

ORIGINAL RESEARCH ARTICLE

SPECTRUM OF CHILDHOOD OCULAR TRAUMA IN EASTERN REGION OF NEPAL

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ABSTRACT

Background: Pediatric ocular trauma is a significant cause of morbidity. It is estimated that there are up to 280,000 hospital admissions worldwide due to ocular trauma in children <16 years of age each year. This study was aimed to describe the spectrum of ocular trauma in children who previously visited the Pediatric Department of the Ram Kumar Mahabir prasad Kedia Eye Hospital.

Methods: A retrospective study was conducted on cases coming to Pediatric Department of the Ram Kumar Mahabir prasad Kedia Eye Hospital from five years. All cases of children <15 years who previously underwent evaluation and/or treatment because of ocular trauma were analyzed. Demographic and descriptive ophthalmologic data were taken out of patient records of Ram Kumar Mahabir Prasad Kedia Eye Hospital. All data were tabulated using Microsoft Excel version 7 sheets and analyzed.

Results: In this study, among 55,159 children who attended Pediatric Outpatient department of Ram Kumar Mahabir Prasad Kedia Eye Hospital 3,048 had ocular injury. There were 64.7% boys and 35.2% girls. Close globe injury was seen in 84.35% and open globe injury in 15.64%. Children aged 7-15 years were involved in 60.8% while 39.2% children were of age 6 years or less.

Conclusions: Ocular injuries seems to be serious in Terai region. Children of all age group are prone to ocular injuries. Though open globe injury is less than close globe injury in this study, open globe injury is more sight threatening.

INTRODUCTION

Trauma is often the most important cause of non-congenital unilateral loss of vision. There is a cumulative risk of ocular trauma and visual loss during life, but the true incidence of accidents involving the eyes is not known.¹ It is estimated that there are up to 280,000 hospital admissions worldwide due to ocular trauma in children <16 years of age each year.

Ocular trauma leading to visual impairment has a variety of socioeconomic problems and remain a significant cause of ocular morbidity, and its impact is devastating in children.² Pediatric ocular trauma constitutes about 20–50% of all eye injuries reported.³ An estimated 90% of ocular trauma can relatively be prevented, particularly in children.⁴ Although developing countries carry the heaviest burden of ocular injuries,^{6,7} data on the epidemiology of childhood ocular trauma in these parts of the world are scant.⁸ However, these children may be more susceptible to eye injuries compared to those from industrialized countries because of more violence, non-regulated use of fireworks, residence in remote rural areas without adequate medical services and poor supervision in neighborhood.⁶

In one of the most carefully conducted epidemiological studies of ocular trauma in Nepal,⁹ it was found that 8.6 persons per 1000 had signs and history of ocular trauma, but only 38% had suffered any visual impairment and majority (> 70%) were unilateral.⁹ Lack of awareness of the need for immediate medical attention and inadequate medical infrastructure often contributes further to the relatively high frequency of associated complications and visual disability.⁶ This study was conducted to analyze the different types of ocular injuries in children in pediatric department of Ram Kumar Mahabir Kedia Eye Hospital.

METHODS

A retrospective study was conducted on medical records of patients with ocular injury aged 15 years and younger, who presented to the emergency and outpatient department of Pediatric Ophthalmology in Ram Kumar Mahabir Kedia Eye Hospital, Birgunj from January 2014 to December 2018. Socio-demographic information of the patients like gender, age, place of residence (urban or rural), mechanism, cause, location and type of injury were recorded.

The severity of eye trauma was classified using the Birmingham

Eye Trauma Terminology System (BETTS).^{10,11} Open globe injuries (OGI), defined as full thickness injuries of the cornea and/or sclera, were categorized as rupture, penetrating (entrance wound), intra-ocular foreign body (IOFB) and perforating injuries (entrance and exit wounds). Closed globe types of injury (CGI) were categorized as contusion (caused by direct delivery of energy by the object or from changes in the shape of the globe), lamellar laceration (partial thickness wound of the eyeball) and mixed injuries.⁶ As superficial injuries are not included in BETTS classification, one more category was added to Close Globe Injuries that included corneal erosion, conjunctival laceration, superficial foreign body and chemical ocular burn. Cases diagnosed as orbital fracture and eyelid wounds were separately recorded.

