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Traumatic Hyphema among Children in South-East Nigeria: Incidence, Complications and Visual Implications

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ABSTRACT

Background/Aim: Children and young adults are frequently affected by traumatic eye injuries resulting in hyphema. The aim of this study was to determine the incidence, complications and visual implication of traumatic hyphema among children in South-East Nigeria.
Materials and Methods: A ten years retrospective study conducted in two mission hospitals located in two urban cities in Anambra state, Nigeria. Needed information which included socio-demographics and clinical findings among others, was extracted from the case files of children who had eye trauma within the period under review and entered into a proforma designed for the study. The information was analyzed using statistical package for social science, version 20(SPSS-20). Associations/correlations were tested using Pearson correlation and $p \leq 0.05$ was accepted as statistically significant.
Results: Thirty nine out of 211 children with eye trauma had hyphema. This gave a ten-year cumulative incidence of 18.5%. Traumatic hyphema was commoner in males than in females; male:female = 1.8:1. The age range of the children with traumatic hyphema was 4-17 years (mean=1 0.1 ± 3.7 years). Playing was the commonest activity at time of injury and stick, cane and stone were the commonest objects of injury. Early presentation was associated with lesser complications and better visual prognosis. Higher grades of hyphema were associated with higher rates of complications. There was no significant association between sickle cell trait/disease and hyphema grade or complications
Conclusion: There is high incidence of hyphema among children with ocular trauma. Early presentation to hospital and appropriate prompt treatment is important in preventing possible sight-threatening complications.

Key Words: Traumatic, Hyphema, Children, Nigeria, Incidence, Complications.

INTRODUCTION

Hyphema is the accumulation of blood in the anterior chamber of the eye.[1] Hyphema causes could be traumatic or non-traumatic. Eye trauma is however, the commonest cause of hyphema.[1] Traumatic hyphema could result from blunt or penetrating ocular trauma.[2, 3] Children and young adult are frequently affected by traumatic eye injuries resulting in hyphema. Uhumwangho et al[2] in Benin City, Nigeria reported that 44.4% of traumatic hyphema cases occurred in individuals aged below 20 years, with 20% being in those aged 10 years and below. Similarly, Onyekwe[4] in Onitsha, Nigeria and Amoni[5] in Kaduna, Nigeria noted that 55.5% and 75% respectively, of the Hyphema cases were in individuals aged

20 years and below. A study Kurdistan also reported that 35% of traumatic hyphema occurred in children aged 6-10 years.[6]

There are varying reports on the incidence of traumatic hyphema. Onyekwe[7] reported an incidence of 13.4% among children aged zero to 16 years in Onitsha, Nigeria. In children who had eye injury following corporal punishment in Ile-Ife, Nigeria, the incidence of traumatic hyphema was found to be as much as 25.9% in children aged zero to15 years.[8] Ashaye[9] in Ibadan reported a 10-year incidence of 34.5%, although this study included adult and children.

Traumatic hyphema, could result in some complications which could adversely impact on the visual outcome.[4,5,9] This negative impact on vision is worse with delayed presentation which is commoner in developing countries.[4,5,10,11] The consequences of traumatic visual loss is usually grave especially when the eye of a child is involved.[12] This study was aimed at determining the incidence, complications and visual implication of traumatic hyphema among children in South-east Nigeria, with a view to making adequate provisions for prompt and proper management of this potentially blinding condition, as well as instituting proper counselling to reduce its occurrence.

MATERIALS AND METHODS

This was a ten years retrospective study conducted in two mission hospitals located in two urban cities in Anambra state, Nigeria. Case files of all children who presented with eye trauma from January 2012 to December 2021were retrieved from the medical records. Those who had hyphema due to the injury were isolated for the study. Patients with ruptured globe were excluded from the study as it was difficult to grade the hyphema in most of these patients. Needed information was extracted from the case files and entered into a proforma designed for the study. This information included socio-demographics, activity at time of injury, object of injury, duration from injury to presentation in hospital, grade of hyphema, presenting visual acuity, visual acuity at three months post injury, complications, associated eye injury, and the patient's genotype. Hyphema was graded using the American Academy of Ophthalmology grading system (grade 0 – 4)[13] as outlined below.

