



## Spectrum of Ocular Trauma among Children in Tertiary Eye Hospital in Jammu and Kashmir

Authors

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### Abstract

**Background:** Ocular trauma is leading cause of visual impairment and monocular blindness all over the world thus recognizing its distribution and causes could potentially help to prevent Ocular trauma and ocular trauma related ocular blindness.

**Objective:** To determine the epidemiology and causes of childhood ocular trauma in tertiary eye hospital in Jammu and Kashmir.

**Materials And Methods:** This is hospital based cross sectional prospective study conducted among 150 children <15 years of age in a tertiary care hospital affected by ocular trauma from January 2019 – January 2021. Age, sex, mechanism and place of trauma, presenting visual acuity and ocular findings were analyzed.

**Results:** Majority of ocular trauma occurred in children aged <5 years (39.3%). Among 150 cases, boys 105(70) predominated girls 45(30%). Early presentation (<24 hours) was found in majority 82(54.7%) cases. Closed globe injuries accounted for 75% of ocular injuries and sharp object was most frequent object responsible for ocular injury(51%). 57% of children had normal visual acuity at presentation with subconjunctival hemorrhage(26%) being most common finding. 41.33% of children were admitted in the hospital while rest were managed on opd basis.

**Conclusion:** Children are vulnerable to eye injuries and most of them are preventable. House being most common place of ocular trauma in this study hence good parental supervision can prevent ocular trauma related visual disability and blindness.

Implementation of safety measures at school can potentially reduce ocular trauma among children.

### Introduction

Ocular trauma is a leading cause of visual impairment and blindness in young adults and children resulting in ophthalmic morbidity and monocular blindness all over of the world<sup>1</sup>. The functional and cosmetic defect has a significant impact on the personality and lifestyle of the affected individuals. The peculiar anatomic

features and the risk of amblyopia cause functional loss inspite of a good anatomic reconstruction<sup>2</sup>. The significance of the problem is compounded by the findings of various studies that a majority of these injuries are preventable<sup>3-6</sup>, thus making it an issue of great social and medical concern. Eye trauma in childhood and its adnexa represent approximately 4-20% of all eye

injuries<sup>2</sup>. By identifying any underlying factors in the etiology of serious injuries, it may be possible to design effective methods for reducing the incidence of visually damaging trauma<sup>6</sup>.

The present study was carried out to determine the nature and causes of injury, duration between injury and presentation and impact of ocular trauma in children.

### Methodology

This is prospective cross sectional hospital based study (January 2019 – January 2021) conducted in the department of ophthalmology Government Medical College Srinagar among the children having history of ocular injuries. We included 150 eyes of 145 children during the study period. Consent was obtained from parents of all children. Those who did not agree to get either medical or surgical treatment in our hospital and whose presenting visual acuity could not be taken were excluded from the study. Specially designed Proforma was used which included information on demographic data, nature and cause of injury and duration between injury and presentation for admission. Ocular injuries were classified into open globe injuries, closed globe injuries and lid injuries as given by international trauma classification group.

Visual acuity assessment was performed with catford drum and k-pictures and Lea-symbols in preverbal children. Snellen's distant visual acuity chart was used for the verbal and school going children. The cases where surgical intervention or hospitalization was not required were treated medically on OPD basis.

### Results

Out of 150 ocular injuries, male child had higher incidence of ocular injury in 105 eyes compared to 45 eyes in female children and male to female ratio was 2.3:1. Mean age of study children was 7.2 years with mean age of male children was  $7.63 \pm 3.8$  years whereas that of female children was  $6.2 \pm 4.0$  years which was found to be statistically significant (P value 0.041). Ocular trauma occurred frequently in age group of 0 -5 years (39.3%) followed by 6 -10 years (36%) and >10 years age group (24.7%). Among 150 cases of ocular injury 140 (97%) was unilateral and 5 (3%) children sustained bilateral eye injury. Right eye injury was observed in 78(52%) of cases and 72(48%) in left eye. 54.7 % of ocular injury cases presented within 24 hours of eye injury as illustrated in table 1.

**Table 1** Demographic profile of children with ocular trauma

Age( mean= 7.2 years)	No. of Participants (n=150)	Percentage %
0>5	59	39.3
>5-10	54	36
>10	37	24.7
SEX		
Male	105	70
Female	45	30
Eye involvement		
Right	78	52
Left	72	48
Unilateral cases	140	97
Bilateral cases	5	3
Time of presentation		
<24 hours	82	54.7
24 hours -1 week	58	38.7
1week -1month	5	3.3
>1month	5	3.3

**Characteristics No. of Participants Percentage (%) 82**

Initial (presenting) visual acuity was in the category of 6/6- 6/18 in 57%; 6/18-6/60 in 9%, <6/60-3/60 in 2% and <3/60 in 32% of cases. None of the children had NPL vision at the time of presentation following trauma as shown in table 2. Close globe injury (75%) was most frequent impact of ocular injuries among children in this study followed by open globe injury (25%).

Among 113 close globe injury cases, large proportion of cases had subconjunctival hemorrhage (34%) and hyphema (22%) as second common finding. Out of 37 cases of open globe injury 5 cases were associated with endophthalmitis at presentation. Majority of open globe injury was due to sole trauma in cornea 30 (81%), and rest was associated with scleral perforation as demonstrated in table 4 and 5.

