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FACTORS PREDICTING OUTCOME OF TRAUMATIC BRAIN INJURY: A STUDY FROM MANIPUR

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ABSTRACT

Background: Traumatic brain injury (TBI) is considered a public health problem and is a major cause of death and disability among young adults. There is lack of regular epidemiological monitoring of TBI in India. Hence we have made an effort to present epidemiology and outcome of TBI from Manipur.

Materials and methods: Patients with acute brain injury were included in the study. Based on the Glasgow Coma Scale (GCS), patients were divided into mild (13-15), moderate (9-12) and severe (<9) head injury. Surgery done in patients with computerized tomography showing haematoma >30ml, midline shift > 5mm, features of raised intracranial tension and those with severe head injury. Patients' particulars were noted and statistical analysis was done using SPSS 16.0.

Results: Total 1660 patients presented to the emergency room in the study period. 84.7% patients were males. Conservative management was done in all patients with mild head injury and 112 among 200 patients with moderate head injury. Eighty eight patients among 200 (44%) with moderate head injury required evacuation of haemorrhage. Mortality was high in patients with severe head injury.

Conclusion: Dedicated trauma center is the need of the hour in Manipur. TBI was more common in older age-group as compared to young patients in our population. Delayed transport, poor referral system are haunting several precious lives in this part of the country. Primary health centres need to be equipped for proper referral. Silent epidemic of TBI is best managed by prevention.

INTRODUCTION

Traumatic brain injury (TBI) is considered a public health problem and has become alarming problem in the west. India is catching up as well. World statistics reveal TBI as major cause of death and disability among young adults. Government has dedicated trauma care centre in central part of India. However there is lack of such facilities in North-Eastern states till date. Developed countries like United States of America have regular epidemiological monitoring of TBI by Centre for Disease Control (CDC), however we lack such data in India. Hence we have made an effort to present epidemiology and outcome of TBI from Manipur, one of the North-Eastern states of India.

Aim of the study: To study demography and factors predicting outcome of traumatic brain injury

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MATERIALS AND METHODS

Retrospective observational study done in the period of May 2013- April 2014 in the Department of Surgery, Regional Institute of Medical Sciences, Imphal, Manipur, India – 795004. All patients presenting to RIMS hospital emergency services with acute brain injury resulting from mechanical energy to the head were included in the study. Patient refusing to give consent, patient discharged against medical advice were excluded from the study. All the patients presenting with head injury were triaged in emergency room (ER) based on the Glasgow Coma Scale (GCS) into 3 groups mainly, mild (13-15), moderate (9-12) and severe (<9) head injury. Mild head injury patients were treated on outpatient basis and discharged after an observation of 4 hours. Patients with moderate head injury with their CT brain showing haematoma >30ml, Midline shift >5mm, features of raised intracranial tension were taken up for surgery after resuscitation. Patients with haematoma <30ml, midline shift <5mm were observed in emergency room for 24 hours and then discharged with

advice. All the patients with severe head injury were taken up for surgery after initial resuscitation.

Demographical parameters noted: Age; Gender; Primary injury; Associated injury; Glasgow coma score (GCS) at presentation; Computerized Tomography (CT) scan finding; Treatment given; Condition at discharge; 30 day follow-up SPSS version 16.0 was used for the statistical analysis.

RESULTS

Total 1660 patients presented to the emergency room in the study period.

Table 1. Pattern of head injury classified according to GCS at presentation

GCS at presentation	Number
Mild head injury (13-15)	1400
Moderate head injury (9-13)	200
Severe Head injury (<9)	60

Table 2. Sex distribution of TBI patients

	Male	Female
Mild	1186	214
Moderate	172	28
Severe	48	12
Total (%)	1406 (84.7%)	254 (15.3%)

Table 3. Shows age distribution TBI patients

	<30 years	>30 years
Mild	583	817
Moderate	74	126
Severe	2	58
Total (%)	659 (39.7%)	1001 (60.3%)

Table 4. Shows hours of delay in presentation following TBI

	<4 hours	>4hours
Mild	713	687
Moderate	124	76
Severe	31	29
Total (%)	868 (52.3%)	792 (47.7%)

