Anterior segment OCT (AS-OCT) was first described in 2001 and has been commercially available for more than a decade. However, the technology has not achieved widespread adoption in clinical care, even among glaucoma specialists. There are several possible reasons for its underutilization.

The initial AS-OCT device that was introduced (Visante, Carl Zeiss Meditec) could be used only for anterior segment evaluation, and the wavelength for the scans (1,310 nm) was optimized for examination of the iridocorneal angle. Furthermore, the relatively high cost of the device along with the inability to receive insurance reimbursement for the procedure (at least in the United States) were likely factors affecting the low adoption rate.

Additionally, despite the large number of research studies showing AS-OCT to have good reproducibility and repeatability, AS-OCT systems were meant to augment the standard gonioscopy technique rather than replace gonioscopy. Some glaucoma specialists maintain that there is no incentive to adopt AS-OCT because gonioscopy is quick and fairly easy to perform.

**AT A GLANCE**

- AS-OCT can be a valuable tool for the identification and sequential evaluation of patients with various anterior segment pathologies. It is especially advantageous for evaluating degrees of narrow angles and angle closure.

- The precision of AS-OCT can be truly exceptional if the images are acquired properly.

Figure 1. Anterior chamber angle with almost iridotrabecular contact. Imaged by the Cirrus HD-OCT (Carl Zeiss Meditec) in five-line raster imaging mode. Original image (A) and image labeled with anatomic landmarks (B). Abbreviations: Descemet's, Descemet membrane of cornea; endothelium, endothelium of the cornea; SL, Schwalbe line; TM, trabecular meshwork.
Despite its recognized advantages, gonioscopy has inherent shortcomings, some of which may be significant hindrances to obtaining precise measurements. Gonioscopy takes hands-on training to learn and potentially years to master, requires contact with the patient’s eye, is subjective, and requires light for visualization, which may affect angle opening. Additionally, with gonioscopy, the operator may inadvertently open the angle by unintentional indentation.

AS-OCT offers certain advantages compared with gonioscopy. It requires no contact with the eye, can be done in complete darkness or under standardized lighting conditions, and can be performed by a technician to be interpreted by the physician. Although AS-OCT cannot provide images analogous to indentation gonioscopy, taking scans with the lights on and off can offer an idea about the narrowing of the angle with lighting and the degree of pupilary constriction.

Fortunately, the current generation of spectral-domain OCT (SD-OCT) devices widely used by clinicians to image the posterior segment can also acquire anterior segment images. Therefore, purchase of a separate dedicated OCT designed only for the anterior segment is no longer necessary.

The wavelength of SD-OCT devices is typically between 840 nm and 870 nm, compared with the 1,310 nm of dedicated AS-OCT devices. Although this limits penetration through the sclera, most SD-OCT devices now have anterior segment lenses or attachments that allow imaging of the anterior segment and iridocorneal angles. For these applications, novel anterior segment parameters based on the location of the Schwalbe line (instead of the scleral spur) have been developed, and SD-OCT has exquisite ability to visualize Schwalbe line. In addition, the trabecular meshwork and adjacent structures can be easily visualized by identifying the so-called TM scoop or the newly named band of extracanalicular limbal lamina, or BELL.

One of the most common indications for use of gonioscopy is to examine the iridocorneal angle for angle closure. Although gonioscopy is relatively quick and easy to perform, it does not offer an easy way to precisely document the degree of angle opening. Even the criteria for determining whether a patient needs a laser iridotomy for angle closure...
based on gonioscopy alone have not been well defined. A recent study reported that, using an algorithm based on pretreatment AS-OCT scans, the AS-OCT parameters were superior to glaucoma-trained ophthalmologists in predicting the success of laser peripheral iridotomy for primary angle-closure suspect (PACS) eyes. Thus, incorporating AS-OCT into the clinical setting certainly deserves a look.

In clinical practice, one of the most useful aspects of AS-OCT is the ability to use the scans to teach patients about their ocular conditions, especially those with narrow angles or with primary angle closure (PAC), who are typically asymptomatic. Figures 1 through 5 illustrate how precisely AS-OCT is able to capture cross-sectional images of the iridocorneal angle with standardized lighting conditions. In Figure 1, there is almost iridotrabecular contact, whereas in Figures 2, 3, and 4, definite iridotrabecular contact is seen.

Based on the accepted definitions of PACS and PAC, the extent of iridotrabecular contact (less than or greater than 180°, respectively) is important to determine, and this can be addressed by acquiring multiple scans in different locations. With certain OCT devices, however, it is virtually impossible (Continued on page 56)
(Continued from page 43)

to acquire 360° images of the iridocorneal angle.

Despite this limitation, the precision of AS-OCT is truly excellent if the images are acquired properly. Furthermore, AS-OCT can precisely document peripheral anterior synchiae, which can be suggestive of PAC versus primary angle-closure glaucoma versus chronic angle-closure glaucoma (Figures 5 and 6).11

**CONCLUSION**

AS-OCT can be a valuable tool for the identification and sequential evaluation of patients with various anterior segment pathologies. It is especially advantageous for evaluating degrees of narrow angles and angle closure. Alongside gonioscopy, AS-OCT provides clinicians with an additional window into the evolving arena of angle-closure glaucoma, which is one of the leading causes of visual morbidity worldwide.12,13

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