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Original Research Article

Blink of innocence: A study of paediatric ocular trauma at a tertiary eye care centre in South India

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ABSTRACT

Purpose: To assess the prevalence of ocular trauma and extent of visual loss in paediatric patients at a tertiary care eye hospital in South India.

Materials and Methods: A retrospective study was conducted on all children of age group 15 years and younger, of both genders, sustaining ocular injuries and seeking care within the ophthalmology outpatient department of a tertiary eye care hospital. The study spanned for a duration of six months. The demographic profile of the participants was recorded, detailed history was taken, followed by standardised ocular evaluation. Orbital imaging was done where deemed necessary. An eye was considered blind due to trauma if best corrected visual acuity for distance was worse than 3/60 due to trauma. Patients with pre-existing low vision in the affected eye were excluded in the study.

Results: 50 children were included in the study. The mean age upon initial presentation manifested was 9.8 years. The demographic distribution revealed a predilection for children within the age group of 11 to 15 years, constituting 38% of the sampled populace, with the subsequent demographic tier of 5-10 years encompassing 36%. Noteworthy differentials emerged between rural and urban cohorts, with rural representation at 64% and urban at 36%. The predominant ocular injuries were categorized as 72% closed globe injuries and 18% open globe injuries. Operative interventions were administered to 54% of the cases, while the remaining 46% were subject to conservative therapeutic modalities. Within the subset of closed globe injuries necessitating surgical intervention (36%), specific pathologies included lid tear, canalicular tear, and traumatic cataract.

Conclusion: Ocular trauma in paediatric population can lead to permanent blindness and visual handicap. It also affects the social, emotional and psychological development of the child. Most of these injuries can be prevented by supervision of children during play, educating the children, family members and teachers regarding ocular health and hygiene.

1. Introduction

Ocular trauma refers to injury to eye ball and surrounding structures. Ocular trauma is a leading cause of acquired visual impairment in the paediatric population. The sequelae of paediatric ocular injuries are deleterious, culminating in persistent visual impairment and blindness, thereby exacerbating the economic burden on society. These events affect the psychological, social, and emotional development of the affected child. Parents too get worried about the future of the child. Ocular trauma in children accounts for 8% to 14% of the total injuries.[1]

Childhood eye injury is different from adult ocular trauma in terms of the objects involved in causing injury, evaluation, and management protocols.[2] Childhood eye trauma includes a range of corneal surface abrasions, to corneal and scleral perforations.[3] The majority of

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ocular injuries in children are preventable by taking minor precautions and identification of risk factors for ocular injury.[4]

Ocular injuries have been broadly classified into two types:

1. Open and closed globe and
2. Adnexal injuries.

Open globe injury is an emergency and requires immediate attention.[5] Eye trauma is more common in developing countries than in developed countries.[6]

The present study was undertaken to delineate diverse etiological factors contributing to the genesis of paediatric ocular injuries, deploy preventive interventions within the population, and assess the visual repercussions associated with paediatric ocular trauma.

2. Materials and Methods

A retrospective study was conducted on all children of age group 15 years and younger, of both genders, sustaining ocular injuries and seeking care within the ophthalmology outpatient department of a tertiary eye care hospital. The study spanned for a duration of six months. Patients who were unstable and those with pre-existing low vision in the affected eye were excluded in the study.

Detailed history was taken and complete ocular evaluation was done for the patients. Visual acuity of the patient at the time of presentation was recorded using Teller Acuity Cards in toddlers, and by Snellen's visual acuity chart in older children. Pupillary reaction was noted, followed by a detailed evaluation with slit lamp bio microscopy. Fundus examination with indirect ophthalmoscope with 20D lens was done wherever possible. In cases of media opacity, where fundus visualization was difficult, B scan ultrasonography was performed. Intraocular pressure was measured wherever feasible. Patients who were suspected to have intraocular foreign body and fractures of the orbital walls underwent orbital imaging.

The ocular injuries were classified using the standardized international classification of ocular trauma, the Birmingham Eye Trauma Terminology System (BETTS).BETTS is employed to represent the ocular injury terminology, distinguishing between open or closed globe injuries.[7]

Patients requiring surgical intervention were admitted for further management and informed consent was obtained. In instances where children were uncooperative with the examination, assessments were conducted under general anaesthesia before any interventions were initiated. The results were analysed and tabulated.

3. Results

The statistical data represent 50 children.

3.1. Demographic characteristics

The mean age at presentation was 9.8 years. Children aged 11-15 Years (38%) were most commonly affected followed by children from 5 to 10 years (36%) (Figure 1). There was significant difference between rural (64 %) and urban (36%) children. There were 35 (70%) boys and 15 (30%) girls (Figure 2).

