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Prevalence of Primary Open Angle Glaucoma in Myopes and Hypertensives-An Observational study.

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Abstract:
Aim: *Estimation of Prevalence of Primary Open Angle Glaucoma (POAG) in Myopes and Hypertensives.*
Materials and Methods: *50 patients each of Myopia and Hypertension were included in the study as per inclusion criteria. An informed consent was obtained from the patients included in the study. These patients were investigated and diagnosed as Primary Open Angle Glaucoma if Intraocular Pressure(IOP) was >21mm Hg and/or Cup Disc Ratio>0.6 and/or Visual Field Defects were suggestive of Glaucoma. The study was conducted from January2017to March 2017 at Government Regional Eye Hospital, Visakhapatnam.*
Results: *Mean Age of patients in Myopic Group was 32.7 years and Hypertensive group was 50.6 years. In the Myopic group 15% of patients had POAG, whereas in the Hypertensive group 5% of patients had POAG.*
Conclusion: *Myopia and Systemic Hypertension are significant Risk factors for Primary Open Angle Glaucoma as per our study.*
Keywords: *Myopia, Primary Open Angle Glaucoma, Hypertension*

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I. Introduction

Glaucoma is a progressive Optic neuropathy with characteristic changes in optic disc with corresponding visual field defects.

Primary Open Angle Glaucoma is a progressive optic neuropathy with cupping of optic nerve associated with Intraocular Pressure(IOP) exceeding normal limits without apparent cause and gonioscopically open angles.

Various risk factors have been implicated for occurrence of Primary Open Angle Glaucoma. The cut-off for 'normal' IOP of 21 mmHg has its source in a German population survey in the 1950s in which 95% of normal people studiedhad IOP below this level[1].It is difficult to define POAG by a simple cut-off IOP.Nevertheless it is clear from many epidemiological, clinical, histopathological,and experimental studies that IOP is a major and causalrisk factor for glaucoma[2,3]. IOP aside, the strongest independent risk factor for developing glaucomais age, with subjects aged over 60 years seven times more likely to develop glaucoma than those aged less than 40 years[4].Myopia, diabetes, systemic hypertension, and vascular conditionssuch as migraine and vasospasm are also considered risk factors forPOAG.

II. Materials and Methods

The study was conducted at Government Regional Eye Hospital, Department of Ophthalmology, Andhra Medical College, Visakhapatnam from January 2017 to March 2017.

Inclusion Criteria:
Myopia:
1.Myopia of -3D to -6D
2.Patients of Age of 20years to 40 years
3. Not a known case of Glaucoma
Hypertension:
1.Patients with Hypertension of more than one year duration-on/off treatment
2.Blood Pressure >130/80 mm Hg

Exclusion Criteria:
1. Myopia with retinal Detachment, Peripheral Retinal Degenerations, Keratoconus
2.Those who have undergone refractive surgeries and Glaucoma Surgeries

3.Ocular Inflammatory Disorders
4.Secondary Glaucomas
5.Causes of Optic Atrophy other than Glaucoma

Diagnostic criteria for POAG implemented in our study:

a) Intraocular pressue (IOP) consistently more than 21mmHg in at least one eye.
a. Measured by Goldmann'sApplanation Tonometer, 3 times on 3 consecutive days at 11 AM in each eye, the median value will be chosen as the IOP for that eye. Of both the eyes, the highest value will be considered as IOP of that person.
b. The commonly used IOP cut off of 21 mmHg is based on the concept that 2 standard deviations above the mean, within Gaussian distribution for the population represents the upper limit of normal IOP[5].
b) Typical optic nerve head damage, Cup Disc ratio>0.6, Evaluated with Slit Lamp Biomicroscopy using +78 D lens.
c) Glaucomatous visual field damage
a. Visual Field Evaluation was done with Humphreys Visual Field Analyser.
b. The analysis of visual fields was done with Anderson's criteria.
c. The severity of glaucomatous visual field changes were graded using the Hodapp, Parrish and Anderson classification guidelines given in the European Glaucoma Society guidelines for Glaucoma, 3rd Edition.

