 43.5% in some studies. Other modalities including cauterization, lasers, sclerosants, and steroids have been used with varying success rates.

Beta blockers have been used in vascular tumours including infantile haemangiomas with favourable outcomes. They are believed to induce apoptosis of capillary endothelial cells, cause vasoconstriction and antagonise VEGF, shrinking these lesions. There have been a few reports of timolol drops being used in PGs, but there are no studies published on the gel formulation of timolol.

With the advantage of being non invasive, minimal adverse effects, easy to use, with good cosmetic outcomes, if found efficacious and safe, topical timolol could become a first line agent for PGs.

Objectives: Primary objective - To assess the efficacy of topical timolol 0.5% gel in the treatment of periocular PGs.

Secondary objective - To assess the safety profile of topical timolol 0.5% gel.

Methods: This was a prospective interventional non-comparative study with a sample size of 20. Cases of conjunctival PGs were prescribed topical timolol gel twice a day and followed up over a period of 3 months. The maximum dimensions of the lesion, colour (for vascularity), the number of bleeding episodes, and the adverse effect profile, including tests for tear film stability were noted and analyzed.

Results: We found a significant reduction in the size of the lesions ($p=0.026$), colour scale ($p<0.01$) and the number of bleeding episodes ($p<0.01$). 20% cases had excellent response (complete regression); 55% had good response (>50% reduction in size); 20% had fair response (20-50% reduction), and 5% had poor response (<20% reduction). There was no significant change in the pulse, blood pressure, visual acuity or intraocular pressure, but a significant decrease in the tear film breakup time ($p<0.01$). Minor adverse events included dry eye (15%) and papilla (15%).

Conclusions: Topical timolol 0.5% gel is a safe and effective option for the treatment of periocular PGs, and may be used as a first line modality in its management, particularly in patients requiring general anesthesia for surgery and sessile lesions difficult to excise completely.

P-ORB-027

Utilizing OCT-A to investigate retino-vascular parameter changes in compressive and non-compressive thyroid eye disease

A. Hmede¹, H. Baalbaki¹, A. Khalil¹, R. Amine^{2,1}, J.-S. Torbey¹, R. Istambouli¹, M. Khraiche¹, M. El Harati¹, R. Alameddine¹

¹Ophthalmology, American University of Beirut Medical Center, Beirut, Lebanon, ²Ophthalmology, Cleveland Clinic, Ohio, United States

Introduction: Thyroid eye disease (TED), also known as Graves' Ophthalmopathy, is an autoimmune condition linked to thyroid dysfunction, occurring in a significant percentage of Graves' disease cases. Its clinical presentation encompasses various symptoms such as eyelid edema, proptosis, and dysthyroid optic neuropathy (DON), affecting a minority of TED patients. Left untreated, DON can lead to severe visual impairment due to optic nerve damage. Optical coherence tomography angiography (OCT-A) has emerged as a valuable non-invasive tool for assessing retinal microvasculature and evaluating optic nerve damage in conditions like TED, offering insights into diagnosis and treatment strategies.

Objectives: To compare the changes in macular vascularity, optic nerve vascularity, retinal nerve fiber layer thickness and ganglion cell layer thickness between patients of different severities of thyroid eye disease (TED) and healthy controls.

Methods: A single-center retrospective study was conducted, encompassing patients diagnosed with TED and healthy controls. Each subject underwent comprehensive ophthalmic examinations and optical coherence tomography angiography, focusing on the fovea and optic nerve head using Cirrus HD-OCT (Carl Zeiss Meditec) during clinic visits. Key outcomes comprised various OCT and OCT angiography parameters, such as Central Macular Thickness (CMT), Ganglion Cell Layer thickness (GCL), Retinal Nerve Fiber Layer (RNFL) parameters, and vessel density parameters of the macula and optic nerve. Additionally, clinical activity score (CAS) and visual field (VF) parameters were assessed. Subgroup analysis involved categorizing TED patients into active TED, inactive chronic TED, and dysthyroid optic neuropathy (DON) groups.

Results: A total of 200 eyes (103 patients) with thyroid eye disease, and 144 eyes (72 patients) controls were recruited. Patients with DON had a statistically significant decrease in the mean ganglion cell layer (mGCL) ($p < 0.01$) and minimum ganglion cell layer (minGCL) ($p < 0.01$) including all sub-quadrants S1-S6 ($p < 0.01$) compared to patients with active TED, inactive TED or healthy controls. Moreover, the mean retinal nerve fiber layer (mRNFL) including its superior and nasal sub-quadrants showed a statistically significant decrease in the mean ($p < 0.01$). All other studied parameters including the other RNFL thickness sub-quadrants, superficial macular and nerve vessel densities did not show any significant changes among the groups ($p > 0.05$).

Conclusions: In eyes with DON, a decrease in mean ganglion cell layer thickness, including subquadrant thickness (S1 through S6), along with a reduction in the mean RNFL thickness and its corresponding nasal and superior subquadrants was observed, in comparison to healthy controls, patients with inactive TED, and patients with active TED. However, no significant changes were observed between other groupings, either among themselves or in comparison to healthy eyes.

P-ORB-028

Orbital immune profiling delineates disease-promoting follicular T cells during the active stage of thyroid eye disease

S. Fang^{1,2,3}, Y. Huang^{1,2,3}, F. Xie³, Y. Wang¹, B. Yu^{1,2,3}, J. Liu^{1,2,3}, Y. Wang¹, S. Zhong¹, X. Liu¹, S. Zhang¹, Y. Li^{1,2}, B. Li³, J. Sun^{1,2}, H. Zhou^{1,2}, X. Fan^{1,2}

¹Department of Ophthalmology, Shanghai Ninth People's Hospital, Shanghai JiaoTong University School of Medicine, Shanghai, China, ²Shanghai Key Laboratory of Orbital Diseases and Ocular Oncology, Shanghai, China, ³Shanghai Institute of Immunology, Shanghai JiaoTong University School of Medicine, Shanghai, China

Introduction: We previously reported the role of orbital-infiltrating T helper (Th)17 cells in the inflammation and tissue-remodeling in thyroid eye disease (TED). However, mechanisms underlying TED disease activity still remain unclear.

Objectives: To address which cell types were associated with TED activity, we conducted single-cell omics studies based on TED clinical stages.

Methods: Orbital connective tissues (OCTs) from active and stable TED patients were investigated by bulk RNA-sequencing, single-cell sequencing, and mass cytometry (CyTOF). A large follow-up cohort of TED patients were recruited to prove the identified heterogeneous cell composition in OCTs by multi-color flow cytometry and immunofluorescence analysis. Luminex assay was further used to examine the potential biomarkers in patients' sera.

Results: Our data showed that TED OCTs were composed of nine cell types: T cells, B cells, plasma cells, myeloid cells, natural killer cells, orbital fibroblasts, myofibroblasts, endothelial cells, and epithelial cells. T follicular helper (Tfh)-like T cells were more enriched in OCTs from active TED while exTh17 cells were the main characteristics of stable TED. The transformation of Tfh-like T cells into exTh17 cells was the marker of TED disease signature. Tfh-like T cells expressed tumor necrosis factor- α , interferon- γ , and interleukin (IL)-17A that contributed to orbital inflammation. Additionally, B cells and plasma cells were featured of tumor necrosis factor- α and interferon- γ -induced stressed phenotypes in active TED. Both active and stable TED had higher levels of M1-like and M2-like macrophages, which could not tell disease activity. Furthermore, the CD45⁻ stromal cells such as orbital fibroblasts and endothelial cells appeared inflammatory states via secreting IL-6. Serum IL-21 levels expressed by Tfh-like T cells were higher in active TED and might be used as a potential biomarker.

Conclusions: We demonstrated an inflammatory Tfh-like T cell subsets that dominated TED activity. Our current study may help to unravel TED pathogenesis and to create effective, targeted therapies for TED in the future.

P-ORB-029

Practice patterns in revision dacryocystorhinostomy

A.G.N. Gungab¹, M.J. Ali², E. Boniao³, G. Sundar⁴, B. Lim⁴

¹Ophthalmology, Fatima University Medical Center, Antipolo, Philippines, ²Ophthalmology, LV Prasad Eye Institute, Hyderabad, India, ³Ophthalmology, Amai Pakpak Medical Center, Davao, Philippines, ⁴Ophthalmology, National University Hospital Singapore, Singapore, Singapore

Introduction: The common causes of a DCR failure have been identified as cicatricial closure, inappropriate osteotomy, inadequate lacrimal sac marsupialization, exuberant granulation response, nasal factors or a combination of these.

Objectives: This study aimed to report the practice patterns while performing revision dacryocystorhinostomy (RevDCR) amongst oculoplastic surgeons from several regions across the globe.

Methods: The survey consisted of 41 specific questions sent via email that contained a link to the Google forms. The questions covered several aspects of the respondents' practice profiles, evaluation methods, pre-operative choices, surgical techniques, and follow-up preferences while dealing with patients of prior failed DCRs. Questions were answerable either as multiple choice or free text typing. The survey respondents were anonymized. The responses were collected and analyzed, and data were tabulated to understand the preferred practice trends.

Results: A total of 137 surgeons completed the survey. Most respondents identified themselves as experienced surgeons managing failed DCRs (76.6%, total respondents (n) = 137). The commonly preferred modalities for evaluation of a failed DCR were lacrimal irrigation (91.2%) and nasal endoscopy (66.9%). About 64% (87/137) of the respondents performed a combination of nasal endoscopy, lacrimal irrigation, and probing to localize the area of the failed DCR. A majority of the respondents used anti-metabolites (73.3%, n = 131) and stents (96.4%, 132/137) during the revision surgery. Most surgeons preferred endoscopic approach (44.5%), (61/137) for revising a failed DCR and most preferred general anaesthesia with local infiltration (70.1%, 96/137). Aggressive fibrosis with cicatricial closure was identified as the most frequently encountered cause of failure (84.6%, 115/137). The osteotomy was performed on an as-needed basis by 59.1% (81/137) of the surgeons. Only 10.9% of the respondents used navigation guidance while performing a revision DCR, mainly for post-trauma scenarios. Most of the surgeons completed the revision procedure within 30–60 minutes (77.4%, 106/137). The self-reported outcomes of revision DCRs were good (80–95%, median-90%, n = 137).

Conclusions: A significantly high percentage of oculoplastic surgeons who responded to this survey from across the globe performed nasal endoscopy in their pre-operative evaluations, preferred endoscopic surgical approach, and used antimetabolites and stents while performing revision DCRs.

P-ORB-030

Globe intussusception following orbital trauma: a case series

M. Naik¹, A. Desai², G. Dendukuri³

¹Ophthalmic Plastic Surgery, LV Prasad Eye Institute, Hyderabad, India, ²Ophthalmic Plastic Surgery, Shantilal Shanghvi Eye Institute, Mumbai, India, ³Maxillofacial Surgery, LV Prasad Eye Institute, Hyderabad, India

Introduction: Unique finding of "Intussusception of globe" into the maxillary sinus is reported in cases of globe luxation. Additionally, technique of retrieval into orbit along with review of literature is described.

Objectives: To report 'Globe Intussusception' as an extreme form of globe dislocation outside the orbital pyramid, and provide literature review.

Methods: Single-center, retrospective, interventional case series of 3 patients is presented. Review of English literature from the year 1971 to 2020 was performed using search terms traumatic globe dislocation and maxillary sinus.

Results: Three cases of globe intussusception are reported. Computed tomography imaging revealed orbital fracture, and globe prolapse into the maxillary sinus with or without involvement of ethmoid sinus. This was associated with complete intussusception of the globe through the conjunctiva, giving an 'empty socket' appearance. In all 3 cases, fracture repair along with retrieval of the eyeball from the sinus was carried out surgically. Reduction of the intussusception, and bringing the eyeball out of the conjunctival pouch was a special additional challenge in these cases. The review of 24 cases reported in world literature till date is presented.

Conclusions: We suggest retrieval of the intussuscepted eyeball via a 360° peritomy and suture tagging of extraocular muscles to ensure safe repositioning of globe with intact extraocular muscles.

P-ORB-031

Thyroid eye disease is correlated to sinus mucosal thickening on CT imaging

D.-H. Lee¹, P. Dolman¹

¹Ophthalmology, University of British Columbia, Vancouver, Canada

Introduction: Thyroid eye disease (TED) is an autoimmune disease that causes enlargement of orbital muscle and fat. Sinus mucosal involvement is associated with several autoimmune disease processes. Recent literature has suggested that patients with TED have associated sinus mucosal thickening and inflammation.

Objectives: To determine if sinus mucosal thickening and opacification on CT is correlated with thyroid eye disease (TED) and whether the degree of sinusitis correlates with adjoining extraocular muscle (EOM) enlargement.

Methods: A retrospective chart review was conducted on new patients referred for TED from January 1, 2010 to January 1, 2020 to a single oculo-plastics subspecialty clinic within a tertiary referral center. Exclusion criteria included age less than 18 years, history of previous orbital or sinus surgeries, unavailable CT scans within 3 months of initial clinic visit, or incomplete chart records. TED severity was graded by the VISA classification which categorizes patients into 4 groups, Vision/Optic Neuropathy (VISA-V), Inflammation/Congestion (VISA-I), Strabismus/Motility Restriction (VISA-S) and Appearance/Exposure (VISA-A). The diameters of the four rectus EOMs were measured via CT images and sinusitis severity was radiographically graded via the Lund-Mackay system.

Results: A total of 175 patients were included, 23 VISA-V, 27 VISA-I, 92 VISA-S, and 33 VISA-A patients. Less VISA-A patients (27%) had sinus mucosal thickening than VISA-S patients (58%, $p < 0.05$). The degree of sinusitis had a trend towards being more severe in VISA-S patients (1.88) than VISA-A patients (0.82, $p = 0.08$). The degree of sinusitis also correlated with EOM size (Pearson correlation score of 0.356 $p < 0.0001$).

Conclusions: Sinus mucosal thickening appears to be increased in VISA-S TED patients. There is also a correlation between the degree of EOM enlargement and sinusitis.

P-ORB-032

VRDN-003, a full antagonist antibody to IGF-1R for thyroid eye disease: phase 1 PK/safety of subcutaneous administration

*R. Mudumbai*¹, *K. Foster*², *B. Dickinson*², *A. Matthew*², *J. Vijayaraghavan*², *C. Michalsky*², *V. Bedian*²

¹Eye Institute at Harborview, University of Washington Medicine, Seattle, United States, ²Viridian Therapeutics Inc., Waltham, United States

Introduction: Prior phase 2 proof-of-concept results showed the clinical activity of 2 intravenous (IV) infusions of VRDN-001 in active and chronic thyroid eye disease (TED). VRDN-003 is a next-generation antibody that is molecularly identical to VRDN-001 except for a half-life extension modification.

Objectives: The ongoing phase 1 study assessed the effect of VRDN-003's half-life extension on its pharmacokinetics (PK) and safety profile when administered as IV infusion vs subcutaneous (SC) injection.

Methods: Healthy volunteers (HVs) were randomized to receive a single dose of VRDN-003 or placebo in the following dose cohorts: IV 5.0 mg/kg, IV 15.0 mg/kg, SC 300 mg, or SC 600 mg. Preliminary treatment-emergent adverse events (AEs) were assessed through December 12, 2023, and will continue to be assessed through study exit (120 days). Preliminary PK parameters including bioavailability were assessed by noncompartmental analysis, and a 2-compartment Population PK model was employed to simulate exposures following repeat SC dosing.

Results: Twenty-eight HVs received either VRDN-003 IV (n=8), VRDN-003 SC (n=12), placebo IV (n=4), or placebo SC (n=4). AEs were reported by 25% (2/8) of participants who received VRDN-003 IV, 25% (3/12) who received VRDN-003 SC, and 13% (1/8) who received placebo. Of the AEs, 3 were deemed treatment related by the investigator, all occurring in VRDN-003 SC-treated participants and all grade 1/mild as follows: injection site reaction, insomnia, and hepatic enzyme increased. No serious AEs were reported. VRDN-003 half-life was estimated to be 40–50 days, 4–5 times longer than VRDN-001. Bioavailability was estimated to be approximately 60% after SC administration. Based on simulated dosing regimens, VRDN-003 could be administered less frequently than VRDN-001 (e.g., SC Q4W or Q8W) while reaching similar exposure levels observed with VRDN-001 IV in its prior phase 2 study.

Conclusions: These results show the potential for VRDN-003 SC dosing regimens with the goal of reducing the treatment burden associated with IV infusions. A single dose of VRDN-003 was well tolerated with an extended half-life 4–5 times longer than its parent molecule, VRDN-001. Safety and efficacy of VRDN-003 SC is planned to be further assessed in clinical studies enrolling patients with TED.

P-ORB-033

Application of apparent diffusion coefficient in MRI in the prognosis of thyroid associated ophthalmopathy

Y. Su¹, X. Liu¹, J. Sun¹, H. Zhou¹, X. Fan¹

¹Ophthalmology, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Thyroid associated ophthalmopathy (TAO) is the most common orbital disease in adults that affects the retro-ocular space. Accurate identification of the stages of TAO is of great importance. CAS, the most widely accepted criterion for the diagnosis of TAO stages, alone is insufficient for monitoring changes in clinical manifestations. MRI with diffusion-weighted imaging is appearing as a promising technique in the evaluation of TAO.

Objectives: To evaluate MRI parameters, including apparent diffusion coefficients (ADC) and normalized ADC (n-ADC), of the optic nerve (ON) and extraocular muscles (EOMs) in magnetic resonance imaging in different stages of TAO, to find out the correlation of MRI parameters with disease changes after anti-inflammatory treatment during follow-up in Chinese patients.

Methods: A total of 45 patients (90 orbits) were enrolled and classified into different stages by CAS. Twenty-three (51.1%) patients received anti-inflammatory treatment and underwent a follow-up evaluation. Fifteen age- and gender-matched control participants (30 orbits) were included. ADC and n-ADC values of ON and EOMs were compared between TAO and healthy controls and were further correlated with CAS. Changes in these parameters were also evaluated before and after anti-inflammatory treatment.

Results: ADC and n-ADC values were both significantly higher in TAO patients than in controls and higher in active than inactive TAO. In the inactive stage, n-ADC values of medial and inferior rectus muscles were still higher than those in healthy controls. Both ADC and n-ADC values decreased after intravenous steroid treatment. Multivariate modeling found n-ADC values of the inferior rectus and ON to be a significantly independent predictor of active TAO. The cutoff value of pretreatment n-ADC was 1.581 and to detect active stage with specificity of 90.1% and sensitivity of 57.5%.

Conclusions: ADC and n-ADC values are valuable MRI indicators for the identification of different stages in TAO. They are also ideal tools to monitor the efficacy of anti-inflammatory treatment in patients with active stage. n-ADC values of the inferior rectus and ON, when combined with CAS, can be promising predictive factors in the detection of stages of diseases.

P-ORB-034

Morphological and histological changes following triamcinolone and botulinum toxin injection in monkey upper eyelid

Q.A. Vu^{1,2}, T.H. Nguyen³, D.Q. Thai⁴, K.E. Choi², S. Baek²

¹Ophthalmology, Hanoi Medical University Hospital, Hanoi, Vietnam, ²Ophthalmology, Korea University, Seoul, Korea, Republic of, ³Oculoplastic and Reconstructive Surgery, Vietnam Institute of Ophthalmology, Hanoi, Vietnam, ⁴Plastic and Reconstructive Surgery, Hanoi Medical University, Hanoi, Vietnam

Introduction: Various nonsurgical treatments have been reported for correction of thyroid associated ophthalmopathy (TAO) or thyroid eye disease (TED), including triamcinolone acetonide (TA), botulinum toxin type A (Botox or BTXA), and filler injection. Because histologic analysis of human eyelids is difficult and limited, animals have become valuable models for conducting various translational eye research. The nonhuman primate is not only an ideal model for investigations of structural and functional changes with intraocular diseases but also eyelid diseases because of the similar eye anatomy. Hence, in this experiment, this model was used to compare the clinical effect and histologic changes in the upper eyelid muscles after injection of TA alone or TA combined with BTXA.

Objectives: To evaluate the functional and histologic changes in the upper eyelid after injection of Triamcinolone acetonide (TA) alone or TA combined with Botulinum toxin A (Botox or BTXA) in the monkey model.

Methods: Twenty eyes were divided into 4 groups. In group 1, 0.5 mL of TA was administered transconjunctival to the inverted upper eyelid of one eye. In group 2, the same procedure was done into the other upper eyelid. Next, 5UI/0.1 mL Botox was injected transcutaneously in the middle third of the upper eyelid. In group 3, a subconjunctival of 0.5 mL TA was administered to the inverted upper eyelid of one eye 3 times: the injection day, 2 weeks, and 6 weeks, whereas a normal saline injection of the same volume was administered one time at the injection day in group 4. Follow-up was done at 2, 6, and 12 weeks after injection.

Results: No specific changes in the marginal reflex distance 1 (MRD1), marginal reflex distance 2, and lid crease were noted in either TA alone injection groups 1,3, and 4. Contrastly, there was a significant decrease in MRD1 at 2 weeks and 6 weeks after injection in group 2.

On histology, Müller's muscle does not attach directly to the superior border of the tarsus, but it changes to the tendon before attaching to the tarsal plate.

Conclusions: TA combined with BTXA showed better results in decreasing upper eyelid height than TA alone in normal monkey eyelids due to its predictable effect. In addition, there were no differences between the side effects and the histology results between the four groups. Therefore, TA combined with BTXA may become a promising treatment for selective thyroid eyelid retraction and could offer an alternative to surgery and its complications.

P-ORB-035

Potential role of IGF-1R in the interaction between orbital fibroblasts and B lymphocytes

R. Wang¹, Y. Zhong², D. Song³

¹Department of Ophthalmology, Beijing Tsinghua Changgung Hospital, School of Clinical Medicine, Tsinghua University, Beijing, China, ²Department of Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China, ³Ophthalmology, Shiley Eye Institute University of California, Beijing, China

Introduction: Thyroid eye disease (TED) is an inflammatory process involving lymphocyte mediated immune response and orbital tissue damage. It has been proven that the anti-insulin-like growth factor-1 receptor (IGF-1R) antibodies produced by B lymphocytes is involved in the activation of orbital fibroblasts and the inflammatory process of orbital tissue damage in TED.

Objectives: The purpose of this study is to explore the role of IGF-1R in the mechanistic connection between orbital fibroblasts and B lymphocytes in TED.

Methods: Orbital fibroblasts sampled from orbital connective tissues and peripheral B lymphocytes isolated from peripheral blood, which were obtained from 15 patients with TED and 15 control patients, were co-cultured at a ratio of 1:20. The level of IGF-1R expression in orbital fibroblasts was evaluated by flow cytometry and confocal microscopy. Transient B lymphocyte depletion was induced with anti-CD20 monoclonal antibody rituximab, while the IGF-1R pathway was blocked by the IGF-1R binding protein. The expression levels of interleukin-6 (IL-6) and regulated upon activation, normal T cell expressed and secreted (RANTES) in the co-culture model were quantified via ELISA.

Results: IGF-1R expression was significantly elevated in TED orbital fibroblasts compared to that of controls. A 24-h co-culture of orbital fibroblasts with peripheral B lymphocytes induced elevated expression levels of IL-6 and RANTES in each group (TED patients and controls), with the highest levels occurring in TED patients (T+T group). Rituximab and IGF-1R binding protein significantly inhibited increased levels of IL-6 and RANTES in the co-culture model of TED patients.

Conclusions: IGF-1R may mediate interaction between orbital fibroblasts and peripheral B lymphocytes; thus, blocking IGF-1R may reduce the local inflammatory response in TED. Rituximab-mediated B lymphocyte depletion played a role in inhibiting inflammatory responses in this *in vitro* co-culture model, providing a theoretical basis for the clinical application of anti-CD20 monoclonal antibodies in TED.

P-ORB-036

Application of transverse superior fascial expansion (TSFE) to treat moderate ptosis with poor function

N.T.T. Hiền¹, H. Duong², P.T. Văn³, B.H. Ngọc³, Đ.T.M. Anh⁴, V.T.Q. Anh³

¹Oculoplastic and Reconstructive, Vietnam National Eye Hospital, Hanoi, Vietnam, ²General, Nguyệt Cát Eye Clinic, Hanoi, Vietnam, ³Ophthalmology, Hanoi Medical University, Hanoi, Vietnam, ⁴Ophthalmology, Phú Thọ Province General Hospital, Phú Thọ, Vietnam

Introduction: Ptosis surgery is still a challenge for many surgeons. The choice of method and materials used in surgery depends on the degree of level ptosis and experience of surgeons. Common materials on frontalis sling such as thread and silicon wire have shown some limitations such as high recurrence rate and rejected. Some autologous materials such as fascia fascialata, frontalis muscle flap show long-term effects. However, they are not indicated for all cases and the implementation technique is relatively difficult. The transverse superior fascia is an autologous and insitu material that has proven to be effective, overcoming some limitations of other methods.

Objectives: Introducing the technique, anatomy of TSFE and evaluating the initial results achieved.

Methods: A descriptive, non-controlled intervention study in 20 patients with 26 eyes had moderate congenital ptosis had no previous surgery, the levator function 1 - 5 mm. Patients were followed up after surgery 1 week, 1 month, 3 months and 6 months. Research indicators included: visual acuity, MRD1, contour, crease, palpebral fissure height, lagophthalmos, lid lag and ocular surface.

Results: 20 patients with 26 eyes with moderate ptosis were operated with transverse superior fascial expansion suspension. Male : female ratio = 1:1,5, youngest age is 4 years old, oldest age is 12 years old. Levator function around 3.5 mm, MRD1 before and after operation are 0.5 ± 0.3 mm and 3.4 ± 2.8 mm alternatively. After 6 months of follow-up, only 4 of patients with 5 eyes had 1-2 mm eyelid opening. The curvature of the eyelid margin and eyelash folds are balanced on both sides. 5 eyes had 1 mm lagophthalmos after 6 months follow up.

Conclusions: TSFE is a good material for treating moderate ptosis with poor levator function for long time follow up. This material is considered an additional choice in ptosis surgery.

P-ORB-037

Orbital computed tomography parameters for the assessment of inflammatory activity in patients with thyroid eye disease

M.S. Seo¹, J.E. Ha¹, S.E. Woo², N. Kim³, J.W. Jeoung⁴, M.J. Lee¹

¹Ophthalmology, Hallym University Sacred Heart Hospital, Anyang, Korea, Republic of,

²Soonchunhyang University Hospital Seoul, Seoul, Korea, Republic of, ³Seoul National University Bundang Hospital, Seongnam, Korea, Republic of, ⁴Seoul National University Hospital, Seoul, Korea, Republic of

Introduction: Computed tomography (CT) is one of the most widely used imaging modalities in patients with thyroid eye disease (TED). Changes in volume and the density of orbital structures have been reported in TED and these imaging parameters potentially can be associated with the inflammatory activity of TED.

Objectives: To investigate the relationship between various orbital CT parameters and inflammatory activity in patients with TED.

Methods: This is a retrospective cohort study. Patients with TED who underwent comprehensive clinical examination, laboratory tests, and radiologic evaluation using orbital CT imaging were included. The orbital CT images were analyzed using commercially available automated segmentation software (MEDIP PRO, MEDICALIP Co., Seoul, Korea). The extraocular muscles (EOMs), intraorbital fat, and the lacrimal gland were reconstructed 3-dimensionally and the volumetric calculation was performed. The densities of orbital structures were measured in Hounsfield units (HU). The volumes and densities of orbital structures were compared between active and inactive TED groups.

Results: Forty TED patients were included in this study. The age and gender were not different between the two groups. In the active TED group, the clinical activity score and thyroid-stimulating immunoglobulin were significantly higher than inactive TED group. The mean volume of EOMs was significantly higher in the active TED group than inactive TED group ($p=0.001$), while the density of EOMs did not show the difference in the two groups ($p=0.257$). About intraorbital fat, the mean HU value was significantly higher in the active TED group than inactive group ($p=0.013$). The volume of orbital fat, the volume of the lacrimal gland, and the density of the lacrimal gland were not significantly different between the two groups.

Conclusions: In this study, we analyzed the volumes and densities of various orbital structures and found the volume of EOMs and the density of orbital fat showed significant differences between active and inactive TED groups. These results implied the volume of EOMs and the density of intraorbital fat may help evaluate the inflammatory activity in patients with TED. Further study with large sample sizes is needed to verify the usefulness of these radiologic findings as biomarkers of TED activity.

P-ORB-038

A predictive model designed to assist novices in determining if skin removal alone is adequate for upper blepharoplasty

Y.-C. Lee^{1,2}, C.-H. Yang^{3,2}

¹Ophthalmology, National Taiwan University Hospital, Hin-Chu Branch, Hin-Chu City, Taiwan, China ,

²National Taiwan University, College of Medicine, Graduate Institute of Clinical Medicine, Taipei,

Taiwan, China , ³Department of Ophthalmology, National Taiwan University Hospital, Taipei, Taiwan, China

Introduction: In certain cases of upper eyelid blepharoplasties, simply removing maximal skin may not yield the desired results. Therefore, the elevation of the crease height may be deemed necessary. Presently, there is a lack of methods available to aid in assessing whether skin removal alone is adequate or if crease elevation is necessary to attain an optimized outcome.

Objectives: Creating a mathematical tool to aid in surgical planning and improve the results of upper blepharoplasty

Methods: This retrospective study analyzed individuals aged 30 to 90 who had upper blepharoplasty by a single surgeon between January 2022 and December 2023. Patients with specific conditions including myasthenia gravis, myotonic dystrophy, pregnancy, blepharoptosis, brow ptosis, thyroid eye disease, prior eyelid surgery or trauma, and those using topical alpha-agonists were excluded. Data were gathered before and at the first and third months post-surgery, measuring parameters like distance from eyelid margin to fold (MFD), distance from eyelid margin to crease (MCD), and vertical skin distance (VSD), indicating distance from eyelid margin to inferior brow aspect. Logistic regression analysis was performed on both preoperative and postoperative data for model development. Other classification algorithms such as decision trees, K-Nearest Neighbors (KNN), and support vector machines (SVM) were also employed for predictive modeling.

Results: A total of 263 eyes from 184 patients were analyzed in this study, with 177 eyes undergoing skin excision alone and 83 eyes undergoing skin excision along with levator muscle advancement. The alteration in vertical skin distance (VSD) corresponds to the extent of skin excision performed, while changes in the distance from the eyelid margin to the fold (MFD) and the distance from the eyelid margin to the crease (MCD) represent the discrepancy between the original and desired measurements. Logistic regression analysis, utilizing both preoperative and postoperative data, was employed to develop a predictive model. This model aimed to ascertain whether skin excision alone sufficed for achieving the desired outcomes, achieving an accuracy rate of approximately 83.33%.

Conclusions: In order to optimize the results of upper blepharoplasty procedures, the utilization of the prediction model can facilitate the formulation of an effective surgical strategy, thereby enhancing the likelihood of achieving the desired aesthetic and functional outcomes.

P-ORB-039

The necessity for a compression eye patch after orbital surgery

R. Kikuchi¹, T. Kashima¹, M. Mimura², N. Yoshida¹

¹Oculofacial Clinic Tokyo, Tokyo, Japan, ²Oculofacial Clinic Osaka, Osaka, Japan

Introduction: Compression eye patches are commonly used after orbital surgery to prevent retrobulbar hemorrhage and swelling. However, no previous reports have mentioned their necessity nor have they been evaluated. In this report, we evaluate the effectiveness of eye patches for orbital surgery using simultaneous bilateral orbital fat decompression surgery.

Objectives: We questioned the effectiveness of compression eye patches and conducted a study to evaluate their efficacy.

Methods: A total of 15 patients (1 male, 14 female) with a mean age of 43.0 ± 11.6 years who underwent orbital fat decompression for ocular proptosis due to thyroid eye disease were observed. None of the patients had a history of bleeding disorders or antithrombotic medications and underwent surgery under general anesthesia on a day case basis with both eyes operated on simultaneously. Follow-up was at six months. In this study, a compression eye patch was applied to only the left eye for 2 hours immediately after surgery, but not to the right eye. The surgery was performed through a lower lid conjunctival incision. The wound was closed without sutures, and ointment was applied immediately after. The patient rested in the recovery room for 2 hours postoperatively, then was instructed to rest and ice both eyes at home until the next day. We created an evaluation table to research downtime, color, area of bruising, degree of swelling, and complications in the left and right eyes on the day after surgery. Statistics were compared by t-test.

Results: The amount of orbital fat resection in both eyes was 3.6 ± 1.8 cc in the right eye and 3.8 ± 1.6 cc in the left eye, with no significant difference ($p=0.78$). There was no significant difference in color, area of bruising, or degree of swelling in both groups ($p=0.43, 0.80, 0.69$). No major postoperative complications such as post-spherical hemorrhage or significant subcutaneous hemorrhage were observed. Diplopia worsened only on the day after surgery in two patients, but improvement was observed one month after surgery. Mild postoperative mydriasis was observed in 3 right eyes and 4 left eyes.

Conclusions: There were no differences between both eyes in any evaluation criteria. This result suggests compression eye patches may be unnecessary in orbital surgery.

P-ORB-040

How to improve services for patients with oculoplastic, orbital and ocular oncology disease at Teaching Hospital, Zambia

J. Mulenga^{1,2}, B. Ng'andwe¹, P. Moonga³, J. Buchan², A. Foster²

¹Ophthalmology, University Teaching Hospitals - Eye Hospital, Lusaka, Zambia, ²International Center of Eye Health, London School of Hygiene and Tropical Medicine, London, United Kingdom, ³Glaucoma, University Teaching Hospitals - Eye Hospital, Lusaka, Zambia

Introduction: Orbital, Oculoplastic including Ocular Oncology conditions affect the eye and its surrounding structures. They are not only sight threatening but potentially life threatening as well. This study evaluates the services for patients with these conditions at University Teaching Hospitals-Eye Hospital in Lusaka Zambia. The purpose is to make recommendations to improve services in Zambia, as well as contribute to the available information on this subject for Sub-Saharan African countries.

Objectives:

1. To retrospectively assess the number of patients with, and causes of, orbital, oculoplastic and ocular oncology diseases presenting at the hospital
2. To document the management and outcomes of the major causes of Orbital, Oculoplastic and Ocular Oncology diseases seen.
3. To identify factors that contribute to good and poor outcomes for patients with Orbital, Oculoplastic and Ocular Oncology diseases.
4. To assess the current facilities, equipment, and services to manage Orbital, Oculoplastic and Ocular Oncology diseases.
5. To develop a prospective form which can be used in future to assess the causes, management, and outcome of patients with Orbital, Oculoplastic and Ocular Oncology diseases,

Methods: A retrospective review of 150 case files of patients with an Orbital, Oculoplastic and Ocular Oncology diagnosis presenting at UTHs-EH. The causes, management and outcomes of these conditions were identified. An assessment of the current resources for service provision at the hospital was also undertaken. Finally, a prospective data collection form was developed which can be used for future data collection and analysis of these cases.

Results: Of the 150 cases 54% were under the age of 40 years. The most common condition seen was squamous cell carcinoma of the conjunctiva, usually confined to the globe, but sometimes spreading to the orbit. The major investigation was histopathology, and the most common treatment was surgery. Loss to follow-up was a major challenge to management and was associated with 76% of the poor outcomes. Assessment of the equipment and facilities revealed deficiencies in investigative and diagnostic services.

Conclusions: The number of cases and variety of diagnoses of patients with orbital and oculoplastic conditions suggests that a specialist clinic at UTH would improve the management and follow-up of patients with these conditions.

P-ORB-042

Predictive modeling of graves' orbitopathy activity via meibomian gland analysis with in vivo confocal microscopy

Z. Su¹, Y. You², S. Cheng³, J. Huang¹, X. Liang⁴, X. Wang¹, F. Jiang¹

¹Department of Ophthalmology, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China, ²Department of Ophthalmology, Affiliated Jinhua Hospital, Zhejiang University School of Medicine, Jinhua, China, ³Department of Ophthalmology, Wuhan Hospital of Traditional Chinese and Western Medicine, Tongji Medical College, Huazhong University of Science and Technology; Wuhan No.1 Hospital, Wuhan, China, ⁴Department of Biostatistics, School of Public Health, Southern Medical University, Guangzhou, China

Introduction: Graves' orbitopathy (GO) is a debilitating ocular disease, and accurately assessing disease activity is crucial for effective treatment and prognosis.

Objectives: This study identifying microstructural meibomian glands (MGs) in GO patients as indicators and developed a diagnostic model for predicting GO activity.

Methods: We utilized in vivo confocal microscopy (IVCM) to examine MGs in GO patients, including meibomian gland orifice area (MOA), meibomian gland acinar density (MAD), meibomian gland acinar longest diameter (MALD), meibomian gland acinar shortest diameter (MASD), meibomian gland acinar irregularity (MAI), meibum secretion reflectivity (MSR), acinar wall inhomogeneity (AWI), acinar periglandular interstices inhomogeneity (API), and severity of meibomian gland fibrosis (MF). Patients classified in the active phase of GO were determined based on the Clinical Activity Score (CAS). The research employed the least absolute shrinkage and selection operator (LASSO) method to select key indicators. Subsequently, a logistic regression model was constructed to predict GO disease activity.

Results: A total of 45 GO patients, corresponding to 90 eyes, were included in this study. A Lasso regression algorithm was utilized to select the predictor variables. resulted in the inclusion of five predictor variables were included in our diagnostic model ultimately (MAD, MSR, API, AWI, and MF). The area under the curve (AUC) for the training set model reached 0.959 (95% CI: 0.914-1), and for the validation set was 0.969 (95% CI: 0.916-1). The training set and validation set models both demonstrated high accuracy in calibration (P train = 0.9925; P test = 0.6258). Finally, a Nomogram chart was constructed to visualize the diagnostic model.

Conclusions: This study constructed a diagnostic model based on microstructural indicators of MGs obtained through IVCM. It offered a clinical utility for assessing GO disease activity, aiding in the diagnosis and selection of treatment strategies for GO.

V-ORB-001

Anatomical consideration for Asian patients in Endoscopic Dacryocystorhinostomy

Y.J. Lee¹, J.W. Jang¹

¹Kim's Eye Hospital, Seoul, Korea, Republic of

Introduction: The nasal anatomy of Asian patients has distinctive features while performing endonasal DCR compared to whites. For the successful outcome of surgery, proper size and location of osteotomy are essential.

Objectives: To review the anatomic differences in Asians during endoscopic dacryocystorhinostomy (DCR), and introduce surgical technique tips for the oculoplastic surgeons who are not accustomed to performing DCR on Asian patients.

Methods: We performed a review of the published literature by searching PubMed articles of Asian nasal anatomy for endonasal dacryocystorhinostomy in English. We also review the DCR video of one of the author, Prof. Jae woo Jang based on the features of Asian nasal anatomy.

Results: The frontal process of Maxilla is thicker in Asians. The uncinat process contacts the lacrimal sac fossa at the lower level 100% in Asians. The percentages of operculum of the middle turbinate within lacrimal sac fossa were 93.4% in Asians, 53.2% in whites. The agger nasi cell is positioned anterior to the lacrimal sac in Asians.

Conclusions: To make a good osteotomy in Asian patients, adequate removal of frontal process of Maxilla is important. At the lower level of the lacrimal sac, the uncinectomy should be considered. The removal of operculum of middle turbinate and the agger nasi cell should be considered.

Video

[Click here to play video](#)

V-ORB-002

Partial NLD blocks: lacrimal syringing VS. cone beam computed tomography DCG

M. Khare^{1,2}

¹Ophthalmology, Nayan Jyoti, Prayagraj, India, ²Ophthalmology, Priti Medical Research & Charitable Trust, Prayagraj, India

Introduction: Lacrimal Syringing is most common clinical procedure done to assess patency of lacrimal excretory pathway. The syringing generates high pressure which can negotiate partial Naso lacrimal duct (NLD) blocks, giving a false impression of patency. Cone beam computed tomography dacrycystography (CBCT-DCG) is done by instillation of Omnipaque dye in conjunctival cul-de-sac. CBCT-DCG is 100% physiological test, image complete lacrimal excretory pathway, localize partial NLD blocks. CBCT-DCG utilize natural hydrostatic pressure to propel the dye.

Objectives: Whether CBCT-DCG capable of elucidating the cause of persistent epiphora in cases of **PATENT** syringing?

Methods: This video demonstrates the pressure generated by lacrimal syringing which has the ability to negotiate partial NLD blocks. CBCT does the scanning in sitting posture with normal blinking. The dye is instilled in conjunctival cul-de-sac and scan is taken after 5 minutes. The scanning gets completed within 13 seconds. This cross - sectional study done in cases of persistent epiphora with patent syringing. All the patients underwent FDDT, Syringing & CBCT-DCG. Two representative's cases will be discussed in this video.

Results: CBCT-DCG does use the hydrostatic pressure to propel the dye from conjunctival cul-de-sac to inferior meatus. CBCT-DCG is capable of imaging complete lacrimal excretory pathway from canaliculus to tip of NLD. CBCT-DCG provides excellent anatomical details with topographical data. The **sensitivity** of CBCT-DCG is 100% in diagnosing the cause of persistent epiphora with patent syringing except for trauma cases. This video demonstrates two cases of patent syringing with persistent epiphora. In both the cases, CBCT-DCG revealed partial blockage. The real-time lacrimal syringing video of Patient-1 revealed its ability to negotiate partial blockage due to dacryolith. The real-time lacrimal syringing video of Patient - 2 revealed multiple partial blockage with pooling of dye in corresponding area.

Conclusions: This video clearly demonstrates the capability of **lacrimal syringing** in negotiating the partial NLD block. Hence, lacrimal syringing application needs Re-thinking. CBCT - DCG is non-invasive, 100% physiological, able to image complete lacrimal excretory pathway, localize site of obstruction and does not use external force.

Video

[Click here to play video](#)

V-ORB-003

A novel treatment for canaliculiti - partial wall resection canaliculoplasty with intubation

Z. Li¹, Z. Li², J. Cai¹, G. Sun¹

¹Joint Shangtou International Eye Center (JSIEC) of Shantou University and the Chinese University of Hong Kong, Shantou, China, ²The First Dongguan Affiliated Hospital of Guangdong Medical University, Dongguan, China

Introduction: Canaliculitis is the inflammation of the lacrimal canaliculus. The infection causes small dacryoliths or stones to form, which are concretions consisting of sulfur granules. Usually, antibiotic treatment won't work well alone. Lacrimal irrigating just only flush away the discharge in the canaliculus other than the dacryoliths, canaliculotomy and intubation could not solve the enlargement of the canaliculus.

Objectives: To report a novel method of canaliculoplasty with partial wall resection and silicon tube stent for canaliculitis.

Methods: Microscope for surgery. i) A parallel skin incision was made 3mm away from the inner canthus eyelid margin; exposing enlarged and swelling lacrimal canaliculus. ii) Open the canaliculus wall and clear the secretion. iii) A silicone pipe was passed through the upper and lower lacrimal puncta and canaliculus respectively down to the lacrimal sac and nasolacrimal duct to the nasal cavity. iv) Resect the partial wall of the enlarged lacrimal canaliculus and keep just enough part to encapsulate the silicone tube. Then use interrupted suture with 8-0 vichyl thread to reconstruct lacrimal canaliculus.

Results: Retrospective study, a total of 26 patients (22 females) (26 eyes) underwent partial wall resection canaliculoplasty with intubation for canaliculitis. During the surgery, we observed that the canaliculi enlarged congestion and swollen, like an eyelid abscess. Dacryoliths were found in 22 (84.6%) patients. Follow-up 3-6 months after surgery, 2 patients had the canaliculi obstructed, and 24(92.3%) patients had patent lacrimal passages, All patients had normal lid margin and lacrimal puncta without mucopurulent.

Conclusions: Partial wall resection canaliculoplasty with intubation is an effective method that not only reconstructs the canaliculus; but also restores the drainage function of the canaliculus.

Video

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V-ORB-004

The Cutler-Beard flap for upper eyelid reconstruction

E.R. Rocha Lara¹, A.G. Baeza Echeverria¹, F. Iyo Alberti²

¹Orbit and Oculoplastics, Fundacion Hospital Nuestra Señora de la Luz, Mexico City, Mexico, ²Orbit and Oculoplastics, Fundacion Hospital Nuestra Señora de la Luz, Mexico, Mexico

Introduction: It was first described in 1955 by N.L Cutler and C. Beard. It is a two-stage full thickness advancement flap from the lower eyelid.

Objectives: Have knowledge of surgical treatment alternatives that are safe and have reported good functional and aesthetic outcomes for patients with alterations in eyelid integrity due to tumor lesions, trauma, or congenital malformations.

Methods: We present the case of an 82-year-old female patient. No relevant medical history for the current condition. She was referred to our department of Orbit and Oculoplastics due to the presence of a mass in the upper left eyelid measuring 12 mm x 7 mm. A biopsy was previously performed by punch technique, which reported it as squamous cell carcinoma. The decision is made to remove the lesion and perform a Cutler-Beard flap for upper eyelid reconstruction. After a period of about 6 weeks the second stage is done.

Surgical technique. The defect of the upper lid is first prepared by a wide excision of the tumor mass. The defect should be shaped in a rectangular fashion with two vertical incisions and a joining horizontal one. The entire tarsus and lid tissue well up into the fornix may be removed if necessary. Next a horizontal incision is made through the full thickness of the lower lid just below the inferior border of the tarsus, this incision is made 1 to 2 mm below the inferior portion of the tarsal plate parallel to and approximately as long as the horizontal aspect of the upper lid defect. The two corners at the upper edge of the flap are carried beneath the undisturbed portion of the lower lid which now forms a bridge. The flap is stretched upward behind this bridge and is sutured into the defect in the upper lid. After a period of about 6 weeks the second stage is done.

Results: After 3 months post-surgery, the functional and esthetic results have been successful. The patient remains asymptomatic and pleased with the cosmetic outcomes. In her latest medical follow up, the scars are nearly imperceptible, no alterations were found on the ocular surface related to exposure of the eyeball.

Conclusions: The loss of a significant amount of eyelid tissue jeopardizes the integrity of the eyeball and consequently the patient's vision, making timely treatment essential to improve the visual prognosis. It's crucial to address cosmetic sequelae in patients as well, as they could significantly impact their quality of life in the future.

Video

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V-ORB-005

A rare but undiagnosed cause of Epiphora Centurion syndrome: its clinical presentations, diagnosis and management

*R. Akter*¹

¹Oculoplasty, Chattagram Lions Eye Institute and Hospital, Chattagram, Bangladesh

Introduction: Centurion Syndrome, although uncommon, stands out as a significant yet often missed root of Epiphora. This entails exploring its clinical manifestations, approaches to treatment, and prognosis. This syndrome, known for triggering excessive tearing, requires a closer look into its diagnostic challenges, symptomatology, and therapeutic.

Objectives: Excessive tearing, also known as epiphora, is frequently reported by individuals seeking care at ophthalmology facilities. The causes of epiphora can vary significantly between patients referred to a regular ophthalmologist and those directed to an oculoplastic unit.

Methods: Four individuals presented with symptoms characteristic of centurion syndrome. Details regarding their diagnosis, treatment plan, and recovery have been documented. The assessment involved a thorough examination including slit-lamp assessment, analysis of eyelid positioning, dry eye assessments, evaluation of ocular surface health, examination of the nasolacrimal system's functionality, and inspection of punctal aperture.

Results: These patients are typically young males in their second or third decades of life. They share common characteristics such as a prominent nasal bridge, inward angulation of the medial canthal tendon, and a displaced punctum, either located outside the lacrimal pump or away from the lacrimal lake. Enophthalmos is observed in one patient, while the rest do not exhibit this condition. There is a consistent presentation of features across all patients. Management involves surgical interventions, including the release of the anterior limb of the medial canthal tendon combined with medial punctoplasty or tarsorrhaphy for adjusting the punctal position.

Conclusions: Centurion syndrome, although uncommon, is identified as a potential yet undiagnosed factor contributing to epiphora. Its challenging diagnosis is attributed to patients having a patent lacrimal drainage system. However, surgical management proves to be effective and yields favorable outcomes.

Key Message: Centurion, Male, Epiphora, Medical Canthal Tendon.

Video

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Pediatric Ophthalmology and Strabismus

FT-PED-001

Digital Strabismus Ruler: Smartphone-Based Artificial Intelligence for Strabismus Measurement and Diagnosis

R. Wang¹, Y. Yang¹, J. Lyu², X. Yu¹, F. Xu², H. Lin¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China, ²School of Software and BNRist, Tsinghua University, Beijing, China

Introduction: Strabismus is a chronic condition requiring continuous monitoring throughout the entire treatment process. However, the current gold standard for measuring and monitoring strabismus, manual prism, and cover-test, faces challenges due to high labor costs, subjectivity, and its limitation to specialized centers. There is an urgent need to develop methods that are accessible, cost-effective, and capable of capturing personalized disease characteristics over time.

Objectives: To develop the Digital Ruler of Strabismus (DRS) to enable prism measurements comparable to those of manual methods using smartphones.

Methods: We developed DRS using 3D reconstruction and deep learning algorithms, which analyze patient-sourced 30s videos of programmatic cover tests. A prospective multicenter study was conducted to evaluate its performance. The study assessed the effectiveness of diagnosis and compared the consistency between manual and smartphone measurements.

Results: 336 participants from three eye centers were included, from Jan to Jun 2023, with a median age of 10 years, ranging from 2-72 years. DRS exhibited strong correlation with manual tests for horizontal and vertical deviations (R: 0.977 and 0.520, $P < 0.0001$), showing mean differences of -1.1 PD (95% limits of agreement -11.5 - 9.4 PD) and -0.5 PD (-15.1 to 14.6 PD), respectively. High deviation cases (≥ 45 PD) and young children (3-5 years) showed a robust correlation (R: 0.99 and 0.989, respectively). DRS accurately diagnosed strabismus ($ACC \geq 0.941$) and direction ($ACC = 0.997$), with high sensitivity and specificity. Furthermore, DRS introduced a novel temporal dimension for intermittent strabismus, enabling assessment of realignment time (s) and speed ($^{\circ}/s$), offering a unique perspective on disease dynamics.

Conclusions: DRS has achieved medical-grade human biomedical signal detection through consumer-grade smartphone hardware. This accomplishment holds significant implications for promoting proactive health management and advancing the frontiers of medical intervention. The shift of the medical window to earlier stages is of paramount importance and is poised to address gaps in the comprehensive management of strabismus.

FT-PED-002

Intelligentized implantable ocular muscle-nerve stimulator can treat congenital nystagmus

Z. Miao¹, L. Wang¹

¹Peking University People's Hospital, Beijing, China

Introduction: Congenital nystagmus (CN) is an ocular-motor disorder which presents at birth or early infancy. The prevalence of CN is estimated to 0.01%-0.025%. Current treatment for CN includes surgical and nonsurgical therapy. The previous involves null zone shifting and tenotomy-reattachment surgery. Ocular muscles are injured irreversibly in the procedure of surgical intervention. The latter contains refractive correction, prisms and pharmacological methods. Existing intervention treatments can't diminish involuntary oscillations adequately. It's consensus that ocular involuntary oscillations causing steady fixation disruption which lead to poor visual acuity of patients with CN. It's essential and important to find a new method to control involuntary oscillations of CN.

Objectives: To evaluate the efficacy and safety of implantable ocular muscle-nerve stimulator in the treatment of congenital nystagmus.

Methods: We enrolled 10 adult-patients with congenital nystagmus. Implant the Internal machine and suture the electrode to the inner side of the right lateral rectus muscle. Ocular muscles received different levels of energy stimulation based on each patient's clinical data. Preoperative and postoperative clinical data were recorded for both eyes, including nystagmus amplitude, nystagmus frequency and foveation time.

Results: After one month stimulation, decreases in right eyes' mean nystagmus frequency (3.78 ± 1.27 Hz vs. 1.15 ± 1 Hz, $P < 0.05$) and mean nystagmus amplitude ($4.11 \pm 2.44^\circ$ vs. $0.75 \pm 0.59^\circ$, $P < 0.05$) were observed. Decreases in left eyes' mean nystagmus frequency (3.48 ± 1.19 Hz vs. 0.95 ± 0.9 Hz, $P < 0.05$) and mean nystagmus amplitude ($3.26 \pm 1.37^\circ$ vs. $0.77 \pm 0.51^\circ$, $P < 0.05$) were observed. Right eyes' mean foveation time was 146.85 ± 114.14 ms/s before stimulation but was prolonged to 867.10 ± 144.68 ms/s after stimulation ($P < 0.05$). Left eyes' mean foveation time was 170.35 ± 99.87 ms/s before stimulation but was prolonged to 877.30 ± 126.24 ms/s after stimulation ($P < 0.05$). All 3 of these main clinical efficacy indices varied with different stimulation parameters. No adverse effects were observed.

Conclusions: Intelligentized implantable ocular muscle-nerve stimulator is a novel reversible therapeutic option for effectively diminishing involuntary oscillations of CN by minimizing the side effects of traditional surgical therapy.

FT-PED-003

Pediatric staphyloma classification: new perspectives via UWF SS-OCTA

X. Ding¹, L. Sun¹, A. Hou¹, S. Zheng¹, L. Zhang¹, L. Qin¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Posterior staphyloma (PS) is an outpouching or protrusion of the sclera. The occurrence of PS not only compromises the visual integrity but also underscores the complexity of managing myopic diseases, highlighting the vital need for accurate classification, diagnosis, and treatment strategies. So far, the ultrawide field scanning laser ophthalmoscope (UWF SLO) imaging and 3D MRI, enabled visualization of the entire eye shape. However, 3D-MRI has its low spatial resolution makes subtle changes challenging to detect, and the lack of accessibility in daily ophthalmic clinics restricts its routine application. Recent years have witnessed significant advancements in retinal imaging, most notably the emergence of the UWF swept-source OCT (SS-OCT) system. In this study, we aim to bridge this gap by performing UWF 3D SS-OCTA and UWF SLO imaging on a large cohort of children with pediatric posterior staphyloma.

Objectives: To employ UWF 3D SS-OCTA modality, integrating novel strategies, in characterizing the features and disease associations of posterior staphyloma in pediatric patients. This study seeks to compare pediatric staphylomas to established adult classifications, identify distinct pediatric patterns, and introduce a new classification system for pediatric staphyloma using advanced multi-modal imaging.

Methods: UWF 3D SS-OCTA imaging, integrating **novel** strategies, was employed to analyze staphyloma presentations in the pediatric cohort. This data was then set against the traditionally established adult classifications. Additionally, the etiology of staphylomas was investigated.

Results: The UWF 3D SS-OCTA modality showcased superior imaging detail and better classification compared to UWF SLO, offering a more nuanced view of staphyloma patterns in pediatric patients. Specifically, only 54.7% of the pediatric cohort fit into previously recognized categories. The pediatric group displayed prominent temporal and inferior temporal staphylomas, likely linked to the high prevalence of peripheral vascular diseases. The study led to the proposal of five unique pediatric staphyloma classifications.

Conclusions: The UWF 3D SS-OCTA modality offers unparalleled insights into staphyloma patterns, especially in pediatric patients. Pediatric staphylomas exhibit a unique presentation, divergent from adults, with two novel types identified. The findings underline the importance of updating classification systems, ensuring they reflect the realities observed in pediatric pathology and diagnostics.

FT-PED-004

Protein biomarkers in tear fluid may be a promising non-invasive ROP screening tool

A. Liu¹, Y.H. Sze², B.C.Y. Chu³, C.H.Y. Lai³, Q. Li³, K. Jalal⁴, M. Wong⁴, T. Lam^{2,5}, W.-C. Lam^{6,1}
¹Ophthalmology, The University of Hong Kong, Hong Kong, Hong Kong, SAR of China, ²Optometry, The Hong Kong Polytechnic University, Hong Kong, Hong Kong, SAR of China, ³Ophthalmology, Queen Mary Hospital, Hong Kong, Hong Kong, SAR of China, ⁴NICU, Queen Mary Hospital, Hong Kong, Hong Kong, SAR of China, ⁵Centre for Eye and Vision Research, Hong Kong, Hong Kong, SAR of China, ⁶Ophthalmology, The University of British Columbia, Vancouver, Canada

Introduction: Retinopathy of prematurity (ROP) is the leading cause of preventable childhood blindness. Indirect ophthalmoscopy is the current gold standard for ROP screening, yet it is a stressful procedure for preterm infants. Tear protein biomarkers may offer a non-invasive option for accessible ROP screening.

Objectives: An expansion and verification of our previous study in identifying dysregulated tear proteins among ROP infants.

Methods: Infants whose birth weight ≤ 1500 g or gestational age ≤ 30 weeks in NICUs were recruited. Examination began at 4 weeks chronologic age or 31 weeks postmenstrual age. ROP diagnoses were made based on the International Classification of Retinopathy of Prematurity (Third Edition) guideline. Tear fluids from ROP (n=3) and non-ROP (n=15) infants (ROP: 34.8 ± 2.6 weeks postmenstrual age, non-ROP: 35.2 ± 0.7 , $p=0.78$) were collected with Schirmer's strips. Tear proteins were quantified by SWATH-acquisition in ZenoTOF 7600 mass spectrometer and analysed in PeakView (Sciex).

Results: 876 unique protein groups (1% FDR) were quantified, with 52 significantly differentiated proteins ($FC \geq 1.5$ or ≤ 0.67 , $p < 0.05$). Among them, 17 (33%) are involved in protein-protein interaction with vascular endothelial growth factor A (VEGFA), a therapeutic hallmark of ROP treatment. This includes the significantly downregulated apolipoprotein A4 (APOA4, $FC=0.29$, $p=0.03$).

Conclusions: The downregulation of APOA4 is consistent with our previously reported finding using another mass spectrometry system (TripleTOF 6600). These reproducible results with independent samples signify the potential application of APOA4 as a biomarker for ROP. APOA4 is known to regulate platelet aggregation and thrombosis, and its association with vascular growth disruption may contribute to the incomplete vascularization of the retina in ROP pathogenesis. Our study highlights the potential use of tear protein biomarkers for non-invasive ROP screening, which is accessible and convenient. As little as 1 mm of tear fluid collected with Schirmer's strips is sufficient to identify the significantly differential ROP biomarkers. Additionally, tear proteins on Schirmer's strips can be preserved at room temperature if dry-heated upon sample collection. Therefore, such innovation can facilitate early ROP screening to identify high-risk cases and potentially reduce the rate of vision loss in ROP, especially in rural areas.

FT-PED-005

Metabolomic profiling of the aqueous humor in patients with pediatric cataract

Z. Liu¹, Y. Yu¹, H. Chen¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Pediatric cataract is a blinding disease in children with extensive phenotypic heterogeneity and multiple mechanisms. Metabolic mechanism of pediatric cataract remains unknown.

Objectives: This study aimed to investigate the metabolite profile of aqueous humor (AH) in patients with pediatric cataracts, and identify the underlying pathogenesis.

Methods: Metabolomic profiles of AH were analyzed and compared between pediatric cataract patients (n=33) and age-related cataract patients without metabolic diseases as controls (n=29), using global untargeted metabolomics with ultra-high-performance liquid chromatography tandem mass spectrometry. Principal component analysis, partial least squares discriminant analysis and heat map were applied to demonstrate metabolomic characteristics. Pathway analysis was conducted using Kyoto Encyclopedia of Genes and Genomes. Receiver-operating characteristic (ROC) analyses were employed to select potential biomarkers.

Results: A total of 318 metabolites were measured, and 54 significantly differential metabolites (25 upregulated and 29 downregulated) were identified between pediatric cataract group and control group (VIP > 1.0, fold change > 1.5 or < 0.667 and $P < 0.05$). The most relevant pathways were enriched in the histidine metabolism (increased L-Histidine and decreased 1-Methylhistamine) and the tryptophan metabolism (increased N-Formylkynurenine and L-Kynurenine). 5-Aminosalicylic Acid showed relatively strong inter-correlations with N,N-Diethylethanolamine, L-Tyrosinemethylester, and 2-methyl-2,3,4,5-tetrahydro-1,5-benzoxazepin-4-one, and all these four differential metabolites were decreased in pediatric cataract group. The ROC analysis implied 13 metabolites served as potential biomarkers in AH of pediatric cataract patients (all AUC > 0.900).

Conclusions: These results illustrated novel potential metabolites and metabolic pathways in pediatric cataract, which provides new insights into the pathophysiology of pediatric cataract.

FT-PED-006

Revealing the discrepancies between motion-in-depth perception and static stereopsis in intermittent exotropia

X. Chen¹, L. Liu¹

¹Ophthalmology and Laboratory of Optometry and Vision Sciences, West China Hospital, Sichuan University, Chengdu, China

Introduction: Intermittent exotropia (IXT) is the predominant form of strabismus associated with impaired stereopsis. The static stereopsis and motion-in-depth perception in IXT patients must be assessed, during the same examination to determine the extent of binocular visual dysfunction. Prior research has shown limited instances of simultaneous reporting of static stereopsis and motion-in-depth perception test results based on identical measurements in individuals with IXT. Furthermore, there is a paucity of studies that have quantified the response time of stereo vision in patients with IXT utilizing the same software program.

Objectives: This study sought to assess motion-in-depth perception and static stereopsis deficits in individuals with intermittent exotropia (IXT) using a consistent methodology.

Methods: The study comprised 25 patients diagnosed with IXT and an equal number of healthy control subjects. Each participant underwent a thorough ocular examination and stereopsis testing, which included assessments of motion-in-depth perception and static stereopsis using a standardized program. The study documented the thresholds and response times for processing stereopsis information.

Results: The threshold for motion-in-depth perception among individuals with IXT was determined to be 88 pixels/s, with a range of 73 [35–110 arc sec]. In comparison, the threshold for static stereopsis was found to be 35 [35–73 arc sec], which was significantly superior to the motion-in-depth perception threshold ($p=0.0049$). Additionally, the motion-in-depth perception threshold in IXT patients was found to be significantly different from that of the control group ($p<0.0001$). Furthermore, the time required to complete the static stereopsis test was statistically different from that of the motion-in-depth perception test for IXT patients ($p=0.0001$). A negative correlation was observed between the ocular deviation angle and the threshold of the static stereopsis test in the group with IXT. Additionally, there was no significant correlation found between the ocular deviation angle and the motion-in-depth perception test.

Conclusions: In conclusion, individuals diagnosed with IXT exhibit superior static stereopsis compared to motion-in-depth perception. Furthermore, the processing of static stereopsis information is characterized by a shorter response time relative to motion-in-depth perception among IXT patients, and a negative correlation exists between the threshold of static stereopsis and the degree of ocular deviation angle.

FT-PED-007

Evaluation of active dichoptic therapy in cases of anisometropic amblyopia

N. Yadav¹, S. Phuljhele Aalok², R. Saxena², R. Dhiman², N. Chauhan², R. Kshetrimayum², S. Bansal²

¹Dr RP Centre, Dr Rajendra Prasad Centre for Ophthalmic Sciences, AIIMS, New Delhi, India, ²Dr RP Centre, Dr Rajendra Centre for Ophthalmic Sciences, AIIMS, New Delhi, India

Introduction: Dichoptic based vision therapy have shown the effect of dichoptic therapy in amblyopia. The current new software provides games at various difficulty levels, with the help of AI. And enables the regular monitoring of compliance of patients.

Objectives: To compare Active Dichoptic Therapy versus part time occlusion in cases of Anisometropic Amblyopia.

Methods: Prospective, randomized, interventional study, sixty children aged 5-16 years with anisometropic amblyopia were randomized into two groups: dichoptic group (n=30) received artificial intelligence integrated active dichoptic therapy (1 hour/day) and the occlusion group (n=30) received occlusion therapy of the non-amblyopic eye (2-6 hours/day). Patients were evaluated for best corrected visual acuity (BCVA), near vision, contrast sensitivity, binocularity, and near and distant stereoacuity at baseline, 6 weeks, 3 months and 6 months.

Results: Mean distance BCVA improved from baseline to 6 months in both dichoptic and occlusion groups ($P < 0.001$ for both). Mean near vision also showed improvement in both the groups at end of 6 months ($P = 0.02$ and 0.04 for dichoptic and occlusion group, respectively). Mean contrast sensitivity at baseline was 1.30 ± 0.12 and 1.28 ± 0.07 in dichoptic and occlusion groups, respectively, and improved to 1.60 ± 0.08 and 1.49 ± 0.07 at 6 months ($P < 0.001$ for both), with better results in dichoptic group at 6 months ($P < 0.001$). Mean near stereoacuity at baseline was 706.67 ± 172.07 and 704.48 ± 159.43 in dichoptic and occlusion groups, respectively, and improved to 115.33 ± 59.81 and 256.52 ± 112.11 at 6 months ($P < 0.001$ for both). Mean distant stereoacuity at baseline was 733.33 ± 151.62 and 747.83 ± 168.69 in dichoptic and occlusion groups, respectively, and improved to 286.67 ± 110.58 and 608.70 ± 204.30 at 6 months ($P = < 0.001$ and 0.01 in both groups respectively). The difference of mean near and distant stereoacuity between both the groups was significantly better in the dichoptic group ($P < 0.001$ for both near and distant stereoacuity). 93.33% and 73.33% children were compliant in dichoptic and occlusion groups, respectively, at the end of 6 months.

Conclusions: Dichoptic therapy is a good alternative to occlusion in mild to moderate anisometropic amblyopia showing better results in terms of improvement in binocularity, however, similar outcomes for distance and near vision were obtained in both the interventions. Compliance was better in dichoptic therapy due to regular monitoring and more engaging and varied games.

FT-PED-008

Bleb-like retinal detachment in aggressive ROP: risk factors, treatment & outcomes

B. Panchal¹, H. Kanisetty¹, S. Jalali², T. Padhi³, M. Ger¹, NEHA Study Group

¹Vitreoretina, L V Prasad Eye Institute, Visakhapatnam, India, ²Vitreoretina, L V Prasad Eye Institute, Hyderabad, India, ³Vitreoretina, L V Prasad Eye Institute, Bhubaneswar, India

Introduction:

- More preemies survive, leading to more retinopathy of prematurity (ROP) cases.
- Posterior ROP in zone 1 (not recognized by ICROP 2021) is gaining attention due to its severe outcomes and treatment challenges.
- Bleb-like retinal detachments, combining exudative and traction components, are a unique feature of this ROP form.
- This case series aims to address the knowledge gap in managing such detachments in Aggressive ROP.

Objectives: To analyze the risk factors, treatment challenges, and outcomes following treatment in eyes with bleb-like retinal detachment in Aggressive ROP.

Methods:

Retrospective analysis of bleb-like retinal detachments (BRD) in aggressive ROP (March 2023 - Feb 2024):

- **Ten eyes of five babies** with aggressive ROP and bleb-like detachments were studied.
- **Detailed demographics** and **serial fundus photographs** were documented.
- **Individualized treatment plans** were implemented.
- **Lens-sparing vitrectomy** by a single surgeon aimed to relieve traction and reattach the posterior pole, preventing total retinal detachment.

Results: The mean gestational age was 30 weeks (28-34 weeks) and birth weight was 1.08 kg (1.0 - 1.4 kgs). Post menstruation age (PMA) at the time of presentation was 34 weeks. All the babies belonged to poor socioeconomic status families and lived in areas with limited access to health care. All cases had a significant history of oxygen administration during their hospital stay. Two babies received a blood transfusion to correct anemia. One survived septic shock. **Traction of more than 6 clock hours was noted in all the eyes.** Eight out of the 10 eyes required a surgical intervention to alleviate the traction. Half the adult dose of bevacizumab was injected intravitreally 5 days before surgery in all the cases. After intravitreal bevacizumab, regression of plus was noted in all the eyes as early as day 1 post-injection. **Complete posterior vitreous detachment could be possible in only three out of the 8 eyes.** Two eyes avoided surgery and laser after bevacizumab monotherapy. Mean follow-up was 5.4 months (1-8). One case had ROP recurrence and required laser.

Conclusions: This case series suggests poor socioeconomic status, low birth weight, and multiple risk factors are associated with AROP-BRD. Early bevacizumab followed by vitrectomy for traction relief may offer promising outcomes, although further studies are needed.

FT-PED-009

Study on the effect of ω -3 polyunsaturated fatty acids affecting angiogenesis in children with ROP

Y. Li¹, Y. Su¹

¹Anhui Provincial Children's Hospital, Hefei, China

Introduction: Retinopathy of Prematurity (ROP) is an ocular vascular disease that severely affects vision in preterm infants. ω -3 Polyunsaturated Fatty Acids (ω -3 PUFAs) inhibit ROP by promoting the secretion of Adiponectin (APN).

Objectives: This study explored the regulatory mechanism of ω -3 promoting APN secretion and affecting angiogenesis.

Methods: The clinical data of 40 preterm neonates with ROP and preterm neonates without ROP were collected, and the level of APN in serum at different time points was detected. C57BL/6J mice, white adipocyte 3T3-L1 cell, and the endothelial cells BEnd.3 cells in mice' cerebral microvessels were used to construct the vitro Oxygen-Induced Retinopathy (OIR) models, which were treated with ω -3 PUFAs, ω -6 PUFAs, Docosahexaenoic Acid (DHA) and Arachidonic Acid (AA), respectively. APN, Endoplasmic Reticulum (ER) stress marker expression, inflammatory factor release, cell proliferation, and angiogenesis were analyzed by ELISA, 5-ethynyl-2'-deoxyuridine (EdU), immunostaining, and Tubule formation assay. Aortic ring assay and choroid sprouting assay analyze the effects of ω -3 PUFAs on retinal and choroidal angiogenesis.

Results: The APN level of serum in children with ROP was significantly lower than that in ROP-free preterm neonates. ω -3 PUFAs promoting the secretion of APN in serum and White Adipose Tissue (WAT) of OIR mice, inhibiting abnormal angiogenesis. ω -3 PUFAs (DHA) can promote APN secretion by inhibiting the ER stress and inflammatory responses of 3T3-L1 cells. DHA regulates the proliferation of endothelial cells and the production of new blood vessels. DHA can inhibit retinal angiogenesis and choroidal angiogenesis.

Conclusions: ω -3 PUFAs can regulate endothelial cell function and inhibit angiogenesis by inhibiting ER stress response and inflammatory response.

P-PED-001

Inferior oblique anterior nasal transposition vs. myectomy for SO palsy: a comparative randomized clinical trial

Z. Salem¹, E. El Touki¹, M. Saif^{2,3}, R. Mohamed¹, M. Abdel Khaleq⁴, S. Taher¹

¹Ophthalmology, Research Institute of Ophthalmology, Giza, Egypt, ²Ophthalmology, Faculty of Medicine, Beni-Suef University, Beni-Suef, Egypt, ³Ophthalmology, National Institute of Longevity Elderly Sciences, Beni Suef, Egypt, ⁴Ophthalmology, Faculty of Medicine, Beni-Suef University, Beni-Suef, Egypt

Introduction: Superior oblique palsy (SOP) is the most common cause of paretic vertical ocular deviation. Anterior transposition of IO was first described by Elliot et al. to correct both excyclotorsion and hyperdeviation in SOP associated with IO overaction; however, this procedure may be complicated by limited postoperative elevation. Stager and colleagues later described inferior oblique anterior nasal transposition (IOANT) to overcome this limited elevation postoperatively, by converting the IO muscle from an extorter and elevator in adduction to an intorter and antielevator in adduction. Until now, no studies have been performed to evaluate the outcomes of IOANT and/or compare them to those of inferior IOM.

Objectives: This study aims to evaluate the efficacy and safety of IOANT compared to IOM, for treatment of superior oblique palsy (SOP), and the effect of both procedures on the palpebral fissure size.

Methods: This is a comparative randomized study of 30 cases of superior oblique palsy, divided into two groups (A) and (B). Patients in group A underwent an ipsilateral inferior oblique anterior nasal transposition, and those in Group B underwent an ipsilateral inferior oblique myectomy. Patients were randomly allocated to either group A (N=15) or group B (N=15). All surgeries were performed by the same surgeon, at the same institution, using the same technique respectively. All participants were assessed at the first postoperative day, at one week, and again at three months after the surgery. The primary outcomes were ocular alignment, abnormal head posture (AHP) and diplopia; and the secondary outcome was palpebral fissure size (mm).

Results: We analyzed the data obtained from the 3rd postoperative visit (at 3 months). There were no statistically significant differences between the two groups in terms of ocular alignment, AHP and postoperative diplopia. There was also no statistically significant difference in palpebral fissure size (mm) between the two groups, pre- or post-operatively. The surgical outcomes of both groups were satisfactory with acceptable success rates; however, the results of large-angle vertical deviation ≥ 20 PD, large V pattern ≥ 15 PD, and IO +3, +4 were more potent and stable in the ANT group.

Conclusions: IOANT is as safe and as effective as IOM in patients with SOP, with the added benefit of correcting large angle vertical deviations and avoiding postoperative limitation of elevation and therefore, avoiding the need for subsequent inferior rectus muscle surgery.

P-PED-002

Clinical characteristics and surgical outcomes of acute acquired V-pattern esotropia

K. Xu¹, Y. Zhang¹, W. Fang¹, Q. Liu¹, Z. Hu¹, W. Li¹, T. Qiao¹

¹Department of Ophthalmology, Shanghai Children's Hospital, School of Medicine, Shanghai Jiao Tong University, Shanghai, China

Introduction: V-pattern esotropia (VE) is an esodeviation when the difference of horizontal deviation between upgaze and downgaze is more than 15 prism diopters, which is often the result of inferior oblique overaction (IOOA), with or without superior oblique palsy. The overall prevalence of patterns is believed to occur in 15% to 25% of strabismic patients. However, the acute onset of VE is extremely rare. Since it is an acquired and incomitant esotropia with sudden onset, we define it as acute acquired V-pattern esotropia (AAVE) in this report. This reminds us of acute acquired comitant esotropia (AACE). However, the etiologies remain unclear to date. Some studies discussed about the relationship between A or V pattern and AACE, but there exist some controversies. In this article, we present 15 cases with AAVE, describe its clinical characteristics, surgical outcomes and prognosis by comparing with V-pattern esotropia.

Objectives: To evaluate the clinical characteristics, surgical outcomes and prognosis of acute acquired V-pattern esotropia (AAVE) by comparing with typical V-pattern esotropia (VE).

Methods: 15 cases of AAVE and 18 cases of VE were retrospectively reviewed in this study. All patients underwent a comprehensive medical history, ophthalmologic and orthoptic examinations, and stereopsis test. Patients with neurological symptoms were received brain and orbital imaging. Surgical intervention was implemented to correct primary position esotropia and inferior oblique overaction (IOOA).

Results: The mean age at onset of AAVE group and VE group were 8.46 ± 3.60 years and 3.12 ± 1.25 years, respectively ($P < 0.0001$). One patient of AAVE had a history of febrile convulsion and generalized seizures. The cycloplegic refraction of AAVE was mild to moderate hyperopia or myopia, with a mean diopter (D) of $+0.71$ D (spherical equivalent, range, -4.75 to $+3.5$ D). The preoperative esodeviation of AAVE was significantly greater, but there was no statistical difference in the severity of IOOA and extent of V pattern between two groups. Overall surgical success rate of AAVE was 73.3%. The stereoacuity of AAVE was obviously improved postoperatively at their last follow-up visit compared with VE group ($c^2 = 8.53$, $P = 0.0362$).

Conclusions: AAVE was a sudden onset of esotropia, occurs more common in older children, with mild to moderate hyperopia or myopia. All the AAVE patients had IOOA and V pattern. Some cases may be associated with neurological disorders. Surgical outcomes of AAVE were highly favorable.

P-PED-003

Brain functional alterations in facial processing regions associated with amblyopia

G. Huang¹, M. Liao², P. Jiang³, L. Liu²

¹Department of Optometry and Visual Science, Sichuan University, Chengdu, China, ²Department of Ophthalmology, West China Hospital of Sichuan University, Chengdu, China, ³Department of Radiology and Huaxi MR Research Center, West China Hospital of Sichuan University, Chengdu, China

Introduction: In facial recognition, both relational (i.e., the relative positions of eyes, nose, and mouth) and featural (i.e., the shapes of eyebrows, eyes, and mouth) information are crucial for processing of faces. Previous behavioral research has demonstrated the existence of deficiencies in facial processing among patients with strabismic amblyopia. However, the specific neural mechanisms underlying these deficiencies have not yet been explored.

Objectives: This research aims to investigate the differences in brain function, functional connectivity between adult patients with amblyopia and healthy individuals, specifically focusing on facial featural and relational processing, utilizing task-related fMRI. We endeavor to elucidate the precise relationship between brain functional alterations in amblyopes and the impairment of their featural and relational processing of faces.

Methods: Using a 1-back task with facial stimuli from different individuals, we conducted functional localization of brain regions associated with facial processing, such as the occipital face area (OFA) and the fusiform face area (FFA). Additionally, we employed a Chinese version of 'Jane faces task', requiring participants to make judgments through button presses on whether the facial images presented before and after a delay were the same face. The experimental design utilized a block design, presenting facial stimuli with relational set and featural set in distinct blocks. All neuroimage data were acquired using a 3T fMRI scanner. Based on the 1-back task data, clusters with significantly increased activity in the face blocks compared to the baseline blocks were identified as regions of interest (ROIs) for facial processing areas. Then we compared the differences in functional connectivity (FC) between amblyopes and healthy controls (HCs).

Results: A total of 19 amblyopes and 23 HCs underwent fMRI scanning. The mean accuracy of the featural set and relational set all were significantly lower in the amblyopes compared to the HCs ($p < 0.01$). In addition, we also found that amblyopes exhibited higher FC between the right FFA and the left amygdala compared to the HCs (FDR-corrected $p < 0.05$), and the FC between the right FFA and the right OFA was lower in the amblyopes compared to the HCs (FDR-corrected $p < 0.05$).

Conclusions: Overall, we found that amblyopia leads to a deficit in processing features and relations in faces. Moreover, our findings suggest that amblyopes exhibit abnormalities in high-level information processing and recognition.

P-PED-004

Effects of cycloplegia on crystalline lens morphology and location in acute acquired concomitant esotropia

W. Chen¹, J. Liu², J. Hao¹, W. Dai¹, J. Chen¹, J. Fu¹

¹Beijing Tongren Hospital, Capital Medical University, Beijing, China, ²Wilmer Eye Institute, School of Medicine, Johns Hopkins University, Baltimore, United States

Introduction: The increase of AACE observed in recent years has been previously linked to excessive near work, but the impact of accommodative component remains ambiguous. It is known that contraction and relaxation of ciliary body in accommodation influence the morphology and location of crystalline lens. However, further research is required to delineate the characteristics of lens in AACE patients.

Objectives: The study aims to compare morphology and location of crystalline lens between acute acquired concomitant esotropia (AACE) patients and control subjects, both prior to and following cycloplegia.

Methods: This is a prospective and observational clinical study. Morphology and location parameters of the crystalline lens in 53 AACE patients and 32 healthy control subjects were assessed before and after cycloplegia using CASIA2 system, which represents the latest swept-source anterior segment optical coherence tomography. Morphology parameters included anterior radius of curvature (ARC), posterior radius of curvature (PRC), lens thickness (LTH) and equivalent diameter of lens (LED). Location parameters comprised lens decentration (LD) and lens tilt (LT). Comparison of these parameters before and after cycloplegia were conducted between AACE and controls. Additionally, the study analyzed and compared the changes in these parameter post-cycloplegia.

Results: Our findings suggest no significant difference in morphology parameters including ARC, PRC, LTH and LED between AACE patients and controls before or after cycloplegia. However, 2D-modeling data in the 0° meridian revealed that variation after cycloplegia of LD (lens shift) in right eyes was notably different in AACE patients, measuring -0.03(0.08) [median(interquartile range)] which was significantly distinct from the control group, exhibiting a measurement of 0.01(0.06) ($z=-2.373$, $p=0.018$). In left eyes, a similar trend was observed with variation after cycloplegia of LD in the 0° meridian being 0.02(0.06) in AACE, significantly differing from control group's measurement of -0.02(0.08) ($z=-2.809$, $p=0.005$). Further, correlation analysis revealed that larger temporal shift of lens was associated with greater changes in ARC ($r=0.300$, $p=0.006$) and LTH ($r=-0.286$, $p=0.008$).

Conclusions: The study concludes that while the morphological features of the crystalline lens are similar in AACE patients and controls, a notable difference is observed in the lens displacement post-cycloplegia in AACE patients, indicating a potential link with excessive accommodation.

P-PED-005

The clinical and genetic landscape of *PAX6*-related disorders in 166 Chinese families

*Y. Jiang*¹, *Q. Zhang*¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: *PAX6* variants are generally associated with aniridia but the genetic and phenotypic spectrum of *PAX6* appears broad and complicated, posing a challenge for the diagnosis and treatment of related ocular diseases and requiring further investigation.

Objectives: This study aims to systematically evaluate the genetic and phenotypic characteristics and elucidate the genotype-phenotype correlations in a large Chinese cohort with *PAX6* variants.

Methods: Variants were screened from in-house exome sequencing data through multiple bioinformatic predictions and co-segregation analysis. The Sanger sequencing was performed for further validation. The associated clinical data were collected and summarized.

Results: A total of 118 potential pathogenic *PAX6* variants were identified in 230 patients of 166 unrelated pedigrees (119 newly identified and 47 previously reported) in this cohort. For the *PAX6* missense variants, the AlphaMissense prediction results was highly consistent with the in-house data and disease-causing variants in the HGMD database. Based on the available data, foveal hypoplasia, complete or partial aniridia, and iris hypoplasia was observed in 94.5%, 76.8% and 22.2% of patients, respectively. The parental mosaicism was confirmed by droplet digital PCR in three families. The phenotypes of mosaic carriers were milder than patients with heterozygous variants. The associated ocular comorbidities, refractive error, and aniridia types varied among different variant types and locations.

Conclusions: These findings in this study suggest that foveal hypoplasia should be placed in the leading position of diagnosis indicators lists prior to other common signs related to *PAX6* variants such as aniridia. The identification of parental mosaicism provides valuable insights for genetic screening in sporadic cases. The AlphaMissense tool shows potential as a novel method for predicting the pathogenicity of missense variants in *PAX6* in the future. The recognition of the genotype-phenotype relationship and the expanded genetic and phenotypic landscape of *PAX6* within this study not only provide novel insights for the diagnosis and treatment of related diseases but also display the complexity of *PAX6* involvement behind the various ocular phenotypes.

P-PED-006

Perceptual learning improves contrast sensitivity and stereopsis of esotropia after strabismus surgery

K. Xu¹, H. Ye¹, W. Luo¹, X. Du¹, W. Li¹, Y. Di¹, W. Fang¹, T. Qiao¹

¹Department of Ophthalmology, Shanghai Children's Hospital, School of Medicine, Shanghai Jiao Tong University, Shanghai, China

Introduction: Esotropia is a form of strabismus characterized by convergent misalignment of the visual axes. Infantile esotropia (IE) usually occurs before the age of 6 months without spontaneous resolution, characterized as a constant angle of deviation that may increase with time. Accommodative esotropia (AE) generally presents between the ages of 1 and 8 years, and partially accommodative esotropia (pAE) is distinguished by remaining esotropia after full correction of hyperopia. Esotropia can cause anomalous binocular visual experience, leading to the loss of stereopsis. However, the reacquisition of high-grade binocularity and stereopsis are rare. The treatment of binocular vision was underused over the past few decades. Numerous studies have confirmed the effectiveness of perceptual learning for intermittent exotropia, while the impact of which on esotropia has not been reported.

In the current study, we aimed to investigate the function of contrast sensitivity and stereopsis in patients with esotropia who have successful surgical alignment, and further assess the effectiveness of perceptual learning for esotropia after strabismus surgery.

Objectives: Esotropia can cause anomalous binocular visual experience, leading to the loss of stereopsis. We aim to assess the effectiveness of perceptual learning for esotropia after strabismus surgery.

Methods: This study retrospectively analyzed the efficacy of perceptual learning therapy for patients with esotropia after strabismus surgery. All patients received home-based computerized perceptual learning program, and they were trained for at least 3 months. Contrast sensitivity was evaluated at 5 different spatial frequencies, and Random dot stereoacuity was measured.

Results: Records were reviewed of 44 patients. Compared with the postoperative values, the mean logCS values at high spatial frequencies (12 cpd, 18cpd) were increased after 3 months of training ($P = 0.010$ and 0.011), and at the final visit after training ($P = 0.001$ and $P < 0.0001$). Stereoacuity after 3 months' training was significantly improved in comparison to postoperative conditions ($P = 0.0135$), and a better result was found at final visit of training ($P = 0.0003$).

Conclusions: This study showed that perceptual learning can improve the contrast sensitivity at high spatial frequencies (12 cpd, 18 cpd) and promote the recovery of stereoscopic vision after esotropia surgery, displaying great application prospects for the treatment of esotropia.

P-PED-007

Retinopathy of Prematurity computerized screening and monitoring system in a tertiary hospital in the Philippines

E. Naraval¹, J.J. Santos-Rayos¹, M.F. Navarrete¹, M.V. Cayabyab¹, R. Fermin²

¹Ophthalmology, Mariano Marcos Memorial Hospital and Medical Center, City of Batac, Philippines,

²Pediatrics-Neonatal Center, Mariano Marcos Memorial Hospital and Medical Center, City of Batac, Philippines

Introduction: Retinopathy of prematurity (ROP) is a significant cause of blindness in childhood. It is the leading cause of vision loss worldwide and 8.4% of childhood blindness in the Philippines. It is potentially avoidable if detected early and treated promptly.

Objectives: This descriptive study pioneered and set up a database with an alarm system program for monitoring and screening newborns with risk factors for ROP. The study's objective was to ensure that all premature babies with any risk factor for ROP admitted to our institution have timely referrals, timely screenings, and no missed screenings for ROP. The significance of the study was to contribute to the early detection and prompt treatment of ROP, which is critical in preventing one of its dreaded complications, lifelong blindness.

Methods: This study was conducted from August 2022 to July 2023. A retinopathy of prematurity monitoring and screening system with an automated computer alarm was developed and incorporated into the healthcare institution's existing electronic medical records program. All premature babies with ROP risk factors were enrolled in the database with the computer alarm system to guide the proper timing of referrals and screenings for ROP and the detection of patients with missed screenings.

Results: The total number of patients enrolled in the study was 241. All (100%) were screened for ROP. There were 15 (6%) patients diagnosed with ROP upon initial screening. For timeliness, 234 (97%) have timely referrals, and 232 (96%) have timely screenings. The most common reason for delayed referrals and screenings was waiting to wean off patients from the ventilation support before referring them for ROP screening. No patient enrolled in the database missed ROP screening. However, in comparison of the total number of admissions with risk factors for ROP versus the total number of patients in the database, 2 (2%) were not enrolled in the database due to the referring resident's confusion in the ROP referral parameter (born term with low birth weight). Problems during the implementation were identified and addressed.

Conclusions: The results of this study showed that the database and alarm systems for monitoring and screening ROP was a helpful tool to healthcare workers for a timely interdepartmental referral and screening system for premature patients at risk for ROP if fully utilized. It was recommended to do ROP screenings even if patients were hooked to assisted ventilation.

P-PED-008

Adherence to screening recommendations for uveitis in juvenile idiopathic arthritis cases. Is current practice adequate?

A. ALFlaiti¹, F. AL Hosni², A. Ganesh³

¹Ophthalmology, Armed Forces Hospital, Muscat, Oman, ²Medical Student, Sultan Qaboos University, Muscat, Oman, ³Ophthalmology, Sultan Qaboos University Hospital, Muscat, Oman

Introduction: Juvenile idiopathic arthritis (JIA) is the most common chronic rheumatic disease among children below 16 years of age. JIA-associated chronic anterior uveitis (CAU) is the most frequent extra-articular manifestation and develops in 10–20% of children with JIA. CAU in JIA is usually asymptomatic, and can cause visually disabling complications if it remains untreated. Therefore, screening for JIA-associated uveitis in at-risk patients is essential. International screening guidelines recommend ophthalmic assessments at specific intervals.

Objectives: This study aimed to provide information about the extent to which ophthalmology and rheumatology services and patients at Sultan Qaboos University Hospital (SQUH), Oman adhere to screening guidelines.

Methods: This was a retrospective observational study. The charts of patients who were diagnosed with JIA from 2015 to 2020 were reviewed. Data collected included patient demographics, details regarding rheumatology referral, ophthalmology screening appointments, duration of disease, JIA type, disease markers, medications, diagnosis of uveitis, and age at diagnosis of uveitis.

Results: A total of 39 JIA patients met the inclusion criteria. The female : male ratio was 2:1. The median age of the patients at diagnosis was 3 years (interquartile range 2-7 years). Regarding JIA subtypes, 33.3 % of patients had oligoarticular JIA, 35.9% had systemic-onset JIA, followed by 30.8% with polyarticular JIA. A total of 56.4 % of patients were on biologics. Rheumatology adherence for referring for the first screening visit was 94.9%, ophthalmology adherence for scheduling first visit appointments was 76.9%, and patient adherence for first visit was 96.7%. The 5-year average overall adherence to screening guidelines was 81.3% (ophthalmology) and 88.4% (patients). One patient developed uveitis during the study period. A significant association was found between age of JIA patients and patient adherence, $p=0.037$. There is a need to improve ophthalmology service adherence to the screening criteria. While patients' adherence to the first visit is high, their adherence throughout the five years needs improvement. All patients had risk factors for uveitis, although only one developed uveitis.

Conclusions: There is a need to improve ophthalmology service adherence to the screening criteria. While patients' adherence to the first visit is high, their adherence throughout the five years needs improvement. All patients had risk factors for uveitis, although only one developed uveitis.

P-PED-009

Modified muscle transposition without tenotomy is an effective procedure for paralytic vertical strabismus

Z. Huang¹, R. Xie¹

¹Xiamen Eye Center of Xiamen University, Xiamen, China

Introduction: In 2003, Nishida et al.⁵ first reported an approach involving muscle transposition for abducens nerve palsy without rectus tenotomy. Nishida et al. in 2005⁶ and Shoaib and Hing in 2013⁷ reported muscle transposition for the treatment of abducens palsy without tenotomy or muscle splitting. In the present study, we aim to describe the effectiveness of a modified Nishida procedure, whereby, the vertical or horizontal rectus muscle is transposed without muscle disinsertion and also without muscle splitting.

Objectives: To investigate the effects of modified muscle transposition without tenotomy for paralytic horizontal and vertical strabismus.

Methods: We retrospectively analyzed 16 patients with paralytic strabismus who visited our hospital from January 2020 to September 2021. All patients underwent muscle transposition without tenotomy or muscle splitting.

Results: Ten of the 11 patients with abducens deficiency underwent simultaneous antagonist muscle recession with a mean correction (\pm SD) of 69.2 ± 12.8 prism diopters (PD) (range: 50–90 PD), and one patient underwent simple muscle transposition (correction: 29 PD) (total mean correction: 65.6 ± 17.2 PD). Three of the 5 patients with vertical strabismus underwent simple muscle transposition (mean correction: 27 ± 5 PD), one underwent simultaneous antagonist muscle recession (correction: 37 PD), and one underwent simultaneous antagonist and yoke muscle recession (correction: 72 PD) (total mean correction: 38 ± 19.8 PD). In all patients, the eyeballs could move beyond the midline, and none of the patients with horizontal strabismus developed postoperative vertical strabismus. No complications, such as anterior segment ischemia (ASI), were observed in any of the patients.

Conclusions: This procedure achieved similar corrective results as those of other commonly used muscle transposition procedures, including the Hummelsheim, Knapp, or reverse Knapp. Present modification of Nishida procedure has the advantages of being simple, less invasive, and potentially reversible, with a lower risk of muscle slippage and ASI, in addition to a lower possibility of requirement of multistage surgery.

P-PED-010

Validation of Postnatal growth and Retinopathy of Prematurity screening guidelines: a report from the developing world

*H. Tayyab*¹

¹Ophthalmology, Aga Khan University Hospital, Karachi, Pakistan

Introduction: To avoid repeated examinations, various models of ROP screening have been proposed. One of the most explored and validated models is the Postnatal Growth and Retinopathy of Prematurity (G-ROP) criteria, which was established using a large database. It is based on six alarms where when once met, the ROP screening should be initiated. These alarms include: GA < 28 weeks, BW < 1051 g, weight gain < 120 g during 10 to 19 days after birth, weight gain < 180 g during 20 to 29 days after birth, weight gain < 170 g during 30 to 39 days after birth, or hydrocephalus.

Objectives: The objective of this study is to explore the effectiveness of G-ROP model in identifying ROP successfully. To our knowledge, this is the first study from this region to retrospectively study the G-ROP model in our representative cohort.

Methods: A retrospective chart review was done of neonates admitted in the neonatal intensive care unit (NICU) of The Aga Khan University Hospital, Karachi, Pakistan from January 2018 – February 2022. Infants were considered to have a known ROP outcome if there was: type 1 ROP, type 2 ROP or no ROP.

The highest stage of ROP, lowest zone of ROP (I, II, or III); the presence or absence of plus disease; and type and date of all treatments, including laser retinal photocoagulation, cryotherapy, retinal detachment surgery (e.g. scleral buckle or vitrectomy), and intravitreal injection of an anti-VEGF agent, with name and dose of agent used were recorded variables.

Results: When we applied the G-ROP model for screening, 132 (98.5%) out of 134 babies were flagged to be screened. The sensitivity for G-ROP criteria to identify type 1 ROP was 100% (confidence interval: 93.5 – 100%). G-ROP criteria achieved 95.4% sensitivity (confidence interval: 77.1-99.8%) for type 2 ROP. The overall sensitivity of G-ROP criteria to pick any type ROP was 98.7% (confidence interval: 92.98 – 99.9%). One baby having BW of 1150 grams and GA of 29 weeks with no remaining G-ROP criteria being met developed stage 2 in zone 2 with no plus disease. Nineteen babies received treatment for ROP at The Aga Khan University Hospital whereas the rest of the babies chose to have treatment from other facilities due to various reasons. The G-ROP criteria demonstrated 100% sensitivity for all treatment requiring babies and no baby was missed in this model.

Conclusions:

We report the first validation study from Pakistan. We report a very high sensitivity of G-ROP screening model in our cohort of preterm infants.

P-PED-011

Essentiality of universal eye screening of neonates in a tertiary care rural hospital in India”

S. Singh¹, A.K. Shukla²

¹Ophthalmology, Mahatma Gandhi Institute of Medical Sciences, Wardha, India, ²Ophthalmology, Mahatma Gandhi Institute of Medical Sciences, Wardha, India

Introduction: Universal eye-screening is not routinely followed in India and can be useful for the early identification of ocular abnormalities of neonates . Our study involved implementation of screening of all the inborn and out born neonates admitted in a Post Natal Care (PNC) ward and Neonatal ICU of a Paediatrics unit of a tertiary care rural hospital and to find the incidence and types of ocular morbidities seen in newborns.

Objectives: To implement a program for screening of the eyes of all inborn and out born neonates admitted in a Post Natal Care (PNC) ward and Neonatal ICU of a Paediatrics unit of a tertiary care rural hospital

To find the incidence and types of ocular morbidities seen in these newborns.

Methods: The study was initiated after Institutional Ethical Committee clearance. All 2410 neonates admitted in a Post Natal Care (PNC) ward and Neonatal ICU of a Paediatrics unit of a tertiary care rural hospital over a period of 6 months were enrolled after obtaining informed consent from the parent. Demographic details & history like unique ID, gestational age, chronological age, sex, birthweight, date of birth & mode of delivery of the neonates was noted. A screening ocular examination was done with the help of torch light. Bruckner’s test was performed on both eyes and graded. Any ocular abnormality was documented and abnormal red reflex was noted and was appropriately managed. Data was analysed using Epi Info™ software

Results: Out of 2410 neonates screened for any ocular abnormality 1268 (52.61%) were males and 1142(47.38%)were females. 515 babies had Extreme Low birth weight with weight less than 1250gm. Low birth weight (1250 -2500gm) was found in 389 males and 426 females. Birth weight more than 2500gm was found in 874 males and 706 females. We found that Facial abnormality was found in 3 babies(1 male and 2 females). Adnexal abnormality was the most common ocular morbidity seen with congenital dacryocystitis seen in 230 males and 228 females(19%of all babies). Subconjunctival hemorrhage and conjunctival congestion were found in 25 males and 34 females. Infections like ophthalmia neonatarum was seen in 2.44%, and fundus abnormalities including Retinopathy of Prematurity (ROP) was seen in 11.11%babies.

Conclusions: Torch light examination and Bruckner’s reflex are easy, simple and non-invasive for early identification of ocular abnormalities of neonates. Promoting and adapting these simple interventions will save eye sight.

P-PED-012

Pseudoesotropia in Chinese children: a triphasic development of the IEFD-to-IPD ratio and its changing perception

N. Wei¹, X. Qian¹, F. Sun², B. Zhang³

¹Department of Pediatric Ophthalmology and Strabismus, Tianjin Medical University Eye Hospital, Tianjin, China, ²Department of Ocular Plastic and Orbital Disease, Tianjin Medical University Eye Hospital, Tianjin, China, ³Nova Southeastern University, Fort Lauderdale, United States

Introduction: In comparison with Caucasian children, Chinese children have a more prominent medial epicanthus and a flatter nasal bridge. This may lead to the appearance of the eyes being crossed, particularly with a head turn or during a lateral gaze. It is often noted that concerned parents bring in their children, whose eyes are perfectly aligned, to the pediatric ophthalmologists for consultation. In infants, it accounts for up to ten percents of outpatient visits.

Objectives: To delineate the development of the interepicanthal fold distance (IEFD) to interpupillary distance (IPD) in Chinese children, and to quantify how their ratio (EFDPD ratio) affects parent's judgment on whether a child's two eyes appear misaligned.

Methods: The values of IPD and IEFD were measured in 750 children, aged between 3 and 17 years. The developmental trend of EFDPD ratio was established. Two hundred parents were shown a series of pictures of children with varying EFDPD ratios and asked to judge whether the child in each picture demonstrated misaligned eyes. Based on the parent's responses, psychometric functional associations with EFDPD ratios were established.

Results: The EFDPD ratios were significantly higher (0.63 ± 0.027) and showed little change among children from 3 to 6 years of age ($p = 0.704$). During the age of seven to 12 years, however, the EFDPD ratio significantly decreased ($p < 0.001$) before stabilizing at 0.59 ± 0.023 by the ages of 13 to 17 years ($p = 0.376$). Children with EFDPD ratios > 0.65 were more likely to be perceived as strabismic by the parents, while children with an EFDPD ratio < 0.55 were rarely perceived as so. As many as 30% of the children aged between 3 and 6 years demonstrated EFDPD ratios > 0.65 , and this number reduced to 5% by the age of 12 years.

Conclusions: The development of the EFDPD ratio in Chinese children shows a triphasic pattern, with a large value before the age of 6 years, a quick drop between 7 and 12 years, and little change after 13 years of age. As the EFDPD ratio declines, fewer children appear as strabismic.

P-PED-013

A total of 228 children with Strabismus were diagnosed with other systemic diseases

X. Xie¹, L. Lin¹

¹Xi'an Children's Hospital, Xi'an, China

Introduction: A Total of 228 Children with Strabismus were Diagnosed with Other Systemic Diseases.

Objectives: To analyze the characteristics of 228 children with strabismus and other systemic diseases.

Methods: A retrospective case-control study. The clinical data of 1048 children diagnosed with strabismus in the Department of Ophthalmology of Xi'an Children's Hospital from January 2020 to June 2023 were collected. Among them, 228 children (27.5%) were complicated with other systemic diseases. Among them, 126 were males and 162 were females, aged 2~16 (6.50 ± 2.75) years. The types and clinical features of other systemic diseases were analyzed.

Results: There were 288 children in this study, and 72 (31.6%) had neurological diseases, including epilepsy, leukomalacia, neurodevelopmental delay, etc. There were 40 cases (17.5%) with endocrine system diseases, including growth retardation, short stature, and abnormal thyroid function. There were 34 cases (14.9%) with circulatory diseases, including atrial septal defect, ventricular septal defect, and ductus arteriosus may not be closed. There were 32 cases (14.0%) with urological diseases, including renal malformation, hydronephrosis, cryptorchidism, etc. There were 50 cases (21.9%) with other systemic diseases. The types of strabismus included concomitant strabismus (138 cases, 60.5%), A-V sign (75 cases, 32.9%), and other types of strabismus (15 cases, 6.6%). Children with concomitant strabismus were more likely to have endocrine system diseases than A-V sign and other types of strabismus ($\chi^2=5.13$, $P<0.05$), and children with A-V sign were more likely to have neurological diseases than other types of strabismus ($\chi^2=3.29$, $P<0.05$).

Conclusions: Some children with strabismus often have other systemic diseases; Concomitant strabismus is prone to endocrine system diseases; Signs A-V are predisposed to be complicated with neurological diseases; Children with strabismus should pay attention to medical history collection and exclusion of other systemic diseases.

