



Research Article

HEAD INJURY: ONE YEAR EXPERIENCE AT A TERTIARY LEVEL TRAUMA CENTRE

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ABSTRACT

Introduction: Head injury is a major public health problem that is a cause of mortality and morbidity to the patient, family and the society. Road traffic accident is the commonest cause. Trauma presents with variety of injuries and problems that demand rapid evaluation, discussion, improvisation and intervention to save life and prevent permanent disability.

Method: This was a prospective study which included 2125 patients with head injury admitted in neurosurgery ward from January 2017 to December 2017.

Results: October and May were months wherein maximum head injury patients were admitted. Population less than 50 years age and male gender were commonly affected. Road traffic accident is the commonest mode of injury. Cerebral contusions were the most common finding. Majority of patients were managed conservatively.

Conclusion: This study reveals that the head injury is one of the major health problems in India and especially eastern UP, Bihar, MP etc. Younger active population less than 50 years age are more commonly encountered with head injury. Road traffic accident is the commonest mode of injury. Males and students are more prone for injury. Brain contusion is the commonest injury seen in CT scans. Majority of patients can be managed conservatively.

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INTRODUCTION

Head injury remains a major public health problem that is a cause of mortality and morbidity to the patient, family and the society. That is why head injury makes considerable demands on health services. In developing countries accident rates in general and traumatic brain injury in particular are increasing as traffic increases besides other factors like industrialization, falls and assaults. Head injuries account for one quarter to one third of all accidental deaths, and for two thirds of trauma deaths in hospitals [1]. Trauma presents with variety of injuries and problems that demand rapid evaluation, discussion, improvisation and intervention to save life and prevent permanent disability.

Closed head injury is the result of variety of mechanisms including motor vehicle and motor cycle accidents, falls from heights, assaults and pedestrians being struck by motor vehicles. Gunshot is the commonest cause for penetrating injury but sometimes other types of blunt and sharp objects can violate the skull. Traumatic brain injury can occur in isolation or in the presence of additional injuries to other major organs [2].

The management of head injury has been revolutionized by round the clock monitoring, CT scan and monitoring of

intracranial pressure. Intermittent positive pressure ventilation, dehydration therapy and better techniques of operations and early intervention have made tremendous difference in the outcome of severe brain trauma. Brain injury is the most common cause of death in trauma victims accounting for about half of deaths at the accident site. The injuries are generally blunt and motor vehicle accidents are most frequent. Of particular significance are motorcycle accidents involving passengers without helmet, which produce severe injuries. As many as two thirds of all motor vehicle accident victims sustain some head injury. Of patients who require long term rehabilitation, head trauma is usually the primary injury. This data is generally applicable to children as well. Although the mechanisms vary, head injuries are the major cause of morbidity and mortality in childhood trauma victims, accounting for an annual mortality rate of 1 per 1000 in this age group [3].

Today we have a better understanding of the mechanisms of both primary damage caused by the critical insult and the destructive process which are triggered by it. The monitoring technology required to detect adverse secondary events has evolved considerably in the past few years. Significant reduction in mortality and morbidity associated with severe head injury has been achieved with early medical attention, safe and prompt transfer to trauma centre aggressive management protocols that emphasize maintenance of blood pressure, prompt evacuation of mass lesion and control of intracranial pressure.

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India has the rather unenviable distinction of having the highest rate of head injury in the world. More than 100000 lives are lost every year in India with over 1 million suffering from serious head injury. In India 1 out of 6 trauma victims die while in United States this figure is 1 out of 200. Head injuries are responsible for 2% of all deaths and 26% of injury deaths in this country. Furthermore, approximately half of the nearly 4 million days of hospitalization per year from motor vehicle trauma are for head injuries [4].

