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Research Article

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

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ABSTRACT

Background: Road traffic accidents (RTAs) are a major cause of misery, disability and death globally, with a disproportionate number occurring in developing countries. Complications from closed head injuries are the single largest cause of morbidity and mortality in patients who reach the hospital alive. The present study assesses the outcome in the management of head injury admitted in our hospital following RTA in the period of one year.
Methods: This retrospective study carried out in the department of Neurosurgery in a rural tertiary hospital, Kolar, Karnataka, India. Patients who got admitted between periods of January 2012 to January 2013 were included in the study. 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. The study was conducted based on these reports and observations and outcome of patients. The results were expressed as percentages.
Results: At the time of admission 41% patients were under alcoholic influence, 97% patients had history of LOC, 50% patients had ENT bleed and 7.5% had CSF leak. The GCS score of less than 8 was seen in 33% cases, 9 to12 in 52% cases and between 12 to 14 in 15% patients. As per Glasgow outcome scale (GOS), 91% of patients had good recovery, 5.5% patients had disability (hemiparesis, ptosis) and 3.5% patients died in the course of treatment.
Conclusions: 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.

Key words: Head injury, Road traffic accidents, Management

INTRODUCTION

Road traffic accidents (RTAs) are a major cause of misery, disability and death globally, with a disproportionate number occurring in developing countries.[1-3] The problem is increasing at a fast rate in developing countries due to rapid motorization and other factors.[4] The incidence of head injury per 100,000 populations per year ranges from 56-430.[5,6] The incidence varies in urban and rural population. The overall incidence in US is around 200 per 100,000 per year.[7] Severe traumatic brain injury (TBI) has been one of the major causes of death in Malaysia.[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.

METHODS

This was a retrospective study, carried out at the department of neurosurgery in a rural tertiary hospital. Patients who got admitted between periods of January 2013 to January 2014 were studied. 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

In the present study, out of 90 patients, 68 (75%) were male, and only 22 (24%) were female. Only 11 (12%) patients were less than 20 yrs of age. Most of the patients 64 (71%) were in the age group of 21-60 years, while only 15 (17%) patients were >60 years of age group (Figure 1).

According to the data collected 38 (41%) patients were under alcoholic influence, 87(97%) patients had history of LOC, 47 (50%) patients had ENT bleed and 7 (7.5%) 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 31 (33%) cases. GCS between 9 to12 was seen in 47 (52%) cases and GCS between 12 to 14 was seen in 12 (15%) patients (Table 2). Plain CT

scan of head revealed, 39 (42%) patients had EDH, 33 (35%) patients had SDH, 10 (11%) patients had cerebral contusion, 5 (6%) patients with SAH and 3 (3%) patients with DAI (Figure 2).

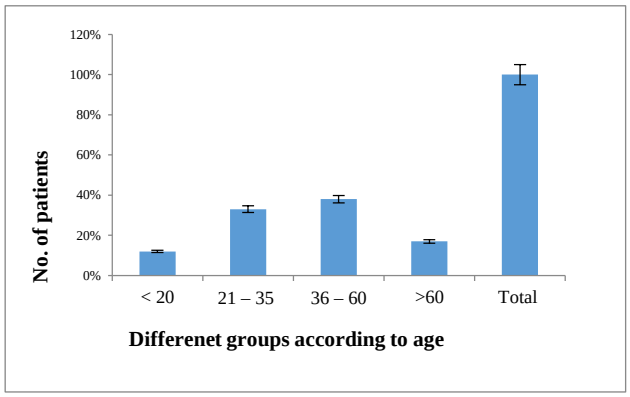

Figure 1: Number of admissions according to age of patient incorporated in the study (n=90).

