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OCULAR MANIFESTATIONS IN CASES OF HEAD INJURY- A CLINICAL STUDY

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ABSTRACT

Background: Aim: To study various ocular manifestations in patients with closed head injury.

Materials and Methods: A prospective, observational study was undertaken on 100 patients with closed head injury referred to the Department of Ophthalmology, Father Colombo Institute of Medical Sciences, Warangal from January 2025 to December 2025. These subjects were selected consecutively as and when they appeared with following inclusion and exclusion criteria.

Results: In the present study, the highest incidence of head injuries was in the group 31 to 39 years. There were 87 males and 13 females. The mean age for males is 33.63 + 14.4 and the mean age for females is 25.23 + 12.44. The main cause was RTA (86%), fall from height (8%) and assault (6%). The most common ocular finding in this study is ecchymosis seen in 53% of the cases followed by periorbital edema in 42% of the cases and subconjunctival hemorrhage in 39% of the cases. Lid laceration was there in 20% cases, chemosis in 10 %, ptosis in 4%, vitreous hemorrhage in 2%, proptosis in 2%, exposure keratopathy in 2%, scleral perforation 3%, iris sphincter tear 1%, traumatic uveitis 2%, phacodenesis 1%, papilledema 1%, subretinal hemorrhage 1%, Berlin's edema 3%, Purtscher retinopathy 1%. 4% patients had traumatic optic neuropathy, 3% had cranial nerve palsy, 1% has 6Th cranial nerve palsy, 1% had combined sixth and seventh nerve palsy, 1% had paralysis of third, fourth, sixth and seventh cranial nerves and 8 cases had pupillary abnormalities. Extradural hematoma was present in 3% cases, subdural hematoma in 2% cases, cerebral edema in 2 % cases, and orbital fractures in 14% cases. Vision greater than 6/60 was present in 77% cases, less than6/60 in 11% cases and vision could not be recorded in 12% cases. There should be a detailed early ophthalmological assessment in all patients with head injury.

Conclusion: Head injuries with ocular manifestations occur in younger age group. Road traffic accident was the most common cause. Males have to work outside their home for their jobs more than that of females. So they are more prone to accidents. Oedema and ecchymosis of eyelids constitute the most common ocular finding. Patients with mild ocular injuries pointed towards good visual prognosis. Most of them had mild head injury and hence good prognosis in terms of survival of the patient. The patients with severe ocular injuries like corneal tear, globe rupture and optic nerve injury showed poor visual prognosis.

Keywords: Head injury, Ocular manifestations, Traumatic optic neuropathy, ecchymosis, cranial nerve palsy.

INTRODUCTION

Although the eyes represent only 0.1% of the total body surface and 0.27% of the anterior body surface, their significance to individuals and society is disproportionately higher. The eye is the third most common organ affected by injuries. Role of ocular injuries secondary to head trauma in the causation of blindness continues to be an immense health problem. The immediate impact of head injury

threatening other vital organs is so compelling that damage to the visual system is most likely to be ignored.[1]

Man's endeavors to attain greater heights by industrialisation and rapid modes of transport have led to a rise in the incidence of head injuries. Head injuries also result in a burden on the family and society, as they are often associated with intellectual and cognitive function loss, as well as vision problems. Majority of the victims belong to the young, productive group who are more affected by road traffic accidents.[2]

Head trauma is common in our modern era of road transportation. A head injury occurs every 15 seconds, and a patient dies of head injury every 12 minutes. Over 50% of all trauma deaths are associated with head injury, and close to 60% of vehicular trauma deaths are due to head injuries. Clinical correlation of ophthalmic findings is important in early localisation of sites of injury, ongoing assessment, management, and prognosis of a patient with head injury.[3]

