

Research Article

Open Globe Injuries in a Tertiary Hospital, South Western Nigeria

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Submitted: 24 October 2017

Accepted: 27 November 2017

Published: 29 November 2017

ISSN: 2333-6447

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Keywords

- Open globe injury
- Severe visual impairment
- Ocular health education

Abstract

Introduction: Open globe injuries remain a serious public health problem, resulting in significant vision loss. The knowledge of the mechanism of injury, quick and correct ophthalmic intervention will help in minimizing visual loss and other ocular complications that could have arisen. The aim of this study is to determine the clinical characteristics of open globe injury presenting to our facility.

Methods: The data of patients who presented with open globe injury to the Eye Clinic and Accident & Emergency Room of Ekiti State University Reaching Hospital, from January 2013 to Dec 2015 were analyzed retrospectively. The medical case notes of these subjects were reviewed to extract the demographic data, mechanisms of injury, visual acuity at presentation, nature of injury and location of injury. Data obtained were analyzed with SPSS version 20.

Results: 118 eyes (116 patients) of complete medical records were seen. Age range was 6 years to 77 years with mean age 29.9 ± 19.1 years. Male to female ratio is 2.5:1. The highest frequency of open globe injury 45 (38.1%) occurred among males in the age group 16 to 30 years. Penetrating injury accounted for 78 (66%) and was the commonest mechanism of injury resulting in open globe injury. Majority of the patients presented with severe visual impairment 75 (63.6%). At presentation, only 8 (6.6%) were found to have no light perception visual acuity. The location of the occurrence of open globe injury in our study were: Outdoor (25.4%), School (23.7%), Place of occupation (15.3%), Road traffic accident (13.6%), Home (11.9%), farm (5.9%) and Playing field/sport (4.2%). Open globe injury (OGI) occurred commonly from Assault with objects 30 (25.4%), blunt injury with fist 21 (17.8%), broken bottle/glasses 17 (14.4%), bottle cork 13 (11%).

Conclusion: OGI occurrence cuts across all age group. Its initial presentation with severe visual impairment and blindness may be curbed by aggressive ocular health education by eye care givers.

INTRODUCTION

A traumatic breakdown in the integrity of the wall of the eye (sclera or cornea) is known as an open globe injury [1]. Globe rupture occurs when the integrity of the outer membranes of the eye is disrupted by blunt or penetrating trauma. Any full-thickness injury to the cornea, sclera, or both is considered an open globe injury and is approached in the same manner in the acute setting [2]. Globe rupture is an ophthalmologic emergency and requires definitive management by an ophthalmologist. Open globe injuries remain a serious public health problem, resulting in significant vision loss [3]. Open globe injuries are mostly seen in the young, middle-aged, and male working population [3]. In Turkey, the incidence of open globe injury (OGI) in adults was found to be 3.40/100,000, with 5.00/100,000 in males and

1.67/100,000 in females. Open globe injuries were mostly seen in the age group of 17 to 29 years [4]. In a tertiary hospital in Nigeria, incidence of 4.50/100,000 was reported during a communal clash [5]. Ajayi et al., reported that ocular trauma constituted 4% of the total patients seen in a hospital in Nigeria [6]. The mechanism of open globe injury varied but its largely traced to the occupation and activities involved in during the injury. Ocular injuries affected mostly the economically active age group. Most injuries were either occupational related or related to play or assaults [7]. The most common mechanism of injury was occupational accident [3], others include vehicular road traffic accidents, sports injury, and fist injury from fighting or brawl [8,9]. Prompt recognition and ophthalmologic intervention are essential to maximizing functional outcome [1].

