Relation between corneal and optic nerve head variables in healthy subjects and patients with primary open-angle glaucoma

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**Purpose:** To correlate corneal variables (determined using the Pentacam) with optic nerve head (ONH) variables determined using the Heidelberg Retina Tomograph (HRT) in healthy subjects and patients with primary open angle glaucoma (POAG).

**Methods:** Cross sectional, non-interventional, hospital-based study. 75 healthy eyes and 73 glaucomatous eyes were included in the study (controls and cases respectively). Several multivariate linear regression models were constructed to establish the predictive capacity of the set of corneal variables (adjusted for age and sex) on each ONH variable. The corneal variables determined were mean keratometry, corneal volume, central corneal thickness, overall corneal thickness, the mean thickness of a circular zone centered at the corneal apex of 1 mm radius (zone I) and the mean thickness of several concentric rings, also centered at the apex until the limbus, each of 1 mm width (zones II to VI respectively). The ONH variables were the morphometric parameters provided by the HRT.

**Results:** For the control group the set of corneal variables showed a significant predictive capacity on disc area (adjusted-R2 = 39%), rim area (adjusted-R2 = 43%) and horizontal cup-to-disc ratio (adjusted-R2 = 38%). For the POAG group the set of corneal variables showed a significant predictive capacity on disc area (adjusted-R2 = 70%), cup-area ratio (adjusted-R2 = 60%), cup-volume (adjusted-R2 = 64%), rim-volume (adjusted-R2 = 39%), mean-cup-depth (adjusted-R2 = 59%), cup-shape-measure (adjusted-R2 = 57%) and retinal-nerve-fibre-layer thickness area (adjusted-R2 = 50%).

**Conclusions:** There is a relationship between corneal variables and ONH parameters that goes far beyond central corneal thickness. This relationship seems to be more relevant in glaucomatous patients than healthy volunteers.