The retinal thickness and anterior/posterior ocular biometry in Chinese myopic eyes with and without high astigmatism.

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Purpose: It is known that myopes have elongated axial length and changes in retinal thickness, but whether these posterior structural changes are associated with anterior ocular biometry remain unclear. This study aimed to investigate the relationship between regional retinal thickness and anterior/posterior ocular biometry in myopic subjects with and without high astigmatism as compared to those in emmetropes.

Methods: Three groups of young Chinese adults (age 18-35 years) were recruited: Emmetropes (EM, n=10): spherical-equivalent (SE) within $\pm 0.50\text{D}$ & Cylinder (Cyl) $\leq 0.50\text{D}$; myopic astigmats (MA, n=10): SE$<-2.00\text{D}$, Cyl $\geq 2.00\text{D}$ & axis $=180^\circ \pm 25^\circ$; and simple myopes (SM, n=5): SE$<-2.00\text{D}$ & Cyl$\leq 0.50\text{D}$. Axial dimensions and corneal parameters were measured with A-scan ultrasound biometry and Medmont E300 corneal topographer, respectively. The retinal thickness at the fovea and 15° eccentricity (temporal, superior and inferior) retinas were measured using a spectral-domain optical coherence tomography (Spectralis HRA+OCT) with horizontal and vertical line scans (scan length: 30°; factor for scan averaging: 100). Using the built-in segmentation software, we further subdivided the retinal thickness into inner retinal, outer retinal and photoreceptor layers.

Results: One-way ANOVAs indicated significant differences in the retinal thickness between groups (all $p<0.05$): the total temporal, superior and inferior retinas, and the outer temporal retina were significantly thinner in MA than those of EM (Tukey post-hoc test, all $p<0.05$); however, neither the differences between SM and MA nor SM and EM was significant (Tukey post-
hoc test, all p>0.06). The total and inner retinal thinnings (except the temporal retina) were significantly associated with higher myopia (r= +0.50~+0.73), increased vitreous chamber depth (r= -0.40~-0.76) and elongated axial length (r= -0.51~-0.70; Pearson’s correlation: all p<0.03). Intriguingly, at the temporal region, the total and the outer retinal thicknesses were significantly and moderately correlated with the horizontal corneal radius of curvature (r= +0.50 & +0.43), refractive (r= -0.55 & -0.56), and corneal astigmatism (r= -0.46 & -0.52; Pearson's correlation: all p<0.04).

**Conclusions:** The thinning in retinal thickness is associated with both axial elongation and corneal parameters, supporting the hypothesis that the anterior and posterior ocular parameters are closely correlated.