



PROFILE OF OCULAR TRAUMA IN CHILDREN AND ADOLESCENTS AT A TERTIARY CARE HOSPITAL IN KASHMIR

Ophthalmology

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ABSTRACT

Introduction: Ocular trauma is one of the most predominant causes of acquired, mono-ocular blindness, especially in children and adolescents. The present study aims to identify and evaluate the patterns and etiology of ocular trauma occurring in children and adolescents across various districts of Kashmir. **Material And Method:** The study was an observational study conducted in the department of Ophthalmology, GMC Srinagar for a period of two and a half years from March 2019 to August 2021. A detailed history regarding the age, time and mode of injury and any previous treatment was taken. This was followed by a detailed ocular examination including visual acuity, extra-ocular movements, SLE and fundus examination. **Results:** A total of 229 patients were included in the study. The mean age of the patients was 13.6 years. Adolescents falling into the age group 16-19 years (43.23%) were most affected. Out of 229 patients included in the study, 150 (65.5%) sustained open globe injuries while 57 (24.9%) sustained closed globe injuries. Shotgun pellets were the most common cause of injury, accounting for (31.8%) of the total cases. The final visual acuity was recorded at the end of 03 months. **Conclusion:** Paediatric ocular trauma is associated with great degree of morbidity and is a major cause of visual handicap in younger age group. It is, however, preventable to a great extent.

KEYWORDS

Trauma, visual acuity, pellets

INTRODUCTION

Ocular trauma is one of the most predominant causes of acquired, mono-ocular blindness, especially in children and adolescents. The human eye is the third most common organ affected by trauma after the hands and feet.^{1,2} In addition to the risk of amblyopia, it is a major visual handicap that adversely affects the psychological and social development of a child. Ocular trauma roughly accounts for about 8-14% of all childhood injuries.³ The incidence and circumstances of injuries varies between developing and developed countries and even from region to region in a country. The present study aims to identify and evaluate the patterns and etiology of ocular trauma occurring in children and adolescents across various districts of Kashmir Valley.

MATERIAL AND METHOD

This study was an observational study conducted in the department of Ophthalmology, GMC Srinagar which is one of the main referral center in Kashmir for such cases. The study was conducted for a period of two and a half years from March 2019 to August 2021. The data was collected after informed consent from parents and guardians.

Inclusion Criteria:

The study included patients from age 0 to 19 years having sustained trauma in one or both eyes attending the eye OPD and Emergency ward.

Exclusion Criteria:

- Children with Birth injuries.
- Old injuries, duration more than three months old.
- Trauma in an already blind or physical eye.
- Critical, unconscious and comatose patients.



Fig 1 Pre- And Post Operative Picture Of A Patient With Globe Rupture And Lid Laceration

A complete history regarding the age, time and mode of injury and any previous treatment taken. This was followed by a detailed ocular examination including visual acuity (VA), extra-ocular movements, Slit lamp examination (SLE) and fundus examination. In infants and pre-school children, VA was done by observing fixation and following of objects, light and/or using pictures. In older children and adolescents, illiterate-E and Snellen's visual acuity was used. B-scan USG was done, wherever required. Radiological investigation including X-ray and CT-Scan was done to rule out orbital fracture and for the localization of Intra-ocular foreign body in suspected cases.(FIG 1)

Management varied according to the type of injury. Superficial injuries including minor corneal abrasions, peri-orbital edema, ecchymosis, superficial foreign bodies were managed conservatively, while open globe injuries including corneal and scleral perforations and globe rupture were admitted and an initial primary closure of wound was done, thus restoring the anatomical structure of globe which was followed by vitrectomy and/or lensectomy with or without IOL implantation wherever needed. Best Corrected Visual Acuity (BCVA) was noted in all patients after three months.

The BETTS (Birmingham Eye Trauma Terminology System) classification was used to classify the type of injury (FIG.2). Other classification systems include classification according to location of wound (by ocular trauma classification group)⁴ and a new classification system which includes adnexal injuries proposed in 2009.⁵

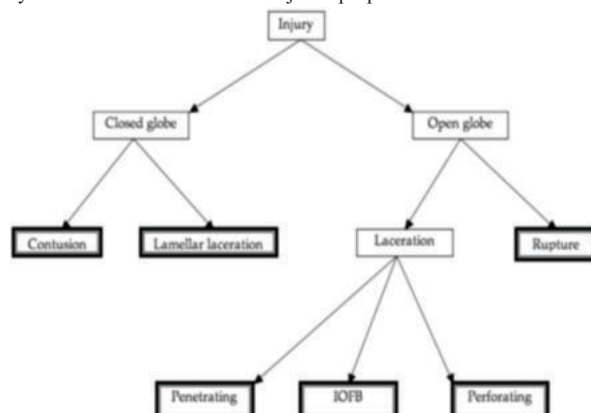


Fig.2 Birmingham Eye Trauma Terminology System Classification Of Ocular Injuries.