**Table 2** Place and agent causing ocular trauma

Place of injury	No. of participants(n=150)	Percentage%
House	64	43
Playground	57	38
Classroom	26	17
RTA	3	2
Agent for ocular trauma		
Sharp object	76	51
Blunt object	62	41
Fire crackers	10	7
Chemicals	2	1

**Table 3** Visual acuity at presentation in injured eyes

Visual acuity	No. of eyes(n=150)	Percentage%
6/6-6/18	85	57
6/18-6/60	14	9
6/60-3/60	3	2
<3/60	48	32

**Table 4** Classification of ocular trauma in injured eyes

Type of eye injury	No of eyes(n=150)	Percentage%
Open globe injury	37	25
<b>Zone I</b>	<b>30</b>	
<b>Zone II</b>	<b>2</b>	
<b>Zone I+II</b>	<b>4</b>	
<b>Zone I+II+III</b>	<b>1</b>	
Closed globe injury	113	75
<b>Zone 1</b>	<b>69</b>	
<b>Zone II</b>	<b>25</b>	
<b>Zone III</b>	<b>3</b>	

**Table 5** Impact of ocular injury in trauma eyes

Ocular impact of trauma	No. of eyes(n=150)	Percentage%
Subconjunctival Hemorrhage	39	26
Hyphema	25	17
Conjunctivitis	6	4
Lid Ecchymosis	8	5
Lid Laceration	8	5
Corneal Ulcer	9	6
Corneal Foreign Body	9	6
Corneo-scleral Perforation	37	25
Comotio Retinae, Retinal Ischemia	3	2
Conjunctival Laceration	3	2
Corneal Abrasion	3	2

## Discussion

We found male children had higher tendency for ocular injury than female which is similar to findings of other literatures

such as Caroline J MacEwen et al<sup>7</sup>, Shoja et al,<sup>8</sup> Saxena et al,<sup>9</sup> and this may be due to fact that girl children are more involved with indoor games where as boys are involved in more outdoor and aggressive games. However, in contrast to the higher frequency of ocular trauma in younger age group 0-5 years in this study, other study has shown 5-10 years of age group children more vulnerable for ocular trauma<sup>10</sup>. This variation of finding may be possibly due to lack of surgical facility for younger children at these centers and this may be the reason for relative older children as common age for ocular trauma in other study in comparison to our current study.

House was the commonest place for eye injury (43%) as in many similar studies by Kaur et al,<sup>11</sup> Angelino et al<sup>12</sup>, This is followed by 38% in playground and school classroom (17%) as third site for ocular injury. This disagrees with study findings from MacEwen et al<sup>7</sup>, where school is more frequent than playground. Study done in western Nepal showed 55.5% of the children had sustained trauma in the field<sup>10</sup>.

In this study the most frequent agent of eye injury was sharp objects (51%) and this finding was comparable to studies from Kaur et al<sup>11</sup> who had 73.67%, but this finding was not supported by Angelino et al,<sup>12</sup> and Aboel-Fetoh et al<sup>13</sup>, study. Sports related ocular injury accounted only in 8.7% of cases in our study however it is reported to be higher in other study<sup>4,7</sup>. This difference may be due the difference in daily activities of children among various countries worldwide.

Early presentation within 24 hours of ocular trauma was seen among 45.3% of cases in this study. However, 54.7% of patients presented late after ocular trauma ranging after 24 hours to 1 month and late presentation may be possibly due to ignorance, illiteracy, poor socioeconomic condition and difficult to access hospital. Among all, 42% patients underwent surgical intervention.

The cases requiring surgical intervention in cases of ocular injury is variable from different parts of the world 17.6%-58.3%<sup>12-15</sup>.

Closed globe injury (75%) was the most frequently observed ocular injury in children in our study, which is consistent with the reports from Angelino et al<sup>12</sup>, Aboel-Fetoh et al<sup>13</sup>, Where as open globe injury was the most common cause of ocular injury in studies done Saxena et al<sup>9</sup>, Shoja et al<sup>8</sup>, Hosseini et al<sup>16</sup> We found open globe injury to be 25% among all children with ocular trauma.

Out of 37 open globe injury, corneal perforation (67.56%) was the commonest ocular manifestation found. This finding is in consistent with reports from Saxena et al 44%,<sup>9</sup> Angelino et al<sup>12</sup> 66.7%. None of the cases in our study had intraocular foreign body.

Majority of children (56.7%) had normal vision in trauma eye at presentation with visual acuity category of 6/6-6/18.

Overall we found, 25% of cases of open globe injury, 75% of cases of closed globe injury. This finding was consistent with study reported by Saxena et al<sup>9</sup> and Juan et al<sup>15</sup>, where higher percentage of cases had no visual impairment in closed globe injury. We found incidence of post-traumatic endophthalmitis rate at presentation was as 8.1%, which seems to be lesser in comparison to other studies (14.0%<sup>16</sup>, 11.91%<sup>7</sup> and 54.16%<sup>17</sup>) this may be due to that other studies had only open globe injuries cases in their study.

Uncommon causes of eye injury in the present study were injury caused by bird beak, bone chip. We have observed the injury trend during vacations.

Open globe injuries present more potential for poor vision than the closed globe injuries<sup>9,18</sup>. In our study visual outcome was poor in patients with posterior segment trauma which is consistent with the findings demonstrated by Agarwal et al<sup>19</sup>.

## Conclusion

As this study was done in a limited time period sample size is small. The irreversible nature of

visual loss and immense morbidity associated with it need to be emphasized and publicized. Prevention campaign of ocular trauma is still vital for reducing morbidity and treatment costs associated with pediatric ocular injuries. Parents, elders, teachers and caretakers have an important role to play in prevention of injuries in children. We recommend government and non-government organization to look at the severity of ocular trauma and to take necessary ocular trauma prevention campaign.

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