Original Article

Epidemiological Study of Primary Glaucoma in A Tertiary Care Centre in Ahmedabad

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Abstract

Purpose: A hospital-based survey was conducted in GCS Medical College, Hospital and Research Centre, Ahmedabad, Gujarat, to study epidemiology of glaucoma. *Materials and Methods:* Detailed history, ocular examination was done in all patients diagnosed with glaucoma. Intra-ocular pressure was measured by Perkins applanation tonometer. Visual acuity was checked using Snellen's Chart. After dilating the pupil, the fundus was examined, glaucomatous changes in optic disc were noted diagrammatically. Visual field changes were noted from Humphrey perimetry. Gonioscopy was done by 4 mirror gonio lens to determine type of glaucoma. OCT was done for RNFL. *Results:* Total 1521 patients attending eye OPD of GCSMCH & RC were diagnosed and treated for glaucoma during the period of *three years* from *May 2015* to *April 2018* out of which only 161 patients were consistent throughout the study. Rest 1360 patients were lost to follow up. The maximum percentage of patients were between *45* and *60 years* of age. Mean base line intra-ocular pressure was *22 mm Hg* (SD = ± 0.20). Average cup-disc ratio was 0.6 (SD = ± 0.20). 111 patients (68.94%) were phakic and 50 patients (31.06%) were pseudophakic. POAG patients were 67 (41.61%), PACG patients were 52 (32.29%), PAC and PACS patients contributed to 22 (13.66%) and 20 (12.42%) respectively. 161 glaucoma patients who were primarily treated included 118 (73.29%) patients with medical treatment, 21 (13.04%) patients treated with laser and 14 (8.69%) patients managed surgically by trabeculectomy with mitomycin and 8 (4.96%) patients by cataract extraction following which the angles opened. During the course of our study, 106 number of patients required change of treatment out of which 75 (70.75%) patients were changed with medical line of treatment, 20 (18.87%) patients were changed to laser form of treatment and 11 patients (10.37%) were operated with trabeculectomy with mitomycin. *Conclusion:* Initiatives to increase public awareness and comprehensive eye examination by ophthalmologists are the key to reduce or eliminate undiagnosed glaucoma and also increase the compliance of the patients. The high non-compliance rate and high prevalance rate of change of treatment is also suggestive of requirement of close follow up and timely intervention to prevent blindness and morbidity related to glaucoma disease. The overall drop out rate was 89.41%. Also further study needs to be done for the reasons of high glaucoma drop out.

Keywords: Glaucoma; Intra-ocular pressure; Gonioscopy; Phakic; Pseudophakic.

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Introduction

Glaucoma is a chronic slowly progressive optic neuropathy, characterized by optic disc and Retinal Nerve Fiber Layer (RNFL) changes along with raised Intra Ocular Pressure (IOP) and visual field defects. Glaucoma is the second leading cause of blindness in the world. About more than half of the glaucoma patients in our community remain undiagnosed, which is either due to late onset of symptoms or Ophthalmologists missing early diagnosis.[1] Some

are not properly counselled; either due to resource constraints or lack of manpower which leads to high dropout rate.[1] On the other side, nearly half of glaucoma patients using ocular hypotensive medication do not need the medication or are over treated.[2]

On the basis of the available data, there are approximately 11.2 million people aged ≥ *35 years* who are suffering from different types of glaucoma in India.[1] Primary open angle glaucoma is estimated to affect 6.48 million people, whereas primary angle closure glaucoma affects around 2.54 million people. However, different types of primary angle closure disease comprise about 27.6 million people. So, the study of prevalence, distribution and determinants of glaucoma in urban population ≥ *35 year* aged patients coming to a tertiary care hospital was done for a period of *three years* duration.

