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Editorial

Unique features of pediatric ocular trauma

Rajendra P Maurya^{1,*}

¹Regional Institute of Ophthalmology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India



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Ocular injuries are the most common cause of acquired unioocular blindness in children. Yet they have not received much attention that they deserve. Eye injuries account for approximately 8–14% of total injuries in children^{1–3} and are the most common type requiring hospitalization (in up to 40% cases). Next to amblyopia, ocular injuries are the main reason for preventable monocular visual loss in childhood.⁴ Paediatric ocular injuries are distinct from those in adults in many ways. Etiologically, such injuries are largely accidental, as opposed to those caused by intentional violent assault in adults. Ocular injuries may be sustained in utero, during delivery and after birth. In utero injuries are known to occur as a result of needle injury during amniocentesis. Globe perforation, non-pigmented epithelial cysts in the anterior chamber, aphakia due to resorption of lens and retinal holes and detachment have been reported. Trauma due to forceps application during delivery can lead to hazy cornea at birth, which needs to be differentiated from congenital glaucoma. Years later, bullous keratopathy may occur in such eyes.

Injuries have an age-specific pattern in children. It is well-known that infants and children less than 3 years of age sustain less injuries due to close parental supervision.⁵ However, they generally suffer handler-related injuries like from the fingernail of siblings, mother or caretaker, sewing and knitting needles, as well as scissors or knives and blows hook etc. 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. A marked preponderance of injuries is seen in the 6–10 years age group.⁶ Children in this age group are relatively immature and exposed to varying surroundings making them more vulnerable to injuries. Male children are affected more due to their adventurous and aggressive nature.^{7–9} Sports-related injuries are commonly seen in children in the 5–14 years age group.¹⁰ Eye involvement in road traffic accidents does not show any age preference. Injuries by animal tail, bird beak and ‘gulli’ & danda are prevalent in rural areas. An uncommon mode of trauma is by hypodermic needles used to squirt water during play.¹¹

The causes of ocular injuries are diverse and tend to vary in different geographical areas. They are also related to the socio-economic status of the study population.^{2,9,12} In the Indian context, wooden stick injuries and those due to iron objects are common. Even objects like glass bangles, cycle spokes and teacup handles can cause grave ocular injuries. Bird beak and animal horn injuries commonly occur in the rural setting. The environment and the media have an immense influence on the impressionable minds of children. Krishnan and Sreenivasan,¹³ who reported that penetrating injuries are more common. The higher incidence of blunt trauma in studies by MacEwen et al.¹⁴ Probably reflects the difference in mechanisms of injury seen in developed and developing countries like India, where penetrating injuries are relatively more common. Injuries other than

* Corresponding author.

E-mail address: mauryarp_bhu@yahoo.com (R. P. Maurya).

due to mechanical causes are less common. The causes of ocular injuries are diverse and tend to vary. There have been several studies worldwide denoting the causes mechanism of paediatric ocular injuries. Some of them are listed below. Bukhari et al In a study in Pakistan found that ocular injuries account for approximately 8-14% of total injuries suffered by Children.¹⁵ Desai et al found in a survey of total of 415 Patients of Scottish origin admitted to hospital for ocular Injury and of these 93(22%) were children below 15 Years age.¹⁶ Prevalence of ocular injuries was found to be 8.1% in a study conducted by Dulal et al in Nepal.¹⁷

Previous studies have reported that sex of the patient is important factor for eye injuries to children. This trend has been attributed to the adventurous and aggressive nature of boys and they avail more freedom compared to female in all societies making them prone to ocular injury^{8,17} crackers during Diwali festival and water balloons during Holi in India have led to the loss of many eyes, year after year.

At presentation, eliciting a history of the causative agent is important, though not always forthcoming, especially in unwitnessed trauma. Patience is the keyword while examining an injured eye of child and no forceful examination should be done. The assessment of visual acuity at presentation, should be geared to the age and level of cooperation of the child. External examination should include assessment of the lids, face, orbit, ocular motility and status of the pupil. Evaluation of the globe should include examination of the conjunctiva, cornea, anterior chamber, iris and lens. Posterior segment examination and measurement of intraocular pressure should be done only when safely possible. It is desirable to examine the injured eye under sedation/general anaesthesia for a complete evaluation of the extent of injury and in planning further management. The mechanical ocular trauma can be classified according to the Ocular Trauma Classification Group recommendations. This system classifies ocular injuries according to four variables: (i) Type of injury based on the mechanism of injury. (ii) Grade of injury defined by visual acuity in the injured eye at the time of initial examination. (iii) Pupil defined as the presence or absence of a relative afferent pupillary defect in the injured eye. (iv) Zone of injury based on the anteroposterior extent of the injury.

Diagnostic challenges associated with paediatric ocular trauma are varied. First of all children don't give proper history of accident. In an order to avoid punishment child may give vague history of injury situation. There is unwillingness in child to admit forbidden behavior like fireworks etc. Often paediatric ocular trauma is associated with possibilities of child abuse, poor supervision, neglect or significant occult eye injury. Also, examination or recognition of extent of injury is quite difficult in young / non-cooperative children in many situations child need injury evaluation under GA / sedation. IOL power

calculation for traumatic cataract is difficult in children as they don't cooperate.

