

A Population Based Study on Pediatric Ocular Trauma and Measures for Prevention of Monocular Blindness.

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ABSTRACT

Background: Pediatric ocular trauma carries a dreadful course if timely intervention is not done by a nearby physician or ophthalmologist. Therefore all levels of healthcare has to be equipped enough to tackle such frightful situations. The aim of the study is to evaluate the possible causes and management of pediatric ocular trauma and the measures to prevent monocular blindness in a rural area of Haryana. Design of the study – A tertiary centre based retrospective and observational study. **Methods:** This retrospective observational study includes children up to the age of fifteen years who presented with ocular trauma between February 2018 to June 2018 in the OPD of Department of Ophthalmology World College of Medical Science and Research Jhajjar. **Results:** A total number of 212 children presented with ocular trauma. The minimum age at presentation was 1 year while the maximum was at 14 years and 9 months. Out of 212 cases, 75% were males and 25% were females. The mode of trauma which was observed to be more common in pediatric age group was blunt 85% of cases as compared to penetrating 15%. 63% of cases of blunt trauma received conservative treatment with regular intervals follow up and the remaining children underwent surgery. The most common complaints of children after trauma is globe compression and corneal opacity. **Conclusion:** Pediatric ocular trauma is an alarming situation and all the teachers and family members have to be aware regarding the consequences. The treatment facility for pediatric ocular trauma has to be provided at all healthcare levels.

Keywords: Pediatrics, Ocular Trauma.

INTRODUCTION

Blunt trauma forms a major part of ocular trauma. Balls and falls are the most common causes of blunt ocular trauma in the paediatric age group. It causes ocular damage by the mechanism of ocular compression. Concept of coup and countercoup injury similar to brain injury was used to explain the pathophysiology of blunt trauma to the eyeball.^[1,2] Few examples of coup injuries in blunt trauma are corneal abrasions, subconjunctival haemorrhages, choroidal haemorrhages, and retinal necrosis and the best example of a countercoup injury is commotio retinae. Ocular trauma in children is a leading cause of visual morbidity. Ocular injuries accounts for approximately 8-14% of total injuries suffered by children.^[3] Besides, direct damage to the ocular structures may result in loss of vision, poor visual outcome and amblyopia caused by prolonged period of light. Children are more prone to injuries because of their inability to avoid hazards.^[4]

The male child is in particular more vulnerable to have eye injuries as compared its female counterpart.^[4,5] Etiologically such injuries are largely accidental. Infants and children, less than 3 years of age sustain fewer injuries due to close parental supervision. Older children injure themselves by spikes of toys, pencils, arrows, needles, thorns and stones. Sports related injuries are common in children from 5-15 years of age.^[4,5] Injuries by animal tail and bird beak are common in rural areas.^[5] Thermal non-penetrating injuries caused by fire crackers and toy pistols on religious events such as Diwali, Eid and Shab-e-Barat lead to loss of many eyes every year.^[6] This study was conducted with the sole aim of documenting ocular trauma in children in a rural area.

MATERIALS AND METHODS

This retrospective observational study includes children up to the age of fifteen years who presented with ocular trauma between February 2018 to June 2018 in the OPD of Department of Ophthalmology World College of Medical Science and Research Jhajjar. Ethical permission was taken from the Institutional Ethics Committee. A detailed history of each case was recorded followed by physical examination. Visual acuity was measured at the time of presentation. Pre-school and school going

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children were examined using appropriate methods and different methods were used to assess the visual acuity of literate and illiterate children. Ocular examination was performed using with slit lamp, hand held slit lamp and direct ophthalmoscope and fundoscopy was performed using an indirect ophthalmoscope. Cases with insignificant ocular damage or with minor subconjunctival haemorrhage were discharged and advised for follow up. Foreign bodies lodged superficially were removed under local anaesthesia. Cases diagnosed with corneal abrasions or lacerations were prescribed antibiotic or antifungal eye drops. Ointments and cycloplegics were also prescribed depending on the severity of trauma. Cases with uveitis were treated with either with topical or systemic corticosteroids. Cases of hyphaema were treated with conservative approach such as bed rest and topical medication. Cases presenting with penetrating ocular injuries required surgeries. The same was performed in the O.T. under G.A. using operating microscope. Globe repair was done as early as possible in cases of globe damage or damage to several intraocular structures. Following these procedures, cases discharged were advised weekly follow up for visual acuity and final visual acuity was recorded after 6 months. Cases with prior management of long standing trauma were excluded from this study. Statistical analysis of data was performed.

RESULTS

Two hundred and twelve children attended the Department of Ophthalmology, World College of Medical Science and Research Jhajjar from February 2018 to June 2018. The minimum and maximum presenting ages were 1 year and 14 years and 9 months respectively [Table 1]. Out of these 212 students, 159 and 53 were males and females respectively. In male children the right eye and left eye were involved in 93 (58%) and 66 (42%) cases respectively. In female children the right eye and left eye were involved in 37 (70%) and 16 (30%) cases respectively. Blunt mode of trauma was the most frequently observed mode of injury among children. It was seen in 180 (85%) cases. Other modes observed are described in tabular form. Most common finding seen in cases after ocular trauma was subconjunctival haemorrhage, which was seen in 39 (18%) cases followed by corneal lesions seen in 19 (9%) cases [Table 2]. Damage to multiple ocular structures was seen in 23 (11%) cases. Surgical intervention was required only in 80 (27%) cases. Compressed globe was the most common cause of decreased vision and was seen in 31 (14%) cases followed by corneal opacity in 11 (5%) cases [Table 2].

