The types and treatment of glaucoma among adults in North Eastern part of Nigeria

FO Olatunji[1], UF Ibrahim[2], N Muhammad[3], AA Msheliza[4], BE Akku[4], UY Ibrahim[5], BT Rano[2], Maigoro[2], MU Ali [2]

Abstract

Objective: To assess the pattern of presentation and management of glaucoma at the institution.
Design: A Retrospective analysis of all adult glaucoma that presented between February 2002 and July 2007.
Setting: The Study was carried out at the Federal Medical Centre, Azare, a tertiary health facility.
Participants: Included in the study were patients Aged ≥ 20 years with intraocular pressure (IOP) ≥ 22mmHg who had records of cup: disc ratio (CDR) Visual acuity (VA) at least on presentation.
Exclusion criteria: presence of other visual impairing diseases such as diabetic /hypertensive retinopathy, corneal opacities, , and cataract. Patients whose diagnosis was not confirmed by an ophthalmologist.
Outcome Measures: Age, sex, IOP, CDR and VA at presentation and at follow up visits, type of treatment offered. Central visual fields (CVF) assessment and gonioscopy were carried out in the course of the study since there was no records of such investigations.
Results: 157 eyes of 82 patients satisfied the inclusion criteria, 53 of whom were males (64.6%). The mean age was 50.8 (ranged 20 – 83) years. The presenting VA was normal in (38.9%); impaired in (9.6%); severely impaired in (9.6%); and blind in (42.0 %).
CDR of 0.2 to 0.5 was found in (5.7%) and 0.6 to 0.7 in (9.6. %) and 0.8 or greater in (84.7%). The mean presenting IOP was 37.6 mm Hg. 126 eyes of 69 patients were treated with anti-glaucoma medications. Trabeculectomy was performed in (14.0%) only.
Conclusion: Glaucoma presented at advanced stages in the centre. There was a low rate of surgical treatment.

Key Words: Adult Glaucoma Presentation, Pattern, Treatment, Nigeria

Introduction

Glaucoma is a nonspecific term used for several ocular diseases that often ultimately result in increased intraocular pressure (IOP) and decreased visual acuity (VA).(1) Primary open-angle glaucoma (POAG) is described distinctly as a multifactorial optic neuropathy that is chronic and progressive with a characteristic acquired loss of optic nerve fibers.(1) Intra ocular pressure remains an important primary and prognostic risk factor for OAG,(2, 3) but other IOP-independent risk factors may be involved in the pathogenesis and progression of OAG.(4,5) The glaucomas now constitute the second most common cause of global blindness, after cataract, accounting for 12.3% of world total Blindness.(6)

Glaucoma in west Africa is predominantly POAG. Chronic angle closure glaucoma (CACG) is seen occasionally but acute angle closure glaucoma (AACG) is extremely rare.(7) In this population, POAG begins at an earlier age than in Europeans and the disease typically advances rapidly. In the majority of cases diagnosis is made late; after loss of central vision in one or both eyes.(8,9)

Correspondence to: FO Olatunji University of Ilorin Teaching Hospital, PMB1459, Ilorin. Nigeria. Tell: +123 803 3912 863. E-mail: drfolatunji@yahoo.co.uk

[1]Ophthalmology Department, [2] Federal Medical Centre, Azare, Bauchi State, Nigeria., [3] Sir Yahaya Memorial Hospital Birnin kebbi. kebbi state, Nigeria. [4] Federal Medical Centre, Gombe, Gombe State, Nigeria. [5]Aminukano Teaching Hospital, Kano, Kano State, Nigeria.

Aim

To find out the pattern in terms of severity and types of glaucoma that presented at the institution within the period and how they were managed. This is the first of such study in the center.

Materials and Methods

A Retrospective analysis of all adult glaucoma patients that were seen at the Federal Medical Centre (FMC) Azare between February 2002 and July 2007 who satisfied the inclusion criteria was carried out. FMC Azare is a tertiary medical centre in Bauchi State in the North Eastern part of Nigeria.

Definitions

POAG was defined as open angle, CDR of at least 0.6 and an IOP of >21mmHg. Early POAG was defined as IOP >21 and CDR > 0.2 in a patient whose fellow eye has an established POAG (IOP > 21mmHg and CDR of at least 0.6). CACG was defined as closed or occludable angle with CDR of at least 0.6 and an IOP of >21mmHg.

