Traumatic hyphaema in Kaduna, Nigeria

S. S. AMONI

From the Department of Ophthalmology, Ahmadu Bello University Hospital, Kaduna, Nigeria

SUMMARY In a 2-year prospective study of 76 patients with traumatic hyphaema seen at the Ahmadu Bello University Hospital, Kaduna, 75% were under 20 years of age. A low male to female ratio of 3 to 1 relative to other reports was noted. Hyphaema occurred in the left eye 1.6 times more often than in the right eye. Thrown objects, such as sticks and stones, caused hyphaema in the largest number of patients in the series. Only 34.2% of the patients reported for care within the first 24 hours of injury, while as many as 46.9% of them had total hyphaema. These factors are vastly different from most other reports. Of 62 patients with known final visual acuity 40 (64.5%) had vision of counting fingers at 1 m or less in the affected eyes. The final vision was worse as the level of hyphaema increased. Thus of 13 patients with vision of no perception of light, 8 (61.5%) had total hyphaema. The reasons for some of the differences from other reports are discussed and suggestions are offered as to ways of improving the visual outcome from the disease.

Hyphaema continues to be a puzzling clinical entity in spite of both laboratory and clinical studies of the disease.¹⁻⁴ It has various known causes: trauma (play, fighting, surgical, occupational, recreational, accidental), tumors of the iris, diseases leading to iris neovascularisation, and anterior uveitis to mention a few.^{1 3 5}

Considerable differences of opinion exist about its management. Some of the forms of treatment suggested include miotics, mydriatics cycloplegics, topical and systemic corticosteroids singly or in various combinations, sedation with complete bed rest with unilateral, bilateral, or no patching of the eyes, and the use of such medications as acetazolamide, urea, mannitol, and glycerol when the intraocular pressure is raised.^{1 6-10}

Opinions also differ on the timing and the mode of surgical treatment.¹¹⁻¹³ The final visual outcome is often more related to the associated ocular injuries than to the hyphaema itself.

The literature on the topic of hyphaema from Africa is sparse.^{8 12} This study was undertaken to determine the general pattern of nonsurgical traumatic hyphaema in our population and to compare it with similar reports from other parts of the world.

Patients and methods

A protocol was prepared for a prospective study of the patients admitted with the diagnosis of traumatic

hyphaema into the Guinness Eye Unit of the Ahmadu Bello University Hospital, Kaduna, between January 1976 and December 1977. The hospital provides both primary and referral ophthalmic services to people living predominantly in the northern part of Nigeria and to a lesser extent to patients from various other parts of the country and the neighbouring ones.

Included in the investigation were such parameters as age, sex, laterality, type of trauma, time interval between injury and presentation, visual acuity, intraocular pressure, level of hyphaema, full ocular examination, associated complications, hospital course, and results of follow-up examination when possible. Although the aim of the study was not to evaluate different treatment modalities, patients were generally kept on bed rest and sedated. Various eye patching schemes were adopted—affected eye, bilateral, or none at all.

Oral acetazolamide was given if the intraocular pressure was raised. Surgical evacuation of blood was carried out at various periods after an unsatisfactory control of raised intraocular pressure in patients with total hyphaema.

There were 76 patients, 57 males and 19 females, a ratio of 3 to 1.

Results

Hyphaema was confined to the left eye in 47 patients and to the right eye in 29. The stay in hospital before the resolution of hyphaema in 25 patients who had no secondary haemorrhage or who needed no

Correspondence to Dr S. S. Amoni, Guinness Eye Unit, Department of Ophthalmology, Ahmadu Bello University Hospital, Kaduna, Nigeria.

operation for evacuation of blood ranged between 3 days and 12 days, average 5 days.

Follow-up examination after discharge was not done in 32 patients for reasons to be discussed later in this paper. Ten patients were seen only once between 1 and 2 months afterwards, 6 were seen 3 months afterwards, and 12 over 3 months after discharge with a range of 4 months to 29 months. The age and sex distribution is shown on Table 1. The ages ranged from 2 years to 56 years, with patients in the first 2 decades of life comprising 75% of the total.

Interval between occurrence and presentation (Table 2). Only 26 patients presented within 24 hours of injury. Of these, 22 were males and 4 were females, a ratio of 5.5 to 1. Thirty patients were seen after the first day but within the first week of their disease.