RESULTS

A total of 229 patients were included in the study. The mean age of the patients was 13.6 years. Adolescents falling into the age group 16-19 years(43.23%) were the most affected followed by 11-15 years age group (33.62%). There were 178 boys (77.72%) and 51girls(22.56%)

Table 1 and Fig. 3show the age and sex distribution of the study patients.

Table 1 Age Distribution Of Study Patients

Age (in years)	Number	Percentage
0-5	16	6.99%
6-10	37	16.15%
11-15	77	33.62%
16-19	99	43.23%
Total	229	100%

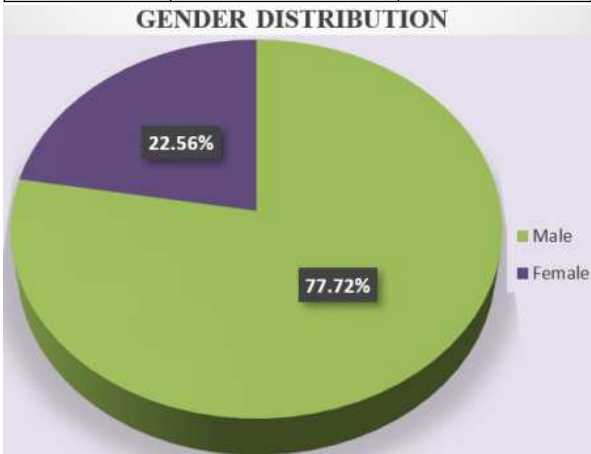


Fig3. Gender Distribution

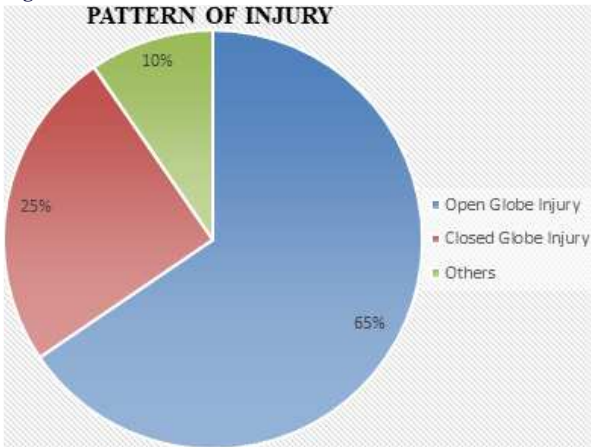


Fig4. Pattern Of Injury

Out of 229 patients, 150 (65.5%) sustained open globe injuries while 57(24.8%) sustained closed globe injuries(FIG.4). 18 patients (7.8%) had adnexal injuries including lid and canalicular tear while 4 (1.74%) patients had chemical injuries. Injuries included 71(31%) cases of corneal tears with and without iris prolapse, 41(17.9%) cases of corneo-scleral (limbal) tears, 36 cases (15.7%) of scleral perforation and 2 (0.8%) cases of globe rupture. Among closed globe injuries, 10(4.36%) patients had hyphaema, 27(11.7%) had superficial corneal and conjunctival foreign bodies, 20(8.7%) had corneal abrasions. (TABLE 2)

Table 2 Pattern Of Injury

Pattern of Injury		Number	Percentage
Open globe injury (65%)	Corneal perforation	71	31%
	Corneoscleral(limbal)	41	17.9%
	scleral	36	15.7%
	Globe rupture	2	0.8%
Closed globe	Hyphaema	10	4.36%

(25%)	Superficial foreign bodies	27	11.7%
	Corneal abrasions	20	8.7%
Others (10%)	Lid and canalicular injuries	18	7.8%
	Chemical injuries	04	1.74%
Total		229	100

CAUSE OF INJURY

Shotgun pellets were the most common cause of injury during 2019-2021, accounting for (31.8%) of the total cases, with the adolescent age group(10-19 years) being the most affected. The pattern of pellet injuries varied and included both open globe(limbal perforation-34.25%, scleral perforation-31.51%, corneal perforation-20.55%) and closed globe injury-13.70% (superficial pellet and globe contusion) (FIG. 5).

