

A STUDY ON MODES OF INJURY, MANAGEMENT AND ITS VISUAL OUTCOME IN PAEDIATRIC OCULAR TRAUMA

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ABSTRACT

BACKGROUND

Ocular trauma is one of the important cause of Blindness in children. Blindness in children has impact on the individual as well as the society. The Blindness due to childhood trauma is largely preventable. This study highlights about the various causes of ocular trauma and the damage caused by it in various ocular tissues and its management.

MATERIALS AND METHODS

This is a prospective study for a period of 1 year; 50 paediatric patients of age less than 12 years reporting with ocular trauma to the Regional Institute of Ophthalmology- Government Ophthalmic Hospital were registered and evaluated with detailed history, vision, slit lamp examination and fundus examination. They were subjected to further investigations and management was carried out either by medical or surgical, according to the type of injury and the site of involvement. Vision acuity was assessed after treatment and during followup.

RESULTS

In our study, 50 children in the age group of up to 12 years with ocular trauma were enrolled and evaluated. The age group of 10 to 12 formed the majority of the patients accounting for 42%, followed by 6 to 9 years accounting for 36%. About 46% of the patients, the major mode of injury was when handling stationeries and household articles. The main place of injury was residence accounting for 52%. Males were more commonly affected than females. Male accounted about 82%. The ratio was 4.55: 1 approximately. Both eyes were equally affected. Open globe injury was commoner than closed globe injury. Open globe injury was 60%. This might be because open globe injuries present to the hospital. 78% of patients presented to the hospital within a day of injury. Open globe injury patients presented earlier to the hospital than closed globe injury. Anterior segment trauma (64%) was commoner than other tissues. Visual acuity was drastically reduced in open globe injury than closed globe injury. The main mode of treatment was surgical (82%). Cataract was the commonest complication (14 patients).

CONCLUSION

To conclude since most of the injuries occur in residence when handling stationeries and household articles, the monitoring of children by the parents or caregivers can prevent most of the injuries. The visual outcome will be better if timely intervention was done.

KEYWORDS

Paediatric, Ocular Trauma, Cataract.

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BACKGROUND

Ocular trauma is the most common cause of unilateral blindness. Blindness in childhood is a tragedy insurmountable, because it affects not only the individual but also the family and society as a whole. Injury also leads to cosmetic problems associated with disfigurement and psychosocial consequences of strabismus and amblyopia. It

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is a significant cause of visual loss, especially in lower socio-economic status in underdeveloped countries. The majority of injuries occur at home accounting to 52%.^{1,2} Adult supervision clearly decreases the incidence of eye injuries in children. It is largely preventable.

5 to 15% of childhood blindness is due to trauma. During first few years of life, the incidence of ocular injury is essentially equal in males and females but changes quickly to male preponderance seen in adults. The ratio was 4:1³ approximately, attributed in part to boys who are more frequently involved in using sharp and pointed play objects. Sports equipments especially cricket ball, stones, wooden sticks (gilli danda), fire crackers, bow and arrow, etc.⁴ Commonly causes injury in older children. Other ocular disorders may be noticed after even subtle trauma. An injury

may bring to light pre-existing leucoma, strabismus or proptosis. Therefore, one should always consider non-traumatic aetiologies in the evaluation of injured child. Child abuse should always be considered in a child younger than 3 yrs. of age, especially in bilateral involvement.⁵ Due to young age inability to cooperate with examinations and the potential for development of amblyopia, children presenting with eye injuries are evaluated and treated slightly different from adults. Proper communication should be maintained between patient and family throughout the course of it. In this study, the modes of injury and its effect on visual acuity and the distribution of injuries in various ocular tissues and its management in paediatric age group is evaluated.

MATERIALS AND METHODS

The study was done in Regional Institute of Ophthalmology and Government Ophthalmic Hospital, Chennai. This is a prospective study for a period of 1 year. 50 paediatric patients of age less than 12 years reporting with ocular trauma to the Regional Institute of Ophthalmology-Government Ophthalmic Hospital were registered and evaluated with detailed history, vision, slit lamp examination, fundus and were subjected to treatment according to the injury.