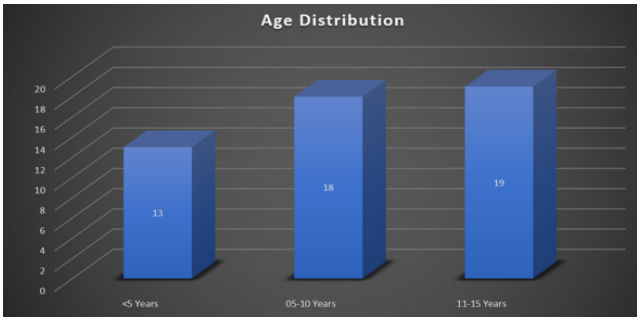

Figure 1: Age distribution

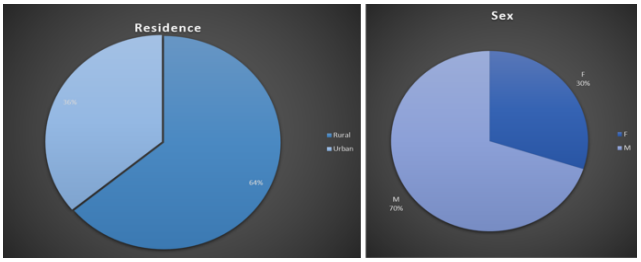

Figure 2: a: Residence; **b:** Sex

3.2. Details of ocular injuries

Forty-five children (90%) had uniocular and 5 children (10 %) had binocular injuries. Of the children who sustained uniocular injury, Left eye was involved in 24 children (53%) and right eye in 21 children. (46%) (Figure 3). Most (72%) had closed, and 18 % had open globe injuries (Figure 4).

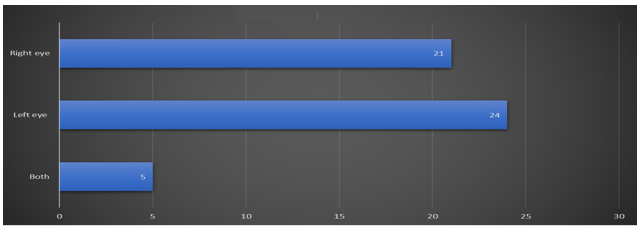

Figure 3: Lateralilty

Figures 5, 6 and 7 depict few cases of paediatric ocular injuries.

Injuries incurred during unmonitored recreational activities exhibited the highest prevalence, (n=15), followed

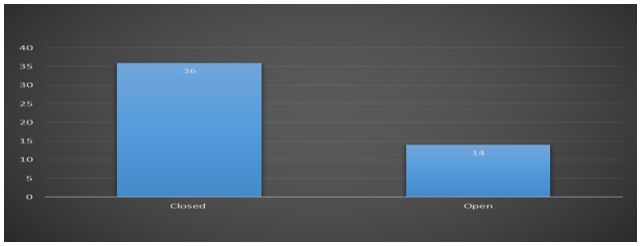

Figure 4: Type of injury (open or closed)

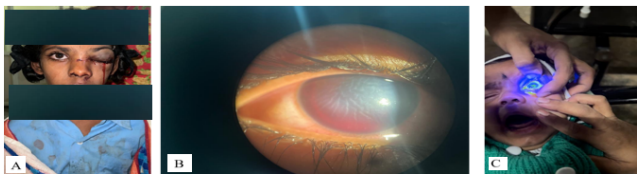

Figure 5: a: Periorbital edema and ecchymosis with mechanical ptosis left eye; **b:** Hyphema with DM folds; **c:** Corneal epithelial defect in an infant due to fall of glue.

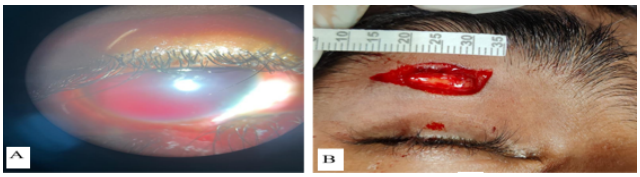

Figure 6: a: Hyphema with traumatic uveitis lower lid marginal tear; **b:** Laceration in the brow region of right eye.

