

## OCULAR MANIFESTATION IN HEAD INJURY

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### ABSTRACT

**Aim:** To evaluate the pattern and clinical profile of ocular injury in patients hospitalized and managed for head injury at a tertiary teaching hospital in Eastern India. **Material and methods:** This is a prospective cross sectional study, carried out in 190 patients tertiary teaching hospital. This study is done with the patients who are admitted at NRS Medical College and Hospital for head injury over a period of six months. **Results:** Male are more comparing to female. Road traffic accidents with two-wheeler is most common for head injury. Most frequent soft tissue injury is periorbital ecchymosis (95 patients). Most frequent neuro-ophthalmic manifestation is abducent nerve palsy. Orbital fracture with ruptured globe is also recorded. **Conclusion:** The most common cause of head injury is road traffic accident. The most common oculo-visual complications following head injury are damages to the globe, adenxae and ocular cranial nerve palsies. All patients with head injury should also undergo eye check-up along with head injury treatment.

**KEYWORDS:** Ocular Manifestation, Head Injury, road traffic accident.

### INTRODUCTION

Head injury triggers 200-300 admissions per 100,000 inhabitants a year. Vehicle collisions cause the bulk of head injury cases. There are about 300,000 deaths from road collisions worldwide annually and up to 10 million total casualties. In India every year 60,000 people die in traffic accidents and a much greater number suffer from moderate to serious body & head injuries. Peak incidence is seen between 15-24 years of age, male is more commonly affected than female.<sup>[1]</sup> Because orbits and eyes are closely connected to the skull and brain, there are several lesions in them.

Traumatic brain injury (TBI) is widely recognized worldwide as a significant cause of morbidity and death, with figures ranging from 106 to 790 per 100 000 people per year.<sup>[2,3]</sup> Not unexpectedly, there can be a wide variety of visual problems following head trauma, including photophobia, double vision, blurred vision, vision loss and visual processing issues.<sup>[4]</sup>

This study is to examine different ocular manifestations in cases of patients with head injury.

### MATERIAL AND METHODS

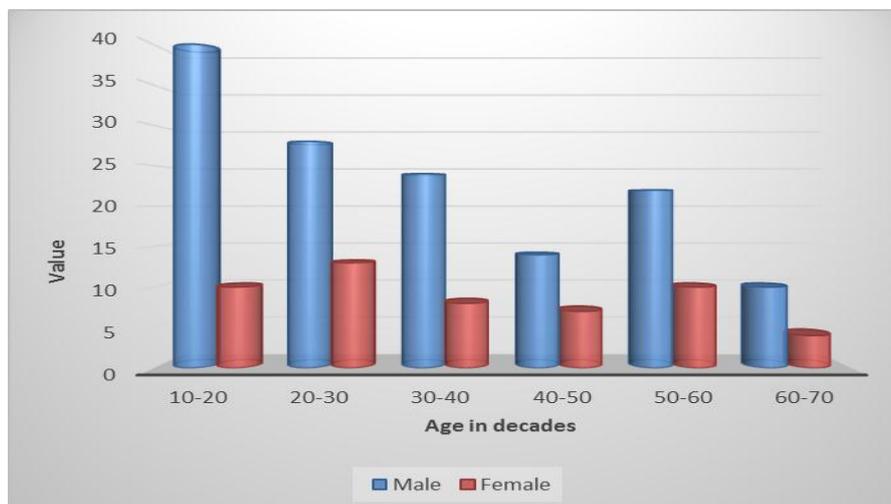
The study is conducted in 190 patients which was diagnosed with head injury on the basis of history,

ophthalmological findings at the time of admission. All the patients were hospitalized at the NRS Medical College and Kolkata Hospital for a duration of six months. We examined these patients and followed up on signs and symptoms of eye morbidity that were subsequently present. Specific inspection of the anterior and later parts of the slit lamp was performed. Extraocular motion, tests on optic nerve activity were tested. Diagnostic investigation has been done including computed tomography scanning /or magnetic resonance imaging of the brain and orbit, gonioscopy, diplopia and intraocular pressure assessment. We evaluated the visual acuity (VA) using the Snellen's chart as needed. Head and eye disorders were divided into three major groups of eye system defects: globe and adnexal soft-tissue injuries, neuro-ophthalmic anomalies, and bone orbit injuries and other skull fractures. Patients were treated according to their respective diagnosis and were referred to the required specialties at the same hospital for those presenting with multiple organ involvement.

