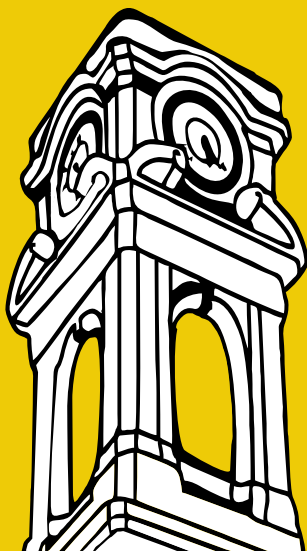




EUROPEAN
EYE BANK
ASSOCIATION

**EEBA
2018**

COIMBRA
PORTUGAL
25-27 January
Quinta das Lágrimas



PROGRAMME



WELCOME TO COIMBRA

J O I N
E E B A
N O W !



EUROPEAN
EYE BANK
ASSOCIATION

Founded in 1989 with the simple objective of sharing information regarding eye banking, the European Eye Bank Association (EEBA) is today the leading technical-scientific association in Europe dedicated to the advancement of eye banking (tissues and cells for the treatment of eye diseases) and an authoritative reference point for eye banks wishing to work according to quality standards.

Become a Member of the **European Eye Bank Association** and share real professional and scientific benefits with corneal surgeons and eye bank specialists.

MEMBERSHIP BENEFITS

- | | | |
|--|---|--------------------------|
| • Newsletter | • Access to Member-only section of the web-site | • Voting rights |
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Annual Individual Membership Fee: euro 90,00

*For further details please contact: European Eye Bank Association
Via Paccagnella n. 11 - Padiglione Rama - 30174 Zelarino - Venice (Italy)
Tel: +39 041 9656422 - admin@europeaneyebanks.org*

www.europeaneyebanks.org



**EEBA
2018**
COIMBRA
PORTUGAL
25-27 January
Quinta das Lágrimas

WELCOME TO COIMBRA

Dear Friends and Colleagues,

On behalf of the Coimbra Eye Bank and the Portuguese Society of Ophthalmology, it is my great pleasure to welcome each of you to Coimbra and to the XXX Annual Meeting of the European Eye Bank Association.

Home to the oldest University in Portugal, and one of the oldest in the world, the history of Coimbra is steeped in more than seven centuries of academic and intellectual tradition. With a longstanding reputation for teaching excellence, it has grown and adapted through the centuries to become a major European hub for medicine and research. Imbued by that spirit, we are confident that the XXX Annual EEBA Meeting will be a unique opportunity to meet and bring inspired people together.

The meeting has been designed to provide an innovative and comprehensive overview of the latest developments in eye banking and corneal transplantation. The major theme of the congress is "The Changing Relationships between Eye Banks & Corneal Surgeons", an overarching topic that is sure to provide insightful and exciting opportunities for discussion and education. Many distinguished scientists and ophthalmologists have joined the faculty and we will have superb scientific presentations, hands-on wet labs, round-table debates and cutting-edge lectures by some of the world's top experts.

Although the scientific program is stellar, we hope that you take the time to appreciate the beauty and spirit of Coimbra. Taking pride in its past as the medieval capital of Portugal, Coimbra displays its perennial influence in portuguese history with grace and dignity. It's atmospheric and romantic ancient core is full of winding cobblestone streets and remarkable medieval architecture. The meeting is held in the historic "Quinta das Lágrimas" hotel, set in an 18th century palace that has welcomed kings and queens and was home to Portugal's most famous love story.

Before I close, I'd like to thank each of you for attending our conference and contributing with your expertise and energy to the success of EEBA. Throughout this conference, I ask you to stay engaged, stay active, and help us turn this meeting into a springboard for future achievements. Our combined effort is truly our greatest asset to help us shape the future of Eye Banking.

My personal respect and thanks goes out to all of you

Maria João Quadrado

ORGANIZING COMMITTEE:

- **Maria João Quadrado, MD, PhD**
Head of Coimbra Eye Bank, Coimbra University Hospital - Portugal
- **Joaquim Murta, MD, PhD**
Head of the Ophthalmology Department, Coimbra University Hospital - Portugal
- **João Quadrado Gil, MD, PhD**
Coimbra Eye Bank, Coimbra University, Hospital - Portugal

SCIENTIFIC COMMITTEE:

- John Armitage, BSc, PhD
- Maria João Quadrado, MD, PhD
- Joaquim Murta, MD, PhD
- Walter Rodrigues, MD
- Pedro Candelária, MD
- Luis Oliveira, MD

MEETING VENUE:

- **Quinta das Lágrimas**
*Rua António Augusto Gonçalves.,
3041-901 Coimbra*

ORGANIZING AGENCY:

- **Silvia da Silva**
Veranatura, Lisboa - Portugal



ORGANIZATION

With the support of:

**CHUC - Centro Hospitalar
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**IP - Instituto Português do
Sangue e Transplantação**



Banco de Olhos CHUC



**Universidade de Medicina
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Direção-Geral da Saúde





KONAN MEDICAL

CellChek D™ Series

CellChek D and D+

Introducing the first multi-imaging system for donor corneal analysis. CellChek D+ provides an amazing view into the cornea that simply has never been seen before, defining structure of endothelium, stroma, and epithelium. CellChek D+ features comprehensive imaging to assist both eye banks and corneal surgeons to make better decision on implantable material.

Key Features

Donor Enhance Imaging System

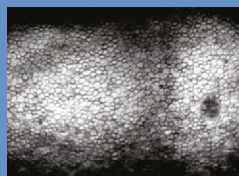


Specular Image

Donor Enhance Image

CellChek D+ model shown above

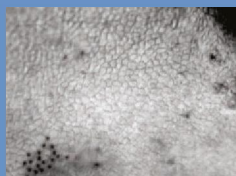
With this new dual imaging specular microscope, several remarkable new features have been added to aid eye bankers and corneal surgeons in evaluating the status of the cornea, especially technically challenged grafts for Endothelial Keratoplasty. CellChek D+ features a specular mode to give you the largest field of visualization to assess overall health of endothelium.



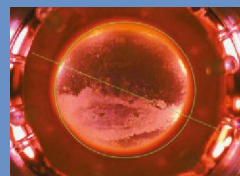
Specular mode provides the largest field of view to assess the overall health of the endothelium.



D+ Enhanced Mode combines specular and enhanced images of damaged or dead cells, EK cut interface damage, and cold cells.



Organ culture cornea with a thickness of 1000-1500µm; impossible to evaluate with standard specular microscopes. Now cells can be counted all the way to the limbus by placing the cornea in BSS.



In Finder Mode, the low magnification camera will show the entire cornea like a slit lamp, with a digital measuring tool for the diameter of the clear zone, width of the scleral rim, or the affected area.

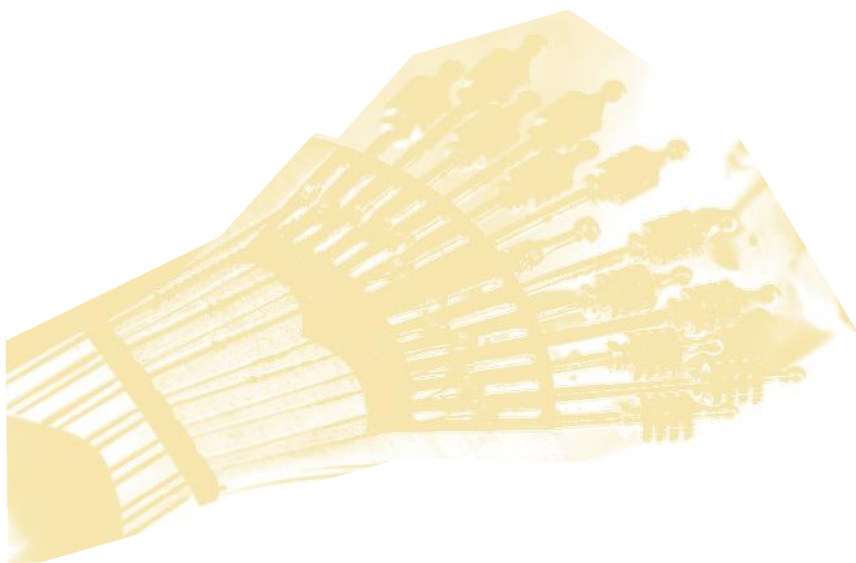
14:00 REGISTRATION

15:00 GUIDED TOUR OF COIMBRA UNIVERSITY

WELCOME
PORT WINE OF HONOUR AND COIMBRA FADO SONG



25 JANUARY
THURSDAY



08:30 REGISTRATION

08:30 EEBA COMMITTEE MEETING (CLOSED MEETING)

09:00 **WETLABS**

WETLAB I

Gebauer 

Room IGNIS

Organized by Gebauer


Gebauer SLc Original for Pre-Cut

DSAEK & Gebauer SLc

Expert for Pre-Cut Lenticules (LIKE)

Presenters: John Dean

WETLAB II

ziemer 
OPHTHALMOLOGY

Room AER

Organized by Ziemer

Presenters: Werner Bernau

WETLAB III

Moria
Ophthalmic Instruments

Room GARDEN

Organized by Moria

DSAEK and Ultra Thin DSAEK Tissue

Preparation with the MORIA System

and Latest Accessorie

Presenters: Frédéric Giulj, Boris Crepey

11:00 *Coffee Break*





11:15 **WELCOME TO COIMBRA**
Maria João Quadrado
Banco de Olhos CHUC Universidade, Coimbra, Portugal
EEBA 2018 Chair

11:30 **OPENING CEREMONY**
John Armitage
European Eye Bank Association President
João Almeida Sousa
Instituto Português do Sangue e Transplantação President
Manuel Monteiro-Grillo
Sociedade Portuguesa de Oftalmologia President
Graça Freitas
Direcção-Geral de Saúde President
Maria João Quadrado
Banco de Olhos CHUC Universidade, Coimbra, Portugal

SESSION I - CORNEAL SURGEONS AND EYE BANK

Moderators: John Armitage, Joaquim Murta, Iva Dekaris

12:00 **Niels Ehlers Memorial Lecture**
John Armitage
NHS Blood and Transplant, Bristol, United Kingdom
Jesper Hjortdal
The Danish Cornea Bank, Aarhus University-Hospital, Denmark

12:20 **What do Surgeons Currently Expect from an Eye Bank**
Joaquim Murta
Banco de Olhos CHUC, Universidade Coimbra, Coimbra, Portugal

12:30 **Corneal Surgeons and Eye Banking**
Iva Dekaris
University Eye Hospital Svetlost, Zagreb, Croatia

12:40 **ECCTR: Using the European Cornea and Cell Transplant Registry for Clinical Improvement**
John Armitage
NHS Blood and Transplant, Bristol, United Kingdom
Gary Jones
Veneto Eye Bank Foundation, Venice, Italy

12:55 **INDUSTRY PRESENTATIONS - KONAN**

13:00 *Lunch*

SESSION I - CORNEAL SURGEONS AND EYE BANK (cont.)

