

Cornea

PP297

Perspectives for the development of preclinical mouse models of glaucoma after Boston keratoprosthesis type 1

Presenting author: Dominique Geoffrion, Canada

Purpose:

To determine the feasibility of establishing a reproducible mouse model of glaucoma after Boston keratoprosthesis type 1 (KPro) surgery, specifically that of a miniaturized mouse model of KPro (mKPro).

Setting:

Centre de recherche du Centre hospitalier de l'Université de Montréal (CR-CHUM), Montreal, QC, Canada

Methods:

A total of 20 corneas of donor C57BL/6 mice (n=10) were implanted in one eye of each recipient BALB/C mice (n=20), assembled as part of the mKPro, either with or without intraoperative lensectomy. Main feasibility outcomes consisted in incidence rates of hypotony, capsule nicking, and lens extrusion, as well as acquisition of posterior segment OCT images.

Results:

With lensectomy (n=10), loss of ocular tone and rhegmatogenous retinal detachment occurred in 100% of mice. Without lensectomy (n=10), capsule nicking and opening, as well as lens extrusion, occurred in 80% of mice. Causes of these complications included the large proportion of intraocular volume occupied by the lens, the shallow anterior chamber, and thus the lack of available intraocular volume to implant the KPro if the lens remains present.

Conclusions:

Successful mKPro surgery may require a great deal of practice to be useful as a reproducible model in mice. An animal model with a larger eye ought to be prioritized by research teams in future studies.

Cornea

PP298

Corneal Thickness Evaluation in Healthy Eyes: Comparison Between Two Different No-contact Diagnostic Devices

Presenting author: Livio Vitiello, Italy

Purpose:

To assess the correlation between corneal thickness (CT) measurements acquired with two different no-contact diagnostic devices, Nidek CEM-530 and Pentacam HR, and to elaborate, if necessary, a regression formula to compare these results.

Setting:

University Eye Clinic, Department of Medicine, Surgery and Dentistry, “Scuola Medica Salernitana”, University of Salerno, Italy.

Methods:

282 healthy right eyes of 282 volunteers (140 males; mean age: 49.2 ± 24.1 , range: 20-89 years) were included in this study. CT was appraised at the pupil center (PC), corneal apex (CA) and the thinnest point (TP) using Pentacam HR, and at the corneal center with CEM-530. Kolmogorov-Smirnov test was performed. Then the Student paired T test and Pearson correlation coefficient (r) were used to calculate the statistical significance and the correlation between the two devices. P values less than 0.01 were considered statistically significant.

Results:

Kolmogorov-Smirnov test showed a normal distribution ($p > 0.05$). A good and statistically significant correlation ($p < 0.01$) between CEM-530 measurements and Pentacam HR measurements at the PC ($r = 0.96$), at the CA ($r = 0.96$) and at the TP ($r = 0.94$) was found. The mean differences between CEM-530 and Pentacam HR were $7.5 \pm 8.4 \mu\text{m}$ at the PC, $6.2 \pm 7.9 \mu\text{m}$ at the CA, and $12.3 \pm 9.7 \mu\text{m}$ at the TP, showing that Pentacam HR measurements were significantly thinner than those provided by CEM-530 ($p < 0.01$).

Conclusions:

The results provided by this study point out that CEM-530 measures thicker corneas compared to Pentacam HR.

Cornea

PP299

Intrastromal corneal ring segment spontaneous late extrusion

Presenting author: Jorge L. Alio, Spain

Purpose:

To evaluate refractive, visual, topographic and aberrometric changes in keratoconic corneas implanted with intracorneal ring segments (ICRS) that have been explanted due to late natural extrusion of the segment after > 2 years implantation.

Setting:

Vissum Miranza, Alicante, Spain; OftalmoSalud, Lima, Peru; Minya University Hospital, Egypt.

Methods:

Retrospective, multicenter, series of cases of 23 keratoconic corneas that have been implanted for > 2 years and have been explanted due to natural extrusion of the segment. Clinical measures of corrected and uncorrected distance visual acuity (CDVA and UDVA), manifest refraction, flat steep and average keratometry, pachymetry and high order aberrations value were analyzed where applicable. To perform exploratory factor analysis, the Kaiser-Meyer-Olkin (KMO) test was used to evaluate sampling adequacy. Moreover, factor analysis with VARIMAX rotation was used to determine the main factors of the inventory.

Results:

Mean time interval 5 years. All topographic findings were reversed nearly to the baseline level after segment explantation ($p > 0.05$). We found a significant worsened in refractive cylinder pre-ICRS extrusion ($p < 0.05$). Regarding the exploratory factor analysis, KMO revealed a suitability of 0.528 in the preimplantation matrix ($p < .001$), 0.534 in the postimplantation matrix ($p < .001$), and 0.549 in the preexplantation matrix ($p = .009$). The main factor obtained in the preimplantation moment included the keratoconus grade, keratometric readings and visual acuities. After ICRS implantation, the most strength components were the refractive cylinder, CDVA and UDVA. In the preexplantation analysis the main factor were corneal aberrations.

Conclusions:

As shown in the current study, in case of late natural extrusion of the ICRS, the segment can be safely extracted, followed by reversal of the corneal topographic data to the preoperative level. We showed a significant astigmatic change in patients implanted with ICRS prior to late extrusion of the segment, suggesting the role of this parameter as a prognostic factor of extrusion.

Cornea**PP300****Implantation of an Artificial Endothelial Layer for Treatment of Chronic Corneal Edema: Two-year follow up.****Presenting author:** Victor A Augustin, Germany**Purpose:**

Despite the widely established clinical efficacy and safety of the Descemet Membrane Endothelial (DMEK) procedure, the technically challenging graft preparation methods, global shortage of corneal donor tissues, limited access to eye bank facilities as well as the legal and ethical barriers associated with organ transplantation still restrain access to corneal transplantation in many parts of the world. Such issues highlight an imminent need for alternatives such as an artificial endothelial layer.

Setting:

The David J Apple Center for Vision Research, Department of Ophthalmology, Heidelberg University Hospital, Heidelberg, Germany

Methods:

The artificial endothelial layer, the EndoArt[®] (EyeYon Medical, Ness Ziona, Israel), functions as a hydrophilic water-impermeable plate that is designed to be attached to the recipient's posterior stroma, preventing the inflow of aqueous humor into the stroma and decreasing corneal edema. We present two-year results of the surgical technique for implantation of the artificial endothelial layer in our first two patients with endothelial decompensation that may serve as an alternative to the conventional DMEK and reduce the indication for corneal transplantation.

Results:

In our two first cases, the artificial endothelial layer led to rapid reduction of the central corneal thickness that persevered until the two-year follow-up examination without any complications. Though the visual acuity did not experience a significant increase, both patients reported high satisfaction and an overall brighter visual quality on the operated eye.

Conclusions:

In conclusion, this technique shows feasibility of a novel artificial endothelial layer for treatment of patients with endothelial dysfunction. Further studies with a larger sample size and a longer follow-up period are necessary to establish its long-term efficacy and safety profile.

Cornea

PP301

XENIA™ Implant for management of keratoconus or post-LASIK ectasia: 2 years results from the UK

Presenting author: Balasubramaniam Ilango, United Kingdom

Purpose:

The management of high astigmatism and myopia in cases of keratoconus and post-LASIK ectasia can be challenging. Surgical options include corneal transplantation and corneal reshaping - using ring segments or Stromal Lenticule Addition Keratoplasty. We describe a form of SLAK using a XENIA™ Implant - a novel biocompatible corneal lenticule of highly purified corneal collagen fibres of porcine origin. 2 years results of the first 9 patients treated with this technique are presented.

Setting:

Optimax Clinic, Leicester, England. United Kingdom

Methods:

A total of 9 eyes of 9 patients have undergone the procedure. 6 eyes with keratoconus and 3 with post-LASIK ectasia.. A custom corneal stromal pocket of 100µm depth and 8.7mm diameter was created with a 3.7 mm access port using an IntraLase femtosecond laser. A 120/80µm thick, 7.2/8.2 mm diameter XENIA™ (Gebauer) lenticule implant was implanted into this stromal pocket through the 3.7 mm port. No sutures were used. Post operatively topical dexamethasone and chloramphenicol were used. Pre and post-operative topography, pachymetry, unaided/aided vision and intraocular pressures were recorded .

Results:

Following implantation of the lenticule, average corneal thickness was increased from 401µm to 513µm. Average optical k readings were not statistically altered (51.4 D vs 51.5D). Average anterior corneal astigmatism decreased from 7.4 D to 2.0D. Unaided vision improved from 1.74 LogMar to 1.54 LogMar. (Awaiting BCVA). There were 3 cases (keratoconic patients) of post operative Lenticule haze which improved with topical treatment. Xenia Lenticule remained transparent in post-Lasik patients

Conclusions:

There was a significant improvement in uncorrected vision and reduction of corneal astigmatism. If long term results show similar results, this technique and lenticule could be used to expand the repertoire of surgical options available to manage these difficult cases. As the lenticule is antigenically neutral, rates of rejection are expected to be minimal. There is no reliance on human tissue donors, solving the two main issues of current surgical management of these patients – rejection and shortage of donor material. Post-Lasik patients did better than keratoconic eyes.

Cornea

PP302

Combination of Small Incision Lenticule Extraction with Prophylactic Accelerated Cross-Linking (ReLEx SMILE Xtra) in Patients with Thin Cornea: Three Years Follow-up

Presenting author: Farideh Doroodgar, Iran, Islamic Republic of

Purpose:

To study the safety and clinical outcomes of ReLEx SMILE with accelerated cross-linking in eyes with thin corneas.

Setting:

This case series

Methods:

This case series reports the outcomes of fifty-four thin corneas with corrected distance visual acuity of 20/25 or better, stable refraction of at least 1 year, age of 21 years or older, and residual corneal thickness of greater than 400 μm were studied before performing collagen crosslinking. Following the removal of lenticule, riboflavin 0.25% in saline was injected into the interface and allowed to diffuse for 90 seconds. Finally, eyes were exposed to UV-A radiation of 30 mW/cm² for 60 seconds through the cap. Total energy delivered was 1.8 J/cm².

Results:

54 eyes of 27 patients with mean age of 25.22 ± 2.67 years were treated. Mean follow-up was 3 years. Mean Spherical Equivalent (SE) was $-5.58 \pm 1.22\text{D}$ preoperatively and $-0.111 \pm 0.636\text{D}$ postoperatively. The mean Central Corneal Thickness (CCT) and keratometry changed from $498.39 \pm 11.79\ \mu\text{m}$ to $417.85 \pm 12.82\ \mu\text{m}$ and $45.47 \pm 0.68\text{D}$ to $41.13 \pm 1.13\text{D}$, respectively. Mean uncorrected visual acuity (UCVA) was 20/25 or better in all eyes. No eye lost lines of Corrected Distant Visual Acuity (CDVA). There were no complications like haze, keratitis, ectasia, or regression.

Conclusions:

Long term clinical outcomes, it appears that SMILE Xtra might be a safe method. SMILE Xtra can be a good option to minimize the possibility of corneal ectasia in thin cornea.

Cornea

PP303

Outcome of repeat Corneal Collagen crosslinking in paediatric patients with Keratoconus

Presenting author: Artemis Matsou, Hong Kong

Purpose:

To report our 4-year outcomes on repeat corneal collagen crosslinking (CXL) on paediatric patients with Keratoconus (KC) progression after primary treatment.

Setting:

Corneo Plastic Unit, Queen Victoria Hospital, East Grinstead, UK

Methods:

We conducted a retrospective analysis of all patients with KC (age <18 years-old) who underwent both primary and redo-CXL between Nov 2010- July 2018 at the Queen Victoria Hospital, East Grinstead, United Kingdom. Progression of KC was based on the presence of an increase (≥ 1.5 D) in keraometric values (Km or Kmax), reduced VA one or more lines, or a change in refractive spherical equivalent of ≥ 1.0 D. Primary and redo CXL were performed using standard or accelerated protocol. Outcome measures were pre- and post-op best corrected visual acuity (BCVA), maximum keratometry (Kmax), average keratometry (Km), spherical equivalent (SE).

Results:

Among 135 patients who underwent primary CXL during this period, 6 patients (4.4%, 5M:1F) with a mean age 15 years (range 14-16) and documented KC progression, underwent repeat CXL at mean 18.5 months (range 8-39months) following the first treatment. Five (83.3%) reported atopy and vigorous eye rubbing. Mean pre-operative BCVA was 0.24 logMAR (range 0.1-0.6), mean Kmax 60.84 ± 6.95 D, mean Km 48.4 ± 3.2 D and mean SE -4.5 ± 2.13 D. Three patients had accelerated CXL. Two eyes had further progression and underwent corneal transplantation. The remaining were stable up to 4-year post-retreatment, four had intracorneal ring segments/phakic IOL within 2 years of repeat CXL.

Conclusions:

In our cohort, 4.4% of paediatric KC patients had repeat CXL within the first 3 years of primary treatment. 22% had further KC progression despite repeat CXL. Male patients within the 14-16-year-old age group, and history of atopy and vigorous eye rubbing appear to be the risk factors for repeat CXL. This group of patients is also more likely to require additional procedures such as corneal transplantation or visual rehabilitation surgery.

Cornea

PP304

Anterior OCT and OCTA application in tumors of anterior segment of the eye.

Presenting author: Viktoriia Makukhina, Russian Federation

Purpose:

This study aimed to assess characteristics of tumors of anterior segment of the eye using anterior OCT and OCTA.

Setting:

Helmholtz National Medical Research Center of Eye Diseases

Methods:

45 patients (45 eyes) with tumors of conjunctiva (15), lacrimal caruncle (1), iris (27) and ciliary body (2) without any previous treatment were observed. Besides standard ophthalmological examination all patients underwent anterior OCT and OCTA using the PS-3000 Advance 2 AngioScan OCT scanner (Nidek). Tumors' structure, tissue density, tissue homogeneity, degree of expansion and state of perifocal tissues were examined. OCTA was used for detection of vasculature in conjunctival and iris lesions. In case of the ciliary body tumors conjunctival vessels in the projection of the tumor site were registered.

Results:

High quality anterior-OCT images were obtained in all cases. Anterior OCTA provided successful tumors' vasculature visualization in 35 cases (78%). Tortuosity and distortion of the vessels were visible as well as an increase in their number. While using OCTA more reliable data was obtained with tumors of conjunctiva or lacrimal caruncle, than with iris lesions. For iris tumors examination radix iridis was the most unfavorable location due to the close proximity of the cornea. Difficulties were experienced while scanning tumors with different prominence levels. For both methods it was easier to get informative images while scanning less pigmented tumors.

Conclusions:

Anterior OCT allows to obtain accurate tumor measurements, while also displaying its structure, tissue density, tissue homogeneity, degree of expansion and state of perifocal tissues. OCTA allows to examine morphometric characteristics of the tumor and perform quantitative and qualitative assessment of its superficial and deep vasculature.

Cornea

PP305

A universal architecture of corneal segmental tomography biomarkers for artificial intelligence (AI) driven diagnosis of early keratoconus

Presenting author: Sneha GUPTA, India

Purpose:

To develop an AI classifier using a universal architecture of curvature, thickness and segmental tomography analysed with Zernike quantification of 3-dimensional structure

Setting:

Narayana Nethralaya, Bengaluru

Methods:

A total of 527 healthy patients, 144 asymmetric fellow eyes of KC patients and 454 KC eyes were imaged with a hybrid tomographer (MS-39, CSO, Italy). MS-39 used placido for anterior curvature and OCT (25 hemi-meridians) for posterior curvature, epithelium thickness and corneal thickness mapping. The fellow asymmetric eyes appeared either subclinical or forme fruste. However, no separate sub-classification of the 144 eyes was performed. From MS-39 data, anterior curvature and wavefront aberrations, stromal curvature and aberrations, epithelium and corneal thickness distributions were obtained, and analysed with Zernike polynomials and random forest AI.

Results:

For the healthy eyes, the area under the curve (AUC), accuracy, sensitivity and specificity were 0.994, 95.6%, 97.2% and 96.7%, respectively. The same indices were 0.976, 95.5%, 91% and 92.7% for the asymmetric eyes. The same indices were 0.997, 99.1%, 99% and 99.4% for the KC eyes. The AI re-classified 39 asymmetric eyes as healthy and 104 asymmetric eyes maintained their classification. Thus, these 39 eyes were the actual “sub-clinical” diseases eyes. The remaining 104 eyes were the actual “forme fruste” since these eyes did not match the 3-dimensional tomography of neither the healthy nor the KC eyes.

Conclusions:

This is the first report of a machine-driven identification of sub-clinical eyes and forme fruste KC using 3-dimensional segmental tomography of patient corneas. Such an architecture using Zernike polynomials only can be implemented universally in all hybrid tomographers.

Cornea

PP306

Reduced pupil block with 15% Sulfur Hexafluoride (SF6) tamponade versus 20% SF6 in Descemet membrane endothelial keratoplasty

Presenting author: Hanbin Lee, United Kingdom

Purpose:

Sulfur hexafluoride (SF6) and air are used to achieve adherence of donor graft material in conventional Descemet membrane endothelial keratoplasty (DMEK). Our aim was to report our early experience of intracameral 15% sulfur hexafluoride (SF6) and compare it with 20% SF6 and Air as tamponade in DMEK.

Setting:

Frimley Park Hospital, Frimley Health, NHS Foundation Trust, United Kingdom

Methods:

Using the electronic patient records system Medisoft, patients' notes who had DMEK from April 2017 to March 2021 were retrospectively reviewed. The primary outcome was pupil block, and secondary outcome was graft detachment requiring re-bubbling.

Results:

From April 2017 to March 2021, 28 patients had air, 16 had 20% SF6 and 12 patients had 15% SF6. Pupil block was reported in 7% (2/28), 18% (2/16) and 8.3% (1/12) in air, 20% SF6 and 15% SF6 respectively despite a patent peripheral iridotomy. Re-bubbling rates were 21.4% (6/28), 18% (2/11) and 16% (2/12) in air, 20% SF6 and 15% SF6.

Conclusions:

The use of 15% SF6 as a tamponade resulted lower rates of pupil block compared with 20% SF6. Re-bubbling rates were lower than with air, and similar to 20% SF6. Further follow up and greater numbers are required with the use of 15% SF6 but we propose it could be a useful means to achieve graft adherence whilst reducing the risk of pupil block.

Cornea

PP307

The significance of the ephrin receptors (Eph) and ephrins in cornea's physiology and diseases.

Presenting author: Katarzyna Zimmer, Poland

Purpose:

Eph receptors constitute the largest subgroup of the tyrosine kinase receptors (RTK). They are vastly spread and expressed in the whole organism. During the embryonic development they are responsible for the cells positioning, germ layers organization, organogenesis and the tissues formation. After the embryo period, the receptors expression is not as intense as in the embryonic tissues. In the mature organism, the receptors are mainly responsible for the vessels walls stabilization and tissue recovery after injury. Considering proven high correlation of Eph with angiogenesis and VEGF signaling pathways, they are currently one of the most interesting object of research among ophthalmologist.

Setting:

Coreal neovascularisation (NV) is a condition that often leads to significant visual impairments, including even loss of vision. Getting to know the role of Ephs' in the cornea physiology and pathophysiology could definitely help with understanding better

Methods:

Researching data (Pubmed) about corneal NV pathology and Eph expression in the cornea tissues. Key words were corneal neovascularization, Eph, Eph receptors, ephrin.

Results:

Selected Eph receptors demonstrate expression in the healthy tissues of the cornea. They are located mainly in the perilimbal region and in the epithelium cells. There are some publications reporting the Eph role in the cornea epithelial cells migration and compartmentalization. The relation between the Eph and the keratocytes dependent healing processes has also been carefully studied. In the experimental models of the artificially induced NV in the mouse the increased expression of the selected Eph has been noticed. Additionally, stimulating the signal pathways correlated with Eph, it was possible to induce NV in the cornea.

Conclusions:

The presence of the Eph receptors in the healthy cornea and their role in the healing processes, that are keratocytes dependent, proves their significant role in maintaining the balanced condition of the cornea. Recent research data also show their participation in the pathological events that lead to NV. Considering very beneficial role and lack of toxicity to the ocular tissue, there is a promising future for the Eph targeted drugs in the successful treatment of all the corneal diseases.

Cornea

PP308

Fellow Eye as a Predictor for Keratoconus Progression following Accelerated Corneal Crosslinking

Presenting author: Michael Mimouni, Canada

Purpose:

To assess fellow eye as a predictor for keratoconus progression following bilateral same day accelerated crosslinking (A-CXL).

Setting:

Tertiary Care Center

Methods:

This was a post-hoc analysis of data from a prospective study of bilateral A-CXL for progressive keratoconus between the years 2013 and 2015. The primary outcome measures were absolute change in Kmax (D), relative change in Kmax (%) and A-CXL progression (increase in Kmax >2D). Responses in both eyes were measured by change in Kmax with the right eye serving as the “predictor” of progression for the left eye.

Results:

Three-hundred-ninety-two eyes (n=196) with a mean age of 26.8 ± 7.7 years were included. There was a significant correlation in absolute and relative Kmax change ($r=0.26$, $p<0.001$ and $r=0.32$, $p<0.001$, respectively) between right and left eyes. The only significant predictors of change in Kmax in the left eye were left eye preoperative Kmax ($p=0.02$) and Kmax change of the right eye ($p<0.001$). Eyes that progressed in the right eye were more likely to progress in the left eye (29.4% versus 4.5%, $OR=8.85$, $p=0.001$). In multiple regression right eye progression > 2D was the only significant predictor of left eye progression ($OR=15.15$, $p=0.007$).

Conclusions:

This large-scale study of keratoconus following A-CXL indicates that subjects who progressed in the right eye were 15.5 times more likely to progress in the left eye. Patients with progression following A-CXL in one eye should be closely observed due to increased risk of progression in the fellow eye.

Cornea

PP309

Long-Term Results of Deeper Corneal Stromal Crosslinking in Early and Established Keratoconus

Presenting author: Lional Raj Daniel Ponniah, India

Purpose:

To compare Femtolaser-assisted deeper stromal crosslinking with the conventional crosslinking procedure, and study its long-term outcomes to prove deeper crosslinking better dampens ectasia progression

Setting:

A prospective nonrandomized comparative clinical trial followed by a single-arm longitudinal analysis of Femto CXL in the department of Refractive Surgery, in a tertiary eye care hospital, in South India

Methods:

A prospective non-randomized comparative clinical trial followed by single-arm longitudinal analysis of Femto CXL. Keratoconus with pachymetry over 400 microns were enrolled. In phase 1 Femto CXL,(Group1) creation of a femto-assisted stromal pouch,160 microns deep, into which riboflavin was infused & subsequent UVA was compared with an Epi-off conventional CXL (Group 2) by 1 year. Vision in LogMAR, Pachymetry in microns, MaximumK, MeanK, Astigmatism values in Diaptors, were analyzed at 1year in addition to OCT derived demarcation line (DL) by 1 month. In phase 2, Group1 subjects were followed annually to 3 years for stability using repeated measure statistics

Results:

47 Group1 and 21 Group2 subjects enrolled. In Phase1, UCVA improved by 1 line in both groups, Pachymetry remained the same in Group1 (475±37), significantly reduced by 28 mic.(p=0.002) in Group2 (434±56 to 406±66). Astigmatism reduced by 0.32D inGroup1, increased in Group2 by 0.33D. Both groups flattened corneas. DL was deeper in Group1 p=0.0001(394mic.) against Group2 (243mic.) In Phase2 (44 in 2years; 42 in 3 years), Pachymetry was maintained, UCVA marginally improved (0.63,0.61), BCVA was maintained (0.16), Astigmatism (2.93, 2.91), Kmax (47.88, 47.86), and Kmean (46.07,46.11) were maintained in 2 and 3 years respectively

Conclusions:

Corneal crosslinking deeper than 250 microns could be achieved with Femto-assisted stromal pouch for deeper diffusion of riboflavin than with Conventional crosslinking procedures. Deeply crosslinked corneas remained stable with no progression after 3 years

Cornea

PP310

Epithelial remodeling and CXL-line depth in keratoconus following CXL combined with excimer corneal reshaping with the Athens protocol

Presenting author: Anastasios John Kanellopoulos, Greece

Purpose:

To evaluate epithelial remodeling and CXL-line depth in keratoconic eyes following surface ablation normalization combined with corneal crosslinking (Athens protocol)

Setting:

Laservision.gr Clinical and Research Institute, Athens, Greece

Methods:

Fourier-domain anterior segment optical coherence tomography (AS-OCT) was used to obtain in vivo 3-dimensional corneal and epithelial thickness maps and center, superior, inferior, maximum, minimum, mean, midperipheral, and variability data; as well as cross-section assessment of the average depth and width of the CXL derived intrastromal-line visualized.

Results:

43 treated keratoconic eyes were evaluated over 2 years. The mean overall epithelial thickness (ET) in μm changed from 54.6 to 52.6, superior vs. inferior change in μm : 56.9 and 52.3 to 53.3 and 52. ET change over cone center 45.1 to 53.2. All differences were statistically significant > 0.01 . CXL line mean depth: 265 μm

Conclusions:

These data confirm our previous findings of overall epithelial thickness normalization following CXL with the Athens Protocol. Increase to normal thickness over the cone center along with documentation of a deep CXL-line may serve as confirmation of the result efficacy along with corneal thickness and curvature stability over time.

Cornea

PP311

Improving keratoconus management with central corneal regularization and corneal collagen cross-linking protocol treatment

Presenting author: Rita Napolitano, Italy

Purpose:

To evaluate safety and efficacy of customized central corneal regularization (CCR), together with simultaneous accelerated corneal collagen crosslinking (A-CXL) – CCR-CXL protocol, to treat keratoconus-related corneal ectasia.

Setting:

Casa di Cura “Villa Maria”, Campobasso, Italy.

Methods:

Patients that had undergone combined CCR-CXL protocol. Main inclusion criteria were keratoconus visual acuity deterioration and contact lens intolerance. All patients underwent complete ophthalmological evaluation, corrected distance visual acuity (CDVA) and Scheimpflug-corneal tomography. Central corneal regularization was performed by ablation using flying spot laser. Subsequently, the stroma was saturated with 0.17% riboflavin-5-phosphate added every 2 minutes, followed by A-CXL 9 mW/cm² for 10 minutes. CDVA, medium keratometry value (Kmed), and total corneal morphological irregularity index (CMI) of patients were analyzed before surgery and after 1, 3 and 12 months. A P value of .05 or less was considered statistically significant.

Results:

46 eyes of 39 keratoconus patients were treated. At 1 month, the mean CDVA (LogMar) increased from 0.19 ± 0.24 to 0.12 ± 0.19 ($p < .05$), and the difference remained stable at month 12. Kmed decrease was statistically significant from 49.14 ± 2.2 to 47.49 ± 1.93 ($P < .05$). CMI decreased significantly from 47.8 ± 28.4 to 30.1 ± 24.01 ($P < .01$).

Conclusions:

CCR-CXL protocol seems to be safe and effective in arresting keratectasia progression and increasing corneal optic regularity in keratoconus. These findings showed a significant improvement in CDVA, keratometry values and corneal optical aberrations after being treated with the CCR-CXL protocol.

Cornea

PP312

Artificial Intelligence linked clinical and molecular factors affecting long term outcomes post cross linking in keratoconus

Presenting author: RITIKA MULLICK, India

Purpose:

To study performance of quantitative parameters & indices and link them to molecular factors which can help us predict long term outcomes post cross linking in keratoconus.

Setting:

The study was approved by the institutional review board and patients were recruited following informed consent. It was conducted at a tertiary eye care centre in Bengaluru, India.

Methods:

1200 scans of 350 eyes of keratoconus, which underwent cross linking, after checking edge detection were exported from PentacamHR and classified into 2 groups-good & bad outcomes based on Kmax. Kmax change of 1D flattening post operatively with a minimum follow up of 6 months, extending upto 2 years were considered as good outcome. Keratometry derived KC indices, Zernike wavefront aberrations, from anterior and posterior cornea were given as features to AI. Random Forest Classifier based AI algorithm was used which helped in accurate prediction. We also linked lysyl oxidase(LOX) and MMP-9 level that were analysed intraoperatively from the manual removal of epithelium with these derived indices

Results:

Random forest classifier-based AI model predicted post cross-linking outcomes with area under the curve (AUC) at 0.90, sensitivity & specificity at 0.88 & 0.91 respectively. Amongst the features, detected by the RF classifier-Steep keratometry of the front surface, index of height decentration (IHD) & index of surface variance (ISV), aspheric Q value, RMS of lower & higher order aberrations of the anterior surface, had higher gain ratios Using a confusion matrix in a decision tree classifier we were able to accurately predict 93.5% of good outcomes post cross linking. LOX and MMP 9 had a significant correlation with ISV, higher and lower order aberrations and steep Keratometry

Conclusions:

Artificial intelligence after using various indices classifies the patients as good and bad outcomes post cross linking accurately and thereby improving the predictability of the procedure & assisting in decision making. With addition of molecular data, AI derived model can become a more robust model to predict outcomes post cross linking.

Cornea

PP313

Corneal Elevation Changes in Normal Population and Keratoconus Patients Using Different Acquisition Diameters with Scheimpflug Imager

Presenting author: MOHAMMED Abdel Aziz, Egypt

Purpose:

To detect the changes in corneal elevation values using different acquisition diameters (8, 9 mm) in both normal population and keratoconus patients.

Setting:

a cross-sectional clinical trial conducted at the Ophthalmology Department, Menoufia University Hospital, and Tiba eye center, Menoufia, Egypt

Methods:

This is a cross-sectional clinical trial conducted at the Ophthalmology Department, Menoufia University Hospital, and Tiba eye center, Menoufia, Egypt in the period between January 2019 to December 2020. Two hundred corneas of two hundred subjects were involved and categorized into two groups, a control group with normal cornea 100 subjects (group A) and a group with keratoconus 100 subjects (group B) both confirmed by clinical examination and pentacam readings.

Results:

Receiver operating curve (ROC) analysis was conducted to identify the optimal elevation front parameters levels for prediction of keratoconus. The best cut-off values for front parameters BFS 8mm, BFS 9mm, BFTE 8mm and BFTE 9mm were 6.5, 10.5, 2.5, 2.5 with (96%, 92%, 92%, 92% sensitivity, and 96%, 96%, 80%, 72% specificity), respectively. Also, the best cut-off values for back parameters levels for prediction of keratoconus for BFS 8mm, BFS 9mm, BFTE 8mm and BFTE 9mm were 14.0, 25.5, 6.5 and 9.5 mm with (96%, 96%, 80%, 72% sensitivity, and 88%, 96%, 64%, 88% specificity), respectively.

Conclusions:

We can conclude that there was a significant increase in elevation back parameters in keratoconus patients compared to control. The best cut-off values for front parameters levels as BFS (8, 9mm) and BFTE (8, 9 mm) was 6.5, 10.5, 2.5, and 2.5 mm, respectively.

Cornea**PP314****Novel Collagen Imaging Using Ultra-High-Resolution Polarisation Sensitive OCT in Healthy, Suspect and Keratoconus Corneas****Presenting author:** Pooja Khamar, India**Purpose:**

To establish the in-situ collagen fiber distribution in healthy and keratoconus (KC) corneas and correlate with early disease related collagen fiber changes in suspect corneas

Setting:

Narayana Nethralaya, India

Methods:

A total of 50 healthy and 50 KC corneas were imaged prospectively with ultra-high-resolution polarisation sensitive (PS) OCT. Additionally, 35 asymmetric fellow corneas of KC patients were also imaged. These asymmetric fellow corneas were subclinical in nature upon clinical examination (slit lamp and corneal tomography) by an experienced surgeon. The PS OCT generated two measures of collagen fiber distribution, namely phase retardation (PR) and axis orientation (AO). The PR and AO were evaluated at each pixel of an OCT B-scan. Then, histograms of PR and AO were created and analysed.

Results:

The PR and AO histograms of healthy patients' corneas matched exactly the in-situ distribution of human donor corneas measured ex vivo in earlier studies. In KC corneas, there was a marked reduction in number of pixels with PR less than 25 degrees with a concomitant increase in the number of pixels with AO below 0 degrees ($p < 0.001$). Surprisingly, some of the suspect corneas matched the histograms of the healthy corneas ($n=10$, $p > 0.05$) while the remaining ($n=25$, $p < 0.01$) had a unique distribution which was different from the KC corneas.

Conclusions:

Novel PS OCT imaging clearly identified collagen distribution differences between healthy and KC corneas. Interestingly, some of the asymmetric corneas had a unique collagen distribution indicating early changes before tomographic manifestation in these eyes.

Cornea**PP315****Preoperative aqueous cytokine levels in eyes with Fuchs endothelial corneal dystrophy and pseudophakic bullous keratopathy****Presenting author:** Natalia Fisenko, Russian Federation**Purpose:**

To evaluate cytokine levels in the aqueous humor (AqH) of patients with Fuchs endothelial corneal dystrophy (FECD) and pseudophakic bullous keratopathy (PBK).

Setting:

Research Institute of Eye Diseases, 11 A,B, Rossolimo St., 119021 Moscow, Russian Federation; FSBI «National Medical Research Center for Obstetrics, Gynecology and Perinatology named after Academician V.I.Kulakov», 4, Oparina street, 117997, Moscow, Russi

Methods:

A total of 74 AqH samples (18 FECD, 13 FECD with concomitant primary open-angle glaucoma (POAG), 13 PBK, 22 PBK with concomitant POAG and 8 controls) were collected from consecutive patients who underwent endothelial keratoplasty or cataract surgery (controls). Central corneal thickness was measured in all eyes before the surgery (RTVue-100 OCT, Optovue, USA). The AqH levels of cytokines (IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12(p70), IL-13, IL-17, G-CSF, GM-CSF, IFN γ , MCP-1, MIP-1 β and TNF- α) were measured with multiplex bead immunoassay technique.

Results:

The levels of IL-6, IL-8, IFN γ , MCP-1 were significantly elevated in all groups compared to control ($p < 0.03$). There were increased MIP-1 β levels among FECD with and without POAG groups in contrast to the control ($p < 0.02$). IL-4 and IL-13 were statistically lower in eyes with PBK, PBK and POAG, FECD and POAG, than those in the controls ($p < 0.02$). Similarly, IL-13 was significantly decreased in FECD compared to control ($p < 0.02$). The levels of GM-CSF were raised in FECD and PBK eyes comparing with FECD and PBK accompanied by POAG ($p < 0.02$). Preoperative G-CSF level in FECD was significantly lower than in PBK ($p < 0.009$).

Conclusions:

AqH plays a pivotal role in preventing immunogenic inflammation in intraocular tissue. High preoperative levels of IFN γ , MCP-1, MIP-1 β , G-CSF in the AqH of patients with FECD and PBK show Th1 immune response. The decreased expression of IL-4 and IL-13 indicates the suppression of Th2 immunity. POAG as a concomitant disease enhances the inflammatory reaction in eyes with either FECD or PBK. Thus, FECD and PBK are conditions associated with the disturbance of ocular immune privilege, leading to chronic local corneal inflammation and fibrosis.

Cornea**PP316****Keratoconus and microbiome: A new link. The nexus between microbiome and immune factors at the ocular surface: novel drivers of Keratoconus pathology****Presenting author:** Sneha GUPTA, India**Purpose:**

We have previously demonstrated that Keratoconus (KC) severity correlates with inflammatory factors in the cornea and tears of patients. Since the quality of the tissue microbiome may affect the immune status, we analyzed the ocular surface microbiome and correlated it with tears factors.

Setting:

Narayana Nethralaya, Bengaluru

Methods:

Tear samples and ocular surface swabs were collected from 15 healthy control and 34 KC subjects after obtaining informed consent and institutional ethics approval. Ocular surface examination including topography and visual acuity measurements were performed in all subjects. We performed V3-V4 amplicon sequencing and bioinformatics to establish operational taxonomic units corresponding to phyla, class order, family and genus. Schirmer's strip tear extracts were used to measure soluble molecular factors by multiplex ELISA.

Results:

21 phyla, 53 classes, 103 orders, 213 families and 515 genus were identified in the complete dataset. The dominant phyla were Actinobacteria, Proteobacteria, Firmicutes and Bacteroidetes. Alphaproteobacteria were higher while Actinobacteria reduced in KC compared to controls. The dominant genus were Propionibacterium, Corynebacterium and Staphylococcus. Reduced OUT of Lactobacilli, Streptococcus, Rothia and Brevibacterium was found in KC. Actinobacteria correlated significantly with IL8, CD121 and MPO levels ($p < 0.05$). IL17A and IL12 correlated with Proteobacteria ($p < 0.05$).

Conclusions:

The data reveals that KC subjects have a distinct ocular surface microbiome compared to healthy controls. The data also demonstrate that dysregulated levels of immune mediators in the tears are associated with the microbiome, potentially opening new avenues for KC treatment in the future.

Cornea

PP317

Keratitis caused by three pathogens: a complicated case

Presenting author: Ioanna Gardeli, Greece

Purpose:

The purpose of this paper is the presentation of the clinical course and management of a case complicated with bacterial, herpes simplex virus (HSV) and fungal keratitis.

Setting:

This case is about an one-eyed 50-year-old male who presented to the outpatient clinic. He exhibited refractory painless keratitis with a peripheral corneal ulcer. The patient has a history of herpetic uveitis.

Methods:

The superficial corneal swab was used for culture and Polymerase Chain Reaction (PCR). PCR results were found to be positive for HSV-2 and fungi. In this case cultures of Staphylococcus epidermidis and Aspergillus glaucus were grown.

Results:

In this case we used coll vancomycin for the bacterial keratitis, ganciclovir gel and tab valacyclovir for the treatment of HSV keratitis, whereas for the fungal keratitis we used tab and coll voriconazole. We achieved good treatment efficacy and the clinical course of the patient was good in follow up.

Conclusions:

Prompt diagnosis and treatment of keratitis caused by multiple pathogens in an one-eyed patient is challenging and essential for a good visual outcome.

Cornea

PP318

Growth pattern and distribution of *Pseudomonas aeruginosa* bacteria within the corneal epithelium and stroma in human corneal infection

Presenting author: Ahmad Elsahn, United Kingdom

Purpose:

To study the growth pattern of *Pseudomonas aeruginosa* bacteria in the cornea after corneal infection in human microbial keratitis.

Setting:

Basic research laboratory study

Methods:

Human donor corneas from the eye bank were used. Bacterial suspensions of GFP-expressing *P. aeruginosa* PAO-1L were prepared. A tissue biopsy punch was used to create 4 discs out of each corneal button. 100 microlitres infective medium was added to each well. Infection was allowed for 24 hours, then discs were collected at 3, 6, 9 and 24 hours thereafter. At each time point, corneal discs homogenised in sterile PBS. Viable counting of homogenised material was performed. Laser confocal microscopy was used to assess the growth pattern, distribution, and biofilm formation of bacteria on and within corneal tissue.

