

CLINICAL FEATURES OF PRIMARY GLAUCOMA IN IBADAN

AO ASHAYE

Department of Ophthalmology, University College Hospital, Ibadan, Nigeria

Email: aashaye@scannet.com

SUMMARY

Objectives: This study will describe the clinical features of primary glaucoma in adults seen at the eye clinic of the University College Hospital, in Ibadan and their gonioscopic appearance. Features of primary open angle glaucoma (POAG) were compared with primary angle closure glaucoma (PACG).

Method: The clinical presentation and configuration of anterior chamber angles of 80 newly diagnosed adult cases of primary glaucoma presenting at the eye clinic of the University College Hospital, Ibadan were studied.

Study Group: Over half of the patients were in the 50-69 years age group; 10% were less than 30 years. The male to female ratio was 5:3.

Findings: Acute symptoms, such as haloes, redness were absent in all of them. A high proportion (22%), were blind in both eyes on presentation to the eye clinic. About 55% were either blind or severely visually impaired in one eye. Severe cupping and atrophy of optic nerve heads, severe field loss and high intraocular pressure were the typical presentations.

Eyes examined with a gonioscope revealed that 15% had closed, 26.2% had narrow and 58.8% had wide open angle glaucomas.

Angle closure glaucoma did not present with acute features in the patients studied. Primary angle closure glaucoma (PACG) presented with chronic symptoms similar to primary open angle glaucoma (POAG) in adults. Higher mean intraocular pressure (IOP), lower mean age at presentation, worse visual acuity and fields at presentation were more prevalent in subjects with PACG than in those with POAG.

Conclusion: A more detailed examination of angle features in a population-based glaucoma survey is needed to answer some questions on the characteristics of glaucoma, especially angle closure glaucoma in Africans and reasons why glaucoma presents with severe features in Africans.

Key words: primary glaucoma, adults, clinical features, gonioscopy

INTRODUCTION

Glaucoma is now estimated to be the second most prevalent cause of blindness worldwide after cataracts, and the World Health Organization Programme for Prevention of Blindness estimates that 5 million people are blind due to glaucoma.¹

Glaucoma is the third major cause of blind registration in the United Kingdom and is the second major cause of blindness in some developing countries that also suffer a high prevalence of infectious and nutritional diseases.²

Primary glaucoma has been reported to be a common cause of visual impairment in the black population.¹⁻⁴ While the prevalence of glaucoma in Caucasians is relatively low – about 1% or less at ages 70 years and less.^{5, 6} Several studies suggest a much higher frequency in populations of African descent.¹⁻⁴ The reasons for the high susceptibility of black populations to glaucoma remain unknown. Racial differences in the prevalence of open angle glaucoma have been documented.^{7, 8} Differences in the presentation of primary angle closure glaucomas have also been reported among different races.^{9, 10} However, classic acute angle closure glaucoma with congestive signs and symptoms is apparently rare in Negro populations.⁷⁻¹¹ It is possible that angle closure glaucoma may be misdiagnosed among Negro populations and treated as chronic simple glaucoma. Only gonioscopy can differentiate the two conditions but gonioscopy may not be routinely done in a busy practice because it is time consuming.

Assessment of drainage angle is an important evaluation in all subjects presenting with glaucoma. Information from this procedure is needed to make a definite diagnosis of angle closure glaucoma.

MATERIALS AND METHODS

The study selected 80 adults (≥ 20 yrs) presenting for the first time with primary glaucoma at the outpatient department and emergency clinic of the University College Hospital, Ibadan between May 1995 and August 1995.

The diagnostic criterion for inclusion in the study was the presence of at least two of the following: intra-

ocular pressure 27mmHg or more; vertical cup to disc ratio 0.5 or more; asymmetry of 0.2 or greater, in the absence of other ocular disease to explain the difference or any field loss typical of glaucoma. Other cases of primary angle closure glaucoma included in the study had to fit the following criteria: the sudden occurrence of a rise of intraocular pressure associated with shallow anterior chamber and corneal oedema preceded by symptoms of haloes and ocular pains.

CLINICAL EXAMINATION

Information about the subject and a record of the clinical findings was done for all cases of glaucoma using a questionnaire. The items of information in the questionnaire included present state of health, past illnesses, present and past ocular disease, symptoms of angle closure glaucoma. Clinical examinations performed and recorded by the author were visual acuity with and without spectacles or pinhole with a standard Snellen chart, refractive error estimated by objective retinoscopy, visual field, measured with Friedman 2 field analyzer.

The ocular fundus was examined through an undilated pupil with a direct ophthalmoscope, noting the vertical cup/disc ratio grading zero for no cup to 1.0 for total cupping.

Degree of optic atrophy was graded into three categories. Those whose pale optic disc area was less than or equal to 30% of the whole disc were categorized as having no optic atrophy.

