GETTING STARTED WITH DMEK

DISCLOSURES — JAMES LEHMANN, MD

▸ Private Practice, Focal Point Vision
▸ Associate Instructor, University of Texas Health San Antonio
▸ Cataract / Cornea / Refractive
  ▸ 95 Grafts last year
  ▸ 60% DMEK, 15% DSEK, 25% PK/DALK
▸ No relevant financial disclosures...

San Antonio, Texas
Work Overseas

- Jerusalem
- Peru
- India
GETTING STARTED WITH DMEK

DMEK – DESCEMET’S MEMBRANE ENDOTHELIAL KERATOPLASTY

- Background
- Patient Selection
- Preoperative Evaluation
- Tissue Preparation
- Instrumentation
- Patient and Theater Prep
- Recipient Eye Preparation
- Donor Cornea Loading
- DMEK Steps
- Post op Care
GETTING STARTED WITH DMEK

HOW MANY DMEKS HAVE YOU PERFORMED?

A. None
B. 1-20
C. 21-50
D. 51-200
E. 201+
GETTING STARTED WITH DMEK

QUESTION 2: I HAVE EASY ACCESS TO PREPARED/STAMPED DMEK TISSUE

A. Yes

B. No
QUESTION 3: WHICH OF THE FOLLOWING IS A CONTRAINDICATION TO DMEK?

A. Ahmed Tube
B. Aphakia
C. Poor View
D. Iris Defect
E. Peripheral Anterior Synechiae
GETTING STARTED

QUESTION 4: A CORNEA PRESERVED IN OPTISOL CAN BE PRESERVED FOR..

A. 5 days
B. 10 days
C. 14 days
D. 18 days
GETTING STARTED WITH DMEK

QUESTION 5: IN DMEK / PHACO, WHAT SHOULD BE REFRACTIVE TARGET FOR PLANO RESULT?

A. -2.00
B. -1.00
C. Plano
D. +1.00
E. +2.00
BACKGROUND
DONOR SELECTION
PREOPERATIVE EVALUATION
TISSUE PREPARATION
INSTRUMENTATION
KERATOPLASTY IN THE 1960S
ONE SIZE FITS ALL UNTIL...
GETTING STARTED WITH DMEK — BACKGROUND

HISTORY OF ENDOTHELIAL KERATOPLASTY

- 1998 – Melles
  - PLK (1st Air bubble)
- 1999 – Terry
  - DLEK (technically difficult)
- 2004 – Price and Gorovoy
  - DSAEK (Microkeratome)
- 2007 – Melles
  - DMEK
GETTING STARTED WITH DMEK — BACKGROUND

DMEK IS PRECISE ANATOMIC REPLACEMENT

- Better Va
- Less Refractive Shift
- Learning Curve
- Limited Candidates?
  - Fuchs
  - PBK
  - Normal Anterior Anatomy
GETTING STARTED WITH DMEK — BACKGROUND

CORNEAS PROVIDED BY US EYE BANKS
US ENDOTHELIAL KERATOPLASTY NUMBERS

Table 4: Domestic Endothelial Keratoplasty Numbers
Annual Comparison 2012 – 2016

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</thead>
<tbody>
<tr>
<td>Total Endothelial Keratoplasty Procedures</td>
<td>28,327</td>
<td>27,208</td>
<td>25,965</td>
<td>24,987</td>
<td>23,049</td>
</tr>
<tr>
<td>DSEK, DSAEK, DLEK Procedures</td>
<td>21,868</td>
<td>22,514</td>
<td>23,100</td>
<td>23,465</td>
<td>22,301</td>
</tr>
<tr>
<td>DMEK or DMAEK Procedures</td>
<td>6,459</td>
<td>4,694</td>
<td>2,865</td>
<td>1,522</td>
<td>748</td>
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23% 3%
GETTING STARTED WITH DMEK — BACKGROUND

DMEK ON THE RISE...

Figure 3: Domestic DMEK Trends

2011-2016 Domestic DMEK Trend - U.S. Eye Banks
DONOR CORNEA SELECTION

- Penetrating Keratoplasty
- DSEK
- DMEK
  - Age up to 65
  - D to P 15/20
  - Cell Count 2500+
  - Days to Surgery < 10

Tissue Detail Form

- Donor ID#: NE1702-057
- Tissue ID#: NE1702-087 LCN
- Tissue Type: Cornea
- Date-Time of Death: 2017-02-06 21:30 EST
- Date-Time of In Situ: 2017-02-06 01:38 EST
- Date-Time of Preservation: 2017-02-06 01:38 EST
- Ocular Cooling: R/A
- Total Cooling: No Cooling Start time

