

Posterior Polar Cataract and Astigmatism

BY LISA B. ARBISSER, MD; CARLOS BUZNEGO, MD; JONATHAN B. RUBENSTEIN, MD;
ABHAY R. VASAVADA, MS, FRCS(ENGLAND); AND SHETAL M. RAJ, MS

CASE PRESENTATION

A 49-year-old, soon-to-be-retired police officer is referred to you for a cataract evaluation. He complains of severe glare when driving at night. The patient states that he has never worn glasses and hopes to minimize his dependence on them postoperatively.

On examination, his visual acuity is +0.50 D = 20/50 OD and +1.50 D = 20/30 OS. The slit-lamp examination is consistent with posterior polar cataracts (Figure 1). Keratometry readings reveal 4.20 D and 2.60 D of corneal astigmatism (Figure 2) in his right and left eyes, respectively.

What is your surgical approach to a posterior polar cataract? Would you place a toric IOL in the event of a posterior capsular breach? What would your plan of action be for this particular patient?

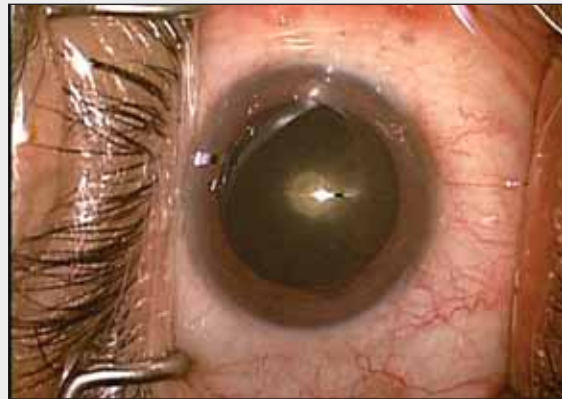


Figure 1. Surgeon's view of the posterior polar cataract.

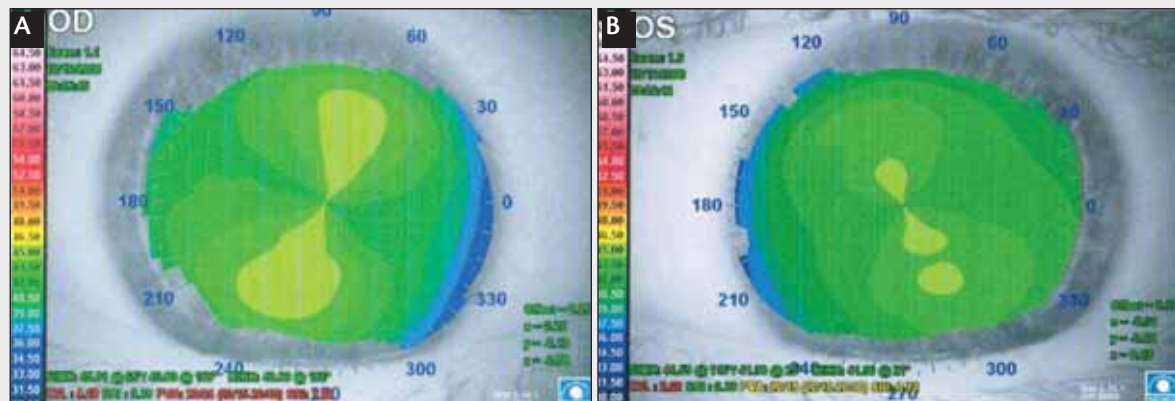


Figure 2. Significant topographic astigmatism that was not present in the preoperative refraction (A and B).

LISA B. ARBISSER, MD

Congenital posterior polar cataracts evolve slowly but cause symptoms necessitating surgery. I would test the patient's contralateral eye for glare and consider a bilateral refractive approach.

Topography (ideally with iTrace [Tracey Technologies, Houston, TX]) shows latent regular astigmatism that is

expected to manifest postoperatively but is masked by lenticular astigmatism. The toric calculator (based on manual keratometry readings) demonstrates residual astigmatism with the AcrySof IQ Toric SN6AT5 IOL (Alcon Laboratories, Inc., Fort Worth, TX) that will necessitate peripheral astigmatic keratotomies on the steep axis. Without bioptics using LASIK and a multifocal IOL,

blended vision would be the least spectacle-dependent option. Because I would expect more residual cylinder in the patient's right eye, I would aim for a -1.25 to -1.50 D result in his right eye. With success, I would target emmetropia in his left eye.