AACG was defined as closed angle with or without CDR of at least 0.6 and features of acute angle closure consisting of at least 2 of the following symptoms: ocular pain, nausea/vomiting, and a history of intermittent blurring of vision with halos; and at least 3 of the following signs: IOP >21 mm Hg, conjunctival injection, corneal epithelial edema, mid-dilated nonreactive pupil, and shallow anterior chamber in the presence of occlusion. Ocular Hypertension (OHT):- IOP >22 mmHg, CDR <0.6, normal fields and open angles if gonioscopy record is available.

Inclusion criteria

Patients aged 20 years and above with glaucoma as defined above who were diagnosed by an ophthalmologist and has all the records of, CDR, VA and IOP >21mmHg at least on presentation.

Exclusion criteria: - Age less than 20 years, presence of other ocular or systemic diseases that can impair vision such as diabetic retinopathy, corneal opacities, hypertensive retinopathy, and cataract. Patients whose diagnosis was not confirmed by an ophthalmologist.

Records of age, sex, duration of symptoms before presentation, antiglaucoma drugs used for medical treatment and after surgery for patients who underwent surgery were taken. IOP, CDR and VA at presentation were recorded while Central visual fields (CVF) assessment and gonioscopy were carried out on those patients that presented for the first time or were reviewed during the course of the study (year 2007) only, since no patient had such assessment/records previously. Where available, IOP, CDR and VA records during follow-up visits at the first week, 6 months, 1 year and 3 years after the 1st presentation or after surgery were recorded.

IOP was measured with the Schiotz tonometer until pulsair: – non contact applantation tonometer (EasyEye Keeler limited 2001 EN 60601-1) became available in 2006. After, Sciotz tonometer was used only for patients that were uncooperative for applanation tonometry. Ophthalmoscopy was carried out mainly with direct ophthalmoscope. The +90 Diopters lens was used if the view through the direct method was not clear due, for instance, to refractive errors. VA was recorded with the standard Snellens chart or the E-chart for illiterate patients. Corrected visual acuity was not routinely done unless requested by the doctor.

CVF assessment was performed by an optometrist trained in the use of the automated visual field analyzer: Synemed EP-910. Visual field changes were classified in a fashion taken from Stewart and Chorak et al [10] who divided visual field into five stages: 1) within normal limits, 2) early changes (Para-central or Seidel's scotoma), 3) late arcuate changes, 4) central island remaining with complete superior and inferior arcuate scotomas and 5) unable to perform due to deep diffuse depression of the field with co-existent loss of central vision.

Gonioscopy was performed by ophthalmologists who have adequate experience in gonioscopic assessment. Only a 1-mirror gonioscopy lens (volk optical inc. VG-1 1.50x) was available and used with a coupling agent (2% methyl cellulose) to assess the angle structures. Shaffer method of gonioscopy grading was used to differentiate the angles into:-

1. Open angle: grade 2 angle in at least 180 degrees of the angle circumference.
2. Occuludable angle: grade 1 or 2a (nonpigmented part of the trabeculum only visible) in at least 180 degrees.
3. Closed angle : No angle structure seen in at least 180 degrees

In view of the retrospective nature of the study normal tension glaucoma (NTG) could not be defined reliably since none of the patients had a 24-hour phasing of their IOP. The data obtained were recorded and entered into the Computer. The data were analyzed using the SPSS version 12.0 and Epi info version 6.0.

Result

Sample distribution

One hundred and fifty seven (157) eyes of 82 patients satisfied the inclusion criteria, 53 of whom were males (64.6%). The age ranged from 20 to 83 years with a mean of 50.8 years. Table 1 shows the distribution of the sample.

Table 1. Age and Sex distribution of Glaucoma patients.

	Male		Female		Total	
Age Group (Years)	**No**	**%**	**No**	**%**	**No**	**%**
20 – 29	3	3.6	4	4.8	7	8.5
30 – 39	8	9.7	4	2.4	12	14.7
40 – 49	8	9.7	7	8.5	15	18.3
50 – 59	15	18.3	7	8.5	22	26.9
60 - 69	11	13.4	5	6.1	16	19.5
70 - 79	6	7.3	2	2.4	8	9.7
80+	2	2.4	0	0.0	2	2.4
Total	53	64.4	29	35.4	82	100

Presenting Visual Acuity

The presenting VA was normal in 61eyes (38.9%); impaired in 15 eyes (9.6%); severely impaired in another 15 eyes (9.6%); and blind in 66 eyes (42.0 %).

