EBAA 2024 ANNUAL MEETING

EBAA SYMPOSIA PROGRAM

June 8 | Kansas City
#EBAA2024

EBAA SYMPOSIA

2024 Annual Meeting
Saturday, June 8, 2024
Kansas City, MO

Scientific Symposium
8:00 am – 11:30 am

Physician Luncheon
11:45 am – 12:45 pm

Medical Directors Symposium
1:00 pm – 4:00 pm

EBAA 2024 ANNUAL MEETING

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SCIENTIFIC PROGRAMS COMMITTEE

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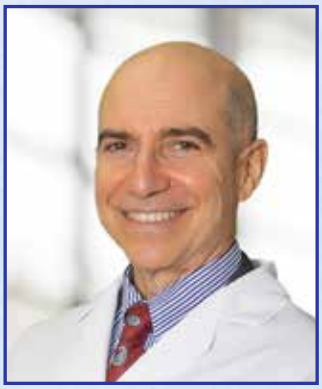

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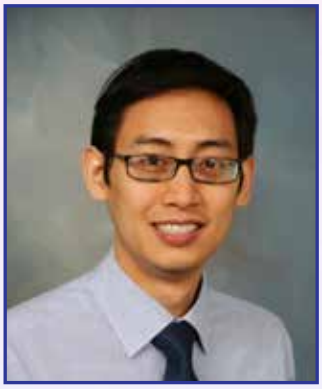

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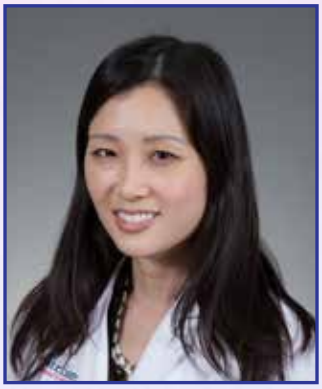

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LEARNER NOTIFICATION AND FINANCIAL INTEREST DISCLOSURES

LEARNER NOTIFICATION

Eye Bank Association of America
2024 Annual Meeting Symposia
June 8, 2024 | Kansas City, MO

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No financial commercial support was received for this educational activity.

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No in-kind commercial support was received for this educational activity.

Satisfactory Completion

Learners must complete an evaluation form to receive a certificate of completion. Partial credit of individual sessions is not available. If you are seeking continuing education credit for a specialty not listed below, it is your responsibility to contact your licensing/certification board to determine course eligibility for your licensing/certification requirement.

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This activity has been approved for 6.5 CEUs. To earn credit for attending the session, please complete the session evaluation in the app.

Objectives - After Attending This Program You Should Be Able To:

1. Learn new developments and techniques in eye banking and corneal transplantation.
2. Understand updates in eye banking standards and practices.
3. Cite new research findings in corneal transplantation, preservation, preparation, and processing.

How to Get Your Certificate:

1. Go to http://EBAA.cmecertificateonline.com
2. Click on the "2024 Annual Meeting Symposia" link.
3. Evaluate the meeting and click the hyperlink provided on the last page to claim your credit certificate.
4. Save/Download/Print all pages of your certificate for your records.

Questions? Email Certificate@AmedcoEmail.com

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The following table of disclosure information is provided to learners and contains the relevant financial relationships that each individual in a position to control the content disclosed to Amedco. All of these relationships were treated as a conflict of interest, and have been resolved. (C7 SCS 6.1---6.2, 6.5)

All individuals in a position to control the content of CE are listed in the program book. If their name is not listed below, they disclosed that they had no financial relationships with a commercial interest.

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Peter Bedard	Moria Surgical: Patent Holder BrightStar Therapeutics: Patent Holder
Christopher Blanton	Johnson and Johnson Surgical Vision: Consultant
Andrea Cogliati	LighTopTech Corp.: Employee
M. Soledad Cortina	Gore: Consultant
Ali Djalilian	Kala: Consultant
Asim Farooq, MD	GlaxoSmithKline: Consultant Amgen: Consultant Ambrx: Consultant Daiichi-Sankyo: Consultant Seagen: Consultant Eisai: Consultant AstraZeneca: Consultant Mythic Therapeutics: Consultant Skye Bioscience: Consultant Immunogen: Consultant
Kendall Frank	Lions Eye Bank of West Central Ohio: Employee
Xu Han	CryoCrate: Owner
Joshua Hou	Moria Surgical: Patent Holder Brightstar Therapeutics: Patent Holder
Bennie Jeng	GlaxoSmithKline: Consultant Kiora: Stock Shareholder

