Central corneal thickness (CCT) measurements obtained with a non-contact low-coherence reflectometry ocular biometry device were reproducible and repeatable, but also significantly greater than values obtained with specular microscopy and contact ultrasound, Jorge Gallardo MD, Barcelona, Spain, told the XXX Congress of the ESCRs. He found the reflectometry device reliable for measuring CCT, but advised its greater reported thicknesses be accounted for in clinical and research uses.

The Lenstar LS900 (Haag-Streit, Koeniz, Switzerland) uses low-coherence reflectometry, a technology similar to OCT that calculates distances in the eye by comparing reflections to a reference beam. In a single, non-contact scan it simultaneously gathers nine biometric values: central corneal thickness, anterior chamber depth, lens thickness, axial length, retinal thickness, K values, white-to-white values, pupillometry and eccentricity of the visual axis relative to the optical axis.

Reported advantages of the technology include greater comfort for patients than with contact ultrasound, low interoperator variability and elimination of separate tests for lens thickness for use with advanced IOL power calculations, including the Holladay II and Olsen formulae.

Several published studies have found the accuracy of the Lenstar device comparable to biometry standards including the IOLMaster (Carl Zeiss Meditec, Jena, Germany), OCT devices and manual keratometry, though axial length and other measures are not interchangeable (Crotsberg LP et al. Br J Ophthalmol doi:10.1136/bjo.2009.161729.; Gunderesen KG et al. BMC Ophthalmol. 2012 Jul 16;12:21.)

In the current study, Dr Gallardo and colleagues assessed CCT measurements in normal eyes by the Lenstar compared with ultrasound pachymetry and specular microscopy pachymetry. The observational cross-sectional study examined 21 eyes in 21 patients with a mean age of 34.3 years ranging from 29 to 38. All patients had best corrected visual acuity of 20/20, and less than +/- 1.0 D sphere or +/- 1.0 D cylinder refractive defect. Eyes with previous ocular medication, surgery or contact lens use, and those with anterior or posterior chamber defects were excluded.

Patient evaluation was done at a previous visit to no medication was applied before the measurements. All measurements for each subject were obtained at a single session by an experienced technician.

All patients underwent three measurements with specular microscopy using a Topcon SP 2000, five measurements with low-coherence reflectometry using the Lenstar, and five measurements under topical anaesthesia with contact ultrasound using the Accupach system. Mean values were calculated for each patient with each device and the data analysed.

Mean CCT measured by the Lenstar was 549 microns +/- 35.3. That was 16.8 microns more than the mean of 532.2 +/- 33.9 as measured by ultrasound, and 12.2 microns more than the mean of 536.8 +/- 36.3 measured by specular microscopy, both significant at p<0.001.

Using Pearson’s correlation, an association was observed between the measures of the three devices, also significant at p<0.001. Bland-Altman analysis also found reasonable agreement between the Lenstar and the other devices.

Dr Gallardo observed that while the mean CCT obtained with ultrasound and specular microscopy were very similar, the Lenstar mean was slightly thicker.

“The agreement of the values found between the three devices supports use of the Lenstar as an alternative method for measuring central corneal thickness. However, we have to consider that those values are slightly different than the values obtained with other devices currently accepted for assessing central corneal thickness,” he concluded.

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