

MCLOSA

The Medical Contact Lens & Ocular Surface Association

28th MCLOSA Annual Meeting 25th November 2022

**Cavendish Conference Centre
London, UK**

2022

Delegate Programme

MCLOSA thanks all its Sponsors for their support at the 2022 meeting.

Please take the opportunity to visit their exhibition stands in the **Whittington Suite**.

Representatives are available throughout the day.

GOLD LEVEL



In alphabetical order:

SILVER LEVEL



BRONZE LEVEL



BAUSCH + LOMB





Registration desk: Open 08:00 - 17:30

Louise Richards will be available if you have any questions about proceedings.

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CPD

The Royal College of Ophthalmologists approves MCLOSA to award **5.5** self-accredited points.

- An e-copy of your CPD Certificate will be emailed to you shortly after the meeting.

Meeting evaluation

Your feedback about the meeting is invaluable to MCLOSA and the speakers presenting. Please complete your evaluation survey online by the 9 December 2022. The survey link emailed to all delegates is also available via the meeting website: <https://www.mclosa.org.uk/evaluation>.

Accessing the video recording of the MCLOSA 2022 meeting

After the meeting a website link and password will be sent to delegates, this will enable you to access videos of the day's presentations and discussions. The resource will be located on the MCLOSA website. Videos will be available to watch until 24 November 2024.

Abstract Posters

Posters in the Whittington Suite		
P-1	Vitamin Deficiency Associated Ocular Surface Disease: Two Unusual Cases	Joanna Dilley London, UK
P-2	Unusual Cause of Bilateral Acanthamoeba Keratitis	Kelvin Cheng Edinburgh, UK
P-3	A Corneal Conundrum: An Unusual Cluster of Moraxella Catarrhalis Keratitis Cases	Stafford Sansome London, UK
P-4	Severity of Blepharokeratoconjunctivitis (BKC) in Children - A Case-Series and a Novel Technique for Repair of Intractable Corneal Perforations in BKC	Ruchi Gour London, UK
P-5	The Application of Machine Learning in Anterior Segment Optical Coherence Tomography in the Detection of Subclinical Keratoconus	Elsa Lee London, UK
P-6	Next Generation High-Precision Surgical Ablation Laser Technology	Harinderjeet Sandhu Southampton, UK
P-7	A Challenging Journey Through the Diagnosis and Treatment of Acanthamoeba Keratitis	Reem Farwana London, UK
P-8	Ocular Surface Optimised Glaucoma Surgery: Best Clinical Practice	Amrita Saravanan London, UK
P-9	An Incidental Finding of Intraocular Choristoma in an Enucleated Microphthalmic Globe: A Histopathologic Case Report	Layan Al Tawil Riyadh, Saudi Arabia
P-10	An Interesting Case of Refractive Surprise	Tarjani Makwana Wolverhampton, UK
P-11	Salzmann Nodular Degeneration and Therapeutic Contact Lenses	Ivanka van der Meulen Amsterdam, The Netherlands

MCLOSA Programme - 25 November 2022

09:00 - 09:10	Welcome	Andrena McElvanney MCLOSA President
09:10 - 09:40	BRON Award Presentations Chairs: Fook Chang Lam , Worthing, UK & Scott Robbie , London, UK	
09:10 - 09:15	Development of Novel Human-Derived Hybrid Host Defense Peptides with Broad-Spectrum Antimicrobial Activities for Infectious Keratitis	Darren Shu Jeng Ting Nottingham, UK
09:15 - 09:20	Investigating and Managing Fungal Keratitis in Low-Resource Settings: A Pragmatic, Evidence-Based Approach	Jeremy Hoffman London, UK
09:20 - 09:25	Radial Keroneuritis AS-OCT Changes in Acanthamoeba Keratitis: A Longitudinal Study	Grace Kiew Southampton, UK
09:25 - 09:30	Creation of a Proof-of-Concept 3D Printed Corneal Trauma Simulation Model	Lana Fu London, UK
09:30 - 09:35	Prevalence of Self-Reported Computer Vision Syndrome Symptoms and its Associated Factors Among University Students	Layan Al Tawil Riyadh, Saudi Arabia
09:35 - 09:40	A Comparative Study on Intraocular Pressure Measurements Using Three Different Modalities of Tonometers, Comparing Measurements from an iCare Rebound Tonometer and Reichert 7CR Non-Contact Tonometer Against Goldmann Applanation Tonometer in Patients with Glaucoma	Amina Miah London, UK
09:40 - 10:20	Contact Lenses for Keratoconus Symposium Chairs: Ourania Frangouli , London, UK & Sophie Jones , London, UK	
09:40 - 09:53	Does Distance Really Make the Heart Grow Fonder?	Rory McClenaghan Southampton, UK
09:53 - 10:06	Sclerals	Ken Pullum London, UK
10:06 - 10:20	Sclerals Rock!	Brian Tompkins Northampton, UK
10:20 - 10:50	Sponsor's Snapshots Introduced by Andrena McElvanney , London, UK	
	Gold Sponsor Contribution: Scope	
	Silver Sponsor Contribution: Altacor, Santen, Thea, Visufarma	
10:50 - 11:20	Coffee, Posters & Exhibition	
11:20 - 13:00	Acanthamoeba Symposium Chairs: Parwez Hossain , Southampton, UK & Andrena McElvanney , London, UK	
11:20 - 11:40	Risk Factors for Acanthamoeba Keratitis	Sajjad Ahmad London, UK
11:40 - 12:00	Diagnosis and Imaging in Acanthamoeba Keratitis	Parwez Hossain Southampton, UK
12:00 - 12:20	Phase 3 Trial Outcomes & the Delivery Protocol Impact in Acanthamoeba Keratitis	John Dart London, UK
12:20 - 12:40	Surgical Management of Acanthamoeba Complications	Damian Lake East Grinstead, UK
12:40 - 13:00	Q&A's	<i>All Acanthamoeba Symposium speakers</i>
13:00 - 14:00	Lunch, Posters & Exhibition	

