

Penetrating Eye Injuries From 2008 to 2017 In the North of Jordan: Any Change In pattern?

Mohammad Droos MD,Samer Alawneh MD*,Hala Hadad MD*,Marwan Otoum MD*,Ahmad Alhosban MD**

ABSTRACT

Aim: To review penetrating eye injuries of children between 6 and 18 years of age over a 10 year period.

Method: A retrospective study was conducted at Prince Rashid Bin Al Hassan military hospital. The medical records of all patients aged between 6 and 18 years that suffered penetrating eye injuries and attended the ophthalmology clinic between January 2008 and December 2017 were reviewed. The age, gender, mechanism of trauma, severity of trauma, eye structures involved and visual outcome were analyzed. Patients that did attend a follow-up within 6 months after the trauma were excluded from the study. The collected data were analyzed using Excel software to determine whether there was any significant change in the pattern of eye injuries over the 10 year period in relation to the mentioned issues.

Results: 57 patients (57 eyes) with a mean age of (10.5±3.7 years) were included in the study. 37 of the patients were male (ratio 1.9:1). The most common place for injury was outdoors at home (63.1%). A stick was the most common implement involved in the injury (36.8%). The cornea was the most common eye structure that was affected (78.9%). 11 patients (20%) had severe visual impairment after 6 months. The incidence of penetrating eye injuries showed a significant decline from 16% in 2008 to 4% in 2017. The mean visual outcome at 6 months was significantly better in the more recent years (p value <0.05); in 2016 and 2017 the mean BCVA was 0.45 and 0.6 respectively compared to 0.17 and 0.25 in the years 2008 and 2009.

Conclusion: The incidence of penetrating eye injuries and their impact on the visual outcome showed a significant decline over a 10-year period from 2008 to 2017. There was no significant change in the male to female ratio and mean age during the same period.

Key words: incidence, penetrating eye injury, visual outcome.

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Introduction

It is estimated that 1.6 million cases of blindness and more than 19 million cases of mono-ocular blindness have occurred as a result of eye injuries. (1) In children, eye injuries are considered to be the leading cause of mono-ocular no congenital blindness. (2) It has been reported that 20 to 50% of cases occurs in children and 35% of 2.4 million cases affects patients younger than 18 years. (3,4)

*From the department of:
Ophthalmology Medicine (RMSJ).

Correspondance should be addressed to:Dr. Mohammad Droos MD;E-mail:aldroos 1975@yahoo.com.

Although 90% of eye injuries are considered preventable, children are still at a higher risk of morbidity owing to reduced ability to avoid and estimate potential hazards to the eye. In Jordan, penetrating eye injuries are frequently seen in our practice.

The aim of this retrospective study was to review penetrating eye injuries among children between 6 and 18 years of age over a 10 year period. Injuries were evaluated in terms of age, gender, mechanism of injury, time and place of injury, severity of eye injury and visual outcome after 6 months. In addition, any change in the incidence and pattern of penetrating eye injuries over the 10 year period were also investigated.

Methods

This was a retrospective study conducted at Prince Rashid Bin Al Hassan military hospital. The medical records of all patients aged between 6 and 18 years that suffered a penetrating eye injury and attended the ophthalmology clinic between January 2008 and December 2017 were reviewed. The age, gender, mechanism of trauma, severity of trauma, eye structures involved and visual outcome were analyzed. Patients that did not attend a follow-up within 6 months after the trauma were excluded from the study.

The collected data were analyzed using Excel software to explore whether there was any significant change in the pattern of eye injuries over a 10 year period in relation to the mentioned issues.

Results

Between January 2008 and December 2017, penetrating eye injuries were reported in 93 cases in all age groups. 61 of those cases (65.6%) occurred in school-age individuals (6-18 years). 57 patients (57 eyes) with a mean age of (10.5±3.7 years) were included in this study; 32 patients (56%) were between 6 and 10 years of age, 18 patients (32%) were between 11 and 14 years of age and 7 patients (12%) were between 15 and 18 years of age. 37 of the patients were male (ratio 1.9:1).

Table I: The place where the eye injury occurred.

Place of eye injury	Number of cases	Percentage of cases (%)
At school	1	1.8
At home (indoor)	9	15.7
At home (outdoor)	35	61.4
In the street away from home	11	17.5
RTA	1	1.8

Table II: The implement responsible for the eye injuries

The implement	Number of cases	Percentage of cases
Stick	21	36.8%
Metallic sharp object	19	33.3%
glass	9	15.8%
Plastic sharp object	5	8.8%
RTA	1	1.8%
Fall	1	1.8%
Pencil	1	1.8%

Table III: The eye structures involved in the penetrating eye injury.