I consider posterior polar cataracts to be cortical-capsular adhesions without elasticity in the adhesion ring and not posterior capsular agenesis. Routine phaco forces easily rupture the posterior capsule, a complication I have avoided in 58 consecutive cases. First, I prevent deepening or shallowing of the anterior chamber until adhesion releases. Second, I avoid overfilling the anterior chamber, lower the bottle, and lift the iris off the peripheral capsule before engaging phaco foot position 1. Then, I raise the bottle to avoid iris retropulsion. Next, I fill and stabilize the chamber with viscoelastic when removing instruments. I only hydrodelineate the endonucleus, and I avoid both hydrodissection and all rotation of nuclear material.

For soft lenses, as in this case, I employ a Rosen phaco splitter to excavate by layers toward the plaque while aspirating the inner nucleus with the phaco tip (little or no ultrasound required). Once lenticular material separates from its central adhesion, I remove the peripheral epinucleus with I/A rather than the phaco tip if this step is challenging. I then carefully polish the posterior capsule with a Terry squeegee under an ophthalmic viscosurgical device (rarely is a planned posterior capsulorhexis required if "unpolishable") and implant a toric IOL in my routine fashion.

If the posterior capsule ruptures, the anterior capsulorhexis is a critical backup. When the complication is recognized early, it is possible to convert posterior capsular tears (they start centrally) into true posterior continuous curvilinear capsulorhexes, which will permit routine implantation of a toric lens. I will slowly and gently insert the IOL into the bag and rotate the lens to the proper angle before permitting its haptics to open. If the posterior continuous curvilinear capsulorhexis fails, then I will forward capture the optic through the anterior capsulorhexis with the haptics in the bag.

After documenting medical necessity, I would apply the same principles to the patient's fellow eye.

CARLOS BUZNEGO, MD

The foremost issue in this case will be the preoperative informed consent discussion with the patient. Because he reports never wearing glasses, it will likely be a challenge to explain that he has corneal astigmatism that will be "unmasked" by the removal of the astigmatic crystalline lens. I would stress that toric IOLs will not fully correct his astigmatic refractive error and that a postoperative laser vision correction enhancement will likely be required. The increased risk of posterior capsular rupture

must be addressed as well. The patient needs to understand that, should this complication occur, he will receive a conventional monofocal lens and his astigmatism will have to be addressed with laser vision correction.

Posterior polar cataracts increase the risk of capsular rupture due to the fusing of the cataract with the posterior capsule. Although I routinely perform hydrodissection (with unpreserved 1% lidocaine) to separate a cataractous lens from the posterior capsule, I avoid it in these cases. Instead, I would perform hydrodelineation and use a cannula to inject fluid between the nucleus and the epinucleus. I would then proceed with gentle phacoemulsification of the nucleus but leave behind the epinucleus to help protect the capsule. Finally, I would draw cortical remnants from the periphery toward the center to minimize shearing forces on the weakened central capsule. If the capsule were torn, I would not implant a toric IOL, because precise positioning and long-term stability are critical with these lenses. Rather, I would implant a three-piece conventional monofocal IOL, its haptics in the sulcus and its optic captured behind the capsulorhexis. Residual astigmatism would be addressed with laser vision correction.

JONATHAN B. RUBENSTEIN, MD

Posterior polar cataracts require preoperative planning and appropriate intraoperative management. Because the risk of posterior capsular rupture is significantly higher in these cases, ophthalmologists must alter their surgical technique. Hydrodissection should be avoided in favor of gentle, slow hydrodelineation, which can be performed at multiple depths in the lens. I would be careful not to overinflate the anterior chamber, which could blow out the posterior capsule. Viscodissection might also be helpful. I would use the slow-motion phaco technique described by Robert Osher, MD, and leave the posterior lenticular material until the end of surgery.

The next clinical issue is astigmatic management. Despite the patient's spherical refractive error, he has significant corneal astigmatism in each eye. He has 4.20 D of regular astigmatism in his right eye and 2.60 D of regular astigmatism in his left eye. Because of the posterior polar cataracts, I would have two plans of attack. The patient's right eye has more astigmatism than can be neutralized with the toric IOLs that are currently available in the United States. According to www.acrysoftoricclaculator.com, this eye would need an AcrySof SN6AT5 lens oriented at 66° to correct approximately 2.00 D of astigmatism, combined with paired 60° peripheral corneal relaxing incisions to correct the remaining 2.20 D of cylinder. If the posterior capsule were violated during removal of the posterior polar cataract, then a toric IOL could not be used. Instead, I would implant a three-piece IOL in the ciliary sulcus, possibly with bag-

sulcus fixation by capturing the optic beneath an intact anterior capsule. I would then reduce the corneal astigmatism with paired 75° peripheral corneal relaxing incisions placed along the 65° axis after the IOL was safely in place.