AIM- To evaluate the various mode of injury and its effect on visual acuity and the distribution of injuries in various ocular tissues and its management in paediatric age group.

Inclusion Criteria

All children aged < 12 years presenting with ocular trauma.

Exclusion Criteria

Children with poor general condition and systemic illness were excluded.

A detailed history of present illness and mode of injury were recorded. Visual acuity was recorded by Snellen's chart. Detailed anterior segment examination using slit lamp was done. Extraocular movements were checked. Pupils were assessed for RAPD (Relative Afferent Pupillary Defect). Detailed fundus examination was done. Intraocular pressure was recorded. X-ray orbit and B-Scan were also done. Patients were treated and postoperative complications if any were noted and followed up to 6 months at regular interval and complications if any were noted.

RESULTS

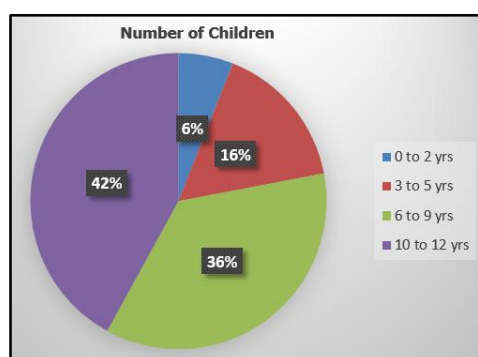


Chart 1. Age Distribution

There is an increase in ocular trauma as the age advances. This might be due to increase in activities as age advances.

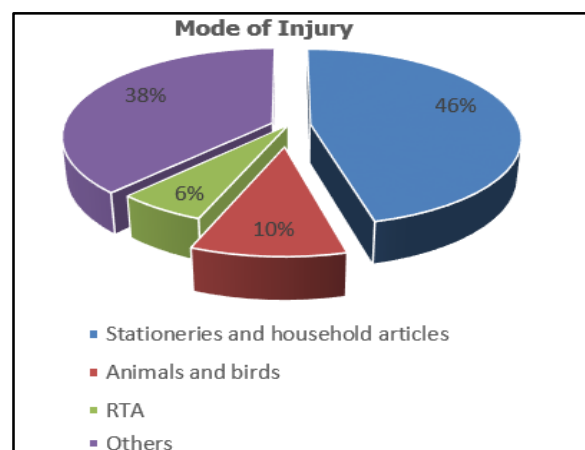


Chart 2. Mode of Injury

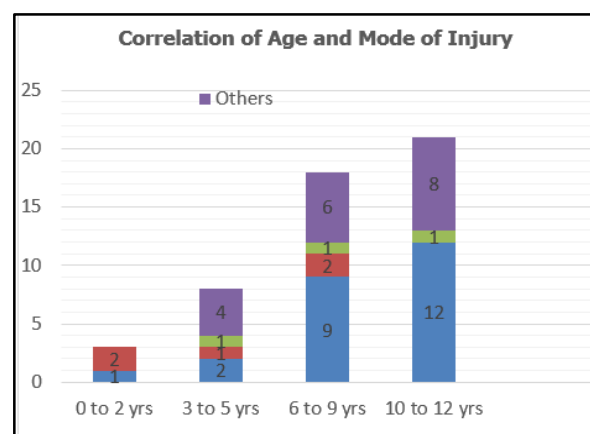


Chart 3. Correlation of Age and Mode of Injury

After the age of two, injury due to road traffic accidents are equally distributed. The predominant mode of injury in all age groups is stationeries and household articles.

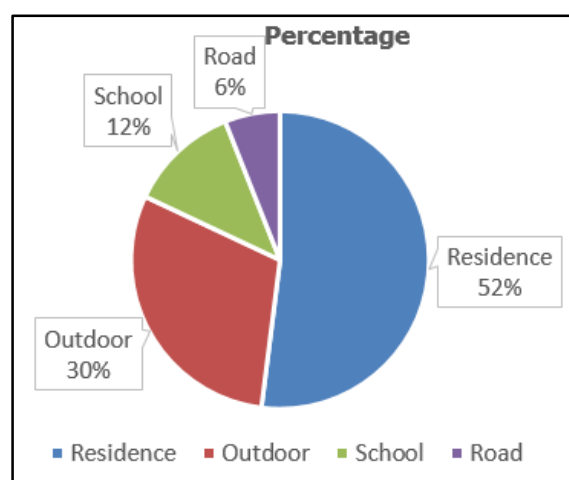


Chart 4. Place of Injury

In our study it showed that residence was the common place of injury, suggesting careful monitoring at home can prevent most of the injuries.