MCLOSA Programme - 25 November 2022 continued

14:00 - 15:00	Kersley Lecture	
	Tissue Engineering the Cornea Professor Che Connon Director of Business Development, Professor of Tissue Engineering, Biosciences Institute, Newcastle University, Newcastle, UK Introduced by: Andrena McElvanney , Epsom, UK	
15:00 - 15:30	OSI Symposium: A Lifestyle Epidemic: Ocular Surface Disease Chairs: Fiona Carley , Manchester, UK & Samer Hamada , London, UK	
15:00 - 15:15	Biologics for Dry Eye Disease	Samer Hamada London, UK
15:15 - 15:30	Ocular Rosacea	Nikolina Budimlija Kildare, EIRE
15:30 - 16:00	Coffee, Posters & Exhibition	
16:00 - 16:45	OSI Symposium: Best Practice cornea and Ocular Surface Disease Chairs: Samer Hamada , London, UK & Christopher Hemmerdinger , Macclesfield, UK	
16:00 - 16:15	Infectious Keratitis	Fiona Carley Manchester, UK
16:15 - 16:30	Persistent Epithelial Defect	Ankur Barua Solihull, UK
16:30- 16:45	Amniotic Membranes	Mayank Nanavaty Brighton, UK
16:45 - 16:50	Presentation of the BRON Award and Poster Prizes	MCLOSA Council
16:50 - 17:00	Closing remarks	Andrena McElvanney London, UK
17:00 - 17:30	MCLOSA Annual General Meeting	Members only
17:30 - 18:30	MCLOSA Drinks Reception	Members only

Tissue Engineering the Cornea

Professor **Che Connon**

Director of Business Development, Professor of Tissue Engineering, Biosciences Institute, Newcastle University, Newcastle, UK

As Professor of Tissue Engineering at Newcastle University Che Connon has successfully combined his passion for entrepreneurial activities with notable academic achievements.

Although a bio-physicist by training Professor Connon has a real passion for applied biology as it allows him to come up with different solutions to real-life problems. Che and his team have been putting their minds to solving complex issues in cell and tissue engineering and bioprocessing, often by taking radical approaches. This has frequently meant not simply taking a bigger hammer to a particular problem but trying to see it from a different angle. Often this also involves an improvement in the fundamental understanding of cells or tissues biology, notably using the cornea as an exemplar.

Che completed his PhD on corneal wound healing under Prof Keith Meek at Cardiff University, soon after he undertook a 2-year JSPS Fellowship in Kyoto with Prof Shigeru Kinoshita. Che then went on to established his own lab at Reading University before taking a Chair in Tissue Engineering at Newcastle University in 2014. Highlights include the first demonstration of 3D bio-printing the corneal stroma and discovering the role of mechanotransduction in limbal niche stem cell biology.

Previously Prof Connon's lab has solved critical cell therapy logistical problems, not by building a bigger and better cryo-storage technology but by working *with* cells to create a room temperature storage solution (Atelerix Ltd); another great example in bioprocessing was realising that the limits to getting bioreactors to produce large numbers of cells was not a surface area problem but a cell collection problem (CellulaREvolution Ltd).

Finally, building upon his landmark paper in corneal 3D bio-printing he has developed a novel process to engineer complex tissue structures, again not by a traditional top-down Engineering approach but by directing cells to make the correct structure themselves. This results in tissues that look, feel and function like the real thing and forms important know how within his most recent spin out company 3D Bio-Tissues.