Results:

The number of bacteria recovered homogenised material increased in a linear manner over the first 9h, after which the growth rate slowed. GFP-expressing PAO-1L bacteria were observed to grow over the surface of the epithelial and penetrate into the corneal stroma. The growth rate quantified by the amount of red fluorescence increased steadily over the 24h period. Green fluorescence indicative of biofilm formation was also noted to increase.

Conclusions:

We have established an ex-vivo model of human bacterial keratitis and demonstrated that *P. aeruginosa* can grow on and within the corneal tissue after infection. Biofilm was found to start forming after 24h of bacterial challenge in microbial keratitis

Cornea

PP319

Novel Drug Repository Contact Lens Study: Prolongation of Corneal Anti-Microbial Contact in Bacterial Keratitis

Presenting author: Lional Raj Daniel Ponniah, India

Purpose:

To evaluate the efficacy of a novel therapeutic contact lens that increases the overall contact time of corneal antimicrobial drug (serving as a drug reservoir) in subjects with bacterial keratitis

Setting:

A Randomized open-label clinical trial, at the Department of Cornea & Ocular Surface Diseases in a tertiary eye hospital, in South India

Methods:

Bacterial keratitis was randomized into Group-1, treated with a topical antimicrobial, in Group-2, a drug-reservoir contact lens with characteristic dual base curves resulting in a central reservoir along with fenestrations to enable capture of topical antimicrobial, was implanted. In both groups, moxifloxacin 0.5% in a standard regimen was instituted. Ulcer size, depth, AC reactions, corneal haze were studied. Subjects were stratified into Category-1 (less than 4mm) and Category-2 (over 4 mm). Followed-up on 12 hours, Days-1,3,5 & 14. Pain evaluated on every visit. A study on the availability of the drug in the central reservoir was analyzed over a time curve

Results:

15 cases (8 in Group-1, 7 in Group-2) in Comparison-Category-1. Pain-scores were 7.25 \pm 0.70 in Group-1, 7.43 \pm 0.78 in Group-2, which reduced by 5.29 points in Group-2 and 2 points in Group-1 at Day-1 ($p < 0.001$), by 6.86 points in Group-2 by Day-3 ($p < 0.001$). Corneal-infiltration on presentation in Group-1 was 2.41 \pm 0.82mm, in Group-2 was 2.59 \pm 0.39mm ($p = 0.594$). Resolution by 12 hours in Group-2 was 0.66mm, in Group-1 was 0.09mm ($p < 0.0001$), by Day-1 was 1.27mm in Group-2, 0.41mm in Group-1 ($p < 0.0001$), by Day-3 2.06 in Group-2 Vs 1.09 in Group-1 ($p = 0.013$). AC-reaction resolved in Group-2 faster within 3-days. Drug availability in reservoir, the potential pre-corneal space was evidenced upto 4 hours

Conclusions:

The concept of using a novel drug repository contact lens is effective in prolonging corneal antimicrobial availability and drug contact time over the lesion and has demonstrated in this study that corneal healing hastens, which may affect the overall outcomes in bacterial keratitis. Using a drug-depo contact lens may reduce the regimen of antibiotics, decrease treatment burden on the medical staff, improve patient tolerance, and reduced toxicities

Cornea**PP320****Endothelial Cell Loss Curve in Descemet Stripping Automated Endothelial Keratoplasty versus Descemet Membrane Endothelial Keratoplasty****Presenting author:** Rodrigo Vilares Morgado, Portugal**Purpose:**

To compare best corrected visual acuity (BCVA), endothelial cell density (ECD) and postoperative complications in adult patients with corneal endothelial disorders who were submitted to Descemet stripping automated endothelial keratoplasty (DSAEK) or Descemet membrane endothelial keratoplasty (DMEK).

Setting:

Retrospective, single-centre, observational cohort study that took place from March 2016 to March 2020 in Centro Hospitalar Universitário S. João (Porto, Portugal), a tertiary university hospital.

Methods:

51 eyes from 51 patients with corneal endothelial disorders who were submitted to either a traditional DSAEK (n=23 patients) or a DMEK (n=28 patients) and followed for at least one year after the procedure in our department were included. Patients without at least one ECD determination after transplantation were excluded. Patient demographics, BCVA with the logMAR scale before and one year after grafting, indication for transplantation, and postoperative complications were recorded. Specular microscopy with ECD determination (in cells/mm²) was performed on all donor corneas before grafting and regularly after transplantation, as part of our patient's usual follow-up.

Results:

Patients' demographics, indications for transplantation and BCVA before grafting were similar in both groups. BCVA 1-year after transplantation was better in the DMEK group (0.26 ± 0.19 vs. 0.47 ± 0.29 in the DSAEK group; $p=0.003$). ECD in donor corneas before grafting was similar in both groups ($p=0.986$). Graft ECD after transplantation was higher in the DMEK group at up to 5 months ($p<0.001$), 5 to 9 months ($p=0.037$) and 9 to 15 months follow-up ($p=0.003$), being similar in posterior determinations. 2 DMEK eyes required re-bubbling and 1 eye presented primary graft failure. 2 DSAEK eyes suffered graft rejection.

Conclusions:

Groups of patients submitted to either DMEK or traditional DSAEK were similar in age, gender and indication or transplantation. Their BCVA and ECD in donor corneas used were also similar. Nevertheless, after grafting, ECD was higher in the DMEK group up to 15 months follow-up. BCVA 1 year after transplantation was also higher in the DMEK group. This study corroborates the notion that DMEK has better visual outcomes than traditional DSAEK and further adds to the possibility that it also is superior to DSAEK in preserving graft ECD after transplantation.

Cornea

PP321

50 first Descemet membrane endothelial keratoplasty in a single center

Presenting author: María Jesús Quiroz Quiroga, Spain

Purpose:

To report the results of 50 first Descemet membrane endothelial keratoplasty (DMEK) performed by three different corneal surgeons.

Setting:

DMEK is a corneal posterior graft technique developed in order to treat endothelial dysfunction. Avoidance of transplantation of donor stroma has led to better visual results and lower rejection rates. On the other hand it has unique technical and surgical

Methods:

This is a retrospective descriptive study of the first 50 consecutive DMEK procedures in a single center by 3 different cornea surgeons. From December 2017 to October 2019 medical records were reviewed. The donor corneal grafts were obtained from the Corneal Tissue Bank (Banc de Sang i Teixits, Barcelona, Spain) and they were mostly predisected.

Results:

A total of 50 surgeries were performed in 41 patients. 58% of patients were female. The principal indication of surgery was Fuchs dystrophy (52%), followed by secondary post-surgical corneal decompensation (29%). The pre-operative mean best corrected visual acuity (BCVA) was 0,25 (decimal scale) while mean post-operative BCVA was 0,65. Mean donor endothelial density was 2661 (mm⁻²) and mean age was 67,8 years old. Most common surgical complications were unfolding of the graft (8%) and anterior chamber bleeding (4%). Reported post-surgical complications included graft failure (18%), re-bubbling (10%) and cystoid macular edema (10%).

Conclusions:

The concept of a single learning curve per institution was previously reported by Dapena and coworkers in 2011 and has been applied in many other studies. Thus, we describe the accumulated experience of the first 50 Descemet membrane keratoplasties performed by 3 different surgeons. The outcomes in terms of mean BCVA and rates of complications were similar to others published series. The DMEK's learning curve seems to be highly reproducible.

Cornea

PP322

FemtoLASIK after deep anterior lamellar keratoplasty to correct residual astigmatism: long-term follow-up

Presenting author: Belén Alfonso-Bartolozzi, Spain

Purpose:

To evaluate the long-term outcomes of Femtosecond laser-assisted In-Situ Keratomileusis (Femto-LASIK) to correct residual astigmatism after Deep Anterior Lamellar Keratoplasty (DALK).

Setting:

Fernandez-Vega Ophthalmological Institute. Oviedo, Spain

Methods:

This retrospective case series study included 10 eyes that underwent Femto-LASIK after a DALK. The refractive error, uncorrected (UDVA) and corrected (CDVA) distance visual acuities, Thinnest Corneal Thickness (TCT) and Central Corneal Thickness (CCT) were registered. The postoperative follow-up ranged between 36 and 60 months.

Results:

All surgeries were uneventful, with no intra or postoperative complications. The mean UDVA rose from 0.13 ± 0.05 to 0.47 ± 0.15 six months after Femto-LASIK. All cases experienced a significant improvement in UDVA. None of the eyes lost lines of CDVA, and seven eyes improved the CDVA compared to preoperative values. The refractive cylinder changed from -3.88 ± 1.00 D preoperatively to -0.93 ± 0.39 six months after Femto-LASIK. In 8 eyes, the UDVA and refractive outcomes remained stable at their respective postoperative follow-up visits. In contrast, 1 eye experienced a refractive regression over the follow-up. TCT and CCT were stable at the different postoperative follow-up visits.

Conclusions:

Our findings suggest that residual astigmatism after DALK surgery can be safely and effectively treated with Femto-LASIK. The refractive stability in eyes with prior Radial Keratotomy might be lower than for other DALK indications, and there may be an increased risk of regression of astigmatism over time.

Cornea

PP323

P.E.R.F.E.C.T. pterygium surgery in Glasgow? Real-world outcomes and follow up issues in the NHS

Presenting author: Oliver Chadwick, United Kingdom

Purpose:

Pterygium is a fibrovascular degenerative growth extending onto the cornea. Multiple excision techniques exist with varied reported recurrence rates (2-39%). The P.E.R.F.E.C.T. for PTerygium® technique has a reported 0.05% recurrence rate and involves extensive Tenon's dissection with a large conjunctival autograft. We evaluated our single surgeon NHS outcomes in Glasgow using this technique's principles for visually significant pterygia.

Setting:

Patients referred for management of visually significant pterygia in the state sector (NHS).

Methods:

A retrospective study of all patients who underwent pterygium removal by a single surgeon in NHSGGC, Scotland, between 2015 and 2020 was performed. Absence of recurrence, or discharge with no documented recurrence at 300 days was the primary end point.

Results:

47 patients were identified: average age 55 years. Mean conjunctival autograft size was 53mm² (median 50mm²; upper 160mm²). In 38 cases (81%) pathology was consistent with pterygium. 2 cases had evidence of dysplasia (4.3%). 45 patients attended any post-operative follow up, with 23 attending review >300 days post-operatively. 11 patients (23%) were lost or Did Not Attend (DNA) scheduled NHS review. Median Scottish Index of Multiple Deprivation (SIMD) decile was 4, but for the DNA group was 1 (more deprived). One patient had 1mm recurrence onto the cornea, not requiring further intervention (2.2%). No patients were re-referred with pterygium recurrence.

Conclusions:

The P.E.R.F.E.C.T. principles resulted in successful surgery for most patients in this series. Issues with incomplete follow up of patients from areas of greater deprivation could influence reporting recurrence rates in this NHS cohort.

Cornea

PP324

To evaluate Femtosecond Laser-Assisted Descemetorrhesis in Descemet stripping automated endothelial Keratoplasty

Presenting author: Alex Samir Fernandez-Santodomingo, Spain

Purpose:

Femtosecond laser-guided descemetorrhesis is proposed as an alternative method to manual descemetorrhesis in Descemet stripping automated endothelial Keratoplasty (DSAEK), maximizing the probabilities of graft transparency and minimizing the detachment rate of Descemet's membrane.

Setting:

Hospital Universitari i Politecnic La Fe (Valencia, Spain)

Methods:

Ten pseudophakic patients suffering from Fuchs' endothelial dystrophy underwent femtosecond laser-assisted DSAEK surgery. Descemetorrhesis was performed using the Victus Femtosecond Laser. The patients were followed for 12 months assessing visual acuity, endothelial cell count and flap status using AS-OCT CASIA 2.

Results:

The median visual acuity increased from 0.5 logMAR (range 0.6–0.4 logMAR) preoperative to 0.2 logMAR (range 0.1–0.4 logMAR) postoperative. The median endothelial cell loss was 25% (range 8%–37%). No clinically significant flap detachments were detected. All patients had clear corneas after surgery, and no side effects or damage to structures of the anterior chamber were noted.

Conclusions:

Femtosecond laser-assisted descemetorrhesis is a safe and highly precise method for facilitating DSAEK surgery.



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Cornea

PP325

Determination of the Mechanical Properties of Human Cornea Using an Anisotropic Hyper-Viscoelastic Model and Coupled Finite Element-Optimization Analysis

Presenting author: Farideh Doroodgar, Iran, Islamic Republic of

Purpose:

Evaluation of mechanical properties of the human cornea using an Anisotropic Hyper-Viscoelastic Model

Setting:

Negah Eye Hospital

Methods:

In this study, eight material parameters of the structural anisotropic fiber-reinforced hyper viscoelastic model of Cornea with various fiber angles (8, 18, 22.5, and 45 degrees) have been obtained using coupled finite element-optimization analysis and experimental data. The utilized model considers the fibers' dispersion along with their reorientation during loading, the nonlinear behavior of finite tissue deformation, and the intrinsic viscoelastic property of the matrix. The effect of each parameter on the sample responses in the tensile test simulation was examined.

Results:

The results demonstrated that the samples' J-shape behavior under the tensile test could be justified by the model used in the present study. Examining the results shows that the numerical simulations performed to predict the cornea tissue behavior are nearly consistent with the experimental results and have good accuracy and that the model has acceptable stability.

Conclusions:

The numerical simulations performed to predict the cornea tissue behavior are nearly consistent with the experimental results and have good accuracy, and the model has acceptable stability.

Cornea

PP326

Postkeratotomy cornea deformation: relief topography types and biomechanical properties.

Presenting author: Olga Rozanova, Russian Federation

Purpose:

To analyze the relief topography and biomechanical properties of the cornea in patients with the history of radial keratotomy (RK).

Setting:

National Medical Center “S. Fyodorov Eye Microsurgery Federal State Institution”, Irkutsk Branch, Russia

Methods:

188 patients (156 RK and 32 myopic controls) were recruited. The relief cornea topography was examined by Pentacam HR (Oculus). The elevation of the front and back cornea in the central, 4 paracentral and 14 peripheral points were analyzed. Corneal hysteresis (CH), corneal resistance factor (CRF), Goldmann-correlated intraocular pressure (IOPg), and corneal-compensated intraocular pressure (IOPcc) were measured by Ocular Response Analyzer (ORA). Experiment protocol included the calculation of the ratio between CH and CRF (CH/CRF) and of the coefficient of biomechanical tension of fibrous membrane (CBT). The history of radial keratotomy surgery were assessed through chart review.

Results:

Five types of postkeratotomy deformation was identified. Peripheral cornea had positive elevation in a form of complete or incomplete ring, depending on completeness of the ring and combination options in front and back cornea 4 patterns were identified. The 5th pattern of cornea relief topography had the irregular character with a significant displacement of the apex and with separate islands of negative and positive elevation. The majority of patients of this subgroup had the rough cornea scarring and history of glaucoma and retinal detachment surgery. The eyes with different types of cornea deformation differed in CH/CRF and CBT.

Conclusions:

Five types of postkeratotomy deformation were found based on the relief-topography of front and back cornea. The corneal deformity type of and the biomechanical properties of the fibrous membrane had the strong relationship. The study of the relief cornea topography seems as a promising direction for determining the subsequent management RK patients.

Cornea

PP327

Comparison between different methods of corneal collagen crosslinking (a systematic review)

Presenting author: SIDI MOHAMED HAMIDA ABDELKADER, Spain

Purpose:

To review the scientific literature on the comparison of the efficacy of different corneal collagen crosslinking (CXL) protocols for the treatment of progressive keratoconus

Setting:

Department of Ophthalmology, Torrecárdenas Hospital Complex, Almería, Spain

Methods:

Systematic review of randomized clinical trials (RCTs) on CXL outcomes. A search was carried out using the Cochrane Library, PubMed, EMBASE, Web of Science, Ovid MEDLINE, and Scopus databases. Internal validity was analyzed by applying the filter CASPe (Critical Appraisal Skills Program Spain)

Results:

Conventional (S) crosslinking (CXL) provided better topographic outcomes than transepithelial (TE) CXL, and S-CXL had a better therapeutic effect of corneal flattening than accelerated (A) CXL. The corneal thinning after CXL was lower with hypotonic riboflavin than with riboflavin-dextran. While one study demonstrated a better therapeutic effect of corneal flattening with S-CXL than with A-CXL, another study showed similar results between both techniques. No correlation was found between the depth of the demarcation line and topographic changes. Quality analysis of the literature reviewed yielded a mean score of 8.64, indicating that the RCTs evaluated had an overall acceptable quality

Conclusions:

Good-quality RCTs comparing CXL techniques have been conducted, and most of them suggest that epi-off CXL can be considered the standard treatment for progressive keratoconus. TE-CXL and iontophoresis-assisted CXL are mainly indicated in patients with a risk of corneal scarring and patients with pain intolerance, respectively

Cornea

PP328

Corneal infiltrates as a complication of corneal crosslinking

Presenting author: Emilio José Segovia Maldonado, Spain

Purpose:

To present 2 cases of patients with corneal infiltrates in a series of patients treated for corneal crosslinking in a public hospital over a period of 3 years.

Setting:

Retrospective study

Methods:

47 consecutive patients were studied who underwent corneal crosslinking (epi-off) with an accelerated protocol (30 min, 9 mW / cm² -10 min)

Results:

In our series of cases, there have been 2 cases of corneal infiltrates (4%), one of them presented the lesions 4 days after the procedure, with good response to topical corticosteroid treatment. The second patient presented infiltrates a week after the procedure, with a poor response to topical corticosteroid treatment with the appearance of new lesions suggestive of herpes zoster, for which topical and oral antiviral treatment was established 3 weeks after the procedure with improvement of the lesions. In both cases, the base keratoconus was stabilized, leaving corneal leukoma that did not require new treatments.

Conclusions:

Corneal crosslinking is a treatment with proven efficacy to stop the keratoconus progression, main complications associated are delays in re-epithelialization, infectious keratitis, herpes recurrence, transient edema, haze and sterile infiltrates. In our cases, the first patient would correspond to a sterile infiltrate and the second case a possible recurrence of herpes keratitis (although the patient had no previous history). Sterile corneal infiltrates are rare complications (7-8% of cases according to the series) and the reactivation of herpetic keratitis is even less frequent, but they must be taken into account and suspected in cases of infiltrates that present atypical evolution.

Cornea

PP329

Repeatability of corneal and epithelial thickness maps using spectral domain optical coherence tomography (SD-OCT)

Presenting author: Inese Petrovica, Latvia

Purpose:

To assess repeatability of central and paracentral measurements of corneal thickness (CT) and epithelial thickness (ET) made commercially available spectral domain optical coherence tomography (SD-OCT) system HOCT1 (Huvitz).

Setting:

Methodological study being carried in University of Latvia, Department of Optometry and Vision Science, Latvia according to the tenets of the Declaration of Helsinki.

Methods:

In 80 healthy eyes of 40 subjects corneal CT and ET was evaluated at central sector and 8 paracentral zones from 5.0-6.0 mm diameter using SD-OCT HOCT1 (Huvitz) with light source 840 nm SLD, speed of scanning 68 000 A-scan/sec., and axial resolution 7 μ m, lateral resolution 20 μ m. Repeatability was assessed using intra-subject standard deviation (SD), coefficient of variation (CoV), and one-way inter class coefficient (ICC).

Results:

At the central sector and paracentral zones average intra-subject SD was respectively 7.48 μ m and 9.98-24.12 μ m for CT, 1.90 μ m and 3.29-4.06 μ m for ET. At the central zone CoV (%) was 1.38 for CT, 3.85 for ET, as at the paracentral sectors 1.73-4.06 for CT, 7.74 – 9.97 for ET. ICC values were high for all CT measurements, moderate for central zone ET measurements and low for ET paracentral sector measurements.

Conclusions:

OCT produced good repeatability at central zone for CT measurements and moderate at paracentral sectors for CT measurements. Repeatability was moderate at central zone for ET measurements and poor at paracentral zones for ET measurements.

Cornea

PP330

Conjunctival lymphoma as the first manifestation of systemic lymphoma: A case series.

Presenting author: MARÍA DEL PILAR RODRÍGUEZ MERCHANTE, Spain

Purpose:

To present three case reports of patients who were diagnosed with disseminated hematological disease after a basic examination of the anterior segment of the eye. The three diagnoses were different types of lymphomas with multiorgan involvement.

Setting:

Ophthalmology Department, Fundación Jiménez Díaz Hospital, Madrid, Spain.

Methods:

Best-corrected visual acuity (BCVA). Performed slit-lamp biomicroscopy (SLB). Iconography. Magnetic resonance (MR). Computed tomography (CT). Positron Emission Tomography-CT (PET-CT). Histological study with pathological anatomy.

Results:

The three patients were referred to the ophthalmology department by their hematologists or because they attended the emergency department with erroneous diagnoses of scleritis or chronic conjunctivitis. The BCVA remained at 1.0 (decimal scale) in all examinations. In the SLB, salmon-colored lesions that infiltrated the conjunctiva and / or conjunctiva tarsal were observed. Biopsies were performed in the three patients, in which the diagnosis of suspected conjunctival lymphoma was confirmed. Subsequently, they were referred to hematology or internal doctor for a systematic study in order to establish the systemic involvement.

Conclusions:

In many cases, conjunctival lymphomas are just a manifestation of systemic hematological diseases. For this reason, in patients with recurrent follicular conjunctivitis, large follicles in the tarsal conjunctiva or salmon-colored conjunctival lesions, our therapeutic attitude should be confirm the diagnosis of conjunctival lymphoma. In case of positive anatomo-pathological study for lymphomas, preferential referral of these patients to the hematology and internal medicine service is essential in order to establish the systemic staging of the lymphoma. The prognosis of these lymphomas after chemotherapy treatment is good.

Cornea

PP332

Corneal thickness precision of swept-source optical coherence tomography and Scheimpflug camera imaging in subclinical, mild and advanced keratoconus.

Presenting author: Neus Burguera-Giménez, Spain

Purpose:

To evaluate the interchangeability and the repeatability of pachymetric parameters using two devices with different optical technology in different keratoconus grade without medical treatment.

Setting:

1. FISABIO-Medical Ophthalmology, Valencia. Spain. 2. Optics, Optometry and Vision Sciences department, University of Valencia. Burjassot. Spain.

Methods:

A cross-sectional prospective and non-randomized study in which 52 keratoconic eyes of 52 patients were enrolled. Three consecutive measurements were performed by the same observer using a rotating Scheimpflug camera and an anterior Swept-Source OCT. Central corneal thickness (CCT), apex corneal thickness (APT), thinnest corneal thickness (TCT) and its position (x,y) were analyzed. Eyes were divided based on the topographic keratoconus classification (TKC) from Pentacam HR as subclinical (11 eyes), TKC 1 (16 eyes), TKC 2 (18 eyes) and TKC 3 (7 eyes). The intraclass correlation (ICC), the reproducibility (Sw) and the repeatability (R) were calculated for each group.

Results:

Statistical differences were found in APT and TCT in all groups when mean values were compared in both devices ($p=0.01$). The same tendency was observed, $ICC=0.98$, for subclinical, TKC 1 and 2 over APT and TCT. ICC was 0.98 and 0.91 for APT and TCT in TKC 3 group, respectively. Reliable ICCs (greater than 0.97) in CCT were observed being $ICC=0.89$ in TKC 3 ($p=0.01$). Poor precision in TCT location for 'y' axes (ICC less than 0.76) was found decreasing ICC to 0.554 in advanced keratoconus. Either devices have shown an adequate Sw and R ($p=0.01$).

Conclusions:

Corneal thickness parameters are interchangeable despite the keratoconus severity. However, consistency is reduced in advanced keratoconus due to corneal irregularity, although it may be also due to the small sample. Further investigations are needed to increase accuracy in TCT location.

Cornea

PP333

Evaluation of posterior elevation topographic indices for discriminating among keratoconus, subclinical keratoconus, normal and eyes with high-dioptic power.

Presenting author: Luis García-Onrubia, Spain

Purpose:

To evaluate the features of the posterior corneal surface in keratoconus (KC), subclinical keratoconus (SC), normal corneas (NC) and high-dioptic power eyes (HDPE); and to determine if the topographic posterior elevation indexes allow differentiating these entities.

Setting:

Keratoconus is a progressive corneal ectasia that can cause severe visual impairment. Topographic indexes can assist in early diagnosis, although no single parameter can discriminate between KC, SC, NC and HDPE.

Methods:

Prospective, observational clinical study. This study included one hundred seventy-five eyes of 175 patients, divided into four groups (50 eyes with KC, 25 eyes with SC, 50 normal eyes and 50 HDPE). The Galilei System G4 topographer (Ziemer Group Company, Port, Switzerland) was used to evaluate posterior corneal surface keratometry, posterior corneal asphericity, posterior central curvature, elevation over best-fit toric aspheric body (BFTA), depression below BFTA and total difference between both heights in BFTA. Mann-Whitney U-test was used for evaluating if each variable had different distributions among the groups.

Results:

The mean age and standard deviation (years) of each group were 31 ± 22 in NC, 43 ± 30 in KC, 61 ± 26 in SC, and 32 ± 21 in HDPE. A female predominance (72%) was observed in the SC group, whereas there were no gender differences in others. Statistically significant differences were found in posterior corneal surface parameters between NC and KC ($p < 0.001$), as well as between HDPE and KC ($p < 0.001$), However, no differences between SC and HDPE were found ($P > 0,05$).

Conclusions:

The topographic parameters based on the posterior corneal surface could differentiate between KC and NC or HPDE, but they could be not enough to discriminate between NC and HPDE from SC.

Cornea

PP334

Corneal melting due to hypovitaminosis after bariatric surgery

Presenting author: Marina Rodriguez-Calvo-de-Mora, Spain

Purpose:

We present a case of sterile corneal perforation secondary to hypovitaminosis A in a patient operated on bariatric surgery 7 years prior

Setting:

Tertiary reference center

Methods:

A 50-year-old male patient with poor general condition, hospitalized in the general surgery department due to a Fournier Gangrene is referred to us because of long-standing loss of vision in both eyes. He had a pterygium surgery in the right eye (OD) some months ago. BCVA was 0.001 (+3 LogMAR) OD and 0.05 (+1.30 LogMAR) OS. In the exploration a damaged ocular surface and dense cataract in OU were observed. Besides, corneal perforation of 3x3 mm was observed in the limbal area of the OD, with the protruding iris showing a chronic, epithelized aspect.

Results:

An urgent tectonic keratoplasty plus amniotic membrane transplantation was carried out. In the following weeks, corneal graft was clear, anterior chamber was formed. The pupil was absent, covered by the iris. A bilateral diffuse keratinization of the ocular surface more evident in the OD compatible with Bitot's spots. vitamin A and E serum levels were requested. Both vitamin A and E levels were undetectable (extremely low). The patient started taking supplements and the signs of ocular xerosis showed improvement. Unfortunately, the follow-up could not be carried out because the patient passed away due to a coronavirus-related disease.

Conclusions:

Bariatric surgery is a growing procedure for the treatment of morbid obesity. Changes in the digestive tract make patients more likely to develop deficiencies in vitamins of group A, D, E and K, making malabsorptive symptoms one of the main causes of xerophthalmia in the developed world. Ophthalmologist must be aware of the signs and symptoms real of ocular surface disease secondary to vitamin A disease.

Cornea

PP335

Comparison of Anterior Segment Measurements obtained with Swept-Source Optical Biometry and Scheimpflug-based Topography in eyes with previous refractive surgery - Preliminary results

Presenting author: Panos Gartaganis, Greece

Purpose:

To evaluate the comparability of corneal power measurements, anterior chamber depth (ACD) and white-to-white (WTW) distance between a high resolution Scheimpflug-based topography (Pentacam HR;Oculus GmbH, Wetzlar, Germany) and a swept-source optical biometry (IOL Master 700;Carl Zeiss Meditec AG, Jena, Germany) in patients having undergone a myopic refractive surgery.

Setting:

Department of Ophthalmology, 251 Hellenic Airforce General Hospital, Athens, Greece.

Methods:

This prospective, interinstrument reliability analysis included 31 individuals with a previous myopic Laser refractive correction. Standard K and Total Keratometry (TK[®]) of the flattest and steepest axis of the IOLMaster 700 were compared with standard keratometry (SimK), true net power (TNP), equivalent keratometer readings (EKR) and total corneal refractive power (TCRP) of the Pentacam. The Bland-Altman analysis evaluated the agreement between the measurements of both devices. A paired t-test was performed to compare the mean values of the variables obtained by the two devices.

Results:

Mean age of the participants was 31.87±13.17years. Ten patients (32.3%) had undergone Laser in Situ Keratomileusis (Lasik) surgery and 21 (67.7%) Phorefractive Keratectomy (PRK) surgery. The two devices generated statistically significant differences in almost all the comparisons between their corneal keratometry values, ACD and WTW. The two devices agreed in some of the flat axis values and more specifically on SimK1 and K1, EKR K1 along 1mm-zone and K1, and EKR K1 along 4mm and TK1, as well as on the comparison between the EKR keratometry values along 1,2,3mm-zone with their corresponding TKs.

Conclusions:

IOLMaster 700 and Pentacam HR do not show good concordance and cannot be used interchangeably when measuring keratometry values in post-refractive eyes, rendering the intraocular lens power calculation in post-refractive eyes really challenging.

Cornea

PP336

Femtosecond-assisted (Femto) laser in situ keratomileusis (LASIK): predictability of flap and residual stromal bed thicknesses

Presenting author: Nisa Silva, Portugal

Purpose:

To assess the predictability of flap (FT) and residual stromal bed (RSB) thicknesses measured by anterior segment optical coherence tomography (AS-OCT) in myopic eyes after femtosecond-assisted (Femto) laser in situ keratomileusis (LASIK).

Setting:

Refractive Surgery Unit of Ophthalmology Department of Centro Hospitalar Universitário do Porto, Oporto, Portugal

Methods:

Prospective and observational study. Fifty-one consecutive myopic eyes were submitted to Femto-LASIK (Alcon/WaveLight® FS200) with a programmed FT of 110 μ m. RSB thickness was estimated preoperatively. Flap and RSB thicknesses were measured at postoperative day 3 and 1 month using an AS-OCT scan (SPECTRALIS® Heidelberg Engineering) of the corneal horizontal meridian at three different points (central, temporal, and nasal). Central measurements were performed within 700 μ m from the central cornea, while temporal and nasal measurements were obtained at 700 μ m from the edge of the flap. Intraclass correlation coefficient (ICC) was used to compare preoperatively estimated and postoperatively measured RSB thickness.

Results:

No differences between central FT at day 3 and 1 month were found ($p=0.532$). Mean temporal FT was significantly higher than central ($p=0.001$) and nasal ($p=0.011$) FT, at day 3. At this time point, the mean deviation of the central FT from 110 μ m was 6(0-19) μ m. Mean central RSB thickness was significantly higher at 1 month than at day 3 (391vs381 μ m, $p=0.017$). Mean deviation of the central RSB thickness from the preoperative estimation was 33(8-66) μ m and 30(4-73) μ m at day 3 and 1 month, respectively. Comparing both parameters, ICC was 0.79(95%IC -0.15-0.95) and 0.80(95%IC 0.18-0.93) at day 3 and 1 month, respectively.

Conclusions:

Flap and RSB thicknesses were highly predictable in myopic eyes submitted to Femto-LASIK. The temporal portion of the flap was thicker. There was a good agreement between the preoperatively estimated and postoperatively measured RSB thickness both at day 3 and 1 month after surgery. The RSB thickness was higher 1 month after surgery than in the immediate postoperative period which may be explained by the dehydration/rehydration corneal process.

Cornea**PP337****Corneal epithelial thickness evaluation in primary Sjögren syndrome associated dry eye****Presenting author:** Filipe Gouveia-Moraes, Portugal**Purpose:**

Dry eye disease (DED) is characterized by ocular surface epithelial damage that leads to ocular symptoms and visual acuity impairment. Anterior segment optical coherence tomography (AS-OCT) provides reliable and reproducible epithelial thickness (ET) measurements and has been increasingly used in many ocular diseases. The aim of this study was to evaluate ET before and after treatment of DED.

Setting:

Department of Ophthalmology, Hospital Garcia de Orta E.P.E

Methods:

Prospective study that included women with Sjögren syndrome (SS) associated DED and healthy age-matched controls. Average corneal ET were evaluated using high-definition AS-OCT at the baseline and at the fourth week of treatment with artificial tear. Ocular Surface Disease Index (OSDI), SICCA Ocular Surface Score (SICCA OSS), Schirmer test 1 (ST1), tear break-up time (TBUT) and tear meniscus height (TMH) were evaluated. Correlations between average ET and tear film measurements were assessed. Statistical significance was defined as p-value < 0.05.

Results:

Our study included 40 eyes, 20 with DED. At the baseline, ST1 and TMH were lower in DED group whereas SICCA OSS and OSDI were higher (p<0.01). The superior ET was lower in DED group (p<0.01). After treatment, ST1, TMH, SICCA OSS and OSDI improved and superior epithelium thickened in DED group. No correlations were found between ET and tear film measurements.

Conclusions:

The present study showed that superior epithelium is more prone to damage in DED. Treatment with artificial tear improved ST1, TMH, SICCA-OSS, OSDI score and thickened the superior epithelium. Our results seem to illustrate the morphological changes in corneal epithelium in DED which could be further recognized as a clinical indicator of DED.

Cornea

PP338

Phenotypic and genotypic correlation in a family with cryopyrin-associated periodic syndrome.

Presenting author: Claudia Azpitarte, Spain

Purpose:

To present a family of 3 patients (mother and siblings) with cryopyrin-associated periodic syndrome (CAPS) and NLRP3 mutation. The disease was diagnosed and suspected after ophthalmic evaluation.

Setting:

Ophthalmology Department, University Hospital Fundacion Jimenez Diaz Hospital, Madrid, Spain.

Methods:

We present biomicroscopy images, confocal images and genetic results of the three patients. Cryopyrin-associated periodic syndromes (CAPS) are a group of autosomal dominant genetic autoinflammatory diseases in which a mutation in the NLRP3 gene encoding cryopyrin is the main alteration. NLRP3 inflammasome is a complex implicated in the innate response. The mutation in this gene is responsible for the activation of the inflammasome which releases IL-1 BETA and IL-18 being responsible for the disease symptoms. Ocular alterations are frequent. We describe a family with CAPS and confirmed mutation of NLRP3 gene. They were followed-up for 5 years.

Results:

We report a family of mother (54-years-old) and two siblings (24 and 22-years-old) who, since youth, had red eye diagnosed as conjunctivitis and unilateral anterior uveitis (UAA). The 24 years-old sibling had less ocular and systemic symptomatology. Cutaneous rash and arthralgia which worsened with cold were associated weekly. Blood tests revealed acute phase reactants elevation. Biomicroscopy demonstrated corneal alterations: the 24 years-old sibling had reticulated-mild stromal changes without significant opacification. The other 2 patients had reticulated mild stromal changes with central corneal opacification and calcification band-like images. The genetic test revealed the mutation. Anakinra was initiated and corneal alterations disappeared.

Conclusions:

The single amino acid substitution of p.R260W mutation induces the activation of the NLRP3 inflammasome. It is associated with red eye, rash and joint pain. Depending on the severity of the mutation, patients may appear with more or less symptoms like the 24 years-old patient. Patients can present with UAA, conjunctivitis and papillitis. The disease needs to be suspected to make a diagnose. Patients should be treated with IL-1 blocking agents early to prevent corneal non-reversible opacification and loss of vision. Further multicentrically studies need to be performed to acknowledge the best treatment to prevent permanent ocular sequelae.

Cornea

PP339

One disease but different names: Fuch's Superficial Marginal Keratitis and Terrien Marginal Degeneration.

Presenting author: Maggie Ezugbaya, Russian Federation

Purpose:

To determine diagnostic criteria for Terrien disease and Fuch's superficial marginal keratitis, to identify their similarities and differences.

Setting:

Ophthalmology Department. Academician I.P. Pavlov First Saint Petersburg State Medical University of the Ministry of Healthcare of Russia.

Methods:

For the period from 2017 to 2020, 40 patients were examined; they were divided into 3 groups: 30 patients with Terrien marginal degeneration, 7 patients with Fuch's superficial marginal keratitis, 3 patients with signs of Terrien marginal degeneration in one eye and typical manifestations of Fuch's superficial marginal keratitis in the other eye. Apart from routine ophthalmologic examination, following methods were used for diagnosis: confocal microscopy, optical coherence tomography of the anterior segment, keratotopography.

Results:

A study of 40 patients' data revealed many common clinical signs of two diseases previously considered as separate conditions. According to the literature, it is known that the main difference between these two diseases is the localization of corneal lesions. We discovered that different lesion's localization in Terrien degeneration and superficial marginal Fuchs keratitis is present merely in some patients, and only early in the course of both diseases.

Conclusions:

Terrien's degeneration and Fuch's superficial marginal keratitis may both represent different variants of clinical manifestations or different stages of progression of the same disease. Since the etiology of Terrien's degeneration and Fuch's superficial marginal keratitis had not yet been established, it is recommended to more strictly follow the clinical course of the diseases during treatment, as they need different clinical approaches.

Cornea

PP340

Efficacy of a New Tear Substitute Containing Hyaluronic Acid and a Low Dose of Hydrocortisone in Dry Eye Disease

Presenting author: Stefano Barabino, Italy

Purpose:

To evaluate the effect of a new tear substitute containing hyaluronic acid (HA) and a low dose (0.001%) of hydrocortisone in patients with dry eye disease in a randomized, double-masked pilot study.

Setting:

Sacco Hospital, University of Milan, Milan, Italy

Methods:

Treatment outcomes were assessed by SANDE questionnaire, Schirmer I test, tear BUT, conjunctival staining by using a new formulation of liquid lissamine green, and fluorescein corneal staining (baseline, day 7, 28, 90). Immune cells (CD45+, CD14+, CD4+, CD8+) were detected by impression cytology and flow cytometry at baseline and day 28. All patients (n=40) received fluorometholone eye drops bid for one week. The study group used the new tear substitute (Idroflog, Alfa Intes, Italy) bid for one week and qid for three weeks; the control group used HA alone with the same regimen. IOP was recorded at all time points.

Results:

Severity and frequency of symptoms were improved in both groups at day 7, 28, 90. Fluorescein and liquid lissamine green staining were significantly decreased at day 30 and 90 in the study group respect to the control ($p \leq 0.05$). Significant improvements were recorded in the study group for Schirmer test and BUT at day 90. While CD45+ cells were decreased in both groups, CD14+ cells and the CD4/CD8 ratio significantly decreased in the study group only ($p \leq 0.05$). None of the treated eyes showed significant increase in IOP at day 28 and 90.

Conclusions:

The results show the efficacy of a new a tear substitute to improve signs of dry eye, and to control inflammation over time. Further results are expected at a longer follow up (6 months), but the importance of chronic use of tear substitutes containing low percentage of steroids in dry eye seems to be demonstrated.

