

Visual Outcome of Childhood Ocular Injuries in a Tertiary Hospital in Benin City

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Abstract: The aim of this study is to determine the causes and visual outcome of ocular injuries among children aged 15 years and below in a tertiary hospital in Nigeria. A 3-year retrospective study was carried out in the eye department of University of Benin Teaching Hospital, Benin City, Nigeria from January 2009 to December 2011. The information retrieved included age, gender, cause of injury, type of injury, eye involved, interval between injury and presentation at the hospital, presenting visual acuity and visual outcome after treatment. The Statistical Package for Social Sciences (SPSS 16) was used to analyze the data obtained; $p < 0.05$ was taken as significant. A total of fifty-four children made up of 35 males (64.8%) and 19 females (35.2%) in a ratio 1.84: 1 were managed for eye injuries. Sharp objects were responsible for 53.7%, followed by blunt objects 31.5%. Twenty-two patients (40.7%) presented with closed-globe injury of which 20 patients (37%) had contusion injury while of the thirty-two patients (59.3%) that presented with open-globe injury, 26 patients (48.1%) had penetrating injury. There was vision in 98.1% of the children prior to occurrence of injury; the left eye was more affected 57.4%. Seventy four percent presented within one week of eye injury, with 37% presenting within a day. There was poor visual outcome in 90.7% after 6 months of treatment. Poor visual outcome could result from ocular trauma in children.

Keywords: Children, ocular injuries, okeigbemen, severity of injury, type of injury, visual outcome

INTRODUCTION

Ocular trauma is a leading cause of visual loss and blindness (Tielsch *et al.*, 1989) and though it affects all age groups, it remains a very important cause of monocular blindness amongst children (Alfaro *et al.*, 1994). Children account for between 20 and 50% of all ocular injuries (Blomdahl and Staffan, 1984; Moreira *et al.*, 1988; Punnonen, 1989). In general, children are more susceptible to eye injuries because of their immature motor skills, limited common sense and tendency to imitate adult behavior without evaluating risks, lessened emotional control, relative ignorance and natural curiosity (Serrano *et al.*, 2003). They are also at risk because of their relative inability to detect and avoid hazards (Umeh and Umeh, 1997).

Visual outcome has been found to be dependent on the type of injury, its severity and the initial visual acuity at the time of presentation at the hospital following the injury (Serrano *et al.*, 2003). In an epidemiological study carried out in Northeastern Colombia, severe visual impairment and blindness were caused mainly by open-globe injuries (Serrano *et al.*, 2003).

The aim of this study is to determine the causes and visual outcome of ocular injuries among children as seen in the University of Benin Teaching Hospital, Benin City, Nigeria, a tertiary health facility that serves

Edo and other surrounding states. This would help in creating awareness of measures parents and caregivers need to take in order to avoid ocular trauma and its sequelae which results in poor visual outcome in children.

MATERIALS AND METHODS

A three year retrospective analysis was carried out in the eye department of University of Benin Teaching Hospital, Benin City. The case notes of all children 15 years and below managed for ocular injury from January 2009 to December 2011 was documented. History taken included age, gender, type of injury, cause of injury, eye involved, interval between injury and presentation at the hospital, presenting visual acuity and visual outcome after treatment

On the basis of the Birmingham Eye Trauma Terminology system, open-globe injury types were classified as rupture, penetrating, intraocular foreign body, perforating and mixed; closed-globe injury types, as contusion, lamellar laceration, superficial foreign body and mixed (Kuhn *et al.*, 1996).

Visual acuity was measured whenever possible according to the patient's age and collaboration during the examination. Data collated was analyzed using Statistical Package for Social Sciences (SPSS) 16. Frequency distribution tables were generated for all

data collected. The ranges and means were determined. The relationships between categorical data were analyzed using chi-square (χ^2) test and Fisher's exact test where appropriate. At the adopted confidence level of 95%, a p-value of 0.05 (5%) or less was regarded as significant.

RESULTS

A total of 54 children were managed for eye injuries in the Ophthalmology Unit of the University of Benin Teaching Hospital (UBTH), between January 2009 and December 2011. There were 35 (64.8%) males and 19 (35.2%) females giving a male: female ratio of 1.84: 1.

The age and sex distribution is seen in Table 1. The age range was 7 months to 15 years with a mean age of 7.3 ± 3.89 years (S.D.). The peak age for occurrence of ocular injury in this study was 4-7 years accounting for 22 patients (40.7%). The peak age among the males was 4-7 years while among the females was 8-11 years. This relationship was statistically significant with p value = 0.03. Majority of the patients were in primary school 24 (44.4%) followed by secondary school 10 (18.5%), kindergarten 8 (14.8%) and pre-kindergarten 3 (5.6%).