Cup: Disc Ratio (CDR).

The CDR ranged between 0.2 in ocular hypertensive eye to 1.00 in advanced glaucoma. CDR of 0.2 to 0.5 was found in 9 eyes (5.7%) and 0.6 and 0.7 was found in 15 eyes (9.6%) while 0.8 or greater was found in 133 eyes (84.7%). Further analysis of the 66 patients that were blind (VA < 3/30) showed that 63 of them (94.5%) had CDR of 0.8 or greater. Also all the 30 patients with impaired vision (<6/18 – 3/60) had CDR of 0.8 or greater.

Presenting intraocular pressure (IOP)

The presenting IOPs are shown in table 2 and the pressures ranged between 22 and 76 mm Hg with a mean of 37.6 mm Hg.

Table 2. Presenting IOPs. 1n 157 Eyes of 87 patients

Presenting IOP	**Male n= 55 No (%)**	**Female n=32 No (%)**	**Total No of Eyes No (%)**
22-35	*18(46.2)*	*21(53.8)*	*70(46.5)*
36-50	*31(50.8)*	*7(11.5)*	*64(38.9)*
>50	*6(26.1)*	*4(17.4)*	*23(14.6)*
Total	***55***	***32***	***157(100)***

Gonioscopy

Gonioscopy was performed in 41 eyes (26.1%). Twenty out of these (48.8%) had open angle, 14 eyes (34.1%) occludable angle and 7 eyes (17.1%) had closed angle.

Visual fields

A total of 52 eyes (32.9%) had CVF assessment. Two (3.8%) had normal visual field; 9 eyes (17.3%) had early glaucomatous field changes consisting of Seidel and para central scotomata; 11 eyes (21.2%) had late arcuate changes /scotomata; and another 11 eyes (21.2%) had tunnel vision. Visual field could not be assessed in 19 eyes (36.5%) due to loss of central vision. They could not see any of the projected targets.

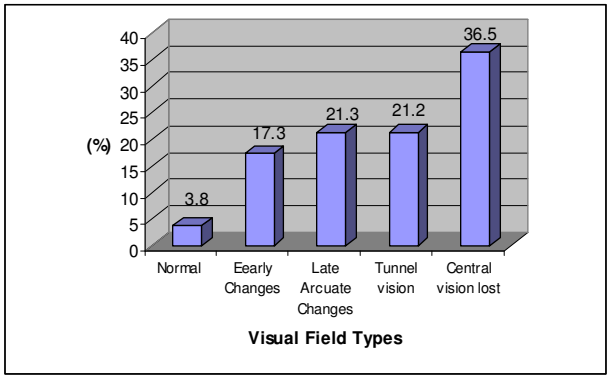

Figure 1. Central Visual Field changes.

Type of Glaucoma.

POAG was diagnosed in 133 eyes (84.7%). Most of the diagnosis of POAG was presumptive since none of the eligible patients had records of gonioscopy, and it was performed on 41 patients only in the course of the study. All the patients diagnosed as having angle closure glaucoma however had gonioscopy. As shown in figure 2 the least diagnosed type of glaucoma was secondary glaucoma (uveitic) in 1(0.6%) eye.

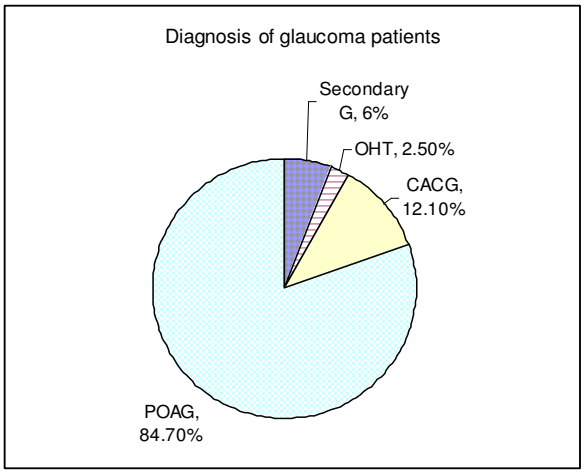

Fig. 2. Diagnosis in Glaucoma Patients.