Cornea

PP341

Fine needle diathermy or subconjunctival injection of anti-VEGF in the treatment of corneal vessels

Presenting author: Salma Chikhaoui, Morocco

Purpose:

Compare the efficacy of subconjugal injections of anti-VEGF with that of fine needle electrocoagulation in the treatment of corneal neo-vessels.

Setting:

Department of Ophthalmology, 20 August hospital Ibn Rochd, Casablanca. Morocco.

Methods:

We conducted a prospective comparative study in our department approved by the hospital's ethics committee. Ninety patients were included in this study, all of whom had corneal vessels on a stromal scar following a treated corneal abscess that we decided to take in order to prepare them for a possible corneal transplant. Patients were randomly divided into three groups of 30 patients: the first group received subconjunctival injections of Bevacizumab (0.1ml of a concentration of Bevacizumab at 25 mg /mL at one month interval), the second a fine needle electrocoagulation, and the third group a combination of the two treatments.

Results:

The corrected initial visual acuity of our patients ranged from 2/10 fingers, 54 patients (60%) had neovascularization of the two lower quadrants of the cornea, 36 of them or 40% had superficial corneal vessels. For the patients who received subconjunctival injections of bevacizumab, we noted a maximal regression of the neovessels in 12 patients,40% of the cases. Regarding the second group treated by fine needle electrocoagulation,18 cases(60%) had a favorable response to the treatment with disappearance of the neovascularization, for the last group that received the combination of the two treatments, we noted 24 cases (80%) of correct response.

Conclusions:

The treatment of corneal neovascular diseases has long been controversial and the advent of new anti-angiogenic molecules has revolutionized their management. However, their efficacy remains limited to the acute phase with hyper-expression of VEGF.

Cornea

PP342

Neonatal Type-2 Herpes Simplex Blepharokeratoconjunctivitis After Cesarean Delivery: Diagnosis and Management

Presenting author: Jeniffer Jesus, Portugal

Purpose:

To describe the presentation signs, diagnosis, and management of an isolated type-2 Herpes Simplex Virus (HSV) ocular unilateral infection in a neonate born by cesarean delivery in the absence of clinical maternal genital signs, symptoms, and history of known contact with an infected partner.

Setting:

Ophthalmology Department, Centro Hospitalar Entre o Douro e Vouga, Santa Maria da Feira, Portugal

Methods:

Retrospective case report about a 40-week girl who was born by cesarian delivery and developed on the 15th day after birth mucopurulent discharge in the Left Eye (LE). Due to the Coronavirus pandemic, she presented via teleconsulting in her General Practice Doctor. She was medicated with topical gentamicin. The clinical condition worsened and three days after she presented to Ophthalmology Emergency Department. At presentation, there was significant blepharoconjunctivitis with cornea epithelial defect. She was medicated with topic azithromycin, gel drops, and eyelid hygiene. Five days after, blepharitis and epithelial defect resolved, but cornea opacification became worse, with perilimbal neovascularization appearance.

Results:

The newborn was admitted to Pediatric Department to initiate intravenous acyclovir plus topic dexamethasone. The polymerase chain reaction was positive for type-2 HSV and maternal serologies confirmed the diagnosis. With the treatment, there was a complete regression of neovascularization, but the central corneal scar persisted. The patient developed LE esotropia. She was discharged with a treatment regimen of oral acyclovir, topic cyclopentolate plus preservative-free hydrocortisone tapering in the LE, and occlusion therapy in the Right Eye. At age of 11 months, she remains without recurrences, but maintains LE esotropia, despite the improvement in the LE fixation and corneal scar.

Conclusions:

Because of the rarity of congenital Type-2 HSV keratitis after cesarean delivery, this case highlights the importance to include HSV in the differential diagnosis of any neonatal blepharoconjunctivitis, mainly in the first 30 days of life, when nonspecific discharge is observed, especially in those who do not improve after initial treatment. A high level of suspicion is necessary to prompt recognition of Type-2 HSV in a neonate, mainly in the absence of clinical maternal history and even after cesarean delivery. An appropriate and early treatment is mandatory to prevent corneal scarring which can lead to deprivation and amblyopia.

Cornea

PP343

New application of Schirmer test for salivary and lacrimal glands hypofunction in non-Sjögren patients

Presenting author: Dominika Wróbel-Dudzińska, Poland

Purpose:

The aim of this study was to first demonstrate an successful application of the modified Schirmer tests for salivary gland hypofunction. Subsequently, to compare and correlate the results achieved from the eye Schirmer test and modified Schirmer tests in non-Sjögren patients.

Setting:

This new approach to use Schirmer test was carried in Department of Diagnostics and Microsurgery of Glaucoma, Medical University of Lublin, Poland.

Methods:

Study group consisted of 642 patients with or without subjective or/and objective symptoms of dry eye or mouth who did not fulfil the criteria for diagnosis of Sjögren syndrome. Patients were divided on the basis of history and examination into the different groups. The eye Schirmer test (ST) and the modified Schirmer tests were performed (MST1 was put on the floor of the mouth, MST2 in front of the parotid gland duct). The results were recorded after 1 minute (MST1a), 3 minutes (MST1b, MST2) and 5 minutes (ST).

Results:

The eye ST and modified Schirmer tests scores were considerably higher in the healthy group than in other, ($p < 0,001$ for each group combinations). Similarly, the results of MST1a, MST1b and MST2 decreased with the appearance of subjective and objective symptoms, $p < 0,001$. The differences between the results obtained by ST and MSTs between the groups were highly significant ($p < 0,001$). There were positive correlations between ST and MST, MST1a and MST1b outcomes between the groups, ($p < 0,001$).

Conclusions:

This is the first report comparing the Schirmer test results in eye and mouth simultaneously performed in non-Sjögren symptomatic patients vs asymptomatic healthy individuals. According to the achieved results, the modified Schirmer tests seem to be rapid, convenient and reliable objective screening tools for salivary gland hypofunction in non-Sjögren patients.

Cornea

PP344

Topical insulin treatment for epithelial defects in patients with severe dry eye disease and neurotrophic keratitis.

Presenting author: Sara Fathi Nieto, Spain

Purpose:

To evaluate topical insulin treatment in patients with epithelial defects because of severe dry eye disease and neurotrophic keratitis, who had not responded to conventional treatment.

Setting:

The study was done at Hospital La Fe, Valencia, Spain.

Methods:

We performed a prospective non-randomized hospital-based study. Patients undergoing topical treatment with insulin eye drops four times a day to treat persistent epithelial defects due to severe dry eye disease and neurotrophic keratitis. The healing rate of the epithelial defect was evaluated as well as the decrease in its size.

Results:

Twenty patients were treated with insulin eye drops four times a day. They had persistent epithelial defects refractory to multiple medical treatments, including artificial tears, bandage contact lens, autologous serum, 0.1% cyclosporine A and plasma rich in growth factors (PRGF-Endoret). Each patient was date for checking at a week, at 15 days and at a month, with complete corneal re-epithelialization within 7 to 30 days.

Conclusions:

Insulin eye drops can be a good treatment for patients with persistent epithelial defects despite using conventional treatment. It promotes corneal re-epithelialization and healing. In addition to re-epithelialization and healing, this treatment is tolerated very acceptable manner, with few adverse effects; it is not as expensive as other treatments and its production is not very complicated, having good availability.

Cornea

PP345

Profiling the Ocular Surface Microbiome through Tears in Healthy Contact Lens Wearers and Non-Contact Lens Wearers

Presenting author: Arthur Okonkwo, United Kingdom

Purpose:

To assess if bacterial material can be sequenced from human tears using 16S ribosomal RNA gene sequencing. To investigate potential ocular surface distinct composition induced by soft contact lenses, in those without eye disease.

Setting:

4 million in the UK wear soft contact lenses. Contact lens related keratitis occurs in 1/500/year causing visual loss in 20%. Contact lens related keratitis has distinct microbiology, higher levels of *Pseudomonas aeruginosa*, this may be due to a distinct

Methods:

Tear fluid was collected from patients at a slit lamp using a polymerase chain reaction sterile 5µl capillary tube transferred on ice and stored at -80 degrees centigrade. DNA was extracted from samples, the V4 region of the 16S ribosomal rRNA gene was amplified and sequenced using the Illumina MiSeq platform. Sequence data were analysed using the Quantitative Insights Into Microbial Ecology (QIIME 2) platform and tests for alpha diversity, beta diversity and differential relative abundance were performed. Ethics approval was obtained from The University of Manchester, UK, Research Ethics Committee.

Results:

Five lens wearers (median age 30, range 21-35) and five non-lens wearers (median age 29, range 23-34) were recruited. *Staphylococcus* (23.2% in non-lens wearers and 20.8% in lens wearers) and *Propionibacterium* species (8.1% in non-lens wearers and 4.7% in lens wearers) had the highest relative abundance in both groups. *Escherichia*, *Megasphaera*, and *Dermacoccus* were identified in contact lens wearers only. Median *Pseudomonas* abundance in lens wearers was 4.5% and 2.2% in non-contact lens wearers. A single *Pseudomonas* operational taxonomic unit (OTU) was found to be significantly higher ($P < 0.05$) in lens wearers. No difference was found in alpha or beta diversity.

Conclusions:

Bacteria can be sequenced from tears in healthy volunteers; skin microbiota such as *Staphylococcus* and *Propionibacterium* are most commonly detected, similar to those found in conjunctival swabs in other studies. *Escherichia*, *Megasphaera*, and *Dermacoccus* species were found only in lens wearers, these commonly occur in the gut, vagina and skin, respectively. *Pseudomonas* species may represent a larger proportion of the microbiome in contact lens wearers; therefore, this study will be run on a larger scale looking for significance. High through-put sequencing represents detectable DNA rather than viability; however, it will help future understanding and prevention of contact lens related keratitis.

Cornea**PP346****Tear film cytokine profile of patients with the Boston keratoprosthesis type 1 with and without glaucoma****Presenting author:** Dominique Geoffrion, Canada**Purpose:**

Inflammatory cytokines are involved in glaucoma pathogenesis. The purpose is to compare cytokine levels in the tear film of Boston keratoprosthesis (KPro) patients with and without glaucoma, relative to controls, and correlate levels with clinical parameters.

Setting:

Centre hospitalier de l'Université de Montréal, Montreal (Quebec), Canada

Methods:

This cross-sectional study enrolled 58 eyes (58 patients): 41 KPro eyes with glaucoma, 7 KPro eyes without glaucoma, and 10 healthy controls. Tear samples were collected from all patients by micropipette following saline instillation. Levels of 27 cytokines were measured by multiplex bead immunoassay. Intraocular pressure (IOP), cup-to-disk ratio (CDR), retinal nerve fiber layer, visual acuity, topical medications, and angle closure were assessed in all KPro eyes. Cytokine levels between groups were analyzed by non-parametric tests, and correlations with clinical parameters by Spearman's test.

Results:

Levels of TNF- α , IL-1 β , FGF-basic, IFN- γ were significantly higher in KPro with glaucoma compared to KPro without ($P=0.020$; 0.008 ; 0.043 ; 0.018 , respectively). KPro groups had similar characteristics and topical antibiotic/steroid regimen. Levels of IL-1Ra, IL-15, VEGF, RANTES were significantly higher in KPro with glaucoma compared to controls ($P<0.001$; 0.034 ; <0.001 ; 0.001 , respectively). IL-1 β and IFN- γ levels were positively correlated with CDR ($r=0.309$, $P=0.039$ and $r=0.452$, $P=0.006$, respectively) and IOP ($r=0.292$, $P=0.047$ and $r=0.368$, $P=0.023$, respectively). TNF- α and FGF-basic levels were positively correlated with CDR ($r=0.348$, $P=0.022$ and $r=0.344$, $P=0.021$, respectively).

Conclusions:

TNF- α , IL-1 β , FGF-basic, IFN- γ are elevated in tears of KPro patients with glaucoma and correlate with CDR and IOP. These results show, for the first time in humans, concordance with documented elevations of TNF- α and IL-1 β in murine KPro model. Ocular surface inflammation may reflect inflammatory processes of KPro glaucoma.

Cornea

PP347

Descemet Membrane Endothelial Keratoplasty Versus Descemet Stripping Automated Endothelial Keratoplasty in Aphakic or Aniridic Eyes

Presenting author: Michael Mimouni, Canada

Purpose:

Aphakia and/or aniridia pose a technical challenge when performing endothelial keratoplasty (EK). The aim of the study was to compare outcomes of Descemet membrane endothelial keratoplasty (DMEK) and Descemet stripping automated endothelial keratoplasty (DSAEK) in eyes with aphakia and/or aniridia.

Setting:

Tertiary Care Center

Methods:

This retrospective study included consecutive eyes that underwent DMEK or DSAEK which underwent EK at a tertiary center. Included were eyes with aphakia and/or aniridia at the time of surgery with at least 1-year follow-up. The main outcomes measures were best-corrected visual acuity (BCVA) and serious adverse events.

Results:

Twenty-nine eyes (n=29) with a mean follow-up time of 45.6±34.1 months were included. The DMEK group (n=10) and DSAEK group (n=19) were of similar age (p=0.17), gender (p=0.89), aphakia status (p=0.15), aniridia status (p=0.49) and baseline logMAR BCVA (1.63±0.69 versus 1.60±0.73, p=0.91). At last follow-up the DSAEK group had better logMAR BCVA (1.30 versus 2.00, p=0.04) and at one year 15.8% of the DSAEK grafts failed compared to 80.0% of the DMEK grafts (p=0.001). Furthermore, at the last visit, 52.6% of the DSAEK grafts failed compared to 100% of the DMEK grafts.

Conclusions:

The results of this study indicate superior results with DSAEK compared with DMEK for aphakic and/or aniridic eyes requiring endothelial keratoplasty.

Cornea

PP348

Morphological characteristics of cornea in eyes with pseudophakic bullous keratopathy and Fuchs endothelial corneal dystrophy

Presenting author: Natalia Fisenko, Russian Federation

Purpose:

To evaluate the morphological structure of the posterior corneal layers in pseudophakic bullous keratopathy (PBK) and Fuchs endothelial corneal dystrophy (FECD)

Setting:

Research Institute of Eye Diseases, 11 A,B, Rossolimo St., 119021 Moscow, Russian Federation;
Federal State Autonomous Educational Institution of Higher Education I.M. Sechenov First Moscow State Medical University of the Ministry of Health of the Russian

Methods:

The study included 20 patients (20 eyes) aged 73.8 ± 7.8 with PBK and 24 patients (25 eyes) aged 72.5 ± 10.6 with FECD. Central corneal thickness was measured in all eyes before the surgery by anterior segment optical coherence tomography (AS-OCT, RTVue-100, Optovue, USA). All patients underwent corneal transplantation (DMEK/DSAEK). The postoperative donor graft status was assessed as attached or detached by AS-OCT (RTVue-100, Optovue, USA). Intraoperatively obtained recipients' Descemet's membranes (DMs) were investigated histologically (hematoxylin/eosin staining). Morphometric analysis was performed at the light microscope level (Leica DM-2500, Digital Color Camera Leica DFC295, ImageScope M).

Results:

There was no difference in thickness of DM' prenatal anterior banded layer ($2.58 \pm 0.49 \mu\text{m}$) and postnatal posterior non-banded layer ($11.30 \pm 2.64 \mu\text{m}$) between PBK and normal adult cornea. In FECD eyes DM was significantly thickened due to additional collagen layer and guttate excrescences (postnatal layer thickness – $16.62 \pm 4.34 \mu\text{m}$). Regarding histologic investigation, residual recipient' stromal collagen fibrils remained fixed to intrafacial matrix (IFM) of DM in five cases. One of them underwent DSAEK followed by complete graft attachment. The rest of these cases involved partial DMEK graft detachment and required 20% sulfur hexafluoride anterior chamber rebubbling procedures performed on 6 ± 3 days.

Conclusions:

Chronic corneal edema is associated with different morphological changes of the posterior corneal layers in PBK and FECD. Individual recipients' variations in IFM structure may play a key role in attachment of donor graft to the corneal stroma and affect the postoperative outcome, especially of DMEK cases.

Cornea**PP349****Long-term outcome of same-day split corneal transplantation in Hong Kong****Presenting author:** Tiffany Lok Man Yeung, Hong Kong**Purpose:**

The COVID-19 pandemic has affected corneal tissue supply and increased the already long waiting time for patients requiring a transplant. Hereby we report the long-term clinical outcome of split corneal transplantation, used for anterior lamellar keratoplasty (ALK) on patients with anterior stromal disease (e.g. infective corneal scarring, dermoid or thinning) and for Descemet stripping automated endothelial keratoplasty (DSAEK) on those with endothelial dysfunction (e.g. Fuchs endothelial dystrophy, pseudophakic bullous keratopathy or fail penetrating keratoplasty).

Setting:

Department of Ophthalmology, United Christian Hospital, Hong Kong

Methods:

This is a retrospective case series conducted at a single eye-center in Hong Kong. Split-donor corneas transplanted between Jan 2012 to Dec 2013 were evaluated. In split-corneal transplantation, the anterior lamellar was used for ALK whilst the posterior lamellar for DSAEK. All grafts were precut by Lions Eye Bank of Hong Kong. Each split cornea graft was utilized either on the same day or within 24 hours. DSAEK was performed first to reduce endothelial cell loss through storage. The outcome measures were best corrected visual acuity (BCVA) in decimal notation, endothelial cell count (ECC) loss, graft rejection rate, and complications.

Results:

Twelve donor grafts were used (12 ALK, 12 DSAEK) in 24 eyes (M11:F13, mean age 63.6±17.6). Mean follow-up was 79.2±31 months in ALK, 94.8±13.9 months in DSAEK. In ALK group, mean BCVA improved from 0.17 (±0.19) to 0.25 (±0.28) at 5-year and 0.18 (±0.23) at 8-year. In DSAEK group, mean BCVA improved from 0.15 (±0.198) to 0.31 (±0.23) at 5-year and 0.44 (±0.3) at 8-year. One ALK and 2 DSAEK required re-bubbling. ECC loss in DSAEK group was 48.5% at 1-year and 71% at 5-year. 83% ALK and 75% DSAEK graft remained clear at latest follow-up. No intraocular infection occurred.

Conclusions:

With appropriate patient selection, split cornea transplantation for ALK and DSAEK can be performed safely on two recipients within 24 hours. Such techniques are helpful in countries where there are shortages of donor corneal tissue. It is particularly important now to help reducing the long waiting time for patients needing a transplant as well as relieving pressure from eye banks with the aftermath of COVID-19 pandemic, where tissue donation and supply can be affected.

Cornea

PP350

International survey of corneal surgeons' attitudes regarding keratoplasty rejection risk associated with vaccinations

Presenting author: David Lockington, United Kingdom

Purpose:

To investigate the attitudes and practice of corneal specialists if keratoplasty patients sought advice regarding common vaccinations and risk of potential graft rejection.

Setting:

International online survey of corneal specialists actively involved in corneal transplantation.

Methods:

An online questionnaire was posted on the Kera-net listserv and the EuCornea website in early 2020. Attitudes towards vaccinations and keratoplasty were obtained. Decision making for common keratoplasty (EK, DALK, PK) scenarios at early and late time points were explored regarding the herpes zoster and influenza vaccines.

Results:

There were 142 respondents. 51.1% specifically advise their keratoplasty patients to get all vaccinations. 19.7% stated clinical experience of vaccine-associated rejection episodes; 42.2% were unaware of any. 64% (27/42) would recommend delay if <3 months of transplant surgery, or recent corneal infection, or recent rejection. The 2245 total responses to 18 clinical scenarios demonstrated wide variability in management of grafts in the setting of vaccination. Generally, 45.9% would not alter management, 26.2% would increase frequency of topical steroids and 22.2% would recommend delay to vaccinations. Increased concern was expressed with recent surgery, live zoster vaccine and higher-risk PK scenarios.

Conclusions:

Nearly half of the respondents do not alter management in the setting of keratoplasty and zoster and/or influenza vaccinations. Anecdotal rejection episodes possibly associated with vaccinations were reported by some. Vaccine-related rejection has not been shown in higher-level research, but that has not eliminated clinical concerns. Prospective research into the true vaccine-related risks in keratoplasty is necessary if evidence-based management guidelines are to be developed, or reassurance provided.

Cornea

PP351

Retroprosthetic Membrane Formation in Boston Keratoprosthesis Type 1: Incidence, Predisposing Factors, Complications and Treatment.

Presenting author: Diana Khair, Canada

Purpose:

To evaluate the incidence, rate of formation, and risk factors of retroprosthetic membrane (RPM), after Boston type 1 Keratoprosthesis (BKPro) as well as identify secondary complications linked to its formation and describe its treatment.

Setting:

Tertiary hospital center in Montréal, Canada.

Methods:

133 eyes of 115 patients who underwent BKPro implantation at the Centre Hospitalier de l'Université de Montréal from 2008 to 2017 were included, with at least 1 year follow-up. Charts were reviewed and deidentified data was collected, including incidence of RPM formation, pre-operative and intra-operative risk factors, postoperative complications and treatment modalities.

Results:

Mean follow-up was 5.5 years and 45.2% of eyes developed RPM. A lower incidence of RPM occurred in eyes with endothelial diseases (OR= 0.3923, p= 0.0489). Simultaneous lensectomy and simultaneous IOL extraction were respectively positively and negatively correlated with RPM development (OR: 0.359, p= 0.0097; OR=2.646, 95%, p=0.0086, respectively). As for post-operative complications, the strongest correlation was between RPM and retinal detachment (RD) (OR= 6.16, p= 0.0004). RPM development was also positively associated with the development of hypotony and corneal melt. Nd:YAG capsulotomy was the most common treatment with 58% resolution.

Conclusions:

Almost half of patients who undergo BKPro will develop RPM post-operatively. Endothelial disease and simultaneous IOL extraction seem protective, while simultaneous lens extraction increases the rate of RPM formation significantly. Performing a cataract extraction at an earlier stage may decrease the rate of RPM formation since cataract extraction is known to acutely increase proinflammatory markers. Also, retinal detachment is the strongest correlated complication with RPM development. As such, any patient developing RPM requires close monitoring for RD. Nd:YAG capsulotomy can be used as an initial non-invasive approach with close follow up monitoring for RD development.

Cornea

PP352

Long-term Outcomes of Boston Type I Keratoprosthesis versus Penetrating Keratoplasty After a Single Failed Corneal Graft

Presenting author: Diana Khair, Canada

Purpose:

To compare long term outcomes of the Boston type I keratoprosthesis (KPro) and penetrating keratoplasty (PKP) in patients with a single failed first corneal graft.

Setting:

Tertiary hospital center in Montreal, Canada

Methods:

106 eyes of 102 patients who underwent a second corneal replacement procedure after a first failed graft at the Centre Hospitalier de l'Université de Montréal from 2008 to 2020 were included. Minimum follow-up duration was 1 year. Charts were reviewed and deidentified data was collected including baseline characteristics, preoperative visual acuity and comorbidities, postoperative visual outcomes, postoperative complication rates, graft survival and subsequent interventions.

Results:

72 eyes received a PKP and 34 eyes a KPro with a mean follow-up of 4.3 years and 7.7 years, respectively ($p < 0.001$). Improvement from preoperative BCVA was significantly higher for KPro at 6 and 12 months. Survival analyses demonstrated that both groups maintained 20/200 and preoperative vision for similar lengths of time. Most complications were equally prevalent in both groups. Glaucoma worsening, glaucoma surgery, and hypotony were more frequent in KPro. Graft failure and reoperation rates were significantly higher in the PKP group (31.9% vs 8.8%). The glaucoma subgroup analysis also showed similar visual outcomes in both groups.

Conclusions:

Both interventions provided similar long-term visual results. Worsening glaucoma, glaucoma surgery and hypotony were more frequent in the KPro group, while all other complications were comparable between groups. Failure and reintervention rates were significantly higher in the PKP group. In patients with preoperative glaucoma, glaucoma progression and visual outcomes were similar in both groups

Cornea

PP353

Treatment of neovascularized cornea by aflibercept versus ranibizumab injection prior to penetrating keratoplasty

Presenting author: Ghada Samir, Egypt

Purpose:

Comparing the effect of aflibercept to ranibizumab injection for improving the prognosis of penetrating keratoplasty in high risk corneal transplantation with corneal vascularization

Setting:

Memorial institute of ophthalmic researches - El Hayat eye hospital

Methods:

Fifty eyes of 50 patients with opaque vascularized cornea were included in this study, divided into two groups: Group A (25 eyes) received aflibercept (2 mg/ 0.05ml) , Group B (25 eyes) received ranibizumab (1 mg/ 0.1 ml) . All patients were injected two weeks before PKP through subconjunctival and perlimbal route at the affected quadrant and followed up monthly for 18 months. Primary Outcome was the number of participants with clear graft at 18th month. Secondary outcome was the state of neovascularization before and after intervention that was determined by comparing size, number of vessels and number of affected quadrants.

Results:

Group A, the preoperative corneal NV area ($8.73 \pm 4.32\%$) was significantly decreased to ($6.34 \pm 3.0\%$) two weeks after the injection ($p = 0.011$). In group B, the NV area also exhibited significant change, from ($7.38 \pm 4.31\%$) to ($6.71 \pm 4.15\%$) ($p = 0.012$). The mean decrease in corneal NV area two weeks after injection in group A ($28.3 \pm 9.0\%$) was significantly higher than in group B ($4.50 \pm 11.65\%$, $p = 0.001$). The number of clear grafts at 18th month are 22 grafts (88%) in group A, and 19 grafts (76%) in group B.

Conclusions:

Aflibercept injection resulted in a more effective regression of corneal NV in comparison with the ranibizumab injection. Aflibercept increased corneal graft survival and was more effective in decreasing and preventing neovascularization than Ranibizumab.

Cornea

PP354

Corneal neovascularization following deep anterior lamellar keratoplasty for corneal ectasia: Incidence, timing and risk factors.

Presenting author: Riccardo Dondi, Italy

Purpose:

The purpose of this study was to evaluate the incidence, timing and risk factors of corneal neovascularization (NV) after deep anterior lamellar keratoplasty (DALK) for corneal ectasia.

Setting:

Tertiary Care Referral Center, Ospedali Privati Forlì "Villa Igea", Forlì, Italy; Department of Ophthalmology, Magna Graecia University of Catanzaro, Catanzaro, Italy.

Methods:

This study included 616 eyes who underwent DALK between 2012 and 2020 in two tertiary referral centers. In one center topical corticosteroids were discontinued after complete suture removal 1 year after surgery, whereas in the other they were discontinued 3 to 4 months after surgery. The presence and severity of corneal NV was ascertained based on slit lamp photographs. Potential risk factors for corneal NV were evaluated using the Cox proportional hazards model.

Results:

The cumulative incidence of corneal NV was 8.7% at 1 year after surgery and 13.2% at 5 years. Mean time interval from surgery to development of corneal NV was 12.8 ± 16.2 months, with 68.9% of cases occurring before complete suture removal. Early discontinuation of topical steroids, older age and atopy were associated with an increased risk of developing corneal NV (respectively, HR = 2.392, HR = 1.015, HR = 2.607, all $p < 0.05$).

Conclusions:

The risk of corneal NV is higher in the first year following DALK. Early discontinuation of topical steroids, atopy and older age are significant predictors of cornea NV.

Cornea

PP355

Keratoplasty for herpetic disease: Results from a tertiary center

Presenting author: Catarina Xavier, Portugal

Purpose:

Herpetic keratitis is a major cause of corneal scarring and consequent visual loss in developed countries. Penetrating keratoplasty (PK) may be undertaken to visually rehabilitate patients, however, attributed to the recurrence of herpetic eye disease in the graft and increased risk of graft rejection, graft survival in these patients remains lower than that of other common corneal conditions. The purpose of this study was to evaluate the outcome of PK in patients with herpetic keratitis in our institution.

Setting:

A retrospective longitudinal cohort study in a tertiary centre of ophthalmology in Lisbon.

Methods:

Eyes who underwent PK to treat herpetic keratitis complications/sequelae (first intervention or re-transplantation) between January 2016 and December 2019 were included in the study. We collected data present in the patients' medical records (from their 1st PK until the end of August 2020) regarding the cause for PKs, complications, recurrence, and rejection episodes of each PK performed in each eye. A total of 23 eyes were included in the study. The mean age of patients at the time of the 1st PK was 56,55 years.

Results:

The cause of the 1st PK for each patient was leukoma in 78,3% and corneal perforation in 21,7%. 12 patients underwent a 2nd PK, 50% due to recurrent disease, 33,3% related to an episode of graft rejection, 8,3% due to primary graft failure, and 8,3% after graft failure post cataract surgery. The analysis of the recurrence rate showed that it was 34,8% in the 1st graft, 41,6% in the 2nd graft, and 50% in the 3rd graft. 26,1% of the first grafts had at least one rejection episode, as well 41,67% of the 2nd grafts.

Conclusions:

Rates of graft rejection and recurrence of herpetic keratitis after corneal transplantation have been reported to be 19-46% and 32-47%, respectively, in various studies, which is in line with our results. Herpetic keratitis is a common indication for corneal transplantation but carries an increased risk of graft failure.

Cornea

PP356

Swept-source OCT for corneal graft quantitative evaluation and correlations with the pre-excision measurements

Presenting author: Bartłomiej Kaluzny, Poland

Purpose:

Quantitative evaluation of the human corneal grafts stored in the tissue banks is usually limited to endothelial cell density and central thickness. Swept-source OCT (SS OCT) is capable of measuring the central curvatures of the corneal tissue prepared for transplantation without loss of sterility, providing insights on its refractive state. The aim of the paper is to verify in vitro SS OCT measurements with pre-excision values.

Setting:

Division of Ophthalmology and Optometry, Department of Ophthalmology, Collegium Medicum, Nicolaus Copernicus University

Methods:

Hand-held keratometry and ultrasound pachymetry was performed on 23 corneas before excision of corneoscleral button and insertion in the vial with Eusol-C solution (Alchimia S.r.l, Nicolò, Italy). After 12 to 36 hours of hypothermic storage the corneas were examined within the vials with custom built SS OCT system maintaining a sterile environment. The anterior and posterior central curvatures, and central thickness were measured. Rotation of the corneoscleral button was controlled by making a 6-o'clock mark during excision.

Results:

Mean pre-excision central corneal thickness was 628.36 ± 23.55 and 505.33 ± 52.85 μm when measured with SS OCT ($p < 0.001$). Respective values for average keratometry and anterior curvature in vitro were 7.74 ± 0.39 and 7.65 ± 0.54 μm ($p > 0.05$). Although high differences were observed in corneal thickness, anterior curvature and corneal anterior astigmatism showed good correlation with pre-excision values.

Conclusions:

SS OCT is capable of providing quantitative evaluation of the human corneal grafts in hypothermic storage. Good correlation between curvature measurements before excision and during banking in the vial indicates its clinical utility.

Cornea

PP357

Outcomes of Descemet's membrane endothelial keratoplasty for corneal endothelial failure secondary to phakic intraocular lens – retrospective study

Presenting author: Nuno Moura-Coelho, Spain

Purpose:

To analyze the outcomes of Descemet's membrane endothelial keratoplasty (DMEK) for the indication of corneal endothelial failure secondary to phakic intraocular lens implantation (PIOL).

Setting:

Instituto de Microcirugía Ocular (IMO) Barcelona, a referral centre for corneal transplantation.

Methods:

Retrospective, non-comparative, single-surgeon case series of primary DMEK for PIOL-related corneal decompensation between July 2011 and July 2020 with ≥ 6 -month postoperative follow-up time following DMEK (F-U). Pre-DMEK data analyzed included time between PIOL implantation and explantation, best-corrected visual acuity (BCVA, logMAR) and refractive spherical equivalent (RSE, D), and preoperative corneal pachymetry. Main outcomes analyzed after DMEK were change in BCVA at last F-U compared with BCVA before DMEK, residual refractive error, endothelial cell loss rate (%ECL); change in corneal pachymetry at last F-U compared with pre-DMEK; re-bubbling, immune rejection, and graft failure rates; and postoperative complications.

Results:

Sixteen eyes (14 patients) were analyzed. Mean time to PIOL explantation was 9.3 ± 5.0 years, and median time between PIOL explantation and DMEK was 3 months (IQR 2-4); Mean post-DMEK F-U was 37.3 ± 29.6 months; median BCVA at last F-U was 0.15 logMAR (IQR 0.00-0.35), which was statistically significantly better compared with pre-DMEK BCVA ($p = 0.002$); 77% of eyes had a final RSE within 1.00 D of emmetropia. Mean 2-year %ECL was $55.6 \pm 18.7\%$. Two eyes required re-bubbling (12.5%), one of which evolved to primary graft failure (6.2%); and one eye had late endothelial graft failure at 4-year follow-up (1/15 grafts, 6.7%).

Conclusions:

DMEK is surgically feasible in eyes with PIOL-associated corneal decompensation, resulting in early, clinically significant visual improvement over the medium term. The relatively high proportion of eyes with good refractive outcome following DMEK supports its use in this group of refractive patients, who have high visual demands and the expectation of spectacle independence. However, these eyes may be at risk of increased EC loss following DMEK, with a potentially increased risk of late endothelial graft failure over the medium to long-term.

Cornea

PP358

Phacoemulsification after Descemet membrane endothelial keratoplasty (DMEK): Incidence and influence on endothelial cell density

Presenting author: Keamela Vasanthanathan, Netherlands

Purpose:

To analyze the incidence of cataract extraction after Descemet membrane endothelial keratoplasty (DMEK) in phakic eyes and to evaluate the effect of phacoemulsification after DMEK on the donor endothelial cell density (ECD).

Setting:

Retrospective cohort study conducted at the Netherlands Institute for Innovative Ocular Surgery

Methods:

The clinical data of phakic DMEK patients were examined and from this cohort, all patients who subsequently underwent phacoemulsification after DMEK were reviewed. Data from a prospectively collected dataset were analyzed, including demographic profile, ECD, best-corrected visual acuity (BCVA), central corneal thickness (CCT), and complications.

Results:

From 261 phakic DMEK patients, 13.4% required cataract surgery within the mean follow-up period of 54 ± 28 months. The mean time from DMEK to phacoemulsification was 18 ± 13 months. The probability of cataract extraction after DMEK was 0.06 at 1 year and 0.17 at 10 years, respectively. ECD decreased from 1314 ± 524 cells/mm² pre- to 1167 ± 443 cells/mm² (-11%) at 1-6 months post-phacoemulsification ($P=0.333$). BCVA improved from 0.27 ± 0.13 logMAR pre- to 0.07 ± 0.12 logMAR at 1-6 months post-phacoemulsification. CCT pre-phacoemulsification was $532 \pm 46 \mu\text{m}$ and remained stable at $539 \pm 56 \mu\text{m}$, 1-6 months after phacoemulsification. Phacoemulsification did not elicit DMEK graft detachment in any of the eyes studied.

Conclusions:

The incidence and 10-year projection of cataract extraction in phakic DMEK eyes was relatively low. Phacoemulsification after DMEK provided excellent BCVA outcomes, did not induce graft detachment, and was associated with an acceptable decrease in ECD.

Cornea

PP359

Large-diameter penetrating keratoplasty: a case series from a tertiary hospital

Presenting author: edgar Lopes, Portugal

Purpose:

To describe the indications and outcomes of patients submitted to large-diameter penetrating keratoplasty (LDPK) for the management of peripheral corneal disease.

Setting:

Ophthalmology Department - Cornea and Transplant Unit, Central Lisbon University Hospital Center.

Methods:

The chart and medical data of patients who underwent LDPK in a tertiary hospital (Central Lisbon University Hospital Center) were retrospectively reviewed.

Results:

Corneal grafts with a diameter superior to 8.50mm were considered large grafts. In our series diameter ranged from 9mm to 10mm. Indications for transplantation were Mooren's ulcer, and rejection or infectious abscess of previous transplant. Three patients had previous PK. Two patients had combined procedures (cataract surgery and intraocular lens explantation). Preoperative best-corrected visual acuity (BCVA) was counting fingers at 30cm to light perception (LP), and postoperative BCVA LP to 20/200. Immunosuppression included topical and oral/or corticosteroid, and oral cyclophosphamide, methotrexate, or cyclosporine. During follow-up, complications were ocular hypertension, recurrent ulceration, and rejection followed by Boston type 1 keratoprosthesis implantation.

Conclusions:

An LDPK may rescue an eye that otherwise may have been lost. There is a higher incidence of complications in LDPK and a need for a more aggressive immunosuppressive treatment regimen. Although BCVA is usually low, in some cases renders useful vision.

Cornea

PP360

Removal of a Salzmann nodular degeneration aided by EBK (Epi Bowman Keratectome by Orca Surgical)

Presenting author: Natalia Anglada Masferrer, Spain

Purpose:

The purpose of this presentation is to propose a tool, the EBK, that may be helpful in the Salzmann nodular degeneration (SND) surgery.

Setting:

Hospital Universitari Vall d'Hebron, Barcelona, Spain

Methods:

To obtain the presurgery images of our Salzmann nodular degeneration patient we used the DRI optical coherence tomography (OCT) Triton Swept Source (Topcon Corporation, Tokyo, Japan). The excision of the nodule was recorded by the Carl Zeiss Meditec AG, Callisto Eye surgical microscope (Carl Zeiss Meditec, Jena, Germany) and aided by its anterior segment optical coherence tomography (AS-OCT). We used the EBK (Epi Bowman Keratectome by Orca Surgical) during the surgery to find the surgical plane below the Salzmann nodular degeneration. No conflict of interest.

Results:

With the use of EBK we were able to successfully remove the Salzmann nodular degeneration without the need of neither forceps nor alcohol, by easily finding the dissection plane after debridement of epithelium.

Conclusions:

The use of EBK to remove a Salzmann nodular degeneration may be an alternative to alcohol epithelium debridement and forceps traction. The EBK may make it easier to find the right plane when dissecting a Salzmann nodule.

Cornea

PP361

Conjunctival flap as surgical management for infectious keratitis refractory to topical treatment, a retrospective study

Presenting author: Roxana Becerril-Cazadero, Mexico

Purpose:

The first-line treatment for infectious keratitis is broad-spectrum topical antibiotics, usually guided by an antibiogram. The conjunctival flap is a surgical procedure that aims to restore the compromised ocular surface's integrity and provide mechanical and metabolic support to the cornea. The purpose of this study is to determine the percentage of efficiency in resolving infectious keratitis refractory to topical treatment.

Setting:

This study was conducted at the “Asociación para Evitar la Ceguera en México I.A.P at Mexico City”

Methods:

A retrospective cohort was conducted, all records from 2010 to 2020 with a history of a conjunctival flap as treatment for infectious keratitis were reviewed. A conjunctival flap was indicated in those patients diagnosed with infectious keratitis with antimicrobial treatment guided by antibiogram with poor evolution, defined as lack of response to treatment 48hrs after its initiation, corneal perforation, or enlargement of the infiltrate. Demographic variables, flap characteristics, ulcer type, involved microorganism, culture results, and antibiogram was included

Results:

We included 129 patients (129 eyes) with infectious keratitis undergoing conjunctival flap. A partial covering technique was used in 58.1% of the cases. A conjunctival flap in addition to a scleral patch graft was used in all perforated cases (60 eyes). Regarding the effectiveness of the conjunctival flap as a treatment for infectious keratitis, it was found that 81.4% resolved in a median time of 50 days (21-120 days). No statistically significant differences were found between the etiology of the ulcer (bacterial, fungal, herpetic, and polymicrobial)

Conclusions:

A Conjunctival flap is an effective procedure for resolving infectious keratitis refractory to topical treatment, regardless of the etiology of the infectious keratitis.