Materials and Methods

All patients visiting Ophthalmology OPD of a tertiary care hospital underwent assessment. History by personal interview was conducted regarding demographic profile, presence of any risk factor of glaucoma like family history, ocular trauma, eye surgery, any systemic illness and glaucoma treatment taken in the past. The visual acuity of each eye was noted using Snellen's vision chart. Anterior segment was examined both by torch light and slit lamp to note status of cornea, anterior chamber, pupillary reaction, lens. Intra-ocular pressure was measured with Perkins/Goldmann applanation tonometer. Gonioscopy was done using four mirror gonioscope with indentation. All the patients underwent dilated fundus evaluation by indirect ophthalmoscopy. Visual field was tested through Humphry's automated perimeter. All patients underwent Retinal Nerve Fiver Layer evaluation (RNFL) on Optical Coherence Tomography (OCT).

Patient having glaucomatous field defect, disc changes and IOP ≥ *22 mm* of *Hg* in the presence of an open angle on gonioscopy in either eye was defined as having Primary Open Angle Glaucoma (POAG). A person having glaucomatous field defect with disc changes, IOP ≥ *22 mm* of *Hg* with occludable angle in either eye was considered as Primary Angle Closure Glaucoma (PACG). Persons having optic disc changes but without field defect, were labeled as Glaucoma suspects. Persons having > *22 mm* of *Hg* with open angles but with no field defect or disc changes were considered as ocular hypertensive. A

person having increased IOP, retinal/disc changes of glaucoma and evident ocular morbidity leading to glaucoma was considered as having secondary glaucoma.

Out of 1521 total patients diagnosed with glaucoma during the period from *April 2015* to *May 2018*, 161 patients of age ≥ *35 years*, diagnosed having primary open angle glaucoma and primary angle closure glaucoma, and those who remained in follow up for 3 consecutive years, were included in the study. Patients having congenital glaucoma, secondary glaucoma and ocular hypertension were excluded from the study. Also those who did not come for follow up were considered as drop out patients.

Data collection forms were used and the forms were computed using Statistical Package for Social Studies (SPSS-9) software for analysis. The outcome variable was glaucoma per person (Glaucoma could be in a single eye or both the eyes of a person but only one person was considered to be suffering from glaucoma). The dependent variables were gender, age group, and type of glaucoma.

Results

The proportion of patients having glaucoma in Ophthalmology OPD from *May 2015* to *April 2018* was 4.34%. During the course of *three years*, 161 glaucoma patients have been on regular treatment and follow up. The rest could not complete the defined follow up period. Number of phakic patients were 111 (68.94%) and pseudophakic were 50 (31.05%). Family history was found to be positive in 7 cases (5.34%). The number of male patients were 83 *i.e.*, 51.55 % and female patients were 78 *i.e.*, 48%, the difference was not statistically significant, ($p > 0.05$). The number of glaucoma patients in the age group wise is given in (**Table 1**). The maximum percentage of patients were between *46* and *60 years* of age, which was statistically significantly different from other age groups.

Table 1: Age distribution of Glaucoma patients

Age in years	No of pts	%	*p* - value
0–15	0	0	–
16–30	0	0	–
31–45	17	10.55	< 0.001
46–60	73	45.34	–
61–75	52	32.29	< 0.05
76–90	19	11.8	< 0.001

Table 2: Patients visiting the OPD with following symptoms

| Symptom	No of Patients	% of Patients
Diminished vision	76	47.20 %
Pain	26	16.15 %
Headache	13	8.07 %
None	46	28.57 %

Diminished vision was the most common symptom found in the patients, (**Table 2**).
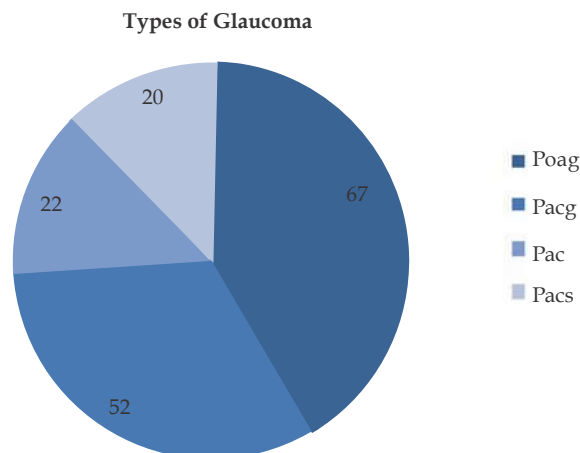
The average cup: disc ratio was 0.6 (SD +/-0.20).

