



UNDERSTANDING PATTERNS OF PAEDIATRIC OCULAR INJURIES: INSIGHTS FROM A STUDY IN CENTRAL INDIA

Ophthalmology

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ABSTRACT

Introduction – Paediatric ocular trauma requires timely diagnosis and early action in order to prevent amblyopia and blindness. Aim – To evaluate the pattern and clinical characteristics of children (<19 years) with ocular trauma presented to emergency. **Materials And Methods** – This is a cross-sectional study on paediatric patients with ocular trauma who presented to Emergency Department of Lala Lajpat Rai Hospital, Kanpur during 6 months period in 2024. Various epidemiological parameters like age, sex, residence and location of injury were analysed. Comprehensive ocular examination was done with prompt treatment. **Results** – Out of 108 patients, 84 (77.78%) were boys and 24 (22.22%) were girls. The maximum patients were from 16-19 years (35.18%) followed by range of 11-15 years (25.92%). The most common place of trauma was identified to be on road (32.41%). Almost 50% of all the paediatric patients came from rural background. Maximum patients presenting to hospital were in the range of 24-48 hours (43.52%) time gap from their trauma. The most common type of ocular trauma was blunt mechanism (57.40%). The most common complication was hyphaema (13%). Most of the cases presented were of ocular adnexal injuries (51.85%). Globe injuries constituted 10.18% whereas orbital fractures were 14.81%. **Conclusion** – Paediatric ocular trauma is mostly preventable and needs prompt intervention. Parents developing awareness for risk factors of ocular trauma will develop lesser chances for amblyopia and complications in children.

KEYWORDS

Ocular trauma, Paediatric, Hyphaema, Globe injuries, Amblyopia.

INTRODUCTION

Ocular Trauma is the leading cause of acquired unilateral blindness in the paediatric age group [1]. The outcome of eye injuries in the paediatric age group are more grave compared to the adults as ocular maturity is not achieved until 10 years, thereby increasing the risk of amblyopia and the years of visual handicap [2]. Worldwide, ocular trauma admissions in children account for 8 to 14 % of total emergency trauma admissions and the incidence of severe visual impairment ranges from 2 to 14% [3].

Eye injuries add to socioeconomic burden to parents and also affects schooling, psychological, social, emotional and monetary aspects of a child [4].

In happy chance, 90% of ocular injuries in children are preventable [5]. Most ocular injuries can be prevented by minor precautions and easy protective measures [6].

Ocular emergency in paediatric group requires concise patient history, immediate examination, basic ocular tests as appropriate management and timely referral proves to be good prognostic factor.

Eye trauma is more common in developing countries than in developed countries [7-8]. The most common emergency admission is with open globe injuries and requires high priority management [9].

The prevalence of childhood ocular emergencies varies from region to region and with demographic profile of the child along with potential risk factors for immediate sequelae of the event [10-11].

The present study is carried out to identify various etiological factors in the ocular trauma, evaluate the pattern of paediatric ocular trauma in this zone of Central India.

MATERIAL AND METHODS

The present study was a prospective cross-sectional study carried out in Lala Lajpat Rai Hospital, Kanpur during 6 months period [2024]. The demographic profile of all patients included age, sex, residential area, date, time and location of injury.

Proper local examination of both eyes was done which included laterality of eyes, ocular movements, fundal glow, vision and intraocular pressure. Importance for pupillary reactions was considered to appraise the optic nerve involvement.

Slit lamp examination and fundoscopy was especially done for patients who presented with degraded vision. CT scan of head and orbit along with ultrasound of the involved eye was obtained.

Patients requiring surgical treatment were admitted and appropriate treatment was given, explaining poor prognosis to their guardian. Rest were treated on outpatient basis, simplifying them the dose and frequency of medications for their children.

Chi Square tests were used to study the significance between the groups (one with complications and without complications). We contemplated the existence of a statistically significant association between groups only when $p < 0.05$.

RESULTS

Considering the ocular emergency for the age group less than 19 years, a total of 108 patients were included in this study. Among the patients, 84 were male and rest 24 were females in all age groups [TABLE 1]. The majority of the patients were from rural backgrounds [TABLE 2]. Regarding the location of injury, it was observed that in our study, most of the injuries are of road traffic accidents followed by injury in playgrounds. Injury in home and schools accounted for 19.44% and 16.67% respectively [TABLE 3].

SEX	TOTAL CASES	CASES IN %
Males	84	77.78%
Females	24	22.22%

P value = 0.018906

[TABLE 1] Explaining The Gender Proportion In %

AREA OF RESIDENCE	TOTAL CASES	CASES IN %
Rural area	54	50%
Semiurban	23	21.29%
Urban	31	28.71%

P value = 0.01805

[TABLE 2] Illustration Of Patients With Respect To Their Residential Location

PLACE OF INJURY	TOTAL CASES	CASES IN %
Home	21	19.44%
RTA	35	32.41%
School	18	16.67%
Playground	34	31.48%

P value = 0.004495

[TABLE 3] Categorising Their Place Of Injury In %

The right eye was involved in 40 subjects (37.03%) and left eye in 48 subjects (44.44%) with 20 cases as bilateral involvement (18.51%). Most of the ocular injuries were in the age group 16-19 years followed by 11-15 years. [TABLE 4]

Most common mode of trauma was blunt mechanism (n= 62; 57.40%).

