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ORIGINAL ARTICLE

Profile of glaucoma cases seen at a tertiary referral hospital

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ABSTRACT

Objective

To determine the demographic and clinical profile of glaucoma cases seen at a tertiary government hospital.

Methods

Clinical charts of glaucoma patients seen at the University of the Philippines-Philippine General Hospital (UP-PGH) from 2000 to 2002 were reviewed. Demographic, clinical, and initial-treatment data of all patients were entered into a standardized data-collection form, statistically analyzed, and compared.

Results

Eight hundred thirty-six patients were included in the study with nearly equal number of males and females. Primary angle-closure glaucoma (PACG), primary open-angle glaucoma (POAG), and lens-induced glaucoma were the three most common types of glaucoma. Most were seen in the late stages of the disease with loss of vision. Patients with PACG were older, mostly females, had poorer vision, higher intraocular pressures, and higher percentage of no-light perception. Surgery was the most common initial treatment for PACG while medical therapy was the most common for POAG.

Conclusion

PACG and POAG were the two most common types of glaucoma seen at the UP-PGH, a tertiary referral hospital.

Keywords: *Primary open-angle glaucoma, Primary angle-closure glaucoma, Lens-induced glaucoma, Epidemiology*

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GLAUCOMA, the leading cause of irreversible blindness, affects nearly 67 million people worldwide, with almost equal number of open angle and angle closure. Another 6 million have secondary glaucoma, bringing the total to 73 million, excluding childhood cases.[1]

Population-based studies in Singapore, Thailand, and Malaysia reported prevalence of glaucoma at 3.2%, 3.8% and 0.7% respectively.[2-4] These studies indicated that primary open-angle glaucoma (POAG) was more common than primary angle-closure glaucoma (PACG) with ratios of 3.2:1, 1.6:1, and 1.5:1 respectively.[5] In the Philippines, angle-closure glaucoma may be the predominant type based on hospital surveys.[5]

The Third National Survey on Blindness conducted in 2002 ranked glaucoma as the third most common cause of bilateral blindness and the fifth most common cause of low vision in the Philippines.[6] The survey projected that a total of 71,821 Filipinos have glaucoma, 18,620 of whom are bilaterally blind. The extrapolation was based solely on previously diagnosed cases or an increase in intraocular pressure (IOP) as measured by Schiotz tonometry during the sampling period. It is, therefore, likely that the effects of the disease are underestimated.

Population-based studies are desirable in determining the prevalence and incidence of a disease; oftentimes, however, they are difficult, costly, and time consuming to conduct. Tertiary referral centers offer a diverse population of patients and can provide a general overview of certain disease profiles. This study determined the demographic and clinical profile—predominant types of glaucoma, pattern of distribution, predominant findings, and treatment given—of glaucoma patients seen at the Glaucoma Clinic of the University of the Philippines-Philippine General Hospital (UP-PGH) from 2000 to 2002.

METHODOLOGY

Clinical charts of patients were reviewed. A standardized data-collection form was devised. Patient information such as age, gender, chief complaint, duration of symptoms, ocular findings, and initial treatment given were entered into Microsoft Excel (Microsoft Corporation, Redmond, WA, USA).

Visual acuity (VA) was obtained with a Snellen chart and converted to the decimal system. IOPs were obtained with either the Goldman or Perkins applanation tonometer. Estimating the vertical cup-disc ratio (CDR) was done either with the Goldman lens, 78D or 90D aspheric lenses at the slitlamp, or direct ophthalmoscope. Gonioscopy was performed using either the 3-mirror Goldman lens or the Zeiss 4-mirror lens. Visual fields were tested with the Humphrey Field Analyzer (Humphrey Corp, San Leandro, CA USA) using the threshold 24-2 or 30-2 test strategy. The specific type of glaucoma was determined based on the clinical presentation, optic-nerve-head findings, visual-field changes, IOP, and gonioscopic findings. The eye with the worse visual acuity and/or visual-field defect was included in the analyses.