Grade 0: Microhyphema (circulating red blood cells in the anterior chamber)
Grade I: <1/3 anterior chamber volume
Grade II: 1/3 – 1/2 anterior chamber volume
Grade III: > 1/2 anterior chamber volume
Grade IV: Full chamber hyphema (Eight ball hyphema).

The information was analyzed using statistical package for social science, version 20(SPSS-20). Associations/ correlations were tested using Pearson correlation. All reported p-values are two-tailed and $p \leq 0.05$ was accepted as statistically significant.

The tenets of Helsinki declaration for studies in human subjects were adhered to throughout the study.

RESULTS

Two hundred and eleven children, comprising 126 males and 85 females, presented with ocular trauma during the ten year period. Out of this 211children, thirty nine (18.5%) had traumatic hyphema. The cumulative incidence of traumatic hyphema among these children was therefore 18.5% (95% CI = 13.2%-23.8%). Twenty five (64.1%) of these 39 children with traumatic hyphema were males while 14/39 (35.9%) were females (m:f =1.8:1). The incidence of traumatic hyphema in males as a group was 19.8% (95% CI =12.8%-26.8%) while the incidence in females as a group was 16.5% (95% CI = 8.5% - 24.5%). The age range of the children with traumatic hyphema was 4-17 years (mean=1 0.1 ± 3.7 years). Table 1 shows the age category of the patients. Twenty three out of 39 (59%) of the children were aged 10 years and below.

Six out of the 39 children (15.4%) had sickle cell trait (AS genotype); one (2.6%) has sickle cell anaemia (SS genotype) while

29 (74.4%) had no sickle cell trait(AA genotype).Three children (7.7%) had no record of genotype in their case files.

Table 1: Age Category of Patients

Age Category in Years	Frequency	Percentage
0 – 5	3	7.7
6 – 10	20	51.3
11-15	11	28.2
> 15 years	5	12.8
Total	39	100

Playing and corporal punishment/flogging were the commonest activity at time of eye injury (table 2).

Table 2: Activity at Time of Injury

Activity	Frequency	Percent
Playing	19	48.7
Flogging/Corporal punishment	7	17.9
Domestic Accident/falls	5	12.8
Farming	3	7.7
Fighting	2	5.1
Total	39	100.0

The commonest objects causing traumatic hyphema were stick, cane, and stone missiles which caused 38.4% of all the injuries (table 3). Most of the stick injuries occurred while playing while one-third occurred in teenagers during farm work.

Table 3: Object of Injury

Object	Frequency	Percentage
Stick	6	15.4
Stone missile	5	12.8
Cane	4	10.2
Door handle	3	7.7
Belt	3	7.7
Fist blow	2	5.1
Football	2	5.1
Metal spoon	2	5.1
Slap	2	5.1
Rubber rope	2	5.1
Mango fruit	1	2.6
Pencil	1	2.6
Wooden ruler	1	2.6
Blunt edge of deep freezer	1	2.6
Torch	1	2.6
Table edge	1	2.6
Elbow	1	2.6
Bunch of key	1	2.6
Total	39	100

Most of the cases of traumatic hyphema (76.9%) presented to the hospital within three days of injury with about a quarter presenting within 24 hours of injury (table 4). About five percent presented after one week of injury. There was a weak positive correlation between patient's age and duration before hospital presentation with younger patients presenting earlier than the older ones, though this was not statistically significant (Pearson correlation = 0.236; p = 0.148).

