

A STUDY OF HEAD INJURY PATIENTS ADMITTED IN THE EMERGENCY ROOM.

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Abstract:

Background: Head injury is one of the most frequent presentation of patients in emergency department. Emergency physicians are involved in triage, assessment, investigation and early management of these patients to improve mortality, disability rates, outcome and survival benefit to the patient, their family and society.

Aims and objectives: To study the patients with head injury in view of Glasgow Coma Scale (GCS), presenting symptoms, CT (Computed Tomography) scan findings, severity, associated injuries, disposition and outcome in emergency room.

Materials and method: This observational study included 200 patients above 15years of age, admitted to the emergency room with head injury. Data was recorded in preformed patient's record form. Data was analyzed by Microsoft office 2010 and help of statistician was taken as and when required.

Results: In our study most of the patients were male (74.5%) with age less than 40 years (63.5%). Most common presentation of injured was altered sensorium (32.5%) and commonest

mode of injury was road traffic accident (67%). Initial CT scan was normal in 42.5% patients while 18% found subdural hemorrhages, 14.5% contusions, 13.5% extra-Dural hemorrhages and 12% subarachnoid hemorrhages. 91% patients were treated conservatively while 9% required operative intervention. According to GCS, 70% patients had mild head injury while 11% had moderate and 19% had severe head injury.

Conclusion: In our study majority of the patients were of age less than 40 years. Maximum no. of patients had history of road traffic accidents as mechanism of injury. Altered sensorium was the commonest clinical presentation. Most of the patients had mild head injury and shifted to the ward while mortality was highest in patients with severe head injury. Immediate assessment and timely intervention by emergency physician helped to grade the severity of head injury and decide further line of management including operative intervention.

Take home message: Early assessment and timely management of head injury patients by Emergency physician can prevent or reduce the rate of secondary brain damage and improve outcome.

Key words: Head injury, GCS, CT Scan, Brain Hemorrhage, emergency physician

Background:

Head injury is one of the most frequent presentations of emergency department following motor vehicle accidents, fall from height, sports and recreational injuries. When patient comes to emergency department, emergency physicians are involved in their Triage, Assessment, Investigation and Early Management. The treatment provided by them plays potential role in outcome of patient as well as family and society¹.

A head injury does not always cause an injury to the brain, and the terms 'head' and 'brain' are used to distinguish between the original injury to the head and consequent injury to the brain respectively. According to the 'Centre for Disease Control² (CDC), Head Injury (traumatic brain injury-TBI) is defined as:

“Injury to the head, associated with symptoms or signs attributable to injury: decreased level of consciousness, amnesia, other neurological or neuropsychological abnormalities, skull fracture, diagnosed intracranial lesions or death.”

Rapid urbanization, industrialization and changing in lifestyle along with various social factors have given rise to many problems amongst which head injury has alarming increase in incidence.

Lack of education (illiteracy), awareness and delay in emergency care added further to rising mortality and disability rates so, early management of head injury is critical to survive the patient.

Aims and objectives:

To study the patients with head injury in view of Glasgow Coma Scale (GCS), presenting symptoms, CT (Computed Tomography) scan findings, severity, associated injuries, disposition and outcome in emergency room.

Materials and method:

This is an observational study of 200 patients aged above 15, who came to the emergency department with head injury. In all patient GCS was noted on admission. Detailed history was taken in form of patient's personal data, mechanism of injury. Any history of altered sensorium, any bleeding from ear, nose or throat, convulsion and vomiting was inquired.

Also data were recorded for CT scan findings, presence of Skull fractures, Mode of treatment, mortality, associated injuries, Severity of head injury with immediate mortality, disposition from emergency room. This data was entered in preformed patient record form. The statistical analysis was done by using Microsoft Office 2010. Help of statistician was taken as and when required.

Observation and result:

Age distribution:

Table-1 shows that majority of the patients (63.5%) were less than 40 years of age with a range of 16 -88 years. Our study shows that most of the patients were in the age group of 21-30 years amounting to 22% of total case. The study done by B.P Sharma et al⁴ from Indian Oil Corporation Hospital, Digboi had an incidence of 34% of cases in same group. In our study 63.5% (127) patients were less than 40 years of age, from productive age group responsible for economy of country.

Gururaj et al⁵ had 40% cases of head injury in 21-35 years age group.