The presenting visual acuity after the injuries may be a pointer to the severity of the injury. Furthermore application of various substances after the injury before presenting in the hospital may affect the eventual visual outcome. In a tertiary hospital in Nigeria, Forty eight (3.4%) applied various substances into their eyes after sustaining ocular injury. Substances applied include Kerosene 25%, cassava water 20.8%, breast milk 12.5%, personal urine 10.8%, and cow urine 8.3% [7]. Moreover late presentation to the emergency room or the eye clinic may be a major cause of unilateral visual loss in all age groups [10]. Gupta et al reported that in OGI, a young age at presentation, poor initial visual acuity, absence of a red reflex, and the presence of cataract significantly influence final outcome [11]. The knowledge of the mechanism of injury, quick and correct ophthalmic intervention will help in minimizing visual loss and other ocular complications that could have arisen [12,13]. The aim of this study is to determine the clinical characteristics of open globe injury presenting to our facility. It is believe that data from this study will help in planning and improving the ophthalmic emergency services, it will also form an integral part of the ocular health education and promotion geared towards reducing ocular morbidity in the society.

METHODS

A retrospective study of all open globe injuries that presented to the Eye clinic and Accident & emergency room of Ekiti state university teaching hospital, Ado Ekiti from January 2013 to Dec 2015 were carried out. The approval of the ethical review committee of the institution was obtained for the study.

The medical case notes of these subjects were reviewed to extract the demographic data, mechanisms of injury, visual acuity at presentation, nature of injury and location of injury (home, work, playing field, school, indoor or outdoor). The visual acuity on presentation was assessed by making the subject sit 20 feet (6 meters) away from an illuminated Snellen’s chart. They all had thorough ocular examination including slit lamp biomicroscope. The initial clinical signs and all findings were recorded and analyzed using SPSS version 20.

RESULT

A total of 118 eyes (116 patients) of complete medical records were seen during the study period. This constituted 2.5% of all the outpatients seen in the clinic during the study period. Age range was 6years to 77years with mean age 29.9 ± 19.1years. Table 1 shows the demographic data where there is male preponderance. Male to female ratio is 2.5:1. The highest frequency of open globe injury 45(38.1%) occurred among males in the age group 16 to 30years. A total of 73(61.8%) of OGI occurred in age less than 30years (0 to 30years). Figure 1 showed that penetrating injury accounted for 78(66%) and was the commonest mechanism of injury resulting in open globe injury. Others include rupture injury 26(22%), perforation injury 10(9%) and Intraocular foreign body (IOFB) 4(3%).

In table 2, majority of the patients presented with severe visual impairment 75(63.6%) while No light perception was seen in 8(6.8%) at initial visual acuity. Figure 2 showed that location of occurrence of open globe injury seen in our study were:

Outdoor (25.4%), School (23.7%), Place of occupation (15.3%), Road traffic accident (13.6%), Home (11.9%), farm (5.9%) and Playing field/sport (4.2%).

Table 3 showed that in this study, open globe injury occurred commonly from Assault with objects 30(25.4%), blunt injury with fist 21(17.8%), broken bottle/glasses 17(14.4%), bottle cork 13(11%).

DISCUSSION

Open globe injuries are a major cause of monocular blindness [12]. In all, 90% or more of these open globe injuries are thought to be preventable. In our study, age range was 6years to 77years with mean age 29.9 ± 19.1years. Male to female ratio is 2.5:1. This male preponderance has been previously reported in this centre [6], and by other authors [8,10]. The male gender is involved in very risky activities which predisposes them to ocular trauma and out of which some ended up as open globe injuries. Trauma

Table 1: Age and Sex Distribution of Open Globe Injury.

Age range(years)	Male n(%)	Female n(%)	Total
0-15	20	8	28(23.7)
16-30	35	10	45(38.1)
31-45	9	5	14 (11.9)
46- 60	16	6	22 (18.6)
61-75	2	2	04 (3.4)
76 years and above	2	3	05 (4.3)
Total	84 (71.2)	34 (28.8)	118 (100)

A total of 61.8% of OGI occurred in age less than 30years (0 to 30years).

Table 2: Initial Visual Acuity in Open Globe Injury.