The research adhered to the guidelines of the declaration of Helsinki. Ethical approval was obtained from the Ethics and Research Committee of Nepal Netra Jyoti Sangh. Data were presented in terms of mean, range, frequency, percentages, and standard deviation. All data were tabulated using Microsoft Excel version 7 sheets and analyzed.

RESULTS

Total 3048 children with ocular trauma were enrolled in this study. There were 1973 (64.7%) boys and 1075 (35.2%) girls. Children below 6 years of age were 1193 (39.2 % of total children affected) of which 744 (62.3%) were male and 449 (37.6 %) were female. More ocular injuries were recorded in children of age 7 to 15 years of age. Children above 7 with ocular injury were 1855 (60.8 %) of which 1229 (66.25 %) were male and 626 (33.7%) female (Table 1).

Table 1: Age and gender distribution of children with ocular injury

| Age Group | Male | Female | n (%) |
|-----------|--------------|--------------|-------------|
| <= 6 | 744 | 449 | 1193 (39.2) |
| 7-15 | 1229 | 626 | 1855 (60.8) |
| Total | 1973 (64.7%) | 1075 (35.2%) | 3048 |

Of 3048 children with ocular injury, 477 (15.65%) children had Open Globe injury and 2571 (84.35%) children had closed globe injury (Table 2).

Table 2: Types of injury

| Type of Injury | n (%) |
|---------------------|--------------|
| Closed globe injury | 2571 (84.35) |
| Open globe injury | 477 (15.65) |
| Total | 3048 |

Most of the children with Open Globe Injury had penetrating wound of eyeball without foreign body 328 (68.76 %) and the rest had penetrating wound of eyeball with foreign body 127 (26.62 %). Ocular laceration without prolapse or loss of intraocular tissue were noted in 19 children (3.9%) and ocular laceration with prolapse or loss of intraocular tissue in 3 children (0.62 %).

Table 3: Types Identified in Open globe Injury

| Types | n (%) |
|--|-------------|
| Penetrating wound of eyeball without foreign body | 328 (68.76) |
| Penetrating wound of eyeball with foreign body | 127 (26.62) |
| Ocular laceration without prolapse or loss of intraocular tissue | 19 (3.9) |
| Ocular laceration with prolapse or loss of intraocular tissue | 3 (0.62) |
| Total | 477 |

Closed globe injury affected 2571 children. Subconjunctival hemorrhage was seen in 1265 children (49.2%), Corneal foreign body in 513 children (19.9 %). Traumatic cataract was recorded in 498 (19.4 %) of children with ocular injury, Corneal Abrasion in 235 patients (9.1%). Conjunctival foreign body in 23 (0.9%), Vitreous hemorrhage in 12 (0.5 %) and traumatic hyphema was seen in 25 (0.97%) (Table 4).

Table 4: Types Identified in Closed Globe injury

| Types | n (%) |
|----------------------------|-------------|
| Subconjunctival hemorrhage | 1265 (49.2) |
| Corneal Foreign Body | 513 (19.9) |
| Traumatic Cataract | 498 (19.4) |
| Corneal Abrasion | 235 (9.1) |
| Conjunctival foreign body | 23 (0.9) |
| Vitreous hemorrhage | 12 (0.5) |
| Traumatic Hyphema | 25 (0.97) |

DISCUSSION

Domestic accidents are the most difficult to assess, as there is much more of a reporting problem than with workplace-related or road accidents. One of the few large-scale information systems on product related injuries to consumers is the National Electronic Injury Surveillance System in the USA but it is based on self-reported ocular trauma and selected hospital samples, which makes it difficult to compare this information source with clinical studies. The Eye Trauma System is an additional source of clinical data on reported cases of trauma.¹² In the current epidemiological study, we aimed at analyzing all aspects of ocular trauma in children presented to Kedia Eye Hospital. Among 55159 patients attending Kedia Eye Hospital, total 3048 children with ocular trauma reported in the Outpatient Department. The incidence rate was 5.52 %. According to Singh et al. incidence of pediatric ocular trauma in tertiary eye care center of central India was found to be 12.8%.¹³ Dandona et al. reported that ocular trauma accounted for 4.2%–7% of all childhood blindness though the total incidence was not reported.¹⁴ Shukla et al. reported the incidence of ocular trauma as 57 cases/10,000/year, though this incidence was for all age groups and denominator being all ocular cases coming to hospital.¹⁵