Head injuries cause the hospitalisation of 200-300 people per 100000 population per year, and about 25% of these are associated with ocular and visual defects. The role of ocular injuries secondary to trauma in the causation of blindness has become a subject of immense importance. Often at times, when the eye is examined as a part of neurological assessment of a patient with head injury, the purpose is mainly to gauge the severity of the head injury itself. Since the mechanisms of underlying ocular manifestations of head trauma are not fully understood, many hypotheses have been advanced to explain these defects.[4]

The eye is frequently involved in head trauma due to proximity of the eye to the head, as well as due to the neural connections between the eye and the brain. In non-penetrating or closed head injury, displacement, stretching, and shearing forces may damage areas of brain, including those associated with vision.[5]

Disorders of eye movement are thought to result from direct trauma to orbital contents, cranial nerves and other brain contents.[6]

Aim of the Study

- To study various ocular manifestations in patients with closed head injury

Objectives of the Study

- To study the demographic profile of head injury cases
- To study the various causes of head injuries

MATERIALS AND METHODS

A prospective, observational study was undertaken on 100 patients with closed head injury referred to the Department of Ophthalmology, Father Colombo Institute of Medical Sciences, Warangal from January 2025 to December 2025. These subjects were selected consecutively as and when they appeared with following inclusion and exclusion criteria.

Inclusion Criteria

- All patients with closed head injuries.

Exclusion Criteria

- Patients with ocular manifestations due to tumors and other pathologies which are precipitated by head injuries.

Method of collection of data

Patients who were brought in with head injuries were first asked if they would agree to be a part of the study. A medical consent form was given to them, which was signed by them and subsequently collected from them; if the patient was unconscious or was a minor, consent was taken from the attender. The demographic profile of the patient was collected. Detailed history regarding the injury and cause of injury was taken.

Medico Legal Case (MLC) was registered in whichever cases necessary. The clinical details were entered in to standard clinical proforma.

Visual acuity was assessed with and without correction. Visual acuity was assessed at bedside for bedridden patients. For ambulatory patients, visual acuity was tested in ophthalmology out-patient department. For comatose patients, visual acuity was not recorded. Thorough pupillary examination was carried out. Patient was assessed for ocular alignment and extraocular movement. Extraocular movements that were assessed were ductions, versions, convergence, saccades and pursuits. Anterior segment examination was done by bright flash light or slit lamp depending upon the status of the patient. Posterior segment examination was done by direct and indirect ophthalmoscopy. Intraocular pressure was recorded using Schiotz indentation tonometer or Goldmann's applanation tonometer when necessary. Diplopiacharting is done whenever the patient complains of diplopia or restricted movement. Forced duction and forced generation tests are done whenever patients have abnormal extraocular movements or there is suspected restriction of movements. Gonioscopy was done if necessary. Radiological investigations were ordered whenever needed.

Statistical Analysis

Data entry and analysis was done using Microsoft Excel 2010.The data collected was analysed statistically using description statistics like frequency and percentage. The results are depicted in the form of percentages and graphs. Numerical data was presented in mean and standard deviation.

RESULTS

Table 1: Sex Distribution

SEX	NUMBER OF CASES
MALE	87
FEMALE	13
TOTAL	100

In this study, there were 87 males and 13 females.

Table 2: Age Distribution

AGE	NUMBER OF CASES
<10	7
10-19	11
20-29	24
30-39	29
40-49	15
50-59	9
60-69	5
TOTAL	100

The highest incidence of head injuries was in the age group of 30-39 years.

Table 3: Age and Sex Distribution

AGE	TOTAL NUMBER OF CASES	MALE	FEMALE
<10	7	5	2
10-19	11	8	3
20-29	24	21	3
30-39	29	26	3
40-49	15	13	2
50-59	9	9	0
60-69	5	5	0
TOTAL	100	87	13
MEAN & SD	32.54 +14.4	33.63 +14.4	22.23 + 12.44

The mean age for males is 33.63 +14.4 and the median age for females is 22.23 + 12.44. For men, the age ranged from 2 to 65 years and for females the age ranged from 4 to 45 years. The majority of males were in the age group 20-39 (47 cases or 54.0%) and the majority of females were also in the age group 20-39 (6 cases or 46.15%).

