

## Clinical Profile Research on Individuals with Ocular Blunt Trauma at a Teaching Hospital

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### Abstract

**Background:** Mechanical and non-mechanical ocular injuries can be distinguished. Mechanical wounds can pierce the eye or cause a severe damage. Despite the significance of ocular trauma for public health, there is a dearth of population-based data, particularly from poor nations, on its severity and risk factors.

**Aims & objectives:** The current investigation sought to examine the clinical profile of ocular blunt trauma at a teaching facility.

**Material and Methods:** The current investigation involved patients of all ages who had a documented history of recent blunt ocular injuries. It was a prospective observational study.

**Results:** 132 patients who had suffered blunt ocular trauma were assessed during the study period. The majority of patients were male (77.27%), in the 31 to 50 year age range (56.06%), had injuries to their right eye (53.03%), were farmers by profession (50%), and suffered their injuries while working in the fields (50%). Ecchymosis and lid edema (78.79%), sub conjunctival hemorrhage (72.73%), hyphaema (33.33%), lid laceration (22.73%), corneal abrasion (21.21%), traumatic iritis (9.09%), iris injury (9.09%), lens dislocation (1.52%), and traumatic cataract (1.52%) were the anterior segment pathologies found during the clinical examination. Berlin's edema (4.55%), vitreous hemorrhage (4.55%), angle recession (4.55%), retinal detachment (3.03%), retinal/choroidal hemorrhage (1.52%), ruptured globe (1.52%), and choroidal rupture (1.52%) were the pathologies found in the posterior segment.

The majority of patients (62.12%) were treated medically; some needed conservative treatment (28.19%); lens ectomy for traumatic cataract and lens dislocation (3.03%); laser treatment (3.03%); and in two cases, higher-level care was recommended due to retinal detachment (3.03%). In the majority of instances, improvement in eyesight was noticed at the 2-month follow-up.

**Conclusion:** In the third to fifth decade, blunt ocular trauma is more common in men than in women. The avoidance of additional problems depends on early assessment of the severity of the injury and adequate therapy. Goggles, face shields, access to prompt emergency eye care management, and health education regarding eye protection should all be emphasized.

**Keywords:** Blunt Ocular Trauma, Lid Edema, Sub Conjunctival Hemorrhage, Emergency Eye Care, Eye Protection.

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## Introduction

The eyelids, eyelashes, and protective borders of the orbit all work together to shield the eyeball from direct harm [1]. The patients and their family are significantly impacted socioeconomically and psychologically by ocular damage, which remains a primary source of curable visual impairment and blindness [2,3]. Reports of ocular trauma in India range from 1 to 5%. Around 55 million occurrences of ocular injuries occur annually around the world, of which 750000 require hospitalization. Trauma can cause a variety of eye injuries to the globe, optic nerve, and adnexa, ranging from minor inconveniences to serious issues that could impair vision. Mechanical and non-mechanical ocular injuries can be distinguished [4]. Mechanical wounds can pierce the eye or cause a severe damage. Blunt trauma is frequently the cause in the adult population (e.g., motor vehicle collisions, altercations, or work-related injuries involving hammering). The most frequent cause of globe rupture in the elderly is falling [5-7]. Despite the significance of ocular trauma for public health, there is a dearth of population-based data, particularly from poor nations, on its severity and risk factors. The current investigation sought to examine the clinical profile of ocular blunt trauma at a teaching facility.

**Aims & Objectives:** The current investigation sought to examine the clinical profile of ocular blunt trauma at a teaching facility.

## Material and Methods

The current study was a prospective, observational study carried out in Central India's Department of Ophthalmology. The study lasted two years (July 2019 to June 2021). The institutional ethical committee approved the study.

Patient must be willing to participate and have a documented history of recent blunt ocular injuries. Patients having a history of penetrating eye injuries, those with fractured orbits, and those who sustained eye injuries more than a month ago are excluded from treatment.

After a formal informed consent was obtained, the study was discussed. In order to determine the sociodemographic profile, the mode of injury and the time between the injury and presentation, the injury to other organs, whether there was a loss of consciousness, the history of previous eye surgery, the status of tetanus prophylaxis, and any potential wound contamination, a thorough history was taken.

