

# Clinical Profile and Management Outcome of Paediatric Penetrating Ocular Trauma in a Tertiary Eye Centre in Eastern India

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## ABSTRACT

**Introduction:** Globally an estimated 70 million blind years are caused by childhood blindness. This study was done to evaluate the pattern, causes and treatment outcome of penetrating ocular trauma in pediatric age group.

**Material and Methods:** This prospective interventional study was conducted among children (<14 yrs) with penetrating ocular trauma, who presented in our tertiary eye center between April 2014 to March 2017. The Demographic data, causes, type, extent & severity of injuries and impact on vision were identified and analyzed. Primary Perforation repair was done under General anaesthesia.

**Results:** Out of 86 patients, 55 (63.95%) were boys and 31(36.04%) were girls with age ranging from 2 -14years. Most of the injuries occurred at home (n=38, 44.18%) while rest (n=48,55.82%) occurred away from home e.g. playground (n=20,23.25%), street/Road (n=12, 13.95%) and school (n=16, 18.6%). Most common cause of injury was projectile objects (34.56%), followed by sharp objects (19.51%), iron rod (18.0%), firework /cracker (9.76%), vegetative matter/thorns (6.7%) while the less common causes were animal injury (4.5%) road traffic accidents (3.4%). Commonest type of injury was isolated globe injury (51.22%) followed by perforation with associated lid and adnexal injury (43.90%) and orbital fracture (21.95%). Left eye was affected in 46.34%. The most common complication was hyphema (31.70%) followed by iris prolapse/ iridodialysis (21.95%), traumatic cataract (19.51%), vitreous hemorrhage/ retinal detachment (14.63%), endophthalmitis (6.10%) and disorganized globe or phthisis (13.41%).

**Conclusion:** Children are assets for a nation and even trivial ocular trauma has devastating visual potentials. This study emphasizes the need for eye injury prevention in young children whether at home or outside by active participation of the parents, teachers or care takers. It will minimise the individual as well as national losses.

**Keywords:** Ocular trauma, Corneal laceration, Cracker injury, Hyphema, Penetrating injury.

## INTRODUCTION

Ocular trauma is a leading cause of preventable childhood blindness.<sup>1</sup> Adult supervision at home and school and prompt presentation to medical care post trauma would help initiating prompt management and contribute in reducing the morbidity due to visual handicap. Present study was done to know the etiology, presentation, prognosis, predictors of final visual outcome in penetrating ocular trauma in children (≤14 years of age) in a tertiary eye centre with emphasis on multidisciplinary management.

Aim of this study was to identify the etiology, clinical features and final visual outcome of paediatric open globe injuries in eastern India over a period of 1 year.

## MATERIAL AND METHODS

After taking clearance from the institutional ethical committee, penetrating paediatric trauma cases less than 15 years of age presenting to our tertiary eye care institute from Sep 2015-August 2016 were enrolled with consent of the guardian. A total of 86 patients were enrolled excluding the critically ill ones. The demographic data, type of injury, object of injury, presentation time, extent of injury, management and complications were noted. Presentation to the hospital within 24 hours of injury was considered as early presentation, and beyond that was considered as late. Primary repair was done all cases under general anaesthesia. Presenting visual acuity and visual acuity after repair were noted.

## STATISTICAL ANALYSIS

Regression analysis of these prognostic factors with final visual acuity was done with SPSS version 14.

## RESULTS

The study involved 86 eyes. Male to female ratio was 3.2:1 with age ranging 2-14 years. In 47 patients left eye was involved and in 39 patients right eye was involved. Home was the most common place of injury 38 cases (44.18%) followed by playground 20 cases (23.25%), school 16 cases (18.6%) and road/street (13.95%) (Figure-1). Commonest object of injury was sharp objects (34.56%) followed by projectile objects (19.51%) and many others (Table 1). Visual acuity at presentation was perception to light in 11 (12.79%) eyes and ≥3/60 in 17 (54.54%) eyes with only one patient with good vision (>6/18) (Table 2). After primary repair 35 (40.69%) eyes had vision ≥3/60 while only 2(2.32%) eyes had vision >6/18. Patients reporting within 24 hours of injury were 45.5%, out of which 62.7% had final visual acuity more than 3/60 which was significant (p<0.05) (Table 3).

Central visual axis involvement was seen in 35 cases (40.69%). Rest (60%) cases with visual axis non involvement (*i.e.* beyond central 3 mm of cornea) had final visual acuity of Snellens ≥3/60. Scleral along with corneal involvement was seen in 22 cases (25.5%). Hypopyon and Hyphema and hypopyon were present in 27 (approx 31.7%) and 12 (13.41%) eyes respectively. Traumatic cataract was noted in 13 eyes (15.51%). Vitreous in anterior chamber was seen in one case (1.16%).