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

Criteria	No		Yes	
	Number	%	Number	%
Vomiting	33	33	57	61
Seizures	74	79	16	17
ENT bleed	43	46	47	50
CSF leak	83	89	7	7.5
LOC	3	3	87	97
Alcoholic influence	22	24	38	41

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

GCS score	Number of patients	Percentage
12 -14	12	15
9 - 12	47	52
< 8	31	33
Total	90	100

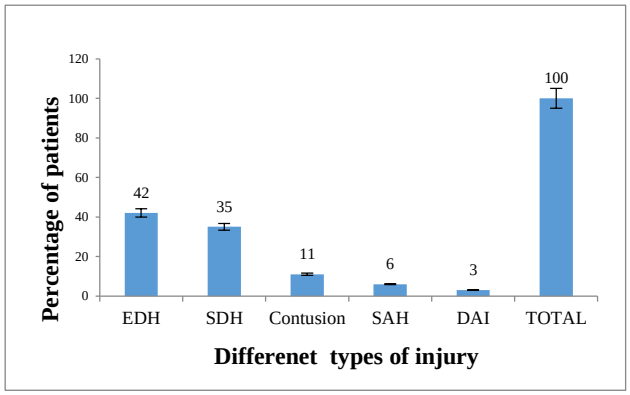

Figure 2: Number of patients based on the nature of head injury at the time of admission.

Thirty three (33%) 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, 35 (39%) patients underwent craniotomy and evacuation, 2 (2%) patients underwent craniotomy and decompression and 23(26%) patients underwent burr hole and evacuation of clot (Table 4).

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	29	14	90
Less than 10	1	46	

Table 4: Number of patients based on the type of treatment given (n=90).

Type of treatment	Number of patient	%
Craniotomy and evacuation	35	39
Craniotomy and decompression	2	2
Burr hole and evacuation of clot	23	26
Conservative management	30	33
total	90	100

Table 5: External injuries associated in our sample of patients (n=90).

External injuries	Number of patients	%
Tibial fracture	2	2
Ulnar fracture	1	1
Fascio maxillary injury	7	8
Femur fracture	2	2
Rib fracture	6	7
Nil	72	80
Total	90	100

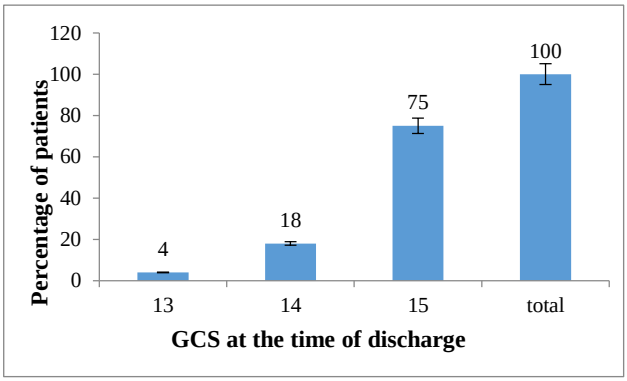

Figure 3: Comparison of GCS score at the time of discharge.

Associated injuries were seen in total 18 (20%) of patients. 5 (5%) patients had limb fractures, 7 (8%) patients had fascio-maxillary fractures and 6 (7%)

patients had chest injuries (Table 5). At the time of discharge, 70 (70%) patients had GCS of 13, 18 (17%) patients had GCS of 14 and 4 (3%) patients had GCS of 13 (Figure 3). According to Glasgow outcome scale (GOS) of these patients, 82 (91%) of patients had good recovery, 5 (5.5%) patients had disability (hemiparesis, ptosis) and 3 (3.5%) patients died in the course of treatment (Table 6).

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

GCS score	Number of patients	Improved GCS score	Disability	Expired
12 -14	12	11	1	-
9 -11	47	46	1	-
< 8	31	25	3	3
Total	90	82	5	3

DISCUSSION

In the present study, highest number of patients was having EDH (42%). Others had SDH (35%), contusion (11%), SAH (6%) and DAI in (3%) of patients. Early detection of EDH, SDH and depressed fracture will improve outcome of these patients by early surgical interventions.

In our present study total vehicular accident fatalities comprised 90 cases. Our study shows the overwhelming majority of the deceased 68% 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 21-60 years (71%) 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 90 head injury cases, most commonly found intracranial haemorrhage was extradural haemorrhage (42 %) 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 11 (12%) patients under the age of twenty years, 15 (17%) were above 60 years. 60(67%) 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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