

Comparison of Visual Acuity, Refractive Status, Intraocular Pressure, Central Corneal Thickness, RNFL Thickness and Disc Changes Between Patients with Primary Open Angle Glaucoma and Primary Angle Closure Glaucoma - A Retrospective Observational Study

Dr. Geetha P¹, Dr. Gnanaoli M²

¹Assistant Professor, Regional Institute of Ophthalmology and Government Ophthalmic Hospital, Chennai.

²Post Graduate, Regional Institute of Ophthalmology and Government Ophthalmic Hospital, Chennai, India.

Corresponding Author: Dr Geetha P

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ABSTRACT

Aim and objective: To compare visual acuity, refractive status, intraocular pressure, central corneal thickness, RNFL thickness and disc changes between patients with primary open angle glaucoma and primary angle closure glaucoma

Materials and methods: A retrospective study conducted over a period of 6 months with a sample size of 172 eyes from 100 patients. Various parameters including Pachymetry, IOP and gonioscopy were performed.

Result: POAG is more in prevalence in the age group of 45- 60 and more in males than females. In general, POAG groups were predominantly myopic and have a thinner central corneal thickness average $534 \pm 24.6 \mu\text{m}$ and leading to effects in Intraocular pressure. PACG is more prevalent among males than females in contrary to our reference and it is common in the age group 40-60yrs. PACG's were more predominantly Hyperopic and having thicker CCT on an average of $544 \pm 25.7 \mu\text{m}$.

Conclusion: This study concludes that more rapid glaucomatous changes is seen in the patients with POAG than PACG. These patients should be screened carefully and provided more diagnostic and preventive management.

Keywords: Primary open angle glaucoma, Primary angle closure glaucoma, Central corneal thickness, RNFL thickness.

INTRODUCTION

Glaucoma is a multifactorial optic degenerative neuropathy characterized by the loss of retinal ganglion cells. It is a combination of vascular, genetic, anatomical, and immune factors. It is estimated that 57.5 million people worldwide are affected by primary open angle glaucoma (POAG)(1).

MATERIALS AND METHODS

The aim of the study was to compare visual acuity, refractive status, intraocular pressure, central corneal thickness, RNFL thickness and disc changes between patients with primary open angle glaucoma and primary angle closure glaucoma. It was a retrospective study conducted over a period of 6 months with a sample size of 172 eyes from 100 patients (86 eyes of 50 patients with POAG and 86 eyes of 50 patients with PACG were included.) All patients above 35 years of age with pseudophakia with clear ocular media diagnosed with POAG and PACG were included while cases of

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secondary glaucoma, retinal pathologies, mature cataract, refractive surgery and penetrating keratoplasty were excluded. All participants were subjected to tonometry (by GAT), gonioscopy, pachymetry, OCT RNFL and data was collected.

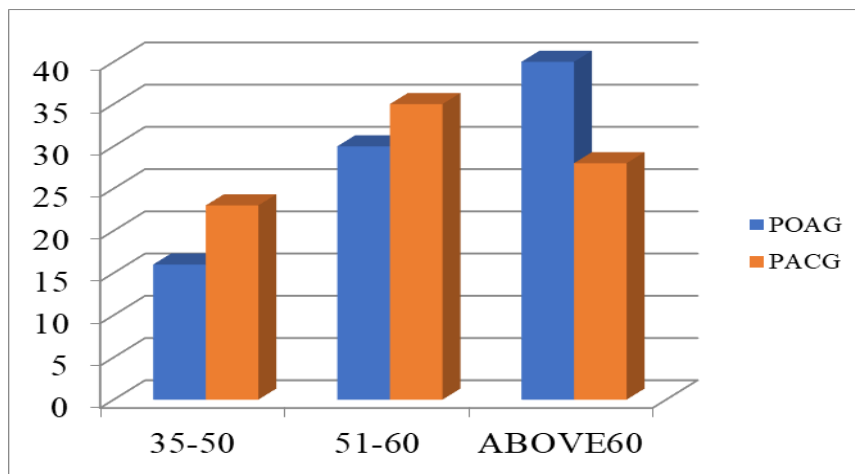
Age Distribution

The age distribution of POAG cases ranges between 58.6±8.2. The age distribution of PACG cases ranges between 55.2±7.8.