The baseline pressure was ≥ *22 mm* of *Hg* (SD ± 0.12, (**Graphs 1–3**).
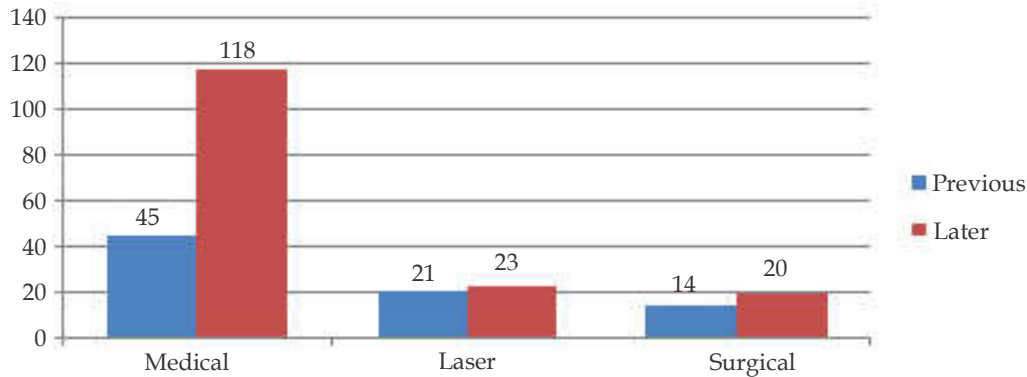
Intra-ocular pressure changes
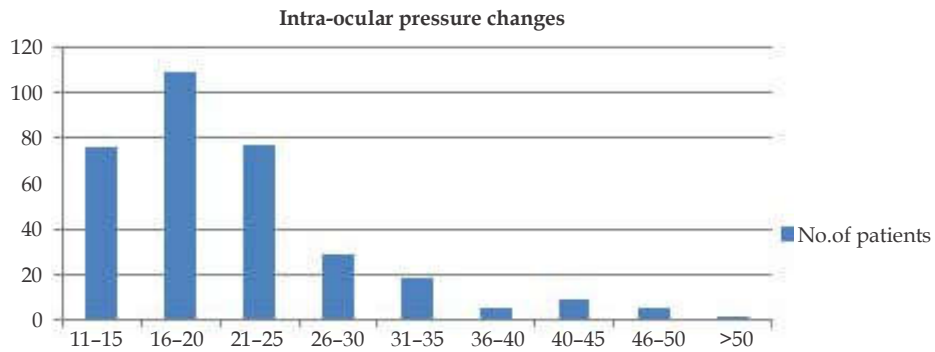
Graph 1: Patients with different initial Intra-ocular Pressure (IOP) changes in either eye are as follow

Visual field changes
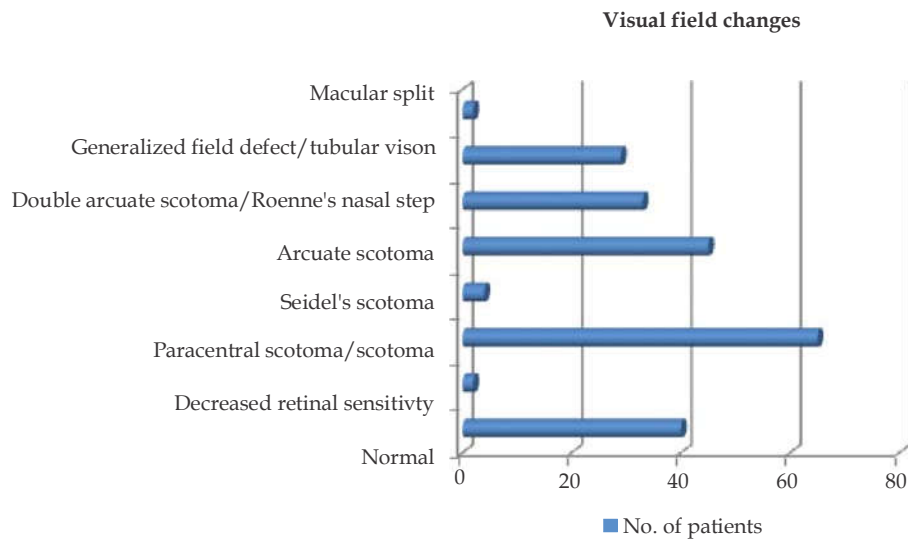
Graph 2: Paracentral scotoma was the most common type of field defect found in either eye