The Hodapp, Parrish, Anderson Classification

1. EARLY GLAUCOMATOUS LOSS
a) MD < - 6 dB
b) Fewer than 18 points depressed below the 5% probability level, and fewer than 10 points below the P < 1 % level.
c) No point in the central 5 degrees with a sensitivity < 15 dB

2. MODERATE GLAUCOMATOUS LOSS
a) MD < - 12 dB
b) Fewer than 37 points depressed below the 5% probability level and fewer than 20 points below the P < 1 % level.
c) No absolute deficit (0dB) in the 5 central degrees.
d) Only 1 hemi-field with sensitivity < 15 dB in the central 5 degrees.

3. ADVANCED GLAUCOMATOUS LOSS
a) MD > - 12 dB
b) More than 37 points depressed below the 5% probability level or more than 20 points below the P < 1 % level.
c) Absolute deficit (0dB) in the 5 central degrees.
d) Sensitivity < 15 dB in the 5 central degrees in both hemifields.
d) An open angle, with any 2 of the above criteria supports a diagnosis of POAG.
a. An Open Angle on Gonioscopy was defined as trabecular meshwork visible in more than one quadrant (>90 degrees).

Statistical Analysis: Data was analyzed with the help of descriptive statistics.

III. Results

There were 100 participants in the study, with 50 myopes and 50 Hypertensives. The mean age of the myopic group was 32.7 years and the mean age of hypertensive group was 50.6 years.(Figure 1)

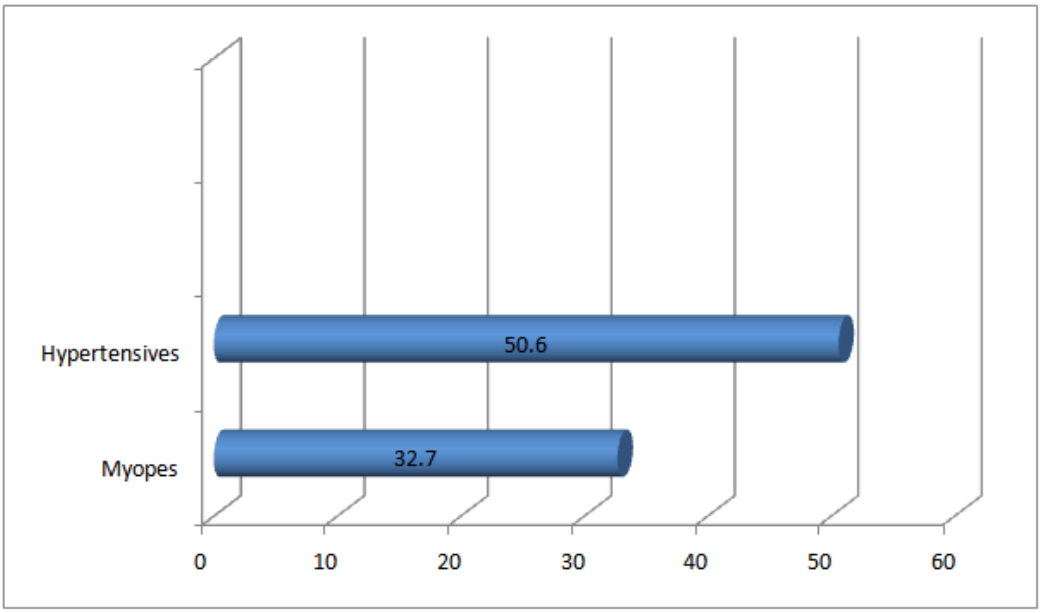

Figure 1-Mean Age Distribution

There were 26 males (52%) and 24 females(48%) in the myopic group, whereas 25 males(50%) and 25 females(50%) in the hypertensive group.(Figure 2)