Table 5. Shows resuscitation prior to referral among TBI patients

	Yes	No
Mild	603	797
Moderate	43	157
Severe	32	28
Total (%)	678 (40.8%)	982 (59.2%)

Table 6. Depicting mode of injury among TBI patients

	RTA	Fall	Violence
Mild	754	600	46
Moderate	169	20	11
Severe	54	1	5
Total (%)	977 (58.8%)	621 (37.4%)	62 (3.8%)

Table 7. Shows the mortality pattern in TBI patients

	Number	%
Mild	0/1400	0
Moderate	6/200	3
Severe	57/60	95

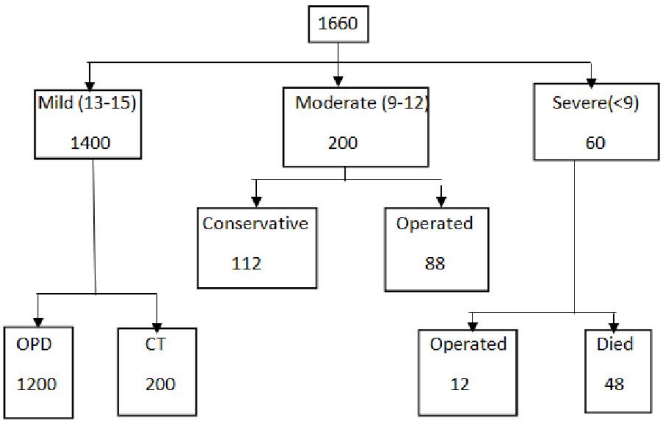
Table 8. Shows intoxication among TBI patients

	Yes	No
Mild	940	460
Moderate	146	54
Severe	51	9
Total (%)	1137 (68.5%)	523 (31.5%)

Table 9. Showing CT finding among TBI patients

Fracture	47	Displaced – 15 Undisplaced - 32
Hematoma	185	EDH > SDH
Contusion	78	
Normal	150	

Table 10. Flowchart showing case distribution based on GCS



OPD- out patient department, CT- computerized tomography

Major thoraco-abdominal injury was seen in 5% and spine injury was seen in 1% of patients. Sixty eight and half per cent of patients were intoxicated with alcohol at the time of presentation to ER. On doing non contrast computerized tomography (NCCT) of brain, 47 of the patients had skull fracture with or without intra-cerebral haemorrhage. Most commonly involved region was Fronto-temporo-pareital (42%) followed by frontal (19%). Conservative management was carried out in all of the patients with mild head injury 1400/1400 (100%) and 112 among 200 patients with moderate head injury (56%). Eighty eight patients among 200 (44%) with moderate head injury required evacuation of haemorrhage. Forty-eight patients among 60 (80%) with severe head injury, died at presentation. Evacuation was attempted in remaining 12 patients. Nine of the patients (15%) who underwent surgery died and only 3 patients (5%) with severe head injury survived after surgery.

DISCUSSION

TBI is one of the preventable causes of sudden death and disability and has become a significant health problem across the globe. Rapid urbanization, increased affordability to high speed motor vehicles and prevalence of social disharmony being the likely causes. Lack of statistics from a country like ours would significantly affect the healthcare resource management creating lot of morbidity and mortality. World Health Organisation (WHO) estimate disability adjusted life years (DALY) losses are higher for low-income countries due to injuries and TBI is often central reason in these injuries. Gururaj *et al* in his epidemiological study noticed that TBI

was mostly due to road traffic accidents (RTA) (60%) followed by fall (20-30%) and violence (10%) (Gururaj, 2002). Myburg JA cited that TBI was mostly caused by motor vehicle accidents. In our study RTA (58.8%) was the causal factor in majority of cases. The knowledge of epidemiological profile of TBI would be apt to streamline limited resources available as well as to give evidence for strategizing national policy. This paper provides a gist of available data from Manipur, a north-eastern state on TBI which would give avenue for research and intervention from the government. Channabasava *et al* in a study from NIMHANS, (Bangalore, India) observed that TBI accounted for 24% of all injury among hospital based victims with an incidence of 120 per 1,00,000 population (Channabasava *et al*., 1993). Wu X *et al* In a study from eastern China observed that TBI due to road traffic accidents was seen in 61% of patients (Wu *et al*., 2008). Among them one third were motorcyclists, 31% pedestrians and motor vehicle passengers contributing for only 14%. India is catching with China in terms of population and one needs to be aware of similar findings and take a step ahead in order to prevent these injuries.

