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Original Research Article

A Retrospective Clinical Analysis of Outcome in Management of Head Injury in Patients with Highway Road Accidents

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Abstract

Aim: A clinical analysis of outcome in management of head injury in patients with highway road accidents.

Methods: A retrospective study was conducted in the Department of Forensic Medicine and Toxicology, SKMCH, Muzaffarpur, Bihar, India for 15 months. The data was collected regarding demography, mode of injury, clinical presentation, and condition at admission, treatment given, hospital stay and outcome of these patients. All patients were clinically evaluated by a team comprising of doctors from surgical, medical and orthopedics specialties in the emergency department and subsequently admitted and treated at Neurosurgery. Plain CT scan head along with X-ray of cervical and for dorso- lumbar spine were carried out to rule out other injuries. Whenever necessary, CT scans of spine, USG abdomen (FAST).

Results: Out of total number of cases, 100 were present with road traffic accidents with 16(16%) patients with head injury as cause of death. According to the data collected 50 (50%) patients were under alcoholic influence, 95(95%) patients had history of LOC, 52 (52%) patients had ENT bleed and 9 (9%) had CSF leak at the time of admission. At the time of admission Glasgow coma scale (GCS) score of less than 8 was seen in 33 (33%) cases. GCS between 9 to12 was seen in 51 (51%) cases and GCS between 12 to 14 was seen in 16 (16%) patients. 35 (35%) patients were managed conservatively using anti-epileptics, diuretics and osmotic agents. In patients with less than 8 GCS, ICP monitoring was done initially, 40 (40%) patients underwent craniotomy and evacuation, 3 (3%) patients underwent craniotomy and decompression and 25(25%) patients underwent burr hole and evacuation of clot. According to Glasgow outcome scale (GCS) of these patients, 85 (85%) of patients had good recovery, 15 (15%) patients died in the course of treatment.

Conclusion: it is concluded that, RTA is an unfortunate economic burden for our nation. Head injury due to RTA is a recognized major public health problem causing death and disability among the population.

Keywords: RTA, injury, GCS

Introduction:

Road traffic accidents (RTAs) are a major cause of misery, disability and death globally, with a disproportionate number occurring in developing countries.[1,2] Autopsy findings may also help for proper understanding of head injuries and their treatment by medical fraternity.[3] Because a head injury occurs every 15 seconds and a patient dies from head injury every 12 minutes, a day does not pass that an emergency physician is not confronted with a head injured patient.[4,5] Head injury is the result of variety of mechanisms including motor vehicle and motor cycle accidents, pedestrians being struck by motor vehicles, falls from heights, occupational hazards, assaults, riots and bomb blasts.[6,7] Penetrating injury is most often due to gunshots but sometimes other types of blunt objects can violate the skull. Most commonly, traumatic brain injury occurs in the presence of additional injuries to other major organ systems but it can also occur in isolation. In today's world with more opportunities, people are travelling more by road, rail and airways. India has second highest reported mortality rate of 29.2 per 100000 people from road traffic injuries. Injuries are reported to be the seventh leading cause of death (11% of all deaths) in India, with road traffic injuries making up to 78% of them (WHO, 1999). According to a report of the Ministry of Home Affairs, Government of India, one accident occurs every two minutes, and one suicide every five minutes in India, with the accident rate corresponding to 45 per 100 000 population. India has 1% of vehicles in the world; but it accounts for about 6% of the total cases of unintentional injuries. Every 4 minutes, a person killed or injured in India due to RTA. Head injuries account for one quarter to one third of all accidental deaths, and for two thirds of trauma deaths in hospitals. Road traffic injures account for 2.1% of global mortality. India accounts for about 10% of road accident fatalities worldwide.[8] Some of the epidemiological studies are hospital based.[9,10] In India, the studies are from traffic police or from the hospital records.[11,12] Nearly 1.6 million people per year suffered from head injury in US.[13-15] Road traffic accidents are the leading cause of head injury, being responsible for up to 50 per cent of cases. Other common mechanisms of injury include falls and assault. There is significant geographical variation, for example firearms are the third leading cause in the US.[16]