In this study 64.73 % were male and 35.2 % of children with

ocular injury were female, 39% below 6 years of age were affected of which 62.3% were male and 37.6% were female. Children above 7 with ocular injury were 60.8% of which 66.25% were male and 33.7% female.

Ocular injury was found more among children above 7 years of age than below. The age-specific pattern of ocular injury with the lowest prevalence among the children below 7 years of age (23.6%), which is similar to the study by Al-Bdour et al.¹⁶ This can be explained by the fact that this age group of children are most of the time under close parental supervision and that they are physically less active than the older children. So due to tendency of parents to be more watchful towards younger children ocular injuries were less commonly found in younger age groups (<7 years).¹⁷ However, these children were prone to suffer from handler-related injuries like fingernail of sibling, mother or caretaker and domestic materials like toys and domestic utensils.

Similar to Dulal et al.,¹⁷ in this study 60.8% children with ocular injury were of older age group. Older children injure themselves accidentally by sharp edges and spikes of toys, pencils, arrows, thorns and stones. Fall during swinging/sliding in parks is an important cause of ocular trauma associated with facial and orbital injuries. Sports-related injuries were commonly seen in children in the 7–15-year-age group.

In this study boys were more affected than girls. These findings are in accordance with those from previous studies.^{2,6,7} Furthermore, the former observation might be attributed to the wilder and aggressive manner of play of boys in this age group and their use of high-risk toys such as bullet guns and fireworks.

Closed globe injury (84.35%) was the most frequently observed ocular injury in children in our study, which is consistent with the reports from Singh et al. and Shukla et al.^{13,15} whereas open globe injury was reason for more severe ocular injury similar to the study of Dandona et al.¹⁴ We found open globe injury to be 15.65% among all children with ocular trauma.

Most number of patients presented with subconjunctival hemorrhage (49.2%). 19.9% of patients had corneal foreign body and 9.1% of children cornea were abraded. Unlike Dulal et al. 2012¹⁷ where 17.3% had a sub-conjunctival hemorrhage,

17.1% had corneal abrasions, 10.5% had corneal foreign bodies. The difference can be explained as number of children involved in this study was more than the study done by Dulal et al.¹⁷

Cataract formed secondary to trauma in 19.4% of children with ocular injury. In the patients with cataract, lens aspiration was performed. In some cases, Intraocular lens was implanted in the first setting while in most of the cases secondary intraocular lens was placed.

Penetrating injuries, orbital injury, ocular laceration penetrating wound of eyeball with and without foreign body being the most common type of injury, necessitate adequate preventive measures in the form of counseling of parents, caretakers and children and awareness drives especially in school, with special emphasis on adequate precautions, preventive measures, and immediate ophthalmic consultation in the event of an injury. In addition, it may be worthwhile to educate the parents, caretakers and school staff about important symptoms of ocular injuries for the justifiable reason that children may at times fail to report their injuries to guardians leading to complications of delayed intervention.¹³ In this study 68.76% of children had penetrating wound of eyeball without any foreign body. In Orbital injury occurred 3.9% had ocular laceration with no loss of intraocular tissue and 26.62% of children with eye injury had penetrating wound of eyeball with foreign body. Among 3048 children involved in this study 25 children had traumatic hyphema. Traumatic hyphema is usually seen in children or young adults with an incidence of approximately two per 10,000 children per year.² Two-thirds of traumatic hyphema are due to blunt ocular trauma and one-third is due to traumatic rupture of the globe.³

CONCLUSION

Due to large number of families depending on agriculture for daily needs, ocular injuries seem to be serious in children of Terai region of Nepal. Children of all age group are prone to ocular injuries.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

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