ORIGINAL ARTICLE

INSIGHTS INTO PRIMARY OPEN-ANGLE GLAUCOMA PATIENTS: UNVEILING DEMOGRAPHIC, CLINICAL, AND THERAPEUTIC PROFILES IN A LEADING TERTIARY REFERRAL HOSPITAL IN YOGYAKARTA

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ABSTRACT

Introduction: *Primary open-angle glaucoma (POAG) is the primary cause of irreversible blindness in adults worldwide. The characteristics of glaucoma patients and their response to therapy may differ by institution, region, and country. This study aimed to describe the demographic, clinical, and therapeutic aspects of POAG patients at Dr. Sardjito General Hospital Yogyakarta.*

Methods: *This study included POAG patients who underwent full clinical ophthalmologic evaluations at Dr. Sardjito General Hospital Yogyakarta from January to December 2021. Characteristics such as age at presentation, sex, residence, visual acuity, intraocular pressure (IOP), cup-to-disc ratio (CDR), laterality of affected eyes, Humphrey field analyzer-measured mean deviation (MD), and pattern standard deviation (PSD), medical and surgical treatment were recorded retrospectively.*

Results: *Data from 253 POAG patients were collected, the mean age was 52±17.15 years old and the female sex was more common at 58%. The mean IOP was 16.49±8.02 mmHg, and the mean CDR was 0.68±0.18. The mean refractive errors of all eyes were -0.64±0.22 dioptres (D), with 63% of eyes had good visual acuity (6/12 or better), 19% had moderate visual acuity (6/15 to 6/50), and 18% had poor visual acuity (count fingers to no light perception). Furthermore, the mean MD and PSD were -8.89±12.01 dB and 4.73±3.52 dB, respectively. Of all patients, 81% received medication only while 19% received medication and surgical intervention. Trabeculectomy was the most common surgery performed (94%).*

Conclusion: *POAG is generally a bilateral disease and occurs mostly in middle age population. Overall, trabeculectomy was the most common surgery performed in POAG patients.*

Keywords: *glaucoma, epidemiology, intraocular pressure*

INTRODUCTION

Visual impairment is one of the health problems causing huge burden globally. Glaucoma is the third cause of blindness after cataracts and refractive disorders.[1] The number of glaucoma patients are approximately 76 million worldwide, according to data from population-based studies.[2]

Glaucoma is a type of optic neuropathy in which the retinal ganglion cells are progressively destroyed in a distinctive pattern, leading to increased loss of optic nerve fibers in a typical pattern, resulting in a distinctive pattern of optic nerve head cupping and visual field loss. [3,4] Primary open-angle glaucoma (POAG) is the predominant subtype of glaucoma and

affects 68.56 million individuals worldwide. POAG tends to be idiopathic. The patient has gradual visual field loss but does not appear with acute pain, red eyes, or rapid visual loss.[5]

Treatment for glaucoma patients currently relies on maintaining low intraocular pressure (IOP), an effective method of preventing glaucoma progression. However, recent investigations have shown that glaucoma is a multifactorial disease, and that its complicated causes and progression can affect treatment efficacy. Therefore, decisions on treatment for patients with progressive glaucoma must take into consideration the background of the patient and the type of glaucoma.[6]

Epidemiological data regarding the POAG patients in Yogyakarta is still limited. Therefore, there is a need for more sources of information on the profiles of glaucoma patients in order to better understand patient characteristics. This study was conducted to investigate the characteristics of POAG patients in Dr. Sardjito General Hospital Yogyakarta from January to December.

METHODS

This study used a retrospective descriptive design. Data on POAG patients who underwent full clinical ophthalmologic evaluations to Outpatient Clinic of Dr. Sardjito General Hospital from January to December 2021 were collected in this study. These ophthalmologic evaluations included testing for visual acuity, refractive error and intraocular pressure, as well as slit lamp and fundus examinations. Standard automated perimetry was performed with the Humphrey field analyzer (HFA; SITA standard 24-2 or 30-2). Best-corrected visual acuity was measured with a decimal visual acuity chart. The spherical equivalent, determined as spherical power plus half the cylindrical power, was used to represent refractive error.

The data were obtained from medical records, including age at presentation, sex, residence, visual acuity, intraocular pressure (IOP), cup-to-disc ratio (CDR), laterality of affected eyes, Humphrey field analyzer-measured mean deviation (MD), and pattern standard deviation (PSD), medical and surgical treatment. This study used secondary data in the form of medical records. The exclusion criteria were medical records with incomplete data.

RESULTS

The demographic characteristics of 253 patients with POAG included in this study are shown in Table 1. The patients had a mean age of 52±17.15 years old. The sex ratio was 107:146 (male:female). Sixty five percent patients were originated from Yogyakarta, 25% were from Central Java, and 10% from outside Yogyakarta and Central Java. According to the location of

the eyes affected by these disorders, in most cases, both eyes were affected (bilateral).

Table 1. Demographic data of POAG patients

Variable	
Age (years)	
Mean±SD	52±17.15
Gender, number of patients (% of total)	
Male	107 (42)
Female	146 (58)
Residence, number of patients (% of total)	
Yogyakarta	164 (65)
Central Java	64 (25)
Others	25 (10)
Laterality of affected eyes (% of total)	
Unilateral	21 (8)
Bilateral	232 (92)

Note: POAG, primary open-angle glaucoma.