Severe head injury is associated with high mortality and morbidity [4]. Destruction of the brain is the fundamental medical and legal standard for human death. Permanent cessation of heartbeat and breathing produces death because, without resuscitative efforts destruction of the whole brain occurs. The term "brain death" refers to a temporary condition where the whole brain has been destroyed but heartbeat and organ and tissue metabolism are maintained via technologic support of cardio-respiratory functions [5]. Any therapeutic inadequacies may result in further increase in morbidity and mortality. Hence management of head injury is also a responsibility, requiring sound judgment and awareness of a possibility of injury to other systems which may complicate the problems. In spite of best management, 15–20% of head injuries prove fatal. The majority of patients require conservative management and only 10–20% of patients need surgical intervention [6].

The importance of protecting the head from injury is gaining wider recognition. Firm preventive efforts will clearly be effective in reducing the incidence of serious head injuries and their complications. Compulsory wearing of protective devices e.g. helmets and automatic shoulder belts, in cars etc. have reduced the incidence and severity of head injury.

Objective

The objective is to study nature of head injured patients, monthly variations in incidence, age wise distribution, sex and occupation wise distribution, and mode of injury with respect to demographic variables.

METHODS

This was a prospective study carried out in the department of neurosurgery IMS, BHU from January 2017 to December 2017. All the patients of head injury admitted in the department were included in the study. All the admitted patients of head injury were followed during their stay in the hospital from admission to discharge or death. The information regarding the patients of head injury who reported to Accident & Emergency Department was obtained from the patient or attendant or relative or from Medical Records Department. Information was obtained regarding nature of head Injury (scalp, skull, intracranial); mode of injury (fall from height, road traffic accident, fire arm injury, assault, blast injury); nature of injury, occupation of the patient, age and sex of patient and month wise incidence of head injury. The study included 2125 patients with head injury admitted in neurosurgery ward from January 2017 to December 2017.

RESULTS

The total number of patients of head injury admitted in neurosurgery department from January 2017 to December 2017 that is 12 months was 2125. The highest numbers of

patients were admitted during the month of May and October 2017 and lowest during June, 2016. The total number of patients admitted in Accident and Emergency for 2017 is shown in Table 1.

Table 1 Month wise distribution

Month	No. of patient	Percentage
Jan	167	7.76
Feb	142	6.68
March	170	8.00
April	190	8.94
May	212	9.97
June	138	6.49
July	162	7.62
August	163	7.67
Sept	182	8.56
Oct	214	10.07
Nov	198	9.32
Dec	187	8.80

We had patients of age 4 months to 90 years. Maximum patients were between 20 and 30 years of age. The age distribution is given in Table 2. Other young age groups like 0-10, 10-20, 30-40 and 40-50 year were also having similar comparable figures. Reason for common occurrence of head injury in patients below 50 years is that they are actually active population who are either working or are going out for school. So they are more exposed to road traffic accidents. Older age group patients were sequentially lesser in number with only 13 patients in 80-90 year age group because they are living at home but are prone for injury with minor trauma even due to fall while walking or climbing stairs.

Table 2 Age wise distribution

Age group (in years)	No. of patient	Percentage
0-1	25	1.17
1-2	47	2.21
2-5	101	4.75
5-10	150	7.06
10-20	332	15.62
20-30	399	18.78
30-40	344	16.19
40-50	307	14.45
50-60	194	9.13
60-70	137	6.45
70-80	76	3.58
80-90	13	0.61

The male: female ratio in our study was approximately 2:1 (Table 3). In our setup patients are from rural as well as urban background almost equally distributed in number.

Table 3 Gender distribution

Gender	No. of patient	Percentage
Male	1432	67.39
Female	693	32.61

Maximum patients were students and that too of class ninth onwards. Farmers, labourers, servicemen were also in large numbers. In fact clubbed together they comprised the maximum bulk. Most of the injured females were housewife or the female students. The distribution as per occupation is shown in Table 4.

Based on CT scan findings and clinical examination the nature of injury was specifically defined and patients were kept in different classes of injury as shown in Table 5. The main component of injury or the hematoma was taken as the prime injury and the patient was categorized accordingly.

