



Original Research Article

Prevalence of primary open angle and primary angle closure glaucoma in patients with their outcome after medical and surgical treatment at department of ophthalmology of MB hospital, Udaipur, Rajasthan

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ABSTRACT

Introduction: This study is conducted to evaluate the prevalence and progress after medical and surgical treatment of primary open angle and angle closure glaucoma patients.

Materials and Methods: A study conducted at Ophthalmology department of RNT medical college and MB Hospital, Udaipur during the period of 1 year and it included a total of 60 patients of glaucoma. Inclusion criteria: patients above 40 years fulfilling ISGEO criteria of Glaucoma diagnosis. Exclusion criteria: Patients below 40 years and patients having congenital or secondary glaucoma.

Results: The prevalence of primary open angle and angle closure glaucoma was 1.37% and 0.42% with overall prevalence of glaucoma in our study was 1.78%. In primary angle closure 18 eyes were given surgical and no medical treatment. In primary open angle glaucoma 14.28% patients were on monodrug therapy, 19.04% were on double drug therapy, 47.62% were on triple drug therapy, 19.04% were on quadruple drug therapy. In primary angle closure glaucoma 27.77% patients had undergone Iridotomy, 27.77% had Trabeculectomy, 22.24% had prophylactic Iridotomy, 11.11% had Cataract surgery and 11.11% had trabeculectomy with cataract surgery.

Conclusion: It is concluded that primary open angle glaucoma is more prevalent than angle closure glaucoma. Surgical treatment is preferred for Primary angle closure glaucoma and no patients having primary open angle glaucoma were undergone surgery.

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1. Introduction

Glaucoma is an optic neuropathy in which the damage to optic nerve occur with characteristic loss of nerve fibers and increased cup to disc ratio. It leads to irreversible and progressive, loss of vision. It is frequently, but not forever, linked with increasing fluid pressure of eyes. Elevated intraocular pressure (IOP) is an important risk factor for glaucoma. Optic nerve is permanently damaged which leads to blindness in untreated glaucoma.

Universally, glaucoma is regarded as the second leading cause of vision loss and affects roughly 66 million people around the world. 1 in 200 individuals at the age of 50 years

or younger and 1 in 10 over the age of 80 years were affected by glaucoma.¹⁻⁴ It is the third leading cause of vision loss in India and the country has been predicted to host nearly 20% of the world glaucoma population by 2020.^{5,6}

Primary Open angle glaucoma had a prevalence rate of 0.41-3.51%. Previous studies have accounted that Primary Angle Closure Glaucoma (PACG) to be nearly as common as POAG in India.⁷⁻¹³

There are two types of glaucoma, "open angle" and "closed angle". Most common type of glaucoma is open angle glaucoma and it is responsible for 90% of glaucoma patients in the western countries. It is unproblematic and does not have acute attacks. Less than 10% of glaucoma cases were closure angle glaucoma in western

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countries, but in Asia, half of glaucoma cases are of closed type. Approximately 10% of patients with closure angle glaucoma exhibit acute angle closure crises characterized by sudden ocular pain, seeing halos around lights, red eye, increased IOP (>30 mmHg), morning sickness and vomiting, and a fixed, mid-dilated pupil.

For most of glaucomas major risk factor is increased IOP and IOP is the major target for the treatment of glaucoma. IOP is the result of secretion of liquid aqueous humor from ciliary processes of the eye and its seepage from the trabecular meshwork.

Throughout all controlled randomized trials over 5 years, a minimum 18% decrease in mean IOP from baseline resulted in as a minimum of 40% decrease in rates of aggravation of glaucoma. From these studies it is concluded that pathophysiology behind glaucoma is elevated intraocular pressure.¹⁴ The existence of a substantial quantity of peripheral anterior synechiae, an elevated IOP and a larger cup:disc ratio are other prognostic factors of insufficient pressure control despite a patent laser peripheral iridotomy.^{15–17} Within the first six months majority of patients develop an increase in IOP.¹⁸ When glaucomatous optic neuropathy and damage of visual field occur, nearly 100% patients necessitate surgical treatment for controlling IOP.¹⁹

There are limited data which gave information for the overall burden of open-angle glaucoma (OAG).²⁰ One of the most common obstructions, in obtaining estimates of glaucoma patients, is prolonged medical examination procedures are required to key out glaucoma patients. Finding the prevalence of glaucoma needs an elaborated assessment of both visual field and optic nerve head. Providentially, various latest population-based surveys have ascertained the preponderance of glaucoma applying in-depth study plans.²¹ The objective of this study was to use pooled data from these population bases surveys to precisely find out this large, worldwide population based studies to determine more precisely the enormity of this disease to design how the figures will change in the up coming decades.

