

A Clinical Study to Evaluate a Correlation between Thyroid Problems with Glaucoma

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Abstract

Background: Hypothyroidism, a decrease in thyroid hormone production by the thyroid gland. The present study was conducted to assess correlation of hypothyroidism with glaucoma. **Subjects and Methods:** The present study was conducted on 50 patients with thyroid disorders. Visual acuity was determined with Snellen's chart. Patients diagnosed with POAG were followed up after 6 months for repeat IOP and perimetric analysis. **Results:** Out of 50 thyroid patients, males were 20 and females were 30. 3 males and 4 females had Optic nerve head changes and 1 male and 2 females had field changes. The difference was significant ($P < 0.05$). **Conclusion:** There is increase chance of eye disorders in patients with thyroid disorders. Authors found correlation of hypothyroidism with glaucoma.

Keywords: Thyroid, Glaucoma, Visual.

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Introduction

Hypothyroidism, a decrease in thyroid hormone production by the thyroid gland and thereby lowered level in circulation can range from subclinical to overt hypothyroidism. Subclinical hypothyroidism (SCH) is characterized by serum thyroid hormone concentrations within the normal reference range with a single rise in serum thyroid-stimulating hormone (TSH) level. SCH is classified according to the serum TSH level into mild (increased TSH 4.0–10.0 mIU/L) and more severe categories where serum TSH concentrations increased to >10.0 mIU/L.^[1]

Primary open angle glaucoma (POAG) is the leading cause of visual impairment and blindness in the United states and worldwide. It is higher among Africans-Americans than most other racial and ethnic groups. The risk increases with increasing age. The term Graves disease includes a constellation of disorders consisting of goiter, hyperthyroidism and often associated with ophthalmopathy occasionally with infiltrative dermopathy or acropathy. The exact aetiopathogenesis of Grave's disease is unknown but it is likely to be an autoimmune disorder. It is diagnosed in 3rd and 4th decade of life and it shows a female dominance over a male with male female ratio being 1:7.^[2]

Risk factors in the development of glaucomatous optic nerve damage are the amount of elevation of the IOP, increasing age, a family history of glaucoma and black race. In the case of hypothyroidism, excessive mucopolysaccharide accumulation within the trabecular

meshwork acts like a surfactant, sticking together adjacent endothelial membranes.^[3] The present study was conducted to assess correlation of hypothyroidism with glaucoma.

Subjects and Methods

The present study was conducted in the department of Ophthalmology. It comprised of 50 patients with thyroid disorders of both genders. All were informed regarding the study and written consent was obtained. Ethical clearance was taken from institutional ethical committee.

General information such as name, age, gender etc. was recorded. A through clinical examination was performed in all patients. The onset, duration, past history and family history of thyroid diseases and glaucoma were recorded.

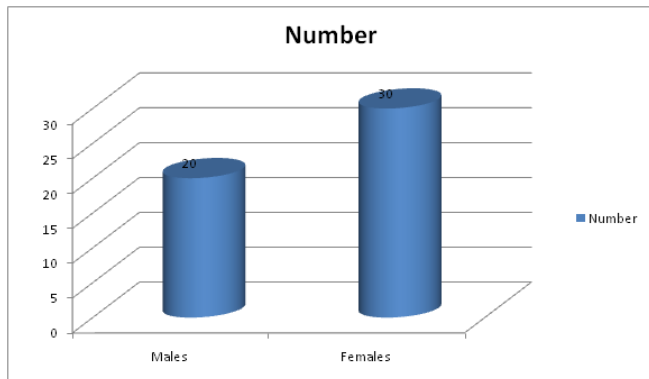
Visual acuity was determined with Snellen's chart. Intraocular pressure was measured in all patients of thyroid with Shiotztonometry. Detailed slit lamp examination and fundus examination with direct and indirect ophthalmoscopy was done. Patients diagnosed with POAG were followed up after 6 months for repeat IOP and perimetric analysis. Results were tabulated and subjected for statistical analysis. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients.

Gender	Male	Female
Number	20	30

Table [1] Graph 1 shows that out of 50 thyroid patients, males were 20 and females were 30.

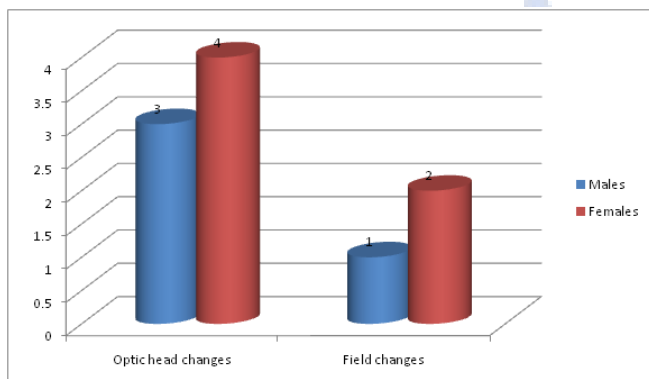


Graph 1: Distribution of patients

Table 2: Eye findings in thyroid patients

Gender	Optic nerve head changes	Field changes	P value
Males	3	1	0.01
Females	4	2	0.02

[Table 2], Graph 2 shows that 3 males and 4 females had Optic nerve head changes and 1 male and 2 female had field changes. The difference was significant ($P < 0.05$).



