



Research Article

CLINICAL FEATURES AND MANAGEMENT OF HEAD INJURY

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ABSTRACT

Background: Head injury recognized as a major public health problem that is frequent cause of death and disability worldwide. No effective management therapy exists for traumatic brain injury. Such cases are treated conservatively with pharmacological agents alone and in combination of surgery and rehabilitation. This study was conducted to identify the clinical features, management and outcome of head injury cases.

Material and Methods: A total of 100 consecutive patients with a diagnosis of head injury were studied. Patients were evaluated by Glasgow coma scale and X-ray and CT scan. 89 patients were managed conservatively. The remaining 11 patients underwent emergency craniotomy.

Results: Majority of cases had history of road traffic accident and unconsciousness was leading clinical presentation. Of the 89 patients who were managed conservatively 10 expired accounting for a mortality rate of 11.23%. Of the 11 patients managed operatively 6 died (54.5%). Mortality was highest in adults with GCS between 3-8.

Conclusion: Predicting outcome in patients of severe head injury is a challenging task. Immediate GCS, radiological evaluation, surgical intervention and intensive care in all appropriate cases can improve the final outcome.

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INTRODUCTION

Background

Head injury recognized as a major public health problem that is frequent cause of death and disability worldwide. It affects all ages, however, majority of road traffic accidents (RTA) occurs in young adults of productive age group. Head injury is also associated with significant socioeconomic losses in India as well as in other developing countries¹.

The majority of the head injury cases are due to RTA (60%) followed by falls (20-25%) and violence (10%)². Patients with head injury commonly present with loss of consciousness, headache and vomiting followed by skull fracture. Associated clinical findings suggestive of basal skull fractures are nasal bleed, ear bleed, and CSF rhinorrhea or otorrhoea.

Skull fracture detected usually by X-ray indicates more severe internal brain injury and is frequently associated with development of intracranial hematoma³. The computed tomography (CT) scan provides an objective assessment of the structural damage to brain following traumatic brain injury. Individual CT characteristics are important predictors of outcome in TBI. Despite various advances in radiology, CT remains the investigation of choice⁴.

Neurological assessment for assessing severity is commonly done by Glasgow coma scale (GCS). With all its drawbacks GCS still remains the most widely used coma scale as it is the simplest and most easily reproducible scale⁵.

Currently, no effective management therapy exists for traumatic brain injury. Such cases are treated conservatively with pharmacological agents alone and in combination of surgery and rehabilitation. This study was conducted to identify the clinical features, management and outcome of head injury cases after conservative and surgical management.

METHODS

Ethical statement

This study was carried out in the department of Surgery of a tertiary care hospital. The study was approved by Institutional ethical committee.

Study population

This study was carried out at Krishna Hospital and Medical Research Center, Karad from January 2012 to October 2012. A total of 275 patients with a diagnosis of head injury were admitted in the neurosurgical unit during this period. Out of these 100 consecutive patients with a diagnosis of head injury were studied.

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Monitoring of patients

All the patients were first seen in the casualty department and sent to the surgical intensive care unit. In surgical intensive care unit, respiration was assessed, airway was maintained and pulse and blood pressure recording was done. Rapid assessment of other associated injuries such as trauma to thorax, abdomen and pelvis and long bones and spine was done. Blood was collected for investigation and an intravenous line secured. Meanwhile a detailed history was obtained either from the patient or from the people who brought the patient. Any history of unconsciousness, vomiting, convulsions, bleeding from the ear or nose was inquired. History of alcohol intake was also noted. Past history regarding hypertension, diabetes and bronchial asthma or any other relevant disease was asked.

All those patients who had respiratory distress were intubated. Ryle's tube was put in all unconscious patients. Patients in shock were resuscitated by giving Intravenous fluids, hemacel, blood and pressor agent like dopamine as per necessity.

The Glasgow coma scale

It is a standardized measurement of coma which numerically rates the response of the patients with head injury. The score ranges from 3-15. After this a careful neurological examination was undertaken. The findings were accordingly charted on a Glasgow coma scale. The external injuries were noted.

On the basis of Glasgow coma scale severe head injury was defined as a score of 8 or less. According to Glasgow coma scale patients are divided into 3 groups. GCS of 9-12 are grouped as moderate head injury and GCS of 13-15 as mild head injury.

