Racial differences in correlations between optic nerve head morphology and ocular blood flow in healthy eyes.

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Purpose: To assess differences in the relationship between optic nerve head (ONH) morphology and ocular blood flow between persons of African descent (AD) and European descent (ED) with healthy eyes.

Methods: 46 participants (20 AD, 26 ED) with normal fundoscopic exam and intraocular pressure were included. Each participant was assessed for disc area (DA), rim area (RA), linear cup to disc ratio (CDR), mean retinal nerve fiber layer (RNFL) thickness by Heidelberg retina tomograph. Retrobulbar blood flow was assessed by color Doppler imaging in the ophthalmic (OA), central retinal (CRA), nasal short posterior ciliary (NPCA) and temporal short posterior ciliary (TPCA) arteries. Peak systolic velocity (PSV), end diastolic velocity (EDV) and the resistive index (RI) were assessed in each artery. Mean retinal capillary blood flow and % of the area with no blood flow in both hemifields were measured with Heidelberg retinal flowmeter. Correlations between ONH morphology and ocular blood flow were derived using Pearson correlations. Differences between the correlations in the AD and ED groups were assessed using the Fisher r-to-z transformation method.

Results: Age, gender, IOP and blood pressure were not significantly different between groups. Significant differences in correlations were observed between groups in the CRA. In this artery, PSV and DA were positively correlated in AD (r=0.43) and negatively correlated in ED (r=-0.35) (Δr=0.78; p=0.01). A similar finding was observed for PSV and RA (AD: r=0.39; ED: r=-0.22; Δr=0.61; p=0.04). Significant negative correlations between RI and CDR were observed in all arteries in the ED group (r coefficients range=-0.48 to -0.39), but not in the AD group (r coefficients range=-0.14 to 0.17). No significant differences were observed in the correlations of ONH morphology and capillary blood flow.

Conclusion: ONH morphology and ocular blood flow relationship was significantly different in the healthy eyes of AD compared to ED.