Ultrathin DSAEK

Massimo Busin, MD
Jacqueline Beltz, FRANZCO
Amit Patel, FRCOphth
Silvana Madi, MD
Paolo Santorum, MD

27-401 ASCRS 2014
Sunday 27 April 15:00 – 16:30
Ultrathin DSAEK

M. Busin; J. Beltz; S. Madi; A. Patel; P. Santorum

Instruction Course ASCRS 27 April 2014 15:00 - 1630

Introduction

Now that DSAEK has gained popularity, we strive towards faster and better visual results. Since a report by Neff and Holland presented at ESCRS in 2009 (Neff et al Cornea 2011 Apr;30(4):388-91) evidence has increased to suggest that thinner tissue is compatible with better visual outcome following EK. For this reason, some surgeons prefer to perform DMEK for patients with endothelial failure, and this has been shown to yield excellent visual results. DMEK however is technically challenging, and may result in higher tissue loss, detachment rate, and graft failure. The feasibility of DMEK is also limited in eyes with more complex pathology and this renders DMEK inadvisable for many patients.

We developed Ultrathin DSAEK in order to prospectively evaluate the outcomes of DSAEK surgery performed with thin tissue, and the results have been published (Busin et al Ophthalmology 2013;120:1186-1194). With Ultrathin DSAEK (UT-DSAEK), we aim to achieve the visual results of DMEK, whilst maintaining the surgical ease of DSAEK.

Indications

UT-DSAEK is indicated for any form of endothelial failure, but may be more appropriate than DMEK in the following situations:

- Phakic eyes
- Aphakic/aniridic eyes
- Eyes with ACIOls
- After filtering glaucoma procedures
- In long standing/severe corneal edema

Relative Contraindications

- Eyes with poor visual potential, that may achieve adequate results with regular DSAEK
- Eyes with very poor visibility, requiring a fixation suture
- Post –PK eyes, in which full thickness relaxing incisions are planned for the future

Methods and instructions

Tissue Preparation

1. Debunking Step
   a. Tissue mounted on artificial anterior chamber
   b. Bottle height 120cm above tissue
   c. Thickness of tissue measured
   d. System closed, clamp at 50 cm, fluid advanced
   e. Approx. 2/3 of anterior stroma removed, using 300 μm cutting head passed for 4 seconds
   f. Removed lamellar retained for subsequent case
   g. Thickness of residual stromal bed measured

2. Refinement Step (Further removal of anterior stroma)
a. Tissue remains mounted on artificial anterior chamber
b. Rotate the top of the chamber, or the tissue 180 degrees
c. Choose cutting head based on pachymetry reading, according to Busin Nomogram

BUSIN NOMOGRAM

< 180, No Second Cut !!!

> 180 but < 210, 90 Head

> 210 but < 230, 110 Head

> 230, 130 Head

d. Bottle height remains same
e. Close system by advancing plunger, placed at 50cm
f. Advance the cutting head, slowly and smoothly for 4-6 seconds

3. Alternative method of tissue preparation (Non-Dehydrated tissue)
   a. Organ Cultured corneas may be prepared with omission of the “thinning media” step
   b. This provides a hydrated cornea of approx. 1000 μm, with potential to create a tissue that is thick enough to be easy to work with, but thins down post-op to be indistinguishable from UT tissue
   c. Note the cutting heads cut a significant amount more than expected on this tissue
   d. Debulk with 300μm head

4. Marking Stromal side
   a. Using trypan blue, mark circumference of cut
   b. Mark ‘F’ on anterior surface

5. Remove the tissue
   a. Bend tubing and open plunger (to prevent collapse, and endothelial damage)
   b. Remove tissue from front

6. Punching tissue to desired diameter
   a. Approximately 2mm less than vertical corneal diameter
   b. Usually 8.5 – 9mm
   c. To prevent incomplete punch, pull rim upwards and rotate, prior to removing trephine

7. Using blunt cannula or ‘scorer’ at 12 o’clock, or ‘stripper’ via a temporal paracentesis, mobilise endothelium and DM, and place near nasal limbus

8. Create steep, short clear corneal wound nasally (3.2mm) and temporally (1mm)

9. Remove stripped DM and endothelium using forceps

10. Enlarge superior wound to 1mm

11. Insert AC maintainer at 12 o’clock, with bottle 50 cm above eye

12. Create inferior iridotomy (vitreoretinal scissors)

13. Mount tissue onto glide
   a. Difficult to lift thin tissue
b. Using a mini glide, modified to ‘scoop’ the tissue, place the tissue on the glide
c. Very thin tissue will drape over the edge of glide
 d. Center the tissue on glide, and advance to the tip

14. Insert tissue
   a. Have AC maintainer on
   b. Advance forceps through the temporal wound, across eye, and out of the nasal wound
   c. Grasp tissue
d. Oppose glide to wound
e. Draw tissue into the eye
f. Allow tissue to open
g. Remove AC maintainer
h. Care with removal of forceps

15. Center tissue
   a. Ballot cornea from surface

16. Inject air beneath tissue
17. Suture all wounds, air tight with 10-0 Nylon
18. Take a 30 G needle, via a long, peripheral tunnel, inject air beneath donor tissue, taking care to be in front of the iris, until complete fill is achieved

19. Orbital floor steroid and antibiotic

Post-operative management

1. Posture supine for 2 hours
2. Assess patient at slit lamp
   a. Remove some air if air level fails to lie above level of iridotomy
3. Commence topical steroid and antibiotic
   a. 2 hourly for 2 weeks
   b. 3 hourly for 2 weeks
   c. 4 x a day for 2 weeks
d. 3 x a day for 1 month
e. 2 x a day for 1 month
f. 1 x a day, for life, unless phakic/steroid responder

4. Review
   a. Day 1
   b. Day 2
   c. Week 1
d. Month 1
e. 3 monthly

FIGURE 1 Photographic representation of tissue preparation for UT-DSAEK. Left) First, debulking cut with 300µm cutting head. Right) Second, refinement cut, with 110 µm cutting head from opposite direction.
Results

Ultrathin Descemet’s Stripping Automated Endothelial Keratoplasty with the Microkeratome Double-Pass Technique.

Massimo Busin, MD, Silvana Madi, MD, Paolo Santorum, MD, Vincenzo Scorcia, MD, Jacqueline Beltz, FRANZCO

(Busin et al Ophthalmology 2013;120:1186-1194)