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Presentation of Pediatric Ocular Trauma to the Ophthalmology Unit of a Tertiary Care Hospital

Mubashir Rehman¹, Adnan Ahmad¹, Afrasyab², Zakir Hussain², Jawad Humayun³, Irfan Aslam Khattak⁴

Abstract:

Purpose: To determine the frequency of presentation of pediatric ocular trauma presented to emergency department of ophthalmology unit of a tertiary care hospital.

Methodology: Patients were selected from emergency and outdoor patient department. Detailed ocular examination including visual acuity, extra ocular movements, adnexal examination, slit lamp examination of conjunctiva, cornea, anterior segment and posterior segment examination was carried out. Digital Xray orbit (Antero Posterior and Lateral view) was carried out to rule out intra ocular, intra orbital foreign body and orbital fractures.

Results: Total number of patients involve in this study were 101. Eighty one were male and 20 were female. Patient age ranges from 1 year to 16 years with mean age \pm SD = 12 ± 2 . Most of the patients were in age group 11-16 years (55%) and most frequent ocular trauma was open globe injury in 69.3% patients. There was statistically significant difference among age groups in type of Ocular trauma, open globe injury being the most common one in age group 11-16 years (P value = 0.0032).

Conclusion: In pediatric age group most common injury following ocular trauma is open globe injury followed by closed globe injury, chemical injury, thermal injury, orbital wall fracture and eyelid & lacrimal laceration. Majority of eye injuries in pediatric age group are preventable and this cause of visual disability can be greatly reduced by implementation of safety precautions such as keeping sharp objects out of children reach. *Al-Shifa Journal of Ophthalmology 2023; 19(1): 20-25. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*

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Introduction:

Ocular trauma is one of the neglected causes for preventable visual disability and avoidable visual morbidity throughout the world specially in young adults and pediatric age group^{1,2}. Almost 75% of all ocular emergencies, trauma is by far the most common reason for ocular damage³. Trauma to eye is the reason for blindness in 1.6 million people throughout the world causing bilateral damage in 2.3 million people and unilateral visual loss in 19 million people; making it most common cause of unilateral visual disability worldwide¹. Therefore, traumatic eyes makes a significant burden on health care system.²

It is estimated that 22–55 percent of all ocular injuries occur in pediatric age group and hence ocular trauma is the main cause of monocular blindness in children⁴. In

Chaoshan, a review of hospitalized patients for orbital and ocular injuries in all age groups found that out of all 23.6% were in the age group of 0–145. Furthermore population-based studies on ocular trauma in children have shown that approximately two-thirds of all injured patients were males⁵.

Ocular trauma has always been a subject of controversy and debate for the experts specially ocular trauma classification and scoring has been challenged and criticized by many authors⁶. Cao H et al⁵ in their study have classified pediatric ocular trauma into open globe injury, closed globe injury, chemical burn, thermal burn to eye, eyelid laceration and orbital wall fractures.⁵ The prevalence of different types of ocular trauma in children has shown in a study conducted in china⁵ in which open globe wound accounted (54.1%), closed globe injuries (38.8%), chemical burn (1.0%), thermal burns (0.8%), lacrimal apparatus and eyelid laceration (7.0%) and orbital wall fractures (0.4%).⁵

Ocular trauma in pediatric age group is increasing in developing countries² and it is of particular concern for ophthalmologists because injured eyes in this age group are prone to amblyopia⁵. Ocular trauma is a particular cause of psychological impacts not only on the child but also on his family members and hence counselling of the victim and his family particularly parents is one of the prime components in management of such patients⁷.

Preventive measures and awareness are particularly required in urban areas of low socioeconomic status in order to avoid this preventable cause of blindness². A well-established and organized epidemiological data regarding ocular trauma analysis is required to plan health care strategies for prevention and management of such injuries particularly in children⁸.

Little has been on record on types of ocular trauma in our region and lots of our new generation is exposed to this problem. We usually mismanage it because of lot of factors like resources, man power and

especially education of parents regarding this problem. In this study we wanted to find out which type is more prevalent, so that we can more focus on that particular area to minimize the damage.

Material and Methods:

Study design: Cross sectional (Descriptive study)

Different types of ocular injuries were defined before starting the study. Open globe injury was defined as a full thickness wound of the corneo-scleral envelope while closed globe injury was referred to blunt trauma where corneo-scleral wall of the globe is intact. Chemical injury is injury due to various chemicals like acids and alkalis. Thermal injury is injury due to direct impact of heat. Lacrimal apparatus and eyelid laceration are partial or full thickness defect in the eyelids and tearing of lacrimal canaliculi and damage to lacrimal sac. Orbital wall fractures are fractures involving orbital margins.

