

MISALIGNED TORIC IOLS



Assessing the postoperative alignment of these lenses and optimizing the timing of their repositioning.

BY ALANNA S. NATTIS, DO; AND ERIC D. ROSENBERG, DO

EVALUATION OF POSTOPERATIVE TORIC INTRAOCULAR LENS ALIGNMENT WITH ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

Lucisano A, Ferrise M, Balestrieri M, et al¹

ABSTRACT SUMMARY

Toric IOLs have been used to correct corneal astigmatism during cataract surgery. Although most IOLs show stability, rotation from the intended position is possible. Ophthalmologists must accurately evaluate a toric IOL's postoperative alignment to determine possible causes of residual refractive error and to plan further surgery or adjustments. Although several techniques for assessing the postoperative stability of a toric IOL have been described, they can be imprecise, and their accuracy can vary among practitioners.¹ Lucisano and colleagues described new software integrated into an anterior segment OCT (AS-OCT) system (Casia SS-1000, Tomey) for the postoperative evaluation of toric IOL alignment.

The investigators dilated the pupil in order to visualize the marking dots in the periphery of the toric IOL. The procedure involved a single, quick (< 0.3 seconds), noncontact, non-invasive, 3D scan while the patient was seated in primary position. Prior to the scan, the examiner tilted the patient's head slightly to the right and left to determine the influence of head position on IOL position.

A screen layout created after the scan showed a topographic map on one side and an anterior segment image on the other; together, they produced an image of the anterior segment with an overlapping green linear marker that could be rotated on a pivot centered over the corneal apex. Rotation of the toric IOL from the intended position translated as the difference in degrees between the topographic axis and the value calculated from the linear marker.

Lucisano and colleagues evaluated postoperative IOL rotation in 15 eyes of nine patients. The researchers found that, with the head in primary position, mean IOL misalignment from the intended topographic steep axis was $1.4^\circ \pm 1.5^\circ$. They recorded identical IOL rotation with the patient's head tilted right and left, thus maintaining the values of misalignment found in primary position.

DISCUSSION

Surgeons have used several techniques to assess the postoperative alignment of a toric IOL (eg, slit-lamp examination, digital overlay, computer analysis of retroilluminated photographs).¹⁻³ Drawbacks to these techniques are that they depend partially on subjective judgment, require a multistep analysis, and do not take into account the position of the patient's head or cyclotorsion during fixation—all of which can lead to measurement variability.¹ Lucisano and colleagues used new toric IOL AS-OCT software that allows simultaneous analyses of corneal topography and the anterior segment in a single, rapid scan without the need to reposition the patient. Additionally, images are acquired and assessed automatically, independent of the operator's skill, and they have a resolution power

STUDY IN BRIEF

- New anterior segment OCT software for analyzing toric IOL alignment after surgery provides ophthalmologists with another method by which to evaluate and optimize outcomes.

WHY IT MATTERS

Misalignment of the IOL may be the cause of residual refractive error after the implantation of a toric lens. There are no standard algorithms for assessing IOL position postoperatively, and many methods are subjective and variable among examiners. The new technique is easy to perform and less subjective than other methods.

of 1°, affording high interobserver repeatability. That said, the investigators noted that limits to the IOL software include a necessity for good visualization of IOL marks, which may not be possible in an eye with

a small pupil, corneal opacities, or anterior capsular fibrosis.

The emphasis (among both ophthalmologists and patients) on precision and accuracy in cataract and refractive surgery continues to grow.

Equally important is the ability to troubleshoot when results are less than optimal.

The AS-OCT software evaluated in this study holds promise for improving results with toric IOLs.

INCIDENCE AND OUTCOMES OF REPOSITIONING SURGERY TO CORRECT MISALIGNMENT OF TORIC INTRAOCULAR LENSES

Oshika T, Inamura M, Inoue Y, et al⁴

ABSTRACT SUMMARY

Toric IOLs are an option for providing better distance UCVA, greater spectacle independence, and lower degrees of residual astigmatism in patients with significant preoperative corneal astigmatism.⁴⁻⁸ Precisely positioning a toric IOL along the correct axis at the time of cataract surgery is crucial to its efficacy: A 30° rotation can negate the toric correction completely and require surgical repositioning of the IOL.⁴⁻⁸

In this study of 6,431 eyes, Oshika and colleagues⁴ analyzed the incidence and timing of toric IOL repositioning surgery to correct misalignment at eight surgical sites between May 2013 and April 2016. Because this was a retrospective study, examination methods, surgical procedures, and indications for repositioning were not standardized. In general, reference and alignment of axes were marked manually with the patient in an upright position prior to surgery to prevent cyclotorsion errors. Further, the incisions were not sutured, no limbal relaxing incisions or astigmatic keratotomies were performed, and capsular tension rings were not used in any case.

The investigators assessed postoperative IOL alignment at each visit. Misalignment was defined as the difference between preoperative calculated IOL axis and the examined

IOL axis. The orientation of the IOL was measured on slit-lamp digital retroillumination photos with the pupil(s) fully dilated. Repositioning was indicated when the surgeon judged that correcting IOL position would improve the patient's visual acuity.

Among the 6,431 eyes that received a toric IOL at the time of cataract surgery, 42 (0.653%) underwent repositioning surgery 9.9 ± 7.5 days (range, 0–30 days) postoperatively on average. The average degree of misalignment requiring a second surgery was 32.9° ± 15.7° (range, 10°–74°), and, on average, these eyes had refractive cylinder of 2.40 ± 1.10 D (range, 0.50–6.50 D). Final measurement of alignment after repositioning surgery was obtained at 7.6 ± 5 weeks.

After the IOL was repositioned, misalignment was reduced to 8.8° ± 9.7° (range, 0°–40°), which was a statistically significant improvement. Refractive cylinder also decreased to 1.10 ± 0.80 D (range, 0–3.25 D).

Oshika and colleagues found a significantly negative correlation between the interval from cataract surgery to repositioning surgery and the degree of residual misalignment. For example, the degree of residual misalignment was 13.1° ± 13.5° when repositioning was done within 6 days of initial surgery, and 6.3° ± 5.9° if performed 7 days or more after cataract surgery. In two eyes that underwent repositioning within 24 hours, the IOL rotated again considerably, and additional surgical intervention was required to correct the problem.

DISCUSSION

Other case studies have reported varying repositioning rates depending on the brand of IOL used, but, to the best of our knowledge, this study by Oshika and colleagues is the first large-scale clinical investigation of the rate and outcomes of surgical repositioning to correct a malpositioned toric IOL. The investigators reported a

STUDY IN BRIEF

- ▶ A large retrospective study analyzed the rate of toric IOL repositioning surgery and identified an optimal time for IOL realignment, should it be required.

WHY IT MATTERS

Managing residual astigmatism after toric IOL implantation can be challenging. Depending on the degree of IOL rotation and the amount of residual astigmatism, surgical repositioning may be indicated. Prior to this study, no large database showed an optimal time for repositioning a toric IOL. This information can help cataract and refractive surgeons better manage residual astigmatism after toric IOL implantation.

relatively low rate of misalignment (0.653%). As the use of toric IOLs to address astigmatism during cataract surgery grows, it is important that surgeons be aware of possible IOL rotation and the best course of management. There are multiple ways of assessing postoperative IOL rotation, and new technology for this purpose is evolving.^{1-4,6-8}

The study by Oshika and colleagues adds to the information on astigmatism management available to cataract surgeons. The researchers determined an optimal time frame for IOL repositioning, should it be necessary. This finding highlights not only the importance of recognizing IOL misalignment but also when to address it surgically. ■

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