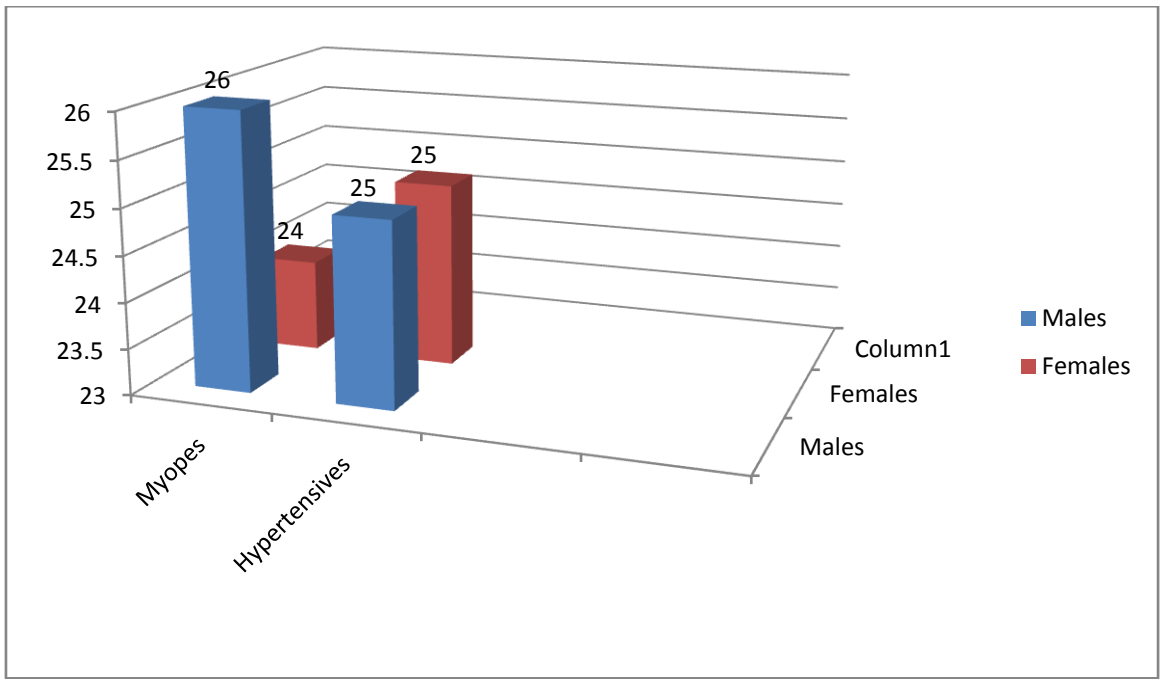

Figure 2-Sex Distribution

IOP >21 mm Hg in Right Eye in Myopic group was found in 8 subjects (16%), whereas in Hypertensive group, IOP was >21 mm Hg in the Right Eye in 3 subjects (6%). In the Left Eye IOP was > 21 mm Hg in 8 subjects (16%) of the myopic group, whereas in 3 subjects (6%) in the hypertensive group. (Figure 3)