Table 4 Occupation wise distribution

occupation	No. of patients	Percentage
Nil (kid)	138	6.49
Student	480	22.59
Farmer	352	16.56
Serviceman	304	14.13
Businessman	148	6.96
Housewife	416	19.58
Labourer	225	10.59
miscellaneous	62	2.92
Total	2125	100

Table 5 Nature of head injury

Nature of injury	No. of patient	Percentage
Scalp laceration	67	3.15
Undepressed skull fracture	168	7.9
Depressed skull fracture	83	3.9
SDH	373	17.56
EDH	412	19.40
Brain contusion	569	26.78
SAH	106	4.99
ICH	48	2.26
Diffuse axonal injury	216	10.16
pneumocephalus	83	3.9
TOTAL	2125	100

Like a patient of small EDH with large contusion was primarily considered to be a case of brain contusion. In our study brain contusion was the commonest injury occupying more than one fourth of overall patients. This was followed by extradural hematoma and then the subdural hematoma. There was good number of patients of skull fractures. However depressed compound fractures were only one third of them. Though mere scalp injury is the commonest injury in hospitals our study includes only the admitted patients so this number is not too much as we admit only those patients who have major lacerations or who are hemodynamically unstable. Subarachnoid hemorrhage was again a very common finding but most of them were associated with other findings like contusions most commonly, so their number is also not too much. We had a significant number of patients of diffuse axonal injury also. Isolated pneumocephalus was an uncommon occurrence. Most of the patients had associated other hematoma also. There were few patients who had deep intracerebral or thalamic hematomas also. Majority of patients were injured in road accidents comprising about two thirds of overall patients. Significant numbers were accidental fall from heights mostly of who were children. Assault is also very common in this region. So a significant proportion of patients were admitted with this history. The distribution of patients according to cause of injury is shown in Table 6.

Table 6 Mode of injury

Mode of injury	No. of patients	Percentage
RTA	1393	65.55
Fall from height	442	20.8
Assault	290	13.65
total	2125	100

Based on the CT scan findings and clinical correlation we operated total 523 patients that is about one fourth of total admitted patients. Majority were extradural hematoma followed by SDH and contusions. 59 patients of compound depressed fractures were also operated. Break up is shown in Table 7. 1602 patients were managed conservatively either in ward or ICU.

Table 7 Nature of operated head injury

Nature of injury	No. of patient	Percentage
EDH	204	39.01
SDH	128	24.47
Brain Contusion	132	25.24
Depressed skull fracture	59	11.28
Total	523	100

DISCUSSION

Trauma centre BHU, Varanasi is one of the largest trauma centers of India. It serves a major eastern part of India including UP, Bihar, MP, Jharkhand, part of Orissa and West Bengal. Health care in this part of the country is supported by the central government hospital, state government hospital the district hospitals, private sector hospitals, nursing homes, poly clinics, GP clinics, etc. But the appropriate facilities for management of a trauma patient are available only at our trauma center. That is why we have a huge load of head trauma at our center.

More than 100000 lives are lost every year in India with over 1 million suffering from serious head injury. In India 1 out of 6 trauma victims of head injury die, this includes deaths at accident sites, during transportation to hospitals and deaths during treatment. Head injuries are responsible for 2% of all deaths and 26% of injury deaths in this country. This is a huge proportion. So, our aim should be to improve our health system to bring down the mortality and morbidity as low as possible. Furthermore, approximately half of the nearly 4 million days of hospitalization per year from motor vehicle trauma are for head injuries [4]. In our center we admitted 2125 patients during the year 2017 from January to December. Actually this is not the actual load. In fact many patients were managed in the emergency room without admission specially who were neurologically as well as hemodynamically stable.

When we compared the number of admissions in different months we found that maximum patients were admitted during May and October. This is because temperature and climate during these months are favourable for roaming so people remain more on roads on their vehicles and are thus more prone for injury. June is the hottest month and people usually limit themselves at home or work place so lesser number of accidents occurs.