Sex distribution:

In our study, 74.5% patients were males and 25.5% females (Fig. 1) comparable to 75% in a study of Gururaj⁵.

This male preponderance may be due to the fact that in our country, males are more exposed to automobile and industrial accidents. In most of the Indian families, males are the main source of earning for family. Any mortality & morbidity which affects males predominantly leads to increased economic burden to the family and society.

Mechanism of injury:

Figure-2 shows that maximum no. of patients (67%) had road traffic accidents as mechanism of injury followed by fall (25%) and assault (8%).

Various studies are showing different data about mechanism of injury (Table-2).

It shows that our study has maximum no. of road traffic accidents as mechanism of injury.

Clinical presentation:

Table-3 shows various symptoms present in our patients.

1. Altered sensorium:

In our study 32.5% of patients were presented with altered sensorium, compared to 41% in study done by Sharma A K⁶ et al. and 21% by Teemu Louto⁷.

2. ENT bleeding:

Any bleeding from ear, nose or oral cavity is a warning sign of basilar skull fracture (Photo-2).

In our study 31.5% of patients had history of ear, nose or oral bleeding at presentation. It was associated with facio-maxillary injuries and some required tracheostomy for airway management.

A study by Anil M Bhole et al⁸. had observed nasal bleeding in 64%, ear bleeding in 18%, ear and nasal both bleeding in 14% of patients.

3. Convulsion:

In our study 6% of patients had history of convulsion, which is more in no. compared to 2% in a study by klauber⁹ et al at San Diego County Hospital and 4.5% of Teemu Louto⁷ at Tampere University Hospital, Finland.

In head injury patient, convulsion may be caused by increase in intracranial tension due to subarachnoid hemorrhage, subdural hemorrhage or meningeal irritation. Focal seizure may be due to discrete cerebral lesion commonly an extradural or subdural hematoma compressing some area of motor cortex.

4. Vomiting:

Our study had shown vomiting in 22% (44) patients (table-3). Vomiting alone without loss of consciousness may not be of major importance. But in unconscious patients with raised intracranial pressure vomiting is accompanied by bradycardia. It may complicate the head injury patient by increasing the risk of aspiration.

CT scan findings:

CT scan is the gold standard for diagnosing intracranial hematoma after traumatic head injury (Fig- 3). It allows differentiation between hematoma and contusion, between localized edema and generalized brain swelling. In our hospital CT scan was done in all the patients with head injury irrespective of severity of injury. Most of the time, ATLS criteria, New Orleans criteria or Canadian head CT rules are followed for advising CT scan for the patients with mild head injury.

In our study we found normal CT scan findings initially in 42.5% of patients (Table-4). Amongst all lesions subdural hemorrhage(SDH) was found in 18% (36) patients followed by contusion 14.5% (29), extra-dural hemorrhage (EDH)13.5% (27), subarachnoid hemorrhage(SDH)12% (24), cerebral edema6.5% (13) and Pneumocranium 7% (14) patientsrespectively (Fig-3). Some patients had multiple findings at same time.

Anil M. Bhole⁸ et al had studied and found cerebral contusions in 84%, Fractures in 24%, SDH in 22%, EDH in 16% and ICH (intracranial hemorrhage) in 8% of patients while 26% had normal CT scan.

Skull fractures:

In our study 12.5% patients had skull fracture, compared to 24% of Anil M Bhole⁸

Skull fractures were seen in X- ray as well as CT scan. Our study had a number of patients who remained asymptomatic and alert having skull fracture. Those with compound skull fracture are at risk of developing intracranial infection and those with a closed linear fracture have increased risk of developing intracranial hematoma.

Mode of treatment and mortality:

According to Table-5, 91% (182) patients were treated conservative or non-operative, while 9% (18) patients were taken for operative management. Out of 91% (182) conservatively managed patients,3% (6) patients with severe head injury were died in emergency department only while no further data recorded for postoperative mortality in patients taken for operative management.

Associated injuries:

In our study 20.5% (41) patients had associated other injuries. Out of them 14% (28) patients had positive CT Scan findings and associated injuries (Table-6). In 2 patients abdominal injury was detected by FAST but managed conservatively.

Severity of head injury with immediate mortality:

In our study 70% of patients had mild head injury and 11% and 19% had moderate and severe head injuries respectively (Table-7). Out of 19% patients with severe head injury, 6 died in emergency room, so mortality rate was 3% in our study.