Table 4: Causes of head Injury

CAUSES OF HEAD INJURY	NUMBER OF CASES
RTA	86
FALL FROM HEIGHT	8
ASSAULT	6

In this study, the causes for closed head injury causing ocular manifestations were road traffic accidents (86%), fall from height (8%) and assault (6%).

Table 5: Trauma to Ocular Adnexae

TRAUMA TO OCULAR ADNEXAE	NUMBER OF CASES
ECCHYMOSIS	53
LID LACERATION	20
PERIORBITAL EDEMA	42
PROPTOSIS	2
PTOSIS	4

The most common ocular finding in this study was ecchymosis seen in 53% of the cases followed by periorbital edema in 42% of the cases. Lid laceration was there in 20% cases, proptosis in 2% and ptosis in 4%.

Table 6: Anterior Segment Manifestations

ANTERIOR SEGMENT MANIFESTATIONS	NUMBER OF CASES
SUBCONJUNCTIVAL HEMORRHAGE	39
CHEMOSIS	10
EXPOSURE KERATOPATHY	2

SCLERAL PERFORATION	3
TRAUMATIC UVEITIS	2
SUBLUXATION OF LENS	1
SPHINCTER TEAR	1

In anterior segment, subconjunctival hemorrhage is seen in 39% of cases, chemosis in 10%, exposure keratopathy in 2%, scleral perforation in 3%, traumatic uveitis in 2%, subluxation of lens and iris sphincter tear in 1 % each.

Table 7: Posterior Segment Manifestations

POSTERIOR SEGMENT MANIFESTATIONS	NUMBER OF CASES
BERLIN'S EDEMA	3
VITREOUS HEMORRHAGE	2
PAPILLEDEMA	1
PURTSCHER RETINOPATHY	1
SUBRETINAL HEMORRHAGE	1

In the posterior segment, Berlin's edema is seen in 3%, vitreous hemorrhage in 2%, papilledema in 1%, sub-retinal hemorrhage in 1% and Purtscher retinopathy is 1%.

Table 8: Neuro-Ophthalmic Manifestations

NEURO-OPHTHALMIC MANIFESTATIONS	NUMBER OF CASES
III NERVE PALSY	3
TRAUMATIC OPTIC NEUROPATHY	4
VI NERVE PALSY	1
VI NERVE PALSY + VII NERVE PALSY	1
III, IV, VI, VII NERVES INVOLVED	1

In this study, 3% patients had third nerve palsy, 4% had traumatic optic neuropathy, 1% had sixth nerve palsy, 1% with combined sixth and seventh nerve palsies and 1% had paralysis of third, fourth, sixth and seventh cranial nerves.

Table 9: Pupillary Abnormalities

PUPILLARY ABNORMALITIES	NUMBER OF CASES
FIXED DILATED PUPIL	4
RAPD	4

Both fixed dilated pupils, and RAPD, were present in 4% cases.

Table 10: CT Findings

CT FINDINGS	NUMBER OF CASES
ORBITAL FRACTURES	14
EXTRADURAL HEMATOMA	3
SUBDURAL HEMATOMA	2
CEREBRAL EDEMA	2

Extradural hematoma was present in 3% cases, subdural hematoma was present in 2%, cerebral edema in 2% cases and orbital fractures in 14% of cases.

Table 11: Visual Acuity

VISUAL ACUITY	NUMBER OF CASES
VISION GREATER THAN 6/60	77
VISION LESS THAN 6/60	11
VISION COULD NOT BE RECORDED (DUE TO ALTERED SENSORIUM)	12

In this study, vision greater than 6/60 was present in 77% cases, less than 6/60 in 11% cases and vision could not be recorded in 12% cases.

DISCUSSION

In our study we have assessed different ocular manifestations which we found in patients of closed head injury.