Adnexal soft tissue injury heal rapidly in children hence primary repair should be performed expeditiously. Elasticity of Children's bones increases the incidence of non-displaced trap-door fractures with tissue incarceration & ischemic muscle necrosis and which may lead to lifelong risk of diplopia Rapid healing of bone occurs in children may lead to misalignment and deformity of fractured bone. Child's visual system is still developing hence any injury obscuring visual axis is associated with risk of amblyopia. Conditions such as persistent ptosis and post-traumatic motility disturbances may predispose amblyopia. In children skin sutures must be removed early in order to prevent scarring. Hypertrophic scarring is common in children thus there could be requirement of scar revisions which should be explained to attendants after primary repair.

The most important aspect of paediatric trauma is prevention. Education regarding masterly watchful inactivity and supervised play, the concept of child-proofing of houses, schools and play areas, the hazardous nature of firecrackers, and road safety measures is critical. Parents, elders, teachers and caretakers, as well as the media have an important Role to play in prevention of injuries in children. The irreversible nature of visual loss and immense morbidity associated with it need to be emphasized and publicized. Sensitizing people with regard to the psychosocial aspects of ocular injuries is also required in our set-up. Legislation to ban the use of bows and arrows, fire crackers and by children would help in saving a lot of eyes. Prevention of trauma was and is still vital for reducing morbidity and costs associated with paediatric ocular injuries.


References

1. Scribano PV, Nance M, Reilly P, Sing RF, Selbst SM. Paediatric nonpowder firearm injuries: Outcomes in an urban paediatric setting. *Pediatrics*. 1997;100(4):E5.
2. Takvam JA, Midelfart A. Survey of eye injuries in Norwegian children. *Acta Ophthalmol (Copenh)*. 1993;71(4):500–5.
3. Maurya RP, Singh VP, Yadav I, Singh MK, Mishra CP, Sen PR, et al. Profile of pediatric ocular trauma at a tertiary eye care centre in Northern India. *Ind J Clin Exp Ophthalmol*. 2015;1(2):76–83.
4. Lithander J, Kindi HA, Tonjum AM. Loss of visual acuity due to eye injuries among 6292 school children in the Sultanate of Oman. *Acta Ophthalmol Scand*. 1999;77(6):697–9.
5. Montanes CB, Cueva MC, Fernandez EG, Garcia SC, Sanchez AL, Safa MD. Eye injuries in childhood. *Ann Esp Pediatr*. 1998;48:625–30.
6. Al-Bdour MD, Azab MA. Childhood eye injuries in North Jordan. *Int Ophthalmol*. 1998;22(5):269–73.
7. Niranan M, Raivio I. Eye injuries in children. *Br J Ophthalmol*. 1981;65(6):436–8.
8. Strahman E, Elman M, Daub E, Baker S. Causes of paediatric eye injuries: A population based study. *Arch Ophthalmol*. 1990;108(4):603–6.
9. Maurya RP, Srivastava T, Singh VP, Al-Mujaini A, Mishra CP. The epidemiology of ocular trauma in Northern India: A teaching hospital study. *Oman J Ophthalmol*. 2019;12(2):78–83.

10. Macewen CJ, Baines PS, Desai P. Eye injuries in children: The current picture. *Br J Ophthalmol*. 1999;83(8):933–6.
11. Jalali S, Das T, Majji AB. A new source of penetrating ocular trauma in children. *Retina*. 1999;19:213–7.
12. Soylu M, Demircan N, Yalaz M, Isiguzel I. Etiology of pediatric perforating eye injuries in southern Turkey. *Ophthalmic Epidemiol*. 1998;5(1):7–12.
13. Krishnan M, Sreenivasan R. Ocular injuries in Union territory Of Pondicherry. Clinical presentation. *Indian J Ophthalmol*. 1988;36(2):82–5.
14. Macewen CJ, Baines PS, Desai P. Eye injuries in children: The current picture. *Br J Ophthalmol*. 1999;83(8):933–6.
15. Bukhari S, Mahar PS, Umair Q, Bhutto IA, Memon AS. Ocular trauma in children. *Pak J Ophthalmol*. 2011;27(4):208–13.
16. Desai P, Macewen CJ, Baines P, Minassain DC. Incidence of cases of ocular trauma admitted to hospital and incidence of blinding outcome. *Br J Ophthalmol*. 1976;80(7):592–6.
17. Niiramen M, Raivio I. Eye injuries in children. *Br J Ophthalmol*. 1981;65(6):436–8.

Author biography



Rajendra P Maurya, Editor in Chief IJCEO, Associate Professor & I/c Orbit, Ocular Oncology and Oculoplasty Unit Regional Institute of Ophthalmology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, (UP), India  <https://orcid.org/0000-0001-9343-6003>

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