Level of traumatic hyphaema (Table 3). Of the 64 patients with recorded levels of hyphaema 30 (46.9%) had total hyphaema. There were 14 males and 16 females in this group of patients. Hyphaema occurred in $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ of the anterior chamber volume in 10, 8, and 7 patients respectively.

Causes of traumatic hyphaema (Table 4). Throwing of stones and the use of sticks, mostly in play, were

Table 1 Age and sex distribution in 76 patients with traumatic hyphaema

Age (yr)	Male	Female	Total	% Total
0-10	22	10	32	42.1
11-20	20	5	25	32.9
21-30	14	2	16	21.1
31-40	—	1	1	1.3
41-50	—	—	—	—
51-60	1	1	2	2.6
Total	57	19	76	100.0

Table 2 Interval between occurrence and presentation in 76 patients with traumatic hyphaema

Time before Presentation	Number of patients			% Total
	Male	Female	Total	
Within 24 hours	22	4	26	34.2
During 1st week	20	10	30	39.5
During 2nd week	1	1	2	2.6
During 3rd week	3	0	3	3.9
In 1 month	0	1	1	1.3
> 1 month	4	0	4	5.2
Uncertain	7	3	10	13.2
Total	57	19	76	99.9

Table 3 Levels of traumatic hyphaema

Level hyphaema	Number of patients			% Total
	Male	Female	Total	
Trace	6	3	9	11.8 (14.0)
$\frac{1}{4}$ *	9	1	10	13.2 (15.6)
$\frac{1}{2}$ *	8	—	8	10.5 (12.5)
$\frac{3}{4}$ *	6	1	7	9.2 (10.9)
Full*	14	16	30	39.5 (46.9)
Unstated	9	3	12	15.8
Total	52	24	76	99.7 (99.9)

*Volume of blood in the anterior chamber. Brackets indicate % of 64 patients with known levels of hyphaema.

Table 4 Causes of traumatic hyphaema

Play	26
Stick	12
Stone	12
Cloth	1
Sling shot	1
Occupational	7
Rebound effect of rubber	5
Screw driver	1
Plank of wood	1
Sports	6
Tennis ball	2
Football (soccer)	2
Hand ball	1
Fishing hook	1
Domestic	6
Fight	6
Road traffic accident	4
School teachers whip	2
Mother's slap	1
Unrecorded	19
Total	76

responsible for hyphaema in the largest number of patients in this series. There was a conspicuous lack of toys and industrial accidents as causative factors in contrast to the experience in the more technologically advanced countries of the world. The domestic causes of hyphaema included falling against the edges of a mud bed, wooden door, and face down on rocky ground. The rebound effect of rubber caused hyphaema in a patient with a sling shot and in 5 taxi drivers as they tied luggage to the boots of their cars.

Associated ocular injuries and complications (Tables 5, 6, 7). The cornea was most frequently involved in complications associated with traumatic

hyphaema. Corneal blood staining occurred in 16 patients, 10 males and 6 females. The ages ranged from 2½ to 35 years. Fifteen of the patients had total hyphaema, and the remaining 1 had corneal laceration in addition to hyphaema that persisted after paracentesis and repair of the laceration.

Table 5 Associated complications in patients with traumatic hyphaema

Cornea		26
Abrasion	2	
Laceration	8	
Blood staining	16	
Iris		6
Iridodialis	2	
Iris sphincter tear	3	
Posterior synechiae	1	
Lens		12
Cataract	9	
Displacement	3	
Vitreous		9
Haemorrhage	9	
Retina		2
Haemorrhage	1	
Tear	1	
Macula		4
Haemorrhage	4	
Optic nerve		1
Optic atrophy	1	
Enucleation		3
Phthisis bulbi		3
Adnexae		3
Lid laceration	1	
Lid swelling	2	
Rebleeding		7
Raised intraocular pressure		15

Besides the 2 patients in whom visual acuity improved during the period of follow-up (from perception of light to 6/12 in one, and perception of light to 6/24 in the other) the vision in this group of 16 patients either stayed at the initial low level or became worse with time. Corneal blood staining was still present in 29 months of follow-up in 1 patient but cleared in 2 months in another one.

The lens was the next most common structure involved. There were 9 eyes with cataracts and 3 patients with lens displacement.