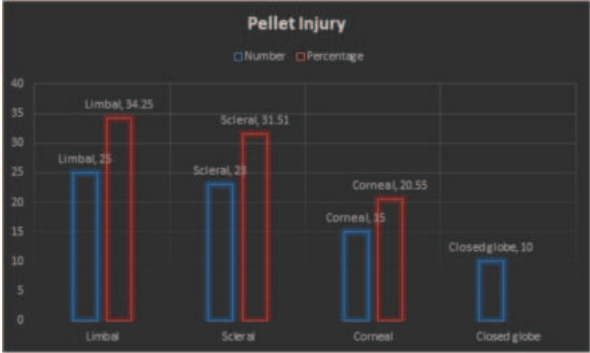


Fig5. Distribution Of Pellet Injuries

Injury with a sharp object like a knife, pencil, pen, scissors, needles and glasses accounted for the second(24.01%) most common cause of injury followed by sports related injury (31.10%) with a ball, bat, racket etc. Trauma with wooden sticks was another major cause of injury, accounting for 25(10.9%) cases. Other causes included firecracker, toy-gun related trauma, trauma with a cow horn, fall on the ground, and exposure to chemicals like acids, hot water burn(20.08%). (FIG.6)

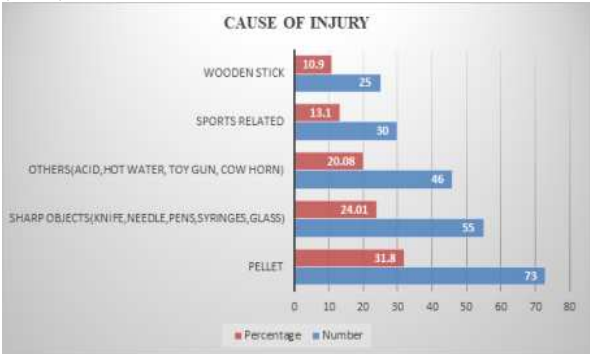


Fig6. Cause Of Injury

Most of the closed globe injuries, including corneal abrasion and corneal foreign bodies, were managed conservatively and most of them retained visual acuity of 6/6. Out of 10 patients(4.36%) with hyphaema, five required hospital admission, but did not require surgical intervention. All open globe injuries required primary surgical repair. Patients were on constant follow up and some severe cases required a second surgical procedure including lensectomy and vitrectomy with or without IOL implantation.

Tab 3. Vision Improvement In The Study Patient Among Open Globe Injuries

VISION	PRE-OPERATIVE		POST- OPERATIVE	
	Number	Percentage	Number	Percentage
No PL	2	1.3	2	1.3
FC- 6/60	62	41.3	27	18.0
6/36 -6/12	41	27.3	58	38.6
>6/12	45	30.0	63	42.0
Total	150	100	150	100

Tab 4. Vision Improvement In The Study Patient Among Closed Globe And Other Injuries

VISION	PRE-OPERATIVE		POST- OPERATIVE	
	Number	Percentage	Number	Percentage
6/6 to 6/9	61	77.2	70	88.6
6/12 to 6/60	18	22.8	09	11.4
Total	79	100	79	100

The final BCVA was recorded at the end of 03 months. Out of 150 open globe injuries, 1.3% had severe vision loss with no PL pre-operative, 41.3% had a visual acuity of less than 6/60, 27.3% had VA of 6/36-6/12 and 30% had VA of 6/12 or better. Following treatment, 42% gained a visual acuity of >6/12 while 38.6% had VA of 6/36-6/12 and 18% had VA of <6/60 while 1.3% continued to have no perception of light. Out of 79 patients (closed globe, adnexal and chemical injuries), 77.2% patients had a visual acuity of 6/9 or better, and 22.8% had a visual acuity of 6/12 to 6/60 before treatment. After treatment, which included both conservative and operative procedures in specific cases, the number of patients with visual acuity 6/9 or better improved to 88.6% while 11.3% retained a visual acuity of 6/12 to 6/60. (TABLE 3 and 4)

DISCUSSION

Very few studies have been conducted to evaluate ocular trauma in pediatric and adolescent age groups in Kashmir. This study was conducted at a tertiary care center, which receives such cases from all districts of Kashmir. The incidence, pattern and mode of injury vary from region to region. **Ashok et al**⁶ conducted a study in Maharashtra where the incidence of injuries was more in rural areas than urban areas. Our study showed a similar trend in which 67% of patients belonged to rural areas while 43% were urban residents.

