

Cataract After Hyperopic PRK

BY BRANDON D. AYRES, MD; JONATHAN SOLOMON, MD; VANCE THOMPSON, MD;
ROBERT J. WEINSTOCK, MD; AND TAL RAVIV, MD

CASE PRESENTATION

A 52-year-old military contractor wants to correct the “blurry” vision in his right eye before his upcoming 12-month deployment to the Middle East. The patient has difficulty with his goggles and does not tolerate contact lenses. He prefers to be as free of glasses as possible.

The patient underwent hyperopic PRK on both eyes 4 years ago, with an enhancement on his left eye (Figure). He has a history of a “weak” right eye.

On examination, the UCVA in the patient’s right eye measures 20/40, correcting to 20/30- with a manifest refraction of $+1.25 -2.25 \times 180$. His left eye has a UCVA of 20/20 and a manifest refraction of plano $-0.50 \times 125 = 20/20$.

A slit-lamp examination reveals a trace anterior cortical change in his right eye and 1+ nuclear sclerosis in both eyes. The patient’s old records show his pre-PRK refractions at $+4.50 -2.00 \times 170 = 20/30$ OD and $+2.50 -0.75 \times 95 = 20/20$ OS.

How would you proceed?

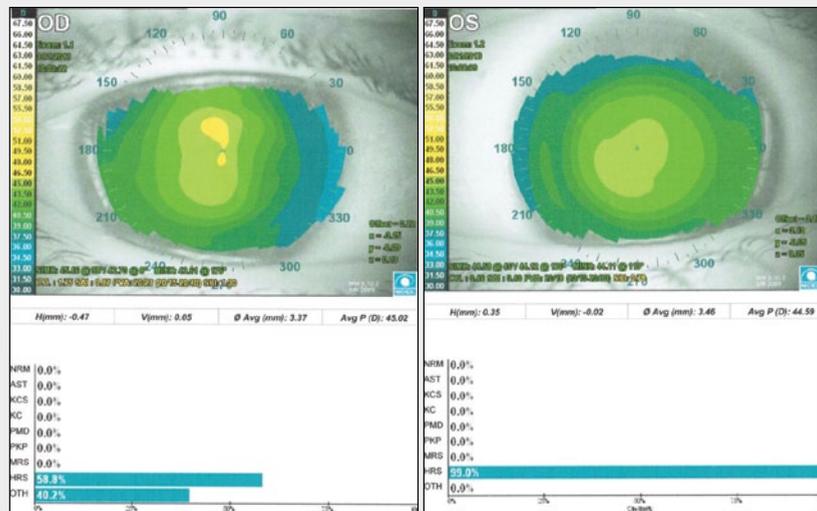


Figure. Topography is consistent with the patient’s history of hyperopic refractive surgery on both eyes. The right cornea has 1.75 D of cylinder versus 0.46 D in the left.

—Case presented by Tal Raviv, MD.

BRANDON D. AYRES, MD

This interesting case illustrates a clinical situation that is becoming more and more common. A presbyopic patient who underwent hyperopic PRK now has decreased visual acuity due to cataract formation. His topography is consistent with hyperopic PRK and mild residual with-the-rule astigmatism that accords with his manifest refraction.

I would proceed with cataract removal and lens implantation. The first challenges would be calculat-

ing the IOL’s power and deciding among a toric IOL, corneal relaxing incisions, a monofocal lens, and a presbyopia-correcting IOL. Hyperopic LASIK tends to reduce spherical aberration, so I would avoid aspheric IOLs in favor of a traditional or neutrally aspheric lens. This patient would like to minimize his dependence on glasses, which, at minimum, requires decreasing his astigmatism, but one could also consider implanting a presbyopia-correcting IOL. My monofocal lens of choice for this patient would be the AcrySof Toric IOL

(nonaspheric; Alcon Laboratories). Although I typically use multifocal IOLs, an alternative to the monofocal lens is the Trulign Toric Posterior Chamber IOL (Bausch + Lomb), which is currently the only accommodating toric lens available. The Trulign is also neutrally aspheric, making it my choice for this patient.