INDIVIDUAL	COMMERCIAL INTEREST: RELATIONSHIP
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Shahzad Mian	Kowa: Research Grant Site Principal Investigator NIH: Research Grant Site Principal Investigator
Afshan Nanji	Beyeonics: Other
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Sudeep Pramanik	Eyedea Medical : Stock Shareholder
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Onkar Sawant	Eversight: Employee

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Ching Yuan	BrightStar Therapeutics: Patent Holder BrightStar Therapeutics: Consultant

PROGRAM SCHEDULE

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SCIENTIFIC SYMPOSIUM 8:00 AM – 11:30 AM

8:00 am – 8:02 am	**Welcome and Introductions** Joshua H. Hou, MD, and M. Soledad Cortina, MD
8:03 am – 8:14 am	**Assessing Research Productivity of U.S. Academic Cornea Specialists Using the Relative Citation Ratio** Jeremy Shapiro, BA,* *University of Michigan Medical School*
8:15 am – 8:26 am	**Gender Differences in Ophthalmologist Salary Among Cornea Specialists at U.S. Public Medical Schools** Emily Sun,* *Wilmer Eye Institute*
8:27 am – 8:38 am	**Identification of the Role of Wnt Signaling Pathways in the Endothelium during Cold Storage of Donor Corneas using Transcriptomics-based Approach** Sangly Srinivas, PhD, *Indiana University*
8:39 am – 8:50 am	**Novel Eye Banking Practices Based on Biocompatible Cryopreservation of Ocular Tissues in Regular Deep Freezers** Xu Han, PhD, *CryoCrate/ Wake Forest University / University of Missouri*
8:51 am – 9:02 am	**Your Scope or Mine? Consistency of Trypan Blue-based ACD Evaluation across Different Imaging Setups** Peter Bedard, MS, *Lions Gift of Sight*
9:03 am – 9:14 am	**Dual-Modality Imaging for Cellular Volumetric Evaluation of Donor Corneal and Retinal Tissues** Cristina Canavesi, PhD, MBA, *LighTopTech Corp.*
9:15 am – 9:26 am	**Ocular Surface Disease May be Associated with Allograft Dehiscence Following DALK and PK** Simran Sarin,* *The University of Iowa/ Iowa Lions Eye Bank*
9:27 am – 9:38 am	**Intracameral Antibiotic Prophylaxis After Corneal Transplant Surgeries** Shahzad Mian, MD, *Eversight/ University of Michigan*
9:39 am – 9:42 am	**Research Grant Announcement** Mark Greiner, MD, *EBAA Research Committee*
9:43 am – 10:00 am	**Break**

* Medical Student

10:00 am - 10:02 am	**Welcome Back** M. Soledad Cortina, MD, and Joshua H. Hou, MD
10:03 am – 10:14 am	**Quantifying Corneal Endothelial Cell Injury During Loading and Ejection of DMEK Grafts Using a Modified Calcein-AM Staining Method** Sung Lee, *Lions Gift of Sight*
10:15 am – 10:26 am	**Clinical Outcomes of DescePrep-Prepared DMEK Tissue: A Retrospective Review of the First Eight Cases** Katie Solley, MSE, *Eyedea Medical, Inc*
10:27 am – 10:38 am	**A Novel Technique for Processing Keratolimbal Allografts for the Treatment of Limbal Stem Cell Deficiency** Onkar Sawant, PhD, *Eversight*
10:39 am – 10:50 am	**Retrospective Analysis of Adult Human Retina Pigmented Epithelial Cell (ahRPE) Culture Success Rate from Human Cadaver Ocular Tissues** YoneJung Yoon, PhD, *The Eye-Bank For Sight Restoration*
10:51 am – 11:25 am	**Invited Session: Novel Surgical and Cellular Therapy Interventions for Corneal Epithelial Diseases** Ali R. Djalilian, MD, *University of Illinois, Chicago*
11:26 am – 11:28 am	**Best Paper Announcement** Michelle Rhee, MD, *Eye Banking and Corneal Transplantation Journal* *Supported by the Eye Banking and Corneal Transplantation Journal*
11:29 am – 11:30 am	**Closing Remarks** Joshua H. Hou, MD, and M. Soledad Cortina, MD

