

Refractive Cataract Surgery in the Setting of Glaucoma

There are special considerations when attempting to enhance these patients' visual acuity after cataract extraction.

BY R. BRUCE WALLACE III, MD

As the baby boomers age, the comorbidity of glaucoma and cataract increases. Like others of their generation, patients with concurrent glaucoma and cataract generally desire enhanced visual function without the need for glasses. This article shares my tips for performing refractive cataract surgery on these individuals.

PREOPERATIVE

Patients with glaucoma require extra scrutiny—primarily of the optic nerve—prior to undergoing refractive cataract surgery. Physicians must carefully analyze and discuss with patients and their families subjective measurements such as visual fields and objective measurements from optic disc photography, scanning laser polarimetry, and optical coherence tomography. In many respects, however, individuals with glaucoma undergo much the same treatment as their counterparts without the disease in terms of refractive cataract surgery. Nonetheless, it is especially important to ensure that their expectations are realistic regarding the likelihood for visual improvement after the crystalline lens' replacement.

Improved biometry combined with computerized fourth-generation theoretic formulas have increased the accuracy of IOL power calculations. My colleagues' and my goal is to be within 0.50 D of the spherical target for more than 90% of eyes undergoing cataract or refractive lens exchange surgery. Inaccurate measurements of axial length remain the most common cause of errors in IOL power.¹ Many cataract surgeons use A-scan ultrasonography to measure preoperative axial length. The lower level of accuracy of this technique compared with immersion A-scan and partial coherence interferometry,

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however, makes contact ultrasound scans a less attractive option.² Immersion A-scan, once mastered, does not necessarily require more time or effort.³

In my opinion, regarding user friendliness and dependability, partial coherence interferometry with the IOLMaster version 5.0 (Carl Zeiss Meditec, Inc., Dublin, CA) is unsurpassed. The 5.0 upgrade, in many ways, represents an entirely new device capable of achieving much faster readings. I have found that it delivers more reproducibility and dependability for preoperative measurements of axial length and keratometry. The upgrade also provides my technicians with a safety net in the form of computerized prompts to alert them when readings are questionable, and it signals end-points for acceptable readings. The keratometry performed by this machine has become so dependable that I tend to rely more on its readings than on corneal topography when planning peripheral corneal relaxing incisions or the implantation of a toric IOL.

It is important to use the latest formulas for calculating the IOL's power (eg, the Holladay II, Hoffer Q, Haigis II) in order to achieve the best refractive results.⁴ These formulas are available on computer programs that can analyze surgical outcomes and provide ongoing person-

alization of lens constants, a valuable asset to enhancing one's IOL power calculations. I recommend attaining a high level of refractive accuracy using these tools with monofocal IOLs before entering the refractive lens arena. My colleagues and I discuss presbyopia-correcting IOLs with all patients undergoing cataract surgery, but I do not recommend multifocal IOLs to those with advanced glaucomatous damage, because the lenses may further compromise these individuals' contrast sensitivity. I will sometimes implant the Crystalens (Bausch & Lomb, Rochester, NY) in such eyes, but I will emphasize to the patients that their visual outcome is uncertain due to preexisting optic neuropathy.

Determining the correct central corneal power in eyes that have undergone corneal refractive surgery represents a growing challenge.⁵ New instrumentation such as the Pentacam Comprehensive Eye Scanner (Oculus, Inc., Lynnwood, WA) and contact-lens-fitting software available on the latest corneal topographers may provide more reliable keratometric measurements in these cases.

One bright aspect of removing a cataract is the potential of lowering the IOP in many glaucomatous eyes. An IOL is 75% thinner than the crystalline lens. After the IOL's implantation, the anterior chamber will be deeper, and the angles will be wider, thus improving the access of aqueous to the trabecular meshwork.

INTRAOPERATIVE

Surgeons should make every effort to perform a precise, painless, predictable cataract procedure (Figure 1). To protect against infection and inflammation, my patients receive topical fourth-generation fluoroquinolones, prednisolone acetate, and nonsteroidal anti-inflammatory topical medications beginning 3 days prior to surgery and continuing postoperatively. I recently extended antibiotic prophylaxis to 2 weeks postoperatively after the report of a multicenter study by Moshirfar et al in which cases of endophthalmitis occurred after 1 week.⁶

My colleagues and I instill topical povidone-iodine immediately before and after the procedure. Topical anesthesia with light IV sedation contributes to patients'



Figure 1. Dr. Wallace treats preexisting astigmatism with limbal relaxing incisions in eyes with and without glaucoma.

rapid visual recovery. When preparing the eye for surgery, I isolate the lashes and lid margins with an adhesive eye drape. The lid speculum is placed with care in order to avoid corneal contact. I inject both dispersive and retentive ophthalmic viscosurgical devices (OVDs) in order to protect the corneal endothelium. Prior to performing the anterior capsulotomy, I mark the central cornea with a 6.0-mm optical zone marker as a template in order to consistently create a 5.0- to 5.5-mm capsular opening, which allows the peripheral anterior capsule to overlap the anterior surface of the IOL.⁷ This configuration has been shown to reduce the incidence of posterior capsular opacification.⁸

Using the latest phacoemulsification technology improves surgical predictability. Current machines feature enhanced fluidics, and they decrease the incidence of surge and produce less heat; the result is fewer complications and faster visual recovery. Most surgeons are familiar with nuclear cracking and chopping phacoemulsification techniques, but I find that nuclear flipping techniques are usually more effective for soft nuclei. The burst hemi-flip method is an easy approach to nuclear removal that takes advantage of current phacoemulsification technology and has a universal application, although it is especially useful for soft nuclei (ie, refractive lens exchange). I employ this technique for most eyes, even those with dense nuclei. I bisect the nucleus and flip each half into the pupillary plane before emulsification. My colleagues and I try to limit postoperative astigmatism to less than 1.00 D. We perform limbal relaxing incisions for preexisting cylinder, including in glaucomatous eyes.

Gone are the days of pilocarpine and physostigmine miosis, yet pseudoexfoliation glaucoma, neovascular glaucoma, uveitic glaucoma, previously filtered or shunted glaucoma, and traumatic glaucoma can still create problems during cataract surgery. Temporal clear corneal incisions help to preserve tissue for future glaucoma surgery, and, during cataract procedures, they allow ophthalmologists to avoid the sites of previous glaucoma surgery. Eyes with anterior synechiae due to narrow angles and/or uveitis can benefit from viscodissection with an OVD injected into the angle prior to anterior capsulotomy. It is

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SURGICAL PEARLS

important to ensure the complete removal of the OVD at the end of surgery to avoid postoperative pressure spikes.

POSTOPERATIVE

Patients with glaucoma may benefit from IOP measurements in the immediate postoperative period, similar to protocols for YAG peripheral iridectomy and selective laser trabeculoplasty. All glaucoma patients require careful monitoring of their IOP if placed on steroids, and these topical drugs should be avoided in known steroid responders. I usually have patients resume all of their topical glaucoma medications soon after surgery. Some controversy surrounds the use of topical prostaglandin analogs after cataract surgery due to the possibility that these drugs increase patients' risk of cystoid macular edema. Many clinicians continue treatment with prostaglandins, however, if the posterior capsule is intact.

CONCLUSION

Cataract surgery continues to improve in terms of safety profiles and better refractive outcomes, and the benefits extend to patients with concurrent glaucoma and cataract. Although these patients can present surgeons with unique challenges, recent improvements in IOL surgery provide them with safer surgical options and significantly better refractive outcomes. □

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