THIS DONOR IS APPROVED FOR

- Research: No
- Education: No
- International: No

MEDICAL SUMMARY

- Recent Hx: FL was found down, transported to the ER with full ACLS protocol and pronounced.
- Medical/Surgical Hx: RTX, RTX, Rind Cmc in leg, Rogers Serious 3rd acci, FTH, Abuse
- Previously on Vent: Yes
- Amount of Time on Vent: 2 days

CORNEA EVALUATION

- Approved Sources: RK, ALK, Gauscama shunt patch or other non-keratoplasty use
- Clear Zone (mm): R: 5
- Lens Type: Phakic
- Cell Count (per mm2): 1713
- IOP: 17
- Epithelium: MILD HAZE; MILD DIFUSE FUSORF
- Stroma: CLEAR AND COMPACT; MILD ARCUS
- Descemets: NO FOLDS; NO DEFECTS NOTED
- Endothelial: FEA DIFUSE STRESS """"
- Additional: REGULAR SERRAL RIM; SERRAL RIM 2MM OR GREATER CIRCUMFERENTIALLY
- Comments: ------
- Specular Data-Time: 2017-02-06 12:41 EST
- Specular Tech: Margaret Reynolds
- No Specular Microscopy Image

KeraLink New England

NE17/22-097 LCN
Cornea

Tissue Type

Donor Age: 04 Y
Donor Gender: Male
Donor Race: Hispanic
Primary OD: IC / IC M
Preservation Tech: Tanya Popus
Preservation Tech: Tanya Popus
Storage Media: HTLS60-63
Media Lot#: 1061-008
LANDMARK STUDIES

- Cornea Donor Study
  - Donor Age
    - 1000+ patients
    - Not sig diff unless 70+
  - Corneal Preservation Time Study
    - 0-7 days vs. 8-14 days
    - No diff unless 12-14 days
    - And overall success 90%
DONOR CORNEA SELECTION IN DMEK IS DIFFERENT

- Age Range (45-65)
- No Diabetes...Increased risk of harvesting problems...
- No Pseudophakes
- No Good Data
GETTING STARTED WITH DMEK — PREOPERATIVE EVALUATION

PRE OPERATIVE PLANNING

- Anesthesia
- Patient Ability to Cooperate/Position
- Anatomy of Anterior Segment / Lens Management
- DSEK or DMEK?
- Other questions
ANESTHESIA FOR DMEK

- Goals
  - Anesthesia
  - Akinesia

- Types
  - Local
  - General
PATIENT ABILITY TO COOPERATE / COMPLIANCE

- Laying Flat Night of Surgery
- Ability to Undergo Re-bubble in Office under Topical Anesthesia
GETTING STARTED WITH DMEK — PREOPERATIVE EVALUATION

ANTERIOR SEGMENT ANATOMY

- Who is the best candidate?
  - Fuch’s or PBK
  - No ACIOL
  - No Iris Damage
  - Minimal Stromal Scarring
  - Stable PCIOL or combined case
Fuchs' Dystrophy
GETTING STARTED WITH DMEK — PREOPERATIVE

OTHER SITUATIONS MORE AMENABLE TO DSEK OR PK
LENSES MANAGEMENT

- Cataract
  - Tough View
- Pseudophakic
- Switch to DSEK
  - ACIOL
  - Sutured PCIOL
- Aphakic
  - DSEK or PK
LENS MANAGEMENT IOL CALCULATIONS

- Hyperopic Shift
  - Aim for -0.5 to -1.00
- Change in Axis of Astigmatism
  - More Against-the-rule Astigmatism
- Difficulties with Toric and Multifocal IOL
GETTING STARTED WITH DMEK — PREOPERATIVE EVALUATION

PRE-OP QUESTION — DMEK OR DSEK?

- Surgeon Dependent – Both Good
- Contraindication to DMEK is ACIOL
- Social considerations, possibly more rebubbling with DMEK
- Better vision, faster recovery, less refractive shift with DMEK
- Tissue Prep Familiarity
FAILED PK

- Possibly DMEK!
- Historically DSEK or PK
  - Historical Best Va
  - Specs / CTL / RGP
GETTING STARTED WITH DMEK — PREOPERATIVE EVALUATION

GLAUCOMA SURGERY AND PSEUDOPHAKIC BULLOUS

- DMEK AN OPTION!!!
- Harder cases, need experience...
- Assess iris / anterior segment
- DSEK may be easier
- Visual Potential?
GETTING STARTED WITH DMEK — PREOPERATIVE EVALUATION

SUMMARY OF PREOPERATIVE PLANNING — DMEK CHECKLIST?