An extensive and methodical examination was conducted, and results were recorded. Visual acuity testing (Snellen's chart), anterior segment examination (slit lamp biomicroscopy), pupillary evaluation (reactivity to light, presence of afferent pupillary defect), assessment of extraocular movements and confrontational visual fields, measurement of intraocular pressure (Schiotz tonometer/Applanation tonometer), and posterior segment examination are all included in an eye exam (direct and indirect ophthalmoscope). In pertinent situations, gonioscopy and field charting were done. When necessary, investigations such as X-ray orbits, computed tomography scans, and/or ultrasound B scans were carried out. All of the cases underwent treatment in accordance with the injury, and they were monitored on a regular basis to evaluate the sequelae and visual prognosis. Descriptive statistics were used in the statistical analysis.

## Results

132 patients who had suffered blunt ocular trauma were assessed during the study period. The majority of patients were male (77.27%), in the 31 to 50 year age range

(56.06%), had injuries to their right eye (53.03%), were farmers by profession (50%), and suffered their injuries while working in the fields (50%). Ecchymosis and lid edema (78.79%), sub conjunctival hemorrhage (72.73%), hyphaema (33.33%), lid laceration (22.73%), corneal abrasion (21.21%), traumatic iritis (9.09%), iris injury (9.09%), lens dislocation (1.52%), and traumatic cataract

(1.52%) were the anterior segment pathologies found during the clinical examination. Berlin's edema (4.55%), vitreous hemorrhage (4.55%), angle recession (4.55%), retinal detachment (3.03%), retinal/choroidal hemorrhage (1.52%), ruptured globe (1.52%), and choroidal rupture (1.52%) were the pathologies found in the posterior segment.

**Table 1: General characteristics**

Characteristics	Number of cases	Percentage
Age (in years)		
<15	14	10.61%
15-30	28	21.21%
31-50	74	56.06%
>50	16	12.12%
Mean age (in years)	37.17 ± 9.23	
Gender		
Male	102	77.27%
Female	20	22.73%
Occupation		
Farmer	66	50.00%
Student	30	22.73%
Homemaker	18	13.64%
Shopkeeper	14	10.61%
Others	4	3.03%
Eye involved		
Right	70	53.03%
Left	62	46.97%
Mode Of injury		
Agricultural	66	50.00%
Fall	24	18.18%
Road Traffic accident	18	13.64%
Sports related	16	12.12%
Assault	6	4.55%
Cracker-burst injury	2	1.52%

**Table 2: Clinical findings**

Location	Number of cases	Percentage
Anterior segment pathologies		
Ecchymosis and lid edema	104	78.79%
Sub conjunctival hemorrhage	96	72.73%
Hyphaema	44	33.33%
Lid laceration	30	22.73%
Corneal abrasion	28	21.21%
Traumatic iritis	12	9.09%
Iris injury	12	9.09%
Lens dislocation	2	1.52%

Traumatic cataract	2	1.52%
Posterior Segment Pathologies:	0	0.00%
Berlin's edema	6	4.55%
Vitreous hemorrhage	6	4.55%
Angle recession	6	4.55%
Retinal detachment	4	3.03%
Retinal/choroidal hemorrhage	2	1.52%
Ruptured globe	2	1.52%
Choroidal rupture	2	1.52%

The majority of patients (62.12%) were treated medically, while others needed conservative treatment (28.19%), lens removal for traumatic cataract and lens dislocation (3.03%), laser treatment (3.03%), and 4 cases were referred to a higher center due to retinal detachment (3.03%).

**Table 3: Treatment given**

Treatment	Number of cases	Percentage
Medical management	82	62.12%
Conservative	38	28.79%
Lens removal	4	3.03%
Laser	4	3.03%
Referred to higher center	4	3.03%

In the majority of cases, improvement in vision was noted at the 2-month follow-up.