P-PED-014

It is not just the eyes... a description of abnormal vestibulocochlear anatomy in Duane's Retraction syndrome

K.L.J. Wu¹, Y.T. Koh², T.K.J. Chan³, S. Choi⁴

¹College of Medicine and Veterinary Medicine, University of Edinburgh, Edinburgh, United Kingdom, ²Department of Ophthalmology, Tan Tock Seng Hospital, National Healthcare Group, Singapore, Singapore, ³Department of Ophthalmology, NHS Lothian - Princess Alexandra Eye Pavilion, Royal Hospital for Children and Young People, Edinburgh, United Kingdom, ⁴Department of Radiology, NHS Lothian - Royal Hospital for Children and Young People, Edinburgh, United Kingdom

Introduction: Duane's retraction syndrome (DRS) is a rare form of strabismus. There is limited literature on its association with hearing loss and accompanying auditory abnormalities.

Objectives: We present a case study of a two month old boy with DRS and bilateral severe sensorineural hearing loss to characterise the unusual vestibulocochlear anatomy and associated auditory abnormalities.

Methods: Case report.

Results: A two month old boy who failed newborn hearing screen was referred to ophthalmology after audiology work-up was initiated. Auditory testing suggested severe to profound bilateral hearing loss. An MRI scan of the internal acoustic meatus revealed an enlarged right cochlea, featuring a cystic apex and poorly defined turns superiorly. The left cochlea was enlarged with cystic characteristics and no discernible internal architecture, continuous with a dilated vestibule and dysplastic lateral semicircular canal. The overall presentation was most consistent with incomplete partition type I. The left 6th cranial nerve was aplastic. ECG results were normal, and infection screening for cytomegalovirus was negative. Genetics screening for abnormalities in genes GJB2 and GJB6 (leading causes of autosomal recessive non-syndromic prelingual deafness) were negative.

At 11 months, the patient was diagnosed with left DRS Type 1 during a routine ophthalmology visit. Visual acuity was 6/38 with both eyes open using Cardiff acuity cards. A -2 restriction on abduction was noted, along with mild hypermetropia and a slight left estropia. Cycloplegic refraction was +1.5 dioptres in both eyes. Fundus examination was normal.

The patient had a normal perinatal period, except for a hematoma detected around 8 weeks gestation, which resolved without complications. The mother received a COVID vaccine at around 8 weeks gestation as well. This period coincides with the embryogenesis of the ear and eye and might be contributory. There was no relevant family history.

Conclusions: It is therefore important to screen all DRS patients audiotically, especially where newborn screens are not routine. Early diagnosis of concurrent hearing loss is crucial for timely audiological management to ensure proper child development. Likewise, patients with hearing abnormalities should be considered for routine ophthalmology screens. The significance of the haematoma or vaccine as contributory factors is uncertain. Further work to investigate the embryogenesis of eye and ear development can help further provide insight into the pathogenesis of DRS.

P-PED-015

The comparison of stereoscopic vision function among TNO, Yan's and Frisby test in 3-14 years old children

J. Fu¹, Y. Zhao¹, J. Hao¹

¹Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: Stereoacuity is clinically important because stereoscopic vision is considered the “gold standard” of binocular vision, requiring good vision in both eyes, good oculomotor control as well as cortical neurons to combine the two eyes’ inputs and extract disparity. However, there has been no comprehensive research on the commonly used and accurate near stereo vision inspection methods.

Objectives: To comprehensively assess the TNO, Yan’s and Frisby stereo test in young children, including testability, test/retest reliability, sensitivity and specificity for detecting binocular vision disorders.

Methods: We tested 195 children between the age of 3–14 who came to our clinic with the TNO, Yan’s and Frisby stereo test in 2 sessions. The cover/uncover test was to detect heterotropia. The best corrected visual acuity (BCVA) was assessed in both eyes using Snellen E LogMAR visual acuity test. Cycloplegic autorefractometry was performed after administration of 1.0% cyclopentolate and Mydrin-P.

Results: Testability were high, 98.5%, 95.4% and 90.8%, respectively in TNO, Yan’s and Frisby in the first session, and increased in the second session. The intraclass correlation coefficient (ICC) was high between the two sessions for qualitative measurement and moderate for quantitative measurement. ICC in qualitative measurement are 0.817, 0.849 and 0.923 respectively in TNO, Yan’s and Frisby, with $P < 0.05$. ICC in quantitative measurement are 0.529, 0.815 and 0.645 respectively in TNO, Yan’s and Frisby, with $P < 0.05$. Sensitivity was low but specificity was high for detect binocular vision disorders. Sensitivity were 35.7%, 58.5% and 28.4%, specificity were 78.9%, 60.8% and 93.4% respectively in TNO, Yan’s and Frisby.

Conclusions: TNO, Yan’s and Frisby can achieve high testability in children aged 3–14, TNO is easier to understand in these three methods. TNO, Yan’s and Frisby can distinct stereoblind in multiple tests. For whom are not stereoblind, they could get different scores in multiple measurements of the same method, which doesn't mean their stereovision is getting worse or better. TNO, Yan’s and Frisby can't be used to screen for binocular vision alone.

P-PED-016

Trained Retinopathy of Prematurity (ROP) nurses accurately detect referral warranted ROP

S. Shah¹, T. Nguyen², V. Raileanu³, A. Griffin⁴, B. Smith³

¹Ophthalmology, Queensland Childrens' Hospital, Brisbane, Australia, ²Faculty of Medicine, University of Queensland, Brisbane, Australia, ³Neonatal Critical Care Unit, Mater Mothers' Hospitals, Brisbane, Australia, ⁴Statistics, QIMR Berghofer Medical Research Institute, Brisbane, Australia

Introduction: Only an estimated 4% of neonates screened develop disease severe enough to require treatment. Whether trained neonatal nurses can safely read and interpret wide field retinal images has not been fully explored. An accurate interpretation would significantly improve communication with families and increase efficiency of the ROP screening process. With critical paediatric ophthalmologist shortages across Australia, and almost a doubling in ROP prevalence over the past two decades, it is clear that this is an issue that needs to be addressed urgently.

Objectives: This safety study aims to evaluate the agreement in referral warranted ROP (RWROP) disease detection between specialised neonatal ROP nurses and an experienced ophthalmologist in a tertiary level NICU.

Methods: This study was a single centre, prospective, blinded, observational agreement study. All neonates that met standardised screening criteria for ROP from July 2020 to November 2022 were eligible for inclusion. Screening of eyes was done by specialised neonatal nurses (ROP nurse) using the Natus RetCam3. After the examination the ROP nurses completed a specifically designed ROP Grading proforma. Separately, ROP image interpretation and grading was done remotely via telemedicine by an expert paediatric ophthalmologist. The primary outcome of interest was the presence of referral warranted ROP (RWROP). All neonates underwent multiple ROP screenings. The 'NICU journey' was defined as all ROP screening visits (initial screening as well as all subsequent screens) whilst the neonate was an inpatient in the NICU.

Results: Results of screening from 195 neonates were included. At the first visit, the nurse and ophthalmologist agreed about whether or not referral was warranted for 191 of 195 neonates (98%, Kappa = 0.79, $p < 0.0001$). All disagreements ($n=4$) were in the same direction, with the nurse considering that the neonate had RWROP and the ophthalmologist reporting that referral was not required. There was a 100% sensitivity of nurse detection at this first visit. The nurse and ophthalmologist agreed about whether referral was warranted at all visits across the 'NICU journey' for 184 (94%) neonates, corresponding to absence of RWROP for 660 visits (86%) and presence of RWROP for 92 visits (12%).

Conclusions: The present study found an excellent level of agreement of RWROP detection when interpreting RetCam retinal images by trained ROP nurses. This study adds to the evidence base to expand the current scope of practice of trained, specialised ROP nurses.

P-PED-017

Screening of convergence insufficiency and effectiveness of pen exercise in a tertiary eye hospital

M. Mostafa Hossain¹, Q. Sazzad Iftekhar¹, S.M. Naznin¹, S. Toufique¹

¹Pediatric Ophthalmology & Strabismus, Ispahani Islamia Eye Institute & Hospital, Dhaka, Bangladesh

Introduction: Convergence Insufficiency with or without refractive error may be associated with difficulties in reading and writing in children and young adults which sometimes may manifest as blurring of vision, eyestrain and or headache. Even after proper correction of refractive error patients may suffer from discomfort and may not have good binocular vision.

Objectives: The study was undertaken to screen out the patients with Convergence Insufficiency (CI) and to see the effectiveness of pen exercise.

Methods: A prospective cohort study was undertaken in a tertiary eye hospital from June to December 2023 on 209 subjects of 8-25 years of age with visual acuity 6/6 or Best Corrected Visual Acuity 6/6 without manifest strabismus. History of eyestrain, blurring of vision or headache was taken whether present or not, and evaluation including Near Point of Convergence (NPC), Near Point of Accommodation (NPA), Fusional Amplitudes (FA), exophoria and stereopsis was done. Diagnosis of CI was confirmed based on any two of three criteria of NPC, exophoria and FA. Patients with convergence insufficiency (CI) were screened out.

50% (n=51) of patients with CI were advised with pen exercise and the remaining 50% (n=51) of patients without any advice of pen exercise were considered as control group. All the CI patients (n=102) were advised for follow-up examination after six weeks for data analysis.

Results: Among 209 patients 102 had CI. Fifty-five (53.9%) were male and 47 (46.1%) were female. Among 102 patients of CI, 81 (79.4%) patients were in the age group of 8-15 years, 14 (13.7%) were in the age group of 15 to 20 years and 7 (6.9%) were in the age group of 20-25 years. Exophoria was present in all the 102 patients. Nine (8.8%) patients had eyestrain, blurring of vision or headache. Stereoacuity of 40-100 seconds of arc was present in 101 patients and 140-800 seconds of arc in 1 patient. Only 10% (n=5) attended after six-week follow-up. The remaining patients have not yet attended for follow-up.

Conclusions: Screening of Convergence Insufficiency needs to be considered and statistical analysis with data of follow-up patients to see the effectiveness of pen exercise may be undertaken in children and young adults.

P-PED-018

The comparison of different severity of amblyopia among different strabismic patients needing surgery

A. Gheibi¹, M. Khorrami-Nejad^{2,1}, M.R. Akbari¹, H. Nashee Jaber², B. Masoomian^{1,3}, A. Cheraghpour⁴

¹Translational Ophthalmology Research Center, Farabi Eye Hospital, Tehran, Iran, Islamic Republic of,

²School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran, Islamic Republic of,

³Wills Eye Hospital, Thomas Jefferson University, Philadelphia, United States, ⁴Farabi Eye Hospital, Tehran, Iran, Islamic Republic of

Introduction: The presence and severity of amblyopia can significantly impact the outcome of strabismus surgery. This study is the first of its kind to compare the prevalence of different levels of amblyopia among various strabismic patients requiring surgery.

Objectives: To report the prevalence of bilateral and different severity of unilateral amblyopia among strabismic patients needing surgery.

Methods: This retrospective study was performed based on hospital records of 13332 patients managed with surgery at Farabi Eye Hospital, Tehran University of Medical Sciences, from 2015 to September 2022. Of these patients, 9766 cases who had enough cooperation to measure visual acuity were entered to the study. Gender, age, visual acuity, refractive error, presence of amblyopia, and laterality (unilateral or bilateral) were collected.

Results: All patients with sensory exotropia (XT), sensory esotropia and heavy eye syndrome had amblyopia. The next highest prevalence of amblyopia was found in Nystagmoid patients (68%), Monocular Elevation Deficiency (44%), superior oblique (SO) underaction or hypodeviation and 3rd nerve palsy (43%), alternate XT (42%), Thyroid eye disease (40%), dissociated vertical deviation (38%), Primary inferior oblique (IO) muscle overaction (25%), Duane retraction syndrome (DRS) type I (23.4%), DRS type II (20%), SO palsy (17.2%) and Intermittent XT (14.2%). On the other hand, the least prevalent of amblyopia was inferior rectus (IR) palsy (9%) and then intermittent XT and brown syndrome with a prevalence of 14%. Regarding the prevalence of unilateral amblyopia, all patients with sensory exotropia and sensory esotropia had unilateral amblyopia and 50% of patients with heavy eye syndrome had unilateral amblyopia. The least prevalent unilateral amblyopia was found in IR palsy (4.8%), IO palsy (6.7%), intermittent XT (7.2%) and SO palsy (10.5%). Regarding the prevalence of bilateral amblyopia, the highest prevalence of amblyopia was found in patients with nystagmus (56%), heavy eye syndrome (50%), superior oblique underaction or hypodeviation (18.2%). On the other hand, the least prevalent bilateral amblyopia was DRS type II (4.6%), IR palsy (4.8%), SO palsy (6.6%) and intermittent XT (7.1%).

Conclusions: Patient with different type of deviation who underwent surgery had different prevalence of amblyopia. Sensory strabismus and nystagmoid patients had the highest prevalence of amblyopia.

P-PED-019

Comparative video gait analysis of assistance for children with cerebral visual impairment (CVI)

P. Chong¹, R.W. Enzenauer^{2,3}, G. Ambrose-Zaken⁴

¹Campbell University School of Osteopathic Medicine, Lillington, United States, ²University of Colorado School of Medicine, Aurora, United States, ³Pediatric Ophthalmology, Children's Hospital Colorado, Aurora, United States, ⁴Safe Toddlers, Fishkill, United States

Introduction:

Cerebral visual impairment (CVI) is the leading cause of visual impairment in children in developed countries and is increasing in prevalence in developing nations. Visual impairment has been shown to negatively impact all aspects of life, including learning and development. Safe Toddlers pediatric belt canes are essential mobility tools for pediatric patients because they give blind toddlers a head start to independence by combining independent walking ability and safety in addition to the potential for improved motor and cognitive development as well as long-term health benefits.

Objectives: This study sought to quantify the mobility benefits of pediatric belt canes by performing video gait analysis of pediatric patients.

Methods: Videos of fifteen pediatric patients with CVI walking without and with the assistance of Safe Toddlers pediatric belt canes were analyzed using the MediaPipe platform to perform gait analysis. Subsequent analyses included linear regression analysis and data smoothing to calculate metrics for foot mobility, approximate speed, step frequency, and estimated step lengths. T-testing was performed to compare the gait analysis metrics for patients with and without pediatric belt canes.

Results: Patients utilizing pediatric belt canes showed 71.5% increase in foot mobility, 86.1% increase in approximate speed, and 74.6% increase in step length ($p < .05$). No differences were observed in step frequency.

Conclusions: Pediatric belt canes lead to marked improvements in mobility for mobility visually impaired children, supporting the beneficial effects of utilizing pediatric belt canes in the care and management of such patients.

P-PED-021

Intraocular lens implantation as a method of refractive error correction in children

*M. Prost*¹

¹Center for Pediatric Ophthalmology, Warsaw, Poland

Introduction: Implantation of IOLs is not a method used to correct refractive errors in children and its use is still a controversial. Therefore there are only a few reports on this subject.

Objectives: To present the results of the treatment of high refractive error in children by iris claw intraocular lens implantation.

Methods: Iris claw intraocular lens implantation surgery was performed in 10 children aged 2-6 years, whose high refractive error could not be corrected with eyeglasses or contact lenses: in 6 children with high monocular refractive error, in 2 children with high binocular refractive error in Down syndrome and in 2 children with autism.

Results: In 4 of the cases in which visual acuity could be tested, there was an improvement in vision from a mean of 0.05 to a mean of 0.5. In 2 of the children, visual acuity could not be tested, but there was better tolerance of obstruction. In 4 of the children with Down syndrome and autism, the parents reported a significant improvement in their environmental functioning.

Conclusions: The iris claw intraocular lens implantation surgery may find use in the correction of high refractive error in selected cases in children.

P-PED-022

Visual outcomes of PRK for treatment of anisometropic amblyopia in non-compliant children: one-year follow-up

M. Etezzad Razavi¹, A. Eslampour¹

¹Mashhad Eye Research Center, Mashhad University of Medical Sciences, Mashhad, Iran, Islamic Republic of

Introduction: Anisometropia as a common cause of amblyopia, has high response to the treatment, if the amblyopic child had sufficient compliance with traditional treatments. non-compliant encouraging nature of the anisometropic amblyops, has led researchers to seek alternative treatments to prevent development of amblyopia.

Alternative amblyopia therapy options includes contact lens, laser surgery, phakic intraocular lenses, binocular stimulation, systemic medication and clear lens exchange in higher refractive errors instances, are other possible treatment options.

Objectives: To evaluate the safety, efficiency, short-term stability and sensory results of photorefractive keratectomy (PRK) in a sample of Iranian children with anisometropic amblyopia and non-compliant with conventional treatment.

Methods: This was a prospective interventional case series. A total of 12 children with anisometropic amblyopia with a mean age of 8.8 ± 3.1 years (range, 6-17 year) underwent PRK by one surgeon at a hospital clinic setting. Treatment of the target refraction were anisohyperopia and astigmatism > 2.00 D, anisomyopia > 3.00 D. Main outcome measures were uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), spherical equivalent (SE) refraction, stereoacuity, binocularity, corneal haze at 1, 3, 6 and 12 months after surgery.

Results: Mean BCVA improved from 0.34 ± 0.24 to 0.26 ± 0.18 , 0.21 ± 0.18 and 0.20 ± 0.19 LogMAR at 3, 6 and 12 months respectively. The improvement of BCVA at 6 and 12 months was statistically significant in comparison to the preoperative period ($p=0.003$). Eight eyes (66.7%) gained 1 to 3 lines, one eye lost one line of BCVA and 3(25%) were unchanged. Mean UCVA progressively increased from 0.63 ± 0.24 to 0.44 ± 0.24 , 0.32 ± 0.16 , 0.25 ± 0.19 and 0.25 ± 0.19 LogMAR at 1, 3, 6 and 12 months, respectively. Ten eyes (83.4%) gained 1 to 3 lines, one eye lost 1 line of UCVA and 1 (8.3%) was unchanged. The mean preoperative stereopsis was 341.9 ± 245 seconds of arc improved to 166.6 ± 87.5 that was statistically significant ($p=0.012$). Only one patient with suppression, found fusion response. There was no corneal haze in patients except one, that cleared by 3 months.

Conclusions: PRK seems to be safe and effective alternative option in pediatric with anisometropic amblyopia and non-compliant with traditional treatment.

P-PED-023

Evaluation of visual and refractive characteristics of exotropic patients needing multiple strabismus surgeries

A. Cheraghpour¹, M. Khorrami-Nejad^{1,2}, M.R. Akbari¹, H. Resan Hussein², B. Masoomian^{1,3}, A. Gheibi¹

¹Translational Ophthalmology Research Center, Farabi Eye Hospital, Tehran, Iran, Islamic Republic of,

²School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran, Islamic Republic of,

³Wills Eye Hospital, Thomas Jefferson University, Philadelphia, United States

Introduction: The clinical features of exotropic patients requiring surgery can significantly impact the need for reoperation, a factor that has not been adequately addressed in previous evidence.

Objectives: To find visual, refractive, and eye movement clinical features in exotropic patients who needed multiple strabismus surgery.

Methods: In this retrospective cross-sectional study, all medical documents of 6129 patients with the mean age of 21.9 ± 13.8 (range, 3 to 77) years who had large-angle exotropia and were conducted once, twice, three time or more surgical treatment over a period of 10 years were reviewed. Of 6129 patients, 3583 (48.5%) cases had alternate exotropia without any dominance; however, 2546 (41.5%) cases showed unilateral constant exotropia. Different clinical characteristics were compared among exotropic patients who had one or multiple strabismus surgeries for resolving their strabismus angle.

Results: The mean age of 3583 patients with alternate exotropia and 2546 patients with unilateral constant exotropia at the time of their surgery were 18.3 ± 13.2 , and 26.4 ± 13.4 years, respectively. Of 3583 patients with alternate exotropia, 13.89% ($n=498$) of them required two surgeries, and 2.98% ($n=107$) of them required three times or more surgical interventions for resolving their strabismus ($P<0.001$). On the other hand, we found that in 2546 patients with unilateral constant exotropia, 16.61% ($n=423$) of them required two surgeries, and 6.44% ($n=164$) of them required three times or more surgical interventions for resolving their strabismus ($P<0.001$). The results of the present study indicate that some of the clinical characteristics (age at the time of surgery, best-corrected distance visual acuity (CDVA), refractive error components, and horizontal and vertical angles of deviation at near and far fixation distances) showed significant differences in patients with one, two, three or more surgical interventions (all $P<0.05$).

Conclusions: The present study demonstrated different clinical characteristics of patients with alternate and unilateral exotropia who needed multiple surgical interventions for resolving their strabismus. It is therefore recommended that optometrists who conduct preoperative examinations of exotropic patients make attempts to pay more attention to differences in clinical characteristics of these patients.

P-PED-025

Gain of function *HEPACAM* mutation in a patient with congenital fibrosis of the extraocular muscles Cerebellar Cyst

H.J. Dizon¹, M.B. Ibañez IV¹, M. Mateo-Hernandez¹

¹Ophthalmology, Ospital ng Maynila Medical Center, Manila, Philippines

Introduction: Congenital fibrosis of the extraocular muscle (CFEOM) is a rare, nonprogressive ophthalmoplegia with a prevalence of 1/250,000. To date, several genes have been identified to cause CFEOM, with *TUBB3* being the most commonly implicated in CFEOM type III. On the other hand, *HEPACAM* mutations are known to cause megalencephalic leukoencephalopathy with subcortical cysts (OMIM: 613926) but not CFEOM. Some genes that cause CFEOM and the *HEPACAM* are implicated in white matter abnormalities and axonal pathologies, suggesting a possible link between these genes. Here we report a case of CFEOM type III with a *HEPACAM* variant.

Objectives: The authors of this study aim to describe and expand the phenotype and possibly the genotype of CFEOM Type III with cerebellar cyst

Methods: Case Report

Results: The patient presented with severe ptosis with restricted movement of the right eye on all gazes, and a delay in motor development. Cranial and Orbital MRI with contrast revealed hypoplasia of the right extraocular muscles, and absence of the cranial nerve III and also possible cranial nerve IV. Incidentally, a large retro cerebellar cystic lesion, elevating the tentorium superiorly and compressing the cerebellum antero-inferiorly. Genetic testing of the patient showed the patient to have a heterozygous mutation in the *HEPACAM* gene.

Conclusions: The diagnosis of CFEOM is based on the clinical, radiologic findings and genetic testing to classify which subtype of CFEOM the patient has. Across the literature, cases of CFEOM type III are particularly rare, and they may present with a wide spread of neurodevelopmental anomalies. CFEOM type III has been mapped to the *TUBB3* gene. However, the results of the genetic test of our patient suggest a potential linkage of CFEOM Type 3 with the *HEPACAM* gene, suggesting that it may be a possible pathogenic variant. Continued study of these complex genetic mutations may yield insight into the development of a new subtype of CFEOM.

P-PED-026

A retrospective case review of surgical outcomes in cases of Marcus Gunn Jaw Winking phenomenon and Double Elevator Palsy

*A. Vithlani*¹

¹Ophthalmology, Great Ormond Street Hospital, London, United Kingdom

Introduction: In a minority of patients with MGJW Syndrome there is a limitation of upward movement of the eye of the affected side resulting in hypophoric or hypotropic deviation. The following two cases are included in the minority of patients with MGJW syndrome as well as limitation of upward movement (Double Elevator Palsy) resulting in a hypotropic squint.

Objectives: To compare the outcome of two operative techniques for the management of Marcus Gunn Jaw Winking Syndrome and Double Elevator Palsy.

Methods: Two patients were identified in an ophthalmic clinic at a tertiary referral centre. Information regarding pre and post-operative alignment and extra ocular movements were extracted and details of surgical techniques were noted. Reasons for chosen surgical technique were also noted.

Results: Patients in both cases presented with significant hypotropia and double elevator palsy in the affected eye. Both patients underwent strabismus surgery. The patient in case 1 underwent a Knapp procedure (superior vertical transposition of both horizontal recti) and the patient in case 2 underwent superior vertical transposition on one horizontal rectus muscle and recession of the inferior rectus. Diagrams and pictures are also extracted to demonstrate changes pre and post operatively. Measurements of each patients squint in primary position decreased significantly in both cases post operatively. However the child undergoing the Knapp procedure still had a significant restriction in elevation compared to the child that underwent a single horizontal recti transposition and inferior rectus recession. The reason the inferior rectus was recessed is because it was found to be contracted during the forced duction test. The inferior rectus was not recessed in case 1 as the inferior rectus was not contracted during the forced duction test and recessing this muscle would not improve alignment of eyes.

Conclusions: Despite similar post-operative squint measurements the patient in case two demonstrated better elevation in the affected eye. This highlights the need for careful forced duction test to be carried out. Another way to assess whether the inferior rectus is short or contracted is to observe the affected eye whilst the patient is under general anaesthetic and see if the eye is still in a hypotropic position. If the eye is still in a hypotropic position then this suggests inferior rectus contracture, but forced duction test should also be carried out to confirm this.

P-PED-027

Clinical characteristics and association between intermittent exotropia of hypermetropic anisometropia in sibling

N. Hajiyeva^{1,2}, R. Hajiyev^{1,2}

¹National Ophthalmology Centre named after academician Zarifa Aliyeva, Baku, Azerbaijan,

²Hatmedicine Klinikasi, Baku, Azerbaijan

Introduction: Intermittent exotropia (IXT) is a common type of strabismus characterized by an intermittent outward deviation of eyes. It typically develops during early childhood and may result in reduced visual acuity and stereopsis if left untreated. Hypermetropic anisometropia, on the other hand, refers to a significant difference in refractive errors between the two eyes.

Currently, the etiology of this strabismus is explained by a congenital disorder of the anatomy of the eyeballs and innervation mechanisms. However, questions remain regarding the underlying factors that contribute to the development of these conditions.

Objectives: This work allows us to compromise the existing explanations of the formation of intermittent exotropia. The objective of this report is to enhance understanding of this condition and provide insights into its management.

Methods: 2 comparative clinical case reports and literature review. The medical records of two siblings, a 15-year-old boy with intermittent exotropia and anisometropia, and 5-month-old girl also with anisometropia. Both siblings underwent a comprehensive ophthalmic examination. The inclusion criteria for the review were studies reporting on clinical features, treatment options, and outcomes of patients with intermittent exotropia.

Results: The cause of intermittent exotropia may be undiagnosed anisometropia in early childhood. A 15-year-old child was diagnosed with intermittent exotropia, severe anisometropia, and severe amblyopia. Correction and pleoptic treatment only slightly increased visual acuity. His sister was examined prophylactically at 5 months of age. The initial examination revealed an anisometropia with high degree of hypermetropia and high degree of astigmatism. Timely prescription of glasses for girl led to a decrease in hypermetropia, astigmatism and restored normal vision.

Conclusions: Intermittent exotropia is a complex condition with diverse clinical features and treatment options. We conclude that anisometropia present in early childhood decreases significantly over several years. But at the same time, if this anisometropia is not corrected in time, it leaves a mark in the form of amblyopia and exotropia. Control examination of children at 3-5 months of age and, timely correction can lead to the absence of amblyopia in adolescence and relieve them from exotropia in the future. Further research is needed to establish optimal treatment strategies and long-term outcomes for intermittent exotropia.

P-PED-028

Children's retinas a long-term investment, Stickler syndrome

M.Á. Carvajal Quiñónez¹, A.I. Pérez Pacheco², R.A. Almanza Cano¹

¹Surgery of Retina and Vitreous Department, Guillermo Ávalos Urzúa Hospital, Guadalajara, Jalisco, Mexico, ²Anterior Segment and Refractive Surgery, Guillermo Ávalos Urzúa Hospital, Guadalajara, Jalisco, Mexico

Introduction: The genetic diseases are among us and often unrecognized or misdiagnosed, Sticker's syndrome is one of the most common causes of rhegmatogenous familial retinal detachment in childhood, firstly described in 1965.¹⁻² The prevalence ranging from 1-9 per 10,000 people with an incidence rate of 1 in 7,500 – 9,000 newborns. They are close to 11 genes involved in this syndrome with affection to a greater or lesser extent in the connective tissue, in addition to 8 types of clinical presentation. The vitreous is normally fully matured by 10-14 weeks of intrauterine growth, from this moment suspicion for this pathology begins and we must be aware of these changes.

Objectives: To recognize and diagnose a genetic rare entity that leads to blindness in children and adolescents worldwide.

Methods: We present a 32-year-old male patient with a diagnosis of Stickler syndrome, a history of congenital cataracts in both eyes, who underwent cataract surgery of the right eye (RE) in the year 2003, followed by a 360° photocoagulation in both eyes (figure 1) before cataract surgery procedure was done, subsequently months later, suffers an eye ocular trauma in the left eye (LE), which causes a retinal detachment that were surgery with: Vitrectomy + Retinopexy + Silicone is performed, the patient is left with visual acuity of light perception in RE and 20/80 in LE.

Results: The following results are shown in the passing months through OCT evolutions.

2009 A macular OCT of the left eye (LE) from March 2009, shows the presence of hyporeflective areas, which involves perifoveal area to nasal area, everything compatible with intraretinal cystic edema, with a foveal area thickness of 271 microns.

2010 A macular OCT of the left eye (LE) from February 2010 with the same intraretinal cystic edema, but with reduction of edema after intravitreal treatment, with a foveal area thickness of 255 microns.

2023 A macular OCT of the left eye (LE) from August 2023, shows a bigger new progression of the hyporeflective areas, which involves perifoveal area to nasal area, everything compatible with intraretinal cystic edema new episode, with a foveal area thickness of 833 microns.

Conclusions: The patients who are treated prophylactically find a better visual prognosis than those where the natural history of the disease evolves. Auditory and visual rehabilitation is part of comprehensive care to reincorporate them into productive social life, remembering how young these patients are.

P-PED-029

Axenfeld syndrome presenting as blue eyes in a newborn – a case report

*A. Mould-Shalom*¹

¹Ophthalmology, National Hospital, Abuja, Nigeria

Introduction: Axenfeld syndrome, distinct from Axenfeld-Rieger syndrome, is rare. Only about 50% of infants born with Axenfeld anomaly go on to develop the syndrome. The index case of bilateral Axenfeld syndrome presented at 7 days of life having been born with blue eyes which progressively deepened every day. Along with examination findings of buphthalmos, elevated intraocular pressure and gonioscopic evidence of Axenfeld anomaly, the increasing intensity of the blue cornea signalled a rapid course of the congenital glaucoma. Bilateral combined trabeculotomy and trabeculectomy procedures were undertaken as an emergency with good post-operative outcome and resolution of the bluish discolouration.

Objectives: To create awareness among Ophthalmologists and other eye care personnel on this pattern of presentation.

Methods: A Hospital-Based Case Report

Results: The cornea remained clear and intraocular pressure well controlled without anti-glaucoma medications at 18 months follow-up visit.

Conclusions: Blue eyes at birth from congenital glaucoma as a presentation of Axenfeld syndrome is uncommon. Urgent surgical intervention is necessary to prevent blindness.

P-PED-030

Static and dynamic parameters of accommodation and pupilar diameter in children with myopia treated by diluted atropine

M. Dostalek^{1,2}, J. Heissigerova³, M. Kominek⁴, R. Atrata⁴, I. Krejcirova⁴, B. Zajdlikova⁴, M. Hlozaneck⁵, P. Benes¹, B. Caslavská^{1,2}, R. Stepanova⁶, P. Studeny⁷, M.A.R.S. Study Group

¹Department of Optometry and Orthoptics, Medical Faculty, Masaryk University, Brno, Czech Republic,

²Center of Paediatric Ophthalmology, Binocular, Litomyšl, Czech Republic, ³Department of Ophthalmology, 1st Faculty of Medicine, General University Hospital in Prague and Charles University, Prague, Czech Republic,

⁴Department of Pediatric Ophthalmology, Medical Faculty, Masaryk University and Faculty Hospital, Brno, Czech Republic, ⁵Department of Ophthalmology for Children and Adults, 2nd Faculty of Medicine, Charles University and University Hospital Motol, Prague, Czech Republic,

⁶Center of excellence CREATIC, Masaryk University and University Hospital, CZECRIN, Brno, Czech Republic, ⁷Department of Ophthalmology, 3rd Faculty of Medicine, Charles University and University Hospital Kralovske Vinohrady,, Prague, Czech Republic

Introduction: Myopia represents growing problem of contemporary paedo-ophthalmology. Besides benefits of novel therapeutical approaches, it is valuable to assess its side effects.

Objectives: To describe the impact of twelve month local application of 0,02 % and 0,04 % atropine and placebo respectively to static and dynamic features of accommodation and pupillar diameter representing prominent side effects of the myopia progression treatment.

Methods: 127 subjects (6-11 y in randomisation) of the RTC M.A.R.S.: Randomised, double-masked, placebo-controlled multicentric study of efficacy, safety and side effects of highly diluted atropine collyrium (0,02 % and 0,04 %) in slowing the progression of shortsightedness (Eudract No: 2020-002046-16). Static accommodation capability was assessed monocularly and binocularly as near point of accommodation [cm] (NPA; blurred/recovery). Dynamic properties of accommodation represented accommodation facility [number of cycles] (AF, $\pm 1,25$ D flipper; monocularly/binocularly). Photopic and mesopic light adapted (i.e. static) horizontal pupillary diameters [mm] (PD) were measured.

Results: The treatment effects on static PD's were atropine dose related ($p < 0.001$). In photopic and mesopic light conditions resp. has changed from baseline after twelve months of treatment period at placebo; 0,02 %; and 0,04 % atropine groups resp. (baseline: mean(SD) 12 months: mean(SD) p value): 3.71(1.31) 3.88(1.35) 0.141; 3.48(1.23) 4.65(1.52) < 0.001 ; 3,41(1.27) 4.86(1.64) < 0.001 ; 5.97(1.14) 5.92(1.21) > 0.999 ; 5.59(1.34) 6.33(1.14) < 0.001 ; 5.64(1.13) 6.55(0.82) < 0.001 . The treatment effects on NPA were dose non-related in break point and dose related in recovery point ($p = 0.050$) resp. in monocular tests: 6.11(2.06) 6.81(2.17) 0.014; 6.72(2.84) 8.29(2.82) < 0.001 ; 6.54(1.77) 8.44(2.36) < 0.001 ; 7.16(2.28) 7.83(2.41) 0.018; 7.91(3.79) 9.47(3.15) < 0.001 ; 7.30(1.97) 9.71(2.76) < 0.001 . Results of binocular tests paralleled monocular tests. AF did not documented any effect related to the atropine treatment in monocular and binocular conditions respectively.

Conclusions: Twelve months of low-concentration atropine local treatment changed photopic and mesopic PD in expected, dose-related manner. Accommodation capability was diminished in extreme limit (enlarged NPA distances) but not influenced in standard near working distance (unchanged AF tests).

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P-PED-031

Analysis of the effect of visual therapy on improving children 's abnormal visual function with asthenopia

J. Liang¹, P. Lin¹, D. Yao¹, S. Zhang¹

¹Xi'an Children's Hospital, Xi'an, China

Introduction: The optometry Center of the Ophthalmology Department of Xi 'an Children's Hospital in Xi 'an, Shaanxi Province, China, has carried out children's visual training for many years and accumulated relevant training experience. This study retrospectively analyzed the clinical efficacy of children with visual dysfunction accompanied by visual fatigue who underwent visual training at the optometric center of our hospital, and is reported as follows.

Objectives: The clinical efficacy of visual therapy on abnormal visual function with asthenopia in children was analyzed.

Methods: From January 2022 to April 2023, 57 patients (114 eyes) with visual dysfunction and asthenopia aged 8.25 ± 1.94 years old who underwent visual training in the optometry center of Xi 'an Children's Hospital were collected. The power and visual function of patients before and after training were recorded. The visual function mainly includes Worth 4 Dots test to check binocular vision, Von-Graefe method to measure far and near strabismus, gradient method to check AC/A, approach method to measure the proximal point of the collection, negative lens method to measure the amplitude of adjustment, cross-column mirror to measure the adjustment response, and flip beat to measure the adjustment flexibility. The visual function and visual fatigue scale were reviewed at 1 month (4 times) and 3 months (12 times) of training. The results of reexamination before training, 1 month and 3 months after training were compared.

Results: The scores of visual fatigue scale of 31 patients before and 1 month after training were (26.00 ± 6.77) and (19.57 ± 8.90) , respectively, and the difference was statistically significant ($T = 9.45, P < 0.05$). Compared with 1 month before training, near phoria ($Z = -1.374, P = 0.04$), near point of convergence ($Z = -2.549, P = 0.01$), amplitude of accommodation of left and right eyes ($Z = -4.823, -4.801, P < 0.001$), NRA and PRA ($Z = -2.829, -3.461, P < 0.01$), Accommodative Facility of left, right and binocular ($Z = -6.446, -6.305, -4.178, P < 0.001$) were significantly improved. There was no significant difference in the changes of distance phoria and accommodative response after 1 month of training (all $P > 0.05$). There were no significant differences in left and right eyes amplitude of accommodation, NRA, PRA and near-phoria training after 3 months of training compared with 1 month of training (all $P > 0.05$).

Conclusions: Vision therapy can improve binocular vision function effectively in children with visual function and asthenopia, and the symptoms of asthenopia were improved.

P-PED-032

Ocular evaluation in cerebral palsy patients at a tertiary Hospital, Zambia

*M. Musiwa*¹

¹Eye, University Teaching Hospital- Eye Hospital, Lusaka, Zambia

Introduction: Cerebral Palsy is a group of non-progressive disorders of movement or posture. Visual handicap in Cerebral Palsy patients can have a direct impact on psychosocial status. Refractive errors, strabismus, nystagmus, amblyopia and cortical visual impairment are observed in 50 to 90% of patients with Cerebral palsy.

Objectives: The general objective was to evaluate for visual impairment in CP patients at children's hospital, University Teaching Hospital.

Methods: A cross section study was performed on 100 Cerebral Palsy patients attending the neurological clinic at the University Teaching Hospitals, Children's hospital from February to April 2021. The patients were sampled systematically from the register at the neurology clinic and ophthalmological examination was conducted at Eye hospital which is located within the perimeter as the neurology clinic. Measurement of visual acuity, ocular motility, refraction along with the evaluation of the anterior and posterior segments were done.

Results: 49% of the patients seen had ocular abnormalities of which the most common abnormality was refractive error (32.5%) followed by strabismus (21.5%). Esodeviation was more commonly found than exodeviation (65.0% vs 35.0%), and hyperopia was slightly more prevalent than myopia. Astigmatism was the most common refractive error at 40.0%.

Conclusions: Children with Cerebral palsy at the University Teaching Hospitals-children's hospital have a high prevalence of strabismus and refractive errors. Esotropia and hyperopia are the most common ocular abnormalities. All Children with Cerebral Palsy may require a detailed ophthalmologic evaluation.

P-PED-033

Comparison of intravitreal bevacizumab injection and laser photocoagulation for treatment of retinopathy of prematurity

G. Kaur¹, K. Singh¹, H. Kaur², A.S. Arri³, H.S. Arri³

¹Ophthalmology, Regional Institute of Ophthalmology, Government Medical College, Amritsar, India,

²Sri Guru Ramdas University of Health Sciences and Research, Amritsar, India, ³Baba Farid University of Health Sciences and Research, Faridkot, India

Introduction: ROP is vision threatening vaso-proliferative disorder affecting retina of premature infants. It is the leading cause for avoidable childhood blindness worldwide. The **cause** of ROP is multifactorial, but oxygen as well as vascular endothelial growth factor (VEGF) levels perform critical roles in its pathogenesis. **Screening** is mandatory for babies <2000grams body weight and <34 weeks gestational age.

Early treatment of ROP(ETROP) group classified ROP into two types based on the ROP findings

➤ Type 1 ROP needs treatment includes-

- ❑ ZONE 1 WITH PLUS DISEASE, ANY STAGE
- ❑ ZONE 2 WITHOUT PLUS DISEASE, STAGE 3
- ❑ ZONE 2 WITH PLUS DISEASE, STAGE 2 OR 3

➤ TYPE 2 ROP will be kept under observation.

Indication for retinal laser photocoagulation is Type 1 ROP or high risk pre-threshold and for Intravitreal bevacizumab injection (anti VEGF) are aggressive ROP (AROP), non dilating pupil, dense iris neovascularisation, vitreous haemorrhage, unfit or no regression for laser treatment.

Objectives: To compare the treatment outcome of intravitreal bevacizumab and laser photocoagulation in preterm babies with type 1 ROP.

Methods: A Retrospective interventional study was conducted on 194 eyes of 97 premature babies diagnosed with Type 1 ROP between January 2021 to January 2023 to compare the efficacy of Intravitreal Bevacizumab injection (dose-0.625mg/0.025ml) versus frequency doubled Nd:YAG laser ablation with laser frequency set 260-350nm and laser interval duration of 0.15 seconds.

Inclusion criteria: Neonates with less than or equal to 34 weeks of gestation and/or Body weight less than or equal to 2000grams diagnosed with TYPE 1 ROP between January 2021 to January 2023.

Exclusion criteria: Incomplete documentation of disease severity, treatment and post treatment follow up.

Results: **128/150 eyes (85.3%)** showed regression post laser therapy while **29/44 eyes (66%)** post intravitreal bevacizumab injection.

• Retreatment required in Intravitreal Bevacizumab group (34%) was found to be higher than in Laser therapy group (29.3%).

Conclusions: Effective screening of all the premature neonates and timely intervention results in better visual and structural outcome in ROP. Both laser photocoagulation and Intravitreal bevacizumab injection are better therapies for Type 1 ROP with laser being more effective.

P-PED-034

Retinopathy of prematurity screening programme of Neonatal Intensive Care Unit (NICU) Sakaka Aljouf Saudi Arabia

A. Akinfe¹, H. Saber², A. Pando³, F. Akinfe⁴

¹Ophthalmology, Prince Mutaib Bin Abdulazziz Hospital, Sakaka Aljouf, Saudi Arabia, ²Ophthalmology, Prince Mutaib Bin Abdulazziz, Sakaka, Saudi Arabia, ³Ophthalmology, Prince Mutaib Bin Abdulazziz Hospital, Sakaka, Saudi Arabia, ⁴Radiology, Prince Mutaib Bin Abdulazziz Hospital, Sakaka, Saudi Arabia

Introduction: Retinopathy of prematurity (ROP) is a potentially blinding eye disorder that primarily affects premature infants. It occurs when abnormal blood vessels grow and spread throughout the retina, the light-sensitive tissue at the back of the eye. ROP can range from mild with no lasting vision problems to severe with retinal detachment and permanent vision loss. Early detection and treatment are crucial in managing ROP to prevent vision impairment. Regular eye examinations by an ophthalmologist are recommended for premature infants at risk of developing ROP.

Objectives: Broad objectives:

To prevent ROP blindness among Neonates in NICU

Specific objective:

To examine fundus of all neonates in NICU

To classify the ROP diagnosed

To offer interventions to indicated sight threatening cases of ROP

Methods: Descriptive study: target disease is ROP

Period: 1 year study (2019) and weekly/ fortnight screening of eyes till discharge and subsequent screening in the OPD for 1 year

Target location: NICU of Mother and Child Hospital Sakaka Aljouf Kingdom of Saudi Arabia 2019

Human Resources: Consultant Ophthalmologist, Specialist, Resident in Ophthalmology, Ophthalmic Nurse, Neonatal Nurse, ICT team, Consultant Neonatologist, Resident Paediatrician,

Equipment/Materials: cyclopentolate , indirect ophthalmoscope, +20D volk lens, & Ret scan

Inclusion criteria

1. Weight of neonate < 1500g
2. Gestation age/birth < 30 weeks
3. +/- sepsis syndrome
4. +/-Exposure to Oxygen
5. Length of exposure to Oxygen
6. +/-Associated congenital anomaly
7. +/- neovascularisation
8. Classification + plus diseases /staging/ clockwise/zone I, II, and III

Design: descriptive retrospective study

Sample size: 23 neonates/ 46 eyes

Results: The screening of the 23 neonates reveals 2 cases of features Retinopathy of Prematurity (8.69% of Neonate screen requires further close monitoring) 2 eyes (4.35%) had features of ROP. 1 (2.17%) had early ROP and 1 (2.17%) had moderate ROP . 91.30 % of the neonates exposed CPAP / Oxygen. Lowest recorded weight was 986g and highest recorded weight 1486g . 1 case of congenital anomaly, 1 case neonatal septicemia. No Case of Vitreous hemorrhage was recorded, No case of traction all retina detachment was recorded.

Conclusions: With high tech neonatal care and technology retinopathy of prematurity blindness can be prevented among the neonates in the Neonatal Intensive Care Unit.

P-PED-035

Clinical care of Retinopathy of Prematurity (ROP)

*A.G. Mwizero*¹

¹Kibagabaga Level 2 Teaching Hospital, Kigali, Rwanda

Introduction: This case report presents the clinical history and management of a female preterm infant who was born at 28 weeks' gestation, weighing 1020 g at Kibagabaga level 2 teaching hospital. She was diagnosed with respiratory distress syndrome and received continuous positive airway pressure (CPAP) treatment for 26 days. At 26 days of life, the ophthalmology unit came for screening of retinopathy of prematurity due to the very low birth weight, gestational age, and the duration of supplemental oxygen therapy, she was at high risk of developing ROP and therefore eligible for ROP screening.

Objectives: To screen for and to treat retinopathy of prematurity.

Methods: Before fundoscopy, a quick history and general physical examination were performed, we used topical tropicamide 0.5% and phenylephrine 2.5% were instilled every 15 min 4 times, one hour before examination to dilate completely the pupils. Retinal examination was performed at bedside using a binocular indirect ophthalmoscope, a 20-diopter lens, a newborn eyelid speculum, and a pediatric scleral depressor.

Results: Intraretinal hemorrhages were seen in her right eye that also exhibited zone 2 stage 1 pre plus disease and the left eye zone 1 stage 1 pre plus disease. She was treated with one injection of avastin (intravitreal bevacizumab) in both eyes. 1 month after the treatment, the ophthalmology unit came for follow up and found both eyes in zone 2 suggestive of regression of the disease.

Conclusions: In recent study from Egypt, as risk factors of ROP, there was a significant correlation between LBW (≤ 1500 gm), low GA (≤ 32 weeks), and oxygen supplementation through either nasal cannula, CPAP or mechanical ventilation (Raouf Gaber et al., 2021). In Rwanda, every infant with $GA \leq 32$ weeks and $LBW \leq 1500$ g, days on oxygen therapy is eligible for screening for ROP which correlates with the study done in Egypt. In 2015, Wong et al. reported outcomes of a retrospective review of 6 infants (10 eyes) with zone I or posterior zone II ROP who received either intravitreal avastin (4 eyes; dose, 0.625 mg) or intravitreal ranibizumab (6 eyes; dose, 0.25 mg). Recurrence was seen in 5 of 6 (83%) eyes treated with ranibizumab on average 5.9 weeks after treatment. No recurrence was detected in the four eyes treated with avastin. In our study, she was treated with 1 injection of avastin in both eyes and, follow up has been done and there was presence of regression of the disease.

Our report suggests that early screening and treatment can stop the progression of the disease.

P-PED-036

Acute post-traumatic endophthalmitis in children: about a case

D.M. Otsasso Okomiko¹, Z. Hammoumi¹, C.M. Lemine¹, N. Bouhazzama¹, Z. Laftimi¹, G. Daghouj¹, L. El Maaloum¹, B. Allali¹, A. El Kettani¹

¹Pediatric Ophthalmology, Hopital 20 Aout 1953, Casablanca, Morocco

Introduction: Endophthalmitis is a serious intraocular infection that can compromise the functional and anatomical prognosis of the eye. The frequency of endophthalmitis after puncture trauma ranges from 1.3% to 61%. The time it takes to take care of it must be taken into account; thus, in ocular trauma with CEIO, the risk of developing endophthalmitis is 3.5% if the initial surgical repair is performed within 24 hours.

Objectives: The aim of our work is to describe the clinical and therapeutic particularities of a clinical case of acute post-traumatic endophthalmitis in children.

Methods: We report the clinical case of a 3-year-old female child who consulted the ophthalmological emergency department of the 20 August 1953 hospital in Casablanca for a right eye trauma by a metal wire that occurred 72 hours before admission.

Results: This is a 3-year-old female child, correctly vaccinated, who consulted the ophthalmological emergency department of the 20 August 1953 hospital in Casablanca for a right eye trauma by a metal wire that occurred 72 hours before admission.

Clinical examination on admission revealed a visual acuity in the right eye that was difficult to assess, a subconjunctival bulla in the temporal, a clear cornea, a significant anterior chamber inflammation with a cyclitic membrane in the pupillary area. The fundus examination was inaccessible. Examination of the contralateral eye was unremarkable.

X-rays of the orbit did not show any radiopaque foreign bodies.

The initial course of treatment consisted of the emergency search for and suturing of the sclera wound and then the initiation of medical treatment consisting of intravenous antibiotic therapy, local antibiotic therapy, atropine dilation and local corticosteroid therapy.

The evolution was marked on the second day postoperative by the occurrence of hypopion associated with a dense intravitreal organization on ocular ultrasound. The response to this evolution consisted of three intravitreal injections of antibiotics (Ceftazidime + Vancomycin), the last of which was combined with dexametasone. The child also received three conjunctival injections of dexametasone. Under this treatment, the evolution was marked by the complete regression of the hypopion and the thinning of the anterior vitreous.

Conclusions: Ocular endophthalmitis is one of the most feared complications of penetrating eye trauma. Their management must be early and adequate because the occurrence of endophthalmitis compromises the functional and anatomical prognosis of the eye.

P-PED-037

Ocular morbidity in children at Souro Sanou Teaching Hospital of Bobo Dioulasso (Burkina Faso)

L.H.Y.R. Garané¹, J.W. Diallo², K.L.M. Paré², T. Mariam³

¹Surgery/Ophthalmology, Souro Sanou Teaching Hospital, Bobo-Dioulasso, Burkina Faso, ²Surgery, Souro Sanou Teaching Hospital, Bobo Dioulasso, Burkina Faso, ³Souro Sanou Teaching Hospital, Bobo-Dioulasso, Burkina Faso

Introduction: The ocular morbidity of the child represents the whole of the eye affections of children. These eye conditions are a public health problem due to the handicap and the psycho-emotional repercussions they can lead to.

Objectives: In order to provide data necessary for the evaluation and prevention of blindness and for the planning of pediatric eye care services, it seemed important to us to study the ocular morbidity of the child at Souro Sanou Teaching University Hospital of Bobo dioulasso.

Methods: This was a retrospective study in children who consulted in the ophthalmology department aged 0 to 16 years covering a period of five (05) years, going from January 01st, 2015 to December 31th, 2019.

Results: During the period, a total of 940 children were included. They were 540 boys and 400 girls. The mean age was 6.88 years (SD = 4.79 years) with extremes of two days of life and 16 years. The age group from 0 to 5 years was the most representative with 46.06%.

The clinical symptoms involving a consultation were dominated by eye trauma (40.32%), followed by the decline in visual acuity (15.21%), leukocorria (11.17%), and exophthalmos (5.85%).

The main pathologies were represented by eye trauma and their consequences (30.74%), followed by cataracts (12.87%), ametropia (12.45%) and infectious eye diseases (11.91%). Ocular tumors were noticed for 8.93%, so glaucoma and strabism were noticed for respectively 4.46% and 2.13% of children. They lead too serious visual impairment. Among children, 44% of them were too young for the evaluation of visual acuity. But for the others (n=429) binocular blindness and low vision reached 11.19% (n=48) and 10.48% (n=45) of children, respectively. Monocular blindness (n=123) was mainly due to eye trauma (82.11%), followed by congenital cataract (3.25%) and retinoblastoma (2.44%). Binocular blindness (n=48) were caused by congenital cataract (60.41%), glaucoma (10.41%) and ametropia (myopia disease = 8.32%)

Conclusions: This study showed that the pathology of the child is very diverse in our environment. It's for the most preventable or treatable, but nevertheless responsible for a large part of visual impairment by low vision and blindness it caused.

Key words: Children - Ocular morbidity - Eye trauma - developing countries

P-PED-038

Goniotomy is a safe and effective treatment for glaucoma secondary to uveitis in childhood

C. Lyons¹, T. Ewing¹, S. Armarnik¹, N. Correa¹

¹Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: Childhood glaucoma secondary to uveitis remains a challenging problem; Many surgeons opt for Seton surgery as a primary approach.

Objectives: To evaluate the long-term success of goniotomy as the treatment in children at our institution with glaucoma secondary to chronic uveitis.

Methods: Retrospective chart review of all children who underwent goniotomy surgery at our institution between 2001 and 2023, who also had a diagnosis of chronic uveitis. Post operative success was defined as IOP greater than or equal to 6, but less than or equal to 21 mmHg after 1 or 2 goniotomies, without the need for further surgical intervention or sight threatening complication.

Results: 31 eyes of 21 patients were included. Mean age at first goniotomy was 10.25 years. Uveitis was diagnosed a mean of 4.7 years prior to goniotomy. Patients were followed up after goniotomy for an average of 6.8 years (range 1.1 – 15.6 years).

Mean pre-operative IOP at the time of waitlisting for surgery was 33.6mmHg. Children were taking an average of 3.52 medications, 70.9% were requiring acetazolamide for IOP control. 43% had Juvenile Idiopathic Arthritis and 33% Idiopathic Anterior Uveitis. Post-operatively, mean IOP was 15.9, 15.2 and 15.6mmHg at 1, 5 and 8 years respectively. At most recent follow-up, 77.4% were deemed a surgical success. 21% of these had required a second goniotomy to achieve this, and 21% required antiglaucoma drops to maintain IOP \leq 21mmHg. Mean cumulative probability of success was 92% at 1 year, 83% at 5 years and 66% at 8 years. 94% had a visual acuity of better than or equal to 20/40 at most recent follow-up. Other than a small post-operative hyphema which was almost universal, there were no major complications.

Conclusions: Goniotomy is both safe and is effective in the long term management of glaucoma in children with uveitis. As a quick, simple and effective procedure, we feel it should be considered as first surgical intervention for these children, if the angle is open.

P-PED-039

Evaluation of macular neurovasculature and choroidal blood flow following inferior oblique myectomy

Z. Hashemi Javaheri¹, A.A. Sabermoghaddam¹, M. Abrishami¹, M.Y. Kiarudi¹, M. Motamed Shariati¹
¹Eye Research center, Mashhad University of Medical Sciences, Mashhad, Iran, Islamic Republic of

Introduction: Regarding the proximity of the IO insertion to the macula surgical manipulation could potentially affect the macular neurovasculature. Data on the macular blood flow changes after IO myectomy remain unclear.

Objectives: This study aimed to evaluate the short-term effects of inferior oblique myectomy on the retinal neurovasculature, choroidal thickness, and choroidal vascularity index at the macula.

Methods: Patients over five years old who are candidates for inferior oblique muscle myectomy surgery participated in the study. Subjects with any systemic and ocular disease that could affect the macular neurovasculature were not included in the study. After recording demographic data, including age and gender, and conducting a complete ophthalmic examination, macular optical coherence tomography (OCT), enhanced depth imaging-OCT (EDI-OCT), and OCT angiography (OCTA) imaging (AngioVue software (V.2017.1.0.151; Optovue, Fremont, CA, USA)) were performed before (one day to one week) and in the specific time intervals (one week, one month and three months) after the surgery for all participants.

Results: Eighteen patients (13 male, and 5 female) who underwent IO muscle myectomy, with a mean \pm standard deviation (SD) age of 24.22 ± 18.14 were included in this study. The baseline mean \pm standard deviation of subfoveal choroidal luminal area (SFCLA) and subfoveal total choroidal area (SFTCA) were $0.390 \pm 0.03 \text{ mm}^2$ and $0.539 \pm 0.04 \text{ mm}^2$, respectively. The changing pattern of the sub-foveal choroidal vascularity index (SFCVI) and SFCLA was statistically significant ($p= 0.013$, $p= 0.035$, respectively).

Conclusions: IO myectomy can lead to changes in choroid hemodynamics in the short term. However, these changes seem to be temporary.

P-PED-040

Utility of the Red Reflex Test for detecting ophthalmic pathology in the pediatric population

C. Sano¹, M. Manrique¹, I. Pinnell¹, W. Madigan¹, S. Jain¹

¹Ophthalmology, Children's National Hospital, Washington, DC, United States

Introduction: The red reflex screening test (RRT) is heavily relied upon to detect ocular pathologies in the pediatric population. Some studies report limitations in accurately detecting posterior segment pathologies (PSP). In this study we compared the efficacy of the RRT to identify anterior segment pathologies (ASP) compared to PSP and evaluated the role of ambient illumination and pharmacological dilation on the results of the RRT.

Objectives: (1) Compare RRT detection of ASP compared to PSP as well as (2) determine impact of ambient illumination and (3) pharmacological dilation on RRT efficacy.

Methods: After IRB approval, ophthalmology residents and fellows at our tertiary care institution blinded to patient diagnosis performed a standardized RRT both in standard illumination and in the dark as well as before and after pharmacologic pupil dilation. Following the RRT, a retina specialist blinded to the RRT results examined the patient to identify any ocular pathologies. The findings of this prospective trial were analyzed for efficacy of the RRT and to compare our variables of interest.

Results: A total of 84 patients (168 eyes) with a mean age of 9.0 ± 5.5 years were included in the analysis. 90 eyes (53.6%) had evidence of a PSP, while 16 eyes had findings consistent with ASP (9.5%). Aligning with literature reports, the RRT showed higher sensitivity and negative predictive value (NPV) for ASP compared to PSP which had higher specificity and positive predictive value (PPV). Additionally, ambient lighting had no significant effect on the RRT results while dilation significantly increased the accuracy of the RRT results for both ASP and PSP.

Conclusions: Our results suggest although the RRT is effective in detecting ASP, it is not acceptable for detecting PSP in children. Pupil dilation should be used to increase the accuracy of the RRT but is often unrealistic in the primary care setting. Due to the RRT's usage by pediatric providers as a screening tool, communicating the limitations of the RRT in PSP detection and without dilation is paramount.

P-PED-041

The incidence and risk factors of retinopathy of prematurity in South Korea: a nationwide cohort study

E.H. Jung¹, G.Y. Moon¹

¹Ophthalmology, Eulji University/Nowon Eulji Medical Center, Seoul, Korea, Republic of

Introduction: Retinopathy of prematurity (ROP) is a major treatable cause of childhood blindness. Thus, epidemiological investigations are necessary for detecting and preventing ROP. Determining risk factors for ROP are also essential to improve screening methods.

Objectives: We aimed to investigate the incidence and risk factors of ROP in Korea.

Methods: The National Health Insurance Service (NHIS) covers almost all Koreans. Furthermore, the National Health Screening Program for Infants and Children (NHSPIC) is a government-run, health-screening program for children aged <6 years. We used the NHIS-Infants and Children's Health Screening cohort database to evaluate the incidence of preterm infants and ROP. The database contains data on 84005 participants, drawn from 5% of the NHSPIC survey on participants born annually during 2008–2012. Sociodemographic factors and systemic diseases were assessed as potential risk factors for ROP.

Results: We identified 2615 premature infants (3.11%); 846 of them had ROP (cumulative incidence: 32.4%). Although preterm births increased annually in 2008–2012, the ROP incidence in preterm infants did not increase by the birth year. Twenty patients (2.4%) with ROP underwent laser photocoagulation or surgery. Extremely low birth weight was a high risk factor (odds ratio [OR] = 49.86, $p < 0.001$). Moreover, chorioamnionitis (OR = 2.77, $p = 0.028$), respiratory distress syndrome (OR = 4.09, $p < 0.001$), apnea (OR = 1.59, $p = 0.008$), anemia (OR = 2.41, $p < 0.001$), and intraventricular hemorrhage (OR = 2.34, $p < 0.001$) were found to be risk factors for ROP.

Conclusions: The incidence of premature babies increased between 2008 and 2012. However, the overall incidence of ROP among premature infants remained unchanged by birth year. Our findings revealed the roles of birth weight, respiratory conditions, anemia, and intraventricular hemorrhage in ROP.

P-PED-042

Assessment of the validity of "Squint ASSIST" for measuring angle of deviation in horizontal strabismus patients

S. Suwannaraj¹, N. Srisanpang¹, P. Wongwai¹

¹Ophthalmology, Faculty of Medicine, Srinagarind Hospital, Khonkaen University, Khonkaen, Thailand

Introduction: Accurate assessment of the angle of deviation is essential for appropriate diagnosis, treatment planning, and monitoring of patients with strabismus. Recently, corneal light reflex deviation from face photography were evaluated for objective angle measurement, including the development of "Squint ASSIST" (Squint Automatic Strabismus Sizing using Image Sensing Technology). This program utilizes smartphone-based image and evaluated corneal light reflex deviation. However, the validity and reliability of "Squint ASSIST" in comparison to traditional methods and expert clinical evaluation remain to be fully elucidated.

Objectives: To evaluate the validity of "Squint ASSIST" for accurately measuring the angle of deviation in patients with horizontal strabismus.

Methods: A prospective cross-sectional study was conducted involving 136 patients diagnosed with horizontal strabismus. Face photographs were captured using a smartphone camera equipped with flash by two trained photographers. Two methods were employed to assess the angle of deviation: the first method compared the corneal light reflex deviation between both eyes, while the second method compared the corneal light reflex deviation within the same eye (both in primary position and when deviated). Bland-Altman analysis and Pearson correlation were utilized to evaluate agreement and correlation between angles measured by "Squint ASSIST" and an experienced pediatric ophthalmologist.

Results: A total of 1,384 photographs were analyzed. Bland-Altman analysis shows the Intra-observer repeatability and Inter-observer reproducibility of both photographers in the first and second methods are within acceptable limits. The mean difference of -1.23 (-3.68,1.22) PD in the first method and -2.00 (-4.79, 0.79) PD in the second method were revealed between angles measured by "Squint ASSIST" and the experienced pediatric ophthalmologist. The 95% limits of agreement ranged from 26.27 PD to -29.23 PD in the first method and from 26.14 PD to -30.14 PD in the second method. Pearson correlation demonstrated a very strong and significant association between angles measured by "Squint ASSIST" and those determined by the experienced pediatric ophthalmologist in both the first method ($r = 0.962$, $p < 0.001$) and the second method ($r = 0.955$, $p < 0.001$).

Conclusions: "Squint ASSIST" exhibits feasibility for measuring strabismic angles in term of good repeatability and reproducibility. Improving accuracy holds significant potential to benefit in real clinical settings.

P-PED-043

Pediatric cataract surgery with primary intra-ocular lens implantation in less than two years of age in Eastern Nepal

*P. Joshi*¹

¹Pediatric Ophthalmology and Strabismus, Mechi Eye Hospital, Birtamod-3, Jhapa, Mechi, Koshi Province, Nepal

Introduction: Despite improvements in surgical techniques and understanding, there is no consensus among pediatric ophthalmologists regarding primary intra-ocular lens (IOL) implantation in less than 2 years of age. In Nepal, most surgeons prefer to do a two-step surgery, First step - lens aspiration with primary posterior capsulotomy (PPC) and anterior vitrectomy (AV); Second step - IOL implantation at a later date.

Objectives: To study the profile and outcome of Pediatric Cataract Surgery with primary IOL implantation in less than two years of age in Eastern Nepal.

Methods: This is a Retrospective study. The pediatric cataract surgery with IOL implantation done in less than 2 years of age were reviewed from August 2015 to December 2023. Children aged less than two years, with cataract, and eyes with axial length > 17.50 mm were included. Traumatic cataract, Microcornea /microphthalmia, Congenital Glaucoma, Corneal abnormality, and any ocular comorbidity were excluded. All the cases underwent lens aspiration with PPC with AV with posterior chamber IOL implantation. Outcome measures were Clarity of the visual axis, Postoperative inflammation, Fixation pattern, and Retinoscopy.

Results: Five hundred thirty-three (533) eyes of 248 less than two years old babies were operated for cataract surgery. 75 eyes were left aphakic, underwent only lens aspiration with PPC with AV. Four hundred fifty-nine (459) eyes of 198 babies underwent primary IOL implantation with PPC with AV

Less than 1 year of age accounted for 239 eyes (52%) and 220 eyes were 1 to 2 years of age. The mean age was 11.6±7 (2 to 24) months.

Follow up at Six weeks – 314 eyes (68.4%). The visual axis was clear in all cases and were orthophoric.

Follow up at 2 years - 216 eyes (47.1%). Visual Acuity Opacification in 9 cases needed vitrectomy, 3 cases needed IOL redialing, 1 case of IOL drop, and Posterior Synechia in 20 cases. The occurrence of complications in the less than one year and more than 2 years age groups was not statistically significant.

Conclusions: Primary IOL implantation in less than two years of age is favorable. Primary IOL implantation, and PPC with AV is safe and effective in less than two years of age.

P-PED-044

Uncorrected refractive error rates in school-aged children in communities facing financial disparity

M.R. Gemae¹, D. Jinapriya^{1,2}, Y.N.J. Strube^{1,2}, E. Nzekwu³

¹Queen's University, Kingston, Canada, ²Department of Ophthalmology, Hotel Dieu Hospital, Kingston, Canada, ³Nation's Vision, Calgary, Canada

Introduction: Uncorrected refractive error (URE) is the leading cause of childhood visual impairment worldwide. There is a paucity of data reporting URE prevalence in Canada, especially among priority populations, defined as communities facing health inequity and financial disparity.

Objectives: This study investigated the prevalence of URE in priority schoolchildren through a novel in-school eyecare program in Calgary.

Methods: During the 2019-2020 academic year, 34 eligible schools in the Calgary Catholic School District (CCSD) and Calgary Board of Education (CBE) participated in an in-school comprehensive eyecare program offered to children from kindergarten to grade 9. Informed consent was obtained from parents/guardians to opt-in the program. Children who had undergone an eye exam within the past year were excluded. All eligible, consented students underwent a comprehensive eye exam performed by a licensed optometrist. Examinations were performed on-site and included visual acuity, intraocular pressure, auto-refraction, slit lamp examination, extraocular motility and alignment, pupillary examinations, confrontational visual field, and color vision tests. "Abnormal eye examinations" were defined as abnormal findings on any of the listed examinations, including complex findings requiring referral to a pediatric ophthalmologist. Children received low-cost or free eyewear upon parental approval, fitted and dispensed by a licensed optician. Follow-up was conducted to evaluate eyewear acquisition from either the in-school eyecare program or other optical stores.

Results: 2891 children participated in the program (1201 from CBE, 1690 from CCSD). Between school districts, the rate of "abnormal" comprehensive eye examinations ranged from 29-37%, with 8-9% of children requiring a referral to pediatric ophthalmology. The rate of "abnormal" eye examinations increased with age, with the highest rates observed in children in grades 8 and 9 across both districts. The prevalence of URE was 25-32% across school districts. 90% of students requiring spectacles were fitted with eyewear by the end of the school year.

Conclusions: This study highlights a concerning prevalence of URE among schoolchildren in communities facing financial disparity in Calgary, ranging from 25 to 32%. This rate is much higher than previously reported in other regions of Canada. These results emphasize the importance of innovative community-tailored initiatives to reduce the impact of URE on childhood development, academic performance, and mental health.

P-PED-045

Patterns of eye diseases in children visiting university of gondar tertiary eye care and training center, Gondar Ethiopia

*A. Kassahun*¹

¹Ophthalmology, University of Gondar, Gondar, Ethiopia

Introduction: Pediatric ocular diseases are important because of their impact on child's development, education, future work, opportunities and quality of life.

Objectives: To determine patterns of eye diseases in children visiting University of Gondar tertiary eye care and training center, Gondar, Ethiopia.

Methods: Hospital based prospective study carried out at University of Gondar tertiary eye care and training center from August 1st 2018 – July 31st 2019.

Results: Among 829 patients, 455 (54.89%) were males. The most frequent presenting age group was ≤ 5 year, 491 (59.23%). Most patients were from urban area 498 (60.07%). Among children above age of 5 year, 318 (94.1%) had presenting visual acuity of $\geq 6/18$ in better eye. Moderate and severe visual impairment were found in 14 (4.14%) and 2 (0.59%) children respectively. Blindness presenting VA $< 3/60$ in the better eye was found in 4 children. Bacterial conjunctivitis was the most frequently found ocular disease accounted for 171 (20.63%) of patients, 146 were in age group ≤ 5 year. Vernal keratoconjunctivitis was the second most commonly encountered ocular disorder presented in 147 (17.73%) patients, 89 (60.54%) were males. Seasonal allergic conjunctivitis was found in 107 (12.91%) patients, 52 (48.5%) were in age group ≤ 5 year. Post-traumatic corneal tear and post-traumatic cataract were found in 38 (4.59%) and 32 (3.86%) patients with male preponderance 68.42% and 81.25% respectively. Twenty six (3.14 %) patients presented with strabismus. Refractive error was found in 15 (1.81%) patients.

Conclusions: Most of the study participants were males and the most common age was ≤ 5 year. Most of the ocular morbidities in children during the study year were either treatable or preventable with infectious and allergic conjunctivitis accounting for majority of the cases. Routine refraction of children is recommended.

P-PED-046

Assay of TORCH profile in patients with congenital cataract aged 0-4 years at a tertiary eye hospital

T. Kanumuri¹, A Krishna Kishore¹, Y Raman¹, D. Qureshi¹

¹Ophthalmology, Osmania Medical College, Hyderabad, India

Introduction: Congenital cataract refers to the opacification of crystalline lens at birth. TORCH agents have been recognised as one of the potential causative agents of congenital cataract.

Objectives: To evaluate the TORCH profile (Toxoplasma gondi. , Rubella, Cytomegalovirus, Herpes simplex virus1 & 2) of all congenital cataract patients excluding traumatic cataracts aged 0-4 years over a period 12 months at a tertiary eye hospital.

Methods: In this cross-sectional study done for 12mo, all congenital cataract patients aged 0-4yrs excluding traumatic cataracts were assayed quantitatively and qualitatively at tertiary eye hospital.

Results: Out of 49 congenital cataract patients included in the study, 43(87.75%) were seropositive for TORCH profile. 7 out of 49 presented unilaterally while 42 were bilaterally cataractous. 37 out of 43 seropositive patients (86.04%) were IgG +ve, 6 out of 43(13.95%) were positive for both IgM& IgG and none were IgM positive. 11 out of 43(25.58%) were CMV+ve alone, 5 of 43(11.62%) were rubella +ve , 1 out of 43(2.32%) was HSV1 +ve while 25 of 43(58.13%) were +ve in combinations.

Conclusions: The positivity rate of TORCH profile is high in congenital cataract patients. Hence prior testing and its evaluation needs to be done so that the clinician can be vigilant and identify the associated syndromic presentation at the earliest.

P-PED-047

comparison of accommodative amplitude and lag in the fellow eyes of patients with unilateral amblyopia and healthy eyes

A. Gheibi¹, A. Cheraghpour¹, E. Jafarzadehpour², Q. Sattar Abed³, B. Masoomian^{1,4}, M. Khorrami-Nejad^{1,3}

¹Translational Ophthalmology Research Center, Farabi Eye Hospital, Tehran, Iran, Islamic Republic of,

²School of Rehabilitation, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of,

³School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran, Islamic Republic of,

⁴Wills Eye Hospital, Thomas Jefferson University, Philadelphia, United States

Introduction: Most studies have primarily focused on the amblyopic eye, leading to a lack of evidence regarding potential differences between the fellow eyes of patients with unilateral strabismic amblyopia and normal healthy eyes.

Objectives: To compare accommodation function by measuring accommodative amplitude and lag of accommodation in the fellow eyes of patients with mild, moderate, and severe unilateral strabismic amblyopia versus healthy controls.

Methods: In this retrospective study, 20 patients with unilateral strabismic amblyopia (10 mild, 6 moderate, 4 severe) and 30 healthy controls were included. All patient with collections from Farabi eye hospital in 2023. Spherical equivalent refractive error, accommodative amplitude, and accommodative lag were measured in all fellow eyes and compared between groups.

Results: The fellow eyes of patients with mild amblyopia showed significantly greater hyperopia versus controls (mean difference 1.31D, $P=0.04$). Accommodative lag was significantly higher in severe amblyopia fellow eyes compared to mild/moderate amblyopia and controls (mean difference 0.64D, $P=0.001$). No difference in accommodative amplitude was found between groups.

Conclusions: Mild unilateral strabismic amblyopia was associated with a hyperopic refractive shift in the fellow eye, while severe amblyopia resulted in reduced accommodation accuracy. Accommodative amplitude was unchanged across severities. These results reveal previously unrecognized impacts of unilateral strabismic amblyopia severity on fellow eye refractive and accommodative function. Also, the results provide unique insights into subtle fellow eye effects that could influence management.

P-PED-048

Paediatric optic nerve glioma: a 10-year Scottish retrospective study and analysis of outcomes

Y.T. Koh^{1,2,3}, K.L.J. Wu⁴, T.K.J. Chan^{1,2}

¹Ophthalmology, Royal Hospital for Children & Young People, NHS Lothian, Edinburgh, United Kingdom, ²The Princess Alexandra Eye Pavilion, NHS Lothian, Edinburgh, United Kingdom, ³Ophthalmology, Tan Tock Seng Hospital, National Healthcare Group, Singapore, Singapore, ⁴College of Medicine and Veterinary Medicine, University of Edinburgh, Edinburgh, United Kingdom

Introduction: Optic nerve gliomas are rare tumors with a variable and unpredictable course. There has been no study specific to the Scottish population thus far.

Objectives: We describe our experience over ten years in a single institutional Scottish tertiary center of a cohort of children with isolated optic nerve glioma with a focus on demographics, clinical presentation or features, visual outcomes and treatment.

Methods: Consecutive case series. A retrospective review of medical records was performed for all patients with optic pathway glioma treated by the Division of Oncology in a tertiary center between Jan 2013 – Dec 2023. Demographic, clinical, surgical, radiologic, pathologic, and ophthalmologic data were collected.

Results: Twenty-one children were analysed. The median age of diagnosis was 41 months (range 5 months – 15 years 1 month). Approximately half (57.1%, n=12/21) of our patient population was diagnosed neurofibromatosis type 1 (NF1). Presentation was varied, 14.3% (n=3/21) were asymptomatic, 23.8% had neurological symptoms (n=5/21), 33.3% (n=7/21) had ophthalmic symptoms, 28.6% (n=6/21) had a combination of ophthalmic and neurological symptoms, with 1 patient having additional endocrinological symptom of precocious puberty. Approximately two-thirds of patients had optic nerve glioma involving the chiasm (66.7%, n= 14/21), with 4 cases being isolated to the optic chiasm alone. 23.8% (n=5/21) had optic nerve glioma isolated to the optic nerve, with 1 being bilateral and 9.5% (n=2/21) had multifocal glioma. Diagnosis was based on typical neuroradiologic findings, and 8 patients had histologic confirmation of their tumors. Approximately half (42.9%, n=9/21) had good vision on presentation. Of these 9 patients, 7 had NF-1. No patient with good vision on presentation lost vision over the course of follow-up. 42.9% (n=9/21) patients were observed. 42.9% (n=9/21) had chemotherapy alone, 4.7% (n=1/21) had surgical resection alone and 9.5% (n=2/21) had combined chemotherapy and surgical resection. Majority of NF-1 patients were observed (66.7%, n=8/12). Only 1 child from the non-NF1 group was observed, with 55.6% (n=5/9) needing chemotherapy, 22.2% (n=2/9) needing chemotherapy and surgery and 11.1% (n=1/9) needing surgery. 1 child from the study died 24 months from diagnosis and initiation of treatment.

Conclusions: NF1-related optic nerve gliomas were less often treated and were associated with a lower probability of progression.

P-PED-049

Assessment of optic disc morphological characteristics of highly myopic eyes in Chinese school-aged children

H. Wang¹, Y. Tao²

¹Department of Ophthalmology, Department of Ophthalmology, Beijing Chaoyang Hospital, Capital Medical University, Beijing, China, ²Beijing Chaoyang Hospital, Capital Medical University, Beijing, China

Introduction:

The morphological characteristics of the optic nerve head (ONH) in myopic eyes are a clinically significant issue, especially for high myopia in school-aged children, and this can be monitored using optical coherence tomography.

Objectives:

The purpose of this study is to investigate the morphological characteristics of ONH, and the factors associated with peripapillary choroidal thickness in Chinese school-aged high myopia children.

Methods:

A total of 48 patients, possessing 48 high myopia eyes and 48 contralateral low myopia eyes were enrolled. The ONH characteristic parameters, including peripapillary retinal nerve fibre layer thickness, peripapillary choroidal thickness, peripapillary choroidal blood flow density, Bruch's membrane opening (BMO) characteristic parameters were measured on optical coherence tomography scans.

Results:

Eyes with high myopia had a larger disc size, higher peripapillary atrophy area proportion, larger peripapillary atrophy area, larger BMO minimum rim width, lower peripapillary choroidal thickness compared with those contralateral low myopia eyes (all $P < 0.001$). The BMO distance and border length were longer, and border tissue angle was smaller in the high myopia eyes. The multivariate regression analysis revealed that border length, axial length, and border tissue angle were independently associated with peripapillary choroidal thickness (all $P < 0.05$); axial length was associated with peripapillary retinal nerve fibre layer thickness ($P = 0.007$).

Conclusions:

The peripapillary atrophy area, BMO area, border length, BMO distance, and BMO minimum rim width increased, but peripapillary choroidal thickness, retinal nerve fibre layer thickness decreased with axial elongation of the globe in young myopia children. Longer axial length and border length were positively correlated with lower peripapillary choroidal thickness, and a smaller border tissue angle was positively correlated with lower peripapillary choroidal thickness were found in this study. Monitoring of border length and border tissue angle is essential in the early stages of myopia in children.

P-PED-051

Multimodal imaging assisted phaco-aspiration in pediatric cataracts

S. Khokhar¹, A. Pujari¹

¹Ophthalmology, AIIMS, New Delhi, India

Introduction: To describe the key features of multimodal imaging in pediatric cataracts which hint towards the need for phaco-aspiration.

Objectives: To describe the key features of multimodal imaging in pediatric cataracts which hint towards the need for phaco-aspiration.

Methods: As a routine requirement, we perform ultrasound biomicroscopy (UBM) in all cases in the pre-operative/intraoperative period. It delineates the cross-sectional details along the lens nucleus, cortex, capsule, and the retro-iris space. In eight cases, we noted a unique pattern of antero-posteriorly shrunken lens with intralenticular membranous folding's. The membrane was hyperechoic and continuous. During surgery, the microscope integrated intra-operative optical coherence tomography revealed a mulberry morphology of the lens core which was resistant to multiple hydro-delineation.

Results: The cataracts with this kind of morphology on UBM and i-OCT were not amenable to routine bi-manual aspiration, and hence a quick phaco-aspiration was essential. These multi-modal imaging features were initially noted in two cases, and later, with subsequent implementation, the imaging predicated the need for phaco-aspiration in another six cases.

Conclusions: In pediatric cataracts, the multimodal imaging (UBM, and i-OCT) approach has the potential to hint towards the need for phaco-aspiration in certain cases. This minimizes the surgical trauma and helps in achieving the predictable outcomes.

P-PED-052

Balance sensitivity and specificity when referring for amblyopic risk factors

J. Vaughan¹, T. Dale¹

¹Ophthalmology, Oregon Health & Science University, Portland, United States

Introduction: A vision screening program for children should balance sensitivity and specificity when referring for amblyopic risk factors. Using too specific criteria will miss many young children during the critical window of treatment for amblyopia. A program using a very sensitive referral criteria will over refer many who do not need treatment.

Objectives: In search of a balanced vision screening referral criteria, the following referral criteria will be examined: Anisometropia: 1.0D, Astigmatism: 2.25D, Hyperopia: 2.5D, Myopia: 2.25D when screening children 36-72 months for amblyopic risk factors.

Methods: Approval was obtained from the Oregon Health & Science University Institutional Review Board to collect and review data on vision screenings between 2015 and 2020. The screenings were conducted on Head Start children 36-72 months of age by trained screening staff using a PlusoptiX S12 photoscreener. The device performed binocular readings measuring for refraction, pupil diameter, pupil distance, and symmetry of corneal reflexes summarizing results with a pass or refer. To measure sensitivity and specificity, both passes and refers were offered free comprehensive dilated eye exams. Pediatric ophthalmologists and optometrists performed onsite eye exams at Head Start locations to validate the vision screening results. If treatment was necessary, children were given a prescription for glasses or a referral to specialist. Glasses were dispensed within 2 weeks directly to the children.

Results: A total of 342 eye exams were performed at different Head Start locations. A comprehensive eye exam was performed on 217 passes and 125 refers. Medical records from dilated eye exams were analyzed. Based on treatment prescribed by the eye doctors, there were 95/125 correct vision screening refers based on diagnosis of refractive error requiring treatment. There were 194/217 correct passes based on diagnosis of normal. The referral criteria indicated a sensitivity of 81% CI [.72, .87] and a specificity of 88% CI [.82, .91] based on eye exam treatment.

Conclusions: An overall accuracy of 85% is a good compromise between referring too many children who do not need treatment and missing those who do. Because the overall accuracy is not 100%, children should be screened every year while their visual system is developing. Many parents do not understand the importance of early detection for amblyopia, so a robust follow up program needs be in place to ensure those referred receive the treatment they need.

P-PED-053

Visual outcome in strabismic and non-strabismic infants post cataract surgery

J. Akambase¹, M. Barkley¹, R. Sharma¹, A. Webber¹, S. Dai¹

¹Ophthalmology Department, Queensland Children's Hospital, Brisbane, Australia

Introduction: Strabismus is more common in children post cataract surgery when compared to the general paediatric population. It occurs more frequently in patients with unilateral than bilateral cataract. The association between the prevalence of strabismus and visual outcomes post paediatric cataract surgery is still not fully understood.

Objectives: To assess the visual outcome in children who developed strabismus post cataract surgery.

Methods: A single centre retrospective chart review of all children aged less than 12 months who underwent lensectomy from 1st January 2014 to 1st January 2021. Cases were identified from theatre coding and electronic medical records. Cases with strabismus prior to cataract surgery were excluded. The selected cases were grouped into those that developed strabismus after the cataract surgery and those that never developed strabismus.

Results: Seventy-five (75) children (114 aphakic eyes) were included, 36 (48%) had unilateral cataract surgery while 39 (52%) had bilateral. The mean age at time of cataract surgery was 3.0 ± 2.5 months (range 1 – 10 months). The mean follow-up period was 41.2 ± 22.8 months (range 2 – 72 months). Nineteen out of 75 patients (25%) developed strabismus. The post-operative best corrected visual acuity (BCVA) was significantly different ($p = 0.02$; < 0.05) between the unilateral and bilateral lensectomy groups with average of $0.4 \log\text{MAR} \pm 0.3$ for the bilateral group and $0.7 \log\text{MAR} \pm 0.5$ for the unilateral group. The BCVA was similar in the strabismic and non-strabismic ($p = 0.22$; < 0.05) aphakic eye. The mean interocular difference in visual acuity between eyes in the non-strabismic group is $0.32 \log\text{MAR} \pm 0.58$ and in strabismic group is $0.97 \log\text{MAR} \pm 0.81$, and this difference is statistically significant.

Conclusions: Children undergoing cataract surgery, especially at an early age, should be followed up carefully for the development of strabismus. Understanding the interocular visual acuity of infants and frequency of occurrence of strabismus post cataract surgery is of great essence as this will create awareness for them to be followed up carefully for the development of strabismus and early treatment of amblyopia to prevent permanent vision loss. Further research is needed to better understand the mechanism of vision loss in the strabismus population.

P-PED-054

Ophthalmologic changes before and after early minimally invasive endoscopic craniosynostosis surgery

J. Guido¹, V. Radenovich², D. Jimenez³, G. Olivas², Z. Makoshi³, D. Yates³

¹Texas Tech University Health Science Center El Paso Paul Foster School of Medicine, El Paso, United States, ²Children's Eye Center, El Paso, United States, ³El Paso Children's Hospital, El Paso, United States

Introduction: Craniosynostosis is a disorder involving premature closure of cranial sutures. This study analyzes the ophthalmic changes in infants with non-syndromic craniosynostosis before and after minimally invasive endoscopic surgery.

Objectives: To analyze early ophthalmic changes following endoscopic surgery in infants with non-syndromic craniosynostosis. We hypothesize that early intervention in craniosynostosis improves concurrent ophthalmic abnormalities.

Methods: This is a prospective cohort study to evaluate ophthalmic parameters in infants between the ages 0 and 12 months with non-syndromic craniosynostosis before and after surgery since 2019 by a single craniofacial team. 116 patients underwent complete eye examination with retina photos. 72 patients returned for postoperative examination. Ophthalmic parameters include optic nerve color, presence of disc edema, tortuosity, and dilatation of vessels in the retina. We also examined astigmatism and strabismus.

Results: Of the 116 patients measured preoperatively, 51 patients had metopic craniosynostosis, 38 had sagittal, 23 had coronal, and 4 had lambdoid craniosynostosis. Initially, 62 patients had dilatation of vessels, 53 had disc edema, 28 had tortuous vessels, and 11 had abnormal coloration of the optic nerve. 72 patients had at least one follow up evaluation, in which all ocular parameters measured improved across all age groups. This trend was most noticeable when patients underwent surgery before the age of 7 months, with improvement of 66.18% of preoperative ophthalmic abnormalities in patients aged 0-3 months, 69.84% in patients aged 4-6 months, and 43.48% in patients aged 7 months or more. Preoperative astigmatism was found in 89.74% of sagittal patients, 82.61% of coronal patients, 75% of lambdoid patients, and 74.51% of metopic patients. Preoperative strabismus was found in 17.39% coronal patients, 9.80% metopic patients, 7.69% sagittal patients, and no lambdoid patients.

Conclusions: These results show early intervention for craniosynostosis improves abnormal ophthalmic findings across all observed categories and age groups. Endoscopic craniosynostosis surgery is minimally invasive and improves visual outcomes and quality of life. Future directions include comparison to patients who elected not to get surgery and longitudinal evaluation of the measured ophthalmic parameters compared to controls.

P-PED-055

Paediatric vision testing – engaging with new technologies

S. Cornelius¹, A. Vithlani²

¹Ophthalmology, Great Ormond Street Hospital foundation Trust, London, United Kingdom, ²Great Ormond Street Hospital foundation Trust, London, United Kingdom

Introduction: To describe the introduction of new vision testing technologies, OKN-VA App and Peekaboo Vision App, at a tertiary referral Paediatric Centre, Great Ormond Street Hospital.

Objectives: To assess how effective these new technologies are at engaging children/young people including patient groups who do not easily manage formal measurement of vision.

Methods: The OKN-VA device is a novel Visual Acuity test which uses optokinetic detection technology (Threshold Visual Acuity Test, Objective Acuity, Ltd, Auckland, NZ). It was introduced at GOSH in June 2023 as part of the RegenxBIO (RGX) Research Trial, measuring the VA of children/young people with neuronal ceroid lipofuscinosis type 2 (CLN2), Batten disease.

The Peekaboo Vision device is a digital Forced Choice Preferential Looking (FCPL) test for use on an IPAD which has been validated against traditional card-based standards.

A case note review is being undertaken of patients tested with either the OKN-VA device or Peekaboo Vision App. The ability of the test to engage the patient was noted. Positive engagement was recorded when a test was completed, and a level of VA recorded.

Results: VA-OKN device: All of the patients included on the RGX trial and one who had a pre-screening assessment engaged with the VA-OKN technology and it was possible to measure vision.

Peekaboo Vision App: We are currently developing the process of assessment and will be able to report levels of engagement soon.

Conclusions: FCPL acuity cards (Teller Acuity Cards) are the gold standard for vision assessment when recognition tests are not manageable, although there remains a population that do not engage with these cards. Exploring possibly more engaging alternatives will increase our ability to measure vision in this population.

A pilot and a longitudinal study undertaken at University Medical Centre Hamburg-Eppendorf found that 74% of 23 children with CLN2 disease had measurable VA-OKN. The VA-OKN has been very effective in engaging patients at GOSH.

Published studies have shown good levels of engagement with the Peekaboo Vision App.

Establishing that the OKN-VA device and/or the Peekaboo Vision App can effectively engage children/young people, especially those who do not manage formal VA assessment, allows us to explore the use of these new technologies further. We will move on to compare the digital devices with the FCPL acuity cards (Teller) within varied patient groups to determine their place within the paediatric vision assessment process.

V-PED-001

Lateral rectus periosteal fixation in exotropic Duane's retraction syndrome

S. Chaurasia¹, J. Sukhija¹, P. Gupta¹

¹Ophthalmology, Post Graduate Institute of Medical Education and Research, Chandigarh, India

Introduction: Exotropic Duane Retraction Syndrome with severe co-contraction throw management delimiting and surgical challenge for strabismologists.

Objectives: To study the clinical profile and surgical outcome of patients undergoing Lateral rectus periosteal fixation as the sole procedure in exotropic Duane's retraction syndrome

Methods: It was a retrospective case series. Patients of exotropic Duane's retraction syndrome (DRS) who underwent Lateral rectus (LR) periosteal fixation as the sole procedure between July 2017 to August 2023. Patients with less than 6-months of postoperative follow-up were excluded. Surgical success was defined as a postoperative horizontal deviation within 8 prism diopters (pd), abnormal head posture (AHP) less than 5 degrees, and a two-step decrease in overshoots and widening in palpebral fissure height in adduction within 2mm of the palpebral height in the primary position

Results: A total of 28 DRS cases were screened among which 11 eyes of 10 patients were selected for the analysis. There were 6 patients with variety type 3 and 4 with type 2. Mean exotropia in the primary position was 48 pd. Mean palpebral height in primary position and during adduction was 10.18mm and 6.77mm respectively. Mean face turn was 19.5 degrees. Mean LR duction was -4.09. Mean MR duction was 3.95. Force degeneration was positive in all cases. Up-shoot was present in adduction in 9 eyes of 9 cases with mean up-shoot of 2.22. Downshoot was present in one case (1.5). Post operatively mean exotropia in the primary position was 4.54pd ($p < 0.01$). Mean palpebral height in primary position and during adduction was 10.8mm and 9.18mm ($p < 0.01$) respectively. Mean face turn was 3.5 degrees ($p < 0.01$). Mean LR duction was -4.09. Mean MR duction was 1.95. Up-shoot in adduction in 9 patients improved to 0.22. Mean follow up was 6.9months. Surgical success was seen in 10 patients. None of the patients developed esotropia or required transposition procedure.

Conclusions: LR periosteal fixation when carefully performed as a sole procedure in exotropic DRS is effective in correcting primary position alignment, decreasing co-contraction, improving palpebral fissure height and decreasing up-shoot or downshoot in adduction (also in primary position in type 3) and improving MR ductions without consecutive esotropia or need for transposition procedure. LR limitation remain unaltered post-operatively though clinically look marked due to correction in primary position exotropia.

Video

[Click here to play video](#)

Retina and Uveitis

FT-RET-001

Intravenous treatment of choroidal neovascularization by mesenchymal stem cells for HIF-1 α siRNA -loaded nanoparticles

L. Zhang^{1,2}, W. Jia^{1,2}, H. Wang^{1,2}

¹Xi'an People's Hospital (Xi'an Fourth Hospital), Xi'an, China, ²Xi'an Key Laboratory of Digital Medical Technology of Ophthalmologic Imaging, Xi'an, China

Introduction: Retinopathy of prematurity, diabetic retinopathy, and vascular age-related macular degeneration (AMD) are the leading causes of blindness in infants, adults, and the elderly respectively. The development of alternative therapeutic strategies that are minimally invasive and safe is highly desirable for effective treatment of these blinding eye diseases.

Objectives: To demonstrate the feasibility of mesenchymal stem cell (MSC)-mediated nano drug delivery, which was characterized by the "Trojan horse"-like transport of HIF-1 α siRNA for noninvasively targeted treatment of choroidal neovascularization (CNV).

Methods: A poly (lactic-co-glycolic acid) (PLGA)-core/lipid-shell hybrid nanoparticle (NP) carrier was designed for the delivery of HIF-1 α siRNA. MSCs were transfected with the hybrid NPs and the transfection efficacy was evaluated by flow cytometry and fluorescence microscopy imaging *in vitro*. The effect of MSC-loaded hybrid NPs on HIF-1 α expression *in vitro* was analyzed by using quantitative polymerase chain reaction. In a CNV mouse model, mice were intravenously injected with MSCs loaded with hybrid-siRNA nanoparticles within 1 hour after laser photocoagulation. After 7 days, choroidal flat mounts and retinal histology stained with hematoxylin and eosin (H&E) were performed for assessment of targeted treatment effect of CNV *in vivo*. Major organs were also collected for biosafety analysis.

Results: The average diameter of hybrid NPs loaded with HIF siRNA was ~300 nm and the zeta potential was 46.82 mV. The transfection efficiency of hybrid NPs was 72.7% into MSCs. The expression of HIF-1 α mRNA *in vitro* co-cultured with MSCs loaded with hybrid-siRNA was significantly lower than that in control group (0.62 ± 0.1 vs 1.00 ± 0.09 , $P=0.001$). *In vivo* the area and the length of CNV after intravenous delivery of the MSCs loaded with hybrid-siRNA NPs were greatly reduced ($72479.52 \pm 21246.16 \mu\text{m}^2$ vs $113531.04 \pm 14451.93 \mu\text{m}^2$, $P=0.015$; $107.27 \pm 10.82 \mu\text{m}$ vs $186.12 \pm 41.78 \mu\text{m}$, $P=0.038$). And systemic biosafety evaluations showed no apparent hazards of MSCs loaded with hybrid-siRNA NPs on cell growth and physiological health of mice.

Conclusions: An excellent therapeutic efficacy is achieved in reducing the area of CNV by intravenously injecting MSCs-loaded with hybrid-siRNA nanoparticles. With the MSCs-mediated homing, intravenous injection of cell-based nanoagents produced an effective inhibition of ocular angiogenesis in the laser-induced CNV mouse model.

FT-RET-002

Photobiomodulation reduces risk for vision loss and onset of geographic atrophy in dry age-related macular degeneration

C. Tedford¹, V. Gonzalez², D. Boyer³, R. Rosen⁴, S. Xavier⁵, A. Hu⁶, D. Warrow⁷, T. Schneiderman⁸, A. Ho⁹, G. Jaffe¹⁰, D. Do¹¹, M. Munk¹², E. Lad¹³, S. Tedford¹, C. Croissant¹, M. Walker¹, R. Ruckert¹

¹LumiThera Inc., Poulsbo, United States, ²Valley Retina Institute, McAllen, United States, ³Retina Vitreous Associates Medical Group, Beverly Hills, United States, ⁴New York Ear and Eye Infirmary of Mount Sinai, New York City, United States, ⁵Florida Eye Clinic, Altamonte Springs, United States, ⁶Cumberland Valley Retina Consultants, Hagerstown, United States, ⁷Cumberland Valley Retina Consultants, Chambersburg, United States, ⁸Retina Center NorthWest, Silverdale, United States, ⁹Mid Atlantic Retina, Cherry Hill, United States, ¹⁰Duke Reading Center, Duke University School of Medicine, Durham, United States, ¹¹Byers Eye Institute, Stanford University, Palo Alto, United States, ¹²Augenarzt-Praxisgemeinschaft Gutblick AG, Pfäffikon, Switzerland, ¹³Duke Eye Center, Durham, United States

Introduction: Dry AMD is a top contributor to vision loss across the globe. No current treatment exists to improve visual function or reduce disease progression in early/intermediate dry AMD.

Objectives: To evaluate the safety and efficacy of photobiomodulation (PBM) in intermediate dry age-related macular degeneration (AMD).

Methods: LIGHTSITE III (NCT04065490) was a prospective, double-masked, randomized, sham-controlled, parallel group, multicenter study to assess the efficacy and safety of PBM in dry AMD. PBM therapy consists of low-level light exposure to selected tissues resulting in positive effects on mitochondrial output and improvement in cellular activity. Subjects were treated with six series of multi-wavelength PBM (590, 660 and 850 nm) or active Sham (3x per week/3-5 weeks) delivered every 4 months over a 24-month period using the Valeda® Light Delivery System. A Cox proportional hazards model was performed to evaluate the time to event hazard ratio of 1) best corrected visual acuity (BCVA) loss >5 ETRS letters and 2) onset of geographic atrophy (GA). Data were analyzed at 24 months.

Results: 100 subjects (148 eyes) with dry AMD were randomized (Beckman classification: 20% early AMD, 72% intermediate AMD, 8% geographic atrophy (GA)). The LIGHTSITE III study demonstrated a sustained improvement in BCVA with a primary endpoint BCVA benefit at both 13 and 24 months in the PBM vs. Sham treatment group. A total of 58.2% of PBM-treated eyes showed ≥ 5 letter gain (mean 8.5 ± 2.1), 18.7% showed ≥ 10 letter gain (mean 13.4 ± 2.5) and 5.5% showed ≥ 15 letter gain (mean 16.6 ± 1.8) at 24 months. Subjects in the Sham group showed a greater vision loss over two years and continued to progress into GA, with 18% of the sham patients losing >5 letters and 24% disease progression with evidence of new GA. The hazard ratio for BCVA with a >5 letter loss was 0.47, ($p < 0.02$) which indicated a significant 53% reduction in onset of vision loss of >5 letters for subjects that received PBM vs. Sham treatment. The hazard ratio for onset of new GA was 0.27, ($p < 0.006$) indicating a significant risk reduction of 73% to new GA over two years with PBM.

Conclusions: LIGHTSITE III shows improved clinical and anatomical outcomes following PBM treatment. The current analysis supports a 53% reduced risk of BCVA vision loss (>5 letters) and 73% reduced risk of progression to new GA with irreversible retinal tissue loss. PBM therapy may offer a new treatment strategy with a unique mitochondrial mechanism and modality for patients with dry AMD to maintain retinal health and slow AMD disease progression.

FT-RET-003

A promising therapeutic target for retinal inflammation in diabetes models: USP25

D. Sun¹, Q. Hu¹, X. Zhang¹, B. Jiang¹, Z. Zhang¹

¹Ophthalmology, The Second Affiliated Hospital of Harbin Medical University, Harbin, China

Introduction: The activation of microglia in diabetic retinopathy (DR) plays a crucial role in driving this pathological progression. Previous investigations have demonstrated that ubiquitin-specific peptidase 25 (USP25), a deubiquitinating enzyme, is involved in the regulation of immune cell activity. Nevertheless, the precise mechanisms through which USP25 contributes to the development of DR remain incompletely elucidated.

Objectives: The aim of this study was to elucidate how USP25 modulates the ROCK/NF- κ B signaling pathway to regulate the activation of microglial cells in a high-glucose environment and to further investigate its role in regulating the secretion of proinflammatory factors.

Methods: We established a murine model of streptozotocin (STZ)-induced diabetes and an in vitro model of high-glucose-stimulated microglia. Immunofluorescence staining, Western blotting, and quantitative real-time PCR (qRT-PCR) techniques were employed to elucidate the influence of USP25 on microglial progression within a high-glucose milieu, unraveling potential mechanisms underlying microglial-mediated retinal inflammatory responses in hyperglycemic conditions.

Results: Our findings revealed that AAV-sh-USP25 administration led to a decrease in the expression levels of tumor necrosis factor- α (TNF- α), interleukin (IL)-1 β , glial cell activation (reducing the expression of ionized calcium-binding adaptor molecule 1 (Iba-1)) and monocyte chemoattractant protein-1 (MCP-1) within the retina. This intervention also resulted in reduced activation of glial cells, enhanced survival of ganglion cells, and mitigation of neuroinflammation. Notably, akin to the effects observed with Y-27632, USP25 downregulation attenuated high glucose-induced microglial activation and secretion of pro-inflammatory factors, concomitant with a decrease in ROCK1, ROCK2, and NF- κ B signaling. Furthermore, inhibition of USP25 led to a reduction in the nuclear translocation of the phosphatase NF- κ B.

Conclusions: Our study has provided novel insights by demonstrating that the regulatory role of USP25 in the secretion of proinflammatory factors is mediated through the involvement of ROCK in modulating the expression of NF- κ B and facilitating the nuclear translocation of the phosphatase NF- κ B. This regulatory mechanism plays a crucial role in modulating the activation of microglial cells within a high-glycemic environment. These findings emphasize USP25 and the ROCK pathway as potential targets for the treatment of diabetic neuroinflammation.

FT-RET-004

Comparison of the efficacy and safety of SCD411 and aflibercept in neovascular age-related macular degeneration

S.W. Kang¹, J. Choi², V. Sheth³, A. Nowosielska⁴, M. Misiuk-Hojlo⁵, A. Papp⁶, D. Brown⁷, J.-H. Lee⁸, Y. Barak⁹

¹Ophthalmology, Samsung Medical Center, Seoul, Korea, Republic of, ²Ophthalmology, Kyung Hee University Medical Center, Seoul, Korea, Republic of, ³University Retina and Macula Associates, Lemont, United States, ⁴Ophthalmology and Eye Surgery Clinic, Warsaw Eye Hospital, Warsaw, Poland, ⁵Clinic of Ophthalmology, Wroclaw Medical University, Wroclaw, Poland, ⁶Ophthalmology, Semmelweis University, Budapest, Hungary, ⁷Retina Consultants of Texas, Houston, United States, ⁸SamChunDang Pharm. Co. Ltd, Seoul, Korea, Republic of, ⁹Ophthalmology, Rambam Health Care Campus, Haifa, Israel

Introduction: Aflibercept, first introduced as “VEGF-trap”, is a soluble decoy receptor fusion protein approved by the US Food and Drug Administration in 2011 and the European Medicines Agency in 2012. Aflibercept has a biological advantage over ranibizumab because of its higher binding affinity to VEGF and longer duration of action. However, the high cost of the original aflibercept is considered as a barrier for some patients and for some developing countries to access the treatment.