Cornea

PP362

Effect of topical treatment with prostaglandin analogues on the corneal stiffness, in patients with open-angle glaucoma and ocular hypertension. A prospective study.

Presenting author: Marta Isabel Martínez-Sánchez, Spain

Purpose:

The aim of the study is to evaluate the effect of topical prostaglandin (PG) treatment on the corneal biomechanical properties in treatment naïve patients with either open-angle glaucoma (OAG) or ocular hypertension (OHT).

Setting:

Glaucoma unit, “Príncipe de Asturias” University Hospital, at Alcalá de Henares, Madrid.

Methods:

This prospective, observational cohort study recruited 26 OAG and 8 OHT newly diagnosed and treatment naïve patients. Only one eye per patient was included in the study. The central corneal thickness (CCT), the Goldman Applanation Tonometry (GAT-IOP), the Goldmann-correlated intraocular pressure (IOPg), the cornea-compensated IOP (IOPcc) (using the Ocular Response Analyzer) and the Corvis ST dynamic corneal response parameters, were also registered at both baseline and 6 months after topical PG treatment.

Results:

The IOP decrease (Δ) values obtained with the different measuring devices analyzed were; Δ GAT - 6.5 ± 3.7 , Δ IOPg - 6.3 ± 5.6 , Δ IOPcc - 6.5 ± 5.7 , Δ IOPnct - 4.4 ± 5.7 and Δ bIOP - 3.8 ± 5.4 . Statistically significant differences were found between Δ GAT vs Δ IOPnct ($p=0.003$), Δ GAT vs Δ bIOP ($p=0.0002$), Δ IOPcc vs Δ bIOP ($p=0.0006$), Δ IOPcc vs Δ IOPnct ($p=0.006$), and Δ IOPnct vs Δ bIOP ($p=0.003$). Significant lower values of the stress-strain index (SSI) (1.77 ± 0.3 vs 1.54 ± 0.27) after the 6-month treatment were found ($p=0.0002$).

Conclusions:

The new stress-strain index provided by the Corvis ST seems to significantly decrease after topical prostaglandin therapy. Considering that the SSI seems not to be correlated with either the IOP and the CCT, and thus seems to show the real stiffness of the cornea, we believe that our results support the hypothesis that topical PG therapy do decrease the corneal stiffness and thus, that the ocular hypotensive effect of these drugs is overestimated if GAT is used for IOP measurement.

Cornea

PP363

Correlation between Gaussian and tangential curvature maps in healthy and Keratoconus eyes using AS-OCT combined with Placido disc

Presenting author: Maria A Henriquez, Peru

Purpose:

To investigate and compare the efficacy of Gaussian and tangential corneal topography maps obtained with the Anterior segment optical coherence tomography (AS-OCT) combined with Placido disc MS-39 device to distinguish mild keratoconus from high astigmatic eyes.

Setting:

Research Department., Oftalmosalud Instituto de Ojos; Lima, Perú

Methods:

Prospective, longitudinal study, including 104 eyes of 104 patients, 51 KC and 54 healthy eyes. Gaussian and Tangential maps of anterior and posterior Surface were obtained with the MS-39. The following measurements were obtained from each map and compare between the two groups: location of the corneal apex in mm relative to the corneal vertex, dioptric power of the cornea apex and cornea vertex, corneal irregularity indexes at 3 and 5 mm, anterior-posterior apex ratio, inferior-superior dioptric asymmetry value.

Results:

Keratoconus eyes mean maximum keratometry was 48.24 Diopters (D) (range 45.54D-52.6D) and 48.73D (range 38.04D-64.53D) in the Gaussian and Tangential map respectively ($p=0.004$). In healthy eyes mean maximum keratometry was 47.17 Diopters (D) (range 43.4D-50.2D) and 47.27D (range 40.63D-56.55D) in the Gaussian and Tangential map respectively. A model constructed by logistic regression analysis showed higher area under the curve (AUROC) when using values from the Gaussian map than from the tangential map for discrimination between healthy and KC eyes (AUROC 0.99 vs 0.98).

Conclusions:

Parameters obtained from the Gaussian curvature maps had better sensitivity and specificity than parameters obtained from Tangential curvature maps when discriminating between KC and healthy eyes.

Cornea

PP364

Test-Retest reproducibility of Scheimpflug imaging parameters in healthy and non-progressive keratoconus eyes: 1-year apart.

Presenting author: Maria A Henriquez, Peru

Purpose:

To assess the test-retest reproducibility after one year of the Scheimpflug imaging parameters in healthy and non-progressive keratoconus (NP-KC) eyes.

Setting:

Research department, Oftalmosalud Instituto de Ojos

Methods:

Prospective, cohort study that included 32 healthy eyes and 70 NP-KC eyes of patients that were attended at Oftalmosalud Instituto de Ojos, Peru, between January 2015 and August 2018. Parameters were evaluated at baseline evaluation and after one year. The intraclass correlation coefficient (ICC), coefficient of repeatability (CR), Standard Error Measurement (SEM) and Bland-Altman plots were calculated.

Results:

Healthy and NP-KC eyes were found to have high ICC(over 0.90) in parameters related to uncorrected visual acuity(VA), refraction, keratometry and pachymetry. CR for maximum keratometry were 0.65 Diopters(D) and 2.69 D, and for thinnest pachymetry were 13.39 μ m and 30.04 μ m in the healthy and NP-KC groups, respectively. CR for posterior elevation were 6.09 μ m and 12.03 μ m and for best corrected VA (BCVA) were 0.0 LogMAR and 0.33 LogMAR for healthy and NP-KC group, respectively. In NP-KC group 90.90 % (20/22) of the parameters had a CR that was at least twice the value for the healthy group.

Conclusions:

Healthy eyes and NP-KC eyes groups were found to have high reproducibility in the majority of Scheimpflug parameters studied. However, the CR found in NP-KC group were higher than those found in the healthy eyes group and can overlap the criteria to define progression, suggesting that new criteria should be established to assess KC progression.

Cornea

PP365

Proximity and location of the corneal notable points in healthy and keratoconus eyes using a combined AS-OCT and Placido disc device

Presenting author: Maria A Henriquez, Peru

Purpose:

To analyze the coordinates, and distances among the thinnest epithelial point (TEP), thinnest stromal point (TSP) and steepest curvature point (SCP) in healthy and keratoconus (KC) eyes.

Setting:

Research department, Oftalmosalud Instituto de Ojos

Methods:

Prospective, longitudinal study, including 104 eyes of 104 patients, 51 KC and 53 healthy eyes that attend to Oftalmosalud Instituto de Ojos, Lima, Peru. All eyes underwent Anterior segment optical coherence tomography (AS-OCT) combined with Placido disc MS-39 (CSO, Firenze, Italy). Location (coordinates) of the points and proximity between them were evaluated and compared. A mathematical equation was used to calculate distances between points, T-student test was used for multiple comparisons and Pearson correlation coefficient to assess correlation between distances.

Results:

Mean distance between the SCP and cornea apex were 6.23 ± 1.57 mm and 4.28 ± 0.57 mm for healthy and KC group respectively ($p = 2.548 \times 10^{-13}$). Mean distance between the STP and the apex of the cornea were 0.901 ± 0.324 mm and 1.33 ± 0.86 mm for healthy and KC group respectively ($p = 0.001$). Mean distance between the ETP and the STP were 3.859 ± 0.73 and 4.14 ± 1.07 for healthy and KC group respectively ($p = 0.30$).

Conclusions:

Significant differences were found between normal and KC eyes with respect to the thinnest stromal point and maximum curvature in relation to the apex of the cornea.

Cornea**PP366****Clinical Results of Accelerated CXL in a Saudi Population – 1-year results.****Presenting author:** Alaa Eldanasoury, Saudi Arabia**Purpose:**

To assess refractive, topographic, and high order aberration (HOA) changes 1 year after accelerated cross-linking (CXL) in early and moderate keratoconus in a Saudi population.

Setting:

Magrabi Eye Hospital, Jeddah, Saudi Arabia

Methods:

Retrospective analysis of 87 eyes of 87 consecutive patients with documented progressive keratoconus who received accelerated CXL. Exclusion criteria included central corneal thickness of less than 400 μm and maximum keratometry (Kmax) of greater than 55.0 D. Isotonic riboflavin 0.1% in hydroxypropyl methylcellulose and KXL UVA delivery system (Avedro, Inc, MA) were used for all eyes. Soaking time was 10 minutes after removal of the epithelium, continuous UVA exposure time was 10 minutes with an average power of 9.0 mW/cm^2 and total energy dose of 5.4 J/cm^2 .

Results:

Mean age was 25.1 ± 4.7 yrs. One year after operation, 5% eyes gained 2 lines and 1% eyes lost 2 lines of DCVA, mean change in MRSE was 0.02 ± 0.99 D, mean vectoral change of astigmatism was $-0.20 \times 43.7^\circ$, mean change in Kmax was 0.67 ± 0.78 D and mean change in central pachymetry was 13.50 ± 12.70 μm . There was a statistically significant decrease in average corneal power, Kmax, surface asymmetry index and corneal total HOA and coma ($p < 0.05$). There was no significant change in MRSE, corneal astigmatism, and corneal spherical aberrations ($p > 0.05$).

Conclusions:

At 1 year, accelerated CXL does not induce significant change in CDVA and MRSE, however it induced significant decrease in central corneal thickness, topography shape indices, Kmax and total HOA.

Cornea

PP367

Epi-On Versus Epi-Off Corneal Collagen Cross-Linking for Progressive Keratoconus: Five Years of Follow-Up

Presenting author: Çisil Erkan Pota, Turkey

Purpose:

To evaluate and compare the 5-year efficacy and safety of transepithelial (epi-on) corneal collagen cross-linking (CXL) with standard epi-off CXL in patients with progressive keratoconus (KC).

Setting:

Akdeniz University Hospital Ophthalmology Department

Methods:

This prospective cohort study was included 80 eyes of 56 patients with progressive KC who underwent CXL. Epi-on CXL was performed in 40 eyes and epi-off CXL was performed in 40 eyes. All patients underwent a complete ophthalmologic testing that include uncorrected and best corrected visual acuity, central corneal thickness (CCT), corneal astigmatism, simulated keratometry (K1, K2, and Kmax), corneal specular microscopy preoperatively and postoperatively at 1, 3 and 5 years. Ultraviolet-A treatment was performed with a UV-X system at 3 mW/cm².

Results:

In both groups, a significant improvement in visual function (Epi-on group: baseline 0.31±0.16 logMAR, 5-year follow-up 0.21±0.17 logMAR, p=0.01; epi-off group 2: baseline 0.33±0.18 logMAR, 5-year follow-up 0.25±0.19 logMAR, p=0.01) was recorded. Significant differences were found in the change at 1 and 5 years between the groups for cylinder reduction, K1, K2, Kmax and CCT (all p<0.05). Epi-off CXL had greater significant change in decreasing K1, K2, Kmax and corneal astigmatism (all p<0.05). The KC progression rate was 15% (5/40) in the Epi-on CXL and 5% (2/40) in the epi-off CXL group at the 5-year follow-up.

Conclusions:

Both procedures halted the progression of KC at the 5-year follow-up; however, epi-off CXL was safer and more effective when compared with epi-on CXL.

Cornea

PP368

Effect of repeated riboflavin application during CXL on corneal biomechanics

Presenting author: Hormoz Abdshahzadeh, Switzerland

Purpose:

To evaluate the impact of applying riboflavin repeatedly during corneal cross-linking (CXL) on the corneal biomechanical strength of ex vivo porcine corneas.

Setting:

Laboratory for Ocular Cell Biology, Center for Applied Biotechnology and Molecular Medicine, University of Zurich, Zurich, Switzerland and ELZA Institute, Dietikon/Zurich, Switzerland

Methods:

Sixty-six porcine corneas with intact epithelium were divided into 3 groups and analyzed. All corneas were pre-soaked with an iso osmolar solution of 0.1% riboflavin in PBS (“riboflavin solution”). Corneas in Groups 1 and 2 were irradiated with a standard epi-off CXL (S-CXL) UV-A irradiation protocol (30 minutes, 3 mW/cm²). Corneas in group 3 served as a no irradiation control. Corneas in group 1 received riboflavin solution during S-CXL irradiation (CXL-PBS-Ribo); corneas in group 2 received only iso osmolar PBS (CXL-PBS). Immediately afterwards, 5-mm wide corneal strips were prepared, and elastic modulus and stress after relaxation were measured.

Results:

Significant differences in stress-strain extensometer were found between the control and S-CXL-treated groups (1 and 2), however no significant difference was observed between groups 1 and 2 (120% and 118.5%; $p=0.999$).

Conclusions:

Compared with applying isosomolar PBS to keep the cornea hydrated during CXL, the application of riboflavin solution does not affect the corneal biomechanical stiffening achieved with standard epi-off CXL.

Cornea

PP369

The effects of corneal cross-linking on intraocular pressure

Presenting author: Khalil Zrikem, Morocco

Purpose:

Cross-linking (CXL) is a technique that aims to harden the corneal tissue of eyes with a progressive form of keratoconus by changing its biomechanical properties. A true corneal hardening after CXL would inevitably result in an increase in measured intraocular pressure (IOP).

Setting:

The aim of our study is to determine the possible changes of IOP measurements by Goldmann aplanation tonometer (TAG), after treatment with CXL on corneas with keratoconus.

Methods:

We measured intraocular pressure with TAG before crosslinking and 3, 6 and 12 months after cross-linking on 54 eyes (47 patients) with keratoconus.

Results:

There was a significant increase in IOP at 3, 6 and 12 months after CXL ($p < 0.001$). The mean IOP before cross-linking was 11.7 mmHg, whereas it was 12.8 mmHg at 3 months, 12.9 mmHg at 6 months and 12.95 mmHg at 12 months. We also found a direct correlation between central corneal thickness and IOP after cross-linking. In contrast, there was no significant correlation between IOP change after CXL and age, gender or pre-CXL keratometry.

Conclusions:

Our study found a significant increase in IOP measurements with TAG on keratoconic corneas after CXL. This is probably due to the increase in corneal stiffness and would not be a real rise in IOP.

Cornea

PP370

Anterior segment optical coherence tomography to diagnose spontaneous endothelial layer disruption

Presenting author: María Martínez-Hergueta, Spain

Purpose:

The aim of this study is to describe the diagnosis, treatment and evolution of a Descemet's membrane rupture with endothelial disruption on a patient with no prior history of intraocular surgery or presumed traumatic damage. To the authors' knowledge, this is the first reported case of Descemet's membrane rupture of a non-traumatic patient. The early diagnosis and follow up was conducted through Anterior Segment Optical Coherence Tomography. The methodology allowed to establish the correlation between the evolution of the damaged layers and the vision recovery.

Setting:

Department of Ophthalmology. Elda General University Hospital, (Alicante), Spain

Methods:

A 56-year-old man, with no previous ocular history, arrived at our emergency service with pain and right red eye since awoken. On examination, his best corrected visual acuity (BCVA) was 20/200 in his right eye (RE) and 20/20 in his left eye (LE). Slit-lamp examination revealed a central clear epithelial ulcer with stromal thickening and a defect on the Descemet's membrane with no intraocular inflammation. The specular microscopy revealed a loss of endothelial cells and an anterior segment optical coherence tomography confirmed a disruption of the endothelial layer and Descemet's membrane directly posterior to the stromal edema and epithelial defect.

Results:

The patient was given topical cycloplegic and antibiotics every 6 hours and 1% prednisolone drops every 8 hours during a week. Although the corneal epithelial defect was resolved after two days of treatment, the Descemet's membrane rupture and the stromal edema persisted. One week later the BCVA improved to 20/32 and the anterior segment optical coherence tomography showed a recovery of the corneal anatomy. After one month the patient presented a clear cornea with BCVA in his right eye of 20/20.

Conclusions:

A conservative management was proposed to treat the Descemet's membrane rupture on a patient with no prior ocular surgical history, a rare condition considering the lack of a traumatic damage. The patient showed a progressive evolution and recovery the normal anatomy of the corneal layers within one month. This case highlights the importance of the anterior segment optical coherence tomography for the early diagnosis and the follow-up of the local loss of the endothelial cells.

Cornea

PP371

Efficacy and tolerability of polyvinylpyrrolidone-iodine 0.6% treatment in adenoviral keratoconjunctivitis: a Prospective Randomized Controlled Study

Presenting author: Gabriella Ricciardelli, Italy

Purpose:

To analyze the effect of the employment of polyvinylpyrrolidone-iodine (PVP-I) 0.6% eye drop on the clinical course of patients affected by Adenoviral Keratoconjunctivitis (AKC).

Setting:

This is a prospective multicenter randomized controlled study,. 68 patients affected by AKC who presented to four Italian eye centers between June 2019 and September 2019 were enrolled. Nine patients dropped out of the study because they failed to complet

Methods:

Patients were randomized to receive: PVP-I 0.6% eye drops 4 times/daily for 20 days (Group A) or hyaluronate-based tear substitutes 4 times/daily for 20 days (Group B). Best-corrected visual acuity (BCVA), Optical Coherence Tomography (OCT) Optovue iVue pachymetry map; corneal haze; conjunctival injection and chemosis; subepithelial corneal infiltrates (SEIs); corneal and conjunctival staining and corneal densitometry were recorded at diagnosis and at every follow-up visit.

Results:

Overall, 59 AKC patients (34 for Group A and 25 for Group B) completed the study. Patients of Group A showed a significantly shorter resolution time and lower incidence of SEIs compared to patients of Group B. In particular, SEIs were present at the last visit in 3/34 (8.82%) patients of the Group A vs 11/25 (44%) of the Group B ($P = 0.005$). Patients of Group A showed a significantly lower incidence of corneal haze compared to patients of Group B (0/34 vs 3/25; $P = 0.038$). No side effects were reported for both groups.

Conclusions:

Although further clinical evaluations are needed, according to our data the use of PVP-I 0.6% eye drop in the setting of AKC reduces the risk of SEIs as well as the resolution time of the disease.

Cornea**PP372****Keratoconus screening in pre-school children using high resolution OCT-based anterior segment tomography****Presenting author:** Farhad Hafezi, Switzerland**Purpose:**

Since the development of corneal cross-linking, early treatment has become important in the pre-school population (aged 2 to 5 years) to stop the disease at its earliest stages. Accordingly, early detection is key. In this age group, children can usually not sit still long enough to allow for precise image capture. In addition, the nature of image capture in current Placido-based and Scheimpflug technologies makes reliable imaging in this age group challenging. Here, we describe a successful and reliable approach for keratoconus screening in pre-school children using high-resolution OCT-based anterior segment tomography.

Setting:

ELZA Institute AG, Zurich, Switzerland

Methods:

Five children between the age of 28 and xx months presented with either a positive family history for keratoconus or with high degrees of astigmatism, as measured using skiascopy. High resolution OCT-based anterior segment tomography (MS-39, CSO Italia, Scandicci, Italy) was performed in all cases to determine keratoconus susceptibility.

Results:

Current topographical and tomographical systems show distinct weaknesses when used in pre-school children aged 2 to 5 years: Placido-based topographers have the advantage of rapid capture but go along with intense light, which leads to eyelid closure and/or blinking. Furthermore, these systems only provide anterior curvature information. Scheimpflug-based devices give more complete topographical information, but they need approximately 2 seconds for image capture, which is too long in this age group. High-resolution OCT-based anterior segment tomography allowed for rapid capture of tomographical and topographical data of sufficient quality to unambiguously assess the corneas of children in this age group.

Conclusions:

With the introduction of high-resolution OCT-based anterior segment tomography, screening of at-risk pre-school children becomes realistic. Early screening and detection of keratoconus may open alleys for early treatment using corneal cross-linking, when deemed appropriate.

Cornea

PP373

A case report of toxic keratopathy secondary to topical anaesthetic abuse

Presenting author: Tiffany Lok Man Yeung, Hong Kong

Purpose:

To report a case of a 22-year-old man who presented to our clinic with bilateral painful red eyes after suffering from an ocular chemical burn, where he wore his soft daily contact lens after accidentally soaking them in makeup remover. Patient's presenting visual acuities were 6/38 in both eyes, with a pH of 7 after copious eye irrigation. Slit-lamp examination showed bilateral conjunctival injection with mild corneal oedema and large epithelial defects.

Setting:

Department of Ophthalmology, United Christian Hospital, Hong Kong

Methods:

He was treated with oral ascorbate acid, doxycycline, topical chloramphenicol, intensive lubricants and bandage contact lens (BCL) with steady improvement over the following week. Patient re-presented with worsening pain in both eyes two weeks later after missing his follow-ups. Visual acuities were 6/12 in the right and 6/120 in the left. A dense ring-like corneal infiltrate was seen in the left eye with an overlying epithelial defect, an endothelial plaque and moderate anterior chamber inflammation. Both corneal scraping and conjunctival swab were negative. Treatment was changed to hourly fortified ceftazidime and tobramycin.

Results:

Despite intensive antibiotics, his left eye showed no signs of improvement with visual acuities at 6/7.5 on the right and counting fingers on the left. On further questioning, patient admitted to have been self-medicating with topical proparacaine hydrochloride 0.5% (Alcaine, Alon, Fort Worth, TX, USA) obtained from a private practitioner 4-5 times daily for pain relief prior to presenting to our unit. With intensive medical treatment and cessation of topical anaesthetics over the following 4 weeks, his left eye was stabilized with a final unaided visual acuity returned to 6/12.

Conclusions:

Topical anaesthetic toxicity can be associated with poor outcome. Differential diagnosis of topical anaesthetic abuse should be considered when there is poor or no response to conventional treatment, with clinical features of toxic keratopathy such as punctate epithelial keratopathy, loss of corneal epithelium, delay in epithelial healing, ring-shaped stromal infiltration, corneal oedema/melting or even perforation, and pain disproportionate to clinical picture.

Cornea

PP374

Shifting trends in etiological causes of chemical eye injuries during Covid 19 pandemic

Presenting author: Elif Akbas, Turkey

Purpose:

To evaluate the etiological cause distribution in chemical eye injuries during Covid-19 pandemic.

Setting:

Study was performed at Ege University Faculty of Medicine, Izmir, Turkey.

Methods:

In this retrospective case series, the medical records of patients, who presented with chemical eye injuries between March 30, 2020 to March 1, 2021, were evaluated.

Results:

Twenty-seven eyes of twenty-three patients (19 adults, 4 children) were included. The mean age of the patients was 33.2 ± 16.4 (range, 4-76) years with a female to male ratio of 4/19. Best-corrected visual acuity was 0.40 ± 0.52 logMAR at the initial exam. The first two most common causes of chemical injuries were hydrochloric acid (n=6) (cleaning agents, industrial materials) and alcohol-based hand sanitizer (n=6). Alcohol based hand sanitizer injury was present in 5 patients (2 adults, 3 children).

Conclusions:

Due to COVID-19 pandemic, alcohol-based hand sanitizer usage became more common. Before the pandemic, there was not any sanitizer-related injury in the last decade in our clinic. According to the results of the present study, alcohol-based hand sanitizer was the most common causative agent along with hydrochloric acid. Three out of four pediatric patients were injured with alcohol-based hand sanitizer, which draw attention to the fact that properly placed hand sanitizer stations, being just at the eye level of children, can cause chemical eye injuries in the pediatric population.

FINANCIAL DISCLOSURE: -

Cornea

PP375

Non-ablative thermomechanical skin treatment for dry eye disease: A prospective multicentre open-label trial

Presenting author: Sunil Shah, United Kingdom

Purpose:

To assess the efficacy of a novel thermo-mechanical action based peri-orbital fractional skin treatment in alleviating signs and symptoms of dry eye disease (DED).

Setting:

A multicentre, prospective, controlled, open labelled study was conducted at Midlands Eye, UK, Vallmedic Vision, Andorra and Khmer-Sight Foundation, Cambodia. The trial received ethics approval and was listed in ClinicalTrials.gov (NCT04730336).

Methods:

Consented participants attended visit-1, 2, 3, and 4 every two weeks and visit-5 for 3 months follow up. Participants received three sets of treatments on visit-1, 2 and 3. Detailed ophthalmic examinations including vision, intraocular pressure (IOP), dry eye symptomatology were assessed including the Ocular Surface Disease Index (OSDI) questionnaire, tear break up time, and tear osmolarity.

Results:

One hundred and thirteen participants (83 females; mean age 55.5 ± 14.6 years) with signs and symptoms of DED and peri-orbital wrinkles were recruited. This novel treatment was associated with no change in vision ($P=0.998$), IOP ($P=0.894$) and adverse events. Clinically and statistically significant improvement in the DED symptoms was observed characterised by a reduction of 23.1 ± 13.0 ($P < 0.001$) OSDI index. Tear break up time improvement ranged from 0.7 to 4.7 seconds between the three study centres ($P > 0.05$ between all three sites). Tear osmolarity reduced from 298.3 ± 14.6 mOsm/L to 294.9 ± 10.2 mOsm/L following the treatment ($P=0.056$).

Conclusions:

Thermo-mechanical action based peri-orbital fractional skin treatment can significantly reduce DED signs and symptoms without any adverse event. This is a novel highly attractive treatment for DED.

Cornea

PP376

The characteristics and risk factors of very asymmetric keratoconus

Presenting author: GEN NAKAO, Japan

Purpose:

To characterize very asymmetric keratoconus (KC) in terms of clinical demographics and risk factors in the Japanese population.

Setting:

Osaka University Hospital, Osaka, Japan

Methods:

We retrospectively reviewed the clinical records of patients with very asymmetric KC attending a university hospital. Patients with very asymmetric KC had defined clinical KC in one eye and normal topography in the fellow eye. All patients completed a questionnaire on potential risk factors (family history of KC, atopy, asthma, allergy, heart disease, sleep apnea, Down syndrome, eye rubbing, sleep position, and dominant hand). These data were compared with those of KC patients who had clinical KC or topographic KC in both eyes. Subgroup analysis in very asymmetric KC eyes were performed based on the KC status: mild and severe.

Results:

We retrospectively investigated 66 patients with very asymmetric KC and 505 patients with KC. Patients reported eye rubbing (53–56%), allergy (62–63%), and atopy (28–29%) in both the very asymmetric KC and KC groups. There was no significant difference in terms of risk factors between the two groups. Approximately half of the 66 patients with very asymmetric KC had KC eyes ipsilateral to the dominant hand. Subgroup analysis in the very asymmetric KC showed that atopy, asthma, allergy, and eye rubbing were more frequent in the mild KC group than in the severe KC group.

Conclusions:

The patient-reported frequency of eye rubbing, allergy, and atopy were similar between KC and very asymmetric KC. Further, we found no association between hand dominance and KC laterality

Cornea

PP378

Occurrence of Herpes viruses in morphologically normal corneal grafts

Presenting author: Ayala Katzir, Israel

Purpose:

To discover the occurrence of Herpes Simplex Virus (HSV) type 1, 2 and Varicella Zoster Virus (VZV) DNA in transplanted corneas using polymerase chain reaction (PCR), and to determine the relationship between latent HSV-1 and VZV with occurrence of herpetic eye disease in recipients and graft failure.

Setting:

January 2019 – September 2020, all corneas in this time line from Hadassah Ein Kerem hospital were examined by a PCR test before corneal transplantation in search for HSV and VZV DNA.

Methods:

88 corneas were morphologically evaluated before surgery by slit lamp examination and CellChek[®] specular microscopy. Excluded corneas were tested positive for HBV, HCV and HIV by donor serological assessment, a low cell count (under 2,300 cells /mm²), corneal scars and abnormal endothelial cell morphology. Transplanted corneas were directly sampled for HSV 1,2 and VZV DNA by PCR. All eyes transplanted with the donor corneas were evaluated and followed for corneal transparency, endothelial cells morphology and number/mm² by specular microscopy, signs for ocular inflammation, intraocular pressure, and anterior segment optical coherence tomography (OCT) for graft attachment.

Results:

HSV-1 DNA was detected in 5 transplanted corneas out of the 88 that were examined (5.7%). HSV-2 was not detected in any cornea, and VZV in one cornea out of 82 examined (1.2%). Four of the positive corneas were used in descemet membrane endothelial keratoplasty (DMEK) surgeries. One for a combined DMEK/anterior vitrectomy/ iridoplasty surgery and one as a tectonic graft. One recipient (16.7%) developed herpes dendritic epitheliopathy and keratouveitis 12 months after transplantation, the graft remained clear after treatment. One cornea (HSV negative) stayed edematous at 20 months follow - up. The rest of the corneas stayed clear.

Conclusions:

Herpes viruses, especially HSV-1, may be PCR DNA positive in morphologically normal donor corneas. Recipients of herpes positive corneal grafts may be at risk for herpetic eye disease. Further evaluation with a bigger sample size and a longer follow-up time is needed to establish a clinical correlation to donor graft survival and to recipient ocular infection with HSV-1. HSV-1 positive DNA samples will be evaluated for viral RNA by reverse transcriptase PCR (RT-PCR) to further evaluate HSV latency and active replication.

Cornea

PP379

Aniridia associated keratopathy: A retrospective analysis

Presenting author: Vishal Vohra, United Kingdom

Purpose:

This retrospective study analysed the incidence of aniridia associated keratopathy (AAK), presence of ocular co-morbidities and visual impairment status in patients with aniridia.

Setting:

1) Department of Ophthalmology Royal Victoria Infirmary, Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, UK 2) Bioscience Institute, Faculty of Medical Sciences, Newcastle University, Newcastle upon Tyne, UK

Methods:

Thirty patients with aniridia being identified in the Ophthalmology Department at Royal Victoria Infirmary were enrolled in the study. Collected data: demographics, AAK severity was recorded, best-corrected visual acuity (BCVA) at the presentation and last visit, follow up duration, associated ocular and systemic comorbidities.

Results:

Out of the 30 patients (14 male:16 female), 29 (96.6%) were bilateral aniridia and only 1 had unilateral aniridia. Eight eyes (30.7 %) were classified as Stage I AAK, 6 eyes (23%) were Stage II, 12 eyes (46.1%) were Stage III. The mean BCVA in aniridia patient without AAK was 1.0 (SD 0.5; range 0.5-2) logMAR, significantly ($p= 0.024$) better compared to patients with AAK with a BCVA of 1.4 (SD=0.7; range 0.3-3) logMAR. Associated ocular comorbidities included fifty-nine (100%) eyes with nystagmus, forty (69%) with glaucoma and twenty-five (42%) with cataract. Twenty-four patients (80%) were registered as sight impaired.

Conclusions:

Visual outcome in aniridia patients with AAK are significantly worse compared to patients without AAK. The AAK combined with other ocular comorbidities, such as glaucoma ,cataract and nystagmus has significant implications for long-term visual prognosis.

Cornea

PP380

Bilateral acanthamoeba keratitis – a case series.

Presenting author: Edward Ahern, Ireland

Purpose:

To describe the clinical presentation, management, and outcomes of 3 cases of bilateral acanthamoeba keratitis and review the relevant literature.

Setting:

Department of Ophthalmology, Cork University Hospital, Ireland

Methods:

Patients presented with bilateral, painful red eyes on a background of contact lens use. Case 1 examination revealed bilateral punctate epitheliopathy initially treated as viral conjunctivitis. AK was diagnosed after 10 days as bilateral perineural infiltrates, AC inflammation and corneal oedema developed. Case 2 examination showed bilateral corneal oedema and descemets membrane folds. She was initially treated as HSV endothelitis. AK was diagnosed 8 days later as increased punctate epitheliopathy and perineural infiltrates developed. Case 3 was treated as adenoviral conjunctivitis. Development of a left ring infiltrate and right corneal pseudodendrites led to a clinical AK diagnosis after 20 days.

Results:

AK PCR was positive for cases 1 and 2 and negative for case 3. All patients commenced intensive treatment with PHMB 0.02% and Brolene, any existing topical steroids prescription was ceased. For case 1, treatment with PHMB is ongoing and visual acuity (VA) remains compromised due to stromal oedema at 1/60 bilaterally. For case 2, an excellent clinical response was achieved with VA returning to 6/6 OU. For case 3, the right eye showed complete resolution with VA returning to 6/6. Unfortunately the left eye developed secondary microbial keratitis, resulting in a dense central corneal scar and VA of PL.

Conclusions:

The diagnosis of AK is often challenging due to the non-specific initial features. Although more commonly unilateral, this case series highlights that AK can also occur bilaterally and a high index of suspicion should be maintained in all presentations of contact lens wearers as initial clinical features may be variable and non-specific. Prompt diagnosis is of utmost importance as delay in diagnosis and treatment is associated with poorer outcomes, as is treatment with topical steroids prior to AK diagnosis. Treatment for AK should be initiated immediately when there is clinical suspicion regardless of laboratory investigations.

Cornea

PP381

Corneal Posterior Characteristics in Down syndrome patients

Presenting author: Alfredo Vega Estrada, Spain

Purpose:

To characterize posterior corneal surface features in Down syndrome (DS) patients and compare it with healthy and keratoconic corneas

Setting:

Vissum Grupo Miranza. Alicante, Spain. Hospital Virgen de los Lirios de Alcoy, Alicante, Spain.

Methods:

This retrospective, comparative, nonrandomized, clinical study included 123 eyes, divided into three groups (37 eyes of DS patients, 46 with mild keratoconus and 40 controls), and took place at Vissum Alicante. Only patients with no previous ocular surgery, no corneal scars and no active ocular disease other than keratoconus were included. The Sirius System topographer (CSO, Firenze, Italy) was used in order to analyze posterior corneal surface keratometry, shape and keratoconus screening indices, posterior corneal aberrations, corneal volume and pachymetry.

Results:

DS patients, when compared with healthy controls, have a steeper (KM 7 mm $-6,30\pm 0,44$ vs $-6,15\pm 0,22$; $p < 0,05$) and more irregular (RMS/A 4,5 mm $0,22\pm 0,22$ vs $0,09\pm 0,03$; $p < 0,001$. Kvb $33,22\pm 44,29$ vs $10,63\pm 2,88$; as well as thinnest pachymetry ($497,68\pm 26,88$ vs $538,95\pm 31,67$; $p < 0,001$). At the same time, no statistically significant difference was found between DS patients and mild keratoconus patients ($p > 0,05$) in KM 7 mm ($-6,38\pm 0,34$), HAO ($0,56\pm 0,36$), C-like ($0,51\pm 0,34$) and pachymetry ($500,56\pm 36,83$).

Conclusions:

Posterior corneal surface of DS patients is steeper, and more irregular and as well as reduced volume and thinner pachymetry than patients with healthy corneas. Additionally, posterior corneal surface in DS patients shows similar characteristics to those found in mild keratoconus.



8 – 11
October 2021

Cornea

PP382

A case of corneal amyloid deposition secondary to monoclonal gammopathy of undetermined significance

Presenting author: Adela Hulpus, United Kingdom

Purpose:

To report the case of a patient suffering with monoclonal gammopathy of undetermined significance (MGUS) with secondary peripheral corneal amyloid deposits.

Setting:

St Paul's Eye Unit, Royal Liverpool University Hospital, Liverpool, United Kingdom

Methods:

This is a case report of a patient known to have MGUS who developed secondary peripheral corneal amyloid deposition.

Results:

A 50 year old Caucasian male presented with bilateral gradual loss of vision over the last 12 months. He had a medical history of MGUS and possible vasculitis of unknown etiology. There was no family history of corneal dystrophies. On examination there was non specific diffuse haze in the central anterior corneal stroma, lattice like deposits in the peripheral cornea and mild peripheral corneal neovascularisation with discrete opacification. The rest of the examination was unremarkable. The patient underwent corneal conjunctival limbal biopsy which confirmed amyloid deposition and no evidence of vasculitis.

Conclusions:

The ocular findings in patients with MGUS can sometimes be specific and offer important information and direction to the medical teams. This diagnosis should always be considered when faced with slowly progressing, unexplained and non specific corneal changes.

Cornea**PP383****Managing Progressive Myopia in children by Orthokeratology****Presenting author:** Salvo Giugno, Italy**Purpose:**

Myopia is a spherical refractive error that causes light to focus in front of the retina: if it is not treated may cause severe complications. Orthokeratology lenses can reshape the cornea if worn overnight slowing down the progression of myopia in children. We assessed the efficacy of Esa Ortho-6 for the correction and the stabilization of myopia in children.

Setting:

Studio Oculistico Dr. Salvatore Giugno Viale Mario Gori 63, Niscemi (CL) Italia

Methods:

45 young patients aged between 6 and 20 were enrolled; all patients had a myopia ranged between -1 and -6 diopters. They were treated with the use of Esa Ortho-6 lenses at night. In the control group were enrolled 21 patients who had myopia between -1 and -4,75 diopters, in the same range of age of the OK group. Anterior segment tomography (CSO- Sirius), UCVA, BCVA, spherical equivalent, axial length (Topcon Aladdin) and over refraction with orthokeratology lenses fitted were evaluated every 6 months of orthokeratology therapy.

Results:

This treatment has been proven successful, as evidenced by decreased spherical refractive error and axial length relative to the control at interval follow-up ranging from 6 months to 3 years, compared to the control group. The obtained p value is <0.001. The exact mechanism by which orthokeratology lenses reduce myopia progression is unknown, but research shows that the corneal reshaping decreases peripheral hyperopic defocus and therefore increases peripheral myopic defocus to likely reduce stimuli for axial elongation and subsequent development of myopia.

Conclusions:

Orthokeratology is effective in reducing the rate of myopia progression: this is in agreement with reference literature. Although there is small risk of vision-threatening complications (corneal keratitis), orthokeratology may be offered to young patients with moderate to high myopia.

Cornea

PP384

Bilateral abscessus keratitis in injecting drug users (IDU): two cases report.

Presenting author: Rosita Lucía Wakfie Corieh, Spain

Purpose:

To present two case of bilateral abscesses keratitis in IDU (heroin and cocaine smoked in a pipe). Both patients recognized the entry of cocaine particles smoked in a pipe in their eyes.

Setting:

Department of Ophthalmology. Fundación Jiménez Díaz University Hospital. Madrid, Spain.

Methods:

Best-corrected visual acuity (BCVA). Performed slit-lamp biomicroscopy (SLB). Iconography. Fundoscopy. Anterior segment optical coherence tomography. Gram stain of corneal scraping. Culture and antibiogram of corneal scraping. Eye ultrasound. Toxicological systemic tests.