Initial management, defined as the therapy instituted within the first two weeks of consultation at the glaucoma clinic, was classified as any of the following: (1) observation or no intervention, (2) medical therapy only, (3) laser, or (4) surgery. Medical management consisted of IOP-lowering agents such as beta-blockers, alpha-agonists, topical and systemic carbonic anhydrase inhibitors (CAI), prostaglandin analogs, glycerol, and intravenous mannitol. Laser procedures included laser iridotomy (LI), laser iridoplasty, argon laser trabeculoplasty (ALT), and diode cyclophotocoagulation (CPC). Surgical procedures performed were trabeculectomy, combined cataract extraction with filtration surgery, cataract surgery alone, cyclocryotherapy (CCT), goniotomy, trabeculotomy, pars plana vitrectomy, and glaucoma-drainage-device (GDD) implantation.

Descriptive statistics were employed and the data compared.

RESULTS

A total of 866 charts were reviewed. Thirty patients had no glaucoma and were excluded; 836 patients were subsequently included in the study.

Table 1. **Demographic and visual characteristics of the study population.**

Variables	
Age (years)	
Mean ± SD	55.0 ± 18.7
Range	0.25 - 91.0
Gender [n (%)]	
Male	380 (45.5)
Female	456 (54.4)
Chief complaint (%)	
Blurring/loss of vision	564 (67.5)
Eye pain	121 (14.5)
Eye redness	20 (2.4)
Headache	12 (1.4)
Trauma	9 (1.1)
Referral	59 (7.1)
Duration of complaints (%)	
< 1 week	30 (3.8)
1-3 weeks	45 (5.7)
3-6 weeks	58 (7.3)
> 6 weeks	659 (83.2)
Best corrected visual acuity	
Mean	0.3 (20/60) ± 0.4
Range	20/20 – NLP
IOP on presentation	
Mean	27.2 ± 15.4
Range	0 – 80
Cup-disc ratio (CDR)	
Mean	0.7 ± 0.2
Range	0.1 – 1.0

The demographic characteristics of the study population are summarized in Table 1. The mean age was 55 years and there were more females. The most common chief complaints on consultation were blurring of vision and eye pain. The mean best-corrected visual acuity (BCVA) was 20/60, mean IOP was 27.2 mm Hg, and mean vertical CDR was 0.7.

Table 2 shows the different types of glaucoma in the study population. The top three glaucoma conditions were PACG (29.5%), POAG (14.4%), and lens-induced glaucoma (8.0%). Glaucoma suspects (GS), defined as increased CD ratio of 0.6 or greater with normal visual fields were also frequently seen (20.3%).

In those with PACG, 17.4% were acute or subacute and 82.6% were chronic. Thirty-four percent had no light perception (NLP). In those with POAG, 18.3% were classified as normal tension and 6.7% juvenile. Majority of the lens-induced glaucoma were either phacomorphic (74.6%) or phacolytic (17.9%).

The most common initial treatment modalities were observation, medical therapy only, and laser. Topical beta-blockers and systemic CAI were the most commonly prescribed medication, while LI was the most frequently performed laser procedure. Trabeculectomy, combined lens extraction and filtration surgery, and lens extraction alone were the most common surgical procedures performed (Table 3).

PACG, POAG, and secondary glaucoma are compared in Table 4. Those with secondary glaucoma were younger and had poorer visual acuity. Compared to POAG, those with PACG were older, had poorer visual acuity, higher IOP, and a higher percentage of NLP vision (Table 5). More than half of PACG (56.2%) underwent some form of glaucoma procedure as the initial treatment and 36.7% had glaucoma surgery. Majority of POAG received medical treatment only.