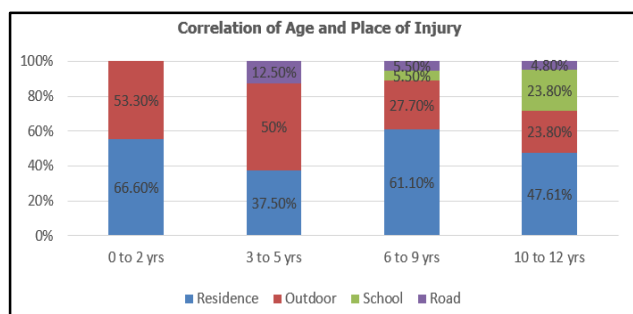


Chart 5. Correlation of Age and Place of Injury

From the data obtained, it shows that trauma occurring in residence forms the major part. So careful watching of activities of children at home can prevent most of the injuries. In the age group of 3 to 5 years, the predominance of outdoor injuries might be due to the increase in exposure to external environment at this age group. In the age group of 10 to 12 years, injuries at home is equal to that occurring in school and outdoor.

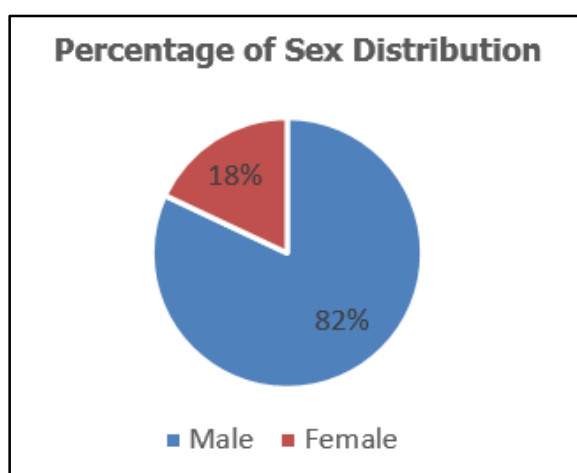


Chart 6. Percentage of Sex Distribution

Males are more commonly injured than females. This might be due to a greater involvement of male children in outdoor activities.

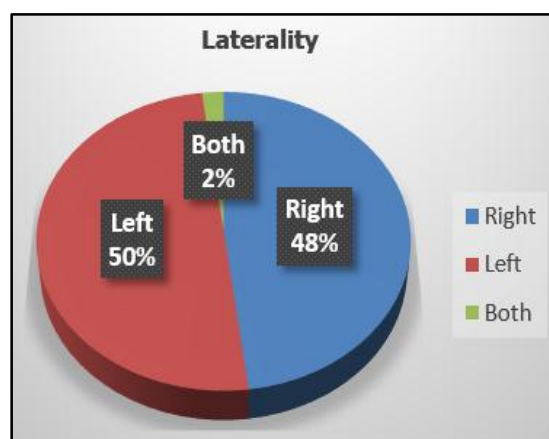


Chart 7. Laterality

Both the eyes are affected equally in this study.