- Anesthesia – Peribulbar
- Pt must be able to lie flat / undergo rebubble
- Fuch’s Dystrophy +/- Cataract
- At first avoid eyes complex anterior segment pathology
- Perform Peripheral Iridotomy with YAG 1 week pre op (if view good enough)
GETTING STARTED WITH DMEK — TISSUE PREP

EVOLUTION OF TISSUE PREPARATION

- Surgeon Preparation
  - Time
  - Cost
  - Risk of Damage to Tissue
- Eye Bank Preparation
  - S Mark
GETTING STARTED WITH DMEK — TISSUE PREP
In USA, better to get it from eye bank, already prepped!
  - Less financial risk to surgeon
  - Less OR time
Ensure eye bank has track record
  - Ask # of cases/primary failures
  - Now coming pre-stained.loaded
INSTRUMENTATION FOR TISSUE PREPARATION

- “Micro finger” by Moria (20022)
- Tying Forceps
- Vanas Scissors
- .5 Toothed Forceps
- Bechert Horizontal Y Hook
HALF-TIME...
QUESTIONS?
PATIENT AND THEATER PREP

RECIPIENT EYE PREPARATION

DONOR CORNEA LOADING

DMEK STEPS

POST OPERATIVE CARE
PATIENT PREPARATION

- Inferior Peripheral Iridotomy
- IOL Calculations
  - 1 piece Acrylic
  - Aim for -.75
- White-to-white
- Peri/Retrobulbar Anesthesia
GETTING STARTED WITH DMEK — PATIENT AND OR PREP

MAIN INSTRUMENTATION

- Cataract Set
- Plus
  - Reverse Sinskey
  - Blunt 8 mm Trephine
  - 10 cc syringe c BSS
  - TB syringe c 30g needle
- Cohesive Viscoelastic
GETTING STARTED WITH DMEK — PATIENT AND OR PREP

CRITICAL INSTRUMENT — HAND HELD SLIT LAMP

- EIDOLON 510L
GETTING STARTED WITH DMEK — PATIENT AND OR PREP

INSTRUMENTATION FOR DONOR LOADING

- On Back Table
  - Petri Dish
  - BSS
  - Sterile Cornea Viewing Chamber
  - Trypan Blue
GETTING STARTED WITH DMEK — PATIENT AND OR PREP

INSTRUMENTATION FOR DONOR LOADING

- Bausch and Lomb
  - **VIS100** Injector
- Made by Medicel AG
- Two Sizes, prefer...
  - **2.8 mm incision**
- Remove the Spring!
PATIENT AND THEATER PREP
RECIPIENT EYE PREPARATION
DONOR CORNEA LOADING
DMEK STEPS
POST OPERATIVE CARE
GETTING STARTED WITH DMEK — RECIPIENT EYE PREP

RECIPIENT EYE PREPARATION SURGICAL STEPS

- Traction Sutures
- Mark the Cornea
- Incisions
  - Paracenteses
  - 3.2 mm Main Incision
- Viscoelastic
- Stripping of Descemet’s/Endo
- I/A - Irrigation/Aspiration
GETTING STARTED WITH DMEK — RECIPIENT EYE PREP

RECIPIENT PREPARATION — TRACTION SUTURES
GETTING STARTED WITH DMEK — RECIPIENT EYE PREP

RECIPIENT PREPARATION — MARKING THE CORNEA
GETTING STARTED WITH DMEK — RECIPIENT EYE PREP

RECIPIENT PREPARATION — INCISIONS
RECIPIENT PREPARATION — STRIPPING OF DESCEMET'S/ENDO
GETTING STARTED WITH DMEK — RECIPIENT EYE PREP

RECIPIENT PREPARATION — STRIPPING OF DESCEMET'S/ENDO
PATIENT AND THEATER PREP
RECIPIENT EYE PREPARATION
DONOR CORNEA LOADING
DMEK STEPS
POST OPERATIVE CARE
DONOR CORNEA LOADING

- Peel the Prepared Graft
  - Only central 3mm attached
  - 8 mm punch
- Stain with Trypan Blue
- Load into the Viscoject Injector
  - Petri Dish
GETTING STARTED WITH DMEK — DONOR CORNEA

DONOR CORNEA LOADING
PATIENT AND THEATER PREP
RECIPIENT EYE PREPARATION
DONOR CORNEA LOADING
DMEK STEPS
POST OPERATIVE CARE
GETTING STARTED WITH DMEK — SURGERY STEPS

DMEK INTRAOPERATIVE STEPS

- INJECT and SUTURE
- DANCE
- BIG BUBBLE
INJECTION
GETTING STARTED WITH DMEK — SURGERY STEPS

INJECTION
GETTING STARTED WITH DMEK — SURGERY STEPS

THE DMEK DANCE — UNROLL, CONFIRM ORIENTATION, UNFOLD, CENTER

» FOUR essential “Moves”