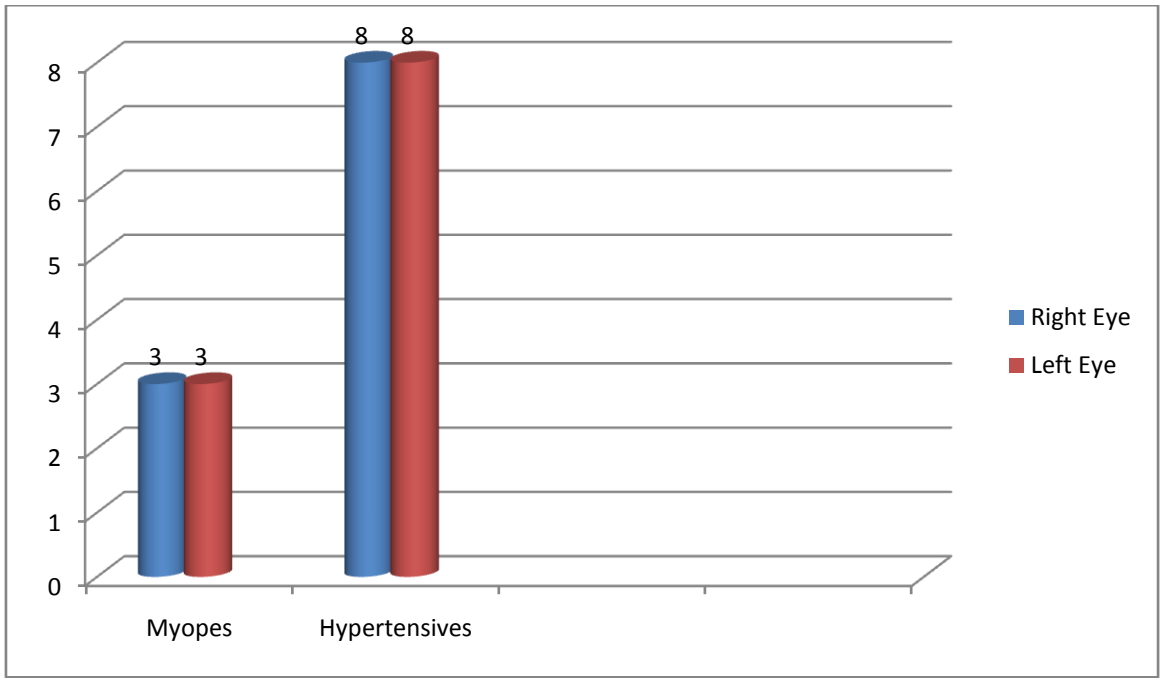

Figure 3-IOP >21 mm Hg in Myopes and Hypertensives

Cup-Disc ratio of >0.6 in the Right Eye was found in 7 subjects (14%) of the Myopic Group and in 3 subjects (6%) of the Hypertensive group. In the Left Eye Cup-Disc ratio of more than 0.6 was found in 8 subjects (16%) of the myopic group and in 4 subjects (8%) of the Hypertensive group. (Figure 4)