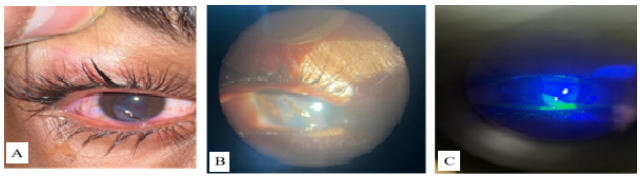

Figure 7: a: full thickness corneal tear with incarceration of iris tissue; **b:** Slit lamp view; **c:** Positive seidel's test

by those arising from sport activities (n=11). These encompassed injuries occurred through trauma with a ball and falls sustained during sporting activities. Furthermore, occurrences involving injuries inflicted by objects, such as wooden sticks (n=6) and pencil tips (n=4), were documented. Noteworthy in the dataset were injuries resulting from road traffic accidents (RTA), as well as thermal and chemical exposures.

Details of injuries are shown in Table 1.

4. Treatment

Operative interventions were administered to 54% of the cases, while the remaining 46% were subject to conservative therapeutic modalities (Figure 8).

Table 1: Causes of ocular injury

Unsupervised playing	15
Sport related (Ball, Self-fall)	11
Pencil tip	4
Wooden stick	6
Road traffic accident	5
Chemical	4
Thermal	4
Other	1

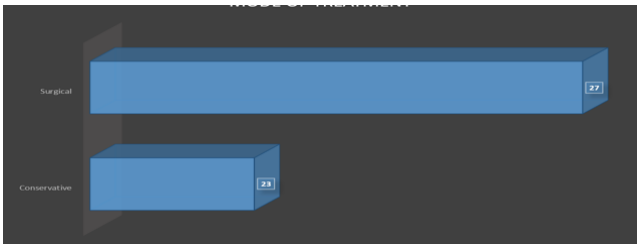

Figure 8: Mode of treatment

5. Discussion

Paediatric ocular trauma constitutes about 20–50% of all ocular injuries reported.[4] Noteworthy difference emerged between rural and urban population, with rural representation at 64% and urban at 36%. Similar findings are seen in several studies. Singh has shown a high preponderance of childhood trauma in the rural population. In their study, they demonstrated that rural area children are at 1.5 times higher risk of ocular injuries than urban children.[8]

However, Chakraborti et al, in their study from eastern India, noted the majority of children were from urban populations (70%).[9] The differences in the rural and urban population could be due to lack of eye care facilities in the rural setting. It also depends on the referral services and the facilities available for the treatment in the hospital.

We found that, children aged 11-15 Years (38%) were most commonly affected, followed by children from 5 to 10 years (36%). These finding correlates with other studies from Indian population.[3,8] In this age group, a child starts going to school and is often involved in many sports activities.

Our study showed preponderance to males 35 (70 %) over females 15 (30%). Similar finding has been observed in multiple studies.[3,8,10] One potential explanation for this observation may be, that boys participate more in outdoor activities compared to girls. Another suggested reason, as proposed by Singh et al, is the societal emphasis on the importance of males over females in Indian culture, particularly regarding illness—a conclusion with which we concur.[8]

In the current study, the most common cause of ocular injury was unmonitored recreational activities, followed

by sport related injuries. Children are attracted to sports activities. They do not understand the importance of supervision by the experts. Therefore, injuries which occurred during unmonitored playing and sports-related injuries were common in our study. Additionally, instances of injuries caused by objects like wooden sticks and pencil tips were recorded. The wooden stick emerges as a frequent source of injury, according to the majority of studies.[8,11] The reason behind this observation could be the ready availability of wooden material in the vicinity of the house. The dataset included injuries stemming from road traffic accidents (RTA) as well as exposure to thermal and chemical elements.

In the present study, closed globe injuries (72%) to the eye dominated compared to the open globe ones (18%). Similar trends have been observed in many studies.[10,11] However, some studies have observed open globe injuries to the eye dominating compared to the closed globe ones.[3,8]

In order to address paediatric ocular trauma and prevent blindness resulting from ocular injuries, we propose the formation of a dedicated ocular trauma team within each ophthalmic department. This team, comprising a casualty medical officer, resident ophthalmic surgeon, vitreoretinal specialist, anaesthetist, and medical social worker, is designed to ensure prompt management of injuries and contribute to community education for the prevention of ocular trauma.[12–18]

6. Conclusion

Prompt referral and effective intervention are instrumental in averting blindness arising from ocular trauma. Consistent follow-ups for children are crucial for addressing potential long-term complications. It is imperative to provide education on ocular health and hygiene to children, parents, and teachers to mitigate the occurrence of eye injuries. The establishment of a responsive ocular trauma team can contribute to the timely treatment of paediatric ocular trauma and serve as a means to raise awareness and educate children, families, and the broader society about the implications of ocular trauma.

7. Source of funding

None.

8. Conflict of Interest

None

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