Original Article

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Prevalence and Risk Factors in Primary Open Angle Glaucoma of Patients Attending Ophthalmology OPD at Kims, Hubballi

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Abstract

Context: Glaucoma is the largest cause of bilateral blindness, second only to the cataract; however, the disability caused by glaucoma is irreversible. According to the World Health Organization model, based on the most recent available data, glaucoma accounted for 12.3% of blindness in 2002. *Aims:* To find out the Prevalence of Primary open angle glaucoma in patients attending Ophthalmology OPD at KIMS Hubli and to study the various risk factors associated with Primary open angle glaucoma. *Settings and design:* Hospital based cross sectional study was carried out at Ophthalmology out patient department of KIMS, Hubballi. *Methods and material:* Around 500 patients during the period of January 2016 to December 2016 satisfying the inclusion & exclusion criteria were enrolled into the study after valid consent. History, Visual acuity, slit lamp examination, CCT measurement, IOP measurement, Gonioscopy, Fundus evaluation, Visual field assessment was done on patients. *Statistical analysis:* Proportions and appropriate statistical tests were used for statistical analysis. *Results:* Out of 1000 eyes of 500 patients included in the study, 83 eyes of 54 patients were diagnosed as cases of POAG.The overall prevalence of POAG were found to be 10.8 %. All 54 cases of diagnosed POAG were above 40 yrs of age. 18 pts were diabetic (33.33%), 22 had hypertension (40.74%). 6 patients had family history of glaucoma (11.11%).There were 11 smokers (20.37%) 5 myopic (9.2%) and 6 (11.11) patients had CCT < 555 µm in the study. *Conclusion:* We found high prevalence rate (10.8%) of POAG compared to population based studies. And the prevalence of POAG increases with age. Diabetes, hypertension, family history, smoking, myopic, and thinner CCT are risk factors associated with POAG.

Keywords: Primary Open Angle Glaucoma; Age; Diabetic; Hypertension; Myopic.

Introduction

Glaucoma is defined as "a progressive optic neuropathy involving characteristic structural damage to the optic nerve and characteristic visual field defects"[1].

Glaucoma is a major public health problem, causing visual impairment which hampers day to day work [2].

Glaucoma is the largest cause of bilateral blindness, second only to the cataract; however, the disability caused by glaucoma is irreversible. According to the World Health Organization model, based on the most recent available data, glaucoma accounted for 12.3% of blindness in 2002. It is a 'silent killer' as most of the time, it is asymptomatic up to the very advanced stage and at the time of presentation to the ophthalmologist, the visual loss is often irrecoverable [3].

Primary open-angle glaucoma (POAG) is described distinctly as a multifactorial optic neuropathy that is chronic, progressive, and irreversible, 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 are too high for the continued health of the eye. It manifests by cupping of the optic disc in the absence of other known causes of the disease [4,5].

Other synonymous terms that may also appear in the literature include chronic simple glaucoma (CSG), chronic open-angle glaucoma (COAG), and idiopathic open-angle glaucoma. It has been estimated that 80 million people worldwide will have glaucoma by the year 2020, of which

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11.2 million will be blind [6].

Recent population based studies have reported that primary open angle glaucoma is the main type of glaucoma and its prevalence ranges from 0.5%-0.7% [7].

Risk factors are clinically useful to assess the risk for glaucoma based on the characteristics of the individual patient. Most of the evidence for chronic open angle glaucoma has been obtained from prevalence surveys or case-control studies.

Primary open angle glaucoma accounts for at least half of all glaucoma. Increased intraocular pressure, age, a positive family history, race are considered significant risk factors in development of glaucoma. Primary open angle has also been reported to be more prevalent in patients with hypertension and diabetes mellitus than in general population.

The purpose of this study was to estimate the prevalence of primary open angle glaucoma and associated risk factors. This study helps to detect and diagnose primary open angle glaucoma at the earliest. Understanding the risk factors, early diagnosis and prompt treatment could save useful vision in many eyes.

Methods

Based on previous studies, prevalence of POAG, in clinical study was 8.6% [8]. To estimate the true prevalence with 95% CI and 2.5% error minimum sample size required is 484. The formula used to calculate sample size is p (1-p)

Where is the table value for 95% Confidence level =1.96

P is the prevalence of POAG

d is error taken as 2.5%

Around 500 patients attending the ophthalmic outpatient department of Karnataka Institute of Medical Sciences, Hubballi during the period of January 2016 to December satisfying the inclusion & exclusion criteria were enrolled into the study after valid consent.

Inclusion criteria:

Patients above 40 yrs of age attending Ophthalmology OPD at KIMS Hubli.

Exclusion criteria:

1. Primary angle closure glaucoma
2. Patients with cataract
3. Presence of any secondary glaucoma
4. Patients < 40 years

Demographic data of all patients are noted. Relevant history regarding ocular symptoms, family history of glaucoma, diabetes mellitus, hypertension, prior ocular surgery, and long term medication was taken.

