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Primary Angle Closure Glaucoma in a Tertiary Centre in South India

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Original Research article

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Abstract: To study the profile of the stages of Primary Angle Closure Glaucoma (PACG). Between October 2013 and May 2017,all consecutive patients of primary angle closure glaucoma(PACG) were enrolled at Glaucoma outpatient clinic (OPD) in Government General Hospital, tertiary centre, Nellore, after subjecting the referred patients to comprehensive eye examination. Age and sex distributions, symptoms, the best corrected visual acuity, intraocular pressure, gonioscopy, disc evaluation and visual fields, and status of the second eye was recorded, with respect to the three stages of angle closure glaucoma: PACS, PAC and PACG. One hundred eyes of fifty patients with a diagnosis of primary angle closure disease were enrolled at Glaucoma outpatient clinic in Government General Hospital, tertiary centre Nellore, after subjecting the patients to complete eye examination by a single glaucoma specialist. The mean age of the patients included in our study was 56.74 years ± 7.3years. 37 patients (74%)presented with complaints of diminution of vision as main symptom, followed by periocular pain, redness, coloured haloes and other complaints PACS, PAC and PACG were found in 18(18%), 12 (12%) and 69 eyes (69%) respectively. Mild, moderate, severe visual impairment and blindness was found in 5 (7.2%), 32 (46.4%), 11 (15.9%), 21(31%) cases respectively. Primary angle closure glaucoma (PACG) constituted69% of all adult glaucomas seen. 18% of these had primary angle closure suspect(PACS), 12% had primary angle closure(PAC). Angle closure glaucoma occurred maximally in the sixth decade and females constituted 72% of those affected. 19 patients had bilateral PACG. 16 patients were unilaterally blind with visual acuity less than <3/60.
Keywords: Primary angle closure Glaucoma, stages, symptoms, signs.

INTRODUCTION

Primary Angle Closure Glaucoma is one of the leading causes of irreversible blindness [18-20]. It is a " sneak thief" of sight due to asymptomatic nature until advanced stage of the disease. Primary Angle Closure Glaucoma is a disease with a differing incidence, indeterminate initial stages, and a varied presentation in difference races. There is a significantly high incidence of angle closure glaucoma (ACG) in India, which forms almost half of all adult primary glaucomas seen [3,4]. There is however a paucity of literature available about the presentations and relative incidence and natural history of the stages of angle closure glaucoma [20].

The global prevalence of glaucoma for population aged 40-80 years is 3.54% (95% CI, 2.09-5.82). The prevalence of POAG is highest in Africa (4.20%; 95% CI, 2.08-7.35), and the prevalence of PACG is highest in Asia (1.09%; 95% CI, 0.43-2.32). In 2013, the number of people (aged 40-80 years) with glaucoma worldwide was estimated to be 64.3 million, increasing to 76.0 million in 2020 and 111.8 million in 2040 [26].

Among the oriental population and in the South East Asian countries like India angle closure glaucoma seems to be more prevalent. According to the Andhra Pradesh Eye Disease study [8](APEDS) ,the prevalence of manifest PACG in those above 40 years of age is 1.08%,while the prevalence of occludable angles without angle closure glaucoma is 2.2%.

The Vellore Eye Study [19] estimated the prevalence of PACG to be 4.3% which was about five times more prevalent than POAG in their study. They have also noted that contrary to the traditional teaching angle closure in the study population was not associated with pain. Primary angle closure is potentially reversible by the laser iridotomy [27, 28] which is a safe and non-invasive procedure.

A prospective study of 50 consecutive patients of primary angle closure disease (PACD), routinely

referred to the Glaucoma Services of our hospital, was undertaken to study the clinical profile of the three stages of Primary Angle Closure Disease: Primary Angle Closure Suspect (PACS), Primary Angle Closure (PAC), Primary Angle Closure Glaucoma (PACG).

MATERIALS AND METHODS

Study area

All patients attending Glaucoma services outpatient clinicof a tertiary eye care centre namely Govt General Hospital located in Nellore, Andhra Pradesh, SouthIndia,during October 2013and May2017,who were diagnosed to have primary angle closure disease(PACD), were included in the study.

Sample size

Fifty patients

Study design

A prospective observational study

Exclusion criteria

We excluded patients in whom staging of angle closure disease was not possible, for example, those with Aphakia, Pseudophakia or previous filtering surgery.

Study protocol: All patients suspected or diagnosed to have glaucoma in the general outpatient clinic of our hospital are sent for management to the Glaucoma unit. The referrals are based on an individual's symptoms, clinical examination for anterior chamber depth and optic nerve head status, intraocular pressure (IOP) recordings, a visual field. Some cases of acute angle closure glaucoma were initially examined and treated by the ophthalmologist on emergency duty and were then referred to the Glaucoma unit together with their records. Of the cases referred, 50 consecutive patients diagnosed to have a definitive primary angle closure disease were prospectively studied with respect to the three stages of angle closure disease: PACS, PAC,and PACG.