It is not surprising that traffic accidents were responsible for the greater proportion of head injuries associated with ocular manifestations. In many series worldwide, road traffic accident constitutes the leading cause of head injury which is shown in study of Kulkarni et al,[3] Odebode et al,[4] Masila et al,[5] and in our study again, it is the leading cause. In our setting, motorised transportation has been on the rise in recent years – and this is not without the attendant

risk of increased automobile accidents. In developing countries like India, which are progressing towards more cosmopolitan standards, road traffic accidents play a major role in physical sufferings of young, working generations.

Head injury being one of the important causes, and eyes being frequently involved in most of head injury patients, it has to be ensured that adequate ophthalmic assessment happens on time and treatment is to be delivered accordingly to prevent permanent visual deficit.

In this study of 100 patients, the highest incidence of head injuries was in the age group of 30 to 39 years. There were 87 males and 13 females. The mean age for males is 33.63 + 14.4 and the median age for females is 25.23 + 12.44. For men, the age ranged from 2 to 65 years and for females the age ranged from 4 to 45 years. The majority of males were in the age group 30-39 and the majority of females were in the age group 20-39 (three cases each in 20-29 and 30-39 age groups).

In the study by Smitha et al,[2] 16 cases (32%) belonged to the age group of 16-30 years, 13 cases (26%) to the age group of 31-45 years, 15 cases (30%) to the age group of 46-60 years, 4 cases (8%) to the age group of <15 years and 2 cases (4%) to the age group of >60 years.

92% patients were male and 8% were females. In the study by Kulkarni et al3 of 200 closed head injury cases, 194(97%) were males and six (3%) were females. The age ranged from 5 to 67 years with a mean of 28.08 years. The age range for men was 5-67 years with a mean of 27.85 years. For women, the age ranged from 14 to 47 years with a mean of 35.33 years. Young adult males (21-30 years) were more vulnerable to head injury, 62% as opposed to the 41-50 year old among the females, 2%.

In a study by Pakalapati et al,[7] the total number of cases taken under evaluation was 350. Out of these, 125 cases had significant ocular injuries due to road traffic accidents. In the 125 cases, 97 of them were male patients, whereas 28 of them were female patients. The percentage for the male patients turned out to be 77.6%, whereas the female patients gave a percentage of 22.4%. 10.4% of males were between 0-20 years, 26.4% were between 21-40 years, 24% were between 41-60 years, 14.4% were between 61-80 years, and 2.4% were greater than 80 years. In the female cases, 1.6% patients were between 0-20 years, 12% were between 21-40 years, 6.4% were between 41-60 years, and 2.4% were between 61-80 years. The maximum cases were found in the age group of 21-40 years (38.40%), followed by 41-60 years (30.40%).

The demographic profile of closed head injury correlates with the findings of other studies, showing that males are predominantly involved; the main reason behind this being that males move out of their home more frequently for work. They are also more likely to be involved in industrial activities. Men have also been known to suffer from alcohol abuse, which results in road traffic accidents and assaults. Men have also shown signs of being more likely to engage themselves in risktaking behaviours – placing them in situations where they are susceptible to head injuries. Especially since this study was taken in a rural setting, the percentage of women in this sample space is lesser. This is due to the fact that women gravitate towards more of domestic chores, and are mostly involved in agricultural activities.

As men belonging to the age group of 30-39 are more probable to venture out on the roads for the purpose of certain work-related activities and chores, the study also showed the highest number of head injury incidents correlating to the above mentioned age group.

In this study, the causes for closed head injury causing ocular manifestations were road traffic accidents (86%), fall from height (8%) and assault (6%). Among the patients who had road traffic accidents, 76 (88.37%) were males and 10 (11.63%) were females. Among the patients who had fallen from a height, all were males and among the patients who were assaulted 3 were males and 3 were females.