PHYSICIAN LUNCHEON 11:45 AM – 12:45 PM

11:45 am – 12:45 pm	**Physician Luncheon** Facilitated discussion moderated by Jennifer Li, MD, and Afshan Nanji, MD *Physicians, medical students, residents, and fellows are invited to attend.*

MEDICAL DIRECTOR SYMPOSIUM 1:00 PM – 4:00 PM

1:00 pm – 1:01 pm	**Opening Remarks** Joshua H. Hou, MD, *Lions Gift of Sight*
1:02 pm – 1:25 pm	**Systemic Infectious Disease Transmission & Eye Banking** Sean Edelstein, MD, *Mid-America Transplant*
1:26 pm – 1:41 pm	**Tissues Causing Issues: What We Need to Know about Recent TB Outbreaks** Jennifer Li, MD, *Sierra Donor Services Eye Bank*
1:42 pm – 1:57 pm	**Determining Tissue Imputability Following an Adverse Reaction** Elmer Tu, MD, *Eversight*
1:58 pm – 2:13 pm	**The Role of the Medical Director - Annual Competencies** Amy Lin, MD, *Utah Lions Eye Bank*
2:14 pm – 2:29 pm	**The Role of the Medical Director - Inspections and Accreditation** Michelle Rhee, MD, *The Eye-Bank for Sight Restoration*
2:30 pm – 2:45 pm	**The Role of the Medical Director - Research Programs** Mark Greiner, MD, *Iowa Lions Eye Bank*
2:45 pm – 3:00 pm	**Break**
3:00 pm – 3:24 pm	**Broadening Tissue Acceptance Among Surgeons** Joann Kang, MD, *The Eye-Bank for Sight Restoration* Evan Warner, MD, *Wisconsin Lions Eye Bank*
3:25 pm – 4:00 pm	**Medical Director Dilemmas** Moderator: Jennifer Li, MD, *Sierra Donor Services Eye Bank* Panelists: M. Soledad Cortina, MD, *Eversight* David DeRose, MD, *Lions World Vision Institute* Christopher Blanton, MD, *OneLegacy*
4:00 pm	**Closing Remarks** Joshua H. Hou, MD, *Lions Gift of Sight*

SCIENTIFIC SYMPOSIUM INVITED SESSION

INVITED SESSION

Invited Session:
Novel Surgical and Cellular Therapy Interventions for Corneal Epithelial Diseases

Ali R. Djalilian, MD, *University of Illinois, Chicago*

Ocular research continues to evolve and lead to new discoveries and therapies in sight restoration. The corneal epithelium was one of the first ocular tissues to be treated clinically with an autologous cell-based therapy, an innovation that took place more than 20 years ago. Following the discovery of this therapy, other novel cell-based and cell-derived therapies are being studied in the clinic to promote regeneration of the epithelium in severe ocular surface disease.

While logistically challenging and costly, cell-based therapies for corneal epithelial disease will likely provide options for patients who have failed currently available therapies. This session discusses the current and future cellular therapies for corneal epithelial diseases and the research that is currently taking place.

SCIENTIFIC SYMPOSIUM ABSTRACTS

SCIENTIFIC SYMPOSIUM ABSTRACT

8:03 am – 8:14 am

Assessing Research Productivity of U.S. Academic Cornea Specialists using the Relative Citation Ratio

Jeremy Shapiro, BA,* *University of Michigan Medical School*

Co-Authors:
Jovany Franco, MD; David Azer; Ashley Roth; Austin Gregg; and Shahzad Mian, MD

Purpose:
To assess the research productivity of U.S. academic cornea specialists using the relative citation ratio (RCR).

Method:
A list of U.S. academic ophthalmology departments was obtained using the FREIDA Residency and Fellowship Database (American Medical Association). Department websites were reviewed to identify all fellowship-trained cornea faculty. Publication count, mean RCR, and weighted RCR for each faculty member were obtained from iCite (National Institutes of Health [NIH]) in February 2024. Only original research articles were included. Data were compared by gender, prior PhD completion, academic rank, and year of ophthalmology residency completion.

Results:
Data were obtained for 640 cornea specialists across 110 academic ophthalmology departments. Across this group, median publication count was 12 (interquartile range [IQR] 3–39), median mean RCR was 1.23 (IQR 0.76 – 1.78), median weighted RCR was 13.16 (2.81–55.07). These metrics correlated positively with male gender, prior PhD completion, earlier residency completion year, and higher academic rank.