Visual acuity by ocular trauma system	FREQUENCY(PERCENT)
NLP	8(6.8%)
LP- HM	16(13.6%)
6/240- 6/75	75(63.6%)
6/60 - 6/15	14 (11.9%)
<6/12	5(4.1%)
TOTAL	118(100%)

The 5 classes of visual acuity done according to Ocular trauma system score [21]

Table 3: Nature of Injury.

Nature of injury	Frequency (n)	Percent (%)
Assault with objects	30	25.4
Cutlass/farm implement	4	3.4
Blunt injury with fist	21	17.8
Knife	3	2.5
Pencil/Pen	5	4.2
Beating metal/nail	7	5.9
Broomstick/rubber band	5	4.2
Gun pellet	6	5.2
Belt hook	5	4.2
Car airbag	2	1.8
Broken bottle/glasses	17	14.4
Bottle cork	13	11.0
Total	118	100

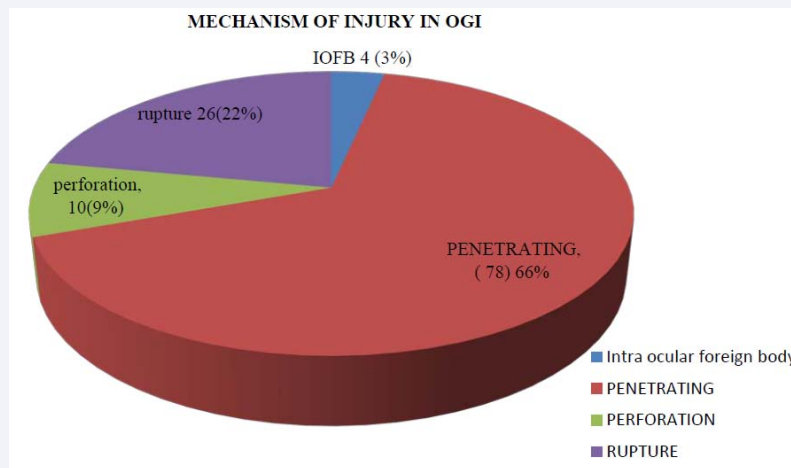


Figure 1 Mechanism of Injury.

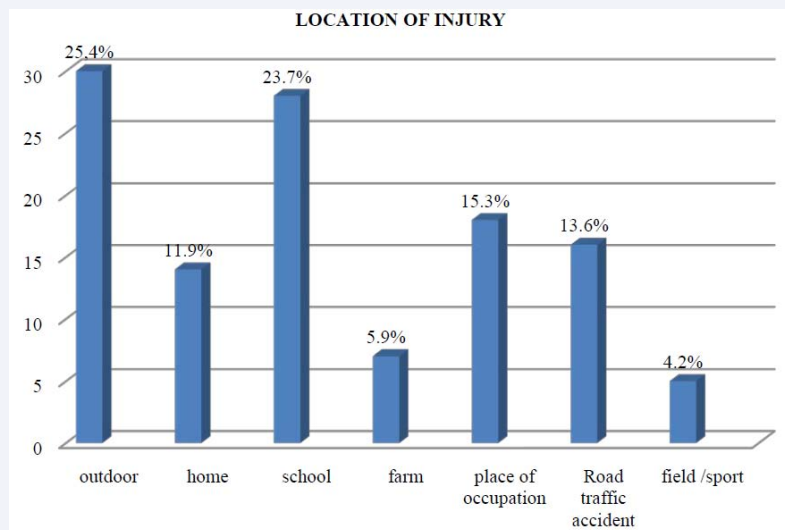


Figure 2 Location of Injury.

from violent behavior accounts for a large proportion of open globe injuries especially among the male gender [12].