At 3D Bio-Tissues he and his team have developed an in-house engineering platform that takes a bio-inspired, bottom-up approach to tissue engineering to create structured, functional and scalable tissues that mimic natural tissues such as cornea, skin and muscle from the nano right through to the macro-scale!

1 Development of Novel Human-Derived Hybrid Host Defense Peptides with Broad-Spectrum Antimicrobial Activities for Infectious Keratitis

Darren Shu Jeng Ting¹

Rajamani Lakshminarayanan², Imran Mohammed³, Harminder S Dua¹

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Background/aim: Infectious keratitis (IK) is a major cause of corneal blindness worldwide. This study aimed to develop potent human-derived hybrid host defense peptides (HyHDPs) with broad-spectrum antimicrobial activities for IK.

Methods: HyHDPs were rationally designed through combination of human cathelicidin (LL-37) and human-beta-defensins (HBDs), and with guidance from molecular dynamics (MD) simulations. Efficacy of HyHDPs was determined against a range of bacteria, fungi and Acanthamoeba. Risk of antimicrobial resistance (AMR) was evaluated using multipassage AMR assay. Pre-clinical murine studies were performed to examine the in vivo efficacy and safety of HyHDPs in methicillin-resistant *S. aureus* (MRSA)-related keratitis.

Results: Hybridisation of LL-37 and HBD-2 led to the development of HDP23, which demonstrated good efficacy against *S. aureus* and MRSA [minimum inhibitory concentration (MIC)=12.5-25.0µg/ml], but not against fungi or Acanthamoeba. MD simulations provided atomistic insights into the key membrane-active residues and accelerated the discovery of HDP56. Compared to HDP23, HDP56 exhibited 4-32 times improved efficacy against *S. aureus*, MRSA, *Pseudomonas aeruginosa*, and *Fusarium solani* (MIC=3.1-6.3µg/ml). At 50µg/ml, HDP56 exhibited good anti-Acanthamoeba trophozoites efficacy (87%) and anti-encystation efficacy (67%). *S. aureus* did not develop any AMR against HDP56 after 15 treatment passages/days but developed significant AMR (32 times increase in MIC) against levofloxacin after 13 passages/days. Pre-clinical murine studies demonstrated strong efficacy and safety of HDP56 (0.5mg/ml) in treating MRSA-related keratitis (93% reduction in bacteria, which was equally effective to levofloxacin (5mg/ml).

Discussion: Rational hybridisation of HDPs, with guidance from MD simulations, has enabled the development of a novel HDP-based therapy for IK.

2 Investigating and Managing Fungal Keratitis in Low-Resource Settings: A Pragmatic, Evidence-Based Approach

Jeremy Hoffman¹

Reena Yadav², Sandip Das Sanyam², Pankaj Choudhary², Abhishek Roshan², Sanjay K Singh², Simon Arunga³, Victor H Hu¹, David Macleod¹, Astrid Leck¹, Matthew J Burton¹

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Purpose: Managing fungal keratitis (FK) in low-resource settings (LRS) is challenging. Confirming fungal aetiology is rarely performed and often not possible, whilst empirical treatment strategies frequently fail. We propose a pragmatic approach to diagnosing and managing FK for LRS based on evidence from our work in Nepal.

Methods: All consenting patients with microbial keratitis (MK) attending a tertiary ophthalmic hospital in Eastern Nepal were assessed for the presence of FK by in vivo confocal microscopy (IVCM) and/or smear microscopy. Demographic, clinical, and microbiological data were collected from all patients. These data were analysed in two nested case-controlled studies investigating indicative clinical features and evaluating investigations. Patients with confirmed FK were enrolled in a randomised controlled trial and allocated to receive topical chlorhexidine 0.2% or natamycin 5%, where the primary outcome measure was 3-month BSCVA.

Results: Between 3 June 2019 and 9 November 2020, we enrolled 643 patients with MK. A fungal cause was identified in 482/642 (75.1%) of cases. Serrated infiltrate margins, patent nasolacrimal duct, raised corneal slough, and organic trauma were independently associated with FK ($P<0.01$). Smear microscopy had the highest sensitivity (90.7% [95% CI 87.9-93.1%]), followed by IVCM (89.8% [86.9-92.3%]) and culture (75.7% [71.8-79.3%]). Of the three smear microscopy stains, KOH had the highest sensitivity (85.3% [81.9-88.4%]), followed by Gram stain (83.2% [79.7-86.4%]) and calcofluor white (79.1% [75.4-82.5%]). Natamycin-treated participants had significantly better 3-month BSCVA than chlorhexidine-treated participants (regression coefficient -0.30 [95% CI -0.42 to -0.18]; $P<0.001$). There was no difference in re-culture positivity at day-7. Most chlorhexidine-treated patients healed (151/175, 86.3%), although fewer than natamycin-treated cases (163/173, 94.2%; $P=0.018$).