Vitreous haemorrhage occurred in 9 patients, and macular haemorrhage was noted in 4 others. Raised intraocular pressure was recorded in 15 patients.

Seven patients, all males, comprising 9.2% of the total number, had further bleeding into the anterior chamber while they were in hospital. Four of these patients were seen within a day of their injury and their average time for rebleeding was approximately 5 days after admission to hospital. Vision remained poor or became worse in these patients except in one in whom visual acuity improved from light perception to 6/9 within 3 months.

Three eyes were enucleated, 2 for intractable glaucoma and 1 for cosmesis after the eye had become phthisical. Corneal blood staining had occurred in all 3 patients.

Other associated findings and complications

Table 6 Corneal blood staining in 16 patients with traumatic hyphaema

Age	Sex	Level of hyphaema	IOP	Visual acuity		Comments
				Initial	Final	
7	F	T	—	NPL	NPL	Hyphaema persists after paracentesis. Corneal blood staining still after 3 months.
2½	M	T	—	LP	LP	Rebled after 10 days' hospital stay. Staining persists at 29 months
12	M	T	49	LP	LP	Staining persists 6 months later
35	F	T	45	NPL	NPL	Persists after surgery
12	M	T	—	NPL	NPL	Staining less but present 2 months later
23	M	T	—	HM	NPL	Enucleation for intractable glaucoma
13	F	T	40	PL	6/12	Cornea clears at 2 months
9	F	T	40	PL	NPL	Blood staining noted 6 days post paracentesis
6	M	T	—	PL	CF (+10-00)	Iridodialis: dislocated lens
25	F	T	—	NPL	NPL	Phthisis bulbi eventually
8	M	T	—	NPL	PL	
9	M	T	—	NPL	NPL	Enucleation eventually
7½	M	T	25	PL	6/24	Vision 4 months later
11	M	T	—	PL	PL	Vitreous haemorrhage: cataract
24	F	T	—	HM	HM	Vitreous haemorrhage
23	M	½	soft	PL		Corneal laceration

T = Total hyphaema. IOP = intraocular pressure, mmHg. PL = perception of light, NPL = no perception of light. HM = hand movements

Table 7 Secondary haemorrhage in 7 patients with traumatic hyphaema

Age, yr	Sex	Initial level of hyphaema	Days before rebleed	I O P	Visual Acuity		Comments
					Initial	Final	
30	M	$\frac{1}{4}$	5	51.0	CF	LP	Rebleed 2 days after acetazolamide started
2 $\frac{1}{2}$	M	T	10	—	LP	LP	Rebleed after clearing. Cornea still stained 29 months later
22	M	$\frac{1}{4}$	4	50	LP	LP	
25	M	T	3		LP	6/9	Vision 3 months later
23	M	$\frac{1}{4}$	4		HM	NPL	Enucleation later
25	M	T	5		LP	HM	
6	M	T	4	—	PL	CF (+ 10-00)	Iridodialysis, dislocated lens

T = total hyphaema. IOP = intraocular pressure, mmHg. CF = counting fingers. HM = hand movements. (N)PL = (no) perception of light

included corneal abrasion, corneal laceration, iridodialysis, iris sphincter tear, posterior synechiae, retinal haemorrhage, retinal tear, and optic atrophy.

Surgical evacuation of blood. In Table 8 it is noted that surgical evacuation of blood from the anterior chamber was done in 16 patients, representing 21% of the total number in the series. Surgery was performed between 2 days and 33 days from the onset of the injury, with an average period of approximately 11 days. In 4 patients in whom visual acuity improved appreciably after surgery (2 from PL to 6/6, one from PL to 6/12 and the other from PL to 6/24), the operation was performed within the first week of injury.

Visual outcome. In Table 9 it is seen that the final

visual acuity was worse with increase in the level of hyphaema. Of 28 patients with total hyphaema and known final visual acuities, 20 (71.4%) had vision of counting fingers or less in the affected eyes. Eight patients (28.6%) had vision of no light perception eventually.