I generally use the postrefractive surgery IOL calculator on the American Society of Cataract and Refractive Surgery's website to help select a spherical IOL power and then proceed with toric IOL calculations. I bring into the OR several IOLs in powers around my target. I use the ORA System (WaveTec Vision) to help me determine the best IOL power for emmetropia intraoperatively and then to align the toric lens. Even with my use of advanced calculations and intraoperative gymnastics, I would still warn the patient before surgery that an enhancement or IOL exchange might be necessary postoperatively.

JONATHAN SOLOMON, MD

To formulate a plan for this patient, I would require more information. First, was he comfortable with the visual acuity of his right eye at any time after the original PRK procedure or the enhancement? Does he feel that his vision has worsened since his last procedure? What is his visual potential? Does he have realistic expectations, or will he only be satisfied with total independence from spectacles, an unrealistic hope? Without completely exploring all of these questions, I would not intervene further surgically.

For this article, I will assume that the answers to my earlier questions inclined me to proceed with refractive lens-based surgical correction. Even so, I would like to know if the patient desires an improvement only of his distance vision or of his distance and near acuity. If the latter, then I would want to know his height in order to determine a comfortable working distance when his arm is bent. I would also check for an underlying, mild amblyopia/esodeviation, which might have accompanied the anisometropia, to avoid any concerns with angle kappa and induced coma.

Because the patient plans to travel to the Middle East, it would be important to consider starting daily artificial tears and/or immunomodulation with cyclosporine ophthalmic emulsion 0.05% (Restasis; Allergan) along with lid hygiene to prepare the ocular surface for surgery and postoperatively.

Surgically, I would concentrate on the patients' defocus equivalent and reduce his astigmatism. If the refraction, tomography, and OPD Scan-III (Marco) all agreed, a toric IOL would be appropriate. Assuming the patient desires a measure of intermediate and near visual acuity, a Trulign IOL with a goal of -0.25 to -0.50 D oriented

“Even with my use of advanced calculations and intraoperative gymnastics, ... an enhancement or IOL exchange might be necessary postoperatively.”

—Brandon D. Ayres, MD

with the assistance of intraoperative aberrometry would be ideal, given the technical challenge of hitting a refractive target after PRK without inducing greater negative spherical aberration. Also helpful would be the assurance of an accurately sized/shaped capsulotomy through the use of a femtosecond laser and fastidious polishing of the capsule. I would place a capsular tension ring to avoid uneven compression of the polyamide haptics and hinged lens, assuming a relatively short axial length and correspondingly small equatorial lens bag.

Postoperatively, I would recommend an extended course of topical steroidal and nonsteroidal antiinflammatory therapy to reduce the risk of capsular contraction and phimosis.

VANCE THOMPSON, MD

Because it sounds as if the blur is not new, the patient is likely amblyopic in his right eye. Records from 20 years ago would be helpful, but they often are not available in cases such as this one. If the patient said that the vision in his right eye had never been clear with glasses, I would presume that he is amblyopic. If he had had clear vision in both eyes with glasses 10 years ago, however, it is possible he had an undiagnosed early cataract when he underwent PRK 4 years ago.

In either case, I would ask him if he notices blurry vision in his right eye at a distance when both of his eyes are open. If he is amblyopic on the right, he likely will not notice the blur, in which case I would ask him what he is trying to achieve through an enhancement of his right eye. If he notices the blur with both eyes open, however, and if his vision is much clearer when he closes his right eye and looks only through his left eye, I would conclude that the reduced visual acuity of his right eye is degrading image quality when both of his eyes are open. If he felt that image quality improved significantly when both of his eyes were open and his manifest refraction were in place for his right eye, then I would consider a refractive enhancement.

Because the patient is going to the Middle East and has a history of PRK, I would take into account two risk factors for a haze reaction: repeat PRK and exposure to ultraviolet light. One option would be repeat PRK with

“Because it sounds as if the blur is not new, the patient is likely amblyopic in his right eye.”

—Vance Thompson, MD

mitomycin C (0.02% for 15 seconds followed by a thorough rinse with balanced salt solution). Another would be astigmatic keratotomy, which would be a great way to reduce his astigmatism to a more comfortable level.

