

## STUDY OF OCULAR MANIFESTATIONS OF HEAD INJURY PATIENTS IN TRAUMA CENTRE & CIVIL HOSPITAL

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**ABSTRACT: MATERIAL & METHODS:** This randomized, prospective study was carried out on patients of head injury admitted in trauma centre & civil hospital, Ahmedabad over 1 year period. Initially all of them were examined & those with ocular manifestations were included in the study. Detailed history, general examination & ophthalmic examination was done. All patients were examined in follow-up at 1 month, 2 months, 3 months & 6 months. **RESULTS:** In this study total 454 patients of head injury were seen of which 65 had ophthalmic findings. Out of 65 patients, 53 were male & 12 were female. Most common ophthalmic features were lid edema & ecchymosis & pupillary abnormalities. CT scan was done in 53 patients out of 65 patients. Cranial nerves are affected in descending order of 3<sup>rd</sup>, 6<sup>th</sup> & 4<sup>th</sup>. Lateral rectus palsy does not have lateralising value in all cases. Ocular complications are frequent in orbital fractures. Papilloedema is sign of marked raised ICT was present in 14 patients. **DISCUSSION:** Males were affected more 53 out of 65 than females 12 out of 65 which corresponded with high no. of head injury in male mainly because of more no. of vehicular accidents & assault. Ophthalmic findings were associated most commonly with frontal region injury. Most common findings in severe head trauma were dilated non-reacting pupils, papilloedema & cranial nerve palsies. **CONCLUSION:** Majority of ocular findings help in diagnosis & confirmation of intracranial lesion & localizing the side & site. Mortality is higher in cases with ophthalmic manifestation than in general head injury.

**KEYWORDS:** Head injury, ophthalmic features, road traffic accidents.

**INTRODUCTION:** Head injury causes 200-300 admissions/ 100000 population/ year. Majority of cases of head injury are caused by vehicular accidents. There are almost 300000 death from road accidents annually in the world & total casualties are upto 10 millions. Every year in India 60000 people per year die in traffic accidents & a much bigger number suffer from mild to severe injuries of body & head. Peak incidence is found between age of 15-24 years, male are affected more commonly than female.<sup>(1)</sup>

Since orbits & eyes are in close relation with skull & brain many of the lesions are manifested in them. Ocular complications occurred in 28% of children with head injury mostly of optic nerve & were associated with other neurological signs. Ophthalmic presentation in a case of head injury depends on site & severity of damage.<sup>(2)</sup> Ophthalmic manifestations can be summerised as follows:

1. Lid: ecchymosis, edema.
2. Conjunctiva: subconjunctival haemorrhage.
3. Pupil: abnormal pupillary reflexes.  
Abnormal size & equalities.
4. Cranial nerve palsies: Oculomotor.  
Trochlear.  
Abducent.

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5. Orbital fractures: mainly superior, lateral or medial wall fractures.
6. Eye movement & gaze palsies.
7. Vision & visual field changes.
8. Optic disc: papilloedema, optic atrophy.
9. Retina & vitreous: hemorrhages.
10. Optic nerve injuries.
11. Visual pathway lesion.

Understanding pathophysiology facilitating diagnosis & organizing management have produced 15-20% of reduction in mortality following severe cases of head injury.<sup>(3)</sup>

### AIMS OF STUDY:

- To study the different ocular manifestation in the cranio cerebral injuries & their frequency of occurrence.
- To establish the relationship of different ocular manifestations with the type & site of head injury.
- To find out in which ways the ophthalmic findings help to decrease overall mortality from head injuries by early recognition & appropriate measures.
- Comparison of CT scan & ocular findings in judging the state of intracranial pressure & other lesions.

**MATERIAL & METHODS:** This randomized, prospective study was carried out on patients of head injury admitted in trauma centre & civil hospital, Ahmedabad over 1 year period. On a particular day of each week, patients admitted in surgical male, female & children ward were selected for study. Initially all of them were examined & those with ocular manifestations were included in the study.

Following patients were excluded from the study:

- Those who were kept under observation for ruling out head injury.
- Patients with local trauma to eyes with/ without head injury.
- Fractures of orbit without any cranio-cerebral injuries.

Detailed history of all patients were taken. All patients underwent general examination including assessment of level of consciousness according to Glasgow coma scale. Ocular examination includes visual acuity when possible, anterior segment examination, pupil reaction, eye movement, diplopia test (When patient complaint of diplopia), visual field (Confrontation method at bedside. Perimetry when needed) & fundus examination.

In all of the cases X-ray skull AP & lateral view was done in civil hospital, they were reported by radiologist for fracture. In most of the patients CT scan was done if intracranial contusion or laceration were suspected or in patients with deteriorating clinical condition. In patients with only concussion injuries, good GC 14/15 & no neurological deficit with normal X-ray, CT scan was not done. All patients were examined in follow-up at 1 month, 2 months, 3 months & 6 months.

