



STUDY OF PRIMARY OPEN ANGLE GLAUCOMA IN PATIENTS ATTENDING TERTIARY CARE CENTRE AND ASSOCIATED RISK FACTORS –A CROSS SECTIONAL STUDY

Dr. Uday Mohite	Professor and head of Department of Ophthalmology VDGMC Latur
Dr. Vivek Gosavi	Assistant Professor Department of Ophthalmology VDGMC Latur
Dr. Ashwini Tayade	Junior Resident, Department of Ophthalmology VDGMC Latur
Dr. Nageshwar Pimpre	Junior Resident, Department of Ophthalmology VDGMC Latur

ABSTRACT

Background : Glaucoma is a group of optic neuropathies and the leading cause of irreversible blindness worldwide. Primary open angle glaucoma is the commonest type of glaucoma. In affected people, optic nerve fibres are damaged with ensuing loss and raised intraocular pressure in some sufferers. **Objectives :** 1. To study prevalence of primary open angle glaucoma 2. To study various risk factors associated with POAG **Material and Methods :** A cross-sectional study was conducted in a tertiary care hospital after ethical approval. Primary glaucoma patients aged ≥ 30 years, attending ophthalmic OPD were included consecutively for a period of 6 months. Ocular examination included visual acuity, slit-lamp examination, disc evaluation, gonioscopy, intraocular pressure (IOP), and visual fields. Glaucoma was defined according to the International Society Geographical and Epidemiological Ophthalmology. **Results :** A total of 154 participants were included in study. Mean age of study subjects was 58.58 ± 1.916 years. Male predominance was seen with M:F ratio as 1.75:1. Hypertension 7 (43.75%), Diabetes Mellitus 5(31.25%), Myopia 4(25%), H/O Smoking 4(25%), Family H/o Glaucoma 2(12.5%) and CCT < 555 μ g 2(12.5%) were associated with cases of POAG. A statistical significant association was seen between age and POAG, indicating glaucoma as a disease of advancing age more than that 40 years. ($p=0.043$). Similarly a significant associations were seen for Hypertension ($p=.018$) and DM ($P=0.002$) and POAG. **Conclusion:** High prevalence of POAG was seen among study participants. Diabetes, hypertension, smoking, myopia, family history of hypertension and thinning of CCT were risk factors for development of glaucoma.

KEYWORDS : POAG-Primary Open Angle Glaucoma, IOP- Intraocular pressure, CCT-Central corneal thickness.

INTRODUCTION

Glaucoma is the second leading cause of world blindness after cataract. Worldwide, the prevalence of glaucoma is increasing and is expected to affect 111.8 million people by 2040. The prevalence of open-angle glaucoma is reported to be highest in Africa and that of narrow-angle in Asia.[1] In a systematic meta-analysis, the global prevalence of glaucoma was found to be 3.54%.[1] Asians represent 47% of those with glaucoma and 87% of those with angle closure glaucoma (ACG).

Prevalence of primary ACG (PACG) in Southeast Asian countries is more than the rest of the world.[2] India accounts for a minimum of 12.9% of primary open angle glaucoma (POAG) blindness and 12.7% of PACG (PACG) blindness in the world.[3] Glaucoma is a group of eye diseases in which the ganglion cells of the retina are progressively destroyed in a distinctive pattern [4,5]. This leads to increasing loss of optic nerve fibers in a typical pattern, resulting in a distinctive pattern of optic nerve head cupping and visual field loss [5].

Among the risk factors, raised intraocular pressure (IOP) is significant [6]. This disease is a leading cause of blindness world wide [7,8]. Primary open angle glaucoma (POAG), a variant of this disease, in addition to risk factors has also genetic predisposition [9-13].

Primary open-angle glaucoma is described distinctly as a multifactorial optic neuropathy that is chronic and progressive, with a characteristic acquired loss of optic nerve fibers. Such loss develops in the presence of open anterior chamber angles, characteristic visual field abnormalities, and intraocular pressure that is too high for the continued health of the eye. It manifests by cupping and atrophy of the optic disc, in the absence of other known causes of glaucomatous disease[14].

