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Epidemiological study of traumatic brain injury in a tertiary care centre in South India

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ABSTRACT

Background: This study investigated the epidemiological pattern of traumatic brain injury (TBI) in our hospital, so as to juxtapose with available statistics and formulate recommendations for patient betterment.

Methods: The Government Medical College, Thiruvananthapuram was the setting of this cross-sectional longitudinal study and included all patients admitted with clinical/radiological evidence of TBI over a period of three months (October 2019 to December 2019). Details regarding mechanism of injury and the socioeconomic background of the subjects were collected during the stay in hospital, by means of a semi structured questionnaire. SPSS software was used to analyze the data collected.

Results: Out of 658 patients included in the study, majority of the subjects belonged to the age group 30-60 years. About 80% of subjects were males. 63% were manual laborers. Majority of the patients had about 10-15 days' stay in the hospital. Road traffic accidents were the most common mechanism of injury and involved two wheelers mainly. Lack of helmet and restraining seat belt was noted in a sizeable percent of the subjects. Loss of consciousness was the most common complaint and GCS in the majority of subjects ranged from 9-13. Subdural hematomas and hemorrhagic contusions were the most common CT findings. 39.7% of the patients had associated spinal injury. About 48% of the subjects were operated. There was 7% mortality.

Conclusions: Road traffic accidents accounted for the majority of traumatic brain injury incidents and a sizeable portion of patients required expert neurosurgical care.

Keywords: Epidemiology, TBI, Kerala

INTRODUCTION

A major health and socioeconomic problem in the world is accounted for by traumatic brain injury (TBI).¹ It affects people of all ages and is considered as a silent epidemic, because the effects of TBI is largely unknown to the common population. Hence epidemiological studies are required for targeted prevention and effective treatment of TBI patients.

TBI was recently defined as: 'An alteration in brain function, or other evidence of brain pathology, caused by

an external force'.² The Global Burden of Disease Study 2016 showed that there were 27.08 million new cases of traumatic brain injury, and age-standardised incidence rates of 369 per 100,000 population, per year.³ Tagliaferri et al conducted a systematic review of epidemiology of TBI in Europe and concluded that mortality rate was 15 per lakh population and case fatality rate was 2.7%.⁴ There are various factors that determine the pattern and severity of TBI, such as age, socioeconomic factors, geography, level of awareness among the citizens, the implementation of stricter traffic laws. Some studies have shown that falls are the most common cause for TBI, followed by road

traffic accidents.⁵ TBI usually affects the younger population.⁶ Individuals younger than thirty (30) years are usually affected more.

There are various methods of classifying the severity of TBI, to highlight the amount of brain parenchymal disruption. These are the Glasgow Coma Scale (GCS), the Abbrevated Injury Severity Score (AIS), and so on. The aim of categorisation is to predict the outcome. TBI may also be divided as mild/ moderate/ severe TBI or as primary/secondary. Primary brain injury includes cortical disruption, axonal injury, vascular injury, haemorrhage and so and occur at the time of impact. Secondary injury results from various aetiologies, such as inflammation, hypoxia, oedema and ischemia.

This study was done to assess the epidemiological pattern of TBI in our region and make comparison with existing patterns elsewhere so that steps for prevention and patient betterment can be taken in the future.

METHODS

This study with a cross sectional longitudinal study design included all patients admitted in our hospital (n=658) with traumatic brain injury. Those patients not admitted following TBI and not willing for the study were excluded. The study setting was all the surgical wards of Government Medical College Thiruvananthapuram, Kerala, India. The study period was three months, from September 2019 to December 2019. Socio economic details and information regarding the mechanism of injury were recorded using a semi structured questionnaire. Data was entered in Excel sheets and appropriate analysis done using SPSS software. IEC clearance was taken, as also consent from study subjects.

