Misaligned Toric IOL

BY WARREN E. HILL, MD; ANITA NEVYAS-WALLACE, MD;
RICARDO GLIKIN, MD; AND ROGER F. STEINERT, MD

CASE PRESENTATION

A 69-year-old myopic female had 1.75 D of regular keratometric and topographic astigmatism in her right eye. The axial length measured 24.41 mm with the IOLMaster (Carl Zeiss Meditec, Inc., Dublin, CA), and keratometry readings were 43.05/44.82. She underwent cataract surgery in her (first) right eye and the implantation of a 17.50 D AcrySof Toric IOL (model SN60T4; Alcon Laboratories, Inc., Fort Worth, TX), oriented and visually confirmed at the steep axis of 75°. The targeted postoperative refraction was plano. The surgery was notable for zonular laxity without intraoperative dialysis.

At the 1-month postoperative visit, the patient's UCVA is 20/70 and improves to 20/20 with a refraction of +0.25 +1.50 X 30. She is referred to you for a consultative evaluation.

An examination of the anterior segment reveals a quiet anterior segment with a centrally positioned PCIOL, oriented at 105°, in the bag. No pseudophakodonesis is visible at the slit lamp.

The patient expresses dissatisfaction with her uncorrected distance acuity and spontaneously voices modest unhappiness about the loss of her near UCVA. She does not find a trial correction neutralizing only the astigmatic component acceptable (-0.75 +1.50 X 30). She strongly desires uncorrected distance vision.

How would you proceed?

WARREN E. HILL, MD

It appears that the model of toric IOL, its spherical power, and the axis of placement were incorrect. If the original clear corneal incision had been placed temporally at 180°, the power in the steep meridian would have increased, and the axis would have shifted clockwise. Instead, the axis of placement ended up counterclockwise to the original steep axis, resulting in a large angular error and residual postoperative astigmatism.

Rotating the present IOL within the capsular bag to an optimal axis of 70° would reduce the overall amount of refractive astigmatism to 0.75 D, but this corrective step would still fall short of the refractive objective by leaving a spherical equivalent of +1.00 D. Achieving a refractive result close to emmetropia and adequately correcting the corneal astigmatism would require a +19.00 D AcrySof Toric IOL (model SN60T5).

For me, the intraoperative observation of zonular laxity is highly important. Even with the placement of a capsular tension ring (CTR), the weak zonules could make rotating or exchanging the present IOL problematic. Because placing limbal relaxing incisions (LRIs) at the slit lamp would not provide the patient with acceptable uncorrected distance vision and an IOL exchange would potentially initiate a cascade of complications, I would opt for PRK or LASIK, which could correct both the residual astigmatism and the spherical equivalent to provide her with satisfactory distance vision.

For her second eye, I would make certain that manual keratometry was performed. I would also include a valid number for the amount of surgically induced astigmatism in the AcrySof Toric IOL calculator. In addition, I would take great care in both the preoperative marking of the cornea and the intraoperative placement of the toric IOL.

ANITA NEVYAS-WALLACE, MD

There are three main options for handling this patient's hyperopic astigmatism associated with a grossly misaligned toric IOL. The first is to rotate the IOL to the proper meridian (which would be the 68° meridian[1]) and then perform LASIK or surface ablation for the hyperopia. The second is simply to correct the entire refractive error via LASIK or surface ablation. The third option is to exchange the IOL for a 19.00 D AcrySof Toric lens (model SN60T4) placed at the proper meridian.

Attempting to remove or rotate this sticky IOL with its bulbous haptics risks damaging an already imperfect zonule. Although LASIK theoretically can neutralize the astigmatism induced by a toric IOL that is misaligned only rotationally, the aberrations induced by a decentered toric IOL are more complex. Even a small zonular tear could cause the IOL to become decentered, which would result in optical aberrations that are not readily correctable at the corneal plane, even by a wavefront-guided procedure. My first choice, therefore, would be to correct the entire refractive error in this case with LASIK, provided that the corneal thickness is sufficient.

Although the patient's current hyperopia is partly responsible for her poor visual acuity, it also presents an opportunity for improved depth of focus. A hyperopic LASIK ablation would make the cornea more prolate and thus add negative asphericity and reduce the total amount of spherical aberration. Furthermore, pupillary constriction on attempted accommodation would then increase the IOL's power centrally and improve the patient's near vision for the same distance acuity.