Kohi and Teasdale et al¹⁰ compared the relationship of GCS and outcome of patient in their study and found an unfavorable outcome in 69% of patients with GCS of 3-8. But in their patients they included long term outcome, while in our study we considered only immediate mortality.

Miller et al¹¹ had mortality rate of 71% for GCS 3-8; 13% for GCS 9-12 and no mortality for patients with GCS more than 12 but they did not mention duration of observation.

Disposition from emergency room:

The patients were received in emergency room, managed and then shifted to other place according to priority.

Out of 200 patients 108(54%) patients were shifted to the wards who did not required close monitoring and intensive care, 50(25%) patients required intensive monitoring so shifted to ICU (Table-8). 8(4%) patients with minor head injury had associated extremity fractures so shifted to orthopedic ward. 6(3%) patients expired in emergency department itself. 18(9%) patients required neurosurgical intervention so they shifted to neurosurgical operation theatre. 10(5%) patients had taken discharge against medical advice.

Discussion:

Road traffic accidents are a major cause of mortality in India. More than 1 million people die due to head injury every year in India. In developed countries incidence of head injury has declined due to improved quality of infrastructure, strict laws of driving and awareness amongst people about prevention of accidents and trauma. In a developing country like India the situation is different due to increase in population, poor infrastructure, illiteracy, insufficient facilities, and non compliance of traffic rules such as wearing helmets while on two wheelers. So except for prevention nothing can be done for primary damage to brain. Early transportation to a well equipped emergency department would result in decrease of mortality & morbidity in trauma patients.

Conclusion:

We studied total 200 patients, with maximum no of patients less than 40 years of age and male predominance. Majority of cases had history of road traffic accidents and altered sensorium as the commonest clinical presentation. Initial assessment by ATLS protocol (ABCDEF), quick neurological examination and Glasgow Coma Scoring helped to grade the severity and decide further line of management. CT scan helped to decide further line of treatment and reduce mortality and morbidity. Operative intervention was planned depending on Glasgow Coma Scale and CT scan findings. Most of the patients had mild head injury and shifted to ward. Mortality was highest in patients with severe head injury.

Take Home message:

Emergency physician is the first person involved in most of the patient with head injury.

Immediate transfer of such patients to the facility available, timely intervention and management done by them can prevent or reduce the rate of secondary brain damage.

Competing interests: None

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Tables:

Table-1 Age Distribution

| Age group | No. of patients | % of patients |
|--------------|-----------------|---------------|
| 16-20 | 40 | 20.0 |
| 21-30 | 44 | 22.0 |
| 31-40 | 43 | 21.5 |
| 41-50 | 30 | 15.0 |
| 51-60 | 17 | 08.5 |
| 61-70 | 14 | 07.0 |
| 71-80 | 06 | 03.0 |
| 81-90 | 06 | 03.0 |
| TOTAL | 200 | 100 |

Table-2 various study on mechanism of injury:

| STUDY | RTA % | FALL % | ASSUALT % | OTHER % |
|--------------------------------------|----------|-----------|--------------|------------|
| Sambasivan et al ⁹ (1973) | 37.0 | 33.82 | 17.30 | 11.23 |
| Bharti P ³ (1993) | 49.1 | 23.60 | 23.37 | 03.89 |
| Gururaj ⁵ et al (2003) | 59.0 | 25.00 | 10.30 | 05.70 |
| Our study (2014) | 67.0 | 25.00 | 08.00 | 00.00 |

Table-3 Clinical presentation

| Main symptoms | No. of patients | % of patients |
|-------------------|-----------------|---------------|
| Altered sensorium | 65 | 32.5 |
| ENT bleeding | 63 | 31.5 |
| Vomiting | 44 | 22.0 |
| Convulsion | 12 | 06.0 |

Table- 4 CT scan findings

| CT scan finding | No. of patients | % of patients |
|------------------------------|-----------------|---------------|
| Cerebral Edema | 13 | 06.5 |
| Extra-dural Hemorrhage | 27 | 13.5 |
| Subdural Hemorrhage | 36 | 18.0 |
| Cerebral Contusion | 29 | 14.5 |
| Subarachnoid Hemorrhage | 24 | 12.0 |
| Pneumocranium | 14 | 07.0 |
| Intra-parenchymal Hemorrhage | 02 | 01.0 |

| | | |
|-----------------|----|------|
| Skull fractures | 25 | 12.5 |
| Normal | 85 | 42.5 |