Moderators: John Armitage, Joaquim Murta, Iva Dekaris

14:00

ROUND TABLE

Implementation on the Single European Code for Tissues and Cells

Paul Ashford

ICCBBA, San Bernardino, USA

John Armitage

NHS Blood and Transplant, Bristol, United Kingdom

Ralf Knels

EUROCODE, MVZ Dresden, Germany

Paulo Severino

Instituto Português do Sangue e Transplantação, Lisboa, Portugal

Cristina Rocha

Direção Geral de Saúde, Lisboa, Portugal

14:45

Eye Bank in Portugal: A Framework

Ana França

Instituto Português do Sangue e Transplantação, Lisboa, Portugal

SESSION II - ENDOTHELIAL KERATOPLASTY I

Moderators: Philip Maier, Bernard Delbosc, Luis Oliveira

14:55

What Happens After Descemet Membrane Endothelial Keratoplasty (DMEK): A Post Mortem Study

Esther A Groeneveld-van Beek

NIIOS, Amnitrans Eyebank Rotterdam, Netherlands

15:05

Effect of Cornea Preservation Time on Descemet Stripping Endothelial Keratoplasty (DSEK) Success and Endothelial Cell Loss: A Multi-Center Randomized Clinical Trial

Erik Hellier

Eversight Ohio, USA

15:15

Implementing a New Quality Control in Precut Corneas Because of Non Satisfactory Follow-up

Elba Agustí

Barcelona Tissue Bank, Barcelona, Spain

15:25

Pre-loaded Membrane for DMEK Surgery and Early Clinical Outcomes

Alessandro Ruzza

Veneto Eye Bank Foundation, Venice, Italy

15:35

Coffee Break and Poster Session

26 JANUARY
FRIDAY



SESSION III - ENDOTHELIAL KERATOPLASTY II

Moderators: Francisco C Figueiredo, Bernard Duchesne, Nuno Alves

- | | |
|-------|--|
| 16:00 | Quarter-DMEK for Fuchs Endothelial Dystrophy to Increase the Endothelial Graft Pool
Anita Sajet
<i>NIIOS, Amnitrans EyeBank Rotterdam, Netherlands</i> |
| 16:10 | Graft Preparation Failure in Descemet Membrane Endothelial Keratoplasty (DMEK)
Jet S. Kok-van Rijssel
<i>NIIOS, Netherlands</i> |
| 16:20 | Pre-Cut DMEK/LAMEK from the Tissue Bank: Does the Use of Pre-Prepared Lamellae Reduce the Re-Transplantation Rate?
Nicola Hofmann
<i>German Society for Tissue Transplantation, Hannover, Germany</i> |
| 16:30 | Four Microscopy Technics Compared for Corneal Lamellar Cuts Surface Roughness Assessment
Garcin Thibaud
<i>University Hospital, Ophthalmology department, Saint-Étienne, France</i> |
| 16:40 | First Year of Descemet Membrane Endothelial Keratoplasty (DMEK) in Hospital São João
João Pinheiro Costa
<i>Centro Hospitalar S. João, Porto, Fac. Medicina Universidade do Porto, Portugal</i> |
| 16:50 | The Use of Anterior Cornea Lamella from DSAEK Preparation in Peripheral Corneal Ulceration 1 Cornea - 2 Solutions.
Diogo Hipolito Fernandes
<i>Serviço Oftalmologia, Centro Hospitalar Lisboa Central, Lisboa, Portugal</i> |
| 17:00 | EEBA EYE BANK CORRESPONDENTS MEETING & SIG DIRECTORY |
| 20:00 | GALA DINNER AT A TRADITIONAL PORTUGUESE WINE CELLAR |



09:00 EEBA BUSINESS MEETING (OPEN MEETING)

SESSION IV - CORNEAL BLINDNESS NOW AND FUTURE CHALLENGES

Moderators: Simone Hennerbichler, Graeme Pollock, Patricia Dahl

10:00 **Corneal Blindness Now and Future Challenges**

Maria João Quadrado

Banco de Olhos CHUC, Universidade Coimbra, Coimbra, Portugal

10:10 **The Future of Eye Banking**

Jesper Hjortdal

The Danish Cornea Bank, Aarhus University Hospital, Denmark

10:20 **ROUND TABLE**

Therapeutic Alternatives for Severe Lachrymal Dysfunction Syndromes

Eva Martinez

Barcelona Tissue Bank / Banc Sang I Teixits, Spain

Ricardo Casaroli

Barcelona Tissue Bank / Banc Sang I Teixits, Spain

Akila Chandrasekar

NHS Blood and Transplant, Liverpool, United Kingdom

10:45 **PRGF & Ocular Surface Regeneration**

Jesus Merayo

Instituto Oftalmológico Fernández-Vega, Oviedo, Spain

10:55 **ROUND TABLE**

Advanced Therapies of the Endothelium

Stefano Ferrari

Veneto Eye Bank Foundation, Venice, Italy

Gilles Thuret

Université Jean Monnet, Saint-Étienne, France

Sajjad Ahmad

Moorfields Eye Hospital, London, United Kingdom

11:20 **Coffee Break and Poster Session**

27 JANUARY
SATURDAY



SESSION V - OCULAR TISSUE DONATION AND PRESERVATION

Moderators: Diego Ponzin, Yveta Urbanova, Sabine Salla

- 11:50 **Trends in Corneal Transplant Indications and Techniques in Coimbra, Portugal: 2011-2016**
Luís Bernardes
Faculdade de Medicina da Universidade de Coimbra, Coimbra, Portugal
- 12:00 **Analysis of Corneal Donor Profile in the North of Portugal Over the Last Decade**
Miguel M. Neves
Centro Hospitalar Universitário do Porto, Porto, Portugal
- 12:10 **Narratives in Health Communication: Do Narrative Texts Influence Text Perception, Attitudes and Behavioral Intentions Towards Tissue Donation?**
Kristin Becke
Deutsche Gesellschaft für Gewebetransplantation (DGFG) Hannover, Germany
- 12:20 **New Era of Cornea Transplantation in Bangladesh**
Mir Moshir Rahman
CHOKH, Dhaka, Bangladesh
- 12:30 **Cornea Donation for Research Versus for Transplantation: Prospective Study of Acceptance Rates in a French University Hospital**
Garcin Thibaud
University Hospital, Ophthalmology Department, Saint-Étienne, France
- 12:40 **Impact of Diabetes Mellitus Type 2 on Donor Corneas Endothelial Cell Density**
Raquel Esteves Marques
Ophthalmology Department, Hospital de Santa Maria, Lisboa, Portugal
- 12:50 **Preserving basement membranes during detachment of cultivated oral mucosal epithelial cell sheets for total bilateral limbal stem cell deficiency**
Maria Rovere
Hospices Civils de Lyon, France

13:00 **INDUSTRY PRESENTATIONS - MORIA**

13:05 *Lunch*



SESSION V - OCULAR TISSUE DONATION AND PRESERVATION (Cont.)

Moderators: Diego Ponzin, Yveta Urbanova, Sabine Salla

- 14:00 **Development of a New Lyophilization Procedure for Human Amniotic Membranes**
EM Martínez-Conesa
Barcelona Tissue Bank - Banc de Sang i Teixits, Spain
- 14:10 **Development of a New Corneal Storage Medium with Antimycotic Tablet**
Jana Tóthová
Alchilife S.r.l., Padua, Italy
- 14:20 **Validation of the BD Bactec Method for Sterility Testing of Corneal Preservation Media According to the European Pharmacopoeia (Chapter 2.6.1.)**
Rossella Vignola
Eye Bank of Rome, Italy
- 14:30 **Validation of HB&L Method for Sterility Testing of Corneal Storage and Transport Media in Compliance with the European Pharmacopoeia**
Laura Giurgola
Alchilife S.r.l. Ponte San Nicolò, Padua, Italy
- 14:40 **Transition of Corneal Tissue from Cold Storage to Organ Culture: A Qualitative Comparison of Paired Corneas**
Wessel Vermeulen
Euro Cornea Bank, Beverwijk, Netherlands





SESSION VI - HIGH-RISK CORNEAL TRANSPLANTS

Moderators: Jesper Hjortdal, Margareta Claesson Armitage, Andreia Rosa

- 14:50 **High-risk Corneal Transplants - How to Deal**
Andreia Rosa
CHUC - Centro Hospitalar Universitário de Coimbra, Coimbra, Portugal
- 15:00 **EURO-GTP II PROJECT - Good Practices for Demonstrating Safety and Quality Through Recipient Follow-up**
Rita Piteira
Barcelona Tissue Bank | Banc Sang i Teixits, Spain
- 15:10 **Corneal Immune Reactions: Long-term Results of a Monocentric Keratoplasty Register**
Philip Maier
Eye Center, Medical Center, Faculty of Medicine, University of Freiburg, Germany
- 15:20 **Mycophenolate Mofetil for High-risk Penetrating Keratoplasty: A Case-Series**
Raquel Esteves Marques
Ophthalmology Department, Hospital de Santa Maria, Lisboa, Portugal
- 15:30 **Travels in Candida - Infection Following Organ Culture of Corneas**
Graeme A Pollock
Lions Eye Donation Service, Centre for Eye Research Australia, University of Melbourne, Australia
- 15:40 **Long-term intraocular pressure control and corneal graft survival in eyes treated with trans-scleral cyclodiode laser for refractory glaucoma after penetrating keratoplasty**
Francisco Figueiredo
Department of Ophthalmology, Royal Victorian Infirmary, Newcastle upon Tyne NHS Trust & 2 Newcastle University, United-Kingdom
- 15:50 **CLOSING CEREMONY**
EEBA's President Message;
Best Oral Presentation Award, Best Poster Award;
EEBA 2019 (NIIOS) Presentation;
EEBA Flag Ceremony.

**VISIT OUR WETLAB ON
JANUARY 26 FROM 9-11 AM**

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Pg. 18

What Happens After Descemet Membrane Endothelial Keratoplasty (DMEK): A Post Mortem Study

Esther A Groeneveld-van Beek

NIIOS, Amnitrans Eyebank Rotterdam, Netherlands

Pg. 19

Effect of Cornea Preservation Time on Descemet Stripping Endothelial Keratoplasty (DSEK) Success and Endothelial Cell Loss: A Multi-Center Randomized Clinical Trial

Erik Hellier

Eversight Ohio, USA

Pg. 20

Implementing a New Quality Control in Precut Corneas Because of Non Satisfactory Follow-up

Elba Agustí

Barcelona Tissue Bank, Barcelona, Spain

Pg. 21

Pre-loaded Membrane for DMEK Surgery and Early Clinical Outcomes

Alessandro Ruzza

Veneto Eye Bank Foundation, Venice, Italy

WHAT HAPPENS AFTER DESCMET MEMBRANE ENDOTHELIAL KERATOPLASTY (DMEK): A POST MORTEM STUDY

Thomas M. Müller¹, Esther A Groeneveld-Van Beek², Kristin M. Mangundap², Anita Saje²,
Jet S. Kok-Van Rijssel², Marieke Bruinsma³, Jack Parker¹, Gerrit R.J. Melles¹
(1-NIIOS; Melles Cornea Clinic, 2-Nios; Amnitrans Eyebank Rotterdam, 3-NIIOS)

Purpose

To describe the histologic features of post mortem eyes after Descemet membrane (DM) endothelial keratoplasty (DMEK) and their potential implications.

Material & Methods

Eleven post mortem DMEK corneas of eight patients, operated for Fuchs endothelial dystrophy (FED), with an average postoperative time of 3.5 (± 1.9) years (range 7 months to 6 years), were procured after death and processed for histologic light microscopy evaluation.

Results

Nine corneas showed a 'normal' central anatomy, i.e. the donor-to-host interface resembled that of a virgin eye. Ten corneas showed peripheral abnormalities: in 9, the DMEK graft overlapped the edge of the descemetorhexis; 1 eye showed scarring overlying a portion of the graft with a previous detachment followed by spontaneously adherence; 3 eyes showed graft folds with scarring; in 2 eyes, the anterior banded layer of the host DM was still in-situ across the cornea (both of these eyes had required re-bubbling); and 2 eyes showed host DM remnants within the corneal incision that may have interfered with wound healing.

Conclusions

Incomplete host DM removal may relate to postoperative DMEK graft detachment and wound instability. Graft detachments may re-attach with interface scarring. Re-bubbling procedures may be performed within 4-6 weeks, before scarring of detached graft portions occurs. Subtle DMEK graft folds may explain subjective complaints of monocular diplopia.

EFFECT OF CORNEA PRESERVATION TIME ON DESCEMET STRIPPING ENDOTHELIAL KERATOPLASTY (DSEK) SUCCESS AND ENDOTHELIAL CELL LOSS: A MULTI-CENTER RANDOMIZED

Erik Hellier, Mba, Cept¹, Loretta Szczotka Od, PhD², Allison Ayala Ms³, Wendi Liang Msph³, Beth Ann Benetz Ma⁴, Roy Beck Md, PhD³, Jonathan Lass Md⁵

(1-Eversight, Ann Arbor, Michigan, USA, 2-Case Western Reserve University Department of Ophthalmology and Visual Sciences and University Hospitals Eye Institute, Cleveland, Oh, Usa, 3-Jaeb Center for Health Research, Tampa, Florida, Usa, 4-Cornea Image Analysis Reading Center, Uh Eye Institute, Cleveland, Oh, Usa, 5-Case Western Reserve University Department of Ophthalmology and Visual Sciences and University Hospitals Eye Institute, Cleveland, Oh, Usa; Cornea Image Analysis Reading Center, Uh Eye Institute, Cleveland, Oh, Usa)

Introduction

In the United States and in many other countries there is a prejudice against using hypothermic stored (4 - 8°C) donor corneas for keratoplasty beyond 7-8 days. To address this concern, the National Eye Institute-sponsored Cornea Preservation Time Study was organized.

Purpose

To determine whether 3-year graft success rate and endothelial cell loss using corneal donor tissue preserved 8-14 days is similar to that of donor tissue preserved 0-7 days following DSEK in order change keratoplasty practice and increase the available pool of corneal tissue

Methods

1,090 individuals (1,330 study eyes) underwent DSEK predominantly for Fuchs' dystrophy (94% of eyes) at 40 clinical sites by 70 surgeons with donor corneas provided by 23 US eye banks. The donor cornea was randomly assigned in a masked fashion to the surgeon with preservation time (PT) of 0-7 days (0-7d PT) or 8-14 days (8-14d PT). Slit lamp biomicroscopy, IOP, and ultrasonic pachymetry were performed at 6, 12, 24 and 36 months with graft success at 3 years as the primary endpoint. In addition, endothelial cell loss (ECL) in 945 eyes of 769 participants with successful DSEKs at 3 years was determined by a central image analysis reading center from clinical specular or confocal central endothelial images.

