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Title

Finding a common link between primary open-angle glaucoma, hypertension, and diabetes

Priority 1 (Research Category)

Qualitative research

Presenters

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Abstract

Context: With a strong correlation of primary open-angle glaucoma (POAG) with diabetes and hypertension, this study investigates what the link is and investigate if any preventative measures can help prevent further prevalence of POAG.

Objective: To compare the disease features and processes of primary open-angle glaucoma (POAG), hypertension (HTN), and diabetes (DM) in search for a common underlying link between all three conditions.

Study Design: In this IRB-approved retrospective study, 767 eligible patients at a University eye clinic were categorized into 4 groups: (1) HTN alone, (2) DM alone, (3) combined HTN and DM, and (4) neither HTN nor DM. These patients were selected for chart review and a survey conducted via phone call. Demographic variables collected were age, gender, race, BMI, IOP, HgbA1c, and BP. One-way ANOVA and Chi-squared tests were used to determine any significant differences. A literature search of 21 articles was then conducted to explain correlations found among the patient data.

Setting: University eye clinic in Dallas, TX

Population studied: Patients with a single or mix of the following conditions: POAG, DM, HTN

Intervention/Instrument: Literature review

Outcome Measures: A correlative or causative link among POAG, HTN, DM

Results: The literature analysis identified common features in POAG, HTN, and DM. The pathophysiology of all three conditions involve a decrease in nitric oxide bioavailability and increased oxidative stress from uncoupled endothelial nitric oxide synthase (eNOS) activity. This results in sympathetic overactivity, diminished retinal blood flow, and dysfunction of blood flow autoregulation. Other similarities include chronic hypoxia, an increase in hypoxia-inducible factor-1 alpha, and up-regulation of vascular endothelial growth factor (VEGF). In genotypic analysis, genes affecting the eNOS region has been linked to POAG, HTN, and DM.

Conclusion: Our study has determined a common pathophysiological link involving decrease in nitric oxide bioavailability and increased oxidative stress from uncoupled eNOS activity. This information may be useful in the management of patients with POAG, HTN, and DM.