

## A Prospective Hospital Based Cross-Sectional Assessment of the Profile of Ocular Trauma

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Received: 15-01-2023 / Revised: 20-02-2023 / Accepted: 05-03-2023

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Conflict of interest: Nil

### Abstract

**Aim:** The aim of the present study was to assess profile of ocular trauma in patients attending tertiary care center in Bihar region.

**Methods:** This prospective cross-sectional study was carried out in Regional Institute of Ophthalmology, IGIMS, Patna, Bihar, India for the period of one year. A total of 100 cases with a history of both mechanical and non-mechanical trauma attending the casualty and outpatient departments were considered.

**Results:** Of the 100 cases, 25% (n=25) of ocular trauma was in the age group 20-30 years, and the least number of cases, 3% (n=3), were seen over 70 years. The pediatric age group (17 years and younger) constituted 17% (n=17) of the cases. Ocular trauma was 83% (n=83) in males and 20% (n=20) in females. 80% (n=80) of cases were from a rural background, and 20% (n=20) were from an urban background. In 45% (n=45) of cases right eye was involved, whereas in 40% (n=40) of cases left eye was affected. In 15% (n=15) of cases, both eyes were involved. There were 40% (n=40) close globe injuries, 25% (n=25) open globe injuries, and 35% (n=35) were adnexal injuries.

**Conclusion:** Ocular trauma had male predilection and was common in young adults. The most common cause of eye injuries was automobile accidents. This necessitates the implementation of improved road safety measures in this region. Appropriate eye-protective devices like safety goggles, face shields, helmets, and glasses with special filters to protect from optical radiation must be worn.

**Keywords:** Eye injury, Ocular trauma, Open globe and Closed globe, Visual deficit.

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### Introduction

Globally more than half a million blinding injuries occur every year. About 1.6 million people are blind from ocular trauma, 2.3 million bilaterally visually impaired. 19 million with unilateral visual loss worldwide. [1] Ninety percent of ocular injuries can be prevented using appropriate protective wear. The impact of trauma on a human eye may range from

occurrence of minute corneal abrasions/innocuous sub-conjunctival hemorrhage to a badly lacerated globe. [2] The eye is the third most common organ affected by injuries after the hands and feet and most of the information reach the humans through vision.

Consequently, the socioeconomic impact of ocular trauma can hardly be

overestimated as those affected often have to face loss of career opportunities, major lifestyle changes and occasionally permanent physical disfigurement. [3] In addition to physical and psychological cost of eye injuries to the individual, there is a direct and indirect financial cost to the society and environment. [4] because even minor eye injuries can cause considerable morbidity and time loss from work. [5]

It is believed that majority of eye injuries are preventable with existing, relatively inexpensive protective devices and health education. However the lack of health infrastructure, poor health seeking behavior of patients and low level of patient care all compound to create a worse prognosis for those with ocular trauma in developing countries. With regard to the public health problem presented by ocular trauma, it becomes necessary to gather information regarding the mode of presentation, nature of injuring agent, to observe and detect the extent of involvement of different structures and complications ensuing from them by available clinical and investigational means. This would enable us in the management of ocular trauma so that timely intervention can prevent loss of vision and preserve the eyes. [6]

The crux of preserving visual function in individuals with ocular damage is accurate surgery timing and the logical use of medications and surgical methods. Whether the trauma is minor or severe, in an urban or rural setting, or involving an adult or child, the patient must be medically stabilized and the eye thoroughly assessed. [7,8]

The aim of the present study was to assess profile of ocular trauma in patients attending tertiary care center in Bihar region.

## Materials and Methods

This prospective cross-sectional study was carried out in Regional Institute of Ophthalmology, IGIMS, Patna, Bihar, India for the period of one year. A total of 100 cases with a history of both mechanical and non-mechanical trauma attending the casualty and outpatient departments were considered.

The following parameters were analyzed: sex, age, patients' occupation, residence, financial status, time of the inflicted injury, place and way of inflicting the injury, and visual acuity on admission. In addition, the type of injury was analyzed, i.e., contusion, lamellar laceration, mixed, penetrating, perforating, I.O.F.B. (intra ocular foreign body), or rupture with all resulting complications. A full history of the trauma, its nature, and its circumstances was gathered. After explaining to the patient about the study and obtaining the patient's willful consent, a standardized proforma was completed for each patient documenting the history, clinical findings, and the investigations done.

Clinical examination included Visual acuity as measured by Snellen's chart, comprehensive Slit Lamp examination, and fundus examination with an indirect ophthalmoscope was all performed. Previous treatment history, preexisting ocular disease, and associated systemic and local findings were noted. All cases of ocular trauma, including mechanical, non-mechanical, thermal, chemical, electrical, radiational, explosive injuries and injuries affecting the globe as well as orbit and adnexa, were included. Patients who were not willing to participate in the study and foreign bodies on the ocular surface were excluded from the study. Ethical clearance from the institutional ethical committee was obtained.

