

MACULAR OCT IMAGING BEFORE CATARACT SURGERY



Should this testing become the standard of care?

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OPTICAL COHERENCE TOMOGRAPHY AS A DIAGNOSTIC INTERVENTION BEFORE CATARACT SURGERY-A REVIEW

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Industry support for this study: None

ABSTRACT SUMMARY

A meta-analysis assessed 11 studies that examined the benefits of preoperative OCT. Most of them used spectral domain OCT (SD-OCT), one study used swept-source OCT (SS-OCT), and two studies used both imaging modalities. Study size was incorporated, with meta-analytical statistics performed on the total number of patients across the 11 studies instead of each study's being weighed equally.

Three outcomes were identified across the studies and assessed: (1) the incremental benefit of preoperative OCT screening, (2) the prevalence of macular pathology in patients undergoing cataract surgery, and (3) the relative benefits of screening patients with SD-OCT versus SS-OCT.

The evidence across the studies supported the preoperative use of OCT imaging. The proportion of patients found to have macular pathology on OCT that was missed with biomicroscopic fundoscopic examination ranged from 4.6% to 26.4%, with a mean on meta-analysis of 13.7%. Macular degeneration and epiretinal membrane were the most common abnormalities identified

STUDY IN BRIEF

- ▶ A meta-analysis assessed the available evidence for including macular OCT imaging as part of routine cataract evaluations. Macular OCT imaging was found to play an important role in the assessment of patients with cataracts. More than one in 10 patients had clinically relevant macular pathology that would otherwise have been missed with biomicroscopic funduscopy alone.

WHY IT MATTERS

This study adds to a growing body of evidence supporting routine, dedicated macular OCT scanning before cataract surgery.

with OCT but missed on fundoscopic examination. SD-OCT had a higher sensitivity than SS-OCT, but both imaging modalities were beneficial.

DISCUSSION

The outcomes of modern cataract surgery continue to improve with the refinement of surgical technique, biometry, IOL calculations, and lens technology. With these improvements, the importance of assessing potential limitations on the anticipated postoperative outcome increases. Efforts in this area can improve patient understanding, facilitate the setting of realistic preoperative expectations, enhance the accuracy of informed consent, reduce the risk of postoperative patient dissatisfaction, and help identify issues that may affect clinical management and decision-making.

Macular pathology can have an impact on the decision to proceed with surgery, visual outcome expectations, IOL selection, and postoperative management. Slit-lamp biomicroscopy may miss clinically relevant macular disease, especially when hampered by a poor fundal view due to cataract. In their meta-analysis, Ahmed and colleagues discuss ophthalmologists' growing appreciation of OCT imaging for the detection of macular pathology before cataract surgery, with additional pathology detected in approximately one in seven patients. The study authors surmise that, considering the advantages of detecting ocular diseases early, routine OCT screening would greatly benefit patients. The downsides of routine OCT screening include its cost and a potential delay of

surgery. The literature analysis of OCT's cost-efficacy was positive, however, with the incremental quality-adjusted life years generated by OCT screening

outweighing the additional cost. Additionally, Ahmed et al address the idea that macular OCT screening may cause delays or inefficiencies in

cataract surgery pathways and propose that, if implemented effectively, routine OCT screening would be highly beneficial to patient care.

SENSITIVITY AND SPECIFICITY OF SS-OCT FOR DETECTING MACULAR PATHOLOGIES VS SD-OCT

Yeu E, Berdahl JP, Gupta PK, Patterson M²
Industry support for this study: Carl Zeiss Meditec

ABSTRACT SUMMARY

This prospective, cross-sectional, observational, examiner-masked study compared the sensitivity and specificity of SS-OCT biometry (IOLMaster 700, Carl Zeiss Meditec) versus the gold standard SD-OCT for detecting macular pathology in patients with cataracts.

A total of 130 patients were evaluated; 65 of them had macular pathology, and 65 did not. The SD-OCT scans were anonymized and randomly assigned to three independent masked examiners for evaluation. A subsequent analysis included each examiner's sensitivity, specificity, and subjective confidence with each scan. SD-OCT interpretation was identical across the three examiners in 90.4% of eyes.

For the 90.4% of the cohort with complete SD-OCT interobserver agreement, the same examiners assessed the SS-OCT biometry images of the eyes

to determine sensitivity and specificity. SS-OCT produced a sensitivity ranging from 71.1% to 79.2%, meaning that significant pathology could have been overlooked in one-quarter of these cases. Specificity ranged from 86.8% to 94.1%.

DISCUSSION

SD-OCT produces a scanning area of 6 x 6 mm with a depth of 2 mm. The modality has been shown to improve the identification of macular pathology in patients undergoing a cataract evaluation. Although this form of diagnostic imaging can be beneficial for all patients, it is especially important for those considering premium IOLs.

SS-OCT biometry produces a 1-mm image of the fovea. This technology is designed to ensure the reliability of biometry measurements by checking for foveal fixation. SS-OCT may be used secondarily to screen patients for macular pathology via the foveal snapshot, and some surgeons use the imaging modality for this purpose. Previous studies have estimated the sensitivity at 42% to 68% and 77% to 83%.^{3,4}

Yeu and colleagues emphasize that a screening test must be highly sensitive and highlight the potential negative outcomes of implanting

a presbyopia-correcting or toric IOL without recognizing the eye's underlying macular pathology. Compared to SD-OCT, SS-OCT has lower resolution and a smaller scanning zone and is prone to artifactual changes. These factors contribute to SS-OCT's suboptimal sensitivity when compared to SD-OCT. Yeu et al note that an SS-OCT biometer can provide some useful information during a cataract workup. The fact that SS-OCT biometry failed to diagnose potentially meaningful macular pathology in approximately one in four patients, however, shows that the modality should not be relied upon in lieu of a dedicated macular OCT scan. ■

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 4. Hirschhall N, Leisser C, Radda S, Maedel S, Findl O. Macular disease detection with a swept-source optical coherence tomography-based biometry device in patients scheduled for cataract surgery. *J Cataract Refract Surg*. 2016;42(4):530-536.

STUDY IN BRIEF

- A prospective, cross-sectional, observational, examiner-masked study compared the sensitivity and specificity of macular screening with a swept-source OCT biometer versus the gold standard spectral-domain OCT for macular imaging.

WHY IT MATTERS

Some modern swept-source OCT biometry devices provide a useful foveal snapshot that may help identify macular pathology. Unfortunately, this foveal fixation snapshot demonstrated less sensitivity in the study than spectral-domain OCT, with a false negative rate of 21% to 29%. This has implications for preoperative patient counseling and surgical planning.

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