To the best of literature available, there is a little known about prevalence & medical prognosis of open angle and angle closure glaucoma in Udaipur, Rajasthan. Hence present work is done to evaluate preponderance of glaucoma as well as to study prognosis of patients on medical or surgical treatment.

2. Materials and Methods

Across sectional study 60 glaucoma patients was conducted in department of Ophthalmology, MB Hospital attached to RNT Medical College, Udaipur.

3. Inclusion criteria

Subjects above 40 years, Subjects giving informed consent and Fulfilling ISGEO criteria of Glaucoma diagnosis.

4. Exclusion criteria

Subjects below 40 years, congenital glaucoma and Secondary glaucoma. Detailed history about name, age, occupation, personal and past record, habits and life style of the subjects were taken. Family history of hypertension, diabetes, refractive errors and glaucoma was enquired along with Anthropometric measurements like height and weight, IOP. After general physical examination, ophthalmic examination was performed regarding eye brows, eye lashes & eye lids, conjunctiva, cornea, anterior chamber, iris, pupil and lens as well as ocular movements. Intraocular pressure was measured by Applanation tonometry, angle by Gonioscopy and slit lamp biomicroscopy. Along with media, optic disc, optic cup, neuroretinal rim, peripapillary region for any atrophic changes, retinal nerves and vessels was also be examined. Central corneal thickness, perimetry and OCT were also being performed using Optical biometry AL scan, Humphrey perimetry method and Heidelberg Optical Coherence Tomography respectively.

5. Results

The preponderance of POAG was found to be 1.37% and that of PACG was found to be 0.42% with overall prevalence of glaucoma was 1.78%. The mean age of patients in POAG and PACG were 67 ± 7.77 years and 62.7 ± 11.3 years respectively. There were 44 males and 16 females in our study. In POAG 26.6% patients had hypermetropia and 43.3% patients had myopia. In PACG 26.6% patients had hypermetropia and 3.33% had myopia.

In POAG patients mean of CCT was 524.4 ± 21.3 and in PACG patients mean of CCT was 525.2 ± 42.3 . The mean CDR in POAG patients was 0.61 ± 0.14 and in PACG patients was 0.53 ± 0.13 . The mean of IOP in POAG patients were 23.09 ± 1.27 and, mean intraocular pressure in PACG patients were 39.83 ± 18.1 . Here, Mean MD in POAG subjects was -10.55 ± 5.42 which is lower than mean MD -11.8 ± 4.19 in PACG subjects. Likewise, mean PSD in POAG and PACG patients was 4.80 ± 1.40 and 5.23 ± 1.33 respectively. The mean PSD in open angle glaucoma was lower as compared to angle closure in primary angle closure glaucoma patients (Table 1).

Here, in POAG mean \pm SD of MD and PSD at 1 month of follow up is -10.06 ± 5.39 and 5.40 ± 1.44 and at 3 month follow up is -9.5 ± 4.85 and 4.94 ± 1.33 with a non-significant difference (p-value= 0.4788; p-value=0.5104). Similarly in PACG mean \pm SD of MD and PSD at 1 month of follow up is -12.44 ± 3.41 and 5.48 ± 1.90 and at 3 month follow up is -10.34 ± 4.93 and 4.78 ± 1.32 with a non-

Table 1: Baseline parameters of glaucoma patients.

Parameters	POAG	PACG	P-value
CCT (μm)	524.4 \pm 21.3	525.2 \pm 42.3	0.9233
CDR	0.61 \pm 0.1 1	0.53 \pm 0.1 3	0.0087
IOP	23.09 \pm 1.27	39.83 \pm 18.1	0.0001
MD	-10.55 \pm 5.4 2	-11.8 \pm 4.19	0.5411
PSD	4.80 \pm 1.4 0	5.23 \pm 1.3 3.	0.6702