Investigations

Once the patient was settled, relevant X-rays and CT scans along with routine laboratory investigations were done. In patients with suspected abdominal injuries abdominal ultrasound and diagnostic abdominal tapping was also done.

Routine investigations like complete blood count, blood sugar level, blood urea and creatinine, serum electrolytes, coagulation profile, urine examination, x-ray cervical spine & chest x-ray. Repeat CT-head done after 48 hrs if patient didn't improve neurologically or deteriorates in sensorium.

Management of patients

Conservative management

Patients who required conservative line of management were managed in wards with intravenous fluids and nasogastric feeding, maintenance of electrolyte balance and taking care of bowel and bladder. Depending upon the CT findings mannitol 1 mg/kg/day was given to patients with diffuse cerebral edema. Mannitol was given 3-5 days. Phenytoin sodium 5 mg/kg/day were administered to all patients with a history of unconsciousness, convulsions or having demonstrable cerebral injury on scan. Patients who required ventilatory support for more than 48 hours or those who were unconscious for a long time and had developed chest complications or those patients with severe faciomaxillary injury underwent a tracheostomy.

Surgical management

Craniotomies done on patient with large size of extradural hematoma, subdural hematoma, intraparenchymal hemorrhage with midline shift.

RESULTS

In our study, majority of patients were in the age group of 21-30 years amounting to 27% of the total cases followed by 31-40 years with 21%. Male were more commonly (74%) affected than females. Majority of the cases had head injury due to RTA (79%) followed by fall in 18% cases. 21% of patients were found under influence of alcohol at the time of injury (Table 1).

Table 1 Demographic data of the study population

Demographic characteristics	No. of patients
Age group (yrs)	
11-20	12
21-30	27
31-40	21
41-50	18
51-60	13
61-70	06
71-80	02
81-90	01
Sex	
Male	74
Female	26
Mode of injury	
RTA	79
Fall	18
Assault	03
Alcohol influence	
Present	21
Absent	79

The event following the injury included episode of loss of consciousness in 32% cases, vomiting in 23%, ENT bleeding in 33% and convulsions in 3% cases. 155 of the cases had associated systemic injuries along with head injury. A total of 18 patients had skull fracture. Out of these isolated fracture was noted in 3 patients, pneumocephalus in 7 cases, extradural hemorrhage in 5 cases, cerebral contusion in 2 cases and subdural hemorrhage in one case. CT findings revealed cerebral edema in 7 cases, extradural hemorrhage in 14 cases, subdural hemorrhage in 19 cases, contusion in 20 cases, subarachnoid hemorrhage in 13 cases and pneumocephalus in 7 cases. In our series, according to Glasgow coma scale, we had 72 patients who had minor head injury, 11 patients with moderate head injury and 17 patients with severe head injury.

Table 2 Clinical features of the patients studied

Clinical features	No. of patients
Signs and Symptoms	
Unconsciousness	32
Vomiting	23
ENT bleeding	33
Convulsions	03
Associated systemic injur	
Present	15
Absent	85
Associated injuries	
Fracture upper extremity	03
Fracture lower extremity	04
Fracture pelvis	01
Chest injuries	04
Abdominal injuries	01
Fascio-maxillary injuries	01
Spine injuries	01

In our study 89 patients were managed conservatively. The remaining 11 patients underwent emergency craniotomy. Most of these had severe head injury with a GCS of 3-8 and associated polytrauma. Conservative treatment was given in the form of dehydration therapy (mannitol), steroids, anticonvulsants, antibiotics and antacids and neuro-protective agents. Meticulous nursing care is required for moderate and severe head injury patients. Of the 89 patients who were managed conservatively 10 expired accounting for a mortality rate of 11.23%. Of the 11 patients managed operatively 6 died (54.5%) (Table 3).

Table 3 Analysis of outcome of patients

V a r i a b l e	No. of patients	Survived	Died
Head injury			
Conservative treatment	77	70	07
Operative treatment	08	03	05
Total	85	73	12
Head injury with associated systemic injury			
Conservative treatment	12	09	03
Operative treatment	03	02	01
Total	15	11	04
Glasgow Coma scale			
13-15	72	71	01
9-12	11	11	00
3-8	17	02	15
Total	100	84	16

DISCUSSION

After cancer and heart attack, accidents are major cause mortality in India. Enormous population, grades of illiteracy, inadequate roads and insufficient facilities attributed to the head injury mortality in developing country like India.