The increasing use of motorcycles particularly for commercial service is a source of concern in this regard because motorcycles cause many more fatal road crashes than other vehicles worldwide. As motorcycles are relatively unsafe vehicles, the riders must be considered as unprotected vehicle users and their injuries are usually severe. of particular significance are motorcycle accidents involving passengers without helmet, which produce severe injuries. Pedestrians are most vulnerable to injury and death. This may be due to a number of factors, including lack of pedestrian facilities in road design, poor knowledge and practice of road safety measures by the general population, recklessness behavior of motorists, high speed driving, and low levels of vehicle ownership.[17]

Complications from closed head injuries are the single largest cause of morbidity and mortality in patients who reach the hospital alive. 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 annual mortality rates of 1 per1000 in this age group.[18]

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 more frequent. As many as two third of all motor vehicle accident victim sustain some head injury. Severe head injury is associated with high mortality and morbidity. Destruction of brain is the fundamental medical and legal standard for human death. Permanent cessation of heart beat and breathing produces death because, without resuscitative efforts, destruction of whole brain occurs. The term 'brain death' refers to temporary conditions where the whole brain has been destroyed but heartbeat, organ and tissue metabolism are maintained via technologic support of cardio-respiratory functions.[19]

Any therapeutic inadequacies may result in further increase in morbidity and mortality. 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.[20]

In India, the incidence of head injury is steadily increasing with urbanization and increasing number of vehicular population.[21] Among the road traffic accidents70% have head injury, among road accident deaths 70% are due to head injury. Majority of deaths occur during first 72 hours.

Recently, number of fatal accidents has increased in India. Total number of vehicles in India are only 1% of world's total vehicles, however, total number of accident in India as reported in 1991 were 6% of total accidents, thus making it highest incidence of accident rate in the world. Currently annual road accidents in India are over 12, 00,000. Every minute there is an accident and every eight minute there is a death.[22] In 1987, New York Times reported that fatality rate in India for 10,000 vehicles were 55, which was that time reported to be highest in the world.[23]

Indian statistic as reported over a 12 year from 1980 to 1992, showed unacceptably high accidents and deaths. Baker et al 1986 reported over 8% of total death in US were due to injury.[24] Approximately in US each year, 50,000 die from head injury.[25] Though there were reports on road traffic accidents, reports on the outcome of the management in the head injury in Indian scenario is scanty. Therefore, the present was undertaken to assess the outcome in the management of head injury admitted in our hospital following RTA in the period of one year.

Materials and Methods

A retrospective study was conducted in the Department of Forensic Medicine and Toxicology, SKMCH, Muzaffarpur, Bihar, India for 15 months.

Methodology

The data was collected regarding demography, mode of injury, clinical presentation, and condition at admission, treatment given, hospital stay and outcome of these patients. All patients were clinically evaluated by a team comprising of doctors from surgical, medical and orthopedics specialties in the emergency department and subsequently admitted and treated at Neurosurgery. Plain CT scan head along with X-ray of cervical and for dorso- lumbar spine were carried out to rule out other injuries. Whenever necessary, CT scans of spine, USG abdomen (FAST). MRI spine or contrast CT (abdomen and chest) was carried out to rule out other injuries. The study was conducted based on these reports and observations and outcome of patients. The results were expressed as percentages.

Results

Out of total number of cases, 100 were present with road traffic accidents with 16(16%) patients with head injury as cause of death. In the present study, out of 100 patients, 74 (74%) were male, and only 26(26%) were female. Only 13 (13%) patients were less than 20 yrs of age. Most of the patients 70(70%) were in the age group of 20-60 years, while only 17(17%) patients were >60 years of age group.

According to the data collected 50 (50%) patients were under alcoholic influence, 95(95%) patients had history of LOC, 52 (52%) patients had ENT bleed and 9 (9%) had CSF leak at the time of admission (Table 1). At the time of admission glasgow coma scale (GCS) score of less than 8 was seen in 33 (33%) cases. GCS between 9 to12 was seen in 51 (51%) cases and GCS between 12 to 14 was seen in 16 (16%) patients (Table 2). Plain CT scan of head revealed, 43(43%) patients had EDH, 34 (34%) patients had SDH, 11 (11%) patients had cerebral contusion, 6 (6%) patients with SAH and 3 (3%) patients with DAI.

35 (35%) patients were managed conservatively using anti-epileptics, diuretics and osmotic agents (Table 3). In patients with less than 8 GCS, ICP monitoring was done initially, 40 (40%) patients underwent craniotomy and evacuation, 3 (3%) patients underwent craniotomy and decompression and 25(25%) patients underwent burr hole and evacuation of clot (Table 4).