Conclusion: Fungal organisms account for most MK cases in this setting. Serrated infiltrate margins, raised surface, and a history of organic trauma are strongly indicative of FK. This should be confirmed with simple, inexpensive smear microscopy using KOH and Gram staining. Topical natamycin 5% should be used as initial monotherapy, but if unavailable or too costly, topical chlorhexidine 0.2% may be used.

3 Radial Keratoneuritis AS-OCT Changes in Acanthamoeba Keratitis: A Longitudinal Study

Grace Kiew

Harinderjeet Sandhu, Ria Reddy, Parwez Hossain
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Purpose: Acanthamoeba keratitis is a well-known sight-threatening condition associated with contact lens wear in which early diagnosis remains a challenge clinically. Recent studies have shown the use of anterior segment optical coherence tomography (AS-OCT) in identifying radial keratoneuritis, thought to be pathognomonic for Acanthamoeba keratitis. The purpose of our study was to follow the changes on AS-OCT longitudinally from presentation to resolution of keratitis with treatment.

Methods: 26 patients with confirmed Acanthamoeba keratitis on confocal microscopy and/or culture had AS-OCT imaging performed at presentation and at multiple time points until resolution of infection. The length, width and depth of radial keratoneuritis on AS-OCT was measured at each visit.

Results: Out of 11 patients with complete data, there was a significant decrease in length of radial keratoneuritis on AS-OCT from presentation to day 111 ($p=0.03$) as well as width ($p=0.016$) and depth of keratoneuritis ($p=0.002$). 61.5% of patients had evidence of multiple inflamed nerves and 84% of patients had anterior chamber activity and/or keratic precipitates at presentation. The average presenting corneal thickness was 611 microns.

Conclusion: This study provides further evidence for the use of AS-OCT in early identification of radial keratoneuritis along with tracking the resolution of radial keratoneuritis in Acanthamoeba keratitis, suggesting a possible objective method of monitoring for quantitative improvement in clinical practice. It also provides valuable insight into presenting features of Acanthamoeba keratitis. Further studies using linear mixed model analysis would be useful to evaluate contributions of other variables to the AS-OCT findings noted in this study.

4 Creation of a Proof-of-Concept 3D Printed Corneal Trauma Simulation Model

Lana Fu

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Background: Corneal trauma can result in permanent visual impairment. Understanding the cornea's refractive properties and training in suturing techniques are essential to restore the natural corneal curvature and improving visual outcomes after injury.

Methods: A literature search was undertaken of Ovid/MEDLINE and PubMed/EMBASE to review current cornea surgery simulation models. Clinical cases between August 2020 to August 2022 were used to identify suitable complex cornea trauma examples for the simulation practice model. A cornea trauma simulation model was designed from clinical cases using Fusion 360 (Autodesk, San Rafael, USA) and printed with the J850 (Stratasys, Eden Prairie, Minneapolis, USA). Material options were selected to conform to cornea biomechanical accuracy.

Results: The corneal trauma simulation models were produced in a single print run of 20 with a Shore hardness A value consistent with the mammalian cornea. Dimensions of the simulation cornea were based on the emmetropic model eye. The simulated surgery was performed using the 3D printed models in a trainee wet lab session. Participants evaluated the face and content validity of the simulation model.

Conclusion: Our experience using 3D simulation models demonstrated several features enabling improved surgical treatment of corneal trauma. 3D printing is an innovative technology with applications across many fields, including healthcare. It allows for creating customised simulation models for cornea surgical practice with a short lead time and reduced waste.

5 Prevalence of Self-reported Computer Vision Syndrome Symptoms and its Associated Factors Among University Students

Layan Al Tawil

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Purpose: To determine the prevalence of symptoms of computer vision syndrome and to identify its associated factors. The secondary objective was to assess knowledge and practices related to preventing computer vision syndrome symptoms.

Methods: The data for this cross-sectional study were collected through a self-administered questionnaire distributed to 713 female undergraduates studying business and medicine in Saudi Arabia. The questionnaire included computer vision syndrome validated symptoms and factors associated with computer vision syndrome development.

Results: The most common symptom due to prolonged computer use was neck or shoulder pain, reported by 82.2% of the subjects. Overall, 66.5% of the subjects suffered from headache and 51.5% from dry eyes, in mild, moderate, or severe form. Business students were 1.6 times as likely as medical students to suffer from computer vision syndrome (odds ratio = 1.65; 95% confidence interval: 1.22, 2.24). The use of electronic devices for more than 5 hours (odds ratio = 1.52; 95% confidence interval: 1.07, 2.16) was also associated with experiencing computer vision syndrome symptoms. Regarding computer vision syndrome prevention, factors such as hours of use, screen distance, screen brightness, and room illumination showed statistically significant difference between the two groups ($p < 0.0001$).