Conclusion:
As a group, U.S. academic cornea specialists exceed the standardized average RCR value of 1, albeit with significant variability across individuals. Our study serves to benchmark the research productivity of this physician group using the relatively novel RCR metric. These benchmark data can, in turn, be used for evaluation of the relative research impact of individual specialists or provider groups.

* Medical Student

SCIENTIFIC SYMPOSIUM ABSTRACT

8:15 am – 8:26 am

Gender Differences in Ophthalmologist Salary Among Cornea Specialists at U.S. Public Medical Schools

Emily Sun,* *Wilmer Eye Institute*

Co-Authors:
Maria A. Woodward, MD; Christina Prescott, MD; and Fasika Woreta, MD, MPH

Purpose:
Studies have found gender differences in salary among ophthalmologists, though it is unclear whether this disparity extends to ophthalmology subspecialties. We aim to examine salary differences by gender among U.S. academic ophthalmologists specializing in cornea.

Method:
We collected salary data for all full-time ophthalmology cornea faculty in programs where state laws mandate public salary disclosure for university employees. Gender and faculty rank information was obtained from program websites. We then examined for differences in salary by gender.

Results:
There were 20 ophthalmology programs across 13 states where salary data was publicly available, with 72 ophthalmologists specializing in cornea (28 women, 44 men). There were similar numbers of women and men who were assistant or associate professors (19 vs. 20), but fewer women who were full professors (9 vs. 24). Overall, male faculty members had an average salary of $380,380 compared to $285,635 for female faculty members. Assistant female professors had significantly lower salaries than male assistant professors ($141,098 vs. $258,571, p=0.04). Female associate or assistant professors had significantly lower salaries than male associate or assistant professors ($185,206 vs. $287,047, p=0.05).

Conclusion:
Significant gender differences in salary and faculty rank exist among academic ophthalmologists at U.S. public medical schools among cornea specialists. Future investigation of reasons for salary disparities by gender in cornea is warranted.

* Medical Student

SCIENTIFIC SYMPOSIUM ABSTRACT

8:27 am – 8:38 am

Identification of the Role of Wnt Signaling Pathways in the Endothelium during Cold Storage of Donor Corneas using Transcriptomics-based Approach

Sangly Srinivas, PhD, *Indiana University*

Co-Authors:
Chris Sica, CEBT; Amit Chatterjee, PhD; Diego Ogando; Edward Taeyoon Kim; Kiran Bharat Gaikwad; and Lisa Brooks, CEBT

Purpose:
Application of an omics-based approach to explore the molecular mechanisms underlying damage to the donor endothelium during cold storage (CS).

Method:
Donor corneas were stored at 4°C for short (2-3 days, SCS, n=2), intermediate (7 days, ICS, n=2), and long (14 days, LCS, n=2) durations. Total RNA extracted from the endothelium of each sample was used to perform RNA seq using Illumina NextSeq 500 platform and the data were analyzed to determine differentially expressed genes (DEGs).

Results:
We identified 58.7% (15,851) protein-coding (PC), 25.2% (6804) of long noncoding RNAs (lncRNAs) and 16.1% of other RNAs (miRNA, snoRNA, pseudogenes, and novel transcripts) transcripts following different durations of CS. Analysis of DEGs showed upregulation (log2fold change > 1) of 783 (4.9%) and downregulation (log2fold change < -1) 669 (4.2%) of genes in ICS vs. SCS; corresponding data were observed 2.5% and 2.6% in LCS vs. SCS. Gene ontology and functional enrichment analyses showed that upregulated PC DEGs significantly impacted cell-ECM interactions, cell metabolism, and cytokine pathways. Upstream pathway analysis showed significant upregulation of transcription factor TCF3, indicating impact on Wnt signaling pathways.

Conclusion:
(A) CS progressively induces changes in Wnt signaling pathways, which affects cell-ECM interactions and inflammatory cytokines pathways in the donor endothelium. (B) Altered transcriptome can be implicated in rapid endothelial cell loss after transplantation.