SCD411 is a proposed aflibercept biosimilar that binds to VEGF-A and is produced in Chinese hamster ovary cells by using recombinant DNA technology. It has demonstrated similar structural characteristics, physicochemical properties, and biological activities similar to those of reference aflibercept in a series of in vitro and in vivo nonclinical studies. This phase 3 randomized clinical compared the efficacy, safety, pharmacokinetics, and immunogenicity of SCD411 with those of reference aflibercept.

Objectives: To compare the efficacy and safety of SCD411 and reference aflibercept in patients with neovascular age-related macular degeneration.

Methods: This randomized, double-blind, parallel-group, multicenter study was conducted in 14 countries. Patients with neovascular age-related macular degeneration, with subfoveal, juxtafoveal, or extrafoveal choroidal neovascularization were aged 50 years or older. Intravitreal injection of SCD411 or aflibercept (2.0 mg) were administered every 4 weeks for the first three injections and every 8 weeks until week 48. The primary efficacy endpoint was the change in best-corrected visual acuity from baseline to week 8 with an adjusted equivalence margin of ± 3.0 letters.

Results: Patients were randomly assigned to receive either SCD411 (n = 288) or reference aflibercept (n = 288). A total of 566 participants (98.3%) completed week 8 of the study. The least-squares mean difference of change in best-corrected visual acuity from baseline to week 8 (SCD411 – aflibercept) was -0.4 letters (90% confidence interval = -1.6 to 0.9). The incidence of ocular (69 of 287 [24.0%] vs. 71 of 286 [24.8%]) and serious ocular (5 of 287 [1.7%] vs. 3 of 286 [1.0%]) treatment-emergent adverse effects were similar between two groups.

Conclusions: SCD411 has equivalent efficacy compared with reference aflibercept in patients with neovascular age-related macular degeneration and has a comparable safety profile. The results support the potential use of SCD411 for the treatment of neovascular age-related macular degeneration.

FT-RET-005

Transplantation of hESC-RPE cells via injectable microfluidic-templated microgels for retinal regeneration

X. Ma¹, Y. Wei¹, C. Ma¹

¹Ophthalmology, Dalian Medical University, Dalian, China

Introduction: Retinal pigment epithelial (RPE) cells are specialized neural cells crucial for vision, while human embryonic stem cell-derived retinal pigment epithelial (hESC-RPE) cells hold great potential as a viable cell source for treating retinal degenerative diseases. However, the transplantation efficiency and viability of hESC-RPE cells are rather low due to detrimental shear-force during operations and host immune-clearance.

Objectives: Microfluidic technology (Fib@GHMS) was utilised to fabricate novel GelMA / HAMA microspheres encapsulated with fibrin, thereby combining the benefits of material protection for cells and minimally invasive injection surgery. The stem cell material complex was injected and transplanted minimally invasively as a novel vehicle for hESC-RPE cell transplantation in order to treat retinal degenerative diseases.

Methods: We herein develop a novel cell-based therapy with the aid of a microfluidic-templating microgel cell carrier to achieve substantially enhanced loading and delivery efficiency of hESC-RPE cells, thereby promoting visual function recovery after subretinal injection in Royal College of Surgeons (RCS) rats.

Results: Specifically, monodisperse microcarriers consisting of gelatin-methacryloyl/Hyaluronic acid-methacryloyl core coated with fibrin shell (denoted as Fib@GHMS) were fabricated in a high-throughput and controllable manner, which allowed the adhesion and proliferation of hESC-RPE cells, and direct injection as granular gels via minimally invasive approach. Subsequently, visual-functional assay with electroretinogram recordings (ERGs) revealed higher B-wave amplitudes in RCS rats with Cell-loaded Fib@GHMS transplants. This optimized cell implantation after transplantation into the subretinal space, leading to the increased retention of transplanted cells, along with the rescue of photoreceptors and a well-preserved inner nuclear layer at 8 weeks.

Conclusions: In conclusion, our innovative delivery system Fib@GHMS for hESC-RPE cell transplantation towards retinal regeneration presents a potential therapeutic graft for retinal tissue engineering, and may open up a new avenue for clinical translation of minimally invasive cell-based treatments in retinal degenerative diseases.

FT-RET-006

Molybdenum-based nanoclusters as the antioxidative nanomedicine for the treatment of RPE degeneration

Y. Ju¹, P. Gu¹, W. Guo¹

¹Department of Ophthalmology, Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: Oxidative stress-induced retinal pigment epithelium (RPE) degeneration is the pathologic basis of most retinal degenerative diseases, especially dry age-related macular degeneration (AMD), for which corresponding therapeutic strategies currently were still in their infancy and lack optimal efficacy.

Objectives: The aim of this study is to target the pathological basis of RPE oxidative degeneration through inorganic nanocatalyst strategy for dry AMD treatment, respectively, providing a new experimental basis and potential strategy for the treatment of AMD dominated retinal degeneration.

Methods: Cerium-doped molybdenum-based polyoxometalate (MoCe) were synthesized by one-pot reaction. The physical and chemical properties of MoCe were characterized by X-ray photoelectron spectrometry, transmission electron microscopy. The antioxidant capacity of MoCe was characterized by several radical scavenging experiments. The protective effects of MoCe on retinal structure and visual function were assessed by fundus photography, SD-OCT, immunostaining of photoreceptor markers and ERG. Finally, we investigated the potential mechanism of MoCe protection against RPE degeneration by RNA-seq sequencing in combination with bioinformatics analysis.

Results: MoCe nanoclusters possessed stable physicochemical properties and good biocompatibility in vitro and in vivo. MoCe was highly effective in scavenging ROS through the valence effect of MO^{5+} and Mo^{6+} . A single intravitreal injection of MoCe significantly inhibited SI-induced RPE oxidative damage, rescued functional protein expression of RPE and retina, thereby protecting retinal structure and visual function. Through RNA-seq combined with bioinformatics analysis, we found that MoCe could upregulate DNA repair related genes in RPE and protect RPE against oxidative stress-induced apoptosis by inhibiting the JNK/c-JUN signaling pathway, thus repairing retinal damage.

Conclusions: MoCe nanomedicine protected RPE by reducing ROS level and inhibiting SI-induced oxidative stress, thus protecting visual function. This study provides a new direction for the treatment of retinal degeneration such as dry AMD with RPE oxidative degeneration as the primary pathological feature.

FT-RET-007

Suprachoroidal therapy with melanin rescues light induced retinal toxicity in rabbit model

S. Hazra¹, A. Singh¹, N. Maity¹, S. Basak², A. Konar³

¹Veterinary Surgery & Radiology, West Bengal University of Animal and Fishery Sciences, Kolkata, India, ²Department of Cornea and External Diseases, DISHA Eye Hospitals, Kolkata, India, ³Animal Facility, CSIR-IICB, Kolkata, India

Introduction: Light which is an essential trigger for vision, becomes a factor for irreversible blindness in conditions like Age related macular degeneration (AMD), photoreceptor degeneration in retinitis pigmentosa or exacerbates retinal atrophy in ocular albinism. Inherent factors like melanin pigments and heat shock proteins play an immense role in quenching the deleterious wavelength of light. Studies have reported a higher incidence of AMD in whites versus the coloured population. This study was conceptualized to investigate the protective role of melanin, for light induced retinal toxicity in albino rabbits.

Objectives: Evaluation of antioxidant activity of exogenous melanin and its safety, in ameliorating light induced retinal toxicity when delivered through suprachoroidal route in rabbit model.

Methods: Phototoxicity was induced in eye of albino rabbit with high intensity light of 300Lux, for 4 weeks. Eyes were monitored by fundus examination and OCT. Histopathology and gene expression of candidate proteins, IL1Beta, IL6, TNF alpha Glutathione, BCL, Caspase, Cry α A, Cry α B. were performed. Oxidative stress was determined by activity of SOD and catalase. In another group of rabbits, suprachoroidal melanin injection was followed by light exposure. The rescue in retinal toxicity by melanin was determined clinically, by histopathology, tunnel assay, gene expressions of inflammatory cytokines, apoptotic genes and oxidative stress markers.

Results: Fundus and OCT examination revealed adverse changes in the light affected retina, which were ameliorated by melanin treatment. Histopathological of the choriocapillaris of untreated retina showed presence of dilated vessels, extravasation of RBC's and drusen like lesions, which did not exhibit in the treated eye. The expressions of IL6, IL1b, TNF alpha and SOD, were significantly reduced in treated eye, $p < 0.05$, Expression of apoptotic genes, Caspase was significantly $p < 0.05$ reduced and BCL was rescued in the treated retina. Heat shock proteins were significantly $p < 0.05$ reduced in melanin treated retina. Activity SOD and Catalase in melanin treated eyes were significantly modulated $p < 0.05$ versus untreated retina. Tunnel positive cells in untreated retina were remarkable vs the treated. The melanin treated eyes exhibited no inflammatory response.

Conclusions: Exogenous use of melanin mitigates light induced retinal toxicity in albino rabbits, this new approach warrants further investigation to steer the therapy towards treatment of retinal diseases like dry AMD.

FT-RET-008

Long-term continuous assessment of ILM slipping and filling induced super-large macular hole healing

*J. Ma*¹

¹Zhongshan Ophthalmic Center, State Key Laboratory of Ophthalmology, Sun Yat-sen University, Guangzhou, China

Introduction: A full-thickness macular hole (FTMH) is a vertical defect arising from the internal limiting membrane (ILM) and extending down to the retinal pigment epithelium (RPE) in the foveal retina. Although the single-sheet 'cover' variant may achieve better anatomical restoration and vision, the original ILM flap 'filling' technique offers advantages in the closure of larger FTMHs. Our previous observation found the ILM filling technique more preferable in FTMHs larger than 900 μm , which we defined as super-large FTMH. Despite the preferable results of the ILM filling technique in closing super-large FTMHs, a question arises as to whether the visual prognosis is affected by the filling of the non-neural retinal sheet in the hole. This study was to evaluate the long-term change in the MH closure pattern and visual function after the ILM filling technique was conducted in the context of super-large FTMHs.

Objectives: To assess the long-term continuous anatomical and functional healing process of super-large full-thickness macular hole (FTMH) after internal limiting membrane (ILM) filling and air tamponade.

Methods: Pars plana vitrectomy (PPV) with ILM filling and air tamponade was performed in eyes with idiopathic super-large FTMH ($>900 \mu\text{m}$). Patients were divided into three groups according to the macular hole (MH) diameter (group A, $<1,000 \mu\text{m}$; group B, $1,000\text{--}1,100 \mu\text{m}$; group C, $>1,100 \mu\text{m}$). The MH closure pattern was analysed using optical coherence tomography (OCT). The pre- and post-operative macular hole sensitivity (MHS), parafoveal sensitivity (PFS) and fixation status were assessed using a Microperimeter-3. The pre- and post-operative best-corrected visual acuity (BCVA) were measured. A monthly follow-up was conducted for 15 months postoperatively.

Results: Ninety-seven eyes from 96 consecutive patients with super-large FTMH were included in the study. The primary success rate was 95.88%, and 90.72% of the cases had the hole closed within 1 week post-operatively. The MH closure pattern improved continuously and differed significantly in three groups ($p<0.05$). Significant improvement of BCVA ($p<0.01$), PFS ($p<0.05$) and fixation stability ($p<0.01$) was observed in all groups.

Conclusions: Super-large FTMH ($>900 \mu\text{m}$) could close promptly within 1 week post-operatively after ILM filling and air tamponade. The morphological and functional improvement would last over an extended period post-operatively. No central scotoma enlargement was found regardless of the closure patterns, and there was significant retinal sensitivity and fixation status improvement.

FT-RET-009

Anatomical and functional outcomes of 25g vitrectomy in fundal coloboma with retinal detachment

S. Yarrarapu¹, S.V. Azad¹, P. Venkatesh¹, R. Vohra¹, R. Chawla¹, V. Kumar¹

¹Dr Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

Introduction: Coloboma is derived from the Greek word *koloboma*, meaning mutilated or with defect. Iridofundal coloboma (IFC) is a congenital anomaly occurring due to incomplete closure of the embryonic fissure during fetal development with an incidence of 0.5 - 2.2 cases per 10,000 live births. IFC is often associated with microphthalmia and about 40% of such eyes develop retinal detachment in lifetime. Microincisional Vitrectomy Surgery (MIVS) is a type of vitrectomy surgery that uses smaller probes and a transconjunctival scleral incision. 25-gauge vitrectomies are relatively new and their long-term outcomes in colobomatous retinal detachments are not yet studied. Colobomatous eyes are usually smaller and thus we believe smaller gauge instruments provide a definite advantage over the larger gauges.

Objectives:

To study the long-term anatomical and functional outcomes of 25-Gauge (25G) Microincision Vitrectomy Surgery (MIVS) in Fundal Coloboma with Retinal Detachment (RD).

Methods:

This was an ambispective interventional pilot study of eyes with coloboma-associated RD undergoing 25G MIVS with silicone oil tamponade. All surgeries were done by a single experienced surgeon at a tertiary eye centre.

Results: We evaluated 60 eyes of 58 patients with 30 eyes each in the retrospective and prospective group. The mean age of presentation was 18.45 ± 8.92 years (range: 5-50 years) and the mean follow-up duration was 31.56 ± 28.05 months (range: 6-77 months). Commonly associated ocular features in these patients were iris coloboma in 56 eyes (93.33%), micro cornea in 45 eyes (75%) and cataract in 34 eyes (56.7%). The single operation success rate was 80% (48 eyes), with an overall successful outcome achieved in 94.7% (54 eyes). Recurrence of RD occurred in 12 eyes (20%). A statistically significant improvement in vision was noted in the majority of cases from logMAR 1.95 ± 0.27 preoperatively to logMAR 1.42 ± 0.55 post-surgery ($P < 0.001$). Long-term post-operative complications included raised IOP in 28.33%, cataract in 30%, and silicone oil emulsification in 25%, band-shaped keratopathy in 5% and subconjunctival silicon oil in 3.3% of patients.

Conclusions:

25G MIVS provided an anatomical success rate of 94.7% in eyes with coloboma RD with a significant improvement in visual acuity. 25G MIVS is effective for vitrectomy in coloboma associated RD and comparable to other larger gauge vitrectomy systems.

FT-RET-010

Feasibility and safety of remote robot-assisted vitreoretinal surgery

A. Xu¹, W. Chen¹, R. Li¹, H. Lin¹

¹Zhongshan Ophthalmic Center, Guangzhou, China

Introduction: The shortage of high-quality resources for vitreoretinal procedures, particularly in low- and middle-income countries, necessitates innovative solutions.

Objectives: In this study, we explore the feasibility and safety of employing a high-precision robotic system to perform remote vitreoretinal surgery, addressing the challenges posed by limited resources and geographical disparities.

Methods: A randomized controlled animal study was conducted using a specially designed remote robotic system with a remote center of motion architecture and micron-scale precision for vitreoretinal surgery. Fifty-one pigmented rabbits were randomly assigned to either the remote robotic surgery group ($n = 27$) or the traditional surgery group ($n = 24$) for subretinal injections. Additionally, 15 porcine eyes with 1-mm suture in the vitreous cavity were remotely received foreign body removal. Surgical videos were recorded to analyze the success rates, intraoperative complications, and duration. Postoperative retinal conditions were monitored using OCT and fundus photography at 1, 3, 7, and 14 days. All the remote procedures were executed on three different centers at distances of approximately 3 km, 20 km, and 600 km across the sea.

Results: The remote robotic surgery group exhibited a significantly higher first-attempt success rate for subretinal injections (96% vs. 54%, $P = 0.001$) and fewer intraoperative complications, including hemorrhage and lens injury, compared to the traditional surgery group. Only 1 (4%) rabbit had localized hemorrhage in remote robotic group ($P = 0.035$); while 7 (29%) rabbits occurred hemorrhage and 3 (13%) had lens injury in traditional surgery group. The mean total surgery duration was longer in the remote robotic group (11:54 vs. 7:39, $P = 0.001$). Retinal recovery occurred more rapidly in the remote robotic group, with 85.2% achieving recovery before the seventh day compared to 31.2% in the traditional group. Furthermore, remote foreign body removal success rate was 100%, with a first-attempt success rate of 53%. The average overall delay in three distances was 429 ms for remote robotic surgery, with no significant differences among them.

Conclusions: Our study introduces a novel robot-assisted surgical system, demonstrating its safety and reliability for remote vitreoretinal procedures. This innovative approach has the potential to overcome temporal and spatial barriers, thereby contributing to the reduction of healthcare disparities worldwide.

FT-RET-011

Impact of methods of ILM peeling on prognosis of vitrectomy among patients with high myopic traction maculopathy

X. Ma¹, N. Zhang¹, C. Ma¹, Y. Wei¹

¹Ophthalmology, The First Affiliated Hospital of Dalian Medical University, Dalian, China

Introduction: This study compared the effectiveness of vitrectomy combined with internal limiting membrane peeling and vitrectomy combined with fovea-sparing internal limiting membrane peeling in treating high myopic traction maculopathy.

Objectives: This study assessed changes in BCVA, macular retinal structure, and central subfield thickness before and after the surgical procedures. CSF thickness and M-CHARTS were utilized to determine if preserving the foveal inner limiting membrane could enhance the outcomes for patients with high myopic traction maculopathy following vitrectomy.

Methods: Forty-five eyes from patients diagnosed with high myopic traction maculopathy were analyzed. They were divided into two groups: Group A (22 eyes) underwent vitrectomy combined with internal limiting membrane peeling, while group B (23 eyes) underwent the same procedure with fovea preservation. Follow-up exceeded 6 months, during which changes in BCVA, retinal structure in the macular area, and retinal thickness in the macular fovea were assessed before and after surgery.

Results: BCVA of the two groups was significantly improved and CSF thickness was decreased after surgery, and the difference was statistically significant. There was no statistical significance in BCVA and CSF thickness between the two groups at each time point after surgery, indicating that the mode of internal limiting membrane peeling did not affect the prognosis of vision and recovery of retina thickness after vitrectomy in high myopic traction maculopathy. The vertical and horizontal visual deformation scores of the two groups were decreased after surgery, and the differences were statistically significant. The proportion of new macular holes in group A and group B was 22.2% and 11.8% respectively, indicating that fovea-retaining internal limiting membrane peeling could reduce the incidence of macular holes after vitrectomy for high myopic traction maculopathy to a certain extent.

Conclusions: Both surgical methods are effective in treating high myopic traction maculopathy, leading to improved BCVA, reduced retinal thickness, and enhanced macular function to some extent. The combination of vitrectomy and internal limiting membrane peeling may result in complications due to surgical alterations in retina structure. Fovea-sparing internal limiting membrane peeling is superior to the traditional approach to a certain extent, reducing the occurrence of macular hole following vitrectomy among patients with high myopic traction maculopathy.

FT-RET-012

Effect of internal limiting membrane peeling combined with anti-VEGF injection on diabetic macular edema

C. Ma¹, X. Ma¹, N. Zhang¹, Y. Wei¹, S. Chen¹

¹Ophthalmology, The First Affiliated Hospital of Dalian Medical University, Dalian, China

Introduction: Efficacy of internal limiting membrane peeling combined with preoperative injection of anti-VEGF in the treatment of proliferative diabetic retinopathy (PDR) with diabetic macular edema (DME).

Objectives: To investigate the efficacy of internal limiting membrane peeling combined with preoperative injection of anti-VEGF in the treatment of proliferative diabetic retinopathy (PDR) with diabetic macular edema (DME).

Methods: A total of 65 eyes of 65 patients diagnosed with PDR from June 2018 to June 2020 were included. There were 34 eyes in the simple vitrectomy (PPV) group and 32 eyes in the vitrectomy combined with ILM peeling group. The best corrected visual acuity (BCVA), central retinal thickness (CRT), total macular volume (TMV), severity of macular edema (ME) and complications were recorded. The prognostic factors of visual acuity after ILM peeling were analyzed.

Results: The BCVA of the two groups (PPV group and combined group) at 1, 3, 6, and 12 months after surgery was higher than that before surgery ($P < 0.05$). At 6 and 12 months after surgery, the BCVA in the combined group was significantly higher than that in the simple PPV group (6 months $P = 0.01$, 12 months $P = 0.007$). The mean CRT values of the two groups at 1 month after surgery were significantly lower than those before surgery (PPV group: $397.65 \pm 106.18 \mu\text{m}$ vs. $451.94 \pm 118.88 \mu\text{m}$, combined group: $388.88 \pm 108.68 \mu\text{m}$ vs. $464.36 \pm 111.53 \mu\text{m}$, $P < 0.05$), and gradually decreased. The differences between the two groups at 3, 6 and 12 months were statistically significant ($P = 0.004$, 0.003 and 0.00 , respectively). TMV decreased from the 3rd month in the single-dose group (3m 11.14 ± 1.66 vs. 12m $20 \pm 2.09 \text{mm}^3$, $P < 0.05$). At 12 months, the proportion of edema eyes with CRT greater than $350 \mu\text{m}$ was significantly lower than that before surgery (PPV group: 13.24% vs. 77.94% ; 1.56% vs. 81.25% in combination group, $P < 0.05$). There was no significant difference in the recurrence rate of epiretinal membrane, ME, vitreous rebleeding and tractional retinal detachment between the two groups. BCVA after ILM peeling was positively correlated with CRT and ME before and after ILM peeling ($r = 0.430$, 0.485 , $P < 0.05$).

Conclusions: PPV combined with ILM peeling can promote the absorption of ME, improve visual acuity, postoperative CRT and TMV, and reduce the recurrence rate of ME after surgery.

FT-RET-013

Morphologic features and implications of regulated versus dysregulated rhegmatogenous retinal detachment

A. Pecaku¹, S. Naidu¹, I. Martins Melo¹, S.E. Demian¹, M. Pimentel¹, R.H Muni¹

¹Department of Ophthalmology and Vision Sciences, University of Toronto/St. Michael's Hospital, Toronto, Canada

Introduction: Two distinct clinical patterns of rhegmatogenous retinal detachment (RRD) exist. One is characterized by acute, progressive, and extensive cases, defined as those with retinal pigment epithelium (RPE)-photoreceptor dysregulation, and the other presents as localized, slow, or non-progressive where the RPE is in relative control of the subretinal space. Understanding the morphological differences between regulated and dysregulated RRDs is critical to selecting the most appropriate surgical technique.

Objectives: To describe the varying morphological features of patients with RRD based on the extent of regulation of the subretinal space by the RPE pump in humans in vivo, based on high-resolution swept-source optical coherence tomography (SS-OCT).

Methods: Prospective cohort study. Primary RRDs referred to St. Michael's Hospital, Toronto, Canada, from 2020 to 2023 were included. All patients underwent SS-OCT and ultra-widefield SS-OCT at baseline. Dysregulated RRDs were characterized as acute, progressive, and extensive. In contrast, regulated RRDs were defined as localized, non-progressive, slowly progressive, or subclinical RRDs. Foveal scans were examined for the presence of outer retinal corrugations (ORC), cystoid macular edema (CME), bacillary layer detachment and associated pathologies, and hyperreflective dots. The stage of RRD on SS-OCT was determined based on the staging system developed by Melo et al.

Results: 122 eyes were included. 21.3%(26 /122) of RRDs were classified as regulated, while 78.7%(96/122) were dysregulated. The mean age of patients with regulated RRDs at baseline was 43.9 years (± 18.4) vs 62.9 years (± 12.7) for patients with dysregulated RRDs ($P < 0.001$). The presence of ORC on OCT was observed in 3.8%(1/26) of regulated vs 84.4% (81/96) of eyes in the dysregulated RRD group ($P < 0.001$). CME was found in 50.0% (8/16) of eyes with regulated RRD vs 87.2%(82/94) of eyes with dysregulated RRD ($P < 0.001$). Among patients with regulated RRDs, 31.3% (5/16) were in Stage 2, 0% (0/16) in Stage 3A, 6.3% (1/16) in Stage 3B, 0% (0/16) in Stage 4, and 62.5% (10/16) in Stage 5. In patients with dysregulated RRDs, 14.9% (14/94) were in Stage 2, 16.0% (15/94) in Stage 3A, 38.3% (36/94) in Stage 3B, 23.4% (22/94) in Stage 4, and 7.4% (7/94) in Stage 5 ($P < 0.001$).

Conclusions: Significant morphological differences, particularly in the incidence of outer retinal corrugation between regulated and dysregulated RRD exist, which may substantially impact management strategies.

FT-RET-014

Macular splint: a prospective study evaluating gas injection prior to vitrectomy for macula off retinal detachment

A. Kherani¹, J. Farah Agi², R. Nirwan³, N. Lucenda de Figueiredo⁴, E.B. Rodrigues², R.G. Williams¹

¹Section of Ophthalmology, Department of Surgery, University of Calgary, Calgary Retina Consultants, Calgary, Canada, ²Ophthalmology, Federal University of Sao Paulo-UNIFESP, Sao Paulo, Brazil, ³Island Health, Victoria, Canada, ⁴Ophthalmology, Centro de Tratamento da Visao, Joao Pessoa, Brazil

Introduction: Rhegmatogenous retinal detachment (RRD) is a sight-threatening condition that stands as one of the prevalent challenges addressed by vitreoretinal surgeons. Pars plana vitrectomy (PPV) represents the most commonly performed intervention for RRD globally. The urgency of surgery is driven by the status of the macula.

Intravitreal gas is as a valuable adjunct in the treatment of various vitreo-retinal diseases, serving as a versatile tool for vitreomacular traction release, submacular hemorrhage mobilization and pneumatic retinopexy (PnR). PnR, a recognized treatment for RRD, offers the advantage of an office-based administration and an expedited treatment approach without logistical requirements of operating room availability.

Objectives: The purpose of this study was to assess whether pre-operative intravitreal gas injection and face down positioning for fovea-involving rhegmatogenous retinal detachment before Pars Plana Vitrectomy (PPV) would promote macular reattachment, facilitate surgical intervention, potentially reduce the need for perfluorocarbon (PFCL) endodrainage. Secondary objective was to assess whether this approach could impact visual acuity post-operatively.

Methods: This prospective randomized study involved thirty participants, who were randomly allocated into two groups: Group I underwent intravitreal gas injection (0.5cc of 100% perfluoropropane (C₃F₈)) and face-down positioning until PPV. Group II followed standard surgical planning for vitrectomy. The study assessed the effect of preoperative intravitreal gas injection's influence on macular reattachment, PFCL utilization for endodrainage. Post operatively, we evaluated BCVA at 3, 6 and 12 months.

Results: It was observed that 80.0% of Group I patients (95% CI: 51.9 to 95.7%) had macular reattachment at the time of surgery. Furthermore, patients with an attached fovea at the time of the surgery exhibited a lower percentage of PFCL usage (41.7%) compared to those with detached fovea (88.9%) ($p=0.013$). BCVA was similar in both groups at 3, 6 and 12 months ($p=0.054$).

Conclusions: Patients with macula off, fovea-involving RRD, who underwent intravitreal gas injection followed by face-down positioning prior to PPV, exhibited a statistically significant likelihood of achieving foveal reattachment before surgery. Notably, this approach correlated with a reduced need for PFCL for endodrainage. Post operative visual acuity was similar in both groups.

FT-RET-015

Internal limiting membrane peeling versus no peeling during primary vitrectomy for rhegmatogenous retinal detachment

S. Hummatova¹, M.L. Mammadova²

¹Retina department, Spero Hospital, Baku, Azerbaijan, ²Retina department, National Ophthalmology Center, Baku, Azerbaijan

Introduction: Rhegmatogenous retinal detachment is a serious condition that can significantly impair visual function, even after a successful surgery. The aim of RRD treatment is to identify, localize, and close the retinal tears/breaks, as well as also removing any traction on the edges of the tear. A traction has three components: anteroposterior, circumferential, and tangential. ILM, as a cause of tangential traction in retinal detachment (RD) and proliferative vitreoretinopathy (PVR) and its relief by ILM peeling during vitrectomy.

Objectives: The aim of this work is to monitor the effect of peeling of the internal limiting membrane (ILM) in the macula at the anatomical and functional results in the postoperative period, especially with regard to the development of ERM and recurrent retinal detachment.

Methods: A prospective study was conducted on 60 eyes with primary RRD between December 2021 and May 2022 at "Spero hospital", Baku, Azerbaijan

There were 2 groups. ILM peeling group which included 28 eyes, and no ILM peeling group which included 32 eyes respectively. Sex male /female in ILM group 19/9, in nonILM group 20/12, age was 30< in both groups. LogMAR BCVA was in ILM group 1.65 ± 0.4 and nonILM group 1.70. Day of duration RRD was 5day - 3-4 weeks.

Results: After six month in ILM group best corrected vision acuity was 20/ 200-20/40 (logMAR 1.0-0.30), no ERM formation, no recurrent RD. Non ILM group best corrected vision acuity was between 20/400-20/50 (logMAR 1.30-0.40), 8 patients had ERM formation, and recurrent RD in 4 patients.

Conclusions: Internal limiting membrane peeling seems to prevent the occurrence of a postoperative ERM and recurrent RD in patients with primary rhegmatogenous retinal detachment.

Vision acuity less good in non ILM peeling group or no significant differences between groups 6 month postoperatively.

FT-RET-016

Area under the curve visual acuity following Pneumatic Retinopexy vs Pars Plana Vitrectomy for retinal detachment

S.E. Demian¹, A. Pecaku², C. Zajner³, A. Mihalache⁴, R. Huang⁵, P. Tan⁶, R. Muni¹

¹Ophthalmology and Visual Sciences, Saint Michael's Hospital, University of Toronto, Toronto, Canada,

²Ophthalmology and Visual Science, Saint Michael's Hospital, University of Toronto, Toronto, Canada,

³Schulich School of Medicine & Dentistry, Western University, London, Canada, ⁴Temerty Faculty of Medicine, University of Toronto, Toronto, Canada, ⁵Temerty Faculty of Medicine, University of Toronto, Ontario, Canada, ⁶Saint Michael's Hospital, University of Toronto, Toronto, Canada

Introduction: Two common methods of surgical repair for rhegmatogenous retinal detachment (RRD) are pars plana vitrectomy (PPV) and pneumatic retinopexy (PnR). Many studies have assessed visual acuity outcome at various time points. No previous studies have assessed the area under curve (AUC) visual acuity over time. Assessing AUC visual acuity will allow to more thoroughly assess post-operative functional outcomes following RRD repair.

Objectives: A retrospective cohort study describing postoperative longitudinal visual acuity (VA) over 1-year following RRD with PnR versus PPV, by assessing AUC visual acuity.

Methods: 1000 patients with RRD presenting to St. Michael's Hospital, from 2009-2023, were assessed for their VA and fundus examination at baseline, postoperative day 1, week 1, months 1, 3, 6 and 12 respectively. Patients with vision loss \geq 3 months, PVR \geq grade B, demarcation line, and previous retinal pathology/intervention were excluded. AUC visual acuity was assessed over a period of one year.

Results: 68.8% (661/961) were males with a mean age of 60.35 ± 11.38 years old.

59.1% (557/961) were phakic and 55.4% (531/961) had a fovea involving RRD at presentation. The mean presenting logMAR VA was 0.96 (SD 0.9) in the PnR group vs 1.12 (SD 1.24) in PPV ($P=0.7$).

80.7% (774/1000) of patients underwent PnR and 19.3% (185/1000) had a PPV.

The AUC LogMar visual acuity was 0.404 in the PnR group vs 0.518 in the PPV group.

There were statistically significant difference in LogMAR VA favouring the PnR group at 1 week ($p<0.001$), 1 month ($p=0.023$), 3 months ($p<0.001$) and 6 months ($p<0.001$).

Conclusions: AUC visual acuity evaluates the functional visual outcome over a defined period of time. PnR demonstrated a superior AUC visual acuity over a period of 1 year compared to PPV. PnR was particularly advantageous in the early postoperative period.

FT-RET-017

Quantitative assessment of blood flow in acute central serous chorioretinopathy with subthreshold micro-pulse laser

F. Ma¹, Y. Qi¹, Q. Shang¹, D. Liu¹, L. Liu¹

¹Ophthalmology, The Second Hospital of Hebei Medical University, Shijiazhaung, China

Introduction: The impact of SMLP on choroidal blood flow perfusion is currently not well understood. This study aims to observe changes in choroidal blood flow parameters and RLS after SMLP treatment for acute CSC, exploring the treatment mechanism of SMLP.

Objectives: To quantitatively evaluate changes in choroidal blood flow parameters in patients with acute central serous chorioretinopathy (CSC) treated with subthreshold micro-pulse laser photocoagulation (SMLP) in patients with or without SRF absorption.

Methods: The eyes were divided into two groups based on whether subretinal fluid (SRF) had completely resolved at 6-month follow-up: Group A (the complete resolution group) and group B (incomplete resolution group). Swept-source optical coherence tomography angiography (SS-OCTA) of the macular area was performed. Quantified image analysis was conducted based on the in-built software to calculate the changes of choroidal choriocapillaris layer perfusion area (CCPA), choroidal large vessel layer perfusion area (CLPA), choroidal thickness (CT), outer nuclear layer (ONL) thickness, three-dimensional choroidal vessel index (3D-CVI) in nine different regions, namely foveal area, superior/inferior/temporal/nasal regions of pericentral area and superior/inferior/temporal/nasal regions of peripheral regions. Risk factors for SRF complete and incomplete absorption was analyzed using both univariate and multivariate logistic regression analyses. Functional alterations were performed in terms of BCVA and microperimetry. Area under curve (AUC) was analyzed to explore predicative value of quantified image parameters.

Results: A total of 38 patients (38 eyes) were included in the study. 22 eyes achieved complete SRF absorption at 6-months follow-up (57.9%) with 16 eyes achieved partial SRF absorption. After treatment, the complete resolution group showed increased CCL perfusion area, ONL thickness, and best-corrected visual acuity (BCVA), while the incomplete resolution group failed to show significant changes. Risk factors for absorbing and non-absorbing SRF at 6-months include age (OR=1.064, P=0.001), smoking (OR=1.844, P=0.118), gender (OR=0.756, P=0.483), alcohol (OR=0.365, P=0.011), refractive error (OR=0.443, P=0.068), and fibrinous exudation on imaging of OCT (OR=1.113, P=0.848). AUC indicated CCPA and CLPA of peripheral ring were good predictors.

Conclusions: SMLP can increase CCL perfusion area, ONL thickness, BCVA, and RLS in eyes with acute CSC. It has more impact on the CCPA and CVI.

FT-RET-019

The fluocinolone acetonide 0.18-mg implant: effects on chronic NIU-PS and IOP-related therapies in the CALM registry

M. Barakat^{1,2}, A. Cutino³, CALM Investigators

¹Retina Macula Institute of Arizona, Scottsdale, AZ, United States, ²College of Medicine - Phoenix, University of Arizona, Phoenix, AZ, United States, ³Alimera Sciences, Inc, Alpharetta, GA, United States

Introduction: Chronic non-infectious uveitis affecting the posterior segment (NIU-PS) represents a condition in need of continuous maintenance in a significant proportion of affected patients. The 0.18-mg fluocinolone acetonide intravitreal implant (FAi) is one therapeutic option that releases fluocinolone over a course of 36 months.

Objectives: To assess effectiveness and safety outcomes through 24 months following FAi in chronic NIU-PS as catalogued in the CALM Registry.

Methods: Eligible patients were ≥ 18 years of age with chronic NIU-PS and no contraindications to the FAi. Data were collected on recurrence of uveitis, change in optical coherence tomography (OCT) parameters, and need for adjunctive medications. As steroid therapies can affect intraocular pressure (IOP), safety data included IOP elevations and associated interventions.

Results: A total of 243 eyes of 182 patients received the 0.18-mg FAi (mean age 63.2 years; 69% white; 65% female). In the 12 months prior to FAi, 84% of eyes had ≥ 1 recurrence of uveitis; two years post-FAi, the uveitis recurrence rate decreased to 9.9%. Anatomically, OCT central subfield and cube average thickness significantly decreased from baseline to month 24 (by 10.7% [$P < 0.001$] and 5.4% [$P = 0.005$], respectively). Median IOP remained stable around 14.0 mmHg through 24 months. At baseline, many eyes used topical, IOP-lowering drops (combination drops: 42 eyes [17.3%]; alpha-adrenergic agonists: 35 [14.4%]; beta-blockers: 27 [11.1%]; prostaglandin analogs: 21 [8.6%]; carbonic anhydrase inhibitors: 15 [6.2%]; rho kinase inhibitors: 4 [1.6%]; miotics: 2 [0.82%]). At 24 months post-FAi, adjunctive IOP-lowering therapies were stable and manageable ($n = 69$ eyes; combination drops: 22 eyes [31.9%], alpha-adrenergic agonists: 14 [20.3%]; beta-blockers: 10 [14.5%]; prostaglandin analogs: 7 [10.1%]; carbonic anhydrase inhibitors: 3 [4.3%]; rho kinase inhibitors: 0; miotics: 1 [1.4%]). Throughout the 24 months, IOP-lowering procedures included laser trabeculoplasty (1.2% of eyes) and incisional surgery (3.3% of eyes [trabeculectomy: 1.2%; tube implantation: 2.1%]). No cataract surgeries were reported.

Conclusions: This patient registry analysis demonstrates that the efficacy and safety results seen in controlled clinical trials of the 0.18-mg FAi in eyes with chronic NIU-PS translate to the real world. At 24 months, the 0.18-mg FAi demonstrated control of macular thickness, a stable rather than increased need for IOP-lowering adjunctive medications or procedures, and no new safety signals.

FT-RET-020

Morphometrics in biomarkers of polypoidal lesions and choroidal vessels associated with treatment response in PCV

Y. Zhang^{1,2}, J. Wang¹, X. Gu¹, X. Yu^{1,2}

¹Department of Ophthalmology, Beijing Hospital, National Center of Gerontology, Institute of Geriatric Medicine, Chinese Academy of Medical Sciences, Beijing, China, ²Graduate School of Peking Union Medical College, Beijing, China

Introduction: PCV is recently regarded as a subtype of pachychoroid diseases, and there was significant heterogeneity of responses to anti- VEGF treatment within PCV eyes, which may be related to choroidal vascular permeability. It has also been reported that MNV secondary to pachychoroid is usually characterized by large-caliber vessels with a paucity of capillaries within the lesions, which is more related to arteriogenesis rather than angiogenesis. However, it's still unclear as to predict the response to anti- VEGF of PCV eyes based on advanced imaging and clinical biomarkers.

Objectives: To investigate the relationship between the response to 3-monthly anti- VEGF therapy of PCV eyes and multiple quantitative parameters of polypoidal lesions and three-dimensional choroidal vessels using swept source optical coherence tomography angiography (SS-OCTA).

Methods: We recruited PCV patients who underwent 3-monthly standard anti-VEGF therapy. Choroidal features including sub-foveal choroidal thickness (CT), three-dimensional choroidal vascularity index (CVI) and the vascular density of choriocapillaris (CCVD) were measured automatically using the built-in software of SS-OCTA. Quantitative features of polypoidal lesions were recorded using the semi-automated AngioTool, including vessel area, vessel length, vessel density (VD), junction density, total number of endpoints and lacunarity. All of the PCV eyes were divided into "good responders" and "poor responders" based on the absorption of subretinal fluid (SRF). Multiple linear regression model was used to explore the underlying predictors at baseline that significantly associated with the shrinkage of lesion area.

Results: 52 eyes were included, and 27 eyes were categorized as good responders, with 25 eyes as poor responders. Poor responder group had significantly higher CT, higher CVI, greater vessel length density ($P = 0.021$), greater junction density ($P = 0.008$) and less endpoint density ($P < 0.001$). Multivariate analysis showed that higher shrinkage of lesions were significantly associated with lower CVI ($P = 0.003$), greater endpoint density ($P < 0.001$) and less junction density ($P = 0.014$) at baseline.

Conclusions: PCV eyes with choroidal hyperpermeability and dense lesions with lower open-ended vessels at the lesion periphery tend to have poor therapeutic response. PCV with pachychoroid features may be more related to arteriogenesis rather than angiogenesis. Quantitative analysis using SS-OCTA may be used as biomarkers to predict the response to anti- VEGF treatment.

FT-RET-021

Screening chronic kidney disease through deep learning utilizing ultra-wide-field fundus images: a multi-center study

Y. Chen¹, X. Zhao¹, X. Gu¹

¹Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China

Introduction: Screening for chronic kidney disease (CKD) at the population level presents substantial technical and socioeconomic challenges.

Objectives: Leveraging ultra-wide-field (UWF) fundus images, we developed a deep learning algorithm that utilizes both the posterior and peripheral regions of the retina for large-scale CKD screening.

Methods: A prospective, multi-center study was conducted to develop the model using UWF fundus images and renal function indicators obtained from participants across twenty-three ophthalmology departments across China. Participants with clear UWF fundus images, paired renal function examinations, and comprehensive medical histories were included. Our approach initially involved training a vessel segmentation model, UNet++, to automatically segment and measure retinal microvascular parameters (RMPs). Subsequently, we explored the correlation between RMPs and renal function. We then proceeded to develop a deep learning-based CKD screening classification model based on UWF fundus images (UWF-CKDS) and compared its predictive performance with that of the extracted 50° central images (CTR-CKDS).

Results: A total of 25,335 UWF fundus images corresponding to 7,453 patients with paired renal function examinations were ultimately included in this study. The UNet++ model delivered satisfactory results in vessel segmentation and RMP measurement. The fractal dimension (D_f) exhibited a significant correlation with renal function indicators, particularly the association between Artery-UWF- D_f and eGFR ($r=0.31$, 95%CI 0.29-0.33, $P<0.05$). Finally, our UWF-CKDS demonstrated superior predictive performance compared to CTR-CKDS, with a significantly higher AUC (0.84, 95%CI: 0.80-0.87 versus 0.80, 95%CI: 0.76-0.84, $P<0.01$). This performance difference was also validated in a multi-center test (0.80, 95% CI: 0.75-0.85 versus 0.76, 95% CI: 0.70-0.81, $P=0.02$). When the sensitivity value was set at 0.80 for screening purpose, UWF-CKDS also showed better specificity than CTR-CKDS in the multi-center test (internal 0.72 95%CI: 0.69-0.74 versus 0.70 95%CI: 0.67-0.72, $P=0.22$; multi-center 0.65 95%CI: 0.62-0.69 versus 0.56 95%CI: 0.53-0.60, $P<0.01$).

Conclusions: The UWF-CKDS trained and tested by nationwide, multi-center dataset showed solid performance in CKD screening and verified the role of peripheral retina in predicting renal function. This noninvasive, automatic, non-mydratic, and highly adaptable UWF-CKDS offers an innovative and accurate method for population-level CKD screening.

FT-RET-022

Cross-modal image analysis including Delayed Near InfraRed Analysis (DNIRA) identifies novel biomarkers for dry AMD

M.V. Pereira da Silva^{1,2,3}, *F. Altomare*^{4,3}, *N. Hirmiz*⁵, *M. Rose*⁵, *N. Patil*^{6,7,8}, *D.T Wong*^{4,3}, *L. Giavedoni*^{4,3}, *X. Zhao*⁴, *H. Wang*⁴, *A.R Khan*^{9,10}, *S. Boyd*^{4,3}

¹Ophthalmology, Northern Ontario School of Medicine, Sudbury, Canada, ²Ocular Oncology, Princess Margaret Hospital, University Health Network, Toronto, Canada, ³Ophthalmology & Vision Science, University of Toronto, Toronto, Canada, ⁴Ophthalmology, St Michael's Hospital, Unity Health, Toronto, Canada, ⁵Engineering, Western University, London, Canada, ⁶Michael G DeGroote School of Medicine, McMaster University, Hamilton, Canada, ⁷Gesund.ai, Hamilton, Canada, ⁸KA Imaging, Waterloo, Canada, ⁹BioMedical Physics, Western University, London, Canada, ¹⁰Brain & Mind Institute, Robarts Research Institute, London, Canada

Introduction: With new therapies for geographic atrophy (GA), there is growing need for biomarkers to improve disease classification and prediction. DNIRA is a dye-based, non-angiographic method that increases visualization of the retinal pigment epithelium, previously shown to be technically valid, safe and relevant to RPE structure and potentially function. It has the potential to enhance current modalities through cross-modal analysis.

Objectives: This prospective natural history clinical study of eyes with dry AMD and controls/comparators aimed to identify, quantify and interpret the potential differences, or "delta", between regions of hypofluorescent blue fundus autofluorescence (hypoFAF), and hypofluorescent DNIRA (hypoDNIRA) to determine its potential utility.

Methods: With consent, patients underwent colour photography, ICG angiography (ICGA) and multi-modal confocal imaging (Spectralis), at baseline and over time. Pre-DNIRA images were acquired with low gain (75-85%) and low tracking (20-30 images) in the ICG (795/810nm) spectrum. ICGA (25mg iv) was followed 2-3 days later by DNIRA imaging, without further injection of dye. FAF, DNIRA and IR images were co-registered at and between visits. Using purpose-built neural networks, areas of hypoFAF and hypoDNIRA were segmented, and the delta mathematically compared using a ratio, normalized ratio, or subtraction. Performance was assessed using the DICE coefficient. Human graders provided ground truth for hypoFAF and estimated the delta.

Results: No pathological hypofluorescence was seen in normal eyes (28/28), and the total area of hypoDNIRA exceeded hypoFAF in 38/52 (73%) of eyes with GA. The 3 definitions of delta yielded distinct information, with large unifocal GA preferentially detected with the normalized ratio, complex shapes with the simple ratio, and overall dark phenotypes with the subtraction function. Four retina specialists diagnosed mitochondrial disease by FAF, but genetic testing was not part of the study. Human graders reached consensus regarding the delta only when images were highly similar. DNIRA was distinct from other imaging methods, and hypoDNIRA could increase or decrease over time.

Conclusions: DNIRA is dynamic and distinct from other modalities. It provides unique data dependent on the definition of "delta", and requires automated segmentation for cross-modal analysis. These data suggest that supplementation of standard imaging with DNIRA based biomarkers can help classify AMD. Its ability to predict disease requires larger sampling.

FT-RET-023

Retinal vascular abnormalities in the contralateral eyes of children with Coats' disease using ultra-widefield FFA

S. Yan¹, H. Zhou¹

¹Beijing Tongren Eye Center, Beijing Tongren Hospital, Beijing, China

Introduction: Coats' disease is considered as a unilateral condition with retinal vascular telangiectasia, aneurysmal dilatations and retinal exudation. This study aimed to describe the fundus abnormalities in the affected and fellow eyes of children with Coats' disease by using ultra-wide field imaging system, as well as to explore the clinical significance of peripheral abnormalities in the contralateral eyes.

Objectives: To investigate the retinal vascular abnormalities in the affected and fellow eyes of Coats' disease in children using ultra-widefield fundus fluorescein angiography.

Methods: Patients diagnosed with Coats' disease with complete clinical records and ultra-widefield fundus fluorescein angiography (UWFFA) images were retrospectively reviewed. Coats' affected eyes were staged according to Shields classification system. Retinal vascular abnormalities of the primary affected and fellow eyes were recorded by investigating the UWFFA.

Results: A total of 100 patients with Coats disease were included, of which 5 were clinically diagnosed with bilateral Coats disease. Among the 190 eyes of 95 patients with unilateral Coats' disease, there were 83 males (87.4%), and the mean age at presentation was 9.82 ± 3.81 years (4-18 years). 53 patients (55.8%) had right eye as the affected eye. Diseases stages were distributed as follows: 10 eyes (10.5%) with stage 2A, 51 eyes (53.7%) with stage 2B, 10 eyes (10.5%) with stage 3A1, 13 eyes (13.7%) with stage 3A2, 10 eyes (10.5%) with stage 3B, 1 eye (1.1%) with stage 4. All the fellow eyes of patients with Coats' diseases presented peripheral vascular abnormalities. 97.9% (93/95) fellow eyes had capillary bed abnormalities, manifested as peripheral capillary telangiectasia that most commonly located in the temporal periphery (95.8%). In 20% (19/95) of the fellow eyes, vascular leakage was present. In 62% (59/95) fellow eyes, microaneurysmatic abnormalities were found. 30.5% (29/95) fellow eyes had peripheral vascular tortuosity and 90.5% (86/95) eyes had peripheral right-angle vessels. 90.5% (86/95) retinal terminal vessels were loop pattern and 9.5% (9/95) were branching pattern.

Conclusions: UWFFA allows the detection of peripheral vascular changes in the fellow eyes of patients with Coats' disease. Coats' disease appears to be a highly asymmetric bilateral disease.

FT-RET-024

Quantification of intermittent retinal capillary perfusion in retinal vein occlusion and proliferative diabetic subjects

M. Bhalla¹, A. Athwal², T. Burdett², F. Ghaseminejad³, S. Han¹, D. Chan¹, M. Sarunic², E. Navajas¹

¹University of British Columbia, Vancouver, Canada, ²University College London, London, United Kingdom

Introduction: The retina is a metabolically demanding neural tissue with limited blood supply. Retinal vascular diseases affect the spatially and temporally variable demands of retinal tissue. Recent advances in optical coherence tomography angiography (OCTA) processing allow for visualization and quantification of these changes.

Objectives: To detect intermittent capillary perfusion using OCTA in patients with branch retinal vein occlusion (BRVO), central retinal vein occlusion (CRVO), proliferative diabetic retinopathy (PDR) and healthy control eyes.

Methods: The study was approved by the ethics committee of the University of British Columbia. OCTA images of the macular and temporal to the macula area were acquired using the Zeiss Plex Elite 9000 from 4 groups: BRVO (n=9), CRVO (n=8), PDR (n=8) and normal controls (n=10). Five 6x6mm scans were acquired at a baseline time point (T0) and thirty minutes after (T30) at the macula and temporal to the macula. The scans at T0 and T30 were registered and averaged providing one single high quality en face image of the superficial and deep plexus at each time point. Pixels were labeled vessel or non-vessel using a previously published machine learning model. Two flow measures were calculated: Loss of Perfusion (LoP) defined as the % of vessel pixels present in T0 image not present in T30, and Gain of Perfusion (GoP) defined as the % of vessel pixels present in T30 image not present in T0 image. The amount of intermittent capillary perfusion was the sum GoP+LoP (GoP+LoP).

Results: Regions of capillary perfusion and dropout across time-points could be observed amongst all groups, including the control group. All pathological groups showed higher GoP+LoP values than control ($p<0.05$), indicating a higher perfusion heterogeneity in patients with RVO and PDR. Additionally, the region temporal to the macula showed higher perfusion heterogeneity in capillary perfusion compared to the macula region in all groups including normal ($p<0.05$). Analysis between layers also shows higher variation in the deep plexus compared to the superficial plexus across all groups. There was a strong negative correlation between perfusion density and perfusion variation.

Conclusions: Our results highlight significant perfusion heterogeneity of capillary perfusion in BRVO, CRVO, and PDR patients compared to controls. Monitoring the capillary heterogeneity in these patients could provide utility in monitoring of the disease and in evaluating treatment efficacy.

FT-RET-025

Update on pegcetacoplan for geographic atrophy: clinical studies and real-world experience

S. Sadda¹, J. Heier², N. Steinle³, D. Boyer⁴, A. Abbey⁵, D. Eichenbaum^{6,7}, C. Li⁸, F. Yemany⁸, G. Dieckmann⁸, D. Pereira⁸, M. Tsuboi⁸, C. Bauma⁸, C. Wykoff^{9,10,11}

¹Doheny Eye Center UCLA, Pasadena, United States, ²Ophthalmic Consultants of Boston, Boston, United States, ³California Retinal Consultants/Retina Consultants of America, Santa Barbara, United States, ⁴Retina Vitreous Associates Medical Group, Los Angeles, United States, ⁵Texas Retina Associates, Dallas, United States, ⁶Retina Vitreous Associates of Florida, St. Petersburg, United States, ⁷Morsani College of Medicine at The University of South Florida, Tampa, United States, ⁸Apellis Pharmaceuticals, Waltham, United States, ⁹Retina Consultants of Texas, Houston, United States, ¹⁰Blanton Eye Institute, Houston, United States, ¹¹Houston Methodist Hospital, Houston, United States

Introduction: GALE (NCT04770545) is an ongoing, phase 3, multicenter, 3-year open-label extension study of pegcetacoplan in patients with geographic atrophy (GA) secondary to age-related macular degeneration (AMD) who completed the phase 3, 24-month OAKS (NCT03525600) or DERBY (NCT03525613) trials. This report provides updates of the efficacy and safety of pegcetacoplan as the clinical program proceeds.

Objectives: To report long-term efficacy and safety data through 36 months of continuous pegcetacoplan treatment from OAKS, DERBY and the initial 12 months of the GALE open-label extension study, including data based on fellow eye and GA lesion location, and to provide an update on real-world experience with pegcetacoplan.

Methods: After completion of the 2-years pivotal phase 3 OAKS and DERBY studies, which evaluated pegcetacoplan treatment vs sham for GA, patients could enroll in the GALE 3-year open-label extension study. Patients in the pegcetacoplan arms of OAKS and DERBY continued the same treatment regimen, pegcetacoplan monthly (PM) or pegcetacoplan every other month (PEOM), and patients who were on sham switched to pegcetacoplan at their same interval. Both subfoveal (SF) and nonsubfoveal (NSF) GA were included, and fellow eye development of CNV was non-exclusionary. Safety and efficacy data over 36 months are reported.

Results: 83% (n=782) of patients who completed OAKS and DERBY entered GALE, and 92% (n=727) who enrolled in GALE completed the first 12 months. Between Months 24 and 36, pegcetacoplan reduced GA growth vs projected sham in NSF GA by 42% with PM and 28% with PEOM, in SF GA by 31% with PM and 25% with PEOM, and in the overall (NSF and SF combined) population by 35% with PM and 24% with PEOM (all p<0.001; nominal). Over 36 months of continuous treatment starting from OAKS/DERBY enrollment, pegcetacoplan reduced GA growth vs projected sham in NSF GA by 32% with PM and 26% with PEOM; in SF GA by 21% with PM and 19% with PEOM, and in the overall population by 25% with PM and 20% with PEOM (all p-values <0.001 and nominal). In patients with bilateral GA, pegcetacoplan treatment over 36 months reduced GA growth in the study eye vs fellow eye by 21% with PM and 19% with PEOM (both p<0.0001; nominal). At Month 36, the mean area of retinal tissue preserved in NSF GA was 2.44 mm² with PM and 1.94 mm² with PEOM, equating to approximately 12,400-18,900 (PM) and 9,900-15,000 (PEOM) RPE cells saved respectively. The safety profile in the first 12 months of GALE was consistent with OAKS and DERBY (>18,000 through 12 months of GALE). The estimated rate of reported events of retinal vasculitis in the post-marketing setting remains rare (~0.01% per injection) with an estimated 152,000 injections administered in the real-world setting through 2023.

Conclusions: Long-term efficacy and safety of IVT pegcetacoplan were demonstrated in patients with GA secondary to AMD.

FT-RET-026

Choroidal and retinal abnormalities in Cushing syndrome: correlation with cortisol level

M. Zhang¹, J. Duan¹

¹Department of Ophthalmology, West China Hospital, Sichuan University, Chengdu, China

Introduction: Central serous chorioretinopathy (CSC) is the most common reason for vision loss in working-age men. Lately, CSC was classified as a pachychoroid spectrum disease. Glucocorticoid exposure is the strongest risk factor for CSC. Cushing syndrome (CS) refers to the constellation of clinical signs and symptoms resulting from chronic exposure to elevated cortisol level, due to pituitary or adrenal gland adenoma. Until now, the correlation between cortisol levels and choroidal/retinal abnormalities has not been established.

Objectives: To investigate the structure and blood flow of the retina and choroid in Cushing syndrome (CS) and their relationship with cortisol levels.

Methods: A consecutive series of CS patients with adrenocortical carcinoma were included in this study. Cortisol levels gradually returned to normal after adrenalectomy. Optical coherence tomography (OCT) and OCT angiography were used to assess CS patients before and after the surgery for retina and choroid. The luminal and interstitial areas of the choroid were calculated. The vessel density of retinal superficial capillary plexus and retinal deep capillary plexus, and choriocapillaris flow area (CCFA) were measured automatically by OCTA. Serum cortisol at 8 a.m. and midnight, 24h-UFC and adrenocorticotrophic hormone (ACTH) were measured before and after the adrenalectomy in all patients. Correlation analysis was performed between cortisol level and fundus changes.

Results: Compared with normal cortisol levels, CS patients had significantly lower central macular thickness (CMT) with increased cortisol level ($220.82 \pm 16.59 \mu\text{m}$ and $223.68 \pm 15.78 \mu\text{m}$, $p = 0.019$). While the central choroidal thickness (CCT) was higher with increased cortisol level ($255.18 \pm 105.89 \mu\text{m}$ and $205.94 \pm 87.04 \mu\text{m}$, $p < 0.001$). The choriocapillaris flow area (CCFA) was higher with increased cortisol level ($2.05 \pm 0.14 \text{ mm}^2$ and $2.00 \pm 0.13 \text{ mm}^2$, $p = 0.02$). The change of CCFA was correlated with the score of Huaxi Emotional-distress Index and 24-hour urine-free cortisol (24h-UFC).

Conclusions: The increased cortisol level was correlated with lesser CMT and thicker CCT. The decrease of CCFA was correlated with 24h-UFC, indicating the effect of increased cortisol level on choroidal vessels.

FT-RET-027

Factors related to visual prognosis of ophthalmic artery and its branch occlusion after cosmetic facial filler injection

C.-b. Sun¹, Z. Liu²

¹Eye Center, Second Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou, China,
²Department of Ophthalmology, Zhejiang Provincial People's Hospital, People's Hospital of Hangzhou Medical College, Hangzhou, China

Introduction: Ophthalmic artery and its branch occlusion is a rare but sight-threatening complication after cosmetic facial filler injection.

Objectives: To evaluate the clinical characteristics and factors related to visual prognosis of ophthalmic artery and its branch occlusion caused by cosmetic facial filler injection.

Methods: In this retrospective case study, a total of 26 patients with ophthalmic symptoms including visual loss, diplopia, or ptosis immediately after cosmetic facial filler injection were included. Clinical and imaging data of all patients were collected and analyzed.

Results: Among 26 patients, hyaluronic acid, autologous fat, and stem cell preparation was injected in 23, 2, and 1 case, respectively. Injection point was located in the forehead, glabella, nose, eyelid, and temporal scalp in 12, 8, 6, 4, and 1 case, respectively. Clinical manifestations included ophthalmic artery occlusion (2 cases), central retinal artery occlusion (7 cases), posterior ciliary short artery occlusion (9 cases, including 6 cases of anterior ischemic optic neuropathy, 3 cases of posterior ischemic optic neuropathy, and 2 cases of localized choroidal ischemia), extraocular muscle paralysis (6 cases), ptosis (4 cases), and mydriasis (2 cases). MRI examination revealed new focal cerebral infarctions in 2 cases. Among 18 patients with retinal or optic nerve involvement, 11 cases showed complete central retinal artery occlusion or diffuse ischemic optic neuropathy, and no visual improvement after treatment; 7 patients showed incomplete central retinal artery occlusion or segmental ischemic optic neuropathy, and evident visual improvement after treatment.

Conclusions: Visual prognosis of ophthalmic artery and its branch occlusion caused by cosmetic facial filler injection is poor. Incomplete central retinal artery occlusion, segmental ischemic optic neuropathy, and best corrected visual acuity ≥ 0.02 at baseline are main factors indicating a relatively good visual prognosis.

FT-RET-028

Effect of DEX injection during cataract surgery on retinal morphology and function in patients with diabetic retinopathy

X. Ma¹, N. Zhang¹, Y. Wei¹, C. Ma¹, S. Chen¹

¹Ophthalmology, The First Affiliated Hospital of Dalian Medical University, Dalian, China

Introduction: The poor visual prognosis after cataract surgery in diabetic patients may be related to postoperative complications.

Objectives: The aim of this study was to assess the retinal function and anatomical outcomes following intravitreal dexamethasone (DEX) injection during cataract surgery in patients with diabetic retinopathy complicated by diabetic macular edema (DME).

Methods: This retrospective, observational, single-center study aimed to evaluate the mean change in central macular thickness (CMT) from baseline to 1 month after surgery as the primary outcome. Secondary outcomes included the mean change in best corrected visual acuity (BCVA) at month 1 and 3, the mean change in CMT at month 3, changes in visual field electroretinogram at month 1 and occurrence of adverse events.

Results: A total of twenty-one patients (24 eyes) were included in this study. The average age of the patients was 69 years (range: 63-87 years), with male patients accounting for 61.9%. There was a significant reduction in mean (SD) CMT from baseline to one month post-surgery; from 447 μm (134 μm) to 341 μm (134 μm), ($p=0.0087$). BCVA also significantly improved from baseline; increasing from an average of 46 ETDRS letters (20 letters) to 59 ETDRS letters (22 letters), ($p=0.0375$). Electrophysiology analysis showed no significant change in b-wave amplitude between baseline and one-month follow-up, $12.69\pm 6.89\mu\text{V}$ vs $12.29\pm 6.30\mu\text{V}$, ($p=0.8347$). During the follow-up period, four eyes (16.7%) experienced high intra-ocular pressure which was successfully managed through local treatment.

Conclusions: Intravitreal DEX injection can effectively enhance both retinal anatomy and function among patients with DME following cataract surgery.

FT-RET-029

Bilateral panuveitis and arteritis post intravitreal faricimab injection

J. Xiong^{1,2}, Y. Kapucu¹, P. Mitchell^{1,3}

¹Sydney West Retina, Westmead, Sydney, Australia, ²University of Sydney, Save Sight Institute, Sydney, Australia, ³University of Sydney, Clinical Ophthalmology & Eye Health, Westmead Clinical School, Sydney, Australia

Introduction: Intraocular inflammation with arteritis has not yet been described in literature as an adverse outcome of intravitreal faricimab injection. This case report aims to report a patient presenting with panuveitis and arteritis following intravitreal faricimab injections for diabetic macula oedema.

Objectives: To describe the first reported case of bilateral panuveitis and arteritis after intravitreal faricimab injection for diabetic macula oedema.

Methods: Case report.

Results: A 73-year-old female presented for routine review with a 3 week history of bilateral conjunctival injection and discomfort, post bilateral faricimab intravitreal injection for diabetic macular oedema. She had a 20 year history of poorly controlled diabetes, with bilateral severe non-proliferative diabetic retinopathy and diabetic macula oedema. Her visual symptoms developed 3 weeks after her fourth faricimab injection. Visual acuity on presentation was right eye (RE) 6/15 and left eye (LE) 6/30, with intraocular pressures of RE 14mmHg and LE 17mmHg. Slit lamp examination revealed bilateral keratic precipitates and pan-uveitis with arteriolar sheathing. Fundus photography and fundus fluorescein angiogram revealed non-occlusive retinal arteritis. A uveitis screen was conducted for infective and inflammatory causes which were negative. The patient was commenced on hourly topical steroids.

At 48 hours, intraocular pressures increased to RE 46mmHg and LE 19mmHg. The patient was commenced on oral acetazolamide and topical therapy. Systemic steroids were avoided due to the patient's poorly controlled diabetes, and periocular steroids were avoided given the likely steroid response after topical steroid therapy. At 1 week review, vision was stable in the RE (6/18) and improved in the LE (6/18), with resolving anterior uveitis. The vitritis and vasculitis remained stable. The patient is currently undergoing further reviews as follow up.

Conclusions: To our knowledge, this is the first reported case describing bilateral panuveitis and arteritis post intravitreal faricimab injection. It is thus important to closely monitor intraocular pressures and inflammation in patients receiving intravitreal faricimab injections, given the absence of pain and minimal symptoms. This case also highlights the need for further reports of intraocular inflammation and vasculitis to better improve management.

FT-RET-030

Effects of intravitreal injection of ranibizumab combined with Ozurdex on clinical efficacy in patients with BRVO-ME

M. Nabijiang¹, L. Ding²

¹The Department of Ophthalmology, People's Hospital of Xinjiang Uygur Autonomous Region, Urumqi, China, ²Ophthalmology, The People's Hospital of Xinjiang Uygur Autonomous Region, Urumqi, China

Introduction: Retinal vein occlusion-induced macular edema (RVO-ME) is a significant global cause of vision loss, with the effectiveness of combined anti-vascular endothelial growth factor (anti-VEGF) drugs and dexamethasone implantation (DEX I) being a relevant, yet not thoroughly explored, area of interest.

Objectives: To investigate the effect of intravitreal implant of ranibizumab combined with dexamethasone on vascular endothelial growth factors (VEGFs), interleukins (ILs) and clinical efficacy in patients with branch retinal vein occlusion complicated with macular edema (BRVO-ME).

Methods: Seventy-four patients (74 eyes) with BRVO-ME treated in our hospital from February 2021 to July 2022 were randomly divided into monoclonal antibody treatment group (n=37) and combination treatment group (n=37): Monoclonal antibody treatment group was treated with ranibizumab, and combined treatment group was treated with dexamethasone intravitreal implant on the basis of ranibizumab. Ophthalmologic indexes (intraocular pressure (IOP), macular foveal thickness (CMT)), best-corrected visual acuity (BCVA), anterior aqueous humor VEGFs (VEGF-A, VEGF-B), anterior aqueous humor ILs (IL-6, IL-8) levels and the incidence of adverse events were compared between the two groups before treatment and after 3 months and 6 months of treatment.

Results: The mean CMT, BCVA, VEGF-A, IL-6, IL-8 levels in the anterior aqueous humor of the patients in the combined treatment group were significantly lower than those before treatment and in the mAb treatment group at the 3rd and 6th month of treatment ($P < 0.05$). There were no significant differences in IOP and VEGF-B level in anterior aqueous humor between the groups ($P > 0.05$). There were no significant differences in the incidence rates of adverse events between the two groups ($P > 0.05$).

Conclusions: Compared with anti-VEGF monoclonal antibody alone, combined with dexamethasone intravitreal implant therapy can significantly improve the visual acuity and ocular symptoms of BRVO-ME patients, and reduce the inflammatory factors in aqueous humor, which has a broad clinical application prospect.

FT-RET-031

Long-term observation of treatment strategies for primary vitreoretinal lymphoma: a single-center experience in China

M. Zhang¹, Y. Tuo¹, Y. Qian¹, X. Zhang¹, R. Dai¹, Y. Zhang², W. Zhang²

¹Department of Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China, ²Department of Hematology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

Introduction: There is no achieved consensus on the best therapeutic approach for patients with primary vitreoretinal lymphoma (PVRL) without documented central nervous system (CNS) manifestations.

Objectives: This study aimed to evaluate the outcomes of different regimens for PVRL in the prevention of subsequent central nervous system lymphoma (CNSL).

Methods: This retrospective study collected 31 PVRL patients (58 eyes) with no CNSL manifestations from January 2015 to August 2022 in the Ophthalmology Department of Peking Union Medical College Hospital. We reviewed clinical manifestations, laboratory evidence and therapeutic regimens of these patients, focusing on the incidence of CNS involvement during follow-up.

Results: Among the 31 patients with PVRL, 13 patients received only intravitreal injection of methotrexate (group A), and 18 patients received combined intraocular and systemic treatment (group B). Twelve (38.7%) patients achieved complete response (CR). The median follow-up time of 31 patients was 46.6 months, the median progression-free survival (PFS) was 18.8 months, and the median overall survival (OS) was 42.8 months. The 5-year cumulative survival rate was 50.0% in group A and 88.2% in group B, with no significant difference between the two groups ($P = 0.18$). Overall, CNSL developed in 21 of 31 patients (67.7%) during follow-up. Specifically, CNSL developed in 11 of 13 patients (84.6%) in group A, and 10 of 18 (55.63%) in group B. The 5-year cumulative survival rate was lower in patients with CNSL (59.0%) than in patients without CNSL (100%), and there was no statistically significant difference between treatment groups ($P=0.11$). Adverse systemic effects occurred in 10 of 18 (55.6%) patients receiving systemic chemotherapy; the most common adverse effect was gastrointestinal complaint.

Conclusions: For patients with isolated PVRL, treatment with intraocular injection of MTX combined with systemic intervention can delay CNS involvement, but can not significantly reduce the progression of CNSL.

FT-RET-032

Arctiin ameliorates disease severity by inhibiting Th17 differentiation in EAU disease

*X. Fan*¹, *M. Xu*²

¹Ophthalmology, Jincheng People's Hospital, Jincheng, China, ²Tianjin Key Laboratory of Retinal Functions and Diseases, Tianjin Medical University Eye Hospital, Tianjin, China

Introduction: Adiponectin receptor activator (arctiin) promotes Treg cell differentiation and ameliorates experimental autoimmune uveitis (EAU).

Objectives: In this study, we investigated the effects of an adiponectin receptor activator on Treg cell fate (mitochondrial metabolism, differentiation, and immune-suppressive function) in vitro and in vivo, and identified its precise molecular mechanisms in the context of EAU.

Methods: Collect plasma and peripheral blood mononuclear cell (PBMC) samples from Vogt-Koyanagi-Harada (VKH) patients and investigate the expression levels of adiponectin and its receptor in uveitis using ELISA, Western blot, qPCR, and flow cytometry. EAU and administer arctiin at different stages of the disease. Use fundus photography, optical coherence tomography (OCT), and flow cytometry to observe the effect of arctiin on the severity of EAU and the differentiation and function of Treg cells. Induce differentiation of CD4⁺ T cells into Th1, Th17, and Treg cells in vitro and treat them with adiponectin and its receptor activator to investigate the effect of receptor activation on T cell differentiation. Finally, sort Treg cells in vitro and in vivo, and use techniques such as transcriptomics, metabolomics, protein chips, and ChIP-seq to explore the molecular mechanisms by which adiponectin receptor activation regulates Treg cell fate.

Results: In the EAU model, injection of adiponectin receptor activator (arctiin) significantly reduced the clinical score of EAU and increased the number of Treg cells in the eye. In the T cell differentiation experiment in vitro, adiponectin receptor activator (arctiin) significantly promoted the differentiation of Treg cells, increased the basal metabolic rate of Treg cells, and promoted mitochondrial fatty acid oxidation. Transcriptomics and metabolomics analysis showed that adiponectin and its receptor activator (arctiin) could activate the PPAR- γ signaling pathway of Treg cells, promote mitochondrial fatty acid oxidation-driven oxidative phosphorylation, up-regulate the expression of Foxp3, and promote the differentiation and immune inhibitory function of Treg cells.

Conclusions: The signaling pathway regulated by adiponectin and its receptor, by activating the adiponectin receptor and regulating mitochondrial fatty acid metabolism-driven oxidative phosphorylation, can promote the differentiation and function of Treg cells, and plays a key role in the occurrence and development of EAU.

FT-RET-033

Gai1/3 mediate MYDGF signaling to regulate retinal vasculopathy

K. Li^{1,2}, Y. Yao^{1,2}, S. Wang^{1,2}

¹Department of Ophthalmology, The Affiliated Eye Hospital of Nanjing Medical University, Nanjing, China, ²The Fourth School of Clinical Medicine, Nanjing Medical University, Nanjing, China

Introduction: Retinal neovascularization (RNV) is the main pathological feature of proliferative diabetic retinopathy (PDR). Recent studies have focused on the pro-RNV functions of non-VEGF growth factors. The study mainly focused on the role of Gai1/3-mediated myeloid-derived growth factor (MYDGF) signal transduction in promoting RNV, aiming to provide new therapeutic targets for DR.

Objectives: This study focuses on the key role of Gai1/3-mediated MYDGF signaling in promoting RNV.

Methods: By using strategies including shRNA, CRISPR/Cas9, knockout cell lines, and Gai1/3 DKO mice, we focused on the role and the mechanism of Gai1/3 in mediating MYDGF signal transduction and regulating retinal vascular endothelial cell (RVEC) functions, in vitro and in vivo. To inhibit RNV in DR mice, strategies will be utilized to intervene MYDGF-Gai1/3 pathway.

Results:

- The expression of MYDGF and Gai1/3 was significantly increased in the retinal fibrovascular membrane tissues of PDR patients, with downstream Akt-mTOR and Erk1/2 signaling activated.
- In vitro, gradient concentrations of MYDGF stimulation promoted tube formation and sprouting of RVECs. Knockdown of the signaling proteins Gai1/3, using shRNA, significantly inhibited RVEC migration, tube formation, and proliferation.
- In vivo, intravitreal injection of lentiviral MYDGF shRNA inhibited retinal vascular development and angiogenesis in laser-induced choroidal neovascularization mice model. Furthermore, Gai1/3 knockdown and knockout both inhibited hyperoxia-induced RNV.
- Gai1/3 knockdown significantly inhibited MYDGF-induced Akt-mTOR and Erk activation.

Conclusions: The pathological process of DR is accompanied by the production of a large amount of MYDGF, which promotes RNV. In the MYDGF signaling pathway, Gai1/3, as a key signaling molecule, mediates the activation of downstream Akt-mTOR and Erk-MAPK, thus promoting the survival, proliferation, and migration of RVEC and finally inducing RNV. Conversely, targeted intervention of MYDGF-Gai1/3 pathway may effectively inhibit RNV in related diseases.

FT-RET-034

Involvement of *Lgals3* in choroidal neovascularization and subretinal fibrosis formation

Y. Liu^{1,2}, D. Wu^{1,2}, X. Fang^{1,2}

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University,, Hang Zhou, China, ²Zhejiang Provincial Key Laboratory of Ophthalmology, Zhejiang Provincial Clinical Research Center for Eye Diseases, Zhejiang Provincial Engineering Institute on Eye Diseases, Hang Zhou, China

Introduction: Age-related macular degeneration (AMD) is the leading cause of irreversible blindness worldwide in patients over 65 years. The vascular endothelial growth factor (VEGF) plays an essential role in the development of choroidal neovascularization (CNV). Anti-VEGF therapy has become the first-line treatment for improving visual acuity in nAMD patients, however, a large percentage of patients still suffer from poor response to anti-VEGF therapy. As a result, the potential molecular target which can inhibit the development of both CNV and subretinal fibrosis in nAMD still needs to be explored.

Objectives: *Lgals3*/galectin-3 plays a pivotal role in many vascular diseases. However, the involvement of *lgals3*/galectin-3 in eyes with nAMD remains unknown. The purpose of this study was to investigate the role of *lgals3* in nAMD using the mouse model of laser-induced CNV.

Methods: Laser photocoagulation was performed to induce CNV in mice. Seven days after laser treatment, the gene and protein expression levels of *lgals3* were evaluated using real-time quantitative PCR and immunoblot. Intravitreal injection of *lgals3*-siRNA was performed after laser induction, and the size of CNV and subretinal fibrosis was evaluated using flat mount technique.

Results: *Lgals3*/galectin-3 was significantly upregulated in the RPE/choroidal complex of CNV mice. Intravitreal injection of *lgals3*-siRNA significantly suppressed the area of CNV and subretinal fibrosis, together with M_{cp}-1 decline. Moreover, hypoxia induced *lgals3*/galectin-3 production in ARPE-19 cells, which was reduced by silencing hypoxia-inducible factor -1 α (Hif-1 α).

Conclusions: Our present data demonstrated that *lgals3*/galectin-3 is involved in the pathogenesis of CNV and subretinal fibrosis, and *lgals3*/galectin-3 could be a potential therapeutic target for nAMD.

FT-RET-035

Targeted lipidomics uncovers oxylipin perturbations in Bietti's crystalline dystrophy

Q. Li¹, X. Jiao², J. Fielding Hejtmancik², Z. Jin³, X. Peng¹

¹Ophthalmology, Beijing Tongren Eye Center, Beijing, China, ²National Eye Institute, Bethesda Maryland, United States, ³Beijing Institute of Ophthalmology, Beijing Tongren Eye Center, Beijing, China

Introduction: Abnormal lipid metabolism was observed in Bietti's crystalline dystrophy (BCD), though detailed pathogenesis still remains unclear. We carried out a targeted lipidomic study specifically focusing on the long chain PUFAs (LCPUFA) and the associated oxylipins.

Objectives: To characterize the plasma lipid profiles of patients with BCD.

Methods: The case-control cross-sectional study prospectively recruited 64 participants with genetically confirmed BCD and 64 healthy participants with age, gender, and body mass index matched for each patient. All participants were genetically confirmed by *CYP4V2* gene sequencing and underwent retinal imaging examinations for evaluation of chorioretinopathy. Fasting blood samples of BCD patients and controls were collected, and plasma was analyzed for routine lipid profiles. Long chain polyunsaturated fatty acids (LCPUFA) and associated eicosanoid metabolites were evaluated by high performance liquid chromatography coupled with tandem mass spectrometry (HPLC-MS/MS). The levels of plasma lipids in participants with BCD was compared with controls and evaluated for correlation with severities of chorioretinopathy.

Results: Routine lipids profiles showed elevated plasma levels of triglyceride ($P=0.043$) and low-density lipoprotein cholesterol ($P=0.024$) in BCD patients. Lipidomic analysis showed significantly decreased levels of ω -3 LCPUFA including docosahexaenoic acid (DHA, 22:6, $P=0.00068$) and eicosapentaenoic acid (EPA, 20:5, $P=0.0016$), as well as ω -6 LCPUFA arachidonic acid (ARA, 20:4, $P<0.0001$) in BCD patients. Eicosanoid metabolites, either derived from ω -3 and/ or ω -6 LCPUFAs via cyclooxygenase (COX) or lipoxygenase (LOX) pathways, including 5-HEPE, 12-HEPE, 13-HDHA, 15-HETE, 12-HETE, 5-HETE, 6k-PGF1a, PGE2, PGJ2, and TXB2, exhibited significant differences ($P<0.0001$) between BCD patients and healthy controls. Meanwhile, increases in plasma levels of oleic acid (18:1, ω -9 monounsaturated fatty acid, $P=0.020$), 12,13-EpOME (linoleic acid (18:2) metabolite through the cytochrome P450 (CYP) pathway, $P=0.012$) and 11,12-DHET (ARA metabolite through CYP pathway, $P=0.0043$) were found in BCD patients.

Conclusions: BCD patients demonstrated significant decreases in plasma levels of ω -3 and ω -6 LCPUFA (DHA, EPA, and ARA), as well as their downstream metabolites via the COX and LOX pathways, suggesting that these might be implicated in BCD pathogenesis and could serve as systemic biomarkers and therapeutic targets of the disease.

FT-RET-036

PKG-mediated phosphorylation of TOP2A activates HDAC to drive epigenetic modulation and photoreceptor death for IRD

K. Jiao¹, Y. Dong¹, J. Yan¹, H. Peng¹, Z. Hu¹, H. Liu¹, F. Paquet-Durand²

¹Key Laboratory of Yunnan Province, Yunnan Eye Institute, Affiliated Hospital of Yunnan University, Yunnan University, Kunming, China, ²Institute for Ophthalmic Research, Eberhard-Karls-Universität Tübingen, Tübingen, Germany

Introduction: Inherited retinal degeneration (IRD) encompasses a heterogeneous group of debilitating ocular conditions marked by progressive photoreceptor loss, with retinitis pigmentosa being the most prevalent among them, affecting approximately 1 in 4,000 individuals globally. Despite the genetic diversity of IRD, a unifying mechanistic aspect is the dysregulation of cyclic guanosine-3', 5'-cyclic monophosphate (cGMP). Research has shown that elevated levels of cGMP often lead to photoreceptor cell death, thereby accelerating retinal degeneration (RD). This dysregulation implicates a complex network of molecular actors, prominently featuring protein kinase G (PKG). PKG has been identified as a key mediator in the cGMP-dependent pathway, responsible for phosphorylating serine and threonine of their downstream targets that influence cell survival and apoptosis. Despite significant advancements in understanding these cGMP and PKG-related degenerative pathways, efficacious treatments for IRD remain elusive, making it a compelling area of unmet clinical need.

Objectives: This study aimed to investigate the role of DNA topoisomerase II alpha (TOP2A) and its interplay with protein kinase G (PKG) and histone deacetylase (HDAC) in a mice model of inherited retinal degeneration (*rd1* mice).

Methods: Immunofluorescence and quantitative analyses were employed to evaluate the expression of TOP2A and other related markers. Specific inhibitors TSC24 and SAHA were used to elucidate the effects of TOP2A and HDAC, respectively. Furthermore, we examined the role of TOP2A in the PKG/HDAC signaling axis using KT5823, a PKG inhibitor.

Results: Significant upregulation of TOP2A was observed in *rd1* mice compared to wild-type (WT) controls, especially in the outer nuclear layer (ONL). Phosphorylation levels of TOP2A strongly correlated with photoreceptor cell death. Treatment with TSC24, a TOP2A-specific inhibitor, significantly reduced TOP2A-positive and TUNEL-positive cells. Moreover, TOP2A phosphorylation led to HDAC activation, which was mitigated by TSC24. We also found that PKG activates HDAC through TOP2A phosphorylation.

Conclusions: Our findings provide novel insights into the role of TOP2A in IRD, implicating its functions in HDAC activation and the PKG/HDAC axis, thereby offering potential therapeutic targets for combating this debilitating condition.

FT-RET-037

Baicalin ameliorates retinal neovascularization by inhibiting AKT/Nrf2/Hmox1 signaling pathway

M. Wang¹, Q. Li¹, Y. Liu¹, H. Song¹, W. Shen¹

¹ophthalmology, Changhai Hospital, Shanghai, China

Introduction: Retinal vascular diseases, such as diabetic retinopathy, primarily manifest through abnormal proliferation of retinal neovascularization. Baicalin, a flavonoid derived from the root of *Scutellaria baicalensis*, has been reported to possess inhibitory properties against tumor neovascularization.

Objectives: The aim of this study was to investigate the impact of baicalin on retinal neovascularization by inhibiting protein kinase B (AKT)/nuclear factor E2-related factor 2 (Nrf2)/heme oxygenase 1 (Hmox1) signaling pathway.

Methods: The retinal development model and oxygen-induced retinopathy (OIR) model were established in neonatal C57BL/6 mice, and the mice were divided into control group and baicalin group. In the control group, dimethyl sulfoxide (DMSO) was intraperitoneally injected, while in the baicalin group, baicalin was intraperitoneally administered. Immunofluorescence staining was performed on the retinal tissue samples obtained. In vitro experiments were conducted to assess the effects of baicalin on the proliferation, migration, and sprouting of human umbilical vein endothelial cells (HUVECs). RNA sequencing (RNA-seq) was employed to identify potential targets of baicalin, which were subsequently validated using Western blot analysis.

Results: Compared to the control group, baicalin injection in neonatal mice significantly reduced vascular density, the number of tip cells, branching points, and proliferative endothelial cells. Additionally, it significantly decreased retinal neovascularization and proliferative endothelial cells in OIR mice. In vitro experiments demonstrated that baicalin effectively inhibited the proliferation, migration, and sprouting of HUVECs. RNA-seq analysis revealed that baicalin suppressed the expression of Hmox1, and Western blot results indicated that baicalin inhibited the AKT/Nrf2/Hmox1 signaling pathway.

Conclusions: This study suggests that baicalin improve retinal neovascularization by inhibiting the AKT/Nrf2/Hmox1 signaling pathway. Therefore, it has the potential to serve as a viable treatment for pathological angiogenesis.

P-RET-001

Patients with retinopathy of prematurity may have a higher risk of developing glaucoma: a population-based cohort study

Y.-Y. Chen^{1,2}

¹Department of Ophthalmology, Taichung Veterans General Hospital, Taichung, Taiwan, China ,

²School of Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan, China

Introduction: Previous case reports highlighted glaucoma occurrences in retinopathy of prematurity (ROP) patients, noting an increased risk with laser treatment over intravitreal injection (IVI) of antivascular endothelial growth factor (anti-VEGF). However, large-scale studies on glaucoma as a long-term ROP complication are limited. Therefore, we conducted the nationwide population-based cohort study.

Objectives: We compared the subsequent risk of glaucoma among patients with ROP and those without prematurity. We also investigated if laser treatment was associated with an increased risk of glaucoma development among those with ROP.

Methods: Utilizing the Taiwan National Health Insurance Research Database, we identified newborns diagnosed with ROP from 2008 to 2020. A comparison group comprising individuals without prematurity was randomly selected in a 4:1 ratio to the ROP cohort, matched based on age, sex, and year of enrollment. Cox regression analysis was employed to calculate hazard ratios (HRs) for subsequent glaucoma development. Specifically, within the ROP cohort, we focused on patients with stage III ROP and categorized them into two subgroups based on whether they underwent laser treatment or not. The risk of glaucoma incidence was then compared between the laser-treated subgroup and those treated with IVI of anti-VEGF.

Results: The ROP group consisted of 2,841 patients, while the comparison group comprised 11,364 individuals matched for age and gender. During the study period, glaucoma developed in 336 (11.8%) of the ROP group compared to 1.9% of the comparison group ($p < 0.001$). Cox regression analysis indicated a significantly higher hazard of glaucoma in the ROP group compared to the comparison group (HR = 6.08; 95% confidence interval [CI], 5.49–6.61). Within the subset of patients with stage III ROP, those who received laser treatment exhibited a significantly elevated risk of glaucoma compared to the IVI anti-VEGF group (HR = 2.61; 95% CI, 1.84–3.48).

Conclusions: This nationwide population-based cohort study revealed that patients with ROP had a significantly higher risk of subsequent glaucoma than those without prematurity. Among patients with ROP, laser treatment was a significant risk factor of glaucoma compared to IVI anti-VEGF treatment.

P-RET-002

A caspase-3 inhibitor nanoparticles inhibitor RPE cell proptosis in model of dry AMD

Y. Chen¹, Y. Yin¹, H. Xiao²

¹Ophthalmology, China-Japan Friendship Hospital, Beijing, China, ²Beijing National Laboratory for Molecular Sciences, State Key Laboratory of Polymer Physics and Chemistry, Institute of Chemistry, Chinese Academy of Sciences, Beijing, China

Introduction: Age related macular degeneration (AMD) is one of the main causes of progressive loss of central vision. Dry AMD is characterized by local atrophy of the retinal pigment epithelium (RPE), accounting for about 90% of all AMD cases. Recently, studies have found that caspase-3/GSDME mediated cell pyroptosis plays an important role in the pathological process of dry AMD. Therefore, inhibiting RPE cell proptosis and retinal reactive oxygen species (ROS) have become one of the strategies for treating dry AMD.

Objectives: To investigate the effect of a nanoparticle encapsulating the caspase-3 inhibitor Z-DEVD-FMK in vitro model of dry AMD.

Methods: This study designed a nanopolymer carrier that encapsulated the caspase-3 inhibitor Z-DEVD-FMK to form nanoparticles (NP). The characteristics of nanoparticles were detected by electron microscopy, particle microscopy, HPLC, and UV absorption. ABTS was used to validate the reactive oxygen species (ROS) scavenging ability of nanoparticles. A NaIO₃ induced ARPE-19 cell model of dry AMD in vitro was used in our study. The cell protective ability of NP was tested through MTT assay and cell apoptosis assay. The tissue penetration and cellular uptake ability of NP were tested through 3D cell model assay and endocytosis assay. We investigate the ROS clearance ability of NP in cells through ROS probes, and the inhibitory ability on caspase-3/GSDME pathway proteins through immunofluorescence staining and Western blot assay.

Results: Compared with the small molecule drug Z-DEVD-FMK, NP has better cell protection and ROS clearance ability. NP is easier to penetrate tissues and is taken up by cells faster. NP can significantly reduce the expression of caspase-3/GSDME cell pyroptosis pathway proteins.

Conclusions: Nanoparticles have good biosafety and therapeutic effects in vitro models of dry AMD, making them potential therapeutic strategies for dry AMD.

P-RET-003

The expanded clinical spectrum of autosomal recessive bestrophinopathy

*S.R Nowilaty*¹

¹Vitreoretinal Division, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

Introduction: Autosomal Recessive Bestrophinopathy (ARB) is readily diagnosed when its classic features are present: characteristic subretinal hyper-autofluorescent (AF) vitelliform lesions, perimacular pigmentary alterations, and a cystoid maculopathy with subretinal fluid.

Objectives: To describe the full clinical spectrum of ARB including atypical presentations, late presentations and carrier features in a large cohort of consanguineous patients with ARB and homozygous variants in *BEST1*.

Methods: Retrospective case series of 40 consanguineous ARB patients and evaluation of their asymptomatic family members by fundus examination, electro oculography (EOG), and genetic testing.

Results: All patients (age 4 to 40, mean 25 years) were consanguineous and hyperopic. Typical ARB features included subretinal hyper-AF yellow deposits (90%), perimacular pigmentary changes (60%), submacular fluid/schisis (95%), and submacular fibrosis (45%). Atypical presentations were encountered in 30% of cases and included:

- 1) peripheral retinal paravascular locations of the yellow deposits which resorbed over time leaving characteristic pigmentary streaks;
- 2) a single central macular vitelliform lesion resembling autosomal dominant vitelliform dystrophy with no hyper-AF signal beyond the macula;
- 3) isolated diffuse perimacular hyper-AF without clinically visible lesions encountered particularly, but not always, in older subjects;
- 4) isolated central serous chorioretinopathy-like picture which was only recognized after lengthy history taking and family members examination;
- 5) and cases of isolated narrow angle glaucoma recognized as ARB only after careful macular optical coherence tomography (OCT) scans detected a discrete separation at the interdigitation zone. In all cases ARB diagnosis was supported by electrophysiology and family members examination and confirmed with genetic testing. Asymptomatic heterozygous family members showed pinpoint macular or mid-peripheral white or hypopigmented retinal pigment epithelial changes which correlated with their carrier state in 84% of cases.

Conclusions: A high degree of suspicion is required to correctly diagnose non-classic presentations of ARB. This presentation will highlight these atypical cases. Careful fundus examination, history taking, correct macular OCT analysis, and family members examination are essential for establishing the diagnosis of ARB, avoiding erroneous treatments and permitting to monitor patients for glaucoma and deliver appropriate genetic counseling.

P-RET-004

Comparison of the efficacy of subthreshold micropulse laser vs anti-VEGF therapy for central serous chorioretinopathy

Z. Chen¹, J. Li¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Central serous chorioretinopathy is a common macular disease. The study aimed to analyze the clinical effectiveness and anatomical changes of subthreshold micropulse laser (SML) and intravitreal anti-VEGF injection (IVA) in the treatment of central serous chorioretinopathy (CSCR) using multimodal imaging examination.

Objectives: To compare the therapeutic ability between 577-nm SML and IVA in CSCR treatment.

Methods: The medical records of 50 eyes of 49 patients who underwent IVA injection (30 eyes) or SML (20 eyes) for the treatment of CSCR were reviewed. All participants were followed up for six months. The changes in best-corrected visual acuity (BCVA), central retinal thickness (CRT), subretinal fluid (SRF) and subfoveal choroidal thickness (SFCT) values from OCT at 1st month, 3rd month and 6th month of follow-up visit were evaluated among the groups.

Results: The baseline characteristics (age, gender, type of leakage in FA, BCVA, CRT, SRF, SFCT) of the patients were not significant between the groups (all $p > 0.05$). The mean \pm SD of SML sessions and IVA injection were 1.67 ± 0.80 and 1.75 ± 0.97 , respectively ($p > 0.05$). In comparison to the baseline values, the BCVA at the 6th months after treatment showed considerable improvement in both groups ($p < 0.05$), while the CRT, SRF and SFCT values prominently decreased at the final evaluation visit (all $p < 0.05$). No statistically significant difference was revealed in the BCVA and CRT data of all time points between the two groups (all $p > 0.05$). At baseline, 1st, and the 3rd month, there was no statistically significant difference for the SRF and SFCT values between the two groups ($p > 0.05$). However, at the 6th month, the SRF in the SML group was noticeably lower than in the IVA group ($p < 0.05$), while the SFCT in the SML group was markedly higher than in the IVA group ($p < 0.05$). No complication was observed during follow-up period in both groups.

Conclusions: The effectuality of SML and anti-VEGF treatment has been confirmed both functionally in terms of BCVA and anatomically through OCT, as demonstrated by the decrease in CRT, SRF and SFCT in the two groups. During the follow-up period, it has been observed with a greater reduction of SFCT in the IVA group, and more absorption of SRF in the SML group.

P-RET-005

UFW SS-OCTA replaces fluorescein fundus angiography to guide the photocoagulation treatment in retinal vascular diseases

Y. Luo¹, T. Lan¹, C. Huang¹

¹Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China

Introduction: FFA is the gold standard for the diagnosis of retinal vascular diseases, and determine whether to perform retinal photocoagulation therapy or not. FFA is an invasive and time-consuming examination which can cause potential adverse reactions. OCTA has realized the imaging of retinal and choroid blood vessels in live tissue, which has the advantages of convenience, fast, repeatable operation, and quantization. The newest Intalight UWF SS-OCTA (VG200, Intalight Imaging, Ltd., Luoyang, China) can capture a 29 × 24 mm (150° FOV) angiography image and achieve an automatic montage image of a 220° FOV.

Objectives: This study aimed to investigate the feasibility of ultra-widefield swept source optical coherence tomography angiography (UWF SS-OCTA) replacing fluorescein fundus angiography (FFA) to guide photocoagulation treatment for retinal vascular diseases.

Methods: A total 290 eyes of 195 patients with retinal vascular disease, such as retinal vein occlusion (RVO), diabetic retinopathy (DR), and retinal vasculitis, were enrolled in this study. All these patients underwent using UWF SS-OCTA (VG200, Intalight imaging, Ltd., Luoyang, China) examination with a single scan image and the widefield AngioMosaic image, and some patients also underwent FFA and fundus photography when necessary. The abnormal signs such as retinal non-perfusion area and the laser spot were analyzed to guide the performance of retinal photocoagulation.

Results: Intalight UWF SS-OCTA captured a 29×24 mm angiography image by a single scan, and achieved a montage image of a 220° field of view. OCTA images of retinal superficial vascular complex clearly showed the retinal non-perfusion area (NPA), retinal neovascularization, and intraretinal microvascular abnormalities. The laser spots were clearly displayed on the OCTA image of the choroidal capillary layer with the enhanced Angio mode. 34.3% RVO patients, 15.8% DR patients, and 20% patients with retinal vasculitis started initial retinal photocoagulation therapy, and 13.9% RVO patients, 13.6% DR patients, and 60% patients with retinal vasculitis needed supplementary retinal photocoagulation, respectively.

Conclusions: The UWF SS-OCTA images of the retinal superficial vascular complex and the choroidal capillary layer with the Enhanced Angio mode can effectively replace FFA image to guide photocoagulation treatment of retinal vascular diseases, which is non-invasive, convenient, fast, large range, high resolution, safe and efficient.

P-RET-006

Normal values of the macula vessel density in healthy adults using optical coherence tomography angiography

M. Abrishami^{1,2}, H.R. Heidarzadeh¹, A. Bolouki¹, N. Shoeibi¹, S.M. Hosseini¹, E.E. Miandehi³

¹Eye Research Center, Mashhad University of Medical Sciences, Mashhad, Iran, Islamic Republic of, ²Ocular Oncology Service, Department of Ophthalmology and Visual Sciences, University of Toronto, Torontocana, Canada, ³Persian Cohort Research Center, Mashhad University of Medical Sciences, Mashhad, Iran, Islamic Republic of

Introduction: There is a scarcity of research focusing on the normal parameters of Macula Vessel Density (VD) and Foveal Avascular Zone (FAZ), with existing studies often constrained by limited sample sizes. Addressing this gap, we embarked on a comprehensive investigation aimed at establishing normative values for FAZ and macular VD within the population of our region. Our study, conducted on a large scale, aimed to overcome the limitations of previous research and provide robust data on these crucial parameters. Through meticulous data collection and analysis, we sought to contribute valuable insights into the understanding of ocular health within our population. Our findings promise to enhance clinical practice by offering reliable benchmarks for the assessment of macular vascular characteristics, thereby facilitating early detection and management of ocular diseases.

Objectives: To determine normal macular vessel density (VD) and foveal avascular zone (FAZ) values using optical coherence tomography angiography (OCTA) analysis in healthy adults from northeast Iran.

Methods: As part of the Prospective Epidemiological Research Studies in Iran (PERSIAN) Organizational Cohort study at Mashhad University of Medical Sciences (POCM), we conducted a cross-sectional study using 3×3 and 6×6mm OCTA scans to evaluate the VD of the macular superficial capillary plexus (SCP), deep capillary plexus (DCP), and the FAZ area in healthy adults.

Results: The study included 792 participants, with an average age of 39.8 years and a standard deviation of 6.8 years. The mean values of various parameters were measured, including the right eye whole image SCP and DCP VDs, FAZ area, FAZ perimeter, and fovea 300 μm area vessel density (FD). These values were found to be 45.9±2.6%, 50.2±3%, 0.3±0.1mm², 2.1±0.4mm, and 50.4±3.3%, respectively. Females and younger participants had significantly higher mean values of whole image SCP and DCP VDs. Additionally, all FAZ parameters had significantly higher values in females, while younger participants had significantly higher mean FD values. Simple linear regression analyses showed that age was negatively correlated with right eye SCP and DCP VDs.

Conclusions: Our research has established the standard values for SCP and DCP VDs. The SCP and DCP VDs are influenced by age and gender. Furthermore, our regression analysis revealed that age negatively correlates with SCP and DCP VDs. Additionally, DCP VDs were found to correlate with height and weight negatively.

P-RET-007

Association between posterior vitreous adhesion degree and diabetic retinopathy severity observed by wide field SS-OCT

R. Chen¹, P. Lu², D. Yang³, Y. Chen⁴, X. Chen⁴, A. Liang⁴, Z. Wang⁴, K. Zheng⁵, H. Liang⁴, Z. Xu⁴, L. Zhang⁴, D. Cao¹

¹Department of Ophthalmology, Guangdong Provincial People's Hospital (Guangdong Academy of Medical Sciences), Southern Medical University, Guangzhou, China, ²Guangdong Cardiovascular Institute, Guangzhou, China, ³The Chinese University of Hong Kong, Hong Kong, Hong Kong, SAR of China, ⁴Department of Ophthalmology, Guangdong Provincial People's Hospital, Guangzhou, China, ⁵Shantou University Medical College, Shantou, China

Introduction: Anomalous retinal-vitreous cross-talk is associated with the pathogenesis of diabetic retinopathy (DR). Though several vitreoretinal features in DR eyes has been illustrated in previous explorations, there is a lack of studies describing the extent of vitreoretinal adhesion among different DR severity and exploring its effect on vision threatening DR (VTDR).

Objectives: To investigate the relationship between the degree of posterior vitreous adhesion and DR severity using advanced wide field swept-source OCT (WF SS-OCT).

Methods: A total of 258 eyes of 143 type 2 diabetes mellitus (DM) subjects were enrolled from March to September 2022, including 64 eyes with no retinopathy (NDR), 60 eyes with mild or moderate non-proliferative diabetic retinopathy (NPDR), 65 eyes with severe NPDR and 69 eyes with proliferative diabetic retinopathy (PDR). All the subjects were imaged with a 400kHz SS-OCTA instrument (TowardPi Medical Technology Co., Ltd, China). The vitreoretinal sections through fovea and optic disc were collected with 24mm scanning line. The degree of posterior vitreous adhesion was determined by posterior vitreous detachment (PVD) classification system based on WF SS-OCT. Stage 0: without PVD, stage 1: PVD from peripheral to paramacular area, stage 2: perifoveal PVD with posterior vitreous to the papilla and fovea adhesion, stage 3: peripapillary PVD with vitreopapillary adhesion, stage 4: complete PVD. Goodman-Kruskal Gamma method and χ^2 test were applied for evaluating the correlation between PVD degree and DR severity.

Results: The proportion of complete PVD decreased from 29.69% to 2.90% with DR progression, while the extent of posterior vitreous adhesion was significantly increased with advancing DR severity (Gamma= -0.297, P<0.001). In patients with DM duration longer than 10 years, VTDR was more likely to occur in eyes with greater vitreoretinal adhesion compared to those with complete PVD (Gamma= -0.620, P<0.001). Furthermore, a significant correlation was also observed between posterior vitreous adhesion and the occurrence of diabetic macular edema (P=0.002).

Conclusions: The extent of vitreoretinal adhesion significantly associated with DR progression, especially in VTDR eyes. Our study highlights the importance of observing posterior vitreous adhesion status in DR evaluation and management. Timely intervention to achieve complete PVD may assist to prevent the deterioration of DR and enhance visual outcomes.

P-RET-008

Anatomical and functional outcome of scleral buckling surgery in uncomplicated RD in the era of microincision vitrectomy

A. Raihan¹, S. Biswas¹

¹Surgical Retina, Chittagong Eye Infirmary and Training Complex, Chattogram, Bangladesh

Introduction: The purpose of this study was to evaluate the anatomical and functional outcomes of scleral buckling for the treatment of uncomplicated rhegmatogenous retinal detachment (RRD).

Objectives: Despite an increasing trend toward primary vitrectomy for RRD, scleral buckling procedure should be continue as a good surgical option.

Methods: It is a prospective randomized mono-centric analysis of 18 patients with uncomplicated RRD who underwent scleral buckling surgery from January 2020 to December 2022.

Results: Primary retinal reattachment rate of 94.4% (17 patients) were achieved with single surgery at final follow up. The mean best corrected visual acuity preoperatively was 1.43 ± 0.44 in logMar while it was 0.67 ± 0.36 in logMAR at final follow-up postoperatively.