Results:

A 38-year-old man presented a corneal abscess in the left eye (LE) due to *Staphylococcus hominis*, with good response to fortified vancomycin and ciprofloxacin. 5 months later, he presented an abscess in the right eye (RE) due to *Moraxella lacunata*, treated with fortified vancomycin and ceftazidime. A 53-year-old man presented an abscess in the RE, no microorganism isolating but high suspicion of *Streptococcus pneumoniae* due to associated pneumonia, which improved with fortified vancomycin and ceftazidime. 2 months later, he presented an abscess in the LE due *Corynebacterium* sp with high clinical suspicion of fungus, treated successfully with moxifloxacin, amphotericin B and systemic voriconazole.

Conclusions:

The infectious keratitis in IDU present management challenges, as these patients have poorer overall health and increased risk for noncompliance. There are several reported cases of infectious keratitis in association with cocaine keratopathy, but only few bilateral cases. Crack cocaine is the inhaled free-base derivative of powdered cocaine, and exert direct toxic effect on the cornea, causing disruption of the epithelium, which is exacerbated by the alkaline cocaine fume that cause low-grade chemical burns. Its anaesthetic properties lead to decreased corneal sensation and poor blink reflex. The management includes pH, Schirmer and corneal sensation testing, drug screening, and hospital admission.

Cornea

PP385

A case of Reis-Bucklers corneal dystrophy in a 13-year-old male

Presenting author: Ioanna Gardeli, Greece

Purpose:

The purpose of this paper is the presentation of a case with Reis-Bucklers corneal dystrophy.

Setting:

This case is about a 13-year-old male that was referred to cornea department for recurrent corneal epithelial defects in his left eye. He presented with a persistent epithelial defect and central corneal opacity in the bowman's layer with a honeycomb appearance.

Methods:

Pentacam examination was performed.

Results:

The epithelial defect in his left eye closed after 10 days, whereas the central corneal opacification in the bowman's layer remained. In follow up, one month later the patient presented with central corneal opacity in the bowman's layer in both eyes. His father's examination revealed corneal dystrophy. Based on the clinical findings and the family history the diagnosis of Reis-Bucklers corneal dystrophy was established.

Conclusions:

Reis-Bucklers corneal dystrophy is a rare bilateral corneal dystrophy and is autosomal dominant with strong penetrance. It usually presents within the first decade of life and is diagnosed by clinical history and physical examination of the eye.

Cornea

PP386

Prevalence of allergic disorders and dry eye disease in patients with keratoconus

Presenting author: Mario Troisi, Italy

Purpose:

The allergic disorders and dry eye disease have been described to be potentially complicated by keratoconus. According to many authors, allergic conjunctivitis is a risk factor for the keratoconus progression, due to the phenomenon of eye rubbing and a greater concentration of lytic enzymes in the corneal stroma, such as metalloproteinases (MMPs); tear film disorders also expose to the risk of corneal epithelial defects. The purpose of this study is to evaluate the prevalence of dry eye and allergic conjunctivitis in progressive keratoconus compared with stationary forms of the ectatic disease

Setting:

Salerno Hospital University, Ophthalmologic Unit

Methods:

We have examined consecutive patients with keratoconus, afferent from 01.01.2019 to 21.12.2020 at the Ocular Surface Diseases Center, having at least one previous topographic and pachymetric examination in the last 4-12 months, not treated with corneal cross linking or keratoplasty. The eyes were divided into two groups, based on the trend of Kmax, cylinder progression or corneal thickness decrease at the thinnest point. Pentacam tomography, OSDI questionnaire, BUT test, Schirmer test I and biomicroscopic evaluation of the ocular surface were performed. Clinical history, treatments, corneal fluorescein staining and signs of conjunctival inflammation (follicular reaction and hyperemia) were also evaluated.

Results:

321 eyes with keratoconus from 217 patients (121 males/96 females) have been examined; mean age: 29,4 years (range: 12-63). 116 eyes of 84 patients had progressive ectasia. The prevalence of allergic disorders was of 112 patients, including 78 in the progressive keratoconus group and 34 in the stable keratoconus group. A dry eye condition was found in 118 patients, including 69 in the progressive keratoconus group and 49 in the stable keratoconus group. A high correlation between allergic symptoms and tear film dysfunction was also found (score on the OSDI questionnaire >13 and BUT test <10 sec).

Conclusions:

The high percentage of allergic diseases in the progressive keratoconus group suggests a possible pathogenetic role in the involvement of this disease. Further studies are necessary to verify this causal association and the role of concomitant dry eye syndrome in the progression of corneal ectasia.

Cornea

PP387

Ten years of Pediatric Ocular Chemical Burn Experience in a Tertiary Eye Care Center in Turkey

Presenting author: ilayda korkmaz, Turkey

Purpose:

To report ten years of pediatric ocular chemical burn experience in a tertiary eye care center in Turkey.

Setting:

This retrospective study of pediatric ocular chemical burn patients was conducted at Ege University, Izmir, Turkey.

Methods:

A total of 33 patients aged 18 or younger with ocular chemical burn admitted to Ege University Ophthalmology Department between 2010 and 2020 were enrolled into the study. Demographic data and clinical characteristics of all patients including age, gender, laterality, causative chemical agent, chemical burn severity according to Dua classification, secondary ocular complications, limbal stem cell deficiency (LSCD) according to staging system defined by 'LSCD Working Group' and surgical interventions were reviewed. The initial and final Best Corrected Visual Acuities (BCVA) were recorded.

Results:

The mean age was 10.4 ± 5.5 with a F/M ratio of 12/21. Ten (30.3%) of the patients were injured with acid, 5 (15.1%) with alkaline. The most common causative agent was nail-polish remover (21.2%), followed by cologne (15.1%) and hand-sanitizer (12.1%). Bilaterality was present in 12.1%. The severity of burn was \geq Grade 4 in 20 patients (60.6%). Chemical injury resulted with LSCD in 18 (54.5%) patients. Surgery was performed (LSCD \geq Stage 2B) in 13 (39.3%) patients including limbal stem cell transplantation (LSCT) (n=7), amniotic membrane transplantation (AMT) (n=2), LSCT+ penetrating keratoplasty (n=3), LSCT+AMT (n=1). The mean follow-up time was 31.9 ± 28.6 months after the surgery. Final BCVA was 0.73 ± 1.61 logMar in patients who underwent surgery.

Conclusions:

The ocular chemical burn is a true ocular emergency that requires urgent and intensive treatment. In pediatric population, accurate diagnosis and management of the ocular chemical burns are challenging. Also, the severity of burn and consequently the rate of LSCD tend to be higher in pediatric age. It is crucial to prevent ocular chemical burns by eliminating environmental risk factors.

Cornea

PP388

Accuracy of total corneal topographic astigmatism (CorT Total) compared to Total Keratometry (TK)

Presenting author: Noel Alpins, Australia

Purpose:

To compare the accuracy of corneal measures by assessing ocular residual astigmatism (ORA) using total corneal topographic astigmatism (CorT Total) to total keratometry (TK) measured from the Zeiss IOL Master 700.

Setting:

NewVision Clinics, Melbourne, Australia

Methods:

The CorT Total parameter is calculated using all the data captured during tomography, including posterior cornea for virgin eyes assessed for refractive laser surgery. The CorT Total generated from the CSO Sirius was then compared to the TK calculated from the Zeiss IOL Master 700. The comparisons were made using the ORA, which quantifies corneo-refractive differences between the corneal measurement and the manifest refractive cylinder at the corneal plane. A low mean of the ORA magnitude indicates a close correlation of refractive and corneal astigmatism magnitudes. A low spread (ORAsd) indicates a low variability between corneal astigmatism and refractive cylinder.

Results:

The mean ORA magnitude for the CorT Total (n= 200) was 0.59D and TK was 0.62D; the ORAsd for the CorT was 0.35D and for the TK was 0.35D. There was a statistically significant difference in the ORA magnitude (p=0.013).

Conclusions:

The CorT Total from Sirius tomography displayed a lower, better ORA magnitude than the total keratometry (TK) from the IOL Master 700 but was equivalent with the ORAsd. The CorT Total can be used as an accurate measure and benchmark of total corneal astigmatism when planning toric IOL and corneal surgery.

Cornea

PP389

Endothelial Cell Loss Rate Following Penetrating Keratoplasty: Optical versus Therapeutic Grafts

Presenting author: Abdelrhman Shams, Egypt

Purpose:

To compare the rate of endothelial cell loss (ECL) following penetrating keratoplasty (PKP) for optical and therapeutic indications.

Setting:

Cornea Unit, Ain Shams University Hospitals

Methods:

This is a prospective, observational, comparative study that enrolled two groups; group 1 included 30 corneas of 30 patients who performed optical PKP for various purposes, while group 2 comprised 30 corneas of 30 patients who were planned for performing therapeutic PKP for unhealed, resistant corneal infections. Specular microscopy was done to all the patients at the 3-, 6- and 12-months visits using Nidek CEM-530 (NIDEK Co., Ltd. Japan) specular microscope.

Results:

There were no statistically significant differences between both groups as regards to the timing of the graft clarity following surgery or the rate of ECL at the 3- and 6- months intervals, yet the rate of ECL was significantly higher in group 2 compared to group 1 at the 12 months interval (P-value <0.05), though the statistical difference was narrow from a clinical point of view. There was also no statistically significant difference between both groups regarding the rate of grafts rejection.

Conclusions:

Therapeutic PKP can be considered non-inferior to optical PKP regarding the graft viability, the rate of ECL, and the rate of graft rejection along a follow up interval of one year.

Cornea**PP390****An update to the First in Human Safety Study with the EndoArt artificial corneal endothelial implant.****Presenting author:** Ivanka van der Meulen, Netherlands**Purpose:**

To report the follow up results of the implantation of an artificial corneal endothelial device, the Endoart (EyeYon, Israel). Currently the state-of-the-art treatment for corneal endothelial failure is the use of human donor tissue via tissue-banking and transplantation techniques. The Endoart device is an artificial dome-shaped disc replacing the endothelial layer intended for use in patients with corneal endothelial failure, that functions as a fluid gradient barrier, with the aim of providing corneal clarity, without the use of human donor tissue. The first in human study takes place in the Netherlands, Spain, and Israel. We report on the Dutch cohort.

Setting:

Department of Ophthalmology, Amsterdam University Medical Centers, location AMC, Amsterdam, the Netherlands.

Methods:

In this prospective safety study 5 patients with corneal endothelial failure were included. All patients had a corneal indication for endothelial keratoplasty surgery, but with concurrent severe monocular comorbidity which was expected to limit visual gain from endothelial keratoplasty, with good visual acuity in the fellow eye. The Endoart was implanted and positioned against the interior cornea, in most patients after removal of the diseased endothelium. Patients were followed as per protocol. Study parameters were device attachment, shift, re-bubble rates, suturing of device, cornea thickness and clarity, visual acuity, and adverse events.

Results:

Five patients (5 eyes) were implanted with an Endoart implant. The mean age was 67.7 years + 9.9 (range 57-82). All Endoart devices remained attached after initial re-bubbling, 2 devices were sutured. Corneal thickness decreased in 4 of 5 eyes, from a mean preoperative pachymetry of 906 + 157 micron to 708 + 150 microns. One patient developed an epithelial defect, most probably related to a herpes infection in the past. Another patient initially recovered good visual acuity, but the cornea thickened again peripherally, and a device exchange to a larger diameter is planned. No device related adverse events occurred.

Conclusions:

In the first 5 patients the Endoart was safely attached throughout the study period 3-18 months. In most patients the cornea thickness decreases, without thinning. Visual acuity improved in 2 patients, even though patient selection for the first in man study included only eyes with a guarded visual prognosis. Ongoing study is being done to improve the procedure and its outcomes.

Cornea

PP391

The effects of laser displacement on femtosecond laser-assisted conjunctival autograft preparation for pterygium surgery

Presenting author: Valencia Foo, Singapore

Purpose:

To evaluate the effects of no-suction femtosecond laser (FSL) stability on conjunctival autograft (CAG) dissection in pterygium surgery.

Setting:

Singapore National Eye Centre, Singapore

Methods:

Prospective analysis of 35 eyes from 34 subjects who underwent femtosecond laser-assisted pterygium surgery with the Ziemer Z8 laser (Ophthalmic Systems AG, Switzerland). Intraoperative absolute FSL displacements were measured and correlated with the duration and ease of CAG peel, CAG thickness, measured with intraoperative optical coherence tomography, and deviation from intended graft thickness.

Results:

Median absolute FSL displacement was 22 μm (interquartile range [IQR] 14.7 to 60.8), while median vertical FSL displacement was 14.7 μm (IQR 7.3 to 44) and median horizontal FSL displacement was 22.0 μm (IQR 14.7 to 44). Median duration of CAG peel was 5.4 seconds (IQR 3 to 21.4). Eyes with more difficult peels and longer duration of CAG peels had significantly greater vertical FSL displacements ($p=0.04$ and 0.02 respectively), but not horizontal displacement, CAG thickness or deviation from original thickness, compared to those with better quality and shorter duration peels.

Conclusions:

Micro-displacements during the suction-free CAG preparation are common but they did not affect the quality of the CAG peel, duration of peel, or CAG thickness. However, vertical globe displacement during FSL-assisted CAG creation was significantly associated with a more difficult and longer CAG peel duration. This highlights the importance of the cornea traction suture fixation to ensure stability of the eye during FSL application.

Cornea

PP392

A Novel carrier and technique for delivery by injection of in-advance pre-loaded endothelial grafts for DSAEK through a small wound

Presenting author: Eric Abdullayev, United States

Purpose:

To introduce a novel carrier and technique for delivering by injection of in-advance preloaded DSAEK grafts through smaller 3.2 mm wound

Setting:

Study performed at Lions Eye Institute for Transplant and Research

Methods:

Novel DSAEK graft glass carrier was used with human donor corneas with healthy endothelium but not suitable for transplant. We compared the endothelial viability of 8mm corneal grafts with thickness an average 80 microns pre-loaded into the novel carrier for period 24hrs (n=13) and 48 hrs (n=5). Then connected to BSS loaded 3ml syringe and unloaded by injection. Specular microscopy, vital dye staining was performed, and devitalized areas were semi-quantitatively assessed by digital imaging. Digital images were processed with ImageG-win64 software. Insertion wound size was measured. Grafts position after overnight shipping was evaluated.

Results:

All insertions were performed through 3.2 mm wound size and grafts unloaded by injection without observed difficulties. Mean devitalized areas 5.5% after 24 hrs and 4.4% after 48hrs hours preloaded were observed. Average endothelial cell density prior to preloaded (2735 cells/mm²) weren't significantly different when compared than for 24 hrs (2799 cells/mm²) and 48 hours (2688 cells/mm²) preloaded. Same graft position observed after overnight shipping

Conclusions:

A novel glass carrier allows delivery by injection of in-advance preload DSAEK grafts into anterior chamber through significantly smaller 3.2 mm incision and demonstrates little endothelial damage and appears to be safe for the endothelial cells promoting better clinical outcomes

Cornea

PP393

Lenticule Patch Implantation in Corneal Pathologies

Presenting author: Burak Mergen, Turkey

Purpose:

To evaluate the initial clinical outcomes of the small incision lenticule extraction (SMILE)-derived lenticule patch graft for the management of corneal defects.

Setting:

Two different tertiary referral hospitals: University of Health Sciences Beyoglu Eye Training and Research Hospital and Basaksehir Çam and Sakura City Hospital, Istanbul, Turkey

Methods:

Patients who underwent SMILE-derived lenticule patch graft implantation with sutures between 2016 and 2020 were evaluated retrospectively. The etiology, logarithm of the Minimum Angle of Resolution (logMAR) equivalent best corrected visual acuity (BCVA), and globe integrity were evaluated. Additional surgical intervention and secondary surgeries were recorded.

Results:

Sixteen eyes of 16 patients (9 females, 7 males) were included in the study. The mean age of the patients was 48.9 ± 19.6 years (24-80). The most common underlying etiologies were corneal melting (18.7%), penetrating injuries (18.7%), and neurotrophic keratitis (18.7%). The etiology remained undefined in 4 patients (25.0%). Corneal integrity was achieved in all eyes after the procedure. The mean logMAR BCVA was 1.9 ± 0.8 before the surgery and became 1.2 ± 0.7 after the surgery. In three patients, amniotic membrane transplantation was performed together with a lenticule patch. Penetrating keratoplasty was performed in 4 patients (25.0%) after the procedure.

Conclusions:

Lenticule patch application in corneal defects is effective and reliable in preserving eye integrity. This method provides an advantage especially in patients who are not able to have a cornea transplant under emergency conditions until the cornea transplantation becomes possible.

Cornea

PP394

Lensectomy outcomes in Marfan syndrome using Radio frequency diathermy and inverted retropupilar iris claw intraocular lens implantation

Presenting author: Luis Izquierdo Jr, Peru

Purpose:

To evaluate visual outcomes and complications after retropupilar inverted iris claw intraocular lens (IOL) implantation in patients with ectopia lentis due to Marfan syndrome that underwent lensectomy assisted with a radio frequency diathermy for capsulotomy.

Setting:

Instituto de ojos Oftalmosalud, Lima, Peru

Methods:

Patients with ectopia lentis due to Marfan syndrome were included. A surgical technique consisting of anterior capsulotomy with Klott's radio frequency diathermy (Oertli Instrumente AG, Bernerck, Switzerland) and bimanual irrigation aspiration, followed by capsular lysis, anterior vitrectomy and retropupilar inverted Artisan aphakia (Ophtec, Groningen, Netherlands) IOL implantation was performed. The patients were followed up on postoperative day 1, then after a week, a month and a year. The uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), and complications were assessed after 12 months postoperatively.

Results:

27 eyes of 16 patients were included in the study. The mean age at surgery was $14.7 \pm SD10.19$ and mean post-operative follow-up period was 12.5 months. Mean corrected distance visual acuity (CDVA) showed a significant improvement from 0.7 ± 0.442 logMAR units at the baseline to 0.3 ± 0.296 logMAR units postoperative. Mean postoperative UDVA was 0.02 ± 0.25 LogMar. No IOL dislocation has been seen up to date and only 2 patients came back to our service with a free haptic, which was promptly repaired.

Conclusions:

Lensectomy in ectopia lentis with the aid of radio frequency diathermy and retropupilar inverted iris claw IOL implantation technique is of great aid to the surgeon. Both postoperative UDVA and BCVA improve and the rate of complications is minimal, being an excellent choice of treatment.

Cornea

PP395

A Substantial Alternative Treatment Of Progressive Keratoconus Disease With 24 Months Follow-Up Time Using Human Fresh Corneal Lenticule Implantation Obtained After SMILE Surgery

Presenting author: Anita Sylja Lokaj, Kosovo

Purpose:

The aim of the study is that to increase visual acuity and central corneal thickness in keratoconus progressive patients by implanting human fresh corneal intrastromal lenticule which obtained after smile surgery.

Setting:

Eye Hospital, Prishtina, Kosova 10000

Methods:

Forty eyes of 40 patients who applied to Department of Ophthalmology, Eye Hospital, Prishtina, Kosova were included in this longitudinal study. (NCT-04591587) Prior to the surgical procedure patients with progressive keratoconus were diagnosed by using Carl Zeiss equipment's such as slit-lamp microscopy, corneal tomography, anterior segment, optical coherence tomography AS-OCT. Twenty eyes underwent to human fresh corneal intrastromal lenticule, which obtained from patients who underwent small incision lenticule extraction (SMILE). The follow-up time was 24 months after human fresh corneal lenticule implantation. We assessed the patients' visual acuity and central corneal thickness in keratoconus progressive patients.

Results:

Results: The mean age of the patients was $27,35 \pm 5,24$ and 8 (40%) were women, 12 (60%) were men. Compared to preoperative values, CT changes from $(399,95 \pm 15,13)$ to $(476,40 \pm 9,91)$ 24 - months after operation. Preoperative values, K1 and K2 were significantly improved (K1 pre-op $48,51 \pm 0,74$ and post-op at 24 month K1 $47,43 \pm 0,769$; $p < 0,001$) and (K2 pre-op $53,78 \pm 1,41$ and post-op at 24 month; K2 $49,78 \pm 0,87$ $p < 0,001$); and 24 months significantly decreased according to pre-operative value. Moreover compared to preoperative values, UDVA (LogMAR) at the first month was significantly improved (pre-op $0,99 \pm 0,07$ logMAR) and 24 months ($0,51 \pm 0,12$, $p < 0,001$) significantly increased according to pre-operative values for UDVA (LogMAR).

Conclusions:

Our study demonstrated that to implant of human fresh corneal intrastromal lenticule to patients' with keratoconus is an important alternative treatment. Furthermore, that treatment may be latest approach to treatment of keratoconus due to more economic, comfortable for both patients and physicians.

Cornea

PP396

Microscope-Integrated Intraoperative OCT-Guided Big-Bubble Deep Anterior Lamellar Keratoplasty

Presenting author: DAVIDE DEMARIA, Italy

Purpose:

To evaluate the feasibility of microscope-integrated intraoperative optical coherence tomography (OCT) for real-time quantitative analysis of surgical planes in big-bubble deep anterior lamellar keratoplasty (DALK).

Setting:

San Maurizio Regional Hospital, Department of Ophthalmology, Bolzano, Italy

Methods:

In this interventional case series, intraoperative OCT-guided big-bubble DALK was performed in 16 consecutive eyes of 16 patients with keratoconus. Trephination depth was measured using the intraoperative OCT caliper tool. Aiming for a depth within 150 μm from the endothelial surface, the trephination groove was extended to a deeper plane using a 15-degree blade. Repeat OCT scans were taken to measure residual stromal thickness before insertion of the DALK probe from the bottom of the extended trephination. Caliper measurements, success rate of pneumatic dissection, and complications were recorded.

Results:

After trephination, residual stromal thickness exceeded 150 μm in all eyes and averaged 257.1 ± 42.5 μm . In each case, the initial trephination groove was extended to a depth within 150 μm from the endothelial surface (118.9 ± 27.1 μm). Pneumatic dissection succeeded in 12 eyes (75%). Type 1 bubble was obtained in 11 eyes. Perforation requiring conversion to penetrating keratoplasty occurred in 4 eyes during insertion of the cannula into a residual stromal bed of < 100 μm (n=2; 63 and 75 μm) or layer-by-layer dissection (n=2).

Conclusions:

Quantitative analysis of intraoperative OCT scans can be used to assist decision making on whether to proceed with pneumatic dissection or extend the trephination groove, thereby facilitating insertion of the injection cannula at the desired stromal depth.

Cornea

PP397

Sutureless Ambiodisk of the corneal epithelium defect for recurrent corneal erosion Syndrome: a prospective study of outcome and efficacy.

Presenting author: Mr Emad Mahmoud, Ireland

Purpose:

This study aims to evaluate the safety and success rate of Sutureless Ambiodisk of the Corneal epithelium for recurrent corneal erosion syndrome at Cork University hospital, Cork, Ireland in a prospective non-comparative intervention case study with one-year follow-up.

Setting:

Cork University hospital & South infirmary Victoria University hospital, Cork, Ireland.

Methods:

Patients with RCE who remained symptomatic despite on Lubrications drops for at least 6 months and use BCL were included. Pain score, duration and frequency of recurrent attacks, biomicroscopy exam, measure of epithelial defect, dilated fundoscopic exam, IOP check and AS-OCT were recorded. Patients treated with Ambiodisk under topical. Follow-up at 1 week, 1 months, 3 months, 6 months and 1 year. Success was defined as resolution of symptoms within one month of treatment and intact Corneal epithelium and partial success as a significant reduction in their symptoms can manageable by lubrication, and failure persistent patients' symptoms or worse.

Results:

52 eyes (50 patients) with recurrent Corneal Erosion Syndrome, Sharp trauma was 77% (n=40), Corneal dystrophy was 15.3% (n=8) and unknown was 7.7% (n=4). The mean age of the patients was 39 years and mean follow-up is 12 months. Three eyes lost follow up. 32 (65.3%) eyes were qualified as successes. 14(28.5%) as partial and 3 (6%) failure. No Intraoperative complication were observed. One patient developed bacterial keratitis one week postoperative, one developed HSK after two months and one has insignificant change in refraction. No visual deterioration of the patients.

Conclusions:

Sutureless Ambiodisk treatment of the corneal epithelium defect is safe and effective for patients with recurrent Corneal erosion syndrome.

Cornea

PP398

Corneal Remodeling: A femtosecond laser assisted technique to treat Keratoconus: 7 year- follow-up

Presenting author: Cesar Carriazo, Colombia

Purpose:

To analyze 7-year- outcomes of a femtosecond-assisted -technique to treat keratoconus.

Setting:

Clinica Carriazo, Barranquilla, Colombia Instituto de la Vision, Buenos Aires, Argentina

Methods:

One hundred and fifty cases which underwent Corneal Remodeling were analyzed. Regarding the procedure, anesthetic drops were instilled. A platform designed for femtosecond laser was used to perform the ablation: an 8 mm diameter-270 degree or 360 degree- keratectomy. Once ablation was completed, the edges of the resection were sutured with interrupted stitches. Age of the population was 36.28 ± 15.19 years-old.

Results:

Regarding postoperative 7-year-Uncorrected Distance Visual Acuity (UDVA) 0.47 ± 0.28 was obtained, sphere change changed from -3.69 ± 3.51 to -0.21 ± 2.21 and 100% of the cases changed preoperative Against-the-Rule or Oblique Astigmatism and presented postoperative With-the-Rule Astigmatism. Corrected Distance Visual Acuity (CDVA) came from 0.26 ± 0.14 to 0.81 ± 0.16 . After performing PRK procedure in 42 cases they achieved UDVA 20/30 or better. All of the cases gained at least 1 line of CDVA; 45% of the cases gained 4 to 6 lines of CDVA. Postoperative Coma Aberration decreased up to 80%.

Conclusions:

Corneal Remodeling is a safe technique. Produces a new corneal flattening, reduction of anterior chamber depth and decrease of optical aberrations. It allows surgeons to perform complementary procedures on a new profile.

Cornea**PP399****Management of Band keratopathy: problems and their solutions.****Presenting author:** Daria Dibina, Russian Federation**Purpose:**

To assess the results and long-term follow-up after treatment in patients with band keratopathy (BK) and to evaluate the efficacy and safety of various methods to restore a smooth ocular surface after removing the calcium deposits.

Setting:

S. Fyodorov Eye Microsurgery Federal State Institution, Moscow, Russia

Methods:

19 eyes of 17 patients with multiple causes of BK are described. At the preoperative examination cornea was revealed with various severity of BK from almost invisible opacities to rough surface disruption. BCVA was 0.065, median CCT was 636 μ m and median depth of calcific deposits–112 μ m. Scanning electron microscopy analysis of the evaporated tear fluid samples of all patients and control groups without BK was performed. We made EDTA chelation like a first step of management of BK in 15(16 eyes) cases, in 1 case-EDTA chelation with DSAEK, in 2 cases – penetrating keratoplasty and in 1 case(2 eyes)–mechanical debridement. One of our patients had 2calcific deposits recurrence.

Results:

In our practice, we used 27mg of K3-EDTA to produce 0.1%chelating solution and to remove corneal calcium deposits. If cornea was irregular we restored a smooth surface with diamond burr debridement with different forms and grits of burr and with PT. The sample from the corneal scarification was investigated by scanning electron microscopy, spectrometry and histological examination. Postoperatively BCVA in 1-month was 0.09, median CCT was 592 μ m and average epithelial thickness was 44 μ m. Postoperatively examination showed smooth surface without calcium deposits. Histological examination identified superficial calcification deposits. SEM revealed a bumpy surface with a multilayered symmetrical pattern. Elemental analysis of a corneal scraping was mainly composed of calcium, phosphorus and oxygen.

Conclusions:

It is important to find out a cause of the formation of BK to avoid recurrence of the disease. The goal of treatment is to remove the calcium opacities and restore a smooth ocular surface. Diamond burr superficial keratectomy and PTK are effective and safe methods to restore regular surface of the cornea. In most cases, In eyes with poor visual potential removing calcium deposits is performed mainly to improve ocular comfort.

Cornea**PP400****Three-dimensional visualization system: is there space for endothelial lamellar surgery?****Presenting author:** Alberto Morelli, Italy**Purpose:**

To evaluate and compare clinical outcomes, surgical time, and surgeon satisfaction of endothelial keratoplasty surgery using Traditional Microscope (TM) and 3D Heads-up Microscope (3D-M).

Setting:

Eye Clinic, Department of Neurosciences, Psychology, Pharmacology and Child Health, University of Florence, Italy.

Methods:

This prospective study included 36 patients affected by Fuchs Endothelial Dystrophy (FED) who underwent Descemet's membrane endothelial keratoplasty (DMEK). We divided patients in 2 groups of 18 patients each according to the visualization system used: Traditional and 3D Microscope systems (TM group and 3DM group, respectively). A surgeon feedback questionnaire was administered after every procedure. The following clinical parameters were evaluated: best corrected visual acuity (BCVA), central corneal thickness (CCT) and endothelial cell density (ECD) were documented before (baseline) and at 1,3 and 6 months after DMEK. Intra and post-operative complications were recorded.

Results:

Baseline assessments did not differ between the two groups (all $p > 0.05$). All the surgical times were significantly lower in the TM group except for the graft unfolding time was similar in both groups. Mean CCT declined at all post-operative follow-ups without statistically significant differences between the two groups. Moreover, BCVA, percentage of ECD loss and intraoperative and postoperative complication rate were similar between the two groups. Surgical satisfaction score was found better in the TM group, but without statistically significant difference between the two visualization systems.

Conclusions:

3DM can be safely employed in DMEK surgery with particular regard to the clinical outcomes involving no significantly higher risk of intraoperative complications compared to the TM assisted surgery. However, a longer surgical time found in the 3DM group, possibly due to a challenging learning curve, may lead to surgeon's disappointment. The main advantages of a Heads-up approach may be the improved ergonomic comfort during surgery, as documented by the surgical satisfaction questionnaire, and the better predisposition for educational purposes.

Cornea**PP401****Long-term follow-up of Ferrara intrastromal corneal ring segments in keratoconus****Presenting author:** edgar Lopes, Portugal**Purpose:**

To report the long-term follow-up of Ferrara Intrastromal Corneal Ring Segments (ICRS) (Ferrara Ring; AJL, Boecillo, Spain) for the management of keratoconus and assess the changes in the ABCD keratoconus staging system.

Setting:

Ophthalmology Department - Cornea and Transplant Unit, Central Lisbon University Hospital Center.

Methods:

The records of 42 eyes of 32 patients diagnosed with keratoconus and treated with Ferrara ICRS between 2013 and 2015 in a tertiary hospital (Central Lisbon University Hospital Center) were retrospectively reviewed. The following parameters were studied: corrected distance visual acuity (CDVA), refraction, keratometry (K), corneal asphericity, thinnest pachymetry, and ABCD staging system. The parameters were evaluated preoperative, one year, three years, and five years postoperatively.

Results:

The mean CDVA (decimal) improved from 0.38 (0.21) preoperatively to 0.75 (0.23) at 5 years ($P<0.001$). Topography showed flattening (preoperatively vs. 5 years postoperatively): mean medium K value reduced from 51.27 (4.01) to 48.89 (3.95) ($P<0.001$) and mean maximum K value improved from 61.74 (6.59) to 56.90 (5.88) ($P<0.001$). The mean asphericity at 8mm was -1.18 (0.44) preoperatively and -0.75 (0.47) at 5 years ($P<0.001$). The most variations happened in element A of ABCD classification: preoperatively was 4.40 (2.01), improving to 3.28 (1.8) at 1 year ($P<0.001$), and 2.46 (1.64) at 5 years ($P<0.001$). B and C elements also improved.

Conclusions:

After ICRS implantation, the CDVA and corneal asphericity improved at 1 year. The gain was maintained at 5 years follow-up. The postoperative corneal topography showed corneal flattening that improved over the follow-up period. Mean ABCD keratoconus staging before ring implantation was A3B4C2 and changed to A2B3C2 five years after surgery. The A element of the Belin ABCD staging system, representing the anterior surface curvature, was the most affected postoperatively.

Cornea

PP402

Descemet Membrane Endothelial Keratoplasty: 4 years Single-Center Experience

Presenting author: Ana Filipa Moleiro, Portugal

Purpose:

To evaluate the 4-year graft survival and clinical outcomes of the first case series after Descemet membrane endothelial keratoplasty (DMEK) in a tertiary hospital center.

Setting:

Retrospective, single-center, observational cohort study that took place in Centro Hospitalar Universitário São João (Porto, Portugal), a tertiary university hospital.

Methods:

Retrospective revision of the 46 DMEK surgeries performed between 2016 and the end of 2020. Main outcome parameters (survival graft, best-corrected visual acuity [BCVA] in logMAR scale, central endothelial cell density [ECD]) were recorded. Postoperative complications and need for subsequent keratoplasties were documented. Twenty-five (54%) patients were female while 21 (46%) were male. Mean recipient age was $66,8 \pm 13.9$ years (range, 25-86 years).

Results:

The leading indication for surgery was Fuchs Dystrophy, followed by Bullous Keratopathy and failures of previous transplants. Five eyes needed rebubbling. Allograft rejection was diagnosed in one eye. Overall graft survival was 86,9% at six months, 84,7% at 1 year and 82,6% at 2 years. Seven eyes underwent retransplantation. At 4-year follow-up (N=8), only one patient present graft compromise. BCVA improved from 0.8 ± 0.7 before surgery to 0.2 ± 0.6 logMAR units at 1 year ($p < 0.001$). At 4-year follow-up, mean BCVA is 0.3 ± 0.6 logMAR units. Average preoperative donor ECD was 2636.1 ± 422.6 cells/mm² which decreased to 1420.5 ± 502.9 at 1 year and 1137.6 ± 443.9 at 2 years.

Conclusions:

The majority of eyes that underwent DMEK showed stable clinical outcomes with a significant improvement in visual acuity. The incidence of postoperative complications is higher in the first years which may represent the learning curve of the DMEK technique. The overall results suggest that DMEK may be a safe and effective treatment option for corneal endothelial diseases.

Cornea

PP403

Is Viscoelastic IOL protection an option when performing DMEK, DSEK or PDEK with an already present Hydrophilic IOL

Presenting author: Michael Tsatsos, Greece

Purpose:

Hydrophilic IOL opacification has been described following DS(A)EK and DMEK especially following repeated injection of air as in rebubbling. As many of the patients referred to our tertiary centre for Endothelial failure were already pseudophakic often with a Hydrophilic IOL, we adjusted our technique to perform DS(A)EK, DMEK and PDEK with a miotic pupil and to inject a small amount of Dispersive Viscoelastic in the pupillary area over the IOL prior to final/complete air injection in the Anterior chamber.

Setting:

Aristotle University of Thessaloniki

Methods:

10 DS(A)EK, 10 DMEK and 10 PDEK consecutive cases with an already present Hydrophilic IOL performed by a single surgeon were followed up for a period of 3 years.

Results:

One DMEK patient that required 2 rebubbings developed central IOL opacification 18 months following DMEK. Two other patients (1 DMEK and 1 PDEK) required 1 rebubbling but the Hydrophilic IOL remained clear throughout the Follow-up period. No other complications were seen

Conclusions:

Intraoperative miosis and small amount of dispersive viscoelastic over the IOL in the pupillary area appear to greatly reduce the possibility of IOL opacification even in the presence of a Hydrophilic IOL.

Cornea

PP404

Lamellar keratoplasty for limbal dermoid cyst in Goldenhar syndrome

Presenting author: Víctor Lázaro-Rodríguez, Spain

Purpose:

To describe the surgical management of a limbal dermoid in a case of Goldenhar syndrome (GS). GS or oculo-auriculo-vertebral dysplasia is a rare congenital disorder arising from the abnormal development of the first and second branchial arches. The estimated incidence is 1:5600, with male preponderance. It has a multifactorial etiopathogenesis involving genetic and environmental factors as well as maternal illnesses during pregnancy. GS is characterized by mandibular hypoplasia, ocular and auricular malformations, and vertebral anomalies. The common ophthalmic anomalies are limbal dermoid, epibulbar dermoid and upper eyelid coloboma. The dermoid cyst is a benign tumor although with serious ophthalmologic sequelae.

Setting:

Cornea and Ocular Surface Unit and Paediatric Ophthalmology Unit, Barraquer Ophthalmology Centre, Barcelona.

Methods:

A 3-year-old male presented with a congenital lesion in his left eye (LE). Ocular examination of the LE revealed an inferotemporal limbal dermoid cyst measuring 5 x 4 mm, involving the cornea upon 3 mm in diameter and the corneal stroma in depth. Best corrected visual acuity was 20/40 in the right eye and 20/80 in the LE. Refraction identified against the rule astigmatism of 3.5 diopters in the LE. On systemic examination, a left preauricular appendage and a mild left mandibular hypoplasia was detected. These findings were consistent with the diagnosis of Goldenhar syndrome. Personal history revealed gestational anemia.

Results:

Due to the presence of amblyopia caused by against the rule astigmatism and also because of the esthetic alteration, surgical excision of the dermoid cyst and lamellar keratoplasty was performed. The result of the anatomopathological study revealed fragments presenting epidermis and pilosebaceous follicles consistent with dermoid cyst. After the surgery, orthoptic treatment for amblyopia with occlusion was started to correct the amblyopia. At one year, best corrected visual acuity of the LE was 20/32, considered as normal for a 4-year-old child.

Conclusions:

A child with GS presenting to an ophthalmologist demands an early detection of potentially vision-threatening anomalies. Visual acuity may be reduced due to coexisting amblyopia, astigmatism, and obscuration of the visual axis by the tumor. Irritation by the protruding cilia may also be a presenting feature. The purpose of surgical treatment is to prevent amblyopia or aesthetic considerations. Surgical technique depends on the size and depth. Fast intervention in the first years of life provides a faster recovery and a better quality of life. A thorough multi-system evaluation is necessary to rule out associated systemic anomalies and possible multispecialty management.

Cornea

PP405

Clear Lensectomy with Toric IOL Implantation After Corneal Collagen Cross-Linking In selected cases of Progressive Keratoconus

Presenting author: Waleed Ali Abousamra, Egypt

Purpose:

To evaluate the visual and topographic outcomes of a two-stage approach treatment for selected cases of progressive keratoconus (KC); Corneal Collagen Cross-Linking (CXL) followed by phacoemulsification with toric IOL implantation

Setting:

Mansoura Ophthalmic Center, Mansoura university

Methods:

The study included 9 eyes of 6 patients diagnosed with progressive keratoconus, aged from 35 to 47 years (41.6 ± 11.2). All studied eyes underwent a 2-stage approach treatment: first corneal collagen cross-linking (CXL) followed after at least 6 months by phacoemulsification with foldable toric intraocular lens (IOL) implantation in both eyes of 3 patients and only one eye of the other 3 patients. A complete ophthalmological examination was performed preoperatively and postoperatively. Topographical and visual outcome were evaluated during one-year follow up period.

