Bowman Club 2022, 25 March 2022

Oral abstract presentation

OP-1 CONJUNCTIVAL GENETIC 'FINGERPRINTING' IN OCULAR MUCOUS MEMBRANE PEMPHIGOID

[1,2]Jesse Panthagani*, [1]Rachel Vincent, [2]Anisha Sekaran, [2]Priyanka Pujara, [1]Graham R Wallace, [1,2]Saaeha Rauz. *[1]Academic Unit of Ophthalmology, Institute of Inflammation and Ageing, University of Birmingham, UK; [2]Birmingham and Midland Eye Centre, Sandwell and West Birmingham Hospitals, Birmingham, UK*

10.1136/bmjophth-2022-BCM.1

*Correspondence, Jesse Panthagani: j.panthagani@bham.ac.uk

Objective Ocular Mucous Membrane Pemphigoid (OcMMP) is a rare disease characterised by chronic autoimmune-driven conjunctival inflammation leading to progressive scarring, and blinding sequelae. The purpose of this study was to characterise the conjunctival gene 'fingerprint' involved in the fibrosis signalling pathways in the pathogenesis of OcMMP.

Methods and Analysis Ocular surface gene expression studies were undertaken on conjunctival swabs from OcMMP and age-matched control patients. The NanoString nCounter Human Fibrosis panel (NanoString Technologies Inc.) quantified RNA expression from 770 genes. Differentially expressed genes (DEG) and pathway analysis were determined using HyperScale architecture designed by ROSALIND, Inc. with normalisation, fold changes (≥+1.5-fold or ≤-1.5-fold) and p-values adjustment (<0.05) using the Benjamini-Hochberg method. Significantly identified genes were aligned to the aldehyde dehydrogenase (ALDH)/retinoic acid fibroblast autoregulation conjunctival scarring signalling pathway, known to be central to immune-mediated mucosal scarring in OcMMP.

Results 6 OcMMP patients (8 eyes, mean age 76.5 (±7.0 SD) years, 6 (66%) male, 3 (50%) biopsy-positive) and 8 age-matched cataract patients (15 eyes; age 73.1 (±9.3) years, 3 (37%) male), serving as controls were analysed. Ninety-three DEGs were observed between OcMMP and controls (48 upregulated and 45 downregulated). Of these, the top 10 upregulated DEGs were COL3A1, COL1A1, FN1, TPSAB1/B2, THBS1, SERPINE1, SPP1, COL5A1, OASL and IL1B. 44 pathways that had a global significance score greater or equal to 2, the most significant representing extracellular matrix (ECM) remodelling, synthesis, and degradation.

Conclusion The conjunctival genetic 'fingerprint' predominantly suggests an activated fibroblastic phenotype in the OcMMP patients and could represent (i) novel targets for drug discovery and (ii) surrogate outcomes/novel biomarkers for the monitoring of disease progression.

OP-2 LONG-TERM OUTCOMES OF REBUBBLING AND GRAFT DETACHMENT IN DESCEMET MEMBRANE ENDOTHELIAL KERATOPLASTY USING A STANDARDISED PROTOCOL

Lana Fu*, Emma J Hollick. *King's College Hospital, London, UK*

10.1136/bmjophth-2022-BCM.2

*Correspondence, Lana Fu: L.Fu@nhs.net

Objective To analyse risk factors and long-term outcomes after rebubbling and graft detachment in Descemet membrane endothelial keratoplasty (DMEK).

Methods and Analysis 176 consecutive DMEK grafts of 125 patients performed by 8 surgeons with a standardised technique between January 2015 and January 2022 were analysed. Main outcome measures were graft detachments, rebubbling rate, postoperative outcomes, and risk factors for graft failure and rebubbling.

