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A Cross-Sectional Study to Evaluate Prevalence of Hypertension in Glaucoma Patients in a Level 3 Hospital

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Abstract –

Aim - The present study was conducted to determine the prevalence of hypertension in glaucoma patients visiting the ophthalmology outpatient department of a level 3 hospital.

Methods- All of the eligible patients were assessed for their glaucoma status by performing slit lamp examination, Goldmann Applanation tonometry, visual acuity and information on blood pressure was collected amongst the patients using a sphygmomanometer.

Results- In the present study, Systemic hypertension was found in 66 of the 114 patients which amount to 57.9%.

Conclusion- The prevalence of hypertension in glaucoma pts was higher and mean intraocular pressure was also higher in hypertension patients.

Key Words – Glaucoma, Hypertension, Intraocular Pressure, Tonometry.

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INTRODUCTION

Glaucoma is the world's second most common cause of blindness and accounts for 15 percent of global blindness. In India (23.5 percent) of global blindness, the regional blindness burden is largest, with at least 5.8 million blind due to Glaucoma. It accounts for at least 12.9 percent of the world's primary open angle glaucomatous blindness in India, and these estimates are projected to be double the amount today by 2021.[1] While it predominantly affects the elderly age group, glaucoma occurs at all levels of our society, with a substantial economic effect on health.

Various risk factors like diabetes, high blood pressure, smoking, and heart disease are associated with glaucoma and they have a negative impact on general eye health.. Hypertension is one of the modifiable risk factors that can be adjusted to avoid the development of glaucomatous optic atrophy[2]. There is a disturbance of the pressure in the choroidal arteries supplying the optic disc and the retrolaminar portion of the optic nerve, resulting in vascular insufficiency in the optic disc and the retro-laminar part of the optic nerve, as well as visual field defects and pathological diseases[3] By 2010, the overall prevalence of 1.96 percent was estimated to represent 44.7 million people affected by POAG

and 4.5 million were expected to be bilaterally blind.

In past studies it has been seen that high blood pressure is related to increase in intra ocular pressure (IOP) as there is increase in production of aqueous humour as a result of increased ciliary blood flow and capillary pressure and decrease in aqueous outflow[4]

A variety of studies have shown that intraocular pressure is associated with systemic blood pressure.[5] One of the important factors is the estimation of primary open angle glaucoma (POAG) prognosis, which can be determined by several variables of systemic vascular disease. [6] Progressive atrophy of the optic nervous head is the primary consequence of increased IOP in the eye.[7]According to Beaver Dam eye study the variability in systolic blood pressure results in change in aqueous humor formation which lead to increased IOP [8]. Studies in Barbados and Egna-Neumarkt have shown that there is a correlation between open-angle glaucoma and diastolic pulse pressure.[9]

However there is a lack of data in` Indian population. Bearing the above facts, the present study planned to determine the prevalence of hypertension in glaucoma patients.

MATERIAL AND METHODS

The present study was approved by the university‘s ethical committee. This cross -sectional study was conducted in the outpatient ophthalmology department at a level 3 hospital, Santosh Medical College, Santosh Deemed to be University, Ghaziabad, India. The study was done on 114 diagnosed cases of POAG. Pre Diagnosed patients of hypertension were excluded from the study. The assessment of glaucoma patients was based on the detailed clinical history, general physical examination and specific test for ocular examination. Verbal and written consent was taken from the patients about the procedure and methods.

Visual acuity was tested with Snellen’s vision chart. Anterior segment was evaluated with slit lamp biomicroscopy. Each patient was subjected to Goldman’s applanation tonometry to estimate intraocular pressure. Blood pressure was checked using a sphygmomanometer.

Statistical analysis was performed using MS excel and SPSS version 24. Descriptive data was stated as mean ± standard deviation. A P-value less than 0.05 was deliberated to be statistically significant. Dichotomous variables were compared using chi-square test

RESULT

In the present study 73/144(66.36%) were males and 41/114 (35.9) females. Systemic hypertension was found in 66 / 114 patients (57.9%.). The average intraocular pressure among study subjects was 29.78 mmHg (22–38 mm Hg) with Goldman Applanation tonometry.