I would probably urge the patient not to address his developing cataracts until he returns from his deployment. If he felt like his right eye were causing him problems with both eyes open and he really needed a better image, and if my refraction was not giving him the visual acuity he had felt comfortable with in previous years, then it would need to be addressed through cataract surgery.

ROBERT J. WEINSTOCK, MD

For me, the decision comes down to more PRK, the implantation of a toric IOL, or observation. The patient likely has mild amblyopia in his right eye and has only lost half a line of vision between his UCVA and BCVA. His spherioequivalency is near plano in his right eye, and his “blurry” vision is most likely due to the astigmatism. With 20/20 UCVA in his dominant left eye, it is unusual for him to notice the small drop in UCVA in his right eye. Perhaps he is getting a hyperopic shift in his right eye, he was made myopic after the original PRK, and it is the near vision that has become blurry in his right eye. Further questioning is in order, and even a contact lens trial could prove helpful in deciding how to proceed.

Considering the patient’s age, a hyperopic drift from lenticular changes and cataract formation will likely continue, which makes PRK a temporary fix. Replacing the crystalline lens with a toric IOL is challenging if plano is the goal. The IOL power calculation will be challenging due to the prior PRK, and his UCVA is only down slightly from his best possible correction. In this scenario, I would recommend observation.

If the contact lens monovision trial were successful, however, I would consider laser-assisted lens extraction with a near-target toric IOL. I would use the ORA System and the TrueVision 3D Visualization and Guidance System (TrueVision Systems) to help me select the lens’ power and to position the IOL. I would make sure that the patient was able to reside locally for 1 month postoperatively or, if not, would postpone intervention until he returned.

WHAT I DID: TAL RAVIV, MD

After we discussed a watchful, waiting approach, the patient reiterated his preference for prompt surgical correction of his perceived deficit. I proceeded with lens extraction and toric IOL surgery after counseling the patient on the potential for a PRK touchup. Using the American Society of Cataract and Refractive Surgery’s postrefractive surgery calculator (favoring results from the “no prior data” formulas such as the Haigis-L and Shammas), I ordered a number of IOLs and then relied on intraoperative aberrometry (ORA System) for the final lens selection and rotation of the toric IOL. The patient achieved a postoperative UCVA of 20/20-3 and a plano refraction. ■

Section Editor Thomas A. Oetting, MS, MD, is a clinical professor at the University of Iowa in Iowa City.

Section Editor Tal Raviv, MD, is an attending cornea and refractive cataract surgeon at the New York Eye and Ear Infirmary and a clinical associate professor of ophthalmology at New York Medical College in Valhalla. He is also in private practice as a founding partner of New York Laser Eye in New York. He is a consultant to WaveTec Vision. Dr. Raviv may be reached at (212) 448-1005; tal.raviv@nylasereye.com.



Section Editor Audrey R. Talley Rostov, MD, is in private practice with Northwest Eye Surgeons, PC, in Seattle.

Brandon D. Ayres, MD, is in practice at Ophthalmic Partners of Pennsylvania PC and is a surgeon in the Cornea Service at Wills Eye Hospital in Philadelphia. He acknowledged no financial interest in the products or companies he mentioned. Dr. Ayres may be reached at (484) 434-2700; bayres@willseye.org.



Jonathan Solomon, MD, is surgical/refractive director of Solomon Eye Physicians and Surgeons in Greenbelt and Bowie, Maryland, and McLean, Virginia. He is a consultant to Bausch + Lomb and a speaker for Marco and for WaveTec Vision. Dr. Solomon may be reached at jdsolomon@hotmail.com.



Vance Thompson, MD, is the founder of Vance Thompson Vision in Sioux Falls, South Dakota. Dr. Thompson may be reached at (605) 361-3937; vance.thompson@vancethompsonvision.com.



Robert J. Weinstock, MD, is a cataract and refractive surgeon in practice at The Eye Institute of West Florida in Largo, Florida. He is a consultant to TrueVision Systems and WaveTec Vision. Dr. Weinstock may be reached at (727) 585-6644; rjweinstock@yahoo.com.