In our series the majority of patients fell in the age group of 21-30 years amounting to 27% of the total cases. This coincides with study conducted by Sharma BP and Sharma N, who had found an incidence of 34% of the cases in the same age group⁶. Gururaj Ghave noted a maximum incidence of head injury in 21-35 years age-group amounting for 40% of the cases².

A male preponderance was seen in our study amounting to 74% of males and 26% of females. 75% of the patients in the series by Gururaj G were males². This male preponderance can be attributable to the fact that men are mostly exposed to automobile and industrial accidents because of the nature of their jobs.

Majority of the cases had head injury due to RTA (79%) in our study. Bharati P *et al* and Gururaj G also observed RTA, 49.1% and 59% respectively, as the commonest mode of injury in their studies^{2,7}.

Alcohol consumption has been identified as major risk factor for occurrence of traumatic brain injuries. In my study 21% of patients were found under influence of alcohol at the time of injury and in study by GururajG the percentage is 24%².

The most common complaint with which a patient of head injury comes is unconsciousness. It is a concern to both the patient and the doctor. In our series, unconsciousness was the most common mode of presentation (32% cases). Derangements of consciousness are of prognostic importance. In a study conducted by Sharma *et al*⁶, a transient loss of consciousness was seen in 125 out of the 312 patients. Vomiting alone without any history of unconsciousness or

other neurodeficit may not be of major importance. But few unconscious patients with raised intracranial pressure may get vomiting this is usually accompanied by bradycardia. Vomiting in an unconscious patient is potentially dangerous owing to risk of aspiration. This risk is compounded if the patient is under the influence of alcohol. In our series 23 patients had history of vomiting. In our series we observed convulsions in 3% patients. In the San Diego County Hospital study by Klauber *et al*⁸, out of 1311 patients 29 had a history of convulsions with a mortality rate of 2%. In our series we had one case presented with neurodeficit. One had hemiparesis and was found to have a subdural hematoma for which he was operated.

In our series patients out of 17 patients who had a GCS between 3-8 expired out of that 15 patient dies accounting for a mortality rate of 88.2% in this group. The mortality rate in moderate head injury group was 0% and that in the minor head injury group was 1.3%. In the series by Kohi and Teasdale⁹ who compared the relationship of the Glasgow coma scale to the outcome of the patient, an unfavorable outcome was seen in 69% of patients with an GCS of 3-8. Miller *et al* had a mortality rate of 71% for GCS 3-8; 13% for GCS 9-12 and 0% for patients with GCS above 12.

In our series, a total of 100 patients underwent C.T. scan study of head.11 patients with cranial lesions required surgery. The Miller *et al* concluded that a normal or near normal mental status examination in a head injury patient on arrival at the emergency room is inadequate to exclude a potentially serious intracranial lesion. From this study, we are of the opinion that a patient who gives a history of loss consciousness or amnesia following head injury needs cranial CT scan irrespective his GCS on admission.

In our study, of the 89 patients who were managed conservatively 10 expired accounting for a mortality rate of 11.23% and of the 11 underwent craniotomy, 6 died. Overall the mortality rate in our study was 16%. Mock *et al*¹⁰ concluded in their study that good outcome is seen, if a victim of trauma receives proper life saving care within a few minutes of injury. Early detection of hematoma and prompt operative decompression helps to reduce mortality and morbidity.

Although, predicting outcome in patients of severe head injury is a challenging task, immediate GCS, radiological evaluation, surgical intervention and intensive care in all appropriate cases can improve the final outcome. The Advanced Trauma Life Support (ATLS) guidelines should be followed and surgeons should follow the general management plan while treating all cases of suspected head injury.

CONCLUSION

Head injuries were most common in male adults. Initial quick neurological examination and Glasgow coma scoring helped to grade the severity and decide the further line of management. Majority of cases had history of road traffic accident and unconsciousness was leading clinical presentation. CT scan of the head is the investigation of choice, who has clinical features of head injury, which help to decide further line of treatment and reduce mortality and morbidity. Mortality was highest in adults with GCS between 3-8. Early detection of hematoma and prompt operative decompression helps to reduce mortality and morbidity.

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