Conclusions: Scleral buckling surgery achieved excellent anatomical and functional success in most of the patients with uncomplicated RRD.

P-RET-009

Analysis of efficacy of CNV secondary to choroidal osteoma for anti-VEGF therapy and its features

X. Ye¹, Y. Xuan¹, M. Wang¹, Y. Zhang¹, Q. Chang¹, L. Li¹, W. Liu¹, K. Wang¹

¹Eye&ENT Hospital Of Fudan University, Shanghai, China

Introduction: Choroidal osteoma (CO) can lead to profound vision-threatening problems, most often related to the development of choroidal neovascularization (CNV). The mechanism of osteoma-related CNV has yet not to be determined although recently published studies indicate a distinct anatomical connection between CNV and intrinsic tumor vascularization. Intravitreal injection of anti-VEGF agents has become the preferred choice for clinical treatment of this CNV by yielding encouraging results. However, there are still many questions, such as the long-term efficacy of anti-VEGF therapy and the prognosis of osteoma-induced CNV, which require further regular and long-term follow-up observation by multimodal imaging technologies studies.

Objectives: To evaluate the efficacy of anti-vascular endothelial growth factor (VEGF) treatment of choroidal neovascularization (CNV) secondary to choroidal osteoma (CO) and to explore the origin and characteristics of this CNV using multimodal fundus imaging.

Methods: Each patient received intravitreal anti-VEGF drugs (ranibizumab or conbercept) after diagnosis, following a 3 loading doses+pro-re-nata (PRN) schedule with monthly follow-up. The retreatment of PRN regimen mainly relies on the CNV activity or recurrence judged by the best-corrected visual acuity (BCVA), OCT, OCTA, and FFA/ICGA.

Results: Twenty-two eyes underwent a mean number of 4.27 ± 2.57 injections at a mean of 21.36 ± 15.42 months follow-up. After the initial three loading injections, BCVA improved and all of the anatomical parameters decreased significantly. Ten eyes experienced recurrence (45.5%) after loading treatment and were given further mean 3.50 ± 3.30 injections. No significant differences in BCVA and all parameters were found between ranibizumab and conbercept. CNV lesion used hyperreflective horizontal lamella and hyporefective horizontal or vertical tubular lamellae as a scaffold to grow in a creeping form above the gradually broken Bruch's membrane.

Conclusions: Neovascularization of CO may originate from a tumor, with a possible unique process of repair, regeneration, and remodeling in response to Bruch's membrane injury. Anti-VEGF drugs can effectively inhibit subretinal effusion caused by CNV, but they cannot completely inhibit such CNV growth in some cases.

P-RET-010

Involvement of Müller Glial autoinduction of IL-1 β in diabetic retinopathy

D. Wu¹, Y. Liu¹, K. Yao¹

¹Ophthalmology, The Second Affiliated Hospital of Zhejiang University, Hangzhou, China

Introduction: During diabetes, hyperglycemia and oxidative stress upregulates a major angiogenic factor, vascular endothelial growth factor (VEGF-A), which induces retinal neovascularization, vascular leakage, and perhaps macular edema. During the early stage of DR, proinflammatory proteins, such as intercellular adhesion molecule (ICAM-1) and tumor necrosis factor- α (TNF- α), are upregulated, and increased leukostasis is observed. These early pathologic changes are associated with upregulation of VEGF. Interleukin (IL)-1 β , a multifunctional proinflammatory cytokine involved in the pathogenesis of inflammation, vascular dysfunction and cell death, was reported to increase in the retina in experimental diabetes. However, little is yet known about the involvement of IL-1 β in the VEGF production of Müller glia in DR.

Objectives: Müller glia is one of the sources of vascular endothelial growth factor (VEGF)-A, a major angiogenic factor that contributes to the pathogenesis of ocular diseases such as diabetic retinopathy. The purpose of this study was to investigate the molecular mechanism of VEGF-A production in Müller glial cells.

Methods: Immunoblot, enzyme-linked immunosorbent (ELISA) and real-time quantitative PCR (qPCR) analyses were performed to measure protein and mRNA expression levels of VEGF-A in human Müller glial cells (MIO-M1 cell line).

Results: Of various pro-fibrotic cytokines, administration of interleukin-1 (IL)-1 β to human Müller glial cells exclusively increased mRNA (fold change; IL-1 β = 1.9, TGF- β 2 = 1.9, p < 0.01) and protein (fold change; IL-1 β = 4.3, p < 0.01) levels of VEGF-A via real-time qPCR and ELISA analyses. Pretreatment with anti-IL-1 β receptor (IL-1 β R)-neutralizing antibody reversed IL-1 β -induced mRNA expression of *VEGFA* (fold change; IL-1 β = 0.9, p < 0.05), while normal IgG did not show any recovery. Moreover, the upregulated *VEGFA* mRNA expression was significantly suppressed by signal transduction inhibitors (p < 0.05). Supporting these findings, administration of IL-1 β to Müller glial cells increased the phosphorylated levels of signal transduction via immunoblot analyses. Moreover, IL-1 β upregulated the expression of IL-1 β via its own downstream pathway in an autocrine manner [(*IL1B* fold change; PBS = 1.0, IL1 β = 2.4).

Conclusions: Our present data demonstrated that the IL-1 β -IL β R axis activates PI3K, p38, and ERK1/2 signal transductions in Müller glial cells, causing VEGF-A production forming the vicious cycle of IL-1 β autoinduction concurrently.

P-RET-011

Reducing blindness from diabetic retinopathy in rural India using teleophthalmology

A.K. Shukla¹, S. Singh¹, A. Sheikh¹

¹Ophthalmology, Mahatma Gandhi Institute of Medical Sciences, Wardha, India

Introduction: It is predicted that in India, the number of adults with diabetes will be the highest in the world, making India a capital of eyes affected with diabetes. Due to lack of proper screening and treatment facilities mainly at rural areas, many of the undiagnosed diabetic patients become blind. Early detection at grassroot level may be a solution.

Objectives: To create awareness about the sight threatening and other systemic complication of Diabetes

To make screening of diabetic patients for Diabetic Retinopathy (DR) accessible and affordable

Methods: All known Diabetic patients registered at NCD clinics for medical treatment were screened by trained Paramedical Ophthalmic Assistants (PMOA) and NCD Nurses in 5 Government facilities. Village level Health Workers were oriented and given Health Education regarding Diabetes and Diabetic Retinopathy. Demographic information and Medical history was collected in Diabetic Retinopathy Screening proforma. Visual acuity was recorded and Blood sugar, Blood pressure was measured. Data of the patients was uploaded with help of a Diabetic Retinopathy android application using a tablet. Fundus photographs of all the screened patients were uploaded on cloud based online software. All the fundus photos were analysed by the Ophthalmologists at Base Hospital and graded according to Early Treatment of Diabetic Retinopathy Study (ETDRS) criteria

Results: Using teleophthalmology a total of 1086 eyes showed DR changes on fundus photography with a Non-mydratic fundus camera, out of 14260 eyes in which fundus photographs were gradable, showing a prevalence of 7.62%. Prevalence of STDR was 14.93% (56 patients) among the 375 diagnosed with DR. Among the patients with STDR 63.63% were having duration of Diabetes more than 5 years. Out of 56 patients with STDR, 54 underwent treatment at base hospital. 31 were given Laser treatment, 8 were given Intravitreal injection. Prevalence of STDR among total number of known Diabetics screened was ~ 1%.

Conclusions: The study shows that diabetic patients attending Primary and Secondary Government health care facilities can be screened by trained para-medical man power by taking fundus photographs with help of Non-mydratic fundus camera. Training of Para-medical man power at Government facilities, Use of online software for data entry, Tele-ophthalmology for reporting of Fundus photos of Diabetic patients and timely referral of patients with DR can be very effective for controlling blindness due to DR at large scale

P-RET-012

Clinical efficacy and safety of suprachoroidal triamcinolone acetonide in resistant diabetic macular edema

A. Gul¹

¹Ophthalmology, Benazir Bhutto Hospital, Rawalpindi Medical University, Rawalpindi, Pakistan

Introduction: Patients with diabetic retinopathy experience decreased central vision due to diabetic macular edema which is multifactorial. Treatment options include laser photocoagulation, anti-VEGF medications, and corticosteroids. The mainstay of treatment is intravitreal anti-VEGF agents. Steroids are second-line agents due to side effects of cataracts and raised IOP. Steroids have anti-inflammatory, anti-angiostatic, and anti-permeable properties. Suprachoroidal space is a novel investigational route of drug administration between the sclera and choroid, targeting sites of therapeutic drug action within the choroid and adjacent retina.

Objectives: Current study is being conducted to determine the clinical efficacy and safety of suprachoroidal triamcinolone acetonide in cases of resistant diabetic macular edema.

Methods: It is an ongoing prospective interventional clinical trial. Up till now 40 Phakic eyes of type 1 and type 2 diabetics aged 25-80 years with resistant diabetic macular edema with CST of $>300\mu\text{m}$ and BCVA of $\leq 6/9$ (0.20 Log MAR) after 3 or more injections of intravitreal anti-VEGF agents have been enrolled in the study. Suprachoroidal triamcinolone acetonide was given 3.5 mm away from the limbus in a dosage of 4mg in 0.1ml in suprachoroidal space using a 1cc 30G disposable ready-to-go syringe to all patients. Post-injection antibiotic drops were given four times a day for 1 week for prophylaxis of infection and inflammation.

Results: Mean pre-injection BCVA was 0.837 ± 0.17 SD by Log MAR Chart. Mean post-injection BCVA at the 6th month was 0.493 ± 0.12 SD. Changes in BCVA were statistically significant with a p-value of 0.00. Improvement in BCVA was seen in 38 patients (93.3%). The mean pre-injection CST was $940\mu\text{m} \pm 5.76$ SD by OCT. Mean post-injection CST in the 6th month was $305\mu\text{m} \pm 3.27$ SD. Changes in CST were statistically significant with a p-value of 0.0001. Improvement in CST was seen in all 40 patients (100%). Eye pain was seen in 37 patients (90%), and Subconjunctival hemorrhage was seen in 4 (13.33%) patients. Inflammation and IOP spikes were seen in 1 patient each. There was no statistically significant difference in IOP between baseline and post-injection IOP in the 6th month.

Conclusions: Suprachoroidal triamcinolone acetonide leads to anatomical and functional improvement in cases of resistant diabetic macular edema. A single injection effectively improves OCT macular thickness with no recurrence for up to 6 months.

P-RET-013

Lamina cribrosa thickness and silicone oil retrolaminar migration after vitrectomy in proliferative diabetic retinopathy

M. Karliyuchuk¹, S. Pinchuk², P. Bezditko³, A. Urazov²

¹Bukovinian State Medical University, Chernivtsi, Ukraine, ²Center of Eye Microsurgery "Vash Zir", Chernivtsi, Ukraine, ³Kharkiv National Medical University, Kharkiv, Ukraine

Introduction: Silicone oil (SiO) may infiltrate or diffuse directly into retinal layers and then into the optic nerve by infiltrating along the retinal nerve fibers through the lamina cribrosa (LC).

Objectives: To analyze the relationship between retrolaminar migration of intraocular SiO with LC thickness in patients with proliferative diabetic retinopathy (DR) after vitrectomy with SiO tamponade.

Methods: This retrospective study included 34 patients with proliferative DR after vitrectomy with SiO tamponade who underwent unenhanced head computed tomography for various clinical indications between April 2017 and December 2023. All images were visually evaluated for subretinal and retrolaminar migration of intraocular SiO involving the anterior visual pathway (optic nerve, optic chiasm, and optic tract) and the ventricular system. LC thickness was measured with spectral domain optical coherent tomography using LC_Thickness_programm.m and main_low_noise_filters_programm.m, based on the adaptive compensation algorithm for eliminating a high-level noise in the deep layers of optic nerve and improving the visualization of the posterior border of the LC, as well as for processing B-scan with a set of 3 digital filters: Butterworth Low-pass Filter inversion image, Wavelet Low-pass Filter Analysis Daubechies original and inversion image.

Results: In patients with proliferative DR the average LC thickness was $687 \pm 34 \mu\text{m}$ (579 to 772 μm), that was 1,9 times higher than in healthy people ($p < 0,001$). We detected subretinal and retrolaminar silicone oil migration in 9 of the 34 patients (26,47%), noting silicone oil at the optic nerve head ($n = 3$), retrolaminar optic nerve ($n = 3$), optic chiasm ($n = 2$), optic tract ($n = 1$), and in the lateral ventricles ($n = 2$). Two patients had migration to 2 locations each (1 patient – in retrolaminar optic nerve and optic chiasm, 1 patient – in retrolaminar optic nerve and lateral ventricle). We compared the LC thickness of patients without and with subretinal and retrolaminar SiO migration. It was established that LC thickness of patients with subretinal and retrolaminar SiO migration was significantly less (559 to 658 μm) than in patients without it (679 to 772 μm). It should be noted that the number of cases positive for migration was small, limiting the statistical power and accuracy of the prevalence.

Conclusions: A direct correlation between scleral LC thickness and retrolaminar migration of intraocular SiO in patients with proliferative DR after vitrectomy with SiO tamponade was revealed.

P-RET-014

Multimodal imaging characteristics and risk factors analysis of Waldenström macroglobulinemia retinopathy

H. Chen¹, Y. Wang¹, Y. Chen¹

¹Ophthalmology, Peking Union Medical College Hospital, Beijing, China

Introduction: Waldenström macroglobulinemia (WM) is a type of indolent B cell non-Hodgkin's lymphoma characterized by lymphoplasmacytic infiltration of the bone marrow and elevations of monoclonal immunoglobulin (IgM) in serum and/or urine. WM retinopathy (WMR) is one of the manifestations of hyperviscosity syndrome (HVS) caused by WM. WMR appears some typical manifestations, such as distortion of retinal vessels, retinal hemorrhage, etc, which is a severe threat to patients' vision. The research on the characteristics and risk factors of WMR is limited, especially on the risk correlation analysis among WMR, systemic and ocular factors, such as IgM, M protein, visual acuity (VA), etc.

Objectives: To summarize the multimodal imaging features and analyze the risk factors of Waldenström macroglobulinemia retinopathy (WMR).

Methods: Retrospective, cross-sectional study. Patients diagnosed with WM and underwent ophthalmic examination in Peking Union Medical College Hospital in the last decade were included. Multimodal imaging characteristics of WMR were summarized. Univariate and multivariate logistic regression analysis of WMR and potential systemic and ocular factors was performed.

Results: A total of 50 patients with WM were included in this study, and 28 patients had WMR in at least 1 eye. WMR was found to have worse LogMAR visual acuity (0.52 ± 0.54 vs 0.21 ± 0.18 , $P = .009$) and was characterized by tortuous retinal vessels, extensive retinal hemorrhage, distinctive shape of macular edema, and so on. In univariate analysis, the presence of WMR was significantly associated with the mean visual acuity (LogMAR), serum red blood cell counts, serum platelet counts, hemoglobin level, serum M protein, serum IgM level, and lactate dehydrogenase (with $P < .05$). In multivariate analysis, WMR was significantly correlated with M protein (adjusted odds ratio = 1.127, 95% CI: 1.052-1.209, $P = .001$) and serum IgM (adjusted odds ratio = 1.059, 95% CI: 1.023-1.095, $P = .001$) with the predicted areas under the curve of 0.859 and 0.820, respectively. The optimal cutoff values were 26.2 g/L for M protein and 51.0 g/L for IgM, which accounts for a sensitivity of 95.4% and 95.4% and specificity of 64.3% and 60.7%, respectively.

Conclusions: WMR has specific characteristics in ophthalmic examinations. Serum IgM levels and M protein are good predictors of WMR, which could attach important value of fundus examinations for patients with WM.

P-RET-015

Prevention of blindness through screening for retinal pathology in HIV Clinic in Ukraine using a portable fundus camera

O. Hurzhii¹, R. Krishnan², D. Heiden³, M. Sira⁴, V. Tretiakov⁵

¹Visium Eye Clinic, Kyiv, Ukraine, ²Seva Foundation, India, ³Pacific Eye Associates, San Francisco, United States, ⁴L.V. Hromashevsky Institute of Epidemiology and Infectious Diseases of the National Academy of Medical Science of Ukraine, Kyiv, Ukraine, ⁵National Military Medical Clinical Center, Main Military Clinical Hospital, CO "100 PERCENT LIFE", Kyiv, Ukraine

Introduction: Early screening for HIV-associated retinal pathology (HARP) can prevent blindness and save lives, addressing the global health concern of high HARP prevalence in HIV patients.

Objectives: In resource limited settings, retinal examination by trained ophthalmologists and early identification of disease is not always possible. In such settings retinal imaging and teleophthalmology enables prompt retinal screening and diagnosis. We describe our experience of HARP screening using the Pristine 5.0 (Seva Vistaro) retinal camera in the HIV department of L.V. Gromashevsky Institute of Epidemiology and Infectious Diseases of Ukraine in Kyiv, Ukraine.

Methods: HARP screening was performed on 97 HIV patients (178 eyes) with CD4 count less than 100 cells/ μ l, using the retinal camera in the period between 03/01/2022 and 01/30/2024. Retinal photos were taken by infectionist, who was previously trained on basics of retinal pathology in HIV patient. Patients' pupils were dilated with the Tropicamide 0.5%. Two retinal images of each eye (macula and disc centred) were taken for each patient. Retinal images uploaded on a secure cloud platform were remotely viewed by a uveitis specialist for interpretation.

Results: 146 images (82%) were of sufficient quality to be graded by the specialist. Retinal changes characteristic of tuberculous uveitis were identified in 9 images (9 eyes), cytomegalovirus retinitis in 57 images (57 eyes), toxoplasma retinochoroiditis in 14 images (14 eyes), acute retinal necrosis caused by varicella zoster (VZ) virus 2 images (2 eyes). HIV retinopathy was diagnosed in 97 images (97 eyes).

Of 32 images deemed ungradable, 12 images had media opacity, 9 caused by patients' inability to position the head on the camera and 11 due to other causes.

Conclusions: Our study demonstrates the feasibility and effectiveness of using retinal photography for HARP screening in resource-limited regions. The implementation of routine retinal imaging in HIV patients with CD4 counts <100 cells/ μ l (a group vulnerable to ocular complications) facilitated timely diagnosis of sight and life threatening diseases. The implementation of camera based, routine retinal screening in HIV clinics can help overcome the limitation of access to trained ophthalmologists in resource-limited settings. This approach not only enhances the detection of ocular manifestations but also has the potential for early intervention, contributing to vision preservation and, in certain instances, life-saving measures.

P-RET-016

Diagnostic application in diabetic retinopathy rats: a study based on raman spectroscopy and machine learning

K. Xiao¹, L. Li², Y. Chen³, R. Lin¹, B. Wen⁴, Z. Wang⁵, Y. Huang¹

¹Ophthalmology and Optometry, Fujian Medical University, Fu Zhou, China, ²Ophthalmology, Fujian Provincial Hospital, Fu Zhou, China, ³Department of Laboratory Medicine, Fujian Medical University, Fu Zhou, China, ⁴Ophthalmology and Optometry, Fujian, Fu Zhou, China, ⁵Ophthalmology, Army Medical University, Chongqing, China

Introduction: Vision impairment caused by diabetic retinopathy (DR) is often irreversible, making early-stage diagnosis imperative. Before clinical manifestations become apparent, retinal damage has already occurred. In order to achieve improved diagnostic outcomes, It might be wise to develop and implement advanced and refined diagnostic tools capable of probing the intricate molecular changes taking place within the retina.

Objectives: To utilize Raman spectroscopy in conjunction with machine learning to discriminate between the early stages of DR and the preproliferative phase of DR, while identifying corresponding biomarkers.

Methods: In this research study, 24 Sprague-Dawley (SD) rats were randomly allocated into three distinct groups: the natural control group (NC), the one-month diabetic murine group (DM1), and the six-month diabetic murine group (DM6). DM1 and DM6 were induced by intraperitoneal injection of streptozotocin (STZ) and provided with a high-glucose diet to establish the diabetes models. Utilizing transmission electron microscopy (TEM), researchers identified specific morphological alterations within the retinal tissues of the diabetic groups to ensure that the DM1 group accurately represented the early stages of DR, while the DM6 group effectively represented the preproliferative phase of DR. Concurrently, obtained RS data from each group were fed into machine learning (ML) models.

Results: Random forest (RF) and Orthogonal partial least squared-discrimination analysis (OPLS-DA) both exhibited distinct group separation. The classification achieved sensitivities, specificities, and ten-fold cross-validation accuracies all exceeding 80%. And bands with VIP values >1 and P-values <0.05 in the OPLS-DA model were identified as important bands used to generate the receiver operating characteristic (ROC) curves. In the curves of NC and DM1, spectral bands with area under curve (AUC) > 0.8 include 524, 1335, 543, and 435 cm⁻¹, indicating the significant roles of proteins, lipids, and nucleic acids in the molecular events of early-stage DR. In the curves of NC and DM6, spectral bands with AUC > 0.8 include 1045 and 1335 cm⁻¹, highlighting the importance of proteins and nucleic acids in the preproliferative phase of DR.

Conclusions: By leveraging the molecular fingerprints acquired from RS in conjunction with ML, precise diagnosis and the identification of potential biomarkers in diabetic rats can be achieved. These findings underscore the potential utility of combining RS with ML as an adjunctive diagnostic tool for DR in clinical settings.

P-RET-017

Exosomes derived from hypoxia-treated astrocytes alleviates retinal ischemia/reperfusion injury

W. Chi¹, X. Ye¹, X. Yao¹

¹Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: There is still a lack of effective treatment strategies for ischemic retinopathy. Exosomes derived from different cell types, including stem cells, were previously reported to display therapeutic effects. Retinal astrocytes are crucial to maintaining retinal homeostasis, but reactive retinal astrocytes can aggravate inflammation. Considering the dual role of astrocytes, the function of exosomes derived from hypoxia-treated retinal astrocytes remains unclear in retinal ischemia/reperfusion (I/R) injury.

Objectives: Our study aims to explore the role of exosomes derived from hypoxia-treated astrocytes in the model of retinal I/R.

Methods: Exosomes were isolated from primary mouse astrocytes (MACs) and human retinal astrocytes (HRACs) under the condition of normoxia (norm-exo) or hypoxia (hypo-exo) for 24h. The CD63-GFP/PKH26 labeled exosomes were used to observe the uptake process in retinal ganglion cells (RGCs). We conducted microRNA array analysis and dual luciferase reporter gene assay to screen the differentially expressed microRNA and the binding site of microRNA. The model of retinal I/R was established through anterior chamber perfusion. One eye of each was intravitreally injected with exosomes or microRNA, and the contralateral eye served as the control group. Two-tailed Student's t-test or one-way ANOVA was used for statistical analysis.

Results: Compared with the normoxic group, hypoxia significantly increased the number of exosomes secreted by astrocytes ($p < 0.001$). The fluorescent image showed that astrocyte-derived exosomes could be taken up by RGCs in vitro. Through microRNA array and RT-qPCR, the upregulation of miR-329-5p was observed in the hypo-exo. Intravitreal injection of hypo-exo or miR-329-5p rescued the thinned retinal thickness ($p < 0.001$) and decreased the proportion of apoptotic cells in the I/R model. MiR-329-5p resulted in the upregulation of Bcl-2 and the downregulation of MAPK8/JNK1, p-JNK1, c-JUN, Bax, and cleaved Caspase-3. Moreover, we verified that miR-329-5p specifically targeted the binding site of *MAPK8-WT1* to suppress MAPK8 expression.

Conclusions: Our study revealed that exosomes derived from hypoxia-treated astrocytes could lessen retinal ischemia/reperfusion injury through inhibiting the apoptosis of retinal cells, including RGCs. MiR-329-5p was enriched in the exosomes and directly targeted the binding site of MAPK8 mRNA, subsequently downregulating the JNK pathway and cell apoptosis.

P-RET-018

Closing the gap between the orbit and the eye: Inflammatory orbital disease and uveitis: a 57 case report series

M. Romero-Márquez¹, I. Gómez-Luévano¹, L.E. Concha-del Río¹, C.B. Hübbe-Tena²

¹Clinic of Inflammatory Eye Disease (Uveitis), Asociación para Evitar la Ceguera en México, Mexico City, Mexico, ²Clinic of Inflammatory Eye Disease (Rheumatology), Asociación para Evitar la Ceguera en México, Mexico City, Mexico

Introduction: Inflammatory orbital disease (IOD) is the third cause of orbital pathology in adults after thyroid eye disease and lymphoproliferative processes. IOD in conjunction with uveitis is a rare entity only anecdotally described in isolated reports with scarce information on diagnostic algorithms, systemic associations, and outcomes.

Objectives: To describe a case series featuring patients (px) with concurrent IOD and uveitis, reporting systemic associations, diagnostic methods, treatment (tx) and outcome in a single center in Mexico City.

Methods: Observational, retrospective study involving review of clinical records of px seen from 2018 to 2023, with at least 1 year follow-up.

Results: A total of 489 px w/thyroid eye disease (TED) and 143 px w/idiopathic orbital inflammation (IOI) were admitted in 5 years at the institution. 366 TED px and 106 IOI px met the inclusion criteria. 57 (12%) px from both groups were found w/concomitant IOD and uveitis, 8 px w/TED and 49 of the IOI group. Granulomatosis with polyangiitis was diagnosed (dx) in 24 px, 3 w/ orbital biopsy (OB) and the rest with bloodwork; IgG4-related disease was diagnosed in 2 px w/OB, Rheumatoid arthritis in 2 patients w/laboratory, systemic lupus erythematosus w/ polymyositis, sarcoidosis and xantogranulomatosis in 1 px respectively. 12 cases remained idiopathic after systemic examinations, bloodwork, and OB. On the TED group, 2 px had anterior recurrent uveitis as only associated manifestation, one w/idiopathic occlusive vasculitis, one w/idiopathic noninfectious intermediate uveitis, 3 px w/scleritis and one with a Vogt-Koyanagi-Harada like disease. Tx was given according to disease association.

Conclusions: This is the world's largest case series ever reported of px with inflammatory orbital disease and uveitis. It's important to mention that more than half of the px were dx w/adequate ophthalmologic and systemic examination, bloodwork and complementary testing when needed, without the necessity of an invasive procedure to obtain a dx; most OB in the present series ended up being inconclusive and didn't add additional information that could led to an etiology. Multidisciplinary workup is recommended in these patients for adequate dx and tx; the association of one or more autoimmune diseases is a new entity and require follow-up to identity and treat promptly.

P-RET-019

the role of EGF receptor signaling in regulating YAP activation and promoting proliferative vitreoretinopathy

W. Zhang¹, Y. Wang¹

¹Tianjin Eye Hospital, Tianjin, China

Introduction: Both epidermal growth factor receptor (EGFR) and the Yes-associated protein (Yap) signaling pathway are implicated in cell proliferation and differentiation.

Objectives: In this study, we explored whether the formation of proliferative vitreoretinopathy (PVR) depends on the interaction of the EGFR receptor and Yap pathway.

Methods: We studied the effects of EGFR and Yap activation on retinal fibrosis in a PVR mouse model as well as in knockout mice (conditional deletion of EGFR or Yap specifically in retinal pigment epithelial (RPE) cells). Reversal and knockdown experiments were performed to induce a model of ARPE-19 cells treated with transforming growth factor- β 2 (TGF- β 2) in vitro. The effect of EGFR/Yap signaling blockade on the PVR-induced cell cycle and TGF- β 2-induced ARPE-19 cell activation was determined.

Results: The EGFR inhibitor erlotinib or conditional deletion of EGFR attenuated Yap activation and decreased the expression of Yap and its downstream target Cyr61 and of connective tissue growth factor (CTGF) in vivo and in vitro. EGFR-PI3K-PDK1 signaling induced by PVR promoted Yap activation and cell cycle progression. Furthermore, activated EGFR signaling bypassed RhoA to increase the protein levels of Yap, C-Myc, CyclinD1 and Bcl-xl.

Conclusions: Our work highlights that EGFR-PI3K-PDK1-dependent Yap activation plays a crucial role in the formation of PVR. Targeting EGFR and the Yap pathway provides promising therapeutic treatments for PVR.

P-RET-020

Multimodal fundus imaging and label-free quantitative proteomics of sodium iodate-treated mice

Z. Chen¹, S. Wu¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Age-related macular degeneration (AMD) is a degenerative disease of the retinal macula and is the leading cause of blindness in the elderly. Sodium iodate (NaIO_3) is a stable oxidizing agent and its injection has been proven to serve as a reproducible model of AMD, recapitulating some of the morphological features of GA.

Objectives: Using multimodal imaging to describe the phenotype of sodium iodate (NaIO_3)-treated mouse model and using this model to investigate dry AMD.

Methods: NaIO_3 was intraperitoneal injection using a dose 40 mg/kg body weight in adolescent C57BL/6J mice. Multimodal retinal imaging was performed at 6 days post-injection to further study the phenotype of NaIO_3 -treated mouse model, including fundus photography, optical coherence tomography (OCT), fundus autofluorescence (FAF), fundus fluorescein angiography (FFA) and indocyanine green angiography (ICGA) and optical coherence tomography angiography (OCTA). The histopathology of retina was evaluated by transmission electron microscope (TEM). Label-free quantitative proteomics was performed on retina of normal and NaIO_3 -treated mouse.

Results: After NaIO_3 injection, retinal degeneration is observed. Fundus photographs showed numerous scattered yellow-white speckled deposits. OCT images indicated disruption of the retinal layers, damage of the retinal pigment epithelium (RPE) layer and accumulation of hyper-reflective matter in multiple layers of outer retina. Widespread foci of a high FAF signal were noticed. FFA revealed diffuse hyperfluorescence. ICGA presented punctate hyperfluorescence. Large choroid blood vessels were visible in ICGA and OCTA. TEM illustrated abnormal material accumulation and damaged mitochondria. Bioinformatics analysis of proteomics revealed that the differentially expressed proteins participated in diverse biological processes, encompassing phototransduction, retinol metabolism, necroptosis and phagosome, along with significant enrichment pathways like NOD-like receptor signaling pathway, and Jak-STAT signaling pathway.

Conclusions: By multimodal imaging, we described the phenotype of NaIO_3 -treated mouse model mimicking dry AMD in detail. In addition, proteomics found some significant enrichment pathways, though the exact mechanism in dry AMD is not fully understood, but providing clues for future research.

P-RET-021

Efficacy of intravitreal bevacizumab as monotherapy for the treatment of aggressive retinopathy of prematurity

B. Panchal¹, Y.C. Kottali¹, H. Kanisetty¹, A. Reddy¹, T. Padhi², S. Jalali³, NEHA Study Group

¹Vitreoretina, L V Prasad Eye Institute, Visakhapatnam, India, ²Vitreoretina, L V Prasad Eye Institute, Bhubaneswar, India, ³Vitreoretina, L V Prasad Eye Institute, Hyderabad, India

Introduction: Retinopathy of prematurity (ROP) remains a leading cause of childhood blindness worldwide, particularly aggressive ROP manifesting with plus disease or hybrid features. While laser photocoagulation has been the mainstay of treatment, intravitreal anti-vascular endothelial growth factor (VEGF) therapy offers a promising alternative. This study aimed to evaluate the efficacy and recurrence risk of intravitreal bevacizumab monotherapy in managing aggressive ROP.

Objectives: To describe the efficacy of intravitreal bevacizumab as monotherapy for the treatment of Aggressive Retinopathy of Prematurity.

Methods: Preterm infants with aggressive ROP (any stage with plus disease, hybrid ROP) were enrolled in this retrospective study. Intravitreal bevacizumab (0.625 mg/0.025 ml) was injected under topical anesthesia. Patients were followed as per ICROP guidelines. Study period January 2018 - December 2021.

Results: Two hundred and twenty eyes of 112 infants with aggressive ROP were enrolled. Mean gestational age was 31.2weeks (+/-2.3weeks). Mean birth weight (1453.5grams+/-389g). Mean PMA at injection was 36 weeks. Neonatal jaundice and respiratory dysfunction were the top 2 systemic risk factors (75.8%). Mean NICU stay was 27.2days, median 20 days. 18.6% of eyes showed recurrence, 8 eyes received a repeat injection and eventually all eyes with recurrence were lasered. Mean regression of the disease was noted at 19 days. Average visits were 10 (3.7 until regression of ROP and 7.3 until retina was mature). Mean first follow up after bevacizumab treatment was 11.4 days. 12% of infants were in Zone Half, 19% zone 1, 48% in zone 2. There were no major complications such as endophthalmitis, cataract, or vitreous hemorrhage after injection.

Conclusions: Intravitreal bevacizumab injection is an effective method for the management of infants with aggressive ROP. However, some cases may show recurrence and require laser photocoagulation. Close monitoring for recurrence or progression is necessary. Eyes with half zone or posterior zone 1 ROP have a higher chance of recurrence.

P-RET-022

OCT predictors of pneumatic displacement effect of submacular hemorrhage secondary to polypoidal choroidal vasculopathy

X. Fang¹, F. Zheng¹, Y. Han¹, J. He¹, Y. Liu¹, Y. Xu¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Zhejiang Provincial Key Laboratory of Ophthalmology, Zhejiang Provincial Clinical Research Center for Eye Diseases, Zhejiang Provincial Engineering Institute on Eye Diseases, Hangzhou, China

Introduction: Clinical studies including STAR had showed intravitreal injection of tPA and SF6 (pneumatic displacement, PD) yield noninferior benefit for SMH compared with PPV surgery. However, it is still not clear which kind of baseline OCT features was associated with good displacement effect after PD. Therefore, we investigated the OCT predictors of early displacement by analyzing widefield SS-OCT cube scans obtained from SMH patients in this study.

Objectives: To investigate predictive OCT factors associated with early displacement of submacular hemorrhage (SMH) after intravitreal injections of C3F8 combined with tissue plasminogen activator (tPA) and anti-VEGF agents in polypoidal choroidal vasculopathy (PCV) patients.

Methods: Patients with SMH secondary to PCV were enrolled in the retrospective study. All patients underwent intravitreal injections of C3F8, tPA, and anti-VEGF agents. Wide-filed swept-source OCT 3D-cube scans were obtained before and one week after the surgery. The displacement effect of SMH one week after surgery was graded as complete displacement (Group 1) and incomplete displacement (Group 2) based on the presence of SMH under the fovea according to OCT images. OCT measurements, including the area, height, volume and contrast-to-noise ratio (CNR) of SMH and the volume of pigment epithelium detachment (PED), were analyzed and associated with displacement grade.

Results: Twenty-one eyes of 21 patients were enrolled. SMH got displaced in all eyes after the treatment: SMH of 7 eyes got completely displaced (Group 1), SMH of 14 eyes got incompletely displaced (Group 2). The mean height of the remaining SMH under fovea was $326.78 \pm 159.94 \mu\text{m}$, ranging from $137 \mu\text{m}$ to $642 \mu\text{m}$ in group 2. There was no difference in the mean area of baseline SMH in the two groups ($76.53 \pm 38.19 \mu\text{m}^2$ VS. $52.64 \pm 36.78 \mu\text{m}^2$, $P=0.181$). The mean height and volume of SMH were $646.98 \pm 205.81 \mu\text{m}$ VS. $459.95 \pm 163.73 \mu\text{m}$ ($P=0.035$) and $0.55 \pm 0.18 \text{ mm}^3$ VS. $0.39 \pm 0.13 \text{ mm}^3$ ($P=0.032$), suggesting Group 1 had much thicker SMH compared with Group 2. But no correlation was found between these two indexes and displacement grade by logistic regression analysis. The mean volume of PED was $0.26 \pm 0.08 \text{ mm}^3$ and $0.24 \pm 0.07 \text{ mm}^3$ in two groups ($P=0.590$). Lower CNR of SMH at baseline was found in Group 1 (82.32 ± 31.75 VS. 114.24 ± 24.82 , $P=0.018$) and was correlated with displacement grade ($P=0.02$, $\beta=1.2$).

Conclusions: Patients who got complete pneumatic displacement of SMH had thicker hemorrhage and lower CNR. The CNR of SMH was a valuable predictor of early SMH displacement.

P-RET-023

The role and mechanism of FNDC5 in regulating oxidative stress and inflammation to improve diabetic retinopathy

X. Jianping¹, Z. Jinsong¹

¹Aier Eye Group, Funus Disease Department, Shenyang Aier Excellent Eye Hospital, Shenyang, China

Introduction: The changes of intraocular cytokines in patients with retinal vascular diseases are obviously correlated with the occurrence and development of the disease, and the correlation is different in different diseases, which has important guiding significance for the diagnosis and treatment of the disease. FDCN5 and Irisin can be used as biomarkers of Diabetic retinopathy (DR) progression and recovery.

Objectives: Diabetic retinopathy (DR) is a serious complication of diabetes and the main cause of blindness in diabetes patients. Metabolic and inflammatory factors may play important roles in the pathogenesis of DR. Analyze the levels of FNDC5 and 7 cytokines in DR aqueous humor to evaluate the effects of FNDC5 and inflammatory factors. Irisin is the lysate of fibronectin type III domain containing protein 5 (FDNC5). FDCN5 has various functions such as regulating glucose metabolism and oxidative stress, and plays a protective role in Diabetic retinopathy (DR).

Methods: The study included patients with DR eyes (n=20) and cataract eyes (as a control, n=20), and collected aqueous humor samples. ELISA (ELISA) kits were used for FNDC5 and RT-qPCR were used for 8 cytokines, and detect the level of antioxidant glutathione (GSH), and optical tomography (OCT) was used to measure the macular thickness (CMT) of all patients' eyes. SPSS and χ^2 is used for inter group classification data comparison.

Results: The CMT of the DR group was significantly higher than that of the control group; The levels of FNDC5 in DR aqueous humor were significantly lower than those in the control group; There is a negative correlation between CMT in FNDC5; Compared with the control group, the levels of GSH, VEGF-A, BFGF, IL-6, IL-8, IL-10, TNF-a, and VCAM-1 in aqueous humor of DR patients were significantly increased.

Conclusions: The level of FNDC5 in DR aqueous humor decreases. There is a negative correlation between FNDC5 and CMT. FNDC5 can regulate the level of oxidative stress and inflammatory reaction in Diabetic retinopathy.

P-RET-024

Changes in peripapillary retinal nerve fiber layer and ocular parameters in acute anterior uveitis

D.-I. Chiou¹, C.-M. Wu²

¹Ophthalmology, Taipei Municipal Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan, China ,

²Ophthalmology, Shuang Ho Hospital, Taipei Medical University, New Taipei City, Taiwan, China

Introduction: Acute anterior uveitis is a common form of uveitis characterized by inflammation in the anterior portion of the uvea. Interestingly, we observed a notable prevalence of optical coherence tomography-defined peripapillary retinal nerve fiber layer thickening among our patients with acute anterior uveitis.

Objectives: This study aimed to investigate the changes in defined peripapillary retinal nerve fiber layer and other relevant ocular parameters in patients with acute anterior uveitis.

Methods: We conducted a retrospective case series at a uveitis referral clinic in Taiwan. Data on patients' demographic characteristics and ocular parameters including refractive error, best-corrected visual acuity, intraocular pressure, and optical coherence tomography measurements were collected. We compared baseline and follow-up data and evaluated the correlations between variables.

Results: Our study included 21 patients (21 eyes) with acute anterior uveitis. Optical coherence tomography-defined peripapillary retinal nerve fiber layer thickening was observed in 20 patients, and its severity diminished as the inflammation subsided. Following treatment, a significant improvement in best-corrected visual acuity, intraocular pressure recovery and reduction in peripapillary retinal nerve fiber layer thickening were observed ($p < 0.01$). The correlation between peripapillary retinal nerve fiber layer thickness and best-corrected visual acuity was weak ($r = 0.20$, $p = 0.41$). By contrast, a significant negative correlation was noted between the change in peripapillary retinal nerve fiber layer thickness and refractive error ($r = -0.71$, $p = 0.01$).

Conclusions: This study demonstrated that acute anterior uveitis is not only an inflammation of the anterior eye segment but also a dynamic, short-term changing process affecting thickness of the peripapillary retinal nerve fiber layer. Optical coherence tomography can be used for monitoring ocular inflammation status through changes of peripapillary retinal nerve fiber layer thickness.

P-RET-025

Genetic association of diabetic retinopathy with long noncoding RNA CDKN2B-AS1 gene polymorphism

Y.-P. Yao^{1,2}, K. Wang^{3,4,5}, H.-Y. Lin^{1,2,6,7}, S.-F. Yang^{1,8}

¹Institute of Medicine, Chung Shan Medical University, Taichung, Taiwan, China , ²Department of Ophthalmology, Show Chwan Memorial Hospital, Changhua City, Taiwan, China , ³Department of Ophthalmology, Cathay General Hospital, Taipei, Taiwan, China , ⁴Departments of Ophthalmology, Sijhih Cathay General Hospital, New Taipei City, Taiwan, China , ⁵School of Medicine, College of Medicine, Fu Jen Catholic University, New Taipei City, Taiwan, China , ⁶Department of Post-Baccalaureate Medicine, College of Medicine, National Chung Hsing University, Taichung City, Taiwan, China , ⁷Department of Optometry, Chung Shan Medical University, Taichung, Taiwan, China , ⁸Department of Medical Research, Chung Shan Medical University Hospital, Taichung City, Taiwan, China

Introduction: In addition to hyperglycemia and chronic inflammation, numerous genetic factors are believed to be interconnected to evaluate the risk and progression of diabetic retinopathy (DR). Recently, focus has been directed to the role of long non-coding RNAs (lncRNAs) in the development of DR.

Objectives: In the present study, we attempted to test the influences of cyclin dependent kinase inhibitor 2B antisense RNA 1 (CDKN2B-AS1) gene polymorphisms on the susceptibility to DR.

Methods: Five single-nucleotide polymorphisms (SNPs) of the CDKN2B-AS1 gene, rs564398, rs1333048, rs1537373, rs2151280, and rs8181047 were examined in 280 DR cases and 455 DR-free diabetic controls. Among these loci tested, we demonstrated that diabetic carriers of at least one polymorphic allele (G) of rs2151280 (AG and GG; AOR, 1.613; 95% CI, 1.040-2.501; p=0.033) are more susceptible to proliferative DR but not non-proliferative DR.

Results: This genetic association with the risk of developing proliferative DR was further strengthened in homozygotes for the polymorphic allele (G) of rs2151280 (GG; AOR, 2.194; 95% CI, 1.117-4.308; p=0.023). We detected a significant association of the polymorphic allele (G) of rs2151280 with proliferative DR patients (OR, 1.503; 95% CI, 1.112-2.033; p=0.008) but not with the entire DR or non-proliferative DR group. Moreover, as compared to those who do not possess the polymorphic allele of rs2151280 (AA), DR patients carrying at least one polymorphic allele of rs2151280 (AG+GG) exhibited a lower glomerular filtration rate and HDL cholesterol level, revealing a promotive role of rs2151280 in renal and cardiovascular complications of diabetes.

Conclusions: In conclusions, our findings implicate an impact of CDKN2B-AS1 gene polymorphisms on the progression of DR.

P-RET-026

Gene expression and structural analysis in the choroidal complex in a mouse vortex vein cauterizing model

S. Kakihara^{1,2}, Y. Matsuda^{1,2}, K. Hoshiyama^{1,2}, T. Murata¹, T. Shindo^{2,3}

¹Department of Ophthalmology, Shinshu University School of Medicine, Matsumoto, Japan,

²Department of Cardiovascular Research, Shinshu University School of Medicine, Matsumoto, Japan,

³Department of Life Innovation, Institute for Biomedical Sciences, Interdisciplinary Cluster for Cutting Edge Research, Shinshu University, Matsumoto, Japan

Introduction: Venous overload choroidopathy, a new conceptual disease framework, is attracting worldwide attention. We have been studying the role of adrenomedullin (AM) and its receptor system in chorioretinal diseases. To date, no reports have investigated the involvement of AM in venous overload choroidopathy. Therefore, we created a mouse vortex vein cauterizing model which aims to mimic venous overload choroidopathy and investigated gene expression and pathological changes focusing on AM.

Objectives: To investigate retinal and choroidal changes and gene expression in a mouse vortex vein cauterizing model.

Methods: Male C57BL/6J mice aged 9-12 weeks were used. Two temporal vortex veins were coagulated with diathermy to create a mouse vortex vein cauterizing model. Retinal and choroidal thicknesses were assessed on pathology sections 1 day after coagulation treatment with diathermy. A Tight junction of retinal pigment epithelium 7 days after treatment was evaluated by immunostaining for ZO-1 in the flatmount specimens. We investigated the time course of gene expression in the choroidal complex, focusing on AM and related genes.

Results: There was no significant difference in retinal thickness in most areas between eyes with cauterized vortex veins and control eyes. Contrastingly, eyes with cauterized vortex veins exhibited thicker choroids than control eyes in most areas. One week after coagulation of the vortex veins, the ZO-1 immunostaining-positive area of the retinal pigment epithelium was significantly attenuated compared to controls. Compared to pre-coagulation of vortex veins, gene expression of AM in the choroidal complex was significantly increased on day 1 and day 3 after coagulation, and gene expression of calcitonin receptor-like receptor (CLR) and receptor activity modifying protein 3 (RAMP3), receptor components of AM, were significantly enhanced on day 7 and on day 1,7 post-coagulation, respectively.

Conclusions: Cauterizing temporal vortex veins resulted in a thicker choroid compared to the controls. Time course analysis of gene expression of AM, CLR, and RAMP3 suggested that AM may play an important role in choroidal congestion. Further studies using this model may allow for a deeper investigation of the pathogenesis of venous overload choroidopathy.

P-RET-027

Subretinal injection of alteplase for the treatment of massive acute macular hemorrhage secondary to PCV

R. Wan¹, Z. Mao¹, X. Yu¹, Z. You¹, X. Tian¹

¹The Affiliated Eye Hospital of Nanchang University, Nanchang, China

Introduction: Idiopathic polypoid choroidal vasculopathy (PCV) often presents with acute submacular hemorrhage (SMH), causing a sharp decline in vision in a short period of time. A large amount of blood accumulates in the macular area for a long time, causing permanent damage to the retina and irreversible visual loss. How to quickly and efficiently remove SMH and reduce the recurrence rate has always been a difficult problem.

Objectives: To observe the efficacy and safety of vitrectomy combined with subretinal injection of alteplase (tPA) and intravitreal injection of Conbercept in the treatment of large area SMH secondary to PCV.

Methods: This retrospective study included 32 patients (32 eyes) with large SMHs and PCV who visited our hospital from January 2021 to September 2021. All patients included in the study underwent best-corrected visual acuity (BCVA), spectral domain optical coherence tomography (SD-OCT), ultra-wide angle fundus photography, fundus fluorescein angiography, and indocyanine green angiography before surgery. They were also treated by the same fundus surgeon with subretinal injection of t-PA combined with intravitreal injection of Conbercept. BCVA, ultra-wide angle fundus photography, and SD-OCT were repeated 1, 3, 6, and 12 months postoperatively. The BCVA, clearance rate of the macular hemorrhage, changes in macular fovea thickness (CMT) and postoperative complications were observed.

Results: The 32 patients (32 eyes) in this study included 20 males and 18 right eyes. Their mean age was 72.36 ± 8.62 years old. The preoperative bleeding duration was 7.21 ± 3.36 days, the bleeding size was 6.82 ± 1.53 DD, the preoperative BCVA was 1.73 ± 0.44 logMAR, and the preoperative CMT was 727.96 ± 236.40 μ m. Relative to the preoperative, the postoperative BCVA significantly improved at 1, 3, 6, and 12 months ($P < 0.001$), and there was no significant difference in postoperative BCVA at different time points ($P > 0.05$). The final BCVA and the symptom duration were negatively correlated. Thirty patients (93.75%) had complete clearance of the SMH within 1 week postoperatively. The CMT significantly decreased postoperatively ($P < 0.001$). The frequency of anti-VEGF was 1–8 times (average, 4.2 ± 1.8). No patient has experienced recurrent hemorrhage or other complications.

Conclusions: Subretinal injection of t-PA combined with Conbercept is safe and effective for treating large acute submacular hemorrhage secondary to PCV and can significantly improve the vision of patients.

P-RET-028

Tattoo granulomas with uveitis resulting in bilateral eviscerations

S. Dhanji¹, J. Merkur¹, K. Vaezi¹

¹Ophthalmology - Retina, The University of British Columbia, Vancouver, Canada

Introduction: Bilateral intraocular inflammation with simultaneous tattoo granulomas was first described in 1952 and the acronym TAGU (Tattoo Granulomas with Uveitis) is now preferred. TAGU can only be diagnosed when sarcoidosis and other inflammatory and infective causes for bilateral uveitis have been excluded. The prevalence is low with only 43 patients over the past 71 years and this is the only report of a patient undergoing bilateral eviscerations.

Objectives: We report a case of bilateral eviscerations resulting from tattoo uveitis. This rare and severe complication highlights the importance of early recognition of this condition.

Methods: The progress of a patient over 5 years follow-up is reviewed using high quality multimodal imaging (widefield fundus photography, fluorescein angiography and optical coherence tomography).

Results: A 40-year-old male presented with 1 month of bilateral blurred vision. He also reported pain and elevation around his tattoos. On examination, his best corrected visual acuity (BCVA) was 6/18, he had 3+ anterior chamber cells, transillumination defects and pigmentary retinopathy changes bilaterally. OCT demonstrated RPE disruption and choroidal thickening. He was initially managed for herpetic anterior uveitis but had normal uveitis investigations. The following month his visual acuity declined to BCVA 6/120 and 6/60 in the right and left respectively and oral prednisone was commenced at 1mg/kg daily. He also underwent bilateral cataract surgery with posterior sub-tenon's triamcinolone 40mg. At 6 months, the patient had worsening bilateral corneal oedema BCVA hand movements and count fingers in the right and left eyes respectively. Methotrexate 15mg and cyclosporine 50mg twice daily were added. The patient's panuveitis improved over the next four years, however the corneal oedema persisted resulting in a right penetrating keratoplasty. Unfortunately, this did not improve his vision and his eyes became painful and phthisical 5 years following his initial presentation. He then underwent bilateral evisceration. Histopathology revealed bilateral corneal subepithelial fibrosis, corneal stromal neovascularization and no active uveal inflammation.

Conclusions: This patient had one of the worst outcomes resulting from tattoo granulomas with uveitis described in the literature. It highlights the importance of early recognition by inspecting the tattoos of all patients with bilateral uveitis, early exclusion of infectious aetiologies and commencement of systemic immunosuppression.

P-RET-029

Effects of adrenocortical hormone abnormalities on retina and choroid detected by ultrawide-field OCTA

R. Xiao¹, J. Duan¹, M. Zhang¹

¹Department of Ophthalmology, West China Hospital, Sichuan University, Chengdu, China

Introduction: Cushing's syndrome (CS) and primary aldosteronism (PA) are typical disorders of abnormal adrenocortical hormone level. Adrenocortical hormone abnormalities affect central choroidal blood perfusion and thickness, however the effect on the peripheral choroid remains unclear. Thus, our study contributes to a deeper exploration of the pathogenesis of endocrine abnormality-related choroidal diseases.

Objectives: To investigate the effects of CS and PA on central and extensive peripheral retinochoroid structure and blood perfusion.

Methods: A total of 20 CS and PA patients (40 eyes, 10 patients in each group) with adrenocortical adenoma were included in this study, along with 10 healthy subjects (20 eyes) with normal cortisol levels and no ocular disease. Ultrawide-field ($16 \times 16 \text{mm}^2$) optical coherence tomography angiography (OCTA) was performed to evaluate the patients' pre- and post-operative retinal and choroidal thickness (ChT) as well as vessel density. All OCTA images were divided into 3×3 grids. The grid center was considered the central area, while the rest was defined as the peripheral area.

Results: Compared with healthy subjects, central and peripheral ChT was increased in patients with CS and PA, but there was no statistical difference. Meanwhile, peripheral and central vessel density (VD) of large and medium choroidal vessel (LMCV) (peripheral $p=0.042$, central $p=0.09$) and choroidal vascular index (CVI) of LMCV were lower in CS (peripheral $p<0.001$, central $p=0.0032$). The same trend was demonstrated in patients with PA, whose peripheral and central VD of choriocapillaris (CC) was additionally similarly lower (all $p < 0.05$). After surgery, peripheral and central VD of the CC (In CS, peripheral $p=0.002$, central $p=0.049$; In PA, peripheral $p=0.002$, central $p=0.049$) and LMCV (In CS, peripheral $p=0.044$, central $p=0.046$; In PA, peripheral $p=0.024$, central $p=0.028$), and CVI of LMCV (In CS, peripheral $p=0.011$, central $p=0.001$; In PA, peripheral $p=0.036$, central $p=0.034$) were higher in both CS and PA patients as cortisol concentration increased, while the ChT was thinner (In CS, peripheral $p=0.0007$, central $p=0.031$; In PA, peripheral $p=0.001$, central $p=0.048$). Moreover, there were no significant changes in retinal thickness and VD in healthy subjects and patients pre- and post-operation.

Conclusions: Pathologically elevated adrenocortical hormone affects central and extensive peripheral choroidal blood perfusion, which broadens our understanding on the pathogenesis of choroidal diseases.

P-RET-030

Incidence of glaucoma in Japanese patients with uveitis: a retrospective analysis

Y. Harada¹, K. Kihara¹, I. Sada¹, T. Hiyama¹

¹Hiroshima University, Hiroshima, Japan

Introduction: Patients with uveitis face a heightened risk of developing glaucoma, attributed to inflammatory damage to the outflow tract and steroid therapy. Managing glaucoma secondary to uveitis presents challenges due to difficulties in controlling intraocular pressure amidst inflammatory flare-ups and steroid administration.

Objectives: To determine the incidence of glaucoma among Japanese patients diagnosed with uveitis.

Methods: A retrospective analysis of medical records was conducted to assess the incidence of glaucoma in uveitis patients from July 2009 to June 2023 at Hiroshima University. Data collected included age, sex, anatomic localization, laterality of uveitis (anterior, intermediate, posterior, or panuveitis), and uveitis diagnosis. Additionally, the risk of progression of visual field defects in glaucoma patients who underwent visual field testing (Humphrey 24-2) at least five times was examined.

Results: Out of 671 patients included in the analysis, 212 (31.6%) were found to have concomitant glaucoma. Among these cases, anterior uveitis was identified as the predominant anatomical subtype associated with glaucoma, accounting for 36.7% of occurrences. Cytomegalovirus (CMV) anterior uveitis and sarcoidosis exhibited a significant association with the development of glaucoma; 77.8% and 50.0%, respectively. Anterior uveitis showed a tendency for faster progression of glaucoma compared to other types of uveitis. Additionally, a weak correlation was observed between the magnitude of intraocular pressure (IOP) fluctuations and the progression of glaucoma.

Conclusions: The incidence of glaucoma among uveitis patients in Japan exceeds 30%, with CMV anterior uveitis and sarcoidosis demonstrating particularly high rates. Vigilant monitoring is essential especially for patients with anterior uveitis or high IOP fluctuation to detect and manage glaucoma progression effectively.

P-RET-031

Autoimmune uveitis in Behçet's disease and VKH differ in tissue immune infiltration and T cell clonality

H. Kang¹, H. Sun², D. Yu², Y. Tao¹

¹Ophthalmology, Beijing Chaoyang Hospital, Capital Medical University, Beijing, China, ²The University of Queensland, Brisbane, Australia

Introduction: Uveitis is a serious threat to vision and can be classified as infectious or non-infectious. As the most common and important type, non-infectious uveitis may be related to systemic rheumatism and autoimmune diseases, such as Behçet's disease (BD) and Vogt-Koyanagi-Harada (VKH) disease.

Objectives: Non-infectious uveitis is often secondary to systemic autoimmune diseases, with Behçet's disease (BD) and Vogt-Koyanagi-Harada disease (VKHD) as the two most common causes. Uveitis in BD and VKHD can show similar clinical manifestations, but the underlying immunopathogenesis remains unclear.

Methods: To understand immune landscapes in inflammatory eye tissues, we performed single-cell RNA paired with T cell receptor (TCR) sequencing of immune cell infiltrates in aqueous humour from six patients with BD ($N = 3$) and VKHD ($N = 3$) uveitis patients.

Results: Although T cells strongly infiltrated in both types of autoimmune uveitis, myeloid cells only significantly presented in BD uveitis but not in VKHD uveitis. Conversely, VKHD uveitis but not BD uveitis showed an overwhelming dominance by CD4⁺ T cells (>80%) within the T cell population, due to expansion of CD4⁺ T cell clusters with effector memory (Tem) phenotypes. Correspondingly, VKHD uveitis demonstrated a selective expansion of CD4⁺ T cell clones, which were enriched in pro-inflammatory Granzyme H⁺ CD4⁺ Tem cluster, and showed TCR and Th1 pathway activation. In contrast, BD uveitis showed a preferential expansion of CD8⁺ T cell clones in pro-inflammatory Granzyme H⁺ CD8⁺ Tem cluster, and pathway activation for cytoskeleton remodelling, cellular adhesion and cytotoxicity.

Conclusions: Single-cell analyses of ocular tissues reveal distinct landscapes of immune cell infiltration and T cell clonal expansions between VKHD and BD uveitis. Preferential involvements of pro-inflammatory CD4⁺ Th1 cells in VKHD and cytotoxic CD8⁺ T cells in BD suggest a difference in disease immunopathogenesis and can guide precision disease management.

P-RET-032

Clinical features, management and prognosis of retinal astrocytic hamartoma

Z. Xu^{1,2}, Y. Chen^{1,2}

¹Department of Ophthalmology, Peking Union Medical College Hospital, Beijing, China, ²Key Laboratory of Ocular Fundus Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

Introduction: Retinal astrocytic hamartomas (RAHs) are tumors arising from astrocytes in the retina. Tumors of astrocytic origin are rare in the retina and optic nerve, majority of them are reported to be associated with neurofibromatosis, tuberous sclerosis (TSC). Previous studies have limited sample sizes, clinical features, and various treatment responses of RAHs remain inconclusive.

Objectives: Our aim in this study is to summarize the demographics, clinical features, various treatment, and prognosis of RAHs.

Methods: Relevant studies were identified by searching databases from September 1978 to 28th August 2022. RStudio software (R version 4.2.2) was used for statistical analysis. R package "meta" was applied to analyze the overall pooled incidence. Freeman-Tukey Double arcsine transformation was used for pooling studies with 95% confidence interval (CI). The level of significance was set at $p < 0.05$. We explored heterogeneity by performing the chi-square test and I² test. I² index was used as an indicator for quantity of heterogeneity.

Results: One hundred studies involving 429 patients were included in this study. The incidence of RAH was equally distributed in male and female, 73% patients had unilateral ocular involvement (95% CI [64%-81%] I² = 35.9%). For pooling analysis of etiology, 73% patients were associated with TSC, 22% solitary cases, 1% neurofibromatosis-1 (NF-1) and neurofibromatosis-2 (NF-2), respectively. Over 90% patients complained about decreased visual acuity, floater and metamorphopsia. The most common signs were retinal exudation, tumor calcification, and retinal detachment, followed by vitreous hemorrhage, subretinal fluid, 21% patients had macular edema (95% CI [0%-54%]). Peripapillary tumor was the most common location in 53% RAH patients (95% CI [34%-71%]), 42% were paramacular (95% CI [16%-70%]), 11% were inferonasal (95% CI [2%-22%]). Forty-five studies involving 77 patients were included in the treatment and prognosis analysis. Overall, 13% patients aggravated during follow-up. Twenty patients were treated with either everolimus or sirolimus, 95% alleviated. Six patients underwent mainly intravitreal Bevacizumab or Ranibizumab, they all alleviated or remained stable. Less frequent treatment were pars plana vitrectomy, photodynamic therapy, photocoagulation, cryopexy, scleral buckling and irradiation.

Conclusions: The majority of RAH patients were associated with TSC. Oral mTORis are universal and effective treatment for RAH, patients could achieve satisfactory prognosis.

P-RET-033

Evaluation of cell factors in aqueous humor and related treatment in patients with macular edema (ME) secondary to RVO

M. Qin¹, Q. Zhang¹, P.-P. Zhao¹

¹The First Affiliated Hospital of Bengbu Medical University, Bengbu City, China

Introduction: To date a number of treatment modalities are used in clinical practice for treatment of ME secondary to RVO. Meanwhile different inflammatory factors and cell factors in the aqueous humor are studied in these patients aiming to work out an optimal treatment regimen, yet to attain consensus. In this study, we attempted to develop a precision treatment modality according to the concentration of inflammatory factors and VEGF in the aqueous humor.

Objectives: To investigate the putative causative cell factors in aqueous humor of patients with ME secondary to retinal vein occlusion (RVO). Thus, to optimize treatment options.

Methods: Patients with ME secondary to RVO in the past 3 years were recruited, and divided into two groups: precision treatment group (Ranibizumab or Orzodex, or both, according to the concentration of inflammatory factors and VEGF) and Ranibizumab treatment group. The central macular thickness (CMT) and best corrected visual acuity (BCVA) before treatment and 1, 2, 3 and 6 months after treatment were followed up and recorded.

Results: The mean CMT of two groups (1, 2, 3 and 6 months) after treatment compared with before treatment ($P < 0.001$). In the precision treatment group, the mean BCVA (LogMAR) of 1, 2, 3 and 6 months after treatment were statistically significant compared with before treatment ($P=0.001$ in 1 month, $P < 0.001$ at other time points). In the Ranibizumab group, the mean BCVA (LogMAR) at 1, 2, 3 and 6 months after treatment were statistically significant compared with before treatment ($P=0.004$ in 1 month, $P < 0.001$ at other time points). There was no significant difference in CMT value and BCVA (LogMAR) value between two groups ($P > 0.05$). The average injection times of two groups was statistically significant ($P < 0.05$). There were no serious ocular adverse reactions and systemic complications. In addition, the inflammatory factors (BFGF, IL-6, IL-8, VCAM) of CRVO are higher than BRVO, the difference between the two groups was statistically significant ($P < 0.01$).

Conclusions: 1. It is safe and effective to treat ME secondary to RVO according to the concentration of intraocular cytokines.

2. Precision treatment may reduce the number of injections, thereby reduce the economic burden.

3. The forementioned inflammatory factors of CRVO are higher than BRVO.

P-RET-034

Fundus manifestation and treatment of Takayasu's arteritis

J. Ye¹

¹Ophthalmology, Peking Union Medical College Hospital, Beijing, China

Introduction: Takayasu's arteritis is a chronic progressive, non-specific inflammatory disease. Patients can be first visiting in ophthalmology due to ocular symptoms, the fundus manifestation is usually characterized by chronic ischemic retinopathy and hypertensive retinopathy. Therefore, it is of great significance for ophthalmologists to understand the fundus features of artists and to give timely and correct diagnosis and treatment.

Objectives: To investigation the fundus manifestation and treatment of Takayasu's arteritis.

Methods: Retrospective case series was taken to study the clinical data of 17 patients (34 eyes) diagnosed with Takayasu's arteritis at Peking Union Medical College Hospital from 1992 to 2023. Examination included visual acuity, slit-lamp, fundus, FFA, large vascular ultrasound, digital subtraction angiography (DSA), erythrocyte sedimentation rate (ESR) and reactive protein C (CRP). All patients were given systemic corticosteroids, immunosuppressive agents and anticoagulants. 4 eyes received retinal photocoagulation, and one eye received PPV.

Results: Seventeen cases aged 13-49 years (mean (33.6 ± 11.1) years) were enrolled, including 2 male and 13 female patients. Two patients recognized by initial presentation of impaired vision prior to the diagnosis of Takayasu's arteritis. Visual acuity: LP ~ 0.05 , 6 eyes; $0.1 \sim 0.5$, 4 eyes; $0.6 \sim 1.0$, 5 eyes; and above 1.0, 15 eyes. The fundus examination revealed chronic ischemic retinopathy in 16 eyes. There was hypertensive retinopathy in 14 eyes. FFA showed prolonged arm-to-retina circulation time and retinal circulation time, microaneurysms and neovasculation. 6 cases were classified as brachiocephalic arteritis, and 9 patients belonged to extensive arteritis. ESR increased in 9 patients and CRP elevated in 5 patients. Capillary non-perfusion areas in 4 eyes subsided after retinal photocoagulation, and retina reattached in 1 eye after vitrectomy with visual acuity improved from light perception to count finger.

Conclusions: Fundus manifestation of Takayasu's arteritis is usually characterized by chronic ischemic retinopathy and hypertensive retinopathy, and complications such as vitreous hemorrhage, retinal detachment and PVR occur at advanced stage. The first symptom in some patients can be impaired vision. The prognosis could be improved if ophthalmologists know fundus characteristics of Takayasu's arteritis and give timely and correct diagnosis and treatment.

P-RET-035

Long-term, low-dose rapamycin mitigated vascular alterations and maintained retinal function in diabetic akita mice

Y. Wang¹, W.-C. Lam², A.C.Y. Lo¹

¹Department of Ophthalmology, The University of Hong Kong, Hong Kong, Hong Kong, SAR of China,

²Department of Ophthalmology, The University of British Columbia, Vancouver, Canada

Introduction: Diabetic retinopathy (DR) is a prevalent cause of blindness, impacting approximately one-third of the 539 million individuals with diabetes worldwide. It occurs following hyperglycaemia-induced damage to the retinal microvasculature. Rapamycin, an FDA-approved drug, has undergone repurposing for clinical trials in retinal diseases.

Objectives: This study explored the beneficial effects of long-term, low-dose rapamycin treatment on vascular alterations in diabetic Akita mice.

Methods: Akita mice received intraperitoneal injections of a low dose (0.04mg/kg) of rapamycin every other day starting at 6 weeks old after the onset of diabetes. Retinal samples were collected from 36-week-old mice. Immunostaining with GFAP assessed retinal gliosis (n = 6). Isolectin co-staining with IgG and caspase-3 were conducted to examine vascular leakage and apoptosis in endothelial cells, respectively (n = 3). Retinal function was evaluated using flash electroretinograms (n = 9). Data were presented as mean ± SEM and analysed by one-way ANOVA, with significance at P < 0.05.

Results: In 36-week-old Akita mice, GFAP immunoreactivity increased in the ganglion cell layer (GCL) with thicker processes extending to the outer retina, indicative of reactive gliosis in response to vascular stress. Consistent with this observation, a higher percentage of extravascular IgG was observed in 36-week-old Akita mice (p < 0.01) when compared to their age-matched WT counterparts. Caspase-3 activation in endothelial cells was also noted in Akita mice. Importantly, long-term rapamycin treatment mitigated vascular alterations in restricting GFAP and caspase-3 expression in the GCL, along with a lower percentage of extravascular IgG (p < 0.05) in Akita mice. Additionally, rapamycin improved retinal function by elevating both a-wave (p < 0.05) and b-wave amplitudes (p < 0.01) in Akita mice.

Conclusions: Long-term, low-dose rapamycin treatment effectively attenuated vascular changes, including vascular leakage and endothelial apoptosis, in diabetic Akita mice. This beneficial effect contributed to the preservation of retinal function in DR.

P-RET-037

Quality of life in patients with intravitreal therapies

C. Wolfram¹, A. Alibasic¹, M. Schargus²

¹Dep. of Ophthalmology, University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany,

²Dep. of Ophthalmology, Asklepios Hospital Heidberg-Nord, Hamburg, Germany

Introduction: Intravitreal injection therapies (IVT) are among the most frequently performed procedures in ophthalmology. Clinical efficacy, motivation and adherence to therapy depend on the general health status of patients. The assessment of quality of life is therefore an essential parameter for understanding patient perspective and treatment behavior.

Objectives: To investigate the general quality of life of patients undergoing IVT in a real-world-setting

Methods: As part of the Hamburg registry for IVT, 373 patients undergoing IVT were interviewed and asked to rate their quality of life using the standardized EQ-5D questionnaire. The questionnaire consists of 5 questions with values between 0 and 1 on different dimensions of quality of life (0= lowest, 1= highest quality of life) and a self-assessment of health status on a visual analog scale (VAS) with a value between 0 (=lowest) and 100 (=highest assessment of health status). The statistical analysis of correlation between the EQ5D-values and VAS as well as the reading ability, visual acuity, treatment interval and number of previous injections were calculated by Pearson coefficient and tested for statistical significance using IBM SPSS Statistics Version 28.0.1.1.

Results: The average EQ-5D Index of IVT patients was 0,879 (SD \pm 0,158) and self-reported average health status on VAS was 71,796 (SD \pm 19,09). A correlation between the EQ-5D index and the VAS-scale was found ($r=0.543$, $p<0.001$). Reading ability correlated with EQ-5D values ($r=0.316$, $p<0.001$), slightly but not statistically significant with visual acuity ($r=0.087$, $p=0.179$), not with treatment interval ($r=0.040$, $p=0.492$) or number of previous injections ($r=-0.010$, $p=0.861$).

Conclusions: The overall quality of life of IVT patients is impaired, and the reasons for this are complex. Visual skills such as reading or visual acuity have an impact, but not treatment parameters. The assessment of general quality of life is useful to understand the patients' overall situation, not so much to discover an effect of treatment.

P-RET-038

Lupus retinopathy associated with antiphospholipid syndrome: a case report

L. Cervera-Perez¹, O. Turcio-Aceves¹

¹Retina and Vitreous, Hospital de la Luz, Mexico City, Mexico

Introduction: Systemic lupus erythematosus (SLE) is an autoimmune disease characterized by chronic overactivation of the immune system. Lupus retinopathy is the most common posterior segment pathology in patients with SLE. It affects anywhere from 3-29% of patients, more likely to develop in patients with severe or chronically uncontrolled disease. Early recognition and treatment leads to a reduction in severe ocular complications. (1,2)

We report a case of a 22-year-old female patient with a diagnosis of SLE and antiphospholipid syndrome two years ago, presented with diminution of vision in left eye since 2 weeks diagnosed with guided fundus fluorescein angiography (FFA) and treated immediately with guided panretinal photocoagulation. The patient showed vision recovery in the left eye in her follow-up.

Objectives: Describe the associated ocular manifestations. As well as highlighting the importance of good control of the underlying disease in patients with SLE and antiphospholipid syndrome.

Methods: The patient presented to the emergency room with decreased visual acuity of 2 weeks, best corrected visual acuity was 20/40 in right and 20/200 in left eye. Biomicroscopic examination of anterior segment and intraocular pressure were within the normal limits in both eyes. Fundus examination in right eye was normal and the left eye revealed flame-shaped hemorrhages, falciform fold, neovessels, vitreous hemorrhage and opticociliary shunt vessels. FFA findings include hyperfluorescence due to neovessels in the falciform fold and shunts in temporal and lower temporal fields, blockage in lower temporal field due to vitreous hemorrhage.

Results: The patient next underwent guided retinal laser photocoagulation in her left eye. Follow up until six months showed improved vascular tortuosity but retinal capillary drop-out was also seen. The patient underwent retinal laser photocoagulation with resolution of vitreous hemorrhage and neovessels. At the latest follow-up her visual acuity was 20/80 in her left eye showing a remarkable change in the activity of the disease.

Conclusions: Ocular fundus exams allow direct observation of small vessels in the body. Lupus retinopathy indicates systemic vascular damage, underscoring the need for regular fundus exams. While not part of SLE diagnostic criteria, a multidisciplinary approach among rheumatologists, dermatologists, and ophthalmologists aids in understanding the disease and planning effective treatment.

P-RET-039

Two types of acute zonal occult outer retinopathy classified by multimodal images in Chinese patients

S. Liu¹, Y. Chen²

¹Ophthalmology, The First Affiliated Hospital of Chongqing Medical University, Chongqing, China,

²Ophthalmology, Peking Union Medical University Hospital, Beijing, China

Introduction: Acute zonal occult outer retinopathy (AZOOR) is a rare inflammatory disorder. This study comprehensively examines the clinical presentations and long-term follow-up of AZOOR patients.

Objectives: A retrospective study of AZOOR patients.

Methods: A total of 29 patients (43 eyes) were included. The medical records and multimodal imaging, including ultra-wide-field fundus autofluorescence (UWF-FAF), swept-source optical coherence tomography (ss-OCT), and perimetry were analyzed.

Results: Based on the presence of hyperreflective RPE deposits on OCT images, we classified AZOOR patients in two groups. The ellipsoid zone (EZ) and RPE in the macular region were more susceptible to damage in eyes with RPE deposits compared to those without ($p=0.0014$, $p=0.0004$, respectively). Chronic phase cases with RPE deposits had more hyperautofluorescent rings in the macula compared to those without RPE deposits. AZOOR cases without RPE deposits had significantly better vision compared to those with RPE deposits.

Conclusions: Two distinct subtypes of AZOOR patients can be classified based on the presence of RPE deposits on OCT images. These two groups had different manifestations and visual prognoses. This study provide critical insights into the complex presentation and progression of AZOOR.

P-RET-040

Comparative study on the efficacy of Conbercept and Aflibercept in the neovascular age-related macular degeneration

*H. Peng*¹

¹Department of Ophthalmology, Chongqing Key Laboratory for the Prevention and Treatment of Major Blinding Eye Diseases, The First Affiliated Hospital of Chongqing Medical University, Chongqing, China

Introduction: Age-related macular degeneration (AMD) is the primary cause of severe, irreversible vision loss in those over 55. Anti-VEGF drug therapy is the recommended first-line approach. Limited research directly compares receptor fusion proteins like Conbercept and Aflibercept in nAMD.

Objectives: This study compares the effectiveness of Conbercept and Aflibercept in treating neovascular AMD.

Methods: Conducted at the First Affiliated Hospital of Chongqing Medical University's Ophthalmology Department (May 2020 - May 2023), this prospective study enrolled 159 nAMD patients. Participants were randomly divided into two groups: one receiving 0.5 mg Conbercept and the other 2 mg Aflibercept intravitreal injections. Over 12 months, the study, employing a Treat-and-Extend (T&E) regimen, assessed Best-Corrected Visual Acuity (BCVA), Central Retinal Thickness (CRT) changes and injection frequency.

Results: Of the 159 patients, 137 (149 eyes) completed the study. No significant age difference was found between the groups ($P=0.331$). After 12 months, BCVA improved similarly in both groups (Conbercept: 52.8 ± 18.9 , Aflibercept: 52.0 ± 19.7 letters; $P=0.820$). CRT reduction was also comparable (Conbercept: $246.3 \pm 82.8 \mu\text{m}$, Aflibercept: $275.9 \pm 114.3 \mu\text{m}$; $P=0.079$). Injection frequencies averaged 6.9 ± 0.7 (Conbercept) and 6.7 ± 0.7 (Aflibercept; $P=0.255$). Subtype analysis revealed Type 1 MNV had higher baseline BCVA and lower CRT, with more frequent injections compared to other types.

Conclusions: Both Conbercept and Aflibercept are clinically similar in efficacy for nAMD, with the T&E regimen proving therapeutically effective and potentially reducing patient costs. Anti-VEGF treatment efficacy varies across nAMD subtypes, indicating a potential benefit in tailored treatments for specific subtypes.

P-RET-041

Deciphering the interplay of gut microbiota and metabolomics in retinal vein occlusion

J. Ai¹, F. Dong¹, J. Wang¹, H. Cui¹

¹Department of Ophthalmology, The First Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China

Introduction: Retinal vein occlusion (RVO) is a prevalent blinding disorder within the realm of ophthalmology, while the etiology is not fully elucidated. Various retinal disorders, such as age-related macular degeneration, diabetic retinopathy, or retinitis pigmentosa, may fall under the influence of the gut microbiota, hinting at the existence of a direct gut-retina axis. However, the current lack of research fails to establish any connection between RVO and gut dysbiosis.

Objectives: Our study endeavors to unravel potential mechanisms underlying the onset of RVO by integrating various omics technologies, including genomics and metabolomics, offering significant implications for clinical therapeutic guidance.

Methods: Using 16S rRNA sequencing and liquid chromatography-mass spectrometry (LC-MS), fecal samples from 25 RVO patients and 11 non-RVO individuals underwent comparative analysis.

Results: Significant differences in the abundance of gut microbial species were noted between RVO and non-RVO groups. On the phylum level, RVO group showed an elevation in the ratio of Firmicutes to Bacteroidetes. On the genus level, RVO group showed higher abundance in *Escherichia Shigella* ($P < 0.05$) and less abundance in *Parabacteroides* ($P < 0.01$) than non-RVO group. Functional predictions indicated reduced folate synthesis, biotin metabolism, and oxidative phosphorylation, with an increase in butyric acid metabolism in the RVO group. LC-MS analysis showed significant differences in purine metabolism, ABC transporters, and naphthalene degradation pathways, especially purine metabolism. Pearson correlation analysis revealed significant associations between bacterial genera and fecal metabolites. Enrichment analysis highlighted connections between specific metabolites and bacterial genera.

Conclusions: The study findings suggest the involvement of gut microbial dysbiosis in RVO development, underscoring the significance of understanding its pathogenesis for effective treatment development.

P-RET-042

Multimodal imaging and genetic analysis in hereditary transthyretin amyloidosis

Y. Lin¹, Z. Liu¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: Hereditary transthyretin amyloidosis (hATTR) is a rare disease that may cause various disorders. An eye involvement termed vitreous opacities (VO) could be the first or only manifestation in some cases, while the underlying mechanisms have not yet been clarified. This study reported the clinical manifestations, multimodal imaging, and genetic analysis of a hATTR case presenting with only VO in China. Together with a literature review, this study demonstrated comprehensive clinical features and diagnosis-to-treatment procedures of a specific phenotype of hATTR, which helped explore the mechanisms of how amyloid fibrils first reach and affect the vitreous humor.

Objectives: The purpose of present study was to report a hereditary transthyretin amyloidosis case presented with vitreous opacities (VO) in China, and review the clinical phenotype of the identical genotype of this patient.

Methods: Comprehensive clinical evaluation and ophthalmic multimodal imaging was applied for the proband with merely blurred vision in the left eye for one month before and after the surgery. Targeted exome sequencing, evolutionary conservation analysis, and prediction of structural and functional changes were made. Complete pars plana vitrectomy combined with posterior vitreous detachment and pathological examination was performed. Finally, a literature review of all reported cases with identical genotype was conducted.

Results: A heterozygous transthyretin (TTR) Gly83Arg (c.307G>C; p.Gly103Arg) mutation was identified in the proband. This missense mutation was predicted to be pathogenic. Figures of the surgical procedures were shown. The specimen stained with hematoxylin-eosin and Congo red revealed vitreous amyloidosis deposits. Multimodal imaging in follow-ups showed pseudopodia lentis in the left eye and progressive VO of hydrothermal-vent like shape in 3D image of the right eye. The literature review showed that the TTR Gly83Arg mutation has been reported only in China, and the initial sign of most cases with this genotype was VO (70/72, 97.2%).

Conclusions: VO is usually the first sign in this genotype that has been reported only in China. Multimodal imaging revealed that TTR amyloid fibrils may originate from the retina to the vitreous humor through some weak points around retinal vessels.

P-RET-043

Long-term efficacy of conbercept in proliferative diabetic retinopathy treatment

Z. Li^{1,2}, L. Zhou¹, C. Huang¹, J. Liang¹, Z. Xie¹, C. Jin¹

¹Zhongshan Ophthalmic Center, Guangzhou, China, ²Sun Yat-sen Memorial Hospital, Guangzhou, China

Introduction: Conbercept is a fusion protein composed of the combination between VEGF receptor domains with the Fc fragment of human immunoglobulin. However, there was no long follow-up for proliferative diabetic retinopathy (PDR) patients treated with intravitreal Conbercept (IVC).

Objectives: To assess the long-term efficacy of IVC in PDR treatment.

Methods: A total of 25 PDR eyes without diabetic macular edema (DME) of 25 patients were respectively enrolled from February 2018 to December 2023. Each enrolled patient received IVC treatment with 3+PRN (Pro re nata) regimen. Patients were followed up monthly for a year. The primary outcome measure was best-corrected visual acuity (BCVA) change from baseline to month 12. Secondary outcome measures included central retinal thickness (CRT) change, visual field (VF) loss, DME development and neovascularization (NV) regression.

Results: Twenty-five eyes were followed for 1 year and were included in this analysis. From baseline to month 12, BCVA increased by 4.88 letters (95%CI, 2.03 to 7.33 letters) ($p = 0.0007$), and CRT decreased by 30.78 μ m (95%CI, 16.96 to 44.60 μ m) ($p < 0.0001$). During the 1-year follow-up, the rate of complete NV regression was 63.1%, and DME was developed in 3 eyes (15.8%). From baseline to month 12, the reduction in mean deviation (MD) of central VF was 0.13dB (95%CI, -1.27 to 1.54dB) ($p > 0.05$), and the total score point of peripheral VF reduction was 78.26dB (95%CI, -26.68 to 183.2dB) ($p > 0.05$).

Conclusions: The visual acuity improvement and CRT reduction were obvious in PDR patients using IVC in one-year follow-up, with obvious NV regression, slow DME development and little damage to VF.

P-RET-045

Genetic landscape of *FZD4* mutations in FEVR: Different mechanisms of pathogenicity for mutations in different domains

E. Dai¹, M. Liu², S. Li², M. Yang², Z. Yang², P. Zhao¹

¹Ophthalmology, Xin Hua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²Sichuan Provincial Key Laboratory for Human Disease Gene Study, Sichuan Provincial People's Hospital, University of Electronic Science and Technology of China, Chengdu, China

Introduction: Familial exudative vitreoretinopathy (FEVR) is a hereditary eye disorder characterized by aberrant vascular development in the retina. To date, sixteen genes and one genetic locus have been implicated in FEVR, with mutations in the Norrin/ β -catenin pathway genes, particularly *NDP*, *FZD4*, *LRP5*, *TSPAN12*, and *CTNNB1*, prevalent in cases. *FZD4* encodes a 537-amino acid protein with distinct functional domains, including the N-terminal cysteine-rich domain (CRD) and seven transmembrane domains (TM), playing a vital role in the Wnt signaling pathway. Following the identification of FEVR-associated *FZD4* mutations, limited functional implication analysis has been conducted. Our study identified 5 novel *FZD4* missense mutations in FEVR patients and comprehensively reviewed reported mutations to elucidate distinct pathogenic mechanisms associated with mutations located in various domains.

Objectives: The purpose of this study is to report five novel *FZD4* mutations identified in FEVR and to analyze and summarize the pathogenic mechanisms of 34 out of 96 reported missense mutations in *FZD4*.

Methods: Five probands diagnosed with FEVR and their family members were enrolled in the study. Ocular examinations and targeted gene panel sequencing were conducted on all participants. Plasmids, each carrying 29 previously reported *FZD4* missense mutations and 5 novel mutations, were constructed based on the selection of mutations from each domain of *FZD4*. These plasmids were employed to investigate the effects of mutations on protein expression levels, Norrin/ β -catenin activation capacity, membrane localization, norrin binding ability, and DVL2 recruitment ability in HEK293T, HEK293STF, and HeLa cells.

Results: All five novel mutations (S91F, V103E, C145S, E160K, C377F) responsible for FEVR were found to compromise Norrin/ β -catenin activation of *FZD4* protein. After reviewing a total of 34 reported missense mutations, we categorized all mutations based on their functional changes: signal peptide mutations, cysteine mutations affecting disulfide bonds, extracellular domain (ECD) mutations influencing norrin binding, TM1 and TM7 mutations impacting membrane localization, and intracellular domain mutations affecting DVL2 recruitment.

Conclusions: We expanded the spectrum of *FZD4* mutations relevant to FEVR and experimentally demonstrated that missense mutations in *FZD4* can be classified into five categories based on different functional changes.

P-RET-046

Evaluation of a New Q-switched Nd:YAG laser on premacular hemorrhage

Z. Su¹, L. Zhang¹

¹Eye Center of the Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Premacular hemorrhage is among the causes of sudden deterioration of visual acuity.

Objectives: This study aimed to investigate the therapeutic outcomes of a new Q-switched Nd:YAG laser on premacular hemorrhage.

Methods: Retrospective, case series study of 16 eyes from 16 patients diagnosed with premacular hemorrhage, including 3 cases of Valsalva retinopathy, 8 cases of retinal macroaneurysm, 3 cases of diabetic retinopathy, 1 case of trauma-related hemorrhage and 1 case with leukemia. A 1064nm Q-switched Nd:YAG laser was performed to puncture the posterior hyaloid and inner limiting membrane to drain the hemorrhage.

This retrospective, case series study enrolled premacular hemorrhage patients between May 2017 and January 2023 at the Eye Center of the Second Affiliated Hospital, School of Medicine, Zhejiang University. The inclusion criteria include (1) hemorrhage accumulated in front of macular, diagnosed as premacular hemorrhage; (2) the new Q-switched Nd:YAG laser (Ultra Q Reflex, Ellex Medical Pty Ltd, Australia) was applied for hemorrhage drainage within one week. Patients with a history of ocular surgery or infection were excluded.

Premacular hemorrhage was diagnosed based on optical coherence tomography (OCT), fundus photographs, fluorescein angiography (FFA) and posterior segment examination by experienced ophthalmologists. The new 1064 nm Q-switched Nd:YAG laser was performed to create an opening at the highest anterior surface of the hemorrhagic cyst, while avoiding damage to macular or adjacent vessels. Laser exposures started with an energy of 3 mJ and gradually increases until successful drainage. Several shots were tried per energy stage by the same experienced ophthalmologist. Once a successful puncture was achieved, the patient was asked to remain in a sitting position for two hours to drain the hemorrhage by gravity. All patients were asked to follow up within 1 week.

Statistical analyses were performed with SPSS version 26.0. The pre- and post-laser BCVA values were converted to logMAR equivalent for statistical analysis and compared by compared t-test. $P < 0.05$ was considered statistically significant.

Results: The success rate of 16 patients with premacular hemorrhage drainage was 100% in this study. Improved visual acuity was observed in each patient.

Conclusions: In this case series of 16 patients, the new Q-switched Nd:YAG laser was successful in draining premacular hemorrhage with no serious complications.

P-RET-047

Bloody thunderstorm: Fanconi's anemia

A. Ganvir¹, C. Shinde¹

¹Ophthalmology, LTMMC & GH, Sion Hospital, Mumbai, India

Introduction: Fanconi anemia (FA) is a rare, autosomal recessive disorder with excess chromosomal breakage characterized by multiple congenital abnormalities and progressive pancytopenia. It comes under the category of inherited bone marrow failure syndrome. Numerous ocular features have been described in patients with Fanconi anemia including retinal, sub-hyaloid, and vitreous hemorrhage, venous tortuosity, retinal occlusive vasculopathy, exudates, cotton-wool spots, central retinal vein occlusion, cystoid macular edema, and optic disc edema.

Objectives:

1. To describe unusual retinal features of Fanconi's anemia.
2. To describe management strategy for retinal features.

Methods: Observational study of a series of two patients with Fanconi's anemia and review of literature.

Results: Both patients were diagnosed with Fanconi's anemia by chromosomal breakage testing. A 13-year-old female had sudden diminished vision in both eyes for one week. She received multiple blood transfusions. Retina examination revealed a large pre-retinal hemorrhage over the macula in the right eye and the left eye fundus showed a central retinal vein occlusion-like picture and sea fan-shaped neovascularization on the FFA. The patient was treated with intravitreal Ranibizumab in the left eye and advised retinal photocoagulation, but due to systemic instability, a laser was not done. Retinal features worsened after intravitreal injection.

A 14-year-old male child presented with blurred vision in both eyes after a blood transfusion. Both eyes' retinal examinations revealed sub-hyaloid hemorrhage. We advised observation of the lesion, and after 4 weeks, there was a complete resolution of hemorrhage with significant improvement in vision.

Conclusions: Both cases describe a different level of retinal manifestation. This is due to the severity of retinal ischemia secondary to anemia. The first-case patient had a more hypoxic retina due to which neovascularization developed and subsequent sub-hyaloid, sub-ILM, and vitreous hemorrhage in one eye. We found no improvement in retinal features after intravitreal anti-VEGF. In the second case, only observation leads to the resolution of retinal features where retinal ischemia was minimal.

P-RET-048

Comparison of efficacy and safety of intravitreal ranibizumab and conbercept before vitrectomy in Chinese PDR patients

*J.F. Qu*¹

¹Ophthalmology, Peking University People Hospital, Beijing, China

Introduction: Compared with aflibercept and ranibizumab, conbercept has a different soluble receptor decoy (the fourth binding domain of VEGF receptor 2) which enhances the association rate of VEGF to the receptor. There are studies comparing ranibizumab with aflibercept in age-related macular degeneration (AMD), DME, and pachychoroid neovascularopathy. But studies comparing the efficacy of pre-vitrectomy intravitreal ranibizumab and conbercept, for patients with PDR are lacking.

Objectives: To compare the efficacy and safety of preoperative intravitreal injections of ranibizumab and conbercept in Chinese proliferative diabetic retinopathy (PDR) patients.

Methods: This prospective randomized controlled trial enrolled 90 eyes of 80 patients with PDR. Forty-four eyes of 40 patients that received intravitreal ranibizumab (IVR) injections (0.5 mg/0.05 mL) before vitreous surgeries were assigned to the IVR group. Forty-six eyes of 40 patients that received intravitreal conbercept (IVC) injections (0.5 mg/0.05 mL) before vitreous surgeries were assigned to the IVC group. Intraoperative and postoperative indices were assessed for further comparison between the two groups.

Results: There were no statistically significant differences in all surgery indices, including intraoperative indices (surgery time, $P=0.225$; intraoperative bleeding, $P = 0.808$; endodiathermy use, $P = 0.693$; incidence of iatrogenic retinal breaks, $P = 0.740$; relaxing retinotomy, $P = 0.682$; retinal reattachment, $P = 0.682$ and silicone oil tamponade, $P = 0.814$) and postoperative indices (postoperative vitreous hemorrhage (VH), $P = 0.808$; neovascular glaucoma (NVG), $P = 0.964$; recurrent retinal detachment, $P = 0.531$; postoperative fibrovascular proliferation progression, $P = 0.682$ and reoperation, $P = 0.955$) between the two groups. There were no statistically significant differences in best-corrected visual acuity (BCVA) at each follow-up visit ($P = 0.939, 0.669, 0.741$ and 0.717 , respectively) or in central retinal thickness (CRT) ($P = 0.976, 0.699, 0.551$ and 0.686 , respectively). As for safety profile, both groups had no ocular or system adverse events during the observation period.

Conclusions: IVR and IVC as a pretreatment of vitrectomy had similar efficacy and safety profile for Chinese PDR patients.

P-RET-049

Novel copy number variation and coding variants in Saudi patients with X-linked retinitis pigmentosa

*B. Almoallem*¹

¹Department of Ophthalmology, King Saud University, Riyadh, Saudi Arabia

Introduction: X-linked retinitis pigmentosa (XLRP) is one of the most severe progressive retinal degeneration that accounts 15% of RP cases. Up to date, XLRP, is caused by mutations in two genes including retinitis pigmentosa GTPase regulator (*RPGR*) (OMIM # 300455) account for that vast majority of cases, and *RP2* mutations (OMIM # 312600) make up the remainder of known mutations.

Objectives: Herewith, we aim to study four unrelated XLRP Saudi families.

Methods: Six male patients from four Saudi families, ranging between 5-51 years, were recruited for this study. Whole exome sequencing (WES) NGS based copy number variation (CNV) analysis and was performed in the four index cases of each family followed targeted mutation screening in the affected ones.

Results: All studied patients displayed typical clinical features of profound visual loss, nyctalopia nystagmus and variable presentation of retinal dystrophy in the fundus. WES revealed hemizygous likely causative variants in all studied patients. Three distinct known variants in *RPGR* were found in five patients as follows: a nonsense mutation (c.1544T>G; p.(Leu515*)) in (1/4 family; 25%) , and a frameshift mutations (c.2236_2237del; p.(Glu746Argfs*23) in (2/4 family; 50%) including four affected males that might suggest a founder effect in the Saudi population. In one family we identified a hemizygous likely pathogenic by NGS CNV analysis a deletion of chromosomal region chrX:46712889-46719557, encompassing exons 2-3 of the *RP2* gene.

Conclusions: Our study supports the spectrum of genetic variants associated with the *PRGR* related XLRP by which we identified known variants in 75% of the studied families with five affected patients. Apart from known causative coding variants in *RPGR*; we identified a novel CNV in *RP2* gene. This highlights the importance of NGS based CNV analysis in many similar cases and a great potential tole for missing heritability.

P-RET-050

Short-term efficacy of faricimab treatment for myopic choroidal neovascularization

*J.-K. Wang*¹

¹Ophthalmology, Far Eastern Memorial Hospital, Taipei, Taiwan, China

Introduction: Faricimab is a new anti-VEGF agent, approved for nAMD and DME, but not for mCNV.

Objectives: To investigate the short-term efficacy and adverse events of faricimab treatment for myopic choroidal neovascularization (mCNV).

Methods: We included patients with subfoveal mCNV (n = 23, 20 naïve, 3 refractory), from March 2023 to January 2024. All the patients underwent 1 to 3 monthly intravitreal injection of faricimab. Intraocular pressure (IOP), best-corrected visual acuity (BCVA), anterior/posterior segment examination, and optical coherence tomography (OCT) checkup were performed every month following the injection. Primary outcome measures included change in BCVA, central foveal thickness (CFT) in 1 mm by OCT, dry macula rate, response rate (CFT reduction more than 10%). Complications after injections were recorded. The intra-group changes in CFT and BCVA were compared with Wilcoxon signed rank test.

Results: In patients with naïve mCNV, all macular CNV significantly decreased or disappeared after faricimab management. Dry macula was achieved in 78.5% of the cases after one injection. Mean visual improvement from 0.89 logMAR to 0.55 logMAR, demonstrated 17.2 letters gains (p = 0.002). Macular thickness and fluid decreased significantly after intravitreal faricimab, from mean 291.1 to 223.6 μ m (p = 0.01). Three recalcitrant patients to prior anti-VEGF agents, all responded well after switch to faricimab treatment. There were no systemic thromboembolic events or other serious ocular complications observed including intraocular inflammation, new retinal vascular occlusion/vasculitis, retinal detachment, or infectious endophthalmitis following faricimab injections.

Conclusions: Intravitreal injection of faricimab may be effective for treatment-naïve or refractory mCNV in anatomical and visual improvement. More cases are required to confirm efficacy of faricimab for mCNV indications. Serious systemic and ocular adverse events were not found in this small case series.

P-RET-051

Quantitative features of Conbercept intravitreal injection treatment for type 2 macular neovascularization by OCTA

T. Liu¹, Y. Shi¹, S.Y. Xiaomeng¹

¹Eye Institute of Shandong First Medical University, Eye Hospital of Shandong First Medical University (Shandong Eye Hospital), Jinan, China

Introduction: Optical coherence tomography angiography quantitative features is important.

Objectives: To investigate the association between the activity. of MNV and Optical coherence tomography angiography features , including the Vessel tortuosity and MNV area.

Methods: This was a single-center study. A total of 54 naive eyes (54 patients) with type 2 MNV,who underwent optical coherence tomography angiography (OCTA) were included in the study.which were treated with intravitreal injections of Conbercept using a pro re nata (PRN) regimen. The follow-up time ranged from 2 months to 36 months. All patients had thorough ophthalmologic examinations and multimodal imaging. Image J and SPSS 26.0 were used to analyze images and complete data processing.The main outcomes of in Macular vasculature, including vessel density, macular thickness (CMT) ,MNV area,vessel dispersion ,perfusion density, and foveal avascular zone, were examined using OCTA.

Results: The mean age of the 54 subjects was 37.47±14.78 years (male=21, female=33). The mean best-corrected visual acuity (LogMAR) increased from 0.59±0.40 to 0.25±0.25 after an average of 2.09±0.99 anti-VEGF treatments ($P<.001$). Mean MNV area decreased from 0.84±1.00 mm² to 0.50±0.71mm² ($P<.001$). Central macular thickness (CMT) was reduced from 261.06±100.96 to 189.00±50.59 ($P<.001$). Vessel tortuosity (VT) was also significantly reduced, from 14.55±3.57 to 9.65±3.72 ($P<.001$). Finally, baseline MNV Area was significantly associated with post-treatment BCVA ($\beta=0.056$, $P=.011$).

Conclusions: Conbercept is effective in treating type 2 MNV, as it rapidly abates disease activity, can significantly improve patients' visual acuity, decreases the mean number of injections, and significantly reduces CMT. MNV area and VT are useful biomarkers that can be examined with OCTA to evaluate the effects of anti-VEGF treatments such as Conbercept on type 2 MNV. OCTA combined with OCT may be a quick and reliable way to identify type 2 MNV and monitor its activity.

P-RET-052

Simultaneous inhibition of fibroblast growth factor-2 and VEGF-A with RC28-E in DME: a phase 2 randomized trial

W. Zhang¹, H. Chen¹, Y. Chen¹

¹Ophthalmology, Peking Union Medical College Hospital, Beijing, China

Introduction: Diabetic macular edema (DME) is a multifactorial disease involving other vascular permeability factors and pathways that are not addressed with anti-VEGF monotherapy. Fibroblast growth factor-2 (FGF-2) has been shown to be an important regulator of vascular permeability and angiogenesis. RC28-E is a novel dual-decoy receptor immunoglobulin G 1 Fc-fusion protein that simultaneously blocks both VEGF-A and FGF-2. A phase-2, randomized, active comparator-controlled study was designed to evaluate different doses and dosing regimens of intravitreal RC28-E with conbercept in patients with DME.

Objectives: To compare different doses and dosing regimens of RC28-E with conbercept in patients with DME.

Methods: This is a prospective, randomized, active comparator-controlled, open-label, multicenter, phase 2 clinical trial. The trial enrolled patients 18 years of age or older with center-involving DME, best-corrected visual acuity (BCVA) of 73 to 24 Early Treatment Diabetic Retinopathy Study (ETDRS) letters, and central subfield thickness (CST) of 300 μm or more. Patients were assigned randomly to 1 of 5 treatment regimens: 1.0 mg RC28-E for 3 initial monthly doses and then every 8 weeks; 1.0 mg RC28-E for 5 initial monthly doses and then on an as-needed (PRN) basis; 2.0 mg RC28-E for 3 initial monthly doses and then every 8 weeks; 2.0 mg RC28-E for 5 initial monthly doses and then on a PRN basis; or 0.5 mg conbercept for 3 initial monthly doses and then on a PRN basis. Assessments were made at baseline and every 4 weeks thereafter.

Results: The trial enrolled 156 patients. Mean improvements in BCVA in the RC28-E groups at week 24 were 7.1, 11.0, 7.4, and 10.5 letters for 1.0mgQ8, 1.0mgPRN, 2.0mgQ8, and 2.0mgPRN regimens, respectively, versus 9.7 letters for the conbercept group ($P = 0.146$). Mean improvements in BCVA in the RC28-E groups at week 52 were 5.5, 9.5, 9.2, and 9.7 letters for 1.0mgQ8, 1.0mgPRN, 2.0mgQ8, and 2.0mgPRN regimens, respectively, versus 8.4 letters for the conbercept group ($P = 0.469$). Mean reductions in CST in the RC28-E groups at week 52 were $-163.2\mu\text{m}$, $-136.9\mu\text{m}$, $-142.5\mu\text{m}$, and $-153.6\mu\text{m}$, versus $-160.7\mu\text{m}$ for the conbercept group ($P = 0.948$). RC28-E generally was well tolerated. Incidence of ocular and non-ocular adverse events was comparable between RC28-E groups and conbercept group.

Conclusions: Intravitreal RC28-E improved BCVA and CST in eyes with center-involved DME, all RC28-E doses and dosing regimens were found to be comparable with conbercept.

P-RET-053

Pathophysiological roles of Adrenomedullin in experimental autoimmune uveitis

Y. Matsuda^{1,2}, *S. Kakiyama*^{1,2}, *K. Hirabayashi*^{1,2}, *A. Imai*^{1,2}, *Y. Iesato*^{1,2}, *T. Sakurai*², *A. Kamiyoshi*², *Y. Ichikawa-Shindo*², *M. Tanaka*², *H. Kawate*², *Y. Zhao*², *T. Murata*¹, *T. Shindo*²

¹Ophthalmology, Shinshu University School of Medicine, Matsumoto, Japan, ²Cardiovascular Research, Shinshu University School of Medicine, Matsumoto, Japan

Introduction: Adrenomedullin (AM) is a peptide produced by various cells and has diverse physiological effects, including anti-inflammatory, anti-apoptotic, and anti-oxidative stress effects. Experimental autoimmune uveitis (EAU) is a well-established model of human autoimmune uveitis.

Objectives: In this study, we investigated the pathophysiological roles of AM in uveitis using EAU model in mice.

Methods: 8 to 10-week-old female wild-type (WT) mice and AM knockout (AMKO) mice were used. To induce EAU, N-terminal peptide fragment of human interphotoreceptor retinoid-binding protein (hIRBP(1-20)) emulsified with complete Freund's adjuvant containing mycobacterium tuberculosis H37Ra was subcutaneously injected at the base of tails, followed by intraperitoneal injection of pertussis toxin. The expression of inflammation-related genes in the retina and T cell markers in the spleen was evaluated by real-time PCR on day seven after immunization. Next, in WT mice, human recombinant AM or vehicle was administered subcutaneously using an osmotic pump for 14 days. On day 14, clinical and histological scores were evaluated. The number of CD3-positive T cells and F4/80-positive macrophages were also counted.