Highest incidence of head injury has been reported in the age group of 2–10 years by most of authors [6]. In our study maximum patients were between 20 and 30 years age. However patients below 10 years, 10-20 years, 30-40 and 40-50 years were also in comparable numbers. Lesser number of elderly patients were seen as population lesser than 50 years age are actually active either for earning livelihood or for studying so they are more prone for accidents and injuries.

Maximum patients were students and that too of class ninth onwards. Farmers, labourers, servicemen were also in large numbers. In fact clubbed together they comprised the maximum bulk. This is because these are active people and travel more so are more prone for injuries. Most of the injured females were either housewife or the female students. Trauma due to fall from height was commoner in labourers.

In our study 67.39 % males were there as compared to 32.61% females. This is almost 2:1. Males predominate in other studies also. Most of the USA reports show an incidence ratio of 2.0 or more for males compared to females [7]. Adam *et al* (1996), in

their series of 672 patients showed 533 were male and 139 female patients [8]. Our observation corresponds with the observations made by other authors. The reason is that males move out of their homes more frequently and are more actively working than females.

KnutWesler, *et al*, in their study observed by introducing a new diagnostic tool, a CT scanner in a Norwegian County hospital resulted in a marked redistribution of the handling of acute/severe head injuries [11]. For any trauma centre, CT scanning is an important investigation for initial assessment and follow up, it dramatically improves management and outcome of head injury patients. We have CT scan inside our centre and we do it in all patients of head injury. In a study highest numbers of patients were having scalp lacerations (40.4%) [9]. Other injuries, like contusion (8.8%), EDH (3.2%), SDH (4.2%) and depressed fracture (3%) were lower in numbers [9]. In our study brain contusion was the commonest injury in admitted patients. This is because the main component of injury or the hematoma was taken as the prime injury and the patient was categorized accordingly. Like a patient of small EDH with large contusion was primarily considered to be a case of brain contusion. In our study brain contusion was the commonest injury occupying more than one fourth of overall patients. This was followed by extradural hematoma and then the subdural hematoma. There was good number of patients of skull fractures. However depressed compound fractures were only one third of them. Though mere scalp injury is the commonest injury in at all hospitals our study includes only the admitted patients so this number is not too much as we admit only those patients who have major lacerations or who are hemodynamically unstable.

Eight of ten in the USA incidence reports showed transport related events as single largest cause of new cases of brain injury. Falls routinely are the second leading cause in most incidence studies [7]. Shin Tseng Lee *et al* in their series of 10,000 patients from 1977-1987 admitted to Chand Gung Memorial Hospital in Taiwan observed 56.3% were motorcycle accidents [10]. In a study the mode of injury showed Road Traffic Accidents responsible for 44.4% followed by falls 32.2% [9]. In our study 65.5% patients i.e. two third of total had head injury due to RTA followed by injury due to fall from height about 21%.

The outcome of head injury can be improved by removal of space occupying hematomas at the earliest time possible and by early vigorous management of intracranial hypertension [12]. Based on the CT scan findings and clinical correlation we operated total 523 patients that is about one fourth of total admitted patients. Majority were extradural hematoma followed by SDH and contusions. 59 patients of compound depressed fractures were also operated. 1602 patients were managed conservatively either in ward or ICU. The majority of patients require conservative management and only 10-20% of patients need surgical intervention [6]. In our hospital the percentage of patients operated were slightly more that is 24.6%. This is because we have included only the admitted patients of head injury.

CONCLUSION

This study reveals that the head injury is one of the major health problems in India and specially eastern UP, Bihar, MP etc. younger active population less than 50 years age are more commonly encountered with head injury. Road traffic accident is the commonest mode of injury. Males and students are more prone for injury. Brain contusion is the commonest injury seen in CT scans. Majority of patients can be managed conservatively. About one fourth require surgery.

Appropriate diagnostic, medical and surgical care facilities (including trauma centres) need to be established in every district to provide prompt and quality care to head injury patients. The facilities and infrastructure at referral Centre like BHU should be further upgraded for better management of trauma patients.

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