## Results

**Table 1: Patient details**

Variables	N%
<b>Gender</b>	
Male	80 (80)
Females	20 (20)
<b>Age groups in years</b>	
10-19	17 (17)
20-29	25 (25)
30-39	14
40-49	13
50-59	14
60-69	14
>70	3 (3)
<b>Background</b>	
Urban	20 (20)
Rural	80 (80)
<b>Eye involved</b>	
Right	45 (45)
Left	40 (40)
Both eyes	15 (15)
<b>Eye injuries</b>	
Open	25 (25)
Close	40 (40)
Adnexal	35 (35)

Of the 100 cases, 25% (n=25) of ocular trauma was in the age group 20-30 years, and the least number of cases, 3% (n=3), were seen over 70 years. The pediatric age group (17 years and younger) constituted 17% (n=17) of the cases. Ocular trauma was 83% (n=83) in males and 20% (n=20) in females. 80% (n=80) of cases were from a rural background, and 20% (n=20) were

from an urban background. In 45% (n=45) of cases right eye was involved, whereas in 40% (n=40) of cases left eye was affected. In 15% (n=15) of cases, both eyes were involved. There were 40% (n=40) close globe injuries, 25% (n=25) open globe injuries, and 35% (n=35) were adnexal injuries.

**Table 2: B.E.T.T. classification**

B.E.T. T	N%
<b>Closed globe injuries</b>	
Zone 1	20 (20)
Zone 2	2 (2)
Zone 3	18 (18)
<b>Open globe injuries</b>	
Zone 1	10 (10)
Zone 2	12 (12)
Zone 3	3 (3)

Open and close globe injuries were further divided into three zones according to B.E.T.T. classification (Birmingham eye

trauma terminology). Among closed globe injuries, 20% (n=20) comprised zone 1 injuries, 2% (n=2) injuries to zone 2, and

18% (n=18) zone 3. The open-globe injury involved zone 1 in 10% (n=10) of patients (corneal tear with iris prolapse) and 12%

(n=12) for zones 2 (corneoscleral tear), and 3% (n=3) zone 3 (scleral tear extending beyond equator).

**Table 3: OTS score and likelihood of visual acuity at 6 months**

Sum of raw points	OTS Category	N	No perception of light	Light perception/hand movements+	1/200-19/200	20/200-20/50	>20/40
0-44	1	45	74%	15%	7%	3%	1%
45-65	2	20	27%	26%	18%	15%	15%
66-80	3	11	2%	11%	15%	31%	41%
81-91	4	7	1%	2%	3%	22%	73%
92-100	5	17	0%	1%	1%	5%	94%

In this study, 45% (n=45) cases had an OTS of 1, which is related with a 90% projected outcome of NPL (no perception of light) and P.L. (perception of light) vision (i.e., 73% for no light perception plus 17% for perception of light) and just a 3% probability of vision better than 6/60.

### Discussion

Ocular trauma is among the significant public health problem particularly in developing countries like India. It constitutes 7% of all bodily injuries and 10-15% of all eye diseases. [9] Ocular trauma is a serious public health problem having high socioeconomic burden that affects a person's quality of life and has psychological impacts on patients. [10] Males 80% (n=80) were more likely to sustain traumatic injuries than females due to more males involved in driving, industrial and agricultural occupations. 55% of cases presented to casualty within six hours of injury. Only 10% of cases presented after 24 hours. Patients presenting early and promptly in this region may signify better awareness of ocular trauma in the population as our hospital is the primary referral center.

Like other studies, close globe injuries (40%) were more common than open globe (25%) injuries. [11-15] In our study, the cornea was affected in 25% of patients. In a study by Alem et al., 39.33% of patients had a corneal tear. According to

the JUDO study, the cornea was the most affected part of the eye (63.2%), which was also confirmed in Menelik II Hospital studies. [16-19] In study done by Guly et al., [20] they observed 31% of cases having corneal involvement and 12.9% of cases with conjunctival involvement. In a study undertaken at Hawassa University, corneal tear was the most frequently observed case (39.33%), [21] while, a study done in western India, it was 15.2%. [22]

In the current study ocular trauma was divided into open and closed globe injury. Various epidemiological studies have shown a higher incidence of closed globe injuries. In a Korean study by Oum et al the prevalence of closed ocular injury was about six times higher than that of open ocular injury. [23] Karaman et al in their retrospective analyses of 383 patients found 67.3% of ocular injuries were closed globe and 32.7% were open globe injuries. [24] In a study in Malaysia closed globe injuries were 61.1% and open-globe injuries were 34.8%. [25] In our study, 40 (40%) cases had closed globe injuries whereas 25 (25%) had open globe injuries. [26]

Nontraumatic causes account for most of the vitreous haemorrhage (diabetic retinopathy, sickle cell disease, posterior vitreous detachment, retinal vein occlusion, leukaemia). Nevertheless,

trauma accounts for 12–31% and is the most common cause of vitreous haemorrhage in younger patients. [17]

### Conclusion

Ocular trauma had male predilection and was common in young adults. The most common cause of eye injuries was automobile accidents. This necessitates the implementation of improved road safety measures in this region. Appropriate eye-protective devices like safety goggles, face shields, helmets, and glasses with special filters to protect from optical radiation must be worn. The need to wear protective headgear and eyewear is critical and should not be overlooked. Majority of patients presented within 6 hours of trauma to our centre. The most commonly affected structures were the eyelid and adnexa in this study. There was a significant number of Berlin's oedema in this study. B.E.T.T. classification of ocular trauma at the time of presentation helps to categorize ocular injuries. Visual prognosis can be effectively explained to the patient with regular use of ocular trauma score.

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