Conclusion: The prevalence of computer vision syndrome symptoms was significantly higher among business students, who reported lower awareness and poor practice measures of computer use recommendations. Relevant awareness campaigns focusing on the appropriate use of computers are highly recommended.

6 A Comparative Study on Intraocular Pressure Measurements Using Three Different Modalities of Tonometers, Comparing Measurements from an iCare Rebound Tonometer and Reichert 7CR Non-Contact Tonometer Against Goldmann Applanation Tonometer in Patients with Glaucoma

Amina Miah

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Background: Progression of glaucoma is intraocular pressure (IOP) sensitive. Telemedicine is increasingly necessary to manage the high volume of glaucoma patients. Therefore, alternative reliable IOP measuring devices, comparable to measurements obtained by the traditionally accepted gold standard for measuring IOP Goldmann applanation tonometry (GAT) need to be identified.

Objective: To compare IOP measurements in glaucoma patients, obtained from three different modalities of tonometers, the Goldman applanation tonometer (GAT), the iCare IC100 rebound tonometer (RBT) and the Reichert 7CR non-contact tonometer (NCT), comparing the RBT and NCT to the gold standard GAT.

Method: This study involved 90 eyes from 45 subjects ($n=90$), who were patients selected during a glaucoma clinic appointment. Each subject had their IOP obtained using the iCare RBT, Reichert 7CR NCT and GAT. NCT gave two measurements, Goldmann corrected (IOPg) and cornea corrected (IOPcc). Central corneal thickness (CCT) measurements were obtained using the pachymeter Pachmate 2. Demographic data were extracted from electronic medical records (Medisoft Ltd, Leeds, UK). Data were analysed using linear regression in Python data analysis software.

Results: 45 patients had both eyes assessed ($n=90$). The average age of participants was 70 with a 7:8 female to male ratio. There is a visible relationship between increased measurement readings with increased CCT. IOPg is the most accurate to GAT followed by iCare then IOPcc.

Conclusion: IOPg appears to be the most accurate data acquisition modality for measuring IOP in comparison to the gold standard, GAT, within particular CCT parameters. Readings are more inaccurate for patients with low or high CCT. This is particularly varied using the iCare tonometer.

Joanna Dilley

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Introduction: Vitamin deficiencies are rare causes of ocular surface disease (OSD) in developed countries. We present two cases to highlight how nutritional deficits should be considered in atypical presentations of OSD.

Cases:

- A 32-year-old male presented with a four-week history of gradual right vision loss associated with an enlarging white spot in his vision. Examination revealed a large central corneal ulcer with a deep stromal feathery infiltrate. No microorganisms were cultured. Further detailed history revealed a bland diet of crisps and bread, with no fruit or vegetable intake. Serum vitamin A levels were <0.06 , vitamin B12 and D were also depleted. He responded to intensive topical antifungal and antibiotic therapy with later addition of steroids. A deep central stromal scar remains. He continues to report poor diet despite dietetic input, and for this reason remains an unsuitable candidate for surgical management.
- A 43-year-old lady presented with bilateral severe ocular pain and count fingers vision. She demonstrated bilateral inferior corneal oedema, dense punctate epithelial erosions and focal endotheliitis. Intensive topical lubricants and oral acyclovir were initiated. At follow-up, she remained symptomatic and additional bilateral conjunctival keratinisation was observed. Detailed history revealed previous duodenal switch surgery. Serum vitamin A and D levels returned depleted at $<0.09\mu\text{mol/L}$ and 13nmol/L respectively. High dose intra-muscular vitamin A was commenced and symptomatic improvement in vision was noted after just day 3. Her bilateral CF vision had improved to 6/9 by her next visit.

Conclusion: These cases demonstrate the importance of dietary history and identification of risk factors for nutritional deficits in atypical presentations of OSD.

Kelvin Cheng

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Purpose: To report the first case of bilateral Acanthamoeba keratitis secondary to use of contaminated rigid gas permeable (RGP) contact lens 'suckers'.

Case Report:

- A 57 year old female with a history of previous laser in-situ keratomileusis (LASIK) bilaterally and right post-LASIK ectasia presented with 2 weeks history of a painful right eye. Examination revealed mild conjunctival injection and dendritic epitheliopathy of corneas bilaterally. There was mild inflammation in the right anterior chamber. Microbial tests were acquired and she was started on ganciclovir prophylactically while awaiting results. Her Acanthamoeba PCR returned positive and therefore she was started on anti-amoeba treatment. This case was unique as she was a RGP contact lens user with excellent contact lens hygiene who did not sleep, shower or swim in her contact lenses - typical risk factors for Acanthamoeba keratitis. Upon further questioning, she revealed that she used 'suckers' with a hollow interior to insert her RGP contact lenses and typically rinses her 'suckers' with tap water and allows them to air-dry. Her contact lens sucker was tested for Acanthamoeba PCR which subsequently returned positive.