Graph 2: Eye findings in thyroid patients

Discussion

Glaucoma is an important cause of blindness and the incidence of glaucoma was found to be increased over the age of 40 years. Among the various etiological factors described a rise in intraocular pressure (IOP) and the associated optic disc damage remains the primary cause.^[4] A strong association of Graves' hyperthyroidism with orbitopathy with glaucoma has been reported with several plausible mechanisms. Volume of orbital contents will increase that might cause orbital congestion and an associated increase in the episcleral venous pressure was suggested for the incidence of glaucoma. Hypothyroidism had demonstrated as prevalent in glaucoma patients. Some studies demonstrated the association between hypothyroidism and glaucoma, while others failed to prove such association.^[5] The present study was conducted to

assess correlation of hypothyroidism with glaucoma.

In this study, out of 50 thyroid patients, males were 20 and females were 30. Ritu et al^[6] in their study, out of 50 patients of thyroid imbalance, 20 patients were taken into study. Patients were followed after 15 days, 1 month, 3 months and 6 months. Different Parameters were used like IOP, visual field defects, fundus changes and treatment given. Out of 50 patients with thyroid imbalance, 20 patients (4%) met the inclusion criteria and out of these 15 were females and 5 were males; Mean age at referral was 55 years (range 23 – 77 years). 5 patients had ocular hypertension without field defects or optic nerve head changes. 5 patients had POAG with a cup disc ratio >0.5 , typical glaucomatous visual field defects and pressures ranging from 16 to 27 Hg with medications. There was even a slightly higher IOP in up gaze.

We found that 3 males and 4 females had Optic nerve head changes and 1 male and 2 female had field changes. Lin et al^[7] found that the overall prevalence of glaucoma was 4.6%; 11.9% reported a history of thyroid problems. The prevalence of glaucoma among those who did and did not report thyroid problems was 6.5% and 4.4%, respectively ($p=0.0003$). Following adjustment for differences in age, gender, race, and smoking status, the association between glaucoma and thyroid problems remained.

Thyroid hormones have a central role in the neural development of the eye mainly for the development of retina and attainment of color vision. They regulate mechanisms for controlling the cytoarchitecture and layering of retina. Various mechanisms were recommended to explain the link between glaucoma and hypothyroidism. The IOP and body mass index were significantly higher in hypothyroid patients compared to healthy subjects. Even in patients with subclinical and overt hypothyroidism, the IOP levels were significantly higher when compared to euthyroid patients and healthy subjects.^[8]

There are some possible mechanisms that could support the notion that hypothyroidism affects susceptibility to and the progression of POAG. One such mechanism is the deposition of mucopolysaccharides and hyaluronic acid in the trabecular meshwork caused by hypothyroidism, which in turn causes an obstruction in outflow that would elevate the IOP.^[9] Another potential mechanism might be the increase of outflow resistance in patients with hypothyroidism. Gillow et al^[10] demonstrated this by subconjunctival injection of hyaluronidase in normal and POAG subjects, from which it was determined that outflow resistance was significantly lowered in POAG patients.

Conclusion

Studies suggest that there is increase chance of eye disorders in patients with thyroid disorders. Authors found correlation of hypothyroidism with glaucoma.

References

1. Friedman DS, Wolfs RCW, O'Colmain BJ, et al. Prevalence of open angle glaucoma among adults in the United states. Arch Ophthalmol

- 2004;122:532-538.
2. Tielsch JM. The epidemiology and control of open angle glaucoma: A population – based prespective. *Ann Rev Public Health.* 1996;17:121-36.
 3. Doshi V, Ying-Lai M, Azen SP, et al. Sociodemographic, family history, and lifestyle risk factors for open – angle glaucoma and ocular hypertension: The Los Angeles Latino Eye Study. *Ophthalmology* 2007;3:23-28.
 4. Behrouzi Z, Rabei HM, Azizi F, et al. Prevalence of open – angle glaucoma, glaucoma suspect, and ocular hypertension in thyroid related immune orbitopathy. *J Glaucoma.* 2007;16:358-62.
 5. Cockerham KP, Pal C, Jani B, et al. The prevalence and implication of ocular hypertension and glaucoma in thyroid associated orbitopathy. *Ophthalmology.* 1997;104:914-7.
 6. Ritu Jain, Surabhi Sinha, Juhi Mittal. A clinical study to evaluate a correlation between thyroid problems and glaucoma. *International Journal of Contemporary Medical Research* 2017;4(8):1694-1696.
 7. Lin HC, Kang JH, Jiang YD, Ho JD. Hypothyroidism and the risk of developing open-angle glaucoma: A five-year population-based follow-up study. *Ophthalmology* 2010;117:1960-6.
 8. Karadimas P, Bouzas EA, Topouzis F. Hypothyroidism and glaucoma. A study of 100 hypothyroid patients. *Am J Ophthalmol* 2001;131:126-8.
 9. Wessely K. Discussion of Hertel E. Weiterer Beitrag zur Lehre von Augendruck. *Ber Dtsch Ophthalmol Ges* 2001;41:80-81.
 10. Gillow JT, Shah P, O'Neill EC. Primary open angle glaucoma and hypothyroidism: Chance or true association? *Eye.* 1997;11:113-114.

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