

# CATARACT SURGERY IN PATIENTS WITH CORNEAL DISEASE



Often, cataract surgery has unpredictable refractive results when performed in eyes with abnormal corneas. How can outcomes be improved?

BY NEDA SHAMIE, MD; AND ROBERT K. MALONEY, MD

## TORIC INTRAOCULAR LENSES FOR CORRECTION OF ASTIGMATISM IN KERATOCONUS AND AFTER CORNEAL SURGERY

Mol IE, Van Dooren BT<sup>1</sup>

### ABSTRACT SUMMARY

Investigators analyzed visual outcomes after cataract surgery and toric IOL implantation in eyes with keratoconus, a history of keratoplasty, or a history of pterygium excision. This retrospective study evaluated 17 eyes of 16 patients over a 1-year period. Preoperative astigmatism (mean, 6.70 D) was correctable with spectacles in all eyes and fairly regular, with a bow tie–like pattern on central corneal topography. Topographic astigmatism had been stable and not progressive ( $\leq 1.00$  D variation in the maximum keratometry [K] value) over a 6-month period. Eyes with severe keratoconus, defined as an average K value greater than 55.00 D, were excluded. Three types of toric IOL were used: AT Torbi 709 (Carl Zeiss Meditec; not available in the United States), Tecnis Toric (model ZCT, Johnson & Johnson Vision), and AcrySof IQ Toric (model SN6AT, Alcon). The Haigis formula was the main method used for calculating IOL power.

Best corrected distance visual acuity 12 months after surgery was

20/40 or better in 94% (16/17) of eyes and 20/25 or better in 59% (10/17) of eyes. Mean refractive cylinder decreased from  $6.30 \pm 4.70$  D preoperatively to  $1.50 \pm 1.50$  D at 1 year. Before surgery, 65% of eyes had preoperative corneal astigmatism of 3.00 D or more; 1 year after surgery, 5.8% of eyes had refractive cylinder of 3.00 D or more. Patient satisfaction was high, although total refractive correction was not obtained in the majority of patients.

### DISCUSSION

Earlier research on toric IOL outcomes emphasized ensuring that

preoperative astigmatism was regular and stable.<sup>2-4</sup> A number of studies have reported on the utility and safety of toric IOLs in postkeratoplasty eyes,<sup>5-8</sup> but such reports in keratoconus have had limited numbers of cases and other limitations.<sup>9-12</sup> Cataract surgeons have therefore mostly shied away from offering toric IOLs to patients who exhibit any evidence of keratoconus, even forme fruste, because of the irregular nature of the astigmatism and the concern about progression.

Mol and Van Dooren reported positive outcomes with toric IOLs in eyes with keratoconus and with other corneal conditions usually associated with

## STUDY IN BRIEF

- Investigators evaluated the 1-year results of cataract surgery with toric IOL implantation in eyes with keratoconus, a history of keratoplasty, or a history of pterygium excision. The results of this small retrospective series suggest that toric IOLs can improve refractive outcomes in selected eyes with underlying corneal disease that typically causes irregular corneal astigmatism but also with stable and mostly regular central corneal astigmatism.

## WHY IT MATTERS

Advances in pre- and intraoperative corneal imaging and in toric IOL design have prompted cataract surgeons to explore the safety and efficacy of toric IOLs for selected eyes with corneal pathology. The goal is to offer better postoperative UCVA than can be achieved in this population with monofocal IOLs.

irregular corneal astigmatism. We have likewise found that toric IOLs can help optimize refractive cataract outcomes in patients who have corneal conditions typically associated with irregular corneal astigmatism, provided that the central 3 mm on topography appears regular and bow tie–like in

pattern, the astigmatism is stable, and the patient previously tolerated spectacle correction and did not rely on rigid gas permeable contact lenses. Although emmetropia often is not achieved in these eyes, we have noted a significant postoperative reduction in spherical equivalent and refractive

astigmatism in these eyes, as did the authors of this study.

Larger studies are needed to confirm that, with proper preoperative evaluation and an open discussion about reasonable expectations, toric IOLs can be a safe and effective option for this subgroup of patients.

### CORNEAL COLLAGEN CROSS-LINKING FOLLOWED BY PHACOEMULSIFICATION WITH IOL IMPLANTATION FOR PROGRESSIVE KERATOCONUS ASSOCIATED WITH HIGH MYOPIA AND CATARACT

Spadea L, Salvatore S, Verboschi F, Vingolo EM<sup>13</sup>

#### ABSTRACT SUMMARY

Standard teaching has held that keratoconus stabilizes after patients reach 40 years of age, but corneal ectatic disease has been found to continue progressing in up to 10% of cases.<sup>14</sup> Naturally, many patients over age 40 who experience continued keratoconic progression also develop a symptomatic cataract that requires removal.<sup>15</sup>

Spadea and colleagues reported on two patients in their 50s who had documented, progressive, advanced keratoconus and visually significant cataracts. These patients reported worsening vision and an intolerance of corrective lenses. In one patient, the spherical equivalent was greater than -21.00 D in each eye; in a second patient, spherical equivalent was -11.00 D in one eye and -24.00 D in the other.

Both patients underwent epithelium-off CXL in accordance with the FDA-approved protocol to stabilize their keratoconus. Six months later, they underwent standard cataract surgery with implantation of a monofocal IOL.

## STUDY IN BRIEF

- ▶ Investigators reported visual and topographic outcomes of CXL followed by cataract surgery and IOL implantation in a case series of two eyes of two patients with progressive keratoconus.

### WHY IT MATTERS

The availability of CXL has changed how ophthalmologists treat patients with progressive keratoconus. After first stabilizing corneal ectasia with CXL, surgeons can more confidently address secondary issues such as cataract and improve refractive outcomes.

For IOL power calculations, standard biometry and the SRK/T formula were used. The K value used to calculate the IOL power was also obtained from the measured topographic K values at the 3-mm central diameter.

More than 2 years after surgery, spherical equivalent had decreased from a preoperative mean of -22.50 to -3.50 D in the first patient and from -16.00 to -2.62 D in the second patient. Not only had ectatic progression halted, but the apical steep K values had also flattened on topography.

### DISCUSSION

If a patient older than 40 years has progressive keratoconus, is intolerant of rigid gas permeable contact lenses, and has a concomitant visually significant cataract, the traditional approach is to perform corneal transplantation, wait until the wound stabilizes, remove all sutures,

adjust any irregular astigmatism, and then address the cataract—often more than a year later.<sup>16</sup> An alternative is combined triple surgery using an estimated K value for IOL power selection, but refractive outcomes with this option are generally less than ideal.<sup>16</sup> Either way, such patients typically undergo corneal transplantation.

Spadea and colleagues presented a new, less invasive approach to patients with progressive keratoconus and concomitant cataract. The treatment approach keeps the cornea intact, possibly lessens the visual impact of ectasia, and minimizes refractive error through staged cataract surgery and IOL implantation. As in the study by Mol and Van Dooren,<sup>1</sup> a toric IOL can be considered if the central corneal cylinder is mostly regular.

Although this was a small study, results for the two pairs of eyes that Spadea and colleagues evaluated over 2 to 3 years highlight what is already

known: Corneas continue to flatten over time after CXL, so surgeons must target a more myopic outcome. ■

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