Results

The 3-year graft success rate was 95.3% (0-7d PT group) and 92.1% (8-14d PT group), statistically not similar (confidence limit of 5.4% exceeding the pre-specified non-inferiority limit of 4%), with more primary donor failures in the 8-14d PT group. Probability of failure after the 1st month was 2.4% and 3.1% in the two PT groups, respectively. Longer PT was associated with a lower graft success rate ($P=.008$) with success rates of 96.5% for PT of 0-4 days, 94.9% for 5-7 days, 93.8% for 8-11 days, and 89.3% for 12-14 days ($P=.01$). At 3 years, ECL was 37% (0-7d PT group) and 40% (8-14d PT group) ($P=.03$). ECL was fairly stable from 4 to 13 days PT ($N=878$, 36% to 43%).

Conclusions

The 3-year success rate post DSEK was high, irrespective of PT. PT impact on graft success was small when < 12 days. There was slightly greater ECL 3 years postop with longer PT while fairly constant with PT 4-13 days. PT up to 11 days can be expected to have little influence on DSEK outcomes.

IMPLEMENTING A NEW QUALITY CONTROL IN PRECUT CORNEAS BECAUSE OF NON SATISFACTORY FOLLOW-UP

Elba Agustí¹, Nausica Otero², Eva Martínez², Mari Carmen Solé², Yolanda Plaza², Anna Vilarrodona², Esteve Trias²

(1-Barcelona Tissue Banc. Banc de Sang i Teixits (BST), 2-Barcelona Tissue Bank)

Purpose

Following the report of 18 primary graft failures with endothelial lamellae sent for transplantation during 2016 and 2017, we decided to study the state of the endothelium after cutting the corneas with a microkeratome.

Methods

In this study, 11 non suitable corneas for transplantation were included out of 13 tests, discarding 2 cases in which its initial quality was already inadequate. We did an endothelial evaluation (cell counting with sucrose and vitality with trypan blue) prior to the cut, another one after cutting with the microkeratome apart from other assessments at 24 h, 48 h and 72 h.

Results

All 11 samples showed an initial viability of more than 90% before the cut (average 99.95). After cutting, 10 of 11, showed a viability of more than 85%. In one case, the viability was 30% (which would have been ruled out for implant) In only 3 cases out of 11 a cell counting could be done after cutting. In 9 cases in which a count was made at 24 h (5 cases) or 48 h (3 cases) or 72 h (1 case), an endothelial counting was possible and the viability was more than 85% in all cases, except of the mentioned case where its initial viability was 30% after cutting, the viability raised to 80% afterwards. A general pattern of staining with trypan blue was found in diffuse stress lines and also a blue area where the cut begins.

Conclusion

Just after cutting the cornea, an endothelial counting could not be performed in the majority of cases. After 24 h, 48 h and 72 h we were able to distinguish and count the cells. We introduced this new acceptance parameter of more than 80% of viability after cutting, to assure an optimum tissue quality for the implant.



PRE-LOADED MEMBRANE FOR DMEK SURGERY AND EARLY CLINICAL OUTCOMES

Alessandro Ruzza¹, Prof. Massimo Busin², Mohit Parekh¹, Dr. Pia Leon³, Stefano Ferrari¹, Dr. Diego Ponzin¹

(1-Veneto Eye Bank Foundation, Venice, Italy, 2-Department of Ophthalmology, 'Villa Igea' Private Hospital, Forlì, Italy, 3-Department Of Ophthalmology, 'Ss. Giovanni E Paolo' Hospital, Venice, Italy)

Purpose

To evaluate the initial outcomes and complications of Descemet membrane endothelial keratoplasty (DMEK) utilizing donor tissues tri-folded with the endothelium inwards, pre-loaded at the Eye Bank and delivered with bimanual pull-through technique.

Method

Twenty-five consecutive eyes of 23 patients with Fuchs endothelial dystrophy underwent to a DMEK surgery with membrane prepared with SCUBA technique, punched to a diameter of 8.25 mm and pre-loaded with the endothelium tri-folded inwards in an intra ocular lens (IOL) cartridge with a 2.2 mm opening filled with the same tissue culture medium contained in the vial used for shipment to the surgeon. Standardized DMEK was performed as a single procedure (n=7) or in combination with phacoemulsification and IOL implantation (n=18) within 48 hours from preparation using a bimanual pull-through technique.

Results

Preparation time averaged 27.9 ± 4.4 minutes (range from 18 to 36 minutes), while the surgical time from opening of the stoppers to air fill of the anterior chamber never exceeded 9 minutes (range from 3 to 9 minutes). Postoperative complications included graft detachment in 5 of 25 cases (20%), successfully managed in all cases by single re-bubbling within 6 days from surgery. In all eyes without co-morbidities (n = 22 of 25) BSCVA was 20/25 (0.097 logMAR) or better as early as 3 months after surgery. Six months postoperatively, ECD was available in 16 of 25 eyes with an endothelial cell loss calculated as a percentage of the preoperative value determined at the eye bank (range from 2500 to 2800 cells/mm²) of $31.59 \pm 11.73\%$ (range from 11.76 to 52.08%).

Pg. 23

Quarter-DMEK for Fuchs Endothelial Dystrophy to Increase the Endothelial Graft Pool

Anita Sajet

NIIOS, Amnitrans EyeBank Rotterdam, Netherlands

Pg. 24

Graft Preparation Failure in Descemet Membrane Endothelial Keratoplasty (DMEK)

Jet S. Kok-van Rijssel

NIIOS, Netherlands

Pg. 25

Pre-Cut DMEK/LaMEK from the Tissue Bank: Does the Use of Pre-Prepared Lamellae Reduce the Re-Transplantation Rate?

Nicola Hofmann

German Society for Tissue Transplantation, Hannover, Germany

Pg. 26

Four Microscopy Technics Compared for Corneal Lamellar Cuts Surface Roughness Assessment

Garcin Thibaud

University Hospital, Ophthalmology department, Saint-Étienne, France

Pg. 27

First Year of Descemet Membrane Endothelial Keratoplasty (DMEK) in Hospital São João

João Pinheiro Costa

Centro Hospitalar S. João, Porto, Fac. Medicina Universidade do Porto, Portugal

Pg. 28

The Use of Anterior Cornea Lamella from DSAEK Preparation in Peripheral Corneal Ulceration 1 Cornea - 2 Solutions.

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QUARTER-DMEK FOR FUCHS ENDOTHELIAL DYSTROPHY TO INCREASE THE ENDOTHELIAL GRAFT POOL

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Purpose

To present a novel graft preparation technique that renders 4 endothelial grafts from 1 donor cornea and could potentially quadruple the availability of the endothelial graft pool. In addition clinical outcomes of the first cases utilizing these Quarter-Descemet Membrane Endothelial Keratoplasty (Quarter-DMEK) grafts are evaluated.

Materials & Methods

Detailed description of the Quarter-DMEK graft preparation technique and its effect on endothelial cell density (ECD) before and immediately after preparation. Clinical outcomes were analysed of a prospective interventional case series of eyes that underwent Quarter-DMEK for central Fuchs endothelial dystrophy up to 6 months postoperatively.

Results

With this new graft preparation technique, 4 Quarter-DMEK grafts can be successfully prepared from 1 donor cornea without compromising endothelial cell quality. No trephination step is required for the preparation of Quarter-DMEK grafts.

In a first Quarter-DMEK case series, clinical outcomes at 6 months postoperatively showed good best correct visual acuity (BCVA) results with 100% of eyes reaching a BCVA of $\geq 20/40$ (≥ 0.5), 92% of $\geq 20/25$ (≥ 0.8) and 50% of $\geq 20/20$ (≥ 1.0) ($n=12$). Mean donor ECD decreased from 2867 (± 161) cells/mm² before to 1255 (± 514) cells/mm² at 1 month, and 968 (± 427) cells/mm² at 6 months after surgery.

Conclusions

Preparation of 4 Quarter-DMEK grafts from 1 single human donor cornea is technically feasible without compromising the endothelium. First clinical Quarter-DMEK showed BCVA results comparable to standard DMEK, but a relatively large drop in ECD within the first month.

GRAFT PREPARATION FAILURE IN DESCemet MEMBRANE ENDOTHELIAL KERATOPLASTY (DMEK)

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Purpose

To report the failure rate of two graft preparation techniques for Descemet membrane endothelial keratoplasty (DMEK), and to evaluate how to minimize graft preparation failure.

Materials & Methods

Retrospective, non-randomized study at an eye bank specialized in graft preparation for lamellar keratoplasty. For 1416 donor corneas, DMEK graft preparation failure rate was evaluated for the two different techniques, Technique I: 'Standardized traditional technique' (n=341) and Technique II: 'Standardized 'no-touch' technique' (n=933), and for grafts that were converted from Technique II to Technique I during preparation (n=142).

Results

The overall failure rate averaged 3.9% (55/1416): 7.0% (24/341) for Technique I and 2.9% (31/1075) for Technique II ($P < .05$). Tissue preparations which were converted from Technique II to Technique I failed in 13.4% (19/142), while for grafts that were entirely prepared by Technique II, the failure rate was only 1.3% (12/933). The endothelial cell density decrease (before compared to after preparation) did not differ for both techniques (1.1% vs. 0.2%, $P > .05$).

Conclusion

Various DMEK graft preparation techniques may provide failure rates of <4%. A 'no-touch preparation' approach (Technique II) may combine good graft quality (completely intact endothelial cell layer) with low risk of dissection failure, leaving the possibility of conversion to 'traditional preparation' (Technique I) as a back-up method.

PRE-CUT DMEK / LAMEK FROM THE TISSUE BANK: DOES THE USE OF PRE-PREPARED LAMELLAE REDUCE THE RE-TRANSPLANTATION RATE?

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Purpose

The development of Descemet membrane endothelial keratoplasty (DMEK) is one of the most important innovations in ophthalmology of the past decade. The lamellae were and are mainly prepared directly in the operating room. The use of pre-cut corneal transplants from tissue banks additionally contributes to the safe performance of DMEK. However, the question arises whether such preparation could have an influence on the clinical outcome of DMEK.

Method

Since December 2015, the DGFG holds the approval of the Paul-Ehrlich-Institut for allocation of pre-cut lamellar transplants for DMEK (LaMEK). In the meantime, more than 400 LaMEK were delivered for transplantation. A comparison of the re-registration numbers of patients for re-transplantation according to DMEK/LaMEK can provide information about the success of the procedure when using pre-cut transplants.

Results

Compared to 2015 with transplants prepared exclusively in the operating room, in 2016/2017, with the pre-prepared LaMEK, a clearly smaller number of re-enrollment patients were reported in four transplantation centers. In 2015, 22 patients from a total of 204 DMEKs with in OR-prepared lamellae had to be transplanted again (MW 10.8% re-transplantation rate). During the reference period 2016 to autumn 2017, these were only six patients (MW 4.1%) in the same centers after 147 transplants of the LaMEK.

Conclusions

With the introduction of pre-cut corneal transplants for DMEK, the technique for the surgeon has significantly simplified, since a preparation risk is excluded and time and costs in the OR are reduced. In addition, use of LaMEK also seems to reduce the risk of re-operation for the patient.

FOUR MICROSCOPY TECHNIQS COMPARED FOR CORNEAL LAMELLAR CUTS SURFACE ROUGHNESS ASSESSMENT

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Purpose

Corneal lamellar cuts surface roughness (SR) is a key quality criterion both in refractive and transplantation surgeries. But it remains difficult to reliably quantify SR differences between microkeratome (MKT) and femtosecond laser (FSL). Despite many comparative studies, standardization misses between different SR assessment technics. Aim: To directly compare 4 microscopy technics for corneal lamellar cuts SR assessment.

Methods

Stromal lamellae were cut from organ cultured human corneas with a Moria MKT or a FSL. Environmental scanning electron microscopy (eSEM), standard SEM and chromatic confocal microscopy (CCM) were first used to verify that samples dehydration and metallization did not alter the surface state. Three quantitative methods Atomic Force Microscopy (AFM), Focus-Variation Microscopy (FVM) and CCM were then compared using the same stromal lamellae. Low or high SR lamellae, made by FSL, were selected with sSEM. Bowman membrane was used as a smooth control. Mountains, a validated software, was used to quantify roughness.