Results 6 (3.4%) grafts required rebubbling (<1/3 detached). 41 (23%) grafts developed self-resolving partial detachments (<1/3detached). 5-year graft survival were 96%, 87%, and 83% in fully attached, partially detached and rebubbled eyes. Mean best spectacle corrected visual acuity (BSCVA) at last follow-up were 0.00±0.34, 0.14±0.25, and 0.18±0.19 logMAR (p=0.266) in fully attached, partially detached and rebubbled eyes. Percentage endothelial cell loss (ECL) was 57.5±14.1, 57.9±14.2, and 68.8±8.8 (p=0.035) in fully attached, partially detached and rebubbled eyes. Graft failure occurred in 9 (5.1%) eyes: 3 grafts had primary failure, 2 had early failure (<3 months), 2 had late failure (<12 months), and 2 grafts did not fully unfold intraoperatively. Intraoperative trauma (score) was a risk factor for graft failure (HR 1.81; 95% CI: 1.33 – 2.50 (p=0.0229)). Indication for surgery was a risk factor for rebubbling (HR 5.28; 95% CI: 5.11 – 72.4 (p=0.00703)).

Conclusion DMEK grafts had better graft survival if there was no partial detachment or rebubbling up to 5 years postop. There was significant ECL associated with rebubbling. A standardised technique reduces rebubbling and graft failure risk.

OP-3 PERSONALISED MODEL TO PREDICT KERATOCONUS PROGRESSION FROM DEMOGRAPHIC, TOPOGRAPHIC AND GENETIC DATA

[1]Olivia Li*, [2]Howard P Maile, [3]Mary D Fortune, [4]Patrick J Royston, [2]Marcello T Leucci, [2]Bruce D Allan, [2]Alison J Hardcastle, [5]Pirro Hysi, [1]Nikolas Pontikos, [1,2]Stephen J Tuft, [1,2]Daniel M Gore. *[1]Moorfields Eye Hospital, London, UK; [2]UCL Institute of Ophthalmology, London, UK; [3]MRC Biostatistics Unit, Cambridge Institute of Public Health, University of Cambridge, UK; [4]MRC Clinical Trials Unit at UCL, London, UK; [5]Section of Ophthalmology, School of Life Course Sciences, King's College, London, UK*

10.1136/bmjophth-2022-BCM.3

*Correspondence – Olivia Li: o.li@nhs.net

Objective To generate a personalised prognostic model to predict keratoconus progression to corneal collagen cross-linking (CXL).

Methods and Analysis In this retrospective cohort study, we recruited 5,025 patients (9,341 eyes) with early keratoconus between January 2011 and November 2020. Genetic data from 926 patients was available. We evaluated both change in keratometry or CXL as indices of progression and used the Royston-Parmar method on the proportional hazards scale to generate a prognostic model. We calculated hazard ratios (HR) for each significant covariate, with explained variation and discrimination.

Results After exclusions, model-fitting comprised 8,701 eyes, of which 3,232 underwent CXL. For early keratoconus CXL provided a more robust prognostic model than keratometric progression. The final model explains 33% of the variation in time-to-event age HR [95% confidence limits] 0.9 [0.90–0.91], maximum anterior keratometry (Kmax) 1.08 [1.07–1.09], and minimum corneal thickness 0.95 [0.93–0.96] as significant covariates. Single nucleotide polymorphisms (SNPs)

associated with keratoconus (n=28) did not significantly contribute to the model. The predicted time-to-event curves closely followed the observed curves during internal-external validation.
Conclusions A prognostic model to predict keratoconus progression could aid patient empowerment, triage and service provision. Age at presentation is the most significant predictor of progression risk. Candidate SNPs associated with keratoconus do not contribute to progression risk.

OP-4 DESCEMET MEMBRANE ENDOTHELIAL KERATOPLASTY PATCHING (DMEP) – SELECTIVE ENDOTHELIAL REPLACEMENT IN EYES WITH LOCALISED ENDOTHELIAL DYSFUNCTION

[1,2]Luis García-Onrubia*, [1,2]Nick Stanojcic, [1,2]Jing Hua, [1,2]Maninder Bhogal. *[1]Department of Ophthalmology, St. Thomas' Hospital, London, UK; [2]King's College, London, UK*

