

Macular Function

Cataract & Refractive Surgery Today asked five surgeons to discuss the importance of assessing macular function in cataract patients.

**BY STEVE CHARLES, MD; SAMUEL MASKET, MD; JAY S. PEPOSE, MD, PhD;
RICHARD TIPPERMAN, MD; AND WILLIAM B. TRATTLER, MD**

STEVE CHARLES, MD

As a vitreoretinal surgeon, I have a different perspective on evaluating macular function and retinal risk factors in general than a cataract surgeon. The primary goal should be reducing complications by managing retinal diseases that coexist with the cataract, not only addressing informed consent issues.

Spectral-domain optical coherence tomography (OCT) using multiple-slice monochrome B-scan display provides the most information. Time-domain OCT is less precise, and pseudocolor displays produce pseudointerfaces. Thickness measurements alone obscure the differential diagnosis, which includes epimacular membrane, partial- and full-thickness macular holes, vitreomacular traction syndrome, macular schisis, subretinal fluid secondary to a choroidal neovascular membrane or retinal detachment surgery, retinal edema overlying choroidal neovascularization, diabetic macular edema (DME), and macular edema secondary to central, hemifield, or branch retinal vein occlusion.

Cataract surgery does not cause the progression of age-related macular degeneration (AMD), as shown by an analysis of data from the Age-Related Eye Disease Study (AREDS) by Chew and colleagues.¹ Nonetheless, the surgeon and patient should be aware of the potential for a suboptimal visual outcome. OCT as well as autofluorescence are superb at detecting geographic atrophy secondary to dry AMD, not just wet AMD.

In my opinion, most cases of DME said to have been made worse by cataract surgery are actually examples of postoperative inflammatory edema. Macular edema secondary to DME or retinal vein occlusion should be treated with anti-VEGF (vascular endothelial growth factor) agents prior to cataract surgery.

Regarding the association between cataract surgery and retinal detachment, I believe that coinherited lattice degeneration and other peripheral retinal abnormalities—not increased axial length—cause this complication after cataract surgery. Axial length is a proxy for myopic vitreoretinal disorders; there is no evidence that a longer eye stretches the retina or is the proximal cause of retinal detachment.

SAMUEL MASKET, MD

All clinicians know that the appearance of the macula can be misleading: one that looks highly irregular may have excellent visual potential. For that reason, it is essential to test cataract patients' macular potential to aid in surgical decision making. I would argue that retinal function testing and the evaluation of retinal anatomy and pathology are as important as OCT and other imaging. Each has its role in assessing individuals with ocular comorbidities. I perform tests of visual function as well as those of ocular pathology. This information allows me to be helpful to the patient during discussions for or against cataract surgery. It can also promote reasonable expectations for the procedure.

An assessment of macular function is also integral to my assessment of patients for premium IOLs. In my practice, patients must demonstrate normal macular anatomy as well as normal macular function in order to be considered candidates for multifocal IOLs. For example, an amblyopic eye will have normal macular anatomy but reduced macular function, and such patients typically do not benefit from multifocal IOLs. I use the Retinal Acuity Meter (RAM; AMA Optics, Inc., Miami, FL).

JAY S. PEPOSE, MD, PhD

In my practice, the assessment of macular function is an important element of the preoperative evaluation of all patients considering cataract surgery. The anatomic appearance of the macula on biomicroscopy or OCT does not always correlate well with macular function. I have seen patients with what appears to be a normal macula on biomicroscopy who have a surprisingly low reading of potential retinal acuity and a gossamer-thin epiretinal membrane apparent on OCT. Conversely, some patients may present with apparently extensive myopic degeneration, yet they have normal function on retinal acuity testing. Individuals with significant comorbid macular or optic nerve pathology that inherently diminishes contrast sensitivity may not be suitable candidates for multifocal IOLs; these lenses have been associated with decreased contrast sensitivity compared to aspheric monofocal or accommodating designs.

Along with a detailed history and a careful fundus exami-

nation, an assessment of macular potential assists the ophthalmologist with preoperative counseling, short- and long-term prognostication, and the informed consent process in terms of the relative risks and benefits of surgery. It also aids in the decision to order additional tests such as OCT and fluorescein angiography or to refer the patient to a retina subspecialist. The importance of preoperatively assessing potential retinal acuity will grow, because retinal and optic nerve comorbidity will become more prevalent as the population ages. For example, the AREDS found that 20.2% of individuals with early-stage AMD progressed to advanced disease over 5 years, a rate of 4.0% per year.² During a 12.7-year follow-up, 40.6% of highly myopic eyes developed progressive myopic maculopathy, including diffuse atrophy, lacquer cracks, and choroidal neovascularization.³ In a recent study of 45 patients referred for cataract extraction who were prospectively evaluated by OCT, epiretinal membranes were noted in seven (15.6%), many of which were not detectable by ophthalmoscopy alone.⁴

In our practice, my colleagues and I routinely use the RAM to assess the potential visual function of patients with 20/100 or better preoperative visual acuity. It is not reliable for patients with a BSCVA of 20/200 or worse. The RAM also helps us to identify patients with comorbid retinal or optic nerve pathology that may not be detected by history and inspection alone, particularly in eyes with cloudy media. No test of retinal function, however, including the RAM, has 100% specificity and sensitivity. Nevertheless, several studies demonstrate greater predictive accuracy with the RAM compared to the Potential Acuity Meter (Marco, Jacksonville, FL), although the predictability of all of these tests may vary in specific forms of macular comorbidity.⁵⁻⁷

RICHARD TIPPERMAN, MD

An evaluation of macular function and a visual inspection of the macula are essential prior to cataract surgery. Certain patients' vision will be reduced for both far and near, however, and will not improve with pinhole testing. In these instances, retinal acuity testing is essential to predict their potential visual acuity after cataract surgery. It provides information that will help the ophthalmologist decide whether to proceed with surgery and identify appropriate candidates for premium IOLs. OCT provides information about the anatomy of the macula, not its functional capability.

WILLIAM B. TRATTLER, MD

Patients with visually significant cataracts have reduced vision, but the health of their maculae and visual potential must be assessed and discussed with them before surgery. My technicians perform a potential visual acuity test prior to all cataract procedures. If the evaluation reveals reduced visual results, we attempt to determine the reason and

counsel the patient on what to expect in terms of their vision after cataract surgery. We also obtain OCT scans of the macula to screen for macular abnormalities that may affect postoperative visual results. Some patients may have a normal potential acuity test but also a subtle epiretinal membrane that is visible on OCT and may worsen postoperatively. In these cases, I typically use a highly potent steroid (Durezol; Alcon Laboratories, Inc.) and may extend the patient's use of topical nonsteroidal anti-inflammatory drugs beyond 4 weeks. ■

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