Results: Gene expression of inflammatory cytokines in the retina was enhanced in both WT and AMKO mice when EAU was induced, but it was more pronounced in AMKO. In contrast, in the spleen, EAU induction decreased CD3 expression in WT mice, whereas the decrease was suppressed in AMKO mice ($p < 0.05$, $n = 7 \sim 8$). AM-treated group showed significantly improved clinical and histological scores after EAU induction ($p < 0.05$, $n = 9 \sim 10$) and significantly reduced T cell and macrophage infiltration in the retina ($p < 0.05$, $n = 7 \sim 8$), compared to the vehicle-treated group.

Conclusions: AM is suggested to improve the pathogenesis of uveitis by regulating T-cell and macrophage infiltration and inflammation. Additional analysis, including flow cytometry, would be necessary to elucidate the precise mechanism of AM's therapeutic effect on uveitis.

P-RET-054

Combined intravitreal Conbercept and cataract surgery in diabetic patients: effect on macular morphology and function

H. Yan¹, Y. Ren¹, W. Sun¹, C. Bi¹, Y. Zhang¹, L. Qu¹

¹Shaanxi Eye Hospital, Xi 'an People's Hospital (Xi 'an Fourth Hospital), Affiliated People's Hospital of Northwest University, Xi'an, China

Introduction: Cataract surgery can be associated with macular edema in patients with diabetic retinopathy.

Objectives: This study aimed to assess the impact of cataract surgery combined with intraoperative intravitreal injection of anti-VEGF (Conbercept, China) in patients with moderate or severe non-proliferative diabetic retinopathy.

Methods: This was a prospective, observational, and single-center study. Patients with visually significant cataract and moderate, severe non-proliferative diabetic retinopathy (NPDR) were enrolled from 2022 to 2023. All patients underwent phacoemulsification and hydrophobic acrylic IOL implantation combined with Conbercept intravitreal injection. The extent of diabetes and the grading of cataract were recorded. The software in OCT automatically divided the retina within 6 mm into three concentric circles centered on the macular central fovea, and two radial lines divided the 3 and 6 mm concentric circles into four zones as total of nine zones. The best corrected visual acuity (BCVA), central macular thickness (CMT), and total macular volume (TMV) were measured preoperatively and postoperatively at 1 week, 1 month, and 3 months.

Results: A total of 40 individuals (48 eyes) were included in this study. The BCVA in Log MAR decreased significantly in all patients after the surgery, from preoperative BCVA (1.01 ± 0.75) to 1 week (0.27 ± 0.35 , $P < 0.05$), 1 month (0.29 ± 0.34 , $P < 0.05$), and 3 months (0.23 ± 0.26 , $P < 0.05$), respectively. All patients had a significant decrease in CMT and TMV after the surgery, from preoperative CMT ($283.08 \pm 57.66 \mu\text{m}$) to 1 week ($261.08 \pm 38.30 \mu\text{m}$, $P < 0.05$) and 1 month ($274.13 \pm 38.78 \mu\text{m}$, $P < 0.05$), followed by an increase to 3 months ($309.80 \pm 78.77 \mu\text{m}$, $P > 0.05$), respectively. TMV decreased from preoperative ($0.23 \pm 0.02 \text{m}^3$) to 1 week ($0.20 \pm 0.02 \text{m}^3$, $P < 0.05$) and 1 month ($0.22 \pm 0.03 \text{m}^3$, $P < 0.05$), followed by an increase to 3 months ($0.24 \pm 0.06 \text{m}^3$, $P > 0.05$), respectively, after the surgery. Except for the outer ring decreased significantly at 1 week postoperatively ($P < 0.05$), there was no statistically significant difference between the inner and outer macular rings throughout other study periods.

Conclusions: Intraoperative intravitreal Conbercept is effective for visual improvement, CMT and TMV declination in cataract patients with moderate or severe non-proliferative diabetic retinopathy who underwent cataract surgery. It may suggest that combined intravitreal Conbercept is benefit for prophylaxis diabetic macular edema after cataract surgery. (Funding: BJ2022IIT006, BCF China)

P-RET-055

Minimal membranectomy of tractional retinal detachment in selected severe proliferative diabetic retinopathy

R. Dai¹, Z. Chen¹, Y. Zhou¹, S. Lin¹, X. Xiao¹

¹Peking Union Medical College Hospital, Beijing, China

Introduction: We wanted to verify and present a new technique – minimal membranectomy in selected PDR patients. The principle of this technique was that, during surgery, minimal trauma was caused iatrogenically while the vitreoretinal tractional force was effectively relieved. This meant only necessary relaxation incisions or delamination or cutting of the proliferative fibrosis were done to relieve contraction, especially to the macula, or to stop advancing of the detached area to threaten the macula. Not all the fibrotic membranes were mandatorily to be removed. No tamponade (silicone oil or gas) was used.

Objectives: To verify and present a new technique – minimal membranectomy – in the management of tractional retinal detachment (TRD) in selected severe proliferative diabetic retinopathy (PDR) patients.

Methods: Retrospective, noncomparative, interventional case series for the initial management of TRD associated with severe PDR at a tertiary center in China. Minimal membranectomy instead of the traditional entire membrane delamination was performed in selected patients. The main outcome measures included the change of size of the detached retinal area and visual acuity between the preoperative and the final visits.

Results: A total of 259 pars plana vitrectomies (PPV) were performed in 193 consecutive patients. Among all the PPVs, 115/259 (44.4%) were because of combined rhegmatogenous retinal detachment (RRD) or iatrogenic retinal tears occurred during PPV thus requiring silicon oil or gas tamponade; 45/259 (17.4%) were because of TRD but without a RRD component thus without any tamponade. Among those without tamponade, 9/45 (20.0%) were performed with minimal membranectomy technique. Postoperatively, 8/9 (88.9%) of the patients had a reduced detached retinal area demonstrated by the enlarged area of visible photocoagulation burns, and 1/9 (11.1%) had a stable detachment. All 9 patients had stable or improved vision.

Conclusions: Minimal membranectomy is a safe and effective technique for selected severe PDR/TRD patients. These patients usually had a long diabetic retinopathy duration, poor irrigation from the retinal blood vessels, thinned and ischemic retina, and tightly adhesive but non-active proliferative membrane. This technique can save these patients from vision loss and the complications of tamponade.

P-RET-056

PKG-mediated phosphorylation of TOP2A activates HDAC to drive photoreceptor cell death in inherited retinal degeneration

Y. Dong¹, K. Jiao¹, W. Xu¹, Z. Hu¹

¹Affiliated Hospital of Yunnan University, Kunming, China

Introduction: Inherited retinal degeneration (IRD) is a debilitating condition characterized by the progressive loss of photoreceptor cells. Despite extensive research, the underlying mechanisms remain elusive.

Objectives: This study aimed to investigate the role of DNA topoisomerase II alpha (TOP2A) and its interplay with protein kinase G (PKG) and histone deacetylase (HDAC) in the rd1 mouse model for inherited retinal degeneration.

Methods: Immunofluorescence and quantitative analyses were employed to evaluate the expression of TOP2A and other related markers. The specific inhibitors TSC24 and SAHA were used to elucidate the effects of TOP2A and HDAC, respectively. Furthermore, we examined the effect of PKG activity on TOP2A phosphorylation using the drug KT5823.

Results: Significant upregulation of TOP2A was observed in rd1 mice compared to wild-type (WT) controls, especially in the outer nuclear layer (ONL). Phosphorylation levels of TOP2A strongly correlated with photoreceptor cell death as assessed by the TUNEL assay. Treatment with TSC24 significantly reduced TOP2A-positive and TUNEL-positive cells. TOP2A phosphorylation was accompanied by HDAC activation, which was mitigated by TSC24. Remarkably, PKG inhibition with KT5823 reduced both TOP2A phosphorylation at specific residues and photoreceptor HDAC activity.

Conclusions: Our findings provide novel insights into the role of TOP2A in IRD, implying a function in HDAC activation. This in turn positions TOP2A in a PKG-TOP2A-HDAC photoreceptor degenerative pathway, offering potential therapeutic targets for combating IRD-type diseases.

P-RET-057

Artificial intelligence algorithm for the diagnosis, evaluation, and monitoring of acute retinal necrosis

L. Feng¹, H. Zhou¹

¹Eye Center, The Second Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou, China

Introduction: Acute Retinal Necrosis (ARN) is an ocular emergency with devastating consequences including potential blindness, affecting individuals regardless of age or gender. Retinal necrosis is the most important feature, which initially occurs in the peripheral retina and extends posteriorly in the affected eye. Resulting necrotizing lesions may cause retinal atrophy and ultimately lead to rhegmatogenous retinal detachment. Therefore, the prompt detection and proper evaluation of associated necrotic regions are crucial for diagnosis and treatment. Artificial intelligence (AI) has been proved to have the ability to help automatically detect numbers of common treatable blinding retinal diseases, like diabetic retinopathy, from retinal fundus photographs. However, no research was currently targeting the application of AI algorithms for the analysis of the ARN syndrome before our initiation.

Objectives: This study aimed to develop a clinically applicable AI algorithm to improve the diagnosis, evaluation, and monitoring of ARN by analyzing wide-angle fundus photographs for automated detection and evaluation of retinal necrosis.

Methods: Wide-angle fundus photographs from ARN patients were collected, and the U-Net method was used to construct the AI algorithm. Thereby, a novel algorithm based on deep machine learning in detection and evaluation of retinal necrosis was constructed for the first time. The AI algorithm's performance was validated by its ability to identify necrotic areas, which was then correlated with clinical findings and viral loads in ocular fluids.

Results: The AI algorithm demonstrated high accuracy, with an area under the receiver operating curve of 0.92, with 86% sensitivity and 88% specificity in the detection of retinal necrosis. For the purpose of retinal necrosis evaluation, necrotic areas calculated by the AI algorithm were significantly positively correlated with viral load in aqueous humor samples ($P < 0.0001$) and therapeutic response of ARN ($P < 0.0001$).

Conclusions: The AI algorithm shows promise for clinical application in the diagnosis, evaluation, and monitoring of ARN, with potential to enhance accuracy, reduce misdiagnoses, and decrease physician workload. Our study is the first demonstration of an AI algorithm for the diagnosis of ARN. The present approach has the potential to perform well in the clinical application of aided ARN diagnosis and the monitoring of treatment effects.

P-RET-058

Novel metrics in OCTA: correlation between deep vascular complex dropout & middle retina thinning in DR

H. Khan¹, F. Sumita², S. Yuan³, V. Vanzan¹, J. Lo⁴, M. Sarunic⁵, E. Navajas³

¹Department of Ophthalmology and Vision Sciences, University of British Columbia, Vancouver, Canada, ²Division of Ophthalmology, University of São Paulo Medical School, São Paulo, Brazil, ³Department of Ophthalmology, University of British Columbia, Vancouver, Canada, ⁴School of Engineering Science, Simon Fraser University, Burnaby, Canada, ⁵Department of Medical Physics and Biomedical Engineering, University College London, London, United Kingdom

Introduction: To introduce new metrics for analyzing optical coherence tomography angiography (OCTA) images in non-proliferative diabetic retinopathy (DR) patients and to demonstrate structural changes in areas of capillary dropout.

Objectives:

1. Introduce novel metrics for analyzing optical coherence tomography angiography (OCTA) images in non-proliferative diabetic retinopathy (DR) patients to quantify capillary dropout.
2. Demonstrate the structural changes in areas of capillary dropout in non-proliferative DR patients using OCTA imaging and co-acquired structural OCT images.
3. Investigate the correlation between the severity of diabetic retinopathy and the novel metrics derived from OCTA images, as well as the association between middle retina thinning and areas of capillary dropout.

Methods: A cross-sectional study comparing 6x6mm foveal-centered OCTA images in patients with varying levels of DR. A convolutional neural network was used to segment capillaries followed by analysis using 3 novel metrics: vascular index, intercapillary area, and maximal ischemic point, which collectively quantify capillary dropout. Areas of middle retina thinning were marked on the co-acquired structural OCT images for correlation with OCTA microvascular abnormalities.

Results: There were 101 eyes included: 20 in the control group, 27 diabetic eyes with no DR, 23 with mild DR, 20 with moderate DR, and 11 with severe DR. The vascular index correlated inversely with DR severity while the intercapillary areas and maximal ischemic point distances increased with DR severity. Total area of middle retina thinning increased with DR severity and correlated closely with areas of deep vascular complex dropout.

Conclusions: The new metrics for analysis of OCTA images in DR patients showed an expected correlation with DR severity due to capillary dropout. Presence and location of middle retina thinning had good correlation with DR severity and areas of capillary dropout respectively.

P-RET-059

Pretreatment with intravitreal Bevacizumab prior to vitrectomy for Proliferative Diabetic Retinopathy

K.B. Manas-Lim¹, J.C. Artiaga¹, H. Uy^{1,2}

¹Ophthalmology and Visual Sciences, University of the Philippines- Philippine General Hospital, Manila, Philippines, ²Peregrine Eye and Laser Institute, Makati, Philippines

Introduction: Preoperative intravitreal Bevacizumab (IVB) has been found to reduce neovascularization prior to pars plana vitrectomy (PPV), decrease intra- and post-operative hemorrhage, facilitate fibrovascular membrane dissection, reduce surgical times and iatrogenic retinal breaks, and decrease likelihood of developing new tractional retinal detachment (TRD).

The use of pre-operative IVB has become increasingly more accepted but not yet standard practice. Some controversies still exist regarding administration that have not been resolved by RCTs or meta-analysis on its use for various retinal morphologies and surgical techniques. Concern also still exists that IVB may worsen TRD and cause the foveal vascular zone enlargement. Real-world circumstances may provide insight in the true applicability of pre-operative IVB for complicated PDR.

Objectives: This study aims to describe the clinical profile and anatomical configurations of PDR prior to vitrectomy and to compare the difference in the post-operative visual acuity, incidence of vitreous hemorrhage, incidence of reoperation, duration of surgery, and use of tamponade in patients with and without IVB pretreatment.

Methods: This was retrospective cohort conducted at a Philippine tertiary hospital. The study population included all patients who underwent PPV for PDR from 2020 to 2023. Eyes in the exposure group had IVB administered within 1 month prior to PPV; whereas the control did not. Main outcome measures were the incidence of post-operative vitreous hemorrhage and overall change in best-corrected visual acuity within 3 months of vitrectomy.

Results: A total of 209 cases were included. There was a significantly higher proportion of patients who had improved visual acuity among those who received IVB. There was a significantly lower proportion of patients who had progression of TRD and persistent vitreous hemorrhage among those with IVB pretreatment compared to those without. There was no sufficient evidence to conclude that there was a significant difference in surgery duration, lens status, tamponade and reoperations.

Conclusions: Preoperative IVB as an adjuvant to PPV was effective in improving the postoperative prognosis of complicated diabetic vitrectomy, even in cases with TRD. Preoperative IVB seems to reduce the incidence of post-operative vitreous hemorrhage and TRD progression. Both groups had improved post-operative visual acuity. Preoperative IVB may not be a determining factor for surgery duration, lens status, tamponade, and reoperations.

P-RET-060

Characteristics of opticociliary shunt vessels in non-ischemic central retinal vein occlusion

J. Pan¹, Y. Zhu¹, W. Lao², J. Zhou¹, Y. He³, Y. Jiang³, S. Mao¹, T. Tian³, Y. Luo¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China,

²Hainan Eye Hospital, Zhongshan Ophthalmic Center, Sun Yat-sen University, Haikou, China, ³Sun Yat-Sen University, Guangzhou, China

Introduction: Opticociliary shunt Vessel (OSV) has been a subject of debate regarding their role in the prognosis of central retinal vein occlusion (CRVO), which is a common cause of visual impairment in middle-aged elderly individuals.

Objectives: In this study, we investigated the characteristics of image and the development of OSV, and the correlated factors of OSV, aiming to evaluate the role of OSV in CRVO.

Methods: This retrospective study analyzed fundus photography (FP), fluorescein angiography (FFA) data from non-ischemic CRVO patients enrolled in a randomized, double-blind, multicenter clinical trial to evaluate the efficacy and safety of Conbercept in macular edema secondary to CRVO. The incidence, morphology, location, and quantity of OSV were collected at the visit of baseline, 3 months, and 6 months, respectively.

Results: The incidence of OSV in non-ischemic CRVO patients was 41.9%. OSV began to fill after retinal venous laminar flow, but its full filling was earlier than the complete filling of retinal vein, with a median perfusion time of 5-9 seconds. OSV was observed predominantly within 0.5 to 3 months after disease onset. There were 5 types of OSV, such as spiral, U-shaped, irregular, curve eight, and petaling. Most OSV were located on nasal or superior temporal quadrant of the optic disc. 54.2% of OSV occurred in one direction, 34.9% in two directions, and 2.4% in three directions. The severity of disc edema at baseline and at 3 months affected the observation of OSV. Patients with baseline OSV showed an increasing trend in quantity, caliber, and perfusion time within the first 6 months of follow-up. Extent of disc edema might be associated with the occurrence of OSV.

Conclusions: Extent of disc edema may be associated with the occurrence of OSV. The prognostic value of OSV in guiding CRVO treatment and prognosis remains worthy of attention.

P-RET-061

Birdshot chorioretinopathy: How initial presentation impacts RNFL/GCL

D. Chow¹, M. Hébert², W. Sebag³, K. Perry³, A. Polosa⁴, M.-J. Aubin⁵

¹Faculty of Medicine and Health Sciences, McGill University, Montréal, Canada, ²Department of Ophthalmology, Université Laval, Québec, Canada, ³Faculty of Medicine, Université de Montréal, Montréal, Canada, ⁴Department of Ophthalmology, Hôpital Maisonneuve-Rosemont, Montreal, Canada, ⁵Department of Ophthalmology, Université de Montréal, Montréal, Canada

Introduction: Birdshot chorioretinopathy (BSCR) is an autoimmune condition affecting the eye, potentially causing inflammation, vision decline, and other issues. The retinal nerve fiber layer (RNFL) and ganglion cell layer (GCL), tissue layers essential for vision, may become thinner in individuals with BSCR.

Objectives: To characterize the evolution of retinal nerve fiber layer (RNFL) and ganglion cell layer (GCL) thickness in Birdshot chorioretinopathy (BSCR) based on initial presentation.

Methods: Patients with BSCR followed by the uveitis service of the Centre universitaire d'ophtalmologie – Hôpital Maisonneuve-Rosemont were considered for inclusion (n=172 eyes). They were categorized based on initial presentation: inflammatory presentation with hot disc, vasculitis, and cystoid macular edema (CME); CME only; and no inflammatory component. Differences between initial and final RNFL and GCL measurements were compared using Wilcoxon signed-rank test and subsequently compared between presentation groups.

Results: Median [Q1, Q3] age at presentation was 53 [46, 59] years and 57% were female. Follow-up time was 4.2 [2.1, 5.6] years for RNFL and 6.8 [3.0, 9.4] years for GCL. Initial and final RNFL thickness were 100 [90, 127] and 94 [84, 105] (p<0.001), while initial and final GCL thickness were 65 [48, 76] and 60 [48, 71] (p=0.001). When comparing differences in initial and final RNFL and GCL measurements by presentation, there were no significant differences between presentations (p=0.39 for RNFL and p=0.85 for GCL).

Conclusions: RNFL and GCL measurements decrease over time in BSCR patients, but these do not seem to be further affected by extent of inflammation at initial presentation.

P-RET-062

Evaluation of the effect of acute elevated intraocular pressure on retinal and choroidal blood flow in diabetic rats

*Q. Wang*¹

¹Tongren Hospital, Beijing, China

Introduction:

Diabetic retinopathy is a leading cause of vision impairment, with alterations in retinal and choroidal blood flow contributing to its pathogenesis. Understanding the dynamics of blood flow regulation in diabetic conditions is crucial for developing targeted interventions.

Objectives:

This study aimed to investigate the impact of acute intraocular pressure (IOP) elevation on retinal and choroidal blood flow in diabetic and control rats.

Methods:

Male Sprague-Dawley rats were divided into two groups: diabetic and control. Acute IOP elevation was achieved through controlled perfusion pressure. Retinal and choroidal blood flow was measured using Swept-Source Optical Coherence Tomography Angiography (SS-OCT/OCTA).

Results:

During acute IOP elevation, both diabetic and control rats experienced a significant reduction in retinal and choroidal blood flow perfusion. This reduction was more pronounced in diabetic rats, with a noteworthy decrease in blood flow density and observable vessel occlusion. These findings suggest that the vascular response to acute IOP elevation is impaired in diabetic rats compared with controls. Our results demonstrate a clear association between diabetes and impaired choroidal vascular autoregulation during acute IOP elevation.

Conclusions:

Our study furnishes valuable insights into the impact of acute IOP elevation on retinal and choroidal blood flow in diabetic rats. The observed impairment in choroidal vascular autoregulation implies an increased vulnerability to hemodynamic shifts in diabetic eyes. These findings underscore the significance of early detection and intervention strategies aimed at preserving vascular function in diabetic individuals, potentially influencing the prevention and management of diabetic retinopathy. Subsequent research endeavors should delve into the molecular and cellular mechanisms underlying these vascular changes to identify novel therapeutic targets for sustaining retinal health in diabetes.

P-RET-063

The safe effective lowest power of subthreshold micropulse laser treatment in Chinese patient with acute or chronic CSCR

Q. Chen¹, T. Xie^{2,3}

¹Retina, Shenzhen Eye Hospital Affiliated with Jinan University, Shenzhen, China, ²medical Retina, Shenzhen Eye Hospital Affiliated with Jinan University, Shenzhen, China, ³Retina, Shenzhen Eye Hospital Affiliated with Jinan University, Shenzhen, China

Introduction: CSC is a common chorioretinal disease characterized by a serous detachment of the neurosensory retina at the macula. While acute CSC usually resolves within months with little permanent damage to vision. Chronic CSC can lead to clinically significant irreversible vision loss. ICG-guided half-dose PDT used to be called golden standard therapy for CSC, however, as the verteporfin was expensive and lackage at present in china, SML has already turned into candidate therapy for CSC treatment. SML in the treatment of CSC is a relatively mature technique in clinical. But, there are few studies on the laser parameters, so it's necessary to be more research on the treatment parameters of SML. At the same time, Asian patients are different from Caucasians, therefore, the SML power for CSC patients in china and abroad may be different. China have a large population and lots of patients receiving micropulse therapy, therefore, we designed this study and explore the safe, effective lowest power of SML treatment in Chinese with acute or chronic CSC.

Objectives: To assess the safe, effective lowest laser power of subthreshold micropulse laser (SML) for treating acute or chronic CSC in Chinese patients.

Methods: Patients were distinguished with acute or chronic subtype CSC based on focal or diffuse RPE leakage on FFA, with or without widespread RPE decompensation. Patients were treated with 577 nm yellow SML and categorized into five groups according to titration power. The best-corrected visual acuity (BCVA), central macular thickness (CMT), and sub-retinal fluid (SRF) resolution were evaluated at baseline and at the follow-up periods after SML.

Results: There were 61 acute CSC and 66 chronic CSC patients were enrolled. The baseline characteristics were balanced between five groups (all $p > 0.05$). The acute CSC optimal laser power was 425mw ($p=0.01$, (95% CI -213.58 to -30.81)). For chronic CSC, the above 425mw group had the best efficacy. The titration power was not related to gender, BCVA and CMT at baseline, but for chronic CSC, the magnitude of the titration power was age dependent ($p=0.032$, (95% CI 0.10 to 2.18)). What's more, the decrease of CMT, the improvement of BCVA and the rate of SRF absorption were related to the baseline of CMT (all $p < 0.05$).

Conclusions: 425 mw laser power is the safe effective lowest power for treating acute CSC. The safe effective lowest power for chronic CSC is above 425mw, the decrease of CMT, the improvement of BCVA and the rate of SRF absorption were related to the baseline of CMT.

P-RET-064

Choroidal metastasis from primary carcinoma of the esophagus

J. Li¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Esophageal Carcinoma is an extremely rare cause of choroidal metastasis.

Objectives: We presented the case of a sixty-seven years old Chinese male with four months history of decreased vision and headache, with a history of esophageal carcinoma. We include a brief review of the currently available literature and summarize the pathology, clinical features, and treatment of choroidal metastasis.

Methods: Ophthalmologic examination revealed unilateral choroidal mass and an exudative retinal detachment in the left eye. B-scan ultrasonography showed a mass at the nasal area. Fluorescein angiography displayed hyperfluorescence in late venous phase with dye staining in the left eye mass.

Results: The patient had a history of esophageal carcinoma (pT3N2M0) for half a year and had accepted surgical operation. Then, adjuvant chemotherapy and external beam radiotherapy (EBRT) was initiated. But the patient cannot tolerate standard treatment of chemotherapy and radiation therapy, so the treatment stopped. After two months, oncologist found tumor metastasis of this patient in the left femoral head by PET and MRI. The patient's condition rapidly deteriorated after then, and he passed away 15 months after initial presentation.

Conclusions: Uveal metastasis from carcinoid tumor is rare, which requires individualized multidisciplinary treatment aimed at protecting vision and improving patient survival. To our knowledge, reports of choroidal metastasis from esophageal carcinoma addressing the effectiveness of treatment strategies are limited.

P-RET-065

Choroidal vortex vein drainage system in central serous chorioretinopathy using ultra-widefield OCTA

Z. Luo¹, S. Yu², Y. Xu², K. Xu¹, X. Liang³

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China, ²Vitreoretina, State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China, ³Vitreoretina, State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China

Introduction: Central serous chorioretinopathy (CSC) is a common eye condition that primarily affects the macula in middle-aged individuals. Despite decades of research, the pathophysiology of CSC remains unknown. Indocyanine green angiography (ICGA) imaging has shown that focal choroidal capillaries delay filling and that surrounding dilated vessels cause hyperfluorescence. Advanced ultra-widefield (UWF) ICGA equipment has revealed that the dilated choroidal vessels in CSC eyes extend from the affected area to the vortex vein ampullae of the drainage system. Studies have also suggested that the asymmetric choroidal venous drainage with intervortex venous anastomoses may play a role in the development of CSC. Compared to ICGA, UWF-OCTA allows for volumetric assessments of the choroidal drainage system. However, limited research has been conducted on the OCTA characterization of the vortex veins in eyes with CSC.

Objectives: To evaluate differences in the choroidal vortex vein drainage system (VV) in eyes between patients with central serous chorioretinopathy (CSC) and unaffected individuals using ultra-widefield optical coherence tomography angiography (UWFOCTA).

Methods: In this cross-sectional observational study, 40 eyes of patients with CSC and 28 eyes of healthy volunteers were included. The analysis involved the use of UWF-OCTA to analyze the proportion of the choroidal vortex vein drainage system (VV%), choroidal thickness, choroidal vascular volume (CVV), and choroidal vascularity index (CVI) of the VV in each drainage quadrant. The location relationship between the leakage points in fluorescein angiography and the VV was also explored.

Results: A within-group analysis of VV% showed a statistically significant difference in the CSC group ($P < 0.001$) but not in the control group ($P = 0.270$). Compared to healthy eyes, CSC eyes had a significantly larger CVV and higher CVI in all regions (all $P < 0.05$). The superotemporal (ST) drainage system had the largest CVV and thickest choroidal layer among the four drainage quadrants (all $P < 0.05$) in CSC eyes. The leakage rate in the ST quadrant was significantly higher than that in the inferotemporal quadrant.

Conclusions: CSC eyes have an asymmetric vortex vein drainage system, with relative hyperperfusion in all VV. Further, the preferential drainage route of the submacular choroid may be the ST drainage system in CSC eyes.

P-RET-066

An analysis of the clinical profile of patients with uveitis following COVID-19 infection

S. Ganesh¹, A. Mohanan Earatt¹

¹Intraocular Inflammation and Uveitis, Medical Research Foundation, Chennai, India

Introduction: Coronavirus disease (COVID-19) is caused by the coronavirus 2 (SARS-CoV-2). It was first reported in December 2019 and has since spread rapidly worldwide, causing a global pandemic in March 2020. SARS-CoV-2, a member of the Coronaviridae family of viruses that can cause ocular manifestations through various mechanisms. Coronaviruses have been shown to cause ocular infection in other mammals; thus, the possibility of SARS-CoV-2-related ocular involvement is very likely. Initial reports of ocular involvement included, conjunctival hyperemia, chemosis, epiphora, and conjunctivitis. However, newer clinical presentations and ocular features associated with various stages of the COVID-19 infection are being reported worldwide.

We report a case series of 13 patients who presented with various uveitic manifestations following a recent recovery from COVID-19 infection.

Objectives: To describe the clinical profile of patients presenting with uveitis following COVID-19 infection at a tertiary care eye hospital.

Methods: In this retrospective study we included all consecutive cases, presenting with an acute episode of intraocular inflammation and a history of COVID-19 infection, that was diagnosed within the preceding 6 weeks, between March 2020 and September 2021. Data retrieved and analyzed included age, sex, laterality of uveitis, and site of inflammation. The diagnosis was categorized based on the SUN working group classification criteria for uveitis. Details regarding clinical features, investigations, ophthalmic treatment given, response to treatment, ocular complications, and status at the last visit were also accessed and analyzed.

Results: 21 eyes of 13 patients were included in this study. It included six male and seven female patients. The mean age was 38 ± 16.8 years. Eight patients had bilateral involvement. Seven patients were diagnosed with anterior uveitis, three with intermediate uveitis, one with posterior uveitis, and two with panuveitis. All patients responded well to treatment and were doing well at their last visit. Two patients had complications that necessitated surgical

treatment, following which they recovered good visual outcomes.

Conclusions: With prompt diagnosis and appropriate management, all the patients with uveitis post-COVID-19 infection recovered with good visual outcomes. Thus, ophthalmologists must be aware of the possible uveitic manifestations following even uneventful COVID-19 infection.

P-RET-067

Preclinical study of AL-001, a gene therapy for treating wet AMD administered through suprachoroidal space

X. Liu¹, L. Wang¹, C. Liu², C. Zhao²

¹Beijing Tsinghua Changgung Hospital, School of Clinical Medicine, Tsinghua University, Beijing, China,

²Beijing Anlong Biomedical Co., Ltd., Beijing, China

Introduction: Age-related macular degeneration is the most common cause of vision impairment in individuals 50 years of age and older. Anti-VEGF therapies block VEGF-induced neovascularization have become standard treatment of wAMD. Gene-based delivery of anti-VEGF may provide a promising alternative to protein-based therapies.

Objectives: AL-001, a novel gene therapy drug for the treatment of wAMD by suprachoroidal administration, was evaluated preclinically in this study.

Methods: AL-001 is a recombinant adeno-associated virus particle carrying the expression frame of aflibercept, designated rAAV514-aflibercept. KDR293 cell line *in vitro* was assessed following a 48-hour AL-001 exposure for aflibercept expression analysis. The efficacy of AL-001 on the expression of aflibercept *in vivo* was evaluated by detecting the distribution of viral vector and the expression of aflibercept in aqueous humor and eye tissue of rodents with suprachoroidal space (SCS) injection of AL-001. The long-term expression and efficacy, administration route, pharmacokinetic characteristics, effective dose, safety, and tolerability of AL-001 were confirmed in a laser-induced CNV model in non-human primates.

Results: Compared with intravitreal injection, SCS injection of AL-001 showed better efficacy reducing frequency of clinically relevant grade IV exudative lesions and improving fluorescence leakage. Compared with low dose [SCS injection of 2.8×10^{11} viral genomes (vg) per eye], both medium (SCS injection of 1.01×10^{12} vg per eye) and high dose (SCS injection of 3.65×10^{12} vg per eye) effectively reduced the fluorescence penetration area, the thickness of highly reflective signal substances under the retina, and showed continuous expressions of aflibercept in aqueous humor, retina, choroid, and vitreous body within 5 weeks, and peaked in aqueous humor on 36 days after treatment. There were no clinical signs indicative of AL-001 of $\sim 3.125 \times 10^{12}$ vg per eye related systemic and local effects, including changes in body weight, food intake, safety pharmacologic indicators (body temperature, electrocardiogram, blood pressure and oxygen saturation), clinical indicators (blood count, coagulation function, blood biochemistry and urine analysis), anti-nuclear antibodies and immunotoxic indicators (C-reactive protein, peripheral blood lymphocyte subsets, cytokines and serum complement).

Conclusions: In non-human primates, SCS injections of AL-001 were well tolerated and aflibercept levels were consistently stable.

P-RET-068

Ultra-Widefield OCT characteristics of Retinal Capillary Hemangioblastoma

Y. Poorna Chandrika¹, S.V. Azad¹, R. Vohra¹, P. Venkatesh¹, R. Chawla¹, V. Kumar¹, S. Verma¹

¹Department of Ophthalmology, All India Institute of Medical Sciences, New Delhi, India

Introduction: Retinal Hemangioblastoma, also called Retinal Capillary Angioma, is a benign neoplasm with vascular features originating in the neurosensory retina. RCHs are the most common manifestations of VHL disease, where 85% of the affected eyes manifested exclusively in peripheral retina. OCT features of RCH have not been described.

Objectives: To describe ultra-structural changes of Retinal Capillary Hemangioblastomas(RCH) on Ultra-Widefield(UWF)-OCT and its integration into the proposed RCH Classification.

Methods: Treatment naïve eyes(23) with RCH were included. All RCH(63) were studied for ultra-structural characteristics using UWF-OCT. RCH lesion parameters considered were clinical detectability, site and location, size, traction, margin, fluid collection, internal reflectivity and shadowing. All characteristics were then integrated into the existing Clinical Classification of RCH.

Results: Stage 1a RCH were clinically undetectable, but were captured on UWF-OCT. They were intra retinal and well defined. Among Stage 1b, 75% were detected clinically, with all being intra retinal having well-defined margins. 25% and 16% of them had internal reflectivity and shadowing respectively. Stage 2a, all of them were intra-retinal with well-defined margins, 15% had traction, 90% had internal reflectivity with shadowing noted in 84%. Stage 2b- traction was present in 20%, internal reflectivity and shadowing was present in all with 60% of them having associated fluid. Stage 2c- 93% of the angiomas had traction with 63% having ill-defined margins, 80% have associated fluid, internal reflectivity and shadowing being present in all. Stage 3b- traction was present in all, 56% with ill-defined margins, all patients had associated fluid, internal reflectivity and shadowing. Only 1 angioma each in stage 3c and stage 4 could be described with extensive traction, shadowing, internal reflectivity and fluid associated.

Conclusions: UWF-OCT not only confirms the morphological features described in the already proposed clinical classification, moreover, describes additional ultra-structural findings suggesting tumor progression/activity with respect to staging.

P-RET-069

Different surgical strategies for different macular holes - a new classification system of full-thickness macular holes

Z. Song¹, H. Dan¹, D. Wang¹, P. Shi¹, K. Lin¹, Y. Tao¹

¹Henan Eye Hospital/Henan Eye Institute, Henan Provincial People's Hospital, Zhengzhou, China

Introduction: These two classification methods revealed the pathological process of macular hole, but had no effect on guiding surgeons to decide treatment plan. A series of surgical methods for macular holes were developed during the past decades.

Objectives: To describe a clinical classification for full-thickness macular holes (FTMH) of different sizes and to correlate them with the optimal surgical strategies.

Methods: A total of 221 patients (241 eyes) diagnosed with FTMH were enrolled over a 6-year period between 2013 to 2019. The chosen surgical methods for FTMH of different diameters included pars plana vitrectomy (PPV), gas tamponade, flute-needle aspiration, ILM operation (peeling, scraping, inverted ILM flap, insertion, transplantation), and autologous blood clot (ABC). Anatomical and functional outcomes pre- and post-surgery were evaluated.

Results: Based on clinical experience, the patients with FTMH were classified into five groups (small: $<300\mu\text{m}$; medium: $\geq 300\mu\text{m}$ and $<600\mu\text{m}$; large: $\geq 600\mu\text{m}$ and $<900\mu\text{m}$; huge: $\geq 900\mu\text{m}$; recurrent). Best-corrected visual acuity (BCVA) significantly improved from 0.88 ± 0.44 to 0.56 ± 0.49 in small MH ($P = .0007$), 0.98 ± 0.39 to 0.70 ± 0.41 in medium MH ($P < .0001$), 1.24 ± 0.48 to 0.98 ± 0.38 in large MH ($P = .0004$), 1.16 ± 0.25 to 0.91 ± 0.34 in huge MH ($P = .044$), and 1.16 ± 0.28 to 0.93 ± 0.21 in recurrent MH ($P = .204$). The closure rates of the five types were as follows: FTMH, 100% (37/37) in small MH; 97.9% (94/96) in medium MH; 94.1% (80/85) in large MH; 93.7% (15/16) in huge MH; 57.1% (4/7) in recurrent MH, with significant differences ($P < .001$).

Conclusions: Different surgical methods for different FTMH sizes offer effective clinical strategies with a promisingly high degree of anatomical and visual outcomes.

P-RET-070

Severe early-onset RP1-associated retinal dystrophy with Leu2042* variant in RP1 gene

M. Sibulo¹, J.C. Artiaga^{2,3}, R.V. Covar^{2,4,5}, E.R. Collantes⁶

¹Eye Institute, St. Luke's Medical Center, Quezon City, Philippines, ²Department of Ophthalmology and Visual Sciences, University of the Philippines - Philippine General Hospital, Manila, Philippines, ³Eye Institute, St. Luke's Medical Center, Taguig, Philippines, ⁴Department of Ophthalmology, Rizal Medical Center, Pasig, Philippines, ⁵Eye and Vision Institute, The Medical City, Pasig, Philippines, ⁶Broad Institute of MIT and Harvard, Boston, United States

Introduction: Retinitis pigmentosa (RP), the most common inherited retinal degeneration, is caused by mutations in more than 60 genes, manifesting through various inheritance patterns. Among these, the RP1 gene is significant for its role in RP. This study presents the first clinical characterization of a severe early-onset retinal dystrophy phenotype in a 28-year-old male, attributed to a previously uncharacterized compound heterozygous mutation in RP1 gene.

Objectives: The objective is to describe the clinical manifestations of a patient with a compound heterozygous mutation in the RP1 gene.

Methods: Clinical evaluation, diagnostic imaging, and a comprehensive retinal dystrophy gene panel test comprising more than 300 genes were utilized.

Results: The patient, experiencing a decade of progressive vision loss and night blindness, exhibited severe visual impairment, with diagnostic findings revealing widespread retinal changes and markedly attenuated electroretinogram responses. VA OD 6/15-2 OS counting fingers at 6 inches; lens status clear OU; fundus findings were arteriolar attenuation with diffuse pigmentary changes with clumping on the periphery, with macular atrophy OU.

The gene panel test identified two novel RP1 mutations: c.4052_4053insAlu, p.Tyr1352Alafs9 and c.6125del, p.Leu2042*, with the former being a known autosomal recessive RP founder variant in the Japanese population and the latter previously detected by a clinical testing laboratory in a patient with autosomal recessive RP. Additional genetic tests in family members are necessary to ascertain the allelic configuration of these variants and confirm if they lie in trans with each other. Located in exon 4, p.Leu2042* results in a premature stop codon which leads to a truncated protein possibly resulting in disrupted function.

Conclusions: This report marks the initial clinical characterization of the p.Leu2042* variant in RP1. The presence of this variant alongside the previously characterized p.Tyr1352Alafs9 underscores the genetic complexity and phenotypic diversity of RP1-associated retinal dystrophy. Additional functional studies are needed to ascertain the pathogenicity of p.Leu2042*. This case enriches our understanding of the genetic underpinnings of RP1-related disease and calls for expanded phenotypic characterization of novel variants. Emphasis is given on the importance of obtaining a genetic diagnosis for familial risk assessment and future therapeutic directions.

P-RET-072

Apoptosis plays a critical role in the MeCP2-mediated RPE epithelial-mesenchymal transition

X. Li¹, Y. Zhang¹, X. Li¹, X. Zhao¹

¹Henan Provincial People's Hospital, Zhengzhou, China

Introduction: The MeCP2-mediated epithelial-mesenchymal transition (EMT) in retinal pigment epithelium (RPE) is intricately linked to apoptosis, playing a pivotal role.

Objectives: The objective of this study was to explore the influence of Methyl-CpG-binding protein 2 (MeCP2) on RPE cell apoptosis and its subsequent impact on EMT, providing a fresh perspective on the etiology of proliferative vitreoretinopathy (PVR).

Methods: Cell proliferation was evaluated using CCK8 and flow cytometry. Protein blotting assessed the levels of genes associated with apoptosis and EMT, while qRT-PCR measured mRNA levels related to the cell cycle and apoptosis. Flow cytometry analyzed cell cycle and apoptosis, and immunofluorescence revealed the expression of apoptosis-related genes.

Results: MeCP2 was found to promote RPE cell proliferation, as indicated by the CCK8 assay. MeCP2 upregulated the expression of EMT-related genes in RPE cells, as confirmed by Western blot assay. MeCP2 knockdown resulted in G0/G1 phase blockage in the cell cycle, with PCR data indicating reduced expression of cell cycle-related genes. Importantly, MeCP2 knockdown induced apoptosis in RPE cells, as demonstrated by flow cytometry and further validated through qPCR and Western blot.

Conclusions: MeCP2 treatment enhances cell proliferation and EMT formation, while MeCP2 knockdown inhibits EMT, cell proliferation, and induces apoptosis. These findings suggest that inhibiting MeCP2 may compromise RPE cell EMT.

P-RET-073

Improving the care of Wet Age-Related Macular Degeneration (WET-AMD) patients in University Hospitals Dorset NHS Trust

G. Tsokolas¹, O. Anderson¹, N. Matthews¹, C. Marsh¹, C. Tossounis¹

¹Ophthalmology, University Hospitals Dorset NHS Trust, Bournemouth, United Kingdom

Introduction: Due the COVID-19 pandemic and the frequent treatment needs of the Wet-AMD disease, there is significant time pressure on the review appointments and treatment of Wet-AMD patients in several NHS Trusts across the United Kingdom (UK). University Hospitals Dorset (UHD) has been affected by this issue.

Objectives: This pilot project aims to relieve the pressures and provide a fast-track access to known and already treated Wet-AMD patients with sudden changes in their vision.

Methods: This is a prospective pilot project that is being conducted within the UHD Ophthalmology Department since the 1st of February 2023. It is a collaboration between our Medical Retina Service (MR) and our Eye Emergency Department (EED). An emergency Wet-AMD slot allocation was introduced to the morning weekday EED booking diary. It is meant for Wet-AMD patients already known to our service with sudden deterioration in the vision of the treated or the fellow eye. The pathway involves a booking on the slot through the EED telephone service. The nurses at EED have certain criteria which patients to book and they allocate the patients on the morning slot designated for the Wet-AMD patients in need. Visual acuity, intraocular pressures, dilation, Optical Coherence Tomography (OCT), color imaging are completed on arrival. The EED doctor reviews the patient and imaging and escalates the case to the MR team on site. A decision is taken whether an urgent injection or further follow up is needed. If an injection is necessary, it is performed on the same day by the MR team and a clear plan is documented.

Results: 8 months of data have been presented during the departmental Audit meeting in October 2023. 65 patients with Wet-AMD were seen at the EED Wet-AMD slot. Of those 65 patients, 45 were known Wet-AMD patients already on treatment and 20 were newly diagnosed Wet-AMD patients that were booked at the allocated slot. 34 of the 65 patients (52%) were injected on the same day.

Conclusions: This pilot project demonstrated that a significant number of Wet-AMD patients with sight threatening changes were seen and managed in a timely fashion and this resulted into prevention of sight loss. Additionally, the same day review and treatment offered a cost-effective way to manage these patients since the need for extra injection or one stop clinics were avoided. We believe that this is a step that can be easily implemented on every NHS EED and offer substantial help given the latest pressures on the Wet-AMD service.

P-RET-074

Intravitreal vascular endothelial growth factor inhibitor injections on pregnancy amidst malignant hypertension

S.S. Tolentino¹, J.J. Santos-Rayos¹

¹Ophthalmology, Mariano Marcos Memorial Hospital and Medical Center, City of Batac, Philippines

Introduction: Injections of intravitreal vascular endothelial growth factor Inhibitor (Anti-VEGF) have been used extensively and successfully to treat retinal vascular disorders. This is usually done in common population showing good prognosis of most of these disorders. However, in pregnant patients, vascular endothelial growth factor (VEGF) is essential for the fetus to maintain the fetal and placental vascular system. Administration of any form of anti-VEGF would be potentially embryo-fetotoxic and teratogenic to the fetus.

Objectives: To date, there is a lack of large sample size studies on the use of intravitreal anti-VEGF in pregnancy. This report aims to have a systematic review of a pregnant patient presenting with Hypertensive Retinopathy Grade IV, both eyes.

Methods: Our case presents a 33-year-old primigravid on her 17th week age of gestation who noted sudden, painless blurring of vision on both eyes. Visual Acuity at the time of presentation was 20/40 on the right, hand movement on the left. Dilated funduscopy of both eyes showed presence of arteriovenous nicking, elschnig spots, dot blot hemorrhages, cotton wool spots, and macular star, with macular edema as revealed by Ocular Coherence Tomography (OCT).

Results: Patient was initially for intravitreal Ranibizumab injection, which according to one case report, was used safely in the third trimester. However, patient had complications and uneventful pregnancy losing the fetus. Intravitreal anti-VEGF injection with Bevacizumab was then administered.

Conclusions: In cases of having pregnant patients presenting with retinal vascular diseases in need of intravitreal anti-VEGF injection, it is important to weigh the risks and benefits explained to the patient and the decision to administer the drug or not. Further additional case reports would be helpful in establishing best treatment of these cases.

P-RET-075

Techniques for use of human amniotic membrane in macular hole repair: a scoping review

N. Cheffi¹, D. Solish², T. Felfeli³, E. Mandelcorn³

¹Faculty of Medicine, University of Ottawa, Ottawa, Canada, ²Faculty of Health Sciences School of Medicine, Queen's University, Kingston, Canada, ³Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, Canada

Introduction: Macular holes (MHs) are treated surgically, with the gold standard of a pars plana vitrectomy (PPV), internal limiting membrane (ILM) peeling, and gas endotamponade. Human amniotic membranes (hAM) have recently emerged as an effective method for MH closure. This scoping review examines current reports on the effectiveness of using hAM grafts for the repair of MHs, focussing on the techniques used, and anatomical and functional outcomes.

Objectives: To review the role, applications and techniques for use of human amniotic membrane grafts for macular hole repair.

Methods: A comprehensive database search using MEDLINE, Embase and Web of Science was completed. English-language articles published from inception to August 2023 were included and encompassed all article types except for commentaries, correspondences and reviews. A total of 257 abstracts were screened. 79 studies were assessed in full text. For inclusion, articles needed to discuss the use of hAM in macular hole repair. In a masked, duplicate fashion, 2 independent investigators screened 31 full-text studies for data extraction, including details of hAM, techniques for insertion and manipulation, best-corrected visual acuity (BCVA), MH closure rate and complications and adverse events.

Results: 31 studies and 401 eyes were included. All participants underwent PPV with ILM peeling prior to the insertion of the hAM. Endotamponade included SF6 (67.74%), C3F8 (35.48%) and silicone oil (32.25%). 24 studies reported stroma facing-down insertion. Techniques for insertion included: ILM forceps, OVD injection and manipulation under fluid or PFCL. For proper insertion orientation, most studies report the chorion layer of the hAM was determined by identifying the sticky side of the plug using vitreal forceps. Within all studies, the rate of MH closure was 89.02%, with closure seen in 357 eyes. 29/31 studies showed that more than 50% of patients achieve full MH closure with hAM. The overall rate of BCVA improvement across all studies is 59.10% with 23/31 studies reporting improvement in more than 50% of patients. The most common subtypes were MH with high myopia, recurrent, full thickness and large MH. 74% of studies reported no post-surgical complications. When present, they were commonly hAM graft dislocations. Overall, no ophthalmic or systemic adverse events were reported.

Conclusions: This scoping review demonstrates a notable success rate in closure and BCVA improvement with minimal post-surgical complications with the use of hAM for MH treatment.

P-RET-076

Foveal thickness fluctuation and quality of life in patients with branch retinal vein occlusion

Y. Sugiura¹, F. Okamoto², T. Murakami¹, S. Morikawa¹, Y. Okamoto³, T. Oshika¹

¹Department of Ophthalmology, University of Tsukuba, Tsukuba, Ibaraki, Japan, ²Department of Ophthalmology, Nippon Medical School, Tokyo, Japan, ³Department of Ophthalmology, Mito Kyodo General Hospital, Mito, Ibaraki, Japan

Introduction: It is well known that anti-vascular endothelial growth factor (VEGF) therapy is effective in cystoid macular edema secondary to branch retinal vein occlusion (BRVO-CME). However, the commonly used pro re nata (PRN) regimen often results in repeated recurrences and fluctuations in retinal thickness.

Objectives: To evaluate the relationship between foveal thickness fluctuation (FTF) and vision-related quality of life (VR-QOL) in patients with BRVO-CME treated by intravitreal ranibizumab injection (IVR) for one year.

Methods: This was prospective, multicenter, open-label, observational study. Subjects were 36 eyes of 36 patients with treatment-naïve BRVO who underwent IVR treatment with PRN regimen. VR-QOL using the 25-item National Eye Institute Visual Function Questionnaire (VFQ-25) and best-corrected visual acuity (BCVA) were examined before and at 3, 6, and 12 months after treatment. FTF was calculated from the standard deviation of the central foveal thickness (CFT) in each patient and classified into 4 groups in order, and factors were assessed among the 4 groups.

Results: IVR treatment significantly improved BCVA, CFT and the VFQ-25 composite score in all 4 groups for 12 months. There were significant differences among the 4 groups classified by FTF with the average number of injections for 12 months (5.3 ± 1.9 times), post-treatment CFT and the post-treatment VFQ-25 composite score ($P < 0.0001$, $P = 0.029$, $P = 0.033$, respectively). The VFQ-25 composite score was significantly higher in the group with the smallest FTF (group A). The post-treatment VFQ-25 composite score was significantly associated with the pre-treatment VFQ composite score ($P < 0.0001$) and was not associated with FTF ($P = 0.057$).

Conclusions: VR-QOL in BRVO-CME treated with anti-VEGF improved regardless of the degree of FTF, and was better in the group with smaller fluctuation.

P-RET-077

Myriad manifestations of isolated optic nerve infiltration in acute lymphoblastic leukemia: a visual emergency!

M. Banerjee^{1,2}, S. Azad², P. Venkatesh²

¹Ophthalmology, MAMC Agroha, Hisar, India, ²Ophthalmology, AIIMS New Delhi, Delhi, India

Introduction: Optic neuropathy in leukemia is usually observed in the setting of pre-existing CNS disease, in concert with other neurological or systemic signs and symptoms, and is a rare isolated manifestation of extramedullary leukemia. However, optic nerve infiltration can be the first sign of CNS relapse even after complete systemic remission. The optic nerve is considered the “pharmacological sanctuary” in ALL as it is relatively unaffected by systemic chemotherapy due to the presence of blood-brain and blood-ocular barrier. This leads to incomplete eradication of the leukemic cells, posing a challenge to a successful intervention.

Objectives: Diagnosis of CNS relapse requires evidence of increased white blood cell count in cerebrospinal fluid (CSF) with the presence of lymphoblasts, or clinical signs of brain/eye involvement. However, leukemic infiltration of the optic nerve has been described in cases with normal CSF cytology. MRI findings of optic nerve enhancement may not be present in up to 40% of the cases. Moreover, enhancement and thickening of the optic nerve as seen on MRI cannot always differentiate between infiltration and the possibility of optic neuritis, thus leading to a further clinical dilemma. We present a case series of 5 acute lymphoblastic leukemia (ALL) patients with optic nerve head (ONH) involvement as first sign of CNS relapse.

Methods: All patients were on remission with normal CSF cytology, no evidence of blood/bone marrow relapse. MRI brain and orbit revealed ONH infiltration.

Case 1: 14-year-old female presented with optic disc edema (ODE) OS. BCVA of no PL improved to 6/18 OS post chemotherapy.

Case 2: 15-year-old male presented with ODE with secondary CRVO OS. Patient was lost to follow-up post chemotherapy.

Case 3: 16-year-old male presented with bilateral ODE with combined CRVO and CRAO OS. Resolution of edema was noted post chemotherapy OU.

Case 4: 13-year-old male presented with peripapillary elevated lesion OD. Increase in the lesion noted within two weeks due to delayed treatment.

Case 5: 31-year-old male presented with blurred disc margin OS. Grade V ODE noted after delayed treatment.

Results: Our cases highlight that eye can catch early relapse of ALL in presence of normal CSF cytology.

Conclusions: Optic nerve involvement in leukemia presents a visual emergency, and a high degree of suspicion for manifest/ occult CNS relapse should be considered. Prompt initiation of therapy, as for CNS relapse, may enable recovery of useful vision.

P-RET-079

Bilateral central retinal artery occlusion as a presenting manifestation of systemic lupus erythematosus

J. Li¹, Y. Du²

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China,

²The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Patients with systemic lupus erythematosus (SLE), a chronic autoimmune disease, often produce excessive amounts of autoantibodies and suffer from damage to various organ systems. Ocular manifestations occur in approximately one-third of SLE patients and they can affect every component of the visual system. Occlusive retinopathy occurs in approximately 3% to 11% of patients. There are few reports of central retinal artery occlusion (CRAO) as the primary manifestation in patients with SLE.

Objectives: In this article, we describe a case of acute central retinal artery occlusion that presented as the primary manifestation of SLE in the absence of elevated levels of Antiphospholipid antibodies (APLAs).

Methods: We include a brief review of the currently available literature on retinal vaso-occlusive and summarize the pathology, clinical features, and treatment of this severe vaso-occlusive.

Results: The patient complained of a sudden, painless vision loss in both eyes successively. We found the relative afferent pupillary defect and retinal pallor along with a cherry-red spot at the macula in the left eye, which led us to suspect CRAO. CRAO is an ophthalmic emergency that typically results in permanent vision damage even despite vigorous treatment. Ocular massage, anterior chamber paracentesis, and lowering of the intraocular pressure were unsuccessfully attempted to resume blood flow through the central retinal artery of the left eye. The neurologist suggested implementing a stroke protocol, which the patient rejected. After treatment with intravenous steroids, immunoglobulin, intrathecal injection of dexamethasone, plasma exchange, and intravenous cyclophosphamide, SLE was well controlled in the patient, the right eye with milder symptoms was recovered but her vision was permanently lost in the left eye.

We go over a comprehensive review of the currently available literature on retinal vaso-occlusive disease present in SLE. The pathology mechanism of CRAO is related to immune complex-mediated "vasculitis", which is typically associated with neuropsychiatric lupus. However, the literature review identified antiphospholipid antibody syndrome (APS) in only 6 of 19 patients, indicating that other mechanisms besides APS are associated with CRAO.

Conclusions: Systemic immunosuppression and anticoagulants are required for the treatment of this severe vaso-occlusive retinopathy in SLE. Early recognition and aggressive intervention may prevent severe loss of vision.

P-RET-080

Pediatric retinal detachment following penetrating keratoplasty

*H. Lu*¹

¹Department of Pediatric Retina, Beijing Tongren Hospital, Capital University of Medical Science, Beijing, China

Introduction: Pediatric penetrating keratoplasty can usually be multiple procedures. Repeated invasive intraocular operations may cause long-term intraocular changes in both the anterior and posterior segments including retinal detachment.

Objectives: Five cases of retinal detachment following penetrating keratoplasty were studied to evaluate the clinical features, managements and prognosis.

Methods: Five cases of retinal detachment following penetrating keratoplasty were included and 4 cases were treated with vitrectomy and silicone oil tamponade. The postoperative visual improvement and corneal changes were recorded.

Results: Among 5 cases of retinal detachment following penetrating keratoplasty, 1 patient had to give up surgery due to phthisis and other 4 cases were treated with vitrectomy and silicone oil tamponade. All 4 patients had retinal reattachment and vision improvement. The grafts continued to be hazy in 6 months after surgery.

Conclusions: The management of pediatric retinal detachment following penetrating keratoplasty can be more challenging due to small and hazy cornea conditions. Vitrectomy is usually the choice of surgery and the postop prognosis of both retina and graft remain unfavorable.

P-RET-081

Comparative evaluation of choroidal and retinal microvasculature between SMILE and FS-LASIK surgery: a pilot study

L. Zhang¹, Z. Fang¹

¹Eye Center of the Second Afliated Hospital, Medical School of Zhejiang University, Hangzhou, China

Introduction: The retinal thickness and microvasculature parameters were reported underwent transient alteration after refractive surgery. However, the difference of microvasculature changes between two mainstream refractive surgeries were not explored.

Objectives: To assess the changes of retinal and choroidal microvasculature after corneal refractive surgery, providing insight into the response of microvascular structures and cornea biomechanical parameters to suction during refractive surgery.

Methods: Prospective study. Pre- and postoperative (1 week, 1 month and 3 month) ocular microvascular parameters were assessed using swept-source optical coherence tomography angiography. The retinal thickness and vessel density (%), choroidal thickness, and foveal avascular zone (FAZ) size using swept-source optical coherence tomography angiography at preoperative, and 1 week, 1month, and 3 months postoperative were analyzed between 2 groups and different time points.

Results: Forty-four eyes (23 patients) and forty-two eyes (22 patients) were enrolled in SMILE and FS-LASIK groups, respectively. Statistical analysis revealed no difference of retinal thickness and choroidal thickness between SMILE and FS-LASIK groups both pre- and postoperative. The inner layer of retina in SMILE group was significantly thinner at 1 and 3 months postoperative than preoperative ($P < 0.05$). The retinal superficial vessel density (SVD), retinal deep vessel density (DVD) in SMILE group were significantly higher than FS-LASIK group at 1 week postoperative. The SVD, DVD in FS-LASIK group were significantly decreased at 1w, 1m postoperative, and recovered at 3m.

Conclusions: The retinal microvasculature underwent transient changes after FS-LASIK surgery compared to preoperative. Retinal vessel density in SMILE group was significantly higher than FS-LASIK group. No obvious changes were detected for the thickness of retina and choroid after both SMILE and FS-LASIK groups. Our study provided retinal and choroid changes after refractive surgery as reference to evaluate risks of potential retinal diseases.

P-RET-082

'Juxtapapillary' serpiginouslike choroiditis: a distinct phenotype of tubercular uveitis evolving as anterior scleritis

R. Bansal¹, A. Sharma², V. Gupta¹, A. Gupta¹

¹Ophthalmology, Post Graduate Institute of Medical Education and Research, Chandigarh, India,

²Internal Medicine, Post Graduate Institute of Medical Institute and Education, Chandigarh, India

Introduction: Serpiginous-like choroiditis (SLC) and anterior scleritis (AS) are two independent phenotypes of ocular inflammation, bearing more differences than similarities. While SLC has a predominantly tubercular etiology, AS often has an autoimmune background. Their existence within the same eye, which is intriguing and challenging to the clinicians, has not been reported.

Objectives: We report sequential occurrence of tubercular SLC followed by AS during follow up in the same eyes.

Methods: Retrospective study of seven patients (11 eyes), who received anti-tubercular therapy (ATT) for SLC.

Results: In six patients treated with ATT for SLC, AS developed 'after' SLC (within 5 months-17 years), and one patient presented with 'simultaneous' SLC and AS. Mean age was 33.86 ± 14.02 years. SLC affected macula in all 11 eyes, with 'juxtapapillary' involvement in nine eyes. SLC lesions were 'placoid' in nine eyes (6 patients), and 'multifocal' in 2 eyes (1 patient).

Conclusions: 'Juxtapapillary' SLC with placoid macular lesions may represent a distinct phenotype of tubercular uveitis, with an increased predisposition to AS. This 'juxtapapillary' phenotype of SLC should warn the treating uveitis specialist for a possible evolution into AS on follow up, and the need for immunosuppressive therapy. Considering the contiguous involvement of optic disc, retinochoroid and sclera in sequential pattern, it needs to be explored by histopathological or molecular methods whether the dormant MTB remains harbored within the retinal pigment epithelium or sclera, in between the episodes of choroiditis and scleritis. It may suggest MTB sequestration within the eye, rather than an immune-mediated hypersensitivity reaction.

P-RET-083

Clinical effectiveness of indomethacin in the management of Postoperative Cystoid Macular Edema (PCME)

B. Zong¹, X. Wang², S. Wang²

¹Shandong University of Traditional Chinese Medicine, Jinan, China, ²Department of Vitreoretinal Disease, Affiliated Eye Hospital of Shandong University of Traditional Chinese Medicine, Jinan, China

Introduction: Indomethacin is a nonsteroidal anti-inflammatory drug (NSAID) used to treat mild to moderate acute pain and relieve symptoms of arthritis (osteoarthritis and rheumatoid arthritis) or gout, such as inflammation, swelling, stiffness, and joint pain. Considering the pharmacological properties of indomethacin, we opted for its application in the management of postoperative cystoid macular edema, subsequently monitoring the therapeutic outcomes in the treated cohort.

Objectives: This study aims to evaluate the clinical effectiveness of indomethacin, a nonsteroidal anti-inflammatory drug, in the management of Postoperative cystoid macular edema (PCME).

Methods: A retrospective analysis was conducted on 8 cases who suffered Postoperative cystoid macular edema from March to August 2023. All patients initially have received Epiretinal Membrane Internal Limiting Membrane Peeling Combined with Phacoemulsification and Intraocular Lens Implantation Surgery for the treatment of Epiretinal Membrane within 3 months. The patients were divided into two groups evenly: one group received indomethacin, while the other group did not receive it. Preoperative and postoperative visual acuity, ocular examination results, and optical coherence tomography (OCT) images were retrospectively analyzed to evaluate the anatomical and visual outcomes of the therapy.

Results: The resolution rate for postoperative cystoid macular edema is notably faster in comparison to the control group. A majority of patients reported subjective improvement in their visual perception. The preoperative visual acuity for all patients was logMAR 0.359 ± 0.150 . At the 2-month postoperative assessment, individuals who utilized Indomethacin demonstrated a visual acuity of logMAR 0.243 ± 0.082 , while those in the control group exhibited logMAR 0.287 ± 0.141 ($P = 0.007$). No additional intraoperative or postoperative complications were observed.

Conclusions: Indomethacin emerges as a promising treatment option for eyes with postoperative cystoid macular edema. Our findings indicate enhanced postoperative anatomical and visual outcomes.

P-RET-084

Anti-VEGF therapy response in macular BRVO patients monitoring by optical coherence tomography angiography

J. Yang¹, M. Tang¹, J. Tan¹, L. Zhou¹

¹Affiliated Hospital of Panzhihua University, Panzhihua, China

Introduction: Branch retinal vein occlusion (BRVO) is a relatively common retinal disorder second to diabetic retinopathy (DR). The most frequent cause of the visual impairments in BRVO patients is macular edema and intravitreal anti-VEGF injection is the gold standard first-line therapy. Macular BRVO represents a particular venous occlusion in which the obstruction is restricted to a small vein. Optical coherence tomography angiography (OCTA) allows to visualize the retinal vasculature of retinal and retinal thickness in BRVO patients noninvasively.

Objectives: To predict the response of anti-VEGF therapy in macular branch retinal vein occlusion (BRVO) patients using optical coherence tomography angiography (OCTA).

Methods: Forty-three eyes of 42 patients diagnosed with macular BRVO-ME accepted anti-VEGF therapy were included in our study. The macular BRVO patients were divided into responsive group (\geq two lines) and poor response group ($<$ two lines) based on visual improvement at 6 months after anti-VEGF therapy. The vessel density (VD) of superficial capillary plexus (SCP) and deep capillary plexus (DCP), the foveal avascular zone (FAZ) area, the FAZ perimeter (PERIM), the VD within a 300- μ m wide ring surrounding the FAZ (FD-300), the acircularity index (AI), and the thickness of retinal were quantified by OCTA before and at first day after initial injection.

Results: After treatment, retinal thickness in whole, superior, fovea and parafovea regions, and VD of fovea in SCP are decreased in responsive group ($p < 0.001$, $p = 0.06$, $p < 0.001$, and $p < 0.001$). FAZ area of responsive group was significantly increased after injection ($p = 0.023$). AI of poor response group was decreased after injection ($P = 0.003$). Moreover, receiver operating characteristic curve analysis identified a reduction of retinal thickness of 16.5 μ m (AUC: 0.769, sensitivity: 71.4%; specificity: 77.3%) in inferior area and 34.5 μ m (AUC: 0.736, sensitivity: 85.7%; specificity: 68.2%) in parafovea area were cut-off values for predicting the response of macular BRVO patients to anti-VEGF therapy after injection.

Conclusions: The reduction of retinal thickness in inferior and parafovea area may serve as biomarkers in monitoring anti-VEGF treatment response. Macular BRVO patients with retinal thickness decrease less than 16.5 μ m in inferior area and 34.5 μ m in parafovea area after initial injection are indicated with a poor response to anti-VEGF therapy and other therapeutic interventions are needed.

P-RET-085

CNGA-3 Achromatopsia: A novel finding

H. Khan¹, F. Sumita², R. Carlos³, D. Sarraf⁴, E. Navajas⁵

¹Department of Ophthalmology, University of British Columbia, Vancouver, Canada, ²Division of Ophthalmology, University of São Paulo Medical School, São Paulo, Brazil, ³Division of Ophthalmology, University of São Paulo Medical School, Brazil, Canada, ⁴Department of Ophthalmology, Stein Eye Institute, Los Angeles, Canada, ⁵Department of Ophthalmology and Vision Sciences, University of British Columbia, Vancouver, Canada

Introduction: This study aims to investigate the long-term structural changes in a case of CNGA3-related achromatopsia using spectral domain optical coherence tomography (SD-OCT) and explore their implications on our understanding of the disease.

Objectives:

1. Investigate the long-term structural changes in the fovea of CNGA3-related achromatopsia through SD-OCT imaging.
2. Assess the stability of BCVA over a decade in CNGA3-related achromatopsia and correlate it with observed structural alterations.
3. Evaluate the utility of SD-OCT in monitoring disease progression and guiding clinical management in CNGA3-related achromatopsia.

Methods: A 16-year-old female with CNGA3-related achromatopsia underwent ten years of annual follow-up, including SD-OCT imaging. The diagnosis of achromatopsia was made with genetic testing showing heterozygosity for CNGA3 gene. Best corrected visual acuity (BCVA) was assessed, and structural changes in the fovea were examined. These included hyperreflective external limiting membrane (ELM), ellipsoid zone (EZ) disruptions, optically empty spaces (OES), choroidal hypertransmission defects, and hyperreflective foci (HRF). Findings were compared with existing OCT-based staging systems.

Results: Over the decade, the patient's BCVA remained stable, while progressive structural changes were observed in the fovea. Initially, hyperreflective ELM and subtle EZ disruptions were noted, followed by OES indicative of photoreceptor loss, choroidal hypertransmission defects, and HRF in the ONL and EZ. These findings aligned with a proposed OCT-based staging classification.

Conclusions: This study challenges the conventional notion of achromatopsia as a static disease. Despite stable BCVA, long-term structural changes were evident through SD-OCT imaging. The progressive EZ disruption, HRF appearance and OES development demonstrates that this is a progressive disease. To our knowledge, this is one of the longest follow-ups in the literature.

P-RET-086

Misdiagnosis of non-paraneoplastic autoimmune retinopathy as retinitis pigmentosa: a case report

Y. Di¹, J. Ye¹

¹Ophthalmology, Peking Union Medical College Hospital, Beijing, China

Introduction: Non-paraneoplastic autoimmune retinopathy (np-AIR) is one of the subtypes of AIR that does not have any associated underlying neoplasms. Diagnostic assessment of np-AIR is challenging and often delayed given its rarity and variety of clinical manifestations. Thus, we report a case of np-AIR misdiagnosed as retinitis pigmentosa (RP) to provide clinical experience for the diagnosis and treatment of rare ocular diseases like np-AIR.

Objectives: We report a case of np-AIR misdiagnosed as RP to provide clinical experience for the diagnosis and treatment of rare ocular diseases like np-AIR.

Methods: We retrospectively analyzed a case of np-AIR misdiagnosed as RP. A 33-year-old female presented with painless progressive visual field reduction in both eyes for 9 months. She had received electroretinography (ERG) at the local hospital, which showed a severe reduction in response amplitudes bilaterally, leading to a diagnosis of bilateral RP. The patient sought further evaluation at our clinic for a definitive diagnosis. The best-corrected visual acuity was 20/20 in both eyes. Intraocular pressure and anterior segment examination were normal. Dilated fundus examination revealed bilateral peripheral retinal vessel attenuation and scattered paving stone retinal degeneration. Her medical history was unremarkable. Diagnostic workup included optical coherence tomography (OCT), visual field (VF) testing, fundus fluorescein angiography (FFA), cranial magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA), systemic laboratory tests and serum anti-retinal antibody.

Results: FFA revealed retinal arteriovenous occlusion in the mid-peripheral of both eyes. VF showed bilateral upper and lower nasal visual field defects in both eyes. Serum anti-retinal antibodies were positive for α -enolase and carbonic anhydrase II. All remaining examinations were normal. Based on symptoms, signs, ocular imaging, and laboratory findings, a diagnosis of bilateral np-AIR was made. The patient received bilateral intravitreal injections of triamcinolone acetonide (20 mg) and reported stable ocular condition without significant progression.

Conclusions: np-AIR is a rare autoimmune-related retinal degenerative disease that mimics RP clinically. Serum anti-retinal antibodies serve as one of the main diagnostic criteria. Current mainstays of treatment include systemic or local corticosteroids, immunosuppressive agents, and monoclonal antibodies. Early diagnosis and treatment can lead to favorable visual outcomes.

P-RET-087

Management on fungal chronic postoperative endophthalmitis in a patient with eventless cataract surgery

M. Bursztyn¹, M.M. Garcia¹, E.F.E. Segretin Gutierrez¹

¹Uveitis and Infectious Eye Disease, Hospital Italiano de Buenos Aires, Ciudad Autonoma de Buenos Aires, Argentina

Introduction: Chronic postoperative endophthalmitis is a frequently delayed infectious intraocular process, generally masquerading as anterior and or posterior uveitis, in patients undergoing cataract surgery six or more weeks before the onset of symptoms. Diagnosis is frequently delayed since inflammation usually improves while corticosteroid therapy is installed but typically relapses after descent or suspension of treatment. Several pathogenic microorganisms (low virulence bacteria or fungus) have been described differing from those in acute postoperative endophthalmitis. Treatment in this cases tend to need more aggressive surgical approach to prevent recurrences.

Objectives: To present the medical and surgical management algorithm in a patient with early onset chronic postoperative endophthalmitis after an eventless cataract surgery by phacoemulsification technique

Methods: Case report and literature review.

Results: Patient underwent anterior chamber sample for microbiological tests, revealing a fungal endophthalmitis. Intravitreal and systemic antifungal medication was indicated. As patient inflammation persisted, vitrectomy was performed and new dose of intravitreal antimicrobial agents was instilled. Infectious process was still active despite surgical and medical measures, therefore, removal of intraocular lens with capsule complex and extended 23-g vitrectomy were performed. Patient evolved favourably with resolution of intraocular inflammation and infection. Once free of steroids and without relapse of inflammatory reaction, anterior chamber lens was implanted with almost full recovery of visual acuity and no further episodes.

Conclusions: Chronic postoperative endophthalmitis is a frequently misconsidered diagnosis which can carry high risk of visual impairment and must be considered as a differential diagnosis in cases of postoperative chronic or relapsing uveitis in patients with history of intraocular surgery, specially with prosthetic implants (such as IOL or Glaucoma Drainage Implants).

P-RET-088

Scleritis and episcleritis associated with IgA nephropathy

*V. Rao*¹

¹Uveitis, Sankara Nethralaya, Medical Research Foundation, Chennai, India

Introduction: Immunoglobulin A nephropathy (IgAN), a rare chronic glomerular disease, which maybe associated with varied ocular conditions. In India IgAN is reported in younger patients as compared to Caucasians and comprises 10% to 15% of all kidney biopsies. The most common ocular manifestations include hypertensive retinopathy, scleritis, episcleritis and other uveitis.

Objectives: To study the clinical pattern of scleritis and episcleritis in 4 patients who had associated IgA nephropathy.

Methods: Retrospective observational study conducted in a tertiary eye care hospital in south India.

Results: Retrospective analysis of medical records from January 2004 to January 2024 yielded 5 cases of scleritis and episcleritis associated with biopsy proven IgAN out of 82 cases of patients with diagnosed IgAN who visited the hospital within that period. The first case was a 17yr old male with unilateral scleritis and treated successfully with oral steroids. The second case is a 33yr old male with recurrent bilateral scleritis and being treated with oral steroids and immunosuppressives. The third case is a 30yr old male with unilateral scleritis and was treated with oral steroids and immunosuppressives. The fourth case is a 48yr old male who had unilateral episcleritis and treated with topical steroids. In 3 patients the scleritis and episcleritis resolved with no recurrence in 6m but in one patient it took longer because of initial non-compliance.

Conclusions: Scleritis is an important, although rare association with IgA nephropathy. Awareness of this association helps in successful management of the disease along with the consultant nephrologist.

P-RET-089

Safety of mycophenolate mofetil in treating non-infectious uveitis and scleritis in Japanese patients: prospective study

T. Hiyama¹, K. Komatsu¹, Y. Harada¹

¹Department of Ophthalmology, Hiroshima University Hospital, Hiroshima, Japan

Introduction: Although mycophenolate mofetil (MMF) is a common immunomodulatory therapy for treating non-infectious uveitis, its use has not yet been established or approved in Japan. The efficacy of MMF may vary by race, and given the limited reports on MMF use for non-infectious uveitis and scleritis in Japan, we believe it is essential to determine the safety of MMF in the treatment of non-infectious uveitis.

Objectives: To evaluate the rate and severity of the side effects of MMF in the treatment of non-infectious uveitis and scleritis in Japanese patients.

Methods: This specified clinical research was an exploratory, single-arm, open-label, single centre, prospective study conducted in Hiroshima university hospital, Japan. from July 2022 to February 2024. Patients received MMF (CellCept®) with an initial dose of 1000mg/day, which could be adjusted up to 3000mg/day. The primary endpoint of the study was to evaluate the rate and severity of the side effects of MMF. Secondary endpoints were the rate of overall treatment success, where treatment success was defined as controlled ocular inflammation according to SUN criteria for uveitis and standardized grading system for scleritis (anterior chamber cell $\leq 0.5+$, vitreous haze $\leq 0.5+$, no active retinal/choroidal lesion, scleral injection $\leq 0.5+$) under oral prednisolone ≤ 5 mg/day or topical betamethasone ≤ 2 times/day, proportion discontinuing due to serious adverse events, and discontinuing due to intolerability. Patients were followed up for 12 months.

Results: Ten patients were enrolled (7 women; median age, 54,5 years) Types of diseases were Vogt-Koyanagi-Harada disease (n=4), retinal vasculitis (n=3) sarcoidosis (n=1), sympathetic ophthalmia (n=1), and scleritis(n=1). The median dose of MMF was 2500mg/day, and the maximum dose was 3000mg/day. One patient experienced elevated liver enzymes, which led to discontinuation of MMF; the laboratory results improved after MMF discontinuation. At 6 months, treatment success was achieved in 6 out of 10 patients. The reason for treatment failure was intolerability (n=1) and efficacy (n=3). Oral prednisolone was tapered to ≤ 5 mg/day in all patients at 12 months and discontinued in 7 patients.

Conclusions: Among Japanese adults with non-infectious uveitis and scleritis MMF may be safely used as a steroid-sparing agent. Further research is needed to determine the efficacy of MMF based on different types of diseases.

P-RET-090

Peripheral blood biomarkers influencing secondary vitreous hemorrhage in polypoidal choroidal vasculopathy

Y. Lin¹, X. Xiong¹, J. Cui¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: At present, most studies on the mechanism of development of secondary vitreous hemorrhage (VH) in patients with polypoidal choroidal vasculopathy (PCV) is about ocular factors, and few are about systemic factors.

Objectives: To explore the peripheral blood biomarkers influencing the development of secondary vitreous hemorrhage (VH) in patients with polypoidal choroidal vasculopathy (PCV) and establish a predictive model.

Methods: A retrospective study was conducted, including 77 patients (77 eyes) with secondary VH in PCV and 109 patients (109 eyes) with PCV without VH patient. Data on the sex, age, history of systematic diseases, and laboratory data of patients with PCV were collected. Univariate and multivariate binary logistic regression analyses were employed to explore the independent factors influencing the occurrence of secondary VH in PCV patients and to construct a clinical predictive model.

Results: Binary logistic regression analysis revealed that higher levels of total protein (TP) and platelet distribution width (PDW) were independent risk factors of VH in patients with PCV, while age, red blood cell count (RBC), and lymphocyte percentage (LYMPH%) were protective factors against secondary VH in PCV patients (all $P < 0.05$). Based on these influencing factors, a combined predictive model for predicting VH occurrence in PCV was constructed. The AUC of the combined predictive model was 0.772 (95% CI: 0.703–0.840, $P < 0.001$), with a sensitivity of 0.670 and specificity of 0.766, indicating good predictive ability.

Conclusions: Higher TP and PDW are independent risk factors for secondary VH in PCV patients, while age, RBC, and LYMPH% are protective factors of VH in patients with PCV. The predictive model established in this study effectively predicts the occurrence of secondary VH in PCV patients and can serve as a valuable reference for clinical practitioners.

P-RET-091

Foveal thickness fluctuation and metamorphopsia in patients with branch retinal vein occlusion

M. Kobayashi¹, Y. Sugiura¹, F. Okamoto², T. Murakami¹, S. Morikawa¹, Y. Okamoto³, T. Oshika¹

¹University of Tsukuba Hospital, Tsukuba, Japan, ²Nippon Medical School, Tokyo, Japan, ³Mito Kyodo General Hospital, Mito, Japan

Introduction: It is well known that anti-vascular endothelial growth factor (VEGF) therapy is effective in cystoid macular edema secondary to branch retinal vein occlusion (BRVO-CME). However, the commonly used pro re nata (PRN) regimen often results in reported recurrences and fluctuations in retinal thickness.

Objectives: To investigate the association between foveal thickness fluctuation (FTF) and metamorphopsia in patients with cystoid macular edema secondary to branch retinal vein occlusion (BRVO-CME) treated by intravitreal ranibizumab injection (IVR) for 12 months.

Methods: Thirty six eyes of 36 patients (age 66.6 ± 10.1 years) with treatment-naïve BRVO were included. They were all treated by IVR with pro re nata (PRN) regimen for 12 months. The severity of metamorphopsia and best-corrected visual acuity (BCVA) were evaluated, and optical coherence tomography (OCT) images were obtained monthly until 12 months post-treatment. The severity of metamorphopsia was quantified using the M-CHARTS, and FTF was calculated from the standard deviation of the central foveal thickness (CFT) in each patient and classified into 4 groups in order, and factors were assessed among the 4 groups.

Results: IVR treatment significantly improved BCVA and CFT in all groups for 12 months, but no significant improvement was observed in metamorphopsia in any of the 4 groups. There were significant differences among the 4 groups classified by FTF with the average number of injections for 12 months (5.3 ± 1.9 times) and post-treatment CFT ($P < 0.0001$, $P = 0.029$, respectively), while post-treatment metamorphopsia had no differences among the 4 groups ($P = 0.553$). Post-treatment metamorphopsia was associated with pre-treatment metamorphopsia ($P = 0.001$) and was not associated with FTF ($P = 0.397$).

Conclusions: Anti-vascular endothelial growth factor treatment did not improve metamorphopsia in BRVO-CME patients, regardless of the degree of FTF. Post-treatment metamorphopsia was associated only with pre-treatment metamorphopsia, and not with FTF.

P-RET-092

Edible mushroom-derived compound, vialinin-A, prevents ocular inflammation

S. McMahon¹, T. Spector¹, K. Ramana^{1,2}

¹Noorda College of Osteopathic Medicine, Provo, United States, ²Dept. of Biomedical Sciences, Noorda College of Osteopathic Medicine, Provo, United States

Introduction: Uveitis, an ocular inflammatory complication, is one of the major causes of visual impairment worldwide with unknown etiology. Infections, autoimmune diseases, and other factors could lead to this complication that damages the uveal tract and adjacent ocular structures. Corticosteroids are commonly used for the therapy of uveitis, but their prolonged use has unwanted side effects. Therefore, the development of potential therapeutic approaches is required to treat ocular inflammatory complications with better safety and efficacy. Vialinin-A, isolated from the edible Chinese mushroom, has been shown to be a potent antioxidant with anti-inflammatory actions. However, its role in preventing uveitis is not known.

Objectives: We hypothesize that vialinin-A could prevent ocular inflammation in normal and hyperglycemic conditions. Since uveitis is a systematically originated complication, we examined the effect of vialinin-A first on macrophages then locally on HNPECs.

Methods: Human non-pigmented ciliary epithelial cells (HNPECs) and Thp-1 monocytes were used to determine the anti-inflammatory effects of vialinin-A. The cells were treated with LPS and/or high glucose in the absence/presence of vialinin-A, and cell viability was determined by MTT assay. The expression of various inflammatory cytokines, chemokines, and growth factors was determined by antibody arrays. Endotoxin-induced uveitis will be developed in normal and diabetic rats, and the effects of vialinin-A treatment in preventing ocular inflammation will be examined in various ocular tissues.

Results: Treatment of Thp-1 cells with LPS caused cell death in time-dependent manner and vialinin-A prevented the LPS-induced cell death dose-dependently. Similarly, in HNPECs LPS-induced decrease in cell viability was reversed by vialinin-A. Further, hyperglycemia-increases LPS-induced decrease in cell viability and vialinin-A prevented it. Vialinin-A prevented expression of various cytokines and chemokines and activation of NF-kB in the Thp-1 cells. Further studies are in progress to examine how vialinin-A prevents ocular inflammation including animal studies using endotoxin-induced uveitis in normal and diabetic conditions.

Conclusions: Our results indicate that vialinin-A could prevent endotoxin-induced ocular inflammation by regulating the NF-kB mediated expression of cytokines and chemokines, suggesting it could be further developed to treat uveitis.

P-RET-093

Intermediate and near vision post cataract surgery in uveitic eyes implanted with tecnis eyhance intraocular lenses

A. George¹, S. Sridharan¹, P.D. Majumder¹

¹Department of Uveitis, Sankara Nethralaya, Medical Research Foundation, Chennai, India

Introduction: Intraocular lenses in eyes with uveitis can exhibit differences in performance from eyes without intraocular inflammation because of synechiae and capsular contracture.

Objectives: To assess uncorrected intermediate and corrected and uncorrected near vision and refractive correction required for near in eyes with uveitis implanted with Tecnis Eyhance intraocular lenses.

Methods: Patients with uveitis aged 18 years and older undergoing phacoemulsification with Tecnis Eyhance intraocular lenses were included. Eyes with corneal, macular or optic nerve pathology that could impact vision were excluded. Uncorrected and corrected near vision at 35 cms was assessed 2 to 6 weeks cataract surgery.

Results: We included 62 eyes of 55 patients. There were 28 females, Mean age(SD) was 44(14.7) yrs. Intermediate uveitis was diagnosed in 29% of patients followed by Fuchs iritis in 18%. Mean post op uncorrected visual acuity was 0.17(SD:0.18) , Corrected mean distance visual acuity was 0.06(SD:0.14) with a mean spherical equivalent of -0.2(SD:0.38)D. 68% of eyes were spectacle independent for intermediate when tested. Mean uncorrected LOGMAR near vision was 0.5 (SD:0.1), Mean near vision add was 1.9(Sd: 0.37D)

Conclusions: Tecnis Eyhance IOL implantation was associated with good uncorrected intermediate distance visual acuity even in uveitic eyes.

P-RET-094

Diagnosis of CME by comparison of pre- and post-op macular thickness after cataract surgery with and without pre-op use of NSAIDs

A. Rouf¹

¹Ophthalmology, Madinah Teaching Hospital, Faisalabad, Pakistan

Introduction: Macular Cystoid macular Edema (CME) is still a significant reason that inhibits full visual recovery after cataract surgery. Surgical trauma, postoperative inflammation, and tractional pressures on the macula have all been proposed as potential causes of CME after cataract surgery. Recent research has demonstrated that macular edema, which is not detectable clinically but may be identified by optical coherence tomography (OCT), can be treated.

The underlying illness process determines the primary etiology of CME, however most paths ultimately result in vascular instability and the blood-retinal barrier collapse. Fluid overwhelms the Muller cells in the retina, causing them to lysis. This causes fluid to accumulate in the retina outer plexiform and inner nuclear layers. Retinal vein blockage and diabetes can cause CME by directly inducing vascular instability. CME produced by uveitis or following cataract surgery, on the other hand, is most likely triggered by cytokines secreted by triggered inflammatory cells. They cause the blood-retinal barrier to break down causing capillary leakage⁵. Macular Edema is a significant side effect of cataract surgery. Although using topical NSAIDs to avoid CME following cataract surgery is becoming increasingly popular, This study compares the mean macular thickness following surgery for cataract extraction with and without NSAID usage prior to surgery.

Objectives: To compare mean macular thickness after cataract extraction surgery with and without pre-operative use of NSAIDs.

Methods: This Randomized controlled trial was performed in department of Ophthalmology, Madinah Teaching Hospital, Faisalabad from 21-04-2023 to 20-07-2023. Total 640 patients (320 in each group) were involved in the study. In group-A patients received one drop of NSAID three times a day for one day prior surgery. In group-B, patients not received NSAID.

Results: Results showed that there was a total 395 males and 245 females. Mean age of the patients was 48.24 ± 5.54 in group A and 47.05 ± 5.20 in group B. Comparison of macular thickness showed that thickness was 215.69 ± 14.20 in group A and 227.99 ± 06.09 in group B. There was a significant difference in macular thickness of two groups ($P < 0.001$).

Conclusions: In conclusion, preoperative usage of NSAIDs revealed statistically significant ($p < 0.001$) and clinically relevant benefits in avoiding macular Edema and preserving visual acuity in patients undergoing cataract surgery as compared to the non-NSAIDs group.

P-RET-095

Elevated cholesterol and triglycerides linked to foveal thickness in a high-risk diabetic macular edema population

A.A. Mendoza-Sandoval¹, A. Inzunza^{2,3}, C.D. Diaz-Davalos¹

¹Ophthalmology, Instituto Mexicano del Seguro Social, Veracruz, Mexico, ²Escuela de Medicina, Tecnológico de Monterrey, Guadalajara, Mexico, ³Postgraduate Medical Education, Harvard Medical School, Boston, United States

Introduction: Diabetes can lead to sight-threatening complications, like diabetic retinopathy (DR) and diabetic macular edema (DME). Previous studies have investigated the correlation between biochemical markers and the manifestations of DME using optical coherence tomography (OCT), identifying elevated lipid profiles as critical risk factors. Hispanic patients exhibit almost twice the prevalence of DR compared to Caucasian individuals. Moreover, Hispanics show a higher incidence of DME and are more susceptible to dyslipidemia. Despite these facts, dyslipidemia and diabetic macular edema research among Hispanic mestizo populations remains scarce.

Objectives: This study investigates the relationship between serum levels of total cholesterol and triglycerides and central foveal thickness (CFT) in DME among the under-researched Hispanic population.

Methods: This study employed a cross-sectional, correlational methodology, with approval from the ethics committee. The primary outcome of the study was the association between serum levels of total cholesterol and triglycerides and CFT measurements obtained by OCT. The study included 34 patients. Statistical analyses included linear regression analysis to investigate the relationships between variables. A p-value of ≤ 0.025 was considered significant (Bonferroni correction).

Results: Linear regression analysis revealed a statistically significant relationship between serum cholesterol levels and central foveal thickness ($p < 0.009$), with an estimated increase of 1.4 units in central foveal thickness for each unit increase in cholesterol levels. Similarly, the relationship between serum triglyceride levels and central foveal thickness was also statistically significant ($p < 0.0028$), showing an estimated increase of 1.68 units in central foveal thickness for each unit increase in triglyceride levels. The average central foveal thickness measured by OCT was 431.7 microns. The predominant pattern of macular edema was non-tractional, observed in 85% of cases.

Conclusions: The study found a statistically significant correlation between serum levels of total cholesterol and triglycerides and central foveal thickness in Hispanic Mestizo patients with diabetic macular edema, suggesting that elevated lipid levels could exacerbate the condition. It is important to mention that a third, confounding variable may exist; patients with higher levels of cholesterol and triglycerides might also demonstrate poorer glycemic control and a longer duration of the disease.

P-RET-096

Evaluation of *Toxoplasma* antibodies level in patients with ocular Toxoplasmosis in DR Congo

*N. Nsiangani Lusambo*¹, *A. de-la-Torre*², *D. Kaimbo Wa Kaimbo*¹

¹Ophthalmology, University of Kinshasa, Kinshasa, Congo, Democratic Republic of the, ²Neuroscience Research Group, Universidad del Rosario, Bogota, Colombia

Introduction: Ocular toxoplasmosis (OT) is the leading cause of infectious posterior uveitis in several areas worldwide, and more than 25% of patients with the condition experience permanent visual impairment. A positive *Toxoplasma* IgG serology is found in OT cases, but little information is available on the serum levels of this antibodies.

Objectives: To determine the relationship between OT and levels of *Toxoplasma* IgG antibodies in a cohort of Congolese patients with uveitis.

Methods: A cross-sectional study was conducted between March 2020 and July 2021 in two ophthalmic clinics in Kinshasa. 190 patients with uveitis, underwent a complete ophthalmological examination and a serological determination of anti-*Toxoplasma* antibodies (Ig G) by enzyme-linked fluorescent assay (ELFA, Biomerieux, France). The patients were distributed in 2 groups: those with OT (= group 1) and those with uveitis of other etiologies (= group 2). The IgG level was compared according to sex, age, etiology of uveitis (groups 1 and 2), type of OT, and clinical characteristics of OT using the Mann-Whitney non-parametric test.

Results: 88 patients (46.3%) were included in group 1, and 102 patients (53.7%) in group 2. Patients in group 1 were younger than those in group 2 (mean age \pm SD: 36.4 \pm 14.4 years VS 46.3 \pm 15.9 years, $p < 0.001$). The median IgG level was higher in patients with OT than in group 2 (214.5 IU/ml VS 59.5 IU/ml, $p < 0.001$). Among cases of active OT, patients with primary OT had a higher median IgG level than those with recurrence (295 IU/ml VS 181 IU/ml, $p = 0.006$). No difference was found in the IgG level depending on the sex and age of the patients, the laterality of the ocular involvement, the location, the number, and the size of the chorioretinitis lesions ($p > 0.05$).

Conclusions: An increase in the serum level of IgG anti-*Toxoplasma* antibodies was found in OT cases, with a more significant elevation during primary OT than during recurrences. The level of antibodies seems to have no relationship with the clinical characteristics of the pathology.

P-RET-097

Evaluation of the role of hypoxia, inflammatory, and proliferation factors in the development of diabetic maculopathy

*S. Majidova*¹

¹Department of medical rehabilitation, National Centre of Ophthalmology named after acad. Zarifa Aliyeva, Baku, Azerbaijan

Introduction: The WHO predicts up to 366 million incidences of diabetes mellitus (DM) in the world by 2030.

Objectives: Purpose – comparative assessment of the role of hypoxia, inflammation and proliferation factors in the development of maculopathy in different stages of diabetic retinopathy (DR).

Methods: A retrospective study was conducted in two groups: group I - 40 patients with nonproliferative diabetic retinopathy (NPDR); group II - 42 patients with the development of proliferative diabetic retinopathy (PDR) during the year. The laboratory study included the determination of HIF1- α , sICAM-1 in blood serum (BS), VEGF, inflammatory cytokines TNF- α , IL-1 β , IL-8 in BS and tear fluid (TF), PEDF, TGF- β , MCP1 in TF using ELISA.

Results: There were initially significantly fewer patients with diabetic maculopathy (DMP) in group I - 53% (21/40) than in group II - 79% (33/42) ($p=0.004$). A year later, the relative number of patients with DMP in group II (88% - 37/42) remained higher than in group I (60% - 24/40). Accordingly, in group II during at the first visit, the average indicators of the central macular thickness (CTM) and total macular volume (TMV) were significantly higher than those in group I: $393.2\pm 168.0\ \mu\text{m}$ and $437.9\pm 145.1\ \mu\text{m}$ ($p=0.042$); $11.9\pm 2.3\ \text{mm}^3$ and $12.9\pm 2.2\ \text{mm}^3$ ($p=0.034$).

A year later, the average values of CTM and TMV in group I significantly decreased to $256.5\pm 23.2\ \mu\text{m}$ and $9.9\pm 1.0\ \text{mm}^3$, respectively ($p<0.001$), and in group II with progression of NPDR, the average values of CTM ($424.7\pm 133.0\ \mu\text{m}$) and TMV ($12.9\pm 1.9\ \text{mm}^3$), remaining significantly higher than in group I ($p<0.001$), did not change significantly ($p=0.817$, $p=0.288$) relative to the primary values. In the TF in group I, a significant decrease was noted over the year, in group II, on the contrary, a significant increase in the average level of growth factors and inflammatory cytokines ($p<0,001$). Changes in the anti-angiogenic factor PEDF over the year showed an inverse trend. A year later in group II CMT had a significant positive relationship with all study factors at the systemic and local level.

Conclusions: Our results allow us to conclude about the prognostic significance of the interrelated increase in HIF1- α , sICAM-1 and inflammatory cytokines (VEGF, TNF- α , IL-1 β , IL-8) at the systemic level in the development of DM in NPDR. Along with anti-angiogenic therapy it is advisable to consider the need for preventive anti-inflammatory therapy to prevent the aggravation of diabetic damage to the organ of vision.

P-RET-098

Therapeutic carbohydrate reduction as adjunct diabetic macular oedema management – A case report

L. Hains¹, S. Bacchi^{2,3}, W.O. Chan^{4,5}, J. Muecke^{6,7}

¹Adelaide Medical School, University of Adelaide, Adelaide, Australia, ²College of Medicine and Public Health, Flinders University, Bedford Park, Australia, ³Lyell McEwin Hospital, Elizabeth Vale, Australia, ⁴Department of Ophthalmology and Visual Sciences, University of Adelaide, Adelaide, Australia, ⁵Ophthalmology Department, Royal Adelaide Hospital, Adelaide, Australia, ⁶Adelaide Eye and Retina Centre, Adelaide, Australia, ⁷Sight for All, Adelaide, Australia

Introduction: Therapeutic carbohydrate reduction (TCR) has gained increasing popularity as a form of novel Type-2 Diabetes Mellitus (T2DM) management. More recently TCR is now starting to become a part of clinical practice guidelines as adjunct T2DM management. Popular forms of TCR include diets such as the Ketogenic diet, which has been the topic of numerous studies into potential benefits in mitochondrial and neurodegenerative disease. While the benefits of TCR in T2DM management are well-researched, the subsequent benefits to microvascular disease such as Diabetic Retinopathy and Diabetic Macular Oedema (DMO) remain under-researched.

Objectives: The goal of our study was to retrospectively explore the benefits of a very-low carbohydrate form of TCR in a patient with DMO.

Methods: We retrospectively reviewed the medical record and optical coherence tomography (OCT) scans of a 39-year-old female patient with a thirteen-year history of T2DM and was referred to a metropolitan private ophthalmology practice for management of her DMO. Her ophthalmologist advised the patient to undertake TCR to aid in DMO management and was referred to a private nutritionist who specialises in low-carbohydrate dietary management. OCT scans were analysed and uploaded to the RetinAI machine learning platform for intraretinal fluid (IRF) analysis.

Results: Within two weeks of the dietary change, the patient was able to cease her regular insulin treatment and returned to normoglycaemia. Within four weeks of her initial appointment with the nutritionist, ophthalmology follow-up found a reduction in DMO in both eyes. At the last review 18 months later, the DMO in both eyes had completely resolved. Volumetric analysis found a substantial decrease in the macular IRF in both eyes post commencing TCR. There was one period of poor dietary compliance which showed a large spike in IRF which quickly resolved following recommencing the diet.

Conclusions: This patient saw significant improvement to her long-standing T2DM and subsequently her DMO. Reducing insulin treatment burden and improving T2DM complications such as retinal disease through dietary/lifestyle modification can help improve overall patient disease burden and health system burden as a result. The benefits of TCR and its various forms on retinal microvasculature are under-researched both in clinical and laboratory research and require larger studies.

P-RET-099

Therapeutic carbohydrate reduction as adjunct management of macular oedema secondary to retinal vein occlusion

L. Hains¹, S. Bacchi^{2,3}, W.O. Chan^{4,5}, J. Muecke^{6,7}

¹Adelaide Medical School, University of Adelaide, Adelaide, Australia, ²Lyell McEwin Hospital, Elizabeth Vale, Australia, ³College of Medicine and Public Health, Flinders University, Bedford Park, Australia, ⁴Department of Ophthalmology and Visual Sciences, University of Adelaide, Adelaide, Australia, ⁵Ophthalmology Department, Royal Adelaide Hospital, Adelaide, Australia, ⁶Adelaide Eye and Retina Centre, Adelaide, Australia, ⁷Sight for All, Adelaide, Australia

Introduction: Therapeutic carbohydrate reduction (TCR) such as low-carbohydrate, healthy fat diets and the ketogenic diet are becoming increasingly popular in adjunct lifestyle modification in various medical conditions. Several clinical trials have found substantial benefits to TCR in Type-2 Diabetes Mellitus (T2DM) management, which has since led to TCR being implemented into clinical practice guidelines. There has been little research into the subsequent benefits of TCR on T2DM associated retinal complications such as branch retinal vein occlusion (BRVO).

Objectives: To explore the potential impact of TCR in managing macular oedema secondary BRVO.

Methods: We undertook retrospective analysis of the medical record and optical coherence tomography (OCT) scans of a 74-year-old male with macular oedema (MO) due to BRVO in the left eye. This patient had previously received many years of intravitreal injection (IVI) therapies and laser treatments for persistent MO. The patient was advised by his ophthalmologist to undertake TCR as adjunct therapy to manage his T2DM and BRVO. The patients OCT scans were de-identified and uploaded to the RetinAI machine learning platform for volumetric analysis.

Results: There was a significant reduction in MO and improvement in visual acuity (VA) was noted 6 weeks after beginning TCR. 4-months later, the left macula was found to be virtually free of intraretinal fluid (IRF). The patient was able to with less frequent 8-weekly Aflibercept injections with stable DMO and visual acuity.

Conclusions: IVI injection burden for patients and health systems is growing with the increasing prevalence of T2DM and associated retinal complications. Lifestyle and dietary changes such as TCR may aid in helping reduce the need for IVI injections, which may have significant financial and emotional benefits to these patients. The aim of this study is to promote further research into TCR and microangiopathic retinal disease and further exploration into changes to the retinal microenvironment in TCR.

P-RET-100

Genetic screening and retinal parameter characteristic analysis of familial exudative vitreoretinopathy

w. Zhuang¹, J. Li^{2,1}

¹People's Hospital of Ningxia, Yinchuan, China, ²Ophthalmology, People's Hospital of Ningxia Hui Autonomous Region, Yinchuan, China

Introduction: Familial exudative vitreoretinopathy (FEVR) is a genetically heterogeneous disease with diverse clinical manifestations and inheritance patterns, posing challenges in diagnosis and treatment.

Objectives: This study aimed to identify FEVR gene mutations via whole-exome sequencing, and analyze retinal parameters using AI to uncover disease pathogenesis and identification of potential diagnostic markers.

Methods: A total of 138 patients diagnosed with FEVR at the Ningxia Eye Hospital from September 2021 to December 2023 were collected as the case group, with a matched normal healthy population during the same period selected as the control group for retinal parameter analysis. Exome sequencing was performed on the genomic DNA of probands to screen for mutation sites, followed by Sanger sequencing for pedigree co-segregation analysis. Mutation pathogenicity was further analyzed using bioinformatics software and ACMG guidelines, with conservative analysis and construction of 3D protein structures. Retinal parameters were extracted and quantified using automated artificial intelligence software, and parameters with significant differences between the case and control groups were determined using various statistical methods. Statistical analysis of staging and differences in retinal parameters among different genotypes was conducted.

Results: A total of 47 mutation sites were detected in 9 FEVR-related genes, Mutation analysis revealed 47 mutation sites in 9 FEVR-related genes, with a mutation detection rate of 59% among the 62 tested pedigrees, expanding the mutation spectrum. The most common FEVR gene mutation sites were LRP5 (30%), followed by FZD4 (21%) and TSPAN12 (13%). Eighteen mutations were identified as potentially pathogenic, including 8 novel mutations and 10 reported mutations. Retinal parameter analysis showed significant differences between groups, with FEVR patients exhibiting smaller cup and disc diameters, altered shapes, increased disc-to-macula distance, and reduced vessel parameters. Intragroup analysis within the FEVR case group showed that with the progression of the disease stage, vessel fractal dimension and vessel density parameters significantly decreased.

Conclusions: The study substantially broadens the mutation spectrum of FEVR. Retinal parameter analyses highlighted significant differences between the case and control groups and may provide clues for early diagnosis.

