

Student Original Article

A Study of Primary Angle Closure Glaucoma

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Abstract

Background: Glaucoma is an optic neuropathy that leads to atrophic changes in the disc, associated with characteristic visual field changes. Primary Angle Closure Glaucoma (PACG) is defined as an occludable drainage angle with glaucomatous optic disc damage and visual field damage. Present study aimed to establish profile of PACG in the patient population of a South Indian hospital.

Methods: In this case series, medical records of 101 cases of PACG were retrospectively reviewed. Their demography, clinical features and treatment instituted were collected and analyzed.

Results: 174 eyes of 101 patients were evaluated. Mean age at presentation was 56 ± 10.22 years. Forty patients were blind on presentation of which ten were blind in both eyes. Forty-one percent of eyes were hypermetropic. Most frequent presenting complaint was decreased vision followed by pain. Mean axial length was 21.83 ± 0.93 mm. Of the total, 55.17% of eyes underwent LASER Peripheral Iridotomy (LPI); of which 29.17% eventually underwent filtering surgery at a later date and 41.67% required treatment with anti glaucoma medications following LPI.

Conclusions: Female gender, increasing age, hyperopia and shorter axial length appear to be associated with PACG in the present study. These appear to be similar in Asians and Caucasians. It presents a decade earlier, decreased vision being the most common presenting symptom among Indians. A number of patients have lost their vision before they present to the hospital. LPI alone may not be sufficient in Indian eyes with PACG. Early surgery may be a better option in India as regular follow up is difficult.

Key words: Glaucoma; angle closure; therapy

Introduction

Glaucoma is a major public health problem emerging as the second most common cause of blindness in the world and the major cause of irreversible blindness [1].

Quigley and Broman had estimated that in 2010, 87% of Angle Closure Glaucoma (ACG) cases will be Asian [2]. According to current data, prevalence rates are highest for Chinese, intermediate among Indians and lowest for Japanese [2]. As most glaucoma research has been centered on populations with a preponderance of Primary Open Angle Glaucoma (POAG), Primary Angle Closure Glaucoma (PACG) is a relatively poorly researched entity. The aim of this study was to establish profile of PACG in the patient population in a South Indian Hospital.

Methods

Case records of 101 patients with PACG who presented to a tertiary hospital (O.E.U. Institute of Ophthalmology, Kasturba Hospital, Manipal) over a ten year period (1999 to June 2008) were reviewed retrospectively. The study was approved by the Institutional Ethics Committee (IEC). Clinical records were reviewed in detail with regards to age at presentation, gender, visual acuity, refractive error, presenting complaints, axial length, intra ocular pressure (IOP) by Goldmann applanation tonometer, gonioscopy (using Zeiss 4-mirror gonioscopes), optic nerve head evaluation and Humphrey threshold 24-2 visual field analysis using Swedish interactive thresholding algorithm (SITA) strategy and medical and surgical treatment given.

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PACG was labelled in the cases of glaucomatous optic disc damage with visual field loss in the presence of a primary angle closure (PAC) [3]. PAC patients had an eye with occludable drainage angle i.e., the posterior (usually pigmented) trabecular meshwork was seen for less than 90 degrees of angle circumference and features indicating that trabecular obstruction by peripheral iris had occurred, such as peripheral anterior synechiae, elevated IOP, iris whorling, "glaucomflecken" lens opacities or excessive pigment deposition on the trabecular surface [3]. A glaucomatous optic disc damage in the presence of an occludable angle secondary to an obvious cause was defined as secondary ACG.

Patients with incomplete records and secondary angle closure, such as lens-induced glaucoma, neovascular glaucoma or uveitis, were specifically excluded. Patients who had visual acuity of less than 3/60 with best possible correction were considered blind as defined by WHO [4].

All the patients were treated by the same group of surgeons using the same standard techniques. Medications were started for patients with narrow angle with IOP > 22 mm Hg. Laser peripheral iridectomy (LPI) is the treatment of choice and was performed in all patients except in those who already had disc damage and had more than 75% of the angle closed by peripheral anterior synechiae (PAS). The machine used for LPI was Visulas YAG Plus II [Carl Zeiss]. Energy varied from 6-8mJ with burst mode. The patients whose IOP was not controlled even after addition of two medications were taken up for filtering surgery. These patients underwent trabeculectomy with fornix based conjunctival flap. The mean follow up period was 2.58 ± 1.49 years. Seven patients were lost to follow up.

Statistical Analysis- The database was analyzed with descriptive statistics to obtain a conclusive profile of all patients affected by PACG. Statistical Package for Social Sciences (SPSS) 15.0, Chicago, Illinois for WINDOWS was used.

Results

In this study, 174 eyes of 101 patients were evaluated. Mean age at presentation was 56 ± 10.22 years (range- 34 to 82 years). The female: male ratio was 1.9:1. The most common age group of presentation was 51-60 years while in the preceding

and succeeding decadal intervals, approximately an equal number presented (Table 1).