[TABLE 5]

AGE (YEARS)	TOTAL CASES	CASES IN %
0 to 5	22	20.38%
6 to 10	20	18.52%
11 to 15	28	25.92%
16 to 19	38	35.18%

P value = 0.000303

[TABLE 4] Age Frequency Of Patients With Ocular Trauma

TYPE OF INJURY	TOTAL CASES	CASES IN %
Blunt	62	57.40%
Penetrating	33	30.56%
Thermal / Chemical	13	12.04%

P value = 0.0001

[TABLE 5] Simplifying The Types Of Injury In %

The patients presented to this tertiary care were mostly between 24 to 48 hours from time of injury followed by within 24 hours from time of trauma. [TABLE 6]

TIME OF PRESENTATION SINCE TRAUMA	TOTAL CASES	CASES IN %
<24 hours	41	37.96%
24 - 48 hours	47	43.52%
>48 hours	20	18.52%

P value = 0.000121

[TABLE 6] Analysing The Different Time Period As Per Their Presentation To Hospital Since Trauma

The most common complication was hyphema (13%) while globe rupture was seen in 3.7% (n = 4). 22.22% of patients had visual acuity below 3/60. 8.3% of patients presented with no PL and 4.6% of patients presented with PL with inaccurate PR. Few patients (n = 5; 4.6%) were documented to be inco-operative.

Commonest types of injury were injury of ocular adnexa (n = 56; 51.85%). Globe injuries constituted 10.18% (n = 11) whereas patients with orbital fractures were 14.81% (n = 16).

Classification of Ocular Trauma using BETT:-

- Closed Globe injury: n = 67; 62.03%
- Open Globe injury: n = 11; 10.18%
- Adnexal injury: n = 56; 51.85%

(Note: Since the same trauma can have many presentations hence >1 category is applied to one episode.)

DISCUSSION

The present study is first of its type from the Northern India depicting the demographics of the ocular trauma in the paediatric age group. The hospital received patients from all the parts of the Central India including rural areas.

In the current study, we have observed that most of the cases with ocular trauma resided in rural areas (n = 54; 50 %) followed by urban population (n = 31; 28.71 %). Similar findings were by Katiyar et al [12] in rural children accounting for 78% of ocular trauma. Chakraborty et al, [13] in their study, from eastern India noted that the majority of children were from urban population (70%). The dissimilarity in the rural and urban areas could be due to lack of appropriate eye care facilities in rural areas.

We have observed that males (n = 84; 77.78%) were more affected than females (22.22%) in our study. This preponderance to males over females is due to the higher chances of boys to engage in outdoor activities [14]. This trend seen in males could be also explained by the adventurous and belligerent nature of boys along with the Indian frame of mind, giving more importance to males with respect to illness [15-16]. In the study by Nelson et al performed in the Wills eye hospital, eye injuries occurred twice more frequently in boys than in girls with no age prevalence [17].

We found that children aged 16 - 19 years were most affected followed by those aged 11-15 years. In a case series conducted in Denmark [18], the mean age was 13 years. They stated that this may be due to the fact that the 13-18 years age group is more frequently engaged in individual entertainment, games and recreational activities.

In our study, the most common place of injury was the road (n = 35; 32.41%) followed by the playground (n = 34; 31.48%) and home (n = 21; 19.44%). Our finding was similar in this aspect as per previous literature. El Sebaity et al [19] reported high proportion of paediatric ocular trauma occurring on road (54.7%) in contrast to findings of Dulal et al [20], who reported only 0.2% injuries on road. As per the previous records, the preschool kids were injured more likely at home as they spend most of their time at home. The age group above 10 years were associated more with road traffic accidents and playground as children are more attracted to recreational and sport activities at this phase of their life [21-23]. This can be prevented by their parents being more vigilant and protective for their kids when they are out of their home.

In this study, open globe injuries were strikingly less frequent when compared to closed globe injuries. This was consistent with the Finland - Helsinki eye trauma study [24] having lower percentage of open globe injuries (40.59%) when weighed up against closed globe injuries (59.41 %). However, few studies showed that open globe injuries dominated, explaining on the grounds that patients with severely injured eyes affected their vision much more than patients with close globe injuries [25]. Poor prognosis has been associated mostly with open globe injuries due to the fact that repeated surgeries and chances of suspected infections are high in severely injured patients [15].

4.629% of total documented injuries had fire crackers related injuries. The irresponsible behavior of parents, poor standards of local market crackers and adventurous attitude of kids lead to an increase in incidences of fire crackers related ocular injuries [26]. This trend was seen mostly during the festival season [27].

In our study, most of the cases presented between 24-48 hours of the trauma (n = 47; 43.52%) followed by within 24 hours of the injury (n = 41; 37.96%). A study by Saxena et al [28], 34% of children presented 24 hours after injury. Wadei et al [22] in paediatric Egyptian ocular trauma study showed that 50% of children presented 24 hours after injury. Significant delays in presentation could be due to lack of facilities in transportation in remote areas, ignorant behavior of parents and late recognition of the trauma and related problems.

The major concern to paediatric trauma is spreading awareness in the level of medical related authorities in village/towns in order to prevent amblyopia and blindness in concerned paediatric group [29].

CONCLUSION

The ocular trauma in paediatrics is crucial in order to avoid the amblyopia in them and prevent the psychological and financial burden to oneself and to the society. Emergency department involving quick response team should be adequately managed in order to prevent the sequelae and advise the appropriate treatment along with guarded prognosis. Being one of the most common sources of preventable blindness, paediatric ocular trauma can be prevented easily by spreading the awareness about the risk factors leading to such events. Potential risk factors like sharp objects, firecracker and chemicals should be kept out of the reach of children. The parents, teachers and guardians play an important role in preventing these traumas and adopting a supervisory behaviour towards their child.

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