Original Research Article

An Epidemiological study of traumatic head injury in a tertiary care center in Kancheepuram, Tamil Nadu, India

Abstract

Introduction: Traumatic brain injury is a major public health problem in India. The severity of a traumatic brain injury may range from mild to severe. The increase in economic growth in India coupled with rise in population, motorization and industrialization has contributed to a significant increase in TBI with each advancing year. India having the highest rate of head injury in the world. In India more than 100000 lives are lost every year with over 1 million suffering from serious head injury.

Objectives: To assess the risk factors among for head injury cases and assess the outcome of the traumatic brain injury patients**.**

Materials and Methods: A cross sectional Study conducted among all patients with traumatic head injury attending tertiary care centre and those admitted in intensive care unit with the history of traumatic head injury for the duration of one year (August 2016 to July 2017). Data was collected through questionnaire, hospital records and collected from patients. Data Collected was entered in MS office excel and analyzed in SPSS version 21.

Result: Totally 295 cases were reported with history of traumatic brain injury, out of which 82.7% were males and 17.3% were females. Road traffic accidents was the most common cause for TBI 86.4%. Most of the patient was between the age group of 21-40 (51.5%). Most of the cases were from rural areas 55.3%. Based on GCS 49.5%, 28.5% and 22.0% patients had mild, moderate and severe injury respectively. 44.7% injuries occurred between the time period 04.00PM to 12.00AM.

Conclusion: This study revealed that most traumatic head injury occur due to Road traffic accident stressing the urgent need to create awareness and conduct health education about prevention of traumatic head injury.

Key words: Traumatic brain injury, Road traffic accidents, health education.

Introduction

Traumatic brain injury is a major public health problem in India. CDC defines a traumatic brain injury (TBI) as "a disruption in the normal function of the brain that can be caused by a bump, blow, or jolt to the head, or penetrating head injury." Everyone is at risk for a TBI, especially children and older adults[1].

TBI can be mild, moderate, or severe, depending on the extent of the damage to the brain. Disabilities resulting from a TBI depend upon the severity of the injury, the location of the injury, and the age and general health of the individual. Some common disabilities include problems with cognition, sensory processing, communication like expression and understanding, and behavior or mental health such as depression, anxiety, personality changes, aggression, acting out, and social inappropriateness[2].

The increase in economic growth in India coupled with rise in population, motorization and industrialization has contributed to a significant increase in TBI with each advancing year.TBI results in 10% of the total deaths worldwide and 13-18% in India, which had a major impact in disability adjusted life year[3].Traumatic brain injury (TBI) constitutes to the high morbidity and mortality among the traumatic injuries[4].

Road traffic injuries are the leading cause (60%) of traumatic brain injuries followed by falls (20%-25%) and violence (10%). Alcohol involvement is known to be present among 15%-20% of TBIs at the time of injury. In India, TBI are the 7th leading cause of mortality contributing to 11% of total deaths. Almost half of the deaths in 10- 25 years age group are due to injuries and TBI is the most common injury leading to death[5].

Materials and methods

This cross-sectional study, was aimed to determine the epidemiologic pattern of TBI cases admitted in the intensive care unit for one year from August 2016 to July 2017. All cases traumatic brain injury cases admitted in ICU were included in this study by total sampling, exclusion criteria were those who had no final decision recorded, no recorded CT scan result and who had final decision using tests other than CT scan. The studied variables in this study included section A containing socio demographic profile, Section B containing description of history of injury, section C with details about condition of patient presented at hospital and section D with the final outcome of the patient. The data were recorded by a trained physician in a checklist designed for this study.

Data was entered in MS excel and was analysed using Epi Info software & Statistical Package for Social Sciences (SPSS) software. To test the significance, chi-square test was applied.

Results:

Totally 295 patients were admitted with the history of head injury in intensive care unit under neurosurgery. Among them 82.7% were males and 17.3% were females. The majority (32.5%) cases were of age between 21 to 30 years; second highest (19%) were in age group 31-40 years followed by 15.6% cases of 41-50years and 12.5% cases of 11-20 years with *P* value <0.001.

Most of the patients were from lower middle class (36.3%) and middle class (31.2%). Rural population accounted for (55.3%) and urban (44.7%) in this study. Majority (63%) of the cases were married. (Tab.1).