Sample size was calculated using WHO sample size calculator, whereby the prevalence of eyelid laceration is 7%, Absolute precision = 5%, Confidence level = 95%. Sampling Technique used was non probability consecutive sampling.

All patients having age less than 16yrs age i.e., child age group, having history of trauma to the eye/eyes of either gender presented within one week of ocular trauma were included in the study. Patients not willing to provide an informed consent, patients with co morbidities like maxillary fracture, spine injuries and skull fractures and patients whom had already undergone primary intervention elsewhere were excluded from the study.

Patients were selected from emergency and outdoor patient department. The purpose and benefits of the study were explained to the patients and written informed consent obtained from each patient. A data collection Performa was filled for each patient having his/her biodata and detailed record of the injury. A brief history

regarding inciting material, duration of injury and ocular pain noted. Relevant brief general and systemic examination carried out. Detailed ocular examination of all patients was carried out including visual acuity, extra ocular movements, adnexal examination, slit lamp examination of conjunctiva, cornea, anterior segment and posterior segment examination. Digital Xray orbit (Antero Posterior and Lateral view) was done to rule out intra ocular, intra orbital foreign body and orbital fractures. Data was analyzed using SPSS version 20.0. Descriptive statistics were calculated for all variables. Frequencies and percentages were calculated for categorical variables like gender and type of ocular trauma. Mean + Standard Deviation was concluded for numeric variable like Age. Type of ocular trauma was stratified among age and gender to see effect modifiers. Post stratification Chi Square test was applied. AP-value of <0.05 was considered as significant. All the results were presented in the form of tables.

Results:

Total number of patients involve in this study were 101. Eighty one (81.00 %) were male and 20 (20.00%) were female.

Patient age ranges from 1 year to 16 years with mean age \pm SD = 12 \pm 2. Most of the patients were in age group 11-16 years (55%) table No: 1.

Frequency of different types of ocular trauma is shown in table No: 2 with most frequent ocular trauma open globe injury in 69.3% patients followed by closed globe injury (19.8%), chemical injury (1.9%), thermal injury (0.9%), orbital wall fracture (0.9%) and Eyelid & Lacrimal laceration (6.9%)..

Age wise frequency of ocular trauma is shown in table No: 3. There was statistically significant difference among age groups in type of Ocular trauma, open globe injury being the most common one in age group 11-16 years (P value = 0.0032).

Gender wise stratification of ocular trauma is shown in table No: 4. In gender there was no significant statistical difference in type of Ocular trauma (P value = 0.687).

Table No.1 - Age distribution

Age group	Frequency
1-5 years	5 (5%)
6-10 years	40 (40%)
11-16 years	56 (55%)
Total	101 (100%)

Table No.2 - Pediatric ocular trauma

Type of Ocular trauma	Frequency
Open globe injury	70 (69.3%)
Closed Globe injury	20 (19.8%)
Chemical injury	2 (1.9%)
Thermal injury	1 (0.9%)
Orbital wall fractures	1 (0.9%)
Eyelid & Lacrimal laceration	7 (6.9%)
Total	101 (100%)

Table No.3 - Age wise stratification of ocular trauma

Type of Ocular trauma	Age Groups			Total
	1-5 years	6-10 years	11-16 years	
Open globe injury	1(0.9%)	20 (20.04%)	49 (48.37%)	70 (69.31%)
Closed Globe injury	3 (3.03%)	14 (13.74%)	3 (3.03%)	20 (19.8%)
Chemical injury	0 (0%)	1 (0.9%)	1 (0.9%)	2 (1.8%)
Thermal injury	0 (0%)	0 (0%)	1 (0.9%)	1 (0.9%)
Orbital wall fractures	0 (0%)	1 (0.9%)	0 (0%)	1 (0.9%)
Eyelid & Lacrimal laceration	1 (0.9%)	4 (4.42%)	2 (1.8%)	7 (7.29%)
Total	5 (4.83%)	40 (40%)	56 (55%)	101 (100%)

P value = 0.0032.