**Table 4: Extent of visual loss at presentation and BCVA at two months follow-up**

Visual Acuity	No. of Cases at presentation	Percentage	No. of cases at 2 months follow-up	Percentage
>6/60	38	28.79%	94	71.21%
6/60 – 3/60	52	39.39%	18	13.64%
3/60 – 1/60	36	27.27%	16	12.12%
PL present	4	3.03%	2	1.52%
No PL	2	1.52%	2	1.52%

## Discussion

Ocular trauma is largely composed of blunt trauma. The most frequent causes of blunt ocular injuries include squash balls, elastic baggage straps, falls, and champagne corks. Since a closed space's volume cannot be altered, the eye must either expand in its equatorial plane or rupture when it is compressed along its anterior-posterior axis, according to the basic pathophysiology [8-10]. By using the coup and contrecoup mechanism or ocular compression, blunt eye trauma damages the eyes. These can cause a wide range of ocular problems, from minor ones like

subconjunctival bleeding to serious ones like optic neuropathy, retinal detachment, and traumatic cataract, all of which can be blinding. Additionally, compared to closed globe injuries, open globe injuries dramatically increased the risk of retinal detachment [11]. The increased prevalence of vitreous disruption, imprisonment, and subsequent traction in open globe injuries can be used to explain this. According to a study by S. Padmanaban, the average age of those who experienced ocular impact trauma varied from 26 to 40 years old. Because men are more active both indoors and outdoors, injuries to men happen more

frequently than to women. Similar results were seen in the current investigation [12]. According to current theories, the pathophysiology of traumatic cataracts includes direct capsule rupture, also known as coup, countercoup, and equatorial expansion caused by hydraulic forces that shift the trauma's energy to the opposite side of the eye. Depending on the severity of the trauma and the depth of the globe penetration, it may be accompanied by anterior and posterior segment anomalies [13]. Depending on the comorbidities in the eye, the cataract removal can be done in the same session or scheduled for a later time. Better vision, easier tissue manipulation, and a lower risk of postoperative sequelae are all advantages of secondary removal. Injuries to the eyes were more frequently observed in adults (55%) who worked in agriculture (43.33%) and in male patients (71.67%), according to a study by Misra S et al. Open globe injuries were less frequent (31.67%) than closed globe injuries (68.33%). The most frequent object that caused injury was a wooden stick, both in open and closed globe injuries [14]. At presentation, only 26.7% of the patients had vision better than 6/60; however, two months later, 68.3% of patients had best corrected vision of at least 6/60. According to Shailaja K et al., among closed globe injuries, 133 cases had mixed injuries (3.70%), lamellar lacerations (20.37%), superficial foreign bodies (34.88%), and contusions (41.05%). Zone 1 was injured in 255 cases of closed globe injuries (78.70%), zone 2 in 39 cases (12.04%), and zone 3 in 30 cases (9.26%). In the study by Rahul D. et al., the majority of patients (66% of whom were men) and those with RTA (20.3%) were between the ages of 31 and 40 [15]. Lid oedema with chemosis of the conjunctiva (82.5%), subconjunctival hemorrhage (84.4%), corneal abrasion (15.5%), traumatic hyphaema (31.06%), traumatic optic neuropathy (1.9%), Berlin's oedema (6.7%), and angle recession glaucoma (8.1%) were the

clinical characteristics reported. Final visual results showed that 4 patients (3.8%) had erroneous ray projection and visual acuity of perception of light, and 1 patient (0.97%) had neither. 7 patients (6.7%) showed accurate perception of light and ray projection. 45 patients (or 43.68%) had their visual acuity return to 6/6. 95 cases of blunt ocular trauma were studied by Maiya AS et al., with a male to female ratio of 4.5:1 and the majority of patients (44.2%) falling within the 21–40 year age range. Approximately 50 patients (52.6%) belonged to the agricultural class [16]. 48.4% of the patients, or 46 patients, had agricultural injuries. The most frequent finding was subconjunctival hemorrhage (37.89%), followed by traumatic uveitis (28.42%), lid and adnexal injuries (22.10%), and subconjunctival hemorrhage. [17] The condition known as "Berlin's edema," or commotio retina, is characterized by a brief, clearly defined opacification of the retina that appears following blunt ocular trauma. The cost of rehabilitation services, the necessity for medical attention, and other effects of ocular damage indicate to the value of increasing preventive measures. Many ocular dangers can be avoided by raising public awareness of potential risk factors and agents that can cause injury.

### Conclusion

In the third to fifth decade, blunt ocular trauma is more common in men than in women. The avoidance of additional problems depends on early assessment of the severity of the injury and adequate therapy. Goggles, face shields, access to prompt emergency eye care management, and health education regarding eye protection should all be emphasized.

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