### RESULTS

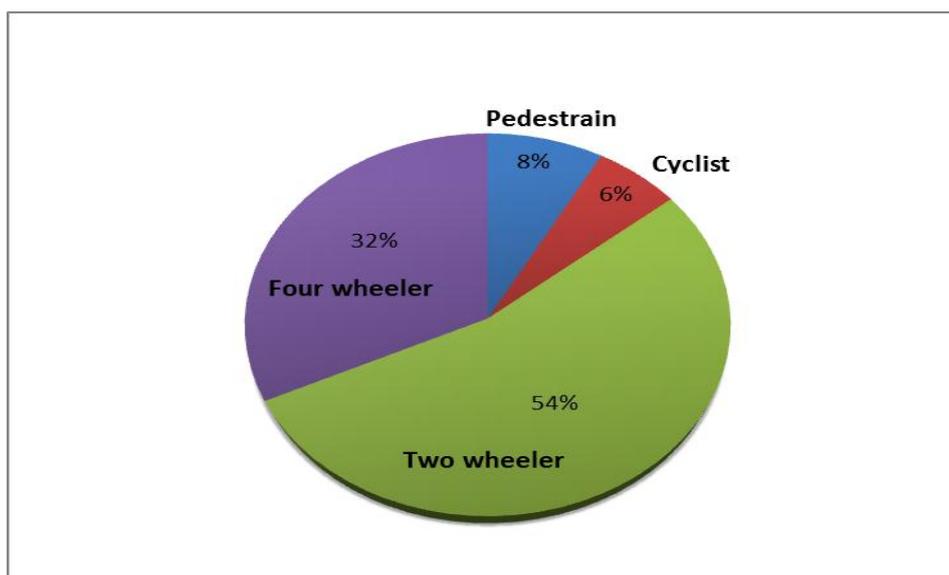
Ocular and visual problems occurred in 190 individuals who were injured to the head during the time considered. There had been 138 male subjects and 52 female subjects. The youngest and the oldest patients actually were 10 years old and 69 years old respectively. During the second decade of life, ophthalmic disorder occurred,

and then decreased. (Fig. 1). Patients experienced several ocular injuries involving anterior and subsequent eye segments.



**Fig. 1: Age and sex distribution in 190 patients having ocular and visual complications of head injury.**

Road traffic accidents with two-wheeler was most frequently affected (54.0%), four-wheeler (32.0%), pedestrians (08.0%) and cyclists (06%), shown in Fig. 2.



**Fig. 2: People affected in traffic accidents.**

**Table 1: Ocular complications of head injury.**

Injury Type	No. of Patients
1. Soft – tissue injury and adenexae	
Periorbital ecchymosis	95
Laceration of eyelids	23
Lid oedema	65
Corneoscleral laceration	9
Subconjunctival haemorrhage	80
• Unilateral	63
• Bilateral	17
Chemosis	20
Brow tear	04

Vitreous haemorrhage	07
Black eye	25
• Unilateral	15
• Bilateral	10
B. Orbital fracture with rupture globe	05
C. Neuro-ophthalmic and Cranial nerve injury	
• Abducens	15
• Oculomotor	13
• Trochlear	06
• Trigeminal	05
• Facial	03
• Traumatic optic neuropathy	15
• Aberrant regeneration of third nerve	02
Papilledema	14
Carotid cavernous fistula	02

Table 1 describes the ocular and visual complications found in 190 cases of head injury. Some common complications included globe and adenexae soft-tissue injuries, neuro-ophthalmic anomalies and orbit fracture with globe rupture. Periorbital ecchymosis (95 patients), subconjunctiva haemorrhage (80 patients), lid oedema (65 patients), chemosis (20 patients), black eye (20 patients), lid laceration (23 patients), corneoscleral laceration (09 patients), vitreous haemorrhage (07 patients) were the most common soft-injuries.

The most commonly observed manifestation of the neuro-ophthalmic condition was abducens nerve palsy. This was the most severe ocular motor nerve palsy in 15 patients, followed by oculomotor 13 patients, trigeminal 5 patients, trochlear 6 patients and facial nerve paralysis 3 patients. Two patients experienced Third Nerve aberrant regeneration. Another reported neuro-complication was papilledema in 14 patients which is normal in head injury cases.