RESULTS

Out of 652 subjects studied, 79.6% were males. Majority of the patients belonged to 30-60 years age group (46), followed by <30 years group (39%). Most of the subjects were manual laborers (63.8%) and 20% were skilled workers. Most of the patients were from the same district (Thiruvananthapuram). There were patients from other districts and outside state (3%) as well. The study subjects had admission duration lasting between 10 to 15 days mostly, in 56%. The most common mechanism of injury was road traffic accidents, followed by fall from vehicle. 9% of the subjects were brought with unknown history. 11% of the victims were pedestrians. About 80% of the subjects had two wheelers involved, and 18 % had involvement of four wheelers. Non-usage of safety helmet and restrictive seat belt was noted in 61 % and 87 % respectively. About 18% of the subjects were diabetic. 90.9% subjects had no history of using spectacles for vision. 12 subjects (1.8%) had prior history of TBI. 86.7% subjects were brought to our hospital directly from the scene of impact. 42% subjects received some form of help within one hour of injury, and about 34% subjects took

more than one hour to reach our hospital. Most of the subjects were brought by the regional ambulance facilities. The most common symptom was loss of consciousness (64.4%). Acute SDH was the most common finding in CT. Significant (>5 mm) midline shift was present in about 15% of the CT scans taken. 39% subjects had additional spinal injury. Intensive care unit (ICU) admission was arranged for 12.7%, and ventilator support for 10% subjects. 321 subjects (48.7%) underwent some form of surgical procedure, the most common being fronto-temporoparietal (FTP), decompressive craniectomy (DC). 6.6% subjects had tracheostomy and there was a total of 7% mortality in our study. 27% subjects had some form of neurological deficits at the time of discharge.

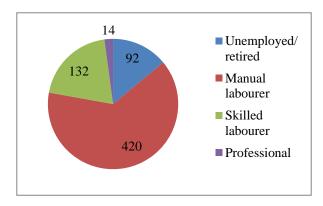


Figure 1: Number of subjects and their occupation.

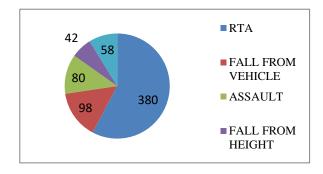


Figure 2: Various mechanism of injury among the subjects.

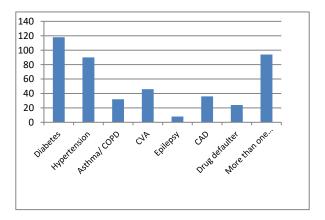


Figure 3: Various pre-existing health issues among the study subjects.

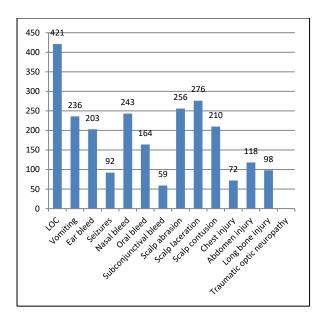


Figure 4: Examination findings and the number of patients.

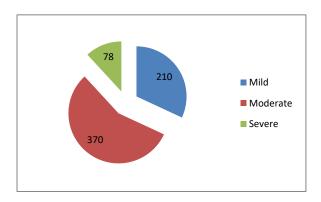


Figure 5: Number of study subjects according to severity of head injury.

Table 1: Various findings in CT scan of brain among the study subjects.

CT Findings	Number of subjects	Percentage of subjects (%)
Extra dural haemorrhage	253	39.2
Subdural haemorrhage	322	48.93
Sub arachnoid haemorrhage	158	24.01
Intra ventricular haemorrhage	76	11.55
Intra cerebral haemorrhage	188	28.51
Haemorrhagic contusions	210	24.6
Fracture of skull bone	178	36.4
Fracture of skull base	96	14.72

DISCUSSION

The results of our study were compared with other studies available in the literature. In our study males were more in number than females. This pattern was observed in previous studies as well. In the national sample U.S. ED studies, the male:female ratio was 1.5:1 and 1.7:1.11,12 Though this pattern was seen reversed in the geriatric population according to Annegers et al such was not the case in our study. 13 The study by Kraus et al showed that the most common mechanisms of injury were road transport related (50%), followed by falls (20%). The study conducted in France also showed that road traffic accidents (60%) exceeded falls (33%) as the most common mechanism on trauma. 15 Similar findings were noted in our study; road traffic accidents were the most common mechanism of injury. A study conducted in Virginia showed that people without helmets were more prone to experience more severe head injury.¹⁶ In our study majority of the subjects failed to use protective helmets or seat bells during travel. In the US, about 43% of patients in one study experienced some form of long-term disability one year after the trauma. 17 This was 27% in our study.

Thus, our study was effective in highlighting the need for increased awareness among the general population regarding the long-term effects of TBI and the steps for prevention of the same.

CONCLUSION

This study showed the need for safety awareness among the general population, the significance of post TBI rehabilitation and the adoption of safety practices such as use of helmets and seat belts.

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Institutional Ethics Committee

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