Medical Treatment of Glaucoma Patients

One hundred and twenty six eyes of 69 patients were treated with anti-glaucoma medications. These were 43 males (31.9%) and 26 female (19.3%). The mean age was 51.7 years, range 20 to 83 years and S.D. 14.4. The mean initial IOP in medically treated patients was 37.8mmHg, range 20-76 mmHg and a mean CDR of 0.90.

Sixty four eyes (40.8%) were treated with timoptol eye drops only; 54 eyes (34.4%) were treated with timoptol and diamox tablets; while 3 eyes (1.9%) were treated with timoptol and pilacarpine eye drops. Timoptol and xalatan drops were used in 1 eye (0.6%) while 4 eyes (2.5%) were treated with timoptol and pilocarpine eye drops and diamox tablets. Fig, 3.

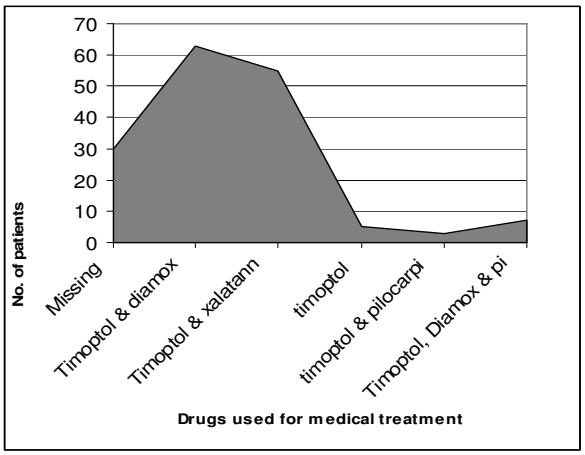

Fig. 3. Medical Treatment of Glaucoma Patients

Surgical treatment of glaucoma patients.

Trabeculectomy was performed in 22 eyes of 13 patients (14.0%); antifibrotic agent was not used in any eye. The mean age was 46 years, range 20-75 years. There were 10 males and 3 females. The characteristics of eyes that had trabeculectomy include a presenting CDR range of 0.5 to 1.0; a normal presenting VA in 68.2% of the eyes (15 eyes); and early to late arcuate field changes in 2 eyes.

Intraocular pressure control with treatment

IOP *at Follow- up Visits:*

Medical therapy

The mean IOP at 1st week, 6 months, 1 year and 3 years after commencement of treatment were 30.6 mmHg(?n n=50), 31.0mmHg(n= 51). 29.1mmg (n=38) and 32.3 mmHg (n=19) respectively. The mean IOP at the first 1 week of commencement of treatment was 29.9 mm Hg.

IOP control post-trabeculectomy.

A total of 18 eyes (81.8%) of those who had surgery had some medications preoperatively. Nine of these (50.0%) had timoptol only. Eight eyes (44.4%) had timoptol and diamox tabletss. While 1 eye (5.6%) had timoptol and pilocarpine eye drops. Eleven eyes (7.0%) were continued on drugs postoperatively. These were 9 eyes (81.8%) that were continued on timoptol only, and 2 eyes (18.2%) that continued on timoptol and diamox tablets. The mean IOP at 1st postoperative week (n=18) was 27.7mmHg range 12-48mmHg. The mean IOP at 6 months 1 year and 3 years were 24.6 (n=17), 24.5 (n=16) and 16.8mmHg (n=5) respectively. Mean preoperative IOP was 37.6mmHg.

Limitations:

Current definition of CACG require differentiation of the closed angle into appositional or synechia through indentation gonioscopy which was not possible by the only 1-mirror lens available. CVF was performed in a few patients only, and even fewer patients had repeated CVF and so there may be a learning curve error. Gonioscopy was performed on 41 patients only since the procedure was barely if ever performed prior to the commencement of the study, the diagnosis of POAG in others was presumptive.