**Table 2: CT Scan findings of head injured patients including soft tissue and bony injury.**

Fracture case	Number
Frontal bone	30
Parietal bone	15
Occipital bone	07
Temporal bone	05
Basal skull	07
<b>Haemorrhages case</b>	
Sub-Dural haemorrhage	31
Sub-arachnoid haemorrhage	28
Extra-Dural haemorrhage	22
Intra-cerebral bleed	14
Multiple brain contusions case	17

The most frequently broken bone was the frontal bone (30) accompanied by parietal bone (15), occipital bone (07), basal skull fracture (05), and temporal bone fracture in (07) patients, according to CT-Scan findings (Table 2). Subdural haemorrhage occurred in patients (31)

followed by subarachnoid (28), extra-dural (22), and intracerebral bleed in patients (14). There were numerous contusions of the brain at (17) patients.

## DISCUSSION

We have examined various ocular manifestations in our research which we find in head injury patients. It is not shocking that road collisions were responsible for the greater proportion of ocular manifestations associated with head injuries. In several series around the world, traffic collisions are the leading cause of head injury seen in the study.

In the anterior segment of the eye, the lids and conjunctiva were more often involved in head injuries than the posterior segment, ocular cranial nerves, or bony orbits. Injuries to this section arise from direct impact on the rigid frontal bones and orbital margins, periorbital ecchymosis, laceration of the lids and subconjunctiva haemorrhage and chemosis.<sup>5</sup> Same has been found in our study. The eyes are frequently (directly and indirectly) implicated in head injury with neuro-ophthalmic deficits.<sup>[6,7,8]</sup>

Throughout our study, traumatic ocular motor abnormality was the most common of the neuro-ophthalmic complications and among cranial nerve palsies, the Abducens were the most frequently affected cranial nerves, followed by oculomotor, trigeminal, trochlear and facial nerves that were least affected. The incidence of Abducens nerve paralysis in the Ode bode et al study was recorded as 27 percent in serious head injuries.<sup>[5]</sup> Eye injuries are the most common cause of monocular blindness, a life-long disability, even where the result is less severe than blindness, substantial medical care can be needed, including surgery, hospitalization even long-term repeated treatments. Nevertheless, most of the past articles on this subject concentrated on particular aspects of visual anatomy, such as ocular cranial nerves, optic nerves, or posterior visual pathways.<sup>[9,10,11]</sup> rather than a detailed description

of how head injury affects the visual system. Our study added to the above list, and gave some previous findings credibility.

As we have mentioned previously that abductive nerves are the most frequently damaged cranial nerves, they are generally affected when a basilar fracture crosses the petrous ridge and a direct association with facial paralysis and deafness can typically be established. As demonstrated in this sequence, this makes the seventh and eighth cranial nerve damage a common association with head injuries related to ocular manifestations. Abducens paralysis may also result from a haemorrhage of the middle cranial fossa causing compression and paralysis of pressure on one or both sides.<sup>[12]</sup>

There were 10 cases of traumatic optic neuropathy in our study. Injury to the optic nerve caused by trauma can occur anywhere from intraorbital to intracranial length of the nerve. Radiological tests (CT scan / MRI) confirmed the existence of Dural Haemorrhage, interstitial nerve haemorrhage, shearing lesions, as well as localized ischaemia and oedema, considered secondary events to start neuropathy. According to Rush *et al.*,<sup>[12]</sup> these injuries are typically self-limiting with healing taking place within 3-4 days. However, corticosteroid treatment or decompression of the optic nerves is advised when they persist.<sup>[13]</sup> With respect to skull fractures, frontal bone fracture was most common in our study (51 percent), which is comparable to the Rupani *et al.*,<sup>[14]</sup> study (56.7 percent) where it was again most common. Between intracranial bleeds, subdural haemorrhage was mainly reported in the Perel *et al.*,<sup>[15]</sup> report (30.1%), and the same applies to our sample where it is 38.1%.

## CONCLUSION

The most common cause of head injury is road traffic accident. The most common finding in the anterior segment was lid tear accompanied by ecchymosis and subconjunctival haemorrhage. Globe injury, adenexae and ocular cranial nerve dysfunction are the most common oculo-visual complications associated with head injury, so that any patient with head injury should also be checked for eye signs along with regular head injury treatment, and this should be done not only on first visit but also on follow-up visits.

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