Conclusion: Although RGP contact lenses are classically thought to confer lower risk of Acanthamoeba keratitis, 'suckers' with hollow interiors provide a nidus for pathogens to accumulate and therefore act as a fomite. Patients utilising contact lens 'suckers' to insert their contact lenses should be advised to thoroughly clean the 'suckers' with sterile cleaning solution and regularly change their 'suckers' to prevent the above scenario.

Stafford Sansome

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Purpose: To analyse the clinical presentation, predisposing risk factors and outcomes of 5 cases of Moraxella catarrhalis keratitis.

Methods: A retrospective analysis was carried out of culture-proved cases of Moraxella keratitis from hospital records and slit-lamp photos during a 2-year period (from June 2020 to June 2022).

Results: Moraxella keratitis was identified in 5 patients. The mean age of the patients was 61 years (range 49-74), 2 females, 3 males. Visual acuity at presentation was counting fingers or less in all cases. Common predisposing factors included alcohol dependency (3/5), heavy smoking (3/5), malnutrition (3/5), gardening/DIY work (3/5), herpetic disease and dry eyes (3/5). Common features included: large infiltrates at presentation (average 4x7mm), infero-central location, severe stromal loss and Descemet's folds (5/5), corneal perforation (3/5), hypopyon (5/5) and intrastromal bleeding (3/5). All patients received a combination of fluoroquinolone and cephalosporins, topical steroids were started within the first 48 hours due to severe stromal loss. Adjunctive procedures with tissue adhesive and bandage contact lens (3/5) and surgical intervention with penetrating keratoplasty and/or cataract surgery (2/5) were necessary for visual rehabilitation.

Conclusions: This rare infection presents a therapeutic challenge with a high incidence of early complications requiring surgical intervention and a poor visual outcome attributable to the nature of the infection and the predisposing factors. Early initiation of topical steroids appears a critical factor in the prevention of stromal melt. More research on the antimicrobial susceptibility of Moraxella infections is required to prevent sight-threatening complications of this type of keratitis.

Ruchi Gour

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Background: The objective of this case series is to highlight the importance of identifying the wide clinical spectrum of blepharokeratoconjunctivitis (BKC) in children and its active management - including oral antibiotics, treating demodex lid infestations and lid margin therapies. We present a case series of seven children with BKC. Six were treated conservatively, one required a novel tectonic mini-DSEK surgery for corneal perforation.

Case presentation:

- A 14-year-old boy with bilateral BKC was advised conservative management. He was not compliant with medications and presented 5 months later with a corneal perforation. The perforation failed to seal after multiple attempts using cyanoacrylate glue, BCL followed by multi-layered amniotic membrane grafting. A novel technique - Tectonic mini-Descemet Stripping Endothelial Keratoplasty (mini-DSEK) was used to restore anatomical integrity with success.
- The other six cases were bilateral asymmetric BKC. Discomfort, blepharitis, meibomitis, conjunctival hyperaemia, inferior corneal pannus, superficial corneal vascularization and stromal scarring were consistent features. Patients were managed conservatively with daily eyelid hygiene, warm compresses, tea-tree oil wipes, topical antibiotics, steroids and oral antibiotics when required.

Conclusion: BKC is a chronic inflammatory process which can cause severe ocular morbidity. If left untreated, BKC can have disastrous consequences. It may be misdiagnosed as viral keratitis or allergic conjunctivitis. Early management entails both topical and systemic treatment. Tectonic mini-DSEK is a novel procedure for corneal perforations which may be used as an alternative to anterior surgical approaches like PK/DALK - thereby reducing the risk of immunological rejection, astigmatism - thus minimising postoperative refractive error and providing early visual rehabilitation.

P5 The Application of Machine Learning in Anterior Segment Optical Coherence Tomography in the Detection of Subclinical Keratoconus

Elsa Lee^{1,2}

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Introduction: Keratoconus is a bilateral corneal ectasia characterised by progressive corneal thinning leading to visual impairment. Despite the advent of recent anterior segment imaging technologies e.g., Scheimpflug and optical coherence tomography (AS-OCT), manual detection of early keratoconus remains challenging. Increasingly, machine learning (ML) has been applied to detect subclinical and forme fruste keratoconus using imaging input data.

