GLAUCOMA PATIENTS DESERVE REFRACTIVE CATARACT OUTCOMES, TOO

By Michael Greenwood, MD

All patients, including those with glaucoma, want the same thing when it comes to cataract surgery: the best possible uncorrected vision. When talking to patients both with and without glaucoma about cataract surgery, I try to keep it simple and present three clear options.

• Option 1 is standard cataract surgery, with which the patient will need a pair of glasses to make things crisp in the distance and up close.

• Option 2 involves the use of advanced technology, such as limbal relaxing incisions (LRIs) or toric IOLs, to correct any astigmatism and make distance vision crisp. With this option, patients will need a pair of reading glasses for seeing at arm’s length or closer.

• Option 3 includes implantation of a multifocal IOL or an extended depth of focus (EDOF) IOL to give patients crisp distance vision and less dependence on glasses for near activities. This approach can also include astigmatism correction with LRIs or toric versions of these lenses.

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MULTIFOCAL IOLS ARE FOR THOSE WITHOUT GLAUCOMATOUS DISEASE

By Joseph F. Panarelli, MD; and Rachel Lee, MD

As with any cataract surgery candidate, patients with glaucoma should receive extensive preoperative counseling to identify visual goals, discuss potential options, and aim to eliminate factors that may compromise final visual outcomes. A growing number of patients are interested in receiving multifocal IOLs as a part of their cataract surgeries because of their advertised benefits. This article discusses issues that ophthalmologists must weigh before recommending multifocal IOLs to patients with glaucoma and sheds light on reasons why glaucoma patients may not be ideal candidates for these lenses.

CONTRAST AND QUALITY OF VISION

A comprehensive assessment of vision quality in patients with glaucoma should include the measurement of contrast sensitivity. Studies show that contrast sensitivity generally decreases with age and is further impaired in glaucomatous eyes.¹ Not only do patients with perimetric (Continued on page 51)
“THESE PATIENTS SHOULD BE EXTENSIVELY COUNSELED THAT, ALTHOUGH A MULTIFOCAL IOL MAY REDUCE THEIR SPECTACLE DEPENDENCE, THE LENSES THEMSELVES, AS WELL AS ONGOING TREATMENTS FOR THEIR GLAUCOMA, MAY DEGRADE THEIR OVERALL QUALITY OF VISION AFTER CATARACT SURGERY.”

–JOSEPH F. PANARELLI, MD

(Dr. Panarelli, continued from page 50) glaucoma demonstrate impaired contrast sensitivity, but also even patients with preperimetric glaucoma may have worse contrast sensitivity compared with those without glaucoma.\textsuperscript{2,3} Decreased contrast sensitivity—which may or may not be correlated with visual field progression—is linked to day-to-day functional disability,\textsuperscript{4,5} including but not limited to the ability to navigate and avoid obstacles, to recognize faces, and to identify and use household objects.\textsuperscript{6} Therefore, any intervention that may compromise contrast sensitivity must be carefully considered.

Multifocal IOLs are designed to provide good near, intermediate, and distance visual acuity at the expense of reduced contrast sensitivity. By consequence of design, only a fraction of the light entering the eye is used to focus the image at each point of distance. Far from being a theoretical risk, studies have shown that multifocal IOLs can degrade contrast sensitivity in vivo to a greater degree than accommodating or monofocal IOLs in nonglaucomatous eyes.\textsuperscript{7,8}

Practically speaking, it is difficult to identify glaucoma patients who may experience contrast sensitivity deficits after cataract surgery. First, there is heterogeneity in methods of assessing and identifying glaucoma patients with contrast deficits. Second, both cataract and glaucoma can negatively affect contrast sensitivity; therefore, it may be difficult to distinguish which disease process is causing a measured contrast deficit. Consequently, we generally recommend avoiding multifocal IOLs in glaucoma patients unless thorough preoperative testing and discussion lead to this decision.

Other premium IOLs, such as toric IOLs and aspheric IOLs, may be better choices in glaucoma patients to correct astigmatism and to potentially improve contrast sensitivity, respectively.\textsuperscript{9-11}

In most cases, it may be preferable to stage cataract surgery and incisional glaucoma surgery. However, if a combined surgery is planned, care must be taken to account for postoperative astigmatism induced by the incisional glaucoma surgery.

FINANCIAL BURDEN

The relationship between medication noncompliance and direct costs to the patient has been studied extensively. Unsurprisingly, higher financial burdens tend to be associated with higher rates of medication noncompliance.\textsuperscript{12} In 2017, the average added out-of-pocket cost for premium IOLs ranged from $1,000 to nearly $2,500 per eye.\textsuperscript{13} By contrast, the direct annual cost of care for glaucoma management—including clinic visits, medications, surgeries, and visual fields—is estimated to be between $623 for glaucoma suspects or patients with mild glaucomatous disease and $2,511 for those with severe disease.\textsuperscript{14}

When recommending premium IOLs, the physician has an ethical responsibility to consider the direct financial burden of choosing these options and to discuss with the patient the importance of continuing medical and surgical treatment of glaucomatous disease, regardless of the decision to choose a premium IOL.

EXPECTATIONS

Although the goal of cataract surgery in patients with and without glaucoma should be to maximize visual outcomes after surgery, the limitations of these expectations must be clearly discussed with patients preoperatively. Often, patients with glaucoma hope to be spectacle-free after cataract surgery. These patients should be extensively counseled that, although a multifocal IOL may reduce their spectacle dependence, the lenses themselves, as well as ongoing treatments for their glaucoma, may degrade their overall quality of vision after cataract surgery.

