Deep lamellar endothelial keratoplasty provides a reasonable alternative to penetrating keratoplasty

Dr Terry performed all of the procedures. The protocol began with the original DLEK technique, which involved making a 9.0 mm incision in the sclera. Part way through the study, Dr Terry switched to a smaller 5.0 mm incision because of improvements in instrumentation and technique. Both techniques were originally developed by Gerrit Melles in The Netherlands.

Several surgical complications occurred. First, there were problems with the deep stromal dissection in two eyes that necessitated a conversion from DLEK to PK during the procedure. Converting from DLEK to PK did not cause any problems, and both patients had the expected results from PK.

Second, the disc was found to be dislocated from the recipient bed the day after surgery in four eyes. Dr Terry was able to successfully reposition all of the dislocated discs with air bubbles, and the discs recovered function.

Corneas clear at six months

A total of 98 eyes underwent the DLEK procedure. After six months of follow-up, all of the corneas were clear and the grafts had healed in a good position.

The average best spectacle-corrected visual acuity was 20/46, with a range of 20/20 to 20/400. This average is similar to the results expected with PK for people with Fuchs’ dystrophy – approximately 20/40 to 20/50. In addition, nearly half the patients in this study had vision of 20/40 or better. This is similar to the results reported with PK surgery, which have ranged from 27% to 54%.

Few people in the study experienced severe vision loss. The proportion of people with vision worse than 20/200 was 13% before surgery and 1% after surgery. This appears to be better than the results from trials of PK, which have found rates of 29% and 33% for severe vision loss.

The authors caution that these comparisons may not be fair because many studies of PK measured best-corrected vision with contact lenses or refractive corneal surgery in addition to spectacles. In addition, many of these PK studies did not report the preoperative visual acuity.

The average refractive astigmatism after six months was 1.34 D, a modest increase from the average of 1.07 D found before surgery. This is far better than the results that have been reported with PK, which are often between 4.0 D and 6.0 D. There was no significant difference in the amount of change in astigmatism between the large-incision and the small-incision groups.

The donor tissue used for the DLEK procedure lost an average of 25% of its density six months after surgery. This appears to be as least as good a result as those with PK surgery, where one study found a 34% loss after one year, but further follow-up is required.

Gerrit Melles MD, PhD, Rotterdam, The Netherlands, the inventor of DLEK and the first to perform the procedure in humans, told EuroTimes that after five or six years of follow-up in his patients, endothelial cell density declined as much with DLEK as with PK.

Complications after PK surgery include erosions, ulcers, vascularisation, infection and endophthalmitis, all of which are related to the placement of sutures. Other possible complications include wound rupture and total loss of vision. This study found none of the complications associated with sutures, and no wound rupture or total loss of vision.

DSEK as with PK

Complications after DLEK surgery include dislocations. Dislocations have occurred in an unpublished series of 32 cases. By comparison, traditional DSEK has a dislocation rate of up to 50%.

The authors caution that these are not per se limitations of the study, but the follow-up was short, and that the authors reported their data on both the combined and separate procedures. Dr Verdier said that future randomised trials also should compare DLEK with Descemet strippping endothelial keratoplasty (DSEK), which is easier to perform than DLEK and may prove to be superior in other ways. Dr Melles, who developed the procedure, and that regular follow-up is important.

Gerrit Melles MD

Dr Terry’s study appeared in Ophthalmology (September 2005; 112: 1541-1549).

He reported no dislocations have occurred in an unpublished series of 32 cases. By comparison, traditional DSEK has a dislocation rate of up to 50%. Dr Terry said that no data is yet available on endothelial cell density six months after DSEK. In Dr Melles’ DSEK series, the endothelial cell counts averaged 1570 cells/mm² at the two-year follow-up interval.

Dr Verdier predicted that either DLEK or DSEK – whichever proves to be the better technique – would replace PK for the 50% or 60% of patients who are candidates.

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