Penetrating injuries, in our study, is among the most common mechanism of injury in open globe injuries. Rupture of globe, perforation, and intraocular foreign body are the mechanism that contributed to the total number of OGI seen during the study period. This is similar to a report by Rahman et al. [12], that OGI from penetrating injuries was the commonest mechanism. The classification of mechanism of OGI and appropriate terminology by Birmingham eye trauma terminology (BETT) provides an unambiguous, consistent, simple, and comprehensive system to describe any type of mechanical globe trauma [20]. Furthermore, open globe injuries are a common and often preventable cause of permanent visual impairment and visual loss [12]. Majority of the patients presented with severe visual impairment 75(63.6%), the patients claimed to have good vision prior to the injury, this is similar to report from other authors [5-7]. This presentation of severe visual impairment from OGI is a pointer to the severity

of the injury although time and day interval after the injury before presentation in the hospital could not be elicited from the medical records. Furthermore, blindness was seen in 24(20.3%) at presentation although only 8(6.8%) out of this were total No light perception (NLP). According to Ocular trauma system score [21], NLP has a raw point of 60 which suggests very severe injury. This value of blindness is slightly lower than value reported by other authors [6,8], a possible explanation for this is that both open and closed globe injuries were considered in their study while open globe injuries were only considered in our study. Many factors may contribute to the presentation of blindness ranging from delayed presentation, agent of injury, and tissue of the eye involved in OGI.e.g central cornea, limbal rupture, lens dislocation, uveal prolapse/vitreous loss and retinal detachment. This reinforces the possibility of variable effects of injuries to the globe. Overall, the final Visual acuity (VA) at presentation may also be influenced by the impact site as well as timeliness and appropriateness of interventional measures.

The location of occurrence of OGI as seen in our study was high in frequency in outdoor, school and place of occupation. Some authors have reported higher frequencies in work place [14,15] & school [16]. Although work related ocular injury and open globe injuries have been found to be largely preventable especially if adequate eye protections are worn and appropriate guards are positioned over obvious hazards [17], vigorous and aggressive ocular health education need to be regularly carried out in these hazardous work places. In a retrospective study of open globe injury in Germany, It was reported that the proportion of injuries at work did not change; injuries in traffic accidents significantly decreased, however, injuries that occurred during leisure time activities increased, especially among 'do-it-yourself' people [18]. This underscores the importance of public eye health campaign needed in our society to reduce the occurrence of OGI.

It is worthy of note from our study that assault with objects constitute the highest frequency of the nature of injury seen. Various objects such as sticks, shoes, metal chain, electrical wires etc were used in the process of assault on our subjects. This is similar to reports from other authors [6,8,15]. The use of various 'bizarre' objects in assault resulting in OGI may be due to the fact that people tend to utilized available closest objects when assaulting their victims.

Others such as blunt injury from fist, broken bottles, shattered glass splinter, bottle corks were among the nature of injury resulting in OGI seen in this study. Pencil/pen, broomsticks (in form of a dart) and projectile rubber band were seen among pediatric age group in our study as etiology and nature of injury in OGI. These occurred mostly in schools and outdoor activities. In a report by Gupta et al. [11], majority of pediatric ocular trauma cases are due to sporting and recreational activities [11]. Average age of the OGI in this pediatric age group was 6yrs comparable to that reported by Jandek et al. [19]. Twenty three percent of our study population is in the pediatric age group, this may emphasizes the need to put safety measures in place in our schools and adults should endeavor to supervise children while playing outdoors in order to minimize occurrence of OGI.

CONCLUSION

OGI occurrence cuts across all age group, although with male preponderance and occurring more outdoors and schools. Its initial presentation with severe visual impairment and blindness may be curbed by aggressive ocular health education by eye care givers.

