Preoperative Assessment for Multifocal IOL Implantation

OCT of the posterior pole can improve outcomes.

BY ELISABETH PATSOURA, MD, MRCOPHTH

Cataract surgery has evolved into a refractive procedure that aims not only to improve vision but also to provide correction of ametropia and presbyopia. In most cases, patients achieve spectacle independence, and thus their quality of life is improved.

Multifocal apodized IOLs bring together a variety of optical and physical properties to provide vision over a wide range of distances. Diffractive steps are incorporated in the anterior lens surface, producing the diffractive add pattern. Although apodization improves vision by eliminating unwanted photic phenomena, it cannot fully compensate for the inherent disadvantage of diffractive optical systems; that is, overall reduced light transmission directed to two foci, with the rest of the light being lost in higher diffractive orders. Contrast sensitivity is also reduced, especially in dim illumination.

The main downsides of these lenses are the degradation of the quality and quantity of vision under certain conditions. This is particularly exacerbated when a coexisting ocular pathology is present, resulting in poor visual performance. Although anterior segment pathology can be readily identified on cursory slit-lamp examination, posterior pole abnormalities are sometimes difficult to detect in the presence of a cataractous lens. This is when optical coherence tomography (OCT) becomes a valuable diagnostic tool for the cataract surgeon.

PRECISION AND APPLICATIONS

OCT uses near-infrared illumination to produce high-quality cross-sectional images of the retina with an axial resolution of about 10 µm. Studies have shown that OCT can reliably detect fundus details even in the presence of a cataract up to grade 3 in the Lens Opacity Classification System. Uncovering preoperatively any underlying macular pathology such as epiretinal membranes, vitreomacular traction, occult choroidal neovascular membrane, minimal cystoid macular edema, and even small retinal pigment epithelium detachments and drusen that are hardly visible on fundoscopy (Figures 1 through 3), can greatly influence the surgeon’s decisions regarding how to manage a patient and choose the most appropriate IOL. In such cases, implantation of a multifocal IOL carries a risk and might predispose the patient to unpleasant postoperative surprises if significant pathology has been missed. In eyes in which an OCT cannot produce a reliable image due to a very dense cataract, a multifocal IOL should not be implanted.

It seems wise to advocate that, with the evolution of new multifocal toric designs that allow implantation of multifocal IOLs in eyes with significant corneal astigmatism and with the emergence of new treatments for anterior surface pathology, especially dry eye syndrome, macular pathology will be one of the few detrimental limiting factors for determining a patient’s inclusion or exclusion for multifocal IOL implantation. Therefore, the importance of detecting macular pathology before cataract surgery cannot be overstressed.

• OCT of the posterior pole should be integrated into the preoperative assessment when multifocal IOL implantation is considered.
• Better patient selection for multifocal IOLs and long-term results can be achieved with OCT.
• OCT can be reliable even in the presence of a mild to moderate cataract.
Based on our experience, subtle retinal conditions such as early epiretinal membranes and early age-related maculopathy changes are often overlooked preoperatively when a patient’s evaluation is based only on dilated fundoscopy. It has been shown that even in early stages of maculopathy, when visual acuity is not yet affected, contrast sensitivity reduction is a consistent finding. This is particularly important when a patient is to receive a multifocal IOL, which further reduces contrast.

In a study we carried out, which included 111 eyes of 111 patients, 51 eyes (group A) were preoperatively assessed without OCT and 60 eyes (group B) were preoperatively assessed with OCT. The most frequent macular pathologies detected postoperatively in multifocal IOL patients who underwent only dilated fundoscopy at preassessment were epiretinal membranes and early macular degeneration. The percentage of maculopathy in group A matched the prevalence of these conditions in the general postoperative cataract surgery population (64% of eyes had detectable macular changes). We thought that this was unacceptably high and that stricter criteria for patient selection had to be applied. By consistently using OCT when preoperatively assessing patients scheduled to have a multifocal IOL implanted (group B), we reduced the incidence of maculopathy to less than one-third of the incidence in group A.
multifocal add-on IOL that can be removed if needed.

Most studies to date looking at patient satisfaction with multifocal IOLs have identified unacceptable photic phenomena as the main reason for explantation. However, these studies have had relatively short follow-up. As studies with longer follow-up (10 years and more) are now being completed, it is likely that development or progression of retinal pathology may become another important cause for patient dissatisfaction and subsequent multifocal IOL explantation.

We have had to explant multifocal IOLs from 2 eyes due to progression of dry AMD. Patients may adapt to the way they see, but this does not equal good visual performance. We need to look further ahead and continue monitoring eyes implanted with multifocal IOLs.

We still encounter the occasional patient who, despite macular pathology, achieves a satisfactory level of vision, but this is definitely not the case for demanding patients who seek high quality of vision.

CONCLUSION

OCT has to become a mandatory diagnostic tool for every patient preoperatively assessed for multifocal IOL implantation. OCT not only safeguards the surgeon’s choice of the best IOL but also the patient’s best interests. Premium IOLs have been developed to meet premium patients’ expectations. Patients willing to pay for multifocal IOLs must be assured of satisfactory outcomes. It is therefore considered malpractice if a comprehensive preoperative examination does not take place before surgery.

Elisabeth Patsoura, MD, MRCoPhth, is an eye surgeon at Ophthamos Research & Therapeutic Institute, Athens, Greece. Dr. Patsoura states that she has no financial interest in the material presented in this article. She may be reached at tel: +30 210 894 0902; e-mail: opthalmos@opthalmos.gr.