Table 2. **Types of glaucoma in the study population.**

Type	Number	Percent
Primary Angle Closure Glaucoma (PACG)	**247**	**29.5**
Acute	28	
Sub acute	15	
Chronic	204	
Primary Open Angle Glaucoma (POAG)	**120**	**14.4**
High Tension	90	
Low Tension	22	
Juvenile	8	
Lens-Induced	**67**	**8.0**
Phacomorphic	50	
Phacolytic	12	
Angle closure due to dislocated lens	3	
Lens particle	2	
Posttraumatic	**57**	**6.8**
Secondary angle closure	40	
Angle recession	12	
Hyphema	5	
Neovascular	**40**	**4.8**
Proliferative diabetic retinopathy	10	
Central retinal vein occlusion	9	
Unidentified	21	
Uveitic	**30**	**3.6**
Postsurgical	**25**	**3.0**
Cataract surgery	11	
Retinal surgery	7	
Corneal perforating injury repair	5	
Penetrating keratoplasty	2	
Pediatric	**7**	**2.0**
Congenital	7	
Anterior segment dysgenesis	6	
Sturge–Weber syndrome	4	
Pseudoexfoliative	**14**	**1.7**
Steroid-Induced	**12**	**1.4**
Other	**24**	**2.9**
Ghost cell	5	
Secondary to corneal leukoma	4	
Schwartz	3	
Mixed mechanism	3	
Increased episcleral pressure	2	
Ocular hypertension	1	
Unidentified	6	
Narrow occludable angle	**13**	**1.6**
Glaucoma suspect	**170**	**20.3**

DISCUSSION

The most common types of glaucoma seen in a tertiary government hospital were PACG, POAG, and lens-induced glaucoma. Many patients consulted late in the course of the disease and had NLP, a high percentage of which was seen in PACG and secondary glaucoma (Table 4). IOP was also higher in these groups associated with poorer vision, indicating the severity of glaucomatous optic neuropathy (GON). A comparison of POAG and PACG (Table 5) showed that untreated PACG resulted in more loss of vision and is a more devastating disease that frequently requires filtration surgery (Table 6). This is also corroborated by other studies,[7-8] emphasizing the need for early diagnosis and treatment. PACG causes more destruction to the eye in the form of advanced GON, loss of central vision, and uncontrolled IOP due to the closure of the drainage angle, either acutely or chronically, that eventually becomes unresponsive to medical or laser treatment. In contrast, POAG is associated with a more gradual increase in IOP that is generally responsive to medical therapy and causes vision loss much later if left untreated. Lens-induced glaucoma, specifically the phacomorphic type, is associated with a rapid increase in IOP resulting from angle closure due to a pupillary block that occurs as a result of increased contact between the

lens and the iris. If the condition is not treated immediately, total loss of vision and permanent closure of the angle can result.

A survey done 20 years earlier at the same institution revealed that PACG and POAG were the most common types of glaucoma, accounting for 35% and 31% of the total cases respectively.[9] In both surveys, PACG was more common than POAG. Caution, however, should be exercised in extrapolating that PACG is the predominant type of glaucoma in the Philippines as patients that come to UP-PGH are those who tend to seek consultation late (> 6 weeks in 83.2%) because of economic reasons. Moreover, they tend to seek consultation only when the disease is symptomatic, such as in the presence of acute pain (14.5%) or blurring of vision (67.5%). Both symptoms were the most common complaints on consultation (82%), indicating that the study population was biased toward the more severe nature of the disease. As in other studies,[10, 11, 12] this study showed that those with PACG were likely to be older, female, and have higher IOP and poorer visual acuity with a larger percentage of NLP. POAG is more common among males and generally respond well to medical therapy (65%), in contrast to PACG where the majority had either laser (19.5%) or surgical treatment (36.7%). A large percentage (27%) of PACG in this study were initially managed by observation, reflecting the high percentage of NLP vision in this group where treatment is no longer cost-effective.

Lens-induced glaucoma was the third most common condition causing elevated IOP and GON in this study. Due to the delay in treatment of the enlarged cataractous lens, resultant complications such as glaucoma developed, indicating that the type of patients seeking care at government referral hospitals tend to seek medical treatment late and were likely to have more advanced disease and complications.