Associated injuries were seen in total 20(20%) of patients. 5 (5%) patients had limb fractures, 7 (7%) patients had fascio-maxillary fractures and 6 (6%) patients had chest injuries (Table 5). According to Glasgow outcome scale (GOS) of these patients, 85 (85%) of patients had good recovery, 15 (15%) patients died in the course of treatment (Table 6)

Table1: Number of patients on the basis of clinical observation at the time of admission.

Criteria	No		Yes	
	Number	%	Number	%
Vomiting	35	35	65	65
Seizures	81	81	19	19
ENT bleed	48	48	52	52
CSF leak	91	91	9	9
LOC	5	5	95	95
Alcoholic influence	50	50	50	50

Table 2: Number of patients based on the GCS score at the time of admission

GCS score	Number of patients	Percentage
12 -14	16	16
9 - 12	51	51
< 8	33	33
Total	100	100

Table 3: Number of patients for the management of head injury based on GCS score

GCS score	Conservative Management	Surgical Management	Total
10 and Above	33	15	100

Less than 10	2	50	

Table 4: Number of patients based on the type of treatment given (n=100)

Type of treatment	Number of patient	%
Craniotomy and evacuation	40	40
Craniotomy and decompression	3	3
Burr hole and evacuation of clot	25	25
Conservative management	32	32
total	100	100

Table 5: External injuries associated in our sample of patients (n=100)

External injuries	Number of patients	%
Tibial fracture	2	2
Ulnar fracture	1	1
Fascio maxillary injury	7	7
Femur fracture	2	2
Rib fracture	6	6
Nil	82	82
Total	100	100

Table 6: Outcome of treatment of patients on the basis of GCS Score

GCS score	Number of patients	Improved GCS score	Expired=15
12 -14	16	12	4
9 -11	51	47	4
< 8	33	26	7
Total	100	85	15

Discussion

In our present study total vehicular accident fatalities comprised 100 cases. Our study shows the overwhelming majority of the deceased 74% were males. It is due to greater male exposure on urban streets and similar higher incidence of traffic accidents among males has been found by many other researchers.[26-29] The most common age group affected in the study was between 20-60 years (70%) and is consistent with the studies available from India and other countries.[26-29]

This age group is the most active phase of life, physically and socially, and hence outnumbers the other road users. Considering the maximum involvement of individuals in the economically productive years, vehicular collision fatalities may have an important economic impact. Preventive measures targeting at these high-risk groups are important to reduce the incidence of severe RTA. The most commonly injury was to the head (80 %) followed by head and limb (20%).

Similar observations were reported in studies from Iran and USA.[30] Out of 100 head injury cases, most commonly found intracranial haemorrhage was extradural haemorrhage (43%) which is consistent with other studies.[31,32] No significant variation was evident in the incidence of fatal vehicular accidents by days of a week in our study. This pattern differs from earlier study conducted in Delhi according to which highest numbers of accidents were on Saturdays.[32] In study of Wanger AK et al, they reported approximately one third of patients with

moderate head injury and half of patients with severe head injury were operated, most of them being for cerebral contusions and/or subdural hematomas.[33] Mortality following head injury has been reported to be in the range of 39-51%.[34]

Previous study showed both known and unknown head injury patients, among 72 patients of head injury eleven patients (15%) died during hospitalization. There were only sixty one (85%) patients were discharged from hospital, whereby twenty nine (40%) with good outcome (GOS: 4 and 5) while the remaining thirty two (44%) patients were with either severe disability or vegetative state.

Only one patient continued to suffer severe disability, while the rest had moderate or good recovery.[35] Compared to this, in our study there were 13 (13%) patients under the age of twenty years, 17 (17%) were above 60 years. 65(65%) patients were treated surgically.

We believe that there is an urgent need to sensitize the general public and police about the transportation and pre-hospital management of such severe head injury patients. Our peripheral hospitals need to be well equipped for treatment of such patients. Treatment of such unknown patients can entail a huge expenditure and therefore, every hospital should allocate funds for the above purpose and only those patients who are in need of higher medical care should be referred to higher centre.

Conclusion

From the present study, it is concluded that, RTA is an unfortunate economic burden for our nation. Head injury due to RTA is a recognized major public health problem causing death and disability among the population. So, it should be managed in time and also should be looked seriously by concerned authority for reducing the incidences of head injury associated with RTA and protecting people by debilitating conditions.

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