Table 1- Age Distribution

Age Group (years)	No. of patients
31 - 40	9 (8.9%)
41 - 50	23 (22.8%)
51 - 60	41 (40.6%)
61 - 70	20 (19.8%)
71 - 80	7 (6.9%)
81 - 90	1 (0.01%)

Forty patients were blind on presentation. Of these ten (9.91%) were blind in both eyes and 30 patients (29.7%) had uniocular blindness. Of 174 eyes, 72 (41%) were hypermetropic. The most frequent presenting complaint was decreased vision, reported by 67.3% of the patients. Pain and redness were reported by 45.5% and 34.6% of the patients, respectively. Axial length in the subjects ranged from 17.70-23.68 mm, with mean axial length being 21.8 ± 0.9 mm.

Thirty one (17.8%) eyes underwent filtering surgery directly and 96 (55.2%) eyes underwent LPI. Out of these 96, 28 (29.17%) eventually underwent filtering surgery at a later date and 40 (41.67%) required treatment with anti-glaucoma medications following LPI. Three patients underwent Argon Laser iridoplasty. Of those who underwent LPI, only 25 eyes did not require any further treatment after LPI in the long term.

Discussion

Various studies in India show that glaucoma patients make up 11-25% of the blind [5]. The prevalence of PACG in India varies from 0.5% to 4.3% [6-8] in Southern parts to being only 0.23% in Eastern India [9]. The risk factors for PAC are female gender, increasing age, Inuit or East Asian ethnicity, shallow anterior chamber, shorter axial length, hyperopia and genetic factors [10].

Increasing age is a major risk factor for developing PACG [11,12]. Mean age at presentation in our study was 56 ± 10.22 years. PACG is rare in most populations below 40 years. It reaches peak prevalence in the 50s and 60s among Caucasians [13] and Eskimos [14,15]. In the present study, nine

patients (8.91%) presented before the age of 40 years while 28 patients (27.7%) were more than 60 years of age.

Women are at increased risk for PACG over men by ratios of 2-4:1 among Caucasians [13], Blacks [16] and Eskimos [10] which is similar to the ratio in the present study i.e. 1.9:1. These findings are also similar to those of Shakya [17], Dandona et al [8] and Vijaya et al [6].

It has been observed that ACG and narrow angles occur more frequently in hypermetropic eyes [18-21]. Chennai glaucoma study has also reported such an association [22] and 41% in the present study were found to be having hyperopia. Compared to normal eyes, eyes with PACG present a shorter axial length [10,19,23]. Therefore axial lengths encountered in our series of patients with PACG are no different from those widely reported in other races.

In Chinese Singaporeans, 36% of PACG subjects were bilaterally blind and an additional 14% blind in one eye [24]. In Mongolians, bilateral blindness caused by PACG was seen in 26% [25]. Whereas in a study done by Dandona et al [8] to assess the prevalence and features of ACG in an urban population in Southern India, they found that manifest PACG had caused blindness in one or both eyes in 41.7% of participants which approximates the results of our study. Figures in Chennai glaucoma study [22] were lower than those in our study, where 5.9% of patients were bilaterally blind and 8.8% were unilaterally blind.

Symptoms of ocular pain, visual disturbance and redness have been associated with PACG. A study describes a cohort of patients in a glaucoma department in New Delhi, India [30] where diminution of vision was recorded for 84%, 92% and 85% of cases of acute angle closure, sub acute angle closure and chronic angle closure respectively. Sixty-two percent, 45% and 12% of patients in these groups presented with redness and pain. Hence, decreased vision in our study was reported by less patients as compared to the New Delhi study, whereas percentage of people complaining of pain and redness were almost the same.

LPI is the initial therapy of choice in PACG [27-29]. Any subsequent rise in intraocular pressure or

failure to lower intraocular pressure is treated in a step-wise manner, first medically and then surgically if necessary. Aung et al found that in Asian eyes with acute angle closure, majority (58.2%) were unsuccessfully treated with LPI alone and required the addition of anti-glaucoma medication or filtering surgery [30]. Whereas in Caucasian populations, intraocular pressure was controlled with PI (surgical or LASER) alone in 65% to 76% of eyes and in up to 84% to 99% of eyes, if additional medication was used [31-34]. Only 1-3% [28,35] of eyes eventually required trabeculectomy. Among patients in present series, 29.17% eventually underwent filtering surgery and 41.67% required treatment with anti-glaucoma medications following PI. The conventional clinical approach of treating patients with PACG with LPI first, followed by medications and then surgery in stepwise manner would be effective but requires regular follow up sessions with optimum care which is a hurdle in our country. Early surgery may be a better option in India as regular follow up is difficult.

Asian eyes have thick dark-brown irides [36] and it is possible that the inflammation and pigment release from performing the LPI in such eyes could also have worsened the trabecular damage and contributed to the subsequent failure of IOP control.

It is important to note that the clinical profile of PACG patients varies in the Indian set-up vis-à-vis the Caucasians.

Key Points

- PACG is an important cause of blindness.
- Female gender, increasing age, hyperopia and shorter axial length are associated with PACG.
- PACG presents a decade earlier and decreased vision is the commonest presenting symptom among Indians.
- A number of patients have lost their vision before they present to the hospital.
- LPI alone may not be sufficient in Indian eyes with PACG. Early surgery may be a better option in India as regular follow up is difficult.

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