Those with widening of the pale disc area more than 30% and less than 75% of the whole disc were categorized as having mild/moderate optic atrophy. Those with severe optic atrophy had a pale disc area which was more than 75% of the optic disc.

Other fundus abnormalities as well as asymmetry in the two eyes were noted. Two consecutive readings of the intraocular pressure were made using the Goldmann applanation tonometer, then an average of the two readings was taken.

Gonioscopy was carried out by the author in both eyes using a two mirror gonio lens (Goldman Model, Clement Clarke International), coupled with 2% hypomellose fluid, examining 360 degrees of the angle and classified into 5 grades using the Scheie system.² In eyes with asymmetric features, the maximum angle width occurring in at least 180 degrees was used.

Scheie angle width of grades 0 and 1 were referred to as 'closed' in this study. Grade 2 angles were referred to as 'narrow', while 3 and 4 were referred to as open. In addition, an occludable angle was considered to be an angle in which the pigmented trabecular meshwork was not visible in three quadrants of the circumference of the angle without manipulation.

The amount of pigmentation in the posterior

trabecular meshwork was graded in three quadrants excluding the inferior quadrant. The maximum pigmentation covering at least 90° of the trabecular meshwork was graded as none or mild, moderate or heavy pigmentation. The number of iris processes were counted and classified as 'none', when there were less than 5 in at least one quadrant, and 'many' when there were 5 or more in at least one quadrant of the angle.

Similarly, the presence or absence of peripheral anterior synechiae was graded as 'none' when absent in all quadrants, 'mild' when present in only one quadrant and 'severe' when present in more than one quadrant.

The presence or absence of iris atrophy was also recorded.

DATA ANALYSIS*

Frequency distribution tables were used to present the data. Proportion and percentages were used to summarize categorical variables. Mean and standard deviation were used for continuous variables.

The chi-square test was used to investigate the significance of the association between any two categorical variables while the t-test was used to compare any two mean values of continuous variables. All tests were two sided and at 5% level of statistical significance.

RESULTS

Table 1 shows the age and sex distribution of the 80 glaucoma patients examined in this study. The male to female ratio was 5:3. The majority (31.3%) were in the age bracket of 60-69 years. Ten percent of the patients were less than 30 years; 45% were 60 years and above, and of these, 30% were over 70 years.

Table 1. Age and sex distribution of patients with glaucoma in U CH, 1995

Age Group	Females		Males		Total	
	n	%	n	%	n	%
20-29yrs	1	3.3	7	14	8	10.0
30-39yrs	1	3.3	3	6	4	5.0
40-49yrs	6	20.0	8	16	14	17.5
50-59yrs	9	30.0	9	18	18	22.5
60-69yrs	10	33.3	15	30	25	31.3
70+	3	10.0	8	16	11	13.8
Total	30	37.5	50	62.5	80	

* The data was processed in a microcomputer using Epi InfoVersion 6.01.

Although a higher proportion of the males were less than 30 years of age (20% versus 6.7%), there was no statistically significant sex differential in the population studied ($P > 0.05$).

SYMPTOMATOLOGY

Symptoms such as seeing haloes, redness, and sudden visual loss were absent in all the patients. Most of the patients (80.5%), however, admitted to gradual loss of vision, varying in duration from one month to two years. None of the patients presented within one week of noticing the symptoms. About 22.0% were bilaterally blind and 34.7% had bilateral visual impairment.

Table 2 shows the clinical features of the patients studied. Nearly a quarter (23.8%) were blind in their right eye and 26.3% in their left eye. More than 30% of them had varying degrees of visual impairment in their right (30.1%) and left (33.8%) eyes.

The cup to disc ratio showed that about two-thirds of subjects studied had cup to disc ratio greater than 0.7 in their right eye.

Cupping of the optic disc was accompanied by severe optic atrophy in most patients, with 65% having severe optic atrophy in their right eye and even a higher proportion of subjects had severe optic atrophy in their left eye (71.4%).

Table 2. The clinical features of the right eye of 80 glaucoma patients in UCH, 1995

Clinical Variables	Right Eye (number)	Percent
1. Visual acuity		
6/4-6/18	37	46.3
<6/18-6/60	17	21.3
<6/60-3/60	7	8.8
<3/60-NLP	19	23.8
2. Cup Disc Ratio		
</=0.5	8	10.0
>0.5-0.7	20	25.0
>0.7-0.9	26	32.5
>0.9-1.0	26	32.5
3. Angle Width		
Grade 0	8	10
1	4	5.0
2	21	26.2
3	39	48.8
4	8	10.0
Total	80	

Visual Fields

Sixteen patients (20%) could not be tested either because the vision was too poor or the patient lacked

understanding of the test. The right eye in patients in the study group presented with visual fields constricted to within 10 degrees of fixation in 42.5% of cases. The remaining 57.5% showed various changes, from a few isolated scotoma, varying degrees of arcuate scotoma, and peripheral constriction not within 10 degrees of fixation.