Results:

At baseline, sphere ranged from -3.00 to -8.00 diopter and cylinder from -3.50 to -5.50 diopter. All eyes could be corrected to 6/18 or more. At 6 months after CXL, steep K and K max decreased significantly from baseline, with no change in visual acuity or refraction. After phacoemulsification with toric IOL implantation, sphere changed from $-5.74 \pm 1.88D$ preoperatively to $0.33 \pm 0.72D$ postoperatively ($p < 0.001$), and cylinder changed from $-4.53 \pm 0.98 D$ to $-1.10 \pm 0.76 D$ ($p < 0.01$). There was significant improvement in mean uncorrected and corrected distance visual acuity. All patients were satisfied with the visual improvement.

Conclusions:

This 2-stage approach in selected cases of progressive keratoconus is safe and effective procedure regarding keratometric stability, visual and refractive results.

Cornea

PP406

Globe rupture revealing osteogenesis imperfecta

Presenting author: Imad MESSAFI, Morocco

Purpose:

Osteogenesis imperfecta (OI) is a connective tissue disorder resulting from abnormal collagen type1 . It is characterized by different clinical manifestations including skeleton, ears, eyes, teeth, skin and joints. Ocular features of OI are various , from which we site megalocornea, keratoconus , keratoglobus, blue sclera, spontaneous globe rupture, primary optic atrophy, papilledema, congenital glaucoma, cataracts, dislocated lens and choroidal sclerosis .Treatment is essentially based on prevention of traumas, physical aids and surgery.

Setting:

Ophthalmology department, Mohammed VI university hospital, Oujda, Morocco

Methods:

We report a case of spontaneous globe rupture revealing OI in young woman.

Results:

A 31-old women was admitted for painful left eye occurring spontaneously. Her medical history showed congenital deafness. Examination : light perception, circular corneo-limbal wound from 5h to 12h with choroid protrusion, a keratoglobus in the right eye with central opacity, which made corneal topography difficult .We noticed that patient had joints laxity, scoliosis and bone deformities related to multiple traumas, confirmed by radiographies. The mother confirmed that “blue sclera “presence at birth. We concluded to a brittle cornea syndrome overlapping with OI. Visual acuity was still limited to light perception and she was addressed to ENT and orthopaedics specialists.

Conclusions:

We report a unique case of osteogenesis imperfecta overlapping with brittle cornea syndrome, causing a spontaneous globe rupture occurring in a fragility zone of a thinned cornea. The diagnosis was essentially made by discovering keratoglobus, then linking it to the other systemic manifestations. Our case enlightens the importance of the early recognition of OI, in order to prevent ocular and extra-ocular complications and provide a better quality of life to these patients.

Cornea

PP407

New technique of corneoscleral transplantation for end stage of acanthamoeba keratitis. Case report.

Presenting author: Igor Iskakov, Russian Federation

Purpose:

To assess safety and efficiency of new technique for surgical treatment of end stage infectious corneal disease.

Setting:

S. Fyodorov Eye Microsurgery Federal State Institution, Novosibirsk Branch, Russia

Methods:

Contact lens wearer with recurrent acanthamoeba keratitis of both eyes after LKP, PKP x3, secondary cataract - OD, PKP, closed vitrectomy - OS within 2,5 year of disease onset. Medical therapy wasn't effective. OD had light perception with projection, OS without projection. Sclera of donor globe was cut by 16,0 mm trephine. Corneoscleral graft was separated by blunt spatula. Perytomy, dissection of recipient cornea and extracapsular cataract extraction were performed. The graft was first fixated with four mattress sutures (through the recipient corneal lip), with 16 interrupted sutures around scleral rim. Conjunctiva was fixed to the limbus of the graft.

Results:

No intraoperative or postoperative complications were noted. Soft contact lens for promoting full reepithelization was used long time after surgery. The conjunctival sutures were deleted in one month after surgery. Immune suppression with systemic cyclosporin A and additional steroids was performed. Transplanted corneoscleral graft was transparent during 12 months follow-up. Uncorrected distant Snellen VA of right eye was 0,3 and corrected one (sph 4,0 cyl 3,5 ax 130) was 0,5. The minimum thickness of transplanted cornea controlled by coherent optical tomography was 534 micron. The average density of endothelial cells of transplanted cornea was 1811 cells/mm². Intraocular pressure was normal.

Conclusions:

New approach of surgical treatment in patients with end stage of acanthamoeba keratitis was approved. The proposed method of cutting a corneoscleral transplant with full thickness scleral rim and its fixation to the recipient's eye using mattress sutures is a simple, safe and effective procedure.

Cornea

PP408

A Difficult case of DSEK

Presenting author: ALESSANDRA BALESTRAZZI, Italy

Purpose:

Describe a complicated case of DSEK in perforating Keratoplasty outcomes.

Setting:

Ophthalmic Hospital, Rome

Methods:

A male of 70 aa, with a PK 2 years earlier (for scar ectasia), was on the waiting list for cataract surgery. Surgery was postponed from March to November 2020 due to the lockdown . Meanwhile the cataract became ambroid and during the surgery it was necessary to use more US than normal. The surgery took place without complications but the cornea did not resume perfect transparency due to epithelial edema. We decided to do a DSEK with a difficult endothelium removal due to an irregularity of the junction with the tendency to diastasis of the corneal scar.

Results:

Next day the corneal button was not adherent. The patient was subjected 2 times to rebubbling at the slit lamp with filling for 2/3 of the AC without success. Thinking that a trouble could be the irregularity of the scar in the superonasal sector, we decided to revise the corneal scar in that sector and to affix sutures that also passed through the corneal lenticule and introduction of air in AC. The next day the lenticule was more adherent and 2 weeks later it was fully adherent.

Conclusions:

The adhesion of the corneal button in DSEK can be more difficult after PK, in these cases an option can be the revision of the scar of the previous transplant and the suture fixation of the graft in the sectors most difficult to adhesion.

Cornea

PP409

First DMEK technique performed in Virgen de Valme University Hospital

Presenting author: Francisco Rosales Villalobos, Spain

Purpose:

Our main objective is to describe the procedure of the first DMEK technique done in Virgen de Valme University Hospital.

Setting:

Virgen de Valme University Hospital, located in Seville, Spain, is a medium-sized Hospital whose Ophthalmology department is pioneer in some ophthalmological intervention techniques.

Methods:

A 74-year-old male patient suffering from corneal decompensation secondary to cataract surgery, is operated for DMEK. The donor's lamellar graft was partially prepared in the Eye Bank. In the operating room the 8.0mm graft is stained and removed. Subsequently, we proceeded to descemetorrexhis of 8.5mm, accessing through a 2.7mm main incision and two accessory ones. Finally, the lamellar graft was implanted, unfolding and placing it, fixing it with an air bubble in the anterior chamber. The patient is instructed to remain supine position during the immediate postoperative period.

Results:

The immediate postoperative period passed without alterations. Afterwards, there was a partial dislocation of the graft, for which a postoperative rebubbling was necessary. Intraocular pressure remained balanced without notable increases. There were no other complications. The patient achieved an increase in the Corneal Endothelial Cell Density (CECD) from 484 cells/mm² (preoperative) to 2432 cells/mm² one month after the intervention.

Conclusions:

DMEK has clear advantages over classic penetrating keratoplasties, such as greater safety and control of the surgery, a faster post-operative recovery and visual acuity, achieving better results. Regarding its comparison with other lamellar techniques such as DSAEK, despite being a slightly more complicated technique to carry out, the postoperative period is faster and visual acuity was found to improve at least as much as DSAEK.

Cornea

PP410

Corneal decompensation and glaucoma associated with NewColorIris cosmetic iris implant 10 years after implantation: Explant surgery, DMEK and scanning electron microscopy study

Presenting author: MARÍA VICTORIA DE ROJAS, Spain

Purpose:

To present a case of explantation of an NewColorIris cosmetic iris implant (CII) and DMEK 10 years after implantation, -the longest reported interval in the literature-, together with the results of the scanning electron microscopy study of the implant

Setting:

Department of Ophthalmology Complejo Hospitalario Universitario A Coruña, Spain

Methods:

A 46 year-old man was referred for CII explantation and treatment of corneal decompensation in the right eye. He had underwent CII implantation 10 years before in both eyes. His BCVA was 20/40 OD and 20/20 OS. Intraocular pressure was 18 mmHg OD, 15 mmHg OS with timolol/brimonidine combination in both eyes. Fundus examination was unremarkable. He underwent CII removal and DMEK in the right eye. The patient refused to explant the CII preventively in the left eye. His left cornea eventually decompensated. CII explantation together with DMEK was performed in the left eye 11 months later.

Results:

Postoperative gonioscopy revealed an open angle with anterior synechia in both eyes. Final CDVA was 20/20 OD and 20/23 OS, intraocular pressure of 13 mmHg OD and 10 mmHg OS under treatment with dorzolamide, timolol and brimonidine. Corneas are clear with postoperative endothelial cell density of 1648 cl/mm² OD and 1974 cl/mm² OS. Scanning electron microscopy showed irregularity of the CII surface and borders.

Conclusions:

Severe complications are associated with iris cosmetic implants that can present even ten years after implant surgery. As long as these implants are in the anterior chamber, ocular structures are at risk of developing complications. Patients with cosmetic iris implants should be warned of the potential blinding complications and advised explantation as soon as possible. Authors have no financial interest

Cornea

PP411

Corneal Stress Strain Index in Different Degree of Myopia

Presenting author: Vaishal Kenia, India

Purpose:

To study corneal stress strain index (SSI) in different degree of myopia

Setting:

Kenia Eye Hospital, Mumbai, India

Methods:

A prospective study design where myopic subjects aged between 18- 45 years with best corrected visual acuity of 20/20, IOP<22mmHg, corneal thickness >500 microns, corneal astigmatism <3.5D were included. Subjects with previous history of refractive surgery, any ocular or systemic disease, poor quality scans were excluded. Corneal SSI was obtained using Corvis ST. Further data was divided based on different degree of Spherical equivalent myopia (SEMyo)(Mild:≥0.75D to 3.00D, Moderate >3.00 to 6.00D and High >6.00 D) and Emmetropia (±0.50D). Statistical analysis was done using One Way ANOVA and P value <0.05 were considered statistically significant.

Results:

Fifty eyes of 25 subjects were enrolled in each grouped. The data was matched for age, IOP, and central corneal thickness (P>0.05). The Mean±SD SEMyo in emmetropia, mild, moderate and high group was -0.35±0.29, -1.86±0.58, -4.09±0.74 and -9.21±3.34D respectively (P<0.05). The Mean±SD corneal SSI in emmetropia, mild, moderate and high group was 0.84±0.10, 0.78±0.11, 0.78 ±0.09 and 0.74±0.11 respectively. One way ANOVA revealed significant higher SSI in emmetropia as compared to high myopic group (F=4.07, P=0.009) however Tukey Post hoc analysis revealed non statistical difference SSI among mild, moderate and high myopia.

Conclusions:

Corneal SSI is lower in high myopia suggesting softer cornea in high myopia.

Cornea

PP412

Differences in Central Corneal Thickness Measurements By Corneal Topography, Anterior Segment Optical Coherence Tomography, and Specular Microscopy in high myopia

Presenting author: Mehmet Emin Sucu, Turkey

Purpose:

To compare the correlation and agreement between central corneal thickness measurements obtained using anterior segment OCT, combined scheinplflug tomography and placido disc topography system, and specular microscopy in high myopic (more than 6 D) eyes.

Setting:

University of Health Sciences Turkey, Beyoglu Eye Training and Research Hospital, Department of Ophthalmology, Istanbul, Turkey

Methods:

The medical records of myopic patients who had applied for refractive surgery evaluation were retrospectively reviewed. Patients with a full ophthalmic examination and central corneal thickness (CCT) measurements obtained by the Sirius corneal topography, the Spectralis Anterior Segment Module Optical Coherence Tomography (AS-OCT) and non-contact specular microscopy (SM) were included in the study. To avoid bias, measurements of only right eyes of patients were taken into consideration. Exclusion criteria were as follows: history of ocular disease, previous ocular surgery, recent use of contact lens, or tear film abnormalities.

Results:

Ninety-five eyes of 95 patients (48 females [50.52%], 47 males [49.47%]) met the inclusion criteria for the analysis. The highest measurement was obtained by the SM ($531.30 \pm 37.42 \mu\text{m}$; range, 444-621), followed by AS-OCT ($525.78 \pm 37.32 \mu\text{m}$; range, 450-620), then by corneal topography ($520.36 \pm 37.98 \mu\text{m}$; range, 430-603). A two-way analysis of variance test showed statistically significant differences between these means ($p < 0.001$). While the difference between the mean CCT values measured by SM and AS-OCT was not statistically significant ($p=0.75$), other 2 pairwise comparisons showed statistically significant difference ($p < 0.001$).

Conclusions:

In high myopic eyes, corneal topography underestimates CCT measurements compared to specular microscopy and AS-OCT. In clinical practice, AS-OCT and specular microscopy may be interchangeable in these patients.

Cornea

PP413

Early changes in corneal biomechanics after femtosecond laser-assisted laser in situ keratomileusis (LASIK) and photorefractive keratectomy (PRK)

Presenting author: Ana Marta, Portugal

Purpose:

To evaluate the changes in dynamic corneal response second-generation parameters and biomechanically corrected intraocular pressure (bcIOP) measured by a dynamic Scheimpflug analyzer – the OCULUS Corvis® ST - before and after femtosecond laser-assisted laser in situ keratomileusis (LASIK) and photorefractive keratectomy (PRK).

Setting:

Refractive Surgery Unit of Ophthalmology Department of Centro Hospitalar Universitário do Porto, Oporto, Portugal

Methods:

Observational cross-sectional study that included consecutive 61 eyes (of 31 patients) who underwent laser vision correction in our department: 41 submitted to femtosecond-assisted LASIK (group 1) and 20 to PRK (group 2). The primary outcome variables were deformation amplitude ratio 1.0 mm (DA-Ratio), stiffness parameter at first applanation (SP-A1), Ambrósio relational thickness through the horizontal meridian (ARTh), integrated radius (IR), corvis biomechanical index (CBI) and bcIOP before the procedure, 1 week and 1 month postoperatively.

Results:

At 1 week, the DA-Ratio($p < 0.001$), IR($p < 0.001$) and CBI($p < 0.001$) increased and SP-A1($p < 0.001$), ARTh($p < 0.001$) and bcIOP($p = 0.001$) decreased in both groups, but ARTh decreased more($p = 0.011$) and CBI increased more($p = 0.006$) in group 1. At 1 month, in group 1, the DA ratio($p = 0.768$) and bcIOP($p = 0.171$) became similar, IR($p < 0.001$) and CBI($p < 0.001$) maintained higher and ARTh($p < 0.001$) and SP-A1($p < 0.001$) maintained lower, comparing to preoperative values. In group 2, the IR($p = 0.099$) and SP-A1($p = 0.673$) became similar, the bcIOP became higher($p = 0.018$), DA-Ratio($p = 0.001$) and CBI($p < 0.001$) maintained higher and ARTh($p < 0.001$) maintained lower. At 1 month, the decrease of ARTh is similar($p = 0.137$) but increase of CBI is higher($p = 0.001$) in group 1 than in group 2.

Conclusions:

The dynamic Scheimpflug analyzer showed early differences in biomechanical measurements after both laser refractive surgeries studied. At 1 week the changes were in the same direction in both groups, with all parameters showing fewer stiffness corneas. At 1 month, the changes were different between groups, with normalization of 2 biomechanical parameters in group 2, indicating a lesser biomechanical effect with PRK.

Cornea**PP414****Efficacy and safety after corneal collagen crosslinking in pediatric patients:
One-year follow-up****Presenting author:** Ozlem Dikmetas, Turkey**Purpose:**

Early diagnosis and intervention are important to be the effective means of stopping the progression in keratoconus cases detected in childhood. Corneal collagen cross-linking (CXL) is the most effective treatment method that has been shown to stopping the progression. This study aims to evaluate the standard corneal CXL results in pediatric age group patients with keratoconus.

Setting:

Hacettepe University Faculty of Medicine, Ankara, Turkey

Methods:

Retrospective review of consecutive progressive keratoconus cases of corneal standard CXL using a standardized protocol for treatment and examinations was performed. Eighteen eyes of 18 patients younger than 18 years old who were followed up for at least 1 year, were analyzed. The best corrected visual acuity (BCVA), corneal topography (Sirius, Costruzione Strumenti Ophthalmici, Florence, Italy), keratometry and pachymetry values were recorded before and in the first year after the procedure. Only one eye of each patient was evaluated in statistical analysis. Paired t test was used in statistical analysis.

Results:

Eighteen eyes of 18 patients with a mean age of 16.9 ± 1.3 (13-18) were included. While the initial BCVA was 0.4 ± 0.3 logMAR, after the CXL was 0.3 ± 0.2 logMAR ($p = 0.01$). There was no vision-threatening complication associated with CXL. Preoperative maximum keratometry (Kmax), K1 and K2 values were 55.4 ± 3.4 (51.9-61.8), 46.5 ± 3.2 (44-53.9), 50.5 ± 2.8 (47-55.9), while Kmax, K1 and K2 values after the CXL 55.2 ± 3.3 (49.9-61.8), 46.6 ± 3.3 (41.6-54.7), 50.5 ± 2.9 (45.8-55.5) ($p=0.384$, $p=0.579$, $p=0.766$). There was no statistically significant change in the mean central corneal thickness ($p=0.037$).

Conclusions:

Conventional corneal CXL effectively halts the progression of keratoconus in pediatric age groups in long-term follow-up with visual, refractive, tomographic and aberrometric efficacy. In this study, it was shown that the progression of keratoconus disease can be prevented by corneal CXL treatment in pediatric patients. In the literature, little information is available on the outcomes of conventional CXL when examined according to age (adult or pediatric) when the treatment was performed. In the pediatric age group, the importance of correct approach to keratoconus patients in early period was emphasized.



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PP415

Scheimpflug analysis of Corneal haze following Collagen Cross linking for Keratoconus: Comparative Evaluation of Standard epithelium- off, Contact Lens assisted and Transepithelial CXL technique

Presenting author: BARKHA GUPTA, India

Purpose:

To evaluate changes in corneal backscattering using Scheimpflug densitometry after corneal collagen cross linking (CXL) for progressive keratoconus over 1 year. To compare course of corneal haze with different techniques- standard epithelium- off CXL, contact lens assisted (CACXL), and transepithelial (TECXL).

Setting:

Hospital based study (Post Graduate Institute of Medical Education and Research, Chandigarh, India)

Methods:

A retrospective study. Data of eyes that underwent CXL was collected, and 94 eyes were included in the study (standard CXL: 47, CACXL: 30 and TECXL: 17). Corneal haze was quantified using Scheimpflug tomography (Pentacam AXL, Oculus Optikgerate GmbH) in three layers- anterior 120 μm , posterior 60 μm and middle stromal layer, and each layer divided into four annular concentric zones of 0 to 2mm, 2 to 6mm, 6 to 10mm and 10 to 12 mm. Imaging was done pre and post CXL at 1 month, 3 months, 6 months and 12 months.

Results:

The baseline mean density score of central anterior stromal layer was 16.14 ± 7.07 , 15.85 ± 7.89 and 15.89 ± 7.21 in standard CXL, CACXL and TECXL group respectively ($p 0.93$). After standard CXL, the mean score increased to 28.83 and 31.34 at 1month and 3months respectively (both $p < 0.001$) and dropped at 6months (28.66, $p < 0.001$) and 12months (23.72, $p 0.003$). Post CACXL, the mean densitometry peaked at 3months (20.35, $p 0.14$) and returned towards baseline at 6months (18.82, $p 0.15$). After TECXL, it increased slightly at 1month (18.47, $p 0.17$) and decreased at 3months (14.88, $p 0.7$) plateaued over 1year.

Conclusions:

Corneal haze increased significantly after standard CXL peaking at 3 months and slow downfall in 6-12 months, returning to baseline at 12 months. Contrastingly, post TECXL and CACXL there was only a slight increase in anterior corneal haze which returned to baseline within 3- 6 months. Corneal haze mainly developed in anterior stromal layer with minimal change in posterior layer. No correlation with visual acuity was seen.

Cornea

PP416

Progressive keratoconus treatment using partial topography-guided PRK combined with customized CXL.

Presenting author: Sara Geada, Portugal

Purpose:

To evaluate the visual, refractive and keratometric outcomes of an innovative technique consisting of customized corneal crosslinking (CXL) combined with partial topography-guided photorefractive keratectomy (t-PRK) for the treatment of progressive keratoconus (KC).

Setting:

Unidade de Oftalmologia de Coimbra (UOC), Coimbra, Portugal; Ophthalmology Unit, Centro Hospitalar e Universitário de Coimbra (CHUC), Coimbra, Portugal; Clinical Academic Center of Coimbra (CACC), Coimbra, Portugal; University Clinic of Ophthalmology, Fac

Methods:

Prospective interventional case series. Consecutive patients with progressive keratoconus underwent partial topography-guided PRK combined with same day customized CXL consisting of ultraviolet (UV)-A irradiation of 365 nm wavelength delivered in an accelerated (10 mW/cm²) exposure in a 3-zone pattern. A total dose of 10 J/cm² was delivered at the thinnest point, surrounded by concentric areas of 7.2 J/cm² and 5.4 J/cm². Best corrected distance visual acuity (CDVA), refractive error and keratometric results were assessed at baseline and at a minimum of 3 months postoperatively.

Results:

Six eyes from 6 patients, mean central corneal thickness of 468.33 μm, were included. Average CDVA improved from 0.37 at baseline to 0.15 logMAR over a postoperative mean follow-up of 7.33±3.72 months, with all patients gaining 2 or more lines of vision. Refractive astigmatism improved in all patients, with mean values decreasing from 3.50 D to 2.38 D and with a maximum reduction of 3.50 D observed in one patient. Maximal curvature (KMax) and steep keratometry reading (K2) improved from 56.02±3.10 to 50.80±2.11 and from 49.85±1.19 to 48.77±2.27, respectively. Complications were not observed during the course of the follow-up.

Conclusions:

These preliminary results seem promising in terms of biomechanical stabilization and functional improvement for KC patients, using a combined approach that incorporates customized cross-linking stabilization and refractive normalization with t-PRK.

Cornea

PP417

Cross-linking plus topoguided laser vs intrastromal corneal ring segments in a keratoconus phenotype

Presenting author: Rosa Pinheiro, Portugal

Purpose:

To compare two treatment modalities, cross-linking with topography-guided photorefractive keratectomy (CXL plus PRK) and intrastromal ring segments (ICRS) for a specific keratoconus phenotype, at 12 months of follow-up.

Setting:

A multicentre study involving two ophthalmology departments, Centro Hospitalar e Universitário de Coimbra and Hospital de Braga.

Methods:

This is a multicentre, retrospective clinical study comparing two similar groups of keratoconic eyes with a paracentral cone and coincident comatic and topographic axes. Group 1 had 37 eyes submitted to accelerated CXL plus partial topoguided PRK and Group 2 had 72 keratoconic eyes that underwent implantation of ICRS. Refractive and keratometric outcomes were analysed preoperatively and at 12 months after the procedure.

Results:

There were no statistically significant differences between the group 1 and group 2 improvements in BCVA (mean improvement 0.21 ± 0.21 logMAR and 0.13 ± 0.17 logMAR, respectively, $p=0.181$), mean reduction in K2 (group 1 improved 2.36 ± 1.97 D and group 2 improved 2.00 ± 1.78 D, $p=0.243$) and average K (1.47 ± 1.64 and 1.04 ± 3.16 D improvements in group 1 and 2 respectively, $p=0.144$). There were significant differences between groups in improvement of refractive sphere ($p=0.006$), which worsened only in group 1 (-1.67 ± 2.77 D) and Kmax ($p=0.001$), which improved only in group 1 (3.33 ± 2.93 D).

Conclusions:

Regarding treatment of paracentral cones with coincident topographic and comatic axes, both methods seem equally effective in improving BCVA.

Cornea

PP418

The comparative effectiveness of hypotonic vs isotonic riboflavin for corneal cross-linking: The Save Sight Keratoconus Registry

Presenting author: Stephanie Watson, Australia

Purpose:

To report the outcomes of eyes undergoing corneal cross-linking (CXL) for keratoconus with isotonic vs performed in 23 centres across Australia, New Zealand, and Europe

Setting:

Data from routine clinical practice was captured through the Save Sight Keratoconus Registry.

Methods:

A total of 771 eyes (654 patients; mean age \pm SD, 26.2 \pm 10.2 years; female, 45.3%) from the 23 international sites with epithelium-off CXL for keratoconus had follow-up data at one-year and met the inclusion criteria. 268 eyes (228 patients [31.1% female]) had undergone CXL with hypotonic riboflavin and 503 eyes (426 patients [31.2% female]) had CXL with isotonic riboflavin. Riboflavin duration was recorded. The outcome measures included changes in visual acuity, keratometry, minimum corneal thickness, and frequency of adverse events. Outcomes were compared using mixed-effects regression models adjusted for age, sex, visual acuity, keratometry, pachymetry, doctor, practice, and eye laterality.

Results:

Riboflavin was most commonly given for 30 minutes in both groups, 242 eyes having hypotonic vs 386 with isotonic CXL. The adjusted mean changes in outcomes were greater with hypotonic than isotonic CXL in visual acuity [6.42 standard error (SE) 1.58 vs 3.86 SE 1.39 logMAR letters respectively, $p=0.022$], K_{max} [-1.67 SE 0.36D vs -0.56 SE 0.29D respectively, $p<0.001$], $K2$ [-1.0 SE 0.28D vs -0.19 SE 0.21D respectively, $p 0.002$] or minimum corneal thickness [-27.8 SE 4.58 μ m vs -12.4 SE 4.14 μ m, respectively, $p < 0.001$]. The frequency of adverse events was higher in the hypotonic 10.1% vs isotonic 27% $p = 0.022$.

Conclusions:

This real-world observational study found that hypotonic riboflavin compared to isotonic riboflavin produced greater change in visual acuity and corneal parameters in keratoconus at one-year post-surgery in the real-world setting. Further investigation is needed to understand the patient groups most likely to benefit from the use of hypotonic vs isotonic riboflavin.

Cornea

PP419

Customized corneal crosslinking for keratoconus treatment

Presenting author: Zuzana Halasova, Czech Republic

Purpose:

Topography guided corneal crosslinking as a new method of keratoconus treatment is evaluated. This personalized customization of the UVA beam pattern to localization of the individual corneal conus should not only cause local stiffening but also enhanced flattening of the conus and therefore modify corneal shape and consequently improve visual functions. Topographic and subjective visual outcomes of customized crosslinking method (CuRV) for keratoconus treatment were assessed.

Setting:

Gemini Eye Clinic, Zlin, Czech Republic

Methods:

34 eyes with keratoconus grade 1-3 underwent customized topography guided cross-linking with epi-on protocol. Pulsed UVA 30 mW/cm² irradiation was delivered to the cornea in 3 circular areas with gradual increase in energy, where apex of keratoconus was exposed to the highest energy of 15 J, intermediate annulus getting 10 J and peripheral annulus only 7.2 J. Uncorrected (UDVA) and Corrected (CDVA) Distance Visual Acuity, spherical equivalent (MRSE), thinnest corneal thickness, endothelial cell density and maximal corneal curvature (Kmax) were recorded at 1 year follow-up.

Results:

We observed a significant improvement in Uncorrected Distance Visual Acuity (UDVA) with median decrease -0.175 logMAR (-0.25 to 0.0 logMAR, 95% CI) at 1 year visit. There was also significant improvement in Corrected Distance Visual Acuity (CDVA) with 0.0 logMAR median of difference (-0.1 to 0.0 logMAR, 95% CI). Corneal curvature map showed flattening of Kmax with mean decrease -2.7 D (-3.4 to -2.0 D, 95% CI). Endothelial cell density was stable and did not show significant changes 1 year after surgery. Thinnest corneal thickness shows slight decrease with median of difference -7.0 μ m (-22.0 to -1.0 μ m, 95% CI).

Conclusions:

Customized corneal cross-linking (CuRV) is showing promising results. There was no progression of keratoconus noted and treatment achieved marked topographic improvement with better functional vision. CuRV seems to be a safe and effective procedure. Financial disclosure: None

Cornea

PP420

Outcome of Customized Corneal Collagen Crosslinking (CuRV) for Keratoconus Patients in Oman – 24 Months Results

Presenting author: Rashid Alsaïdi, Oman

Purpose:

To report 24 months outcome of customized corneal collagen crosslinking (CuRV) for keratoconus patients in Oman. Keratoconus is a leading cause of visual impairment in the younger generation of Oman. New treatment modality would be much helpful in improving the visual function of these patients. This study was designed to assess the safety and efficacy of the novel application of customised corneal collagen crosslinking for keratoconus patients.

Setting:

This prospective study is carried out at the Ophthalmology Center, MOD-hospital, Muscat, Oman with 24 months follow up period starting from 2nd September 2018.

Methods:

Keratoconus patients in the age group of 12-30 with documented progression were included in the study. Epithelial ablation was done over the specific targeted area and corneal collagen crosslinking was carried out with application of Riboflavin followed by UVA light. The treatment area and energy levels were customized according to the topographic findings. Continuous illumination was used with an energy fluence of 30 mW/cm². Total energy levels were ranged from 5.4 J/cm² - 10 J/cm² with the highest energy being to the centre. Clinical evaluation included uncorrected distance visual acuity (UCVA), corrected distance visual acuity (BCVA), corneal topography, pachymetry and K-reading.

Results:

Total of 54 eyes were treated from 2nd September to 12th November 2018. 24 months follow-up data was available in 17 eyes for analysis. 16 eyes (94%) had improved or remained stable of UCVA while 1 eye (6%) showed further deterioration. All 17 eyes had improved or remained stable of BCVA. Considering the corneal steepness; 15 (88%) eyes showed reduction or stability in Kmax while 2 eyes (12%) showed further steepening. Change in the Topographical Keratoconus Classification (TKC); 8 eyes (47%) showed an improvement in TKC while 9 eyes (53%) remained same. No one showed further deterioration

Conclusions:

Epithelium-off customized corneal collagen crosslinking (Epi-Off CuRV) was safe and effective in stabilizing the progression of keratoconus at 24 months for most patients in this study group. Improvements in patient visual function are noteworthy. 2 years results of this novel application of collagen cross-linking are encouraging and longer-term data in larger studies are required. Studies using Epi-Off CuRV with pulsed, higher dose UVA may further inform treatment parameter efficacy.

Cornea**PP421****Effect of collagen cross-linking on contrast sensitivity, corneal aberrations and densitometry****Presenting author:** Adela Hulpus, United Kingdom**Purpose:**

To investigate the effect of corneal collagen cross-linking (CXL) on contrast sensitivity (CS), corneal aberrations and densitometry at 12 months after treatment.

Setting:

St. Paul's Eye Unit, Royal Liverpool University Hospital, Liverpool, United Kingdom

Methods:

Prospective, controlled study in which sequential patients undergoing unilateral CXL for progressing KC were included. All patients received accelerated CXL in the treated eye. Contralateral eyes served as control. The exclusion criteria were age less than 18, progressive disease in the control eye, presence of ocular comorbidities and TKC stage 4 KC. Visual acuity (unaided and pinhole), CS (Pelli-Robson unaided), maximum keratometry (Kmax), TCT (thinnest corneal thickness), aberrometry data (Pentacam) and corneal densitometry (Pentacam) were measured at baseline and at 1, 3, 6 and 12 months in both the treated and untreated eye. Wilcoxon matched-pairs signed-rank test was used

Results:

Forty-eight eyes of twenty-four patients (11 females) were included in the study. Mean age was 26.6 ± 5.7 years. Contrast sensitivity reduced from 1.14 ± 0.26 at baseline to 1.07 ± 0.26 at 6 months then increased at 12 months to 1.22 ± 0.27 . These changes were not statistically significant ($p=0.506$). VA increased at 12 months in the CXL group ($p=0.048$). This correlated strongly with the reduction of Kmax ($p=0.015$) and high order aberrations ($p=0.023$). Central anterior corneal densitometry was increased in the first 6 months after treatment then reduced to baseline values at 12 months. TCT remained stable.

Conclusions:

Our study did not find any significant change in CS and corneal densitometry at 12 months after CXL. However, these two parameters followed a similar trend. The densitometry increased in the first 6 months after the procedure with a simultaneous decrease in CS, and then returned to baseline values. At 12 months CS showed a trend toward improvement although not clinically or statistically significant. Further prospective studies with larger sample sizes, possibly utilising more repeatable contrast sensitivity softwares are required to assess whether this change might result in a significant difference. All wavefront aberration parameters showed improvement after CXL.

Cornea

PP422

Sympathetic Effect of Crosslinking in the Unoperated Contralateral Eye Post Cross-Linking – a Molecular and Clinical Profile

Presenting author: RITIKA MULLICK, India

Purpose:

Collagen cross-linking (CXL) is now a standard of care to arrest progressive keratoconus (KC) in patients. There have been anecdotal reports regarding stabilization of KC in the unCXLed contralateral eye in clinical practice. Hence, in this study we investigated the clinical and molecular changes in the unCXLed contralateral eye following CXL in the ipsilateral/other eye in KC patients.

Setting:

The study was approved by the institutional review board and patients were recruited following informed consent. It was conducted at a tertiary eye care centre in Bengaluru, India.

Methods:

KC diagnosis was based on clinical parameters including visual acuity, topographical features and structural deformity. Serial topographical map-based changes in Kmax upon patient follow-ups were used to determine progressive form of the disease. Tear fluid using schirmer's strips was collected from both the eyes of the study subjects (n=65;130 eyes) prior to CXL and 6 months post CXL. 30 tear soluble factors including cytokines, chemokines, cell adhesion molecules, growth factors and extracellular matrix remodellers were measured by bead-based multiplex ELISA using a flow cytometer.

Results:

A significant ($P < 0.05$) reduction in the Kmax between pre-op and follow up visit was observed in the CXL eye. No changes or increase in the Kmax was observed in the contralateral unCXLed eye between the visits suggestive of stabilization of KC. Further, reduction in the tear soluble factors including IL-1, IL-6, IL-17, IL-18, IL-33, NGAL, β 2microglobulin, MMP2, MMP9 was observed between the pre- and post-op visits in most of unCXLed contralateral eye.

Conclusions:

Trends towards reduction in clinical progression of KC along with reduction in key tear inflammatory factors and extracellular matrix remodellers were observed in the unCXLed contralateral eye between pre-op and follow up visits in KC subjects. This suggests the plausibility of a beneficial sympathetic effect in the unmanaged KC eye CXL in the contralateral eye, but further studies are needed to establish why it works only in certain cases.

Cornea**PP423****Use of ABCD Keratoconus Grading System to Assess Progression of Keratoconus Following Treatment with Corneal Cross-linking.****Presenting author:** Alexander Chorny, Israel**Purpose:**

To date, there is no consensus on a definition of keratoconus (KC) progression. ABCD grading system offers an assessment of progression by four different parameters, rather than the only K.max parameter. However, the ABCD display is built to recognize progression prior to cross-linking (CXL) intervention, as its efficacy has not been studied in patients after CXL. Therefore, the purpose of our study is to assess the accuracy of ABCD grading to recognize the progression of KC following CXL.

Setting:

Keratoconic population at Soroka University Medical Center (SUMC), Israel.

Methods:

In this retrospective cohort study, a population of consecutive patients who underwent CXL for progressive KC at SUMC between July 2014 and June 2017 was identified. Pentacam (Oculus) tomographic data of the most recent imaging taken before CXL and the next imaging performed at least 12 months following the treatment were collected. Statistical analysis was performed to examine correlations between worsening in maximal keratometry (K.max) and worsening in each one of the ABCD grades.

Results:

We identified 87 patients and excluded 22 patients due to poor quality of imaging. Overall, we included 70 eyes of 65 patients, with a mean follow-up 17.0 +/- 5.6 months. Strong and significant correlations were found between worsening in K.max and worsening in A ($p=0.001$) or B grades ($p=0.02$). No statistically significant difference was observed in tomographic parameters K.max and A and B grades before CXL and at least 12 months after. However, statistically significant increase in C grade, decrease in D grade, and decrease in pachymetry at the thinnest location were found.

Conclusions:

Worsening in parameters A and B is correlated with worsening in K.max. Worsening in parameter C is correlated with the expected thinning post-surgery. We suggest changes in A and B to be included in future study on CXL efficacy in order to provide a more comprehensive assessment of CXL efficacy. Worsening in A or B grades of the ABCD grading system may offer an alternative assessment of progression for KC patients who underwent CXL treatment. Worsening in C grade cannot be used for this purpose, as statistically significant thinning of treated corneas was observed during the follow-up period.

Cornea

PP424

Comparison of Dresden and Accelerated Protocol for Cross-Linking Collagen Procedure (CXL) for Keratoconus: a retrospective cohort study

Presenting author: Guilherme Almeida, Portugal

Purpose:

To evaluate the main results of patients with Keratoconus treated with CXC, using Dresden and Accelerated protocols (D-CXL; A-CXL) and establish a comparison of them, based on clinical findings, such as best corrected visual acuity (BCVA) and topographic findings, such as maximum keratometry (Kmax), mean keratometry (Kmean), astigmatism, central corneal thickness (CCT) and thinnest corneal thickness (ThCT) and Keratoconus Inferior-Superior index (I-S) for an one-year follow-up period.

Setting:

Retrospective longitudinal observational study at Instituto de Oftalmologia Dr. Gama Pinto, Lisbon, Portugal

Methods:

72 eyes from 54 patients - 51 treated with D-CXL (3 mW/cm² for 30 min); 21 treated with A-CXL (9mW/cm² for 10 minutes) were included in this study. The topographic pre-op and 1-year post-op study was performed using the Ziemer Galilei G2 Dual Scheimpflug Analyzer. Statistical work-up was made using IBM SPSS Statistics. Tests were done to assess normality. T-Student with paired samples test was used on dependent variables with normal distribution, whereas Wilcoxon Paired-Rank test was done on non-normal distributed variables.

Results:

In the group treated with D-CXL, there was a increase of 0.42 D (CI 95% 0.10-0.75, p <0.05) on mean keratometry and a decrease of 12.33 μ m (CI 95% 8.91-15.76, p <0.001) on CCT and 19.39 μ m (CI 95% 12.12-26.66, p <0.05) on ThCT. The I-S index also improved (- 0.63 D; CI 95% -0.14- -1.10, p <0.05), such as the BCVA (Wilcoxon Paired-Rank p <0.05). The A-CXL showed a decrease on CCT of 9.14 μ m (CI 95% 4.75-13.54, p <0.001) and a progression of + 1.33 D on I-S index (CI 95% 0.30-2.36). There was no improvement of BCVA.

Conclusions:

D-CXL and A-CXL are two available options and equally accepted to slow progression of Keratoconus. Although the diminishing of the queratic thickness on D-CXL group might bring us some concerns about using this technique on thin corneas, it seems also true that the clinical improvement is bigger when compared to the A-CXL. More randomized and controlled trials should be made regarding this field. We could also extend the follow-up period of this patients, in order to get more reliable data on mid-term and long-term outcomes.