SCIENTIFIC SYMPOSIUM ABSTRACT

8:39 am – 8:50 am

Novel Eye Banking Practices Based on Biocompatible Cryopreservation of Ocular Tissues in Regular Deep Freezers

Xu Han, PhD, *CryoCrate/ Wake Forest University/ University of Missouri*

Co-Authors:
Ying-Bo Shui; Ying Liu; Andrew J. Huang; Peter Koulen; and R. Scott Duncan, PhD

Purpose:
Following DSAEK/DMEK, donor corneal stromal and limbal tissues are discarded, primarily due to the absence of an effective preservation method. Rapid advances in tissue engineering also challenge the efficacy of conventional tissue storage protocols. To overcome these challenges, we developed a novel biocompatible cryopreservation medium, OdinSol®, which removes the need for any permeating cryoprotectant and enables tissue cryostorage in regular -80°C freezers. Its derivative product, DionySol®, achieves stromal decellularization and ultrastructural preservation by simply freezing in -80°C freezers.

Method:
Our invention of OdinSol® and DionySol® utilizes a unique polysaccharide cocktail that significantly reduces ice crystal size in the proximity of the cell membrane or collagen fibrils to the nano meter scale. Donor corneas were cryopreserved in a standard sterile 15ml cryovial (NalgeneTM) containing 10ml of either OdinSol® for limbal stem cell (LSC) cryopreservation or DionySol® for stromal decellularization and cryopreservation and then stored in a -80°C freezer. Human iPSC-derived retinal pigment epithelial (RPE) tissues are cryopreserved in OdinSol® using the same protocol. After one to six months of storage, frozen tissues were thawed and analyzed by standard in vitro assays, including TUNEL staining, immunochemical staining, transmission electron microscopy (TEM), or tissue culturing for LSC outgrowth.

Results:
OdinSol® showed notable efficacy in maintaining the cell viability in both limbal and RPE tissues. DionySol® maintained the ultrastructure of the stroma and achieved comprehensive destruction of keratocytes and other cells.

Conclusion:
This nano ice based technology platform paves the path to the establishment of cryo-inventories of LSCs, RPE, and stromal tissues for novel eye bank practices.

SCIENTIFIC SYMPOSIUM ABSTRACT

8:51 am – 9:02 am

Your Scope or Mine? Consistency of Trypan Blue-based ACD Evaluation across Different Imaging Setups

Peter Bedard, MS, *Lions Gift Sight*

Co-Authors:
Hannah J. Hwang, BS; Ching Yuan; and Joshua H. Hou, MD

Purpose:
Specular microscopy has significant limitations when it comes to evaluating the suitability of post-processed DMEK grafts. Peripheral damage from peeling, scoring, and s-stamping is not captured by the limited field of view. Trypan blue is a vital dye that stains dead endo cells. Percent area of cell damage (ACD) on trypan staining is a recognized alternative metric for evaluating total damage in post-processed DMEKs. ACD can be quantified using available software from simple photos of stained corneas. Many eye banks routinely image their corneas, but every eye bank has its own imaging setup. Consequently, results can be inconsistent across different eye banks. The purpose of this study is to determine if the same ACD image capture method can be consistent across 2 resolution-matched setups.

Method:
DMEK grafts were stained with Trypan blue. Grafts were then imaged using 2 hardware setups, a compact digital microscope and a dissection stereoscope. ACD was then calculated using a custom automated segmentation program from the images and compared statistically.

Results:
A total of 11 post-processed, trypan-stained DMEK images were obtained consecutively with compact digital and stereoscopes. Linear regression showed good agreement in ACD (R^2= 0.63, residual SE = 0.88%, P=0.006) between hardware setups. Mean ACD did not differ between cameras (5.7.8 ± 1.4% vs. 5.6 ± 1.3%, P=0.67).

Conclusion:
Comparable ACD results were seen across 2 resolution-matched imaging setups. Consistency of ACD across setups, together with automated ACD software, introduces the possibility of standardized full-graft post-processing imaging.

SCIENTIFIC SYMPOSIUM ABSTRACT

9:03 am – 9:14 am

Dual-Modality Imaging for Cellular Volumetric Evaluation of Donor Corneal and Retinal Tissues

Cristina Canavesi, PhD, MBA, *LighTopTech Corp.*

Co-Authors:
Andrea Cogliati, PhD; and Onkar B. Sawant, PhD

Purpose:
To assess the capabilities of a novel dual-modality instrument (OCX) combining optical coherence tomography (OCT) with Gabor-domain optical coherence microscopy (GDOCM) to produce three- dimensional (3D) wide field of view (2-10 mm^2) imaging of donor corneal and retinal tissues.

Method:
An OCX instrument for joint OCT and GDOCM assessment of eye tissue with an easy-to-use workflow was developed. Corneal tissue in viewing chambers and excised posterior tissues harboring intact Retinal-RPE-Choroid were imaged without contacting the specimens. 3D GDOCM (1.4 mm x 1.4 mm field of view and 2 µm isotropic resolution over 2 mm maximum depth) and OCT (10 mm x 10 mm field of view and 13.5 µm lateral resolution) images were collected.

