Keratorefractive Surgery in Glaucoma Patients

Considerations for refractive and glaucoma surgeons.

BY JOHN P. BERDAHL, MD

Many people want to decrease their dependence on glasses and contact lenses, and those with glaucoma are no exception. Oftentimes, patients will seek the opinion of a refractive surgeon without first consulting their primary eye doctor for fear that he or she will recommend against refractive surgery. It is therefore incumbent on refractive surgeons to thoroughly evaluate every patient for comorbid diseases. Because of the disease's ubiquity, it is not surprising that refractive surgeons often must determine whether a glaucoma patient can have refractive surgery. Conversely, many glaucoma specialists are asked by patients if they are candidates for refractive surgery. Rather than simply say no, glaucomatologists must consider each individual's visual goals.

This article breaks down the decisions about refractive surgery in glaucoma patients into preoperative, intraoperative, and postoperative categories.

PREOPERATIVE CONSIDERATIONS

The first step in evaluating any patient for refractive surgery is identifying his or her visual goals. The second step is determining if those goals are consistent with the patient's ocular anatomy and physiology. Thankfully, there is significant overlap between screening for glaucoma and for refractive surgery. Both should include an assessment of the UCVA, BCVA, IOP, pupil, anterior segment, and optic nerve head in addition to the measurement of central corneal thickness. A thin central cornea warns refractive surgeons to ensure that the residual stromal bed will be sufficient after refractive surgery; it is also an independent risk factor for the development of glaucoma and may affect the validity of IOP measurements. Accurately characterizing the optic nerve head provides a valuable baseline for use later in the patient's life. Patients should also be asked if they have a family history of glaucoma.

"The first step in evaluating any patient for refractive surgery is identifying his or her visual goals. The second step is determining if those goals are consistent with the patient's ocular anatomy and physiology."

Individuals with particularly thin corneas, a family history of glaucoma, elevated IOP, or a suspicious-looking optic nerve merit a full glaucoma workup. This assessment includes visual field analysis and nerve fiber layer evaluation, both for the purpose of documentation and to determine if they have glaucoma or may be glaucoma suspects. Interestingly, corneal hysteresis has become a valuable tool for both refractive and glaucoma surgeons. A thin, floppy cornea may increase a patient's risk for corneal ectasia and hence make him or her a poor candidate for refractive surgery. A thin, floppy cornea with a low hysteresis may also elevate the patient's risk of progressive glaucoma in the future.[1]

Many people do not feel motivated to have regular eye examinations after refractive surgery if they no lon-

ger need glasses or contact lenses. When candidates for refractive surgery have glaucoma or are glaucoma suspects, I frankly discuss with them the nature of glaucoma and its insidious course. Probably the most important point I make is that they require continuous monitoring over time. Those who undergo refractive surgery should also understand that they should disclose the procedure to any eye care provider because of its effect on IOP measurements. My colleagues and I provide all refractive surgery patients with a summary of their preoperative eye examination for their medical records.

Ocular hypertension and controlled glaucoma probably are not contraindications for refractive surgery. Uncontrolled glaucoma, however, must be addressed before refractive surgery is seriously considered. I generally recommend avoiding refractive surgery in patients who have had a trabeculectomy or glaucoma drainage device surgery, because the variable nature of the bleb can lead to significant changes in refraction—particularly astigmatism—over time.[2] If visual field loss threatens the visual axis or the loss of peripheral vision is significant, I also hesitate to perform refractive surgery for fear of further decreasing the patient's contrast sensitivity. I should note that myopes often have optic nerves that are challenging to judge and a high frequency of peripapillary atrophy, which can make retinal nerve fiber layer analysis difficult. These patients should certainly undergo visual field testing at a minimum and may benefit from a consultation with a glaucoma specialist.

INTRAOPERATIVE CONSIDERATIONS

Some practitioners have suggested that the increase in IOP that occurs with a suction ring during the creation of the LASIK flap is unacceptable. The IOP usually rises from 60 to 120 mm Hg, and the elevation lasts for less than 1 minute. In comparison, the IOP rises to approximately 75 mm Hg during cataract surgery with a bottle height of 100 cm of water and remains at this level for much longer. Although the temporary IOP elevation during LASIK merits consideration, I would argue that it is probably of little concern.

PRK does not increase the IOP, but patients tend to require a longer course of steroids after this procedure compared with LASIK. Their risk of a steroid-induced IOP spike is therefore higher.

POSTOPERATIVE CONSIDERATIONS

Patients using glaucoma medications should not stop the therapy during the postoperative period after LASIK. I emphasize to patients that an antibiotic or steroid introduced after refractive surgery is not a replacement for their glaucoma therapy.

> "It is wise to establish a new baseline via a thorough glaucoma examination after refractive surgery in patients with glaucoma or ocular hypertension."

It is wise to establish a new baseline via a thorough glaucoma examination after refractive surgery in patients with glaucoma or ocular hypertension. Doing so is not only advantageous from a medicolegal standpoint, but more importantly, it also helps the clinician to determine if and when future treatment is warranted. For example, if a patient's IOP dropped from 19 mm Hg preoperatively to 14 mm Hg postoperatively, the decrease likely reflects the reduction in corneal thickness instead of signaling that his or her glaucoma medical regimen should be altered. The new baseline glaucoma examination should include a visual field test, nerve fiber layer analysis, corneal hysteresis measurement (if available), IOP reading, and documentation of the optic nerve.

An IOP spike in the postoperative period may cause fluid to reside in the flap interface after LASIK. As a result, IOP measurements will be artificially low. An inexperienced refractive surgeon or glaucoma specialist may mistakenly diagnose inflammation and prescribe additional or stronger steroid therapy. In actuality, it is important to stop all steroids and to add an IOP-lowering agent to lower the IOP and disperse the interface fluid.[3]

CONCLUSION

Refractive surgeons must thoroughly screen every patient for comorbidities, and glaucoma specialists must recognize that their patients may desire and benefit from refractive surgery. With careful preoperative screening, surgical planning, education, and postoperative surveillance, many of these patients who are candidates for LASIK or PRK can decrease their dependence on glasses and contact lenses and enjoy an improved quality of life. ■

John P. Berdahl, MD, is a clinician and researcher with Vance Thompson Vision in Sioux Falls, South Dakota. Dr. Berdahl may be reached at johnberdahl@gmail.com.

1. Congdon NG, Broman AT, Bandeen-Roche K, et al. Central corneal thickness and corneal hysteresis associated with glaucoma damage. *Am J Ophthalmol*. 2006;141:868-875.
2. Rosen WJ, Mannis MJ, Brandt JD. The effect of trabeculectomy on corneal topography. *Ophthalmic Surg*. 1992;23(6):395-398.
3. Moya Calleja T, Iribarne Ferrer Y, Sanz Jorge A, Sedó Fernandez S. Steroid-induced interface fluid syndrome after LASIK. *J Refract Surg*. 2009;25(2):235-239.