**RESULTS:** In this study total 454 patients of head injury were seen of which 65 had ophthalmic findings. Out of 65 patients, 53 were male & 12 were female.

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**Table 1: Age & sex distribution:**

Age group	male	female	total	percentage
0-10 years	8	2	10	15.4
10-20 years	9	3	12	18.5
20-40 years	22	5	27	41.5
>40 years	14	2	16	24.6
total	53	12	65	

Table 1. age & sex distribution

Vehicular accidents was most common cause of head injury, it was mode of injury in 28 (43%) patients. Assaults was present in 11 (16.9%) patients, fall from height in 12 (18.5%) patients & other causes in 14 (21.5%) patients. Most common ophthalmic features were lid edema & ecchymosis & pupillary abnormalities.

**Table 2: Frequency of occurrence of ophthalmic features:**

Ophthalmic features	No. of patients	Percentage (%)
Lid edema, ecchymosis	26	40.0
Subconjunctival hemorrhage, chemosis	14	21.5
Pupillary abnormalities	24	36.9
Cranial nerve palsy	15	23.1
3 <sup>rd</sup> nerve	5	7.7
4 <sup>th</sup> nerve	0	0
6 <sup>th</sup> nerve	4	6.2
7 <sup>th</sup> nerve	6	9.2
Abnormal eye movement	2	3.0
Conjugate deviation	2	3.0
Orbital fractures	10	15.3
Visual abnormality	15	23.1
Retinal hemorrhage	3	4.6
papilloedema	14	21.5
Optic atrophy	7	10.8
Optic nerve avulsion	0	0
Perforation, vitreous hemorrhage	6	9.2

Table 2. frequency of occurrence of ophthalmic features

Majority of patients with ophthalmic findings had some sort of craniocerebral injury detected on CT scan. CT scan was done in 53 patients out of 65 patients. CT scan was normal in 18 (12.3%) patients. Contusion was detected in 11 (16.9%) patients. Epidural hematoma was detected in 3 (4.6%) patients, subdural hematoma in 4 (6.1%) patients, subarachnoid hematoma in 2 (3.0%) patients & intraventricular hematoma in 3 (4.6%) patients. Basal fracture was noted in 4 (6.1%) patients, skull fracture in 7 (10.8%) patients & depressed fracture in 9 (13.9%) patients. CT scan was not done in 12 (18.5%) patients. More than one type of finding was noted in 2 (3.0%) patients.

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Site of head injury & ophthalmic findings can be very well correlated. In patients with injury in frontal region injury, lid edema was present in 10 patients, orbital fracture in 5 patients, subconjunctival hemorrhage in 5 patients, pupil abnormality in 6 patients, optic nerve compression in 3 patients & papilloedema in 2 patients. In patients with injury in parietal region, lid ecchymosis was present in 2 patients, pupil abnormality in 3 patients, third nerve involvement in 2 patients, papilloedema in 3 patients & visual pathway involvement in 2 patients. In patients with injury in temporal region, lid edema, ecchymosis was present in 3 patients, orbital fracture in 1 patient, pupil abnormality in 3 patients, third nerve involvement in 1 patient, abnormal eye movement in 2 patients & papilloedema in 4 patients. In patients with injury in frontoparietal region, orbital fracture was present in 1 patient, lid edema in 4 patients, subconjunctival hemorrhage in 2 patients, pupil abnormality in 2 patients, 7<sup>th</sup> nerve involvement in 2 patients, conjugate deviation in 1 patient & papilloedema in 1 patient.

In patients with injury in occipital region, pupil abnormality was present in 2 patients, lid edema in 1 patient, retinal hemorrhage in 2 patients & papilloedema in 1 patient. In patients with injury in temporoparietal region, pupil abnormality was present in 2 patients, lid edema in 1 patient & papilloedema in 2 patients. In patients with injury in frontofacial region, lid edema was present in 3 patients & orbital fracture in 3 patients. In patients with injury in temporofrontal region, orbital fracture was present in 3 patients, lid edema in 6 patients, subconjunctival hemorrhage in 5 patients & optic atrophy in 1 patient. In patients with injury in cerebellum, 6<sup>th</sup> nerve palsy was present in 2 patients, pupil abnormality in 2 patients & papilloedema in 2 patients. In patients with brain stem injury, 3<sup>rd</sup> nerve palsy was present in 2 patients & conjugate deviation was present in 2 patients.