Types of Glaucoma

Graph 3: The patients suffering from different type of glaucoma are as follow

Graph 4: Change of treatment is done in 78 patients (48.45%)

Graph 4, clearly suggests that medical line of treatment is the mainstay modality for glaucoma patients, to either start with or if at all any change of treatment is needed. And in advanced cases of glaucoma surgical treatment is mandatory to reduce the morbidity.

Discussion

It is estimated that there are more than 60 millions cases of glaucoma worldwide and it will increase to 80 million by 2020.[3] Overall, glaucoma is the second major cause of blindness after cataract and refractive errors.[4] Overall prevalence of glaucoma in our study is 4.34%. Various studies in India have reported prevalence of Glaucoma ranging from 1%–6%.[13] Prevalence in male is 51.55% which is more than 48.44% in female. However, the Arvind comprehensive eye survey,[5] Frahmingham eye study[6] also showed a higher prevalence of glaucoma in male, whereas Beaverdam eye study[7] showed no gender difference.

There was higher prevalence of glaucoma in *45–55 years* age group, whereas several studies showed increased glaucoma prevalence with increasing age.[5] In Chennai Glaucoma Study,[8] patients over *70 years* are *five times* more likely to have POAG than those younger than *50 years*. The prevalence of POAG was found to be 41.61%, while PACG was found to be 32.29% in our study. PAC and PACS patients contribute to 13.66% and 12.42% respectively.

The mean CD Ratio was found to be 0.6 with a SD of 0.2. The average baseline pressure was *20–25 mm Hg*. Many studies showed that IOP fluctuated during the daytime for both healthy individuals and POAG patients, and fluctuation could influence the diagnostic and prognostic evaluation of the glaucomatous diseases.[9-12] Two of our patients progressed to glaucomatous optic atrophy leading to complete blindness.

Out of 161 glaucoma patients, 118 (73.29%) patients were on medical treatment, 21 (13.04%) patients were treated with laser and 14 (8.69%) patients were surgically managed by trabeculectomy with mitomycin-C and 8 (4.96%) patients by cataract extraction following which the angles opened.

During the course of our study, 106 number of patients required change of treatment, in 75 (70.75%) patients were changed with medical line of treatment, that is either the dose, type of drug or drug regime (one, two or three) whatever was the need at the hour of treatment was done, 11 patients (10.37%) were operated with AGS with mitomycin, 20 (18.87%) patients were changed to laser form of treatment during the course of treatment and follow up with us.

Conclusion

Initiatives to increase public awareness and comprehensive eye examination by ophthalmologists are the key to reduce or eliminate undiagnosed glaucoma and also increase the compliance of the patients. Also, more emphasis need to be made on all ophthalmologists to diagnose glaucoma patients at an early stage by using applanation tonometry or NCT for IOP measurement and the same for dilated examination with indirect ophthalmoscopy to pick up early disc changes. Morever, there should be proper counselling of these patients as they have to undergo battery of glaucoma tests and then treatment also is a lifelong issue. Also, nocturnal diurnal variation was noted in few patients during our study, so further emphasis on nocturnal diurnal variation test should be taken into consideration.

The higher drop out rate indicates that proper counseling is a must. We are therefore planning to start counseling sessions *twice a week* for these patients on a regular basis. Also, further study needs to be done for the reasons of high glaucoma drop out. The high non-compliance rate and high prevalance rate of change of treatment is also suggestive of requirement of close follow up and timely intervention to prevent blindness and morbidity related to glaucoma disease.

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