



E-ISSN: 2663-8274
P-ISSN: 2663-8266
www.ophthalmoljournal.com
IJMO 2024; 6(1): 41-45
Received: 16-11-2023
Accepted: 21-12-2023

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Epidemiological profile of mechanical ocular trauma in a tertiary care hospital in rural area

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DOI: <https://doi.org/10.33545/26638266.2024.v6.i1a.182>

Abstract

A prospective, hospital-based observational study was carried out at the Faculty of Medical & Health Sciences, SGT University, Budhera – Gurugram, Haryana. The main objective was to study the pattern and outcome of mechanical Ocular trauma in a tertiary care hospital in a rural area. The study included 100 ocular trauma patients who presented to the emergency and outpatient departments of the Faculty of Medical & Health Sciences, SGT University.

The average age of patients was 29 years. The male-to-female ratio of 7:2 suggested that males were more likely than females to sustain ocular injuries. The age group most affected was 20-30 years comprising 37% of the cases.

Analysis of occupational associations revealed that students, farmers and Industry workers were the most commonly associated occupations with ocular trauma, accounting for 47%, 12% and 10% of the cases, respectively. Majority of injuries took place in RTA (Road traffic Accident) (35%), then by Wooden stick (6%), injuries while playing (4%) etc. Most common clinical finding in eye trauma was subconjunctival hemorrhage followed by ecchymosis, corneo-scleral laceration, corneal epithelial defect, with iris prolapse and subluxated lens being least common.

Keywords: Ocular trauma, open globe injury, closed globe injury

Introduction

Eye injuries can occur in a variety of contexts, ranging from small irritations to severe trauma that can cause irreversible vision loss. These injuries can be caused by road traffic accidents, incidents at home, at work, while participating in sports, or as a result of an assault. The eye's fragile structure makes it especially prone to damage, and immediate intervention is critical to avoid further impairment of vision. The Indian Census Bureau estimates a population of 1,393,400,000 in 2021^[1]. An estimated 3,733,333 people experienced ocular damage and its repercussions. There are about 50 million blind persons in India, and the number is increasing by roughly 3.8 million per year. 1.2% of all blind cases are caused by injuries that could have been prevented^[2]. Ocular trauma is the leading cause of ocular crises, accounting for about 3/4th of Ocular emergencies^[3].

Classification of Ocular Trauma (Birmingham Eye Trauma Terminology)^[4]

1. Closed Globe Injuries

- a) Contusion
- b) Lamellar laceration (Partial thickness wound in eye wall)

2. Open Globe Injuries

- a) Penetrating (Entrance wound only)
- b) Perforating (Entrance and exit wound)
- c) IOFB (Intra Ocular Foreign Body)
- d) Globe Rupture

Material and Methods

After receiving the requisite authorization from the ethics committee, a hospital based observational study was carried out on patients suffering an eye injury, presenting to the emergency and outpatient department in Faculty of Medical & Health Sciences, SGT University – Budhera, Gurugram. This study was carried out for the duration of one year from October, 2022 to September, 2023.

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Inclusion Criteria

All patients who reported to the Eye OPD and casualty departments with mechanical eye trauma were included.

Exclusion Criteria

Patients with congenital ocular abnormality resulting in vision impairment were excluded. All individuals who encountered thermal, chemical, ultrasonic, or radiation damage were excluded.

When a patient arrived with a history of ocular injuries, thorough clinical examination was done.

Ancillary diagnostic procedures like x-rays, B-scan, CT scan & MRI scan were advised as per requirement. Patient was treated medically or surgically as needed.

Following treatment, Snellen's chart was used to record the final best corrected visual acuity.

Results

This study included 100 individuals who were treated in the hospital. Our study found that the most common age group impacted by eye trauma was youth, specifically those aged 21 to 30. Our study indicated that the majority of the patients who had ocular trauma were males (78 out of 100), which could be related to outdoor activities and road traffic accidents. The majority of patients (40%) presented within 24 hours of the injury. The most common cause of injury was road traffic accidents, which accounted for 34% of the study population, followed by wooden stick injury, contributing 10% of the study population followed by injury from fall from height (8%) or with iron wire/iron particle (8%). 68% of the patients were managed conservatively however 32% of them required surgical intervention like that of lid repair, cornea/sclera/conjunctival repair, and management of traumatic cataract and iris prolapse. Two of the patients required evisceration; one was involved in a road traffic accident with an open globe injury and a PL -ve eye, so evisceration was performed to prevent sympathetic ophthalmitis, and the second was injured with a brick and developed descemetocele with perforation.

Various mode of injury on presentation to this center is shown in table 1:

Table 1: Mode of Injury

Sr. No.	Mode of injury	No of Patients
1	RTA	34
2	wooden stick	10
3	fall from staircase/height	8
4	Iron particle/Rod corner/iron wire	8
5	Ball	4
6	Cattle Horn	4
7	Wall nail	4
8	Trauma with Stone/brick	4
9	Blouse Hook while feeding	2
10	Cracker	2
11	Fire cracker Injury	2
12	Key	2
13	Mirror injury	2
14	MUD BALL	2
15	Paddy crop	2
16	Party popper	2
17	PLASTIC BAND	2
18	Trauma while doing welding	2
19	Trauma while playing with toy	2
20	Trauma with table	2

Out of 100 patients, 44 reported to the eye outpatient department (OPD) or emergency room the same day they were injured, or within 24 hours; 23 came in after one day, 8 arrived after two days, 8 came in after three days, 2 came in after five days, and 1 patient came in after a year.