RANGE	POAG	PACG
35-50	16	23
51-60	30	35
ABOVE60	40	28

RESULTS

We had evaluated a total of 172 eyes of 100 patients in which 86 eyes each in POAG and PACG. The number of males is 34 and females is 16 in POAG whereas in PACG it is about 28 males and 22 females.



In this study male cases are comparatively more both in POAG and PACG. But this does not have any significant impact on the results of the study.

Refractive status of POAG cases is predominantly MYOPIC, whereas in PACG it is HYPEROPIC. 77% of TOTAL POAG cases are MYOPIC. 62% of TOTAL PACG cases are HYPEROPIC.

Visual Acuity Distribution

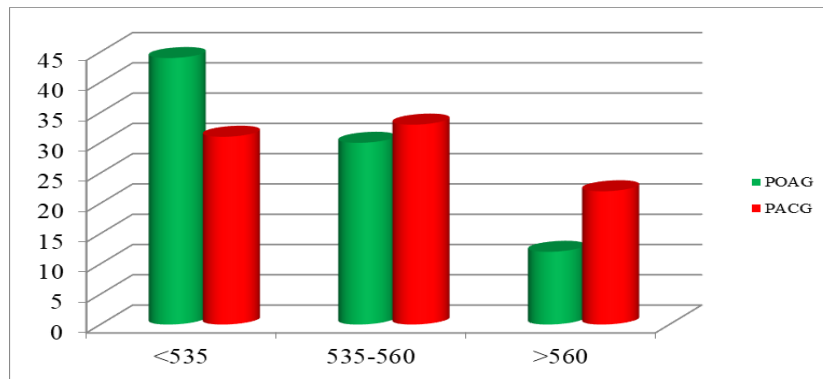
UCVA TABLE

DIAGNOSIS	6\6-6\12		6\18-6\36		6\60-3\60		<3\60		TOTAL	
	n	%	n	%	n	%	n	%	n	%
POAG	20	23%	42	49%	13	15%	11	13%	86	100%
PACG	29	34%	34	40%	21	24%	2	2%	86	100%

BCVA TABLE

DIAGNOSIS	6\6-6\12		6\18-6\36		6\60-3\60		<3\60		TOTAL	
	n	%	n	%	n	%	n	%	n	%
POAG	52	60%	25	29%	4	5%	5	6%	86	100%
PACG	67	78%	15	17%	4	5%	0	0	86	100%

Central Corneal Thickness Comparison (CCT)

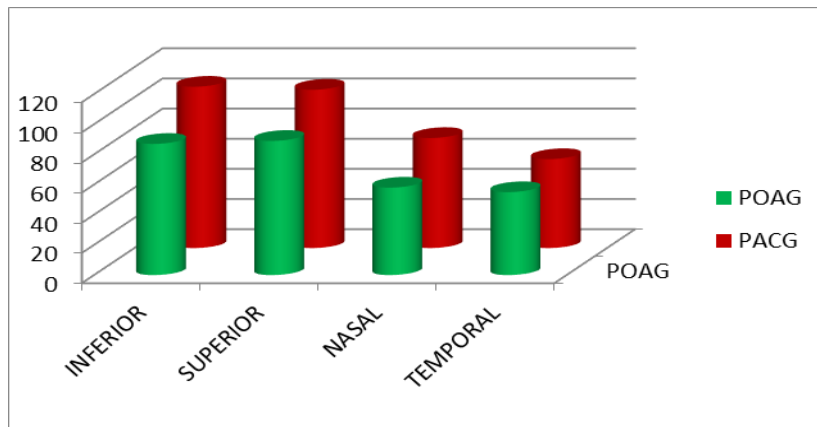


CCT	POAG	PACG
<535	44	31
535-560	30	33
>560	12	22

PACG cases predominantly had higher CCT value compared to POAG. In this chart we describe the various ranges of CCT in POAG and PACG. 51% of POAG cases has a CCT value <535 whereas PACG accounts for 36%. 35% of POAG cases has a CCT value ranging between 535-560 whereas

PACG accounts for 38%. 14% of POAG cases has a CCT value >560 whereas PACG accounts for 26%. From the above results it is clearly seen that the percentage of POAG cases decreases as the CCT value increases and most of the POAG cases lies under the CCT value ranging between 535-560.