» FLIP
» UNROLL
» UNFOLD
» CENTER
GETTING STARTED WITH DMEK — SURGERY STEPS

THE DMEK DANCE, FLIP: INJECT BSS UNDER GRAFT
GETTING STARTED WITH DMEK — SURGERY STEPS

THE DMEK DANCE, UNROLL: TAP OR RELEASE FLUID
GETTING STARTED WITH DMEK — SURGERY STEPS

THE DMEK DANCE, UNROLL: TAP OR RELEASE FLUID
CONFIRMATION OF ORIENTATION — TRICORN HAT
CONFIRM ORIENTATION — NO “S” NEEDED
CONFIRMATION OF ORIENTATION — TRICORN HAT
CONFIRM ORIENTATION — NO “S” NEEDED
GETTING STARTED WITH DMEK — SURGERY STEPS

SMALL AIR
GETTING STARTED WITH DMEK — SURGERY STEPS

**THEN UNFOLD GRAFT...**

- “Point Lock” Fold
  - Tap fold
- “Rolled” fold
  - Use Traction Sutures to rotate globe
  - Bubble goes “uphill”
- Trapped in the angle...
  - Have to restart
GETTING STARTED WITH DMEK — SURGERY STEPS

UNFOLD — ROLLED FOLD
GETTING STARTED WITH DMEK — SURGERY STEPS

UNFOLD — POINT LOCK FOLD
GETTING STARTED WITH DMEK — SURGERY STEPS

GOLF SWINGS = CENTRATION

▸ Rotate Eye so Graft goes “Downhill”

▸ Broad, Soft Strokes

▸ Eye not too firm
GETTING STARTED WITH DMEK — SURGERY STEPS

THE DMEK DANCE, CENTERING
GETTING STARTED WITH DMEK — SURGERY STEPS

UNFOLD A ROLLED FOLD AND CENTER
THEN FULL AIR BUBBLE, EYE FIRM, BUT NOT TOO FIRM
THEN PATIENT LIES FLAT FOR 45 MINUTES IN POST OP AREA...
GETTING STARTED WITH DMEK — SURGERY STEPS

BACK TO OPERATING ROOM TO REMOVE AIR

- 3 cc syringe with 30 gauge needles
  - Inject BSS
  - Remove Bubble To Clear Inferior Paracentesis
- Bandage Lens if Epithelial Defect Present
- Patch and Shield
- See Next Morning
GETTING STARTED WITH DMEK — FULL SURGERY

DMEK / Phaco
James Lehmann, MD
PATIENT AND THEATER PREP
RECIPIENT EYE PREPARATION
DONOR CORNEA LOADING
DMEK STEPS
POST OPERATIVE CARE
IMMEDIATE POST OPERATIVE CARE

- See on Post Op Days 1, 3, 7
- Use OCT to confirm graft position

Day 1
- Vision Poor b/c of Bubble
- Generally no rebubble

Day 3
- Time to Rebubble
TYPICAL REBUBBLE SCENARIO — POST OP DAY 1

Shallow Peripheral Detachment, Position More...
GETTING STARTED WITH DMEK — POST OP CARE

TYPICAL REBUBBLE SCENARIO — POST OP DAY 3

Detachment Bigger, Attached Centrally, Rebubble!
GETTING STARTED WITH DMEK — POST OP CARE

TYPICAL REBUBBLE SCENARIO — POST OP DAY 7

All Good!
MORE ABOUT REBUBBLING

- I do in office, but may be easier in OR
- Sterile Prep
- 30 g needle on TB or 3 cc syringe
- Remove Aqueous, CAREFULLY
- Full Bubble, Lie Flat 40 min, Remove Air
- DON’T GIVE UP
GETTING STARTED WITH DMEK — POST OP CARE

VARIOUS OTHER OCT FINDINGS...
LONG TERM POST OPERATIVE CARE

- Taper Steroid
  - Eventually to steroid every other day for life
- Refractive Shift / Stability
  - Mild Hyperopic shift
  - Mild increase in ATR cyl (+)
- Other eye in 1 Month
ENDING QUESTIONS
WHICH OF THE FOLLOWING IS A CONTRAINICATION TO DMEK?

A. Ahmed Tube

B. Aphakia

C. Poor View

D. Iris Defect

E. Peripheral Anterior Synechiae
A CORNEA PRESERVED IN OPTISOL CAN BE PRESERVED FOR..

A. 5 days
B. 10 days
C. 14 days
D. 18 days
GETTING STARTED WITH DMEK

IN DMEK / PHACO, WHAT SHOULD BE REFRACTIVE TARGET FOR PLANO RESULT?

A. -2.00
B. -1.00
C. Plano
D. +1.00
E. +2.00
THANK YOU!
QUESTIONS?

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