Results

SEM provided better image contrast allowing better visualization of surface roughness versus eSEM. Dehydration and metallization did not change surface state with eSEM and sSEM, neither roughnesses measured by CCM. Only CCM and FVM were able to reveal significant differences between lamellae of different roughnesses. CCM allowed acquisition of larger areas, to better characterize heterogeneous surfaces.

Conclusions

CCM seems particularly suitable to quantify SR of corneal lamellar cuts with good resolution and acquisition speed, small roughness differences distinguishable and larger areas analyzed. MEK also seems to reduce the risk of re-operation for the patient.

FIRST YEAR OF DECEMET MEMBRANE ENDOTHELIAL KERATOPLASTY (DMEK) IN HOSPITAL SÃO JOÃO

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Purpose

To evaluate the learning curve and the results of the first year of DMEK in Hospital São João.

Methods

DMEK was performed in 14 eyes (13 patients) to manage corneal endothelial disorders. Donor tissue was prepared always by the same surgeon in operative room. Visual acuity and endothelial cell count were evaluated prior and postoperatively. Intraoperative and postoperative complications were documented.

Results

Of the 14 eyes (7 Fuchs endothelial dystrophy, 3 bullous keratopathy after cataract surgery, 1 previous graft failure and 1 Iridocorneal endothelial syndrome), 12 eyes showed a good recovery with progressive edema resolution and visual acuity improvement. The mean BCVA improved from 0.15 to 0.54 snellen (range 0.2 to 1.0).

Two cases showed graft failure in the first postoperative month (1 bullous keratopathy and 1 central graft detachment), requiring regrant (1 DSAEK and 1 DMEK).

The mean follow-up time was 7.8 months (2-14 months). The mean donor cell count was 2417 (2022-2907). Mean endothelial cell count by the second month of follow-up was 1642 (1270-2406), with a mean preoperative endothelial cell loss of 32.1%.

Intraoperative complications were not documented. No tissue loss was reported during the preparation of the endothelial roll.

Conclusion

DMEK may offer visual acuity improvement and appears to be a safe and effective treatment for corneal endothelial diseases.

THE USE OF ANTERIOR CORNEA LAMELLA FROM DSAEK PREPARATION IN PERIPHERAL CORNEAL ULCERATION 1 CORNEA -- 2 SOLUTIONS

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Introduction

Peripheral corneal ulcerations can result from a variety of disorders and can lead to a devastating visual outcomes. Management is crucial but surgical options are difficult to apply. Large diameter keratoplasty or crescent anterior lamellar keratoplasty are 2 surgical options in restore structure to a damaged cornea.

Setting

Serviço Oftalmologia - Centro hospitalar Lisboa Central

Purpose

To explore the indications, efficacy and complications of anterior lamellar keratoplasty for peripheral corneal perforations.

Material and Methods

Retrospective case series of 15 cases with the diagnosis of peripheral corneal perforations between 2014 and 2016. All patients were submitted to anterior semi lunar lamellar keratoplasty. „Anterior Lamella obtain from anterior cuts of the Dsaek preparation with microkeratome head (400 micra). Study variables were „etiology, visual acuity, corneal astigmatism, post surgery complications.

Results

15 eyes of 15 patients with mean age of „53,2 years old (range from 42-58 years). Most frequent diagnosis was Mooren ulcer. Mean BCVA before surgery was 20/100 and after surgery (1 year) was 20/40. Corneal astigmatism after 12 months surgery was 2,95D +/-1,75D. Main complications after surgery were ocular hypertension and cataract.

Conclusions

Semi Lunar anterior lamellar keratoplasty in peripheral corneal ulcers/perforations is technically challenging but worthwhile because there are no involvement of the optical center of the cornea by graft edge or sutures and preservation of visual acuity even if the graft fails and becomes edematous.

OCULAR TISSUE DONATION AND PRESERVATION

Pg. 31

Trends in Corneal Transplant Indications and Techniques in Coimbra, Portugal: 2011-2016

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Pg. 32

Analysis of Corneal Donor Profile in the North of Portugal Over the Last Decade

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Pg. 33

Narratives in Health Communication: Do Narrative Texts Influence Text Perception, Attitudes and Behavioral Intentions Towards Tissue Donation?

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Pg. 34

New Era of Cornea Transplantation in Bangladesh

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Pg. 35

Cornea Donation for Research Versus for Transplantation: Prospective Study of Acceptance Rates in a French University Hospital

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Pg. 36

Impact of Diabetes Mellitus Type 2 on Donor Corneas Endothelial Cell Density

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Pg. 37

Preserving basement membranes during detachment of cultivated oral mucosal epithelial cell sheets for total bilateral limbal stem cell deficiency"

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SESSION V (Cont.)

OCULAR TISSUE DONATION AND PRESERVATION

Pg. 38

Development of a New Lyophilization Procedure for Human Amniotic Membranes

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Pg. 39

Development of a New Corneal Storage Medium with Antimycotic Tablet

Jana Tóthová

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Pg. 40

Validation of the BD Bactec Method for Sterility Testing of Corneal Preservation Media According to the European Pharmacopoeia (Chapter 2.6.1.)

Rossella Vignola

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Pg. 41

Validation of HB&L Method for Sterility Testing of Corneal Storage and Transport Media in Compliance with the European Pharmacopoeia

Laura Giurgola

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Pg. 42

Transition of Corneal Tissue from Cold Storage to Organ Culture: A Qualitative Comparison of Paired Corneas

Wessel Vermeulen

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TRENDS IN CORNEAL TRANSPLANT INDICATIONS AND TECHNIQUES IN COIMBRA, PORTUGAL: 2011 -2016

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Purpose

The aim of this study is to determine the recent trends in corneal transplant indications and corneal tissue use in Coimbra.

Methods

Data concerning all corneal transplantation procedures performed at Centro Hospitalar e Universitário de Coimbra (CHUC) between 2011 and 2016 were collected and stored at the CHUC Eye Bank. We retrospectively analysed recipient age, gender, primary diagnosis and transplantation technique.

Results

Across the 6 years considered, 710 corneal transplants were reviewed for analysis. The most frequent indication for corneal transplantation was regrant, which accounted for 207(29.2%) of all procedures, followed by bullous keratopathy, with 125 cases (17.6%) and keratoconus, with 118 cases (16.6%). No statistically significant shift in indications for grafting was identified over the 6-year period ($p = 0.70$). All years accounted, penetrating keratoplasty (PK) accounted for 506 procedures (71.3%), Descemet's stripping automated endothelial keratoplasty (DSAEK) for 129 (18.2%), and deep anterior lamellar keratoplasty (DALK) for 64 (9.0%). Over the 6 years, we observed a statistically significant decline in the numbers of PK, accompanied by an increase in DSAEK and DALK.

Conclusions

Transplant indications have remained stable across the time frame (particularly when comparing with older studies) and similar percentages of bullous keratopathy and corneal dystrophies. In terms of surgical technique, this study provides further evidence of the increasing popularity of lamellar keratoplasties, in opposition to PK.

ANALYSIS OF CORNEAL DONOR PROFILE IN THE NORTH OF PORTUGAL OVER THE LAST DECADE

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Purpose

To describe trends in cornea donations in a tertiary referral center in Portugal – Centro Hospitalar Universitário do Porto (CHUP).

Material & Methods

This is a retrospective review of all corneal donations in CHUP, between 1 January 2006 and 31 December 2016. The number of corneal donors per year, the number of corneal transplants performed each year, the type of corneal donation, the demographics of donors, the cause of death and the criteria for cornea exclusion were analyzed.

Results

There was a progressive year-on-year increase in corneal donors over the study period, from 70 in 2006 to 164 in 2016. As a direct result, there has been an increase in the number of corneal transplants performed per year using locally donated corneas, from 59 in 2006 to 147 in 2016. Males comprised 62, 9% of donors. Donor age demonstrated a peak at fifth and sixth decades (mean age 58,0 years-old). In the majority of patients, the cause of death was cerebral hemorrhage, followed by traumatic brain injury. Almost 45% of the corneas were obtained from multiorgans donations. The number of corneas rejected was kept constant over the years (mean 16,7%). Processing and harvest errors were the main cause for corneal exclusion in 2006, being replaced by donor's infection in later years. There was an increase in cornea's splitting from 0% in 2006 to 5,5% in 2016.

Conclusions

One of the most important requirements for successful corneal transplantation is the availability of donor tissue. Fortunately, the steadily rise of corneal transplantation has been associated with an increase in cornea donations. In our study, the demographics of the donors were kept similar over the years.

NARRATIVES IN HEALTH COMMUNICATION: DO NARRATIVE TEXTS INFLUENCE TEXT PERCEPTION, ATTITUDES AND BEHAVIORAL INTENTIONS TOWARDS TISSUE DONATION?

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Purpose

The idea of storytelling in health communication, the narrative approach, suggests that patient stories transport health related information effectively. This approach offers an alternative to the information and persuasion approach. We analysed the effect of patient stories on text perception, attitudes and behavioral intentions towards tissue donation of thematic non-experts and experts via two studies.

Material and Methods

In study 1 (N = 359) we compared the effect of three different texts (narrative, semi-narrative, non-narrative) on the evaluation of the thematic non-experts. In study 2 (N = 47) we asked thematic experts (doctors and nursing staff) and compared the effect of a narrative and a non-narrative text. Method: online-experiment with a standardized questionnaire (survey-software: Unipark).

Results

The non-experts, who had read the narrative text before, evaluated text perception significantly better than the non-experts, who had read the semi-narrative and non-narrative text. In study 2, after reading the non-narrative text there was a positive effect on behavioral intentions towards tissue donation of the thematic experts.

Conclusion

Overall, patient stories provide a good alternative in communication about tissue donation compared to informative texts, which are predominant in health communication. To raise greater awareness of tissue donation, patient stories might be more effective in communication with thematic non-experts. Otherwise, informative texts might be more effective in communicating with experts.

NEW ERA OF CORNEA TRANSPLANTATION IN BANGLADESH

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Introduction

In Bangladesh, 7.5 million people are suffering from low-vision and blindness. Out of them more than 5,00,000 people are suffering from corneal diseases and await corneal transplantation. Eye banks throughout the country are working towards collecting cadaver donor corneas to reduce corneal blindness.

Methods

Data used in this analysis comes from the hospital records of Islamia Eye Hospital, Harun Eye foundation, Chittagong Eye Infirmary and Training Complex (CEITC), Bangladesh Eye Hospital and Sandhani International Eye Bank and CHOKH, an eye NGO in Bangladesh. The current study analysed the improvement in cornea transplantation in terms of patient's vision, transplant cost, availability of cornea, etc.

Results

The first eye banking and cornea transplantation program in Bangladesh started in 1984. From 1984-2017, more than 5500 cornea transplantations took place and 3,000 of these transplants were completed during 2009-2017. Cornea transplantation has increased 3 fold since 2009 compared to earlier times. Currently on average 500 corneas are transplanted each year. Number of corneal surgeons was only 8 in 2009 which now stands at 22. In 2009 people had to wait for years for a cornea whereas now there is no waiting time before one can get a cornea transplantation.

Conclusion

Bangladesh has experienced a remarkable improvement in terms of cornea transplantation. Numbers of corneal doctors has increased and there is frequent supply of tissues from abroad. However, little has been done to increase local availability of donor cornea in recent years and existing eye banks have not developed their program to increase the supply of cornea domestically.

CORNEA DONATION FOR RESEARCH VERSUS FOR TRANSPLANTATION: PROSPECTIVE STUDY OF ACCEPTANCE RATES IN A FRENCH UNIVERSITY HOSPITAL

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Purpose

Obtaining consent to corneal donation specifically for research is essential: this targeted donation is the only way to obtain fresh tissue of the highest quality. Though, it is not routine and may give rise to reluctance. Aim: To compare in a prospective study cornea donation for Research (R) versus (vs) for Transplantation (Tx) in our French university Hospital.

Methods

Ancillary study of 1 year-prospective preclinical randomized study validating a corneal bioreactor, authorized by French Biomedicine Agency. Consent was obtained by 3 experienced nurses of hospital coordination team (HCT). Donors who presented contraindication for Tx (CITx) were selected for R so as not to reduce grafts number. Standard protocol face-to-face or phone interviews were used for both eligible donors groups based on french legislation. Research aim was explained, if necessary detailed information could be provided.

Results

For R and Tx respectively, 134 and 244 families were contacted during 1 year, in 70% of cases by phone. Whatever method used, we obtained consent in 64% for R vs 54% for Tx ($p=0,065$). Acceptance rates were 60% (R) and 50% (Tx) by phone ($p=0,16$) vs 68% (R) and 63% (Tx) face-to-face ($p=0,67$). Main CITx was cognitive troubles (75%). Donors age was 81 ± 12 for R vs 71 ± 13 years for Tx ($p<0,001$). Endothelial cell density at retrieval was 2541 ± 409 for R vs 2641 ± 596 cells/mm² for Tx ($p=0,052$).