Table 2 shows that the mean IOP was 16.49±8.02 mmHg, and the mean CDR was 0.68±0.18. Furthermore, the mean MD and PSD were - 8.89±12.01 dB and 4.73±3.52 dB, respectively. The mean refractive errors of all eyes were -0.64±0.22 dioptres (D).

Table 2. Clinical characteristics of POAG patients

Variable	(Mean±SD)
IOP (mmHg)	16.49±8.02
CDR	0.68±0.18
MD (dB)	-8.89±12.01
PSD (dB)	4.73±3.52
Refractive errors (D)	-0.64±0.22

Note: IOP, intraocular pressure; CDR, cup-to-disc ratio; MD, mean deviation; PSD, pattern standard deviation; D, dioptres.

Table 3 shows that 63% of eyes had good visual acuity (6/12 or better), 19% had moderate visual acuity (6/15 to 6/50), and 18% had poor visual acuity (count fingers to no light perception). Of all patients, 81% received medication only while 19% received medication and surgical intervention. Trabeculectomy was the most common surgery performed (94%) (Table 4).

Table 3. Best-corrected visual acuity of POAG patients

Visual acuity	Number of eyes (%)
6/12 or better	319 (63)
6/15-6/60	96 (19)

CF-NLP	91 (18)

Note: CF, count fingers; NLP, no light perception;

Table 4. Treatment modality and ocular surgeries performed in POAG patients

Treatment	Number of patients (%)
Modality	
Medication only	206 (81)
Medication + surgery	47 (19)
Type of ocular surgery	
Trabeculectomy	44 (94)
Cyclocryotherapy	2 (4)
GDD Implant	1 (2)

Note: GDD, glaucoma drainage device

DISCUSSION

POAG is a chronic, progressive, anterior optic neuropathy accompanied by cup-to-disc atrophy, decreased field of view, and systemic conditions. Increased intraocular pressure is the main risk factor for the occurrence of POAG. Higher IOP is more likely increasing the progression of optic disc damage.[7]

Demographic consideration shows that POAG is predominantly seen in older people as seen in this study with a mean age of 52 years. Study found older age to be a risk factor for this disease.[2,8] Age group of 40 years and above should be targeted for public enlightenment and screening for glaucoma especially in low-resource countries as this will enhance early detection and subsequent management of POAG. A study in India on the characteristics of glaucoma obtained a comparison between men and women of 1.03:1. There was no significant differences by sex.[9] It can be concluded that POAG can affect all genders.

POAG is generally a bilateral disease that attacks adulthood. At least one eye must have typical damage to the optic nerve or changes in visual field characteristics.[7] From the study, the data on the number of affected eyes in POAG were mostly bilateral. POAG usually occurs bilaterally but has a different degree of severity in each eye.[3]

The CDR findings showed a mean of 0.68. This means that advanced optic nerve loss had occurred before presentation. Besides papillary and peri-papillary changes, CDR is the most important parameter in the evaluation of glaucoma. Even though CDR assessment is useful in characterizing damage from glaucoma, it could manifest inter-observer variations and even variations by the same observer in asserted value on repeat observations.[10]

This study obtained the results of the visual range of POAG patients were normal to mild visual impairment. It was because POAG slowly affected peripheral vision where visual acuity could be normal and furthermore central vision disturbance could occur in the final stage

of the disease. [11] Global indices such as MD and PSD allow clinicians to determine easily whether visual field deterioration has occurred. MD is the weighted mean value of all test points in the total deviation plot, which is based on the deviation from age-matched normal values. PSD values are calculated based on the variation from the normal, age-corrected hill of vision involving the total deviation plot. PSD is a metric that indicates a difference in the sensitivity of adjacent tested points. In glaucoma patients, as irregular depression of visual field sensitivity progresses, PSD values increase. [12] From visual field assessment using HFA, this study showed that the mean MD and PSD were -8.89 dB and 4.73 dB, respectively. Thus, the number of glaucoma patients with normal visual acuity have possibility in decreasing of visual field.

Intraocular pressure lowering can be achieved by medication, laser or surgery (either alone or in combination).[13] Topical IOP-lowering medications have long been the primary POAG treatment and widely used.[14] While topical medications are effective, there are potential pitfalls associated with their use. A significant proportion of patients require more than one type of drop. As glaucoma is a chronic progressive disease, instillation of medication becomes a lifelong commitment, and patient compliance becoming essential for successful management.[15] Trabeculectomy was the most common surgery performed in this study, Trabeculectomy remains the most common initial operation for patients with advanced glaucoma in most countries Trabeculectomy lowers IOP by creating a new drainage site for aqueous humour outflow underneath the conjunctiva. Glaucoma drainage device, or tube surgery, has traditionally been reserved to treat patients with refractory cases of glaucoma or at high risk of failure. [13,16]

Limitations of this study are the difficulties to access the medical record and limited time. Further and more complete research is needed with a larger sample population.

CONCLUSION

POAG is generally a bilateral disease and occurs mostly in middle age population. Overall, trabeculectomy was the most common surgery performed in POAG patients. It is imperative to provide reliable and integrated knowledge about eye diseases, especially glaucoma, to increase public awareness of this disease.

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