Risk factors for glaucoma were studied in various studies. It was concluded that, high intraocular pressure, low blood

pressure, low ocular perfusion pressure, narrow anterior chamber angles, thin corneas, pseudoexfoliation, a low body mass index, and myopia were some of the factors associated with glaucoma.[15-17]

Examining and monitoring the optic nerve head and the RNFL, structurally and functionally, is important for diagnosis and treatment. Functional loss recorded with automated static threshold perimetry is both sensitive and specific to early loss and provides quantitative data for the monitoring of change[18]

Clinically, visual field loss often correlates with nerve fibre layer loss and optic nerve damage. The natural evolution of primary open-angle glaucoma implies the loss of ganglion cells and their axons in the retina. It is well established that significant amount of ganglion cell death (25 to 30%) occurs before any visual field defect is produced, thus giving rise to the concept of pre-perimetric glaucoma [19-21]

Need For This Study

POAG is an important cause of blindness and sub-normal vision worldwide. The disease is not preventable and blindness resulting from POAG is not reversible. Measures available are mostly secondary prevention, but this is an expensive and life-long undertaking. therefore, knowledge about it, and various aspects of its manifestation is necessary for effective amelioration.

AIM AND OBJECTIVES

This study aims to find prevalence of primary open angle glaucoma and various risk factors associated with POAG

MATERIALS AND METHODS

This study was conducted in ophthalmology department of tertiary care Center.

Ethical clearance was obtained before start of the study from institutional ethics committee. All aspects of consideration on

using human subjects and data were respected. Sample size was determined from the previous literature where prevalence of POAG was 10.8

$$N = (1.96)2pq / (E)^2$$

N = 154 (In which N is sample size, p is prevalence, q is 1-p, E is precision of 5%, and 1.96 is confidence interval of 95%.)

Study Duration: 6 Months

Inclusion Criteria

1. All patients of glaucoma attending ophthalmology OPD during the study period were included in the study, after taking informed consent of the patients.
2. Patient above 30 years of age.
3. Fundus changes 4) Visual field defects satisfying Anderson's criteria.

Exclusion Criteria

1. Anterior segment pathology precluding the visualisation of the angle
2. Patients not willing to participate in study

Informed written consent was obtained from participants before enrollment in study. A predesigned and pretested case record form was used as tool for data collection. All patients visiting ophthalmology OPD were examined and detailed history of patients visiting OPD with symptoms and signs suggestive of glaucoma was taken. Data was collected about sociodemographic characteristics, Ocular examination included visual acuity, slit-lamp examination, disc evaluation, gonioscopy, intraocular pressure (IOP), and visual fields. Glaucoma was defined according to the International Society Geographical and Epidemiological Ophthalmology. [22]

Data Analysis

Data generated was analyzed using SPSS version 23. Descriptive and chi square statistics were used to ascertain significance of findings. Statistical significance was placed at P value of <0.05.

RESULTS

A total of 154 participants were included in study. Mean age of study subjects was 58.58 ± 1.916 years. Male predominance was seen with males contributing 98(63.63%) and females 56 (36.37%). M:F ratio was 1.75:1. Most of study subjects were farmers 86(55.84%) and from Lower socioeconomic classes contributing 114 (74.03%). [Table No. 1] Presenting symptoms among cases of POAG were defective vision for far, near or both in 10 cases (62.5%) Eye pain/discomfort 7 cases (43.75%) and Flashes of light in 1 (6.25%) respectively. Overall prevalence of POAG among study participants was 10.38%. [Fig No.1] Mean IOT among cases of POAG was 22.88±3.14.