Objective: To review ML approaches for detecting early keratoconus using AS-OCT data and reported diagnostic performance.

Methods: A systematic literature search was conducted on PubMed, Medline, Embase, the Cochrane library electronic data bases, International prospective register of systematic reviews (PROSPERO), ClinicalTrials.gov, International Clinical Trials Registry Platform (World Health Organisation), and OpenGrey from inception to July 7th, 2022. Studies were synthesised and evaluated using the TRIPOD checklist. Risk of bias assessment was conducted using an AI-tailored QUADAS-2 tool.

Results: The search yielded 91 articles, 6 of which met the eligibility criteria and were analysed. Of these, all were retrospective by design and did not conduct external out-of-sample validation. ML input features varied in dimensionality (range, 8-420 features) and analysis zone diameter (6-10mm), encompassing OCT-acquired parameters of pachymetry (100%), elevation (83.3%), keratometry (83.3%), aberration (66.7%), and built-in composite indices (33.3%). Corneal segmentation was conducted in 4 studies (66.7%). ML methods used were mostly supervised learning (83.3%) and unsupervised learning (16.7%). Studies reported moderate to high accuracy (range, 88.9-95.5%), sensitivity (71.5-98.5%), specificity (5.2-96.0%), and precision (74.3-91.2%). All studies had high risk of bias in patient selection and index test. Reporting of TRIPOD checklist items were incomplete in most studies (83.3%).

Conclusion: Machine learning-driven detection of forme fruste and subclinical keratoconus using AS-OCT acquired corneal features has shown feasibility and reasonable accuracy. However, current studies were of low power and subject to significant sampling, design, and reporting bias. Current modelling approaches employ supervised, unsupervised, and deep learning. Reinforcement and self- and semi-supervised learning are unexperimented. There is a need for a standardised corneal imaging library including normal eyes to reproduce results. ML-automated corneal segmentation and spatial profiling using AS-OCT has the potential for developing a contemporary keratoconus classification and screening system, improving early detection, and facilitating treatment monitoring. Future research should conduct out-of-sample external validation to assess overfitting and fulfil reporting standards.

P6 Next Generation High-Precision Surgical Ablation Laser Technology

Harinderjeet Sandhu

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Purpose: Laser surgery is currently dominated by ultra-violet and near-infrared femtosecond lasers. Ultraviolet-based ablation can put tissue at risk of mutagenic effects, whilst femtosecond laser can damage tissue through the ionising effect from plasma formation. A comparison is made with a new infrared wavelength laser under development, to assess whether there is reduction in collateral ablation damage.

Methods: Cadaveric human corneal tissue from the eye bank not suitable for transplantation is mounted on an artificial chamber and the laser applied to a predetermined depth to emulate manual corneal tissue incisions and dissections. Corneal thickness is analysed by pachymetry, fourier and time domain ocular coherence tomography and Scheimpflug corneal topography. Corneal endothelium is assessed using specular microscopy and trypan blue. Light microscopy assesses accuracy and depth of incisions whilst electron microscopy evaluates smoothness of dissections alongside evidence of collateral stromal tissue damage.

Results: Preliminary results with the new infrared laser have shown collateral damage zone of 4µm in corneal ablation which is significantly less than present laser technology (>30µm).

Conclusion: The reduction in the collateral ablation damage zone could aid with precise layered/sectioned corneal dissection thus facilitating multiple uses of a single donor cornea for more than one recipient. Further work will involve oedematous and opacified corneas to determine viability of laser in these clinical scenarios. Histological analysis will also be performed on brain tissue to assess efficacy in other high precision surgical fields.

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Purpose: To report a case of delayed diagnosis of Acanthamoeba keratitis, complicated by chronic scleritis, persistent uveitis and required enucleation.

Methods: Clinical records and slit-lamp photos review, laboratory investigations, imaging and histological review of a case that resulted negative for Acanthamoeba on multiple testing.

Results: A 76-year-old female with previous history of right Bell's palsy and monthly contact lens wear for hypermetropia presented with a red and painful right eye for 5 days, a clear cornea, no visual loss, no scalp tenderness, no jaw claudication. She reported similar self-resolving episodes affecting left eye during the previous 6 months. After the first month of topical antibiotics and lubricants she developed an epithelial defect that progressively enlarged to 5x7mm and became associated with anterior uveitis, corneal oedema, progressive stromal neovascularisation, hypopyon, intense pain and light sensitivity. She underwent vitreous and anterior chamber biopsy, the corneal biopsy resulted negative on three occasions, the in vivo confocal microscopy resulted negative. Due to the persistent uveitis and intense ocular pain, the patient was initiated on oral prednisolone and methotrexate. 13 months after presentation, due to the progressive loss of vision and persistence of pain, the patient underwent enucleation and histology. The immunohistochemistry showed acanthamoeba cysts in the posterior cornea associated with reactive scleritis.