In the present study number of glaucoma patient with hypertension were 66 and those without hypertension were 48(fig 1).Prevalence of primary open angle glaucoma with systemic hypertension was 57.9%. It was not statistically significant (P<0.05). figure 2 shows the age distribution of hypertension in glaucoma patients. The p-value is 0.000039 and it was significant. figure 3 shows gender distribution of POAG patients. Amongst them males were 64% and females were 35.9%. figure 4 shows hypertension relation with IOP. The patients having systolic BP more than 160 mmHg showed increase in iop up to 38 mmHg. Figure 5 shows male gender distribution of subjects with hypertension in POAG. Males having glaucoma with hypertension were of 34.2% and males with glaucoma without hypertension were 26.16%. Fig 6 shows gender distribution in female patients of hypertension. Females having POAG with hypertension were of 23.68% and females with POAG and without hypertension were of 12.28%.

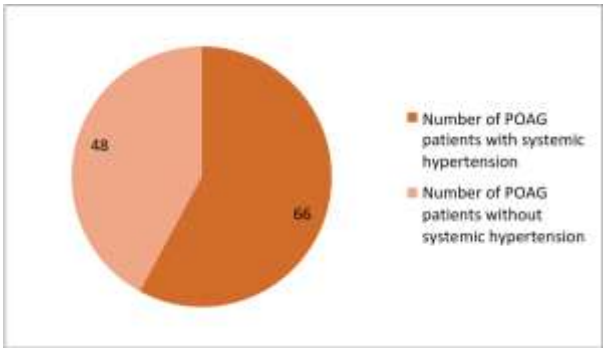

Figure 1: Prevalence of systemic hypertension

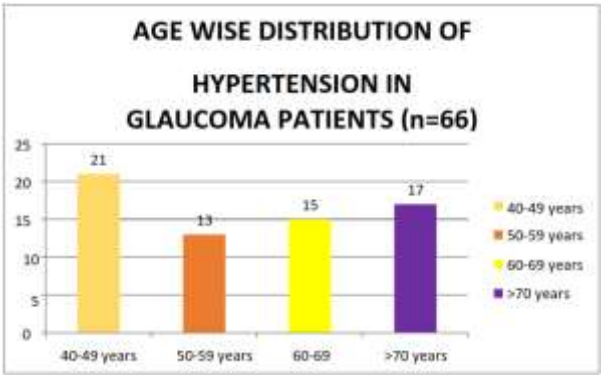

Figure 2: Age distribution of Hypertension in glaucoma patient

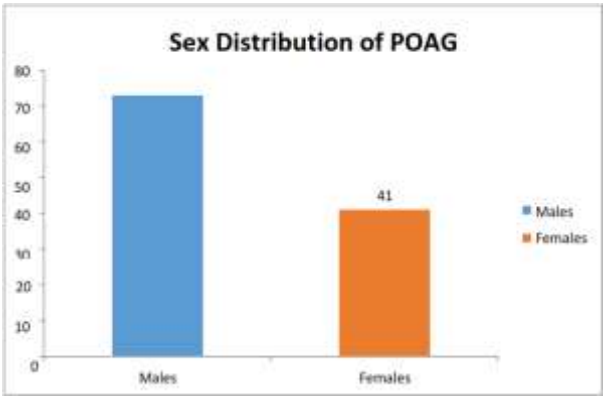

Figure 3: Gender distribution of Hypertension in glaucoma patients

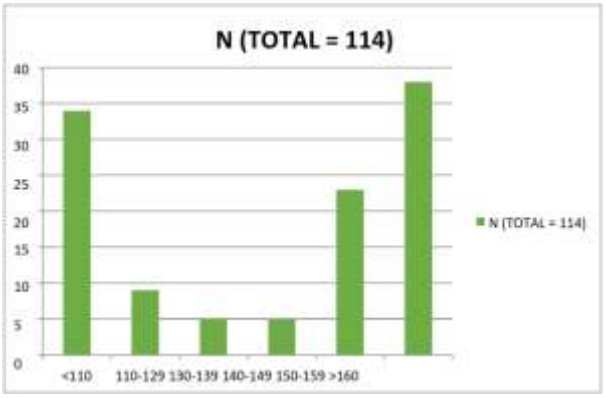

Figure 4: IOP in relation with hypertensio

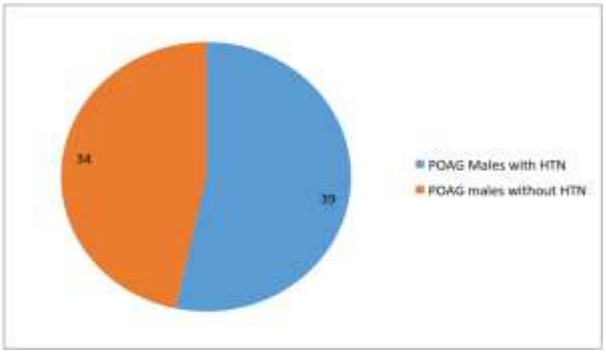

Figure 5: Gender distribution of male subjects with hypertension in POA

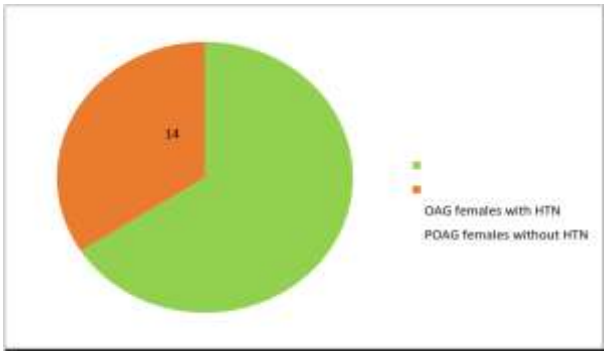

Figure 6: female gender distribution of hypertension

DISCUSSION

The World Health Organization has assessed that India has a 1% of visual impairment and of the assessed 8.9 million visually impaired individuals in India, 12.8% are because of glaucoma.[10] The visual handicap and irreversible visual impairment from glaucoma has critical financial effect the issue is required to arrive at disturbing extents in a couple of years not withstanding its general wellbeing essentialness, information accessible on the prevalence and conceivable danger factors for glaucoma in India is restricted.[11]

There is difference in relation between hypertension and glaucoma which are conducted in different places of the world and even in India. In glaucoma development many factors are responsible such as diabetes is one of the major risk factor for the development of glaucoma. The prevalence of hypertension in glaucoma in is 57.9% which is comparable to studies done by Egna Neumarkt et. al. [12], Blue mountain et. al. [13], Latin eye disease [14], Mitchell et. al. and Baltimore et. al. [15] who found the prevalence rate as 27.9,45.7,17 and 49.3%.

Few studies as Barbados et. al. [16] and aravind comprehensive eye survey had shown that there is more male gender prevalence of glaucoma which is similar to our study as we have higher prevalence of glaucoma in male patients.