Medical conditions associated with POAG were studied in present study. It was revealed that, Hypertension 7(43.75%), Diabetes Mellitus 5(31.25%), Myopia 4(25%), H/O Smoking 4(25%), Family H/o Glaucoma 2(12.5%) and CCT < 555 ug 2(12.5%) were associated with cases of POAG. [Table No.2]

A statistical significant association was seen between age and POAG, indicating glaucoma as a disease of advancing age more than 40 years. (p=0.043), Similarly a significant associations were seen for Hypertension (p=.018) and DM (P=0.002) and POAG. [Table No.3]

Table No.1 : Sociodemographic Characteristics Of Study Subjects (n=154)

Variable	Subgroup	Frequency	Percentage
Age (Years)	≤40	16	10.38
	>40	138	89.62
Sex	Male	98	63.63
	Female	56	36.37
Education	≤10 th std	37	24.02

	>10 th std	117	75.98
Occupation	Farmers	86	55.84
	Employed	37	24.02
	Homemakers	26	16.88
	Others	13	8.44
Socioeconomic class	Upper class (I,II)	40	25.97
	Lower class	114	74.03

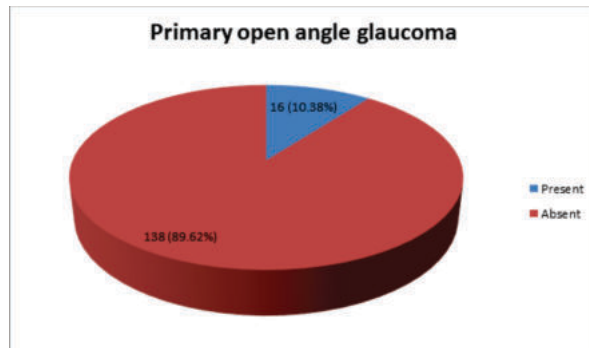


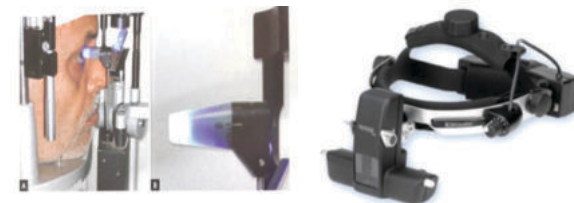
Fig No.1 : Prevalence Of Primary Open Angle Glaucoma (n=154)

Prevalence of POAG among study participants was 16(10.38%)

Table No.2 : Associated Medical Conditions With Cases Of Poag (n=16)

Medical condition	Frequency	Percentage
Hypertension	7	43.75
Diabetes Mellitus	5	31.25
Myopia	4	25
H/O Smoking	4	25
Family H/o Glaucoma	2	12.5
CCT < 555 ug	2	12.5

CCT-Central Corneal Thickness



Applanation Tonometer Indirect Ophthalmoscope

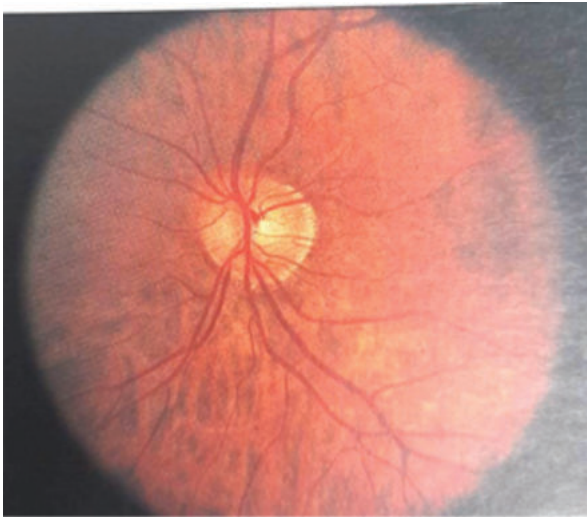
Table No.3 : Risk Factors Associated With Poag Among Study Participants (n=154)