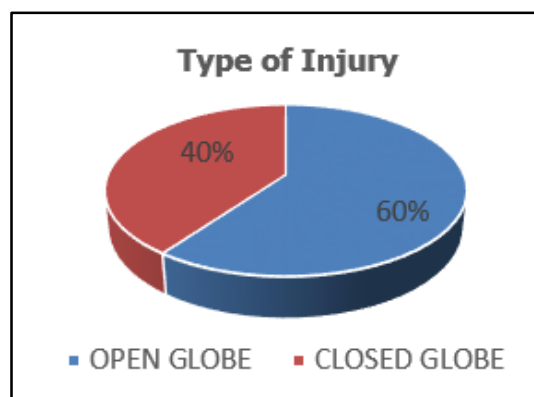


Chart 8. Type of Injury

In this study, the incidence of open globe injury was found to be more than closed globe injury. This might be due to the referral of open globe injuries to the tertiary care hospital.⁵

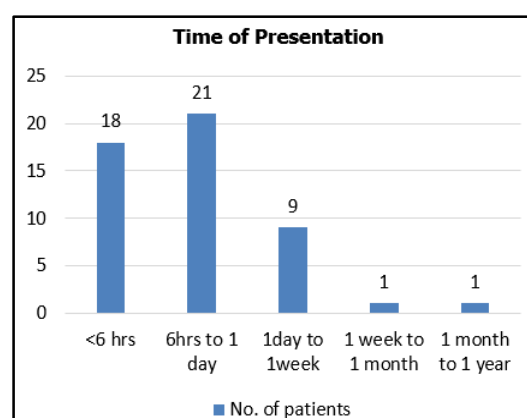


Chart 9. Time of Presentation

78% of the patients presented to the hospital within 1 day.

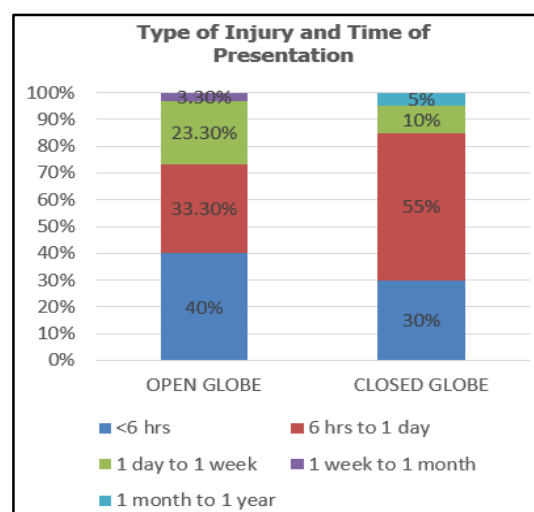


Chart 10. Type of Injury and Time of Presentation

In this study, open globe injuries presented earlier to the hospital than closed globe injuries. Since there is a drastic diminution of visual acuity and associated bleeding, etc. they present earlier than closed globe injury.

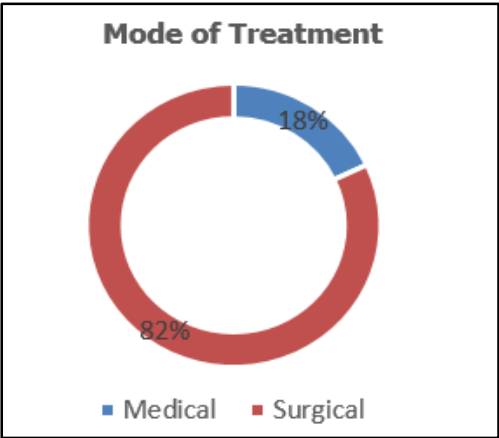


Chart 11. Mode of Treatment

In this study, the main mode of treatment was surgical. This included corneal tear suturing, therapeutic keratoplasty, lid tear suturing, evisceration, core vitrectomy and cataract extraction with intraocular lens implantation.

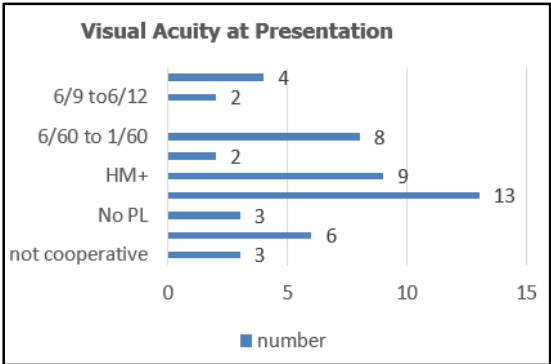


Chart 12. Visual Acuity at Presentation

Majority of the patients presented with PL+ vision in this study.