Discussion

The majority of the patients in this series were 20 years old or younger. This finding is in agreement with other reports, in which the same age group predominated.^{1 9 14} The male preponderance in most other studies is more marked than in this series. All 34 patients reported by Thygeson and Beard¹ were

Table 8 Data on patients with surgical evacuation of blood from the anterior chamber

Age	Sex	Period before seen (days)	Period from trauma to surgery (days)	Visual acuity		Comments
				Initial	Final	
10	M	5	6	PL	6/6	Vision after 1 month
7*	F	7	8	NPL	NPL	Hyphaema persists after surgery
35*	F	2	14	NPL	NPL	Hyphaema persists after surgery
30	M	10	19	NPL	3/60	Subluxed lens maculopathy; cyclocryotherapy
22	M	2	6	PL	HM	
23*	M	1	8	HM	NPL	Enucleation for intractable glaucoma
13*	F	5	6	PL	6/12	Blood-stained cornea clears 2 months
15	M	3	6	CF	NPL	Enucleation
9*	F	5	6	PL	NPL	
6	M	3	4	PL	CF (+ 10-00)	Iridodialysis Dislocated lens
8*	M	7	8	NPL	LP	
7 $\frac{1}{2}$	M	1	2	PL	6/24	Vision 4 months later
3 $\frac{1}{2}$	M	30	33			
10	F	2	3	PL	6/6	Subluxed lens
2	M	16	21			Vitreous haemorrhage
7	F	1	4			Vitreous haemorrhage

*Patients with blood-stained cornea. Abbreviations as in Table 7.

Table 9 Visual acuities in relation to various levels of traumatic hyphaema

Level of hyphaema	Visual acuities							
	6/9 or Better	6/9 to 6/18	6/18 to 6/60	CF	HM	LP	NLP	Unknown
Trace	3	—	1	1	—	1	1	2
‡	3	—	—	—	1	2	—	4
‡	2	1	1	1	—	1	2	—
‡	1	—	1	—	1	2	—	2
Full	2	5	2	2	4	5	8	2
Uncertain	—	—	—	1	1	4	2	4

Abbreviations as in Table 7.

males. Only 9 of 128 cases of Oksala⁹ and 3 of 64 patients of Edwards and Layden¹⁴ were females. The findings in this study are surprising in an environment in which the females lead a rather sheltered life.

Of 109 patients reported by Darr and Passmore⁷, 104 were seen within the first 12 hours of injury. All the patients (128) in Oksala's study reported for care within the first 24 hours of their difficulties.⁹ These reports are in sharp contrast to the experience of this study, in which only 34.2% of the patients were seen within the first 24 hours of injury.

Inadequate awareness, poverty, and paucity of facilities for eye care, which for most patients often necessitated travelling long distances to obtain the appropriate treatment, all account in varying degrees for this state of affairs. These problems also explain the difficulties with satisfactory follow-up examinations.

The preponderance of the involvement of the right eye can probably be explained by the fact that there are usually more right-handed than left-handed people in most populations. A missile thrown with the right hand is more likely to hit the opposite eye of the victim.

Patients with total hyphaema formed the largest group in this study, in agreement with that of Rakusin and Kuming from South Africa.⁸ In most other reports such patients form only a small percentage of the total number.^{7 9 14} The probable reason for this difference is that some of the patients in this series had had secondary haemorrhage before they were seen in the unit. If this proposition is true, then the in-hospital rate of rebleeding of 9.2% will be lower than the true one for the hyphaema population, though it is still within reported ranges.^{6 7 14 15}

It is also possible that the eyes of darkly pigmented people react more unfavourably to trauma as is thought to happen with chronic open-angle glaucoma.^{16 17} The same presumed reasons for slow pupillary dilatation with mydriatics in such people

may also partially explain the increased difficulties with hyphaema in them.¹⁸

Though the ciliary body and the canal of Schlemm are the main source of bleeding and the principal route of absorption of the blood in the anterior chamber respectively, the iris also partakes of both of these processes.^{2 4 10} Since the brown iris has more stromal pigmentation, with fewer iris pores and crypts than a blue iris, it is possible that the proportion of the blood in the anterior chamber that is resorbed through the iris stroma will disappear more slowly in a brown-eyed than a blue-eyed individual.¹⁹

Associated with the large number of patients with total hyphaema in this series is the high rate of corneal blood staining seen. The worse visual outcome with increasing level of hyphaema and with the presence of corneal blood staining is in agreement with other reports.^{8 9 14}

