

Sequential Surgery: Cataract Extraction, IOL Implantation in Eye With Previous PKP

Forethought, care, and patience are required, but excellent outcomes can be achieved.

BY NEDA SHAMIE, MD

Visually significant cataracts can develop in eyes that have previously undergone corneal transplantation (penetrating keratoplasty [PKP] or deep anterior lamellar keratoplasty [DALK]). The incidence is thought to be nearly 25%, with most patients developing some degree of nuclear or cortical cataract within the first 5 years.¹ Steroid use in the postoperative period and intraoperative iris manipulation can contribute to the development of cataracts. Additionally, if the initial corneal pathology was related to infectious keratitis with intraocular inflammation or a full-thickness corneal laceration, the incidence of developing significant cataracts in the first year after surgery is higher.¹

BACKGROUND

In a multivariate analysis of risk factors for developing cataracts after PKP, patients who were 50 years of age or older had a higher chance of developing visually significant cataracts within 5 years of undergoing PKP than their younger cohorts.² Limited data are available on patients who have undergone DALK, but the presumption is that the incidence may be lower, given that DALK is a closed-system surgery as opposed to an open-sky procedure. Additionally, post-DALK eyes tend to require a shorter course of steroids, a potential reason for a lower rate of related cataract formation. Lastly, the underlying pathology leading to the decision to offer DALK includes non-

“The decision to proceed with cataract surgery is guided by the visual deterioration caused by the cataracts.”

inflammatory conditions such as keratoconus, which are independently associated with a lower chance of cataract formation and often occur in the younger subgroup of patients.

In eyes with previous PKP that develop visually significant cataracts, cataract extraction can be performed safely with some caveats. Surgeons should consider five main factors when modifying their decision making and technique: (1) the timing of cataract surgery, (2) IOL calculations, (3) wound construction, (4) corneal endothelial protection, and (5) postoperative management.

CATARACT SURGERY AFTER PKP

Timing

The decision to proceed with cataract surgery is guided by the visual deterioration caused by the cataracts. The best timing for surgery is a subject of debate and is often determined by clinical findings, surgeons' preferences, and patients' expectations.



Ideally, cataract surgery in an eye with a history of PKP is performed after the penetrating corneal wound is stable and the keratometry readings are reliable. This may mean waiting at least 6 months and selectively or completely removing sutures to allow for an optimized and stable corneal curvature. I would also suggest ensuring reliable and stable corneal measurements at two sequential visits 3 to 6 weeks apart. To further ensure the stability of these measurements, the surgeon must also address any tear film instability and ocular surface disease.

IOL Calculations and Choice of Implant

As mentioned previously, the ideal situation is one in which the corneal power measurements (both average keratometry and cylinder) used in determining the IOL's power are stable, allowing for the most predictable refractive outcome. This can be addressed in one of three ways. When the corneal cylinder is high and/or irregular based on corneal topography, astigmatism can be managed sequentially, first with astigmatic keratotomy and then later by cataract extraction and IOL implantation when the corneal power has stabilized. Although this approach may lead to a more predictable refractive outcome, the delayed visual recovery is not always acceptable to the patient. An alternate approach is to perform astigmatic keratotomy at the time of cataract extraction and IOL implantation. When corneal astigmatism is regular and less than 4.00 D as noted on corneal topography, cataract extraction can be performed and a toric IOL implanted.

Wound Construction

A standard clear corneal incision is often possible in an eye that has had PKP but, again, with a few caveats. In eyes with remaining pathology in the recipient corneal rim (eg, pellucid marginal degeneration), the integrity of the wound may be compromised, and apposition of the wound's edges is unlikely. In such a setting, I consider a limbal or a scleral incision. In an eye undergoing cataract surgery that has a large PKP graft, which may leave little room for a well-constructed clear corneal incision, the surgeon should consider a scleral tunnel to avoid disrupting the graft-host junction. Finally, if a clear corneal incision is used, the surgeon should have a lower threshold for placing a safety suture, because the contour of the cornea in an eye after PKP may more frequently lead to wound leakage.

Corneal Endothelial Protection

Endothelial cell loss occurs at a higher rate in post-PKP eyes after cataract surgery. Surgeons must there-

“Endothelial cell loss occurs at a higher rate in post-PKP eyes after cataract surgery.”

fore take extra precautions during surgery to protect the fragile endothelial cell layer. Obviously, the generous use of viscoelastic—ideally dispersive—to protect the endothelial cell layer during phacoemulsification of the phakic lens will help protect against damage. Minimizing phaco power with updated settings that allow more efficient use of the energy also helps.

Perioperative Management

The more frequent perioperative use of steroids is thought to lessen the inflammatory response to surgery, which could initiate a rejection episode. The patient can be asked to start a steroid regimen prior to surgery and to continue dosing four to six times a day for several weeks until all inflammation subsides.

CONCLUSION

Cataract surgery in an eye that has undergone PKP can be safely performed with a few modifications in surgical planning and technique. ■

Neda Shamie, MD, is an associate professor of ophthalmology at the Doheny Eye Institute, University of Southern California Keck School of Medicine, and the medical director at the University of Southern California Doheny Eye Center-Beverly Hills. Dr. Shamie may be reached at nshamie@doheny.org.



1. Rhathi VM, Krishnamachary M, Gupta S. Cataract formation after penetrating keratoplasty. *J Cataract Refract Surg.* 1997;23(4):562-564.

2. Martin TP, Reed JW, Lagault C, et al. Cataract formation and cataract extraction after penetrating keratoplasty. *Ophthalmology.* 1994;101(1):113-119.

SHARE YOUR FEEDBACK

Would you like to comment on an author's article?

Do you have an article topic to suggest?

Do you wish to tell us how valuable

Cataract & Refractive Surgery Today

is to your practice?

We would love to hear from you. Please e-mail us at letters@bmctoday.com with any thoughts, feelings, or questions you have regarding this publication.