P-RET-101

Comparison of the effectiveness of single- to multi-field fundus photography in community care of diabetic retinopathy

C. Ye¹, X. He¹, X. Deng¹, Z. Lin¹, L. Wen², W. Zhou¹, X. Xu¹, S. Hu¹, Y. Liang¹, Y. Wang², J. Qu¹
¹National Clinical Research Center for Ocular Diseases, Eye Hospital, Wenzhou Medical University, Wenzhou, China, ²Fushun Eye Hospital, Fushun, China

Introduction: Diabetic retinopathy (DR) is a major cause of vision loss. While multi-field retinal imaging is ideal, single-field photography offers greater feasibility for community screening. There is limited evidence on the effectiveness of single-field fundus photography for screening and monitoring DR in community settings compared to multi-field imaging.

Objectives: This study aimed to evaluate the effectiveness of single-field fundus photography for DR screening and monitoring versus six-field imaging.

Methods: Adults aged ≥ 30 years with type 2 diabetes from 15 communities in Northeast China were recruited for this prospective cohort study ($n=2006$ at baseline and $n=1456$ at follow-up). Participants underwent single-field (centered on macula) and six-field 45° digital fundus photography at baseline and follow-up visits (mean duration of 21.2 ± 3.2 months). Photographs were graded for DR severity using international standards. Agreement in DR severity grading, referral recommendations, and detection of DR progression between single-field and six-field fundus photography were compared.

Results: Single-field grading showed substantial agreement with multi-field grading in classifying DR severity (81.9% identical at baseline, 80.6% at follow-up, Gwet's AC1 0.79 and 0.77). For referring eyes with moderate non-proliferative DR or worse, single-field grading had $\sim 70\%$ sensitivity and 100% specificity compared to six-field grading. Single-field grading identified 74.9% or 79.7% of eyes progressing or regressing by six-field grading, respectively.

Conclusions: Single-field fundus photography demonstrated reasonable effectiveness for DR screening and monitoring in a community setting, supporting its use for improving access to DR detection. However, reduced sensitivity compared to multi-field imaging should be acknowledged.

P-RET-103

Perspectives on efficacy and safety of anti-VEGF biosimilars in the treatment of neovascular AMD

A. Tran¹, H. Chiu², W.-C. Lam³, A. Samad⁴, C. Qian⁵, S. Somani²

¹Queen's University, Kingston, Canada, ²University of Toronto, Toronto, Canada, ³University of British Columbia, Vancouver, Canada, ⁴Dalhousie University, Halifax, Canada, ⁵University of Montreal, Montreal, Canada

Introduction: With expiry of originator anti-vascular endothelial growth factor (anti-VEGF) patents, policies are transitioning to the use of biosimilars. It remains unclear as to how this transition will impact patient outcomes and provider practices.

Objectives: To explore the perspectives of Canadian ophthalmologists and patients with neovascular age-related macular degeneration (nAMD) on anti-VEGF biosimilar safety and efficacy, as well as current knowledge on rollout policy.

Methods: Ophthalmologists performing anti-VEGF injections were invited from August to October 2023 to participate in a physician survey. nAMD patients were invited in-person in August 2023 to participate in a patient survey. Both surveys included ranking questions and visual analogue scales (VAS) (1-10) to measure agreement with given statements. A priori, "agreement" with these statements was defined as a VAS response of between 7 and 10. All survey participants were invited to a semi-structured interview to supplement survey responses. Analysis of interview data was performed in Dedoose, a specialized software for qualitative analysis, where responses were analyzed using Thorne's interpretive description approach.

Results: There were 38 ophthalmologists across 9 provinces who participated in the survey and 3 who subsequently completed an interview. 47% of ophthalmologists in our sample were unaware of their province's anti-VEGF biosimilar rollout policy and 68% were uncomfortable with using biosimilars, with interviews suggesting preference to be late- rather than early-adopters of biosimilars. 79% of ophthalmologists felt that the switch to biosimilars should not be mandatory. Safety and efficacy of biosimilars were most commonly ranked by ophthalmologists to be the most important factors in choice of treatment. 50 nAMD patients participated in the survey and 11 subsequently completed an interview. 88% of patients in our sample were not comfortable being switched to a biosimilar, with 94% indicating that they believe their doctor should have the choice to decide which drug is best for them. Interviews revealed that patients assumed biosimilars were of lower safety and efficacy compared to originators but had great trust in their physicians' treatment decisions.

Conclusions: Hesitancy with the use of anti-VEGF biosimilars was seen both among Canadian ophthalmologists and patients with nAMD, most commonly in relation to safety and efficacy. Most physicians and patients believed that a switch to biosimilars should not be mandatory.

P-RET-104

Paracentral acute middle maculopathy: a case report

*M. Eldakkak*¹

¹Eye Unit, University Hospitals of Southampton NHS trust, Southampton, United Kingdom

Introduction: We report here a case of Paracentral acute middle maculopathy (PAMM) in a 69 years old female with complete spontaneous recovery and no visual sequelae.

Objectives: We report here a case of Paracentral acute middle maculopathy (PAMM) in a 69 years old female.

Methods: Follow up assessment of OCT findings, autofluorescence and OCTA findings of PAMM.

Results: PAMM occurs as an isolated phenomenon or as complicating feature of an underlying retinal vasculopathy or systemic disease. Early diagnosis of PAMM and investigations are important to rule out underlying causes and systemic management as appropriate. Patients should have a close monitoring till complete recovery.

Conclusions: PAMM occurs as an isolated phenomenon or as complicating feature of an underlying retinal vasculopathy or systemic disease. Early diagnosis of PAMM and investigations are important to rule out underlying causes and systemic management as appropriate. Patients should have a close monitoring till complete recovery.

P-RET-105

Depletion of *Akkermansia muciniphila* in patients with Central Serous Chorioretinopathy

P. Ye¹, F. Zheng¹

¹Eye Center, Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction: Central serous chorioretinopathy (CSCR) has been known as a major cause of decreased vision among middle-aged male individuals. The underlying cause of pachychoid or retinal pigment epithelium (RPE) abnormalities and the exact molecular mechanisms of CSCR remained unknown. Many causes have been concerned with CSCR, like anxiety-sensitive personalities, corticosteroids, sympathetic-parasympathetic imbalance, and endocrine changes. Gut microbiome plays an important role in development of many systemic diseases.

Objectives: The purpose of this study is to investigate alterations of the gut microbiome in patients with CSCR and find new insights in mechanisms of CSCR.

Methods: Patients with CSCR either acute or chronic from and age- and gender-matched healthy individuals were enrolled in this prospective observation study. Fecal samples were collected and analyzed using 16S rRNA gene sequencing.

Results: Gut microbiota of 71 CSCR patients (20 acute, 51 chronic) and 40 healthy individuals were explored. There was no difference in body mass index between two groups. Significant lower diversity of gut micro-organisms was observed in CSCR patients ($p= 0.0008$). Differential gut micro-organisms composition was also found, with significant depletion of 7 families in CSCR patients compared with healthy controls. Among all families, the depletion of *Akkermansia muciniphila* were most striking, which is depleted by more than 9 times.

Conclusions: Reduced diversity and altered composition of gut microbiota were noticed in CSCR patients. Depletion of *Akkermansia muciniphila* might play a role in the pathogenic process of CSCR.

P-RET-106

Pachychoroid neovascularopathy versus macular neovascularization in ARMD with and without shallow irregular PED

H. Riazi Esfahani¹, E. Khalili Pour¹, E. Asadi Khameneh¹, H. Faghihi¹, F. Ghassemi¹, M. Mehrabi Bahar¹, M. Rahimi¹

¹Retina, Tehran University of Medical Sciences/Farabi Eye Hospital, Tehran, Iran, Islamic Republic of

Introduction: Pachychoroid neovascularopathy (PNV) is characterized by the presence of type 1 choroidal neovascularization (CNV), often inside a shallow irregular pigment epithelial detachment (SIPED) in the setting of pachychoroid spectrum disorders characterized by increased choroidal thickness (pachychoroid), increased outer choroidal vascular caliber (pachyvessels), and choriocapillaris thinning on enhanced depth OCT (EDI-OCT). A growing body of research indicates that pachychoroid-driven MNV and AMD-driven MNV are distinct entities. They differ in terms of demographics, pathogenesis, treatment response, and prognosis. OCTA biomarkers such as the number of junction points, fractal dimension, and lacunarity have shown potential in assessing the complexity of neovascular membranes. These biomarkers have been studied in previous investigations and have demonstrated the abilities to provide valuable information about the nature of these abnormal blood vessels and to predict treatment responses and disease severity.

Objectives: To compare the choroidal neovascular features of individuals with pachychoroid neovascularopathy (PNV) and neovascular age-related macular degeneration (nAMD) with and without shallow irregular pigment epithelial detachment (SIPED).

Methods: This study was a retrospective case series analysis of patients diagnosed with nAMD or PNV at the retina clinic of the Farabi Eye Hospital (Tehran, Iran) between March 2019 and September 2022. Using optical coherence tomography angiography, the choroidal neovascular complexes of 27 patients with PNV, 34 patients with nAMD and SIPED, and 15 patients with nAMD without SIPED were analyzed with FIJI and AngioTool software.

Results: PNV compared to nAMD with SIPED had a greater vessel percentage area ($P = 0.034$), junction density ($P = 0.045$), average vessel length ($P < 0.001$), and fractal dimension ($P < 0.001$). PNV, compared to nAMD without SIPED, had a greater total vessel length ($P = 0.002$), total number of junctions ($P < 0.001$), junction density ($P = 0.034$), and fractal dimension ($P = 0.005$). nAMD with SIPED, compared to nAMD without SIPED, had greater vessel area, total number of junctions, total vessel length, and average vessel length (all P values < 0.001).

Conclusions: Biomarkers of choroidal neovascular complexity, such as fractal dimension, can be used to differentiate PNV from nAMD with or without SIPED.

P-RET-107

Rhegmatogenous retinal detachment: progression and characteristics of postoperative demarcation lines

M.J Potter^{1,2}, K. Brosh¹, A. Semionov¹, J. Hanhart¹

¹Ophthalmology, Shaare Zedek Medical Center, Hebrew University, Jerusalem, Israel, ²Dept. of Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: Little is understood about postoperative demarcation lines in rhegmatogenous retinal detachment and their progression over time.

Objectives: To report the infrared imaging characteristics of retinal detachment demarcation lines together with retinal detachment progression analysis.

Methods: This is a retrospective case series of 25 eyes of 24 patients who underwent Rhegmatogenous retinal detachment (RRD) repair and demonstrated a postoperative demarcation line on infrared (IR) imaging.

Results: RRD demarcation lines' hyperreflectivity was situated on the interdigitation-ellipsoid zone complex. These lines were more obvious on the early postoperative week but faded over time (average disappearance time 2.6 ± 2.9 months). The analysis of retinal detachment progression showed that superior RRDs progressed more than inferior RRDs (611μ Vs 122μ , $P=0.02$). Among superior RRDs, the temporal border progressed more than the nasal side (697μ Vs 426μ , $P=0.01$).

Conclusions: We conclude that RRD demarcation lines are distinct findings on IR imaging, appearing early, but diminishing relatively quickly. The reasons for their visibility in some cases and invisibility in others are not yet understood. Overall, this study presents insights into the characteristics of retinal detachment demarcation lines and their potential implications for understanding retinal detachment progression and subretinal-fluid migration. Further research is needed to uncover the mechanism of action and the variables influencing the formation of these lines.

P-RET-108

LSP represses retinal neovascularization with abnormal capillary and the NLRP3 inflammasome in hRECs and db/db Mice

J. Wei¹, J.G. Duan²

¹School of Ophthalmology, Chengdu University of Traditional Chinese Medicine, Chengdu, China,

²Ineye Hospital of Chengdu University of TCM, Sichuan Integrated Traditional Chinese and Western Medicine Myopia Prevention and Treatment Center, Sichuan Vision Protection Science Popularization Base, Chengdu, China

Introduction: Diabetic retinopathy (DR) is the most common and serious microvascular complication. Emerging evidence indicates that NLRP3 inflammation-induced retinal endothelial cell apoptosis and high VEGF expression contributed to retinal endothelial cell destruction and BRB damage, leading to retinal haemorrhage, exudation and macular oedema.

Objectives: In this article, we discussed the role of the NLRP3 inflammasome-mediated inflammation in apoptosis and aberrant vascular proliferation in db/db mice and human retinal microvascular endothelial cells (hRECs).

Methods: 10-week-old male db/db mice and male C57BL/6 wild type mice were used in this experiment. All mice were fed with normal chow diet and were randomly divided into 6 groups as follows: C57BL/6 wild type mice, db/db mice, db/db mice + LSP (50 mg/kg·d⁻¹), db/db mice + LSP (100 mg/kg·d⁻¹), db/db mice + LSP (200 mg/kg·d⁻¹), and db/db mice + Met (300 mg/kg·d⁻¹). Each group has 8 mice, and all mice were administered once daily for 6 weeks after intragastric administration. Apoptosis, inflammatory factors, protein expressions and cell morphology were detected by ELISA, immunohistochemical analysis, retinal staining, biochemical analysis and Western blot methods, respectively. 200 mM glucose was used to induce in human retinal endothelial cells (hRECs) and inflammatory response. After treatment of LSP, cell viability, inflammatory factors, apoptosis, protein expressions and cell morphology were detected by flow cytometry, Hoechst/PI and Western blot methods, respectively.

Results:

1. LSP ameliorates obesity, hyperglycemia, and hyperlipidemia in db/db mice.
2. LSP alleviates retinal vascular injury in db/db mice.
3. LSP inhibits the inflammatory response and improves TJs expression in db/db mice.
4. LSP inhibits cell apoptosis and VEGF expression in the retinal tissue of db/db mice.
5. In LSP inhibits HG-induced cell death in hRECs.
6. LSP suppresses the activation of NLRP3 inflammasome in HG-induced hRECs.
7. LSP inhibits cell apoptosis and VEGF expression in HG-induced hRECs.

Conclusions: In summary, the current study demonstrates that LSP ameliorates DR by inhibiting the NLRP3 inflammasome, cell apoptosis, and the abnormal retinal capillary neovascularization in HG-induced hRECs and db/db mice, which provides a sound scientific basis for the clinical application of LSP in the treatment of DR.

P-RET-109

Intravitreal bevacizumab in the management of traction without detachment in Retinopathy of Prematurity

B. Panchal¹, M. Ger¹, H. Kanisetty¹, T. Padhi², S. Jalali³, D. Agarwal¹

¹Vitreoretina, L V Prasad Eye Institute, Visakhapatnam, India, ²Vitreoretina, L V Prasad Eye Institute, Bhubaneswar, India, ³Vitreoretina, L V Prasad Eye Institute, Hyderabad, India

Introduction: Traction without detachment is a common complication in aggressive retinopathy of prematurity (AROP), potentially leading to vision loss if left untreated. While traditional management involved laser photocoagulation or surgery, recent studies have explored the potential of intravitreal anti-vascular endothelial growth factor (VEGF) therapy. This study aimed to evaluate the efficacy and safety of intravitreal bevacizumab in managing traction associated with AROP without retinal detachment

Objectives: The role of intravitreal bevacizumab in the treatment of traction associated with retinopathy of prematurity.

Methods: We reviewed eight cases of aggressive retinopathy of prematurity referred to the tertiary care center from January 2023 to December 2023 for the management of Aggressive Retinopathy of Prematurity (AROP) with plus disease with a tractional component. Cases were managed with a single half-dose intravitreal injection of bevacizumab at presentation. We describe the clinical features and progress of these cases.

Results: Fourteen of the 16 eyes had significant traction without detachment in AROP. The mean gestational age was 30.75 weeks (28-34 weeks) and birth weight was 1.36 kg (1.1 -1.6 kgs). Post menstruation age (PMA) at the time of presentation was 38.25 weeks (35-39 weeks). All cases had a significant history of oxygen administration during their hospital stay. 7 of the 8 cases were AROP, one case had pre-plus in Zone 2 Stage 3. Traction of more than 2 clock hours up to 6 clock hours was noted in all cases. Post a single half dose of intravitreal bevacizumab, regression of ROP to mature or near mature retina was observed in all cases. The mean follow-up duration was 3.42 months (1-6 months) post injection. One eye was observed to have a notch of the immature retina with persistent traction at month 6. None of the cases had a recurrence of ROP. Laser photocoagulation or surgical intervention was not required in any of the cases.

Conclusions: Traction in ROP was successfully managed with a single injection of half-dose intravitreal bevacizumab. Only one eye of the 14 eyes had persistent traction over a follow-up of 6 months. Close observation following intravitreal bevacizumab without surgical intervention can be attempted to manage cases with traction without detachment in ROP.

P-RET-110

***In Vivo* Eye Imaging Reveals Novel Retinal Insights into ALS Progression and Sex Differences in Mice**

F. Khorrami^{1,2}, *N. Gupta*^{1,2,3,4}, *X. Zhou*¹, *Y. Liang*⁵, *Y. Yu*^{1,2,4,3,6}

¹Keenan Research Centre for Biomedical Science, Unity Health Toronto. St. Michael's Hospital, Toronto, Canada, ²Department of Laboratory Medicine and Pathobiology, University of Toronto, Toronto, Canada, ³Department of Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada, ⁴Department of Ophthalmology & Vision Sciences, University of Toronto, Toronto, Canada, ⁵Department of Mathematics, Toronto Metropolitan University, Toronto, Canada, ⁶Institute of Biomedical Engineering, Science and Technology (iBEST), St. Michael's Hospital, Toronto Metropolitan University, Toronto, Canada

Introduction: The quest for non-invasive imaging biomarkers to detect axonal pathology in amyotrophic lateral sclerosis (ALS) remains unfulfilled. Prior research identified axonal spheroids, indicative of altered axonal transport, in the retinal nerve fiber layer (RNFL) of post-mortem retinas of ALS patients.

Objectives: This study aims to determine if a mouse model of ALS exhibits a retinal phenotype that increases over time through eye imaging.

Methods: We clinically monitored SOD1G93A mice (n = 28, 10 males/18 females) and age-matched controls (n = 28, 10 males/18 females), at 8 weeks of age for a duration of 12 weeks. Longitudinal *in vivo* retinal imaging was conducted every two weeks using Infrared Reflectance (IR-815 nm) and Blue Reflectance (BR-486 nm) fundus imaging, and Optical Coherence Tomography (OCT-870 nm) (Spectralis, Heidelberg Engineering). Hyperreflective puncta within the RNFL identified via IR-cSLO and confirmed with OCT were quantified. At 20 weeks, mice were euthanized, and wholemount retinas were processed for immunofluorescence staining with markers for axons (phosphorylated neurofilament, P-NF) and mitochondria (voltage-dependent anion channel 1/2, VDAC1/2). Statistical analysis was conducted using Generalized Linear Mixed Models (GLMMs).

Results: Hyperreflective puncta localized to the RNFL were observed in both female and male ALS mice via *in vivo* IR-cSLO and OCT. The number of puncta in ALS mice significantly increased over the study period ($p < 0.001$), with ALS mice exhibiting significantly more puncta at 20 weeks compared to controls (mean \pm SD: 5.2 ± 7.2 vs 0.9 ± 1.8 , $p < 0.001$). Female ALS mice displayed a significantly higher puncta count than female control mice (7.2 ± 8.3 vs 0.6 ± 0.9 , $p < 0.01$), and male ALS mice had significantly more IR-puncta than male control mice (1.6 ± 1.7 vs 0.6 ± 0.5 , $p < 0.05$). There was no correlation between clinical scores and puncta count. Immunofluorescence staining revealed the presence of P-NF-positive axonal spheroids in the RNFL and a pronounced VDAC1/2 signal in ALS retinas, with no colocalization observed in axonal spheroids.

Conclusions: Longitudinal *in vivo* imaging has uncovered a novel, progressive, and sex-dependent retinal phenotype in SOD1G93A mouse, characterized by RNFL axonal pathology. These findings underscore the potential of eye imaging as a valuable, non-invasive biomarker for ALS, offering prospects for early detection, monitoring disease progression, and evaluating treatment efficacy in clinical trials.

P-RET-112

Torpediatric! The youngest reported case of torpedo maculopathy with secondary macular neovascularisation

J. Cuthbertson¹, U. Mulla¹

¹Department of Ophthalmology, University Hospital Hairmyres, East Kilbride, United Kingdom

Introduction: Torpedo maculopathy (TM) is largely considered a benign and asymptomatic condition. Only 5 cases with associated macular neovascularisation (MNV) have been reported. Most cases have been reported in adults. Only 4 cases have been treated with intravitreal anti-vascular endothelial growth factor therapy. Here, we present the youngest reported patient with this rare condition and even rarer complication over the course of a 3 month follow up following treatment.

Objectives: To report the visual and anatomical outcomes of the treatment of MNV as a complication of TM in the youngest known patient, a 12 years old female.

Methods: Single patient case report. Visual acuity was measured at presentation and at monthly intervals thereafter following prompt single intravitreal injection of ranibizumab to the affected eye. OCT-angiography was undertaken during the first visit in order to confirm the diagnosis. Macula OCT was taken at each visit. Historical visual acuity and previous macula OCTs were retrospectively collected from the patients community optometrist.

Results: The patient was reviewed routinely by her community optometrist 6 weeks prior to onset of symptoms. BCVA OU 0.0LogMAR. 6 weeks after routine optometrist review, she developed sudden onset central scotoma and metamorphopsia affecting her right eye. She was referred to our department and reviewed as an emergency. At review, BCVA OD CF. Clinical examination, OCT, and OCT-angiography confirmed the diagnosis of TM with secondary MNV. A single intravitreal injection of ranibizumab was injected to the affected eye. Monthly follow up showed BCVA OD improve to 1.08LogMAR month 1; 0.96LogMAR month 2; 0.86LogMAR month 3; with ongoing subjective improvement in quality of vision. OCT confirmed resolution of indicators of activity. There were no complications as a result of treatment. The left eye was unaffected.

Conclusions: The case is unique: this is the youngest reported case of TM with secondary MNV. Successful treatment of the MNV with a single dose of intravitreal ranibizumab is demonstrated functionally with gains in visual acuity and anatomically with improvement in clinical and OCT appearances. This adds to the literature of this rare condition and demonstrates the effectiveness of treatment in an even rarer paediatric case.

P-RET-113

Changes in Vision-related quality of life following anti-VEGF therapy for diabetic macular edema

S. Morikawa¹, Y. Sugiura¹, T. Murakami¹, F. Okamoto², T. Oshika¹

¹Department of Ophthalmology, Faculty of Medicine, University of Tsukuba, Tsukuba, Japan,

²Department of Ophthalmology, Nippon Medical School, Tokyo, Japan

Introduction: Diabetic macular edema (DME) is one of the complications of diabetes. DME often impairs visual functions and could affect the quality of life of patients. However, few studies have elucidated the quality of life of patients with DME

Objectives: To assess the vision-related quality of life (VR-QOL) following intravitreal aflibercept (IVA) for DME and to evaluate subscale items of the VR-QOL.

Methods: In this prospective observational multicenter study, 20 patients who underwent IVA treatment for DME and 29 age-matched healthy subjects were selected. The 25-item National Eye Institute Visual Function Questionnaire (VFQ-25) and best-corrected visual acuity (BCVA) were examined before and at 3, 6, and 12 months after treatment.

Results: The VFQ-25 composite score significantly improved from 3 to 12 months after IVA treatment ($P < 0.05$). Subscales of "general vision", "ocular pain", "near activities", "distance activities", and "role difficulties" significantly improved after treatment ($P < 0.05$). The VFQ-25 composite score and all subscales score except "ocular pain" in patients with DME were significantly lower than those in healthy subjects before and after treatment. The VFQ-25 composite score before treatment was not associated with BCVA in the affected eyes, but was associated in the better eyes ($P < 0.05$). The VFQ-25 composite score at 3 months after treatment was significantly correlated with BCVA in both affected eyes and better eyes ($P < 0.05$).

Conclusions: The VR-QOL of patients with DME improved with IVA treatment but remained worse than in healthy group. The VR-QOL before and after treatment were correlated with BCVA of better eyes.

P-RET-114

Genes and mutations involved in retina dystrophies

*D. Porras Jui*¹

¹Guatemala, Delia Porras, Guatemala, Guatemala

Introduction: Inherited retinal diseases (IRD) are a heterogeneous group of visually debilitating diseases caused by a pathogenic variation in proteins critical to retinal function.

Objectives: Early and accurate diagnosis is necessary for people with IRD to enable patient decision-making, identify appropriate clinical studies, treatment opportunities and improve patient outcomes.

Methods: A literature review was performed in the PUBMED and MEDLINE databases with the following MeSH terms: Inherited Retinal Diseases, mutations, molecular diagnosis. Search filters were used to obtain studies known as clinical or multicenter trials, observational and review studies.

Results: IRDs follow simple inheritance patterns (autosomal dominant, autosomal recessive, X-linked and mitochondrial) and are associated with mutations in 280 genes. The complex molecular basis of IRDs reflects an equally heterogeneous range of clinical phenotypes, which vary in terms of cell/tissue type involvement, disease onset, severity and progression.

Conclusions: The recognition of these mutations and their appropriate applicability in clinical practice represent an extraordinary breakthrough in the approach to this pathology.

P-RET-115

Evaluation of the effects of silicone oil on the macula with OCT in patients with rhegmatogenous retinal detachment

N. Kanchanaranya¹, V. Ou Vong¹, V. Leng¹, K. Kityarak¹

¹Thammasat University, Pathumthani, Thailand

Introduction: In vitreoretinal surgery, silicone oil used as an intraocular tamponade for better success rate. Using silicone oil as over an extended period of time may cause issues. Despite macula is attached, the visual outcomes are not always good. We would like to investigate the change of macula at various time points.

Objectives: The effects of silicone endotamponade duration on the macula were evaluated in patients with rhegmatogenous retinal detachment.

Methods: Total 110 cases with rhegmatogenous retinal detachment that underwent pars plana vitrectomy and silicone endotamponade were included in the study. All cases were classified in three groups according to the duration of silicone tamponade: ≤ 3 months, 3-6 months, and ≥ 6 months. All cases were evaluated at 1 month after silicone removal in terms of intraretinal pathologies in the macula by using spectraldomain optical coherence tomography (SD-OCT).

Results: In this study, 34 (30.91) % of the patients were female and 76 (69.09%) were male. The mean age of the patients was 54.62 ± 14.42 years (19-77); the mean follow-up time was 8.79 ± 2 months (6-12). The mean

duration of silicone tamponade was 6.56 ± 2.74 months (2-12). There was a significant increase in central foveal thickness after silicone removal in eyes 1 month after silicone oil intake ($p=0.0049$ for ≤ 3 months, 0.0002 for 3- 6 months, $p=0.0004$ for ≥ 6 months). The prevalence of cystoid macular edema before and after silicone removal was also significantly higher in the eyes with silicone duration of 3-6 months or longer ($p<0.001$).

Conclusions: The structural alterations in the macula of eyes that have silicone endotamponade could vary depending on how long the silicone oil stays inside the eye.

P-RET-116

Rare manifestation of HSV1 bilateral occlusive vasculitis. Clinical features, multimodal imaging and treatment outcomes

I. Chranioti¹, N. Markomichelakis², F. Tsapardoni¹, M. Kanakis¹, M. Tranou³, P. Tranos³, V. Kozobolis¹, P. Stavrakas¹

¹Ophthalmology, University of Patras, Patras, Greece, ²Ocular Inflammation Institute of Athens, Athens, Greece, ³Ophthalmica Eye Institute, Thessaloniki, Greece

Introduction: Herpes simplex virus (HSV) is a group of viruses divided in two types, 1 and 2, depending on the area of the body that is affected. HSV 1 is more relevant to oral infections while HSV 2 is more associated to genital ulcers. Both types can cause various ocular manifestations such as blepharitis, conjunctivitis, keratitis, uveitis and retinitis- acute retinal necrosis.

Objectives: To present a rare case of a 52-year-old immunocompetent male with bilateral occlusive vasculitis due to HSV-1, clinical course and treatment outcomes.

Methods: We report this single case using multimodal imaging, PCR testing along with clinical investigations and laboratory tests. A multidisciplinary approach was adopted.

Results: A 52 year old immunocompetent male presented with sudden visual loss of 3 days duration. VA on admission was counting fingers (CF) bilaterally (OU). Slit lamp biomicroscopy revealed mild AC reaction with normal IOP (OU). Fundus examination, FFA and OCT-angiography showed severe retinitis and occlusive vasculitis including both arteries and veins localized at the posterior pole along with optic disc swelling, more pronounced in the right eye (RE>LE). SD-OCT depicted a complete disorganization of all retinal layers. Polymerase chain reaction (PCR) of aqueous humor sample confirmed the presence of HSV-1 DNA. Based on these results, the patient was diagnosed with bilateral HSV-1 retinitis and was treated with systemic antiviral agents and high dose methylprednisolone. At 2 months follow-up, VA was counting fingers in the right eye and 20/400 (Snellen) in the left eye. Ischemia with subretinal fluid was still present at the posterior pole in the RE while a complete absence of the photoreceptors layer at the fovea was established in the LE.

Conclusions: Although studies have shown that HSV retinitis tend to occur in immunocompromised patients and unilaterally, in this case we highlight the bilaterality of the infection, the catastrophic sequelae on retinal architecture and the consequent severe impact on visual acuity even if prompt diagnosis and treatment is commenced

P-RET-117

Bilateral optic atrophy and epiretinal membranes: an unusual presentation of ocular tuberculosis

*Y.O. Babalola*¹

¹Department of Ophthalmology, University of Ibadan/ University College Hospital, Ibadan, Nigeria

Introduction: Ocular tuberculosis, a form of extrapulmonary tuberculosis may affect all ocular structures and manifest in various patterns. These include multifocal choroiditis, retinal vasculitis, tuberculomas, optic neuritis and retrobulbar neuritis to mention a few. Atypical presentations are not uncommon.

Objectives: To describe an unusual presentation of ocular tuberculosis with bilateral optic atrophy, choroidal tubercles and epiretinal membrane.

Methods: A case report. A 15-year old boy who presented to the retina clinic with a six-year history of poor vision in both eyes worse in the right eye and ocular pain at onset worse with eye movements.

Results: The best corrected visual acuity was 6/12 and 6/6 in the right and left eye respectively. The anterior segment examination was essentially normal except for a relative afferent pupillary defect in the right eye. A binocular indirect ophthalmoscopy of both eyes revealed a cup disc ratio of 0.3, distinct margins with disc pallor worse in the right eye, epiretinal membranes. Yellowish chorioretinal lesions suspicious for tuberculous choroidal tubercles were present at the posterior pole in both eyes. Ghost vessels were seen in the right eye. A positive history of tuberculosis in the father and younger brother was elucidated from the mother due to the chorioretinal findings. The chest x-ray was within normal limits, erythrocyte sedimentation rate was 10mm/hr. Mantoux test was 10mm by 11mm. Gene xpert was negative for tuberculosis. Optical coherence tomography scans confirmed the presence of epiretinal membranes with back-shadowing of the choroidal lesions. Central visual fields showed constriction worse on the right. Cranial computerized tomography scan at initial presentation was within normal limits. A diagnosis of bilateral optic atrophy secondary to tuberculous optic neuritis with epiretinal membranes was made. He was referred to the infectious disease unit for definitive management.

Conclusions: Bilateral optic neuropathy as a sequel of tuberculous optic neuritis may be a presenting feature of tuberculosis. The epiretinal membranes may be a sign of the prior ocular inflammation from tuberculosis. Ocular tuberculosis may present in a myriad of patterns. A high index of suspicion is key to making a prompt diagnosis.

P-RET-119

Indications and visual outcome of intravitreal bevacizumab injection at the Presbyterian Eye Hospital Acha Douala

G. Koki¹, J. Awum², A. Nchifor², F. Ngounou³, E. Attha⁴, I. Siben⁵, E. Nche²

¹Ophthalmology-ENT-Stomatology, University of Yaounde 1/Second Region Military Hospital, Douala, Cameroon, ²Ophthalmology, Presbyterian Eye Hospital Acha Douala, Douala, Cameroon, ³Ophthalmology, Presbyterian Eye Hospital Acha Bafoussam, Bafoussam, Cameroon, ⁴Ophthalmology, Presbyterian Eye Hospital Acha Yaounde, Yaounde, Cameroon, ⁵Ophthalmology, Presbyterian Eye Hospital Acha Bamenda, Bamenda, Cameroon

Introduction: Anti-VEGF treatment in the management of macular edema and ocular neovascularization has improved visual outcomes. Intravitreal injection of anti-VEGF agents has become the new standard of care for retina neovascular diseases. However, data on the eye indications and visual outcome in African eye care settings and Cameroon in particular is very scarce.

Objectives: 1. To assess the visual outcome post intravitreal Bevacizumab (IVA) injection
2. To identify the indications for intravitreal Bevacizumab injection in our milieu.

Methods: A retrospective analysis of medical records of patients who received intravitreal bevacizumab or Avastin (IVA) injections at the center from January 2020 to December 2021. The main outcome measure was visual acuity (VA) and a gain in one line on Snellen chart was considered as improvement in VA.

Results: The study included 186 eyes of 150 study participants with an average age of 59 years who had received intravitreal Avastin injections during the study period. VA improved from less than 6/60 (approximate < 35 ETDRS letters) at baseline to greater than 6/12 (approximate ≥70 ETDRS letters) within 2 months follow-up and improvement was maintained up to 6 months. Some common indications for injection included non-proliferative diabetic retinopathy with macular edema (22.0%), proliferative diabetic retinopathy with macular edema (13.4%), proliferative diabetic retinopathy (12.4%), central retinal vein occlusion (9.1%), branch retinal vein occlusion (9.1%) and wet age-related macular degeneration (3.0%). The compliance rate reduced from the first month to the sixth month with only 8 patients attaining successive monthly injections at 6 months. No major complication was noted.

Conclusions: Patients who received IVA as initial therapy for specific retina diseases had a significant VA improvement.

Keywords: Intravitreal injection, Bevacizumab, Visual acuity

P-RET-121

Clinical observation of conbercept on the improvement of diabetic retinopathy severity

R. Dai¹, Y. Zhou¹, Z. Chen¹, E. Ding², E. Ding²

¹Peking Union Medical College Hospital, Beijing, China, ²Handan Aiyan Ophthalmology Hospital, Handan, China

Introduction: Conbercept is a newly developed anti-VEGF drug, and like aflibercept, it has a high affinity for all VEGF isoforms and placental growth factors. As the effect of conbercept on DRSS is still a blank, herein we retrospectively analyzed a series of cases to explore the effect of conbercept on DRSS as well as the visual acuity and central retinal thickness.

Objectives: To evaluate the effect of conbercept on diabetic retinopathy severity scale (DRSS) as well as the best-corrected visual acuity (BCVA) and central retinal thickness (CRT) in diabetic retinopathy (DR) patients.

Methods: We retrospectively recruited 25 patients (30 eyes) diagnosed with DR and received an initial intravitreal conbercept (IVC) injection followed by as-needed therapy. The main outcome measures were the proportions of patients whose DRSS level improved by 2 steps or more at the last visit. The secondary outcome measures were BCVA and CRT changes.

Results: At the last visit, DRSS showed improvement by 2 steps or more in 14 eyes (46.67%) and 1 or more steps in 22 eyes (73.33%). The PRP group got better regression on DRSS by 2 steps or more in 5 eyes (50%) compared with the non-PRP group in 9 eyes (45%). The PDR group got better regression on DRSS by 2 steps or more in 10 eyes (50%) compared with the NPDR group in 4 eyes (40%). Compared with the initial visit, the BCVA improved from 0.61 ± 0.34 logMAR to 0.56 ± 0.48 logMAR ($P = 0.353$), and the CRT decreased from $364.06 \pm 169.44\mu\text{m}$ to $343.52 \pm 144.09 \mu\text{m}$ ($P = 0.080$) in the final visit.

Conclusions: Conbercept showed good performance in the improvement of diabetic retinopathy severity, especially in PDR patients or combined with PRP.

P-RET-122

Microorganisms and antibiotic sensitivity in endophthalmitis at a tertiary referral center in China over three decades

W. Zhang¹, H. Chen¹, Y. Chen¹

¹Ophthalmology, Peking Union Medical College Hospital, Beijing, China

Introduction: Endophthalmitis is an intraocular infectious disease that seriously threatens vision. Exploring trends in microorganisms and their antibiotic susceptibility is useful to guide changes in our empirical treatment of endophthalmitis or to confirm current protocols. This article summarized the distribution of pathogens and their susceptibility to antibiotics over the past 30 years at a tertiary clinical referral center in China. It confirmed the current antibiotic treatment patterns and provided potential candidate intravitreal antibiotics specifically for gram-positive and gram-negative bacteria.

Objectives: To identify the culture-positive pathogen profiles and antibiotic sensitivity in endophthalmitis.

Methods: Patients with endophthalmitis hospitalized in Peking Union Medical College Hospital were reviewed. The culture-positive pathogens and antibiotic susceptibility results were recorded, and the trend of sensitivity of gram-positive cocci to fluoroquinolones was analyzed.

Results: A total of 43 gram-positive cocci, 24 gram-negative bacilli and 24 fungi were recorded. All gram-positive cocci were sensitive to imipenem, teicoplanin, vancomycin, rifampicin and tigecycline. The sensitivity to linezolid was 96.88%, and the sensitivity to ciprofloxacin, levofloxacin and moxifloxacin were 42.86%, 57.14% and 60.0%, respectively. The resistance of gram-positive cocci to fluoroquinolones increased significantly after 2005 (11.8% vs 45.9% $P=0.021$), and in people over 55 years of age (11.1% vs 58.3% $P=0.018$). More than 80% of gram-negative bacteria were sensitive to amikacin, aztreonam and 3rd generation cephalosporins. More than 90% of gram-negative bacteria were sensitive to carbapenems and fluoroquinolones. The amount of multidrug resistance (MDR) in gram-positive bacteria was significantly higher than that of gram-negative (72.1% vs 20.8% $P<0.001$). For fungi, the median minimum inhibitory concentration (MIC) of fluconazole, 5-flucytosine, voriconazole, itraconazole, and amphotericin B were 1 μ g/mL (range, 1–16), 4 μ g/mL, 0.06 μ g/mL (range, 0.016–3), and 0.23 μ g/mL (range, 0.016–32), and 0.5 μ g/mL (range, 0.032–32), respectively.

Conclusions: Vancomycin and ceftazidime are still excellent empirical antibiotics for the treatment of endophthalmitis. The increasing resistance of gram-positive cocci to fluoroquinolones poses a challenge to topical antibiotic prophylaxis.

P-RET-123

Effectiveness of aflibercept in the treatment of nAMD and related prognostic factors influencing the drug efficacy

L. Yuan¹, L. Shen¹, Z. Hua¹

¹Ophthalmology, The First Affiliated Hospital of Kunming Medical University, Kunming, China

Introduction: The selection of the treatment plan, the effect of aflibercept, and the selection of clinical indicators in predicting nAMD have become challenged that need to be addressed urgently. This study aimed to select the 3+PRN regimen to evaluate the clinical efficacy of intravitreal injection of aflibercept in the treatment of neovascular age-related macular degeneration and analyze the factors that may influence the treatment effect.

Objectives: This study aimed to evaluate the effectiveness of aflibercept in the treatment of neovascular age-related macular degeneration and analyze the factors influencing the drug efficacy and improvement in vision.

Methods: This was a retrospective analysis. From July 2019 to July 2021, thirty-three eyes of patients with neovascular age-related macular degeneration (nAMD) were followed for 6 months. Initially, all patients received three monthly intravitreal injections of 0.05 mL of aflibercept (2 mg) followed by a pro re nata (PRN) regimen. We documented the patient's age, sex, best-corrected visual acuity (BCVA), and the times of injections. Besides, at baseline, 1, 2, 3, and 6 months, the data on the variables such as central retinal thickness (CRT), subretinal hyperreflective material (SHRM), ellipsoid zone (IS/OS), and outer membrane (ELM) using optical coherence tomography (OCT) were obtained. Fundus photography was carried out to check for macular hemorrhage.

Results: During the follow-up period, the BCVA and CRT at 1, 2, 3, and 6 months were significantly improved than the baseline respectively ($P < 0.05$). CNV type II, the existence of ELM discontinuity, and the presence of scarring and SHRM were associated with worse BCVA. Additionally, eyes without ELM discontinuity, SHRM, and scarring were associated with the improvement of 3- or 6-month BCVA. The CNV type II, presence of SHRM, and ELM discontinuity were strongly associated with scarring.

Conclusions: These results suggested that intravitreal aflibercept was safe and effective in the treatment of neovascular age-related macular degeneration. Factors such as ELM continuity, scarring, and SHRM influenced the improvement in visual acuity, and scarring was associated with the CNV type, ELM integrity, and SHRM.

P-RET-124

A case of ocular toxoplasmosis misdiagnosed as acute retinal necrosis syndrome

Y. Wang¹, F. Luan¹, Y. Tao¹

¹Affiliated Beijing Chaoyang Hospital of Capital Medical University, Beijing, China

Introduction: Ocular toxoplasmosis is relatively rare, and the clinical manifestations are easy to be confused with viral retinopathy such as ARN or other infectious retinopathy.

Objectives: To report a previous case of acute retinal necrosis syndrome (ARN), and then diagnosed with ocular toxoplasmosis by intraocular fluid test. This report aims to provide clinical experience and guidance for the diagnosis and treatment of infectious eye diseases such as toxoplasmosis.

Methods: Retrospective analysis of a case of ocular toxoplasmosis misdiagnosed as ARN was performed. The patient was a young and middle-aged male. The main reason was that the visual acuity of the left eye had decreased for more than 2 months, and it became worse for 1 week. Physical examination: Vision: OD 0.8, OS 0.05. OD: corneal KP (+), deep anterior chamber, Tyn (+), floating cell > 50/vision, large pupil dilated, moderate glass turbidity, gray-white lesions, vascular white sheath and local old laser spots on the upper retinal fundus; OS: no obvious abnormalities were found in the anterior section and fundus. Previous history: The history of uveitis in the left eye was more than 10 years. The left eye was diagnosed with ARN two months ago, and had performed vitreous cavity injection (vancomycin, ganciclovir, ozurdex) three times two months ago. Wide-angle fundus photography, OCT examination, toxoplasma antibody, virus and inflammatory factor detection in intraocular fluid, toxoplasma gondii and Bartonella antibody detection in peripheral blood were performed.

Results: The test results of intraocular fluid and serum showed: both vitreous fluid CMV, HSV, EBV and VZV were negative; intraocular fluid: toxoplasma IgG 320.24 IU/ml, Serum Toxoplasma IgG 158.27 IU/ml, Goldmann-Witmer coefficient: 81.32. Combined with clinical manifestations and intraocular fluid and serum test results, the diagnosis of ocular toxoplasmosis in the left eye was clear. Sulfamethoxazole and trimethoprim were given orally, and prednisolone and compound tropicamide were given topical treatment. After Two months' treatment, the visual acuity of the left eye improved to 0.5, the anterior chamber and vitreous inflammatory reaction was significantly reduced compared with the previous, and the area of the gray-white lesions on the upper retina was significantly reduced. Since follow-up, there has been no recurrence.

Conclusions: The reasonable use of intraocular fluid detection can assist the diagnosis can avoid misdiagnosis and mistreatment to a certain extent.

P-RET-125

Analysis of factors affecting the development of visual axis in different clinical types of PFV before and after surgery

M. Yuan¹, S. Li¹, J. Liu¹, G. Deng¹, L. Li¹, J. Ma¹, T. Wang¹, H. Lu¹

¹Ophthalmology, Beijing Tongren Eye Center, Beijing Tongren Hospital, Capital Medical University, Beijing, China

Introduction: Persistent fetal vasculature (PFV) is a congenital eye condition that occurs due to abnormal development of the eye's vascular system during fetal development. It primarily affects the vitreous body and the structures associated with the anterior chamber angle, ciliary process, lens, retina, and optic nerve. These changes can affect the growth and development of the eye, potentially resulting in variations in axial length (AL).

Objectives: To analyze the factors affecting the development of visual axis in a retrospective case series of different clinical types of PFV before and after surgery.

Methods: We analyzed 58 eyes (58 patients) referred for ophthalmology consultation diagnosed as monocular PFV in our clinic between 2019 and 2022, retrospectively. All eyes underwent lensectomy, posterior capsulectomy and vitrectomy with cauterization of persistent fetal vasculature under general anesthesia. AL, clinical manifestations, clinical classification and surgical approach of these patients were documented. The follow-up period was 21.95 ± 11.37 months (range: 12 to 48 months).

Results: 58 patients (100%) were younger than 1 year old at presentation and surgery. Before surgery, AL of the affected eye with anterior PFV was shorter than the fellow eye ($t=2.929$, $P=0.006$). Also, AL of the affected eye with corneal opacity ($t=15.000$, $P=0.042$), posterior synechia ($t=2.163$, $P=0.040$), retinal detachment ($t=2.929$, $P=0.006$) or morning glory syndrome ($t=3.498$, $P=0.00$) were shorter than the fellow eye. However, AL of the affected eye with rupture of posterior lens capsule ($t=-3.134$, $P=0.010$) was longer than the fellow eye. At last follow-up time, the affected eye without enlarged ciliary processes ($t=-2.320$, $P=0.031$), without rentrolental vascularized membrane ($t=-2.321$, $P=0.030$) or without rupture of posterior lens capsule ($t=-2.073$, $P=0.044$) before operation, could have a significantly longer increase in AL than the fellow eye. 12.07% of eyes with PFV had poor eye growth. Young age at presentation in PFV was a risk factor for poor eye growth after surgery (OR=11.62, 95% CI 1.20 - 112.46, $P=0.034$).

Conclusions: In the context of PFV, the AL of the affected eye can be influenced by the age of onset, structural abnormalities and clinical classification. Complicated cataract at a young age was a risk factor for poor eye growth in PFV. Timely surgery treatment for eyes with PFV could result in better eye growth.

P-RET-126

Monoclonal antibody fragment (brolucizumab) in the treatment of neovascular age-related macular degeneration

A. Yusupov¹, M. Karimova¹, D. Makhkamova¹, Z. Khodjaeva¹

¹Ophthalmology, Republican Specialized Scientific and Practical Medical Center for Eye Microsurgery, Tashkent, Uzbekistan

Introduction: The neovascular form of AMD is characterized by rapid progression, leading to irreversible vision loss, and the therapeutic window for starting treatment is 12 months. The development of the wet form of AMD is the increased formation of a protein-co cystic endothelial growth factor (VEGF-A)

Objectives: To establish the optimal dosage regimen for intravitreal administration of anti-VEGF therapy (Brolucizumab) for neovascular age-related macular degeneration, depending on the height of the edema and the extent of the pathological process.

Methods: The study included 48 patients diagnosed with nAMD. There were 31 men and 17 women. The age was an average of 61 ± 3.2 years. Depending on the amount of drug administration, patients were divided into 3 main groups. Group I consisted of 16 patients, to whom the drug was administered 1 time. There were 15 patients in group II - was administered the drug 2 times (with interval 1 month). Groups 1 and 2 included patients who, for various reasons (health status, family circumstances, patient non-compliance with treatment, financial difficulties) were unable to receive the required 3 monthly injections/ The III group included 17 patients, in this category of patients the drug was administered 3 times.

Results: According to the data obtained, the effectiveness of treatment was observed in all patients. VA in patients of group I before treatment was 0.13 ± 0.05 ($p < 0.05$), in group II 0.11 ± 0.06 ($p < 0.05$), and in group III 0.08 ± 0.04 ($p < 0.05$). After 4 weeks, VA in patients of group 1 was within the range of 0.44 ± 0.06 ($p < 0.05$); in the II group, visual acuity was 0.48 ± 0.07 ($p < 0.05$), and in patients of the III group, VA increased to 0.51 ± 0.05 ($p < 0.05$). When performing OCT with angiography, the average retinal thickness before treatment in patients of group 1 was 428.2 ± 11.3 ($p < 0.05$) μm , in group II 513.2 ± 21.1 ($p < 0.05$) μm , and group III 587.2 ± 17.3 ($p < 0.05$) μm . 4 weeks after the average retinal thickness in patients of group I was 231.2 ± 9.1 ($p < 0.05$) μm ; in the II group, the average retinal thickness was within 238.2 ± 11.3 ($p < 0.05$) μm ; and in patients of group III the average retinal thickness decreased to 218.2 ± 12.3 ($p < 0.05$) μm .

Conclusions: Thus, the use of the drug Brolucizumab significantly improves the visual functions of patients with neovascular AMD, as well as the morphological state of the retina in this pathology, which allows not only to maintain, but also to improve visual acuity, improve the quality of life of patients and prevent blindness and visual disability in patients.

P-RET-127

Visual function and retinal displacement after macular hole surgery

S. Tsukahara¹, A. Takeyama¹, M. Ishida¹

¹Department of Ophthalmology, Toho University Ohashi Medical Center, Tokyo, Japan

Introduction: Metamorphopsia is an important visual symptom of idiopathic macular hole (MH). Patients with MH complain of metamorphopsia even after MH closure postoperatively.

Objectives: To investigate the relationships between visual acuity, metamorphopsia, and retinal structural changes before and after surgery for MH.

Methods: Twenty-eight eyes of 27 patients with MH who underwent vitrectomy with internal limiting membrane (ILM) peeling between April 2020 and March 2023 and were followed up for at least 6 months postoperatively were enrolled. Eyes with high myopia, underwent the inverted ILM flap technique, and ocular complications that may have affected visual function were excluded.

Metamorphopsia before and after surgery was measured with M-CHARTS. The preoperative MH diameters were measured using optical coherence tomography (OCT). The distances between the intersections of two sets of retinal vessels located vertically or horizontally near and distal to the central fovea were measured on OCT angiography images. Retinal displacement was calculated as rate of change in retinal distance after surgery.

Results: Vertical metamorphopsia improved significantly at 1 and 6 months after surgery, and horizontal metamorphopsia improved significantly at all visits. Preoperative metamorphopsia and the difference in the pre- and postoperative metamorphopsia did not correlate with retinal displacement and the basal MH diameter. Retinal displacements at all visits were significantly greater near the central fovea than distal to the fovea ($p < 0.001$). Retinal displacement at 1 month and 6 months after surgery correlated with the vertical and horizontal basal MH diameter (p and r value range: $p = 0.004$ to 0.026 , $r = -0.419$ to -0.524).

Conclusions: Metamorphopsia improved after MH surgery but was not correlated with retinal displacement. Retinal displacement near the central fovea after surgery was greater than that distal to the fovea and was correlated with the MH diameter, suggesting that retinal movement near the central fovea is related to MH closure.

P-RET-128

Pigmented paravenous retinochoroidal atrophy (PPRCA)

*B. Sarungham*¹

¹Retina, Wangkhei Eye Hospital, Imphal, India

Introduction: Pigmented Paravenous Retinochoroidal Atrophy (PPRCA) is a rare disorder of unknown etiology. The disease is characterized by pigment accumulation along the distribution of retinal veins with retino choroidal atrophy. The findings are usually incidental with minimal effect on vision. The diagnosis is made with a clinical examination due to the peculiar retinal findings.

Objectives: To report a rare case of Pigmented Paravenous Retinochoroidal Atrophy in a young girl.

Methods: Case report.

Results: A 14 years old girl who came for routine eye check-up for refractive error with no other complaints was found to have a peculiar pigmentation along the distribution of retinal veins on fundus examination in both her eyes. The findings were incidental and there were no symptoms related to the findings. She had refractive error in both her eyes with best corrected visual acuity of 6/6, N6. Colour vision with Ishihara's chart was normal in both eyes. Slit lamp examination was normal in the anterior segment and without any signs of inflammatory responses of the retina and vitreous body. External examination and ocular motility were unremarkable. Physical examination showed no abnormalities and no significant medical history. Fundus examination revealed greyish retinochoroidal atrophic and pigment clumping lesions along the retinal vein bilaterally. No changes were observed in both optic nerve heads and in the caliber of the retinal vessels. Visual field test and Fundus Fluorescein Angiography was not done as the patient was a minor of 14 years.

Conclusions: The etiology of PPRCA remains unknown with a presumed initial inflammatory insult that leads to the slow developmental of the retinal findings. Many inflammatory and infectious causes have been associated with the disease, including sarcoidosis, Behcet's disease, syphilis, measles, rubeola, and tuberculosis. However, no known systemic diseases have been identified as the cause of the retinal findings. The disease is more common in males than females in the reported literatures. There have been a few cases of familial occurrence, but currently no known genes have been identified with the disease. Recently, a mutation in gene CRB1 has been detected in patients with PPRCA. This gene is involved in various retinal dystrophies. PPCRA is an incidental finding, and the patient's vision is rarely affected.

P-RET-129

Tuberculosis moves in mysterious ways: an ocular tuberculosis case series

M.C.A. Buscayno¹, V.V. Ocampo¹

¹Ophthalmology, Ospital ng Maynila Medical Center, Manila, Philippines

Introduction: Tuberculosis (TB) is a significant public health challenge in the Philippines and is the 4th contributor to global TB cases. While TB commonly manifests as a pulmonary condition, it's a systemic ailment that affects various tissues including the eye manifesting in different ways.

Objectives: To present 3 presentations of ocular TB.

Methods: Retrospective review of medical records of 3 patients with ocular TB in a tertiary hospital in the Philippines.

Results: First is a 25/M with 1 month blurring of vision of right eye. Visual acuity (VA) for the right eye was counting fingers (CF) at 1 foot and 20/20 for left. External eye and slit lamp were unremarkable. Fundus of the right eye showed multiple cream colored exudates at the superior temporal area. Fluorescein angiography (FA) revealed window defect at the superior and inferior temporal area including the macula. Macular optical coherence tomography (OCT) of the right eye revealed macular edema. He underwent laboratories including IGRA which revealed TB. He was managed as multifocal choroiditis, OS and started on anti-TB. Six weeks after, VA for both eyes 20/20. Macular OCT showed resolution of edema.

Second is a 15/F with 1 year recurrent redness in both eyes, tearing and photophobia. Three weeks prior, noted a whitish opacity on the left eye with blurring of vision. VA of right eye 20/30 and CF at 2 feet for the left. On slit lamp, both eyes had posterior synechiae with 0.5+ cells on the right and 4+ cells on the left with 2.2mm hypopyon. Unremarkable fundus exam on the right eye, but xanthochromic reflex was seen on the left eye with severe vitritis. She underwent laboratories including IGRA which revealed TB. The patient was managed as endophthalmitis, OS and then started on anti-TB treatment. One month after, vision in the left eye improved to 20/30.

Third is a 72/M with 2 weeks blurred vision. VA was CF at 3 feet in the right eye and hand motion in the left. Color vision was 14/16 on right and 5/16 on left. Noted a hyperemic disc with indistinct borders and multiple cream-colored exudates in the retinal periphery on both eyes. FA showed diffuse choroiditis and optic neuritis in both. He underwent laboratories including IGRA which revealed TB. Three weeks after, VA was 20/40 and color vision 16/16 on both eyes.

Conclusions: These illustrate how diverse TB can be even when it is latent. It's very important to consider all the signs and symptoms of patients and supplement them with necessary diagnostics to provide the best management for patients.

P-RET-130

Inter-observer agreement in the diagnosis of diabetic retinopathy using multimodal imaging

K.G. Barajas-Martínez¹, I.Y. Pita-Ortíz¹

¹Retina y Vítreo, Hospital Fundación Nuestra Señora de la Luz, CDMX, Mexico

Introduction: It has been shown that timely detection of DR in early stages can reduce the secondary blindness. It is projected that the amount of time each ophthalmologist must invest for the evaluation of each patient increases exponentially and therefore the concept of physical consultation is gradually considered unsustainable and may not be enough to reach minimum standards to prevent vision loss, for that reason, the use of telemedicine should be considered as an effective option.

Objectives: To evaluate the inter-observer agreement in the diagnosis of DR using multimodal imaging studies: UWFI and FFA.

Methods: An ambispective, descriptive, transversal and observational study was carried out in the period of time between march 2022- september 2023. We included all patients who have a clinical diagnosis of DR and multimodal imaging studies. We exclude patients with associated ocular comorbidities. Through the use of electronic clinical records we collected demographic variables and retinal imaging. All the multimodal imaging studies were evaluated by three medical fellows and one retina specialist. Every retinal imaging had a DR classification done by each doctor. A descriptive analysis of demographic data were performed, the interobserver agreement were executed by calculating Cohen's Kappa coefficient with the use of Epidat 4.2 software. For this analysis patients were subclassified in two groups: DR treated with PRP and DR not treated with PRP.

Results: A total of 230 patients were recruited. 55 patients were included with a total of 186 retinal imaging studies. The average age was 60 years, women represented 52% and men 47%. Using both imaging methods, 74% of our patients were classified as laser-modified RD, 20% were assigned some degree of non-laser-modified RD, and only 2% were classified as disease-free. Moderate agreement between observers was identified in detecting patients without disease. In laser-modified disease, we found almost perfect agreement in identifying disease activity or inactivity.

Conclusions: As expected, there is greater ease in classifying patients when a FFA study is used. The present work lays the foundation to determine, first of all, what is the quality and precision with which the diagnosis of DR is made in our hospital through the use of these multimodal imaging studies with a view to using them as telemedicine tools.

P-RET-131

The regulatory effect of Ferrostatin-1 on microglial activation-induced pyroptosis

H. Chen¹, Y. Yu¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China

Introduction: Retinal ischemic disease is a common ophthalmic disease in clinical practice, which is caused by various etiologies leading to retinal vascular occlusion. However, after the retina recovers blood flow and perfusion on the basis of ischemia, the damage to tissues and organs actually intensifies, known as retinal ischemia-reperfusion (RIR) injury. The oxygen glucose deprivation (OGDR) is an in vitro model of RIR, which can simulate the physiological and pathological processes in vivo as much as possible. The main diseases involved in ischemia reperfusion include acute glaucoma, retinal artery/vein occlusion, diabetes retinopathy, etc. (1). Retinal ganglion cells (RGCs) are important participants in the visual pathway, and RIR injury ultimately leads to RGC death and retinal atrophy and thinning. Neural cells have the characteristics of susceptibility to injury and non-renewability after injury. Once damaged, they are difficult to repair. If not treated in a timely manner, it will seriously damage visual function and even cause blindness. At present, there is a lack of precise and effective treatment methods for RGC death and retinal atrophy in clinical practice. How to reduce and reverse damage and RGC death is a key link in the treatment of many ischemic retinopathy mentioned above. Therefore, it is extremely urgent to elucidate the potential pathogenesis and explore new treatment strategies. Ferroptosis and pyroptosis are two newly found potential mechanisms in microglial activation.

Objectives: To investigate the regulatory effect of ferroptosis inhibitor Ferrostatin-1 on microglial cell pyroptosis, induced by OGDR in a model of microglia.

Methods: An OGDR model was established using microglial BV2 cells. After treatment with Ferrostatin-1, Western Blot and qRT PCR measurement were applied to detect the expression of key indicators of pyroptosis, eg. caspase-1 and Gasdermin D, and ELISA was used to detect IL-1 β secretion level. Additionally, DCFDA probes was used to detect ROS levels and reflect the degree of ferroptosis.

Results: In the OGDR model of BV2 microglia cells, the Ferrostatin-1 treatment led to significant decreased ROS levels, less cleavage of caspase-1 and Gasdermin D, and diminished secretion of inflammatory IL-1 β .

Conclusions: The ferroptosis inhibitor Ferrostatin-1 can significantly inhibit the activation of pyroptosis in microglia, and reduce the secretion of inflammatory factors.

P-RET-132

Assessment of erythropoietin treating chronic renal disease anemia and its influence in diabetic retinopathy evolution

J. Nassaralla¹, A. Nassaralla², A. Nassaralla³

¹Retina and Vitreous, Instituto de Olhos de Goiânia, Goiânia, Brazil, ²Retina, Centro Oftalmológico de Minas Gerais, Belo Horizonte, Brazil, ³Medicina, Unieva, Anápolis, Brazil

Introduction: To evaluate the efficacy and the influence of erythropoietin sub-cutaneous injection, used as treatment in anemia of chronic renal disease, in patients with associated type 2 Diabetes with non-proliferative diabetic retinopathy.

Objectives: To evaluate the efficacy and the influence of erythropoietin sub-cutaneous injection, used as treatment in anemia of chronic renal disease, in patients with associated type 2 Diabetes with non-proliferative diabetic retinopathy.

Methods: A retrospective study of forty eyes in twenty non-consecutive patients affected by chronic renal failure anemia and diabetes, with Non-Proliferative Diabetic Retinopathy (NPDR), analyzed, for a one-year period, the progression of their diabetic retinopathy following the treatment with subcutaneous erythropoietin aiming at the anemia alone. The patients were followed for a year, examined, every three months, by the same retina specialist.

Results: From all of the followed patients, 50% of the eyes evolved to non-proliferative center involved diabetic retinopathy and 50% evolved to Proliferative Diabetic Retinopathy (PDR), with all of them showing worsening of the initial best corrected visual acuity. The group that evolved into center involved NPDR was treated with either aflibercept or ranibizumab injections. The group that evolved to PDR was treated with Anti-VEGF injections plus Pan Retinal Photocoagulation and, if needed, vitreous surgery.

Conclusions: Both groups presented worsening in vision and progression in the classification of the diabetic retinopathy along the year. The use of sub-cutaneous erythropoietin as a treatment for chronic renal failure anemia in Non-Proliferative Diabetic Retinopathy does not seem to influence, or prevent, the progression of the DR stages. More studies around worsening of the NPDR after erythropoietin injections will be necessary to confirm our findings.

P-RET-134

Topical prostaglandin analogue induced bilateral cystoid macular edema, more than 12 months after macular hole surgery

T. Asad¹, D. Saraee¹, K. Noe¹, F. Iqbal¹, A. Aftab¹

¹Northern Lincolnshire and Goole NHS Foundation Trust, Scunthorpe, United Kingdom

Introduction: Bimatoprost is a prostaglandin analogue given to lower the eye pressure . There is mention of cystoid edema in early post operative period after cataract surgery but it is not known whether it makes eyes prone to cystoid Macular edema after vitrectomy and/or macular hole surgery.

Objectives: Can prostaglandin analogues cause cystoid macular edema in late post operative period?

Methods: 64 year old female was commenced on topical bimatoprost 300micrograms/ml once per day for bilateral ocular hypertension. Lower Intraocular pressure target was achieved on followup visit. After 4 months duration , cystoid macular edema was noted on followup . Central subfoveal thickness of 633 and 574 micrometers was noted in right and left eye respectively. Topical NSAIDs resolved CMO, but it relapsed after 4 weeks when topical NSAIDs were discontinued.

Results: Patient had right eye full thickness macular hole surgery with combined phacoemulsification of lens and intra ocular lens implant, pars plana vitrectomy, Internal limiting membrane peel and C3F8 gas tamponade over 3 years (34 months) ago before prostaglandin analogue was started , Left eye had macular hole surgery more than a year (17 months) ago.

On discontinuing topical bimatoprost 300micrograms/ml , there was no recurrence of CMO.

Conclusions: Whether Prostaglandin analogue increases probability of cystoid macular edema in eyes that have undergone macular hole surgery may need further research.

Alternative pressure lowering medications can be considered to avoid macular edema development in eyes operated for macular hole.

P-RET-135

Reductions in intraretinal fluid levels due to low carbohydrate-healthy fat diets

L. Hains¹, S. Bacchi^{2,3}, W.O. Chan^{4,5}, J. Muecke^{6,7}

¹Adelaide Medical School, University of Adelaide, Adelaide, Australia, ²Lyell McEwin Hospital, Elizabeth Vale, Australia, ³College of Medicine and Public Health, Flinders University, Bedford Park, Australia, ⁴Department of Ophthalmology and Visual Sciences, University of Adelaide, Adelaide, Australia, ⁵Ophthalmology Department, Royal Adelaide Hospital, Adelaide, Australia, ⁶Adelaide Eye and Retina Centre, Adelaide, Australia, ⁷Sight for All, Adelaide, Australia

Introduction: Low carbohydrate, healthy fat (LCHF) diets have been the topic of numerous successful clinical trials in type-2 diabetes mellitus (T2DM) therapy. LCHF diets such as the ketogenic diet were popularised in the early 20th century in epilepsy management. More recently, LCHF diets have become the topic of research in oncology and neurodegenerative disease. The subsequent impact on T2DM associated-retinal disease remains under-researched in both laboratory and clinical studies.

Objectives: We aimed to explore the impact of LCHF diets in patients with diabetic macular oedema (DMO).

Methods: We retrospectively analysed optical coherence tomography (OCT) scans of patients undergoing care for DMO at a private Adelaide metropolitan ophthalmology practice. These patients had been advised to undertake various forms of LCHF diets to manage their DMO. In patients receiving intravitreal injections (IVIs) the eye receiving injections was excluded. Scans from 2 years prior to commencing LCHF diets to present were analysed.

Results: 15 patients were identified, of which 11 were male (73.33%) with a median age of 69.5 years old (range 46-89). All patients were found to have decreased intraretinal fluid (IRF) after commencing LCHF. There was evidence of significant sensitivity of IRF to dietary compliance, with rebound IRF seen during periods of reported poor compliance. Two patients had evidence of complete drying of the macula in at least one eye.

Conclusions: Our results highlight the need for further research into the area, both in murine/biological studies and in the clinical environment. Quantitative analysis of retinal biomarkers and novel IRF volumetric studies will aid in exploring the impact of LCHF diets on the retinal microenvironment. With the high burden of diabetic macular disease, adjunct therapies to help reduce IVI injection and appointment frequency are vital to improving ophthalmic system efficiency.

P-RET-136

Global economic, humanistic, and epidemiological burden of retinal detachment

A. Sriranganathan¹, J. Martinez², T. Felfeli^{3,4}

¹Faculty of Medicine, University of Ottawa, Ottawa, Canada, ²Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Canada, ³Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, Canada, ⁴Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health, University of Toronto, Toronto, Canada

Introduction: Retinal detachment (RD) is one of the leading ocular emergencies worldwide. If left untreated, most RDs progress to total retinal detachment and blindness.

Objectives: We sought to evaluate the burden of retinal detachment from an economic, humanistic, and epidemiological perspective.

Methods: A systematic review series was conducted. Three separate search strategies were performed using Embase, Ovid MEDLINE, and Scopus databases. Economic and humanistic burden were searched from inception to 2023, and the epidemiological study sought to evaluate recent trends in incidence of RD by reporting data published in 2020 to 2023.

Results: The searches identified a total of 9,074 articles (1608, 1660, 5806 for economic, humanistic, and epidemiological burden, respectively), 138 of which met the review inclusion criteria overall. 76 studies met inclusion criteria for the epidemiological burden review. Average incidence of RD ranged from 2.23-42 per 100,000 person-years and prevalence was approximately 0.16 per 100,000 persons. The incidence of RD following cataract surgery ranged from 2.1-15.5 per 1,000 cataract surgeries performed. The incidence of RD within 6 months of endophthalmitis diagnosis ranged from 30.2-212.9 per 1,000 cases. Out of 23 studies that met the inclusion criteria of the humanistic burden review, the National Eye Institute 25-Item Visual Function Questionnaire (VFQ-25) was the most frequently used questionnaire (n=18), followed by the Chinese version of the Low Vision Quality of Life Questionnaire (CLVQOL) (n=3). Mean (SD) VFQ-25 scores of patients with rhegmatogenous RD (RRD) were 65.4 (19.5) in preoperative eyes, 82.3 (11.8) in eyes 3 months after pars plana vitrectomy (PPV), 87.2 (9.8) in eyes 12 months after PPV, and 83.5 (12.1) in eyes 12 months after scleral buckling surgery. Study arms of eyes that underwent either PPV or scleral buckle reported a mean (SD) VFQ-25 score of 80.2 (14.2) at 6 months and 84.6 (7.2) 12 months after surgery. Out of 39 studies that met the inclusion criteria for the review of economic evaluations, the majority were cost-effectiveness (n=19), cost-utility (n=10) and economic burden (n=8) analyses. Total healthcare resource utilization and costs of treating RD ranged from \$651.42—\$10,546, inflated to 2024 USD.

Conclusions: This report provides a comprehensive synthesis of the literature published on the global burden of RD. Optimized and cost-effective management options are needed to improve the quality of life in patients with RD.

P-RET-137

Branch retinal artery occlusion in a young female patient associated with non-labeled weight gain drugs: A case report

K. Lay¹, P. Kong¹, L. Un¹

¹Ophthalmology, Preah Ang Duong Hospital, Phnom Penh, Cambodia

Introduction: Branch retinal artery occlusion (BRAO) is a relatively rare ocular vascular occlusive disorder, particularly in younger individuals.

Objectives: This case report aims to present a unique case of BRAO in a young female patient who experienced hemifield vision loss after initiating non-labeled weight gain medication.

Methods: A 23-year-old woman presented with sudden superior hemifield vision loss in her left eye one month following the commencement of non-labeled weight gain medication. Ocular examination, including visual acuity assessment, intraocular pressure measurement, visual field testing, fundus examination, color fundus photography, optical coherence tomography (OCT), and laboratory evaluation, was performed to assess the ocular and systemic status of the patient.

Results: Ocular examination revealed inferior BRAO in the left eye, with corresponding findings on fundus examination, color fundus photography, visual field, and OCT. Laboratory evaluation showed elevated inflammatory markers. Imaging studies, including echocardiogram and carotid doppler ultrasound, were unremarkable.

Conclusions: This case underscores the importance of considering atypical risk factors for BRAO in young patients. While the link between non-labeled weight gain drugs and BRAO warrants further exploration, clinicians should be vigilant in assessing medication history in cases of ocular vascular occlusive disorders.

P-RET-138

Pattern of uveitis in a tertiary-care referral hospital in Bangladesh

*M. Afrin*¹

¹Ocular Inflammation and Immunology, Bangladesh Eye Hospital, Malibag Branch, Dhaka, Bangladesh

Introduction: Uveitis being a sight-threatening disease with protean manifestations as well as significant diverse etiologies, illustrations of epidemiological information regarding patterns of uveitis in the various geographic regions have utmost importance. This study attempts to focus on the most recent information on the pattern of uveitis in Bangladeshi Population and compare it with previous ones.

Objectives: To identify the pattern of uveitis at a tertiary-eye care referral institute in recent years and to compare with previous reported studies in Bangladesh.

Methods: Clinical records of all uveitis cases visiting uveitis clinic of Bangladesh Eye Hospital, Malibag branch between January, 2022 and January, 2024 were retrospectively analyzed. Data were collected regarding demographics, clinical presentation, associated systemic disease, work-up, and diagnosis. A standard clinical protocol was maintained and detailed investigations were done to find out the specific cause of uveitis in every case.

Results: A total of 423 patients with uveitis were evaluated. The mean age at presentation was 38.2 years and 63.72% were female. The majority of the cases were unilateral (55.2%) and chronic. Anterior uveitis (45.06%) was the most frequent manifestation, followed by posterior uveitis (23.10%), intermediate uveitis (18.40%) and panuveitis (13.44%). Specific diagnosis was established in 64.56% cases. Infectious uveitis was found to be 26.35% and Tuberculosis (17.49%) being the most common followed by toxoplasmosis (5.6%) and viral uveitis (5.4%). Among non-infectious causes HLA-B27-associated uveitis (16.05%) was most common, followed by Vogt-Koyanagi-Harada (VKH) (7.56%).

Conclusions: An enhanced trend is observed towards specific diagnosis of uveitis. Tuberculosis still remains the most common infectious etiology in Bangladeshi population.

P-RET-139

Dome shaped macula with serous foveal detachment in a patient with Noonan Syndrome: A Case Report

A. Bayo Burgos¹, P. Rodríguez Valdés¹, A. Bofill Ramirez¹

¹Fundación Oftalmológica Los Andes, Santiago, Chile

Introduction:

Noonan Syndrome (NS) is a rare genetic disease, inherited in an autosomal dominant pattern or sporadic mutations, with an estimated incidence of 1:1000 to 1:2500 cases per live births. It belongs to the group of RASopathies, characterized by mutations in genes encoding proteins of the RAS/MAPK cellular signaling pathway. This syndrome is mainly characterized by short stature, congenital heart defects, facial dysmorphism, and mild developmental delay. Other distinctive abnormalities include hearing impairment, hematologic anomalies, cryptorchidism, and intrinsic ophthalmic abnormalities. Ocular manifestations are described in 95% of NS patients. The most common findings are external ocular abnormalities, refractive error, strabismus, amblyopia, nystagmus, changes in the anterior segment, and anomalies in the fundus.

Objectives:

To report a case of dome shaped macula with serous foveal detachment in a patient with Noonan syndrome.

Methods:

Observational case report.

Results:

We present the case of a 15-year-old male patient with NS, a history of intellectual disability, ICD surgery, and treatment with atenolol and amiodarone. Best-corrected visual acuity was 20/25 in both eyes. Ophthalmological examination revealed high myopia in the right eye (-11.50 D sph = -2.00 cyl at 10°) and left eye (-15.00 D sph = -2.00 cyl at 170°), alternating exophoria for distance and exotropia at near. Slit-lamp anterior segment examination showed no abnormalities. Fundus examination revealed clear vitreous, slightly pale discs with peripapillary atrophy, and tessellated fundus. OCT macula showed dome maculopathy in both eyes, with subretinal fluid and hyper-reflective subretinal dots in the right eye. Angio OCT ruled out the presence of other lesions like choroidal neovascularization.

Conclusions:

Ophthalmological abnormalities are common and diverse in NS. The literature shows discrepancies in the types and prevalence of refractive errors found and a low frequency of posterior pole abnormalities. Dome-shaped macula is a known entity in myopic eyes reported to occur in up to 20% of high myopes. Serous retinal detachment without choroidal neovascular membrane is a common cause of visual loss and metamorphopsia. In this case, we present a patient with high myopia and dome shaped macula with serous foveal detachment, a condition widely described; however, the coexistence of these condition in a patient with NS has not been reported.

P-RET-140

Modification of OCT biomarkers in DME before and after anti-VEGF treatment in a Mexican reference center

J.G. Morales Navarro¹, B.D. Pérez Muñoz¹, G. Ledesma Gil¹, F. Graue Wiechers¹

¹Retina and Vitreous, Instituto de Oftalmología Conde de Valenciana, Mexico City, Mexico

Introduction: Diabetic retinopathy is characterized by microvascular abnormalities, with macular edema being a complication. It is the primary cause of vision loss in these patients, posing a global healthcare burden. Integrating biomarker-based approaches into clinical practice holds promise for improving the precision and effectiveness of therapeutic interventions.

Objectives:

Assess the relationship of specific OCT biomarkers with the visual outcome and the impact of their evolution on treatment response in a Mexican reference center.

Methods: Patients were treated between October 2016 and November 2023 with three monthly intravitreal anti-VEGF injections. OCT biomarkers were evaluated: ellipsoid zone (EZ) disruption, external limiting membrane (ELM) integrity, subfoveal neuroretinal detachment (SND), cystoid macular edema, intraretinal fluid, hyperreflective retinal foci (HRF), central macular thickness (CMT), disorganization of retinal inner layers (DRIL). Mutual correlation among OCT biomarkers and their relationship with visual and anatomic outcomes were assessed.

Results: 65 eyes were analyzed. The mean age was 63.48 years, with 45.6% being female. Initial best-corrected visual acuity (BCVA) was measured at 0.84, which improved to 0.72 logMAR by the end of treatment. The mean macular thickness decreased from 429.44 to 352.41 microns afterward. 39% of patients had EZ disruption before treatment, decreasing to 32.2% after. Disruption of the external limiting membrane (ELM) was present in 44.3% of cases initially and decreased to 33.9% after. Cystoid macular edema affected 35.3% of cases initially, increasing to 37% after. There was a difference in CMT before and after treatment ($P = 0.001$). The McNemar test showed differences in the presence of disruption of the ELM ($P = 0.097$) and intraretinal fluid ($P = 0.001$) before and after treatment. The Mann-Whitney test indicated an association between the EZ disruption ($P = 0.10$) and hyperreflective dots ($P = 0.012$), with the final BCVA of each patient.

Conclusions: Analysis of biomarkers before and after treatment reveals notable alterations, particularly in parameters such as disruption of the ellipsoid zone (EZ) and intraretinal fluid. Identification of biomarkers associated with treatment response and visual outcomes holds significant clinical implications. Clinicians can utilize these biomarkers to tailor treatment strategies, monitor disease progression, and optimize patient management in DME cases.

P-RET-142

Fatty acid metabolism is involved in both retinal physiology and the pathology of retinal vascular diseases

A. Umetsu¹, M. Watanabe¹, M. Higashide¹, N. Nishikiori¹, S. Suzuki¹, H. Ohguro¹

¹Sapporo Medical University, Sapporo, Japan

Introduction: Physiologically, the lipid chaperone family of 14–15 kDa proteins known as fatty acid-binding proteins (FABPs) transport fatty acids (FAs) to different intracellular compartments mediating oxidation, signaling, gene-transcription regulation and storage of lipids. On the other hand, pathologically, FABPs are also involved in the development and progression of various systemic diseases including cardiovascular, renal, and endocrine illnesses, the metabolic syndrome, cancer, and neurodegeneration. However, as of this presentation, pathophysiological contributions of FABPs in the ophthalmology fields have been insufficiently investigated.

Objectives: To elucidate the roles of the fatty acid-binding proteins (FABPs) on ocular pathophysiology.

Methods: (1) immunolabeling of human retinas, wild type (WT) rat and mouse retinas, rat models for diabetic retinopathy (DR) and retinitis pigmentosa (RP) with anti-FABP3, FABP4, FABP5, FABP7, FABP8 and FABP12, (2) electroretinogram (ERG) measurements of WT and FABP4-deficient (Fabp4^{-/-}) mice, (3) ELISA or gas chromatography measurements of plasma (P-) and vitreous (V-) levels of FABP4, FABP5 and vascular endothelial growth factor A (VEGFA), and fatty acids (FAs) from patients with retinal vascular disease (RVD) including proliferative DR (PDR, n = 30) and retinal vein occlusion (RVO, n = 18) and non-RVD (n = 18), and (4) a laser-speckle flow analyzer (LSFA) to measure ocular blood circulation levels.

Results: Within the human retina, diverse expressions of FABP3, FABP4, FABP7 and FABP8 were identified. In contrast, positive immunoreactivities toward only FABP4 and FABP12 were detected in the cases of rat and mouse retinas, and interestingly, the FABP4 labeling patterns for DR and RP rat retinas were different from WT retina. The ERG amplitudes of Fabp4^{-/-} mice were enhanced compared with those of WT mice. The concentrations of V-FABP4, V-FABP5, V-VEGFA and total FAs were significantly higher in RVD patients than in non-PDR patients ($P < 0.05$), but while V-FABP4 is more linked to PDR, V-FABP4 has a higher linkage with RVO. The levels of each V-FAs were significantly and positively correlated with V-FABP4 and V-VEGFA, although the vitreous (V-) levels of FABP4, VEGFA and FAs were no correlated with the plasma (P-) levels of those factors.

Conclusions: The current study demonstrated that V-FAs appear to have significant roles in both retinal physiology as well as the pathogenesis of RVD with FABP4 and FABP5, which are intraocularly expressed in most species.

P-RET-143

Effect of vitrectomy with internal limiting membrane peeling on the patients with proliferative diabetic retinopathy

J. Ma¹, X. Fang¹

¹Eye Center, Second Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou, China

Introduction: Whether the internal limiting membrane peeling was performed or not during the PPV surgery for the patients with PDR is not in consensus.

Objectives: The aim is to evaluate the effect of vitrectomy with internal limiting membrane peeling on the patients with proliferative diabetic retinopathy.

Methods: The medical records of 173 eyes (156 patients) who received pars plana vitrectomy combined with ILM peeling or not for PDR in Eye Center, the Second Affiliated Hospital, Zhejiang University School of Medicine, China from October 2017 to July 2022 were retrospectively analyzed. The following data were extracted from medical records for each patient, including demographic data, course of diabetes mellitus, intraocular pressure, surgical records, panretinal photocoagulation fulfillment or not before the operation, patients' outcome (preoperative and postoperative best-corrected visual acuity), whether inner limiting membrane peeling or not, the times of anti-VEGF injection and etc. The patients were divided into two groups. Group A: The patients underwent PPV and inner limiting membrane peeling. Group B: The patients underwent PPV without inner limiting membrane peeling. Statistical analysis was performed using the SPSS software. Logistic regression models were used to estimate the odds ratios (ORs) and their 95% CIs for each risk factor for DR.

Results: BCVA improved substantially after surgery in both groups. 39 patients out of 44 in ILM peeling group got BCVA improvement while 24 out of 44 in the group without ILM peeling. No statistically difference was found in IOP before and after surgery in both groups. 1 patient in group A (1/44) and 6 patients in group B (6/44) got more than 2 times anti-VEGF therapy after the PPV surgery ($P=0.049$). Only 1 patient in group A underwent the second surgery while 9 patients had the another surgery in group B. 2 patients were found inflicted with macular pucker in group A (2/44) and the number was 21 in group B (21/44) ($P<0.001$). The reoperation rate was different for the ILM peeling or not ($P=0.017$). The visual acuity had more probability to improve if the ILM peeling was performed during the PPV surgery ($P=0.041$). The occurrence of epiretinal membrane was lower in the ILM peeling group ($P<0.001$). The injection times was lower in ILM peeling group ($P=0.007$).

Conclusions: Vitrectomy with internal limiting membrane peeling has more favorable effect on the patients with proliferative diabetic retinopathy. It could be an optional therapy for the advanced PDR patients.

P-RET-144

Pro and anti-inflammatory factors in patients with Rhegmatogenous Retinal Detachment with Silicone Oil tamponade

A.Z. Abidin^{1,2}, B. Budu^{1,2}, A.M. Ichsan^{1,2}, R.B. Ladju^{2,3}, H.S. Muhiddin^{1,2}, H.B Eka^{1,2}

¹Department of Ophthalmology, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia,

²Hasanuddin University Hospital, Makassar, Indonesia, ³Hasanuddin University Medical Research Center, Hasanuddin University, Makassar, Indonesia

Introduction: Rhegmatogenous retinal detachment (RRD) is the most common type of detachment in which pathogenic alterations develop in the retina resulting local inflammation. Silicone oil (SO) which is commonly used as an intraocular tamponade, can cause energy metabolism disorders and damage to ocular tissue, resulting in elevated levels of mediators of inflammation in the eye.

Objectives: To determine the role and impact of pro- and anti-inflammatory factors on RRD patients before pars plana vitrectomy (PPV) with SO tamponade and when the SO inside the eye or prior to SO evacuation.

Methods: This study was an observational analytical study with a prospective cohort to evaluate pro- and anti-inflammatory factors, including interleukin-6 (IL-6) and interleukin-4 (IL-4) in the aqueous humor of RRD patients before and after PPV with SO tamponade using enzyme-linked immunosorbent assays (ELISA) method.

Results: IL-6 and IL-4 levels were observed to be higher in RRD patients with PVR, albeit this was not statistically significant. RRD patients who had undergone surgery and were given SO tamponade exhibited higher levels of IL-6 and IL-4, indicating that inflammatory mediators can influence the healing process in RRD and cannot be assumed to be solely produced by SO.

Conclusions: RRD with PVR resulted in greater levels of IL-6 and IL-4 than RRD without PVR. IL-6 and IL-4 levels were observed to be greater in RRD that had undergone PPV with SO tamponade compared to RRD that had not been operated.

P-RET-146

A new free ILM lap technique for the repair of unclosed macular holes

*P. Zhao*¹

¹Xin Hua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China

Introduction: With ILM peeling, the closure rates of macular holes after primary surgery have exceeded 95%. Even though there is a positive success rate, unsuccessful refractory MH closure persists in some cases. The surgical methods for unclosed macular holes are designed based on what is believed to help these holes close naturally.

The first involves Removal of residual tangential tractions and reduction of the hole's marginal tension, such as revisional PPV, SRF injection, retinal massage can be employed. The second involves plugging the macula hole or scaffolding it for cellular regeneration and repair. These include the ILM free flap, lens capsule flap, or human amniotic membrane.

However, these techniques may risk the loss of outer retinal layer continuity, gliosis, and the hindrance of visual recovery. Our team has been hard at work trying to find good solutions for macular holes. However, the two strategies (Peeled ILM repositioning and Rotational ILM flap covering) we previously discovered are not suitable for these challenging persistent unclosed macular holes.

Objectives: To present a novel technique using a free flap of the internal limiting membrane (ILM) to address unsealed macular holes (MHs).

Methods: This study involved four consecutive patients with unsealed MHs. All patients had previously undergone unsuccessful primary ILM peeling surgery. The pars plana vitrectomy (PPV) procedure included the following steps: 1) Enlarging ILM peeling. 2) Identification of a viable ILM flap. 3) Application of a perfluorocarbon liquid (PFCL) tamponade. 4) Flattening of the ILM flap beneath the PFCL. 5) Translating it to cover the MH. 6) Fluid and gas exchange. 7) 15% C3F8 tamponade and maintenance of a prone position for two weeks.

The best corrected visual acuity (BCVA), MH evaluation by optical coherence tomography (OCT), and complications were evaluated.

Results: A free, single-layer ILM flap was applied to cover the MHs in all patients. The average diameter of the unclosed MHs was 688 ± 164 micrometers (ranging from 524 to 886 μm). The free ILM flap technique was successfully preformed in all cases. Over a follow-up period of three months, closure of the MHs was achieved in all eyes.

Conclusions: This technique utilizes a free ILM flap to cover the surface of the MH and necessitates only a single, limited ILM flap. This single-layer, non-inverted ILM flap did not interfere with the reorganization of the outer retinal layers and promoted foveal recovery during the postoperative period.

P-RET-147

Pilot study on pneumatic retinopexy (PR) in a tertiary hospital eye department

P. Patwari¹, L.J. Tan¹, K. Greiner¹

¹Ophthalmology department, Aberdeen Royal Infirmary, Aberdeen, United Kingdom

Introduction: Among the 3 standard treatments of rhegmatogenous retinal detachment (RRD), pneumatic retinopexy remains underutilized in United Kingdom. Hence, we would like to introduce this procedure as a treatment option by firstly evaluating the efficacy and safety of PR.

Objectives: To evaluate efficacy and safety of treating rhegmatogenous retinal detachment using pneumatic retinopexy within one tertiary hospital eye department, through anatomical success, functional success and complications.

Methods: This is a retrospective study on 15 patients who received PR from April 2021 to October 2023. All assessment and execution were done by one associate specialist with one vitreo-retinal consultant. Efficacy and safety were determined by anatomical success, functional success, and complication rates at the last follow up.

Results: RRD characteristics documented 14/15(93%) phakic, 12/15(80%) macula on, 11/15(73%), 3/15(20%), 1/15(7%) for 1, 2, 3 retinal quadrant extension respectively and no inferior RD extension. Retina breaks were 11/15(73%) horse-shoe tears, others round holes; 11/15(73%) were within 1 clock hour, others within 2 clock hours and 6/15(31%) had more than 1 break present in affected eye. At the last follow up, 14/15(93.33%) achieved anatomical success i.e. a flat retina and 100% achieved Snellen better or equal to 6/12 (Log Mar 0.3) visual acuity. 1/15(6.67%) developed complication of asymptomatic epiretinal membrane while 1/15(6.67%) unsuccessful PR developed re-detachment requiring surgery.

Conclusions: The results indicated that PR can be efficacious and safe for selected patients after thorough assessment and can act as an alternative treatment to RRD. A larger sample size re-audit is intended.

P-RET-148

To compare the findings of RVO patients treated with intravitreal bevacizumab +/- triamcinolone

*P. Azadi*¹

¹Kermanshah University of Medical Science, Kermanshah, Iran, Islamic Republic of

Introduction: While the most common prescribed treatment for retinal vein obstruction (RVO) is intravitreal bevacizumab injection, in this randomized double blind clinical trial we would compare the effects of intravitreal bevacizumab with combined bevacizumab and triamcinolone acetonide injection using the optical coherence tomography (OCT) and optical coherence tomography angiography (OCTA).

Objectives: The naïve patients with RVO, BRVO or CRVO, were included and followed up regularly for at least 6 months.

Methods: 58 patients were included. The exclusion criteria were, any history of intraocular injections or macular laser, any media opacity hindering fundus examination, the best corrected visual acuity (BCVA) better than 20/40, ocular hypertension or glaucoma, neovascularization or accompanied retinal artery occlusion, central macular thickness (CMT) less than 250 microns in optical coherence tomography (OCT), and any retinal disease interfering with OCT/ OCTA findings. Patients were thoroughly examined monthly and were randomly divided into 2 groups. For the first group 2.5 mg/ 0.1 cc intravitreal bevacizumab was injected monthly while in the second group 1.25 mg/ 0.05 cc bevacizumab with 2 mg/ 0.05 cc triamcinolone acetonide was injected simultaneously and every other monthly. patients were followed up for at least 6 months.

Results: 58 patients were treated in two groups of 29 people. The average age was 56.93 ± 13.94 years in the one drug group and 54.54 ± 13.07 years in the two-drug group. The mean number of injections was 5 in the first group and 3 in the second group. There was no significant difference between the two groups in terms of visual acuity, peripapillary vascular density, fovea density, perifoveal vascular density and intraocular pressure. In the single-drug group, the amount of FAZ has generally decreased, but in the two-drug group, its amount has generally increased, and its maximum amount was after the second month, which was statistically significant. Para foveal vascular density decreased in single drug group and most of this decrease was after one month of treatment. While in the group of two drugs, its amount increased after the first and third months and generally had an increasing trend. This finding was also statistically significant. The relationship between the two variables of cataract and treatment group was also statistically significant.

Conclusions: Functional and anatomical improvement effects were observed in both groups.

P-RET-149

Listeria monocytogenes endophthalmitis - case study & literature review

*H. Cilliers*¹

¹Ophthalmology, Royal London Hospital, Barts Healthcare NHS Trust, London, United Kingdom

Introduction: In the Summer of 2016, associated with extreme heat conditions throughout Europe, there were outbreaks of *Listeria monocytogenes* in the United Kingdom.

Contaminated sandwiches served at NHS Hospitals were linked to 9 patients, of whom 7 have succumbed to Listeriosis.

This case study of a male patient, who presented to the Ophthalmology Casualty Unit with features of acute ocular inflammatory disease, on review raised concerns for suspected endogenous endophthalmitis. He had significant pre-existing systemic co-morbidities and this followed discharge after recent hospitalisation.

Objectives: This presentation is to make Ophthalmologists aware of Listeriosis by highlighting the distinctive ocular findings and management of this notifiable disease.

Methods: Focus on the typical acute findings on presentation, the procedures followed to obtain a diagnosis, proceeding with interim treatment and further after confirmation of the diagnosis, the subsequent management of *Listeria monocytogenes* endophthalmitis.

Results: This discussion will highlight the importance of obtaining a detailed history, having a high index of suspicion and underscores the necessity for early active intervention with the aim to ensure the best visual and systemic outcome.

The current data on *Listeria monocytogenes* endophthalmitis will be reviewed.

There is also the public health importance of following through with a thorough multi-disciplinary investigation after microbial confirmation of *Listeria monocytogenes*, as the causative pathogen. This is a notifiable disease and details of such reporting will be mentioned in brief.

Conclusions: *Listeria monocytogenes* is considered a rare cause for endogenous endophthalmitis, however seems to become more prevalent as a significant health concern.

In this age of adverse climate change, it is with careful consideration that the positive regulatory steps taken by addressing the overall health of livestock, incorporation humane farming methods, as well as setting rigorous safety control measures for the food industry environment and supply chain be evaluated and encouraged by Public Health to prevent such outbreaks of Listeriosis, which can have significant morbidity and mortality.

P-RET-150

Treatment considerations for a case of refractory PED

*L. Yan*¹

¹ophthalmology, The First Affiliated Hospital of Kunming Medical University, Kunming, China

Introduction: Pigment epithelial detachment (PED) refers to the separation between the retinal pigment epithelium and the Bruch membrane caused by the accumulation of serous fluid, blood, or vitreous warts.

Objectives: Discuss the causes and therapeutic effects of a case of refractory serous PED.

Methods: Use multimodal imaging to diagnose, differentiate, treat and follow up on this refractory PED case, as well as observe its disease progression and progression.

Results: The patient is a 50 year old female who first sought medical attention on April 9, 2019. The chief complaint is deformation of the right eye visual object, a pale yellow shadow in the center for more than 4 months, and no special medical history or chronic medical history. Initial physical examination Vod: 1.0, os: 1.0; There is no obvious abnormality in the anterior segment of both eyes. In the right fundus of the eye, there is a temporal bulging of the macula, with punctate yellow deposition visible above it. No obvious bleeding or exudation is observed. OCT examination: PED (serous) with subretinal fluid in the macular area of the right eye, FFA+ICGA indicates: fluid dark area in the macular area of the right eye, late fluorescence accumulation in FA, and no leakage throughout ICGA. The patient was diagnosed with PED in the right eye. The initial treatment given was right eye micro pulse laser therapy, combined with intravitreal injection of Arbacicept, 2mg, 0.05ml. As the patient's condition changed, the course of the disease went through more than 5 years, with intravitreal injections performed 4 times in 2019, 2 times in 2020, 5 times in 2021, and 3 times in 2022; Micropulse laser treatment 3 times in 2019, 0 times in 2020, 2 times in 2021, and 0 times in 2022; Regular retinal laser treatment once in 2023. Until the last follow-up visit in 2023, we found that the patient's right eye PED had basically recovered, but local choroidal concavity (FCE) changes were found in the fovea. A new subretinal fluid area was found on the temporal side of the macular area in the left eye, and there were numerous circular folds around the optic disc and the choroid around the macula in both eyes. And the patient's choroid thickness is relatively thick 318-323 μm . Expanded Haller's layer can be seen in the posterior pole, and watershed anastomotic blood vessels can be seen.

Conclusions: The folds of the patient's choroid and changes in the thick choroid may be anatomical factors contributing to the patient's refractory PED.

P-RET-151

Knowledge, attitude and practice of patients and their family members regarding AMD: a cross-sectional study

J. Xiao¹, H. Zou², D. Li¹, X. Wang¹, L. Yu¹, B. Yang¹, L. Luo¹

¹Medical Retina, The Second Hospital of Jilin University, Changchun, China, ²Ophthalmology, The Second Hospital of Jilin University, Changchun, China

Introduction: Prior research has predominantly emphasized genetic factors, risk factors, pharmacoeconomics, and preventive measures related to AMD, while another study has predominantly focused on treatment options. Whereas, this study takes a pioneering approach by comprehensively investigating the KAP of Chinese patients and their family members concerning AMD, which may fill a significant void in the current research arena, offering a unique perspective on AMD in the context of China. Therefore, this study aimed to investigate the KAP of Chinese patients and family members towards AMD.

Objectives: This study aimed to investigate the knowledge, attitude, and practice (KAP) of patients and their family members towards age-related macular degeneration (AMD).

Methods: A cross-sectional study was conducted between April and July 2023 at the Department of Ophthalmology, Second Hospital of Jilin University towards AMD patients and their family members through a self-administered questionnaire.

Results: A total of 538 valid questionnaires were enrolled, including 325 patients (60.41%) and 213 family members (39.59%), with 495 (92.01%) had reported undergone surgical treatment. The mean knowledge, attitude and practice scores were 10.99 ± 1.30 (possible range: 0-14), 43.05 ± 3.48 (possible range: 12-60), and 22.36 ± 3.96 (possible range: 6-30), respectively. The correlation analysis revealed a positive correlation was observed between knowledge and attitude ($r = 0.1474$, $P = 0.0006$), as well as knowledge and practice ($r = 0.1308$, $P = 0.0024$). Additionally, attitude exhibited a positive correlation with practice ($r = 0.4973$, $P < 0.001$). Structural equation modeling (SEM) showed that knowledge had a direct and significant effect on attitude ($\beta = 0.707$, $P < 0.0001$) and practice ($\beta = -0.48$, $P < 0.0001$), while attitude had a direct and significant effect on practice ($\beta = -0.086$, $P < 0.0001$).

Conclusions: Patients and their family members had adequate knowledge, positive attitude and proactive practice towards AMD. Targeted educational initiatives to improve AMD knowledge, the cultivation of positive attitudes through supportive interactions, and interventions designed to translate knowledge and attitudes into practical behaviors, with a particular emphasis on timely medical intervention and treatment adherence, are recommended.

P-RET-152

Adult-onset coats disease masquerading polypoidal choroidal vasculopathy

D. Yong¹, M. Chew Romero¹, T. Naing¹

¹Ophthalmology, National University Hospital, Singapore, Singapore

Introduction: Sharp-peaked pigment epithelial detachment(PED) provide high sensitivity and specificity for differentiating polypoidal choroidal vasculopathy(PCV) from neovascular age-related macular degeneration. However not all sharp and peaked PED are due to PCV.

Objectives: To present macular optical coherence tomography(OCT) features of pigment deposition that could masquerade as PED associated with PCV.

Methods: -

Results: An 80-year-old gentleman with no significant past medical history presented with left eye blurring of vision for 2 years. Left visual acuity was counting fingers at 3 metres and examination showed massive subretinal fibrosis and hard exudation involving the macula. There was subretinal blood in the infero-temporal quadrant of the retina, from the macula to the peripheries. OCT revealed a sharp and peaked subfoveal hyper-reflective lesion that was elevating the retinal pigment epithelium (RPE). This was associated with surrounding diffuse intra-retinal hypo-reflective spaces suggestive of intra-retinal fluid occupying inner and outer retinal layers. OCT Angiography was inconclusive. Patient was diagnosed with PCV and received monthly injection of intravitreal Ranibizumab for 5 months without any clinical improvement.

Re-evaluation of OCT disclosed the sub-foveal lesion casting intense optical shadowing suggestive of pigment deposition, not PED. Widefield fundus fluorescein angiography(FFA) and indocyanine green(ICG) were done. There was no hot spot in the posterior pole on ICG. On FFA, the fovea was hypofluorescent due to blockage from pigment deposition and the rest of the lesion was hypofluorescent in early frames from subretinal fibrosis, hard exudation and blood. These subsequently became hyperfluorescent in the later frames due to leakage from the aneurysmal dilated segments of retinal vessels which were associated with multiple small patchy hyperfluorescence at the other areas of the normal looking retina: indicating the diagnosis of Coat's disease. Patient underwent laser therapy to the peripheral lesions.

Although PCV presents with sharp-peaked PED, not all sharp and peaked sub-RPE lesions are PEDs. Associated OCT features such as sub-RPE hyperreflective ring-like lesion, thick choroid, complex multilobulated PED and double layer sign should be present to diagnose PCV.

Conclusions: Subretinal pigment deposition from Coats and other retinal diseases can mimic a sharp-peaked PED. FFA and ICG should be considered when there is lack of improvement clinically after intravitreal treatment.

P-RET-153

Persistent subretinal fluid following diabetic tractional retinal detachment repair: risk factors, natural history

A. Algethami¹, M. Mura², S. Alsulaiman³

¹King Abdullah Medical City, Jeddah, Mecca, Saudi Arabia, ²Ferrara University, Ferrara, Italy, ³Retina, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

Introduction: Tractional complications of advanced proliferative diabetic retinopathy remain a major indication for vitrectomy. Surgery for tractional retinal detachment (TRD) and traction-rhegmatogenous retinal detachment TRRD has variable visual outcomes and several prognostic factors come into play. The main prognostic factors include chronicity of the macular detachment, photoreceptor layer integrity and macular perfusion status. In a subset of following successful vitrectomy for TRD or TRRD, a residual submacular fluid is noted.

Few reports attempted to characterize residual subretinal fluid (SRF) after TRD/TRRD repair. However, the natural history and the effect on final visual acuity remain largely unknown.

Objectives: To study the natural history, anatomical and functional outcomes of persistent subretinal fluid (SRF) after pars plana vitrectomy (PPV) for diabetic tractional retinal detachment (TRD) and combined traction-rhegmatogenous retinal detachment (TRRD).

Methods: Retrospective interventional case series of 43 patients (46 eyes) with persistent SRF following PPV for diabetic TRD or combined TRRD from January 2010 to December 2017 at single tertiary institution. Primary outcomes included best corrected visual acuity (BCVA) and central foveal thickness (CFT).

Results: Thirty-one eyes (67.4%) had macula-off TRD, 5 (10.9%) had fovea-threatening TRD and 10 (21.7%) had combined TRRD. The mean (\pm SD) duration of decreased vision was 48.0 ± 58.2 weeks. The mean follow-up duration was 21 ± 13.2 months. Residual macular SRF was detected by optical coherence tomography in all eyes at 3 months and in 10 eyes (23.8%) at 12 months after surgery. Only 3 eyes (6.5%) had persistent SRF at final follow up. The mean time to resolution was 10.6 ± 4.1 months [range 6.0-23.0]. 13 eyes received additional intervention to address SRF. The mean CFT gradually improved until final follow up (P-value < 0.001). The mean BCVA improved from 1.62 ± 0.88 LogMAR at presentation to 1.05 ± 0.76 LogMAR at final follow up. No statistically significant difference in final BCVA was found between eyes that had intervention and eyes that were observed (P value = 0.762).

Conclusions: Persistent SRF after diabetic vitrectomy resolves slowly over time with gradual improvement in visual acuity. Additional drainage of persistent SRF may not be necessary.