If the patient's left eye is dominant and either has good unaided distance acuity or is about to undergo cataract surgery, I would discuss with her the possibility of targeting mild myopia, rather than emmetropia in her nondominant right eye, in order to provide reading vision. One diopter of myopia should be sufficient for good reading vision in this patient, since both depth of focus and near acuity will be improved by the more prolate corneal shape created by the hyperopic ablation.

RICARDO GLIKIN, MD

This case presentation brings to my mind several questions. During the first postoperative month, was the patient happy with the distance and/or near UCVA in her right eye? If so, did she then perceive a deterioration in her vision? If so, was it a sudden or a progressive loss? What are her postoperative keratometry readings? What are her UCVA, BCVA, keratometry readings, and refractive measurements for the fellow eye?

Based on the information provided, the IOL has rotated counterclockwise from 75° initially to 105° on the slit-lamp examination. There is a difference between the subjective astigmatic meridian and the IOL's axis (I do not know the patient's actual keratometry readings for comparison).

Owing to the zonular laxity, the myopic shift might be due to a forward displacement of the IOL/capsular bag diaphragm.

At this point, I do not think it would be safe to insert a CTR to stabilize the bag (or to attempt to rotate the IOL), but I would have the device ready if performing cataract surgery on the patient's fellow eye. As a myope preoperatively, the patient might not have been advised of a possible loss of uncorrected reading vision.

Once the eye's refraction stabilized, I would discuss with the patient the option of corneal laser refractive surgery to treat her residual (and/or induced) spherical and astigmatic error. I would offer her the option of inducing 1.25 to 1.50 D of myopia for increased near visual acuity. Another option would be surgery on her fellow eye, either cataract removal or a refractive procedure, to improve her overall vision.

ROGER F. STEINERT, MD

The particular challenge in this case is the notation of zonular laxity intraoperatively. As mathematically predicted, the 30° malpositioning of the toric IOL has resulted in no correction of the astigmatism but only a vector-induced axial shift. Thus, the simplest option would be to rotate the IOL to the proper axis. One month postoperatively, because of the zonular laxity, a meticulous and delicate reopening of the capsular bag will be necessary in the OR. Simply attempting to rotate the IOL may result in a catastrophic disinsertion of the entire capsular bag. The surgeon should have a CTR available in case it is needed, and the patient must understand preoperatively that zonular failure may occur and more complicated surgery may be needed in any case.

A residual hyperopic refractive error creates an additional problem. If the patient is unhappy with the residual hyperopia when her astigmatism is corrected using trial frames, then the two options are either an IOL exchange for a higher spherical power or a subsequent PRK or LASIK procedure. If the zonules hold up well enough during the initial IOL manipulation, I would suggest finishing the job with the insertion of a CTR and an IOL exchange that eliminates the hyperopia and may result in low myopia, which will address part of the patient's complaint about her near vision.

Finally, the surgeon should counsel the patient that full uncorrected near vision cannot be obtained in this set-

ting. Because of the zonular laxity, I would not tempt fate further by offering an IOL exchange for a multifocal lens plus LRIs, although this is a theoretical alternative and LRIs do not rotate postoperatively! ■

Section Editors Robert J. Cionni, MD; Michael E. Snyder, MD; and Robert H. Osher, MD, are cataract specialists at the Cincinnati Eye Institute in Ohio. They may be reached at (513) 984-5133; msnyder@cincinnatieye.com.

Ricardo Glikin, MD, is Head of Cataract Section and a staff member for the Ophthalmology Service, Hospital de Clínicas School of Medicine, University of Buenos Aires, and is in private practice in Buenos Aires, Argentina. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Glikin may be reached at riglikin@hotmail.com.

Warren E. Hill, MD, is in private practice in Mesa, Arizona. He is a consultant in the area of IOL mathematics for Alcon Laboratories, Inc., but acknowledged no financial interest in the products mentioned herein. Dr. Hill may be reached at (480) 981-6111; hill@doctor-hill.com.

Anita Nevyas- Wallace, MD, is in private practice with Nevyas Eye Associates in Bala Cynwyd, Pennsylvania, and is Clinical Associate at the University of Pennsylvania Department of Ophthalmology in Philadelphia. She acknowledged no financial interest in the products or companies mentioned herein. Dr. Nevyas-Wallace may be reached at (610) 668-2777; anevyaswallace@nevyas.com.

Roger F. Steinert, MD, is Vice Chair of Clinical Ophthalmology and Director of Cataract, Refractive, and Corneal Surgery at the University of California, Irvine. He is a consultant to Advanced Medical Optics, Inc., ReVision Optics, and LenSx. Dr. Steinert may be reached at (949) 824-4122; roger@drsteinert.com.

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