This study was performed in a setting where people belonged to a certain socio-economic category as they hailed from agrarian societies. Another factor that highly contributed to the findings of this study was that the road traffic accidents occurred mainly on highway roads. These highway roads were found to be improper and full of potholes. Additionally, owing to the background of the subjects of the study, they did not follow basic road safety rules – they usually did not wear helmets or follow road rules while traveling.

In this study by Smitha et al,[2] the most common mode of injury was road traffic accidents seen in 38 cases (78%) followed by fall from height as seen in 7 cases (14%) and assault in 4% of the cases.

In this study by Kulkarni et al,[3] a majority of the 200 patients with head injury were victims of road traffic accidents (52.5%), closely followed by assaults (34%). Other causes of head injury included falls, pedestrians hit by motor vehicles or cattle and in one patient walking into a cement wall.

In this study by Odebode et al,[4] traffic accidents were the most common cause of ocular disorder (84.2%, 48/57). Fall from height and assault accounted for head and ocular injuries in four patients each (7%), while gunshot injury to the head was the cause in one patient (1.8%).

In the study by Abbasi et al,[8] the number of patients considered for the study was 152, out of which 86 patients (56%) suffered from road traffic accidents – being the leading cause for ocular manifestations associated with head injury. The other contributing factors were falls from height (25%), assault (13.8%), and gunshots (4.6%).

The causes of closed head injury closely correlate with the findings of other studies showing that road traffic accidents account for the majority of cases.

The most common ocular finding in this study was ecchymosis seen in 53% of the cases followed by periorbital edema in 42% of the cases and

subconjunctival hemorrhage in 39% of cases, chemosis in 10%, ptosis in 4%, proptosis 2%, exposure keratopathy 2%, scleral perforation 3%, sphincter tear 1%, traumatic uveitis 2%, subluxation of lenses 1%, vitreous hemorrhage 2%, papilledema 1%, sub-retinal hemorrhage 1%, Berlin's edema 3% and Purtscher retinopathy 1%.

In Kulkarni et al,[3] study, the most common eye finding was ecchymosis in 54/200 (27%) followed by subconjunctival hemorrhages in 38/200 (19%) patients. Orbital fractures were seen in 24 patients (12%0). Papilledema was seen in 11/200 cases (5.5%), macular edema in 4/200 cases (2%), retinal hemorrhage in 1 (0.5%) case, vitreous hemorrhage in 1 (0.5%) case, corneal tear in 2 (1%) cases, scleral tear in 2 (1%) cases and lacrimal gland prolapse in 2 (1%) cases.

In the study by Odebode et al,[4] the ocular manifestations include soft tissue injuries to the globe and adnexae in 29(12.89%) patients, fractures of the orbit with the rupture of eye in 2(0.89%) patients. The most frequent soft tissue injuries were periorbital ecchymosis in 17 patients (7.56%), chemosis in 20 patients (8.89%), subconjunctival hemorrhage in 21 patients (9.33%), lid laceration to 10 patients (4.44%), corneoscleral laceration in 5 patients (2.22%), retinal hemorrhage in 2 patients (8.89%) and commotion retinae in 3(1.33%) patients. Miscellaneous neuro-ophthalmic complications observed were other pupillary abnormalities in 12 patients (5.33%), partial or complete ptosis in 10 patients (4.44%) and lagophthalmos in 1 patient (0.44%).

In the study by Masila et al,[5] the most common findings were in ocular adnexae with ecchymosis occurring most frequently in 65 eyes (36.1%). In the anterior segment, corneal epithelial defects (superficial punctate erosions and epithelial defects) were the most frequent findings and occurred in 30 (16.7%) eyes. Corneal and scleral lacerations occurred in 1 eye (0.6%) each. Traumatic cataract was found in 2 eyes (1.1%). In the posterior segment, findings included one patient who had bilateral vitreous hemorrhage (1.1%) and retinal findings included papilledema 8 (4.4%0, optic atrophy 19 (10.06%), retinal hemorrhage 10 (5.6%), retinal detachment 1 (0.6%), commotio retinae 2 (1.1%), macula hole/scar 2 (1.1%), choroidal rupture 2 (1.1%). Orbital fractures were seen in 9 patients (5%).

