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Letter to Editor

Ophthalmology Section

Correspondence: Comparison of Central Corneal Thickness using Anterior Segment Optical Coherence Tomography Versus Ultrasound Pachymetry

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Dear Editor,

We read with great interest, the article by Ramesh PV et al., comparing anterior Optical Coherence Tomography (OCT) and Ultrasound Pachymetry (USP) [1]. We would like to congratulate the authors for their work as a precise Corneal Thickness (CT) measurement is very important in evaluating both the intraocular pressure [2] and the corneal health [3].

However, we would like to make some comments on the paper.

The authors stated that USP requires contact with the cornea and uses the Doppler effect to determine thickness. We agree that this technique requires a contact between the probe and the cornea, but there maybe a printing error, because Doppler effect has nothing to do with USP.

USP relies on the reflection of ultrasonic waves from the anterior and posterior corneal surfaces and to get a precise measurement, the sound waves have to be perpendicular to the examined structures.

On the contrary, the Doppler effect is a change in the frequency of the sound that reaches out in a non-perpendicular way for a moving object.

We agree that USP is considered as the gold standard in pachymetry, but in our opinion, it has some limitations. It depends on the exact axial placement of the probe, making the reproducibility of measurements a subject to examiner expertise.

The authors performed the USP after the instillation of topical anesthesia utilising proparacaine hydrochloride, 0.5% eye drops. Theoretically, this could have given some differences as no influence on CT and volume measurements with the instillation of oxybuprocaine eye drops has been demonstrated [4], but proparacaine eye drops, used by the authors, has been described to cause corneal thickening [5].

In conclusion, we would like to suggest the use of oxybuprocaine, preferably preservative free, instead of proparacaine in future research concerning the comparison of different devices with USP.

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AUTHOR'S REPLY

Ultrasound pachymetry (USP) relies on the reflection of ultrasonic waves from the anterior and posterior corneal surfaces; it does not use Doppler effect. To ensure reproducibility of results, the patients maintained central fixation and the ultrasound pachymeter probe was placed perpendicular to the corneal centre, located visually by a single experienced investigator.

In the study on comparison of corneal thickness after instillation of topical anesthetics, corneal thickness increase with proparacaine and oxybuprocain was comparable; thickness increased by 8.6 µm (4.5-12.6 µm, 95% CI) after instillation of proparacaine and by 7.7 µm (3.6-11.2 µm, 95% CI) after the instillation of oxybuprocaine. In both the cases, however, corneal thickness returned to baseline within 80 seconds. A second transient increase in corneal thickness may occur within five minutes of administration of proparacaine, as the study noted. This phenomenon is not seen with oxybuprocaine [1]. Thus, while measuring the corneal thickness by contact method, investigators need to keep this in mind. To avoid this error, we took care to measure Central Corneal Thickness (CCT) immediately after the anesthesia ensued.

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