Intraocular Pressure

The mean intraocular pressure in the right eye among the 80 glaucoma patients was 33.69 mmHg (standard deviation [SD] = 11.12). A high proportion of the patients had intraocular pressure greater than 40mmHg. This proportion was higher in the left eye compared to the right eye (28.8% versus 23.8%).

Angle Width in Glaucoma Patients

Table 2 shows the distribution of angle width among the subjects studied. A high proportion (58.8%) had wide open angle grades of 3 and 4; 26.2% had narrow angles and (15%) had angle width grades of 0 or 1.

Pigmentation of the posterior trabecular meshwork was mild in 63.8% of eyes, 26.3% had moderate pigmentation while 8.8% had dense pigmentation.

Peripheral anterior synechiae was observed in 9% of eyes and this feature was present only in eyes with occluded angles. Iris processes were commonly seen; 42.5% of eyes had few to numerous iris processes in their angles.

Refraction

Table 3 shows the refraction in 72** patients with glaucoma; 29.2% of eyes had either no refractive error or refractive error less than ± 1.25 diopter sphere (DS)

40.3% had hyperopia of between 1.25DS and 3.00DS. Myopia greater than 3.00DS occurred in 12.5% of cases, while hyperopia greater than 3.00DS occurred in 8.3% of cases. Overall, there were more hyperopic eyes (48.5%) than myopic eyes (22.2%) in the group. There was a statistically significant difference in the distribution of refractive errors between subjects with PACG and POAG. ($X^2 = 10.38, P < 0.05$)

In considering the 12 eyes with angle closure glaucoma and comparing their features with the eyes with open angles, there was absence of pain, haloes and there were no signs of congestive glaucoma in the two groups. Table 4 shows a comparison of features of the 12 eyes with angle closure glaucoma with the eyes with open angle glaucoma.

Mean intraocular pressure was 38.1mmHg SD ± 9.4 in eyes with PACG compared with 30.3mmHg SD ± 11.9 in eyes with POAG. There was a statistically significant difference in the mean IOP in the two groups (t-value = 2.51, $P < 0.02$).

** No refraction in 8 patients.

Table 3. Refraction in the right eye of 72 glaucoma patients in UCH, 1995

Refraction	PACG		POAG		TOTAL	
	n	%	n	%	n	%
Plano to $< +1.25$ DS	2	16.7	19	31.7	21	29.2
+1.25 to +3.00DS	5	41.7	24	40.0	29	40.3
-1.25 to -3.00DS	1	8.3	6	10.0	7	9.7
$> +3.00$ DS	4	33.3	2	3.3	6	8.3
> -3.00 DS	0	0	9	15.0	9	12.5
Total	12	100	60	100	72	100

$\chi^2 = 10.38, P < 0.05$

Mean age of presentation (40.7 years) was lower in the angle closure glaucoma group, compared to a mean age of 53.1 years in the group with open angle glaucoma. The right eye in 31.5% of patients with primary angle closure glaucoma (PACG) had visual acuity better than 6/18; similarly, the right eye in 40.0% of patients with primary open angle glaucoma (POAG) had visual acuity better than 6/18.

Both groups had cupping and atrophy of the optic nerve head and visual field loss. In addition, the right eye in 68% of patients with angle closure glaucoma (ACG) had visual fields within 10 degrees, while the right eye in 32.5% of patients with open angle glaucoma (OAG) had such tubular fields. The difference was statistically significant (t-value = 4.68, $P < 0.05$)

Systemic diseases like diabetes mellitus and hypertension were present in 28.4% of subjects with primary open angle glaucoma (POAG) and 24.4% of subjects with primary angle closure glaucoma (PACG).

Hyperopia greater than +3.00DS was ten times more common in PACG than in POAG. No subject with PACG had myopia greater than 3.00DS.

DISCUSSIONS

Among 80 newly diagnosed cases of primary glaucoma, 85% had open angle, as determined by gonioscopy;

while 15% had closed angle. Pain, seeing haloes and redness were absent in all cases, even in those eyes with closed angles.

Olurin,³ in a study of 733 glaucoma clinic patients, found that 13% had completely closed angles; while 20% had narrow angles capable of occlusion. The 13% that had closed angles presented with clinical features similar to those with chronic open angle glaucoma.

Acute angle closure glaucoma with classic congestive signs and symptoms is a rare occurrence in subjects presenting with primary angle closure glaucoma (PACG) at the eye clinic of the University College Hospital, Ibadan. On the other hand, primary angle closure glaucoma (PACG) more commonly presents in the chronic form.