Table 2: Time interval of presentation

Sr. No.	Time Interval of Presentation	No of Patients
1	0 day	44
2	1 day	23
3	2 Days	8
4	3 Days	8
5	5 Days	2
6	6 days	4
7	7 days	8
8	20 days	2
9	1 Year	1

In our study, most common presentation was subconjunctival hemorrhage (26), followed by ecchymosis (22), corneal/corneo-scleral laceration (14), corneal epithelial defect (14), traumatic iridocyclitis (12), lid/canalicular laceration (10), traumatic optic neuritis (4), retained intraocular foreign body (4), and iris prolapse (2). Clinical findings upon presentation to this center are shown in table 3:

Table 3: Clinical Findings

Sr. No.	Clinical Findings	Number
1	Subconjunctival Hemorrhage	26
2	Ecchymosis	22
3	Corneal/Corneo-scleral/Scleral Laceration	14
4	Corneal Epithelial defect	14
5	Traumatic Iridocyclitis	12
6	Lid/canalicular Laceration	10
7	Hyphema	8
8	Macular hole/scar/edema	6
9	Retained intraocular foreign body	4
10	Traumatic optic neuritis	4
11	Conjunctival Laceration	2
12	Iris Prolapse/tear	2
13	Cataract/subluxated dislocated lens	2



Fig 1: Subconjunctival hemorrhage

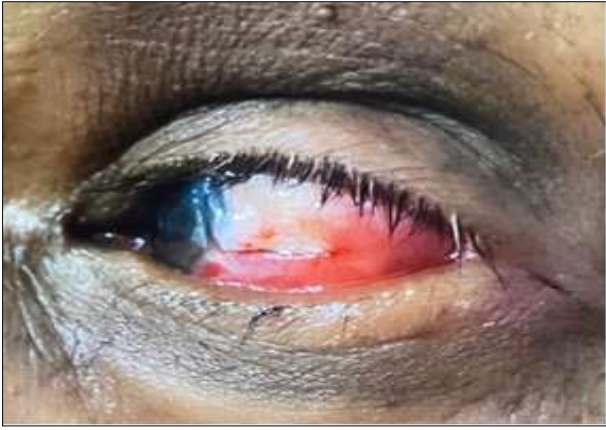


Fig 2: Corneal-scleral laceration



Fig 6: Corneal laceration

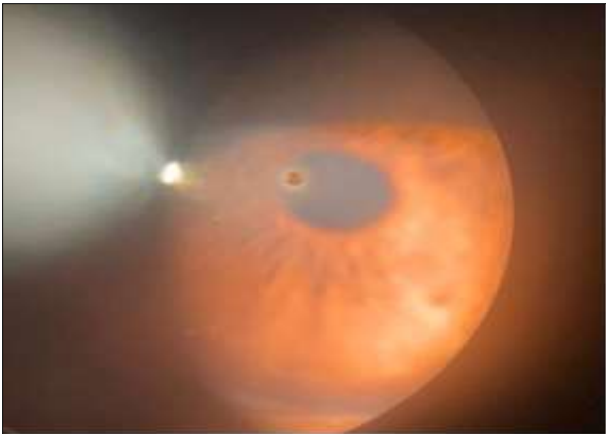


Fig 3: Corneal foreign body



Fig 7: Lid laceration Pre and post repair



Fig 4: Retained intraocular foreign body



Fig 8: Ecchymosis



Fig 5: Iris prolapse



Fig 9: Intra-orbital implant post evisceration



Fig 10: Traumatic cataract with irregular pupil and

According to our study, men are more likely than women to sustain ocular injuries, with the male to female ratio being more than three times higher.

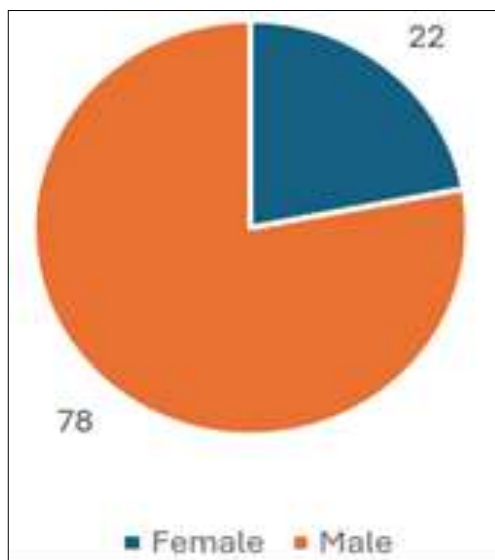


Fig 11: Age group of the patients with Ocular Trauma

In our study, it was found that the most common presentation was amongst 21-30 years of age group with 36 cases being affected, 16 cases presented in age group 31-40 years, 18 patients presented between 0-10 years age group and the least affected age group was between 71-80 with only 2 cases observed.