Cornea

PP425

Visual acuity after cross-linking treatment

Presenting author: Ajla Pidro, Bosnia and Herzegovina

Purpose:

To evaluate correlation between maximum anterior sagittal curvature (Kmax) changes and uncorrected (UDVA) and corrected distance visual acuity (CDVA) in keratoconus patients after the cross-linking (CXL) procedure.

Setting:

Eye Clinic Sarajevo

Methods:

We analyzed 34 patients (34 eyes) with keratoconus after Dresden protocol CXL procedure. All patients underwent complete preoperative examination with follow up of 1 year. We analyzed and correlated K max changes in the postoperative period of 12 months together with visual acuity changes.

Results:

Visual acuity improved significantly in the first 3 months after the procedure and even more significantly until the end of the first year. Even K max is the most relevant and most followed parameter for progression and regression of keratoconus, its lowering was not directly correlated with the visual acuity improvement (both uncorrected and corrected) in the first 6 months after corneal CXL procedure. K max was changed significantly in the period of 12 months post cross linking, but not in the first 6 months.

Conclusions:

Corneal CXL should be considered as a procedure not just for corneal stiffening and stabilization, but also for visual acuity improvement in keratoconus patients.

Cornea

PP428

Handheld anterior segment optical coherence tomography in secondary childhood glaucoma

Presenting author: Dina El-Fayoumi, Egypt

Purpose:

This study aims to describe the anterior chamber angle (ACA) structures in infants and children with secondary congenital glaucoma.

Setting:

Cairo University pediatric ophthalmology and strabismus unit.

Methods:

This is a cross-sectional descriptive study that included 30 eyes diagnosed with secondary congenital glaucoma. Ten eyes were diagnosed as Peters anomaly, 6 eyes were diagnosed as aniridia, 8 eyes were diagnosed as Axenfeld-Reiger anomaly, 3 eyes diagnosed as secondary glaucoma to Sturge-weber syndrome, one eye diagnosed as glaucoma associated with neurofibromatosis type 1. Two eyes were post-traumatic. We used hand-held anterior segment optical coherence tomography (HH-ASOCT) OPTOVUE IVUE SD-OCT.

Results:

The study included 30 eyes with secondary congenital glaucoma in children aged below 5 years. In Peters anomaly, HH-AS-OCT confirmed the diagnosis. It showed malformed posterior stromal corneal fibers and malformed interrupted Descemet's membrane. In Axenfeld-Reiger anomaly, we were able to confirm the diagnosis through imaging posterior embryotoxon, Iris strands adherent to the Schwalbe line, iris hypoplasia, and maldeveloped (fetal) ACA. In aniridia, all eyes had an iris stump, the trabecular meshwork and ciliary processes were visible posterior to the stump. In phacomatoses, also the anomalous ACA was clearly identified and compared to the normal angle of the sound eye.

Conclusions:

Using HH-ASOCT permits thorough examination of the ACA in infants and children with secondary congenital glaucoma and helps in understanding the pathophysiology of the disease as well as the choice of the proper surgical technique.

Cornea

PP429

Intraoperative OCT versus Scheimpflug and Swept-Source OCT measurements for anterior eye parameters

Presenting author: Myriam Böhm, Germany

Purpose:

To compare agreement of anterior segment parameter measurements using an intraoperative optical coherence tomography (iOCT) of a femtosecond laser (LenSx) during interface docking to the eye to preoperative Scheimpflug-tomography (Pentacam AXL) and swept-source optical coherence tomography (IOL Master 700).

Setting:

Department of Ophthalmology, Goethe University, Frankfurt, Germany.

Methods:

In this retrospective study ninety-five eyes of 66 patients who had planned OCT-guided femtosecond laser-assisted lens surgery were included. Anterior segment measurements were performed in mydriasis prior to surgery using Pentacam AXL and IOL Master 700. After surgery iOCT images were analysed using a modification of the FIJI program. Outcome measures included external anterior chamber depth (ACD), central corneal thickness (CCT) and central lens thickness (LT)

Results:

The ACD measured with the iOCT was -0.011 ± 0.126 mm smaller ($p=0.389$) than with the IOL Master 700 and -0.059 ± 0.185 mm than with the Pentacam AXL ($p=0.003$). The IOL Master 700 measures a -0.047 ± 0.146 mm smaller ACD than the Pentacam AXL ($p=0.002$). The measurements of CCT using the iOCT and the Pentacam AXL ($-0.705 \pm 20.837 \mu\text{m}$, $p=0.742$) and the LT measurements of IOL Master 700 and iOCT (-0.050 ± 0.089 mm, $p<0.001$) show no clinically relevant difference. Just the ACD between the iOCT and the Pentacam AXL shows a clinically relevant difference.

Conclusions:

The comparison of all anterior segment parameters of the iOCT with IOL Master 700 shows no clinically relevant differences. Pentacam AXL versus iOCT showed a small clinically relevant difference for the ACD

Cornea

PP430

Anterior segment optical coherence tomography in eye injuries

Presenting author: Dhouha Gouider, Tunisia

Purpose:

To evaluate the usefulness of anterior segment optical coherence tomography (AS-OCT) for initial diagnosis and follow-up in eye injury cases.

Setting:

Ophthalmology Department, Military Hospital of Tunis, Tunisia

Methods:

We examined 15 eyes of 15 patients (13 males and two females) with different types of ocular injuries: penetrating injury (three eyes), perforating injury (three eyes), intraocular foreign body (three eyes), ocular burn (two eyes), contusion (two eyes), and lamellar laceration (one eye). The mean age of the patients was 26.8 years. Slit-lamp examination (SLE) and AS-OCT were performed at the initial visit, directly after the injury, and repeated during the treatment period. Both anterior chamber components and corneal pachymetry were evaluated.

Results:

The slit-lamp examination did not provide a clear diagnosis in two eyes because of the corneal haze. In three cases, only corneal edema was noticed during SLE, whereas AS-OCT revealed Descemet's membrane detachment. In one case, SLE showed a central corneal injury without leakage of aqueous humor with a deep anterior chamber. AS-OCT showed the involvement of the endothelial layer. In patients with corneal burns, AS-OCT was valuable for monitoring the corneal healing progress. AS-OCT helped also establish the localization and size of foreign bodies.

Conclusions:

AS-OCT is a very valuable tool for early diagnosis and treatment monitoring in ocular trauma. It has the advantage of both accuracy and repeatability.

Cornea

PP431

Keratoplasties at Fundacion Oftalmologica Los Andes in the 2008-2021 period: a survival analysis.

Presenting author: Cristobal Loezar Hernandez, Chile

Purpose:

To analyze the survival rates of keratoplasties regarding three main outcomes: failure, graft rejection, and glaucoma. To describe the main causes of keratoplasty in our center, and to compare the survival rates between them, and with the previous literature.

Setting:

Fundacion Oftalmologica Los Andes, Santiago, Chile.

Methods:

Retrospective analysis of patients who underwent keratoplasties between February 2008, and January 2021. We extracted the data from the medical records of patients, retrieving epidemiological variables as age, gender, diagnosis, best corrected visual acuity, and astigmatism. We also assessed the presence of risk factors, type of keratoplasty, and complications. The main outcome of the study was to assess the survival rate regarding failure, graft rejection, and glaucoma. Mean, standard deviations, percentages, and Kaplan-Meier survival analysis will be used to analyze the data with STATA 16.0 Statistical Software (StataCorp LP, College Station, TX, USA).

Results:

Nine-hundred forty seven keratoplasties have been performed in the period observed. We are currently retrieving data from our patients' medical records, and all the analysis will be done at the time of the meeting. We believe that our research will contribute to the current evidence of keratoplasty survival rates by providing data from about 1,000 keratoplasties performed in a Latin American country with different causes than those reported by other studies conducted in the US or Europe.

Conclusions:

The survival rate of keratoplasty has been addressed before, but few reports of the results in Latin American countries exist. To our knowledge, this will be the largest sample of keratoplasties reported in our country, and we believe that it will be useful information for policy makers, and decision-makers considering our country as one with a low rate of tissue donation.

Cornea**PP432****Clinical outcomes with a new model of peritopic scleral contact lens in eyes with irregular cornea****Presenting author:** David Pablo Piñero Llorens, Spain**Purpose:**

To evaluate the clinical results during a 3-month follow-up with a new peritopic scleral contact lens (SCL) model in subjects with irregular cornea and the presence of significant amounts of refractive astigmatism

Setting:

Department of Ophthalmology, Vithas Medimar International Hospital, Alicante, Spain

Methods:

This is a prospective study including a total of 22 eyes with irregular cornea from 11 patients (26-47 years). The presence of corneal irregularity was due to keratoconus (12 eyes), radial keratotomy (6 eyes), unsuccessful laser corneal refractive surgery (3 eyes) and penetrating keratoplasty (1 eye). In all cases, the peritopic ICD Flex Fit SCL (Paragon) was fitted following the protocols established by the manufacturer. Visual, refractive, topographic-aberrometric corneal and pachymetric results were analyzed during 3 months of SCL wear. Furthermore, the lens vault was measured at the apical level with Fourier-domain optical coherence tomography (Triton, Topcon)

Results:

The corrected visual acuity significantly improved from a mean pre-fitting value with spectacles of 0.09 ± 0.27 to a mean value of 0.03 ± 0.04 logMAR after 3 months of SCL wear ($p=0.008$). A trend to anterior corneal flattening was observed after 3 months of SCL wear, but not reaching statistical significance (42.12 ± 3.88 vs 41.88 ± 3.85 D, $p=0.089$), whereas central pachymetry increased significantly (507.9 ± 89.1 vs 542.2 ± 80.6 μm , $p=0.025$). The mean central vault was 254.0 ± 88.9 μm . The vault did not correlate significantly with the pachymetric and anterior keratometric change ($p \geq 0.374$). Lens tolerance was good in all cases, with no adverse events during the follow-up

Conclusions:

Peritopic SCL fitting allows a significant visual improvement in eyes with irregular cornea and large amounts of refractive astigmatism. Some level of corneal flattening and central thickening is observed with the lens wear but within tolerable levels, not being related to the magnitude of the vault

Cornea

PP433

Corneal structural changes associated to orthokeratology: a systematic review

Presenting author: David Pablo Piñero Llorens, Spain

Purpose:

To summarize the peer-reviewed literature on corneal structural changes after orthokeratology (OK) and to analyze the quality of the studies published.

Setting:

Department of Optics, Pharmacology and Anatomy, University of Alicante, Alicante, Spain.

Methods:

An exhaustive search was carried out in the databases Pubmed MEDLINE, Web of Science and Scopus. Original studies in English, with a cohort or experimental design and analyzing the cellular and structural changes of the cornea after OK fitting for myopia correction were selected. The Newcastle-Ottawa Assessment Scale (NOS) tool was used to analyze the quality of the studies selected.

Results:

A total of 12 articles were selected following the inclusion and exclusion criteria (mean follow-up: 19.27 ± 33.97 months). All studies had good quality according to the NOS tool (mean 7.58 ± 1.31). The following reversible changes after OK were reported: reduction in central epithelial basal cells, increase in height and especially in width of superficial epithelial cells, and increase in central stromal thickness and number of active keratocytes. There was also a reduction of corneal sensitivity during OK, as well as in the nerve density of the sub-basal plexus at the central level, with some contradictory outcomes concerning the reversibility of these changes.

Conclusions:

OK produces reversible structural changes in the central epithelium and central anterior corneal stroma, as well as a decrease in the nerve density of the sub-basal plexus and corneal sensitivity. The quality of published studies evaluating these aspects is good, although more studies are needed to evaluate longer follow-up changes.

Cornea

PP434

Challenges of a penetrating keratoplasty in a keratoconus patient - a case report

Presenting author: Maria-Cristina Corbu, Romania

Purpose:

The purpose of this paper is to present the case of a keratoconus patient that underwent a penetrating keratoplasty and developed secondary intraocular hypertension and posterior subcapsular cataract, due to chronic corticosteroid treatment.

Setting:

Keratoconus is a progressive corneal ectasia, treatment including rigid or hybrid contact lenses, corneal cross-linking, or keratoplasty in severe cases. In the case of corneal transplantation, the risk of developing cataract is increased by chronic topic

Methods:

A 20 years old male, diagnosed with bilateral stage III keratoconus, underwent corneal crosslinking, with bilateral best corrected visual acuity of 20/20 (rigid contact lenses). After a period of loss to follow-up, the patient presents with a left eye corneal ulceration, which after treatment leads to central corneal leukoma. Thus, he received a penetrating keratoplasty, postoperative treatment including topical dexamethasone. Three months after beginning treatment, patient develops intraocular hypertension, controlled with topical fixed combination dorzolamide/timolol. One year after keratoplasty, the patient presents with posterior subcapsular lens opacities, and undergoes extracapsular cataract extraction, phacoemulsification and posterior chamber intraocular lens (IOL) insertion.

Results:

IOL power was based on topography readings, and a monofocal toric IOL was chosen. Postoperative evolution was uneventful, with an Uncorrected Visual Acuity (UCVA) of 20/20. However, 2.5 years after surgery, patient presented with UCVA of 20/50, slit lamp examination showing corneal allograft oedema and keratic precipitates. He received a diagnosis of corneal graft rejection, and began treatment with oral methylprednisolone and topical dexamethasone, with a favorable evolution, which allowed for corticosteroid therapy tapering. 2 months after corneal graft rejection, UCVA was 20/28, graft was transparent, with small pigmented keratic precipitates, under low-dose topical dexamethasone.

Conclusions:

In a keratoconus patient, unsupervised rigid gas permeable contact lens usage may be complicated by the development of corneal erosions, evolving into a corneal ulceration, which may lead to corneal leukoma. In such cases, a penetrating keratoplasty is indicated. However, chronic topical corticosteroids can lead to intraocular hypertension and cataract. In a young patient with penetrating keratoplasty, IOL choice may prove challenging, as ultrasound biometry readings should be based on topography, not keratometry, and may be less precise. Furthermore, postoperative evolution of the case may include graft rejection, which requires prompt treatment.

Cornea

PP435

Are there corneas with signs of keratoconus without ectasia? First part: uniformly steep symmetric toric corneas

Presenting author: Carlos G. Arce, Brazil

Purpose:

To describe and establish the characteristics of corneas with uniformly steep symmetric toric surfaces and other signs typical of keratoconus but without ectasia

Setting:

Eye Clinic of Sousas, Campinas, São Paulo, Brazil

Methods:

Galilei Placido topography and dual Scheimpflug tomography was used in this retrospective review of cases screened for refractive and cataract surgery, contact lens fitting and keratoconus in a small eye clinic between 2015 and 2020. Ectasia was defined as a protrusion forward of any of both corneal surfaces and identified by abnormal values of K-max, BFS-max, e2, thinnest thickness or thickness progression and by the formation of typical curvature or elevation patterns representative of a lump-like delimited zone that may be off-center with time. Corneas with other signs of keratoconus but without ectasia were identified and described

Results:

Ectasia is the most representative topo-tomographic sign of the bio-mechanical failure of corneal tissue in keratoconus but it is not the only one. Other signs of keratoconus are steepening or asymmetry of surfaces, faster progression of thickness, central thinning, peripheral flattening, higher asphericity, negative spherical aberration or coma. Some signs may be present individually or in combination in corneas without ectasia. In this study we describe corneas with uniform steep symmetrical WTR/WTR astigmatism, normal e2, thinnest point, and low high order aberrations, which seem stable for years despite may have asymmetric BFTA, positive CLMI.X index and/or faster progression of thickness

Conclusions:

There is not keratoconus without ectasia, steepening or asymmetry but there are steeper, asymmetric or thin corneas without ectasia. We propose that some corneas are at a pre-keratoconus stage, sometimes very stable for long time until other additional environmental factor(s) trigger their progression to a protruded lump-like zone with the lacking components of keratoconus. In this study we describe one of these types of corneas.

Cornea

PP436

Are there corneas with signs of keratoconus without ectasia? Second part: uniformly thin corneas with normal progression of pachymetry

Presenting author: Carlos G. Arce, Brazil

Purpose:

To describe and establish the characteristics of uniformly thin corneas without ectasia, with normal progression of pachymetry and/or other signs typical of keratoconus

Setting:

Eye Clinic of Sousas, Campinas, São Paulo, Brazil

Methods:

Galilei Placido topography and dual Scheimpflug tomography was used in this retrospective review of cases screened for refractive and cataract surgery, contact lens fitting and keratoconus in a small eye clinic between 2015 and 2020. Ectasia was defined as a protrusion forward of any of both corneal surfaces and identified by abnormal values of K-max, BFS-max, e2, thinnest thickness or thickness progression and by the formation of typical curvature or elevation patterns representative of a lump-like delimited zone that may be off-center with time. Corneas with other signs of keratoconus but without ectasia were identified and described

Results:

Ectasia is the most representative topo-tomographic sign of the bio-mechanical failure of corneal tissue in keratoconus but it is not the only one. Other signs are steepening or asymmetry of surfaces, faster progression of thickness, central thinning, peripheral flattening, higher asphericity, negative spherical aberration or coma. Some signs may be present individually or in combination. In this study we describe uniform thin corneas without ectasia, with normal thickness progression and thinnest point around 500 μm . They use to have normal K-max, symmetric or asymmetric curvature patterns and indices, normal central BFS-max and BFTA maps. Most of times CLMI.X is normal

Conclusions:

There is not keratoconus without ectasia, steepening or asymmetry but there are steeper, asymmetric or thin corneas without ectasia. We propose that some corneas are at a pre-keratoconus stage, sometimes very stable for long time until other additional environmental factor(s) trigger their progression to a protruded lump-like zone with the lacking components of keratoconus. In this study we describe one of these types of corneas.

Cornea

PP437

Ten years of management experience of acute ocular chemical burns in a Tertiary Eye Center in Turkey

Presenting author: Zeynep Akgun, Turkey

Purpose:

To report demographic characteristics, type and severity of injury, therapeutic procedures clinical findings, treatment algorithms and long-term results of ocular chemical burns.

Setting:

This retrospective study was conducted at Ege University, Izmir, Turkey.

Methods:

Medical records of patients with chemical burns who admitted to Ege University less than 72 hours after the injury between 2010 and 2020 were reviewed. Age, gender, cause of burn, time between injury and the first treatment, initial best corrected visual acuity (BCVA), intraocular pressure (IOP), need for surgery, post-treatment BCVA, and complications were recorded. The grading of injury severity (Grade I-VI) was performed according to Dua classification.

Results:

A total 104 patients(137eyes) were recorded. The mean age was 42.69 ± 17.39 (7-90) with a M/F ratio of 86/18. Major causes were home accidents(32.6%), industrial accidents(45.1%) judicial incident(2.8%). The causatives were alkaline(49.0%), acid(35.5%) and neutral(5.7%). The mean initial-final BCVAs were 0.97 ± 1.09 - 1.04 ± 1.19 logMAR. The distribution of the grading was 22(16.0%), 22(16.0%), 21(15.3%), 23(16.7%), 24(17.5%), 25(18.2%) eyes, respectively. Complications occurred in eyes with injury \geq Grade II(80.8%). The percentage of LSCD development in each grade was 3.0%, 9.8%, 11.5%, 11.5%, 24.6%, 39.3%, respectively. The relationship between injury-grade and LSCD was statistically significant($p<0.001$). Surgery was performed in 37eyes in mostly \geq Grade IV injury(87.8%).

Conclusions:

The severity of ocular surface burns is the most important prognostic factor. Low-stage burns at presentation have a good prognosis with medical treatment. According to the present study, complications including LSCD develop frequently, especially after high-grade chemical burns. In addition, surgical management is more commonly indicated in higher grade burns.

Cornea

PP438

Dry-eye and inflammation of the ocular surface after cataract surgery: study on the effectiveness of a tear substitute based on trehalose/hyaluronic acid versus hyaluronic acid in the resolution of signs and symptoms

Presenting author: Carlo Cagini, Italy

Purpose:

To compare the effect of trehalose3%/hyaluronic-acid0.15% versus hyaluronic-acid0.15% eye-drops in reducing ocular surface inflammation after cataract surgery.

Setting:

Perugia, Italy

Methods:

Patients with healthy ocular surface were enrolled. Tear break-up-time(TBUT), Schirmer test, corneal fluorescein staining(CFS), Ocular Surface Disease Index(OSDI) and confocal microscopy(IVCM) were performed preoperatively and at 1,4 and 8month after surgery. Patients were randomly assigned to receive either trehalose 3%/ hyaluronic-acid 0.15% eye-drops(Group A), hyaluronic-acid 0.15% eye-drops(Group B) or no treatment(Group C).

Results:

Ninety-eight patients were randomised, 33 in GroupA, 33 in GroupB, 32 in GroupC. Schirmer test increased at 1month-follow-up in GroupA and unchanged in GroupB and C. TBUT and CFS increased at 1month-follow-up in GroupA and after 8 months in GroupB and C. OSDI score decreased at 1month-follow-up in GroupA and at in Group B and C. IVCM showed a better corneal trophism in terms of faster nerve fibers regeneration, reduced tortuosity and reflectivity of subbasal nerve plexus and lower inflammatory changes in Group A compared to Group B and C throughout the follow-up.

Conclusions:

Cataract surgery induces persistent inflammation of the ocular surface. Trehalose3%/hyaluronic-acid0.15% eye-drops are effective in reducing inflammation and signs and symptoms of dry eye.

Cornea

PP439

Multi-parametric evaluation of ocular surface disorders during healing process of viral conjunctivitis

Presenting author: GOZDE SAHIN VURAL, Turkey

Purpose:

To evaluate the ocular surface properties in viral conjunctivitis patients during healing process, to detect the damage of epidemic keratoconjunctivitis (EKC) on conjunctival goblet cells.

Setting:

Department of Ophthalmology, Ege University Medicine Faculty

Methods:

Bilateral EKC patients who were confirmed with PCR testing were included. First (Group 1) and second (Group 2) affected eyes were compared. In addition to routine ophthalmologic examination, biomicroscopic findings (e.g; follicular & anterior chamber reaction, chemosis, subepithelial infiltrates, epithelial defects, lymphadenopathy, and fundus findings), ocular surface parameters including ocular surface disease index (OSDI), tear osmolarity, Schirmer 1 test, (Ocular Surface Staining Score) OSSS, tear break-up time (T-BUT), and conjunctival impression cytology (IC) from inferior quadrant were performed at initial examination and the first month. The data from IC were graded according to Nelson's classification for squamous metaplasia, and analyzed.

Results:

The study was included 36 eyes of 19 patients (44.54 ± 16.80 years, FM/M: 1.4). In Group 1 and 2, OSDI was 53.53 ± 23.01 and 35.90 ± 22.19 ($p:0.03$), tear osmolarity was 309.12 ± 19.38 and 297.47 ± 8.27 mOsm/ μ L ($p:0.029$), OSSS was 1.00 ± 0.79 and 0.18 ± 0.39 ($p:0.001$), T-BUT was 3.59 ± 2.29 and 6.00 ± 1.83 sec ($p:0.002$), Schirmer 1 test was 10.94 ± 8.42 and 16.76 ± 9.05 mm ($p:0.061$), respectively. In Group 1 and 2, the IC was resulted as Grade (G)0 in 23.5% and 17.6%, G1 in 35.3% and 41.2%, G2 in 41.2% and 41.2%, respectively ($p>0.05$). The ocular surface properties were worse in Group 1 except for Schirmer 1 test and IC.

Conclusions:

Differing acute conjunctivitis symptoms from ocular surface complications is important for long-time therapy. Dry eye disorder is an important complication of EKC causing a significant decrease in life-quality and additional vision loss. The authors have no financial disclosure to declare.

Cornea

PP440

Khôl: at what cost for the ocular surface?

Presenting author: latissam El Belhadji, Morocco

Purpose:

Dry eye is a multifactorial ocular surface disease characterized by tear film homeostasis disruption, due to tear film instability and hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities. The Khôl, considered as an ancestral remedy for eye diseases as well as a cosmetic product used for centuries and now finding resurgence in the cosmetic industry worldwide, happens to be an aggravating or triggering factor in tear film homeostasis alteration. The aim of this study is to report the incidence and severity of sicca syndrome in women who use khôl regularly compared to those who never use it.

Setting:

20th August Hospital, Ibn Rochd University Hospital Casablanca, Morocco

Methods:

We conducted a cross-sectional descriptive study from June 2020 to September 2020. We included women from 18 to 25 years old. We collected data through interviews after questioning patients. All patients had an ophthalmologic examination including: visual acuity, ocular tonus, eye fundus, Schirmer's test, fluorescein eye stain test and non-invasive break-up time measure (NIBUT). The severity of ocular surface symptoms was investigated by the OSDI score. Patients with a history of connectivitis, diabetes, glaucoma and patients with severe ocular symptoms (OSDIW score > 32) or severe sicca syndrome (or meibomian gland dysfunction > stage III) were excluded from our study.

Results:

Among 200 participants, 50% of women use khôl regularly and 50% rarely or never do. According to the OSDI score, the group using khôl had severe sicca syndrome in 73% of cases and a mild to moderate sicca syndrome in 27%. The second group had moderate sicca syndrome in 11%, mild in 21%, and no sicca syndrome in 68% of women. Regarding the Schirmer test, there was no significant difference between women in the first and second group. Tear film instability was noted in 46% of women regularly using kohl with a NIBUT < 5 sec.

Conclusions:

A stable tear film is very important to maintain a stable ocular surface for eye comfort. The use of eye cosmetic products in general and Khôl in particular causes disturbances of the tear film homeostasis and causes symptoms of dry eye. Moreover, dry eye treatment's efficacy is reported to be compromised in cosmetic wearers. All these factors add up to the challenge of dry eye patient care in hopes of improving quality of life without restrictions.

Cornea

PP441

Combined neurotrophic and exposure keratopathies: “second wave” of nasopharyngeal carcinoma ophthalmic features

Presenting author: Imad MESSAFI, Morocco

Purpose:

Rhabdomyosarcoma (RMS) is the most common soft tissue sarcoma of childhood. The two most common histologic variants are embryonal and alveolar subtypes. Head and neck localisations include the nasopharynx, which can be responsible of multiple ophthalmic symptoms following the concerned structures. Ocular surface features are usually due to exposure. We report a rare case combining a neurotrophic and exposure keratopathies following treatment of nasopharyngeal RMS.

Setting:

Ophthalmology department, Mohammed VI university hospital, Oujda, Morocco

Methods:

A 9 years old girl, treated by chemotherapy for nasopharyngeal RMS. She presented neurotrophic and exposure keratitis secondary to combined compression of trigeminal and facial nerves.

Results:

Patient admitted for left ptosis and decreased vision. She had dental extraction, abscess and otalgia, treated as otitis without improvement. Ophthalmological exam was normal in right eye, OS: VA at 0.5, proptosis, ophthalmoplegia with semi-mydriasis and normal fundus: Gradenigo and orbital apex syndromes with facial paralysis. Imaging: nasopharyngeal tumor extended to infratemporal fossa, mastoid cells, carotid artery, temporal lobe, optical channel, cavernous sinus and trigeminal nerve. Biopsy: embryonal RMS. After chemotherapy, she presented lagophthalmos, corneal ulceration, abolition of corneal sensitivity and infectious keratitis. Evolution was favourable under preservative free lubricant agents, fortified eye drops and eye occlusion..

Conclusions:

In this report, we describe a case of neurotrophic keratopathy associated with nasopharyngeal RMS. Extension to cavernous sinus and trigeminal nerve seems to be causative of epithelial defect, meanwhile facial paralysis aggravated the clinical presentation by exposing cornea. As most cases of ocular impact of nasopharyngeal carcinoma, our patient presented initially neuro-ophthalmic manifestations. Due to chemotherapy and regression of third cranial nerve compression, the “protective” effect of ptosis disappeared, enabling combination of the previous cited corneal complications.

Cornea**PP442****Investigating the recurrence mechanism of herpes simplex and zoster keratitis by overlaying chronological fluorescein filter images****Presenting author:** Anosh Bonshahi, United Kingdom**Purpose:**

Herpes simplex keratitis (HSK) is the most common cause of corneal blindness in developed nations. Traditional opinion is that a recurrent episode usually occurs adjacent to the site of a previous episode. Recurrence occurs upon viral reactivation in the trigeminal ganglion, and possibly by local corneal reactivation. Examining the distribution of recurrent HSK dendritic lesions through composite chronological overlay images may enhance our understanding of the size, spread, and distribution of these lesions, and possibly the mechanism of recurrence. Similarly, for herpes zoster recurrence, we investigated the site of emergence of recurrent infection to help understand the reasons for recurrence.

Setting:

Moorfields Eye Hospital NHS Foundation Trust, Bedford, United Kingdom.

Methods:

Two patients with recurrent herpes simplex keratitis and one with recurrent herpes zoster keratitis were photographed during chronological infections. Photography was performed with fluorescein filters (Topcon) after application of fluorescein from a wet fluorescein strip. The Topcon fundus camera was set on anterior segment view. The images from recurrent episodes from the same patient were overlaid using free online overlay tools (<https://overlay.imageonline.co/>), such that the extent of overlap between the initial and recurrent herpetic ulcers could be appreciated.

Results:

Cases 1 and 2 show overlap between the initial HSK dendritic ulcer and recurrent ulcers. Case 1 was on steroid drops when recurrence occurred, which caused a large geographical ulcer. Case 2 was on no antiviral treatment when recurrence occurred. The original and recurrent dendrite were confluent only for a very small area. This suggests possible resistance in the previously infected cornea, but not in case 1 where steroid usage may have reduced resistance to spread of the recurrent infection. Case 3 was a HZO patient whose secondary recurrence was distal to the primary, suggesting a local recurrence mechanism.

Conclusions:

Sequential images offer useful insights for HSK and HZO recurrence. Further studies need to be done to see whether this technique is useful in helping understand the mechanism of recurrence and its spread. The size of the dendrite may give some clue as to the nature of the spread of virus in the ganglion between recurrences. Touching or 'handshake' of lesions (case 2) suggests a recurrence originating from the trigeminal ganglion, reflecting contiguous spread in the ganglion. Non-contiguous ulcers as seen in the HZO case (case 3) possibly suggest a local recurrence mechanism.

Cornea

PP443

Fingerprick of autologous blood (FAB) to treat recurrent corneal erosion syndrome (RCES)

Presenting author: Faris Khan, United Kingdom

Purpose:

Recurrent corneal erosion syndrome (RCES) can cause significant disease burden. Symptoms range from acute recurrence requiring emergency management, to chronic, intermittent, self-resolving, unreported pain, even after full standard medical and surgical treatment. This results in significant patient morbidity and often loss of patient confidence. Serum has been used successfully to treat recalcitrant RCES but is impractical, due to its high cost, preparation time and storage instructions. This case series reports the effect of fingerprick of autologous blood (FAB), already used for dry eyes and corneal ulcers, as an alternative to serum for the treatment of RCES.

Setting:

Moorfields Eye Hospital NHS Foundation Trust, Bedford, United Kingdom.

Methods:

Four patients with RCES, who reported chronic, painful symptoms and were on standard ointment or bandage contact lenses, were advised to use FAB 4 times a day for 3 months, in conjunction with their usual treatment regimes. Their symptoms and signs were reviewed at their regular clinic visits.

Results:

The four patients presented here include three females and one male, with a mean age of 49. Three patients have a history of traumatic abrasion, while one has epithelial dystrophy. Symptoms onset before starting FAB treatment ranged from 6 months to 2.5 years. Patients reported using FAB treatment for a median time of 3.5 weeks (range: 2-24 weeks). Use of FAB showed significant symptom relief in 3 out of 4 cases. The fourth case felt neither benefit nor detriment from FAB treatment. No adverse effects were reported following the use of FAB.

Conclusions:

FAB appears to be a safe and promising treatment for RCES, as an alternative to serum. Its ready availability and low cost make it ideal for immediate treatment initiation, unlike serum that requires time and funding. This may prove very convenient for patients, given the variability and chronic nature of RCES symptoms. Scientific evidence shows that many of the active components of serum, such as growth factors and fibronectin, are also present in FAB, indicating a possible mechanism of action. Further studies are required to investigate the effectiveness of FAB in RCES and identify any side-effects.

Cornea

PP444

The etiology of bacterial keratitis in patients with type 1 diabetes mellitus

Presenting author: Natalia Bachuk, Ukraine

Purpose:

The purpose was to define the etiology of bacterial keratitis in patients with type I diabetes mellitus (DM1).

Setting:

Diabetes mellitus is a systemic risk factor for keratitis which are characterized by a more severe course and more often lead to blindness.

Methods:

We retrospectively reviewed the results of bacteriological examination of 62 DM1 patients (62 eyes) with bacterial keratitis and 43 nondiabetic patients (43 eyes) with bacterial keratitis. Research methods were as follows: visual acuity, tonometry, slit-lamp biomicroscopy of anterior and posterior eye segments, bacteriological studies, fluorescein dye test, anterior eye OCT and non-contact corneal esthesiometry.

Results:

Monoculture was detected in 87.1% of DM1 eyes: gram-positive microflora - in 75.8% of eyes due to *Staphylococcus epidermidis* - 38.7% of eyes, *Staphylococcus aureus* - 16.1% of eyes, *Staphylococcus saprophyticus* – 3.23% of eyes, *Streptococcus viridans* - 8.1% of eyes, *Streptococcus pneumoniae* - 3.23% of eyes, *Enterococcus* - 3.23% of eyes, diphtheroids - 3.23% of eyes; gram-negative microflora was found in 11.3% of eyes (*Pseudomonas aeruginosa* - 4.8% of eyes, *Moraxella* species - 3.23% of eyes, *Escherichia coli* - 3.23% of eyes). Mixed microflora was detected in 12.9% of the DM1 eyes.

Conclusions:

Peculiarities in etiology of bacterial keratitis in DM1 patients conclude predominance of the gram-positive microflora among the pathogens due to *Staphylococcus epidermidis*. Compared to nondiabetic patients, DM1 patients with bacterial keratitis showed gram-positive microflora as a causative agent 1.5 times more often, and gram-negative - 3.1 times less often. *Staphylococcus epidermidis* was the causative agent of bacterial keratitis in DM1 patients 1.9 times more often, and *Pseudomonas aeruginosa* – 6.3 times less often than in nondiabetic patients.

Cornea

PP445

Acute Corneal Hydrops in Keratoconus: an epidemiologic and clinical patient description

Presenting author: Catarina Aguiar, Portugal

Purpose:

To statistically describe the epidemiological and clinical features of a group of seven patients followed by the Corneal Department of our hospital, diagnosed with keratoconus and acute corneal hydrops between 2016 and 2021.

Setting:

Acute corneal hydrops in keratoconus is not fully understood, occurring in approximately three percent of patients. Visual acuity can be severely reduced but it usually improves after the reabsorption of the oedema. However, a severe scar can be a perman

Methods:

We evaluated the group of patients regarding their gender, age, form of presentation (emergency department or general consultation with an ophthalmologist) and visual acuity at the time of the diagnosis; their clinical comorbidities, namely Down Syndrome or atopic diseases (asthma, allergic rhinitis or allergic dermatitis); and if they had already been subjected to any surgical treatment and its visual outcomes.

Results:

All the patients evaluated were male and their mean age was 38 years old. 86% of the patients came from the emergency department. Regarding clinical comorbidities, 43% had Down Syndrome, 43% had atopic diseases, 43% had cardiovascular risk factors and 29% had hypothyroidism. At the time of the diagnosis, 71% had poor visual acuity (VA) of the affected eye (described as “count fingers”, “0.05” or “inferior to 0.05”) and the remaining 29% had no objective evaluation. 43% have already had corneal transplantation with an improvement of the VA to a value superior or equal to 0.4.

Conclusions:

Even though hydrops only affects a small percentage of patients with keratoconus, its consequences may be severe, with a permanent impairment of the visual acuity at a young age. Most patients evaluated were diagnosed in an urgent scenario and without any previous follow up for their keratoconus. The general ophthalmologist must be aware of the importance of recognizing this pathology and forward these patients to the corneal specialist. The relationship between atopic diseases and acute hydrops in keratoconus has already been reported so we enhance the importance of a careful clinical history taking and its registration.

Cornea

PP446

Torpid evolution of unilateral keratouveitis with an aqueous humor Polymerase Chain Reaction positive for Human Herpes Virus 7.

Presenting author: Pilar Puy, Spain

Purpose:

The aim of this presentation is to describe the case of a unilateral stromal infiltration in a 35-year-old woman, with persistent inflammation, despite treatment, for almost 3 years. At her first visit she was already on topical dexamethasone three times a day, referring some improvement. Her main complaint from the beginning was blurry vision with symptoms starting 2-4 months before

Setting:

The patient came to the Emergency Department of Fuenlabrada University Hospital, in Madrid, Spain. She was referred to the Cornea Department, where she has been followed from May, 2018

Methods:

Photos taken along these 3 years are used to describe the torpid evolution. A paracentral stromal infiltration was detected, with discrete inferior neovascularization, without retrokeratic precipitates (PRK), nor tyndall. We took an anterior chamber sample of aqueous humor for Polymerase Chain Reaction (PCR) analysis. We initiated treatment with Ganciclovir 0.15% gel 5 times a day and dexamethasone 0.1% 3 times a day. Oral Valaciclovir 1 gr x 3 times a day was added after PCR results.

Results:

The PCR revealed Herpes Human Virus (HHV) 7 in aqueous humor. Ocular hypertension appeared weeks after the beginning of corticosteroid treatment. Each time we tried to reduce topical corticosteroids the infiltrate and neovascularization worsened, with two episodes of PRKs and anterior uveitis that responded well by resuming therapy. The patient developed corticosteroid pre-perimetric glaucoma (defects in OCT parameters), refractory to maximum medical treatment. We decided then to perform Nonpenetrating Deep Sclerectomy with excellent results. At present she is on topical dexamethasone twice a day and Ganciclovir gel at nights as maintenance therapy.

Conclusions:

Chronic corticosteroid treatment is necessary in some cases of unilateral corneal infiltration. There are cases with doubtful diagnosis, despite positive PCR results. To the best of our knowledge, we are reporting the second case of HHV 7 PCR positive keratitis.

Cornea

PP447

1 year front versus central and paracentral corneal changes after Bowman Layer Transplant for keratoconus

Presenting author: Abdo Karim Tourkmani, United Kingdom

Purpose:

To report the front corneal versus central and paracentral corneal changes after Bowman Layer Transplant for keratoconus in a tertiary hospital in the UK.

Setting:

Royal Gwent Hospital, Newport, Wales, UK

Methods:

5 eyes of 5 patients receiving Bowman Layer Transplant for advanced keratoconus were included. Pre and postoperative VA; Kmax; Kmean and corneal cylinder in the front cornea, 4.5 central mm and 6 central mm; and corneal thickness were analyzed.

Results:

Corneal flattening and reduction in corneal astigmatism were observed, more marked in the central and paracentral zone, allowing for improvement in BCVA with the aid of visual correction in 4 eyes.

Conclusions:

This results support previous data reporting BLT as a useful strategy in the treatment of advanced keratoconus, and suggest greater attention may be focused on central / paracentral corneal changes.