86.7% had head injury due to road traffic accident, 6.4% cases had self fall, 2.1% cases were victims of assault and 4.8% fell from height.

Table 1: Demographic profile of TBI patients with Type of Injury

Parameters	Type of Injury					
	Road traffic accident	Self fall	Assault	Fall from height	Total	P value
Sex						
Male	215(88.1%)	14(5.8%)	6(2.4%)	9(3.7%)	244(82.8%)	.116
Female	41(80.4%)	5(9.8%)	0(0%)	5(9.8%)	51(17.2%)	
Marital status						
Married	163(87.6%)	16(8.6%)	3(1.7%)	4(2.1%)	186(63%)	.008
Unmarried	93(85.3%)	3(2.8%)	3(2.8%)	10(9.1%)	109(37%)	
Socioeconomic status						
Upper class	8(61.6%)	2(15.3%)	0(0%)	3(23.1%)	13(4.4%)	.005
Upper middle class	33(86.8%)	3(7.8%)	0(0%)	2(5.2%)	38(12.9%)	
Middle class	87(94.5%)	2(2.2%)	2(2.2%)	1(1.1%)	92(31.1%)	
Lower middle class	92(86.8%)	6(5.6%)	4(3.8%)	4(3.8%)	106(36%)	
Lower class	36(78.2%)	6(13.1%)	0(0%)	4(8.7%)	46(15.6%)	
Place of residence						
Urban	115(87.1%)	09(6.8%)	1(0.8%)	7(5.3%)	132(44.8%)	.514

Rural	141(86.6%)	10(6.1%)	5(3.1%)	7(4.2%)	163(55.2%)	

Among the road traffic injuries, significant number of accidents (88.7%) were 2-wheeler accidents, only 5.4% were of four-wheeler accidents and 5.9% were pedestrians hit by some motorized vehicle on the road. In two-wheeler accidents cases 92.9%, did not wear the helmet and 92.8% of the four-wheeler accidents did not use the seat belt. History of alcohol consumption was noted in 18.6% cases.

Most of the cases 54.2% were transported to hospital by private vehicle, 45.8% of the cases were brought by ambulance, and among those brought by ambulance, 98.5% used 108 ambulance service. 55.3% of cases reached hospital within 1 to 2 hour, 20% cases between 2 to 3 hours and 13.2% cases reached within hour. Majority of the cases, 44.7% incident happened in the evening between the 4 PM to 12 AM and 33.2% happened between 12 PM to 04.PM.

After accident 92.9% cases had loss of conscious, 19% complained of vomiting, 6.1% cases had history of seizure, 53.6% cases had history of headache, 3.1% cases had weakness of limb and 16.9% had history of ENT bleed. At the time of admission 49.5% cases had mild injury, 28.5% had moderate and 22% had severe injury. 30.8% cases were intubated at the time of receiving in emergency care, intubation and severity of TBI were statistically significant (*P* value < 0.001).

At the time of admission on the basis of GCS score cases were characterized, 49.5% cases under mild injury, 28.5% under moderate and 22% under severe injury. 5.8% cases were taken up for emergency surgery.94.2% cases were treated conservatively (*P* value < 0.001).

Table 2: CT brain findings in Traumatic brain injury cases

Findings	N(%)
Epidural Hemorrhage	43(14.6%)
Subdural Hemorrhage	88(29.8%)
Subarachnoid Hemorrhage	79(26.8%)
Cerebral contusion	46(15.6%)
Depressed skull fracture	08(2.7%)
Non depressed skull fracture	02(0.7%)
Diffuse axonal injury	29(9.8%)

Overall outcome of the patient was analyzed with Glasgow outcome scale (GOS) after 3 months of initial injury. Outcome was divided into 3 major groups for analysis that is group1/dead patients (GOS-1), group 2 were Good outcome (GOS-4 and 5) and group 3 were bad outcome (GOS-2 and 3). Among over all patient 10.8% of patient died, 87.7% had good outcome and 1.4% of patient had bad outcome and death rate were reported more among those who had subdural hemorrhage. CT findings associated with outcome of the patient (*P* value < 0.001).