Risk factor	Sub Group	POAG				Total	P value
		Present		Absent			
		N	%	N	%		
Age	≤40	4	25	12	75	16	.043*
	>40	12	8.69	126	91.31	138	
Sex	Male	11	11.22	87	88.77	98	.653
	Female	05	8.92	51	91.08	56	
SE class	Upper	7	17.5	33	82.5	40	.086
	Lower	9	7.89	105	92.10	114	
Hyper-tension	Present	7	6.54	100	93.46	107	.018*
	Absent	9	19.14	38	80.85	47	
DM	Present	5	5	95	95	100	.002*
	Absent	11	20.37	43	79.62	54	
Family	Yes	2	7.14	26	92.85	28	.533
H/o	No	14	11.11	112	88.89	126	
Smoking	Yes	4	6.25	60	93.75	64	.155
	H/o	No	12	13.33	78	86.67	90
CCT < 555um	Yes	2	3.92	49	96.08	51	.064
	No	14	13.59	89	86.41	103	

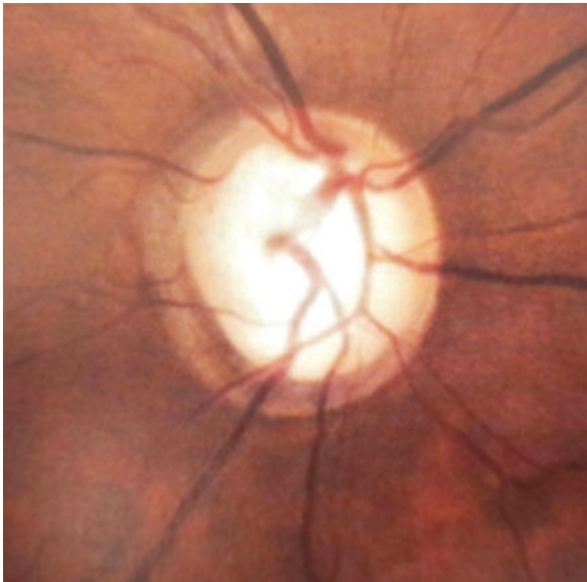
Myopia	Yes	4	6.55	57	93.44	61	.206
	No	12	12.90	81	87.10	93	



High Myopia Disc POAG Pattern



Age Related Atrophic Disc POAG Pattern



Advanced Glaucomatous Optic Disc Pattern

DISCUSSION

The World Health Organization has estimated that 8.9 million

people in India are blind, of which 12.8% are due to glaucoma. The visual disability and irreversible blindness from glaucoma has significant socio-economic impact and the problem is expected to reach alarming proportions in few years. Risk for blindness from Primary Open Angle Glaucoma is very high because of advanced stage at the time of diagnosis, onset of glaucoma at young age, inadequate intraocular pressure control, high rate of progression despite treatment, undiagnosed glaucoma and missed opportunities for diagnosing glaucoma. [23] Screening for glaucoma in the population will help to identify cases early. However it may be economically unviable to screen the entire population. Identification of the risk factors will help to select high risk patients for screening which in turn should lead to an overall reduction in the blindness due to this disease and the morbidity associated with it. [24]

Mean age of study subjects was 58.58 ± 1.916 years indicating glaucoma as disease of advancing age. Similar findings were seen in study by Khandelwal RR et al [25], where mean age was 60.20 ± 10.71 . Male predominance was seen in current study. [Table No.1] Consistent findings were seen in study by Okasa MC et al [26]. Prevalence of POAG was 10.38% in present study. [Fig No.1] Consistent findings were seen in study by Quigley HA et al [3] where it was seen that, India accounts for a minimum of 12.9% of primary open angle glaucoma (POAG) blindness. Our findings are in line with this study. Age >40 years, HTN and diabetes were risk factors associated with POAG ($P < 0.05$). Similar findings were observed in study by Khandelwal RR et al [25]. It was revealed that, high proportion hypertension and diabetes in open-angle cases. Similar studies like Los Angeles Latino Eye Study by Chopra V et al [27] and a study done by Salim S et al [28] reported consistent finding with present study.

CONCLUSION

Primary open angle glaucoma is the most common form of glaucoma in India. The proportion of glaucoma cases increased with increasing age (> 40 years). Provision of screening programs targeting persons with risk factors and opportunistic eye examinations would be beneficial in detection of glaucoma.

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