Table 2: Follow up of perimetry and IOP

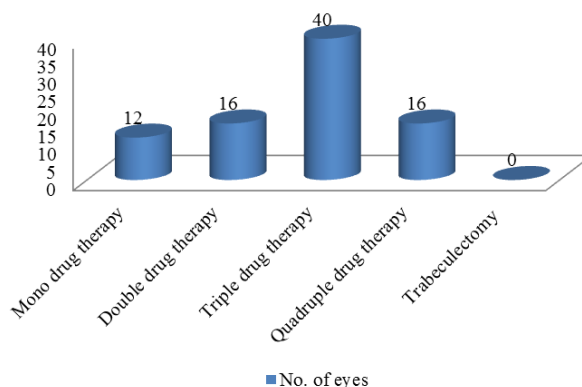
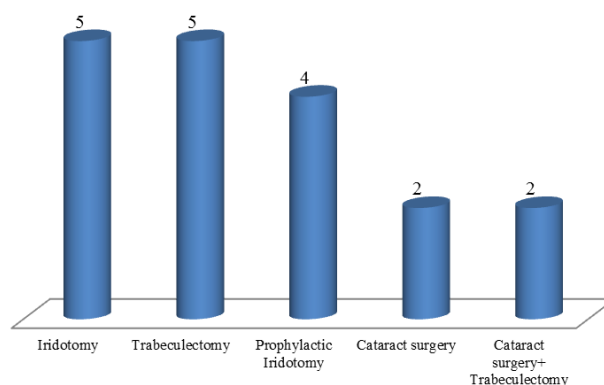
Follow up	POAG		3 month		PACG		3 month	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
MD	-10.06	5.39	-9.5	4.85	-12.44	3.41	-10.34	4.93
PSD	5.40	1.44	4.94	1.33	5.48	1.90	4.78	1.32
IOP	15.24	2.31	14.1	2.07	18.4	1.83	15.7	3.09

significant difference (p-value= 0.0869; 0.0729). Above table showing that there are no significant changes in value of MD & PSD at 1month & 3 months in follow up periods. In POAG mean \pm SD of IOP at 1 month of follow up is 15.24 \pm 2.3 1 and at 3 month follow up is 14.1 \pm 2.11 with a significant difference (p-value= 0.0394). Similarly in PACG mean \pm SD of IOP at 1 month of follow up is 18.4 \pm 1.8 3 and at 3 month follow up is 15.7 \pm 3.09 with a significant difference (p-value= 0.0114) (Table 2).

In POAG 84 eyes had medical treatment with mono, double, triple and quadruple drug therapy no eyes had surgical type of treatment. In PACG all eyes undergone surgical treatment and no eyes had medical type of treatment. Because all patients have already taken 2-3 medicine topically from elsewhere but their IOP could not reach to normal range. So we did Trabeculectomy, Iridotomy and cataract surgery with Trabeculectomy. 4 patients came with acute stage i.e. a complaint of severe pain, decrease of vision, redness, photophobia and lacrimation. For that we given IV mannitol, orally glycerol, acetazolamide tablets for symptomatic relief and next day we did surgery. In POAG 14.28% patients were on monodrug therapy, 19.04% were on double drug therapy, 47.62% were on triple drug therapy, 19.04% were on quadruple drug therapy (Figure 1). In PACG 27.77% patients had undergone Iridotomy, 27.77% had Trabeculectomy, 22.24% had prophylactic Iridotomy, 11.11% had Cataract surgery and 11.11% had trabeculectomy with cataract surgery (Figure 2).

6. Discussion

Here, in our study the overall prevalence of glaucoma was 1.78% and prevalence of primary angle closure glaucoma (PACG) and primary open angle glaucoma (POAG) was 0.42% and 1.37%, as most of patient gets cataract surgery in senile age and it is also treatment of glaucoma that's why probably we observed decreased prevalence of PACG in our

**Fig. 1:** Type of drug therapy given in POAG.**Fig. 2:** Type of treatment in Primary angle closure glaucoma

study. Study by Quigley et al¹ also found a high prevalence of POAG. Salmon JF et al(1993)²² in their study found that PACG was prevalent in 2.3% subjects and this type of glaucoma increases with age. As compared to this POAG was prevalent in 1.5% patients.

Here, mean age was found to be 67 ± 7.77 years in POAG patients with majority of patients belong to age group 71-80 years. We found a 62.7 ± 11.3 years of mean age in PACG patients with majority belong to age group 61-70 years. In a study by Quigley et al¹ also found similar results. The mean age of these patients 70.9 ± 12.5 this was approximate to our mean age. Paul et al²³ also found that in case of PACG majority of patients were in age group 59-70 years.

