Lifestyle IOLs

Are these lenses appropriate for patients with concurrent cataract and glaucoma?

BY BRADFORD J. SHINGLETON, MD

Glaucoma patients want and deserve the most up-to-date IOL technology, and they warrant consideration for lifestyle IOLs such as multifocal and accommodating lenses. Unfortunately, there is a paucity of data on the use of such IOLs in this population. In addition, two unique factors of particular importance to glaucoma patients potentially complicate refractive success with cataract surgery using lifestyle IOLs: contrast sensitivity and ocular anatomy/structure.

Glaucoma is a progressive disease, and patients' safety is of paramount importance in any decision related to the selection of IOLs. This article reviews considerations in the IOL decision-making process for this population.

CONTRAST SENSITIVITY

One of the earliest visual functions affected by glaucoma is contrast sensitivity.[1,2] It can deteriorate before central visual acuity is affected, and the impairment is most pronounced in low-light conditions. A greater reduction in contrast sensitivity is associated with advancing glaucomatous visual field loss. The practical impact of reduced contrast sensitivity due to the disease manifests primarily when patients are driving and during dark adaptation.[3]

Diffractive and refractive multifocal IOLs also decrease contrast sensitivity.[4] This reduction is greatest under scotopic conditions. The practical impact on glaucoma patients who have a multifocal IOL is that their ability to drive can be impaired to a greater extent than it would be due to their disease alone.[5]

ANATOMIC/STRUCTURAL ISSUES

The size, shape, and contour of the pupil are occasionally altered in glaucoma patients due to their use of miotics, the formation of posterior synechiae, trauma, and surgery. Both multifocal and accommodating IOLs are pupil dependent. Excessively small or large pupils could therefore negatively affect patients' vision with such IOLs.

Zonular support can also be compromised, particularly in eyes with pseudoexfoliation (PXF) or traumatic glaucoma. Moreover, zonular weakness can be progressive in patients with PXF. This is a critical point with regard to multifocal or accommodating IOLs, because they depend on stable zonules for consistent centration and fixation.

> "These lenses are reasonable options if the patient is highly motivated and has only mild, stable visual field loss not involving fixation."

Structural changes in the architecture of the eye are common after glaucoma surgery. The presence of a filtering bleb and fibrosis of the scleral flap can alter astigmatism. In addition, the surgeon's use of antimetabolites can change scleral integrity, thus affecting astigmatism. Unfortunately, such effects are variable and not predictable, and multifocal and accommodating IOLs require minimal astigmatism to deliver optimal vision.

Furthermore, some patients who undergo glaucoma surgery develop hypotony maculopathy, which will affect vision with any type of IOL. Even low IOP without hypotony, however, can be associated with variability in anterior chamber depth and a shortened axial length. Lifestyle IOLs rely on precise and consistent axial length measurements and a stable anterior chamber depth.

Finally, accommodating IOLs depend on a properly sized capsulorhexis to function appropriately. Anterior capsular contraction (phimosis) can occur with small capsulorhexis openings, and the problem is more common in patients with PXF. Phimosis can significantly alter the position of the IOL by inducing tilt or decentration, which would compromise the performance of lifestyle IOLs.

CONSIDERATIONS

If a cataract is visually significant, its extraction and the implantation of an IOL, whether monofocal or lifestyle, will likely improve the vision of most patients.[6,7] For individuals with mild glaucoma, multifocal and accommodating IOLs are relatively contraindicated. These lenses are reasonable options if the patient is highly motivated

and has only mild, stable visual field loss not involving fixation. The glaucoma should be expected to remain under control indefinitely, however, and there should be no structural changes that might compromise centration or fixation of the IOL. Moreover, the patient's fellow eye should be fully functional and stable.

Multifocal IOLs are more strongly contraindicated when the patient has moderate glaucoma with a greater degree of visual field loss or less stable IOP control. An accommodating IOL could be considered for these individuals, but caution should be exercised if the patient has PXF, traumatic zonular compromise, or structural changes in the anterior segment.

Advanced or uncontrolled glaucoma represents an absolute contraindication to lifestyle IOLs. The quality of BCVA is the critical factor in these patients; spectacle independence is of secondary concern.

CONCLUSION

The choice of IOL in the setting of glaucoma should be personalized to the patient. Aspheric technology reduces higher-order aberrations and has known benefits for patients with compromised contrast sensitivity. Neutrally aspheric monofocal lenses may be more forgiving in eyes that are predisposed to IOL decentration. Monovision/blended vision is an effective way to enhance spectacle independence for many patients. Those with glaucoma, in particular, may be suited to such an approach using monofocal aspheric technology. Lifestyle IOLs may be appropriate, however, for highly motivated patients with mild-to-moderate, stable glaucoma and a long-term expectation of good binocular visual function. ❑

Bradford J. Shingleton, MD, is in private practice with Ophthalmic Consultants of Boston, and he is an associate clinical professor of ophthalmology at Harvard Medical School in Boston. He acknowledged no financial interest in the material presented herein. Dr. Shingleton may be reached at (617) 573-1018; bjshingleton@eyeboston.com.

1. Wood JM, Lovie-Kitchin JE. Evaluation of the efficacy of contrast sensitivity measures for detection of early primary open-angle glaucoma. *Optom Vis Sci.* 1992;69:175-181.
2. Hawkins AS, Szlyk JP, Ardickes Z, et al. Comparison of contrast sensitivity, visual acuity and Humphrey visual field testing in patients with glaucoma. *J Glaucoma.* 2003;12:134-138.
3. Szlyk JP, Taglia DP, Paliga J, et al. Driving performance in patients with mild to moderate glaucoma as clinical vision changes. *J Rehabil Res Dev.* 2002;39(4):467-482.
4. Zeng M, Liu Y, Liu X, et al. Aberration and contrast sensitivity comparison of aspherical and monofocal and multifocal intraocular lens eyes. *Clin Experiment Ophthalmol.* 2007;35(4):355-360.
5. Montes-Mico R, Espana E, Bueno J, et al. Visual performance with multifocal intraocular lenses. *Ophthalmology.* 2004;111:85-96.
6. Leyland M, Zinicola E. Multifocal versus monofocal intraocular lenses in cataract surgery. *Ophthalmology.* 2003;110:1789-1798.
7. Parekh PD, Samuelson TW. The use of multifocal IOLs in glaucoma. How much is too much? In: Chang DF, ed. *Mastering Refractive IOLs: The Art and Science.* Thorofare, NJ: Slack, Inc.; 2008:386-388.