Corneal Thickness and Intraocular Pressure in a Nonglaucomatous Burmese Population

The Meiktila Eye Study

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Objective: To determine correlates of central corneal thickness (CCT) and its relationship to intraocular pressure (IOP) in a Burmese population.

Methods: We performed a population-based survey of inhabitants 40 years or older in Myanmar; of 2076 participants, data from 1909 nonglaucomatous subjects who underwent ultrasound pachymetry and Goldmann applanation tonometry were analyzed. Linear mixed effects models adjusting for nonindependence of right and left eye data were constructed.

Results: Mean (SD) CCT was 521.9 (33.3) µm, and the mean (SD) IOP was 14.5 (3.4) mm Hg. Intraocular pressure and spherical equivalent were significant predictors of CCT ($P<.001$ and $P=.01$, respectively). Age, sex, body mass index, and corneal curvature were not significant predictors. Central corneal thickness was the only significant predictor of IOP (ie, an increase of 100 µm in CCT predicted an increase of 1.3 mm Hg in IOP). The Spearman correlation between CCT and IOP for the right and left eyes was highly significant ($P<.001$), but the Spearman rank correlation values ($R^2=0.016$ and $R^2=0.017$, respectively) were weak.

Conclusions: The CCT in this Burmese population was significantly associated with IOP and spherical equivalent. The weak association between CCT and IOP is consistent with that of other population-based studies. Other corneal factors are likely to influence Goldmann applanation tonometry.

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THE THEORETICAL INFLUENCE[1] of central corneal thickness (CCT) on intraocular pressure (IOP) measurement by Goldmann applanation tonometry (GAT) has been demonstrated in several studies,[2-12] and pachymetry has become an established part of glaucoma practice, despite lack of a clear understanding of the relationship between CCT and IOP.[6,13,14]

There is considerable racial variation in CCT.[6,10,12] Although most studies have reported a significant positive correlation between CCT and IOP,[6] the relationship is often weak. In the Barbados Eye Studies, no significant correlation between CCT and IOP was found.[15]

Although glaucoma, particularly angle-closure glaucoma, is a major ophthalmic problem in East Asia,[16,17] data about CCT and its relationship to IOP in East Asian populations are limited.[4,5,18] There is evidence that CCT varies within Asian subgroups (Chinese, Filipino, and Japanese).[12] Foster et al[4] reported a significant association between CCT and IOP in a Mongolian population and, more recently, Suzuki et al[18] reported a significant but weak correlation in a Japanese population.

Herein, we report data concerning factors associated with CCT and IOP and explore the relationship between these 2 variables in a nonglaucomatous Burmese population.

METHODS

The Meiktila Eye Survey was a population-based, cross-sectional ophthalmic survey of the residents of rural villages in the Meiktila district of central Myanmar. The district is arbitrarily divided into 6 zones served by a centrally located eye hospital in Meiktila. Participants were selected using a randomized, stratified, cluster sampling process. A sampling frame consisting of a list of all villages in the Meiktila district and their populations was obtained from the Ministry of Health. For