Conclusion

Despite an opt-out system for donation in France, HCTs play an instrumental role in obtaining consent for Tx. We found they are as efficient in obtaining consent for R. It is a key point to obtain numerous "research-grade corneas" with similar quality to grafted corneas.

IMPACT OF DIABETES MELLITUS TYPE 2 ON DONOR CORNEAS ENDOTHELIAL CELL DENSITY

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Purpose

Diabetic eye disease accounts for many ocular manifestations other than diabetic retinopathy, some affecting the ocular surface and anterior segment. This study aims to compare the endothelial cell density (ECD) of donor corneas from diabetic vs. non-diabetic patients.

Materials & Methods

Retrospective study of donor corneas from a tertiary care hospital. Data screening and extraction were performed from the hospital's EyeBank database, specular microscopy (Konan®) and clinical records from emergency department and outpatient clinic. All consecutive donor corneas were included, given specular microscopy had quality readings and data records were complete. Donors were divided in two groups (diabetic and non-diabetic), and specular microscopy data compared. Primary outcome: ECD. Secondary outcomes: coefficient of variation (CV), percentage of hexagonal cells (HEX) and average cell area (AVE). Statistical analysis with SPSS software.

Results

73 corneas were included, from 42 donors (39.7% females). Mean donor age was 56 ± 11 years. From this sample, 15 patients were diabetic (20.5%). Mean ECD in diabetics was 2523.67 ± 299.27 cells/mm², vs. 2528.28 ± 368.92 cells/mm² in non-diabetics ($p > 0.05$). Mean CV was 32.93 in diabetic patients, and 31.23 in non-diabetic ($p > 0.05$). HEX was comparable in both groups as well, with 49.73% in diabetics and 51.04% in non-diabetics ($p > 0.05$). Diabetic donors had an AVE of $401.33 \mu\text{m}^2$ vs. $404.51 \mu\text{m}^2$ in non-diabetic donors ($p > 0.05$).

Conclusions

No significant endothelial differences were found between diabetic and non-diabetic donors.

PRESERVING BASEMENT MEMBRANES DURING DETACHMENT OF CULTIVATED ORAL MUCOSAL EPITHELIAL CELL SHEETS FOR TOTAL BILATERAL LIMBAL STEM CELL DEFICIENCY

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Total bilateral limbal stem cell deficiency cannot be treated by autologous limbal transplantation, cultured Autologous Oral Mucosal Epithelial Cells (CAOMECS) have been shown to be safe and effective alternatives. These cells can be transplanted on supports or without support after detachment from the culture dishes. The objective was to find an optimized detachment method providing a sufficiently resistant and adhesive Cultured Oral Mucosal Epithelium (COME).

Enzymatic treatments (dispase or collagenase at different concentrations) were compared to enzyme-free mechanical detachment. Histological, Immunofluorescence (IF) and Western Blotting (WB) were used to examine the impact on adhesive markers (laminin-332, α 1-integrin, type VII collagen) and junctional markers (E-cadherin, P-cadherin). Finally, the COME ability to adhere to the cornea and produce a differentiated epithelium 15 days after grafting onto an ex vivo porcine stroma model were investigated by histology, IF, and TEM.

Collagenase at 0.5 mg/mL and dispase at 5 mg/mL were selected for comparative study on adhesive expression marker by IF and WB showed that levels of basement membrane proteins and cell-cell and cell-matrix junction proteins were not significantly different between the 3 detachment methods. Collagenase 0.5 mg/mL was selected for the next step validation because of the better reproducibility, 100% success (versus 33% with dispase 5 mg/mL).

Grafted onto porcine de-epithelialized corneal stroma, collagenase 0.5 mg/mL-detached COME were found to adhere, stratify and continue to ensure renewal of the epithelium.

DEVELOPMENT OF A NEW LYOPHILIZATION PROCEDURE FOR HUMAN AMNIOTIC MEMBRANES.

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Our purpose was develop a new lyophilization procedure for human amniotic membrane (hAM) maintaining its histological and biochemical properties and being able to keep it at room temperature.

In order to achieve our goal, we analyzed the effect of several cryoprotective and lioprotectives agents (raffinose, trehalose and epigallocatechin gallate -EGCG) on lyophilization process. Using two different programs of lyophilization (one-day and three-days cycles), we also compared their histology by H&E stain and concentration of some growth factors and cytokines by ELISA, such as EGF, TGF- β 1 and IL-10

The results show that trehalose preserves better hAM structure under one-day cycle than in three-days cycle of lyophilization. Moreover, the concentration of EGF and TGF- β 1 is maintained in the two cycles approach respect to the control. Although the IL-10 expression decreases in the two cycles studied when compared with the one-day cycle, this difference was not statistically significant. Moreover, after lyophilization, both cycles of lyophilization present the same amount of residual water.

Our results allow us concluded that one-day cycle approach associated with trehalose pretreatment was the optimal protocol for hAM lyophilization.

DEVELOPMENT OF A NEW CORNEAL STORAGE MEDIUM WITH ANTIMYCOTIC TABLET

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Purpose

This study aimed at assessing the antimycotic activity of the new cold storage medium, Kerasave, and at evaluating the quality of donor corneas preserved in the medium at 4°C for 14 days in comparison with Optisol GS.

Material and Methods

Kerasave antimycotic activity was determined by in vitro time-kill studies using sterile porcine corneal tissues, contaminated with 104 cfu/ml of *C. Albicans* (ATCC10231 and clinical isolate). The killing rate of the microorganisms was monitored at 4°C after 5 and 10 days of incubation in Kerasave.

Kerasave performance was assessed on 16 pairs of human corneas not suitable for transplantation, procured and evaluated according to standard procedures of Monza Eye Bank, Italy. One cornea was transferred in Kerasave and the contralateral in Optisol GS. Endothelial cell density (ECD), measured by specular microscopy (Keratoanalyzer, Konan), was evaluated pre-processing, and after 7 and 14 days of storage at 4°C. Endothelial cell morphology and mortality were determined according to Stocker method, and epithelial integrity, and corneal transparency were evaluated using a Slit lamp.

Results

In vitro time-kill studies showed a 3 to 4 log10 reduction for both *Candida* strains within 10 days of incubation at 4°C. Kerasave- and Optisol-GS-treated tissues showed similar ECD, mortality and endothelial morphology after 7 and 14 days of cold storage. Slit lamp analysis showed comparable corneal transparency and epithelial integrity in both groups.

Conclusions

The new cold storage medium with antimycotic tablet, Kerasave, exhibited an excellent antimycotic activity and biocompatibility with donor corneas after corneal storage at 4°C for up to 14 days.

VALIDATION OF THE BD BACTEC METHOD FOR STERILITY TESTING OF CORNEAL PRESERVATION MEDIA ACCORDING TO THE EUROPEAN PHARMACOPOEIA (CHAPTER 2.6.1.)

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Purpose

The aim of this study was to validate the method for sterility testing of corneal storage media Tissue-C and Carry-C according to the "Method suitability test" (EP) using BACTEC (Becton Dickinson) automated system in a multicentric study.

Material & Methods

The validation study was performed at the Eye Bank of Rome and Eye Bank of Monza, Italy. Samples of organ culture medium (Tissue-C, AL.CHI.MI.A. S.r.l.), deswelling/transport medium (Carry-C, AL.CHI.MI.A. S.r.l.), and optimal growth media (growth control) were inoculated with 6 EP reference strains to obtain final microbial concentration of 10 cfu/ml, and tested at least in triplicate with BACTEC automatized system. Method sensitivity, specificity and robustness were determined for each medium, with and without antibiotic removal from samples with RESEP (AL.CHI.MI.A. S.r.l.).

Results

Both eye banks obtained the same method sensitivity and specificity results. The method for sterility testing of Tissue-C and Carry-C samples after RESEP-treatment using BACTEC system showed 100% sensitivity and specificity. Samples treated with RESEP showed similar times to detection as compared to growth controls.

Conclusions

BACTEC system can be considered validated with 100% sensitivity and specificity, and robustness for samples of corneal storage media contaminated with 1-10 cfu/ml, and treated with RESEP.

VALIDATION OF HB&L METHOD FOR STERILITY TESTING OF CORNEAL STORAGE AND TRANSPORT MEDIA IN COMPLIANCE WITH THE EUROPEAN PHARMACOPOEIA

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Purpose

This study aimed at validating the method for sterility testing of the corneal culture medium, TISSUE-C (AL.CHI.MI.A. S.r.l.), and the transport/deswelling medium, CARRY-C (AL.CHI.MI.A. S.r.l.), according to the method suitability test, as defined by the European Pharmacopoeia (EP), using RESEP (AL.CHI.MI.A. S.r.l.), which is a new medical device for removal of antimicrobial agents, and HB&L (Alifax) automated culture system.

Materials & Methods

The six EP reference strains were inoculated in TISSUE-C and CARRY-C. Half of the samples were treated with RESEP (RESEP+ group) prior to the sterility testing, whereas the remaining samples were untreated (RESEP- group). Growth controls were obtained by direct inoculation of the microorganisms in the culture broths. Microbial growth was read by HB&L automated light scattering culture system within 48 h.

Results

The use of RESEP allowed detection of microbial growth in 100% of the tested samples, with a mean time to detection (TTD) comparable with that of the growth control group. Significantly lower sensitivity ($38.83\% \pm 20.03\%$ for both media, $p < 0.05$) and TTD variability, depending on the tested microorganism, were observed in the RESEP- group. The method specificity was 100% for both groups.

Conclusion

The use of RESEP increased the sensitivity of the sterility testing method to 100% and, for the first time, allowed validation of the method for sterility testing of corneal storage media according to the EP method suitability test. This further increases the safety of the corneas intended for transplantation.

TRANSITION OF CORNEAL TISSUE FROM COLD STORAGE TO ORGAN CULTURE: A QUALITATIVE COMPARISON OF PAIRED CORNEAS.

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Introduction

Cornea shortage in the Netherlands results in an increasing recipient waiting list. In order to solve this problem, corneas could be acquired abroad.

In the Euro Cornea Bank all corneas are cultured in warm storage, whereas in some other corneabanks, cold storage is used. Therefore we were interested in implementing a cold to warm transfer method with a functional corneal graft (e.g. pre-cut DSAEK).

Material and Methods

A total of 6 paired corneas were used. At least one of the pair was not suitable for transplantation. One of the paired corneas was stored during 4 days in Eusol and its counterpart in MEM. At day 4, the cornea in Eusol was transferred to MEM. During storage, re-evaluation of the corneas was performed two times: at day 10 and at day 20 of storage. At day 20, all corneas were transferred to MEM + 6% Dextran medium. The pre-cut DSAEK was performed after 1 night deswelling and the corneas were evaluated for the last time.

At 4 time points microbiological samples were taken, during storage in Eusol, during storage in MEM (twice) and from the MEM + 6% Dextran medium.

Results

Corneas transferred from cold to warm storage were shown to have the same quality as their mate, by evaluating them microscopically and the pre-cut DSAEK. From all paired corneas all microbiological results were negative (no growth of any micro-organism).

Conclusion

Corneas which have been stored in Eusol at the start and thereafter transferred to MEM show no significant difference with their mate in MEM only. Microbiological safety was shown for both procedures.

HIGH-RISK CORNEAL TRANSPLANTS

Pg. 44

EURO-GTP II PROJECT - Good Practices for Demonstrating Safety and Quality Through Recipient Follow-up

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Pg. 45

Corneal Immune Reactions: Long-term Results of a Monocentric Keratoplasty Register

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Pg. 46

Mycophenolate Mofetil for High-risk Penetrating Keratoplasty: A Case-Series

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Pg. 47

Travels in Candida - Infection Following Organ Culture of Corneas

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Pg. 48

Long-term intraocular pressure control and corneal graft survival in eyes treated with trans-scleral cyclodiode laser for refractory glaucoma after penetrating keratoplasty

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EURO-GTP II PROJECT - GOOD PRACTICES FOR DEMONSTRATING SAFETY AND QUALITY THROUGH RECIPIENT FOLLOW-UP

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Advances in technology and science continue to contribute to the development of novel Tissue and Cellular Therapies/Products (TCTPs). Any modification in the processes associated with the donation, procurement, testing, processing, storage and distribution of TCTPs may impact the quality of these therapies/products and therefore the safety of donors or recipients. It is important that the risks associated with these novelties are identified, quantified and assessed using a standard process.