In the study by Kumari et al,[9] ocular and visual complications occurred in 58 of 86(67.44%) head injury patients. They included soft tissue injuries to the globe and adnexa in 42 patients (48.83%), neuroophthalmic abnormalities in 28 patients (32.55%), and fracture of the orbit with rupture of the eye in 11 patients (12.79 %). The most frequent soft tissue injuries were periorbital ecchymosis in 39 patients (45.34%), subconjunctival hemorrhage in 20 patients (23.25%), lid laceration in 6 patients (6.97%), corneoscleral laceration requiring surgery in 7 patients (8.13%), and macular edema in 4 patients (4.65%). The most frequently encountered neuro-ophthalmic manifestation was pupillary involvement (in the form of abnormalities of pupillary size and reaction in one/both eyes) in 27 patients (31.39 %) followed by EOM restriction (24.41%) and disc edema (16.27%).

In the study by Abbasi et al,[8] the findings show the ocular and visual complications of head injury observed in 152 cases. One very important case found was a patient who developed carotico cavernous fistula bilaterally (features were more prominent on left side). Other frequent complications included soft-tissue injuries to the globe and adenexae, neuro-ophthalmic abnormalities, and fracture of the orbit with rupture of the globe. The most frequent soft – tissue injuries were periorbital echymosis (85 patients), sub-conjunctival hemorrhage (62 patients), lid edema (52 patients), chemosis (16 patients), black eye (18), lid laceration (14 patients), corneoscleral laceration (06 patients), and vitreous hemorrhage (05 patients).

In the study by Pakalapati et al,[7] out of 125 cases with ocular manifestations, 86 had eyebrow lacerations, 67 had lid lacerations, 104 had periorbital edema with ecchymosis, 79 had subconjunctival hemorrhage, 3 had scleral tear, 8 had vitreous or retinal hemorrhage, 2 had coroidal tear, and 3 had lens subluxation or dislocation.

The anterior segment of the eye was more commonly involved in head injuries than the posterior segment, ocular cranial nerves, or the bony orbit. Injuries to this segment result from direct impact on the rigid frontal bones and orbital margins, producing periorbital ecchymosis, lid laceration, and subconjunctival hemorrhage, and chemosis. Same is true for our study.

In our study 4% patients had traumatic optic neuropathy, 3% had third cranial nerve palsy, 1% had sixth nerve palsy, 1% had combined sixth and seventh nerve palsy, 1% had paralysis of third, fourth, sixth and seventh cranial nerves and 8 cases had pupillary abnormalities.

In the study by Smitha et al,[2] traumatic optic neuropathy was seen in 6 cases (12%). Ocular motor palsy was noted in 6% of cases, of which one had 3rd nerve palsy, one had 6^{th} nerve palsy and one had combined 3^{rd} , 4^{th} and 6^{th} nerve palsies.

In the study by Kulkarni et al,[3] pupillary involvement in 10/200 cases (5%) was the commonest neuro-ophthalmic sign. Abducens nerve palsy is seen in 2% of head injury cases. Traumatic optic neuropathy is seen in 0.5% cases and third nerve palsy is seen in 1.5% of the cases.

Other commonly affected cranial nerves in this series were the facial (6 patients) and auditory (2 patients) nerves. Miscellaneous neuroophthalmic complications observed were other pupillary abnormalities(12), partial or complete ptosis (10), and lagophthalmos (1).In the study by Masila et al,[5] pupillary abnormalities were found in 39 eyes. 2 patients had oculomotor nerve palsy.

In the study by Kumari et al,[9] among 21 cases with extra ocular movement restriction, only 9 cases had associated cranial nerve palsy, sixth nerve palsy in 5 cases, fourth nerve palsy in 1 case, third nerve palsy in 3 cases. Rest of intraocular movement restriction was attributed to local mechanical restriction which resolved eventually.