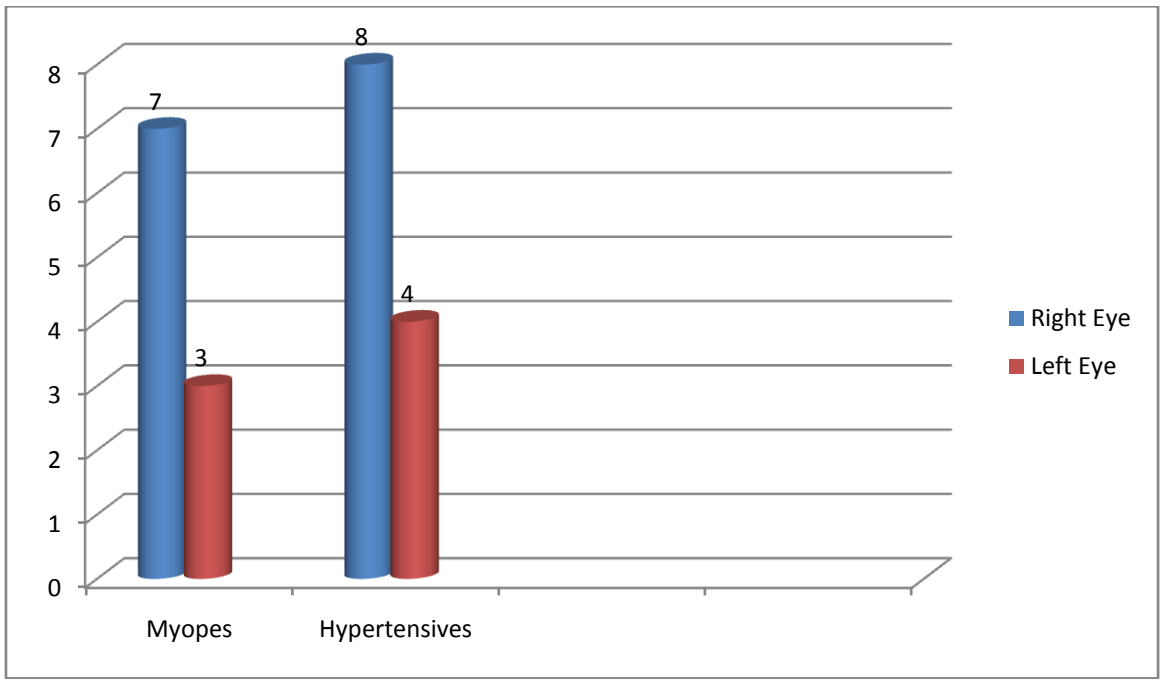

Figure 4-Cup-Disc Ratio >0.6 in Myopic group and Hypertensive Group

The number of subjects with abnormal visual fields in Right Eye in the Myopic Group was 8 (16%), whereas in Hypertensive group the number of subjects was 3 (6%). In the Left eye, abnormalities of visual fields were present in 8 subjects (16%) of the myopic group and 3 subjects (6%) of the Hypertensive group.(Figure 5)

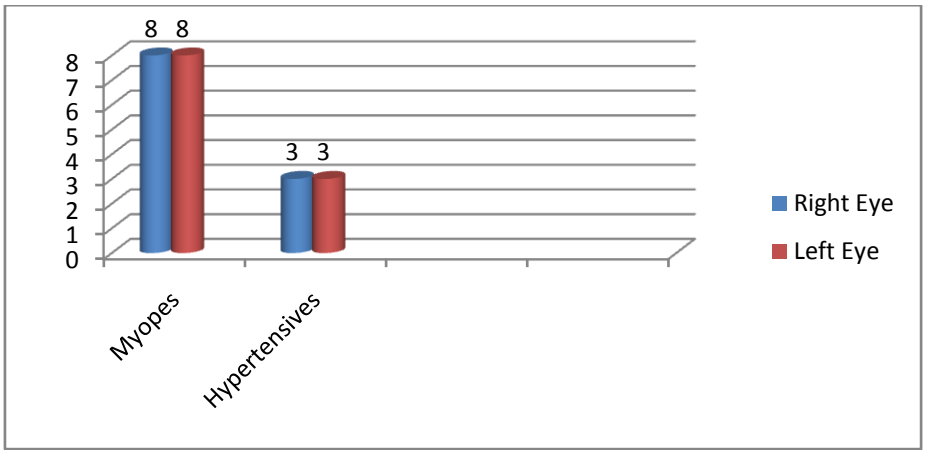

Figure 5-Visual Field Defects in Myopic and Hypertensive Subjects

Prevalence of POAG among the myopic group was 16% (8 subjects) and in Hypertensive group was 6% (3 subjects). (Figure 6)