In 12 of the 80 newly diagnosed subjects, the clinical course was chronic. All the new cases (80) sustained glaucomatous optic nerve atrophy and cupping with severe field defects. Presenting intraocular pressures were high, and therefore differentiation from primary open angle glaucoma (POAG) was made by gonioscopy. Peripheral anterior synechiae was found in only 7 of the subjects. This is not surprising as formation of synechiae depends upon persistent oedema of the iris, which is expected to be found in eyes with congestive signs.

Studies by Alper and Laubach on African-American populations⁹ and by Olurin in Ibadan on West Africans¹¹ reported similar observations. The absence of congestive signs in eyes with angle closure glaucoma was also reported in studies conducted by Avshalom et al. in Tanzania, Malawi and Liberia.¹⁰

The epidemiology of PACG differs in whites; acute congestive symptoms¹⁰ are more prevalent, while in Mongolians, chronic asymptomatic course is often the presentation.¹²

More male patients than females were seen in this study, this difference was, however, not statistically significant. It is generally known that African women have little time to attend to personal needs, being frequently weighed down with domestic responsibilities; in addition to low economic capacity. It is

Table 4. Characteristics of glaucoma subjects in UCH, 1995

	PACG		POAG		T - value	P value
	n	%	n	%		
Mean IOP (mmHg)	38.1	SD±9.4	30.3	SD ±11.9	2.51	$P < 0.02$
Mean age at diagnosis (y)	40.7		53.1			
Male (n, %)	5	41.7	45	66.2	2.61	$P < 0.1$
Female (n, %)	7	58.3	23	33.8		
% with RVA $> 6/18$	4	33.3%	24	40.0%	0.19	$P > 0.5$
% with tubular right eye field	8	66.7%	20	33.3%	4.68	$P < 0.05$
Severe cupping in right eyes	8	66.7%	39	65%	0.01	$P > 0.9$
Presence of systemic diseases	3	25.0%	17	28.3%	0.06	$P > 0.8$

possible that there is a higher incidence of primary glaucomas among African men.

Severe cupping and atrophy, high intraocular pressure and marked field loss were constantly found in most cases; 22.0% of subjects were binocularly blind on presentation while 34.7% had visual impairments.

About one-third of the patients had a cup disc ratio of greater than 90% in at least one of their eyes, with severe atrophy in over 70% of eyes.

High intraocular pressures, severe cupping and atrophy of optic nerve heads, as well as advanced field loss continue to be the typical presentation of glaucoma in adults in Ibadan. Similar findings were reported by Majekodunmi in Lagos.⁴

Ten percent of cases seen were under 30 years. These clinical features indicate that not much has changed over a period of 25 years despite higher numbers of health practitioners and the initiation of a National Blindness Prevention Programme which initially focuses on cataract blindness prevention in many states.

In Nigeria, Olurin,³ in a retrospective study of 8672 new ophthalmic outpatients seen in a 4 year period, found that primary glaucoma was the seventh commonest diagnosis accounting for 4.94% of outpatients presentation; 19.19% of the binocular blindness in her study had glaucoma.

In another study by the same author of 1,000 blind patients,¹³ primary glaucoma was the cause of blindness in 20.7% of cases.

In a clinic study of 733 glaucoma patients by Olurin,¹¹ she noted early age of onset, with 21% of patients being under 40 years of age; the severe visual disability with which patients presented, 46.25% were already blind when first seen; and the rarity of acute angle closure glaucoma.

The early age of onset and the severity of the disease in Nigeria have been documented in other hospital based-studies in Nigeria by Majekodunmi⁴ and Oji.¹⁴ Glaucoma is a common cause of blindness in clinic populations in the northern part of Nigeria.^{15,16} Several decades after Olurin's study in the same setting, primary glaucoma still presents at an advanced stage with over 50% either blind or visually impaired. Primary open angle glaucoma is the more common type of glaucoma seen in Ibadan.

Primary angle closure glaucoma has been reported to be significantly more common than primary open angle glaucoma in Eastern Asian populations.⁸ Among the Chinese, 79% of glaucomas are angle closure type, while 86% of the glaucomas presented by Greenland Eskimos are the angle closure variety.¹⁷ The proportion of primary glaucoma with closed angles obtained in this study is comparable to that obtained by Olurin. This study found that subjects with PACG were younger at

presentation, however, they presented with more severe clinical features than subjects with POAG.

This study shows that angle closure glaucoma is common in ophthalmic African outpatients who present at the University College Hospital, Ibadan in southwestern Nigeria. Although classic congestive signs were rare, severe clinical features were more prevalent in angle closure glaucoma than in eyes with POAG.

Gonioscopy is used in order to differentiate PACG from POAG.

The incorporation of a more detailed examination as described by Spaeth¹⁸ (which includes a detailed examination of the anterior chamber angle identifying pigmentation level, iris insertion, iris curvature) could provide a more accurate picture of the features of primary glaucoma in Africans from southwestern Nigeria.

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