I would approach the patient's left eye in a similar manner. If the posterior capsule remained intact, I would place an AcrySof SN6AT5 Toric IOL at 113°. The 1.00 D of residual astigmatism could either be left alone or corrected with paired 40° peripheral corneal relaxing incisions at 113°. If the capsule broke, then I would implant a three-piece IOL in the sulcus and then make paired 65° peripheral corneal relaxing incisions at 115°. Slight modifications in the length of the peripheral corneal relaxing incisions might be required if the clear corneal incisions were lengthened to accommodate a sulcus-based IOL.

**ABHAY R. VASAVADA, MS, FRCS(ENGLAND),
AND SHETAL M. RAJ, MS**

This patient has regular corneal astigmatism with posterior polar cataracts. To measure the magnitude and axis of the corneal astigmatism, we prefer to use the values from the manual keratometer. To calculate the spherical diopter, we use the IOLMaster (Carl Zeiss Meditec, Inc., Dublin, CA). The AcrySof Toric IOL is now available outside the United States in models up to the T9. As a part of preoperative counseling, we explain to patients the risk of a dropped nucleus, multiple surgical interventions, and residual refractive error as well as the possible need to perform an early Nd:YAG capsulotomy for intraoperative posterior capsular plaque.

During phacoemulsification in such cases, we use a closed-chamber technique. We inject viscoelastic from the paracentesis before retracting the phaco probe/irrigating handpiece out of the eye, and we avoid performing cortical cleaving hydrodissection. Instead, after creating a central trench, we perform inside-out delineation, which is a technique for safely emulsifying polar cataracts. We then emulsify the nucleus using modest parameters and Dr. Osher's slow-motion technique. After mobilizing the epinucleus using focal and multiquadrant hydrodissection, we cleave the epinucleus and cortex with bimanual I/A. We detach the central opacity fibers in the central portion of the posterior capsule after separating the peripheral cortex circumferentially. By following these steps, we have reduced our incidence of intraoperative posterior capsular dehiscence to about 6% in cases of posterior polar cataract.

In the event of a posterior capsular rupture, we perform an anterior vitrectomy via a bimanual limbal approach. If the long axis of the rupture were not in the vertical meridian, we would implant the AcrySof Toric IOL in the bag, because the material of this lens causes it

to unfold very gently and, in our experience, not to extend the ruptured area if the IOL is implanted precisely. We find the use of intracameral triamcinolone very useful when performing an anterior vitrectomy and for confirming the absence of vitreous in the anterior chamber at the end of surgery. We suture the main and paracentesis incisions at the end of the surgery. In a few cases, we have implanted the AcrySof Toric IOL in eyes with compromised anterior and posterior capsules, and the lens was stable 1 year postoperatively. ■

Section Editor Bonnie A. Henderson, MD, is a partner in Ophthalmic Consultants of Boston and an assistant clinical professor at Harvard Medical School. Thomas A. Oetting, MS, MD, is a clinical professor at the University of Iowa in Iowa City. Tal Raviv, MD, is an attending cornea and refractive surgeon at the New York Eye and Ear Infirmary and an assistant professor of ophthalmology at New York Medical College in Valhalla. Dr. Raviv may be reached at (212) 448-1005; tal.raviv@nylasereye.com.

Lisa B. Arbisser, MD, is in private practice with Eye Surgeons Assoc. PC, located in the Iowa and Illinois Quad Cities. Dr. Arbisser is also an adjunct associate professor at the John A. Moran Eye Center of the University of Utah in Salt Lake City. She acknowledged no financial interest in the products or companies she mentioned. Dr. Arbisser may be reached at (563) 323-2020; drlisa@arbisser.com.



Carlos Buznego, MD, is an anterior segment surgeon and founding partner of the Center for Excellence in Eye Care in Miami. He is also a voluntary assistant professor at the Bascom Palmer Eye Institute in Miami. Dr. Buznego may be reached at (305) 598-2020; cbuz@comcast.net.



Shetal M. Raj, MS, is a consultant at Iladevi Cataract & IOL Research Centre, Raghudeep Eye Clinic, Ahmedabad, India. She acknowledged no financial interest in the products or companies she mentioned. Dr. Raj may be reached at +91 79 27492303; shetalraj@hotmail.com or icirc@abhayvasavada.com.

Jonathan B. Rubenstein, MD, is vice chairman and the Deutsch family professor of ophthalmology at Rush University Medical Center in Chicago. He acknowledged no financial interest in the products or companies he mentioned. Dr. Rubenstein may be reached at (312) 942-2734; jonathan_rubenstein@rush.edu.



Abhay R. Vasavada, MS, FRCS(England), is the director of Iladevi Cataract & IOL Research Centre, Raghudeep Eye Clinic, Ahmedabad, India. He acknowledged no financial interest in the products or companies he mentioned. Dr. Vasavada may be reached at +91 79 27492303; icirc@abhayvasavada.com.