In our study, males (77.72%) were more affected than females (22.56%). This could be because the males are more active outdoors, adventurous and enjoy a greater deal of freedom. The findings are consistent with other studies, including a study conducted by **Shazia et al**,⁷ in which the male to female ratio was 2.9:1. Another study by **Rajendra P Maurya et al**,¹ where out of 82 patients, 54 (65.85%) were boys and 28 (34.15%) were girls.

The age between 2-7 years was observed to be the most common age group affected as shown in various studies conducted by **Maurya et al**,¹ **Dulal S**,⁸ **McEwen**⁹ and **Al-Bdour**.¹⁰ However, in our study, the majority of the patients belonged to the 10-19 years age group. This can be explained by the fact that adolescents are more vulnerable experimentally, more energetic, outgoing and adventurous and less concerned about the safety.

The most common cause of ocular trauma in our study was injury due to shotgun pellets. These have been used for control of the mobs during our study period. A cartridge of a pellet gun contains a few hundred pellets made of lead which when fired, disperses hundreds of pellets over several hundred meters. These pellets penetrate soft tissues and eye being a delicate structure, is most vulnerable to damage. The injuries caused to the eye are usually of a serious nature and include both penetrating and perforating trauma affecting both the anterior and posterior segment. The pattern of injuries caused by pellets varies. And in our study, limbal perforation was the most common (34.25%), followed by scleral injuries (31.51%), corneal perforations (20.55%) and closed globe injuries (13.70%).

The second most common cause of injury in our study was injury with sharp objects like knife, needle, syringes and glass. This was found more in younger age group who are generally more curious, naïve and less careful and often end up hurting themselves with these objects. These injuries also include corneal and scleral perforations and are grievous in nature.

Other causes include sports related injuries, injury due to fall from height and include both open and closed globe patterns.

The visual outcome varies with the type of injury. The majority of closed globe injuries had better visual outcomes. In our study, 88.6% of patients retained visual acuity of 6/9 or better in the affected eye while only 11.4% of patients had a visual acuity of 6/12 to 6/60 after treatment. On the other hand, open globe injuries cause more serious harm and are often associated with poor visual outcomes, even after proper management. 42% of patients with open globe injuries were

observed to have a visual acuity of >6/12 after treatment. Similar results have been obtained in previous studies.

CONCLUSION

In conclusion, pediatric ocular trauma is associated with a great degree of morbidity and is a major cause of visual handicap in younger age group. It is, however, preventable to a great extent if proper safety precautions are taken.

REFERENCES

1. Rajendra P. Maurya, Virendra P. Singh, Ishan Yadav, Mahendra K. Singh, C.P. Mishra, Prithvi R. Sen, Abhijeet Kunwar. Profile of pediatric ocular trauma at a tertiary eye care center in northern India. *Indian Journal of Clinical and Experimental Ophthalmology*, April-June 2015;1(2):76-73.
2. Norbder E. Injuries as a public health problem in sub-Saharan Africa: Epidemiology and prospects for control. *East Afr Med J* 2000; 77: 1-43.
3. Brophy M, Sinclair SA, Hostettler SG, Xiang H. Pediatric eye injury-related hospitalizations in the United States. *Pediatrics*. 2006;117(6):1263-1271.
4. Kuhn F, Morris R, Witherspoon CD, et al. The Birmingham Eye Trauma Terminology system (BETT). *J Fr Ophthalmol*. 2004;27(2):206-210.
5. Kuhn F, Morris R, Witherspoon CD, et al. A standardized classification of ocular trauma. *Ophthalmology*. 1996;103(2):240-243.
6. Ashok Hukumchand Madan Rajesh Subhash Joshi Preeti Dasharath Wadekar. Ocular Trauma in Pediatric Age Group at a Tertiary Eye Care Center in Central Maharashtra, India. *Clinical Ophthalmology* 2020;14:1003-1009.
7. Shazia Qayum, Rashid Anjum, Shagufta Rather. Epidemiological profile of pediatric ocular trauma in a tertiary hospital of northern India. *Chinese Journal of Traumatology* 21 (2018) 100-103.
8. Carolene J, MacEwen C J, Paul S, Baines P, Desai P. Eye injuries in children: the current picture. *Br J Ophthalmol*. 1999;83:933-6.
9. MacEwen C J, Baines PS and Desai P. Eye injuries in children: the current picture. *Br J Ophthalmol* 1999; 83: 933-936.
10. Al-Bdour M D and Azab M A. Childhood eye injuries in North Jordan. *Int Ophthalmol* 1998;22: 269-273.