

MORE THAN 20 RADIAL KERATOTOMY INCISIONS

Can the patient's desire for crisp uncorrected distance visual acuity be satisfied?

BY AUDREY ROSTOV, MD; JORGE L. ALIÓ, MD, PHD, FEBOPHTH, FWCRS; AND SADEER B. HANNUSH, MD

CASE PRESENTATION

A 65-year-old man with a history of radial keratotomy (RK) presents for a cataract surgery evaluation.

On presentation, the patient's BCVA is 20/30 OD with a manifest refraction of

-0.25 +1.50 x 133° and 20/80 OS with a manifest refraction of +1.00 +0.75 x 044°. A slit-lamp examination of the right eye reveals 24 RK incisions, a peripheral Salzmann nodule overlying five of the RK cuts from the 2 to the 3:30 clock positions,

astigmatic keratotomies from the 1 to 3:30 and the 6:30 to 9 clock positions, and a 2+ nuclear sclerotic cataract with 2+ cortical changes (Figure 1A). The left eye has 26 RK incisions; straight astigmatic keratotomies at the 1 to 5, 3 to 5, 10 to 7, and 9 to 10 clock positions; and a 3+ nuclear sclerotic cataract with 3+ cortical changes (Figure 1B). All other examination findings, including macular OCT, are normal in each eye (Figure 2).

The patient's priority is crisp uncorrected distance visual acuity.

How would you counsel him? Which IOL would you recommend? Would you remove the Salzmann nodule before operating on the right eye?

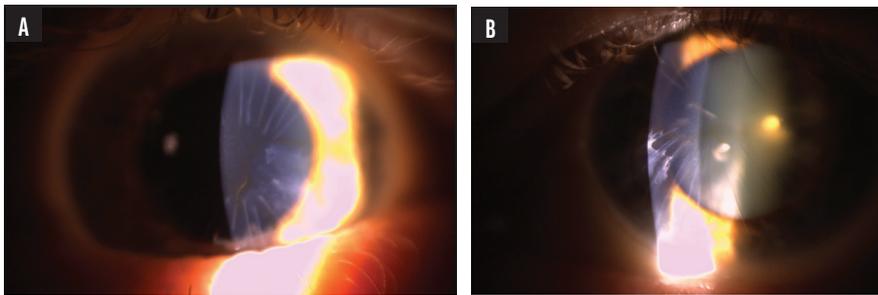


Figure 1. A slit-lamp examination reveals multiple RK incisions in the right (A) and left (B) eyes.

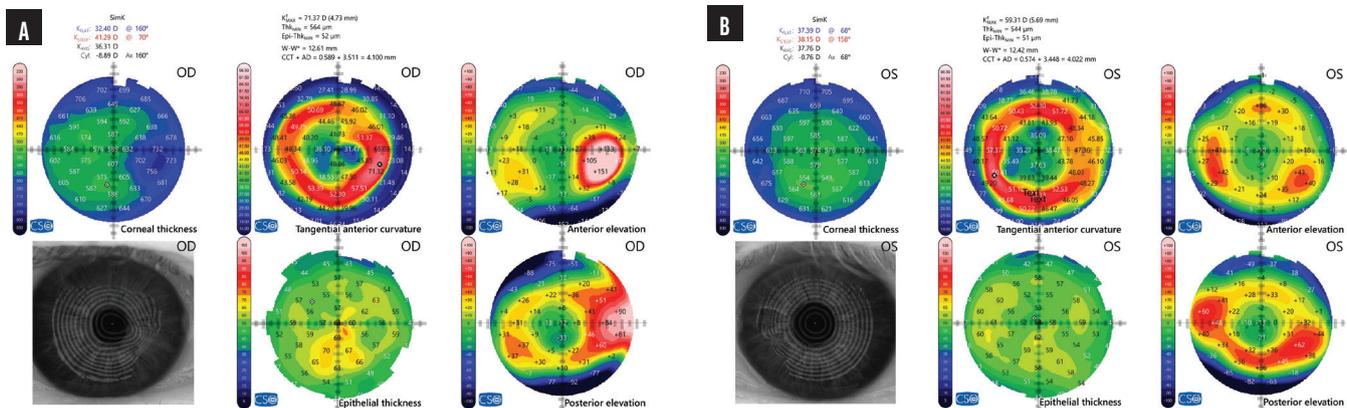


Figure 2. Measurements of the right (A) and left (B) eyes obtained with the MS-39.



JORGE L. ALIÓ, MD, PHD, FEBOPHTH, FWCRS

The excessive number of RK incisions in each eye has created major flattening of the central cornea and induced a high

amount of positive spherical aberration from the peripheral cornea.

I would begin by asking about the patient's quality of vision following RK. I expect it was poor from the beginning, making it impossible to achieve crisp vision with cataract surgery. Instead, the best possible outcome is an average level of vision—20/30 UCVA.

Because the patient has expressed an unrealistic goal, I would dedicate as

much chair time as necessary to educate him on his unique circumstances, the challenges of IOL calculation in post-RK eyes—particularly those with so many incisions—and the likelihood of a refractive surprise. I would also emphasize that 1 month or longer may elapse before each eye attains its final postoperative refractive outcome. I would explain, moreover, that his corneas are intrinsically unstable and that corneal

— Case prepared by Audrey Rostov, MD

edema or the opening of one or more RK incisions during surgery could delay his postoperative recovery. Additionally, a relatively imprecise refractive outcome should be expected.

