

# BILATERAL 16-CUT RADIAL KERATOTOMY

What's the best surgical strategy for this patient's brunescant cataracts?

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## CASE PRESENTATION

A 71-year-old woman presented for a cataract surgery evaluation. The patient's medical history was significant for bilateral 16-cut radial keratotomy (RK) in the 1980s.

Uncorrected distance visual acuity (UDVA) was 20/60- OD and 20/100- OS. BCVA was 20/60- OD with a manifest refraction of plano and 20/60 OS with a manifest refraction of +1.25 -0.75 x 175°. An examination of the anterior and posterior segments was within normal limits except for the RK scars. Significant central brunescant cataracts were present bilaterally, denser in the left eye. Keratometry (K) readings were 34.00 D @ 91° and 38.75 D @ 1° OD and 36.50 D @ 85° and 38.25 D @ 175° OS.

How would you proceed?

—Case prepared by Barry A. Schechter, MD



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Cataract surgery is refractive surgery today. In other words, this patient is going to expect a good refractive outcome. The problem for the surgeon is that achieving this goal will be a major challenge. My first step would be to set reasonable expectations for this patient. I would discuss postoperative adjustments to the outcome with PRK (possibly topography-guided) and/or supplementary add-on (ie, piggyback) IOLs.

Next, corneal topography and tomography would be performed to provide a clearer picture of the regularity and stability of the corneas. The case presentation suggests that multiple scans obtained at different times of day may be required. I would give more weight to the measurements obtained in the morning so that the refractive shift over the course of the day is more myopic. A 16-cut RK procedure can result in an unstable refraction and topography, whereas

an eight-cut RK procedure rarely does. I would like to see the average K values for the central 1-, 2-, 3-, and 4-mm zones. Different devices provide different parameters, but most can provide an average value taken over the central area. These K values can be used in regular IOL formulas. My approach would be to use a double-K method of calculation for the K values (using the K readings obtained before the RK procedure and the K readings obtained before cataract surgery) and then to use a vergence formula.

I would use the ASCRS IOL calculator for prior RK and enter data for as many of the parameters as possible. This approach has been reliable for me.

I would wait 2 to 3 months until refractive stability is achieved before refining the outcome. I would start with the nondominant eye in case wild fluctuations in refractive outcomes occur postoperatively. Patients generally find this approach reassuring; they are more comfortable proceeding with surgery on the second eye once they are happy with the results for the first eye. My preference would be PRK or add-on IOLs rather than an IOL exchange. If the refractive outcome fluctuates, CXL can be considered. If fluctuation is detected preoperatively, it would make sense to use the mean central K value for the IOL calculation and then to target -0.50 or -0.75 D.

I would consider using a pinhole IOL such as the IC-8 (AcuFocus). This IOL design reduces aberrations, visual side effects, and the effects of residual sphere and astigmatism. I would implant this lens in the nondominant eye first and gauge the patient's response to the outcome. If she loves the improvement in quality of vision from a reduction in higher-order aberrations and either does not mind or notice dimming of vision, I would discuss the option of implanting an IC-8 in the dominant eye as well. If, however, she has a problem with dimming, then I would implant a monofocal IOL in the dominant eye.

Once an IC-8 has been implanted in the first eye, it is straightforward for patients to compare the vision of their two eyes and to decide which they prefer. Treating the nondominant eye first allows a comparative trial and assists patients with IOL selection.



VANESSA NGAKENG, MD

I would start by obtaining two sets of measurements, one taken in the morning and one in the afternoon. I would also ask the patient about visual fluctuation to determine if the cornea is stable. If instability is found, I would discuss CXL and keratoplasty with her; CXL would be my preference.

After ensuring corneal stability, I would have a lengthy discussion with the patient about refractive surprises, intraoperative challenges, and postoperative visual fluctuation. During the examination, I would check the RK incisions for separation and intracision cysts, which increase the risk of a ruptured incision during surgery.

Standard topography usually overestimates central corneal power in post-RK eyes, resulting in a hyperopic surprise after cataract surgery. My go-to IOL formula in cases such as this one is the ASCRS IOL calculator for prior RK. If intraoperative aberrometry is available, I would use the information it provides to help with IOL power selection. I would choose a standard monofocal IOL.

After the peribulbar administration of anesthesia, a scleral tunnel incision would be made rather than a clear corneal incision because the RK procedure involved 16 cuts. Low-flow settings would be used to decrease shearing forces on the cornea. I would have 10-0 nylon sutures available in case an RK incision opens. At the conclusion of surgery, a fluorescein stick would be used to check all incisions for leakage.

Hydration of the RK cuts will lead to postoperative vision fluctuation that may last for months. I would wait at least 3 months before considering an enhancement procedure, and my preference would be an IOL exchange.



WHAT I DID: BARRY A. SCHECHTER, MD

The determination of corneal power is one of the most important steps of IOL power calculations. Because the optical zone used in RK is typically small and RK incisions are frequently structurally unstable, with vision fluctuating sometimes throughout the day, eyes can have a flat central cornea and steep periphery, and keratometry alone can overestimate corneal power. Additionally, the RK incisions

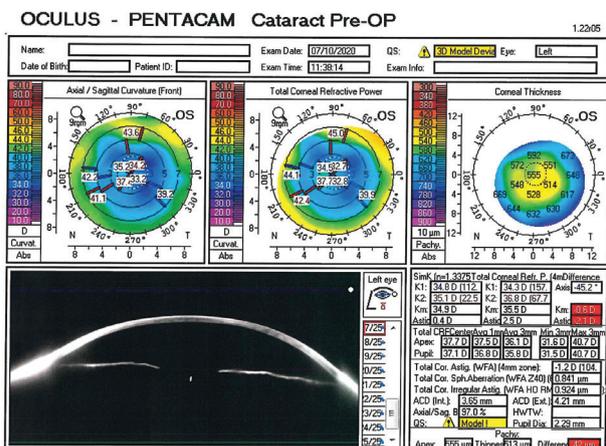




Figure 2. Postoperative appearance of the eye. One of the RK incisions avulsed during cataract surgery and had to be closed with a suture.

seal.<sup>1</sup> The patient was instructed to administer besifloxacin ophthalmic suspension 0.6% (Besivance, Bausch + Lomb) twice daily for 1 week, bromfenac ophthalmic solution 0.075% (BromSite, Sun Pharma) daily for 2 weeks, and loteprednol etabonate ophthalmic gel 0.38% (Lotemax SM, Bausch + Lomb) four times daily, tapered over 2 weeks.

One day after surgery, UDVA was 20/200 with a pharmacologically dilated pupil (Figure 2). The cataract incision was watertight. Trace corneal edema was evident. IOP was 17 mm Hg. UDVA has remained stable at 20/30 for the past 5 months since the 1-week visit.

I have performed cataract surgery and implantation of a toric IOL in eyes that had a history of eight-cut RK when refractive stability was evident and the corneal incisions

appeared to be stable. I still cautioned these patients, however, that potential instability of the RK incisions might necessitate additional surgery in the future to achieve an optimal refractive outcome. ■

1. Schechter BA, Auerbach DB. Evaluation of a dispersive viscoelastic as a watertight wound closure for cataract surgery. Paper presented at: ASCRS Annual Meeting; April 20-24, 2012; Chicago.

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