Surgical evacuation of blood was carried out on the average at a time when there might have been fibrinoid attachments of the blood clot to the iris, thus making the procedure more hazardous.¹¹ The use of fibrinolytic agents is worth considering in such circumstances.^{12 13}

The recent use of the techniques of vitrectomy may be helpful in these cases, though such facilities are difficult to obtain in most developing countries.²⁰

In some recent elegant studies Goldberg has shown the harmful effects of sickled erythrocytes in the anterior chamber of patients with any sickling haemoglobinopathy, including those with sickle cell trait. His advocacy of early surgical evacuation of blood from the anterior chamber in such patients is to be noted.²¹ This finding is of particular importance in an African population among whom the prevalence of sickling haemoglobinopathy is high.

I thank the consultant staff of the Department for their co-operation in the prosecution of the study and the secretarial staff for painstakingly typing the manuscript. Professor I. S. Bhar was the head of Department during this study.

References

- 1 Thygeson P, Beard C. Observations on traumatic hyphema *Am J Ophthalmol* 1952; **35**: 977-85.
- 2 Cahn PH, Havener EH. Factors of importance in traumatic hyphema with particular reference to and study of routes of absorption. *Am J Ophthalmol* 1963; **35**: 591-7.
- 3 Spaeth GL, Levy PM. Traumatic hyphema: its clinical characteristics and failure of estrogens to alter its course. *Am J Ophthalmol* 1966; **62**: 1098-106.
- 4 Shabo AL, Maxwell DS. Observations on the fate of blood in the anterior chamber. A light and electron microscopic study of the monkey trabecular meshwork. *Am J Ophthalmol* 1972; **73**: 25-36.
- 5 Mason GL, Ferry AP. Bilateral spontaneous hyphema arising from iridic microhemangiomas. *Ann Ophthalmol* 1979; **11**: 87-91.
- 6 Ohrstrom A. Treatment of traumatic hyphema with corticosteroids and mydriatics. *Acta Ophthalmol (Kbh)* 1972; **50**: 549-54.
- 7 Darr JL, Passmore JW. Management of traumatic hyphema: a review of 109 cases. *Am J Ophthalmol* 1967; **63**: 134-6.
- 8 Rakusin W, Kuming BS. The management of traumatic hyphema *S Afr Med J* 1969; **43**: 638-40.
- 9 Oksala A. Treatment of traumatic hyphema. *Br J Ophthalmol* 1967; **51**: 315-20.
- 10 Duke-Elder S, MacFaul PA. *System of Ophthalmology*. London: Kimpton, 1972; **14** (1): 93-101.
- 11 Sears ML. Surgical Management of black-ball hyphema *Trans Am Acad Ophthalmol Otolaryngol* 1970; **74**: 820-7.
- 12 Rakusin W. Urokinase in the management of traumatic hyphema. *Br J Ophthalmol* 1971; **55**: 826-32.
- 13 Scheie HG, Ashley BJ, Burns DT. Treatment of total hyphema with fibrinolysin. *Arch Ophthalmol* 1963; **69**: 147-53.
- 14 Edwards WC, Layden WE. Traumatic hyphema: a report of 184 consecutive cases. *Am J Ophthalmol* 1973; **75**: 110-16.
- 15 Brodrick JD, Hall RD. Secondary glaucoma following hyphema. *Trans Ophthalmol Soc UK* 1971; **91**: 757-63.
- 16 Olurin O. Primary glaucoma in Nigeria. *E Afr Med J* 1972; **49**: 725-34.
- 17 Wilensky JT, Gandhi N, Pan T. Racial influences in open-angle glaucoma. *Ann Ophthalmol* 1978; **10**: 1398-402.
- 18 Emiru VP. Response to mydriatics in the African. *Br J Ophthalmol* 1971; **55**: 538-43.
- 19 Fine BS, Yanoff M. *Ocular Histology, A Text and Atlas*. 2nd ed. New York: Harper and Row, 1979: 197-203.
- 20 McCuen BW, Fung WE. The role of vitrectomy instrumentation in the treatment of severe traumatic hyphema. *Am J Ophthalmol* 1979; **88**: 930-4.
- 21 Goldberg MF. The diagnosis and treatment of secondary glaucoma after hyphema in sickle cell patients. *Am J Ophthalmol* 1979; **87**: 43-9.