Is Corneal Refractive Surgery an Option?

Glaucoma patients and glaucoma suspects are interested, but many questions remain unanswered.

BY SHACHAR TAUBER, MD

In the past 3 decades, ophthalmologists and their patients have seen great scientific advances in the correction of refractive error. Using incisional and laser surgical procedures, refractive surgeons have been able to treat hyperopia, myopia, and astigmatism successfully. After a review of the worldwide scientific literature, the Joint LASIK Task Force recently reported a rate of satisfaction among patients of 95.4%.1

The vast majority of patients who undergo modern corneal refractive procedures for ametropia do not have ocular comorbidities. That said, ophthalmologists are increasingly being asked to consider corneal refractive surgery for glaucoma suspects as well as patients with established, medically and surgically controlled glaucoma. Several questions become important in these cases. Do the benefits of corneal refractive surgery outweigh the risks? Will any special considerations be addressed both pre- and postoperatively? Does the patient understand the issues sufficiently to provide informed consent? If the answers to all three questions are “yes,” then surgeons may confidently offer LASIK and PRK to the glaucoma patient. As this article will discuss, however, the medical science is not yet complete.

WHO WANTS REFRACTIVE SURGERY?

Several types of patients treated for glaucoma may request refractive surgery. First are individuals for whom topical medical therapy makes continued contact lens wear inconvenient. Another group comprises individuals in whom the implantation of a multifocal IOL has left them with residual ametropia. A third group is those in whom a contact lens can no longer be adequately fit after surgical intervention such as trabeculectomy or the placement of a glaucoma drainage device.

THE OPTIC NERVE

Will LASIK damage the patient’s optic nerve? The rapid rise in IOP (to a level of 60-90 mm Hg) for a short period of time2 is an obvious concern in this patient population. The increase in pressure is sufficient to cause a transient and, at times, complete loss of vision that is thought to be related to the occlusion of the central retinal artery. Although no human studies exist, classic work in the primate shows that central retinal artery occlusion for 100 minutes will cause neuronal injury.3

Given that other procedures performed on patients with glaucoma have been shown to raise the IOP (eg, digital massage after trabeculectomy, scleral depression, retinal examination, and pneumatic retinopexy), the short increase during the application of the suction ring does not appear to be an absolute contraindication for LASIK in the glaucoma patient. Researchers have investigated the procedure’s potential to cause neuroretinal injury. In a prospective study, they compared a series of psychophysical and structural tests before and after LASIK and found no evidence of either structural or functional damage.4 Other investigators have documented thinning of the nerve fiber layer with scanning laser polarimetry after LASIK, but this may be related to artifacts seen in post-LASIK changes of the corneal birefringence.5,6 Certainly, PRK should be considered when the status of the optic nerve is of concern.

SPECIAL CONSIDERATIONS

Examinations

Although studies of refractive surgery in patients without glaucoma are reassuring, there is no definitive research to date that addresses the glaucoma patient undergoing LASIK or PRK. Case reports exist of patients who developed glaucoma after laser refractive surgery.2,8 It is for this reason that surgeons must exercise unique care when examining patients before and after refractive surgery.

Preoperatively, a careful review of the patient’s history and a thorough examination of the patient are mandatory to identify his or her risk factors for glaucoma or to docu-
ment the extent of preexisting glaucoma. If a patient is identified during the refractive surgery consultation as being at risk of developing glaucoma, the refractive surgeon should consider referring him or her for a consultation with a glaucoma specialist. When patients have glaucoma or are at risk of developing the disease, it is important to document in their charts the results of all preoperative testing, including pachymetry, serial tonometry, gonioscopy, automated visual fields, stereo disc photographs, and optic nerve imaging.

Because central corneal thickness changes after myopic excimer laser ablation, the postoperative IOP tends to be lower than the preoperative pressure. Nomograms have been created in an attempt to correlate the amount of central corneal tissue ablated with the artifactually reduced postoperative IOP. Determining which device will accurately measure the IOP after refractive surgery has also been discussed. It has been suggested that practitioners perform serial pre- and postoperative tonometry, with documentation in the chart that the IOP measured may be artifactually low. A further recommendation is to perform both automated visual fields and optic nerve imaging soon after corneal refractive surgery in an effort to establish a new baseline.

It is important for the patient’s primary eye care provider to be included in the establishment of a plan for the long-term surveillance of glaucoma suspects and glaucoma patients after refractive surgery.

Medication

The postoperative use of topical steroids is common, particularly after PRK but also among patients who develop diffuse lamellar keratitis (DLK) after LASIK. Because of the inaccuracy of IOP measurements after excimer laser ablation for myopia, surgeons must make every effort to limit the use of steroids in these individuals. There have been reports of patients treated for DLK after LASIK when fluid was trapped in the corneal interface, masking the true IOP reading. The rare condition of pressure-induced stromal keratopathy has been reported after LASIK in which the refractive surgeon treated the presumed DLK with intensive topical steroid therapy. Soon thereafter, the patient was observed to have microcystic corneal edema and clear fluid in the interface. The IOP, as measured with a Goldmann tonometer, was 3 mm Hg but was in the 50s when measured with a Schiotz tonometer. The patient’s IOP normalized after cessation of the topical steroids and initiation of topical aqueous suppression therapy. The use of mitomycin C 0.02% during PRK and improved efforts to control DLK intraoperatively (ie, through the use of disposable instruments and femtosecond lasers) have been welcome advances.

Glaucoma patients should resume IOP-lowering medical therapy soon after refractive surgery. Untoward effects on corneal wound healing from the use of ocular hypertensive agents after refractive surgery have not been documented.

CONCLUSION

Glaucoma patients who request corneal refractive surgery pose challenges to the refractive surgeon, the glaucoma specialist, and the primary eye care provider. The debate continues worldwide over whether modern corneal refractive surgery should be performed on these patients. In the author’s practice, glaucoma patients who seek refractive surgery are engaged in a thorough discussion of their expectations as well as the risks, benefits, and limitations of the available procedures. Although it is not likely that refractive surgery will cause or worsen glaucoma, the matter is still not well studied. The author therefore tells patients that glaucoma is a relative contraindication for LASIK or PRK and that the choice to proceed requires careful thought, given the lifetime of care that they require.

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