Euro-GTP II- is a 3 year Project co-funded by the 3rd Health Programme of the EU, that aims to set up the good practices applied to TCTPs preparation processes and patient follow-up procedures to ensure their safe and effective implementation and evaluation.

The project will develop guidance and practical tools to assist professionals to: Determine if a TCTP or process has any novelty; Assess of the risks associated with the TCTP or process; Determine the extent of any studies and/or follow up required to assure the safety and efficacy of TCTPs.

The project will produce 3 main deliverables: Euro-GTP II Guide: reference for stakeholders, when planning their activities. T&C Database: compendium of TCTPs and preparation processes. Interactive Assessment Tool: generate a summary report detailing the risks identified, and the risk scores, and the extent of studies needed according the identified risks.

The outcomes of the Euro-GTP II will provide tools for assessing and verifying quality, promoting safety and assure efficacy of TCTP, addressing mainly the implementation of novelties, but also the need for retrospective studies where weaknesses or insufficient safety data currently exists.

CORNEAL IMMUNE REACTIONS: LONG-TERM RESULTS OF A MONOCENTRIC KERATOPLASTY REGISTER

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Purpose

Graft rejections remain the main cause for corneal transplant failure. During graft rejection the endothelium, stroma, or epithelium or a combination of various layers can be affected. In times of lamellar keratoplasty this may have changed. We herein present the data for graft rejection in our keratoplasty registry.

Methods

The medical records of all corneal transplant patients (2003 – 2016) were screened for rejections. Indications for keratoplasty were classified into five groups (Fuchs, keratoconus, hereditary dystrophies, scars, and other). Operation techniques were classified into PKP, Limbo-PKP, DSAEK, DMEK, DALK. Rejections were subdivided into endothelial-, stromal-, epithelial-, and mixed-rejection and analysed for endothelial cell count (ECC), topical and systemic medication, and visual acuity (BCVA).

Results

282 patients with graft rejection and sufficient follow-up were identified (44% females, median age 57 years). 52% of patients had symptoms for less than 7 days. 89% of rejections were of endothelial origin and occurred within 10 months after keratoplasty. Suture removal (9%) as well as ocular trauma after corneal grafting (18%) were potential risk factors for graft rejection. Endothelial graft rejection – compared to all other rejection forms – had a significantly higher risk for further rejection episodes and a significant drop in ECC. BCVA was significantly diminished after stromal and after endothelial rejections.

Conclusions

Most corneal graft immune reactions are directed against the endothelium. This form shows the worst visual outcome and is associated with the highest risk for further rejection episodes.

MYCOPHENOLATE MOFETIL FOR HIGH-RISK PENETRATING KERATOPLASTY: A CASE-SERIES

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Introduction Repeated corneal grafts, and keratoplasty in patients with chronically inflamed vascularized corneas pose a high risk of graft rejection. In this setting, systemic immunosuppression may be an option to enhance immune tolerance.

Purpose To assess the efficacy and safety profiles of mycophenolate mofetil (MMF) in high-risk penetrating keratoplasty (PK).

Setting Ophthalmology Department, Hospital de Santa Maria, Lisbon Academic Medical Center.

Material & Methods Retrospective case-series of patients submitted to high-risk PK, addressed with MMF started in July to October 2017. Therapeutic scheme used: MMF 500mg bid starting on postoperative period, and maintained for two weeks; dose was then doubled if tolerability confirmed. Demographic data and clinical outcomes were extracted from clinical records.

Results Four patients (2 males) were included in this analysis. Mean age was 46 years-old. All patients had history of past graft rejection, and one presented >2 quadrants of stromal vascularization. Mean follow-up time was 12 months [range 9-14], through which all but one patient maintained a clear graft. Reported adverse events: transient mild gastrointestinal disturbances (n=1); transient elevation of liver enzymes (n=1) and mild leukopenia and thrombocytopenia resolved after dose reduction (n=1). All patients were compliant with MMF, such as with the clinical and analytical regular follow-up. During prophylactic MMF, no further rejection episodes were detected.

Conclusions MMF seems to be an effective corticosteroid-sparing agent for prolonging graft survival in high-risk corneal grafts. Side effects were tolerable and managed with ease.

TRAVELS IN CANDIDA – INFECTION FOLLOWING ORGAN CULTURE OF CORNEAS

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Since 2013, reports have indicated an increase incidence of fungal keratitis and endophthalmitis following corneal transplantation (1). This has been associated with hypothermic storage and DSAEK preparation of donor material by eye banks. We report a cluster of candida parapsilosis infections in five DSAEK recipients following preparation of organ culture stored DSAEK corneas prepared over a 16 day period. We also report on a case of candida tropicalis infection following organ culture which was not eliminated by the antimycotics, nor detected either visually or through microbiological testing of the organ culture media. The probable aetiology of the organ cultured cases was investigated and compared to the probable aetiology of the hypothermic cases.

Results

Candida species contamination of hypothermic stored corneas involved in recent cases of fungal keratitis and endophthalmitis are probably donor-derived and, in the absence of antimycotics, multiply to significant levels during the warming cycles inherent in DSAEK preparation. In contrast, the cluster of candida parapsilosis is possibly associated with direct contamination from a non-sterile microkeratome handpiece. In the single case of candida tropicalis, the contamination was most likely donor-derived. Failure to detect or eliminate it during storage may be associated with the presence of a protective fungal biofilm.

Conclusions

Corneal storage by organ culture in no guarantee against contamination with candida species. The cause of fungal contamination differs between hypothermic and organ culture corneas. Biofilms may impede the detection, decontamination and treatment.

(1) Edelstein et.al. Cornea 35 (2017).

LONG-TERM INTRAOCULAR PRESSURE CONTROL AND CORNEAL GRAFT SURVIVAL IN EYES TREATED WITH TRANS-SCLERAL CYCLODIODE LASER FOR REFRACTORY GLAUCOMA AFTER PE

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Purpose

Refractory glaucoma is a frequent complication after penetrating keratoplasty (PKP) but controversy exists regarding its management which includes trabeculectomy, glaucoma drainage device (GDD) or trans-scleral cyclo diode laser (TC). We report here the long-term outcomes of intraocular pressure (IOP) control and corneal graft survival after TC treatment.

Methods

Retrospective observational clinical study including patients treated with TC for refractory glaucoma following PKP. Data were gathered in a tertiary corneal transplantation service database between 1995 and 2016. The patients were all treated with a similar 180° treatment protocol performed by the same surgical team. Outcome measures: IOP control, number of glaucoma medications, PKP survival.

Results

Twenty-four eyes, of 24 patients (males=15) were identified. Mean age of patient at first TC treatment was 66 (SD 19 years) and mean interval between PKP and first TC was 34.16 (SD 55 months). The mean pre-treatment IOP was 29.75 mmHg (SD 8.02mmHg) and was significantly reduced at six months to 16.45 mmHg (SD 6.00mmHg, $p<0.0001$) with 83% of patients below 21mmHg. Best-corrected visual acuity (BCVA) was stable in 83.33% (n=20) of patients and reduced by more than two Snellen lines in 16.67% (n=4). The survival rate of graft at six months was 83.33% (n=20).

Fourteen patients had a follow-up at five years with a significantly reduced mean IOP at 14.64mmHg (± 3.22 mmHg, $p<0.0001$) with 92.85% (n=13) under 21mmHg and only one patient with a 22mmHg IOP. The mean number of glaucoma medication was significantly reduced from 3.35 (± 0.92) pre-treatment to 1.78 (± 1.05) post-treatment ($p<0.001$) at 5 years. BCVA was stable in 57.14% (n=8) of patients and reduced by more than two Snellen lines in 42.86% (n=6) of them. The survival rate of graft at 5 years was 64.29% (n=9), the failure rate was 35.71% (n=5) including one case of failure after rejection (2 years post-TC). There were no reported phthisis or hypotony following TC treatment.

Conclusions

Our results support the hypothesis that TC can efficiently provide glaucoma control in patients after PKP with a good safety profile and compares favorably in terms of PKP survival to GDD as reported in the literature. We suggest that a randomized clinical trial would give more robust data on this topic.

Pg. 53

Atypical Presentation of Acanthamoeba Keratitis in a 48 year old Woman
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Pg. 54

Donor Characteristics and Contamination of Ocular Tissue Preserved In Organ Culture
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Pg. 55

Influence of Vegf and its Soluble Receptors on Corneal Neovascularization and Graft Survival Rate in Human Corneas
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Pg. 56

Six Years of Corneal Donation to the Hospital São João Eye Bank: Characteristics of Cornea Donors from 2012 to 2017
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Pg. 57

Endothelial Cell Viability of Donor Corneas Preserved in Eusol-c At 4°C

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Pg. 58

Using a Pig Model to Test Cultivated Endothelial Cell Sheets

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Pg. 59

Optimization of Descemet Membrane Endothelial Keratoplasty (dmeK) Graft Tissue for Immunohistochemistry (ihc) Studies

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Pg. 60

Influence of Donor Factors on Suitability of Retrieved Corneas for Transplantation.

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Pg. 61

Degradation of Antibiotic and Antimycotic Agents in Organ-culture

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Pg. 62

The Influence of Different Dispersive and Cohesive Ophthalmic Viscosurgical Devices (ovds) on the Endothelium During Cataract Surgery

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Pg. 63

Alternative use for Rejected Donor Corneas – How to Reduce Tissue Waste and Improve Outcomes for our Patients

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Pg. 64

Influence of Cornea Donors' Cause of death on Transplant Clinical Outcomes

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Pg. 65

Descemet Membrane Endothelial Keratoplasty (dmeK) Preparation by Eye Bank Specialists Reduces the Waiting List for Keratoplasty

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Pg. 66

The Effect of Preservation-to-utilization time interval on Transplantation Outcome

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Pg. 67

Status of Organ/tissue Donation and Transplantation in Bangladesh

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Pg. 68

Corneal Visual Rehabilitation with Dsaek in Patients with Phakic IOL Related Endothelial Decompensation: Clinical Outcomes

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Pg. 69

The Effect of Arterial Hypertension on Donor Corneas Endothelial Characteristics

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ATYPICAL PRESENTATION OF ACANTAMOEBA KERATITIS IN A 48 YEAR OLD WOMAN

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Bank, Poland)

Purpose

To present a case of minimal pain Acanthamoeba keratitis to pay clinicians attention to remember Acanthamoeba when evaluating atypical or complicated cases of keratitis.

Methods

The medical history of an unusual keratitis case was analyzed.

Results

48 y.o. woman presented with discomfort, foreign body sensation, mild conjunctival hyperemia, and decreased visual acuity in her left eye for two weeks. She wore contact lenses only occasionally. Five months before presentation she was diagnosed with herpes simplex keratitis and treated with acyclovir. Recent examination revealed a small dendritic-like ulcer. The patient was then diagnosed as recurrent herpes keratitis and the treatment with topical and oral acyclovir was started. Three weeks later there was no improvement and the ulcer seemed to be deeper, so the treatment with acyclovir and with moxifloxacin (added) was continued. She did not report any pain. In the fifth month of the disease, the patient developed a dense, mid-peripheral ring-like stromal infiltrate. A deep corneal scrapings were positive for Acanthamoeba. After two months of therapy with propamidine isetionate and polyhexamethylene biguanide a stromal infiltrate failed to improve and the patient underwent a penetrating keratoplasty. There were no evidence of Acanthamoeba recurrence in the corneal graft after five months.

Conclusion

Acanthamoeba keratitis must be considered in the differential diagnosis of keratitis even without the classic signs of severe pain. Incorrect diagnosis and treatment may further complicate the clinical picture and delay the proper management.

DONOR CHARACTERISTICS AND CONTAMINATION OF OCULAR TISSUE PRESERVED IN ORGAN CULTURE

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Introduction and Purpose

Corneal tissue for transplantation is typically stored in eye banks at 2°-6°C (hypothermic) or at 31°-37°C (organ culture), with each preservation technique having its own particular methodologies in relation to storage time, tissue evaluation and microbiological safety. As donor ocular tissue cannot be considered sterile, the incidence of bacterial/fungal contamination is a recurrent threat. On the one hand, although the comparative complexity of microbiological testing in organ culture storage is an important consideration, on the other this technique has real advantages, as it allows one to detect microorganisms more accurately on account of the long-term storage period. The aim of this study was to evaluate the factors influencing the risk of donor cornea contamination.

Methods

A case-control study was conducted in relation to 828 corneas (414 contaminated and 414 allocated for transplantation) collected between 1 January 2015 and 31 December 2016 and stored in organ culture.

Results

Our study found that donor age, sex and site of death did not have a significant influence on the contamination rate, nor was the post-mortem interval (death to retrieval) influential. Conversely, factors that seems to increase the risk of contamination were active bacterial sepsis and prolonged hospitalization. Interestingly, our study found that cardiovascular disease as the cause of death seemed to be a ‘‘protective factor’’ against cornea contamination.