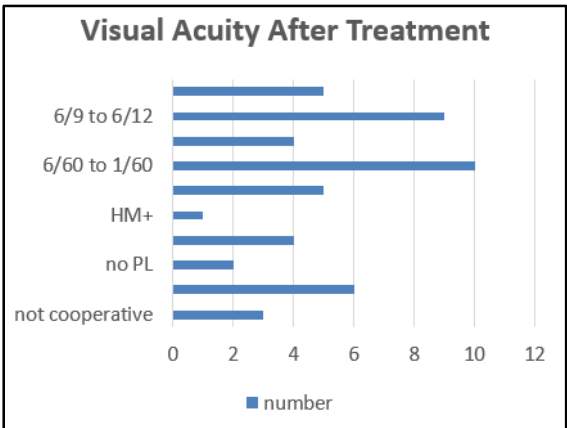


Chart 13. Visual Outcome in Followup

In this study, following treatment of 29 patients showed an improvement in visual acuity and in 15 patients the visual acuity remained the same; 2 patients showed deterioration of vision- one was panophthalmitis (PL+ deteriorated to noPL) and the other developed macular oedema (6/6 deteriorated to 6/12), both leading to deterioration of visual acuity; 1 patient who had traumatic optic neuropathy lost for

followup; 3 patients were not cooperative before and after treatment. This denotes that timely intervention can result in good visual outcome.

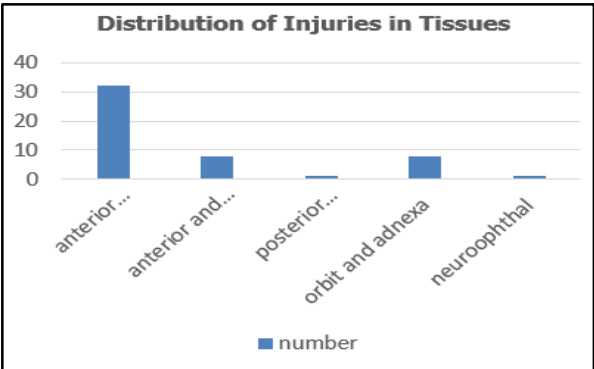


Chart 14. Distribution of Injuries in Tissues

Anterior segment is more commonly involved in trauma followed by orbit and adnexa and combined anterior and posterior segment.



Figure 1. Lid Tear



Figure 2. Subconjunctival Haemorrhage



Figure 3. Lower Lid Haematoma

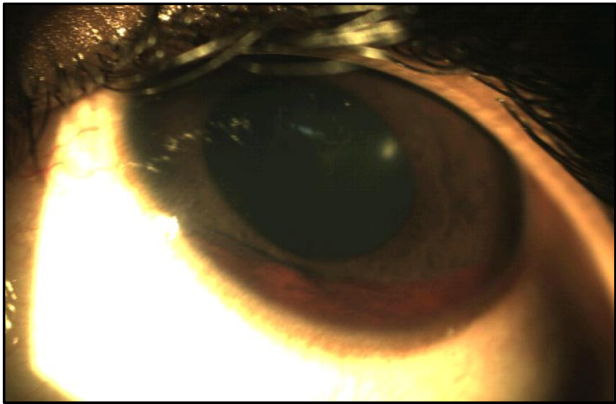


Figure 4. Hyphaema

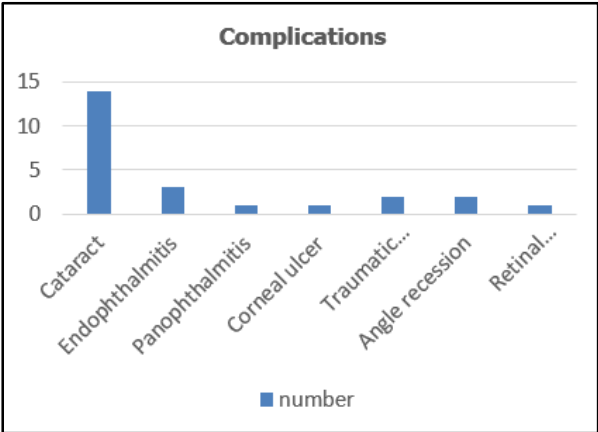


Chart 15. Complications Associated with Ocular Trauma

Cataract was found to be the most common complication in this study.