Conclusions: This case shows offers many important learning points on the clinical management of this infection and the challenges of false negative diagnostic testing.

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There is a crucial need to optimise the health of the ocular surface prior to bleb-forming filtration glaucoma surgery. Poor ocular surface in glaucoma patients arises due to the complex interaction between topical glaucoma medications and the delicate micro-architecture of the conjunctiva. The long-term and frequent use of active ingredients and preservatives such as benzalkonium chloride results in the depletion of goblet cells, reduction of basal tear turnover rate and promotes development of ocular allergy. The effect on the conjunctiva if left unchecked provides an inhospitable environment for filtration surgery (FS). Maintaining the health of the ocular surface and conjunctiva is the single most modifiable risk factor to promote the success of FS by ensuring a well-functioning bleb and a more comfortable patient experience.

At present there are no peer-reviewed, validated guidelines providing clinicians in the United Kingdom with a standard operating procedure on mitigating the effects of glaucoma treatment related ocular surface disease (GTROSD). We propose an algorithm for the assessment of the OS and treatment strategies to aid ophthalmologists preparing the OS for bleb-forming procedures. By optimising the ocular surface with clear preoperative, intraoperative, and postoperative considerations, rates of success for FS are maximised, with a substantive reduction in common postoperative side effects encountered by glaucoma patients in the often life-long post-operative course following surgery.

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Introduction and importance: Choristomas are benign growth of normal tissue in abnormal location and in the ophthalmic practice, they are more commonly found in the epibulbar region. Intraocular choristoma has been reported in different ocular structures but it is very rare especially in association with microphthalmos.

Case presentation:

- We present a 13-month-old child with bilateral microphthalmia with the left side being more significantly smaller than the right that required enucleation for introducing a larger silicone implant. The histopathological examination revealed an intraocular choristoma consisting of chondroid and adipose tissue with surrounding fibrosis. Other areas in the globe were also underdeveloped and dysplastic including the optic nerve, which was replaced by dense wavy collagen fibres and fibrovascular tissue.

Discussion: Even though choristomas are benign, they may be extensive interfering with visual development especially the ones involving the epibulbar area. Systemic disease can have choristomas as an ocular feature such as in Goldenhar-Gorlin syndrome. Choristomas inside the eye are rare and they commonly involve the uveal tissue and the optic nerve head mostly in the form of ectopic glandular tissue and choroidal osseous choristoma. Our case is unique in its intraocular retrolental location, composition of chondroid tissue and fat, in addition to the fact that it was found within a microphthalmic globe with other interesting histopathological findings.

Conclusion: We report a case of an incidental finding of intraocular choristoma with associated microphthalmia, genetic testing may be useful for establishing a genetic aetiology in such cases even in the absence of dysmorphic features.

P10 An Interesting Case of Refractive Surprise**Tarjani Makwana**

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Background: Cataract surgery with intraocular lens (IOL) implantation is one of the most commonly performed ophthalmic procedures and achieving a postoperative refractive outcome close to emmetropia remains a key area of concern for surgeons. Inaccurate biometry measurements can lead to wrong intraocular lens power calculations and result in refractive surprise following cataract surgery.

Case Description:

- A 63-year-old myopic female, with a history of contact lens wear, underwent uncomplicated phacoemulsification with posterior chamber intraocular lens (IOL) implantation aiming for emmetropia. Postoperatively, her uncorrected visual acuity was 3/60 (20/400), with pinhole improving to 6/24 (20/80). An anterior segment exam showed a clear cornea with no punctate staining, no corneal oedema, a quiet anterior chamber, a well-centred posterior chamber IOL, and no posterior capsular opacity. The posterior segment exam was normal. The macula was flat with a sharp foveal reflex and peripheral retinal myopic degenerative changes. A review of the biometry confirmed IOL power insertion consistent with preoperative calculations. With manifest refraction of -5.25/-0.25x45, her visual acuity improved to 6/6. Further investigation revealed that the patient had failed to remove her contact lens prior to biometry measurement and calculation was performed with a contact lens of power -4.75DS insitu in her eye, giving rise to a refractive surprise post-operatively.

Conclusion: Contact lens wear affects biometry measurements and subsequent IOL power selection. It is advisable to repeat biometry measurements after discontinuing contact lenses for a short period to improve the accuracy of IOL calculations.



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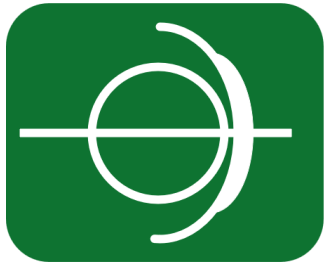
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