Conclusion

In order to reduce the risk of contamination in organ-cultured corneas, each eye bank should take into account these risk factors and consider implementing specific procedures for donor selection.

INFLUENCE OF VEGF AND ITS SOLUBLE RECEPTORS ON CORNEAL NEOVASCULARIZATION AND GRAFT SURVIVAL RATE IN HUMAN CORNEAS

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(Special Eye Hospital „Svjetlost“)

Purpose

To evaluate correlation of vascular endothelial growth factor (VEGF) and its soluble receptors quantity in the recipient cornea at the time of penetrating keratoplasty (PK) and its potential influence on graft rejection.

Methods

Study included 60 eyes scheduled for PK, equally distributed by corneal pathology into 3 risks groups: low, medium, high and controls. Quantity of VEGF-A and C, sVEGFR-1, R2 and R3 was analysed in total cornea and its layers using an enzyme-linked immunosorbent assay; correlated and compared with neovascularization rate and frequency of graft reaction/rejection in 2 postoperative years.

Results

Highest concentrations of VEGF-A and C in total cornea were in high risk cases (599 pg/ml; 8.49 ng/ml) and the lowest in controls (102 pg/ml; 5.23 ng/ml). Soluble VEGFR-1 and sVEGFR-3 were significantly higher in low risk patients (2.11 ng/ml; 1.62 ng/ml) as compared to high risk group in total cornea (1.8 ng/ml; 0.63 ng/ml). There were 2 graft rejections, both in high risk group. Eyes with graft reaction had significantly higher VEGF-A (477 pg/ml) and VEGF-C (6.06 ng/ml) and lower sVEGFR-1 (2.23 ng/ml) and R3 (0.49 ng/ml) as compared to clear grafts. Statistical analysis was done by Kruskal-Wallis ANOVA non-parametric test and difference between groups was analysed by Mann-Whitney U-test.

Conclusion

Our data implicate that graft reaction occurs more often in corneas with increased VEGF-A and C and decreased sVEGFR-1 and R3. Novelty is that soluble VEGF receptors in human corneas may suppress rejection acting as a VEGF-sink, and potentially serve as anti-rejection therapy.

Keywords: Penetrating keratoplasty, vascular endothelial growth factor, soluble VEGF receptors, human corneas, corneal neovascularization, graft survival rate

SIX YEARS OF CORNEAL DONATION TO THE HOSPITAL SÃO JOÃO EYE BANK: CHARACTERISTICS OF CORNEA DONORS FROM 2012 TO 2017

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Introduction

Corneal transplant is one of the most common transplant procedures worldwide and represents a basilar treatment approach in several corneal pathologies.

Purpose

To investigate the characteristics of cornea donors to the Hospital São João Eye Bank during a 6-year period.

Methods

Retrospective analysis of Hospital São João Eye Bank records from January 2012 to October 2017. We analyzed donor standardized records, which included demographic data, cause and time of death, death-to-preservation interval, preservation-to-utilization interval, endothelial cell density (ECD), pachymetry and blood tests.

Results

The sample contained 509 corneal donors. Mean age was $58,94 \pm 16,31$ years and most donors were male (61,1%). The most common cause of death was cardiovascular disease (47.3%), followed by cancer (29,9%) and trauma (12,6%). 69,5% donated tissue was obtained in deceased donors and the others in living donors. Mean death-to-preservation interval was 6.13 ± 3.27 hours. Mean preservation-to-utilization interval was 6.58 ± 2.86 days on the right eye (RE) and 6.64 ± 2.90 days on the left eye (LE). The mean ECD of corneal tissue was $2407,00 \pm 586,96$ cells/mm² on the RE and $2386,37 \pm 644,23$ cells/mm² on the LE. Mean pachymetry was $556,83 \pm 95,72$ μ m on the RE and $562,27 \pm 97,18$ μ m on the LE. Blood tests were negative in 94,9% of cornea donors.

Conclusion

In Hospital São João Eye Bank, the generic donor was a man in the sixth decade of life who died due to cardiovascular disease, whose corneas had approximately 2400 endothelial cells/mm² and 540 μ m in pachymetry and with negative blood tests.

ENDOTHELIAL CELL VIABILITY OF DONOR CORNEAS PRESERVED IN EUSOL-C AT 4°C

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Luís Oliveira
(Centro Hospitalar Universitário do Porto)

Purpose To evaluate the impact of corneal storage at in Eusol-C 4°C on endothelial cell characteristics.

Methods Prospective, non-randomized, study with donor corneas harvested from June to September 2017. Endothelial cell density (ECD) was evaluated on first day of storage (D1) and 8 days after (D8). The mean loss of ECD from D1 to D8 was determined. Changes in cell size were also analysed. Corneal endothelial cell counting was performed with a specular microscope by 2 technicians qualified for the procedure. All donor corneas were preserved in Eusol-C at 4°C.

Results Twelve corneas of 6 cadavers were evaluated (6 obtained from postmortem collection and 6 from multiorgan collection). The mean donor age was $59,7 \pm 5,03$ years (range 55-65). The mean duration between death and harvesting was $7,8 \pm 6.6$ hours (range 2-12h) and the mean time between harvesting and the first endothelial cell counting was $14,0 \pm 8,6$ hours (range 4-19h). Mean endothelial cell density was 2754 ± 159 cells/mm² at the beginning of the preservation (range 2546-2950 cells/mm²) and of 2665 ± 143 cells/mm² on the eight day of storage (range 2545-2865 cells/mm²), $p=0,109$. Mean endothelial cell loss rate was 3,2% from D1 to D8. Differences in cell size from D1 to D8 were not statistically significant, $p=0,402$.

Conclusion The decreased in ECD in donor corneas preserved in Eusol-C at 4°C over a period of eight days was not statistically significant. The evaluation of ECD over time proved to be difficult due to progressive edema of donor corneas and large pleomorphism observed in the endothelial cells.

USING A PIG MODEL TO TEST CULTIVATED ENDOTHELIAL CELL SHEETS

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Purpose

There is a worldwide lack of donor tissue for corneal transplantations. It has recently been demonstrated by collaborators in the ARREST blindness consortium that human corneal endothelial cells can be cultivated on lens capsules providing an alternative to a human donor DMEK graft. The purpose of this study was to demonstrate the feasibility ex vivo of using a pig model to test these cultivated endothelial cell sheets prior to conducting in vivo testing.

Materials & Methods

Freshly harvested porcine eyes were obtained from a local slaughterhouse. The anterior chamber was filled with air and removal of Descemet's was attempted using a reverse sinsky hook. 6.5mm anterior lens capsule grafts, from human organ donors, were created using a trepan. A curved pipette (DORC, Netherlands) for DMEK surgery was used to load the graft into the anterior chamber of the eyes. The eyes were scanned using a custom built anterior segment OCT (Thorlabs, Germany).

Results

Descemet's membrane could be successfully removed from porcine eyes ex vivo using a reverse sinsky hook. Human lens capsule grafts were successfully loaded into the anterior chamber using the curved pipette and positioned to the back surface of the cornea using air. Apposition was confirmed with anterior segment OCT.

Conclusions

In these ex vivo pilot experiments we demonstrate the feasibility of using a pig model to investigate if cultivated endothelial cell sheets can be used as an option to a normal DMEK human donor graft. In vivo studies are being conducted in autumn-winter 2017/2018.

OPTIMIZATION OF DESCMET MEMBRANE ENDOTHELIAL KERATOPLASTY (DMEK) GRAFT TISSUE FOR IMMUNOHISTOCHEMISTRY (IHC) STUDIES

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Purpose

To optimize an immunohistochemistry (IHC) procedure that will enable us to perform detailed cell viability studies of Descemet Membrane Endothelial Keratoplasty (DMEK) grafts.

Materials & Methods

Nine human corneoscleral buttons unsuitable for transplantation were used. DMEK grafts were prepared as previously described, and kept in storage (Optisol, Bausch & Lomb) at 4°C for up to 24 h. Paraformaldehyde was used as fixating agent. Phalloidin (#P1951, Sigma) and WGA (#L4895, Sigma) were used to identify cell limits, DAPI (#D1306, Invitrogen) to label nucleus and propidium iodide (PI, #P4170, Sigma) to identify dead cells. Three different protocols were tested: (1) graft detachment, fixation and staining (n=3); (2) in situ fixation and staining, followed by graft detachment (n=3); (3) in situ staining and fixation, followed by detachment (n=3). Grafts were imaged with a confocal microscope (Zeiss LSM 710, Carl Zeiss).

Results

Staining attained with methods (1) and (3) was uniform and robust, allowing clear identification of cell morphology. When DMEK tissue was fixed and stained before being detached from the corneoscleral button, a lower proportion of cells were positive for PI, indicating that the effect of any manipulation-associated cell death can be minimized with fixation prior to manipulation. The staining obtained with method (2) was inconsistent and patchy, indicating that fixation is required prior to staining.

Conclusions

When performing IHC studies on DMEK graft tissue, in situ fixation and staining prior to graft detachment allows for the best results. Cell viability studies will enable us to validate storage protocols for DMEK tissue before use.

INFLUENCE OF DONOR FACTORS ON SUITABILITY OF RETRIEVED CORNEAS FOR TRANSPLANTATION.

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Purpose

To define factors influencing and predicting the unsuitability of corneal tissue for grafting.

Materials and Methods

Data from 2032 consecutive donor corneas retrieved from 2014 to 2016 at the Eye Bank of the Department of Ophthalmology of the University Medical Center in Mainz were analyzed retrospectively. Chi-squared test/Cramers V and Spearman´s correlation coefficient were used to assess the influence of: age, gender, lens status, cause of death and death to explanation interval (DEI) on the rate of the discarded donor corneas.

Results

902 (44.7%) retrieved corneas were not suitable for transplantation due to: endothelial cell density (ECD)<1500 mm² (51.6%); ECD<2000 mm² and/or corneal culture overdue (14.3%); positive serology (15.1%); contraindications in the medical history (7.1%); microbial contamination (5.2%); corneal morphology (5.1%) and damage during the DSAEK preparation (1.7%). Donor corneas from 36.2% of phakic and 58.1% of pseudophakic eyes were not suitable for transplantation ($p<0.0001$), 37.4% of donor corneas explanted in the first 24h; 44.6% explanted between 24h and 48h; and 62 % explanted between 48h and 72h had to be discarded ($p<0.0001$). Disqualification rate of corneas derived from male donors was higher compared to female donors ($p=0.006$). Age was negatively correlated to ECD ($r=-.271$). Death due to cardiovascular diseases, malignancy or sepsis did not influence the suitability of the donor corneas for transplantation ($p: 0.188, 0.303$ and 0.219 respectively).

Conclusions

Pseudophakia, increasing death to explanation interval, age and male sex decrease the quality of donor corneas. Cause of death seems to be irrelevant.

DEGRADATION OF ANTIBIOTIC AND ANTIMYCOTIC AGENTS IN ORGAN-CULTURE

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To ensure our quality standards, the possible degradation of antibiotic and antimycotic agents in organ-culture media for corneas was verified.

The routine corresponding medium preparations of one batch – 100 ml each – MEM, 2% fetal bovine serum, 2.5 ug/mL amphotericin B (AB), 100 U/mL penicillin G (PG), 0.1 ug/mL streptomycin (ST) were incubated under organ-culture conditions for 0, 1, 3, 4, 7, 14, 21 and 28 days at 31°C. After the individual incubation period samples of 5 mL were taken and stored frozen at -20°C. For measurement, samples were brought to room temperature and then diluted (1:10) with 0.5% formic acid. To detect the possible degradation Ultra Performance Liquid Chromatography (UPLC) was used offering an increase in resolution, speed and sensitivity in liquid chromatography.

Up to 28 days of incubation, the concentrations of ST and AB were stable compared to the reference from day 0. PG concentration did not decrease until day 7 of incubation, followed by a distinct reduction down to 22% and a further loss down to 18% compared to the reference.

Degradations of ST and AB were not detected during the entire incubation period. In our cornea bank 2797 corneas were tested for microbial contamination during organ-culture over a period of 5 years (2012 – 2016). 61 tests yielded positive (47 bacteria, 8 fungi, 6 suspected, not proven). Therefore it is proven that the residual concentrations of antibiotic and antimycotic agents are sufficient showing inhibition of bacterial growth in 98,1% of all cases and in 99,71% of fungal growth respectively. Thus, a change of the medium in a closed organ-culture up to 28 days is not required and quality standards are ensured.