The ASCRS IOL calculator for prior RK would be used, and the flattest keratometry reading in the central 2 mm of the cornea would be entered. The average power would be selected, and the refractive target of surgery would be -0.50 to -1.00 D.

A spherical monofocal IOL (SA60, Alcon) would be my preference. Alternatively, a small-aperture IOL (IC-8 Aphera, Bausch + Lomb) could be implanted. Although some good results have been reported with small-aperture lenses in situations like this one, my results with the technology have been variable and, in some instances, disappointing.

I would not attempt surgical correction of the patient's astigmatism, because the result would be unpredictable. The Salzmann nodule would therefore be removed during rather than before cataract surgery. Removal should improve the corneal topography and reduce astigmatism. Cataract surgery would be performed through a scleral incision.

The left eye would undergo surgery first because it has a greater number of RK incisions. After refractive stability is achieved (minimum of 3 weeks) and the patient is satisfied with the outcome, surgery would be performed on the right eye.



SADEER B. HANNUSH, MD

First, I would ask the patient how satisfied he has been with his UCVA, BSCVA, and BCVA with rigid gas permeable, hybrid, or scleral contact lenses since undergoing RK. I would emphasize that the refractive goal of cataract surgery is similar to the best visual acuity he achieved following RK and explain that achieving this goal might require him to wear spectacles or contact lenses.

Biometry would be performed, and an endothelial cell count would be obtained. A diagnostic refraction of each eye with a rigid gas permeable contact lens in place would provide useful information. A modern formula such as the Barrett True-K, Holladay II, EVO v2.0, or Wang-Koch would be used for the IOL calculation. The refractive target would be mild myopia to avoid consecutive hyperopia. Of note, the significant corneal astigmatism present in the better-seeing right eye is not reflected in the refraction, so it might be best to leave the Salzmann changes alone (ie, not remove the nodule) and avoid a toric IOL. The left eye has a well-centered area of corneal flattening with mild irregularity that, in the absence of amblyopia, suggests the cataract is a significant contributor to the visual deficit.

Cataract surgery with an aberration-free monofocal IOL would be performed on the left eye first. A posterior limbal approach or, preferably, a scleral tunnel incision would be used.

Preoperatively, I would counsel the patient on visual fluctuations and delayed visual stabilization due to the high number of RK incisions, and I would be careful not to make any promises about refractive or visual outcomes. I would also explain that additional lens-based or corneal corrective surgery may be required. Surgery on the right eye would not be performed until he is satisfied with the outcome in the left eye. The mantra *underpromise and overdeliver* would be essential in this situation.



WHAT I DID: AUDREY ROSTOV, MD

Biometry was performed with the IOLMaster 700 (Carl Zeiss Meditec), and IOL calculations used the Barrett True-K formula. Comparison tomography was obtained with the MS-39 (CSO).

First, the left eye underwent cataract surgery with scleral incisions, an IC-8 Aphera IOL, and a refractive target

of -1.50 D. In my experience, this lens works well in eyes that have multiple RK incisions, and the refractive outcome is generally 1.00 D less than the myopic target—even with modern IOL formulas. In this case, the target was -1.50 D in an effort to achieve a refractive outcome of -0.50 D. Surgery was uneventful. One week postoperatively, the patient's UCVA was 20/30 OS, and his BCVA was -0.75. +0.50 x 45° = 20/20-2 OS.

Two weeks after the procedure on the left eye, cataract surgery with the same lens (bilateral implantation of an IC-8 lens is off-label) and same refractive target was performed in the right eye. I did not remove the Salzmann nodule because I was concerned about the potential opening of the RK incisions and recurrence of the nodule in a short period of time, which I have encountered in similar situations.

One month following surgery, the patient's UCVA was 20/30 OD, 20/25 OS, and 20/25 OU. He experienced diurnal fluctuations in his vision but was satisfied with his outcome and willing to wear reading glasses as needed. ■

SECTION EDITOR AUDREY ROSTOV, MD

- Founder and Owner, Bellevue Precision Vision, Bellevue, Washington
- Affiliate surgeon, Cure Blindness Project
- Member, CRST Editorial Advisory Board
- audreyrostov@gmail.com
- Financial disclosure: Consultant (Bausch + Lomb, Carl Zeiss Meditec)

JORGE L. ALIÓ, MD, PHD, FEBOPHTH, FWCERS

- Professor and Chairman in Ophthalmology, Miguel Hernández University, Alicante, Spain
- Founder, Vissum Miranza, Alicante, Spain
- Visiting Consultant, The View Hospital, Doha, Qatar
- Member, CRST Global Editorial Advisory Board
- jlalio@vissum.com
- Financial disclosure: None

SADEER B. HANNUSH, MD

- Attending Surgeon, Wills Eye Hospital, Philadelphia
- Professor of Ophthalmology, Thomas Jefferson University, Philadelphia
- Medical Director, AltruVision Eye Bank, Philadelphia
- shannush@willseye.org
- Financial disclosure: Consultant (Kowa)