Table No.4 - Gender wise stratification of ocular trauma

Type of Ocular trauma	Gender		Total
	Male	Female	
Open globe injury	57 56.14 (0.01)	13 13.86 (0.05)	70 (69.3%)
Closed Globe injury	16 16.04 (0.00)	4 3.96 (0.00)	20 (19.8%)
Chemical injury	1 1.60 (0.23)	1 0.40 (0.92)	2 (1.9%)
Thermal injury	1 0.80 (0.05)	0 0.20 (0.20)	1 (0.9%)
Orbital wall fractures	1 0.80 (0.05)	0 0.20 (0.20)	1 (0.9%)
Eyelid & Lacrimal laceration	5 5.61 (0.07)	2 1.39 (0.27)	7 (6.9%)
Total	81 (80%)	20 (20%)	101 (100%)

P value = 0.8424.

Discussion:

Ocular trauma is an important cause of ocular morbidity in pediatric age group. Children and even adolescents are often unaware of the consequences of high-risk behavior, and thus are more vulnerable to ocular trauma than adults. In different studies worldwide the incidence of severe

visual loss or impairment caused by ocular trauma in children varies from 2% to 14%.⁹ In general, children are more prone to ocular trauma because of their natural curiosity, limited common sense, and immature motor skills. The causes of eye injuries, therefore, are highly related to physical and psychosocial development.

The type of injury and its severity are known prognostic factors of final visual outcome following trauma. Madan et.al. showed in their study that the most common cause of ocular trauma was sports related injuries in a closed globe injury and wooden stick in the open globe injury. They also mentioned that uncommon causes of eye trauma in their study were injury caused by a hen's leg, bird beak, dog bite, and cooker blast.¹⁰

In our study majority of patients were boys that are 80% and most of the patients were older than 5 years of age. Similar results are shown in international studies. Al-Mahdi et al in their study showed that majority of victims of ocular trauma were boys (77.4%) with mean age at admission of 6.63 years. They also noted a higher incidence of ocular trauma in children above 5 years of age than those below this age (58.5%).¹⁰

In another study conducted by Rohit Saxena Ret al it was shown that majority of injuries occurred in children of 5 years and older (87.7%) with 133 (65.1%) boys and 71 (34.9%) girls.¹¹ In our study we found that the most common type of ocular trauma was open globe injury that is 69.3% followed by closed globe injury (19.8%), chemical injury (1.9%), thermal injury (0.9%), orbital wall fracture (0.9%) and Eyelid & Lacrimal laceration (6.9%).

Shoja et al also showed in their study that majority of ocular trauma occurred in the age group of 8-12 years (58.3%). There were 40 (66.6%) boys and 20 (33.3%) girls. Majorities of injuries occurred in streets-roads (41.6%), followed by home (25%). Open globe injuries accounted for 51.7% of injuries, closed globe injuries for 35% and chemical injuries for 13.3%.¹²

Strahlman showed that eye injuries in 11 - 15-year old children occurred at more than twice the rate than for younger children. Also male patients were more commonly affected than females measuring a ratio of approximately 4:1. Accidental blows and falls were found to be the most common cause of pediatric ocular trauma accounting 37%. Sports and recreational activities

accounted for 27% and non-penetrating injuries 35 % in 11- 15-year-old children. Other important causes of ocular trauma were burns (9%), firearm injuries (4%) and car crashes (11%).¹³

Rychwalski found in their study that ruptured globe and ocular contusion comprises 57% of all trauma cases in children.¹⁴ While Lie et al showed that in pediatric ocular trauma the ratio of different injuries were as follow: open globe injuries (71.2%), corneal lacerations (40.4%), lens damage (27.6%), hyphema (25.6%), eyelid lacerations (23.7%) and closed globe injuries (10.3%).¹⁵

Pediatric ocular trauma puts a real socioeconomic burden on healthcare system. Therefore it is of paramount importance to develop preventive measures of eye injuries in children.¹⁶ Children should be educated about the dangers and consequences of ocular trauma. Parents should play their role in this respect by following protective measures e.g. wearing protective eyewear while doing tasks risky for the eyes.¹⁷ In this way children need to be encouraged to wear safety goggles under similar circumstances. Majority of eye injuries in children occur in the home setting.¹⁸ So it is important to make homes a safer place by applying protective measures including avoiding sharp corners and edges in furniture and keep all chemicals and dangerous tools and equipments out of the reach of children.¹⁹ Parents should discourage their kids playing with potentially dangerous toys.²⁰

Conclusion:

We concluded that the most common type of ocular trauma in pediatric age group was open globe injury followed by closed globe injury, chemical injury, thermal injury, orbital wall fracture and eyelid & lacrimal laceration.

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