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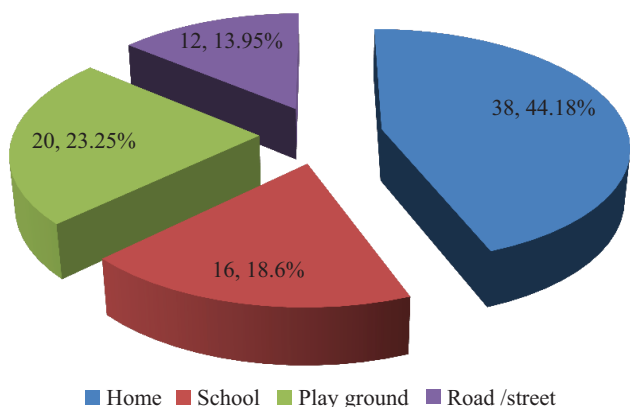


Figure-1: Place of injury

Agents causing ocular injury	Percentage
Sharp objects (Knife, needle, scissors, wire, glass, pencil, pen)	34.56%
Projectile object (Stone, toy gun, gulli)	19.51%
Iron rod	18.0%
Firecrackers	9.76%
Vegetative matter (thorn)	6.7%
Animals (horns, tails, feet)	4.5%
Road traffic accident	3.4%
Others /unknown	3.57%

Table-1: Agents causing ocular injury

Visual acuity	At presentation	Final visual acuity
No PL	11 (12.79%)	12 (13.9%)
PL/HM	30 (34.88%)	15 (17.44%)
Counting fingure (CF)	9 (10.46%)	7 (8.13%)
Snellens 1/60-3/60	10 (11.62%)	9 (10.46%)
3/60-6/60	11 (12.79%)	24 (27.9%)
6/60-6/18	5 (5.81%)	9 (10.04%)
6/18-6/6	1 (1.16%)	2 (2.32%)
Could not be evaluated	9 (10.46%)	8 (10.03%)

Table-2: Visual acuity at presentation and final follow up

1. Isolated globe rupture	51.22%
-hyphema	31.7%
-iris prolapse	27.95%
-traumatic cataract	15.51%
-vitreous hemorrhage	14.63%
-retinal detachment	6.11%
-endophthalmitis	13.41%
-phthisis	4.10%
2. Associated Lid & adnexal injury	43.90%
3. Orbital fracture	21.95%

Table-3: Clinical presentation

Posterior segment involvement was seen in 36 cases (32.7%) consisting of retinal detachment, choroidal detachment, vitreous hemorrhage etc. Primary repair was done in all cases (100%) and 58 cases (60.46%) secondary surgery (consisting of vitrectomy, lensectomy, retinal detachment surgery with endolaser and silicone oil tamponade, cataract surgery with secondary intra ocular lens implantation, scleral fixated intra ocular lens.) Corneal scar was most common complication (23.6%). Re-suturing was required in 3 cases (3.48%). Retinal complications were seen in cases 25 cases (29.06%) consisting of macular scar,

epiretinal membrane, tractional retinal detachment. Additional surgical procedures were done in 18% of cases consisting Other complications were band shaped keratopathy in 22 (25.5 %) of cases, phthisis in 3 cases (4.1%) and sympathetic ophthalmia in 1 case 1.16%.

DISCUSSION

Since ocular trauma can be prevented and effectively treated, the knowledge of its prevalence, associated risk factors and prognostic markers become important for any step aimed at reducing the trauma related visual morbidity in children. Children constituted over almost half of the total ocular trauma cases in a study conducted in South India.<sup>2</sup> However pediatric ocular trauma has very few studies in our country.<sup>3</sup> Eye injury was more commonly seen in boys than girls which is comparable with the previous reports and suggest that the nature of boys being more active and nature of games as compared to girls in this age group.<sup>2-5</sup> Home was the most common place of injury 38 cases (44.18%) followed by play ground 20 cases (23.25%), school 16 cases (18.6%), road/street. stressing upon the importance of domestic safety, special education to parents and teachers as majority are preventable injuries. Along with the preventive measures for safety, legislation on dangerous objects used in households has an important role.<sup>3,5</sup> Injury with wooden stick, an easily accessible object to children, was found most common and was comparable with other studies.<sup>6,7</sup> Thus adult supervision plays a major role in prevention of injury. Various studies observed a co-relation between poor visual acuity at presentation or delay in presentation with poor final visual outcome.<sup>8-14</sup> This study was conducted in a tertiary eye care centre with 24 hour emergency services and we found a significant co-relation between the time gap between injury to presentation at hospital and final visual outcome as compared to prognostic factors like, site of injury and extent of injury. Thus highlighting the importance of well equipped 24 hour emergency services and multispeciality based team approach.<sup>15</sup> Optimal initial surgical and medical interventions followed by orthoptic and optical correction can help to reduce the morbidity caused by amblyopia in pediatric trauma.<sup>6</sup> Optical correction and rehabilitation can be achieved by rigid gas permeable contact lens.<sup>16-18</sup> Although statistically not significant in our study, the role of other prognostic factors like extent of injury, infection, posterior segment involvement etc. cannot be ignored as predictors of final visual outcome.<sup>19</sup> Limitation of the study is that, it did not use ocular trauma score, due to inability and non co-operation of young children.<sup>20-22</sup> Need of the hour is a larger population based study involving primary, secondary and tertiary eye care services in this geographic region.

CONCLUSION

Paediatric ocular trauma is an important cause of visual impairment and morbidity. Most of the injuries reported were preventable, highlighting the need of educating parents and teachers regarding prevention of ocular injuries, supervision of indoor and outdoor activities and importance of early presentation after injury. Multimodality treatment including prompt surgical and medical intervention, optimal optical and

orthoptic management and low visual aid services can reduce the burden of morbidity caused due to amblyopia

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