

## Ocular Complications in Head Injury-A Prospective Study.

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**Abstract:** Ocular complications in head injury are of great clinical importance in localizing the lesion and management. This prospective study evaluates the pattern and clinical profile of ocular complications in 114 patients of head injury attending a tertiary care center over a period of two years. Patients with ocular morbidity were analyzed in relation to age, sex, cause of injury and other associated injuries. The major types of ocular complications like soft tissue injury to the globe and adnexa which includes periorbital ecchymosis, subconjunctival hemorrhage, lid lacerations and globe rupture in 58 patients, neurophthalmic complications in 56 patients and minor finding like orbital fracture were seen in 4 patients. Ocular injuries were multiple in 70% of cases. The subjects were in between 6 to 60 years. 74 were males and 40 were female. Road traffic accident (58.7%) was the leading cause, while fall from height (12.2%), assault (28.0%) and gunshot (0.008%) were other causes.

**Keywords:** Head injury, Ocular Complication, Neurophthalmic complication, Road Traffic accident.

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### I. Introduction

Head injuries cause hospitalization of 200-300 persons per 1 lakh population per year.<sup>1</sup> 25% of these head injuries were associated with ocular complications. Damage to the visual system is often ignored in head injury due to other comparatively serious systemic complications. The mechanism behind the ocular defect in head injury is less understood. One of the hypotheses of soft tissue and adnexal injury of the eye suggests it to be due to the transmission of energy from frontal bones to the orbit and from lateral orbital margins to contiguous facial structures.<sup>2</sup> The disorders of eye movements are thought to be due to direct trauma to orbital contents, cranial nerves, and other brain areas<sup>3</sup>.

### II. Materials & Methods

Out of 459 patients of head injury, 114 patients having ocular complications were taken as the study sample for this prospective study. The study period was of 2 years. Skull and spine roentgenogram and CT scan of the brain were done when indicated. Visual acuity, gonioscopy, perimetry, diplopia charting, IOP measurement were done whenever possible. Findings were transferred into a questionnaire format, which included patient's sociodemographic data, mode of head trauma and findings at neurological and ophthalmic evaluations. Ocular complications were grouped into 3 main grades.

**Grade 1-**Restricted to soft tissue injuries to the eye and adnexa without rupture of the globe.

**Grade 2-**Predominantly neuro-ophthalmic abnormalities with or without soft tissue injury.

**Grade 3-**Rupture of the globe, fracture of orbit with or without other soft tissue and neuro-ophthalmic injury.

The graded ocular complications were related to age, sex, admission Glasgow coma score (GCS) and cause of injury.

### III. Results

Ocular complications occurred in 114 of 459 (24.8%) head injured individuals. Out of which, 74 were males (65%) and 40 were females (35.0%). At presentation, the youngest subject was of 6 years and the oldest was of 62 years. Frequency of ophthalmic complications was maximum in the 3<sup>rd</sup> decade of life. Multiple ocular injuries involving anterior & posterior segments found in 70% of subjects.

**Table:-1** Age & Sex Distributions of Patients

Age Group	Male	Female	Total
0-10	4	4	8
11-20	6	10	16
21-30	34	12	46
31-40	24	8	32
41-50	0	2	2
51-60	4	2	6
>60	2	2	4

1. The frequency of various ocular complications are-

**Injury type No of Patients**

A. Soft tissue injury to the globe and adnexa

Periorbital ecchymosis	34
Laceration of eyelid	20
Corneoscleral injury	10
Subconjunctival hemorrhage	42
Chemosis	40
Retinal hemorrhage	4
Comotio retinae	6
Vitreous hemorrhage	10

B. Neuro-ophthalmic complications

Oculo cranial nerve injury	
Oculomotor	12
Trochlear	12
Abducent	16
Optic nerve damage	24
Cortical blindness	2
Ptosis	20
Pupillary abnormalities	24
Diplopia	8
Lagophthalmos	2

C.Orbital fracture with rupture of globe 4

In 70% of patients ocular and visual complications were multiple in nature.

2.The severity of ocular injuries in relation to age, sex, cause of injury and admission Glasgow coma score are tabulated as follows:-

Age (years)	Parameter		Category	Grade 1	Grade 2	Grade 3
	0-10	11-20				
21-30	30	16	-	12	4	-
31-40	16	14	2			
41-50	-	-	2			
51-60	3	3	-			
>60	2	2	-			
Total	69	41	4			
(60.5%)	(36%)	(3.5%)				
Sex	Male	48	22	4		
Female	20	20	-			
Cause of injury	RTA (58.8%)	37	26	4		
Fall (12.3%)	8	6	-			
Asault(28.0%)	22	10	-			

Total	68	42	Gunshot(0.9%) 4	1	-	-
GCS	≤8	16	14	2		
			9-12	16	12	2
			13-15	36	16	-

#### IV. Discussion

Incidence of ocular injury in our study is 24.8% which is consistent with other studies<sup>4,5,6</sup>, However, Kulkarni et al<sup>7</sup> reported the incidence to be 83.5%. Road traffic accidents(RTA) are associated with ocular injuries in 58.8% in our study which is consistent with most of the studies<sup>8,9</sup> except in a few where fall from a height was the most common. Lid and conjunctiva were more commonly involved than posterior segment and bony orbit in our study. This may be due to the direct impact on the rigid frontal bone or orbital margin. Of the neurophthalmic complications, oculocranial nerve palsy was the most frequent, abducent being the commonest nerve to be involved. This has been attributed to avulsion or contusion of the nerve at the base of the posterior clinoid process where it lies beneath the petrosphenoid ligament. It may also result from hemorrhage in the middle cranial fossa compressing the abducent nerve. Visual loss resulting from globe rupture, traumatic optic nerve damage or occipital cortical injury associated with a head injury in this series should be regarded as the most serious disability. Cortical blindness in 2 of our patients is a very rare association with a head injury. It should be identified early with the help of neurosurgeons for prompt intervention.

#### V. Conclusion

Manifestation of head injury are so serious that, the associated ocular complications are often ignored. Although various sophisticated imaging techniques are available to locate the lesion in head injury, early ophthalmic assessment in correlation with GCS certainly can improve the prognosis.

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