In our study there were male preponderance both POAG (80.9% Vs 19.1%) and PACG (55.5% Vs 44.5%). In a study by Dielemans et al²⁴ found that Men had a more than three times higher risk of having POAG than women. A study by Paul et al²³ also found male Predominance in PACG.

Here, 26.6% patients develop hypermetropia and 3.33% develop myopia in PACG and in POAG hypermetropia were present in 26.6% patients and myopia was found in 43.3% patients. Perera et al studied that myopic patients were more susceptible to develop POAG²⁵. Shen et al²⁶ observed an association of hyperopia with PACG that contrasted with the association we found in POAG patients.

In our study, the mean CCT in POAG patients was 524.4 ± 21.3 and Mean CCT of in PACG patients was 525.2 ± 42.3 . There is no significant difference in Mean CCT in open angle and angle closure glaucoma patients with a p-value of 0.9233. This results is consistent with study done by Shen et al²⁶ does not found a significant difference in Mean CCT in both POAG and PCAG patients. In our study mean CD ratio was slightly higher in POAG patients as compared to PACG patients (0.61 Vs 0.53). In line with this study by Shen et al²⁶ also found similar results. In their study the mean CDR in POAG patients was 0.55 and in PCAG patients was 0.44. They found that patients having high IOP also have high cup-disc ratio. Thapa SS et al (2012)²⁷ studied types and prevalence of glaucoma in Nepal and found that mean of vertical cup-to-disc ratio was 0.26 (97.5th and 99.5th percentiles, 0.6 and 0.8 mmHg, respectively).

In present study mean IOP was higher in PACG patients as compared to POAG patients (39.83 Vs 23.09). Our study results similar to Ngo CS et al²⁸. They studied total 98 patients out of them 48 patients were having POAG and 50 patients were having CPACG. The IOP was found to be statistically higher in CPACG eyes (26.9 ± 6.9 mmHg) as compared to POAG eyes having IOP was 24.5 ± 3.3 mmHg with a significant $p = 0.03$ value. It was documented that marginally increased IOP was found in myopic eyes.

Here, mean MD in POAG subjects was -10.55 ± 5.42 which is lower than mean MD -11.8 ± 4.19 found in PACG subjects. In concordance with this study by Gazzard et al²⁹ also found that MDs (POAG group, -13.3 dB; PACG group, -18.0 dB) indicated more severe visual loss in subjects with PACG. In our study mean PSD POAG patients were 4.80 ± 1.42 which is lesser than mean PSD 5.23 ± 1.37 in PCAG subjects which is not so significant. Similar with this study by Kalaivani et al³⁰ found that there were no statistical

significant difference in Pattern Standard Deviation values ($p=0.107$) between open and closure glaucoma.

Here, in POAG mean \pm SD of MD and PSD at 1 month of follow up is -10.06 ± 5.39 and 5.40 ± 1.44 and at 3 month follow up is -9.5 ± 4.85 and 4.94 ± 1.33 with a non-significant difference (p -value= 0.4788; p -value=0.5104). Similarly in PACG mean \pm SD of MD and PSD at 1 month of follow up is -12.44 ± 3.41 and 5.48 ± 1.93 and at 3 month follow up is -10.34 ± 4.93 and 4.78 ± 1.32 with a non-significant difference (p -value= 0.0869; 0.0729). There are no significantly changes of value in MD & PSD at the of 1month & 3 months in follow up periods.

Our study results shows that IOP significantly decreased after the treatment in both groups, Mohamed Y.S Saif,³¹ The study included 32 (58 eyes) patients with POAG on medical treatment. They were 24 men and eight women with a mean age of 57.75 ± 7.08 years, ranging from 48 to 78 years. The mean IOP before treatment was 29.89 mmHg, ranging from 22.00 to 40.00 mmHg, and decreased after treatment to 12.17 mmHg, ranging from 8.00 to 16.00 mmHg ($P < 0.001$).

7. Conclusion

This study suggest that periodic eye examination are crucial for asymptomatic individual as well, especially if they belong to a high risk category however, such examination are feasible only if the population is aware of glaucoma and does not rely solely on symptoms to seek case. With an appropriate target IOP and continuous reassessment of visual field POAG progression can be considerably slowed down with medical treatment above. Similarly, appropriate use of Medication/laser/surgery to achieve such a target IOP range in PACG can maintain visual fields and halt progression.

8. Source of Funding

None.

9. Conflict of Interest

None.

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