Decreasing Vision and Cataracts After RK and AK

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CASE PRESENTATION

A 51-year-old male presents with a history of decreasing vision such that his current BCVA is about to cost him his pilot's license and thus his job. The patient's past ocular history is significant for bilateral RK and astigmatic keratotomy (AK) 25 years ago. No records are available on his previous refractive surgery or preoperative measurements.

An examination reveals a manifest refraction of -5.00 +5.25 X 164 = 20/50 OD and -1.75 +6.75 X 158 = 20/60 OS. A slit-lamp examination shows a 10-incision RK using a Ruiz procedure in both eyes, +2 nuclear sclerosis with a +2 posterior subcapsular cataract in his right eye, and +3 nuclear sclerosis with a +2 posterior subcapsular cataract in his left eye. The funduscopic examination is normal.

Computed topography reveals pertinent corneal information and the irregular astigmatism from the patient's previous refractive surgery (Figures 1 and 2). Figure 3 shows the radial and astigmatic incisions, several of which cross.

The patient wishes to be free of spectacles, but his only real requirement is a BCVA of 20/20 to avoid losing his job. How would you proceed?

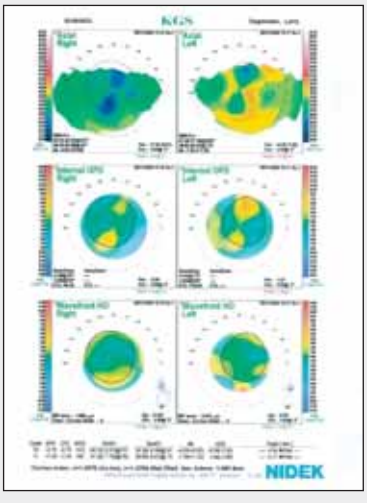

Figure 1. The patient has not only irregular corneal astigmatism but also marked lenticular astigmatism.

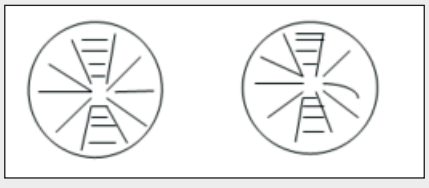

Figure 2. The patient has a history of RK and AK. In his left eye, the 3-o'clock incision is irregular and suspicious for microperforation.

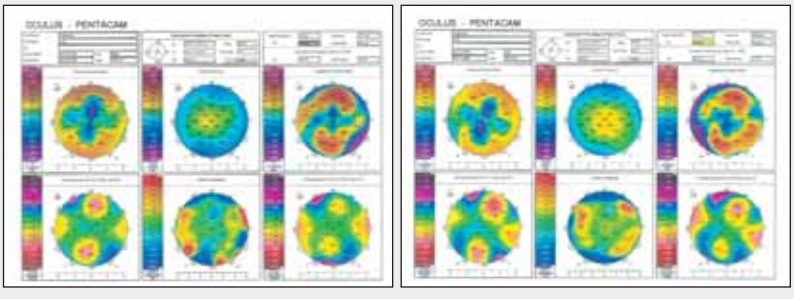

Figure 3. Imaging with the Pentacam Comprehensive Eye Scanner (Oculus, Inc., Lynnwood, WA) reveals the corneal irregularity related to the patient's previous refractive surgery.

STEPHEN F. BRINT, MD

First, I would inform the patient that 20/20 BCVA probably cannot be achieved, short of his possibly wearing a gas permeable contact lens or the SynergEyes A lens (SynergEyes, Inc., Carlsbad, CA). I would also explain that he faces a two-step (possibly a three-step) process for each eye that will be time consuming in terms of surgery as well as healing.

To address the cataracts, I would implant the AcrySof IQ Toric IOL (Alcon Laboratories, Inc., Fort Worth, TX) in an effort to reduce as much of the residual cylinder as possible. Because the patient appears to have 4.00 to 5.00 D of

corneal cylinder, I would select the SA6AT5, which should correct approximately 2.50 D of the cylinder. I have no recent experience with the STAAR Toric IOL (STAAR Surgical Company, Monrovia, CA), which corrects more cylinder, but it would be another option. As there are no historical data, I would calculate the IOLs' power with the Holladay formula, both with the best of several auto keratometry readings and the Holladay simulated keratometry readings from the Pentacam. I would use the highest-powered IOL suggested for a postoperative target of -2.00 D. This is all guesswork, but I would expect the patient to be slightly myopic (in the range of -1.00 D with the residual cylinder) after surgery.

