Original article:

Ophthalmic manifestations in head injury

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ABSTRACT:

Background: Head injury is a common problem encountered these days. Ocular injury associated with head injury should be understood and should be given prime importance. As head injuries occur most commonly in young age group, the socioeconomic impact of ophthalmic manifestations is grave.

Material and methods: This was a prospective, cross sectional study, carried out in 120 patients with open or closed head injury coming to casualty, surgery or ophthalmology opd in Pravara rural hospital, Loni, Maharashtra. Study duration was of 2 years from September 2016 to August 2018.

Results: Results showed that young adult males in the age group 21-40 were most vulnerable to head injury. Road traffic accidents was the most common cause of head injury followed by assault. Glasgow coma scale was an effective way to gauge the severity.

CLW was seen in maximum patients. 26.66% of the patients sustaining head injury had pupils abnormally reacting to light. Occurrence of isolated lateral wall fracture was maximum.

Conclusion: Road traffic accident was the most common cause of head injury. Lid tear was the most common finding in anterior segment. 26.66% of the patients sustaining head injury had pupils abnormally reacting to light. 11.66% cases had orbital fractures and lateral wall fracture was most common

Keywords: Ophthalmic manifestation, Head Injury

INTRODUCTION

In modern era head trauma is very common because of motorized transportation. Head injury, being one of the main causes of death or permanent disability, continues to remain as a major health problem with significant socioeconomic impact. Studies have shown that head injuries are a cause of hospitalization of 200-300 persons per 100,000 populations per year.[1] Head Injury" as defined by National Advisory Neurological diseases and Stroke Council, is "a morbid state resulting from gross or subtle structural changes in the scalp, Skull and/or contents of skull, produced by mechanical forces."[2] Incidence of head injury has increased more drastically causing severe damage to society. Causes of head injury includes assault, accidental injuries at factories and farms, injuries associated with sports and occurring in schools, domestic injuries in geriatric and paediatric age group, road traffic accidents (RTA).

Head injury can be divided into primary and secondary brain injury. The primary injury occurs as a consequence of the initial physical insult. Severity of injury depends upon the pattern, intensity, duration, impact and extent of damage. Secondary injury occurs as a result of further physiological insults. Hypoxia, hypotension, hyper- or hypocapnia, hyper- or hypoglycaemia have all been shown to increase the risk of secondary brain injury. The most useful classification of head injury severity is based on the level of consciousness as assessed by the Glasgow Coma Scale (GCS) after resuscitation.

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Studies have reported that head injuries are frequently associated with ophthalmic manifestations and consequent morbidity.[3]

MATERIAL AND METHODS

A total of 120 patients attending in the Outpatient department of Department of Casualty, Surgery and Ophthalmology, Pravara Rural Hospital, Loni, were studied. Patients with open or closed head injury of all ages and either sex willing to give written and informed consent were included in the study. Patients reported or brought in dead with history of head injury and with history of known ocular disorder were excluded from the study.

A detailed history was taken and note was made regarding age, sex, time interval between injury and arrival at the hosiptal, systemic and ophthalmic complaints and record was maintained. Visual acuity for all the patients was assessed with the help of bedside finger count or snellen's chart. Adenexa and anterior segment examination was carried out with the help of torch light. Wherever possible slit lamp examination was done. Pupillary reactions were observed and noted. Fundoscopy was performed using direct or indirect ophthalmoscope. Patients were subjected to radiological investigations, CT scan & MRI as per requirement.

RESULTS

Total 120 patients with open or closed head injury were included in this study. Out of these 120 patients, 96 (80%) were males and 24 (20%) were females. Incidence of head injury following RTA was maximum in the adult age group (20-40 years).

Table.no.1:clinical profile of patients with head injury

SEX RATIO	NUMBER (%)
Male	96 (80%)
Female	24 (20%)
AGE DISTRIBUTION	
<10 yrs	5(4.17%)
11-20	11(9.17%)
21-30	28(23.34%)
31-40	30(25.0%)
41-50	23(19.17%)
51-60	11(9.16%)
>60yrs	12(9.99%)
CAUSE OF INJURY	
RTA	91(75.83%)
Assault	14(11.66%)
Domestic accidents	11(9.16%)
Others	4(3.33%)

Table No. 2:Glasgow coma score in the cases of head injury:

GCS	No. of Cases	Percentage
0-8	21	17.50%
9-12	27	22.50%
13-15	72	60.00%
Total	90	100%

Table no. 3:profile of ocular trauma in head injury

TYPE OF INJURY	Total	Percentage (%)
A. Soft tissue injury		
Peri orbital ecchymosis	29	24.17%
Lid laceration	34	28.33%
Subconjunctival haemorrhage	28	23.33%
Exposure keratitis	3	3.34%
Corneal tear	1	0.83%
Traumatic cataract	1	0.83%
Vitreous haemorrhage	1	0.83%

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Berlin's edema	2	1.66%
Retinal detachment	1	0.83%
Terson's syndrome	1	0.83%
B. Orbital fracture		
Superiror wall fracture	4	4(3.33%)
Lateral wall fracture	8	(6.66%)
Medial	1	(0.83%)
Floor	1	(0.83%)
C. Neuro ophthalmic complications		
Abnormal pupillary reaction	32	26.66%
Optic atrophy	5	4.16%

Ocular and visual complications included soft tissue injury to the globe and adenexa, orbital fractures and neuro-ophthalmic complications. Most common finding was lid laceration 34 (28.33%) followed by periorbital ecchymosis in 29(24.17%) patients. Sub-conjunctival haemorrhage was seen in 28 (23.33%) patients. 3(3.34%) unconscious patients had exposure keratitis, these were the patients with GCS between 0-8. On fundus examination 1 (0.83%) patient had vitreous haemorrhage and 1 (0.83%) patient presented to us with complain of decreased vision, on IDO examination macular edema was suspected. Total 14 patients were suspected to have orbital fractures. Clinical examination and radiology reports (X-ray orbit, CT-scan) revealed superior wall fracture in 4 (3.33%) patients, lateral wall fracture in 8 (6.66%) patients and floor & medial wall fracture in 1 (0.83%) patients.