Results:
The dual-modality capability of the instrument provided an overview of the tissue and thickness measurement in OCT mode, followed by cellular examination in GDOCM mode. Achieving cellular resolution through the entire cornea, the GDOCM mode identified the presence of infiltrates, determined tissue thickness and captured endothelium images that could be used for endothelial cell density (ECD) evaluations similar to specular microscopy. Combined OCT-GDOCM capabilities of the OCX instrument also allowed Retinal-RPE-Choroid thickness and structural integrity assessment via wide-field OCT modality, while GDOCM modality highlighted retinal and choroidal vasculature features.

Conclusion:
The OCX imaging system produces surgical grade corneal imaging using a single instrument and also performs Retinal-RPE-Choroid tissue imaging to advance the role of eye banks in non-corneal research.

SCIENTIFIC SYMPOSIUM ABSTRACT

9:15 am – 9:26 am

Ocular Surface Disease May be Associated with Allograft Dehiscence Following DALK and PK

Simran Sarin, BA,* *The University of Iowa/Iowa Lions Eye Bank*

Co-Authors:
Kanwal Matharu, MD; Christopher S. Sales, MD, MPH; and Mark A. Greiner, MD

Purpose:
To assess determinants and outcomes of allograft dehiscence after deep anterior lamellar keratoplasty (DALK) and penetrating keratoplasty (PK).

Method:
This study reviewed 1,019 PK and DALK cases between January 1, 2010 and January 1, 2024, for graft dehiscence. Cases were reviewed for the course of dehiscence, medical and ocular comorbidities, incidence of lens expulsion and enucleation, and graft failure.

Results:
Allograft dehiscence was identified in 71 cases and 68 patients. The mean age at dehiscence was 58 years (43.66% female); 75% occurred within 1 year of transplant. Dehiscence was more frequent in PK (65/863) than DALK (6/156, p=0.09) and occurred later (12.59 vs. 5.15 months, p=0.03). Nearly one-third of cases resulted in lens expulsion (n=12; 2 pseudophakic) or enucleation (n=14). Subsequent graft failure was more common in PK than DALK cases (32/65 vs. 0/6, p=0.02). The most common causes of dehiscence were trauma (21/71 {2/6 DALK, 19/65 PK}) and infection (19/71 {1/6 DALK, 18/65 PK}). Forty-two cases had a history of ocular surface disease (e.g. blepharitis), inflammatory disorders (e.g. rheumatoid arthritis), or herpetic keratitis; the rate of graft failure post-dehiscence was greater in this group (23/42 vs. 9/29, p=0.04).

Conclusion:
This study suggests DALK allografts are more resistant to dehiscence than PK. Graft failure following dehiscence is associated with ocular surface and inflammatory disease.

* Medical Student

SCIENTIFIC SYMPOSIUM ABSTRACT

9:27 am – 9:38 am

Intracameral Antibiotic Prophylaxis After Corneal Transplant Surgeries

Shahzad Mian, MD, *Eversight/ University of Michigan*

Co-Authors:
Abdelhalim A. Awidi, MD; Divya Srikumaran, MD; Bennie H. Jeng, MD; and Fasika Woreta, MD, MPH

Purpose:
To understand current practice patterns regarding intracameral antibiotics prophylaxis after corneal transplant surgeries.

Method:
An online survey was distributed to subscribers of Cornea Society. Questions were asked regarding the use of intracameral antibiotics following corneal transplant surgeries and specific medications administered.

Results:
Of 58 surgeon respondents, 44 (76%) practiced in the United States, while 27 (47%) were practicing as cornea specialists for more than 15 years. Intracameral antibiotics were injected following cornea transplant surgeries by 36% (n = 21) of cornea specialists. Intracameral antibiotics were injected most frequently following penetrating keratoplasty (PK) [n = 20, 95%], Descemet Stripping Endothelial Keratoplasty (n = 16, 76%), and Descemet Membrane Endothelial Keratoplasty (n = 15, 71%). Moxifloxacin was the most commonly preferred intracameral antibiotic (n = 34, 79%), followed by cefuroxime (n = 10, 23%). Concern about toxicity to the corneal graft was the most commonly cited reason to not inject intracameral antibiotics (n = 21, 57%), followed by being unconvinced of the need (n = 15, 41%), and mixing/compounding risk (n = 10, 27%).