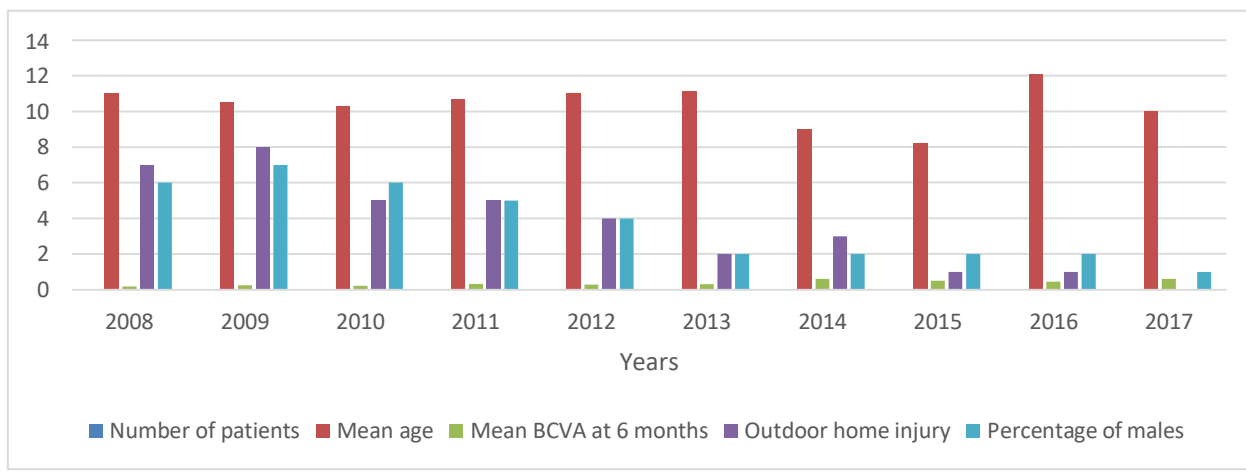
Type of associated globe structures damage	Number of cases	Percentage of cases
Corneal laceration	45	78.9%
Scleral laceration	29	50.9%
hyphema	17	29.8%
Iris damage	13	22.8%
cataract	8	14.0%
Vitreous hemorrhage	5	8.8%
Retinal detachment	3	5.3%
Intraocular foreign body	3	5.3%

Table IV: The final visual outcome at 6 months post injury.

Visual Acuity	Number of patients	Mean age (years)	Percentage of males	Time interval before attendance (h)	Outdoor home injury	Mean Number of operations	Posterior segment involvement
1.0-0.5	16(28%)	12.3	10(63%)	16.3	14(52%)	1.0	1(4%)
0.4-0.1	30(52%)	9.3	19(63%)	21.6	12(63%)	1.2	3(16%)
<0.1-PL	9(16%)	7.3	7(77%)	32.1	8(89%)	1.4	7(77%)
NPL	2(4%)	6.9	1(50%)	36.9	2(100%)	2.5	2(100%)

Table V: The frequency of penetrating eye injuries during a 10 year period between 2008 and 2017.

Year	Number of patients	Mean age	Mean BCVA at 6 months	Outdoor home injury	Percentage of males	Most common implement that caused the injury
2008	9 (16%)	11	0.17	7(78%)	6(67%)	Stick (67%)
2009	10 (17%)	10.5	0.25	8(80%)	7(70%)	Metallic (50%)
2010	9 (16%)	10.3	0.22	5(56%)	6(67%)	Stick (56%)
2011	8 (14%)	10.7	0.32	5(63%)	5(63%)	Stick (50%)
2012	6 (11%)	11	0.28	4(67%)	4(67%)	Metallic (33%)
2013	3 (5%)	11.1	0.30	2(67%)	2(67%)	Metallic (67%)
2014	4 (7%)	9.0	0.60	3(75%)	2(75%)	Stick (50%)
2015	3 (5%)	8.2	0.50	1(33%)	2(67%)	Fall (33%), metallic (33%), RTA (33%)
2016	3 (5%)	12.1	0.45	1(33%)	2(67%)	Glass (67%)
2017	2 (4%)	10.0	0.6	0(0%)	1(50%)	Plastic (50%) Pencil (50%)
Total	57(100%)	10.5	0.3	36(63%)	37(65%)	Stick (36.8%)



Discussion

Penetrating eye injuries are considered to be one of the major causes of permanent visual impairment in children. It is estimated that ocular injuries cost the Australian community \$155 million a year with 44% of this cost owing to perforating injuries. (5) Few studies have evaluated the change in the pattern of eye injuries among adults but not children; such studies have reported a significant decline in occupational trauma, accompanied with an increase in road traffic accident (RTA) injuries.(6) In our study, we investigated the pattern of eye trauma of children over a 10 years period to explore whether there was any change in the incidence, visual outcome, mechanism of injury and place of injury.

The majority of patients (65.6%) who attended the ophthalmology clinic suffering from penetrating eye injuries were between 6 and 18 years of age. The mean age of those patients was 10.5 years and 56% of the patients were between 6 and 10 years of age. These results may be explained by the fact that school-aged individuals are less capable of estimating external hazards than adults, particularly among the younger age groups (6-10 years). As reported in most other studies, penetrating eye injuries were more common in males (65%) than females. (7) That is probably because males are involved in more activities that have a variety of risks of ocular injury. However, in this study, the male to female ratio (1.9:1) was much lower than

that reported other studies, which approached a ratio of 6:1. (7) This difference was owing to the difference in the method of the study and the age profiles of the patients.