There are few studies which are contradictory to this and they say that female has more prevalence than male patient in terms of glaucoma disease like Blue mountain eye et. al. and Andhra Pradesh eye disease et. al. which shows that female has more prevalence in glaucoma.

Accessible information recommends that the commonness of POAG shifts from competition to race and is affected by different variables like age, sexual orientation, and other related danger factors. The prevalence assessed for POAG in east Asia differs from 0.5% to 2.3% and from India is between 0.41% 80 and 2.56%.[17]

In the present study out of the 114 patients with P.O.A.G examined under the study 66 were found co-existing hypertension i.e., 57.9 % of the patients. The prevalence of POAG was found to be more in men than women.

In the present study, the total number of male subjects was 73/114(57.9%) and 41/ 114 (36%) among females. In proportion to increased blood pressure, the mean intraocular pressure increased. In our study, the total number of male subjects was 73 out of 114, which corresponds to 64 % prevalence in males and 41 out of 114 were females. In proportion to increased blood pressure,

the mean intraocular pressure increased. In our sample, the mean IOP was 29.78 mm Hg compared to the Latin eye study with IOP vary ranging.

A positive association between IOP and POAG was suggested in the Blue Mountains eye study [18]. It showed a 3 mm linear increase in IOP across the range of blood pressure levels. In the Egna Neumarkt [19] report, the positive relationship between the two and the linear increase of IOP in relation to blood pressure was approximately 2.5 mm Hg.

Data analysis revealed that with patients with P.O.A.G showed a 6 mm Hg rise over the blood pressure range. In study conducted by Mitchell et. al.[17], hypertension was prevalent with 45.7% of subjects with POAG, compared to 57.9% in our study.

Aravind Comprehensive Eye Survey[20] and the analysis conducted in Barbados by Leske et. al. [21], showed that POAG was more likely for males.

Hypertensive participants, regardless of IOP and other risk factors, had a 50 percent higher risk of glaucoma than normotensive subjects in the Blue Mountain Eye Study[17] in the Rotterdam Study, substantial associations were also identified between OAG and hypertension. The Egna-Neumarkt study[18] showed a poor propensity towards an association between POAG and systemic hypertension, close to the results of the Baltimore eye survey[22], which indicated that the relationship between hypertension and OAG was not significantly increased. The results from other Indian studies are in agreement with findings of the present study.

CONCLUSION

The mild change in intraocular pressure with rise in blood pressure became significant in case of open angle glaucoma and low tension glaucoma or cases with family history of glaucoma and particularly in those patients having wide fluctuation of systemic blood pressure.

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Nil

CONFLICT OF INTEREST

None

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