Conclusion:
A considerable percentage of cornea specialists are injecting intracameral antibiotics following cornea transplant surgeries, most commonly following PK. The most cited reasons for not injecting intracameral antibiotics were concerns about toxicity to the corneal graft and being unconvinced of the need. Studies that investigate usage of intracameral antibiotics following cornea transplant surgeries could influence future practice patterns.

SCIENTIFIC SYMPOSIUM ABSTRACT

10:03 am – 10:14 am

Quantifying Corneal Endothelial Cell Injury during Loading and Ejection of DMEK Grafts Using a Modified Calcein-AM Staining Method

Sung Lee, *Lions Gift of Sight*

Co-Authors:
Joshua H. Hou, MD

Purpose:
(A) To develop a Calcien-AM (CAM)-based method for monitoring endothelial cell injury (ECI) during DMEK graft manipulation based on change in fluorescence signal. (B) To determine ECI during loading vs. ejection of DMEK grafts using this modified CAM method.

Method:
Cultured corneal endothelial cells and donor corneas were stained with CAM and monitored with sequential fluorescence imaging to establish that dye is retained intracellularly with a stable signal for up to 1 hour. Controlled injury to the endothelium was used to confirm localized loss of fluorescence signal with cell damage. To assess ECI from loading vs. ejection, custom-made "half-tubes" were obtained, each containing only the loading-end or ejection-end of a Straiko or LEITR tube. Pre-peeled, pre-trephined DMEK grafts were stained and imaged under fluorescence microscopy, then passed through either a loading-end or ejection-end half-tube. After passing through the half-tubes, the grafts were unscrolled and imaged again. Fiji Weka segmentation was used to quantify ECI based on change in fluorescence signal.

Results:
Loading through Straiko tubes caused a 3.3% ± 2.6% increase in ECI, while loading through LEITR tubes caused a 3.6% ± 1.5% increase. Ejection through Straiko tubes caused a 6.4% ± 3.1% increase in ECI, while ejection through LEITR tubes caused a 4.0% ± 1.9% increase. ECI was significantly higher for ejection vs. loading for Straiko tubes ($p=0.04$, $n=5$), but not for LEITR tubes.

Conclusion:
This modified CAM method is a versatile assay for evaluating ECI throughout the DMEK preloading process. It may be useful for optimizing future pre-load configurations.

SCIENTIFIC SYMPOSIUM ABSTRACT

10:15 am – 10:26 am

Clinical Outcomes of DescePrep-Prepared DMEK Tissue: A Retrospective Review of the First Eight Cases

Katie Solley, MSE, Eyedea Medical, Inc

Co-Authors:
Kendall Frank, CEBT; Marc Gomez, CEBT; Darrell Lee, CEBT; Shannon Schweitzer, MBA, CEBT; Michael Tseng, MD; Sudeep Pramanik, MD, MBA; and Kunal Parikh, PhD

Purpose:
To examine the clinical outcomes of grafts prepared by a novel DMEK graft preparation device, DescePrep.

Method:
A retrospective review of the medical charts of patients who underwent DMEK using DescePrep-prepared tissue grafts from a single eye bank to a single institution. Donor information, patient demographics, patient diagnoses, visual acuity, graft positioning, and post-operative complications were recorded. Exclusion criteria included significant non-graft related surgical complications or underlying, non-corneal disease that would limit the visual outcome.

Results:
Eight eyes from eight patients were included in this study with the majority being male (5 male: 3 female), with a mean age of 75.3 ± 3.7 years. All patients presented with Fuchs' Dystrophy and received a DMEK graft prepared by a certified eye bank technician using DescePrep. Pre-operative best corrected visual acuity (BCVA) was better than 20/80 in all cases. 100% of the eight cases resulted in a clear, attached graft with no incidences of surgical complications, including no need for re-bubbling. Of the four patients reaching their 3-month follow-up, the (BCVA) was 20/30 or better in 100% of cases.

Conclusion:
In a small retrospective sample, DescePrep provided effective preparation of DMEK grafts that were successfully transplanted and improved patient vision.

