Targeted tissue replacement has come of age and deep anterior lamellar keratoplasty (DALK) is slowly becoming a preferred procedure for some corneal surgeons, according to George J Florakis MD, clinical professor of ophthalmology, Columbia University, New York.

Speaking at the joint Irish and UKISCRS refractive surgery meeting, Dr Florakis discussed the pros and cons of tissue targeted corneal replacement versus full thickness keratoplasty, and traced the development of the latest procedures.

Corneal transplants

He noted that corneal transplants are still the most common corneal operation. In the US alone 38,000 are carried out annually, despite the decrease in recent years due to improvements in cataract surgery.

“For several decades full thickness corneal transplantation has been the treatment of choice for decreased vision due to various corneal pathologies but that is changing and more and more patients are getting targeted tissue replacements.”

At the 2010 Paton Society Luncheon, about 200 corneal surgeons unofficially surveyed reported that full penetrating keratoplasties (PKPs) had dropped to 30 per cent or 40 per cent of their transplants – in some cases less than 10 per cent, he said.

The indications for corneal transplantation are changing. In the 1980s, 80 per cent of corneal transplants were for pseudophakic bullous keratopathy, while nowadays, Fuchs’ dystrophy and keratoconus have risen in terms of the percentage of transplants done, partly because the threshold for doing a transplant has now lowered, Dr Florakis commented.

Another major development has been the advancement of eye banks.

Discussing the latest tissue targeted techniques, Dr Florakis said the goal of endothelial keratoplasty is the preservation of normal stroma and the surface, resulting in quicker rehabilitation, less astigmatism and fewer suture-related problems, and less rejection. With DALK the goal is to leave a healthy Descemet’s membrane and the endothelium intact and only replace the stroma (as well as Bowman’s and epithelium), eliminating endothelial rejection. Lamellar keratoplasty selectively replaces abnormal corneal tissue while preserving normal host tissue.

In endothelial keratoplasty the posterior corneal layers are replaced, therefore eliminating the problems of PKP (corneal sutures, corneal surface incisions, (fewer) rejections, wound instability, etc). It also offers a faster recovery time.

Deep Lamellar Endothelial Keratoplasty (DLEK) replaces the endothelium through a limbal, scleral pocket incision that leaves the surface of the recipient cornea untouched. It initially seemed like a great procedure, said Dr Florakis. However, despite training, not many surgeons carry out the procedure and it has been mostly abandoned. “There are a couple of reasons for that. First of all there were some interface irregularities. Secondly it is very technically difficult, with a significant learning curve,” he said.

The next major advance, which he claimed propelled endothelial keratoplasty, was Descemet’s stripping automated endothelial keratoplasty (DSEK).

“This eliminated all the manual procedures and that’s when endothelial keratoplasty really took off,” he said, adding that DSEK is much faster to perform than PKP and especially DLEK.

“Not only that, the recovery time is even shorter. So as opposed to a year or so for visual recovery after a transplant from PKP, or six months for DLEK, it is down to two or three months for a DSEK procedure.”

The benefits of DSEAKs are similar to that of DLEK but also include faster visual recovery. “I’m going to venture to say that endothelial keratoplasty is now the standard of care for endothelial dysfunction,” he said.

Returning to DALK, he said as well as having less risk of rejection, it theoretically increases the donor pool as good donor endothelium is not required and longer preservation intervals are possible. So what is holding it back? Initially results were perhaps poorer than a traditional PK, it is more technically difficult, takes longer and is therefore most costly, and visual outcomes can sometimes be poor and if it is not successful, it is donor wasteful, he said.

“However, it has many advantages over PKP and as time goes on it will be accepted more,” he concluded.

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