Sir,

Agreement in central corneal thickness measurements between optical and ultrasound pachymeters in patients with primary congenital glaucoma

Primary congenital glaucoma (PCG) is considered as the most common hereditary type of glaucoma in childhood.[1] Increased intraocular pressure (IOP) in early childhood is associated with dramatic changes in ocular anatomy.[2] Therefore, the agreement between different biometric devices in studies on normal eyes may not be applicable for cases with PCG. To our knowledge, there is no study on agreement of different devices for measurement of central corneal thickness (CCT) in patients with PCG. In this study, we evaluated the agreement between an optical (IOLMaster 500, Carl Zeiss, Meditec, Jena, Germany) *vs* an ultrasonic pachymeter (UP-1000; Nidek Technologies, Gamagori, Japan) for measuring CCT in PCG.

The CCT data of 30 eyes from 18 patients with PCG were recorded and analyzed. The mean age ± SD of the participants was 9.8 ± 2.8 years (range, 6–16 years), and 10 (58.6%) were male. The mean spherical equivalent of refraction was − 3.3 ± 5.0 D, and the mean IOP was 19.9 ± 3.2 mm Hg. Nine (30%) out of thirty patients had previous glaucoma drainage device in addition to trabeculotomy (which was performed for all eyes). On average, each eye received 1.4 ± 1.0 (range, 0–3) topical antiglaucoma medications. The averages of CCT measured by the IOLMaster 500 and ultrasound pachymetry were 565 ± 53 and 576 ± 48 μm, respectively ($P = 0.001$; paired *t*-test). The 95% limits of agreement for IOLMaster 500 *vs* ultrasound pachymetry were − 36.6 to 10.4 μm. Figure 1 represents the corresponding Bland–Altman plot. The slope of the regression line suggests a slightly greater mean difference between devices for smaller CCT readings than the greater measurements.

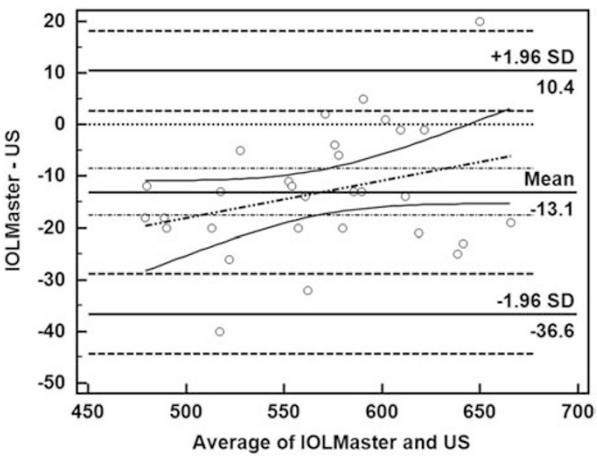

Figure 1 Bland–Altman plot for IOLMaster 500 *vs* ultrasonic pachymeters' central corneal thickness measurements (in μm). Dashed lines delineate the 95% confidence interval of their respective measurement (solid lines).

Precise measurement of CCT is of utmost importance in patients with glaucoma. CCT is the most important corneal factor affecting the measured IOP. According to the results of our study, the IOLMaster 500 may underestimate CCT up to 37 μm compared to ultrasound pachymetry in patients with PCG, and therefore the two devices should not be used interchangeably in clinical practice.

On the basis of the results of a search on PubMed database, we were not able to find any study on agreement between ultrasonic and optical pachymeters in patients with PCG. The major limitation of the present study is small sample size and including both eyes of some patients in statistical analysis. However, PCG is a rare disorder,[3] and recruiting a large sample size of patients with PCG is much harder than other types of adult glaucoma. To compare the mean differences, we used a cluster analysis (in which, two eyes of each patient were considered as a cluster) to account for paired eye correlation. The limits of agreement calculation analysis are not usually confounded by the paired eye data, and using paired eye data may be appropriate for rare ocular disorders.[4]

Conflict of interest

The authors declare no conflict of interest.

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