EK: Complications and Controversies

Michael J. Taravella, MD
Director: Cornea and Refractive Surgery
University of Colorado

Why DMEK?
• Quicker visual recovery
• Lower rejection rate
  – Less stroma?
• Potential for better BCVA
  – Interface
  – HOA

Why not DMEK?
• Steep learning curve
• High rate of damage to endothelium and loss of graft in preparation during learning curve
  – Up to 8-10% loss (learning curve)
• High re-bubble rate
• If totally detached; unlike DSAEK; cannot re-bubble

Why Now?
• Many eye banks are beginning to offer pre-prepared tissue (just like DSAEK)
• Eliminates one learning curve and source of loss of graft/tissue

Which EK?
• If complex; choose DSAEK
  – AC IOL
  – One chamber eye
  – Previous vitrectomy
  – Tube shunt present
  – Previous PKP (failure or rejection)

EK: Aberrometry
• Corneal higher-order aberrations after Descemet’s Membrane Endothelial Keratoplasty
  – Rudolph: Ophthalmolgy 119; 3: 528-534
  – DMEK: LESS HOA than DSAEK
  • More SA in DSAEK group
  • Both better than PKP
Case Selection: DMEK

- Pseudophakic Bullous Keratopathy
  - May need larger graft**
- Fuch’s dystrophy
- Combined procedure (Cataract/EK)
  - SMALLER CAPSULORHEXIS
  - MIOSTAT PRIOR TO INSERTION OF GRAFT

Should you block?

- Pros
  - Anesthesia/Akinesia
  - Consider Sub-tenon’s
- Cons
  - Cannot monitor LP during air fill
  - Consider Topical
    - Proparacaine 1% on surface, Xylocaine gel after prep
    - Intracameral 1% lidocaine
    - 2 or 4% lidocaine on surface
    - Traction sutures to hold eye in place

When should you perform a PI?

- Always!
- Especially DMEK
  - Inferior as possible (6 o’clock)
  - Avoid bleeding
  - FUGO BLADE
    - Use Viscoelastic
    - Plasma blade
    - Controlled size and location
      - Small size avoids diplopia

Which gas?

- Air Ok for DSAEK
  - 32 gauge retina needle; small gauge avoids back leakage
  - 90-95% bubble if tube present; if one chamber eye
    - Consider posterior infusion technique for one chamber eye
    - Keeps bubble in AC
    - Can check IOP to keep physiologic pressure
      - tonopen on the table for glaucoma patients
- SF6
  - Use for DMEK
  - 95% bubble
    - Check patient at end of procedure (Light perception)
    - Check at Slit lamp one hour post procedure
    - Fluid should cover PI
  - Isoexpansive mixture
    - 20% Air/SF6 mixture
  - Decreases re-bubble rate

Methods of insertion: DSAEK (Ultrathin tissue < 100 microns)

- Insert over a Sheet’s glide
- Busin Glide
- Tan (Angiotech) Endoglide
  - Probably not Forceps for ultrathin tissue
**SHEETS GLIDE**
- ADVANTAGES: Easy to insert
- Easy to Deploy
- Must have incision about 5 to 5.5 mm
- ?Endothelial Trauma?
  - About 12% loss from insertion

**SIZE OF DONOR**
- Considerations:
  - Larger donors = more endothelial cells
  - Smaller donor disc = easier to deploy
- Guidelines
  - W-W minus 3
  - DSAEK: 8.0-8.25
  - DMEK: 8.0-8.25
  - ** if PBK consider larger graft (up to 9.0)

**DSAEK/DMEK complications (Depth, Deployment, Dislocation)**
- Failure to Insert properly
- Failure to Deploy
  - Soft eye, AC depth
- Insert Upside Down
- Dislocation

**Hyperacute rejection**

**Inadequate AC depth**

**Insert Upside Down (DSAEK)?**
Inverted Graft

- S on stromal surface
- 60/40 fold (prevention)
- STEPS to Re-invert
  1. Leave graft in eye
  2. Leave air lying above graft
  3. Bent needle on air to catch edge of graft
  4. Pull needle back, graft will flip over around air bubble
  5. Inject air through needle to re-deploy

Insert Upside Down (DMEK)?

- Confirm double scroll configuration on insertion
- Gentle irrigation maneuvers to flip
- “S” stamp?
  - Helpful once deployed
  - Confusing if on part of graft that is curled

Bubble management

- For any EK
  - Make sure bubble is UNDER THE GRAFT
  - Cannula or needle against iris
  - Inflate slowly and monitor graft position
  - 32 Gauge retina needle helpful in preventing “back leak” of air
  - Full (90-95%) fill for 1 chamber eye, tube shunt, and DMEK
    - Monitor LP and IOP (tonopen) for glaucoma patients

Lens management

- AC IOL?
  - Must decide if stable or requires replacement
  - Advantage: less OR time if you can leave in place
  - Disadvantage: less space for deployment, risk traumatic insertion and IOL touch
  - If very large PI; may need to suture to make PI smaller and prevent air from going behind iris

Insertion over an AC IOL
Advanced technique

- Consider removal of AC IOL
- Replace with Glued IOL
  - Requires more OR time
  - Scleral flaps
  - IOL helps to separate AC from PC
  - Less traumatic insertion of donor
- Consider Posterior placement of infusion
  - Helps prevent air from going posterior

DSAEK and Glued IOL technique

Dislocation

- Diagnosis: Slit lamp exam, Visante OCT
  - DSAEK: if partially attached (>75%) will attach eventually
  - DMEK: if partially attached; will NOT eventually reattach

Timing to re-bubble

- DSAEK: not urgent; easier if graft partially attached
- DMEK: as soon as possible
- Technique
  - Minor OR: prep eye and lids
  - Lid speculum
  - 32 gauge needle
  - At slit lamp?

Re-bubble: How many times?

- Primary graft failure?
  - Traumatic insertion?
  - Endothelial viability?
- 3 strikes your out
  - 1 or 2 times if endothelial viability questioned

Donor Issues

- Inspect Donor
- Review Donor Information Sheet
  - How large is stromal bed?
    - Determines maximum trephine size
  - Irregular cut?
    - Usually noted on prep sheet from eye bank
Rejection in DSAEK/DMEK

- DSAEK: incidence uncertain (<12%) @ 2 years
- DMEK: < 1% (Price, et al) @ 2 years
- Rejection in DSAEK/DMEK
  - Less inflammation and AC reaction
  - Unexplained corneal edema with minimal KP
  - Harder to recognize
- Long term steroid use for DMEK/DSAEK?
  - Consider FML BID
  - Restasis?

Topical Steroids in EK

- Long term steroid use for DMEK/DSAEK?
- Prednisolone Acetate 1% Taper over 3 months
- Lotemax: if steroid responder
  - Consider FML BID
  - Restasis?

Contact Information

- Michael.Taravella@ucdenver.edu