Among glaucoma patients, final visual outcomes are also dependent on the ongoing medical and surgical management of their disease. For instance, topical IOP-lowering agents may affect tear film stability and cause fluctuations in vision related to ocular surface disease, particularly among those who use medications with preservatives.\textsuperscript{15-17} Further, patients who may later require incisional glaucoma surgeries may also develop new refractive errors that were not anticipated at the time of cataract surgery.
Multifocal IOLs can enhance visual outcomes in the right patients—and often the right patients are those without glaucomatous disease.

CONCLUSION
Overall, the goal of cataract surgery should be to optimize final visual outcomes based on the patient’s personal goals and comitant disease. Most patients with glaucoma may already have underlying contrast sensitivity or visual field deficits and therefore would not be ideal candidates for multifocal IOL implantation. Additional financial burdens and postoperative expectations should also be discussed.

Even after an ideal candidate for multifocal IOLs has been selected, the surgeon must be aware that multifocal IOLs can decrease visual sensitivity by 2 dB postoperatively, affecting subsequent visual field assessments and necessitating new baseline fields after surgery.18

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17. Barrett Universal II or Hill-RBF. This will increase the surgeon’s chance of hitting the refractive target, as these methods are shown to be the most accurate for all axial lengths.

THE FRINGE

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Often, patients taking glaucoma medications may have ocular surface disease that can affect biometry measurements. If ocular surface disease is present, the ocular surface should be optimized prior to cataract surgery.

Further, we should use the most up-to-date IOL formulas, such as the Barrett Universal II or Hill-RBF. This will increase the surgeon’s chance of hitting the refractive target, as these methods are shown to be the most accurate for all axial lengths.

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IN THE OR

During cataract surgery, glaucomatous eyes can present additional challenges. Patients with pseudofollicular glaucoma often have weak zonules and poor dilation. Poor dilation increases the risk for complications, such as posterior capsular rupture, which makes placing an advanced-technology IOL more difficult. Patients with pseudexfoliation are also at risk for capsular contraction following surgery, which can lead to decentration of the IOL over time. Individuals with previous glaucoma surgery such as trabeculectomy or tube shunt procedures can also have zonular instability, and surgeons may need to adjust their incision placement.

There were initially concerns about IOP elevation during the femtosecond laser portion of laser cataract surgery, but the safety of the procedure and its effect on IOP levels have subsequently been studied thoroughly. On average, IOP increases by about
10 to 16 mm Hg during the laser procedure but returns to baseline shortly thereafter. This transient rise (about 30 to 90 seconds, depending on the surgeon preferences and laser platform) is well tolerated in both glaucomatous and nonglaucomatous eyes. All things considered, patients with glaucoma should not be denied the opportunity to undergo laser cataract surgery.

This is also an excellent time to consider performing laser or manual LRIs in patients with astigmatism. If there is residual refractive error following cataract surgery, these patients can safely undergo a laser fine-tuning with LASIK or PRK (after ensuring their candidacy).

Toric IOLs

Toric IOLs should be offered to all glaucoma patients with significant astigmatism, regardless of the extent of visual field loss, as long as central visual acuity is present and astigmatism is regular and stable. A well-positioned toric IOL will provide better quality of vision than glasses for all patients because their vision is less dependent on the positioning of the spectacle lens. This is especially true with high levels of astigmatism.

In patients who have a filtering bleb that is inducing astigmatism, a toric IOL can be placed as long as the astigmatism is symmetric and stable. For those with pseudoexfoliation or loose zonules, we must consider that the IOL can tilt or become dislocated with time. This can be a problem with any IOL, but misalignment of a toric IOL in particular can create substantial distortion.

Glaucoma patients often have poor dilation during cataract surgery, which can make placement of a toric lens more difficult if the surgeon cannot locate the markers on the IOL. It is important that the IOL be placed on axis, as there is a 3% loss of astigmatic correction for every degree off axis, meaning that an IOL placed 30° off axis will have no astigmatic effect.

Multifocal and EDOF IOLS

Multifocal and EDOF IOLs can be offered to patients with glaucoma, albeit with some caution. Glaucomatous eyes have reduced contrast sensitivity, and a multifocal or EDOF IOL can further reduce contrast sensitivity. Therefore, these IOLs are best used in patients with ocular hypertension or very mild glaucoma with no or minimal visual field changes and low risk of progression. As with toric IOLs, multifocal and EDOF IOLs should be avoided in patients with zonular compromise because of the risk of decentration. These IOLs can also be used in combination with LRIs or in their toric versions, with the same considerations described above.

Accommodating IOLs

Accommodating IOLs can also be used in patients with glaucoma. Because the optics of these IOLs behave similarly to those of a monofoveal IOL, concerns regarding additional loss of contrast sensitivity do not apply. These IOLs are very dependent on a healthy zonular complex, however, and should be avoided in patients with zonular laxity.

A LIFELONG DECISION

In the United States, the average age for cataract surgery is 65, and the average life expectancy is 85. Patients are undergoing cataract surgery at younger ages because of the increased safety of the procedure and the improved outcomes it offers. When patients with glaucoma undergo cataract surgery, we need to remember that the IOLs we choose will last for the rest of their lives. They deserve a refractive cataract outcome, and we surgeons must have the skill and courage to deliver on those expectations.


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- Financial disclosure: None