RNFL Thickness Distribution

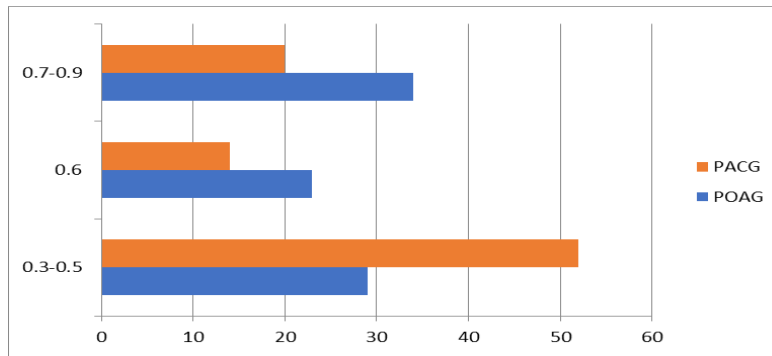


GROUP	NUMBERS	Mean	Std. Deviation	Std. Error Mean
RNFL INF	POAG	86	87.2558	33.59453
	PACG	86	107.3721	37.92347
RNFL SUP	POAG	86	89.6860	29.75716
	PACG	86	105.1395	37.38517
RNFL NAS	POAG	86	58.9651	19.05808
	PACG	86	73.7209	29.84259
RNFL TEM	POAG	86	55.1279	16.21386
	PACG	86	59.6860	18.41052

From this table it is inferred that RNFL thickness loss is seen in all quadrants of POAG when compared to PACG.

In specific TEMPORAL QUADRANT thickness is very low in both POAG and PACG.

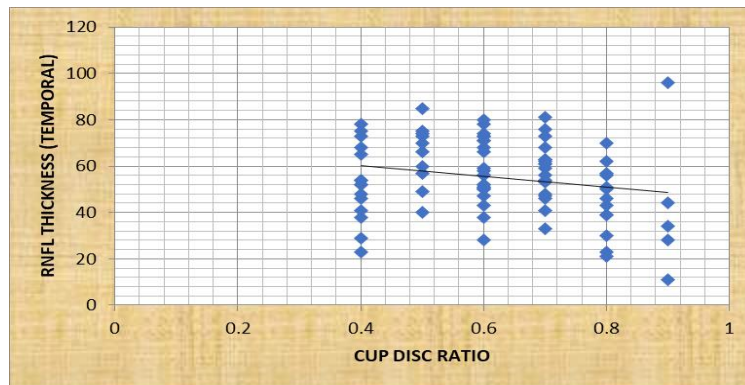
Cup – Disc Ratio Comparison



CDR	POAG	PACG
0.3-0.5	29	52
0.6	23	14
0.7-0.9	34	20

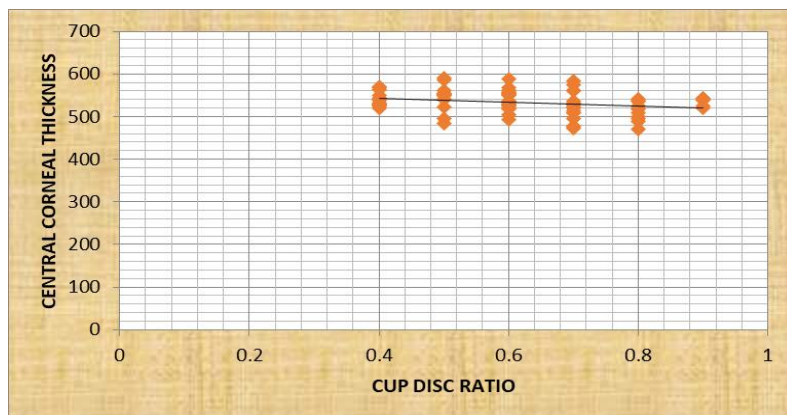
This table shows that CD RATIO is low in PACG THAN POAG. 60% of PACG cases has a CD RATIO ranging between 0.3-0.5 which is lower.40% of POAG cases has a CD RATIO ranging between 0.7-0.9 which is higher.