P-RET-154

Isolated bilateral intraocular tuberculosis: a case report

*T. Marcelo*¹, *C. Arcinue*²

¹Ophthalmology, Rizal Medical Center, Manila, Philippines, ²Ophthalmology, Rizal Medical Center, Metro Manila, Philippines

Introduction: The World Health Organization has declared tuberculosis to be a global emergency, as it remains the most common single cause of morbidity and mortality worldwide, with an incidence of 8.7 million cases per year. In 2018, the Philippines was declared to have the highest incident of tuberculosis among the South East Asian Countries. Although it primarily affects the lungs, ocular tuberculosis represents the extrapulmonary spectrum of this disease.

Objectives: This report aims to present a case seen in a tertiary hospital in the Philippines as a patient presented with monocular blurring of vision but was later on diagnosed to have a bilateral ocular pathology.

Methods: Thorough documentation of the patient's history, physical examination, diagnostic tests and appropriate imaging were done. The patient was seen by a multi-disciplinary ophthalmologic team and was referred to the pediatric service for co-management, as well as the hospital's Tuberculosis - Direct Observed Therapy Clinic.

Results: We are presented with a case of a 16 year old male who complained of sudden blurring of vision on the left eye 1 week prior to consult.

Visual acuity on the right is 6/6, and 6/30 improved to 6/12 on the left eye. Trace cells were noted bilaterally. On indirect ophthalmoscopy of the right eye, there were multiple atrophic chorioretinal scars seen. Left eye showed an optic nerve with indistinct disc border with 1 1/2 disc diameter yellow elevated lesion superior to the disc. Presence of exudative retinal detachment along the superior vascular arcade with the macula still attached was noted.

Conclusions: On further examination, there was palpable left submandibular lymph node. Complete blood count and urinalysis were within normal range. Rapid plasma reagin was normal. Chest X ray was unremarkable. Sputum Acid Fast Bacilli stain yielded normal results. However, Purified Protein Derivative was highly positive at 26 mm. Quantiferon TB - Gold turned out to be positive as well. Patient was diagnosed with Intraocular Tuberculosis, OU.

Patient was then started on Anti Koch's medication and topical corticosteroids which was tapered gradually. Exudative retinal detachment resolved after one month of treatment. Best corrected visual acuity at this time was 6/15 on the left eye. 6 months after completion of the medication, final best corrected visual acuity is 6/6.

P-RET-155

Study of visual outcome in post surgical endophthalmitis patients at tertiary eye care hospital

M. Nookala¹

¹Ophthalmology, Sarojini Devi Eye Hospital, Hyderabad, India

Introduction: Endophthalmitis is a rare but sight-threatening disease characterised by marked progressive inflammation of the vitreous and /or aqueous humors, usually due to an intraocular bacterial, fungal, parasitic or rarely, viral infection.

It is classified according to etiology as post-operative, post-traumatic, endogenous. Other ways of classification are by the organism(s) involved and by the clinical course (acute or chronic/delayed-onset)

It can occur after any ophthalmic procedure including cataract surgery, glaucoma surgery, corneal transplants, pars plana vitrectomy, intravitreal injections. The incidence of endophthalmitis following cataract surgery: 0.08%-0.68%.

It is one of the most devastating eye infections and may lead to irreversible blindness in the infected eye within hours or days of symptom onset. Hence early diagnosis and aggressive treatment with appropriate antimicrobial therapy, as well as surgical intervention, are mandatory for optimal visual outcomes.

Objectives: A prospective interventional study of visual outcome in post surgical endophthalmitis patients over 18 months.

Methods: 39 patients referred with post surgical endophthalmitis were managed as per standard guidelines with intravitreal antibiotics & antifungals, PPV, wound dehiscence repair, exudative membranectomy, AC wash & followed up till 3 months.

Results: Among 39 eyes in the study, 28 eyes s/p SICS, 8 eyes s/p phacoemulsification, 1 eye s/p TKP, 1 eye s/p DSEK, 1 eye s/p intravitreal inj. Ranibizumab. 1 patient lost to follow up. After treatment final VA of > 6/60 was achieved in 12/38 (31.5 %).

Conclusions: Cataract surgery is most commonly performed surgery & leading cause of post surgical endophthalmitis. Early diagnosis and appropriate treatment is necessary for good visual outcome. Old age, poor VA at presentation, gram-ve bacterial infection, short interval b/w cataract surgery & endophthalmitis were significantly related to poor visual outcome.

P-RET-156

Macular fenestration in minimal invasive technology for diabetic retinopathy vitrectomy treatment

B. Hu¹, W. Li¹, X. Zhang¹

¹Tianjin Medical University Eye Hospital (TMUEH), Tianjin, China

Introduction: Diabetic retinopathy, a prevalent complication of diabetes, poses significant surgical challenges. Traditional approaches to manage complex cases involve extensive tissue manipulation, increasing risks of intraoperative complications. This study introduces the "Macular Windowing Technique," a surgical innovation aimed at minimizing tissue excision while mitigating the associated risks and enhancing patient outcomes.

Objectives: To evaluate the effectiveness of targeted macular fenestration, referred to as "Macular Windowing Technique," in patients with diabetic retinopathy, particularly focusing on the benefits of minimal tissue excision.

Methods: A 67-year-old patient diagnosed with vitreous hemorrhage, diabetic tractional retinal detachment, and immature age-related cataract in the right eye was subjected to a combined surgical approach of cataract phacoemulsification, vitrectomy, macular peeling, and retinal laser photocoagulation. During the surgery, an innovative step was implemented to exclusively remove the proliferative membrane over the macula instead of complete preretinal proliferation excision to reduce the risk of retinal breaks and hemorrhage.

Results: The modified procedure revealed a marked decrease in operative time and minimized intraoperative complications. Postoperative follow-ups at 1 week, 3 weeks, 2 months, and 3 months showed gradual improvement in both unaided and corrected visual acuity with stable intraocular pressure, indicating a successful outcome with reduced risk of vision-threatening complications.

Conclusions: The Macular Windowing Technique demonstrates significant potential as a safer alternative to extensive membrane peeling in diabetic retinopathy surgeries, by prioritizing patient safety without compromising the visual prognosis. This method could set a new precedent for managing complex vitreoretinal interfaces in diabetic eye disease.

P-RET-157

Periocular Steroids as primary treatment for Vogt Koyanagi Harada syndrome

A. Panneerselvam^{1,2}, M. Rajamohan²

¹Ophthalmology, Trichy SRM Medical College & Hospital, Research Centre, Tiruchirapalli, India,

²Ophthalmology, Vijayalakshme Eye Hospital, Tiruchirapalli, India

Introduction: To assess the effectiveness of Subtenons Triamcinolone injection as the primary treatment in patients with Vogt Koyanagi Harada syndrome.

Objectives: To prove Posterior subtenon triamcinolone (PST) acetonide injection can be considered a safe and more convenient treatment in Vogt Koyanagi Harada syndrome patients, compared to systemic steroid administration, avoiding systemic side effects and better patient compliance.

Methods: In this study, we assessed the effectiveness of Subtenons Triamcinolone injection of (20mg) in 10 eyes of 5 patients with VKH syndrome. All the patients were prescribed topical difluprednate eyedrops 4 times a day for a month. The improvement in visual acuity, fundus, and OCT findings and recurrences of inflammation were noted. All patients had a minimum of one-year follow-up.

Results: Subtenons Triamcinolone injection resulted in significant improvement of vision within 3 days of treatment and near normal vision in 9 days along with reduction of subretinal fluid in the OCT. One patient alone needed a second dose of injection for one eye after one month following which subretinal fluid resolved completely.

Conclusions: This study shows that isolated Subtenon Triamcinolone injection can be considered as a primary treatment in VKH patients which avoids complications of systemic steroids but needs a large number of patients with longer follow-up.

P-RET-158

One case of juvenile idiopathic arthritis associated uveitis complicated cataract

*H. Zhang*¹

¹Shandong Provincial Hospital Affiliated to Shandong First Medical University, Jinan, China

Introduction: JIA is a common rheumatic immune disease in childhood, characterized mainly by chronic arthritis and accompanied by systemic involvement of multiple systems. Juvenile idiopathic arthritis associated uveitis (JIA-U) is a common and important extra-articular complication of JIA, which is one of the important causes of disability and blindness in childhood. JIA-U is a chronic, non-granulomatous uveitis that often affects the anterior segment, most of which are insidious onset. Complications that threaten vision have already appeared at the initial diagnosis. Cataract is the most common complication. Surgery is an effective treatment for JIA -U complicated cataract. However, there is still controversy internationally regarding whether to implant IOL.

Objectives: This case aims to analyze the treatment methods of JIA-U complicated cataract.

Methods: Case report.

Results: Immunosuppressive therapy combined with biological drugs control ocular and systemic inflammatory reactions. Surgical treatment is performed after stable uveitic eye quiescent (without flicker) for 3 months. The surgical methods is phacoemulsification combined with IOL implantation and, anterior vitrectomy and injecting Ozurdex into the vitreous cavity. After 3 months of surgery, the best corrected visual acuity is 1.0 in the both eyes and intraocular pressure (IOP) was 7 mmHg in the right eye and 16 mmHg in the left eye.

Conclusions: For the treatment of JIA -U complicated cataract, good outcomes can be achieved with appropriate preoperative planning, intraoperative considerations, and postoperative management. Perioperative use of systemic and topical corticosteroids is crucial.

P-RET-159

Retinitis punctata albescens and chronic kidney disease on the background of Bardet-Biedl syndrome: a rare case report

M. Kalbande¹, A. Tammewar¹, R. Naik¹, R. Kalantri¹, B. Dhage¹

¹Ophthalmology, Dr Vithalrao Vikhe Patil Foundation Medical College and Hospital, Ahmednagar, India

Introduction: Bardet–Biedl syndrome (BBS) is a rare monogenic, autosomal recessive, primary ciliopathy, multisystem disorder characterized by retinal dystrophy, obesity, postaxial polydactyly, renal dysfunction, learning difficulties, and hypogonadism. In this case report, we describe a rare presentation of BBS presenting as atypical retinitis punctata albescens and chronic kidney disease (CKD).

Objectives: To study a rare case presentation of BBS as bilateral Atypical Retinitis punctata albescens with left eye strabismic amblyopia and exotropia and Chronic kidney disease and its multidisciplinary approach to treat such patients.

Methods: A 12 year old girl of consanguineous marriage (third degree) presented to Paediatric's OPD with complaints of fever, cough, vomiting and decreased urination since 7 days from where she was referred to us in view of diminution of vision at night since 2 years. On examination she had periorbital and pedal edema, tachypnea, polydactyly, central obesity, dental crowding, high arched palate and delayed developmental milestones. On Ultrasonography bilateral small kidneys with increased cortical echotexture and loss of corticomedullary differentiation with hypoplastic uterus and hydrocolps was noted. On ocular examination left eye strabismic amblyopia was seen with exotropia and on fundus examination atypical retinitis punctata albescens characterised by bilateral retinal involvement with pale disc and arteriolar attenuation was found. Diagnosis was made clinically and was diagnosed as Chronic kidney disease in BBS and was started on hemodialysis. Right Eye patching (for 4 hours) with proper refraction was advised from ophthalmology side.

Results: The patient's visual impairment remained unchanged despite the extensive management approaches highlighting the challenging and progressive nature of BBS, particularly its ocular manifestations. Genetic counseling plays a crucial role in such case for proper family planning and for any anomaly detection. This rare presentation adds to the growing literature emphasizing the varied ocular phenotypes within the BBS spectrum and underscores the complexity of genetic interactions and molecular interactions involved in it.

Conclusions: Physicians must be aware of this syndrome, an early diagnosis and regular follow-ups can profoundly diminish morbidity and mortality in such a pleiotropic condition. Multidisciplinary approach involving nephrologists, ophthalmologists, endocrinologists, and geneticists is important in such patients.

P-RET-160

Characteristics of the vitreoretinal interface in IRVAN syndrome and long-term follow-up results after core vitrectomy

S. LI¹

¹Ophthalmology Department, The affiliated Xuzhou Municipal Hospital of Xuzhou Medical University, Xuzhou, China

Introduction: Idiopathic retinal vasculitis, aneurysms and retinitis of the optic nerve (IRVAN) is a rare ocular disease.

We found that patients with IRVAN syndrome had abnormal vitreoretinal interface. The retinal aneurysm subsided and the exudate was absorbed gradually after core vitrectomy, and vision improved significantly.

Objectives: To analyze the characteristics of the vitreoretinal interface in IRVAN syndrome and the long-term efficacy of minimally invasive core vitrectomy.

Methods: The data of 8 cases (16 eyes) with clinically confirmed IRVAN syndrome were reviewed, and the status of the posterior polar vitreoretinal interface was evaluated by analyzing OCT findings and reviewing the surgical video. Ten eyes in seven cases underwent minimally invasive axial vitrectomy with the aid of Triamcinolone (TA), with manual PVD and a complete removal of the posterior cortex and proliferating membrane on the optic disc surface. The rate of regression of the aneurysmal on the optic disc surface and peri-optic disc and the rate of hard exudate resorption were observed. The changes in visual acuity before and after the procedure were compared.

Results: All eight patients were female, aged 9-41 years, and all had bilateral ocular onset. In all patients, the fundus of the eye showed red aneurysmal dilated arteries on the surface of the optic disc and at the bifurcation of the peri-optic disc arteries with peri-optic disc and/or macular exudate. The diagnosis of IRVAN syndrome was confirmed according to the diagnostic criteria and staging: stage II in 12 eyes of 6 cases, stage III in 3 eyes of two cases. In the 10 eyes with vitrectomy, 8 eyes were stage II and 2 eyes were stage III; post-operation follow-up ranged from 3 to 12 years, with a mean of 7 years; Visual acuity improved in 9 of 10 eyes and no change in one eye. The rate of regression of aneurysms on and around the optic disc surface was 100%, as was the rate of absorption of hard exudate. In contrast, the dilated aneurysm on the surface of the optic disc and the hard exudate on the peri-optic disc did not change significantly in the four eyes that were not operated, although the condition was largely controlled after fundus laser and corticosteroid treatment.

Conclusions: Minimally invasive core vitrectomy with TA assistance to remove the abnormal vitreoretinal interface at the posterior pole of IRVAN syndrome is an effective method to regress retinal aneurysms, induce exudate absorption and restore visual function.

P-RET-161

Biomarkers in OCT

V. Singh¹, A. Sardana¹, A. Rawat¹, S.P. Singh², K. Singh², R. Shakya³

¹Department of Ophthalmology, RIO Prayagraj and Moti Lal Nehru Medical College, Manohar Das Eye Hospital, Reigonal Institute of Ophtahlmology, Prayagraj, India, ²Ophthalmology, MLN Medical College, Prayagraj, India, ³Ophthalmology, Sadguru Netra Chikitsalay, Chitrakoot, India

Introduction: DR is one of the leading causes of blindness worldwide in working adult age groups.^[2] DR naturally progresses from non-proliferative abnormalities to proliferative diabetic retinopathy (PDR), characterized by neovascularization involving disc (NVD) or neovascularization elsewhere (NVE). The leading cause of vision loss in DR patients is Diabetic Macular Oedema (DME). DME is characterized by retinal thickening and oedema, which can develop in all stages of retinopathy. Any abnormal pooling of extracellular fluid may result in displacement of the spatial relationships between retinal neuronal components. Optical coherence tomography (OCT) provides retinal sectional images as in histology study, and is useful for qualitative and quantitative evaluation of pathological retinal changes. The purpose of this study is to establish OCT biomarker DROL (Disruption of Retinal Outer Layers), PROS (Photoreceptor Outer Segment Length), SND (Subfoveal Neuroretinal Detachment) and Hyperreflective walls of foveal cystoid spaces as predictors of visual acuity and central macular thickness in diabetic macular oedema treated with intravitreal ranibizumab.

Objectives: This study aims to establish DROL (Disruption of retinal outer layers), PROS (Photoreceptor outer segment length), SND (Subfoveal neuroretinal detachment) and hyperreflective walls of foveal cystoid spaces (HRW) as Optical Coherence tomography (OCT) biomarkers and predictors of central macular thickness (CMT) and visual acuity in diabetic macular oedema (DME) treated with intravitreal ranibizumab (IVR).

Methods: In this prospective, interventional study done at a tertiary care center over a span of one year from December 2021 to December 2022, a total of 50 eyes of 46 patients of DME were included. Visual acuity and Spectral domain OCT imaging was done at baseline. Using inbuilt callipers on SD-OCT, horizontal extent of DROL and vertical extent of PROS were measured manually. SND and HRW were assessed qualitatively. IVR was administered and patients were followed up at 4, 8 and 12 weeks.

Results: The eyes without DROL had statistically significant ($p < 0.05$) lesser CMT and better BCVA (Best corrected visual acuity) ($p < 0.05$) after pro re nata injection of IVR. There was positive correlation of extent of baseline DROL with final CMT ($p < 0.05$) and final logMAR BCVA ($p > 0.05$), whereas negative correlation with extent of baseline PROS with final CMT ($p < 0.05$) and final logMAR BCVA ($p > 0.05$). Presence of HRW and SND predicted non-resolution of CMT and worse visual acuity after treatment with IVR in DME.

Conclusions: DROL, PROS, SND and hyperreflective walls of foveal cystoid spaces may be utilized as qualitative as well as quantitative biomarkers to predict the post treatment CMT and visual acuity in DME.

P-RET-162

Solar Retinopathy: a case report

S. Biswas¹, U.S. Akbar²

¹Surgical retina, Chittagong Eye Infirmary and Training Complex, Chattogram, Bangladesh,

²Glaucoma, Chittagong Eye Infirmary and Training Complex, Chattogram, Bangladesh

Introduction: The human eye is exposed to ultraviolet B(280-315 nm), ultraviolet A(315-380 nm) and visible light(380-780 nm). With a meiosis of 2mm, a 30-second exposure to sunlight leads to the production of heat at a rate of 70 calories/sq.cm/minute, which is more than enough to produce a severe retinopathy experimentally.

Objectives: To report a case of solar retinopathy.

Methods: A 19 years old male presented to Chittagong eye infirmary and Training complex with a 4-day history of bilateral central scotoma following 10-15 minutes of direct sun-gazing during the solar eclipse on 26th December 2019. On general examination, he was of normal built and height for his age. Upon ocular examination, his BCVA was 6/9 in both eyes. Slit-lamp microscopic examination showed clear cornea in both eyes. Pupils of both eyes were within the normal limit. Lens was also within the normal limit in both eyes. Fundus examination revealed discrete yellow lesions at the fovea of both eyes. Optical coherence tomography scanning showed corresponding retinal pigment epithelial defects in both eyes.

Results: . The patient was managed conservatively with regular follow-up and counseling was done regarding guarded visual prognosis.

Conclusions: Observing a solar eclipse can lead to permanent eye damage. Public awareness of the dangers should be encouraged.

P-RET-163

Clinical characteristics and genotyping of retinal and macula dystrophy patients in a South-east Asian setting

C.M. Chan¹, Y. Bylstra², S. Kam³

¹Medical Retina, Singapore National Eye Centre, Singapore, Singapore, ²Precision Institute of Medicine, Singapore, Singapore, ³KK Womens and Childrens Hospital, Singapore, Singapore

Introduction: The majority of published data on inherited retinal dystrophies are in caucasian populations, with very limited data coming from Asia. This paper aims to describe the clinical characteristics and genotyping findings in a South-east asian population.

Objectives: To describe the clinical characteristics and analyse the genome of consecutive inherited retinal dystrophy and/or macula dystrophy patients presenting to an Inherited Retinal Dystrophy clinic in South-east Asia.

Methods: Four hundred and fifty consecutive patients with retinal and/or macula dystrophy underwent detailed clinical phenotyping including taking a detailed history, drawing up of a family pedigree, visual acuity, colour vision, refraction, OCT macula scans, colour fund photographs, macula autofluorescence imaging, wide field colour and autofluorescence imaging, Goldmann visual field perimetry and electrophysiology. Informed consent was obtained. All patients underwent whole exome genome sequencing. A multidisciplinary team consisting of geneticists, genetic counsellors, ophthalmologists and bioinformatics specialists discussed the results and the variants were classified according to the American College of Medical Genetics and Genomics (ACMG) standards.

Results: The age of the patients ranged from 8 to 72 years of age, with the age at diagnosis ranging from 8 to 61 years. Fifty-four percent of the cohort were males and 46% were females. Eighty-four percent of the cohort were Chinese, 8 percent Indian while 6 percent were Malay. Thirty-five percent of our cohort had mutations in USH2A, EYS and ABCA4. Mutations in ten genes accounted for 55% of our cohort. These genes were USH2A, EYS, ABCA4, PRPH2, CRB1, GUCY2D, RP1, CYP4V2, PROM1 and RP1L1. The most prevalent variant was found to be c.6416G>A p.C2139Y in EYS. This same variant was the second most frequent variant in the Chinese population. Twenty-four percent of our cohort presented in their second decade of life, with 32 percent of our cohort presenting at age 20 years or younger.

Conclusions: The most prevalent variant found in our Singapore cohort was c.6416G>A p.C2139Y in EYS. This same variant was found to be the second most frequent variant in the Chinese population, but was not amongst the top ten most frequent variants in two other East Asian cohorts, namely the Korean and Japanese populations.

In a significant number of cases, genotyping in this cohort revealed variants not expected for the clinical phenotype, showing the important role of genotyping.

P-RET-164

Associations of choroidal alterations and early neurodegeneration in diabetes without diabetic retinopathy

Z. Li¹, Y. Lan¹, F. Yang¹, X. Deng¹, Y. Yang², H. Gong¹

¹Ophthalmology, Sun Yat-sen Memorial Hospital, Sun Yat-sen University, Guangzhou, China, ²Beijing Hospital/National Center of Gerontology of National Health Commission, Beijing, China

Introduction: previous studies suggest that retinal neurodegenerative changes precede detectable retinal microvascular damage. A meta-analysis has shown a decrease in subfoveal choroidal thickness (SFCT) of diabetes without diabetic retinopathy (non-diabetic retinopathy, NDR). There is still a lack of research analyzing the relationship between decreased choroidal perfusion and neurodegenerative changes in NDR patients. Currently, the maximum detection depth of the TowardPi Ultra-widefield swept-source optical coherence tomography angiography (SS-OCTA) is 6mm, providing significant advantages over traditional OCT in choroidal thickness assessments.

Objectives: To identify associations between choroidal alterations and the reduction of peripapillary retinal nerve fiber layer (pRNFL) thickness in NDR patients by TowardPi SS-OCTA.

Methods: This retrospective cross-sectional study included 143 eyes from 83 NDR patients and 124 eyes from 82 matched healthy controls. Ultra-widefield SS-OCTA was used to automatically measure retinal layers thickness, choroidal thickness (ChT), retinal vascular density, and choroidal vascular metrics. Data were analyzed using Student t-tests, generalized estimating equations and generalized linear mixed models.

Results: NDR patients exhibited significant reductions in perifoveal ChT (e.g., perifoveal inferior region: $253.42 \pm 86.59 \mu\text{m}$ vs. $281.01 \pm 80.25 \mu\text{m}$, $P=0.026$ in GEE-test) compared to the controls. The NDR group showed significant decrease in the choroidal vascular index (CVI) ($29.73 \pm 4.18\%$ vs. $31.29 \pm 4.16\%$, $P=0.012$ in GEE-test), and increase in the choroidal stromal index (CSI) ($70.27 \pm 4.18\%$ vs. $68.71 \pm 4.16\%$, $P=0.012$ in GEE-test). The superficial and deep retinal vascular densities in the NDR group did not show significant changes compared to the control group (all P values >0.05). The average pRNFL thickness significantly decreased in NDR patients ($114.58 \pm 11.88 \mu\text{m}$ vs. $120.25 \pm 16.36 \mu\text{m}$, $P=0.005$ in GEE-test). The thickness of outer nuclear layer (ONL) and total retina significantly decreased in NDR patients ($P < 0.05$). In multivariate models, ChT was significantly correlated with pRNFL thickness ($\beta=0.041$, $P=0.001$), even after adjusting by confounding factors ($\beta=0.056$, $P=0.001$).

Conclusions: In NDR, there were decreases in ChT, CVI, pRNFL thickness and ONL thickness. Diabetic choroidopathy may precede diabetic retinopathy. The reduction in ChT was independently associated with the reduction in pRNFL thickness, suggesting that ChT could serve as a predictor of retinal neurodegeneration in NDR.

P-RET-165

Relationship between choroid vascular engorgement and extension and pigment epithelial detachment in neovascular AMD

T. Liu¹, X. Yuan¹

¹Eye Institute of Shandong First Medical University, Eye Hospital of Shandong First Medical University (Shandong Eye Hospital), Jinan, China

Introduction: PEDs represent a common manifestation in AMD, but the pathogenesis of the different types of PED is poorly understood and there are no targeted treatment options, which can lead to severe vision loss.

Objectives: To describe the characteristics of various pigment epithelial detachment (PED), and evaluate Choroid vascular anomalies in patients with age-related macular degeneration (AMD) related PED using ultra-widefield imaging.

Methods: In this Cross-sectional Study, The included 136 eyes were divided into the neovascular PED (NV-PED) and non NV-PED group. There were 45 cases of type 1 macular neovascularization (MNV), 11 cases of type 3 MNV, and 42 cases of polypoid choroidal vascular disease (PCV) in NV-PED. The vortex vein engorgement (EVV) quadrants were assessed using the UWF red channel imaging and analyzed for correlation with the different types of NV-PED.

Results: The optical coherence tomography (OCT) characteristics were significantly different between the two groups but within the NV-PED group, only the height and subfoveal choroidal thickness (SFCT) differed. Patients with PCV presented a higher PED ($p < 0.001$) than type 1 MNV, and a thicker SFCT than the other two groups ($p < 0.001$). The ultra-widefield images demonstrated that NV-PED might have a pathological connection with AMD and PCV and could occur in any region throughout the retina. The type 3 MNV ($P < 0.001, P = 0.001$, respectively) and PCV ($P < 0.001, P < 0.001$, respectively) showed an increased number of quadrants with EVV and extended EVV (EEVV) than type 1 MNV in UWF images. moreover the type of PED was well-correlated with the EVV and EEVV quadrants ($P < 0.001$, $r_s = 0.53, 0.51$).

Conclusions: The ultra-widefield images showed that AMD-related PED extended beyond the macular, and various types of NV-PED may be associated with choroidal circulation disorders, particularly vortex vein abnormalities, and may interrelate as the disease progresses. The ultra-widefield red channel imaging may noninvasively contribute to further understanding of NV-PED pathogenesis.

P-RET-166

Intraocular recurrence in primary vitreoretinal lymphoma

S. Liu¹, T. Jiang¹, Q. Chang¹

¹Department of Ophthalmology, Fudan University Eye and ENT Hospital, Shanghai, China

Introduction: Primary vitreoretinal lymphoma (PVRL) is a highly malignant non-Hodgkin's lymphoma that can involve the vitreous, retina, and optic nerve head and is classified as a type of central nervous system lymphoma (CNSL). Recurrence is a feature of CNSL, and the prognosis of relapsed CNSL is generally poor. Intraocular recurrence, while not uncommon in CNSL, has been observed to possess unique characteristics when compared to CNS relapses. However, the literature on intraocular recurrence of PVRL is limited, and the reported rates of intraocular recurrence have varied significantly in previous studies.

Objectives: To investigate the prognosis, risk factors and clinical features of the intraocular recurrence in PVRL.

Methods: This study included 97 eyes of 51 patients with PVRL from 2011/12 to 2021/1. Intraocular recurrence was defined as the onset or progression of ocular lesions after the completion of treatments. Patients were divided into two groups based on whether they had an intraocular recurrence, with no significant differences in follow-up duration between the groups. Demographic and ophthalmic data, diagnostic test results, treatments, and prognosis of the two groups were collected and compared. Independent risk factors were identified using logistic regression, and cut-off values were determined using receiver operating characteristic curve analysis.

Results: 14 (19 eyes) of 51 PVRL patients had intraocular recurrences, resulting in a recurrence rate of 27.5% over a mean follow-up period of 42.5 months. No difference was observed in the survival outcomes or CNS condition between the two groups. Younger onset age (odds ratio [OR] 0.90, 95% confidence intervals [CI] 0.84-0.98, $p=0.010$), isolated PVRL (OR 35.3, 95%CI 2.08-600.0, $p=0.014$), and no history of intravitreal chemotherapy (OR 7.72, 95%CI 1.37-43.6, $p=0.021$) were identified as independent risk factors. Of the patients with intraocular recurrence, 23.6% were asymptomatic. The rate of interleukin-10 (IL-10) /IL-6 >1 was significantly lower than that at diagnosis (43.8% vs. 92.3%, $p=0.008$). However, the rate of IL-10 ≥ 50 pg/mL was high (81.3%) and not significantly different from that at diagnosis.

Conclusions: This study did not identify the impact of intraocular recurrence on CNS condition or survival in PVRL patients. Younger patients have a higher risk of intraocular recurrence, and combined systemic and intravitreal chemotherapy may reduce this risk. Regular ophthalmic follow-up and IL-10 testing are advised to detect intraocular recurrence.

P-RET-167

Ocular syphilis: case series (2016-2023) from 2 tertiary care centres in Montreal, Canada

A. Hocini¹, M. Hébert², E. Celo³, S. Trottier³, L. Jaworski^{3,4}, M.-J. Aubin^{3,5,6}

¹Faculty of Medicine, Université de Montréal, Montreal, Canada, ²Department of Ophthalmology, Faculty of Medicine, Université Laval, Québec, Canada, ³Department of Ophthalmology, Faculty of Medicine, Université de Montréal, Montreal, Canada, ⁴University Ophthalmology Centre, CHUM, CIUSSS du Centre-Sud-de-l'Île-de-Montréal, Montreal, Canada, ⁵University Ophthalmology Centre, Hôpital Maisonneuve-Rosemont, CIUSSS-de-l'Est-de-l'Île-de-Montréal, Montreal, Canada, ⁶Department of Social and Preventive Medicine, School of Public Health, Université de Montréal, Montreal, Canada

Introduction: The prevalence of syphilis in Canada has seen a significant increase over the past 15 years. Often referred to as the "Great Masquerader" due to its wide array of possible presentations, it is crucial to consider this diagnosis in relevant cases. Without treatment, syphilis can lead to severe complications, including blindness.

Objectives: To describe the demographic characteristics, clinical presentation, prevalence of co-infection with the Human Immunodeficiency Virus (HIV), and treatment of patients with ocular syphilis who were treated at the ophthalmology department of two university hospitals in Montreal, Canada, and to examine the use of oral prednisone in the treatment of patients with ocular syphilis.

Methods: Review of records of 95 patients from 2016 to 2023, with a positive syphilis treponemal serology and a likely ophthalmological diagnosis associated with syphilis.

Results: Mean age of onset was 57 years, with a predominance of 82% of male subjects. The average visual acuity was 0.22 [0.04, 0.70] logMAR (approx. 20/40) at the initial examination and 0.10 [0.00, 0.40] logMAR (approx. 20/25) at the final examination ($p < 0.01$). HIV serological status was known for 74% of the subjects, with an HIV infection rate of 20%. Among the ocular diagnoses, 45% of patients had anterior uveitis, 18% had intermediate uveitis, 8% had posterior uveitis, 24% had panuveitis, 14% had optic nerve involvement, and 5% had episcleritis/scleritis. Both eyes were affected in 57% of patients. A lumbar puncture was performed in 54% of subjects, among whom 18% had a positive result in cerebrospinal fluid examination. Regarding treatment, 78% of patients were treated with the neurosyphilis antibiotic regimen, while 20% received oral prednisone.

Conclusions: Syphilis continues to be prevalent in Montreal, and it should always be considered in the differential diagnosis of ocular inflammation. In our cohort of patients treated at a tertiary care ophthalmology clinic, there was a statistically significant improvement in logMAR acuity between the first and last ophthalmology visits. It remains important to diagnose syphilis and co-infection with HIV, and to initiate treatment promptly.

P-RET-168

Peripapillary retinal nerve fiber layer thickness and vessel density in newly diagnosed SLE without ocular symptoms

*J. Li*¹

¹Ophthalmology, Peking University First Hospital, Beijing, China

Introduction:

SLE-associated optic neuropathy may threaten vision if not promptly and properly treated. It is pivotal to recognize the early changes of optic nerve at a subclinical level. Our study is the first investigation applying optical coherence tomography (OCT) and OCT angiography (OCTA), which are non-invasive and reliable techniques, to detect the primary changes of structure and microcirculation of the optic nerve in newly diagnosed SLE patients without ocular symptoms.

Objectives:

This study aims to assess peripapillary retinal nerve fiber layer thickness (pRNFLT) and peripapillary vessel density (PVD) in patients with newly diagnosed active and inactive systemic lupus erythematosus (SLE) by OCT and OCTA.

Methods:

A cross-sectional study, in which 77 newly diagnosed SLE without ocular symptoms (including 36 active SLE patients and 41 inactive SLE patients) and 72 age- and gender-matched healthy subjects were recruited. All participants underwent OCT and OCTA to evaluate pRNFLT, PVD, and radial peripapillary capillary density (RPCD), respectively. Clinical data at the time of initial diagnosis of SLE, including erythrocyte, leukocyte, platelet, albumin-globulin ratio, erythrocyte sedimentation rate, C-reactive protein, serum complement 3, serum complement 4, anti-dsDNA antibody, and 24-h proteinuria, were collected.

Results:

No difference was found in pRNFLT between active SLE patients, and healthy controls, average pRNFLT, superonasal RNFLT, and inferonasal pRNFLT were reduced in inactive SLE patients than in healthy controls ($p \leq 0.008$). Temporal PVD, inferotemporal PVD, and inferotemporal RPCD in active SLE patients were significantly lower than those in healthy controls ($p \leq 0.043$). There also was a trend towards lower temporal RPCD in active SLE than healthy controls ($p = 0.089$). Average PVD, average RPCD, superonasal RPCD, inferonasal RPCD, and inferotemporal RPCD were decreased in inactive SLE patients than in healthy controls ($p \leq 0.047$). Additionally, inferotemporal RPCD in active SLE patients was positively associated with albumin-globulin ratio ($p = 0.041$). Temporal RPCD was negatively correlated with anti-dsDNA antibody ($p = 0.012$) and 24-h proteinuria ($p = 0.006$).

Conclusions:

PRNFL and PVD damage existed in newly diagnosed SLE patients without ocular symptoms. Temporal and inferotemporal RPCD were associated with the laboratory indicators of impaired renal function in active SLE patients, respectively.

P-RET-169

T&E versus PRN regimen of conbercept for neovascular age-related macular degeneration: results from COCOA

*M. Zhao*¹

¹Ophthalmology, Peking University People's Hospital, Beijing, China

Introduction: Conbercept is an anti-VEGF agent and the efficacy in treating nAMD has been proved. However, the treatment mode still needs to be further explored. To determine which treatment option was preferable and would thereby increase compliance and maintain long-term visual acuity, we conducted the COCOA study, a Prospective, Open-Label, Multicenter, Randomized Phase IV Clinical Trial to compare the three-dose T&E (3+T&E) regimen with a three-dose PRN (3+PRN) regimen with regard to the efficacy and safety of conbercept in Chinese patients with nAMD.

Objectives: To compare the efficacy and safety of two regimens of conbercept—a three-dose treat-and-extend (3+T&E) regimen and a three-dose pro re nata (3+PRN) regimen—in Chinese patients with neovascular age-related macular degeneration (nAMD).

Methods: Patients who had not received anti-vascular endothelial growth factor (VEGF) intraocular injections within 3 months before enrollment were randomly assigned to receive either the 3+T&E or 3+PRN regimen. The 3+T&E recipients received at least three monthly doses until exudative disease activity was no longer evident clinically and on optical coherence tomography; the interval between visits was then extended per a strict prospective protocol. The primary outcome was mean change in best corrected visual acuity (BCVA) from baseline to week 48, with a prespecified noninferiority margin of 4 letters.

Results: Of the 493 participants (248 receiving 3+T&E; 245, 3+PRN), 25.8% receiving 3+PRN and 29.0% receiving 3+T&E had been treated previously with anti-VEGF intraocular injection. At 48 weeks, the mean BCVA letter improvement was +9.9 among the 3+PRN recipients and +8.6 among the 3+T&E recipients ($P = 0.208$). Improvements in ≥ 15 letters were obtained by 32.12% of 3+PRN recipients and 30.77% of 3+T&E recipients ($P = 0.827$). The mean number of injections was 6.4 among 3+PRN recipients and 6.9 among 3+T&E recipients ($P = 0.028$). The mean intervals between injections from baseline to week 48 were 7.46 weeks in the 3+T&E group and 6.93 weeks in the 3+PRN group ($P = 0.010$). Of all patients, 25 (5%) had drug-related adverse events, including ocular events in 14 (2.8%; 7 in each treatment group) and cardiovascular events in 2 (0.4%).

Conclusions: Conbercept, administered in either the 3+T&E or 3+PRN regimen, produced functional and anatomic improvements in Chinese patients with nAMD. The 3+T&E regimen was noninferior to 3+PRN in improving BCVA from baseline to week 48 and enabled longer injection intervals.

P-RET-170

Alibercept 5+PRN with PRP in the treatment of proliferative diabetic retinopathy and diabetic macular edema

S. Li¹, H. Wang¹, Y. Tao², M. Yang¹, H. Zhao¹, M. Si¹, W. Cui¹

¹Ophthalmology, Qilu Hospital of Shandong University, Jinan, China, ²Ophthalmology, The Second People's Hospital of Jinan, Jinan, China

Introduction: Many anti-vascular endothelial growth factor (VEGF) drugs exist, determining a standardized loading dose and administration interval for the intravitreal injection of aflibercept for DR treatment is challenging. In cases of deteriorated retinal anatomy and function, the administration interval needs to be shortened. Therefore, this study aimed to compare the safety and efficacy of retinal laser photocoagulation (PRP) and PRP with intravitreal injection of aflibercept (3+PRN or 5+PRN) for patients with high-risk proliferative DR (PDR).

Objectives: This study aimed to investigate and compare the efficacy and safety of retinal laser photocoagulation (PRP) alone, PRP with aflibercept 3+PRN, and PRP with aflibercept 5+PRN in patients with both high-risk proliferative diabetic retinopathy (PDR) and diabetic macular edema (DME).

Methods: Overall, 170 patients with high-risk PDR and DME (170 eyes from 170 patients) who visited our ophthalmology clinic from December 2018 to December 2020 were divided into the PRP (n=58), aflibercept 5+PRN with PRP (n=53), and aflibercept 3+PRN with PRP (n=59) groups. General information, such as age, sex, and eye category, was obtained. Moreover, best-corrected visual acuity (BCVA), baseline central macular foveal thickness (CFT), microaneurysm (MA), area of neovascularization (NV), area of hard exudate (HE), and cytokine levels in aqueous humor before and after treatment, were assessed. Differences were considered statistically significant at $P < 0.05$.

Results: After treatment, no significant improvement in the BCVA (logMAR) of patients in the PRP group was observed. The BCVA (log MAR) decreased from 0.72 ± 0.17 and 0.74 ± 0.17 to 0.50 ± 0.13 and 0.53 ± 0.17 in PRP with aflibercept 5+PRN and PRP with aflibercept 3+PRN groups, respectively, with a statistically significant difference compared to those in the PRP group ($P < 0.05$ in all cases). However, no statistically significant difference was observed between the combined treatment groups ($P > 0.05$). The CFT in the PRP-only group decreased slightly from 361.80 ± 36.70 mm to 353.86 ± 40.88 mm, with no statistically significant difference ($P > 0.05$), whereas the CFT in the aflibercept 5+PRN with PRP and aflibercept 3+PRN with PRP groups decreased from 356.57 ± 37.57 mm and 358.17 ± 44.66 mm to 284.87 ± 31.52 mm and 303.19 ± 37.00 mm, respectively, with statistically significant differences before and after treatment ($P < 0.05$ for both groups). Statistically significant differences were observed in CFT between the three groups after treatment ($P < 0.05$ in all cases). The number of MA (pcs) in the PRP, aflibercept 5+PRN with PRP, and aflibercept 3+PRN with PRP groups decreased from 118.34 ± 27.96 , 118.60 ± 33.34 , and 116.59 ± 28.95 to 92.95 ± 29.04 , 44.60 ± 20.73 , and 54.26 ± 25.43 , respectively. The two-way comparison of the three groups revealed statistically significant differences in MA ($P < 0.05$ in all cases). In the three groups, NV decreased from 1.00 ± 0.21 mm², 1.01 ± 0.18 mm², and 0.98 ± 0.20 mm² before treatment to 0.49 ± 0.17 mm², 0.31 ± 0.16 mm², and 0.38 ± 0.14 mm², respectively, with statistically significant differences ($P < 0.05$ in all cases). After 12 months of treatment, 13, 18, and 18 patients had reduced HE area in the PRP-only, aflibercept 5+PRN with PRP, and aflibercept 3+PRN with PRP groups, respectively, with statistically significant differences ($P < 0.05$ in all cases). After 12 months of treatment, vascular endothelial growth factor, monocyte chemoattractant protein-1, and glial fibrillary acidic protein levels (pg/mL) in the aqueous humor decreased in both combined treatment groups compared with that at baseline, with statistically significant differences; however, no significant difference was observed between the two combined treatment groups ($P > 0.05$).

Conclusions: Aflibercept 5+PRN combined with PRP was safe and effective in treating patients with high-risk PDR and DME, and was more effective than PRP only and aflibercept 3+PRN with PRP in improving CFT and MA.

P-RET-171

Observational study of DWOP in myopic young people based on ultra-wide-field SS-OCTA and wide-field fundus photography

X. Ning¹, H. Leng¹, L. Chen¹, C. Guo¹, J. Zhong^{1,2}, J. Li^{1,2}

¹Ophthalmology, Sichuan Provincial People's Hospital, University of Electronic Science and Technology of China, Chengdu, China, ²School of Medicine, University of Electronic Science and Technology of China, Chengdu, China

Introduction: Dark without pressure (DWOP) is an asymptomatic and variable hypopigmented lesion observable at the fundus. On optical coherence tomography (OCT), the affected area displays a decreased or absent reflectance in the ellipsoid zone. Currently, the exact mechanism of DWOP remains unclear, and there is no research describing the distribution characteristics and patterns of DWOP.

Objectives: This study aimed to investigate the incidence of dark without pressure (DWOP) in a young myopic group based on ultra-wide-field swept-source optical coherence tomography angiography (SS-OCTA) and wide-field fundus photography, and to explore the quantitative changes in DWOP.

Methods: A total of 218 young subjects (355 eyes) with an average age of 27.01 ± 4.67 years were recruited, including 64 males (29.36%) and 154 females (70.64%). Examinations, including comprehensive ophthalmic examination, wide-field fundus photography and ultra-wide-field SS-OCTA (24mm×20mm), were conducted for each eye. Divided into emmetropia group ($SE \geq -0.5$ D), mild myopia group (-3.0 D $\leq SE < -0.5$ D), moderate myopia group (-6.0 D $\leq SE < -3.0$ D), and high myopia group ($SE < -6$ D) according to the spherical equivalent. The DWOP of 22 eyes was within the ultra-wide-field SS-OCTA scanning range, and the vessel density and thickness of the retina and choroid were quantitatively analyzed.

Results: The incidence rates of DWOP in the young myopia group was 27.32%, and the incidence of DWOP in the high myopia group (50.42%) was significantly higher than that in the emmetropia group (11.13%) ($p < 0.001$). DWOP was most common in the inferotemporal midperiphery, accounting for 33.15%, and was most common at 8:30 to 9:00, with an incidence of 8.91%. The total retinal thickness in DWOP region was 201.50 (191.75, 213.00) μm , which decreased by 5 μm compared with 206.50 (197.75, 214.25) μm in normal area ($p = 0.04$). The thickness of outer retina layer was 153.50 (147.00, 159.00) μm , which decreased by 2.5 μm compared with 156.00 (151.00, 160.00) μm in normal area ($p < 0.01$). The vessel density of the choroidal capillary layer was 49.00 (46.00, 51.00) %, which decreased by 1% compared with 50 (46.00, 52.00) % in normal area ($p = 0.036$).

Conclusions: DWOP most commonly occurs in high myopic eyes, and is mainly distributed in the inferotemporal midperiphery area. Compared to normal regions, the DWOP area exhibits thinning in both the retinal total layer and outer retinal layer thickness, along with a reduction in choroidal capillary layer vessel density.

P-RET-172

Comparison of the efficacy of bevacizumab alone or combined with suprachoroidal triamcinolone for diabetic macular edema

A. Hanif¹, M.A. Tahir¹

¹Department of Ophthalmology, Jinnah Postgraduate Medical Centre, Karachi, Pakistan

Introduction: Treatment modalities for diabetic macular edema (DME) have been evolving with time, with intravitreal anti-vascular endothelial growth factor (anti-VEGF) injections now being the first line of treatment. More recently, suprachoroidal triamcinolone acetonide (SCTA) has been emerging as an attractive and cost-effective adjunctive pharmacotherapy for DME.

Objectives: To compare the mean change in central subfield thickness (CST) after intravitreal bevacizumab (IVB) alone or in combination with suprachoroidal triamcinolone acetonide (SCTA) in diabetic macular edema (DME).

Methods: In this ongoing prospective non-randomized controlled trial, 60 eyes of patients aged at least 18 years, of either gender, with DME diagnosed on a swept-source optical coherence tomography (SS-OCT) with a CST of > 300µm were enrolled in the study. Group A, the monotherapy arm received IVB alone and Group B, the combination arm received IVB with a single dose of SCTA. SCTA was administered in a dosage of 4mg in 0.1ml in the suprachoroidal space (SCS) in a custom-made 30G needle. Ophthalmic assessments were repeated four weeks post-intervention and mean change in CST was determined between both groups.

Results: The mean age of the cohort was 54.53 ± 12.89 years. Out of the 60 subjects, 45 (75.0%) were females and 15 (25.0%) were males. The mean pre-intervention CST was 530.80 ± 9.11 µm in Group A and 532.27 ± 9.08 µm in Group B. Significant reductions in the CST were noted in both treatment arms. The mean change in central subfield thickness (CST) in group A and group B were 76.50 ± 7.91 and 167.77 ± 12.41 µm respectively (p-value = 0.0001)

Conclusions: In eyes with DME, the mean reduction in central subfield thickness (CST) is higher after IVB with SCTA as compared to IVB alone. Significant improvements in CST demonstrated that the synergistic effects of SCTA to costly anti-VEGFs show promising results in the management of DME. Longer follow-ups are required to evaluate the efficacy of this treatment modality in a resource-limited country like Pakistan to improve cost-effectiveness.

P-RET-173

Immune checkpoint VISTA functional expression on neutrophils correlates with disease activity in autoimmune uveitis

Y. Qian¹, S. Zhang², Z. Zhang³, H. Chen², M. Zhang¹

¹Department of Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China, ²Department of Immunology, Key Laboratory of T Cell and Immunotherapy, Institute of Basic Medical Sciences, Chinese Academy of Medical Sciences and School of Basic Medicine, Peking Union Medical College, State Key Laboratory of Medical Molecular Biology, Beijing, China, ³Department of Ophthalmology, Tianjin Key Laboratory of Retinal Functions and Diseases, Tianjin Branch of National Clinical Research Center for Ocular Disease, Eye Institute and School of Optometry, Tianjin Medical University Eye Hospital, Tianjin, China

Introduction: Novel immune checkpoint VISTA is believed to have unique expression patterns and nonredundant immune regulatory roles in various autoimmune disease animal models. However, it has scarcely been studied in human patients, and there is still a lack of studies in autoimmune uveitis.

Objectives: The objectives of this study were to detect the expression profile of VISTA in patients and mice with autoimmune uveitis, and investigate its regulatory functions in the development of the disease.

Methods: The functional expression of VISTA was first measured in experimental autoimmune uveitis (EAU) mice. Next, a first-stage cross-sectional study and a second-stage self-controlled case series study were conducted in patients with autoimmune uveitis to identify the expression profile of VISTA. Differentially expressed cell subtypes and their clinical significance were analyzed. The results were independently confirmed in EAU mice. Last, neutrophils from healthy volunteers and autoimmune uveitis patients were used for in vitro functional studies. Neutrophil activation and neutrophil extracellular traps (NETs) formation were evaluated after treatment with a VISTA agonist and antagonist.

Results: VISTA expression was markedly reduced in EAU mice, and reached the lowest level in their active stage. Of patients with autoimmune uveitis, VISTA expressions were lower in all subsets of peripheral blood myeloid and lymphoid cells, and were significantly decreased in CD14⁺ monocytes and CD16⁺CD62L⁺ neutrophils. Both the cross-sectional study and self-controlled case series revealed a significant correlation between VISTA expression and disease activity, but showed no relationships with other clinical parameters. Similarly, neutrophilic VISTA was significantly reduced in the peripheral blood and spleen of active EAU. Moreover, treatment with a VISTA antagonistic monoclonal antibody significantly induced neutrophil activation and NETs formation, whereas a VISTA agonist decreased cell activation and dsDNA concentration.

Conclusions: VISTA expression is decreased in patients with autoimmune uveitis and EAU mice, and is significantly correlated with disease activity. Reduced VISTA expression on neutrophils induces neutrophil activation and NETs formation. This study for the first time provides several lines of evidence demonstrating that diminished VISTA may be implicated in the pathogenesis of autoimmune uveitis.

P-RET-174

Correlation between hyperreflective intraretinal spots and inflammatory factors in prediabetes/diabetes patients

H. Guan¹, Y. Meng¹

¹Eye Institute, Affiliated Hospital of Nantong University, Nantong, China

Introduction: Diabetic retinopathy (DR) is a complication of diabetes mellitus (DM). Retinal glial cells are retinal resident monocytes which can be activated by hyperglycaemia before clinical signs of DR. Activated glial cells can be recognized as hyperreflective intraretinal spots (HRS) in optical coherence tomography (OCT) images.

Objectives: This study aimed to explore the counts of HRS in OCT images of Pre-DM and DM patients, and the correlation with inflammatory factors in different body humors.

Methods: The study was a prospective cross-sectional survey. 150 age-related cataract (ARC) patients were included from ophthalmology department, the affiliated hospital of nantong university, including 30 control patients with simple ARC, 30 Pre-DM patients without DR, 30 DM patients without DR, 30 patients with non-proliferative DR (NPDR) and 30 patients with proliferative DR (PDR). HRS was observed by OCT preoperatively. Samples were collected before phacoemulsification or vitreous cavity drug injection. Levels of inflammatory factors in serum, tear and aqueous humor were measured by enzyme-linked immunosorbent assay. Correlation between HRS and inflammatory cytokines level were calculated by Spearman's correlation.

Results: HRS positivity rate was 0% in control patients, 83.3% in Pre-DM patients, and 100% in DM, NPDR and PDR patients. Average counts of HRS were 0.00 ± 0.00 (control), 3.78 ± 2.11 (Pre-DM), 4.47 ± 2.29 (DM), 13.23 ± 4.15 (NPDR) and 15.73 ± 5.33 (PDR). In all patients, levels of vitreous MCP-1 had the highest correlation with count of HRS ($r=0.914$, $P<0.05$). In Pre-DM group, the levels of vitreous CSF-1 had the highest correlation with count of HRS ($r=0.588$, $P=0.0006$). In DM group, levels of vitreous ICAM-1 had the highest correlation with count of HRS ($r=0.603$, $P<0.05$).

Surprisingly, no significant correlation was found between the count of HRS and inflammatory factors in NPDR patients ($P>0.05$). In PDR group, the levels of vitreous CSF-1 had the highest correlation with count of HRS ($r=0.901$, $P<0.05$).

Conclusions: HRS were found in most patients with excessive blood glucose, including Pre-DM patients. HRS also correlated with levels of inflammatory factors in body humors, indicating that inflammation and microglial activation was involved in the early stage of blood glucose elevation. HRS may be an early imaging indicator for pre-diabetic and diabetic retina.

P-RET-175

IL-36Ra signaling ameliorate RNV and leakage by regulating the function of VEC/VPC in oxygen-induced retinopathy mice

*A. Sui*¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Zhejiang Provincial Key Laboratory of Ophthalmology, Zhejiang Provincial Clinical Research Center for Eye Diseases, Zhejiang Provincial Engineering Institute on Eye Diseases, Hangzhou, China

Introduction: Interleukin-IL-36Ra (IL-36Ra) plays an important role in regulating various inflammatory or carcinogenic processes in the skin, lungs, kidneys, liver, and intestines, however, the exact mechanism of action in retinal neovascularization (RNV) remains unclear.

Objectives: The objectives of this study were to determine the role and underlying mechanism of IL-36Ra signaling in regulating RNV in oxygen-induced retinopathy (OIR) mice.

Methods: Expression levels of IL-36Ra signaling were detected by immunofluorescence staining and western blotting in OIR mice. The retinas from OIR mice treated with recombinant IL-36Ra (rIL-36Ra) or phosphate buffer saline (PBS) were used to assess the areas of RNV by retinal flat-mounts after immunofluorescence staining retinal vascular leakage by Evans blue assay; evaluate the expression of vascular endothelial cell (VEC) and vascular pericyte (VPC) function-associated molecules by western blot; detect the number of endothelial cells and pericytes by immunofluorescence staining.

Results: Expression levels of IL-36Ra decreased in OIR mice. Inhibiting IL-36 signaling activation by rIL-36Ra significantly inhibited the formation of RNV and reduced leakage of RNV. Moreover, rIL-36Ra could regulate the expression of VEC and VPC function-associated molecules, such as VEGFR2, matrix metalloproteinase (MMP)2, MMP9, tissue inhibitor of metalloproteinases (TIMP)1, TIMP2, platelet-derived growth factor receptor- β (PDGFR- β), reduced the number of VECs and increased the number of VPCs.

Conclusions: IL-36Ra can regulate the function of VEC and VPC to ameliorate RNV and leakage, thereby opening new avenues to treat RNV-associated ocular diseases.

P-RET-176

Spatial and temporal patterns of hyalocyte migration in proliferative diabetic retinopathy and retinal vein occlusion

F. Ghaseminejad¹, P. Rissoli¹, Y. Chen¹, M.J. Ju¹, E. Navajas¹

¹Ophthalmology and Visual Sciences, University of British Columbia, Vancouver, Canada

Introduction: Hyalocytes are resident tissue macrophages present in the vitreous body of the eye. The vast majority of these cells are located posteriorly close to the internal limiting membrane (ILM), although they are also found in fewer numbers as free cells in the vitreous. The main role of hyalocytes is to remove cellular debris and maintain the transparency of vitreous. It has previously been shown that hyalocytes' density increases in retinal vasculopathies, which can present with macular edema, epiretinal membranes, and retinal neovascularization.

Objectives: To compare the quantity and spatial density of hyalocytes in patients with proliferative diabetic retinopathy (PDR), branch retinal vein occlusion (BRVO), central retinal vein occlusion (CRVO), and healthy subjects and to evaluate the temporal changes of these dynamic macrophages.

Methods: Optical Coherence Tomography Angiography (OCTA) images of the macular and temporal to the macula areas were acquired using SS-OCTA images using PlexElite 9000 (Carl Zeiss Meditec, Inc., Dublin, USA) from 4 groups: BRVO (n=10, age=72.96 ± 5.96 years, M:F = 7:3), CRVO (n=11, age=64.22 ± 13.32 years, M:F=4:7), PDR (n=9, age=54.38 ± 14.39 years, M:F=5:4) and healthy controls (n=10, age=47.45 ± 19.26 years, M:F=5:5). Five repeat 6x6mm scans were acquired at a baseline time point (T0) and 30 minutes after (T30). Images from each time point were registered and processed obtaining an average 6x6mm cube from each area. The average cube was then processed, and the ILM was automatically segmented. All images were reviewed and any errors on segmentations were manually corrected. Using a slab 25 pixels above the ILM, en face OCT images were then obtained to visualize the hyalocytes located in the surface of the ILM.

Results: By processing the en face images, we were able to identify the hyalocytes in the surface of the ILM in patient with CRVO, BRVO, PDR, and controls. Comparing the images from T0 and T30, we demonstrate the dynamic nature of these cells. Additionally, by contrasting the density and quantity of the hyalocytes in the 4 different groups in our study, we highlight the active role of hyalocytes on the pathomechanisms of the retinal vasculopathies.

Conclusions: In this study, we identify hyalocytes in-vivo and demonstrate the dynamic nature of these cells in the retinal surface through serial OCTA imaging. We also demonstrate the active role of hyalocytes in retinal vasculopathies.

P-RET-177

Anatomic and functional outcomes of human-amniotic membrane graft in refractory macular hole; our experience in Indonesia

S. Soedarman¹, A.D. Budi Prasetya², S. Muslim³, W. Girsang¹, E. Elvioza¹, R. Agustawan¹

¹Vitreoretinal Department, JEC Eye Hospitals & Clinics, Jakarta, Indonesia, ²Emergency Department, JEC Primasana Eye Hospital, Jakarta, Indonesia, ³Vitreoretinal Department, JEC Candi Eye Hospital & Clinic, Semarang, Indonesia

Introduction: Refractory macular hole (MH) still a challenge in retinal surgery cause by several factors like residual epiretinal traction, insufficient gas tamponade, poor compliance or either no obvious causes. The use of human amniotic membrane (hAM) has been reported in several studies to be effective in managing refractory MH.

Objectives: The purpose of this study is to report the anatomical and functional results of hAM graft as intervention to repair refractory MH when wide internal limiting membrane peeling was unsuccessful.

Methods: Retrospective case series was carried out at tertiary eye hospital in Indonesia to identify all cases that had undergone hAM graft for the treatment of refractory or failed MH between December 2020 to December 2022. Main outcome measures were anatomical MH closure rates and final BCVA in 6 months after surgery.

Results: Eleven eyes of 11 patients with refractory MH were identified and included in the study. Mean age was 49.27 years and predominantly males (73%). Nine eyes (82%) had successfully closed MH with a single intervention with no recurrences during 6 months follow-up. Mean BCVA at 3 month and 6-month improved from 1.747 ± 0.74 logMAR to 1.210 ± 0.51 logMAR and 0.939 ± 0.47 logMAR (range 2.079–0.301 logMAR), which was statistically significant ($p = 0.0207$).

Conclusions: The use of hAM graft seems to be a viable and effective alternative for the treatment of refractory macular holes. However, further larger prospective controlled studies are necessary to confirm our results.

P-RET-178

Nomogram for short-term response of anti-VEGF monotherapy in polypoidal choroidal vasculopathy: a multicenter study

W. Zhang¹, X. Gu², X. Zhao², Y. Chen¹

¹Ophthalmology, Peking Union Medical College Hospital, Beijing, China, ²Peking Union Medical College Hospital, Beijing, China

Introduction: Polypoidal choroidal vasculopathy (PCV) is a severe vascular disease. Substantial research indicated heterogeneity in the response to anti-VEGF monotherapy. The identification of imaging biomarkers is instrumental in formulating treatment plans. Thus, we conducted this prospective multicenter study to construct a predictive model for anti-VEGF monotherapy response using imaging indicators in PCV patients and test it across multiple centers.

Objectives: To develop a predictive nomogram to predict the short-term efficacy of anti-VEGF monotherapy in PCV and conduct multicenter validations.

Methods: In this prospective multicenter study, treatment naive PCV cases from Peking Union Medical College Hospital were randomly divided into a training set and an internal validation set in a 7:3 ratio. In the training set, univariate, LASSO regression, and multivariate regression analysis were employed to identify clinical and imaging features associated with treatment response to 3-monthly anti-VEGF. A nomogram was established based on these features and verified in the internal validation set and an external multicenter test set. Area under the curve, sensitivity, specificity, and accuracy were calculated. Decision curve analysis and clinical impact curve were utilized to evaluate the practical utility.

Results: The case distribution for the training set, internal validation set, and external test set were 66, 31, and 71, respectively. The "Good responder" exhibited a thinner subfoveal choroidal thickness (SFCT) ($230.67 \pm 61.96 \mu\text{m}$ vs. $314.42 \pm 88.00 \mu\text{m}$ $P < 0.001$), lower choroidal vascularity index (CVI) (0.31 ± 0.08 vs. 0.36 ± 0.05 $P = 0.006$), fewer choroidal vascular hyperpermeability (CVH) (31.0% vs. 62.2% $P = 0.012$), and more intraretinal fluid (IRF) (58.6% vs. 29.7% $P = 0.018$). In the multivariate regression analysis, SFCT (OR 0.990; 95% CI 0.981-0.999; $P = 0.033$) and CVI (OR 0.844; 95% CI 0.732-0.971; $P = 0.018$) were ultimately included as the optimal predictive features and presented in the form of a nomogram. The model demonstrated AUC of 0.837 (95% CI 0.738-0.936), 0.891 (95% CI 0.765-1.000), and 0.901 (95% CI 0.824-0.978) for predicting "Good responder" in the training, internal validation, and external test set, respectively, with excellent sensitivity, specificity and practical utility.

Conclusions: SFCT and CVI can serve as imaging biomarkers for predicting short-term response to anti-VEGF monotherapy in PCV patients. The predictive model established based on these exhibited satisfactory performances.

P-RET-179

Efficacy of Ozurdex implant in naïve and refractory eyes with different morphological subtypes of diabetic macular edema

P. Stavrakas¹, E.E. Christou², I. Chranioti¹, V. Nasikas³, C. Koutsiouki³, A. Vakalis³, S. Asteriadis³, P. Tranos³

¹Ophthalmology, University of Patras, Patras, Greece, ²Oxford Eye Hospital, Oxford, United Kingdom, ³Ophthalmica Eye Institute, Thessaloniki, Greece

Introduction: Spectral domain optical coherence tomography (SD-OCT) provides useful information for identifying variable parameters of DME, which could serve as predicting factors for the course of the disease or the potential response to treatment. Emerging evidence suggests that each morphological subtype of DME, namely diffuse retinal thickening (DRT), cystoid macular edema (CME) and serous retinal detachment (SRD) consist of different concentrations of inflammatory cytokines in the aqueous humor and as a result may have variable response to intravitreal Dexamethasone.

Objectives: To investigate anatomical and functional outcomes in different morphological subtypes of diabetic macular edema (DME) treated with intravitreal Dexamethasone implant (Ozurdex) over 6 months follow-up.

Methods: Retrospective, comparative study on patients with DME who received intravitreal dexamethasone implant. Best corrected visual acuity (BCVA), central subfoveal thickness (CST) and maximum CST on optical coherence tomography (OCT) were measured. Recruits were divided into three groups based on morphological patterns of DME: serous retinal detachment (SRD), cystic macular edema (CME) and diffuse retinal thickening (DRT). Presence or absence of previous treatment were considered: previously treated with anti-VEGF (PT) vs naïve eyes (TN). All subjects received single injection of Dexamethasone implant. Primary outcomes included changes in BCVA, CST and CST max at 2, 4 and 6 months follow-up.

Results: CST was significantly reduced following one dexamethasone injection in the whole cohort from total mean value of 513.3 μ m to 368.2 μ m at 2 months, 447.2 μ m at 4 months and 471.5 μ m at 6 months. Change of CST was significantly greater in SRD as opposed to DRT and CME group at all time points. Overall BCVA improved from 0.82 at baseline to 0.75 and 0.76 LogMAR at 2 and 4 months respectively, whilst showing overall deterioration to 0.84 at 6 months. CME group showed the best BCVA at 6 months. Concerning treatment status (TN vs PT) there was no significant difference of CST at 2 and 4 months, while CST was reduced at 6 months for PT group ($p=0.023$). Similarly, BCVA was significantly better in PT group at 6 months ($p=0.017$).

Conclusions: Dexamethasone implant was effective in reducing DME and providing short term BCVA improvement. The presence of SRD was associated with more favorable anatomical results, while CME with better visual acuity. Dexamethasone provided superior results in previously treated patients.

P-RET-180

Keeping ocular toxoplasmosis in purview for immunosuppressed patients with hematologic malignancies improves outcomes

C. Tadrour¹, C. Gottlieb¹, N. Lane¹, L. Renaud¹, G. Docherty¹

¹Ophthalmology, University of Ottawa, Ottawa, Canada

Introduction: Our study highlights the importance of keeping ocular toxoplasmosis (OT) on the differential of immunocompromised patients who present without the classical phenotypes of toxoplasmosis. Although most cases of OT are self-limiting, immunosuppressed patients may progress to a more fulminant course without treatment. We further want to stress the importance of initiating treatment in any immunodysregulated or immunocompromised state for better visual outcomes.

Objectives: To describe OT in immunosuppressed patients with hematologic malignancies, specifically with respect to how the disease masquerades on clinical presentation.

To present a comprehensive literature review on this patient population with OT in order to synthesize an approach to prompt diagnosis and treatment.

Methods: Two cases are reported from a tertiary academic centre (at the time of this abstract, we are actively collecting more cases and may have more at the time of presentation). A systematic literature review provided context and data to inform recommendations regarding diagnosis and treatment.

Results: Two patients who had a diagnosis of lymphoma presented with panuveitis characterized by occlusive retinitis and retinal lesions, respectively. A diagnosis of ocular toxoplasmosis was ultimately made via PCR testing of aqueous fluid, and appropriate treatment with intravitreal clindamycin and systemic antibiotics was initiated. The diagnosis was delayed for one of the patients and it followed a negative diagnostic vitrectomy. The uveitis had resolved following treatment. The systematic literature review of similar cases yielded 12 additional reports; In these cases, an extensive workup was undertaken which eventually led to the correct diagnosis and treatment, halting the damaging process of uveitis in these patients.

Conclusions:

Early aqueous fluid sampling for *Toxoplasma gondii* PCR is essential in this patient population for avoiding a delay in diagnosis, as well as avoiding unnecessary invasive interventions such as diagnostic vitrectomies. Treatment is always indicated for OT in immunosuppressed patients.

P-RET-181

Analysis of ocular fluid in patients with ranibizumab-recalcitrant wet AMD who have serum anti-ranibizumab antibodies

H.S. Chin¹, K. Lee¹

¹Ophthalmology, Inha University Hospital, Incheon, Korea, Republic of

Introduction: One possible mechanism underlying anti-vascular endothelial growth factor (VEGF) recalcitrance in neovascular age-related macular degeneration (nAMD) is the presence of intraocular anti-drug antibodies (ADAs); The presence or absence of intraocular ADAs may explain whether anti-VEGF recalcitrance is induced by ADAs.

We developed an immunoprecipitation method that allows the detection of >30 ng of anti-ranibizumab antibodies. Because ADAs were not detected in the aqueous humor of patients with ranibizumab-recalcitrant nAMD, we conclude that ADAs do not directly inhibit the action of intraocular anti-VEGF drugs.

Objectives: To evaluate whether anti-drug antibodies (ADAs) are present in the ocular fluid of patients with ranibizumabrecalcitrant neovascular age-related macular degeneration (nAMD).

Methods: Two serum ADA-positive ranibizumab-recalcitrant patients and two serum ADA-negative controls were recruited from patients with nAMD treated with ranibizumab monotherapy. Recalcitrance was defined as persistent fluid after ≥ 6 monthly ranibizumab injections. Serum and aqueous humor ADAs were detected by enzyme-linked immunosorbent assay and immunoprecipitation, respectively.

Results: Two of 156 ranibizumab-treated patients were ADA-positive. The patients received six and 14 ranibizumab injections, respectively, up to 4 weeks prior to blood collection. The serum ADA concentration was estimated to be approximately 50,000 ng/mL. Neutralizing ADAs were confirmed in both samples. A specific band was detected by immunoprecipitation only in ADA-positive samples, consistent with the results of enzyme-linked immunosorbent assay. Based on an assessment of the degree of sensitivity of commercially available anti-ranibizumab antibodies, it was estimated that the immunoprecipitation method could detect ADA levels >30 ng. Nevertheless, ADAs were not detected in the aqueous humor of either the experimental or control group.

Conclusions: In the aqueous humor, ADAs are either not present or are present at a lower concentration than that which can be detected by immunoprecipitation. This presumably reflects the fact that blood ADA is the product of systemic circulation clearance through anterior elimination of intravitreal ranibizumab. Based on our results, ADAs do not return to the eye in sufficient quantities to interfere with the action of ranibizumab in the vitreous cavity.

P-RET-182

The microstructural changes of retina between different types of diabetic macular edema

Z. Ge^{1,2}

¹Aier Eye Hospital, Jinan University, Guangzhou, China, ²Changsha Aier Eye Hospital, Changsha, China

Introduction: In this study, we grouped patients into different types of DME and observed the changes in microstructure near the macular area of the retina in DME patients through OCT and OCTA, so as to provide a theoretical basis for the early diagnosis and treatment of patients with diabetic retinopathy and macular edema.

Objectives: To observe the microstructural changes of retina between different types of diabetic macular edema (DME) by OCT and OCTA.

Methods: Patients with DME were divided into three groups: CME (cystoid macular edema), DRT (diffuse retinal thickening) and SRD (serous retinal detachment). Observational indicators include CMT (macular fovea retinal thickness), MCT (macular choroidal thickness), the defect degree of ellipsoidal zone and external membrane, DRIL (disorganization of the retinal inner layers), FAZ (foveal avascular zone), SCP/ DCP (retinal superficial/ deep capillary blood flow density), choroidal capillary area.

Results: According to ANOVA statistical analysis,

The degree of defect ellipsoidal zone and external membrane in the three groups was SRD>CME>DRT. The CMT size, the DRIL length and the FAZ area in DRT group was smaller than that in the other two groups, while there was no significant difference between CME group and SRD group.

Correlation analysis showed that the degree of ellipsoid band and external membrane defect, the DRIL length and the FAZ area was strongly correlated with BCVA (logMAR).

At the same time, FAZ area was weakly positively correlated with the degree of ellipsoidal zone defect.

Conclusions: Compared with the other two groups, the shape of ellipsoidal zone and outer membrane in DRT group is more complete, the disorder of inner structure of retina and the damage of FAZ is slighter, while the pathological changes in SRD group are the most serious.

The size of CMT, the integrity of ellipsoid zone and outer membrane, the length of DRIL and the area of FAZ in patients with DME were all related to visual acuity.

There was no significant difference in choroidal state among the three groups of DME.

P-RET-183

The function of PSGL-1 in the mouse model of endotoxin-induced uveitis

F. Duan¹, J. Lin¹

¹Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China

Introduction: Uveitis is a sight-threatening inflammatory ocular disease.

Objectives: To investigate the function of PSGL-1 in lipopolysaccharide (LPS)-induced endotoxin-induced uveitis (EIU) *in vivo*.

Methods: EIU models were established in PSGL-1^{-/-} mice and C57BL/6J mice treated with anti PSGL-1 mAb, respectively. At 6h, 12h, and 24h after LPS sub retina injection, the eyeballs were taken. HE staining was used to detect changes in the number of inflammatory cells within the vitreous cavity and alterations in the retinal morphology. PCR was employed to examine the mRNA expression levels of inflammatory factors, while Luminex liquid-phase suspension chip quantitative detection was used to measure the protein expression concentrations of these inflammatory factors.

Results: The HE results indicated that there had been an exacerbation of vitreous cavity inflammation cell infiltration in PSGL-1^{-/-} mice compared to WT mice. The mRNA expression levels of COX2, INOS, TNF α , IL6, and CD11 had been higher in PSGL-1^{-/-} mice compared to WT mice, and the protein levels of multiple inflammatory factors had been higher than in WT mice. While, after intravenous injection of Anti-PSGL-1mAb at 6 and 12 hours, the number of inflammatory cells in the vitreous cavity decreased compared to the control group. Additionally, the mRNA expression levels of COX2, INOS, TNF α , IL6, and CD11 had been lower compared to the control group, and the protein expression levels of inflammatory factors had shown varying degrees of reduction.

Conclusions: PSGL-1 gene knockout accelerates the progress of vitreous inflammation. Early anti-PSGL-1mAb treatment can reduce the inflammatory response in the vitreous cavity. PSGL-1 is an important target for the inflammatory response, and anti-PSGL-1mAb may be used for the treatment of acute eye inflammation.

P-RET-184

Quantitative analysis of peripapillary capillary volume using dense B-scan OCT angiography in normal and diabetic retina

*J. Ma*¹

¹Zhongshan Ophthalmic Center, State Key Laboratory of Ophthalmology, Sun Yat-sen University, Guangzhou, China

Introduction: The technology of dense B-scan optical coherence tomography angiography (DB OCTA) can calculate the three-dimensional volume of microcirculation by providing high-quality B-scan scan images of the retina in a certain area. The Volume mode of DB OCTA can collect blood flow signals of the full-thickness retina and choroid within the scanning range. Each B-scan image obtained includes all blood vessels passing through that layer, and the three-dimensional blood flow volume of the full-thickness retina within the scanning range is calculated, which can well represent the microcirculation situation in the retinal area. Diabetic retinopathy (DR) is a common and special microvascular complication in diabetes and the main cause of vision loss in diabetic patients. Detecting abnormal microvascular changes in different stages of DR from a clinical perspective is an increasingly concerned research field, which can monitor retinal perfusion status and provide important information on the occurrence and development of DR. Therefore, applying high-definition tomographic OCTA technology to the evaluation of DR can have good clinical value.

Objectives: The value of quantitatively analyzing peripapillary capillary volume (PPCV) distribution was explored in normal and diabetic retinopathy (DR) eyes using dense B-scan optical coherence tomography angiography (DB OCTA).

Methods: This was a prospective, cross-sectional, observational study of 187 eyes with DR and 101 normal eyes. Dense, automatic, real-time (DART) volume scans of DB OCTA were performed using a Spectralis HRA+OCT2. ImageJ and MATLAB were used to process and calculate PPCV distribution detected by DB OCTA.

Results: In normal subjects, PPCV distribution were significantly correlated with the age and quadrant location of PPCV ($P_s < 0.001$). The PPCV distribution in each quadrant was significantly lower in severe nonproliferative DR patients than in normal subjects in all age groups ($P_s < 0.05$, t-test). This PPCV distribution improved significantly in the pan-retinal photocoagulation (PRP) treatment and surgery groups ($P_s < 0.001$) but remained unchanged in the anti-VEGF treatment group ($P > 0.05$), and correlated significantly with post-treatment best-corrected visual acuity in both the PRP treatment and surgery groups ($P_s < 0.003$) but not in the anti-VEGF treatment group ($P = 0.940$).

Conclusions: Quantitative assessment of PPCV distribution using DB OCTA is valuable in prognosis evaluation of DR with PRP and surgery.

P-RET-185

Interocular asymmetry of RNFL, optic nerve head and fundus vasculature in adults with non-anisometropic myopia

T. Shen^{1,2}, L. Ding², M. Mijiti², Y. Mu², W. Wei², R. Ainiwaer², B. Wei², Y. Qin²

¹Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China, ²People's Hospital of Xinjiang Uygur Autonomous Region, Urumqi, China

Introduction: Organ pairs in the human body are virtually never symmetrical, and this fact has been used as a tool to investigate certain diseases. Asymmetrical parameters in the retina, between the right and left eyes of the same subject, are considered to be a hallmark of certain unilateral or asymmetrical diseases, such as glaucoma or optic nerve tumors. Asymmetry analysis is a valuable tool for early diagnoses of retinal diseases.

Objectives: To investigate the interocular asymmetry of the regional retinal nerve fiber layer (RNFL) thickness, optic nerve head (ONH) parameters and fundus vasculature according to ocular laterality, myopic status and ocular dominance in healthy adults with non-anisometropic myopia using spectral domain optical coherence tomography (SD-OCT).

Methods: This cross-sectional study included 139 healthy adults aged 18-40 years without ocular abnormality except non-anisometropic myopia. The comprehensive ocular evaluations were conducted, then the RNFL thickness, ONH parameters, macular vessel density (MVD), optic disc vessel density (OVD) and optic disc perfusion density (OPD) were obtained using the Cirrus SD-OCT. The interocular asymmetries of RNFL thickness, ONH parameters, MVD, OVD, and OPD according to ocular laterality, myopic status and ocular dominance were analyzed statistically. The interocular difference, repeatability, correlation and agreement were determined by paired t-test, intraclass correlation coefficient (ICC), Pearson's correlation coefficient (r) and Bland-Altman plot, respectively.

Results: Significant right-left interocular differences were detected in RNFL thickness, MVD, OVD, and OPD. The RNFL was thicker in the right eyes in the temporal (ICC=0.86, $r=0.706$) and inferior (ICC=0.83, $r=0.764$) quadrants, but thicker in the left eyes in the superior (ICC=0.77, $r=0.687$) quadrant. The MVD was higher in the left eyes in the superior (ICC=0.15, $r=0.419$), inferior (ICC=0.24, $r=0.493$) and temporal (ICC=0.30, $r=0.212$) quadrants. The OVD was higher in the left eyes in the nasal (ICC=0.39, $r=0.313$) quadrant, and the OPD was also higher in the left eyes in the inner (ICC=0.48, $r=0.474$), inferior (ICC=0.11, $r=0.159$) and nasal (ICC=0.39, $r=0.407$) quadrants. However, no significant interocular difference in any parameters was detected according to myopic status or ocular dominance.

Conclusions: This study revealed that there are normal right-left interocular asymmetries of retina, optic nerve and fundus vasculature, which are not related to myopic status or ocular dominance.

P-RET-186

A comparative study of UW OCTA and UWFA in the detection of non-perfusion areas in diabetic retinopathy

G. Chuyun¹, L. Jie¹, Z. Jie¹

¹Ophthalmology, Sichuan Provincial People's Hospital, University of Electronic Science and Technology of China, Chengdu, China

Introduction: The non-perfusion areas (NP) of diabetic retinopathy is caused by the abnormal metabolism and damage of capillary endothelium, which leads to the occlusion of capillary network. The detection of NP is very important for the study of the development of the disease and the choice of treatment methods. In the past, wide-field fundus angiography (UWFA) was usually used in clinical practice as the gold standard, but it was time-consuming, complicated to operate and may cause dye allergy. As a faster and more convenient examination device, the feasibility and accuracy of the detection of NP need to be verified.

Objectives: To investigate whether SS-OCTA can partially replace UWFA in the diagnosis of NP in DR Patients. In addition, the distribution of NP inside and outside the detection range of SS-OCTA (24x20mm) was explored to determine whether there was a positive correlation between NP inside and outside the detection range of SS-OCTA, and whether NP within the range of 24X20mm could be used to predict the presence of peripheral NP.

Methods: NP was manually divided into UWFA and SS-OCTA (24x20mm) images, and the position and frequency of NP were calculated. The accuracy of SS-OCTA in detecting NP, the loss of NP due to insufficient range, and whether the NP within SS-OCTA can predict the NP outside the range were verified by comparison.

Results: So far thirty-two eyes were enrolled in this study. We were able to detect 54.33% NP in SS-OCTA range compared with UWFA, 44.91% in superior temporal region, 42.37% in inferior temporal region, 62.46% in superior nasal region, and 57.10% in inferior nasal region.

Conclusions: SS-OCTA can detect NP. Although the accuracy of SS-OCTA in detecting NP is basically the same as that of UWFA, SS-OCTA can be used as an alternative, because NP occurs more frequently in the middle peripheral area during the progression of diabetic retinopathy, and it has been proven that patients with peripheral NP are more likely to develop into DME or PDR. Therefore, the current SS-OCTA in the range of 24x20mm can not completely replace UWFA as a means of detecting NP in DR Patients.

P-RET-187

Imaging and clinical biomarkers of response to half-dose PDT in patients with central serous chorioretinopathy

M. Naseripour¹, R. Mirshahi¹, A. Ghomashi¹, K. Ghasemi Falavarjani¹

¹Ophthalmology, Iran University of Medical Sciences, Tehran, Iran, Islamic Republic of

Introduction: Half-dose photodynamic therapy (HD-PDT) is the gold standard treatment of central serous chorioretinopathy (CSC) with a success rate of 95% in CSC. It is of note that 82.2% of patients with CSC show early response (in 1 month) to PDT.

Objectives: To determine the clinical and imaging biomarkers of the response to half-dose photodynamic therapy (HD-PDT) in patients with central serous chorioretinopathy (CSC).

Methods: Clinical records and baseline ophthalmic images of 67 chronic CSC patients who underwent HD-PDT were assessed. In addition to demographic data, optical coherence tomography (OCT), fluorescein angiography (FA) and fundus autofluorescence (FAF) images were analyzed for specific biomarkers. The patients were categorized to early responder and late responder based on the time needed for complete resolution of subretinal fluid after PDT (less than 1 month vs. more than 1 month). The baseline clinical and imaging biomarkers were compared between the two groups.

Results: Seventy-three eyes of 67 patients were included in the study. The mean response time to PDT was 1.63 ± 1.48 months with 82.2 % (60/73) of patients categorized as early responder. The mean response time to PDT in delayed-response group was 4.15 ± 1.51 months. In multivariate analysis, delayed response to PDT was associated with lacking history of systemic corticosteroid consumption, lacking history of pretreatment with eplerenone or acetazolamide before PDT and presence of hyperreflective foci in baseline OCT images (all p values < 0.05). There was no association between final visual outcome and late response to PDT.

Conclusions: The presence of inflammatory biomarkers such as hyperreflective foci in baseline OCT images might be indicative of resistance to PDT. Moreover, the effect of pretreatment with mineralocorticoid antagonist on the response to PDT in chronic CSC should be explored in future prospective studies.

P-RET-189

Electrophysiological changes in retinal function during the early stages of diabetic retinopathy

T.C. Man¹, W.Y. Yip¹, W.S. Lee¹, C.P. Pang¹, M. Brelén¹

¹Department of Ophthalmology and Visual Sciences, The Chinese University of Hong Kong, Hong Kong, Hong Kong, SAR of China

Introduction: The structural changes and subsequent grading of Diabetic Retinopathy (DR) is well established and currently serves as a criterion for the clinical management of DR. In contrast, the role of functional changes in DR is rather disputed and how those functional changes correlate with the grading of DR needs further investigation.

Objectives: Investigate the association between flicker electroretinogram signal with the presence or severity of diabetic retinopathy in diabetic and non-diabetic individuals.

Methods: A specific setup derived from the ISCEV full-field electroretinogram (ffERG) light-adapted flicker setup with additional 45Hz and 60Hz flicker frequency was used. Two 45-degree fundus photos centred on the disc and centred on the macula was taken for DR grading. Recruited participants were divided into three groups. The DM- group was the control group of subjects without diabetes. The DM+/DR- group included subjects with diabetes but no DR. The DM+/DR+ group included subjects with mild non-proliferative DR as defined by the EDTRS grading criteria. Demographic and optometric data were collected in addition.

Variables from the collected data were first examined by descriptive analysis for validation.

Confounding variables of ffERG data were identified by correlation analysis. Associations between the ffERG data and subject groups were evaluated using Generalised Linear Model.

Results: Significant associations between ffERG data and subject groups were found. The peak times of the flicker signals were found to be longer in diabetic subject groups in the 30-, 45 and 60 Hz setup in the linear model ($p < 0.003$). Such association was more robust in the 60 Hz setup. Significant differences in peak times were reported between DM- group ($n=23$) and DM+/DR- group ($n=23$) ($p=0.002$) and between DM- group ($n=23$) and DM+/DR+ group ($n=20$) ($p<0.001$). Significant differences were seen signal amplitude in the 60Hz setup. Using a linear model with age and axial length as the confounding covariates, the estimated amplitude of flicker signal in the DM+/DR+ group ($18.39\pm 1.78\mu V$) was significantly lower than the DM- group ($24.96\pm 1.17\mu V$) ($p = 0.016$).

Conclusions: Despite the limited subject number, significant functional changes were seen in diabetic subjects on flicker ERG even before the onset of structural changes on fundus photos. The preliminary results support the use of flicker ERG as part of screening patients in the early stages of DR. Future larger scale studies are needed to verify these results.

P-RET-190

Development of NT-101, a novel eye drop therapeutic for wet AMD

K.-H. Roh¹, N. Lim¹, Y.S. Lee¹, J.-Y. Jeong², S.S. Yea¹, K. Lee², S. Park²

¹R&D Center, NexThera Co., Ltd., Busan, Korea, Republic of, ²NexThera Co., Ltd., Busan, Korea, Republic of

Introduction: Wet AMD is an advanced form of AMD characterized by abnormal vascularization in the retina, termed choroidal neovascularization (CNV). CNV, triggered by increased angiogenic factors like VEGF, is treated with intravitreal injections of anti-VEGF agents, which have side effects and patient compliance issues.

Objectives: This study aims to develop a novel eye drop, named NT-101, to address this unmet need. To achieve this goal, we have completed GLP and non-GLP nonclinical studies to support the safety and efficacy of the human study protocol for NT-101.

Methods: NT-101 is an ocular preparation that mixes an active pharmaceutical ingredient (API; NT-101-DS) composed of peptides and a carrier protein (NT-C) in a specific buffer (AS buffer). Anti-angiogenic activity of NT-101 was evaluated by *in vitro* tube formation assay in HUVECs and *in vivo* CNV study using laser-induced CNV animal model including C57BL/6 mice, Brown-Norway Rats, Chinchilla rabbits, and Cynomolgus monkeys. Each animal was instilled with vehicle or NT-101 for 6 weeks (monkeys) or 14 days (the other animals) and Eylea[®] intravitreal injection group was used as a positive control. Four-week IND-enabling GLP toxicology studies and genotoxicity studies were also conducted.

Results: NT-101-DS showed therapeutic effects in the test systems within a narrow dose range. However, NT-101, a combination of NT-101-DS and NT-C, broadened the effective dose range of NT-101-DS. Compared to NT-101-DS eye drop, NT-101 eye drops resulted in prolonged ocular surface retention time of the API and enhanced API delivery to choroid and retina. NT-C was not delivered intraocularly. NT-101 eye drops reduced CNV in various animal models and there were no significant differences compared to the positive control group. The NOAEL of NT-101-DS was 65.6 mg/kg/day in Sprague-Dawley rats and was 25.9 mg/kg/day in beagle dogs. Safety pharmacology studies found no off-target effects at doses up to 65.6 mg/kg in rats and 4.3 mg/kg in dogs. Ocular toxicity studies showed no significant systemic or ocular changes.

Conclusions: Our preclinical studies revealed NT-101 as a promising and innovative candidate for the treatment of wet AMD through local administration via eye drops. Currently, preparations are underway in accordance with US FDA IND application procedures.

P-RET-191

Two-year efficacy of conbercept 5+PRN compared to 5+T&E in treating DME: a cohort study

H. Wang¹, M. Yang², Y. Tao³

¹Ophthalmology, Shandong University Qilu Hospital, Jinan, China, ²Ophthalmology, Shandong University Qilu Hospital, Jinan, China, ³Ophthalmology, The Second People's Hospital of Jinan, Jinan, China

Introduction: Currently, there are no Randomized Controlled Trials (RCTs) comparing Conbercept 5+PRN and 5+T&E treatment regimens for DME, lacking evidence-based medical evidence for the aforementioned treatment methods for Diabetic Macular Edema (DME).

Objectives: To compare the visual and retinal anatomical benefits, as well as the number of injections administered, of the Conbercept 5+PRN and 5+T&E regimens in treating DME for 2 years.

Methods: Patients: This study employed a single-center, retrospective cohort design, including patients who visited the ophthalmology outpatient clinic at Qilu Hospital of Shandong University. Based on the treatment received, patients were categorized into two groups: the 5+PRN group (n=60) and the 5+T&E group (n=59). The parameters measured included best-corrected visual acuity (BCVA), central foveal thickness (CFT), number of microaneurysms (MA), diameter of retinal venous vessels, vascular density of the deep capillary plexus (DCP-VD).

Statistical analysis: The IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA) was utilized to conduct the statistical analyses.

Results: At 6 months, the 5+PRN group exhibited a 0.19 improvement in BCVA (logMAR), a 157.01 μ m reduction in CFT, and a 30.11 decrease in the number of MAs ($P < 0.05$). The 5+T&E group showed a 0.19 improvement in BCVA, a 151.47 μ m reduction in CFT, and a 23.31 decrease in the number of MAs ($P < 0.05$). No significant difference was observed between the two groups ($P > 0.05$). At 12 months, the 5+PRN group saw a 0.19 improvement in BCVA, a 164.79 μ m reduction in CFT, and a 45.18 decrease in the number of MAs ($P < 0.05$). The 5+T&E group experienced a 0.15 improvement in BCVA, a 157.33 μ m reduction in CFT, and a 42.64 decrease in the number of MAs ($P < 0.05$). No significant difference was found between the groups ($P > 0.05$). At 24 months, the 5+PRN group achieved a 0.22 improvement in BCVA, a 173.01 μ m reduction in CFT, a 43.4 decrease in the number of MAs, an 18.03 μ m decrease in venous vessel diameter, and a 4 increase in DCP-VD ($P < 0.05$). The 5+T&E group showed a 0.17 improvement in BCVA, a 173.29 μ m reduction in CFT, a 40.77 decrease in the number of MAs, a 20.85 μ m decrease in venous vessel diameter, and a 3.57 increase in DCP-VD ($P < 0.05$). No significant difference was observed between the two groups ($P > 0.05$).

After 24 months, the 5+PRN group received an average of 14.02 ± 2.05 injections, compared to 11.44 ± 1.74 in the 5+T&E group, showing a statistically significant lower number of injections in the 5+T&E group ($P < 0.01$).

Conclusions: After 2 years of treating DME with Conbercept 5+PRN and 5+T&E regimens, both BCVA and retinal anatomical structures improved without significant statistical differences. However, the number of injections was significantly lower in the 5+T&E group compared to the 5+PRN group, indicating that personalized treatment plans can effectively reduce the burden on patients and alleviate healthcare pressures.

P-RET-192

Diagnosis of Polypoidal Choroidal Vasculopathy by non-ICGA criteria among patients with neovascular AMD: a 5 year review

J.P. Lacanilao¹, J.C. Artiaga^{1,2}

¹Department of Ophthalmology and Visual Sciences, University of the Philippines Manila - Philippine General Hospital, Manila, Philippines, ²Eye Institute, St Luke's Medical Center - Global City, Taguig, Philippines

Introduction: Polypoidal choroidal vasculopathy (PCV) is an exudative maculopathy with features similar to wet or neovascular age-related macular degeneration (nvAMD). Clinically distinguishing the two proves difficult and currently requires indocyanine green angiography (ICGA), an invasive and expensive imaging tool. Anti-VEGF monotherapy is the first line of treatment for PCV but it also requires more injections and has higher recurrence rates that would improve if additional treatment is done with photodynamic therapy. Optical Coherence Tomography (OCT) is a rapid, widely available and non-invasive imaging tool that is able to demonstrate distinct PCV features. Differentiating PCV from nvAMD using OCT will thus allow for easier and more cost-effective prognostication, counseling, and prompt treatment.

Objectives: This study aims to determine the proportion of patients PCV based on APOIS criteria among patients diagnosed as nvAMD from a tertiary hospital from January 2018 to June 2023, as well as the frequency of each major and minor criteria.

Methods: This was a single-center cross-sectional chart review retrieving demographic and clinical profiles of treatment-naïve nvAMD patients and their high definition Spectral and en face OCT's. PCV was diagnosed based on the presence of at least two major APOIS OCT diagnostic criteria.

Results: Among treatment-naïve nvAMD patients 53.3% can be said to have PCV. This is within the established prevalence of 20-60% PCV among Asian nvAMD patients. Sub-RPE ring like lesion was the most common major OCT criteria at 57.8% Double layer sign was the most common minor OCT criteria at 86.67% and only statistically significant OCT-based minor criteria in this study. Demographic and clinical profiles are not associated PCV diagnosis.

Conclusions: While ICGA remains to be the gold standard in the diagnosis of PCV, presence of at least two APOIS major OCT diagnostic criteria can be used to assess patients for the possibility of PCV.

P-RET-193

Serum proteomic reveals B cell activation signature as key feature in ocular sarcoidosis compared to ocular tuberculosis

I. Putera¹, B. Schrijver², P.M. Kolijn², A.C. van Stigt², J.C.E.M. ten Berge¹, H. IJspeert², N.M.A. Nagtzaam², S.M.A. Swagemakers³, J.A.M. van Laar⁴, R. Agrawal⁵, S.M. Rombach⁴, P.M. van Hagen⁴, R. La Distia Nora⁶, W.A. Dik²

¹Ophthalmology, Erasmus University Medical Center, Rotterdam, Netherlands, ²Immunology, Erasmus University Medical Center, Rotterdam, Netherlands, ³Bioinformatics, Erasmus University Medical Center, Rotterdam, Netherlands, ⁴Internal Medicine, Erasmus University Medical Center, Rotterdam, Netherlands, ⁵Ophthalmology, Tan Tock Seng Hospital, Singapore, Singapore, ⁶Ophthalmology, University of Indonesia - Cipto Mangunkusumo Hospital, Jakarta, Indonesia

Introduction: Sarcoidosis and tuberculosis (TB) are two granulomatous diseases that often share overlapping clinical features, including uveitis.

Objectives: We aimed to investigate the biological pathways in both diseases, with and without uveitis, through serum proteomics profiling. We also aimed to identify serum proteins as biomarker candidates for ocular sarcoidosis (OS) and ocular TB (OTB).

Methods: We recruited two distinct geographically separated cohorts. The first cohort comprised 90 sarcoidosis patients with systemic manifestation (44 without uveitis and 46 with uveitis) along with 23 Dutch healthy controls from the Netherlands. The second cohort consisted of 22 active pulmonary TB patients (10 without uveitis and 12 with uveitis), as well as 22 Indonesian HC sourced from Indonesia. Targeted serum proteomics analysis was conducted in the discovery step, and further verification was performed using a multiplex approach (Luminex and enzyme-linked immunosorbent assay) for selected proteins. Bioinformatic analysis was conducted to identify the involved biological pathways.

Results: Out of 368 measured proteins, 192 and 102 differentially expressed proteins were observed in sarcoidosis and active pulmonary TB, respectively. Both diseases demonstrated a substantial overlap in immune-related pathways, with the most activated pathways being macrophage classical activation signaling, the T-helper (Th)-1 pathway, and crosstalk between dendritic cells and natural killer cells. B cell activating factor (BAFF) signaling and proliferation-inducing ligand (APRIL) mediated signaling pathways were specifically activated in sarcoidosis and not in TB. Several proteins involved in B cell activation factor signaling, namely TNFRSF13B/TACI, TRAF2, IKBKG, MAPK9, NFATC1, and SLAMF7 were significantly elevated in sarcoidosis, regardless of the presence of uveitis. Additionally, several other serum proteins (CCL17, IL-16, TNFSF10/TRAIL, CCL11/eotaxin, FGF2, and GZMB) may also serve as potential biomarkers for differentiating OS from OTB.

Conclusions: Despite commonalities in the immune-related pathways observed in sarcoidosis and TB through serum proteomics profiling, we discovered that B cell activation factor signaling was significantly activated in sarcoidosis, both with and without uveitis, but not in TB. An easily accessible set of serum proteins, especially serum B cell activation signatures, may potentially serve as discriminative diagnostic biomarkers in cases where the clinical diagnosis of OS or OTB is uncertain.

P-RET-197

Quantitative analysis of choroidal parameters of type 1 macular neovascularization secondary to CSC and nAMD

X. Zhang^{1,2}, Y. Song², M. Yan²

¹The First Clinical College, Southern Medical University, Guangzhou, China, ²Ophthalmology, Central Theater Command General Hospital of PLA, Wuhan, China

Introduction: Macular neovascularization (MNV) is a severe complication of various retinal diseases. Type 1 MNV is the most common form of MNV in neovascular age-related macular degeneration (nAMD) and central serous chorioretinopathy (CSC). Because of several similarities between CSC and nAMD with MNV, differentiating between these diseases can still be challenging and crucial for patients who do not report a history of CSC and exhibit atypical manifestations. So it is important to conduct in-depth analysis of the imaging features using advanced imaging technology. Choroid plays a significant role in these diseases due to its high metabolic rate and oxygen supply capacity[12]. In recent years, some studies have examined or compared the choroidal characteristics of the two diseases, such as choroidal thickness and choroidal blood flow focused on the fovea. Only a few studies have compared the differences in choroidal thickness for the extrafoveal region in these two diseases, and the observational indicators have been limited. Therefore, our study aim to compare the choroidal parameters between CSC and nAMD associated with type 1 MNV using UWF SS-OCTA.

Objectives: To compare the choroidal characteristics of type 1 MNV secondary to CSC and nAMD using UWF SS-OCTA.

Methods: A cross-sectional study was conducted to evaluate patients with type 1 MNV secondary to CSC (50 eyes) and nAMD (98 eyes) using UWF SS-OCTA evaluations. The scan protocol included a vertical 20 mm × horizontal 24 mm area comprising 9 subfields. A normal group of sixty-eight healthy eyes was included for comparison. Analysis of covariance tests were performed to assess the effects of different diagnoses on choroidal parameters, with gender and age as covariates.

Results: Age was found to be associated with all choroidal parameters (all $p < 0.05$). After accounting for age differences, the estimated marginal means of choroidal thickness (CT) and choroidal volume (CV) were significantly smaller in the nAMD group compared to the CSC group and the normal group (all $p < 0.05$) in the central region. The choroidal vascular index (CVI) in the superotemporal and temporal regions was higher in the CSC group than in the nAMD group ($p < 0.05$). The CCD in the temporal region was also higher in the CSC group than in the nAMD group ($p < 0.05$).

Conclusions: UWF SS-OCTA can be utilized to differentiate type 1 MNV secondary to CSC and nAMD at the choroidal level. In certain regions, the CT, CV, CVI, and CCD were higher in the CSC eyes compared to the nAMD eyes.

P-RET-198

Analysis of misdiagnosis causes and clinical observation of acute retinal necrosis syndrome

R. Liu¹, Y. Wang¹, X.L. Hu²

¹Chongqing Aier Eye Hospital, Chongqing, China, ²Department of Pharmacy, Chongqing University Shapingba Hospital, Chongqing, China

Introduction: Acute retinal necrosis (ARN) is an uncommon intraocular inflammatory syndrome characterized by severe and diffuse uveitis, retinal vasculitis, and retinal necrosis, bilateral involvement occurs in most of the patients, misdiagnosed or untreated cases may progress to optic neuropathy or retinal detachment, leading to irreversible blindness.

Objectives: To analyze the misdiagnosis causes and clinical characteristics of acute retinal necrosis syndrome (ARN).

Methods: Review the clinical data of 12 patients (16 eyes) with ARN, summarize the clinical characteristics and analyze the causes of misdiagnosis.

Results: The average time from onset to definitive diagnosis was 21.4 days. 12 cases were misdiagnosed as conjunctivitis, iridocyclitis, glaucomatocyclitic syndrome, uveitis, glaucoma, Eales disease, retinal vein obstruction. The diagnosis of ARN is based in clinical features. The use of polymerase chain reaction (PCR) in aqueous humor samples is useful to identify the etiology. 12 patients received systemic and intraocular antiviral therapy and supplemented by retinal laser photocoagulation, corticosteroids and aspirin. 5 patients underwent vitreous surgery due to the progression of ARN. The best corrected visual acuity ranged from light perception to 12/60 during 3~21 months follow-up period.

Conclusions: It is crucial to avoid misdiagnosis and strengthen identification of ARN, Early diagnosis and timely appropriate intervention are needed.

P-RET-199

Efficacy and safety of intravitreal conbercept with T&E regimens in age-related macular degeneration: 1 year finding

X. Wang¹, H. Peng¹

¹Department of Ophthalmology; Chongqing Key Laboratory for the Prevention and Treatment of Major Blinding Eye Diseases, The First Affiliated Hospital of Chongqing Medical University, Chongqing, China

Introduction: Age-related macular degeneration (AMD) is a common cause of vision loss worldwide. Currently, anti-VEGF drugs widely used in ophthalmology clinics in China include ranibizumab, aflibercept, and conbercept. However, there is still no consensus on the treatment regimen and efficacy evaluation for conbercept. Further study of conbercept in treating wet AMD remains an important but unexplored topic.

Objectives: To explore the therapeutic effect, safety, and numbers of injections with wet age-related macular degeneration (wAMD) under 2 weeks or 4 weeks injection interval adjustment degrees of a modified "treat-and-extend (T&E)" treatment regimen.

Methods: This is a prospective study. Data from patients diagnosed with wAMD who have never received related treatment were collected. Treatment was an intravitreal injection of 0.5 mg conbercept using modified "T&E" treatment plans. After 3 months of monthly intravitreal injections, the patients were randomly divided into two groups, and the degree of adjustment of the injection interval was divided into 2 weeks and 4 weeks. Unlike the ALTAIR study, we cancel the maintenance criteria of classical T&E regimens. The best-corrected visual acuity (BCVA), central retinal thickness (CRT), last injection interval and number of injections were recorded at 3, 6, and 12 months to evaluate treatment efficacy.

Results: 42 eyes were included (n=21 each). At 3, 6, 12 months, the mean change in BCVA from baseline was +8.95, +9.9, +10.48 letters, and +9.71, +12.29, +14.19 letters in the 2-week and 4-week groups, respectively; the mean change in CRT (μm) was 107.29, -114.81, -112.71 and -61.29, -69.14, -70.19, respectively. The mean number of injections was 5.4 and 5.3, and the mean last injection interval was 8.8 weeks and 13.3 weeks in the 2- and 4-week groups, respectively. The interval of the last injections was at least 8 weeks taking up 61.9% of patients in the 2-week group, and at least 12 weeks taking up 81% of patients in the 4-week group. No serious safety incidents occurred in either group.

