A Study of the Association between Hypothyroidism and Open-Angle Glaucoma in an Elderly Population

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BACKGROUND

It has been hypothesized that hypothyroidism may cause the accumulation of hyaluronic acid within the ocular trabecular meshwork (Figure 1), which in turn can cause an increase in intraocular pressure and development of glaucoma. Some studies assessing the relationship between glaucoma and hypothyroidism have shown a significant positive association; whereas, others have not shown an association.

The purpose of this study was to test this hypothesized association between hypothyroidism and open-angle glaucoma in a population-based setting.

OBJECTIVE

METHODS

The study population and controls for this case-control study were taken from all patients in a large US managed care database (Ingenix LabRx Database™) aged ≥ 60 years with four years of continuous eligibility dating from January 1, 2001 through December 31, 2004. A total of 4,728 newly diagnosed open-angle glaucoma patients (ICD-9-CM: 365.1x) were matched to 14,184 controls (3:1 matching) based on age and gender.

Multivariate logistic regression was used to assess the relationship while controlling for various risk factors (i.e., ischemic heart disease, migraines, cerebrovascular disease, diabetes, hyperlipidemia, hypertension, and arterial disease).

RESULTS

The mean age of both cohorts was 74 years (± 7.6), with females comprising 61.7% of the population (Table 1). Patients in the Glaucoma cohort were more likely to have diabetes, hypertension, hyperlipidemia, and migraines than nonglaucoma controls.

Based on a diagnosis of hypothyroidism (ICD-9-CM: 277.0) or use of a thyroid replacement therapy, hypothyroidism prior to the index date was found in 815 (17.2%) glaucoma subjects and in 2,498 (17.6%) nonglaucoma control subjects (Figure 2).

In both cohorts, a larger portion of females (~ 22%) than males (~ 10%) were found to have hypothyroidism (P < 0.01).

When hypothyroidism was defined by the ICD-9-CM code or thyroid drug use, hypothyroidism was identified in 15.9% and 10.1% of glaucoma pts. and 16.1% and 11.0% of controls, respectively (Table 2). After adjusting for the various covariates, a difference in the risk of hypothyroidism between open-angle glaucoma patients and controls was not found (Table 2).

When restricting the hypothyroidism diagnostic classification to prior thyroid drug use, glaucoma patients were less likely to have hypothyroidism than controls (Table 2).

Secondary Analyses

After stratifying patients by gender, female glaucoma patients were significantly less likely to have hypothyroidism than female controls (OR, 0.90; 95% CI, 0.82 – 1.00); whereas, no statistical difference between male glaucoma patients and controls was found (OR, 1.02; 95% CI, 0.85 – 1.22).

There were 7.1% (337) of glaucoma patients and 6.6% (936) of control patients who had a hypothyroidism diagnosis with no drug therapy. After adjusting for possible confounding factors no statistically significant difference was found between the study cohorts (OR, 1.03; 95% CI, 0.90 – 1.17).

LIMITATIONS

Although hypothyroidism has been hypothesized to be associated with glaucoma, this large population study using both diagnosis and/or thyroid drug use, a positive association between hyperthyroidism and glaucoma was not found. The large proportion of patients receiving thyroid replacement therapy may have negated any glaucoma-related consequences of hypothyroidism. However, a secondary analysis of untreated hypothyroidism patients failed to show any difference between the study groups.

CONCLUSIONS

LITERATURE