Table 3: Association between GCS and GCS outcome

GCS	GCS outcome					P value
	Death	Vegetative state	Severe disability	Moderate disability	Low disability	
Mild	3	0	0	1	142	0.000
Moderate	2	1	0	0	81	
Severe	27	1	2	11	24	

Discussion:

The present study in Kancheepuram tertiary care hospital indicates that, males tend to be affected by TBI 4 folds higher than females. In a study conducted in an integrated level 1 trauma center in India, the results show that male to female ratio was 6.5:1[6], whereas a study on road traffic injury mortality and its mechanisms in India have shown a ratio similar to our study[7].

The most common age group which is vulnerable to TBI is between 20 and 30 years which accounts to about 32% followed by 30-40-year age group which accounted for 19%. The similar trend was seen on the study done by Arvind Kumar et.al. Road traffic accidents and their relationship with head injuries which showed 34% and 20% for age groups 20-30 years and 30-40 years respectively[8].

In another study by Gururaj on epidemiology of traumatic brain injury, Indian scenario, the most common cause of TBI was road traffic accident, followed by self-fall and violation which was similar to the observation made from our study. Though the pattern looks similar the rate differs as 86.7% of TBI was due to RTA in our study compared to 60% in a study by Gururaj. The percentage of self-fall in our study was 6.4% to 20% in Gururaj's study and violation was 2.1% to 10%[9].

Epidemiological study of road traffic accident cases by Nilambharet.al., in south India have shown that 15% of RTA causing TBI are due to alcohol which is similar to our study in which alcohol influence accounts for 18%[10].

GCS score at the time of admission play a vital role in selecting the type of management procedure. There are 49.5% in mild group, 28.5% in moderate and 22% in severe group. Study of cases of head injury in a government hospital in rural Indian setting by

Vinod Pusdekar have shown that 36% in mild group, 44% in moderate group and 22% in severe group. Initially GCS and type of management in appropriate time plays an important role in patient outcome.

Conclusion

This study concludes that more traumatic head injury occurred due to Road traffic accident. It showed need to take more steps to create awareness and health education about to prevent traumatic head injury and also to prevent economic burden and reduce the emotional stress to the family.

Ethical Approval:

As per international standard written ethical approval has been collected and preserved by the author(s).

Reference:

1. Traumatic Brain Injury | Concussion | Traumatic Brain Injury | CDC Injury Center [Internet]. Cdc.gov. 2019 [cited 21 May 2019]. Available from: https://www.cdc.gov/traumaticbraininjury/index.html
2. Traumatic Brain Injury Information Page | National Institute of Neurological Disorders and Stroke [Internet]. Ninds.nih.gov. 2019 [cited 21 May 2019]. Available from: https://www.ninds.nih.gov/Disorders/All-Disorders/Traumatic-Brain-Injury-Information-Page
3. Gururaj G. Road traffic deaths, injuries and disabilities in India: Current scenario. Natl Med J India 2008;21:14-20
4. Civil ID. Patterns of injury in motor vehicle trauma. N Z Med J 1986;99:905-6.
5. Gururaj G. et al; Epidemiology of traumatic brain injuries; Indian scenario; J Neurological Research; 2002, Vol 24, January: 24-28.
6. Pandey R, Kamal V, Agrawal D. Epidemiology, clinical characteristics and outcomes of traumatic brain injury: Evidences from integrated level 1 trauma center in India. Journal of Neurosciences in Rural Practice. 2016;7(4):515.
7. Hsiao M, Malhotra A, Thakur J, Sheth J, Nathens A, Dhingra N et al. Road traffic injury mortality and its mechanisms in India: nationally representative mortality survey of 1.1 million homes. BMJ Open. 2013;3(8):e002621.
8. Kumar A, Lalwani S, Agrawal D, Rautji R, Dogra T. Fatal road traffic accidents and their relationship with head injuries: An epidemiological survey of five years. Indian Journal of Neurotrauma. 2008;05(02):63-67.
9. Gururaj G. Epidemiology of traumatic brain injuries: Indian scenario. Neurological Research. 2002;24(1):24-28.
10. Nilambar J, Srinivasa D, Gautam R, Jagdish S Epidemiological study of road traffic accident cases: A study from south India Indian Journal of Community Medicine. 2004:29(1)
11. Pusdekar V, Ambedkar S, Bodade R. Study of cases of head injury in a government hospital in rural Indian setting. International Surgery Journal. 2018;5(10):3252.