Iris-fixated phakic IOL effective for post-keratoplasty ametropia

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Dermot McGrath in Stockholm

Implantation of a toric iris-claw phakic IOL may provide a viable means of reducing refractive astigmatism and ametropia in patients who have previously undergone penetrating keratoplasty (PK) procedures, according to Kari Krotila MD, PhD.

"Our clinical experience has shown that the Artisan toric iris-claw phakic IOL is a good option for reducing ametropia after penetrating keratoplasty for certain patients. The lens positioning has proven to be stable over time and does not risk movement after fixation. However, further studies are required to determine the long-term effects and ultimate safety of phakic IOL placement on the integrity of the cornea endothelium after corneal transplants," he said.

Addressing a special symposium on phakic IOLs held during the XXV Congress of the ESCRS, Dr Krotila, Helsinki University Eye Hospital, Helsinki, Finland, said that ametropia is a common occurrence after penetrating keratoplasty. "After PK, it is quite usual to have 4.0 or 5.0 dioptres of astigmatism and if it is combined with possible anisometropia the patient may have debilitating visual problems in spite of a clear graft," he said.

Dr Krotila noted that current lamellar keratoplasty techniques, whether they involve endothelial transplantation or anterior superficial transplantation, tend to induce significantly less ametropia than was the case with earlier PK procedures. He cited discrepancies of donor-host size and shape, centration of the donor and host trephination, suturing and individual variations in wound healing as possible causes of post-PK ametropia.

Treatment options for post-keratoplasty refractive errors include spectacles or rigid contact lenses, said Dr Krotila. "We have to remember that most PK patients can be rehabilitated using these conservative methods. However if the anisometropia or astigmatism is too large, spectacles might not be a viable option and some patients may be contact lens intolerant, so we need to examine other options," he said.

Surgical options to manage post-keratoplasty ametropia include corneal relaxing incisions, laser surgery, corneal refactoring or intraocular lens implantation, all of which have their benefits and drawbacks, said Dr Krotila.

"While corneal relaxing incisions are safe, their effect tends to be unpredictable and they are often best employed in combination with other surgical approaches such as LASIK for optimal results," he said.

"Very often we need to combine these surgical procedures in order to obtain optimal results. So for example if the astigmatism is very high we can partially reduce that using corneal relaxing incisions and then proceed with corneal laser surgery or iris-claw IOL implantation," he said.

He noted that while corneal laser surgery is effective at reducing spherical errors, it is not a viable option for treating high levels of astigmatism for such patients. Furthermore, post-PK eyes which are often characterised by irregular and steep corneas may be predisposed to certain complications of LASIK and be susceptible to a variety of other risks.

As an alternative to eventual regrafting, surgeons might consider iris-fixated phakic IOL implantation in such scenarios, said Dr Krotila.

"Most post-PK ametropia problems are a combination of astigmatism and myopia and usually with these patients we have a deep anterior chamber which is the ideal location for implantation of an iris-claw phakic IOL. And we can also put this implant into pseudophakic eyes," he said.

Dr Krotila noted that the toric version of the Artisan/Verisyse lens is particularly suitable for post-PK patients, allowing the treatment of astigmatism as well as myopic and hyperopic spherical errors. The IOL is available for myopia with refractive powers from -2.5 to -21D and for hyperopia from +2.00 to +12.50 D with an astigmatic correction up to 7.50 D. The toric model can correct the total refractive error, both spherical and cylindrical.

The IOL power for the Artisan toric lens is calculated based on refraction measurements, anterior chamber depth and topographic keratometry values sent to the manufacturer. Before implanting the IOL, it is important to mark the horizontal axis on the limbus with the patient in a sitting or standing position, advised Dr Krotila.

"Under the operating microscope with the aid of these marks we can adjust the target axis and then implant the IOL to the desired final axis position," he said.

Looking at the few published studies on the use of phakic iris-fixated IOLs for post-PK patients, Dr Krotila said that overall the lens has shown an impressive capability to correct refractive sphere and bring cylinder down to around 2.0 D to 3.0 D.

"This is usually sufficient to enable us to rehabilitate these patients using spectacles. Most patients gained some lines of best corrected visual acuity. Three patients in the literature lost more than two lines of Snellen visual acuity, two of them due to graft rejections and one because of corneal decompensation," he said.

Endothelial cell loss is still a potential concern with these lenses, he noted. "We see an initial drop in the endothelial cell count in the immediate postoperative period, but after three years the loss is similar to what we would expect from normal post-keratoplasty patients without IOL implantations," he said.

Dr Krotila said that the iris-claw phakic IOL is a good option for the treatment of post-PK ametropia. "This lens provides good centration and stable fixation and delivers very good visual outcomes," he said.

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