Injuries from sharp and blunt objects were common to all age groups, with the age group 0-3 years having the highest proportion of injuries caused by sharp objects (62.5%) and the age group 8-11 years having the highest proportion of injuries caused by blunt objects (43.8%). Chemical burns from caustic soda were found only in the age group 0-3 years (12.5%) while burns from other sources such as thermal injury were found in the age group 8-11 years (6.2%) and 12-15 years (12.5%). These relationships were not statistically significant ($p = 0.531$) as seen in Table 2.

The left eye was more affected in most injuries accounting for 31 patients (57.4%) compared to the right eye in 23 (42.6%). Twenty-two patients (40.7%) presented with closed-globe injury of which 20 patients (37%) had contusion injury while of the thirty-two patients (59.3%) that presented with open-globe injury, 26 patients (48.1%) had penetrating injury. One patient had globe rupture (data not shown).

Vision was present in 53 patients (98.1%) prior to injury. As seen in Table 3, 20 patients (37%) presented within 24 h of occurrence of injury. Of these 20 patients

Table 1: Age and sex distribution

Age group (years)	Number of patients		Total (%)
	Male	Female	
0-3	2	6	8 (14.8)
4-7	17	5	22 (40.7)
8-11	9	7	16 (29.6)
12-15	7	1	8 (14.8)
Total	35	19	54 (100)

χ^2 (Fischer's exact) = 8.705; df = 3; p = 0.03

who presented within 24 h, there was no statistically significant relationship between presentation within 24 h and good visual acuity on presentation (p-value 0.1328 odds ratio 9.324; 95% confidence interval 0.4246-204.76). There was also no statistically significant relationship between presentation at the hospital within 24 h and visual outcome at 6 months after treatment (p-value 1.0000 odds ratio 1.148; 95% confidence interval 0.1749-7.536).

Table 4 shows visual acuity on presentation and after treatment. On presentation, two (3.7%) had good visual acuity, 4 (7.4%) had visual impairment, 10 (18.5%) had severe visual impairment while 38 (70.4%) were blind (WHO definition). After six months only 5 patients (9.3%) had good visual outcome.

DISCUSSION

In this study as in previous studies, more males (64.8%) were affected than females (35.2%) in a ratio of 1.84:1 (Onwasigwe *et al.*, 1994; Onyekonwu and Chuka-Okosa, 2008). This is not surprising, as males are usually more active and engage in outdoor activities and more aggressive play. The age most affected was 4-7 years (40.7%) and they were at the primary level of education. This was also found in other studies (Onwasigwe *et al.*, 1994; Otoibhi and Osahon, 2003).

The commonest cause of ocular injury in this study across all the age groups was due to sharp objects (53.7%). This is similar to findings by Otoibhi and Osahon (2003), although in a study carried out at the University of Nigeria. Teaching Hospital, Enugu; blunt objects were the commonest cause (Onwasigwe *et al.*, 1994). This shows the need to educate the children to avoid playing with sharp objects such as broomsticks, pencils, pens, knives, nails, hooks and dangerous toys as much as possible.

The left eye was more involved (57.4%). This is almost the same as that found in a study on open-globe injuries at Enugu (Okoye *et al.*, 2007). This may be

Table 2: Cause of injury related to age

Cause of injury	Age group				Total
	0-3	4-7	8-11	12-15	
Sharp objects	5 (62.5)	13 (59.1)	7 (43.8)	4 (50.0)	29 (53.7)
Blunt objects	2 (25.0)	5 (22.7)	7 (43.8)	3 (37.5)	17 (31.5)
Burns	1 (12.5)	0 (0.0)	1 (6.2)	1 (12.5)	3 (5.6)
Others	0 (0.0)	1 (4.5)	1 (6.2)	0 (0.0)	2 (3.7)
Not known	0 (0.0)	3 (13.6)	0 (0.0)	0 (0.0)	3 (5.6)
Total	8 (100)	22 (100)	16 (100)	8 (100)	54 (100)

χ^2 (Fischer's exact) = 13.329; df = 15; p = 0.531

Table 3: Interval between injury and presentation at the hospital

	Number of patient	(%)
Within a day	20	37.0
> 24 h to 1 week	20	37.0
> 1 week to 1 month	8	14.8
> 1 month to 1 year	4	7.4
>1 year	2	3.7
Total	54	100

Table 4: Visual acuity at presentation and post treatment

Visual acuity	Affected eye		
	At presentation (%)	After treatment (%)	6 months after treatment (%)
6/5-6/18	2 (3.7)	3 (5.6)	5 (9.3)
<6/18-6/60	4 (7.4)	3 (5.6)	3 (5.6)
<6/60-3/60	10 (18.5)	9 (16.6)	6 (11.1)
<3/60-LP	32 (59.3)	33 (61.1)	33 (61.1)
NPL	6 (11.1)	6 (11.1)	7 (12.9)
Total	54 (100)	54 (100)	54 (100)

CF: Count finger; LP: Light perception; NPL: Nil light perception

because the left eye is more likely to be hit when slapped with the right hand or when hit with a cane by a person who is right-handed.