Pupillary involvement was present in 28 cases of which 27 cases had RAPD and rest had traumatic anisocoria due to sphincter tears. Among the patients with RAPD, 5 had vision of perception of light (PL+) and rest of the 22 patients had a bedside vision counting finger 2 meters. Of the all patients with RAPD (27 cases), only 2 (7.40%) patients had a poor visual outcome of <6/60, five patients (18.51%) had vision 6/6 and rest20 (74.07 %) with vision ranging from 6/60 to 6/9.

However, on visual field examination by HFA in patients with RAPD of vision better than 6/60, 17 patients (62.96%) had significant visual field defects, two patients of vision PL+ showed primary optic atrophy.

In the study by Mailk et al10, the most frequently encountered neuro ophthalmic manifestation was pupillary involvement (in the form of abnormalities of pupillary size and reaction in one/both eyes) in 15 patients (7.95%) followed by papilledema and optic nerve trauma.

In the study by Abassi et al,[8] the most frequently encountered neuroophthalmic manifestation was abducens nerve palsy. It occurred in 12 patients and was the most common ocular motor nerve palsy, followed by oculomotor 10 patients, trigeminal 4 patients; trochlear 4 patients and facial nerve palsy 2 patients. One patient developed aberrant regeneration of third nerve. Another neuro-ophthalmic complication observedwas papilledema in 10 patients which is not uncommon to be found in cases of head injury.

Extradural hematoma was present in 3% cases, subdural hematoma in 2% cases, cerebral edema in 2% cases and orbital fractures in 14% of cases. In the study done by Masila et al,[5] intracranial hemorrhage with ocular findings were present in 46.2% cases. Cerebral edema with ocular findings was present in 31.5% cases, pneumocephalus with ocular findings were present in 8.85% of cases and orbital fractures with ocular findings were present in 9.7% cases.

In the study by Abbasi et al,[8] according to CT-Scan findings, the most commonly fractured bone was frontal bone (20) followed by parietal bone (08), occipital bone (04), basal skull fracture (04) and temporal bone fracture in (02) patients. Subdural hemorrhage occurred in (30) patients followed by sub-arachnoid hemorrhages in (22) patients, extradural hemorrhages in (16) patients, and intra-cerebral hemorrhages bleed in (10) patients. Multiple brain contusions occurred in (16) patients.

In this study, visual acuity greater than 6/60 was present in 77% cases, less than 6/60 in 11% cases and vision could not be recorded in 12% cases. Vision could not be recorded in 12% of the cases because of the altered sensorium.

In the study done by Masila et al,[5] 70.8% eyes had normal vision (6/66/18), 21.9% had visual impairment (6/18-6/60), 3.4% had severe visual impairment (<6/60) and 3.9% were blind (No PL).

In the study by Puzari et al,[11] 73.33 % patient had visual outcome of 6/6, 16.66 % had 6/9-6/60, 6.66 % had CF, 1.66% had PL and 1.66 % hadno perception of light.

While in the study by Shtewi et al,[12] 30.43 % patient had 6/6, 50.30 % patient had 6/9-6/60, 15.94 % had CF and 3.28 % had no perception oflight.

In the study by Pakalapati et al,[7] out of 125 patients with ocular manifestations, 94 patients had vision 6/6 – 6/9, 11 patients had vision 6/12 – 6/24, 7 patients had vision 6/36 – 1/60, 5 patients had finger counting to hand movements, 2 patients had perception of light, and perception of light was absent in 2 patients. Vision was could not be recorded in 4 patients. These findings closely correlate with the findings of our study.

CONCLUSION

Our study stresses again on the importance of complete ophthalmological examination at the earliest in association with head injury to assess the final outcome of the injury. Ophthalmological examination also acts as a prognostic marker hence should be repeated at regular intervals to monitor the signs of deterioration as well as recovery. Our study hence emphasizes on importance of incorporating ophthalmic assessment into routine head injury assessment.

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