10.1136/bmjophth-2022-BCM.4

*Correspondence - Luis García-Onrubia: luis.garciaonrubia@gstt.nhs.uk
Objective To report the clinical outcomes of a series of cases in which localised areas of endothelial function were selectively treated with shape and position matched endothelial transplanted in a procedure we have termed Descemet's membrane endothelial patching (DMEP).
Methods Interventional case series. Five patients presented with localised endothelial dysfunction in eyes with high-risk graft failure due either to rejection, recurrence of the focal endothelial dysfunction or because extended treatment with steroid drops was contraindicated. Endothelial grafts matching the area of dysfunction were produced to preserve healthy host cells and limit the immunological burden of new grafts. Patient demographic details, indication for surgery, preoperative and postoperative visual acuity, intraoperative and postoperative complications, and graft rejections episodes were noted.
Results Five patients were included in this cases series. Indications for DMEP were Fuchs' heterochromic iridocyclitis (n=1), Fuchs' endothelial dystrophy (n=2), endotheliitis (n=2). In all cases, a customised DMEP graft was used, as opposed to our standard 8.25mm circular DMEK graft size. The DMEP grafts were centred over the area of focal endothelial dysfunction. In all cases, complete graft attachment was achieved, and the corneas were cleared. Steroid drops were reduced rapidly without any episodes of graft rejection/failure reported at 1 year.
Conclusion DMEP transplants are a viable option to treat localised endothelial dysfunction. Placing non-circular, no central transplants is surgically feasible and does not appear to affect graft adhesion. Limiting the size of the transplant may limit the immunological burden of new grafts and reduce the need for extended courses of steroids.

OP-5 FEMTOSECOND ENABLED KERATOPLASTY TECHNIQUES FOR KERATOPLASTY

Hatch Mukherjee*, Spyros Pipis, Yunfei Yang. *Colchester Eye Centre, East Suffolk and North East Essex NHS Trust, Colchester, UK*

10.1136/bmjophth-2022-BCM.5

*Correspondence - Hatch Mukherjee: hatch.mukherjee@gmail.com
Objective To present a case series evaluating the role of the femtosecond laser in a range of keratoplasty techniques, and evaluation of the Victus femtosecond laser (Bauch & Lomb) software version 3.4 in a range of procedures.

a. Femtosecond assisted descemetorhexis for DMEK.
b. Use of modified hyaluronate augmentation to allow trephination in eccentric or thin corneas including desmetocele, for DALK.
c. Use of femtosecond trephination to allow mushroom configuration with simplified Big bubble DALK tunnel creation.
d. Post keratoplasty intrastromal astigmatic keratotomy.

Methods Surgical and clinical case review including video.
Results and Conclusions The femtosecond laser platform provided a configurable tool with wide ranging applications in corneal surgery. Modifications to manual techniques utilising femtosecond laser offers some surgical benefits.

OP-7 OUR EXPERIENCE OF DMEK WET LAB-TRAINING COURSE AS A PRECURSOR TO STARTING DMEK SERVICE AT NHS TRUSTS DURING COVID-19 PANDEMIC IN UK

[1,2]Tina Khanam*. *[1]Moorfields Eye Hospital, London, UK; [2]Spire, St. Anthony's Hospital, Sutton, UK*

10.1136/bmjophth-2022-BCM.6

*Correspondence - Tina Khanam: t.khanam1@nhs.net
Objective The benefits of simulation model and wet lab training courses have been well publicised. We were keen to introduce DMEK service in our NHS trust and put simulation and wet-lab training courses to the test for corneal consultants.
Methods We designed and held DMEK wet lab courses using human donors and the simulation model and wet lab training for consultants. We collected surveys pre- and post- wet lab course attendance. We also recorded their performance times. We used human research grade corneas and Phillip DMEK, Kitaro model eye, artificial anterior chambers for consultants.
Results All participants had practiced all the steps of DMEK and improved performance times. All reported to have increased confidence level as a direct result of the wet lab courses. All steps of DMEK surgery except graft manipulation were closely simulated to real-life surgery on patients. Out of the six consultants participating, two started DMEK services in their respective NHS trusts in the following month, with others planning to start DMEK services in the coming months.
Conclusions The benefits of simulation and wet lab training is particularly valuable during the COVID-19 pandemic, which drastically reduced the availability of donor cornea, thus grinding to a halt corneal graft surgery nationally for many months. Surgeons, regardless of grade (beginner to advanced) can keep their skills up using wet lab and simulation. This setting also improves safety for patients.

OP-8 ABSTRACT WITHDRAWN