All patients were subjected to the following examinations:

1. Visual acuity testing by Snellens chart and best corrected visual acuity was recorded.
2. Slit lamp examination.
3. Intraocular pressure by Goldman's Applanation Tonometry (GAT). Corrected intraocular pressure is calculated using the formula = (measured corneal thickness (µm) - 578µm) × 5/70
4. Gonioscopy by Goldman's three mirror lens.
5. Direct Ophthalmoscopy, 90D lens examination, Indirect Ophthalmoscopy
6. IDO to document optic disc status & to rule out other retinal lesions.
7. Visual fields by automated perimeter. Visual Field testing was done by automated static perimetry, Central 30-2 program with Goldman size III target, a 31.4asb, white background and full threshold strategy. Heijl-krakau method of fixation was used. Appropriate lens correction placed before the eye to be tested and an occluder was placed over the fellow eye. Visual field defects were classified according to Hodapp-Anderson- Parrish staging system.
8. Central corneal thickness assessment by Ultrasound pachymetry. Data was compiled and results were obtained.

Results

Table 1 shows prevalence of primary open angle glaucoma (POAG). Out of 1000 eyes of 500 patients included in the study, 83 eyes of 54 patients were diagnosed as cases of POAG. 83 eyes of 54 patients were taken into analysis.

Table 2 shows age wise distribution of patients. Majority of patients 19 (35.18%) belonged to 51-60 age group; 14 (25.92%) in 61-70, 11 (20.37%)

above 70 and 10 (18.51%) in 41-50 yrs age group. Mean age was 61.72±11.1.

Table 3 shows sex wise distribution of patients. 38 subjects (70.37%) were males. 16 subjects (29.62%) were females. Thus males were found to be more than twice as affected as females.

Table 4 shows age wise prevalence of POAG. The prevalence of POAG was 8.92% in 41-50 yrs age group, 10.55% in 51-60 yrs of age group, 11.2% in 61-70 yrs age group and 13.09 % in above 70 yrs of age group. The overall prevalence of POAG was found to be 10.8 %.

Table 5 shows factors of POAG. All 54 cases of diagnosed POAG were above 40 yrs of age. 18 pts were diabetic (33.33%), 22 had hypertension (40.74%). 6 patients had family history of glaucoma (11.11%).There were 11 smokers (20.37%) 5 myopic (9.2%) and 6 (11.11) patients had CCT < 555 µm in the study.

Table 1: Prevalence of primary open angle glaucoma (POAG)

POAG		Number	%
Among patients (N = 500)	Yes	54	10.8
	No	446	89.2
Among total eyes studies (N = 1000)	Yes	83	8.3
	No	917	91.7

Table 2: Age wise distribution of patients

Age groups	No of patients	% of patients
41-50yrs	10	18.51
51-60yrs	19	35.18
61-70yrs	14	25.92
>70yrs	11	20.37
Total	54	100

Table 3: Sex wise distribution of patients

Sex	No of patients	% of patients
Male	38	70.37
Female	16	29.62
Total	54	100.00

Table 4: Age wise prevalence of POAG

Age	Total	POAG	%
41-50	112	10	8.92
51-60	180	19	10.55
61-70	124	14	11.2
>70	84	11	13.09
Total	500	54	10.8

Table 5: Risk factors of POAG

Risk factors	Present	%	Absent	%
Diabetes	18	33.33	36	66.6
HTN	22	40.74	32	59.25
Family History	6	11.11	48	88.88
Smoking	11	20.37	43	79.62
Myopia	5	9.2	49	90.74
CCT < 555µm	6	11.11	48	88.88

Table 6 shows distribution of eyes by best corrected visual acuity. Out of 83 eyes included in the analysis, 38 eyes (45.7%) had best corrected visual acuity of 6/12 -6/60; 13 eyes (15.66%) had >6/12 and 32 eyes (38.5%) had ≤ 6/60.

Table 7 shows distribution of eyes by IOP mm Hg. IOP in the study ranged from 12–50 mmHg. Mean IOP was 26.14±8.6 mmHg. 26 eyes (31.32%) with IOP ≤ 20mmHg belonged to glaucoma patients whose IOP was well controlled with medical management. Majority of eyes (35; 42.16%) had IOP of 21-30 mmHg, with 18 (21.68%) having 31-40 mmHg and eyes (4.84%) having IOP of > 40 mmHg.

Table 8 shows distribution of eyes by CDR. 31 eyes (37.34%) had CDR of 0.4-0.6, 50 (60.24%) had ≥ 0.7 and 2 (2.4%) had ≤ 0.3.

Table 9 shows distribution of eyes by visual field defect. Among visual field defects 2 had enlargement of blind spot, 4 had paracentral scotoma, 1 had siedal scotoma, 12 had superior arcuate scotoma, 19 had inferior arcuate scotoma, 32 had biarcuate scotoma, 2 had generalized depression and 11 had no vision.