DISCUSSION

In this study, 50 children of age less than 12 years with ocular trauma were enrolled and evaluated. The age group of 10 to 12 formed the majority of the patients accounting for 42%, followed by 6 to 9 years accounting to 36%.⁶ The major mode of injury was using stationeries and household articles accounting for about 46%. The main place of injury was residence accounting for about 52%.^{1,2} Males (82%) were more commonly affected than females. The ratio was 4.55: 1.⁶ Left eye was more commonly affected (50%). Open globe injury was commoner than closed globe injury. Open globe injury was 60%.^{1,3,6,7} This might be because open globe injuries present to the hospital. 78% of patients presented to the hospital within a day of injury. Open globe injury patients presented earlier to the hospital than closed globe injury. Visual acuity was drastically reduced in open globe injury than closed globe injury.^{8,9} Anterior segment trauma (64%) was commoner than other tissues. Cataract was the commonest complication (14 patients). All these cases underwent cataract extraction with IOL implantation. Timing of lens removal is important for achieving anatomical as well as better visual outcome. Flocculent lens matter is tolerated in children, so delay in surgery for 1 to 3 weeks is acceptable until inflammation subsides.¹⁰ Too early intervention results in postoperative

inflammation and cell deposits on IOL, too late results in amblyopia.

The next common complication was endophthalmitis noted in 4 cases of open globe injury. All cases underwent core vitrectomy with intravitreal antibiotics. One case developed panophthalmitis and was eviscerated. Corneal ulcer developed with 2 cases of closed globe injury, of which 1 had undergone TKP.

Of the 40% of closed globe injuries, 4 cases had lid tear which were sutured. There was no case of canalicular injury. One case had blow-out fracture, which was managed conservatively since there was no diplopia; 4 cases which developed glaucoma were managed medically and surgically as per requirement.

Sl. No.	Type of Lesion	Incidence
1.	Ecchymosis	6
2.	Lid tear	4
3.	Subconjunctival haemorrhage	9
4.	Blow-out fracture	1
5.	Corneal ulcer	2
6.	Glaucoma	4
7.	Cataract	14
8.	Endophthalmitis	4
9.	Panophthalmitis	1
10.	Macular oedema	1
11.	Retinal detachment	1
12.	Traumatic optic neuropathy	1

Table 1. Tissue Distribution

Caring of children with ocular trauma involves several distinctive prospects such as-⁹

- 1. Possibility of prenatal injuries.
- 2. Diagnostic challenges due to limitations experienced during history taking and examination.
- 3. Developing visual system and the potential for amblyopia.
- 4. Orbit that is immature (cosmesis following enucleation and evisceration).
- 5. Predisposition to certain types of trauma, eg. Firecrackers or toys.

Prognosis

Poor prognostic indicators include poor visual acuity on presentation, vitreous haemorrhage, retinal detachment and endophthalmitis⁹; the presence of IOFB and delay in wound closure, and injury to crystalline lens. The occurrence of injury in a rural setting have been shown to increase the risk of endophthalmitis. Open globe secondary to blunt trauma are associated with particularly poor visual outcomes.⁸ Posterior segment injuries are more visually devastating than anterior segment globe injury.

Vast majority of eye injuries are preventable. Key components of prevention include-⁵

- 1. Parental supervision.
- 2. Education of children and protective eye wear.

3. Reinforce the importance of not playing with objects like gilli danda, fire crackers, bow and arrow.
4. Health education on the preventive aspects of ocular trauma in school and mass media like television.
5. Protective eye wear and goggle with 2 - 3 mm centre thickness recommended for sports.

CONCLUSION

To conclude since most of the injuries occur in residence using stationeries and household articles, the monitoring of children by the parents or caregivers can prevent most of the injuries. The visual outcome will be better if timely intervention was done or else onset of amblyopia will limit the recovery of visual acuity.

Despite the significance and scope of eye trauma in children, the amount of research and effort in prevention and treatment is less than other areas of ophthalmic research activities.

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