REFERENCES

- Kuhn F, Morris R, Witherspoon CD. A standardized classification of ocular trauma. *Ophthalmology*. 1996; 103: 240-243.
- Schrader WF. Open globe injuries in South-West Baden-Württembergs: the profile of injuries and starting point for injury prevention [in German]. *Klin Monatsbl Augenheilkd*. 1996; 209: 393.
- Batur M, Seven E, Esmer O, Akaltun MN, Yasar T, Cinal A. Epidemiology of Adult Open Globe Injury. *J Craniofac Surg*. 2016; 27: 1636-1641.
- Kim JE, MarbellaA M, Knippers JD. Incidence of Open Globe Injuries in Wisconsin for 2002. *Investigative Ophthalmology & Visual Science*. 2006; 47: 3959.
- Adeoye AO, Olateju SO, Soetan EO. Communal conflict-related ocular trauma. *Nigerian Journal of Clinical Practice*. 2002; 5: 1-4.
- Ajayi IA, Ajite KO, Omotoye OJ. Epidemiological survey of traumatic eye injury in a Southwestern Nigeria. *Pak J Ophthalmol*. 2014; 30: 137-141.
- Kayode Ajite, Olufunmilayo Fadamiro. Prevalence of Harmful/traditional medication use in traumatic eye injury. *Global Journal of Health Science*. 2013; 4: 55-59.
- Omolase CO, Omolade EO, Ogunleye OT, Omolase BO, Ihemedu CO, Adeosun OA. Pattern of ocular injuries in Owo, Nigeria. *J Ophthalmic Vis Res*. 2011; 6: 114-118.
- Pieramici DJ, MacCumber MW, Humayun MU, Marsh MJ, de Juan E. Open globe injury: update on types of injuries and visual results. *Ophthalmology*. 1996; 103: 1798-1803.
- Yalcin Tök, Tok L, Eraslan E, Ozkaya D, Ornek F, Bardak Y. Prognostic Factors Influencing Final Visual Acuity in Open Globe Injuries. *Journal of Trauma-Injury Infection & Critical Care*. 2011; 7: 1794-1800.
- A Gupta, I Rahman, B Leather barrow. Open globe injuries in children: factors predictive of a poor final visual acuity. *Eye*. 2009; 23: 621-625.
- Rahman I, Maino A, Devadason D, B Leather barrow. Open globe injuries: factors predictive of poor outcome. *Eye*. 2006; 20: 1336-1341.
- Knyazer B, Bilenko N, Levy J, Lifshitz T, Belfair N, Klemperer, et al. Open globe eye injury characteristics and prognostic factors in southern Israel: a retrospective epidemiologic review of 10 years experience. *Isr Med Assoc J*. 2013; 15: 158-162.
- Lipscomb HJ, Dement JM, MCDougal. Work related eye injuries among union carpenters. *Appl Occup Environ Hyg*. 1999; 14: 665-676.
- Bankole OO. Ocular injuries in a semi urban Region. *Nig J Ophthalmol*. 2003; 11: 86-89.
- Bukhari S, Mahar PS, Qidwai U. Ocular trauma in Children. *Pak J Ophthalmol*. 2011; 27: 208-213.
- Lipinscomb HJ. Effectiveness of intervention to prevent work related eye injuries. *Am J Prev Med*. 2000; 18: 27-32.
- Wolfgang F. Schrader. Open Globe Injuries: Epidemiological Study of Two Eye Clinics in Germany. *Croatian Medical Journal*. 2004; 45: 268-274.
- Jandek C, Kellner U, Bornfeld N, Foerster MH. Open globe injuries in children. *Graefe's Arch Clin Exp Ophthalmol*. 2000; 238: 420-426.
- Kuhn F, Morris R, Witherspoon CD, Mester V. The Birmingham Eye Trauma Terminology system (BETT). *J Fr Ophtalmol*. 2004; 27: 206-210.
- Ferenc K, Maisiak R, Mann L, Mester V, Morris R, Witherspoon CD. The ocular trauma score (OTS). *Ophthalmol Clin N Am*. 2002; 15: 163-165.

Cite this article

Ajite KO, Fadamiro CO, Ajayi IA, Omotoye OJ, Abah EC, et al. (2017) Open Globe Injuries in a Tertiary Hospital, South Western Nigeria. *JSM Ophthalmol* 5(3): 1062.