Cornea

PP448

Descemet membrane endothelial keratoplasty (DMEK) in eyes with chronic ocular hypotony following glaucoma surgery

Presenting author: Eitan Livny, Israel

Purpose:

To assess the outcomes of Descemet membrane endothelial keratoplasty (DMEK) in patients with ocular hypotony following glaucoma surgery.

Setting:

Multicenter retrospective case series.

Methods:

PATIENTS\INTERVENTION: Hypotonic eyes with prior glaucoma surgery which underwent DMEK between January 2013 and July 2019 in Israel (two centers) and Canada (one center). **MAIN OUTCOME MEASURES:** Pre/postoperative corrected distance visual acuity (CDVA), complications, 3-6-month endothelial cell loss, and intraocular pressure (IOP).

Results:

Eleven DMEK procedures performed in 10 eyes of patients aged 65-84 years. Indications for DMEK included 7 cases of bullous keratopathy, two cases of failed DMEK and one case of failed DSAEK. All patients had at least one previous trabeculectomy/tube operation. CDVA improved significantly from 1.52 ± 0.68 logMAR preoperatively to 0.49 ± 0.32 logMAR three months postoperatively ($p < 0.001$). Rebubbling was performed in 3/11 procedures (27%). Endothelial cell loss 6-12 months postoperatively was $60\% \pm 16$ (range 41-89%). At last follow up, 6/11 (54%) corneas were clear. The remaining five grafts failed at 1 to 4 years postoperatively. Preoperative IOP was 5.1 ± 1.6 mmHg (range 1-7 mmHg).

Conclusions:

DMEK is a valid procedure for the treatment of corneal edema in hypotonic eyes following glaucoma procedures. These eyes benefit from improvement in vision post DMEK.

Cornea

PP450

Penetrating keratoplasty in Jordan: indications and visual outcomes, a single center experience

Presenting author: MOHAMMED TANASH, Russian Federation

Purpose:

To study the indications and the visual outcomes of penetrating keratoplasty (PK) in Jordan.

Setting:

King Abdullah University Hospital (KAUH), Jordan

Methods:

In this retrospective study, medical charts of all patients admitted for PK between January 2010 and January 2018 were retrieved and studied. Medical charts of 213 patients (136 males and 77 females) who underwent PK and had a minimum follow up of 2 years were selected for analysis. Patient's demographic data, indications for PK, intraoperative complications, complications in postoperative period, intraocular pressure change, hypotensive regimen, graft condition, post PK induced corneal astigmatism, reasons for graft rejection and visual outcome were studied and analyzed. SPSS software program was used for data analysis. The P value <0.05 was considered statistically significant.

Results:

In Jordan keratoconus was the most common indication for PK both in men (71.3%) and in women (74%). The second place in frequency was occupied by corneal opacities due to viral infection and dystrophies (%). The smallest percentage was for patients with Steven-Johnson syndrome. At 2 years best corrected visual acuity in all patients improved from 0.08 ± 0.07 to 0.25 ± 0.24 , the difference being statistically significant ($p \leq 0.05$). Intraocular pressure remained under control in all cases. There was not a single case with graft rejection. After PK a notable improvement in quality of life was observed.

Conclusions:

PK is an effective operation for the treatment of various corneal pathologies. In Jordan, keratoconus is the main indication for PK. At 2 years, patients with keratoconus achieved satisfactory visual outcome after PK resulting in betterment of their quality of life.

Cornea

PP452

Keratoconus: A ring to rule them all

Presenting author: Francisco Alves, Portugal

Purpose:

Keratoconus is a corneal dystrophy that degrades the optical function of the cornea. It typically appears during puberty and can seriously deteriorate the quality of life of the patients. A hereditary pattern is not prominent, however, positive family histories have been reported in about 7% of cases. The various Keratoconus therapeutics have the potential to improve visual acuity (VA). The purpose of this work is to review and summarize the characteristics of intracorneal ring segment implantation (ICRS) in patients diagnosed with Keratoconus.

Setting:

Instituto de Oftalmologia Dr. Gama Pinto

Methods:

Retrospective study from 40 of our patients, from which 46 eyes were submitted to ICRS. From this review, we evaluated: mean age; gender; best corrected visual acuity (BCVA) by lines of the Snellen acuity chart before therapeutics and one year after; variations of VA; Spherical equivalent (SE) before therapeutics and one year after; Corneal Astigmatism before therapeutics and one year after; Corneal Central Thickness (CCT) before therapeutics and one year after; Mean Keratometry (Km) before therapeutics and one year after; Steep Keratometry (Ks) before therapeutics and one year after.

Results:

The mean age of the patients was $22,3 \pm 3,3$ years; there was a predominance of the female gender. The following parameters were evaluated before therapeutics and one year after, respectively: BCVA ($0,504 \pm 0,404$ and $0,69 \pm 0,19$); SE ($-5,43 \pm 4,68$ and $-2,27 \pm 3,11$); Corneal Astigmatism ($3,9 \pm 1,8$ and $3,31 \pm 1,37$); CCT ($484,5 \pm 28,3$ and $500,7 \pm 31,9$); Km ($46,43 \pm 2,64$ and $43,26 \pm 2,51$); Ks ($48,42 \pm 2,65$ and $44,96 \pm 2,69$) 10% of the patients maintained the same VA; 6% lost one or more lines; 84% gained one or more lines.

Conclusions:

By being minimally invasive, ICRS implantation is a safe therapeutic option to Keratoconus: It has very few limitations, the potential to improve VA, and is reversible.

Cornea

PP453

Results of therapeutic penetrating keratoplasty for microbial keratitis

Presenting author: Bugra Duman, Turkey

Purpose:

To determine the surgical outcomes of therapeutic penetrating keratoplasty and its role in the management of bacterial and fungal keratitis

Setting:

a single tertiary referral centre in Istanbul

Methods:

Retrospective analysis of 62 eyes of 62 cases with microbial keratitis who had penetrating keratoplasty due to medical treatment resistance between January 2013 and November 2017 at Cornea Section of Beyoglu Eye Training and Research Hospital were performed. Only patients with bacterial and fungal keratitis were included in the study. All patients underwent full ophthalmological examination including best corrected visual acuity, biomicroscopic evaluation, intraocular pressure measurement. Baseline demographic features, risk factors, microbiological examinations were recorded. Complications, anatomical and visual results were recorded at the end of the follow-up period.

Results:

At the end of the follow-up period, anatomical integrity was observed in 59 (95,6%) of 62 cases. Graft clarity was achieved in 16 (69,5%) of 23 cases with bacterial keratitis and in 7 (58,3%) of 12 cases in fungal keratitis. Visual acuity of 20/400 or better were found in 12/23 (52,1%) of bacterial keratitis cases and 4/12 (33,3%) of fungal keratitis cases.

Conclusions:

Therapeutic penetrating keratoplasty is an effective treatment for the management of bacterial and fungal keratitis resistant to medical treatment. In fungal keratitis, anatomic success, visual acuity and graft clarity ratios were lower than bacterial keratitis.

Cornea

PP454

Advantages of 3D microscopy with iOCT for anterior segment surgery

Presenting author: Christina Grupcheva, Bulgaria

Purpose:

The goal of the study was to compare the outcomes of corneal (penetrating keratoplasty) and amniotic membrane transplantation performed with "head up", iOCT assisted and conventional operative microscopy.

Setting:

The study was performed at the clinical basis of Medical University of Varna, Bulgaria utilizing ARTEVO 800 and Limera 700, bot produced by "Carl Zeiss Meditec".

Methods:

Total of 60 operations were performed by one surgeon. Procedures were pre-evaluated and selected to be of medium difficulty All procedures were randomized to be performed utilizing ARTEVO 800 or Limera 700. Procedures with complications were not included. All procedures were recorded and analyzed retrospectively, including the length of surgery, complications, recovery process and optical results. SPSS package was used for statistical analysis.

Results:

Regardless of the technology, the time for amniotic membrane transplantation was within 8 minutes, without statistically significant difference. Corneal transplantation however, was mean of 15 minutes faster when using ARTEVO 800 ($p=0.004$). Postoperative complications (hemorrhage under the membrane, loose sutures) were reduced in "head up" iOCT assisted procedures. Interestingly the new technology contributed to faster epithelialization of the cornea after amniotic membrane transplantation and better visual results after corneal graft.

Conclusions:

Three dimensional operative microscope with iOCT is relatively new technology which was introduced to improve the position of the surgeon and facilitate equal visualization to everyone from the surgical team. After adaptation to this new surgical tool, it provides more advantages such as faster and more efficient procedures with better anatomical and functional results. Moreover, this technology is providing additional safety in the situation of COVID 19 pandemic.

Cornea

PP455

Time and motion study of Descemet Membrane Endothelial Keratoplasty Triple procedure comparing surgeon stripped, pre-stripped, and pre-loaded tissues.

Presenting author: Harry Roberts, United Kingdom

Purpose:

To investigate theatre time utilization in Descemet Membrane Endothelial Keratoplasty triple procedure comparing the commercially available options of surgeon stripped tissue (DMEK-ss), pre-stripped tissue (DMEK-ps) and pre-loaded tissue (DMEK-pl).

Setting:

Eye Department, Southend University Hospital, Southend-on-Sea, United Kingdom

Methods:

3 consecutive theatre lists of 3 DMEK-triple procedures were prospectively observed using our previously published methodology, where every procedure on each list was performed as DMEK-ss, DMEK-ps, DMEK-pl. Tissue preparation time, surgical time, graft orientation time and total case time were all studied. Results were applied to a previously published model for planning theatre utilisation.

Results:

9 uneventful DMEK-triple procedures were conducted (3 in each group). Average graft preparation time was 13.28 min in DMEK-ss, 7.16min in DMEK-ps and n/a in DMEK-pl. Surgical time was 33.20min, 29.80min and 34.13min respectively. Graft orientation time was 2.45min, 3.25min and 3.45 min respectively. Duration of whole case was 63.38min, 51.18min and 41.49min respectively. Applying our data into our model the total number of cases which could be performed in a theatre session would be 3,4 and 5 respectively.

Conclusions:

Pre-loaded DMEK tissue is associated with more efficient use of theatre time which could result in more cases being conducted on one theatre list.

Cornea

PP456

Corneal Stress Strain Index in Keratoconus

Presenting author: Vaishal Kenia, India

Purpose:

To evaluate corneal stress strain index (SSI) in eyes with keratoconus and age matched healthy normal eyes

Setting:

Kenia Eye Hospital, Mumbai, India

Methods:

Its a prospective study designs where Keratoconus subjects aged between 18- 45 years and age matched normal healthy eyes were included. Subjects with previous history of refractive surgery, any retinal disease, systemic disease, corneal strengthening procedure, poor quality scans were excluded. Corneal SSI was obtained using Corvis ST and compared using two sample t test with significance level of 0.05.

Results:

Thirty Three keratoconus eyes and 48 Normal eyes with mean \pm SD age of 22.15 \pm 3.40 and 24.60 \pm 2.29 years respectively were included. The Mean \pm SD corneal SSI in keratoconus and age matched normal healthy eyes were 0.69 \pm 0.12 and 0.93 \pm 0.11 respectively. Two sample T tests revealed SSI was significantly lower in keratoconus groups as compared to healthy normal eyes ($P < 0.05$) however no statistical significant difference in SSI was noted among different grades of keratoconus. Pearson correlation showed significant negative correlation between SSI and steep K values. ($r = -0.50$, $p = 0.02$).

Conclusions:

Corneal SSI is significantly lower in keratoconic eyes as compared to normal healthy eyes and the SSI decreases with increase in steep K values. This shows that as severity of the cone increases, the material stiffness decreases. Thus, these would have implications on corneal strengthening procedure in severe keratoconus.

Cornea

PP457

Assessment of corneal endothelial cell morphology and anterior segment parameters in coronavirus disease 2019

Presenting author: Emre Aydemir, Turkey

Purpose:

To assess the corneal endothelial cell morphology and anterior segment parameters in patients with previously confirmed 2019 novel coronavirus disease (COVID-19).

Setting:

This prospective cross-sectional study was performed in the Department of Ophthalmology at the Adiyaman University Training and Research Hospital.

Methods:

Corneal endothelial cell and anterior segment measurements of thirty-four patients (18 female and 16 male) who had previously confirmed for COVID-19 were performed. Thirty-four (16 female and 18 male) age- and sex-matched healthy individuals without any systemic or ocular disease comprised the control group. Endothelial cell density (ECD), standard deviation of the mean cell area (SD), coefficient of variation (CV) of cell area, anterior chamber depth (ACD), horizontal anterior chamber diameter (HACD), iridocorneal angle (ICA), central corneal thickness (CCT), horizontal visible iris diameter (HVID), pupillary diameter (PD) and keratometry values (K1 and K2) were analyzed.

Results:

Regarding the corneal endothelial cell morphology, the mean ECD values in the COVID-19 and control groups were 2440 ± 454 cells/mm² and 2402 ± 282 cells/mm², respectively ($p = 0.682$). A significant increase was noted in both SD and CV values of the COVID-19 group compared to controls ($p < 0.001$ for each). ACD, HACD and CCT values were higher compared to the control group; whereas, the difference was statistically insignificant ($p > 0.05$ for each).

Conclusions:

Our findings revealed an impact on the cornea endothelium with higher SD and CV values in the COVID-19 patients. Corneal topography and specular microscopy may be offered to the convalescent phase of COVID-19 patients to monitor its ocular behavior.

Cornea

PP458

The Dependence of Biomechanical Properties of the Cornea on Topometric and Biometric Values

Presenting author: Elena Solodkova, Russian Federation

Purpose:

To assess the dependence of biomechanical parameters on the initial biometric, keratometric and tomographic properties of the cornea in healthy patients with different refraction.

Setting:

S.Fyodorov Eye Microsurgery Federal State Institution, Volgograd branch

Methods:

A retrospective study included 174 eyes of 174 healthy patients with different refraction: myopia was registered in 130 eyes, hyperopia - in 14 eyes, emmetropia in 30 eyes. Ocular examination included evaluation of UCVA and BCVA, measurement of anteroposterior eyeball dimension, study of topographic, tomographic and biomechanical parameters of the cornea by means of Pentacam HR and Corvis ST (OCULUS Optikgeräte GmbH; Wetzlar, Germany).

Results:

There was revealed a significant correlation between the corneal stress-strain index, which is one of the main indicators of corneal stiffness, and patient's age ($p = 0.03$), level of biomechanically compensated intraocular pressure ($p = 0.005$), values of the anteroposterior eyeball dimension ($p < 0.00001$). It was also detected that SSI was not related to the corneal thickness in the central optical zone ($p = 0.06$).

Conclusions:

Application of Scheimpflug ultra-high speed imaging with non-contact tonometry is highly potential as a research and clinical instrument for the analysis of biomechanical properties of the cornea in vivo.

Cornea

PP459

Safety and Efficacy of Combined Corneal CrossLinking and Phototherapeutic Keratectomy (PTK) for keratoconus

Presenting author: Ozum Oztutuncu, Turkey

Purpose:

To evaluate visual, refractive, topographic, and aberrometric outcomes of transepithelial phototherapeutic keratectomy (PTK) + corneal collagen crosslinking (CCXL) in the treatment of keratoconus.

Setting:

University of Health Sciences Beyoglu Eye Training and Research Hospital, Istanbul, TURKEY

Methods:

In this retrospective study, 42 eyes that underwent PTK+CCXL were enrolled. Pre- and postoperative uncorrected and best-corrected visual acuities (UCVA and BCVA, respectively), spherical equivalents, corneal thicknesses, keratometry values, posterior elevations and corneal high order aberrations, endothelial cell counts were analyzed. Postoperative complications were recorded.

Results:

The mean age of the 42 patients included in the study was 23.4 ± 4.9 (15-36). Of these patients, 31 (76.9%) were male, and 11 were female (23.1%). The mean follow-up time was 8.1 ± 3.4 months (4-12). At the postoperative period, both UCVA and BCVA had significantly improved ($p < 0.001$). Maximum keratometry value had regressed approximately 1.5 D at the end of the follow-up time period ($p < 0.001$). The spherical equivalent did not change significantly ($p:0.622$) and there was a significant decrease in corneal higher aberrations in terms of total RMS, coma postoperatively ($p < 0.001$, $p < 0.001$)

Conclusions:

Combined transepithelial phototherapeutic keratectomy (PTK) + corneal collagen crosslinking (CCXL) technique seems effective and safe in keratoconus management.

Cornea

PP461

Treating Keratoconus with Intracorneal Ring Segment – our experience

Presenting author: Andrada-Elena Mirescu, Romania

Purpose:

To evaluate the efficacy of femtosecond laser assisted Intracorneal Ring Segment (ICRS) implantation in a case of advanced stage keratoconus.

Setting:

ICRS implantation using the femtosecond laser represents the latest surgical technique which aims to stabilize the cornea and to improve visual acuity in patients with advanced stage keratoconus.

Methods:

We present the case of a 45 years old male patient with recently diagnosed stage 3 keratoconus in the left eye, to which a Keraring segment (Mediphacos™) was implanted using the Visumax (Zeiss™) femtosecond laser platform. A unique S15 160/250 µm Keraring segment was implanted at a stromal depth of 400 µm with a tunnel width of 1.2 mm, created by the femtosecond laser, using the standard procedure. A bandage contact lens was applied at the end of surgery and topical steroids and antibiotics, combined with lubricants were prescribed for 6 weeks postoperatively.

Results:

We removed the bandage contact lens after 24 hours and at one week postoperatively we obtained an improvement in uncorrected visual acuity (UCVA) from 0.1 before surgery to 0.7. The best corrected distance visual acuity (BCDVA) at one week was 0.9 with difficulty, with normal clear cornea and well positioned ICRS. Topographically, we obtained a 3.5D reduction of Kmax with a central flattening of 7D.

Conclusions:

ICRS surgery using the femtosecond laser for stromal tunnel creation, followed by standard manual segment implantation, proved to be a safe and effective technique which improves visual acuity in patients with advanced keratoconus.

Cornea

PP462

Comparison of outcomes in keratoconic eyes of mechanical epithelial debridement vs. transepithelial phototherapeutic keratectomy vs. transepithelial photorefractive keratectomy followed cross-linking

Presenting author: Jonathan Moore, United Kingdom

Purpose:

To evaluate the outcomes of a series of consecutive progressive keratoconic eyes that underwent either corneal collagen cross-linking (CXL) using mechanical epithelial debridement, transepithelial phototherapeutic keratectomy (trans-PTK) or transepithelial photorefractive keratectomy (trans-PRK) treatment.

Setting:

Cathedral Eye Clinic, Belfast, Northern Ireland, UK

Methods:

Eighty-one (77 patients) consecutive progressive keratoconic eyes underwent CXL (3 mW/cm²) for 30 minutes using 0.1% topical riboflavin sodium phosphate following either the Dresden protocol (group 1; 21 eyes), receiving trans-PTK using Amaris excimer laser (Schwind, GmbH) (group 2; 30 eyes), or trans-PRK (Schwind, GmbH) (group 3; 30 eyes). Uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), pachymetry, keratometry and corneal tomography indices (Oculus Pentacam) were assessed. Follow-up was 6-months postoperatively.

Results:

No intraoperative or postoperative complications were observed. An improvement in UDVA of 0.75 ± 0.41 to 0.61 ± 0.32 logMAR ($P=.004$) in group 2, and 0.47 ± 0.27 to 0.33 ± 0.25 logMAR ($P<.001$) in group 3 was observed postoperatively. CDVA improved from 0.41 ± 0.39 to 0.31 ± 0.23 logMAR ($P=.095$) in group 2, and 0.22 ± 0.23 to 0.10 ± 0.13 logMAR ($P=.001$) in group 3. Kmax significant reduced from 59.28 ± 8.27 D to 57.11 ± 9.95 D ($P=.006$) in group 2, and 56.70 ± 5.17 D to 52.89 ± 5.24 D ($P<.001$) in group 3.

Conclusions:

Both trans-PTK and trans-PRK provide superior visual outcomes compared to mechanical epithelial debridement. Trans-PRK reduced K-max to a greater extent, and seems to be more consistent in improving CDVA.

Cornea

PP463

Long Term Results of Accelerated 9mW Corneal Crosslinking for Early Progressive Keratoconus: The Siena Eye-Cross Study 2 in Paediatric Patients

Presenting author: Simone Alex Bagaglia, Italy

Purpose:

To assess the 5-years clinical results of the 9mW/5.4J/cm² accelerated Crosslinking (ACXL) in the treatment of progressive keratoconus (KC) in paediatric patients.

Setting:

2Siena Crosslinking Center, Siena, Italy

Methods:

Prospective open non-randomized interventional study including 70 eyes of 37 patients with early progressive KC undergoing the Epi-Off 9mW/5.4J/cm² ACXL at the Siena Crosslinking Centre, Italy. The mean age was 13.8 ± 2.63 years. The 20-minutes treatments were performed by using the New KXL I (Avedro, Waltham, USA), 10 minutes of 0.1% HPMC Riboflavin soaking (VibeX Rapid, Avedro, Waltham, USA) and 10 minutes of continuous-light UV-A irradiation. UDVA, CDVA, K MAX, Coma, Minimum Corneal Thickness (MCT), Surface Asymmetry Index (SAI), Endothelial cell count (ECC) were measured and Corneal OCT performed.

Results:

UDVA and CDVA improved significantly at 1st and 3rd Post operative month respectively (P = 0.02- P = 0.047), Δ + 0.09 – Δ 0.018 Snellen lines. K MAX improved at 6th postoperative month (P = 0.006), Δ -1.26 Dioptres from the baseline value. Also COMA aberration value improved significantly (P = 0.001). A mild temporary haze was recorded in the 14 % of patients without affecting the visual acuity, without persistent complications. Corneal OCT revealed a mean demarcation line depth at 343.6 ± 25.7μm.

Conclusions:

The 5-years results of Epi-Off 9mW/5.4J/cm² ACXL demonstrated statistically significant improvements in UCVA and CDVA, corneal curvature and corneal higher-order aberrations conferring a long-term stability of progressive ectasia. The 9mW/5.4J/cm² ACXL could be the natural evolution of Epi-Off CXL treatment for the management of early progressive corneal ectasia optimizing clinic workflow in paediatric patients.

Cornea

PP464

Clear lensectomy with a spherical intar ocular lens implantation followed By combined Corneal Cross-linking with Topo -Guided Photorefractive Keratotomy

Presenting author: Waleed Ali Abousamra, Egypt

Purpose:

To evaluate the visual and topographic outcomes of a two-stage approach treatment for selected cases of keratoconus (KC); Clear lensectomy with a spherical intraocular lens (IOL) implantation followed by combined Corneal Cross-linking (CXL) with Topo -guided Photorefractive Keratotomy (TG-PRK)

Setting:

Mansoura Ophthalmic Center, Mansoura university

Methods:

The study included 11 eyes of 17 patients diagnosed with stable keratoconus, aged from 39 to 49 years (42.4 ± 6.2). All studied eyes underwent a 2-stage approach treatment: first refractive lens exchange and IOL implantation followed after at least 3 months by combined CXL with TG-PRK. A complete ophthalmological examination was performed preoperatively and postoperatively. Topographical and visual outcomes were evaluated during 6 months follow up period.

Results:

After the 2 stages procedure, sphere changed from -10.33 ± 4.18 diopter preoperatively to 0.67 ± 0.71 diopter 6 months postoperatively ($p < 0.001$), and cylinder changed from $-4.21 \pm 0.91D$ to $-1.13 \pm 0.69 D$ ($p < 0.001$). There with significant improvement in the mean uncorrected distance visual acuity (UDVA) from log MAR 1.41 ± 0.49 preoperatively to 0.32 ± 0.08 postoperatively ($p < 0.001$) and the mean corrected distance visual acuity (CDVA) from 0.55 ± 0.14 preoperatively to 0.26 ± 0.11 ($p = 0.01$). All patients were satisfied with their visual improvement.

Conclusions:

This 2-stage approach in selected cases of stable keratoconus with high refractive errors is safe, effective and highly predictable procedure with satisfactory visual and refractive results

Cornea

PP466

The application of the modern dual- polymer formula in aqueous deficiency dry eye syndrome – our observations

Presenting author: Ewa Mrukwa-Kominek, Poland

Purpose:

Assessment of the effectiveness of the hydration eye drops based on the dual-polymer formula containing HP-Guar and hyaluronic acid in patients with the dry eye syndrome and deficiency of the aqueous phase. Indication of the benefits resulting from using these eye drops

Setting:

Department of Ophthalmology, University Clinical Center, Medical University of Silesia, Katowice, Poland

Methods:

Thirty patients (60 eyes) aged 30 to 67 (mean age 48,63) with the dry eye syndrome and deficiency of the aqueous phase were enrolled into the study. The eye drops Systane (Alcon, USA) were administered 5 times per day for 30 - 120 days. The assessment of the eye drops effectiveness was based on: alterations of the tear film stability (Schirmer test, break-up-time BUT, corneal staining, changes in anterior surface of the cornea), subjective symptoms, intensity of discomfort, quality of life, and 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 46 and 20.07 before and after therapy, respectively, showing statistically significant reduction. Corneal topography changes in K1 and K2 was significant ($p < 0.045$) Schirmer test result was 15.86 before and increased significantly up to 18.17 after treatment. First BUT interruption was 12.74, next 13.54 sec. BUT increased to 16.31 and 17.90, 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 Schirmer test, 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

Cornea

PP467

Corneal perforation related to *Beauveria bassiana* and post penetrating keratoplasty management discussion: a case report.

Presenting author: Spyros Atzamoglou, Greece

Purpose:

To present a case of corneal graft perforation due to infection by the filamentous fungus *Beauveria bassiana* which was successfully treated with repeat penetrating keratoplasty (PK).

Setting:

Ophthalmiatreio of Athens, Athens, Greece

Methods:

An 84-year-old male patient with history of bilateral PK for keratoconus presented with pain and decrease in visual acuity on his left eye. A corneal perforation was found, which was treated immediately with a full-thickness corneal transplant. The specimen was sent for bacterial and fungal cultures.

Results:

Topical corticosteroids were prescribed postoperatively. *B. bassiana* was isolated from the corneal scrapings. Postoperative treatment was modified by reducing the dose of corticosteroids (topical dexamethasone 0.1% b.i.d) and adding topical natamycin 5% b.i.d together with systemic antifungal therapy initially with posaconazole (100 mg q12h) which was discontinued because of elevated hepatic enzymes and then with voriconazole (200mg q12h) for 1 month according to the in vitro antifungal susceptibility data. No recurrence occurred in the transplant 4 months postoperatively under topical dexamethasone 0.1% b.i.d.

Conclusions:

This is the first case of keratitis and perforation in a previously transplanted cornea. Due to the rarity of the infection, there are no clear guidelines for postoperative prophylaxis in *B. bassiana* infection. Either the continuation of corticosteroids or the switch to another immunosuppressive therapy and the selection of the appropriate antifungal regimen posed a significant therapeutic dilemma.

Cornea**PP468****Herpes zoster ophthalmicus: more than meets the eye****Presenting author:** Catarina Guedes-Mota, Portugal**Purpose:**

Herpes zoster ophthalmicus (HZO) may cause a variety of ocular conditions, but acute cranial nerve palsies are relatively uncommon clinical findings, with few described cases. Ophthalmoplegia develops in 11 – 29% of patients with HZO and the most commonly affected cranial nerve is the third. The authors report a case of complete oculomotor nerve palsy with pupillary involvement resulting from HZO.

Setting:

Ophthalmology Department – Central Lisbon University Hospital Centre

Methods:

Case-report of an 81 year-old male patient who presented to the Emergency-Room with a ten-days history of itching, soreness, redness and blurry vision in his left eye (OS). Additionally, the patient noticed horizontal binocular diplopia and his left upper eyelid was becoming increasingly droopy, until being permanently closed for forty-eight hours prior to admission. External examination revealed crusted-over vesicles along the distribution of the left ophthalmic branch of the trigeminal nerve, as well as complete left lid ptosis. On oculomotricity evaluation limited adduction, infraduction and supraduction were noted, and left mydriasis, minimally reactive to light, was observed.

Results:

Visual acuity was 20/25 in OD 20/60 in OS. Slit-lamp examination of OS revealed conjunctival injection, denfriform corneal epithelial lesions, keratic precipitates and anterior-chamber cellular reaction. Fundus examination was unremarkable. Neuroimaging was performed, and on cranial computed-tomography angiography saccular aneurysms of the left proximal middle cerebral and right superior cerebellar arteries were identified. After multidisciplinary review, these were not considered to be associated with vascular compression causing the third nerve palsy. Patient was admitted and treated with intravenous acyclovir 750mg t.i.d for sixteen days, adjusted according to renal function. Three-months after initial presentation, left ptosis and ophthalmoplegia had resolved completely.

Conclusions:

Pupil-involving third cranial nerve palsy warrants urgent neuro-imaging to rule out possibly life-threatening conditions. However, in the appropriate clinical setting, it is important to consider HZO as a reversible and treatable cause of oculomotor nerve palsy, even though it is rarely associated with pupillary involvement. HZO-induced oculomotor nerve palsy usually recovers within six months and the long-term prognosis is excellent with timely diagnosis and appropriate treatment. Co-management between Ophthalmology, Neurology, Neuroradiology and Infectiology health practitioners is of great value.



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PP469

All lineal keratic precipitates in a transplant mean graft rejection?

Presenting author: MERCEDES MOLERO-SENOSIAIN, Spain

Purpose:

To report an atypical presentation of a corneal graft suture related abscess.

Setting:

Leicester Royal Infirmary, Leicester, England, United Kingdom

Methods:

Case report

Results:

An 80-year-old female with a history of Moraxella and herpetic keratitis successfully treated with penetrating keratoplasty was noted to have a semicircular pigmented line of keratic precipitates straddling a single suture during a routine follow up appointment. After forty-eight hours of oral antiviral and topical steroid therapy for presumed graft rejection she developed a suture abscess and 7mm hypopyon. Treatment with intensive topical broad spectrum antibiotics was commenced and after 6 weeks showed complete resolution.

Conclusions:

Semicircular endothelial keratic precipitates could be an early sign of suture infection.

Cornea

PP470

Potential role of Amniotic Membrane Eye Drops for treatment of Steven Johnson's Syndrome

Presenting author: Suhel Elnayef, Spain

Purpose:

Amniotic Membrane Eye Drops (AMED) are an innovative treatment that has been used successfully for the management of persistent epithelial defects (PED) and ocular chemical injuries. Due to its anti-inflammatory properties, AMED could also be an alternative treatment for other inflammatory pathologies of the ocular surface such as Steven-Johnson Syndrome (SJS). The use of AMED, which has been proven to be a safe and effective treatment in other pathologies, could also be useful in the conservative management of SJS.

Setting:

To evaluate the effectiveness and symptomatology improvement in a patient with SJS who requires regular use of topical corticoids and suffers relapses despite of the conventional treatment.

Methods:

A 44-year-old woman consulted months after being diagnosed with SJS for photophobia and ocular pain. When examined, she presented severe blepharoconjunctivitis and keratoconjunctivitis sicca. She also developed filamentous keratitis episodes despite topical immunosuppressive and topical corticosteroids treatment.

Results:

Because of the severe symptomatology that the patient experienced in each relapse, the use of AMED was proposed to improve it, as well as to avoid the long-term side effects of corticoids. After several weeks of treatment, the patient had a significant improvement and no longer experienced relapses of filamentous keratitis. Moreover, she stopped requiring chronic high doses of topical corticosteroids, which lowered Intra Ocular Pressure (IOP).

Conclusions:

SJS is a mucocutaneous disease that has variable affection on the surface of the eyes, which in many cases tends to become chronic. Patients often require topical corticosteroids for its management to avoid complications that can lead to blindness in the long term. When topical and conservative treatment is not enough to control the pathology, surgery is required in order to avoid scarring lesions. AMED has proven to be a safe and effective treatment in chemical burns and PED. Because of its anti-inflammatory properties, AMED could offer an alternative in the conservative management of SJS, which can often be challenging.

Cornea

PP471

Bilateral corneal perforation complicating dermatomyositis - a case report

Presenting author: Jamaledine Hamza, Morocco

Purpose:

Dermatomyositis is an inflammatory disease of the skin and muscles of unknown etiology and varying severity. Ophthalmological manifestations are rare, represented by oculomotor involvement, corneal involvement is exceptional

Setting:

55-year-old patient, followed in dermatology for severe dermatomyositis, on corticosteroid therapy and immunosuppressants, who presented to the ophthalmologic emergency room during an outbreak of her painful red eye disease ODG for 72 hours

Methods:

The ophthalmologic examination notes: • Right eye= Count the fingers closely, lift eye = Count the fingers closely • Anterior segment :bilateral corneal dystrophy with bilateral corneal perforation Seidel + • The rest is unseen. Treatment consisted of hospitalization and treatment for endophthalmitis. The evolution was marked by: corneal scarring after one month right eye , 2 months Lift eye.

Results:

Dermatomyositis is a rare condition that affects people between the ages of 40 and 60. it is an inflammatory condition of the skin and muscles of varying severity. Ocular manifestations are rare: mainly oculomotor involvement, ptosis and sicca syndrome. Diffuse retinal lesions are possible, reflecting the extensive vascular involvement more often encountered in the pediatric form of dermatomyositis, with limited visual recovery

Conclusions:

The dry syndrome short of dermatomyositis is rare but remains formidable since it can be complicated by corneal perforation with risk of infection and loss of function of the GO.

Cornea

PP472

Unilateral corneal edema with unknown etiology in a young patient.

Presenting author: Amani Abbas Khoja, Spain

Purpose:

To demonstrate the importance of PA in the study of corneal edema without cause.

Setting:

Ophthalmology Department, Hospital La Mancha Centro, Alcázar de San Juan, Spain

Methods:

A male patient, 38 years-old with lichen planus, no known other medical or family history. He was complaining about a progressive and painless diminution in vision of the left eye (OS) for the last 2 years. He was on anti-edema eye drops without improvement. Visual acuity of the right eye (OD) was 1 and OS 0.1 on initial test. After a complete ophthalmological examination, an aqueous humour sample was taken for Polymerase chain reaction (PCR) analysis and by performing descemetorhexis the Descemet membrane was sent to PA. Hence the Descemet's Membrane Endothelial Keratoplasty (DMEK) procedure was undertaken.

Results:

No abnormalities of OD. However, loss of transparency with corneal thickening was observed in OS by biomicroscopy with pachymetry measurement of 655 μ . Specular microscopy indicated large cells with prominent nuclei. Post DMEK surgery, the cornea recovered the transparency with thickness of 548 μ and a satisfactory endothelial cell count. PCR was negative for herpes virus. Outcomes from PA illustrated multiple layers with pseudostratified epithelium in addition to positive cytokeratin for 7, 8, 18 and 19 were compatible with Posterior Polymorphous Corneal Dystrophy (PPCD).

Conclusions:

This case demonstrated that the PA of the endothelium could be essential for the diagnosis of PPCD. It is a challenge to study corneal dystrophies.

Cornea

PP473

Polychromatic Corneal Dystrophy, a recently studied entity.

Presenting author: Isabel Sendino-Tenorio, Spain

Purpose:

This work aims to present a clinical case of a polychromatic corneal dystrophy (PCD), in order to facilitate their knowledge for diagnosis, clinical management and follow-up.

Setting:

Complejo Asistencial Universitario de León

Methods:

Case report

Results:

We present the case of a 65-year-old woman, her visual acuity was 20/20. In both eyes we could see multicolored, bright, fine, powdery, diffuse and symmetrical deposits in both eyes, located in the posterior corneal stroma, without any involvement of the epithelium or the anterior stroma. A specular biomicroscopy was performed, as a characteristic finding, it showed multiple, round, hyperreflective opacities immediately anterior to Descemet's membrane. These findings were compatible with the PCD. We did not have genetic studies and we could not be able to perform a complete ophthalmological examination to her first-degree relatives.

Conclusions:

PCD is a predescemetic stromal corneal dystrophy, it is an unknown entity due to its low prevalence. In the most recent ICD3 classification, predescemetic corneal dystrophy is divided according to the inheritance. The study by Alió JL et al. suggests that PCD may be an inherited autosomal dominant disorder. If the first-degree relatives are affected, it is recommended to carry out a genetic tests. For this reason, it is relevant to know this dystrophy, despite not needing treatment and not having visual impairment, it is important to carry out a differential diagnosis with other entities that may require specific treatment.

Cornea

PP474

Treatment in the acute phase of epidemic keratoconjunctivitis

Presenting author: Dhouha Gouider, Tunisia

Purpose:

To describe current trends in therapeutic modalities to manage acute epidemic keratoconjunctivitis.

Setting:

Ophthalmology Department, Military Hospital of Tunis

Methods:

We ran a descriptive study of 87 eyes of 61 patients diagnosed with acute epidemic keratoconjunctivitis confirmed by the presence of subepithelial infiltrates (SEIs) in the cornea. A clinical score based on a complete biomicroscopic examination, the measurement of visual acuity, the number of subepithelial infiltrates (SEIs), the break-up-time, and the value of the Schirmer type 1; has been established to evaluate symptoms.

Results:

The mean age of the study population was 36 ± 17 years-old. The treatments taken in the acute phase were either prescribed by a general practitioner (10%) or an ophthalmologist (60%) or taken as self-medication (30%). Antivirals including ganciclovir were taken in 40% of the study group, artificial tears in 93%, antiseptics in 21%, and local antibiotics in 53%. The mean clinical score was 4.2 ± 2.6 . There was no significant difference in the final clinical score, visual acuity, number of SEIs, break-up time, and Schirmer's value between the different treatment groups.

Conclusions:

The latest treatment recommended for the acute phase of epidemic keratoconjunctivitis is artificial tears with cold compresses, local povidone-iodine, and ganciclovir. Topical antibiotics are only used in confirmed bacterial superinfection. Our studied sample did not respond much to these recommendations.

Cornea

PP680

Corneal haze in patients with presumed sarcoidosis uveitis

Presenting author: Wassila MILI, Tunisia

Purpose:

To describe the finding of inferior retrocorneal haze secondary to presumed sarcoidosis uveitis in a series of four patients.

Setting:

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Methods:

Retrospective observational case-series

Results:

Four patients including 3 females and 1 male with an established diagnosis of presumed ocular sarcoidosis are described. The ages ranged from 2 to 40 years at presentation. Corneal examination revealed inferior deep stromal opacity in one eye, subendothelial opacity in one eye, inferior endothelial opacity in two eyes and endothelial fibrinous deposits in two eyes. Associated ocular findings included granulomatous keratic precipitates (n=6 eyes), posterior synechiae (4 eyes). Fluorescein angiography showed bilateral segmental vasculitis in one case. Treatment modalities included topical corticosteroids (n=4), oral corticosteroids (n=1) and Methotrexate (n=2). The corneal opacity resolved under treatment in 4/6 eyes

Conclusions:

Corneal involvement including stromal and endothelial opacities may occur in patients diagnosed with presumed ocular sarcoidosis. A prompt treatment may improve the visual prognosis.