> "My main advice on this case is to ensure that the patient maintains realistic expectations."
> —Mitchell A. Jackson, MD

When his refraction and visual acuity had been stable for at least 1 month, I would determine his refraction and BCVA. If his BCVA were 20/20, he would have the option of spectacles to correct the residual refractive error, or he might desire to undergo wavefront-guided PRK. If his BCVA were not 20/20, I would note the option of his going abroad for topography-guided PRK. As mentioned earlier, rigid contact lenses might be a final option.

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This case is quite challenging, and unfortunately, the surgeon who last operates on this patient will be remembered for any final visual outcome short of 20/20 BCVA. Meeting his unrealistic expectations will be problematic due to the irregular astigmatism from the previous RK and AK procedures. Furthermore, the complex cornea that now exists will make IOL power calculations even more prone to error than usual. My first step would be to set appropriate expectations for the patient. Specifically, I would explain that no single surgery will solve his problem and that he will most likely need gas permeable contact lenses after cataract surgery.

On its Web site, the ASCRS posts a format for determining IOL power after previous refractive surgery (http://iol.ascrs.org/) if the surgeon does not already use a specific formula (such as Masket, Haigis, Randleman, etc.) or have prior experience with such a formula. I would minimize any induced surgical astigmatism or spherical aberration as much as possible by using a microincisional approach of a 1.8- to 2.0-mm clear corneal incision, performing phacoemulsification with the Stellaris Vision Enhancement System (Bausch & Lomb, Rochester, NY), and placing an aspheric Akreos AO Micro Incision Lens (MI60L; Bausch & Lomb) to yield the best lenticular result possible.

After a minimum of 6 months of refractive stability postoperatively, I would tackle any residual refractive error. Most likely, gas permeable contact lenses would yield the best result, but the patient would have other options such as topography-guided PRK with mitomycin C performed abroad. My main advice on this case is to ensure that the patient maintains realistic expectations.

J. BRADLEY RANDLEMAN, MD

This difficult scenario involves multiple separate variables, including challenges in terms of the IOL power calculations and cataract surgery, the management of both regular and irregular astigmatism, and a mandatory requirement of 20/20 or better BCVA postoperatively.

Step 1 for this patient is removing the cataract and implanting the IOL. With multiple RK incisions, irregular astigmatism, and no preoperative records, there is no single, accurate, consistent method for determining the appropriately powered IOL. In our clinic, my colleagues and I use the consensus K technique,[1] which involves as many methods as we can generate for determining the IOL's power and then choosing the most consistent values among techniques. Although cataract extraction should be relatively straightforward, I would pay extra attention to the placement of the cataract incision and the stability of the old RK and AK incisions, especially since some appear to be full thickness and are therefore more likely to open during surgery.

The choice of IOL for this patient includes monofocal or toric lenses. Given the inherent inaccuracy in IOL power calculations and the potential refractive fluctuations from multiple corneal incisions, I would hesitate to implant a toric IOL and would instead opt for bilateral monofocal IOLs. If I could obtain some history of clinical stability over time in the amount and orientation of the regular astigmatic component, a toric lens would be a possibility and might make the rest of the astigmatic management less challenging. I would not offer limbal relaxing incisions to this patient. After cataract extraction and the IOLs' implantation, the postoperative refraction will take longer than usual to stabilize. No further surgical interventions should be undertaken until the refraction is very consistent.

The next step for this patient would depend on his residual refraction and the degree to which irregular astigmatism was affecting his visual acuity. PRK might be an option (perhaps a topography-guided procedure would be optimal), but the overall amount of astigmatism and degree of irregular astig-

matism would likely limit the final outcome. Because the goal is a BCVA of 20/20 or better rather than best achievable UCVA or BSCVA, I would only offer additional corneal refractive surgery if cataract surgery had significantly decreased the refractive astigmatism and the patient could easily refract to 20/20, which is unlikely. The best option for final visual rehabilitation would probably be a strategy involving rigid gas permeable contact lenses, either alone or in combination with soft contact lenses (piggyback fit). ■

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1. Randleman JB, Foster JB, Loupe DL, et al. Intraocular lens power calculations after refractive surgery: the consensus K technique. *J Cataract Refract Surg.* 2007;33:1893-1899.