Conclusions: These modified T&E regimens were effective and safe. There was no significant difference in the therapeutic effect between the 2-week and 4-week groups. The proportion of patients with longer injection intervals in the 4-week group was higher than that in the 2-week group. Patients can achieve similar outcomes with either interval mode; therefore, flexible treatment options can be selected according to the patient's time requirements.

P-RET-200

Clinical efficacy of conbercept injection on nAMD under different levels of inflammation

L. Xu¹, B. Fu¹, Q. Liu¹, S. Jia¹, J. Dong¹, M. Zhao¹, X. Zhuang¹, G. Zhang¹

¹The Fourth People's Hospital of Shenyang, Shenyang, China

Introduction: Age-related macular degeneration (AMD) is regarded as one of the most common causes of irreversible blindness among elderly patients. Neovascular AMD, which accounts for 10% of all AMD cases, can cause devastating vision loss due to choroidal neovascularization (CNV). The clinical effects and safety of intravitreal injection of conbercept in patients suffering from neovascular AMD have not been fully evaluated.

Objectives: The aim of the study was to evaluate the efficacy and safety of intravitreal injection of conbercept in patients with neovascular AMD with different levels of inflammation.

Methods: A total of 120 consecutive patients with neovascular AMD who underwent intravitreal injection of conbercept (3 injections per month + pro re nata (3 + PRN)) were included and stratified based on the intraocular level of high-sensitivity C-reactive protein (hs-CRP). The level of inflammation was defined as low, medium or high, based on the concentration of hs-CRP prior to injection. Before and after conbercept injections, best-corrected visual acuity (BCVA) and central retinal thickness (CRT) were compared, respectively. Moreover, cytokine markers as well as the frequency of injections and adverse events (AEs) were measured.

Results: There were significant differences in BCVA and CRT between low, medium and high tertiles. Compared to the baseline, improved BCVA was observed, and CRT significantly declined after operation. The AEs were most observed in high tertiles. A significant decrease in vascular endothelial growth factor (VEGF), interleukin (IL)-6 and IL-8 was observed after 1 year.

Conclusions: The effectiveness of conbercept on neovascular AMD varies depending on the level of inflammation, which could be achieved by administering different injection frequencies at different levels of inflammation. Furthermore, conbercept is associated with reducing the level of inflammatory factors (IL-6 and IL-8) after intravitreal injection, which suggests that suppressing inflammatory response might contribute to the clinical efficacy of anti-VEGF treatment. Our results provided a novel mechanism for conbercept in patients with neovascular AMD.

P-RET-201

Clinical characteristics of BRVO in large-sample Chinese patients from multicenter of North-Western China

H.-Y. Wang^{1,2}, L. Zhang^{1,2}, W. Jia^{1,2}, R. Wang

¹Shaanxi Eye Hospital· Xi'an People's Hospital (Xi'an Fourth Hospital), Xi'an, China, ²Xi'an Key Laboratory of Digital Medical Technology of Ophthalmologic Imaging, Xi'an, China

Introduction: Even been a common disease and recognized for a long time, branch retinal vein occlusion (BRVO) still leaves a lot of myths to us and worth to discuss. Lacking information of clinic features observation in large-scale patients also cannot make us fully understand this disease. Thus, re-summarizing and refining these features as well as further improving and optimizing traditional imaging evaluation, can not only deepen the correct acknowledge of the entity.

Objectives: To analyze clinical and imaging characteristics of over thousands of patients with BRVO in multicenter of northwest China and evaluate possible influence factors of ischemia and retinal neovascularization.

Methods: A total of 1000 patients (1049 eyes) with naive BRVO in three tertiary eye centers in northwestern China was enrolled, images of fundus fluorescein angiography and color fundus photos were collected from 2019.12 to 2023.12. The characteristics of blood vessels at the obstruction site were assessed, and influencing factors of retinal ischemia and retinal neovascularization were analyzed.

Results: The mean age was 57.98±10.85 years, female (53.3%) patients was slightly more than male. Of all, bilateral eyes were involved in 49 patients, the majority of occlusion type was major BRVO (78.2% vs 21.8% macular BRVO) and ischemic BRVO (62.2% vs 37.8% non-ischemic BRVO). The occlusion sites mostly locate at superior temporal quadrant (68.5%) with majority of arterial overcrossing (83.7%) , and first-order crossing (58.3%) was shown in most eyes. Among all eyes, 19.8% presented retinal neovascularization (RNV), and vitreous hemorrhage (VH) was displayed in 137 eyes. Female, major trunk and no collateral vessel were high risk factors to retinal ischemia. While, arterial overcrossing, no collateral vessel, VH and macular arch ring involvement were high risk factors to RNV.

Conclusions: Ischemic type and main trunk involvement were most type in this study. Arterial overcrossing, no collateral vessel, VH and macular arch ring involvement could be risk factors correlated to RNV. Our study provides vascular imaging characteristics of BRVO in Chinese populations.

P-RET-202

Frequency analysis of allele and genotype distribution of the VEGFA gene in the development of diabetic retinopathy

A. Yusupov¹, K. Muyassar Kh¹, S. Abdullaeva¹, K. Xasan.Sh¹, B. Kamila G¹

¹Department of Molecular Genetics, Republican Specialized Scientific and Practical Medical Center for Eye Microsurgery, Tashkent, Uzbekistan

Introduction: Vascular endothelial growth factor (VEGF) is a proinflammatory cytokine and the main mediator of blood vessel permeability, regulates proliferation and migration of endothelial cells, and is essential for vasculogenesis and angiogenesis.

Objectives: In order to test the concept of a possible association between increased expression of vascular endothelial growth factor with the formation of diabetic microangiopathy and evaluate the role of VEGFA rs2010963 gene polymorphism in the etiopathogenesis of DR, we conducted a molecular study.

Methods: We studied 93 patients with DR (the main group). This group of patients was divided into 2 subgroups depending on the severity of the disease:

1. Patients with NPDR (n=45);
2. Patients with PPDR (n=48).

The control sample consisted of 96 conditionally healthy donors of Uzbek nationality without DR.

Results: When the allele and genotype frequencies of the rs2010963 gene polymorphism of the VEGFA were compared between DR patients and the population group, statistically significant differences were found. In the combined sample of patients with DR, the wild-type allele -G was found considerably lower compared to the control group (56.4% vs. 69/3%, respectively; $\chi^2=6.6$; $p=0.01$). In contrast, the unfavorable -C allele was significantly more frequent in patients with DR than controls (43.5% and 30.7%, respectively). The calculated relative chance of finding this allele in patients with DR was: OR=1.7 at 95%CI1.14- 2.652, relative risk RR=1.4. 95%CI1.084- 1.853, which confirms the presence of a predisposing effect of carrying the allelic variant rs2010963*C gene of the VEGFA to the formation of DR in our population. At the same time, the proportion of wild favorable allele G among patients was OR<1 compared to the control group ($\chi^2=6.6$; $p=0.01$), confirming the protective effect of this allele on DR development.

Conclusions: The significant correlation of genotypic C/C variant of VEGFA rs2010963 gene polymorphism with DR, especially with a more severe course, which we found, makes it possible not only to predict the development and risk of possible complications, but also can be the basis for a modern personalized approach to treatment, including targeted therapy of this severe pathology. Therefore, further research in the direction of studying the expression of this gene may determine the prospects of possible treatment of such patients with the help of effective "target" therapy taking into account the genetic characteristics of each patient.

V-RET-001

Pars plana vitrectomy with foveal sparing and inverted internal limiting membrane flap for optic pit maculopathy

C.I. Campos-Wolter¹, E.J. Garcia-Negron¹, M. Jimenez¹, J.A. Ramirez-Estudillo¹

¹Retina, Fundacion Hospital Nuestra Señora de la Luz, Ciudad de Mexico, Mexico

Introduction: Optic pits are congenital defects presumably arising from the failure of fetal fissure closure in embryogenesis.

First described by Wiethe in 1862, the frequency of this anomaly was estimated to be 1 out of 11,000 people.

Usually asymptomatic, may be an incidental finding on routine dilated fundus exam of people however may course with macular changes such as serous retinal detachment, retinal schisis or cystoid macular edema.

Objectives: To evaluate the anatomical and visual outcomes in optic disc pit maculopathy following pars plana vitrectomy (PPV) with inverted internal limiting membrane (ILM) flap at 12 months follow up.

Methods: 20-year-old healthy woman with a 4 months history of gradual worsening of vision of her right eye, BCVA (Snellen) 20/200 (6/60), there was no ocular history of surgery, neither significant family history of ophthalmic disease. Anterior segment examination did not reveal any significant findings, dilated fundal examination showed an **Optic Disc Pit** in the right eye accompanied by macular alterations, OCT scan was carried out illustrating a retinal macular schisis, due to the progressive worsening of visual acuity, it was decided to perform a right pars plana vitrectomy (PPV) with foveal sparing and Inverted Internal Limiting Membrane Flap, it was used perfluorocarbon liquid to create the flap and place it on the optic disc pit. There were no complications reported from the surgery.

Results: On her 12 months follow-up appointment after the procedure, OCT showed resolution of the schisis cavity with associated outer nuclear layer thinning and foveal thinning with minimum subretinal fluid under the fovea, BCVA in her right eye was 20/40 (6/12).

Conclusions: Pars Plana Vitrectomy with Foveal Sparing and Inverted Internal Limiting Membrane Flap It is a safe and effective option for patients with Optic Disc Pit Maculopathy.

Video

[Click here to play video](#)

V-RET-002

Lupus incognito- the mysterious wolf in disguise! A rare presentation of Systemic Lupus Erythematosus

D. S. Prasad¹, E. Anthony², D. Manohar³

¹Resident, Aravind Eye Hospital, Chennai, India, ²Uvea, Aravind Eye Hospital, Chennai, India, ³Cornea, Aravind Eye Hospital, Chennai, India

Introduction: To describe a rare ocular clinical presentation of Systemic Lupus Erythematosus, bilateral endotheliitis with anterior uveitis.

Objectives: To establish the probable etiology of the transient endotheliitis and anterior uveitis.

Methods: The patient was subjected to systematic clinical examination followed by relevant ocular investigations. A thorough systemic work up including hematology, immunology, serology and microbiological investigations were done. Anterior chamber tap procedure was done in both eyes and the aqueous humor samples were sent for PCR and Gram stain, KOH mount to rule out infectious etiology, patient was treated empirically with topical steroids, antibiotics, antifungals, cycloplegics and was referred to a rheumatologist to start treatment for SLE until PCR reports arrived.

Results: Gram stain and KOH mount showed no growth, PCR of the aqueous humor samples were negative for Eubacteria, mycobacteria, Panfungal, HSV 1,2, VZV and CMV. Patient responded well to treatment with systemic steroids and immunosuppressives and had a transient recurrence on discontinuing the same for a short while in between, thus confirming the probable autoimmune etiology due to SLE.

Conclusions: So far, there has been only one case in literature reported worldwide i.e by Varga et al in 1993, bilateral transient keratoendotheliitis in a 45 year old female with SLE. Thus, this case is yet another rare clinical ocular presentation of SLE to add to.

Video

[Click here to play video](#)

V-RET-003

ILMP and cystotomy for diabetic cystoid macular edema

T. Niu¹, T. Yan¹, T. Li¹, H. Fang¹

¹The Fourth People's Hospital of Shenyang, Shenyang, China

Introduction: There are many treatments for DME including anti-VEGF, dexamethasone intravitreal implant, retinal laser photocoagulation and vitrectomy with internal limiting membrane peeling. In some cases, DME was treated with subretinal irrigation or vesicle irrigation combined vitrectomy, while some studies suggested that cystotomy is effective.

Objectives: We aim to use ILMP and cystotomy to treat diabetic cystoid macular edema.

Methods: We choose 3 cases. The patients had undergone anti-VEGF treatment and vitrectomy with silicone oil tamponade, followed by multiple anti-VEGF treatments. The retinal anatomical structures and BCVA showed no significant improvement which led to poor patient compliance. After that, ILMP and cystotomy were performed with silicone oil removal. The key steps of the operation are: 1. Standard vitrectomy with three-ways stopcock 2. bright blue staining and ILMP 3. cut the vesicle vertically with 27G instrument.

Results: The postoperative OCT result showed that the retinal anatomy restored. Also the BCVA was improved compared with that before surgery.

Conclusions: Our study showed that internal limiting membrane peeling combined silicone oil extraction to remove the inflammatory cells and the physical barrier is important for the treatment of DME. Cystotomy has the effect on the drainage and provides a new therapeutic idea for refractory macular cystoid edema. Early restoration of retinal anatomy in DME patients is particularly important for long-term vision prognosis. Also, using and developing of OCT navigation microscope for surgery is necessary.

Video

[Click here to play video](#)

V-RET-004

Transscleral laser cyclopexy for the management of traumatic cyclodialysis with hypotonic maculopathy

J.E. Covarrubias Avilés¹, C.I. Campos Wolter¹, G.J. Ríos Nequis¹

¹Retina, Fundación Hospital Nuestra Señora de la Luz, Mexico City, Mexico

Introduction: We present the clinical case of a 29 year old male patient with no medical history who presented with blunt ocular trauma with pyrotechnics in the right eye.

Objectives: To highlight the role of the transscleral laser cyclopexy combined with pars plana vitrectomy in achieving early favourable results, with good anatomic and visual results.

Methods: The intervention was performed by phacovitrectomy with peeling of the internal limiting membrane plus transscleral laser cyclopexy (IRIDEX Cyclo G6) with a power of 1000 mW with an exposure time of 2 seconds per point. After surgery, a follow-up was carried out the next day, the first week, the first month, and the third postoperative month. An optical coherence tomography of the macular area was performed before surgery, at the first week of follow-up and 3 months after surgery. Ultrabiomicroscopy was performed before surgery and one week after surgery.

Results: A 29 year old male patient with no medical history presented with blunt ocular trauma with pyrotechnics in the right eye of 3 weeks of evolution.

He presented an initial visual acuity of counting fingers; the examination revealed phacodonesis, temporary cyclodialysis, 360° choroidal detachment, folds in the macular area, and intraocular pressure of 2 mmHg.

In ultrabiomicroscopy he presents cyclodialysis in the temporal sector and 360° choroidal detachment. The OCT of the macular area shows a central thickness of 271 microns, vitreoretinal interface with interference, presence of foveal depression, subfoveal subretinal fluid, folds in the RPE and distortion of internal layers.

The intervention was performed by phacovitrectomy with peeling of the internal limiting membrane plus laser cyclopexy (IRIDEX Cyclo G6) with a power of 1000 mW with an exposure time of 2 seconds per point.

During follow-up on the first postoperative day, the patient had an intraocular pressure of 10 mmHg.

On the seventh postoperative day, there were no folds in the macular area with intraocular pressure of 12 mmHg and ultrabiomicroscopy showed ciliary body without detachment 360°.

At the third postoperative month with visual acuity of 20/320, intraocular pressure of 14 mmHg; OCT of macular area with central macular thickness of 140 microns, presence of foveal depression and disruption of external layers.

Conclusions: Application of transscleral diode laser technique with pars plana vitrectomy can be useful to treat patients with cyclodialysis in the presence of hypotonic maculopathy secondary to ocular trauma.

Video

[Click here to play video](#)

V-RET-007

Repositioning dislocated posterior chamber intraocular lens

E.J. Briceno Souza¹, C.I. Campos Wolter¹

¹Hospital Nuestra Señora de la Luz I.A.P., Mexico City, Mexico

Introduction: Video case

Objectives: Video case

Methods: Video case

Results: Video case

Conclusions: Video case

Video

[Click here to play video](#)

V-RET-008

Inverted multilayer internal limiting membrane plug for management of macular hole retinal detachment in high myope

*A. Upadhyay*¹

¹vitreo- retina services, EyeQ Superspeciality Eye Hospitals, HARYANA, India

Introduction: Macular hole in combination with retinal detachment in high myope occurs as the macular hole is the break that led to the retinal detachment. The retinal detachment is typically posterior but can spread anteriorly, usually not associated with other breaks, this scenario is more challenging over conventional retinal detachment with macular hole, as non closure of the hole may lead to recurrent detachments

Objectives: The primary objective is to close the MACULAR HOLE to fix the retinal detachment, second objective is to ease the peeling of Internal Limiting Membrane(ILM) in a Mobile thin retina , lastly to prevent brilliant blue green(BBG) gaining access to the subretinal space under the detached retina and causing toxicity.

Methods: We present a video where we demonstrate a method for closure of macular hole retinal detachment in a high myope, Here 25 G vitrectomy is performed, triamcinolone injection is injected to check for posterior vitreous detachment followed by core and peripheral vitrectomy is completed with peripheral retinal examination for any other retinal break. Posterior pole retinal detachment with macular hole is now approached with staining the ILM with BBG dye followed by perfluorocarbon liquid(PFCL)assisted technique to stabilize the mobile retina and removal of sub-retinal fluid through an inferior retinotomy and reattach the retina, diluted BBG dye is injected again around the PFCL bubble to stain the ILM preventing the BBG dye from gaining access to the subretinal space.The initial ILM edge is achieved by using ILM forceps in a pinch-and-peel technique, then multi-layered peeling technique is used to plug the hole, peripheral ILM is peeled upto the arcade to assist closure of macular hole and retinal detachment. PFCL bubble is aspirated followed by endolaser to retinotomy and silicon oil injection is done to fill the globe.

Results: Macular hole closure with attached retina is achieved with minimal maneuver, NO secondary retinal detachments or breaks is seen which is commonly seen in myopes because of thin retina.

Conclusions: Inverted Internal Limiting Membrane Multilayered Plug technique for Management of Macular Hole Retinal Detachment in High Myope is a safe and better technique with better surgical outcomes.

Video

[Click here to play video](#)

V-RET-009

Settling the unsettled!

S. Azad¹, A. Kapoor¹, A. Kalginkar¹, N. Shaikh¹, S. Verma¹

¹DR.R.P.CENTRE, AIIMS, NEW DELHI, India

Introduction: If Giant Retinal Tear(GRT) is a Surgical Challenge? Then, GRT with PVR is a Surgical Battle!

Objectives: The objective of the Surgeon is to Pin down the GRT!

Methods: A 6 year old child presented with sudden onset vision loss since 25 days following fall from a bike. Child had undergone lens aspiration with PCIOL for subluxated cataract elsewhere 15 days back. On presentation BCVA was Light Perception with inaccurate projection of rays in right eye(RE) and 6/6 in left eye(LE). IOP was 6 and LE 14 mm of Hg in RE and LE respectively. On examination LE was WNL. RE revealed PCIOL with media haze and a crumpled retina over the disc. Child was posted for RE Surgery.

Results: The child underwent 3 Port PPV + Membrane Peeling + PFCL + Endolaser + Silicone Oil Exchange. The video describes the battle in the form of a dialogue between the Surgeon and GRT, both trying everything possible in their arsenal, unwilling to give up!

Conclusions: The Surgeon wins the long and hard fought battle against the mighty GRT.... At least for now!

Video

[Click here to play video](#)

Vision Rehabilitation

P-VRE-001

Neuro-vision rehabilitation approach in the management of red-green color deficiency

T. Yambot^{1,2}, M.R. Paredes³, S. Morales², S. O. Bernardo³, FDMVCI-NU MOA Study Group

¹School of Optometry, National University MOA, Pasay City, Philippines, ²Vision Development, FDM Vision Care Research and Training Institute, Quezon City, Philippines, ³Optometry, National University MOA, Pasay City, Philippines

Introduction: Color deficiencies can be classified into three different categories: red-green color blindness, blue-yellow color blindness, and the rare complete color blindness. Deuteranomaly is a red-green color blindness where greens will have a more red shade. Protanomaly makes red look more green and less bright. Protanopia and Deuteranopia conditions exist when a person is unable to tell any difference between red and green colors.

Objectives: To discover the 1st innovative neuro-vision rehabilitation approach for the treatment of patients diagnosed with red-green color deficiency.

Methods: A student who failed the Ishihara color vision test had a functional vision assessment in ocular integrity, visual efficiency, and visual information processing. He was tested using the Ishihara Color Test and the Farnsworth D-15 Color Blind Test. Visual Acuity testing was done using the standard optotype Snellen chart and findings were compared with the result of the dynamic visual acuity utilizing the Dyop Vision Test. The Dyop strobe rotating visual targets with a sequence of black, blue, green, yellow, and red colors were presented one at a time on a gray background. The central visual field was measured to determine the limits for the blue, red, and green fields.

Results: The ocular structures were evaluated and found to be essentially normal. Visual acuity testing using the Snellen chart was OU 20/20 at far and J1 at near. A Dyop vision test was done for each eye to compare visual abilities before and after syntonics therapy. There was a significant improvement in the dynamic visual acuity in arc/min using the blue, green, and red strobes on a gray background. The patient demonstrated single binocular vision, fusion, and stereopsis. The central visual field isopter limits were contracted for all the blue, red, and green visual fields and expanded after syntonics therapy. The patient's visual information processing ability was enhanced by visualization and tracking skills development.

Conclusions: Eyes detect light and convert it into electrochemical impulses in neurons that connect the eye via the optic nerve to the thalamus then the visual cortex of the occipital lobe and other areas of the brain at the prefrontal nucleus where object details like form and colors are processed. Syntonics therapy utilizing red-yellow and green-yellow filters for 24 sessions enhances the sensitivity of the weak red L-cones and the green M-cones to enable the patient to see 100% of the Ishihara Color Blindness and Farnsworth D15 Test.

P-VRE-002

Clinical profile and outcomes of secondary intraocular lens (IOL) in a tertiary care institute in Eastern India

K. Chakraborty¹, S. Datta¹, M. Banerjee¹

¹Regional Institute of Ophthalmology, Medical College Kolkata, Kolkata, India

Introduction: Aphakia is an important cause of visual morbidity which, if treated early, can give promising results. Management options include scleral fixated intraocular lens (SFIOL), retropupillary iris claw lens (RICL), and the novel CM-T Flex lens. Visual outcome depends on the etiology and type of surgery.

Objectives: To assess the clinical profile and outcomes of secondary IOL

Methods: We prospectively followed up patients who underwent secondary IOL implantation at our institute. Parameters included uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA) in logMAR, intraocular pressure (IOP), anterior chamber (AC) reaction and central macular thickness (CMT). Statistical analysis was done using SPSS v23.0.

Results: Sixty patients were included, of which SFIOL was implanted in 63.2%, RICL in 25.0% and CM-T Flex lens in 11.8% patients. Mean age was 55.1±12.3 years, 73.3% were male, right eye was operated in 51.7% and history of trauma was present in 55.0% (62.2% in SFIOL vs 33% in RICL, **p=0.05**) patients. Etiologies included complicated cataract surgery in 31.6%, lens drop in 28.3%, lens subluxation in 21.7%, IOL drop in 8.3% and IOL subluxation in 5.0% patients. UCVA of the overall cohort significantly improved from 1.94±0.36 to 0.71±0.41 at 3 months and 0.61±0.32 at 6 months (**p<0.01**) with no significant difference between the two groups (p=0.18). BCVA of the overall cohort improved to 0.47±0.20 at 6 months, with no significant difference between the groups. There was no significant difference in IOP between the groups at 3 and 6 months. Mean CMT (in µm) was 348±127 at 3 months, which decreased to 312±88 at 6 months (p=0.07), with no significant difference between the groups. AC cell count was similar in both the groups. Although AC flare was higher in RICL group on POD-1 (**p=0.04**), it became similar POD-7 onwards (p=0.20). Cystoid macular edema (CME) (21.7%) was the most common complication, followed by epiretinal membrane (8.3%), IOL dislocation (3.3%) and posterior IOL tilt (3.3%). Complications were higher in the SFIOL group (60% vs 20%, **p<0.01**), which became non-significant after adjusting for trauma (p=0.07). CME was treated with 1 mL (40 mg/mL) of posterior sub-tenon triamcinolone acetonide (PST) in 8 patients, significantly reducing CMT (544±135 to 374±117, **p=0.02**).

Conclusions: Visual outcome and IOP were similar between SFIOL and RICL groups. Complication rate was higher in SFIOL group, probably secondary to trauma. CME was seen in 21.7% patients which reduced significantly following PST.

P-VRE-003

Surgical Outcomes of Cataract Removal Combined with Intraocular Lens Implantation in Patients with Iris-Choroid Coloboma

G. Zheng¹, Y. Liu¹

¹The First Affiliated Hospital of Zhengzhou University, Zhengzhou, China

Introduction: This study systematically reviewed patients with congenital microcornea accompanied by iris-choroid coloboma and cataract.

Objectives: To evaluate the surgical outcomes of cataract removal combined with intraocular lens (IOL) implantation in patients with combined iris-choroid coloboma.

Methods: This retrospective cohort study included patients who underwent cataract removal combined with IOL implantation at the First Affiliated Hospital of Zhengzhou University from January 2015 to June 2023. Among these patients, 38 cases (42 eyes) with combined iris-choroid coloboma were selected, and for patients with bilateral involvement, the eye with the first surgery was included in the study. Patients were categorized into three groups based on corneal diameter: $\geq 10\text{mm}$, $\geq 7\text{mm}$ and $< 10\text{mm}$, and $< 7\text{mm}$. Preoperative corneal diameter, axial length, lens opacity, choroid coloboma severity, preoperative corrected visual acuity, and other preexisting ocular complications were observed and recorded. Surgical procedures, intraoperative complications, and postoperative complications beyond 3 months were also recorded.

Results: The average age was 41.43 years (range: 26-53 years). In the $\geq 10\text{mm}$ corneal diameter group, the average preoperative best-corrected visual acuity (BCVA) was 0.15, and postoperative BCVA was 0.41. In the $\geq 7\text{mm}$ and $< 10\text{mm}$ group, preoperative BCVA was 0.057, and postoperative BCVA was 0.23. In the $< 7\text{mm}$ group, preoperative BCVA was 0.048, and postoperative BCVA was 0.056. There was no statistically significant difference in visual acuity improvement between pre- and postoperative in the $< 7\text{mm}$ group, while the other two groups showed statistically significant differences ($p < 0.05$). In the $< 7\text{mm}$ group, only one case received IOL implantation, while the rest underwent combined vitrectomy, including two cases with silicone oil injection. In the other two groups, 3 and 1 case(s) could not undergo one-stage IOL implantation. The most common intraoperative and postoperative complications in these patients included posterior capsule rupture, abnormalities in the fundus requiring silicone oil injection, and occurrences of lens dislocation, secondary glaucoma, and retinal detachment. There were no statistically significant differences in complications among the three groups.

Conclusions: Patients with iris-choroid coloboma are at a higher risk of complications. Delaying surgery, poor preoperative visual acuity, and harder lens nuclei result in significantly increased surgical difficulty and risks.

P-VRE-004

Rehabilitative effectiveness of visual therapy in children with cerebral visual impairment: a randomised control study

S. Chaurasia¹, D. Sardhara¹, J. Sukhija¹, A. Prabhakar², N. Sankhyan³, CVI- Team study group

¹Ophthalmology, Post Graduate Institute of Medical Education and Research, Chandigarh, India,

²Radiology, PGIMER, Chandigarh, India, ³Pediatrics, PGIMER, Chandigarh, India

Introduction: Cerebral Visual Impairment (CVI) poses unique challenges in paediatric ophthalmology, stemming from perinatal brain injuries that manifest as complex visual deficits. This condition ranges from total visual inattention to various higher-order visual dysfunctions. Standard care involves routine examinations and neurological interventions, with limited emphasis on visual rehabilitation.

Objectives: The study aimed to study the effectiveness of tailored home-based rehabilitative visual stimulation, visuo-motor and perceptual learning in improving the functional vision of CVI children compared to children receiving standard therapy.

Methods: This prospective, randomized controlled interventional pilot study examined 50 children aged 6 months to 5 years with Cortical Visual Impairment (CVI) over a 9-month period. It aimed to evaluate the effectiveness of visual stimulation exercises compared to standard therapy. Baseline screening included comprehensive clinical, neurological, ophthalmological, and radiological assessments. Methodologically, the study employed single-blinded procedures with computer-generated randomization and concealed allocation. The intervention group received individualized home-based visual stimulation programs, monitored through telephonic follow-ups and video documentation. At the 9-month follow-up, parent-reported improvements and detailed evaluations of basic visual function and functional vision were conducted.

Results: The study included 66 patients, with 50 completing the second assessment. Baseline characteristics showed no significant differences between the case and control groups. CVI tool kit consisted of assessment of 4 domains: visuo-attention, visuo-motor, visuo-communication & visuo-perception. After the second assessment, significant improvements were observed in functional vision scores, (1080 vs 220; $p = 0.000$) including visual attention, communication, visuo-motor, and processing skills in case group compared to controls. These findings suggested the effectiveness of visual stimulation, visuo-motor and visuo-perceptual cognition exercises in improving the functional vision in children with CVI.

Conclusions: In conclusion, the study highlights the efficacy of visual stimulation exercises in improving functional vision in children with CVI. Significant improvements were observed in various domains of functional vision in the intervention group compared to controls, suggesting the potential benefits of tailored visual therapy interventions in this population.

P-VRE-005

"Eyes Closed, Open Heart": a sporting and scientific event to raise awareness on visual impairment

A. Hocini¹, A. Belaiche², M. Belaiche¹, M.-J. Aubin^{3,4,5}

¹Faculty of Medicine, Université de Montréal, Montreal, Canada, ²Faculty of Medicine, McGill University, Montreal, Canada, ³University Ophthalmology Centre, Hôpital Maisonneuve-Rosemont, CIUSSS-de-l'Est-de-l'Île-de-Montréal, Montreal, Canada, ⁴Department of Ophthalmology, Faculty of Medicine, Montreal, Canada, ⁵Department of Social and Preventive Medicine, School of Public Health, Montreal, Canada

Introduction:

In Canada, around 1.5 million people have visual impairments, facing notable workplace exclusion and economic challenges. With 80% of Canadians having never worked with someone visually impaired, this group experiences significant economic inequality: 22% live on a low income, compared to 8.7% of the general population, and face a 14.5% unemployment rate. This highlights the urgent need for strategies to improve workplace inclusion and economic stability for visually impaired individuals.

Objectives: The purpose of this event is to promote the inclusion of people living with a visual impairment.

Methods:

The event in Montreal featured an inclusive sports tournament and a conference. In the morning, over 60 kids, aged 10-12, with and without visual impairments, competed in a goalball tournament and played sensory games to promote inclusion. After a networking lunch, the afternoon included a medal ceremony, expert presentations on low vision, and testimonies from a visually impaired athlete and medical student. The day ended with a networking reception and was covered by a TV channel.

A pre- and post-event survey was distributed to participants, parents, and volunteers to evaluate the impact of this type of event.

Results:

Initially, 66% of participants were unaware of Goalball, which dropped to 5% after the event. The comfort level in assisting people with a visual impairment saw a significant boost, with initial discomfort at 59% dropping to just 1%. Post-event, everyone reported knowing someone living with a visual impairment, a notable increase from 56% beforehand. Understanding of visual impairments among attendees grew, with those reporting minimal knowledge decreasing from 50% to 27%. Awareness of services in Canada for individuals with a visual impairment also saw improvement, with low awareness decreasing from 72% to 33%. The event inspired 84% of participants to feel motivated to support people with visual impairments. Furthermore, all participants expressed interest in attending future events, showcasing the event's effectiveness in promoting awareness and supporting the visually impaired community.

Conclusions: To conclude, we firmly believe that presenting this event and its different goals at the WOC will motivate other young people to get involved in this important cause. Our findings will also lead to the improvement/development of tailored public health measures to foster the inclusion of the people living with a visual impairment in our society.

V-VRE-001

Intraoperative aberrometry assisted refractive optimisation of SFIOL

S. Verma¹, P. Venkatesh¹, S.V. Azad¹, D. Kumawat¹

¹Rajendra Prasad Centre for Ophthalmic Sciences, AIIMS, New Delhi, India

Introduction: Scleral fixated intraocular lens (SFIOL) is a widely used technique for visual rehabilitation in patients where capsular support is insufficient for "in the bag" or "in sulcus" implantation of intraocular lenses. Studies have shown wide variation in refractive status of eyes even in best of the hands. This is because in addition to correct IOL power calculation, this post op refractive status is expected to be optimised intraoperatively just by adequate centration of IOL. However, even slight variations in tension on haptics due to variable length of haptics placed in scleral flap or scleral tunnel can alter the effective lens position and induce significant residual refractive error, especially cylindrical astigmatism due to tilt.

Objectives: The objective of this new technique is to optimise refractive outcomes in patients undergoing SFIOL.

Methods: A standard SFIOL implantation surgery was done with approximate centration of optic. Corneal entry was sutured and intraocular pressure was maintained at 30 mm Hg with the help of infusion line secured to pars plana port. Intraoperative aberrometry was then performed using Optiwave refractive analysis system (ORA; Alcon). Refractive error of -1.91 D spherical equivalent (SE) was noted. When both the haptics were then further inserted into the tunnel intraoperative aberrometry showed significant increase in refractive error. The haptics were then slightly withdrawn from the tunnels intraoperative aberrometry showed significant reduction in refractive error. Through similar repeated manipulations a final refractive error of -1.08D SE was obtained. Post operatively patient had uncorrected visual acuity of 6/9.

Results: This surgical video highlights how even minor variations in how much haptics have been inserted in scleral tunnel can drastically alter final refractive status. Through repeated intraoperative aberrometry and subsequent manipulations of haptics we were able to significantly reduce final refractive error.

Conclusions: With the help of this technique refractive outcomes post SFIOL can be optimised. This can specially be useful in reducing the final residual cylindrical power which often leads to difficult rehabilitation in such patients.

Video

[Click here to play video](#)

Young Ophthalmologists

FT-YOU-001

AAVR-mediated AAV recombination for ocular gene therapy

X. He¹, Z. Yang¹, S. Ge¹, X. Fan¹

¹Ophthalmology, Ninth People's Hospital, Shanghai JiaoTong University School of Medicine, Shanghai, China

Introduction: Adeno-associated virus (AAV) is considered one of the most promising viral vectors. AAVR has been demonstrated to serve as a critical host factor for AAV infection.

Objectives: Because the engineering modification of AAV capsid has improved its transduction efficiency on various eye cells, we are aiming to find the specific ligand of AAVR *in vivo*, and then modify the natural AAV2 by inserting its functional peptide into the hypervariable region of AAV capsid, so that it can have better delivery efficiency in the gene therapy of the eye.

Methods: Cell culture: ARPE-19, RPE-1, 293T, HUVEC, HepG2, Hela, A549, AGS; IF staining: AAVR, WGA, DAPI; Western blot: HSPG2, AAVR, ITGA5, SDC3, RPSA, ACTIN.

Results: 1: We first used Western blot to detect the distribution of five AAV reported receptors in various tissue types of cells.

2: We have constructed a proximal enzyme system TurboID vector to capture the receptor or protein interacting with AAVR *in vivo* through biotin catalysis.

3: The AAVR-Turbo ID system was continuously expressed in RPE cells through lentiviral transfection. After adding biotin, we observed that TurboID labeled the proteins and peptides that interacted with AAVR.

4: The factors that interact with AAVR *in space* were labeled with TurboID and enriched with streptavidin affinity magnetic beads. The most promising protein was identified as ITGB1 through protein mass spectrometry detection.

5: Inserting the ITGB1 high-frequency active peptide segments into the Q588-A589 region of natural serotype AAV2 capsid, a total of 8 AAV variants were obtained. These variants and AAV2 were injected into the retina of C57 mice, and by using these variants to express GFP protein.

6: rd1 is a type of retinal pigment degeneration mouse with Pde6b gene deficiency. We injected the same doses of EYE5 and AAV2 into the retina of rd1 mice, expressing the Pde6b gene to rescue retinal degeneration. Visual functional experiments on mice and the recovery of retinal structure after treatment was showed.

Conclusions:

1. AAVR is a membrane protein that is highly expressed in RPE cells, ITGB1 and AAVR are closely interacts.
2. By inserting the high-frequency labeled peptide segment of ITGB1 into the Q588-A589 region of AAV2, a novel EYE5 variant with stronger transfection ability can be identified.
3. The gene therapy experiment in rd1 mice further confirms that the EYE5 variant, compared to the natural serotype, is a better gene therapy delivery tool and has the potential to be translated into clinical practice.

FT-YOU-002

The use of nanomedicine in the treatment of dry eye disease: an innovative approach

A. Lins de Albuquerque Cavalcanti Mendes¹, A. Lins de Medeiros², A. Lins de Medeiros²

¹Research Department, Faculty of Medical Sciences of Paraíba, João Pessoa, Brazil, ²Research Department, Vista Clinique, João Pessoa, Brazil

Introduction: Dry eye disease (DED) is a common global problem that affects the tear film and ocular surface, leading to eye irritation, dryness, and vision problems. Excessive screen use has been linked to its increase. Conventional treatment using corticosteroids has limitations, such as low availability, increased intraocular pressure, poor adherence and inappropriate use by patients, as well as a short duration of action. However, nanomedicine shows promise with its effectiveness and safety in resolving these issues. Numerous international studies have confirmed its efficacy.

Objectives: This is a systematic review that aims to know how the use of nanomedicine has a satisfactory result for the treatment of dry eye disease, with minimization of adverse effects compared to the traditional method with anti-inflammation agent corticosteroids.

Methods: Three electronic databases were used to support this research. The summarization process was carried out in six stages: creation of the guiding question, literature search, data collection, critical analysis of the studies included, discussion of the results and presentation of this review. The following guiding question was defined: "*Are nanoparticle-based medicine an effective and safe method for treating dry eye disease?*".

Results: Topical administration of drugs to the eye can be challenging due to the limited bioavailability and various obstacles within the eye. Nanotechnology has emerged as a promising approach for the treatment of DED by improving the delivery of drugs. Nanoparticles, including polymeric, inorganic, and lipid-based nanoparticles, offer effective delivery of both lipophilic and hydrophilic drugs, overcoming the low bioavailability issue. These nanoparticles can be tailored to meet different requirements by manipulating their size and morphology. They provide advantages such as excellent bioavailability, targeted delivery, lower dosage, less frequent administration, fewer side effects, and better patient compliance compared to commercially available drugs. In this perspective, some nanomedicines for DED have already received approval from regulatory federation and agencies. Therefore, this approach highlights the potential of nanotechnological systems in therapeutic drug delivery for the treatment of DED.

Conclusions: In summary, nanoparticle-based drugs has the potential to advance DED treatments. However, there are still challenges to overcome and further research is needed for the application of nanomedicine in ophthalmology.

FT-YOU-003

Short-term physical, chemical and microbiological stability study of 25IU/ ml topical insulin in artificial tears

M.-L. Bastion^{1,2}, W.H. Wan Abdul Halim^{1,2}, M. Mohd Said³, B. Kaur⁴, A. Abdul Ghani³

¹Ophthalmology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia,

²Ophthalmology, Hospital Canselor Tuanku Muhriz, Cheras, Malaysia, ³Pharmacy, Faculty of Pharmacy, UKM Campus Kuala Lumpur (UKMKL), Kuala Lumpur, Malaysia, ⁴Pharmacy, Hospital Canselor Tuanku Muhriz @ Universiti Kebangsaan Malaysia Medical Centre (UKMMC), Kuala Lumpur, Malaysia

Introduction: Topical insulin at 25IU/ml (TI) is effective in normalising healing of debrided cornea epithelium after vitreoretinal surgery, and for dry eye in diabetics (DED). However, given insulin is a protein, the stability of TI in artificial tears containing sodium hyaluronate is unknown. Knowing this will allow us to prescribe TI for DED and cornea wounds at the appropriate storage intervals.

Objectives: Hence we determined physicochemical stability and sterility of TI in artificial tears in eyedrop formulation.

Methods:

Physicochemical stability of TI ophthalmic formulation in Vismed®, sodium hyaluronate 0.18%, (TRB Chemedica International SA) stored in 5°C ± 3°C and 30°C ± 2°C was studied. Samples were put in condition of simulated use and analysed weekly for stability parameters including visual inspection, turbidity, UV spectral absorption, osmolality and pH. Force degradation study was conducted by exposing the sample to high temperature (70 °C for 24 h) to exclude potential formation of aggregates and fragments due to degradation. Insulin was quantified by stability-indicating high-performance liquid chromatographic method with diode-array detection (HPLC/DAD) using RP-C18 column, o-nitrophenol as an internal standard and UV detection set at 214 nm. The level of stability was set according to BP where concentration ranged between 90 and 110% of initial concentration (including the limits of a 95% confidence interval of the measures) is considered as acceptable. Samples were plated on agar plates and compared to positive controls.

Results:

All tested physicochemical parameters remained stable for one month in both conditions and no impact of potential temperature rises was observed on TI concentrations. There was no microbiological growth.

Conclusions:

TI in sodium hyaluronate 0.18% is stable and can be prescribed to diabetic patients for corneal epithelial defects and dry eye, with a one month shelf life. Further studies into its longer term stability and the clinical effectiveness of the combination should be performed.

FT-YOU-005

Transition clinic follow-up in a tertiary glaucoma centre

H. Aluzri¹, J. Richardson¹, V. Sung¹

¹Glaucoma, Birmingham Midland Eye Centre, Birmingham, United Kingdom

Introduction:

Evaluating Transition Clinics' Impact on Pediatric Glaucoma and Post-Transition Surgical Rates

Objectives: Paediatric glaucoma significantly threatens sight, making the transition from paediatric to adult healthcare crucial. This study evaluates transition clinic outcomes and identifies risk factors for additional surgeries post-transition.

Methods: A single-center quantitative retrospective analysis was conducted on 48 eyes of 29 patients (10 female, 19 male) who attended the transition clinic at Birmingham Children's Hospital from 2017 to 2023 and subsequently received follow-up care at Birmingham Midland Eye Centre. Parameters analyzed included intraocular pressure (IOP), visual acuity (VA), cup-to-disc ratio (CDR), visual field integrity, and the nature and duration of subsequent surgical interventions. Our demographic population was diverse with half of the patients phakic(50%), and the majority suffered from secondary glaucoma(71.7%).

Results: At the time of first adult clinic follow up, the average visual acuity was 0.73 logMAR, with an IOP of 17.4 mmHg on an average of 2.0 medications with 1.7 previous glaucoma procedures. The mean interval between the transition clinic and adult clinic follow-up was 5.07 months. Further surgical intervention was required in seven patients (nine eyes), representing 30.4% of the cohort, with a qualified success rate of 66.6%. These were all on patients with secondary glaucoma. The average duration from transition clinic to requiring further glaucoma lowering procedure was 18.4 months. This study establishes that intraocular pressure at transition clinic is a significant($p=0.044$) predictor of the need for additional glaucoma surgery post-transition with BCVA at transition ($p=0.076$) and BCVA(0.061) and medications at adult follow-up(0.089) approaching significance. Follow-up retention was high at 92.9%.with only 2 patients being lost to follow up.

Conclusions: This is the first study that evaluates the effectiveness of transition clinics in ophthalmology, assesses the risk of patient attrition, and quantifies the rate of subsequent surgeries within this demographic. Transition clinics are crucial in managing paediatric glaucoma, with implications for improving long-term outcomes.

FT-YOU-006

A20 deficiency in corneal epithelial cells protects against herpes simplex virus type 1 infection

Y. Yu¹, K. Wu¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: Developing drugs targeting host factors against herpes simplex virus 1 (HSV-1) is a promising direction due to the limited choice of drugs available clinically. A20 has been proven to participate in the infection processes of various viruses and influence viral replication.

Objectives: To investigate the relationship between the HSV-1 infection and the A20 expression in corneal epithelial cells.

Methods: The A20 expression was observed by the immunofluorescence both in the cornea and human corneal epithelial cells (HCECs) in the HSV-1 infection. A20 knockdown systems were established before HSV-1 infected cells at different MOIs. Viral titers in the cell supernatants and the expression of viral genes, viral proteins, and inflammatory cytokines were detected by TCID50, qRT-PCR, Western blot, and ELISA. The expression of upstream stimulatory factor 1 (USF1) was analyzed by western blot. The USF1 knockdown system was constructed to explore the efforts of USF1 on the expression of A20 and the viral replication.

Results: HSV-1 infection induced the A20 expression in the corneal epithelial cells both *in vitro* and in the herpes simplex keratitis mice. The silencing of A20 reduced the HSV-1 replication and downregulated the expression of infected cell protein 4, 8, glycoprotein D, and viral protein 16. A20 deficiency also reduced the RNA expression and the secretion of interleukin (IL)-6, 8. Furthermore, HSV-1 infection reduced the expression of USF1, which is known to suppress the A20 promoter. USF1 silencing upregulated the A20 expression and enhanced the replication of HSV-1.

Conclusions: Our results demonstrated that HSV-1 could enhance the A20 expression, and A20 deficiency protected HCECs by inhibiting viral replication and the downregulation of inflammatory cytokines. HSV-1 infection also reduced the USF1 expression, and the silencing of USF1 promoted viral replication.

FT-YOU-007

Seeing beyond: angio-OCT unveiling the depths of dry AMD

B. Duqietto¹, A. Wylęgała¹, E. Wylęgała¹

¹Ophthalmology, Medical University of Silesia, Katowice, Poland

Introduction: Age-related macular degeneration (AMD) is a significant cause of vision loss in developed countries, driving ongoing research into its underlying mechanisms. A promising new diagnostic approach, optical coherence tomography angiography (OCTA), emerges as a promising tool, facilitating non-invasive assessment of vascular alterations within retinal and choroidal vessels. This method is shedding light on the mechanisms underlying AMD progression, potentially leading to more effective treatments.

Objectives: To evaluate choroidal vessels in patients with dry AMD compared to healthy eyes, and to investigate which choroidal layer is predominantly affected in dry AMD depending on its stage. Furthermore, to assess whether OCTA imaging may have prognostic implications.

Methods: In this study, we conducted a comparative analysis between 22 healthy eyes and 42 eyes at varying stages of dry AMD, including early, intermediate, and late stages according to Beckman classification. We performed OCT and OCTA scans to assess central foveal thickness (CFT), subfoveal choroidal thickness (SFCT) and vascular density (VD) in choriocapillaris, superficial capillary plexus (SCP) and deep capillary plexus (DCP).

Results: In our study cohort of 42 fellow eyes, 10 (23.80%) were classified as having early stage AMD, 21 (50.00%) as intermediate, and 11 (26.10%) as late stage AMD. Statistical analysis revealed significant differences in central foveal thickness (CFT), subfoveal choroidal thickness (SFCT), and vessel density (VD) between intermediate and late stages of AMD compared to controls ($P < 0.001$). However, SFCT and VD in both the superficial capillary plexus (SCP) and deep capillary plexus (DCP) showed no substantial differences between healthy eyes and those in the early stage of AMD. Vascular impairment was predominantly observed in the choriocapillaris and SCP rather than in the DCP.

Conclusions: We observed notable vascular changes across all choroidal layers within the macular region regardless of the AMD stage compared to healthy eyes. AMD patients have mainly reduced vessel density in the superficial choroidal layers. This observation suggests that vessels play a pivotal role in AMD pathology, although it remains still unclear whether they are a cause or a consequence of the disease process. Furthermore, comprehending the ongoing alterations in choroidal layers is essential, as it may advance our understanding of AMD pathogenesis, potentially guiding the development of future preventive therapies.

FT-YOU-008

The ophthalmology escape room: what, how and why?

*A. Dharni*¹

¹Ophthalmology, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, United Kingdom

Introduction: Gamification in medical education is becoming more widely used, especially in emergency medicine and more recently in the UK, dermatology. There are however no documented cases of this engaging learning method being used in ophthalmology. Having identified a new way to explore understanding and assessment of knowledge, an escape room experience was created for medical students rotating through an ophthalmology placement.

Objectives: 1. Provide a method of informal assessment of knowledge and practical skills for 3rd year medical students
2. Introduce and explore none assessed themes of team work and early escalation amongst doctors in training
3. Highlight ophthalmology as an exciting and rewarding career option

Methods: 5 ophthalmology puzzles were designed and organised so they could be approached in any order, and only one outcome would be reached. Prior to the escape room, students has a taught seminar covering ophthalmology conditions, their management and a session on practical skills. The taught session provided the foundation knowledge and skills needed to complete the escape room. Puzzle themes included: assessment of visual fields, practical use with a direct ophthalmoscope, recognising and completing missed parts of an ocular exam, knowledge assessment of common eye presentations, diagnosis and management, and 2 logic stations which were included to generate lateral thinking and help link the puzzles. A time limit of 40 minutes was enforced and students were able to ask for a clue at any point from a facilitator who was present in the room. Following completion of the room, a debrief session was held where students were able to discuss their thoughts and concerns, and provide feedback to the facilitator.

Results: 20 students participated. Average group size: 4. Fastest escape in 21 minutes. Average escape time 33 minutes. 100% of students felt the experience reinforced their knowledge and enjoyed this form of assessment. 100% of students stated they would participate in similar experiences in other medical specialties. 60% students stated the experience positively influenced their thoughts of ophthalmology as a potential career option.

Conclusions: • Escape rooms are an effective way to informally assess students in areas both clinical and non-clinical.
• Student feedback shows escape rooms provide an enhanced educational value and a unique, inviting way of problem solving when compared to OSCEs.
• The method can be used with any staff grade and can be adapted to any specialty.

P-YOU-001

Eyelid reconstruction with auricular cartilage instead of tarsal plate combined with conjunctiva transplantation

Z. Li¹, Z. Li², J. Cai²

¹The First Dongguan Affiliated Hospital of Guangdong Medical University, Dongguan, China, ²Joint Shangtou International Eye Center (JSIEC) of Shantou University and the Chinese University of Hong Kong, Shantou, China

Introduction: Repairing a full eyelid defect after excision of an eyelid malignant tumor is particularly difficult, and the eyelid must be reconstructed to protect the eyeball and restore the opening and closing function of eyelid. Hard palate grafts, labial mucosal grafts, and biomaterial grafts have been reported to reconstruct the eyelid, whereas in this study, auricular cartilage was taken to reconstruct the eyelid.

Objectives: To evaluate the clinical effect of auricular cartilage instead of tarsal plate combined with conjunctiva graft for repairing eyelid defects after enlarged excision of eyelid malignant tumor.

Methods: Retrospective study, including 16 patients after excision of eyelid malignant tumor in the last 5 years, of which 5 had a total defect of the entire eyelid, 10 had a defect of more than 1/2 of the eyelid, and 1 had a tarsal defect with an intact margo palpebrae. Surgical methods: 1. Expanded excision of eyelid malignant tumor. 2. Taking a piece of auricular cartilage on one side, including the auricular cartilage periosteum. 3. Transplanting the auricular cartilage to replace the tarsal plate in the area of eyelid defect. 4. Taking the superior bulbar conjunctiva of the other eye and suturing it on the inner surface of the auricular cartilage to form the palpebral conjunctiva. 5. Covering the orbicularis muscle on the surface of auricular cartilage and transferring the eyelid skin flap. 6. A bandage mirror was put on postoperation.

Results: Postoperative follow-up was more than 6 months. In 16 cases, the postoperative auricular cartilage and grafted conjunctiva healed without symblepharon, repairing the defective eyelid and restoring the eyelid appearance. In 1 case, the auricular cartilage was exposed 1 week after surgery and healed after 2 months, and 2 cases had mild eyelid ectropion.

Conclusions: Auricular cartilage was taken to replace the eyelid and combined with conjunctival transplantation to reconstruct the eyelid and repair eyelid defects after eyelid malignant tumor excision. Auricular cartilage has a similar histological structure to that of the tarsal plate, which is convenient to take and easy to survive. Conjunctival transplantation to reconstruct the palpebral conjunctiva is a key technique affecting the surgery effect.

P-YOU-002

Three-dimensional analysis of age-related changes of retinal capillary plexuses in normal population

X. Liu¹, J. Ye¹

¹Department of Ophthalmology, The Second Affiliated Hospital of Zhejiang University, Hangzhou, China

Introduction: The inner retinal layers are metabolically active and important for the maintenance of visual acuity, which is supplied by the retinal capillary system. However, the morphology of retinal capillary plexuses (RCP) and the connections among the different capillary layers are complex and have not been fully understood. Optical Coherence Tomography Angiography (OCTA) is a useful tool for evaluating retinal vasculature, but current studies are mainly limited to two-dimensional (2D) assessments of the macular region, and rarely three-dimensional (3D) assessments of the wide-area retina. Besides, the primary focus of past studies was on identifying changes in images with diseases, with just a small number of healthy eyes involved. Yet, baseline information is equally important because it can provide ophthalmologists with information on the natural aging changes occurring in healthy people.

Objectives: To observe and quantify three-dimensional (3D) age-related changes in RCP in normal population using wide-field swept-source OCTA (SS-OCTA).

Methods: OCTA B-scan image sequences of 3 × 3 mm and 12 × 12 mm scan areas from sixty healthy eyes of sixty individuals from different age groups were collected. Age-related analysis of RCP in a normal population was conducted using Pearson's correlation, and the variables included the blood volume (BV), vessel surface area (VSA), and vessel density (VD). Furthermore, a meticulous 3D observation of the morphology of RCP was conducted to further investigate the age-related changes.

Results: All variables exhibited a degenerative change in the vascular status with age, but only the 3 × 3 mm VSA, 12 × 12 mm BV, 12 × 12 mm VSA, and macular VD of intermediate capillary plexus (ICP) showed significant statistical differences. A decrease in small vessels and thickening of large vessels with age was noted in 3D observation. Besides, two types of connecting branches were found in the enlarged images, and their proportion changed in accordance with age.

Conclusions: While peripheral blood flow decreases with age, blood flow at the macula remains unchanged, which might be a compensatory mechanism to maintain central vision. Besides, the age-related changes in the morphology of RCP were characterized by a decrease in small vessels, thickening of large vessels, and changes in connecting branches among different capillary plexuses.

P-YOU-003

Frequently encountered lacrimal punctum stenosis in adult allergic conjunctivitis patients

S. Liu¹, K. Wu¹

¹State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangdong Provincial Key Laboratory of Ophthalmology and Visual Science, Guangzhou, China

Introduction: Allergic conjunctivitis (AC) is one of the most common ocular disorders affecting a large proportion of the population. Lacrimal punctum stenosis (LPS) is a frequently encountered lacrimal disorder that causes epiphora and disturbs patients' daily lives. However, there are few studies directly focusing on the correlation between AC and LPS, and further exploration is needed.

Objectives: To investigate the prevalence of LPS and stenosis condition of lacrimal punctum in adult patients with AC.

Methods: This retrospective, observational case series study was conducted in Zhongshan Ophthalmic Center, China. General information was collected and ocular manifestations of the total 210 AC patients aged ≥ 18 years were assessed. Lacrimal punctum conditions of each AC patients were evaluated and graded using the lacrimal punctum grading system based on the slit-lamp microscopy examination.

Results: It was found that 69.0% (145/210) of the AC participants had stenosed lacrimal punctum. The frequency of stenosed lacrimal punctum was 49.3% (414/840), among which the largest proportion was Grade II_A (54.6% [226/414]). The abnormality percentage of upper lacrimal punctum was higher than the lower ones among the AC patients with LPS (upper: 89.0% vs. lower: 73.1%, $P = 0.001$), while there was no difference between the right and left eye (right: 94.5% vs. left: 88.3%, $P = 0.060$). The incidence of LPS between male and female AC patients showed no significant difference ($P = 0.274$). AC patients with LPS demonstrated a significantly older age than those without LPS ($P < 0.001$). Age factor was not only strikingly related to the occurrence of stenosed lacrimal puncta (OR=1.028, 95% confidence interval [CI]: 1.001-1.055, $P = 0.043$) among AC patients, but also to the severity of LPS (upper: $r = -0.171$, $P = 0.001$; lower: $r = -0.251$, $P < 0.001$). Furthermore, the age was also associated with the abnormal number of individual lacrimal puncta ($r = 0.207$, $P < 0.001$).

Conclusions: AC patients had high prevalence of LPS, especially in the upper lacrimal punctum. Increased age was associated with the rising severity and numbers of stenosed lacrimal punctum in AC patients.

P-YOU-004

ROP in multiple-birth neonates may need different screening thresholds: results of a cross-sectional survey

M. Johari¹, M. Heydari¹

¹Ophthalmology, Shiraz University of Medical Sciences, Shiraz, Iran, Islamic Republic of

Introduction: Retinopathy of prematurity is prevalent among multiple birth neonates. However, the current body of literature predominantly focuses on general risk factors, with only a limited number of studies systematically comparing the intricacies between single and multiple birth neonates.

Objectives: The study was designed to conduct a comparative analysis of risk factors for retinopathy of prematurity (ROP) in single and multiple birth neonates.

Methods: In a cross-sectional survey, a total of 521 premature neonates, encompassing singletons, twins, and triplets born at or before 34 weeks gestational age with a birth weight of less than 2000 grams, completed ROP screening program between 2020 and 2023 were included. Data of ROP severity, outcome, treatment modality, and risk factors including gestational age (GA), birth weight (BW), sex, duration of Neonatal Intensive Care Unit (NICU) admission, oxygen supplementation, mechanical ventilation, blood transfusion, method of delivery, maternal and neonatal comorbidities were extracted and compared between premature neonates from single and multiple births.

Results: The analysis of ROP severity distribution revealed 238 neonates (45.7%) with low risk (type 2 prethreshold ROP or less severe) and 16 (3.1%) with high risk (type I prethreshold ROP or more severe) ROP undergoing treatment. In the comparative analysis of risk factors in neonates with high risk ROP undergoing treatment, multiple birth neonates exhibited significantly higher GA (27.50 ± 3.27 vs 30.00 ± 2.00 vs 31.14 ± 0.38 weeks, $p = 0.032$ in singletons, twins and triplets, respectively), higher BW (861.67 ± 274.62 vs 1233.33 ± 347.75 vs 1537.14 ± 208.86 weeks, $p = 0.002$), lower duration of NICU admission (60.17 ± 21.36 vs 34.00 ± 12.17 vs 12.00 ± 6.32 weeks, $p = 0.001$) and oxygen supplementation (47.33 ± 16.57 vs 36.00 ± 8.49 vs 4.60 ± 2.41 weeks, $p = 0.001$). There was no significant difference between single and multiple birth neonates regarding the prevalence of other risk factors.

Conclusions: Multiple gestation neonates may develop high risk ROP needing treatment with higher gestational age and birth weight compared to single birth neonates. This pattern prompts a reevaluation of screening criteria, suggesting a potential need to consider multiple birth neonates with lower traditional risk factors in screening programs.

P-YOU-005

Tarsoconjunctival flap for scleromalacia perforans related to the treatment of conjunctival melanoma

P. Finger¹, H. Reddy², A. Maheshwari¹

¹Ocular Oncology, The New York Eye Cancer Centre, New York, United States, ²The Divisions of Ophthalmic Plastic Surgery and Ocular Oncology, New York Eye and Ear Infirmary of Mount Sinai, New York, United States

Introduction: This case illustrates that multiple treatments are sometimes required to achieve local control of conjunctival melanoma. As a result, the devascularized sclera, particularly after using mitomycin, leaves the sclera incapable of repairing itself due to lack of blood supply. This emphasizes the need for a blood supply offered by such tarsoconjunctival flaps.

Objectives: To describe the use of a modified tarsoconjunctival pedicle flap to repair scleral melt secondary to the treatment of conjunctival melanoma.

Methods: A 67-year-old woman developed progressive scleromalacia after multiple treatments for an American Joint Committee on Cancer cT2d category conjunctival melanoma. Before referral, she underwent synchronous topical chemotherapy (interferon, 5-fluorouracil, mitomycin). Then, incomplete tumor regression led to excision with adjuvant cryotherapy. Lastly, systemic metastasis treated with systemic immunotherapy provided durable remission. However, her multiple treatments (e.g., topical chemotherapy, resection, cryotherapy) were associated with progressive nasal bulbar scleromalacia treated by conjunctival advancement and amniotic membrane grafts.

Results: Sclera reinforcement was achieved after a tarsoconjunctival flap was affixed to the eye to cover, and thus vascularize the scleral defect. The tarsoconjunctival flap provided 5 years of tectonic support.

Conclusions: Tarsoconjunctival pedicle flaps can provide excellent long term scleral integrity for a patient with progressive scleral melting.

P-YOU-007

Navigating diagnostic challenges of uveal disorders in India: A TB-endemic country

I. Sharma¹, G.K. Das¹, P.K. Sahu¹, S. Joshi¹

¹Ophthalmology, Ucms & Guru Teg Bahadur Hospital, Delhi, India

Introduction: Uveal disorders can range from infection, inflammation as well as tumors. Uveal conditions pose a diagnostic challenge because they present with very similarly. In a country like India, where tuberculosis is an endemic disease, investigations done routinely may lead to a bias in diagnosis, incorrect treatment and altered disease morphology.

Objectives: This case series delves into the intricate diagnostic challenges posed by tuberculosis (TB) and sarcoidosis in uveal disorders, particularly in TB-endemic regions like India. Additionally, we emphasize the pivotal role of multimodality imaging in differentiating non-uveitic etiologies from uveitis, show-casing cases associated with infection, inflammation, and tumors.

Methods: We present a series of clinically challenging cases encountered at our centre, including cases of granulomatous anterior uveitis, panuveitis, retinal vasculitis and choroidal hemangioma. Through meticulous clinical history, multidisciplinary systemic evaluation, laboratory investigations, and multimodal imaging techniques: radiological as well as ophthalmological imaging including optical coherence tomography, fluorescein angiography, and ultrasonography were done to discern the etiology.

Results: In TB-endemic regions like India, the diagnostic landscape of uveal disorders is compounded by the overlapping clinical features of TB and sarcoidosis. This complexity underscores the importance of employing multimodality imaging. Our cases highlight the necessity of such diagnostic precision, particularly in distinguishing between infectious, inflammatory, and neoplastic uveal conditions.

Conclusions: This series sheds light on the diagnostic challenges inherent in uveal disorders. By sharing our experiences and emphasizing the importance of multimodality imaging, we aim to underscore the critical role of comprehensive evaluation and interdisciplinary collaboration in navigating these diagnostic challenges. It is noteworthy that despite best efforts, further exploration may be needed to establish the etiological diagnosis, underscoring the need for ongoing research and collaboration to refine diagnostic approaches.

P-YOU-008

Nanoceria-Mediated Cyclosporin A Delivery for Dry Eye Disease Management through Modulating Immune-Epithelial Crosstalk

W. Cui¹, S. Chen², J. Ji³, K. Yao¹, H. Han¹

¹Eye Center, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China, ²School of Medicine, Zhejiang University, Hangzhou, China, ³Department of Polymer Science and Engineering, Zhejiang University, Hangzhou, China

Introduction: Dry eye disease (DED) is the most common global ocular surface disease which affects about a third of the population. Current single-targeting DED management is severely hindered by the existence of an oxidative stress-inflammation vicious cycle and complicated intercellular crosstalk within the ocular microenvironment. Herein, therapeutic agent that integrates antioxidative and anti-inflammatory functions may indeed enhance the therapeutic potency of DED.

Objectives: This study aimed to develop novel nanomaterial for the treatment of DED. The nanomaterial was designed to effectively target the inflammation-oxidative stress vicious cycle during DED progression. We systematically evaluated the therapeutic efficacy of Cs@P/CeO₂, which alleviated inflammation and promoted corneal epithelial regeneration in DED.

Methods: Cerium acetate, oleylamine, and xylene were combined to form cerium oxide nanoparticles, which was then decorated with polyethylene glycol (PEG) to improve biocompatibility and hydrophilicity. Cyclosporin A (CsA) was loaded onto CeO₂ to form Cs@P/CeO₂. *In vitro*, Cs@P/CeO₂ reduced ROS levels in corneal epithelial cells, and inhibited inflammation in macrophages. *In vivo*, Cs@P/CeO₂ improved clinical score, tear break-up time, and sodium fluorescein staining in DED mice. Histological staining showed reduced corneal inflammation and improved morphology. Single-cell RNA sequencing revealed changes in corneal cellular composition and gene expression. Statistical analysis confirmed the significance of the findings.

Results: With the successful synthesis of Cs@P/CeO₂, we characterized its dual functionality, which effectively inhibits oxidative stress and modulates inflammatory responses. Using mice DED model, we found Cs@P/CeO₂ effectively inhibited DED progression, with less tear film instability and corneal damage. Mechanistically, Cs@P/CeO₂ modulates the microenvironment, reducing oxidative stress, inflammatory macrophage polarization, and enhancing pro-healing intercellular communication. These findings highlight the therapeutic potential of Cs@P/CeO₂ for DED treatment.

Conclusions: Our study introduces Cs@P/CeO₂, a novel nanozyme-based therapeutic agent, which exhibits antioxidative and anti-inflammatory properties. The unique ability of Cs@P/CeO₂ to reestablish the corneal homeostasis during DED progression making it a promising candidate for the development of effective DED management strategies.

P-YOU-010

The ancillary diagnostic value of vascular cell adhesion molecule for cytomegalovirus-related Posner-Schlossman Syndrome

J. Feng¹, F. Luan¹, Y. Tao¹

¹Beijing Chaoyang Hospital, Capital Medical University, Beijing, China

Introduction: Previous studies have shown that cytomegalovirus (CMV) infection, immune genetic variability, or vascular endothelial dysfunction may be attributed to the pathogenesis of PSS. However, the precise etiology and pathogenesis of PSS are still not fully understood. There is a certain risk of misdiagnosis and mistreatment because PSS is typically diagnosed through clinical manifestations. Additionally, there are no clinically detectable differences among different types of viral anterior uveitis. Therefore, in this study, we compared the clinical features of PSS patients with CMV-positive and CMV-negative eyes, as well as CMV DNA load and CMV-specific immunoglobulin G (IgG) in aqueous humor. Moreover, we detected inflammatory mediators in the aqueous humor of PSS patients and evaluated the potential implications and the ancillary diagnostic value of these cytokines in the pathogenic mechanism of PSS patients.

Objectives: To evaluate the value of CMV-related indicators and inflammatory factors in the aqueous humor for the diagnosis of CMV-related Posner-Schlossman syndrome (PSS).

Methods: 114 PSS patients (114 eyes) were examined, including CMV-positive patients (29 eyes), CMV-negative patients (85 eyes), and 50 patients (50 eyes) with senile cataracts as the control group. The enzyme-linked immunosorbent assay, polymerase chain reaction, and cytometric bead array were used to examine the aqueous.

Results: In the aqueous humor of PSS patients, the CMV DNA positivity rate was only 25.4%, while the anti-CMV IgG antibody positivity rate was greater at 64.9% ($P < 0.001$). Considerably, greater levels of the levels of interleukin-6, -8, -10 (IL-6, IL-8, IL-10, respectively), and vascular cell adhesion molecule (VCAM) were discovered in the CMV-positive group, compared with the control group ($P = 0.02$, $P = 0.02$, $P = 0.002$, and $P = 0.001$, respectively). However, only the concentration of VCAM was significantly higher in the CMV-negative group ($P < 0.001$). Analysis of logistic regression revealed that the levels of IL-8, IL-10, and VCAM were associated with PSS. Among all the parameters, VCAM levels had the best sensitivity (84.6%), with a cut-off of 245.95 pg/mL, while keeping the specificity constant (80.0%).

Conclusions: The positive detection rate of anti-CMV IgG was substantially higher than that of CMV DNA in the aqueous humor of PSS patients. The VCAM levels in aqueous humor indicated strong sensitivity and specificity, which could be a promising indicator for the auxiliary diagnosis of PSS.

P-YOU-011

Factors for recurrence in acute CSC patients underwent one-third dose verteporfin photodynamic therapy

X. Zhang¹, L. Xu²

¹Ophthalmology, The First Hospital of China Medical University, Shenyang, China, ²Ophthalmology, Shenyang the Fourth People's Hospital, Shenyang, China

Introduction: Though acute CSC usually spontaneously resolves within several months, some patients may lose contrast sensitivity. In addition, approximately 30–50% of patients may experience recurrence within the first year, and 5% of patients may develop chronic CSC, which can result in damage to the RPE and progressive decline in visual acuity. Recently, one-third dose PDT has been testified as a safe and reliable treatment option for CSC, while recurrence of CSC developed in some cases. However, little is known about the effects of one-third dose PDT on aCSC patients and who are at risk for developing recurrent disease after treatment. Hence, better insight into the demographic and clinical characteristics of aCSC patients can be helpful in determining prognostics. Currently, we reviewed a clinical course of patients who presented with first episode of aCSC.

Objectives: To investigate the factors for recurrence in acute central serous chorioretinopathy (aCSC) for patients

who underwent one-third dose verteporfin photodynamic therapy (PDT).

Methods: A retrospective study was performed in aCSC patients treated with one-third dose PDT and followed up for 36 months. Demographic information and clinical features were compared. A logistic regression model was used to evaluate the associated factor of aCSC recurrence.

Results: There were 162 patients with aCSC included in current study. 36-month after one-third dose PDT, good

recovery was identified in 131 patients (80.86%), whereas 31 cases (19.14%) developed recurrence.

Significant between-group differences were observed in baseline age, the right, left and both eyes, best-corrected visual acuity (BCVA), presenting with pigment epithelium detachment (PED), retinal pigment epithelium (RPE) damage and subfoveal choroidal thickness (SCT) level ($P = 0.005$, $P < 0.001$, $P < 0.001$, $P < 0.001$, $P = 0.006$, and $P < 0.001$, respectively). The recurrence of aCSC was associated with presenting with PED (odds ratio = 1.78; 95% CI, 1.45–1.98; $P < 0.001$), RPE damage (OR = 1.13; 95%CI: 1.08–1.23; $P < 0.001$), baseline BCVA (OR = 0.96; 95%CI: 0.95 - 0.99; $P = 0.001$), and SCT level (OR = 1.18; 95%CI: 1.02–1.20; $P < 0.001$).

Conclusions: In acute CSC after treatment of one-third dose PDT, recurrence is associated with RPE damage, baseline BCVA and SCT level. Our findings will assist clinicians to evaluate aCSC in clinical practice and provide insights into the prevention of recurrence.

P-YOU-012

Three-dimensional choroidal characteristics in different subtypes of central serous chorioretinopathy using SS-OCTA

Y. Zhang^{1,2}, J. Wang¹, S. Song¹, X. Gu¹, X. Yu^{1,2}

¹Department of Ophthalmology, Beijing Hospital, National Center of Gerontology, Institute of Geriatric Medicine, Chinese Academy of Medical Sciences, Beijing, China, ²Graduate School of Peking Union Medical College, Beijing, China

Introduction: Central serous chorioretinopathy (CSC) is recently widely recognized as a typical type of pachychoroid spectrum disease, and the primary etiology is believed to be choroidal vascular hyperpermeability. The distinction of different clinical subtypes is still ambiguous, and it remains controversial regarding their distinct pathophysiological characteristics.

Objectives: To assess the choroid vascular characteristics including choroidal thickness (CT), three-dimensional choroidal vessel volume (CVV) and choroidal vascularity index (CVI), as well as the vascular density of choriocapillaris (CCVD) in normal subjects, acute, non-resolving, recurrent and chronic central serous chorioretinopathy (CSC) eyes under the new classification system, using swept-source optical coherence tomography angiography (SS-OCTA). Additionally, the study aims to explore the potential factors that may influence CVI and CCVD.

Methods: The study employed a retrospective observational design. We recruited patients diagnosed with CSC as well as age-matched healthy controls. We utilized the integrated software of SS-OCTA to acquire CT, CCVD, three-dimensional CVI and CVV. The SNK-q test was conducted for pairwise comparisons among five groups. A multiple linear regression model was employed to investigate the relationship between choroidal parameters (CVI and CCVD) and other factors.

Results: There were 83 individuals in total in our study, comprising 16 acute CSC, 13 non-resolving CSC, 12 recurrent CSC, 16 chronic CSC, and 26 healthy control eyes. The CT and CVI of chronic CSC subgroup were significantly lower than the other three subgroups and the CCVD of chronic CSC subgroup was significantly lower than the other three CSC subgroups. Multiple regression analysis demonstrated that lower central CVI was significantly correlated with the subgroup of chronic CSC ($P=0.016$), higher central CT ($P<0.01$), and lower central CCVD ($P<0.01$). Lower central CCVD was significantly correlated with the subgroup of chronic CSC ($P<0.01$), diagnosis of diabetes ($P=0.015$), higher central CVV ($P=0.014$), and central CVI ($P<0.01$).

Conclusions: This is the first study to evaluate choroidal characteristics of four subtypes of CSC eyes under the new classification system in detail. It seems more appropriate to identify chronic CSC based on morphological alterations rather than the duration of the disease. Three-dimensional CVI and CCVD are helpful imaging biomarkers for quantifying choroidal vasculature.

P-YOU-013

Factors influencing visual acuity in patients with active subfoveal circumscribed polypoidal choroidal vasculopathy

F. Xia¹, R. Hua²

¹Department of Ophthalmology, The Fourth People's Hospital of Shenyang, Shenyang, China,

²Department of Ophthalmology, First Hospital of China Medical University, Shenyang, China

Introduction: Polypoidal choroidal vasculopathy (PCV), a subtype of neovascular age-related macular degeneration (nAMD), has recently been categorized as the pachychoroid disease. The increasing use of optical coherence tomography angiography (OCTA) has provided cumulative evidence that PCV originates from type 1 neovascular network. There are some studies analyzed the membrane patterns of nAMD, none have been done in PCV. Therefore, this study was on this research perspective.

Objectives: Our study aimed to analyze the relationship between branching vascular network(BVN) morphology and visual acuity, as well as the parameters that influence the prognosis.

Methods: 51 treatment-naïve eyes, whose lesion ranged within the 6×6-mm scope of OCTA image and without massive hemorrhage, were divided into the ill-defined and well-defined groups based on the pattern of BVN on OCTA. the differences of parameters between the two groups were compared.

Results: The BCVA in the ill-defined group (-0.18[interquartile range:-0.40 to 0.00]) was significantly improved after anti-vascular endothelial growth factor (VEGF) injections, compared with the well-defined group(0.00[interquartile range:-0.18 to 0.00])(z=2.143, p=0.032). The improvement of central foveal thickness(CFT) in the ill-defined group (211.00[interquartile range:73.00 to 305.00]) was more significant than in the well-defined group (68.00[interquartile range:-14.00 to 189.00])(z=2.371, p=0.018). No difference was found in age, gender, number of injections, and other image parameters. After adjusting for age, linear regression analysis revealed that a history of hypertension (B=0.222,95%CI [0.068-0.375], t=2.913, p=0.0060) and macular edema at baseline (B=0.297,95%CI [0.040-0.555], t=2.330, p=0.025) were risk factors for BCVA after anti-VEGF injections. After adjusting for age, multiple logistic regression analysis showed that male sex (B=2.577,95%CI [2.187-79.100], OR=13.153,p=0.005), the presence of polypoidal lesions(PLs) on OCTA at baseline (B=2.364,95%CI [1.840-61.485], OR=10.637, p=0.008), and smaller number of injections (B=-0.412,95%CI [0.454-0.967], OR=0.663, p=0.033) predicted a poor prognosis of polypoidal lesions on OCTA after anti-VEGF injections.

Conclusions: Patients with ill-defined BVN patterns had better improvement in vision. A history of hypertension and baseline macular edema were risk factors for post-treatment BCVA. Male sex, fewer injections, and the PLs on baseline OCTA images predicted residual PLs on post-treatment OCTA images.

P-YOU-014

A study of proteomic changes in aqueous humor in patients with RVO treated with vitreous injection of conbercept

S. Liu¹, X. Ren¹, X. Li¹

¹Tianjin Medical University Eye Hospital, Tianjin, China

Introduction: Retinal vein occlusion (RVO) is the second most common retinal vascular disease after diabetic retinopathy and is a serious threat to vision. Macular edema and neovascularization in RVO are caused by ischemia-induced overexpression of vascular endothelial growth factor (VEGF).

Conbercept has recombinant fusion proteins that are extracellular structural domain 2 of VEGF receptor (VEGFR)-1 and extracellular structural domains 3 and 4 of VEGF-2. Specifically, conbercept has a good affinity for VEGF, which is superior to that of ranibizumab.

Objectives: The purpose of this study was to investigate the changes in aqueous humor (AH) proteomics before and during treatment in patients with vitreous injection of Conbercept (IVC) for the treatment of RVO, and to determine the relationship between these protein components and activity of the disease.

Methods: Samples of AH were collected from 5 patients with CRVO and 5 patients from BRVO and 4 age- and sex-matched controls and analyzed by functional microarrays. All experimental group AH samples contained each treatment stage from onset to cure. A series of univariate and multivariate statistical analyses were performed to identify differential proteins and enriched code pathways.

Results: There were significant differences in the proteomic composition of AH in patients in the BRVO and CRVO groups compared with control patients. Pathway analysis showed that these differential proteins were mainly involved in inflammatory pathways, complement pathways, and extracellular matrix remodeling. There were also significant differences in proteomic composition between the BRVO and CRVO groups. These differential proteins were mainly enriched in the inflammatory pathway and the extracellular matrix remodeling pathway. Inflammatory factors and complement in the AH of BRVO patients treated with IVC were reduced compared with those in untreated stage, and differential proteins in the group of CRVO patients treated with IVC were enriched in extracellular matrix remodeling.

Conclusions: Our study validated the AH proteomic changes in RVO patients after the onset of the disease, revealing the differences between the BRVO and CRVO groups, and also investigated the changes in aqueous humor proteomic changes in the BRVO and CRVO groups during the treatment with IVC, which will provide a possible biomarker for the assessment of prognostic outcomes of conbercept treatment in patients with RVO.

P-YOU-015

Outcomes of combined procedures compared to various single techniques for involutional entropion

A. Al Battashy¹, A. Al Mujaini², S. Mehbub Ul Kadir³, R. Prakash Maurya⁴

¹Ophthalmology, Oman Medical Specialty Board, Muscat, Oman, ²Ophthalmology, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman, ³Ophthalmology, Sheikh Fazilatunnesa Mujib Eye Hospital and Training Institute, Gopalganj, Bangladesh, ⁴Ophthalmology, Regional Institute of Ophthalmology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India

Introduction: Entropion, a common eyelid malposition, can lead to significant ocular discomfort and complications if left untreated. While various nonsurgical and surgical interventions exist, recurrence remains a challenge, particularly with procedures involving excision of tissue. This study evaluates the effectiveness of a novel surgical approach, triangular tarsectomy combined with limited orbicularis myectomy and lower eyelid retractor plication, compared to traditional techniques such as everting sutures (ES) alone or lateral tarsal strip (LTS) alone for correcting involutional entropion.

Objectives: To describe the outcomes of triangular tarsectomy and limited orbicularis myectomy with lower eyelid retractor plication compared to an everting sutures (ES) technique or lateral tarsal strip (LTS) procedure for the correction of lower eyelid involutional entropion.

Methods: A nonrandomized clinical study was carried out at two tertiary eye hospitals between January 2016 and December 2019. Patients in Group A underwent triangular tarsectomy and limited orbicularis myectomy with lower eyelid retractor plication. Group B had ES, and Group C underwent a LTS procedure. All participants were operated by one surgeon and underwent 1-year follow-up.

Results: A total of 78 patients in whom 84 eyelids were affected by lower eyelid involutional entropion were included in the study. The success rate was higher in Group A compared to Group B and Group C (100% vs. 86.7% vs. 95.8%; $P < 0.05$). Recurrence at a 1-year follow-up was noted in only four (13.3%) eyelids in Group B and one (4.2%) in Group C. However, patients in Group C experienced a higher frequency of minimal postoperative complications, including short-term pain (100%), tenderness on the lateral canthal area (100%), tightness of the eyelid (91.7%), and ecchymosis (54.2%) compared to Group A. Patients of Group B experienced minimal or no postoperative complications.

Conclusions: Triangular tarsectomy and limited orbicularis myectomy with eyelid retractor plication may be considered the standard procedure for correcting lower eyelid involutional entropion with no recurrence compared to LTS technique or minimally invasive and cost-effective ES procedure.

P-YOU-016

Burnout among ophthalmology residents in the Philippines: a multicenter study

*A.R. Facundo*¹

¹Ophthalmology, Jose R Reyes Memorial Medical Center, Manila, Philippines

Introduction: Burnout is a psychological state of emotional, physical, and mental fatigue brought about by chronic work stress. Although burnout has been exacerbated by the pandemic, it has been around even before Covid-19 and it's disturbing in doctors.

Medical and surgical residents are at an increased risk of occupational burnout. The shift from medical school life to a sudden change in responsibilities might make residents feel a sense of ineffectiveness and failure, thus affecting their performance. They will be more prone to poor clinical judgment, and socially intolerable by their peers. Burnout can result in devastating outcomes in healthcare, yet data is still insufficient.

Objectives: To determine the percentage of burnout among Ophthalmology residents in the Philippines.

Methods: A cross-sectional study was conducted on all ophthalmology residents in Philippines in January 2023 using Maslach Burnout Inventory (MBI) for Medical Personnel that was used in previous published studies. The questionnaire consists of three subscales: Emotional Exhaustion (EE), Depersonalization (DP) and Personal Accomplishment (PA). The survey also collected demographic data to identify correlation with burnout.

Results: Based on the questionnaire subscales described, 74% Ophthalmology residents had a positive burnout result on the subscales. 55% scored high on Emotional Exhaustion. 59% scored high on Depersonalization subscale. The majority of the respondents are third year residents with a 33%. 62% are from training programs of government institution; 58% are from Luzon. Majority of the respondents are seeing more than 200 cases per week, spend 40-80 hours in clinic per week, 0-5 hours of OR in a week, 0-10 hours of hospital administrative duty (triage officer, officer of the day) in a week. Almost all residents, 99% would have chosen Ophthalmology again as a residency choice. However, only 63% would have chosen Medicine as their graduate level study. Further sub-analysis of the data showed that the number of sleep hours was negatively correlated with emotional exhaustion and levels of the ophthalmology residents.

Conclusions: Prevalence of burnout among Ophthalmology residents (74%) was lower compared to General Surgery (85%) in the Philippines. Low numbers of sleep and more junior residents were correlated with higher levels of burnout especially on the emotional exhaustion subscale. An alarming percentage because it might affect the quality of care provided.

P-YOU-017

Assessing the impact of the Slit Lamp Elective Program on medical student competence, confidence and career interests

N. Mezey¹, W. Hopman^{2,3}, R. Curtis⁴

¹Faculty of Medicine, Queen's University, Kingston, Canada, ²Kingston Health Sciences Centre, Kingston, Canada, ³Department of Public Health Sciences, Queen's University, Kingston, Canada, ⁴Department of Ophthalmology, Queen's University, Kingston, Canada

Introduction: Slit lamp use is one of the core procedural skills and diagnostic tools in ophthalmology. It is also an important diagnostic tool used for eye related presentations in emergency medicine. However, within the constraints of undergraduate medicine, there are limited opportunities for medical students to learn and practice this skill in both pre-clerkship and clerkship.

Objectives: This study sought to evaluate the utility of a slit lamp training program as a learning resource, and its impact on perceived slit lamp skill performance and confidence in slit lamp use. A secondary objective was to assess whether this additional training program had any impact on interest in procedural or surgical specialties like ophthalmology as a career choice.

Methods: Members of the class of 2025 of a single Canadian medical school were offered a 2-evening Slit Lamp Elective Program (SLEP) consisting of video learning, in-person demonstrations and opportunities for hands-on practice of ophthalmologic examination skills. Students were offered the chance to participate in pre and post surveys through informed consent. Survey questions evaluated confidence in specific slit lamp skills and perceived competence, feelings of worry related to slit lamp performance during clerkship and the student's perception of the adequacy of slit lamp exposure in pre-clerkship curriculum. Finally, the surveys assessed the student's interest in ophthalmology as a future career as well as interest in other surgical or procedural specialties as a career. The survey consisted of a Likert scale whereby the answers ranged from 1-5 with 1 signifying strong disagreement and 5 signifying strong agreement with the statement. The pre and post data were compared with the Wilcoxon Signed Rank test.

Results: The results showed statistically significant improvements in 9 of the 12 questions, particularly in confidence and perceived ability related to slit lamp use for a basic eye examination, as well as more advanced skills ($p < 0.05$). The most significant differences were in confidence related to adjustments of the slit lamp and examination skills.

Conclusions: This study demonstrates that there is value in providing additional hands-on training and instruction for pre-clerkship medical students, and that such programs can lead to increases in confidence and perceived ability in examination skills.

P-YOU-018

Posterior capsular radial sign: a novel method to confirm anterior vitreous cortex resection in phacovitrectomy

S. Qu¹, Y. Bi¹, Q. Zhou², M. Lin¹, Y. Shao²

¹Tongji Hospital, School of Medicine, Tongji University, Shanghai, China, ²School of Medicine, Tongji University, Shanghai, China

Introduction: Vitrectomy combined with Phaco and IOL implantation has been widely used in the treatment of eyes with cataracts associated with vitreoretinal diseases. Following the usual surgical procedures, when the surgeon has completed cataract surgery, vitrectomy is the next step. Removing as much of the anterior vitreous body as possible can effectively prevent intraocular proliferation after surgery. For novice surgeons in vitrectomy, the implantation of IOLs and the polishing of the posterior capsule make it difficult to locate the position of the anterior vitreous body. We attempt to share a method that can achieve relatively complete excision of the anterior vitreous body by localization of the posterior capsule of the lens.

Objectives: To introduce a method that can accurately locate the posterior capsule of the lens to facilitate a relatively complete resection of the anterior vitreous body.

Methods: A total of 51 patients were enrolled in this study. After the cataract procedure was completed in the control group, the surgeon performed a conventional anterior vitrectomy. In the experimental group, anterior vitrectomy was performed according to the "threadiness corrugation" of the posterior capsule of the lens. With the help of triamcinolone, two surgeons confirmed the resection of the anterior vitreous cortex; the BCVA and IOP of all patients were recorded at 1 week, 1 month and 3 months after surgery.

Results: Fifty patients underwent combined surgery, except one patient in the experimental group who was lost to follow-up. There was no significant difference in preoperative visual acuity between the two groups ($t=0.83$, $P=0.25$). Both groups had varying degrees of improvement in BCVA. Moreover, there was no significant difference in BCVA between the two groups at the three follow-up periods ($t=-1.15$, -1.65 , -1.09 , $P=0.53$, 0.21 , 0.23). No significant complications were observed in all patients except two patients in the control group with temporary increases in intraocular pressure. Incomplete resection of the anterior vitreous cortex was observed in 2 patients in each group, but there was no significant difference ($\chi^2=7.81$, $P>0.05$).

Conclusions: In the process of cataract surgery combined with vitrectomy, "threadiness corrugation" appears in the posterior capsule of the lens and is an important sign of its localization. Anterior vitrectomy can be accomplished safely and effectively with the help of "threadiness corrugation", and the surgical effect is almost the same as that of traditional surgery.

P-YOU-019

Results of symmetry studies with different partitioning methods in healthy population

X. Liu¹, S. Chen¹, J. Li¹, J. Zhong¹

¹Department of Ophthalmology, Sichuan Provincial People's Hospital, University of Electronic Science and Technology of China, Chengdu, China

Introduction: Previous studies overlooked the assessment of interocular symmetry when enrolling subjects, neglecting to discuss the impact of individual eye differences on the outcomes. However, Ocular symmetry, key in eye health assessment, is associated with diseases like glaucoma, high myopia, diabetic retinopathy, and thick choroidal disease. Regarding interocular choroidal thickness (CT) symmetry, several studies are noteworthy.

Objectives: To investigate the symmetry of the interocular choroidal structure in a healthy population by developing novel partitioning methods utilizing 120° ultra-wide field swept-source optical coherence tomography angiography (SS-OCTA).

Methods: This cross-sectional observational study enrolled 135 healthy volunteers (270 eyes) for single 24 mm × 20 mm SS-OCTA imaging of the fundus across a 120° FOV (field of view), centered on the macula. Various partitioning methods were designed to compare the interocular symmetry of choroidal structure.

Results: The interocular choroidal thickness among subjects exhibited symmetry in dichoptic, concentric circle, cruciform, and macular concentric circle + quadratic partitioning modalities. Otherwise, in the ETDRS partitioning, the mean choroidal thickness (MCT) of the right eye's upper macular epiretinal region ($271.74 \pm 77.69 \mu\text{m}$) was significantly greater than that in the left eye ($263.94 \pm 75.37 \mu\text{m}$), $p = 0.019^*$. Furthermore, in the nine-partitioning method, the MCT of the left eye's temporal lateral region ($212.44 \pm 48.41 \mu\text{m}$) was higher than that in the right eye ($208.58 \pm 46.53 \mu\text{m}$), $p = 0.048^*$.

Conclusions: Both the observation range and partitioning methods may influence the results of interocular symmetry in choroidal structure. Utilizing contemporary population data, our study reveals that newly developed partitioning methods show symmetrical choroidal thickness across eyes.

P-YOU-020

Precision of the Kane formula for calculation of IOL power in cataract surgery in eyes with extreme axial measurements

D. Vite Mata¹, H. Wong Chavarria¹

¹Ecography, Hospital Nuestra Señora de la Luz, Mexico City, Mexico

Introduction: In cataract surgery one of the most important details is calculating the power of the lens. Eyes with extreme axial measurements are a challenge for this. The formulas of the older generations create many hyperopic errors. The Kane formula promises to be a next-generation formula that solves these problems.

Objectives: To know if the Kane formula is the most precise to use in eyes with extreme axial measurements in patients who come to the Hospital Nuestra Señora de la Luz.

Methods: An ambispective, comparative, observational study was carried out in the Hospital Nuestra Señora de la Luz. Any patient who came for intraocular lens calculation and extreme axial length (<22mm and >26mm) were included. The biometric measurement methods used were ultrasonographic, interferometry and reflectometry. The statistical analysis was carried out with the Kolmogorov Smirnov test to know if it passed the normality test and the corresponding statistical test were used for parametric and non-parametric data.

Results: The sample size had 50 patients, 30 of the patients had an axial length less than 22 mm (60%) and 20 had greater than 26 mm (40%). The short eye group was subdivided into two groups by the formulas that were used initially these were BUII and Hoffer Q. The absolute error was used to compare the effectiveness of the mentioned formulas. The long-eyed group calculated with the BUII formula had an average absolute error of 0.326, calculated with the Kane formula it had an average absolute error of 0.7568, a paired T test was used to assess the significance obtaining a value of $p < 0.05$. The short-eyed subgroup that used the BUII formula obtained an average absolute error of 0.585, when using the Kane formula, an average of 0.5611 was obtained, the paired T formula was used, however, it did not obtain significance. The subgroup of short eyes that used the Hoffer Q formula obtained an average absolute error of 0.4433, with the Kane formula the average was 0.485, the Wilcoxon test was used and no significance was obtained.

Conclusions: The results concluded that in long eyes the BUII formula had a lower absolute error than the Kane formula and this had significance. In short eyes, although the BUII and Hoffer Q formulas had a lower average, these did not have statistical significance. It was concluded that the BUII and Hoffer Q formulas are accurate to calculate the power of the intraocular lens in eyes with extreme axial measurements and in this sample the Kane formula did not present a lower absolute error.

P-YOU-021

Habituated global teaching–possibility of all societies grievance prone–judgement after presentation to judge-punishment

K. Venkatesulu¹, B. Shukla², J. Kumar³, N. Reddy⁴, P.N. Nagpal⁵, A. Momose⁶, N. Oba⁷

¹Retina Eye Clinic, Chikkadpally, Opp, Balaji Temple, Hyderabad, India, ²RJN Ophthalmic Institute, Past President AIOS, Gwalior, India, ³Glaucoma, Becker College, Worcester, United States, ⁴Government Retired Professor, Advisor to State Society, Hyderabad, India, ⁵Retina Foundation, Ahmedabad, India, ⁶Institute of Clinical Ophthalmology, Gunma, Japan, ⁷109-3, Aahigaoka, Owariasahi-Shi, Japan

Introduction: The Intentional/unintentional use of incorrect scientific medical terms to the younger medical generation perpetuates generational use of mis-terminology. This habituates them to further inadvertent use of medical misnomers. **Legal advice** was sought regarding the continued use of misnomers in ophthalmology **as requested by the AIOS**. Despite widespread use, initiating change may take a generation to alter terminology to reflect correct meaning but represent the interest of future generations. We sought to acquire a legal position and relay this to the AIOS & TOS (state society).

Objectives: Global Parliament/body/oversight is needed **to remove incorrect scientific medical terms in literature and to prevent further addition too.**

Methods: As per request of AIOS, an Honorable Court Judge was contacted for opinions on laws. Awareness of Indian Penal Codes to many global societies, editors of many journals was made by emails. The senior authors collected evidences through email, questionnaires/responses, judgement and presented concerns to **COPE, WAME** & the chairman-ethics committee of ICO. This would allow possible discussion in the International Federation Ophthalmology Society, as issue is **global ethical concern** (on the contrary to two representatives from each society).

Results: Older generation continue to teach misnomers out of habituation, while the younger generation maintain silence with due respect. **Laws have brought more attention in education.** Being registered societies, AIOS & TOS are bound to follow Indian Penal Codes. AIOS & TOS are knowingly teaching incorrect medical terms generationally, maintaining a habitual cyclical of reenforced misinterpretation even after bringing to their notice. Hence, AIOS & TOS once made aware are technically liable for grievance under article 226 (high court) & article 32 (Supreme Court) in the constitution of India for teaching and publishing incorrect terminology as per the constitution. This may apply to **all global ophthalmology societies too as per their constitution laws.**

Conclusions: Examples: Papillitis was being changed to Optic neuritis. One side reflects habitual misnomer use and the other side reflects precision, which is preferred. The **unofficial Judgement states that the AIOS & TOS** have been perpetuating the wrong use of terms and requires an approach to the higher authority to take proper steps. Perpetual silence fosters the AIOS & TOS as grievance prone under civil jurisdiction & liable for punishment The same **concept may apply to all specialties.**

P-YOU-022

Maternal malnutrition before and during pregnancy is associated with corneal and retinal changes during aging

G. Laurinaviciute¹, S. Galgauskas², R. Simkunaite-Rizgeliene¹, J. Tutkuvienė¹

¹Department of Anatomy, Histology and Anthropology, Institute of Biomedical Sciences, Faculty of Medicine, Vilnius University, Vilnius, Lithuania, ²Faculty of Medicine, Vilnius University, Vilnius, Lithuania

Introduction: There is a lack of data on how the healthy eye structures can change in later adult life due to the impact of maternal undernutrition in early growth period.

Objectives: The aim of this study was to compare parameters of the healthy eyes with healthy retina between adults, who suffered from maternal undernutrition and who had normal maternal nutrition in early growth period.

Methods: The study included 85 older than 50 years subjects with healthy retina who declared that their mothers fastened mildly and severely before and during pregnancy (N=33) (first group) and had a normal nutrition (N=55) (second group). Best corrected visual acuity (BCVA), refraction, keratometry and intraocular pressure were measured, biomicroscopy, ophthalmoscopy, optical coherence tomography was used to examine the retina: average retinal nerve fiber layer (avRNFL), average ganglion cell-inner plexiform layer (avGC-IPL) and average inner limiting membrane-retinal pigment epithelium (avILM-RPE) thickness were compared between groups. Statistical analysis was performed using SPSS software version 23.0.

Results: There was no difference in age, gender, gestational age between groups ($p>0.05$). Gestational weight was significantly lower, but suboptimal in the first group ($p<0.01$). Median BCVA was similar in both groups ($p>0.05$). Eye pressure, pachymetry results also did not differ between the groups ($p>0.05$). Our study showed statistically significant smaller corneal radius in the first group ($p<0.05$). No other structures of the anterior segment of the eye had significant differences between the groups ($p>0.05$). First group had thicker central retina, however, there were no statistical significance to declare it clearly ($p>0.05$). AvRNFL, avGC-IPL, avILM-RPE thickness did not differ significantly between the groups ($p>0.05$). Only ILM - RPE thickness in the outer temporal quadrant was very close to being significantly ($p=0.05$) thicker in the first group.

Conclusions: Our study showed that maternal undernutrition was associated with smaller corneal radius and thicker nasal retinal nerve fiber layer.

V-YOU-001

Managing aphakia and aniridia with scleral fixation of an artificial iris implantation

P. Larco Jr^{1,2}, P. Larco^{1,2}, C. Larco^{1,3}

¹Oftalmo Center Ecuador, Quito, Ecuador, ²Clinica de Ojos Larco Vision, Quito, Ecuador, ³Instituto de Ojos Oftalmosalud, Lima, Peru

Introduction: The implantation of artificial iris in patients with a history of aphakia and aniridia presents a surgical challenge necessitating precise techniques for optimal outcomes. This video elucidates a comprehensive approach to this procedure. Preoperative evaluation involves meticulous assessment of ocular anatomy and visual function. Surgical planning includes selecting an appropriate iris prosthesis, intraocular lens calculation and addressing concurrent ocular conditions. Intraoperatively, meticulous attention is given to minimizing intraocular trauma and achieving proper centration and stability of the artificial iris. Postoperative management focuses on monitoring for complications such as inflammation and device dislocation. Visual rehabilitation strategies including optical correction and patient education are vital for optimizing visual outcomes and ensuring patient satisfaction. This video underscores the importance of tailored surgical approaches and comprehensive postoperative care in achieving successful outcomes in patients undergoing artificial iris implantation for aphakia and aniridia.

Objectives: Describe the technique for implantation of an Artificial iris in the management of aphakia and aniridia with scleral fixation approach.

Methods: 62 years old male patient, with history of ocular blunt trauma and previous vitrectomy surgery is referred for management of aphakia and aniridia. Best corrected visual acuity at evaluation was count fingers at 2 meters. Specular microscopy of 1500 cel/mm² and intraocular pressure of 13 mm/Hg. Due to the absence of support, the surgical plan was scleral fixation of iris implant.

Results: 12 months post operative follow up, patient present a best corrected visual acuity of 20/50, intraocular pressure of 14 mmHg and specular microscopy of 968 cel/mm².

Conclusions: This video underscores the importance of tailored surgical approaches and comprehensive postoperative care in achieving successful outcomes in patients undergoing artificial iris implantation for aphakia and aniridia. Scleral fixation artificial iris is a good option to treat patients with absence of support, is and elegant and effective technique.

Video

[Click here to play video](#)

V-YOU-002

Pseudoexfoliation, a youngster's nightmare

P. Dayasena¹, R.D. Keembiyage¹

¹Ophthalmology, National Eye Hospital, Colombo, Sri Lanka

Introduction: Pseudoexfoliation is a real challenge for a young surgeon by anticipating complications we can mitigate intra-op complications.

Objectives: To report the complex management of hard cataract with pseudoexfoliation by young ophthalmologist's hands.

Methods: To report a complex cataract managed with necessary surgical steps to get good visual outcome.

Results: Necessary planning of the surgery will enable young surgeons to overcome complications.

Conclusions: Anticipating complications and taking preventive measures will result in better outcomes.

Video

[Click here to play video](#)

P-YOU-009

WOC2024: 2817

Conquering the diabetic retina: a masterclass in vitrectomy techniques

S. Hegde¹, B. Panchal², A. Upadhyay³, D. Agarwal², M. Ger², H. Kanisetty²

¹Vitreoretina, Prasad Netralaya Superspeciality Eye Hospital, Udipi, India, ²Vitreoretina, L V Prasad Eye Institute, Visakhapatnam, India, ³Vitreoretina, Eye-Q Hospital, Delhi, India

Theme: Mastering advanced surgical techniques for managing complex diabetic retinopathy (PDR).

Description of interest and importance: Diabetic retinopathy remains a leading cause of blindness worldwide, and its management requires specialized surgical expertise. This course delves into advanced vitrectomy techniques for tackling challenging PDR scenarios, equipping surgeons with the knowledge and skills to optimize patient outcomes.

Topics covered:

- **Basics of diabetic vitrectomy:** A comprehensive foundation, including vitreoretinal anatomy, diabetic pathology, and surgical principles.
- **The "Inside Out or Outside In" Technique:** Analyzing both approaches for managing diabetic membranes, discussing their advantages and limitations in specific situations.
- **Bimanual Surgery for Complex PDR:** Mastering the art of bimanual techniques for enhanced precision and control during complex vitrectomies.
- **Flat Neovascularization and Proliferations Management:** Strategies for tackling these challenging PDR presentations, including laser therapy and surgical approaches.
- **Preretinal Hemorrhage Under Oil (Day 1 Post-Op):** Effective management strategies for this potential complication, including observation, interventions, and follow-up protocols.
- **Under Oil Re-proliferations:** Understanding the causes and timing of intervention for recurrent PDR under silicone oil tamponade.

Target Audience: Ophthalmologists, fellows, and residents seeking advanced training in diabetic vitrectomy techniques

Impact:

This course will empower ophthalmologists to provide advanced vitreoretinal care to patients with complex PDR, potentially improving surgical outcomes and preserving vision. By mastering these techniques, surgeons can offer their patients more effective and personalized treatment options, ultimately leading to better quality of life.

Draft program including time allocation for each speaker:

- **Basics of diabetic vitrectomy:** Dhwanee Agarwal - 8mins
- **The "Inside Out or Outside In" Technique:** Bhavik Panchal - 8mins
- **Bimanual Surgery for Complex PDR:** Awaneesh Upadhyay - 8 mins
- **Flat Neovascularization and Proliferations Management:** Harshitha Kanisetty - 8 mins
- **Preretinal Hemorrhage Under Oil (Day 1 Post-Op):** Marina Ger - 8 mins
- **Under Oil Re-proliferations:** Sharat Hegde - 8 mins
- Q and A

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