Table 3. **Initial treatment given at first consultation.**

Type of initial treatment	Number	Percent
Observation	235	32.6
Medical therapy only	219	30.4
Surgical	207	28.7
Laser	60	8.3
Initial medical treatment		
Beta blocker	423	54.7
Systemic carbonic anhydrase inhibitor (CAI)	247	31.9
Alpha-agonist	53	6.8
Pilocarpine	24	3.1
Prostaglandin analogues	18	2.3
Glycerol	5	0.6
Topical CAI	4	0.5
Surgical treatment		
Trabeculectomy	81	39.1
Lens extraction, IOL implantation, filter	55	26.6
Lens extraction (ECCE or phacoemulsification)	47 11	22.7 5.3
Cyclocryotherapy	5	2.4
Pediatric EUA/Goniotomy/trabeculotomy	4	1.9
Pars plana vitrectomy	4	1.9
Anterior-segment surgery (reconstruction, vitrectomy)		
Laser treatment		
Iridotomy	51	85.0
Iridoplasty	2	3.3
Trabeculoplasty	4	6.7
Diode cyclophotocoagulation	3	5.0

Table 6. **Initial management of PACG and POAG.**

Diagnosis	Observation (%)	Medical (%)	Laser (%)	Surgery (%)
PACG[1]	27.1	16.7	19.5	36.7
POAG[2]	13.8	65.1	2.8	1.8

1. Primary angle-closure glaucoma (including narrow occludable angle)
2. Primary open-angle glaucoma (including glaucoma suspect)

Table 4. **Comparison of PACG, POAG, and secondary glaucoma.**

Diagnosis	Number	Mean Age	M:F Ratio	Chief Complaints	Mean VA	CD Ratio	Percent NLP	Mean IOP
PACG[1]	260	62.1	1:3.1	BOV,[3] eye redness, eye pain	0.24 (6/30)	0.7	33.8	32.8
POAG[2]	290	55.2	1.1:1	BOV, referral, eye pain	0.62 (6/9)	0.7	5.3	17.1
Secondary Glaucoma	286	48.9	1.3:1	BOV, eye pain, referral	0.13 (6/42)	0.7	15.7	33.0

1. Primary angle-closure glaucoma (including narrow occludable angle)
2. Primary open-angle glaucoma (including glaucoma suspect)
3. Blurring of vision

Table 5. **Comparison between PACG and POAG.**

Diagnosis	Number	Mean Age	M:F Ratio	Chief Complaint	Mean VA	CD Ratio	Percent NLP	Mean IOP
PACG[1]	246	61.8	1:3	BOV,[3] eye redness, eye pain	0.22 (6/30)	0.8	36.0	33.8
POAG[2]	120	58.3	1.8:1	BOV, referral, eye pain	0.39 (6/15)	0.8	13.2	21.8

1. Primary angle-closure glaucoma (excluding narrow occludable angle)
2. Primary open-angle glaucoma (excluding glaucoma suspect)
3. Blurring of vision

A high percentage of glaucoma suspects was also seen in this study. An overestimation is possible as the diagnosis of the condition was based on an enlarged cup-disc ratio without taking into consideration the size of the disc. One major limitation of chart reviews is the variability encountered in estimating the size of the cup by different clinicians. Obtaining standard stereoscopic optic-disc photos and evaluating them by trained experts (glaucoma specialists) would be more appropriate and would reduce the prevalence of glaucoma suspects in this population.

In summary, PACG and POAG remain the two most common types of glaucoma seen among patients seeking treatment at the UP-PGH, a government referral hospital. Because of the select population that this institution serves, any conclusion regarding the two types of glaucoma in this country cannot be drawn. A population-based study is, therefore, needed to establish the true incidence and prevalence of glaucoma in the Philippines.

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