Discussion

Glaucoma is the second leading cause of blindness globally,[6] however because of the irreversible nature of its blindness and the age of the patients affected it presents, perhaps, an even greater public health challenge than cataract. The most common type of cataract (senile cataract) affect older people, while POAG predominantly affects relatively younger people (middle aged and aged). In many reports, [7, 11] the affected individuals are younger than 40 years. Nineteen of our patients (23.2%) were younger than 40 years at presentation. Other workers in Nigeria have found 21%[11] 15%[7] and in Ethiopia, 22%[12]

of their patients younger than 40 years. The mean age of 50.8 years at presentation in our series is similar to those of other workers in Ethiopia[12] who found 51.9 years, Nigeria[9] who found 52.7years and in Tanzania[13] 57 years, but less than the findings of Kabiru et al[14] also in Tanzania who found 61 years. In all the findings above in Africans the mean ages at presentation are less compared to those of Caucasians for whom the average age of presentation of POAG is 69.1 years.[15] Our findings of 64.6% male distribution is comparable to the findings of others[16, 17] who found 65%, and 71% respectively, but at variance with those of Kabiru et al[14] who found 80%.

Ninety six eyes (61.1%) were blind at presentation. This consisted of 66 eyes (42.0%) that were blind by visual acuity and 30 eyes (19.1%) by CVA assessment. This is similar to the 41% but less than the 29% blindness by VA assessment only found by Melka[12] and Mafwiri[13] respectively. Advanced cases at presentation have been reported similarly by other previous workers on black patients.[7, 18, 19] The high rate of blindness by VA assessment found in this study and corroborated by others in Africa, the findings in this study that 63 out 66 (94.5%) of the patients that were blind by VA (VA < 3/60) had CDR of 0.8 or greater; and also all the 30 patients with impaired vision (<6/18 – 3/60) had CDR of 0.8 or greater as well as the findings of Mafwiri et al [13] that the higher their presenting IOP the poorer the visual acuity of their patients lend some support to the suggestion of Richard et al[20] that after excluding cases of cataract and refractive errors, reduced visual acuity can be used to harvest glaucoma patients in Africa.

CDR of 0.8 found in 84.7% of our patients is comparable to 83% found by Kabiru et al [14] but higher than 70% found by Mafwiri et al[13]. The mean IOP of 37.6 mmHg found in our series is higher than those of 32 mmHg and 25mmHg found by others.[13 14]

High levels of mean IOP, CDR and high blindness rate found in this study indicate very severe cases at presentation. This may be due to late presentation or a more severe course of the disease. However since records of most of our patients do not reflect duration of symptoms before presentation, the exact reason can not be ascertained.

Only 22 eyes (14%) were treated surgically. This is rather paradoxical given the advanced stages of the diseases in most of the patient at presentation and the high rate of high IOP. Surgical treatment has been found to be more effective than medical treatment and less expensive to the patient at the long run especially in our environment [13, 17 20] given the limited choice of drug options and affordability. Moreover, high IOP at presentation has been linked with higher rate of failure of medical treatment and need for surgical treatment.[21] The lower mean CDR of surgically treated patient (0.89) compound to that of medically treated patient (0.90) in our study may be due, however, to the fact that most of the medically treated patients were too advanced and not suitable for surgical treatment given the reality of no visual recovery and even the chances of worsened vision[7] after trabeculectomy. This lack of visual recovery from treatment of glaucoma makes its management, more especially surgical, less appealing to many ophthalmologists.

The low rate of utilisation of the gonioscopy lens found in this study depicts the scenario in many centres. This is probably because of the advanced nature of the glaucoma cases that present in Africa making the diagnosis of "glaucoma" usually obvious and treatment can be commenced.[19] However, specification of the type of glaucoma requires gonioscopy while CVF assessment is imperative for initial assessment and monitoring of progression even in advance cases, and as a supportive evidence for diagnosis in early stages. With the basic equipment like the slit lamp biomicroscope, a gonioscopy lens and a CVF analyzer, significant improvement can be made to the management of glaucoma in our environment through adequate use of the available technologies. Even in the developed economy, such basic equipment have been found to be effective in glaucoma management. [22]

Conclusion

Glaucoma presented at advanced stages in the centre. There was a low rate of surgical treatment.

Recommendation

The mean post treatment IOPs particularly those of medical treatment were rather high. It is recommended that surgery should be offered as the primary treatment. Secondly, an adjunctive intraoperative antifibrotic agent should be used.

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