Table- 5Mode of treatment and mortality

| Mode of treatment | No. of patient | Mortality |
|----------------------------|----------------|-----------|
| Conservative/Non operative | 182 | 6 |
| Operative | 018 | - |

Table-6Associated injuries

| Associated injuries | No. of patient | Positive CT Scan finding |
|--------------------------|----------------|--------------------------|
| Fracture Upper Extremity | 09 | 05 |
| Fracture Lower Extremity | 08 | 05 |
| Fracture Pelvis | 04 | 02 |
| Chest Injury | 12 | 10 |
| Facio-maxillary | 04 | 04 |
| Spine | 02 | 02 |
| Abdominal Injury | 02 | 00 |
| Total | 41 | 28 |

Table-7Severity of head injury with immediate mortality

| GCS | Severity | No. of patients | Immediate mortality No. of patients |
|-------|----------|-----------------|--|
| 13-15 | Mild | 140 | 0 |
| 09-12 | Moderate | 022 | 0 |
| 03-08 | Severe | 038 | 6 |
| Total | | 200 | 6 |

Table-8Disposition from emergency room

| Disposition | No. of patients |
|-------------|-----------------|
| Ward | 108 |

| | |
|---------------------------------|------------|
| Neurosurgical operation theatre | 018 |
| ICU | 050 |
| Orthopedic ward | 008 |
| DAMA* | 010 |
| Expired | 006 |
| TOTAL | 200 |

*Discharge Against Medical Advice

Figures:

Fig-1 Sex distribution

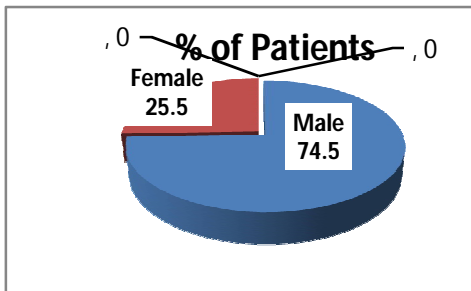


Fig-2 Mechanism of injury

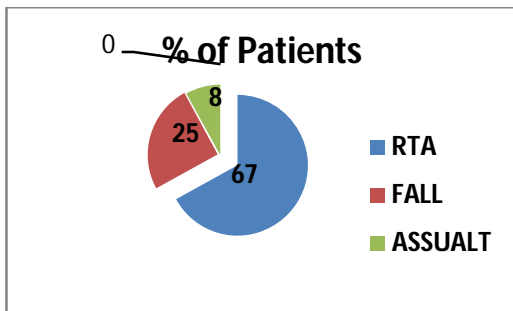


Fig-3: different hemorrhages and fractures of brain

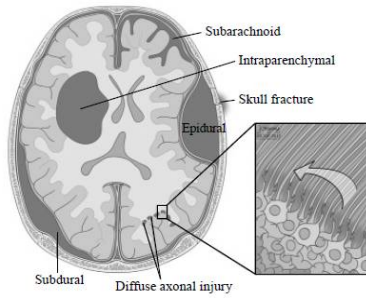


Photo- 1Scalp laceration



Photo-2Periorbital ecchymosis

List of abbreviations:

ATLS- Advanced Trauma Life Support

CT scan- Computed Tomography

CDC- Centre for Disease Control

ENT-Ear, Nose and Throat

GCS-Glass Glow Coma Score

ICH -Intracranial Hemorrhage

ICU- Intensive care Unit

Kg- Kilogram

Mg- Milligram

TBI- traumatic brain injury

Smt. N.H.L. Medical College
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Permission letter

Dr Harsha D Makwana (Asso. Prof)
Dr Advait V Thakor (Prof. & HOD)
Emergency Medicine Department
Smt. NHL Medical College
Sheth Vadilal Sarabhai General Hospital
Ahmedabad
Date- 15/10/2015

To,
The Superintendent,

Sheth V. S. General Hospital, Ahmedabad

Sub: Permission for publication of an article

Respected sir,

Kindly permit me to publish an article titled **"Study of head injury patients in emergency room"** in a journal. It is only for academic purpose.

Thanking you

Yours sincerely

Dr. Harsha D Makwana

HP Makwana

Dr Advait V Thakor

Advait V Thakor

OK
[Signature]
Dean

H.O.D (EM)

[Signature]
PA to Dean