The injury is most common in the young age group people as can be seen from the figure below.

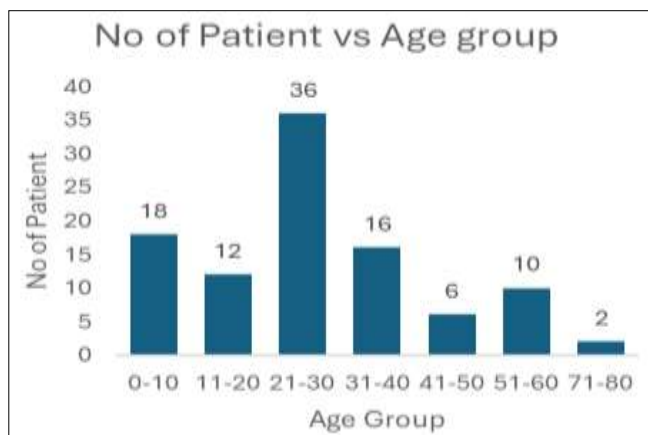


Fig 12: Age group of the patients with Ocular Trauma

In our study, the students (46%) were most commonly affected population due to ocular injury. Farmers were the second most commonly affected population (12%), followed by industry worker (10%), housewife (8%), and grinder operator (4%) and so on.

Table 4: Occupation distribution

Sr No	Occupation	No of Patients
1	Student	46
2	Farmer	12
3	Industry Worker	10
4	Housewife	8
5	NA	6
6	Business	6
7	Grinder Operator	4
8	Worker	4
9	Labor	2
10	Welder	2

Discussion

In our study, a higher frequency of ocular trauma was observed in younger age group and children, 66% patient being under 30 years of age. This was similar to findings of Gupta *et al.* [4] and Dhasmana *et al.* [5] Younger age group is seen to be affected more. This can have significant impacts on both their immediate and long-term health. Severe trauma can lead to physical disfigurement of the eye or the surrounding area, which can impact self-esteem and mental well-being.

Males accounted for 78% of the study group and were more likely to get eye injuries. This could probably be attributed to the fact that men are engaged more in outdoor activities and occupations. Many jobs in India, such as construction, manufacturing, and agriculture, involve tasks that carry a higher risk of ocular injury. Men are often overrepresented in these fields, increasing their likelihood of exposure to hazardous environments. This observation was in line with the findings of Balaghafari *et al.* [6] and Sharma *et al.* [7].

In our study, road traffic accidents accounted for 34% of all injuries, with wooden stick injuries coming in second (10%). Some research support this but others have found different things. Maurya *et al.* [8] quoted that the most common place of injury was home whereas according to Enock *et al.* [9] and Mowatt *et al.* [10], road traffic accidents involving motorcycles are the most frequent cause of eye injuries.

In this study, 44% of patients showed up after 24 hours, 41% during 1 to 5 days, 14% within 6 days to 1 month, and 1% beyond 1 year.

In our study 22% patients presented with open globe injuries whereas 78% presented with closed globe injuries. This is in line with the research by Misra *et al.* [11], who discovered that closed globe injuries were more frequent than open globe injuries.

According to our research, students were more likely to experience ocular trauma (46%). Farmers (12%) and industrial workers (10%) came next. Young adults may not be fully aware of the potential risks of ocular trauma or the importance of eye protection in certain situations. This lack of awareness can lead to a higher incidence of preventable eye injuries In a study by Monika *et al.* [12], students (37%) were more commonly involved, followed by farmers (20%) and industry workers (13%).

The percentage of patients requiring surgical intervention (32%) was lower in our study as compared with some earlier study by May *et al.* [13], who have shown that the surgical intervention was done in nearly 77% cases.

In our study, the most commonly involved structure was conjunctiva followed by lids and cornea. Enock *et al.*^[9] showed that the conjunctiva, lids and cornea were the most commonly affected structures during ocular trauma. Most patients had noticeable improvements in their vision at the time of discharge. These outcomes are far better than those of some other earlier reports, which found that in more than 77% of cases, the best corrected visual acuity at discharge was as low as 1/60.^[14] We believe that our excellent outcomes were largely due to an early post-injury presentation and a lesser number of open globe injuries. However, 10 patients were discharged with a best corrected vision of 6/36 or less. 2 underwent evisceration, 2 went LAMA and 1 was lost to follow up.

Conclusion

It is crucial for individuals who get eye trauma to seek immediate medical attention to minimize the impact and receive appropriate treatment to preserve vision and prevent complications. Regular follow-ups with an eye care professional are also important for monitoring any long-term effects and managing any resulting complication.

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How to Cite This Article

Yadav S, Chugh JP. Epidemiological profile of mechanical ocular trauma in a tertiary care hospital in rural area. *International Journal of Medical Ophthalmology.* 2024;6(1):41-45.

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