Table 4: Duration from Time of Injury to Hospital Presentation

Duration in days	Frequency	Percent
1	10	25.6
2	11	28.2
3	9	23.1
4	3	7.7
5	3	7.7
6	1	2.6
7	1	2.6
8	1	2.6
Total	39	100.0

Only six out of the 39 (15.4%) patients had visual acuity better or equal to 6/12 on presentation. Majority (64.1%) had visual acuity between 6/18 and 6/60. However at three months after injury and treatment, 25/35 (71.4%) had visual acuity improved to 6/12 or better (table 5). Four children were not followed up for up to three months, hence there was no visual acuity record at three months. There was a weak positive correlation between duration before presentation at hospital and visual acuity at three months, with later hospital presentation being associated with worse visual acuity. This association was however not statistically significant (Pearson correlation = 0.276; p = 0.114).

Table 5: Vision Category at Presentation and 3 Months after Injury

Vision Category	Frequency (%)	
	At Presentation	3 months after treatment
Equal/Better than 6/12	6 (15.4%)	25(71.4%)
6/18-6/60	25 (64.1%)	7 (20%)
Worse than 6/60- 3/60	1(2.6%)	0 (0%)
Worse than 3/60	5 (12.8%)	3 (8.6%)
Uncooperative	2 (5.1%)	0 (0%)
Total	39 (100%)	35 (100%)

About half (51.3%) of the traumatic hyphema cases were grade 0 (5/39; 12.8%) and grade 1 (15/39; 38.5%). Grade 2 constituted 8/39 (20.5%) while grade 3 constituted 7/39 (17.9%). Grade 4 (Eight ball) hyphema constituted only 10.3 % of the cases.

One-third of the children had some form of complications from the hyphema. The commonest complication was corneal blood staining which was present in 6/39 (15.1%) of the cases. Others were rebleeding (7.7), secondary glaucoma (7.7%), posterior synechiae (2.1%), and peripheral anterior synechiae(2.1%).

There was a statistically significant positive correlation between the grade of hyphema and the occurrence of complications, with higher grades having more complications (Pearson correlation = 0.563; p = 0.000) as depicted table 6. There was also a strong positive correlation between duration before presentation and occurrence of complication (Pearson correlation = 0.585; p = 0.000). Children who presented earlier had lesser frequency of complications than those who presented later.

Table 6: Grade of Hyphema* Frequency of Complications Cross-tabulation

		Complications		Total
		No	Yes	
Grade of Hyphema	0	5	0	5
	1	13	2	15
	2	5	3	8
	3	2	5	7
	4	1	3	4
Total		26	13	39

There was no statistically significant correlation between sickle cell trait/disease and the grade of hyphema (Pearson correlation = -0.247; p = 0.146). There was also no statistically significant correlation between sickle cell trait/disease and the occurrence of complications (Pearson correlation = 0.013; p = 0.938).

Nineteen out of the 39 children (48.7%) had some associated ocular injuries. Lid injuries (lid edema, abrasion, laceration and ptosis) and traumatic cataract were the commonest ocular injuries being present in 17.9% and 15.4% of the children respectively. Others were corneal abrasion/ulcer (7.7%), vitreous haemorrhage (5.1%) and retinal detachment (2.6%).

DISCUSSION

This study found that the ten-year cumulative incidence of traumatic hyphema was 18.5%. This is quite significant. It is higher than the 13.4% earlier reported by Onyekwe[7] among children in Onitsha, Nigeria. Onyekwe report was however a one year-incidence while the present study was a ten-year cumulative incidence. A higher incidence of 25.9% was found by Oluwakemi et al[8] in Ile- Ife, Nigeria. This was however only in children who underwent corporal punishment. Corporal punishment has been documented to be a significant predisposition to traumatic hyphema.[2,4,9] Ashaye[9] in Ibadan, Nigeria reported an even higher incidence of 34.5% in a 10-year retrospective study. Ashaye's incidence is close to twice the present incidence of 18.5%. The Ibadan study,[9] however included adult and children and the sample size (472) was close to twice the sample size in the present study (211). The incidence of traumatic hyphema in this present study is about twice the incidence of 9% reported by United States eye injury registry database.[14] Although the United States report was for all ages, majority of the traumatic hyphema patients were aged between 10 to 19 years. Socio-geographical differences and possibly differences in level of awareness of eye injury preventive measures could account for the wide variation in the incidence report in the United States of America and that of the present study.