Table 6: Distribution of eyes by best corrected visual acuity

BCVA	No of patients	% of patients
>6/12	13	15.66
6/12-6/60	38	45.7
≤6/60	32	38.5
Total	83	100.00

Table 7: Distribution of eyes by IOP mm Hg

IOP mm Hg	No of eyes	%
≤20	26	31.32
21-30	35	42.16
31-40	18	21.68
>40	4	4.8
Total	83	100.00

Table 8: Distribution of eyes by CDR

CDR	No of eyes	%
≤0.3	2	2.4
0.4 – 0.6	31	37.34
≥0.7	50	60.24
Total	83	100.00

Table 9: Distribution of eyes by visual field defect

VFD	No of eyes
Enlargement of Blind spot	2
Para central scotoma	4
Siedel scotoma	1
Superior arcuate scotoma	12
Inferior arcuate scotoma	19
Biarcuate scotoma	32
Generalized depression	2
No vision	11

Discussion

Out of 1000 eyes of 500 patients screened for POAG in the study, 83 eyes of 54 patients were diagnosed with Primary open angle glaucoma and they were analyzed. Out of 54 patients mean age was found to be 61.72±11.1; range was from 40-87 years.

Actis AG et al [9] in there study found that mean age was 61.49±9.58 years, range from 33.5-87, which correlates with our study. Suzuki et al. [10] in their study found the mean age of 119 POAG patients was 63.8±12.0 years.

In the present study, there were nearly twice as many males 38 (70.37%) compared to females 16(29.62%). Lin et al. [11] in their investigation showed that the number of male POAG patients was 2.55 times that of female POAG patients which also correlates with our study.

Out of 500 patients attending Ophthalmology OPD screened for glaucoma, 54 patients were diagnosed as having Primary open angle glaucoma. The prevalence of POAG was found to be 10.8%. This finding was similar to hospital based study conducted in Nigeria hospital where prevalence of glaucoma was 9.4%, out of which 91.2% was due to POAG and 3.23% due to NTG [8]. The prevalence of POAG in male population was found to be 11.3%. The prevalence of POAG among in female population was found to be 9.75%. The prevalence of POAG in age group of 40-50 yrs was found to be 8.92%. The prevalence of POAG in age group of 51-60 yrs was found to be 10.55%. The prevalence of POAG in age group of 61-70 yrs was found to be 11.2%. The prevalence of POAG in age group above 70 yrs was found to be 13.9%. Prevalence of POAG was found to be more in Male population. Prevalence of POAG increased as age increased, prevalence was more above 60 yrs compared to individuals between 40-60 yrs age group in our study. This finding was similar to a hospital based study conducted in Assam [12].

A family history of POAG is generally considered to be an important risk factor for POAG and having a first degree relative with glaucoma has been consistently associated with an increased risk of POAG. In the present study only 7 patients (5.6%) had a positive family history of POAG. In the Tajimi Study [10], the information obtained in the interview with participants about the family history of glaucoma was also very less (5/119). The lack of awareness of glaucoma in rural and suburban population and errors in recall of the family history of glaucoma may explain the low yield in this study.

People with DM are more prone to POAG and diabetics tend to have higher IOP compared to non diabetics. In this study, 36 patients (28.8%) were having diabetes mellitus. Lin et al. [11] found that 30.2% of patients had diabetes mellitus in their study group of 76,673 POAG patients which is similar to the results obtained in the present study. Ho JD et al. [13] in their study of 4032 patients with POAG found that 1043 patients (25.9%) gave a positive history of diabetes mellitus.

Systemic hypertension may be associated with POAG as the capillary circulation at the disc may be more precarious in hypertensive. In our study, 52 patients (41.6%) had hypertension. Lin et al. [11] study of 76,673 POAG patients found that more than half (50.5%) of patients had hypertension. Ho JD et al. [13] in their study, found that 1968 patients (48.8%) had a positive history of hypertension out of 4032 POAG patients.

Intraocular pressure is the most significant risk factor for POAG and indeed the only one that can be currently modulated. The mean IOP in the present study was found to be 26.14±8.6 mmHg. 26 eyes (31.32%) with IOP ≤ 20mmHg belonged to glaucoma patients whose IOP was well controlled with medical management. Majority of eyes 35 (42.16%) had IOP of 21-30 mmHg, with 18 (21.68%) having 31-40 mmHg and eyes (4.84%) having IOP of > 40 mmHg.

There were 11 smokers (20.37%) and 5 (9.2%) myopic in the study. 6 (11.11%) patients had central corneal thickness less than 555 µm.

Conclusion

Primary Open Angle Glaucoma is typically asymptomatic until significant visual field loss has occurred. As a leading cause of irreversible blindness worldwide, affecting more than 6.6 million people, blindness due to glaucoma is a mounting problem of global public health importance. Glaucoma related blindness is largely preventable through timely diagnosis, effective treatment and ongoing monitoring. Timely diagnosis is the first step which requires in depth knowledge of demographical aspects of glaucoma, namely the risk factors and knowledge of various visual field defects that occur as a result of neuropathy in POAG. This study is one such attempt to know the prevalence and risk factors of POAG.

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