SCIENTIFIC SYMPOSIUM ABSTRACT

10:27 am – 10:38 am

A Novel Technique for Processing Keratolimbal Allografts for the Treatment of Limbal Stem Cell Deficiency

Onkar Sawant, PhD, *Eversight*

Co-Authors:
Nicholas Hicks, CEBT; Stephanie Becker; Nambi Nallasamy, MD; and Shahzad Mian, MD

Purpose:
Severe limbal stem cell deficiency (LSCD) may require a limbal stem cell (LSC) transplant with cells sourced from the patient's unaffected eye, a living relative, or from cadaveric donor corneas via Keratolimbal Allograft (KLAL). Current KLAL tissue requires the surgeon to process the tissue in the operating room. The purpose of this project was to develop an eye bank prepared, surgery ready LSC-enriched graft (KLAL-Pro).

Method:
KLAL-Pro was processed utilizing a corneal graft mounted on an artificial anterior chamber with a limbal incision at 250 µm deep and 2-3 mm wide. The location of the KLAL-Pro was determined by identifying the palisades of Vogt (PoV). Following graft processing, tissues were frozen in Optimal Cutting Temperature compound and cryosectioned to confirm the presence of p63α+ LSCs, PoV, and the graft depth.

Results:
PoV were visible before and after processing, indicating that the pertinent region was collected and the palisade structure remained intact. In one mated pair, the KLAL-Pro graft was an average of 343 µm deep, while the full thickness mate cornea was 607 µm. Between the KLAL-Pro and full thickness mated cornea, the average depth of the PoV (141 µm ± 13 vs. 138 µm ± 10) and the density of p63α+ LSCs (59% vs. 61%) were similar, indicating that our novel processing technique does not result in loss of LSCs. On further processing attempts, we managed to prepare thinner KLAL-Pro grafts (288 µm ± 31) with an average width of 1.8 mm (± 3 mm).

Conclusion:
Processing of LSC at the eye bank may help reduce technical challenges associated with surgical technique and increase utilization of LSC transplantation to manage LSCD. KLAL-Pro grafts may enhance the success of LSC transplantation due to the identification of PoV, controlled depth of dissection, and minimized dependence on immunosuppression compared to traditional KLAL. Clinical data from imminent KLAL-Pro surgeries will be necessary to determine if this procedure offers better outcomes for patients suffering from bilateral LSCD.

SCIENTIFIC SYMPOSIUM ABSTRACT

10:39 am – 10:50 am

Retrospective Analysis of Adult Human Retina Pigmented Epithelial Cell (ahRPE) Culture Success Rate from Human Cadaver Ocular Tissues

YoneJung Yoon, PhD, *The Eye-Bank for Sight Restoration*

Co-Authors:
Erika Bravo, MS; Patricia Dahl, CEBT; and Timothy Blenkinsop, PhD

Purpose:
The retinal pigmented epithelium supports retinal ganglions and photoreceptors in vertebrate eyes. Age-related macular degeneration and blindness are caused by age-dependent atrophy of retina pigmented epithelial cells (ahRPEs). The location of RPE layers makes it difficult to access RPEs for studying RPE roles in diseases. There have been many protocols for cultivating ahRPEs since the 1970s to overcome RPE structure limitations. We obtained native ahRPE monolayers from human cadaver ocular tissues to isolate ahRPEs. In this retrospective study, we examined the factors associated with ahRPE cell culture success.

Method:
RPE culture data from human cadaver ocular tissues were collected in this study from 2019 to 2023 in the Eye-Bank for Sight Restoration Ocular laboratory. Donor details, such as age, cell culture procedure (death to preservation and preservation to process time), RPE cell yield and cell attachment success rate were retrospectively reviewed. Spearman RANK correlation method was used to assess predictive factors associated with RPE cell culture success rates.

Results:
In EBSR RPE program, we recovered 498 human ocular tissues between 2019 and 2023. This data excluded positive serology reports and practices. Donor ages ranged between 20 and 90 years old. The time from death to preservation ranged between thirty minutes and 24 hours. Successful rate was determined by cell attachment and cell viability. According to our study, age had a negative effect on isolated cell numbers (correlation coefficient = -0.098). Isolated cell numbers were affected by the time from death to preservation (correlation coefficient = -0.078). Isolated cell numbers were a critical factor in cell culture success (correlation coefficient = 0.020).

Conclusion:
In our study, we found that donor age, time from death to preservation and cell yield played a critical role in increasing RPE cell culture success rates. In addition, clinical data were not accounted for in the study, and several variables were involved, including processing technicians and processing time. By using machine learning to screen donors according to these variables, RPE cell culture success rates will be increased.

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