**Table 3: Chief complaints of the patients:**

Chief complaint	No. of patients	Percentage (%)
Head injury only	28	43.07
Ophthalmic complaints only	11	16.92
Both	26	40.0

Table 3. chief complaints of the patients

**Table 4: Assessment of prognosis from pupils:**

	No. of patients	death	Percentage(%)
Bilateral dilated pupils	5	4	80
Unilateral dilated pupils	13	3	28.1
Normal sized pupils	40	1	5.0

Table 4. assessment of prognosis from pupils

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15 patients had dimness of vision. Out of 15 patients, traumatic optic neuropathy was present in 4(26.7%) patients, secondary optic atrophy in 3(20%) patients, macular edema in 3(20%) patients, posterior visual pathway lesion (lateral geniculate body 1<6.7%>patients, occipital cortex 1<6.7%> patients) in 2 patients & vitreous hemorrhage in 3(20.0%) patients.

**Table 5: Cranial nerve involvement:**

Cranial nerve	No. of patients
7 <sup>th</sup> (facial nerve)	6
3 <sup>rd</sup> (oculomotor nerve)	5
6 <sup>th</sup> (abducent nerve)	4
4 <sup>th</sup> (trochlear nerve)	0
Total recovery	15
3 <sup>rd</sup> nerve	2
6 <sup>th</sup> nerve	1

**Table 5. cranial nerve involvement**

**DISCUSSION:** Head injuries have remained a major problem because of increasing incidence, irreversible damage & associated ocular, ENT, plastic surgery & neurological problems.<sup>(4)</sup> The present study was done to find out importance of ophthalmic findings in head injury patients for helping in diagnosis & prevention of ocular complications.

Study was done on 65 head injury patients admitted in surgery wards, those with ophthalmic findings were included in the study & those with local injuries of globe were excluded. In this study total 454 patients of head injury were seen of which 65 had ophthalmic findings. In Hooper's study visual complications were present in 58 out of 500 patients.<sup>(5)</sup> Age of patients ranged from 3 to 67 years, highest no. of ocular findings were in 2<sup>nd</sup> & 3<sup>rd</sup> decade of life. Shokunbi found ocular complications in 28% of children with head injury.<sup>(2)</sup> Males were affected more 53 out of 65 than females 12 out of 65 which corresponded with high no. of head injury in male mainly because of more no. of vehicular accidents & assault. Leading cause of head injury was found to be vehicular accidents followed by fall from height & assault.

Ophthalmic findings were associated most commonly with frontal region injury. Patients of head injury having ophthalmic manifestations had more severe head trauma. 40% of patients (26 cases) had GC less than 8/15 (assessed by Glasgow coma scale). Most common findings in severe head trauma were dilated non-reacting pupils, papilloedema & cranial nerve palsies. While orbital fractures were frequently seen in patients with mild injury. Lid edema was the most common findings (40% patients). In 23 cases lid edema & ecchymosis was present at the time of admission. In 2 cases ecchymosis appeared after 12-36 hours of injury more on lower lid & on nasal side, all of these have basal skull fracture on CT scan.

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In orbital wall fractures, site of subconjunctival hemorrhage correlated with the side of wall affected. Unilateral dilated pupil was helpful in diagnosis of intracranial compressing hematoma. It was present on the side of hematoma in 100% cases. Miotic pupils were seen in 4 case due to generalized cerebral irritation from diffuse brain damage. Marcus gunn pupil was present in 3 patients which helped in diagnosing optic nerve injury. Bilaterally dilated pupil is a late sign of increase ICT & has a bad prognosis.

In this study 3<sup>rd</sup>, 6<sup>th</sup> & 4<sup>th</sup> nerve were affected in descending order. Same order was found in Rucker's series of cranial nerve palsies caused by head injury.<sup>(6)</sup> James J. Corbett found enlargement of blind spot in 5 patients out of 6 papilloedema patients. In this study it occurred in 4 cases of which 1 improved, optic atrophy developed in rest.<sup>(7)</sup> Papilloedema is usually bilateral (71.4% patients). In 6 cases it was more on the side of hematoma. Optic nerve compression was occurred in 4 patients. All were treated with systemic steroids. Partial recovery occurred in 2 patients, in patients with no PL, no recovery occurred. Ruch S. & Younge B.R. also found improvement with systemic steroids in 19 patients. They found optic nerve avulsion in 1 patient. In our study it was not seen suggesting its uncommonness.<sup>(8)</sup>

**CONCLUSION:** Majority of ocular findings help in diagnosis & confirmation of intracranial lesion & localizing the side & site. Some signs such as pupil & papilloedema help in deciding management & judging deterioration. Signs such as cranial nerve palsy, optic nerve compression & orbital fractures are important from ophthalmic point of view to decrease ocular morbidity. Papilloedema is a sign of marked rise of ICT associated with midline shift. Mortality is higher in cases with ophthalmic manifestation (12.8%) than in general head injury (5.16%).

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