Table 1: Distribution of gender and age among

presenting cases.

Gender	No. of patients	Minimum Age	Maximum Age
Male	159 (75%)	1 year	14 years 9 months
Female	53 (25%)	1 year 2 months	13 years 3 months

Table 2: Ophthalmic findings among presenting cases.

Clinical signs on examination	Frequency among presenting cases
Conjunctival tear	5 (2.3%)
Corneal abrasion	27 (12.7%)
Corneal abscess	21(9.9%)
Corneal foreign body	4 (1.9%)
Corneal opacity	7 (3.3%)
Corneal tear	5 (2.3%)
Dislocated lens	6 (2.8%)
Ecchymosis	9 (4.2%)
Endophthalmitis	12 (5.7%)
Hyphaema	9 (4.2%)
Lid tear	16 (7.5%)
Multiple ocular structure damage	22 (10.4%)
Retinal detachment	5 (2.3%)
Retinal oedema	3 (1.4%)
Scleral tear	2 (0.94%)
Subconjunctival haemorrhage	39 (18.4%)
Subluxated lens	6 (2.8%)
Traumatic cataract	2 (0.94%)
Uveitis	11 (5.1%)
Vitreous haemorrhage	1 (0.47%)
Total	212

DISCUSSION

Ocular trauma is the leading cause of monocular visual disability and noncongenital unilateral blindness in children. Increasingly, attention has been focused on the worldwide epidemic of eye injuries in the pediatric population, which carries an incidence rate of 0.746 to 9.9 per 10,000 in the United States and other developed countries. Pediatric ocular trauma is a particular concern because injured pediatric eyes are prone to amblyopia. From a public health and injury prevention perspective, identification of the frequency and spectrum of these injuries in a defined population and targeted educational and legislative efforts might be the tools to minimize eye injuries.^[1-4]

Present study revealed that males are affected significantly more than females [Table 1]. The male children are more affected as they tend to spend more time outdoors. Similar results have also been obtained by Montanes CB et al^[7] and Azab M et al^[8].

The Proportion of ocular injuries was 26.4%. Injuries were more common among males (P=.041) and children from lower social class (P=.026). Okoye O et al^[9] observed that The Proportion of ocular injuries was 26.4%. Injuries were more common among males (P=.041) and children from

lower social class ($P=0.026$). Injuries occurred more frequently during farm work (59.4%) and play (21.9%). The most common causes of injury were sticks (34.4%) and stones (21.8%).

Our study revealed that affected Males age range from 1 year to 14 years 9 months whereas in Females 1 year 2 months to 13 years 3 months [Table 1]. Adult supervision has been found to play an important role in the prevention of paediatric ocular injuries. Children less than 3 years of age sustain fewer injuries because of close supervision by parents. We observed higher percentage of cases sustaining close globe injuries in our study.

Cao He et al^[9] observed that children aged 6 to 11 years accounted for the highest percentage (40.8%, 416/1018) of hospitalization, 56.7% (236/416) of whom were hospitalized for open globe wounds. Injury occurred most frequently at home (73.1%). Open globe wounds cost the single most expensive financial burden (60.8%) of total charges with $\$998 \pm 702$ mean charges per hospitalization.

Open globe wounds exhibit a poorer visual prognosis than closed globe wounds, because they are more likely to require surgeries and result in long-term visual impairments or blindness and concomitant developmental delays. Higher frequency of this kind of clinical diagnoses could likely cause a serious prognosis, presenting final visual acuity with no light perception in 3.6% and light perception to 20/200 in 24.8% of patients. Therefore, 28.4% of the children should be defined as legally blind according to the legal definition of blindness in the United States (best corrected visual acuity of 20/200, US notation; 6/60, 6 m notation; or 1 logMar in the better eye).^[8-10]

Visual prognoses in children remain worse than adults despite therapeutic advances because of the nature of the injuries and amblyopic problems. 9.1% ocular injuries were associated with injuries to the lacrimal apparatus and eyelid laceration, orbital wall fractures, or other non eyeball structures in this research. Eyelid lacerations often occur in conjunction with other facial injuries. Orbital fractures in children are more likely to cause entrapment of orbital contents due to the structure of orbital bones at an early age and require earlier surgical repair than adult population. More serious orbital injuries resulted in severe neurologic damage from other head injuries sustained, as well as significant permanent vision loss, which demonstrates that ocular trauma requires a neurosurgical approach.^[6-10] Therefore, we may conclude that ocular trauma was a significant cause of visual impairment in this pediatric population. Likewise, a further prospective analysis needs to be performed in order to understand inciting agents vs. type of eye injuries vs. age group.

Ocular injuries in paediatric age group are to be taken seriously. Most can be prevented by promoting general awareness and first aid techniques among parents and schoolteachers. Most of the injuries were sustained in work places which can be avoided by discouraging child labor. Activities such as fireworks should be done under proper supervision. Health care workers should be trained for avoiding delay in seeking timely treatment for ocular trauma. Further research that provide detailed information on the specific inciting agents of pediatric eye injuries are needed for facilitating the development and targeting of appropriate injury prevention initiatives.

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CONCLUSION