Norton R *et al* documented two third of unintentional injuries among male in developing countries suggestive of greater exposure to risk factors (Nortor *et al*., 2006). Raja IA et al in his study from Pakistan noted that 75% of head injuries patients admitted were male (Raja *et al*., 2001). A study from USA showed male to female ratio of 2:1 (Bernaf and Schwartz, 1998). In our study the male to female ratio was 5.5:1. Tabish E *et al* in his study on paediatric TBI in Kashmir documented 6-10 years to be most affected and noticed males were more affected than females (Tabish *et al*., 2006). However Kennedy F *et al* reported that 90% of their cases belonged to 10-14 years age-group (Kennedy *et al*., 1993). In our study, majority of patients belonged to age-group >30 years, probably due to increased life expectancy and increased consumption of alcohol. Tokdemir *et al* noted that GCS value of pedestrian victim to be significantly lower than that of motorcyclists (Tokdemir *et al*., 2009). However in our study we had motorcyclists with lower GCS scores. GCS at presentation has an impact, GCS≤13 were 17 times more likely to die than TBI patients who had higher score (Pearson *et al*., 2012). NupurPruthi et al observed that only 2.4% cases reached trauma center within 1 hour and 29% reached after 24 hours (Pruthi *et al*., 2012). Time taken from the site of trauma to arrival at hospital was less than 3 hours in 41.1% of patients (Yattoo *et al*., 2009). We had a mean delay of about 4 hours in our study.

Martin *et al* stratified TBI mortality based on age-group which was 15.2% if patient is >65 years and 3.3% if patient < 65 years (Martin *et al*., 2010). NupurPruthi *et al* (2012) in a study from NIMHANS observed overall mortality to be 6.6%. Gerberding *et al*. (2002) in a study noted that TBI caused 20.6 deaths/ 1lakh population among USA residents. In an Indian study mortality rate due to TBI was 6.4% (Yattoo *et al*., 2009). CT scan facility when located in the trauma or ER reduced time to acquire CT images and improved overall mortality (Saltzherr *et al*., 2012). Our centre is a teaching hospital with a single neurosurgeon and absence of emergency CT facility round the clock. Resuscitation is better when patients were transported by air compared to ground travel, however no significant impact of mode of transport on survival or 6 months neurological outcome (Bulger *et al*., 2012). Physician led helicopter emergency services had favourable outcome and mortality score when compared with paramedics (Franschman *et al*., 2012). Study from SKIMS Srinagar noted ambulance service as mode of transport in 66% and 34% by private transport (Yattoo *et al*., 2009). Long-term disability seen in TBI patients are related to presence of a high incidence of pre-hospital secondary brain insult (Myburgh *et al*., 2008). As there is no ambulance facility in the state at present, almost all patients were brought to ER in personal/private transport without any facility for resuscitation. Hyder AA *et al* has opined that burden on rehabilitation services due to TBI would be nearly one million in India at any given point of time (Hyder *et al*., 2007). Gururaj *et al*. (2002) in his study noticed 43% of patients had a post traumatic sequel in the follow up period. Authors didnot consider this part of TBI in the present study. The preventable nature of TBI calls for research in this area to elucidate true burden of disease in order to tailor specific prevention programmes and strategies to alleviate this epidemic of TBI. The most common cause for inciting TBI is motor vehicle accident (Myburgh *et al*., 2008). Severity and prognosis is predicted accurately by combination of clinical signs like pupillary reflex, BP and CT brain (Pearson *et al*., 2012).

Limitations: Retrospective study; long term sequelae not accounted for

Conclusion

Dedicated trauma center is the need of the hour in Manipur. TBI was more common in older age-group as compared to young patients in our population. Delayed transport, poor referral system are haunting several precious lives in this part of country. Primary health centres need to be equipped for proper referral. Silent epidemic of TBI is best managed by prevention.

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