In most studies, the home is the most common place of injury . In this study, home was also the most common place for injury, but at higher rate of 78.9% compared with 47% in a previous study conducted by Caroline et al(6). In addition, in that study, school was the 2nd most common place for eye injuries at a rate of 14%, whereas in our study, school was the least common place for eye injury at a rate of 1.8%. (6) This could be explained by the fact that in students are less involved in extra ordinary activities (uncontrolled and unsafe activities) at school than those in developed countries. This suggests that parents must play a more effective role in monitoring their children’s activities at home, which will be positively reflected in minimizing the frequency and severity of eye injuries.

In our study, the most common implement that caused the injury was a stick (36.8%), which was comparable to that found in other studies conducted in developing countries (29-48%).(2,8,9) In developed countries, sport was the most common mechanism of eye injury followed by assault and toys.(6) Toys was not reported in any case in our study. The implement that causes an injury depends on the activity performed by the individuals, which significantly varies between countries worldwide.

The cornea was the eye structure that was most vulnerable to injury (78.9%) followed by the sclera (50.9%). Posterior segment involvement was reported in 9 patients (15.8%). This order was also observed in other studies conducted in either developing or developed countries, however at variable rates.(9,10)

In our study, severe visual impairment (<0.1-NPL)) was noted in 11 patients (15.8%). Risk factors that were significantly implicated in severe loss of vision included younger age group, posterior segment involvement, higher time interval between the injury and attendance of the ophthalmology clinic and outdoor home injury. Gender did not affect the visual outcome of the eye injury.

There were no local studies about this subject in Jordan, except one done 1998.which showed that the males were more susceptible to injuries as in our study, and stones and sharp objects were the most common causes in comparison to stick in our study.(14)

As shown in Figure 1, the incidence of penetrating eye injuries showed a significant decline in incidence over a 10 year period (p value <0.05).

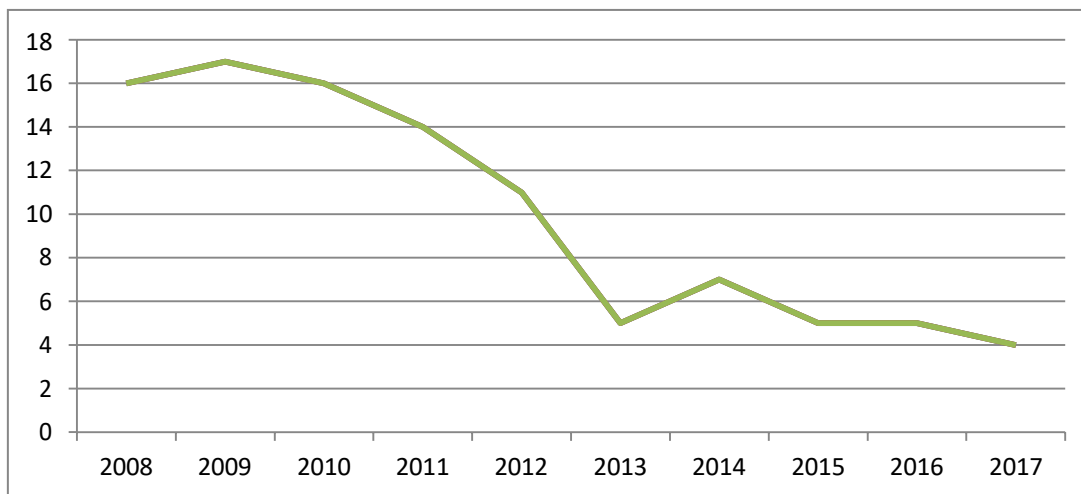


Figure 1: The percentage of patients with penetrating eye injuries between Jan. 2008 and Dec. 2017

The reason for that is probably the decline in the time spent outdoors during non-school time; in 2008 an outdoor home injury was reported in 78% of cases compared with only in 33% and 0% in 2016 and 2017, respectively. Many studies have reported that in the last few years, there has been a significant decline in the time spent playing outdoors after school by students compared with that of their parents when they were at school. (11) Many researchers have attributed this phenomenon to the replacement of the outdoor games by laptops and computer games. (12,13)

The mean visual outcome at 6 months was significantly better in the more recent years (p value <0.05); in 2016 and 2017 the mean BCVA was 0.45 and 0.6, respectively, compared with 0.17 and 0.25 in 2008 and 2009, respectively. A stick was the most common tool in the earlier years, with a higher risk of intractable fungal infections. The male to female ratio and mean age did not show any significant change over a 10 year period (p value >0.05).

A further multicenter prospective study is needed to establish the effect of computer games on eye trauma.

Conclusion

There was a significant decrease in the incidence of penetrating eye injuries and their impact on the visual outcome of children aged between 6 and 10 years over a 10year period between 2008 and 2017. There was no significant change in the male to female ratio and mean age during the same period.

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