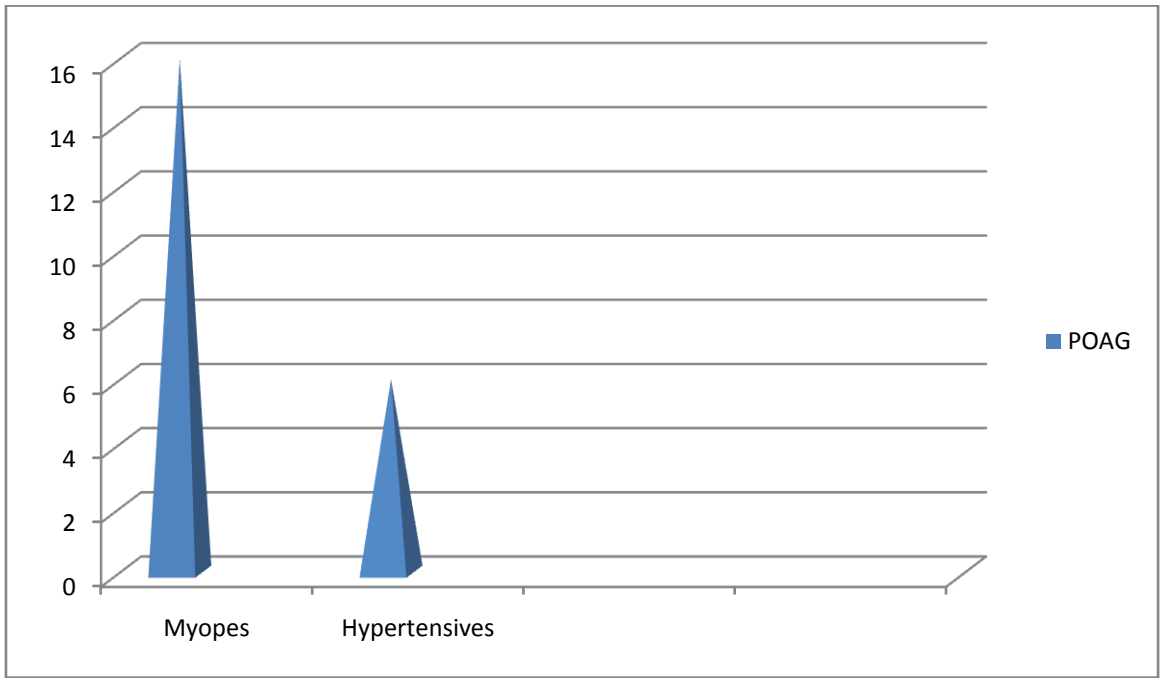

Figure 6-Prevalence of POAG in Myopic and Hypertensive groups

IV. Discussion

In our study, 16% of the myopes (-3D to -6D), had POAG.The Blue Mountain study[6] which is a population based cross sectional study showed glaucoma was present in 4.2% of eyes with low myopia (> or =-1.00 D to < -3.0 D) and 4.4% of eyes with moderate to high myopia (> or = -3.0D) as compared to 1.5% of eyes without myopia. The Blue Mountain Eye Study concluded that, there was two to three fold increase risk of glaucoma in myopic individuals compared to non-myopic individuals. The results of our study were similar to Aravind Eye Survey[7], which showed statistically significant association of myopia with Glaucoma. Aravind Eye Survey concluded that there was twofold or threefold increased risk of glaucoma in myopes compared to non-myopic individuals. Handan eye study[8], Beijing eye study[9], and Singapore malays eye study[10] also correspond with the results of our study.

The prevalence of POAG in Hypertensive subjects in our study was 6%. Paul Mitchell et al in the Blue Mountain eye[11] study examined a representative older population relatively free from selection bias. The study evaluated independent association between hypertension and POAG rather than elevated IOP. They concluded that prevalence of POAG in Hypertensive subjects was more than the normotensive individuals. Hypertensives were at 50% higher risk of POAG than normotensives.The Beaver dam study [12] showed that change in IOP is directly and significantly associated with change in systemic blood pressure and those with higher IOP at

baseline were more likely to have a larger C : D ratio 5 years later. While the findings in this study do not directly indicate a beneficial effect of reduced blood pressure on the risk of glaucoma, they are compatible with that possibility. Positive correlations between systemic hypertension and IOP have also been observed in other population based studies in Africa[13] and Baltimore[14].

Limitations of our Study:

This was a hospital based study and cannot be applied to general population. The sample size is very small and hence the results cannot be applied to the general population.

V. Conclusion

Glaucoma is one of the leading causes of irreversible blindness in the adult population worldwide. Prevalence of Primary Open Angle Glaucoma is more than other forms of Glaucoma. In our study, we calculated the prevalence of POAG in Myopes and Hypertensives. The prevalence of POAG was 16% in Myopes and 6% in Hypertensives. Glaucoma is a lifelong disease with a significant threat to the vision, hence it is advisable to not to miss any case of glaucoma. Hence we conclude that Myopia and Systemic Hypertension are potential risk factors for Primary Open Angle Glaucoma. Hence, all the patients diagnosed with Myopia and Systemic Hypertension should be investigated for Glaucoma for early diagnosis of the disease and prompt treatment so as to reduce the visual morbidity associated with Glaucoma.

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