All patients were evaluated by a single Glaucoma specialist.Detailed eye examination was performed which included detailed history about age,sex, symptoms at the time of presentation and visual acuity assessment using Snellen's visual acuity chart, refraction, best corrected visual acuity(BCVA), torch light examination (including flashlight test, and swinging flashlight test to detect RAPD),slit lamp examination of anterior segment including van Herick's test, iris and pupillary sphincter changes, pseudo exfoliation, neovascularisation iris, intraocular pressure measurement(IOP)with Goldman application tonometer(GAT), angle evaluation with indentation gonioscopy using a Hussmann four mirror lens .The examination of posterior segment was done using stereo bio microscopy with non-contact lens, +78D or +90 D lens and indirect ophthalmoscopy using + 20 D lens. The size of the optic disc, the status of neuro retinal rim, vertical and horizontal cup disc ratio and presence of any other glaucomatous features like notching, splinter haemorrhages and parapapillary atrophy were documented. Data on each subject was recorded in data collection forms.

Definitions

All patients diagnosed with primary angle closure were classified using International Society of Geographical and Epidemiological Ophthalmology Classification (ISGEO).

Classification of primary angle closure based on natural history

Primary angle closure suspect (PACS): An eye in which appositional contact between the peripheral iris and posterior trabecular meshwork (PTM) is present or considered possible, in the absence of elevated IOP, peripheral anterior synechiae,disc or visual field(VF) changes. Epidemiologically, this has been defined as an angle in which $\geq$ 2700 of PTM cannot be seen gonioscopically. But, for practical purposes, 1800 was used.

Primary angle closure (PAC): An eye with an occludable drainage angle and features indicating that trabecular obstruction by the peripheral iris has occurred, such as peripheral anterior synechiae, elevated IOP, iris whorling, "glaucomaflecken" lens opacities or excessive pigment deposition on the trabecular surface. The optic disc does not have glaucomatous damage.

Primary angle closure glaucoma (PACG): PACtogether with evidence of glaucoma is glaucomatous optic neuropathy and corresponding VF loss. Socio economic status grades were classified according to modified Kuppuswamy scale. The data thus collected was subjected to analysis.

RESULTS

One hundred eyes of fifty patients with a diagnosis of primary angle closure disease were included in the study.The mean age of the patients included in our study was 56.74 years ± 7.3years(range 42-75 years).There were 36 (72%) females and 14 (28%) males in the study (Table 1).

Table-1: **Demographic data**

Age group in years	No. of patients	Percentage (%)
40-50	10	20
51-60	27	54
61-70	12	24
>70	1	2

27(54 %) patients were in the range of sixth decade PACD occurred between 40-70 years with the maximally affected decade being the sixth. Females were more commonly involved with PACG (62%)(Table 2).

Table-2: **Visual impairment in PACG patients**

Presenting VA	No of patients (%)
6/6 – 6/18	5 (7.2 %)
<6/18 -6/60	32 (46.4%)
<6/60 -3/60	11 (15.94%)
<3/60	21 (30.4%)

Fig 1 shows that 37 patients(74%) presented withcomplaints of diminution of vision as main symptom, followed by periocular pain, redness, coloured haloes and other complaints.PACS,PAC and PACG were found in 18(18%), 12(12%) and 69 eyes (69%)respectively(Fig 2). Out of 69 eyes with PACG, 19 patients had bilateral PACG. 16 patients were unilaterally blind with visual acuity less than <3/60.

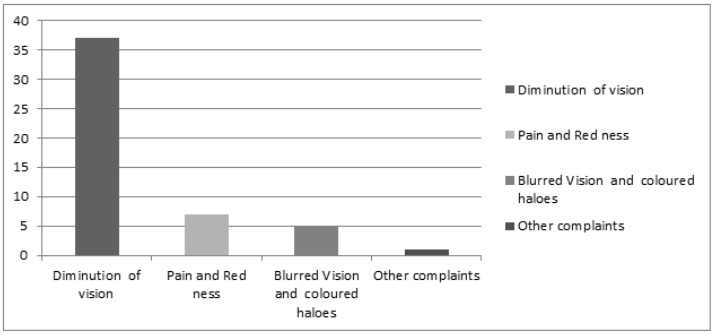

Fig-1: **Complaints of PACG patients**

Mild, moderate, severe visual impairment and blindness was found in 5 (7.2%), 32 (46.4%), 11 (15.9%), 21 (31%) cases respectively. The details of visual impairment in patients with PACG are shown in Fig2.The mean visual acuity (logmar) in PACG patients at presentation was 1.21 ± 0.63(Fig 3).