Early presentation following injury cannot be overemphasized. It is one of the factors that determine good visual prognosis (Alfaro *et al.*, 1994; Edema, 1995). In this study, 37% presented within 24 h while 74% presented within one week. Otoibhi and Osahon (2003) had a similar experience in Benin. However, in this study, the relationship between presentation within 24 h and visual outcome was not statistically significant. This may be because majority of the patients presented with severe visual impairment. This may have affected the visual outcome. Other factors which determine good visual prognosis include type of injury and severity of injury (Alfaro *et al.*, 1994).

Thirty-two patients (59.3%) had open-globe injury while 22 patients (40.7%) had closed globe injury. The type of injury may have contributed to the poor visual outcome as 20 patients (37%) had contusion injury and 26 patients (48.1%) had penetrating injury. The relationship between type and severity of injury and visual outcome was not statistically significant in this study.

Thirty-eight eyes (70.4%) were found to be blind (WHO definition) on presentation, while 40 (74%) remained blind after treatment. This shows the high risk of vision loss associated with ocular trauma. This is avoidable blindness that is preventable. Rahman *et al.* (2006) reported that a good visual acuity on presentation correlated with good visual outcome. In this study, 2 patients (3.7%) had good visual acuity on presentation and still had good visual outcome after treatment.

CONCLUSION

In conclusion, this study has shown that poor visual outcome can occur following ocular trauma (open-globe and closed-globe injuries). Since sharp objects and blunt objects have been implicated as causes of ocular injury, it is needful that these objects be kept out

of the reach of children as much as possible. Parents and caregivers need to create an environment to prevent ocular trauma and the poor visual outcome which results from trauma when injury is severe.

LIMITATION OF THE STUDY

The small number of patients included in the study may have contributed to the lack of significant statistical relationships during analysis. There is a need to conduct a larger study in future.

REFERENCES

- Alfaro, D.V., N.A. Chaudry, A.F. Walonke, T. Runyan, Y. Saito *et al.*, 1994. Penetrating eye injuries in young children. *Retina*, 14: 201-5.
- Blomdahl, S. and N. Staffan, 1984. Perforating eye injury in the Stockholm population. An epidemiological study. *Acta Ophthalmol.*, 62: 378-390.
- Edema, O.T., 1995. Retrospective study of eye injuries. *Nig. J. Surg. Sci.*, 5: 63-67.
- Kuhn, F., R. Morris, C.D. Witherspoon, K. Heimann, J.B. Jeffers and G. Treister, 1996. A standardized classification of ocular trauma. *Graefes. Arch. Clin. Exp.*, 234: 399-403.
- Moreira, C.A., M. Debert-Ribeiro and R. Belfort, 1988. Epidemiological study of eye injuries in Brazilian children. *Arch. Ophthalmol.*, 106: 781-4.
- Okoye, O.I., F. Maduka-Okafor and B.I. Eze, 2007. Open globe injuries. *Nig. J. Surg. Sci.*, 17: 37-42.
- Onwasigwe, E.N., R.E. Umeh and C.N. Onwasigwe, 1994. Ocular injury in children. *Nig. J. Ophthalmol.*, 2: 9-12.
- Onyekonwu, G.C. and C.M. Chuka-Okosa, 2008. Pattern and visual outcome of eye injuries in children at Abakaliki, Nigeria. *West Afr. J. Med.*, 27(3): 152-4.
- Otoibhi, S.C. and A.I. Osahon, 2003. Perforating eye injuries in children in Benin City, Nigeria. *J. Med. Biomed. Res.*, 2: 40-45.
- Punnonen, E., 1989. Epidemiological and social aspects of perforating eye injuries. *Acta Ophthalmol.*, 67: 492-8.
- Rahman, I., A. Maino, D. Devadason and B. Leather, 2006. Open globe injuries: Factors predictive of poor outcome. *Eye*, 20: 1336-1341.
- Serrano, J.C., P. Chalela and J.D. Arias, 2003. Epidemiology of childhood ocular trauma in a Northeastern Colombian region. *Arch. Ophthalmol.*, 121: 1439-1445.
- Tielsch, J.M., L. Parvel and B. Shanker, 1989. Time trends in the incidence of hospitalized ocular trauma. *Arch. Ophthalmol.*, 107: 519-523.
- Umeh, R.E. and O.C. Umeh, 1997. Causes and visual outcome of childhood injuries in Nigeria. *Eye*, 11: 489-95.