THE INFLUENCE OF DIFFERENT DISPERSIVE AND COHESIVE OPHTHALMIC VISCOSURGICAL DEVICES (OVDs) ON THE ENDOTHELIUM DURING CATARACT SURGERY

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Purpose

To quantify the survival rate of endothelial cells and the amount of corneal endothelial surface coverage during cataract surgery with different dispersive and cohesive Ophthalmic Viscosurgical Devices (OVDs) from various manufacturers in a wet lab setup using porcine eyes.

Material & Methods

Freshly enucleated porcine eyes were prepared for imaging of the corneal endothelium using fluorescent stained OVDs. After performing two paracenteses the anterior chamber was filled with the pre-stained OVDs. After capsulorhexis the lens content was removed by phacoemulsification without bimanual irrigation/aspiration [I/A] and the capsular bag cleaned. After surgery, the cornea was cut and turned to reveal its posterior surface. By applying blue light (420 to 500 nm) and the area of fluorescing endothelium in relation to its total surface could be determined using planimetric image-analysis software (ImageJ).

Results

6 different OVDs in 2 groups have been used: dispersive HA or HPMC based OVDs (Healon EndoCoat [AMO], Viscoat [Alcon]; Methylvisc [Rayner]) and cohesive HA based OVDs (Healon GV, Healon [AMO]; ProVisc [Alcon]). The least endothelial coating was in the cohesive group while the dispersive group had statistically significant higher adherence to the endothelium. Also the survival rate of endothelial cells during cataract surgery varied significantly between the two groups.

Conclusions

The dispersive HA and HPMC based OVDs with a low molecular weight showed a greater adherence to the endothelial surface than the standard cohesive HA OVDs with a higher molecular weight leading to a better protection of the endothelium.

ALTERNATIVE USE FOR REJECTED DONOR CORNEAS – HOW TO REDUCE TISSUE WASTE AND IMPROVE OUTCOMES FOR OUR PATIENTS

Raquel Esteves Marques, Luís Abegão Pinto, Ana Miguel Quintas, Paulo Guerra, Walter Rodrigues

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Introduction

Donor corneas are frequently unsuitable for surgery due to several reasons - low endothelial cell density (ECD), aspects of endothelial dystrophy, epithelial and/or endothelial defects, among others. These corneas are set to biological waste, consuming resources often sparse.

Purpose

To describe an alternative use for donor corneas rejected for reasons other than infectious disease.

Setting

Ophthalmology department of a single tertiary care hospital. Donor corneas are harvested and stored in the internal EyeBank.

Materials & Methods

Retrospective analysis of donor corneas harvested from January 2016 until October 2017. Data extracted from the hospital's EyeBank database and clinical records from outpatient clinic. Corneas rejected for transplant were evaluated regarding the reason for rejection, and the corneas with alternative use assessed.

Results

Among the corneas harvested in the study period, 46 donor corneas were unsuitable for corneal graft. Main reason was endothelial disease (low ECD and endothelial dystrophy). Of these, 7 (15.2%) were still used - 6 rejected for endothelial disease, and 1 rejected for inadequate harvesting conditions with consequent structural tissue damage. These corneas were used in glaucoma filtering surgery, as an alternative for Tutopatch® in covering the drainage tube for prevention of tube erosions. Mean post-operative follow-up time was 5 months [range 1 to 11]. No postoperative graft or tube-related complications to mention.

Conclusions

Corneas unsuitable for keratoplasty may have paramount importance in the setting of glaucoma surgery, bettering outcomes and lowering biological waste.

INFLUENCE OF CORNEA DONORS' CAUSE OF DEATH ON TRANSPLANT CLINICAL OUTCOMES

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Purpose

Donor cornea supplies are often sparse for the rising demand, reinforcing the importance of broad donation criteria. This study aims to assess the effect of cornea donor's cause of death in endothelial counts and overall transplant success.

Materials & Methods

Retrospective study of donor corneas from a tertiary care hospital. Data screening and extraction were performed from the hospital's EyeBank database, specular microscopy (Konan®) and clinical records. All consecutive donor corneas were included. Causes of death were grouped in 5 categories: trauma, cardiorespiratory / cerebrovascular events (CR/CV), neoplastic, acute abdomen and other. Results of specular microscopy and rates of graft insuccess (failure or rejection) were compared between groups. Statistical analysis with SPSS software.

Results

144 donor corneas included, from 82 donors (37% females). Mean donor age was 52.5 years. Cause of death in descendent order: CR/CV 61 (41.8%), neoplastic 36 (24.7%), other 25 (17.4%), trauma 15 (10.3%), acute abdomen 9 (6.2%). Endothelial cell density (ECD) was lowest in trauma, and CR/CV patients (2500 and 2505cells/mm² respectively), even though these were younger (<50 years="" oncologic="" donors="" had="" almost="" 100cells="" mm="" sup="" >2 more than the above mentioned groups, and acute abdomen donors had more 174cells/mm² (p>0.05). Failure or rejection were less often with corneas from trauma origin, but no statistical differences were found (p>0.05).

Conclusions

Cause of death seems to affect donor corneas suitability. Cardio/cerebrovascular disease may impact endothelial health and surgical outcomes. Studies with higher sample powers are needed to confirm these trends.

DESCMET MEMBRANE ENDOTHELIAL KERATOPLASTY (DMEK) PREPARATION BY EYE BANK SPECIALISTS REDUCES THE WAITING LIST FOR KERATOPLASTY

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Purpose

To evaluate the increase in endothelial keratoplasties (EK) by using eye bank prepared Descemet Membrane Endothelial Keratoplasty (DMEK) grafts from donor corneas unsuitable for Penetrating (PK), Descemet Stripping Endothelial keratoplasty (DSAEK) or DMEK preparation by the surgeon.

Materials & Methods

Donor cornea selection criteria for eye bank and surgeon cut tissue were evaluated. The percentage of DMEK grafts that were transplanted from otherwise unused corneas prepared by the eye bank was evaluated for the last 2000 donor corneas designated for EK.

Results

Out of 2000 corneas designated for EK, 244 surgeries (12%) were performed using DMEK grafts prepared and distributed from corneas that were unsuitable for graft preparation by the surgeon.

Conclusion

The keratoplasty waiting list shortens by employing eye bank specialists for DMEK preparation of corneas unsuitable for sending to the surgeon for preparation.

THE EFFECT OF PRESERVATION-TO-UTILIZATION TIME INTERVAL ON TRANSPLANTATION OUTCOME

Sofia Sousa Mano, Raquel Esteves Marques, Ana Miguel Quintas, Paulo Guerra, Walter Rodrigues
(Hospital de Santa Maria)

Purpose

We aim to analyse how preservation-to-utilization time interval affects donor corneas quality and surgical outcomes.

Materials and Methods

Retrospective study of donor corneas from a single tertiary care hospital. Hospital's Eye Bank records were analysed, between the period of January of 2016 and September of 2017. We only included used corneas that had completed data available. Variables analysed included donor demographics (age, gender) and preservation-to-utilization time interval. We divided donor corneas in 3 groups according to the preservation-to-utilization time: less than 4 days; between 5 and 8 days; more than 8 days. Our primary outcome was the frequency of primary graft failure (PGF) and graft rejection (GR) in each of the groups. Statistical analysis were performed using SPSS software.

Results

We analysed 67 corneal tissues, that were retrieved from 44 donors (43,3% females) and used in cornea graft transplantation. The mean age of donors was 53 ± 13 years. In every cases the time from death-to-harvesting was less than 6 hours. Mean preservation-to-utilization time interval was 6 days (range 0-12 days). Only 3 patients (4,5%) had PGF and 6 patients (9%) had GR. There were more cases of graft rejection and graft failure in the group with a preservation-to-utilization time interval of more than 8 days, but these difference was not significant ($p > 0,05$).

Conclusions

No significant differences were found between donors with different preservation-to-utilization time interval. A greater sample size is required to test significance.

STATUS OF ORGAN/TISSUE DONATION AND TRANSPLANTATION IN BANGLADESH

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Introduction

Bangladesh has a population of around 1.6 billion and out of them about 20 million are suffering from kidney diseases and another half a million are suffering from corneal diseases. Although the culture of organ donation is not well established in the country. The current study aims to explore the situation of organ and tissue donation and transplantation in Bangladesh

Methods

Relevant documents from different government and non-government hospitals, Kidney and liver foundation of Bangladesh, national eye donation society, CHOKH, an NGO were reviewed. Further, the organ transplant law-1999 was also reviewed.

Results

Bangladesh does not have any study to estimate the actual prevalence of kidney disease and the need for organ grafting. The annual demand for the kidney transplant is estimated to be 5,000. However, on average only around 100 people can manage kidneys from their relatives to undergo a transplant. Bangladesh Organ Donation Law 1999 allows posthumous or brain-death kidney donation apart from living close relatives, but steps have never been taken to introduce such donation. Among the relatives, only brothers, sisters, father, mother, maternal and paternal uncles and aunts can donate kidneys under the 1999 law.

Conclusion

Bangladesh has experienced a remarkable improvement in terms of cornea transplantation and record system. Programs related to awareness building on organ donation, working with religious leaders, enforcement of law against illegal organ trafficking, improving coordination among organ institutes, support from the major stakeholders including the government can help to develop the organ donation in the country.

CORNEAL VISUAL REHABILITATION WITH DSAEK IN PATIENTS WITH PHAKIC IOL RELATED ENDOTHELIAL DECOMPENSATION: CLINICAL OUTCOMES

Sara Crisostomo, Diogo Hipolito Fernandes, Nuno Alves, Joao Feijao, Vitor Maduro, Pedro Candelaria
(Serviço de Oftalmologia - CHLC)

Introduction

Anterior chamber phakic IOLs to correct high ametropias are associated with endothelial cell loss. Studies showed that when the safety criteria are not accomplished the endothelial cell loss is faster and more abrupt.

Purpose

To evaluate the clinical outcomes of phakic intraocular lens (phakic IOL) explantation, phacoemulsification, posterior chamber intraocular lens (PCIOL) implantation followed by Descemet stripping automated endothelial keratoplasty (DSAEK) performed for phakic IOL-related endothelial decompensation

Setting: Ophthalmology Department- Centro Hospitalar de Lisboa-Zona Central

Material and Methods

Retrospective case series of 16 eyes all submitted to AC IOL explantation followed by phacoemulsification plus pCIOL plus DSAEK. The outcome variables best corrected visual acuity, spherical equivalent, endothelial cell count and postoperative complications.

Results

16 eyes of 8 patients with a mean age of 50.2 ± 9.2 years old. The main type of AC IOL explantation was ICARE. After the surgical procedure the mean BCVA improved (before surgery 20/100 vs after surgery 20/30). After surgery the mean spherical equivalent was -3.1 ± 1.4 D and the mean endothelial cell count was 1880 ± 212 cells/mm².

Conclusions

Phakic AC IOL specially angle support are associated with serious endothelial cell depletion and DSAEK or DMEK are excellent procedure to restore visual acuity with efficacy and safety.

THE EFFECT OF ARTERIAL HYPERTENSION ON DONOR CORNEAS ENDOTHELIAL CHARACTERISTICS

Sofia Sousa Mano, Raquel Esteves Marques, Ana Miguel Quintas, Paulo Guerra, Walter Rodrigues
(Hospital de Santa Maria)

Purpose

We aim to compare the endothelial characteristics of donor corneas from hypertensive versus non-hypertensive patients.

Materials and Methods

Retrospective study of donor corneas from a single tertiary care hospital. Hospital's Eye Bank records were analysed, between the period of January of 2016 and September of 2017, as well as each donor eye specular microscopy (Konan®). All consecutive donor corneas with completed data available were included. Donors were divided in two groups (hypertensive and non-hypertensive), and specular microscopy data were compared. Variables analysed included endothelial cell density (ECD), coefficient of variation (CV), percentage of hexagonal cells (HEX) and average cell area (AVE). Statistical analysis were performed using SPSS software.

Results

81 corneas were included in the analysis, from 50 donors (42% females). Mean donor age was $55,54 \pm 11,676$ years. From the included sample, 40 patients were hypertensive (49,4%). Mean ECD in hypertensive patients was $2527,54 \pm 354,04$ cells/mm², versus $2527,09 \pm 358,23$ cells/mm² in non-hypertensive patients ($p>0.05$). Mean CV was $33,19 \pm 8,478$ in hypertensive patients versus $29,89 \pm 9,89$ in non-hypertensive ($p>0.05$). The mean percentage of HEX was $50,05 \pm 16,97\%$ in hypertensive versus and $51,51 \pm 16,66\%$ in non-hypertensive ($p>0.05$). Hypertensive donors had an AVE of $403,51 \pm 58,46$ m² versus $404,20 \pm 62,51$ m² in non-hypertensive donors ($p>0.05$).

Conclusions

No significant endothelial differences were found between donors.



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