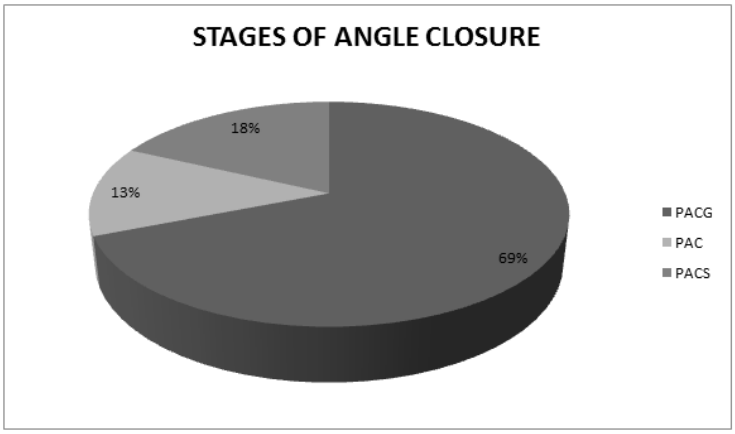

Fig-2: Stages of Primary Angle Closure Glaucoma

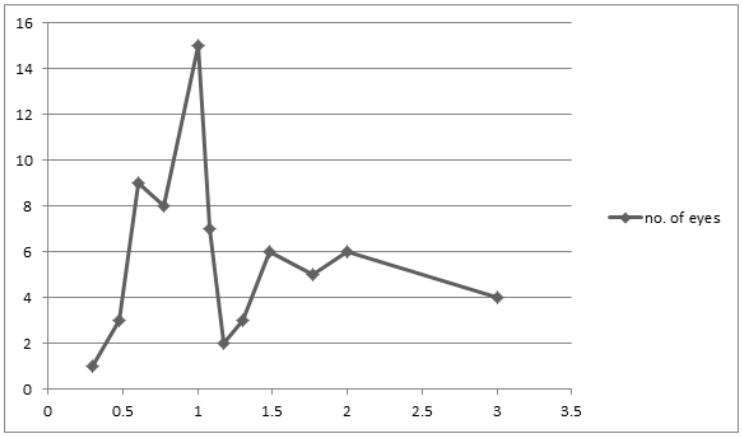

Fig-3: Visual acuity in PACG patients

DISCUSSION

Glaucoma is the leading cause of blindness in the adult population in India[1]. WHO currently ranks Glaucoma as the second most common cause of blindness[2]. The Epidemiology of PACD has received marked attention in recent times[3-23]. Angle closure glaucoma is a potentially treatable condition by laser iridology if recognised before the optic neuropathy sets in.

We have classified the three stages of angle closure disease[24] seen in a referral hospital in South India on the basis of age, sex, socioeconomic status, symptomatology and examination. Exclusion of patients having undergone a prior cataract or glaucoma surgery may have altered the data to a certain extent, but was necessary to identify the stages.

Out of 69 eyes with PACG, 19 patients had bilateral PACG which shows the asymptomatic nature of the disease and the patients presented when the vision in other eye was also affected. 16 patients were unilaterally blind with visual acuity less than <3/60.Diminution of vision was the main presenting symptom in 37 (54 %) patients, followed by periocular pain which was more common in acute attack. Similar to our study, a study by Parulet al[16] reported that diminution of vision was the most common presenting symptom. Most patients presented late in the course of the disease because of asymptomatic nature of the disease.

In our study, 36 (72 %) patients were females and 14 (28 %) were males, which show a female preponderance. A study by Vijaya *et al.* [13] reported that PACG more common in females compared to males. In our study, 27 (54 %) patients were in the range of sixth decade. A study by Parul *et al.* [16] and Sihota *et al.* [17] reported that PACG is more common in sixth decade in agreement with our study.

In our study, 29 (58%) patients were from urban area and 21 (42%) were from rural area. A study by Vijaya *et al*. [13] reported mild dominance of PACG in urban area than in rural area. It is observed in our study, that 54% of patients were from lower socioeconomic status in comparison with a study byDandona *et al*. [8] who stated the reasons for more prevalence in lower socioeconomic status was lack of awareness, low educational status and asymptomatic nature of the disease.

The risk factors for PACD were found to be increasing age, female gender. The diminution of vision was the main presenting symptom with visual acuity <6/60 in the worst eye in most of the cases, which shows the asymptomatic nature of the disease. Limitations our study was a hospital based study with a small sample size.

CONCLUSION

Primary angle closure glaucoma is an important public health burden [22]. So, there is a need to improve the detection rates in high risk groups, by doing IOP measurement, gonioscopy, and optic disc and visual field evaluation, as a part of complete and comprehensive eye examination.

We have attempted to separate the three stages of PACD into identifiable entities. Primary angle closure glaucoma (PACG) constituted 69% of all adult glaucomas seen. 18% of these had primary angle closure suspect (PACS), 12% had primary angle closure (PAC). Angle closure glaucoma occurred maximally in the sixth decade and females constituted 72% of those affected. 19 patients had bilateral PACG. 16 patients were unilaterally blind with visual acuity less than <3/60. There are considerable differences as well as an overlap of clinical features in the stages of angle closure disease, which suggest some anatomical differences or dissimilar pathogenic mechanisms in these eyes. Because visual loss resulting from PACG is potentially

preventable if peripheral iridotomy or iridectomy is performed in the early stage, strategies for early detection of PACD could reduce the high risk of blindness resulting from PACG.

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