Relationship Between CDR & RNFL Thickness



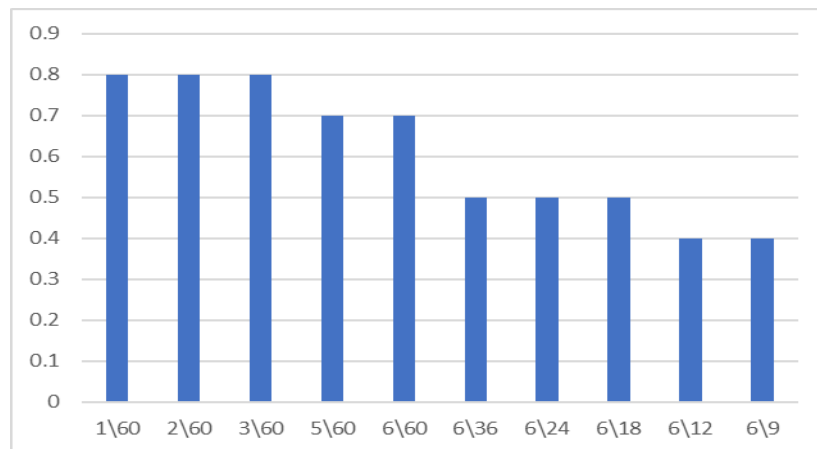
This table shows that when CD RATIO increases RNFL THICKNESS decreases in both POAG and PACG. Hence inversely proportional relation is obtained.

Relationship Between CDR & CCT



This table infers negative correlation between CD RATIO and CCT in both POAG and PACG.

Relationship Between CDR & VISUAL ACUITY



Here VISUAL ACUITY DROPS when CD RATIO range INCREASES. Eventually the patients with higher CD RATIO were recorded with poor visual acuity which evidences the study.

DISCUSSION

Detection of glaucoma at the early stages of the disease is important in strategizing effective management and prevention of blindness. The Ability to arrest progression at the early stage of the disease may improve the quality of life of the glaucoma patients. There was moderate correlation between severity of the disease and quality of life of the affected patients in Malaysia (2,3). In this present study optical coherence tomography (OCT) used to compare mean RNFL thickness between POAG and PACG, slit lamp examination was done to evaluate anterior segment abnormalities. Indirect ophthalmoscope was used to examine the fundus and cup-disc ratio. Pachymeter was used to measure the central corneal thickness between POAG and PACG.

POAG

We found that, in general POAG is more in prevalence in the age group of 45- 60 and more in males than females. In general, POAG groups were predominantly myopic

and have a thinner central corneal thickness average $534 \pm 24.6 \mu\text{m}$ and leading to effects in Intraocular pressure. Visual acuity and cup to disc ratio positively correlated. We found that CCT was negatively correlated with cup to disc ratio. (4). POAG group is seen with increased cup to disc ratio on an average of $0.6 \pm 0.20\text{mm}$ ($p=0.000$). Retinal nerve fiber layer thickness was positively correlated with cup to disc ratio(5,6). RNFL thickness loss was seen in all four quadrants Inferior, Superior, Nasal, Temporal. Especially in temporal quadrant of POAG groups.

PACG

We found that in general PACG is more prevalent among males than females in contrary to our reference (7,8) and it is common in the age group 40-60yrs. PACG's were more predominantly Hyperopic and having thicker CCT on an average of $544 \pm 25.7 \mu\text{m}$. (9). A thicker CCT may be associated with a thick peripheral cornea thus a more crowded angle. In PACG groups Visual acuity and cup to disc ratio is negatively correlated as the same as in POAG groups. It is also found that CCT is negatively correlated with the cup to disc ratio(5). It is also found that RNFL thickness is positively correlated with the cup to disc ratio average $0.5 \pm 0.18\text{mm}$ and

also RNFL thickness loss is found in nasal and temporal quadrants, especially temporal quadrants of PACG groups (10).

CONCLUSION

This study concludes that more rapid glaucomatous changes is seen in the patients with POAG than PACG. These patients should be screened carefully and provided more diagnostic and preventive management, to maintain the quality of vision for their better life to avoid vision loss and quality of life can be maintained.

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Conflict of Interest: None

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