

Retinal Vessel Caliber Is Associated with the 10-year Incidence of Glaucoma: The Blue Mountains Eye Study

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PURPOSE: To examine associations between quantitatively measured retinal vessel caliber and the 10-year incidence of primary open-angle glaucoma (OAG) .

DESIGN: Population-based cohort study.

PARTICIPANTS: The Blue Mountains Eye Study examined 3654 persons at baseline and 2461 persons at either 5 years, 10 years, or both times. After excluding 44 subjects with OAG at baseline, 2417 participants at risk of OAG at the 5- or 10-year examinations were included.

METHODS: Retinal vessel calibers of baseline retinal photographs were measured using a computer-based program and summarized as central retinal artery and vein equivalents (CRAE, CRVE) . Incident OAG was defined as the development of typical glaucomatous visual field loss combined with matching optic disc rim thinning and an enlarged cup-to-disc (C:D) ratio of >0.7 or C:D asymmetry between the 2 eyes (≥ 0.3) at either the 5- or 10-year examination. Generalized estimating equation models were used to account for correlation between eyes while adjusting for glaucoma risk characteristics including intraocular pressure (IOP) or ocular perfusion pressure (OPP) .

MAIN OUTCOME MEASURES: We assessed the 10-year incidence of OAG.

RESULTS: There were 82 persons (104 eyes) who developed incident OAG over the 10-year follow-up. After adjusting for age, sex, family history of glaucoma, smoking, diabetes, hypertension, hypercholesterolemia, body mass index, spherical equivalent refraction, and C:D ratio, narrower CRAE was associated with higher risk of incident OAG (adjusted odds ratio [OR], 1.77; 95% confidence interval [CI], 1.12-2.79, per standard deviation decrease in CRAE) . This association persisted after further adjustment for IOP (adjusted OR, 1.87; 95% CI, 1.14-3.05) or OPP (adjusted OR, 1.76; 95% CI, 1.11-2.78) , and remained significant when analyses were confined to eyes with IOP ≤ 21 mmHg. **CONCLUSIONS:** Retinal arteriolar narrowing, quantitatively measured from retinal photographs, was associated with long-term risk of OAG. These data support the concept that early vascular changes are involved in the pathogenesis of OAG and suggest that computer-based measurements of retinal vessel caliber may be useful to identify people with an increased risk of developing the clinical stage of glaucoma.

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