Traumatic hyphema was more prevalent in males than in females with a male:female of 1.8:1. The incidence was also more in males (19.8%) than in females (16.5%). It is likely that male children engage more in activities likely to cause eye trauma than female children. It is also possible that the force of impact from the object of injury was higher in males than in females. This finding is in

agreement with findings of previous studies which found that both eye trauma and traumatic hyphema were commoner in male than in females.[2,5,7,9,14]

More than half (51.3%) of the traumatic hyphema cases were in children aged six to ten years. Only 7.7% of the injuries occurred in children aged five years and below. This collaborates previous finding that school age children are more susceptible to ocular trauma than younger children.[12,15]

Two-third of the eye injuries occurred while playing (48.7%) or undergoing corporal punishment (17.9%). This is expected as the age groups most commonly affected are known to be more involved in active playing and are more likely to be victims of corporal punishment. This also agrees with previous studies which identified play and corporal punishment as common activities at time of eye injury causing traumatic hyphema.[2,5,9] Stick and missile of stone, and cane were the commonest objects of injury. These are the common objects of outdoor play and corporal punishment respectively in this part of the world. This finding is similar to that of Uhumwangho et al,[2] Onyekwe[4] and Amoni[5]who also reported missiles of stone and stick, and cane(whip) as some of the commonest objects causing traumatic hyphema in children.

There was a weak positive correlation between patient's age and duration from time of injury to hospital presentation, with younger patients presented earlier than the older ones. It is possible that parents and child care givers are more worried about injury to younger children than to older children.

Although 84.6% of the children had visual acuity worse than 6/12 on presentation, 71.4% of these children recovered visual acuity to 6/12 or better after three months of injury and treatment. This suggests that visual prognosis could be good for traumatic hyphema in children if appropriate treatment is instituted early, especially if there are no significant associated ocular injuries. About 70% of the patients in this study presented within 72 hours. This observation is similar to the finding of Balatay et al[6] in Kurdistan, where they observed that only 22.5% of traumatic hyphema patients had visual acuity of 6/12 or better on presentation, but up to 67.5% had visual acuity better or equal to 6/12 after treatment.

About half of the cases of traumatic hyphema did not involve the central visual axis (grades 0 and 1). Higher grades were associated with higher frequency of complications. The most common complications were corneal blood staining (15.1%), re-bleed (7.7%), and secondary glaucoma (7.7%). These values are lower than the 21%, 9.2% and 19.7% reported respectively for corneal blood staining, re-bleed and secondary glaucoma by Amoni[5] in Kaduna. About 60% of Amoni's subjects however had hyphema of grade 2 and higher and this may account for the higher proportions of complications compared to the present study. This is likely since the present study also found a statistically significant positive correlation between level of hyphema and the occurrence of complications. Amoni's subjects also involved adults and children while the present study was only in children. This could also contribute to the observed differences in the frequency of complications. Onyekwe[4] in Onitsha also reported corneal blood staining, re-bleed and secondary glaucoma as the commonest complications of traumatic hyphema. He had similar percentage of corneal blood staining (16%) to the present study. He however observed a much higher proportion for secondary glaucoma (21/74; 28.3%) and a lower proportion for re-bleed (4/74; 5.4%) compared to the present study. His subjects however included adults and children unlike the present study that involved only children.

CONCLUSION

There is high incidence of hyphema among children with ocular trauma. Early

presentation to hospital and appropriate prompt treatment help to prevent possible sight-threatening complications that could arise. Proper provisions should be made in our eye care facilities for adequate management of traumatic hyphema and the associated eye injuries. Parents and child carers should be counselled on the need to seek care early in specialist eye clinics whenever their children had eye trauma. This will aid early diagnosis and treatment to forestall sight threatening complications. There is also need to educate health centre managers and general practice doctors on the need for early referral of traumatic eye injuries.

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