Neuro-ophthalmic compications included abnormal papillary reactions in 32 (26.66%) patients (pupillary involvement in the form of abnormalities of pupillary size and reaction in one/both eyes). Optic atrophy &/or temporal pallor was seen in 5(4.16%) patients.

DISCUSSION

Head injury is a major medical, social, economic health priority issue. Over 50% of all trauma deaths are associated with head injury.[4] Ocular trauma is the cause of blindness in more than half a million people worldwide and of partial loss of sight in many more, and it is often the leading cause of unilateral loss of vision particularly in developing countries.[5]

The role of ocular injuries secondary to head trauma in causation of partial or complete blindness continues to be an immense health problem.[6] As head injuries occur most commonly in young age group, the socioeconomic impact of ocular trauma is grave. Those affected often have to face loss of career opportunities, major lifestyle changes and occasionally permanent physical and mental disability.[7]

In present study results showed that number of males were more as compared to females. Mean age for males in our study was 39.38 ± 17.04 and females it was 35.33 ± 18.97. Of the total cases, 96 (80%) were males and 24(20%) were females. Majority of the patients 81 (67.5%) belonged to age group between 20-50 years. Kumari et al in their study mentioned that 86.04% were males and 13.91% were females in the age range 5-74 years and mean of 28.68 years. Young adult males aged 21-30 years were more vulnerable to head injury.[8]

Arvind Kumar et al in their study also found that number of males were more than females with commonest age group between 21-40 years.[9]

Based on the result of our study major cause of injury was found to be road traffic accident in 91 (75.83%) patients, followed by assault in 14 (11.66%) cases, and domestic accidents in 11 (9.16%) cases. Thurman DJ et al in their study suggested that high velocity impact due to RTA is the commonest cause of head injury.[10] Our study is in agreement with the author. Kanwal Zareen Abbasi et al in their study found that most common cause of injury were traffic accidents i.e. 56.5%, followed by fall from height 25.0%, assault 13.8%, and gunshot 4.6%.[11]

Glasgow Coma Scale (GCS) was applied to grade the severity of head injury & score was recorded for all the patients. In current study maximum numbers of patients 72 (60%) were found to have Glasgow come score as 13 to 15 and least (17.50%) number of patients were seen in the score 0-8. Studies in the past have found significant correlation of the GCS, neurodeficit, and the ocular signs, our study is in agreement with the author.[12]

As described in the table, subconjunctival haemorrhage was seen in majority (23.3%) of the patients. Odebode in his study mentioned that the incidence of subconjunctival hemorrhage was 10.58% which was lower than as compared to 23.3% in our study.[7] Smruthi et al reported 27% of subconjunctival haemorrhage in their study.[13]

Exposure keratitis was seen in 3(3.34%,) unconscious patients, corneal tear in 1 patient. . Kulkarni AR et al in their study mentioned that corneal tear was seen in 2% cases.[14] Sharma B et al in their study found exposure keratitis in 4.21% cases.[15]

In our study 1(0.83%) patient had traumatic cataract. Masila Faith et al in her study found traumatic cataract in 1.1%, which was similar to our study.[16]

In our study, we found vitreous haemorrhage in 1 (0.83%) case, Berlin's edema was seen in 1 (0.83%) case, Terson's syndrome in 1(0.83%) case. Van stavern GP found terson's syndrome in 3.2% cases.[17] Some studies have reported berlins edema in 1.5%[18] Based on our result we found that there is a significant association between cause of injury and fundus findings in the cases of ophthalmic manifestations in head injury.

In our study lateral orbital wall was found to be the most commonly fractured in 8 (6.66%) cases among all fracture cases in spite of being strong boundary. It may be attributed to the mechanism of impact during accidents or fall where lateral wall gets injured most of the time on verge of protecting the eyeball. Unlike in other type of injury to orbit like blowout injury where direction of impact is from the front, orbital injury in RTA is commonly due to force of impact being on lateral aspect of the orbit.[19] Though most common orbital fracture is blowout fracture, usually involving orbital floor with or without medial wall & lateral orbital wall is strongest among other orbital walls however is commonly fractured in settings of severe facial traumas. Kumari et al also mentioned in her study that number of lateral wall fracture was more than any other orbital fracture in her study.[8] By applying Chi-square test there is a significant association between Orbital fracture and GCS in the cases of head injury. Value of $\chi^2 = 30.986$, p=0.001, which is significant.

We found a significant association between pupillary reactions and GCS (Glasgow Coma Score) in the cases of ophthalmic manifestations in head injury, p=0.001. . Kumari et al in their study mentioned that 80% of patient with GCS<10 had associated pupillary involvement in them, thereby showing significant association between severity of head injury and pupillary involvement.[8] Similar result was seen in our study.

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CONCLUSION

Road traffic accident was the most common cause of head injury. Lid tear was the most common anterior segment finding followed by ecchymosis and subconjunctival haemorrhage. 26.66% of the patients sustaining head injury had pupils abnormally reacting to light. 11.66% cases had orbital fractures and lateral wall fracture was most common.

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