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POST MORTEM REPORT OF ROAD TRAFFIC ACCIDENT FATAL HEAD INJURIES

Forensic Medicine

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ABSTRACT

INTRODUCTION: Traumatic brain injury (TBI) is a fatal socioeconomic problem; its impact may cause death and disability. Motor vehicle accidents were one of the most common of mortality and morbidity in young adults in developed as well as developing countries. To enhance the knowledge of road traffic accidents and to create awareness on adherence to rules and regulations of law, here in this study, we tried to evaluate the cause of TBI and its impact on brain structures.

MATERIALS AND METHODS: A Prospective descriptive study on total of 70 blunt trauma head injury cases was focused on head injuries after road traffic accident. A post mortem study was done in detail about head injuries and the data was noted in excel sheet for further analysis.

RESULTS: Male preponderance was noted, i.e., 49 (81.6%) out of 60 deceased patients. Out of 60 RTA fatal head injuries, 17 (28.3%) were in the age group of 31-40 years, 12 (20%) were in the group of 41-50 years noted predominantly. Majority of the patients had linear or fissured fracture, it was about 73.3% followed by 60% comminuted fracture. Majority of the RTA fatal head injuries had subdural hemorrhage which was accountable up to 71.6%.

CONCLUSION: Autopsy on deceased patients can evaluate the cause of death accurately which is more important in unnatural deaths. Knowing the underlying cause of death, manner of death and impact of death can help in framing or developing new regulations or policies to prevent future occurrences.

KEYWORDS

Traumatic Brain Injury, Road Traffic Accidents.

INTRODUCTION

The term "traumatic brain injury" is a new word replaced the older one "Head injury." Traumatic brain injury (TBI) is a fatal socioeconomic problem; its impact may cause death and disability. TBI is defined as "cerebral insult not degenerative or congenital nature, due to external mechanical force that possibly leads to permanent or temporarily disabilities of cognitive, physical and psychosocial functions with or without altered level of consciousness" [1]. Mild TBI is now more commonly referred to as concussion.

TBI also earned name as "silent epidemic," as it does not always result in obvious motor impairment, it can also has hidden symptoms related to cognition and behavior [2]. TBI describes an array of injuries that occur to scalp, skull, brain and underlying tissue and blood vessels in the head. TBI derived from an external source such as falls, assaults, motor vehicle accidents, sport/recreation injury, gun shot wounds, shaken baby syndrome, work place injury, and domestic violence. TBI most commonly follows after a fall or a road traffic accident.

Motor vehicle accidents were one of the most common of mortality and morbidity in young adults in developed as well as developing countries [5 JMSCR]; road traffic accidents have been increasing despite of stringent laws by government authorities. World Health Organization documented that Global Status report on Road Safety as in India more people die in road traffic accidents than anywhere else in the world. It moreover warned that by 2030 road fatalities will become 5th biggest killer [3].

In United States, death is disability due to TBI contributes to about 30% of all injury deaths [4]. In India, RTA is the most commonest cause of TBI and most of the deaths takes place within 24 hours of injury which may be due to delay in access to a tertiary health care facility where can manage critical cases [5]. The total number of road traffic accidents increased by 2.5 percent from 4,89,400 in 2014 to 5,01,423 in 2015. The total number of persons killed in road accidents increased by 4.6 percent from 1,39,671 in 2014 to 1,46,133 in 2015. Road accident injuries have also increased by 1.4 percent from 4,93,474 in 2014 to 5,00,279 in 2015. The severity of road accidents, measured in terms of number of persons killed per 100 accidents has increased from 28.5in 2014 to 29.1 in 2015 [6].

To enhance the knowledge of road traffic accidents and to create awareness on adherence to rules and regulations of law, here in this study, we tried to evaluate the cause of TBI and its impact on brain structures.

MATERIALS AND METHODS

A Prospective descriptive study on total of 70 blunt trauma head injury cases were referred to the Department of Forensic Medicine for Medico-Legal examination, focused on cases of head injuries after road traffic accident. This study has been conducted at Kurnool Medical College; a government hospital is serving the population in and around Kurnool district.

INCLUSION CRITERIA: any age of both sexes Road traffic accident deceased patients with head injuries

EXCLUSION CRITERIA: Decomposed bodies Those cases with no definitive history of the accident Information pertaining to age, sex, place of residence, time of death, mode of death, admission to hospital and other involved persons in the scene was collected from police reports, close relatives of the victim, eyewitnesses, and medical reports if any.

On external examination of the bodies, information related to external injuries such as location, type of injury, bones involved, organ injuries were noted. In the head region, after removing the bony window, the meninges and the brain were examined for hematomas, hemorrhages, other lesions and if any other abnormalities present. Observations of brain injuries, meningeal injuries, base of the skull injuries after removing the dura were noted. Dissection was carried out by separating the cerebellum from cerebrum by single swap movement at its junction and examined the ventricles and both the white and gray matter. The cerebellum and brain stem were also sliced and examined. Dissection of chest and abdominal regions was carried out.

After post mortem evaluation, organs specimen were taken from different sites or from pathological lesions and kept in 10% formalin and sent to histopathological examination. Blood samples were drawn (about 10-20 ml) from the femoral vein for toxicology and alcohol investigations using a mixture of NaF or KF1 and potassium oxalate.

Statistical analysis:

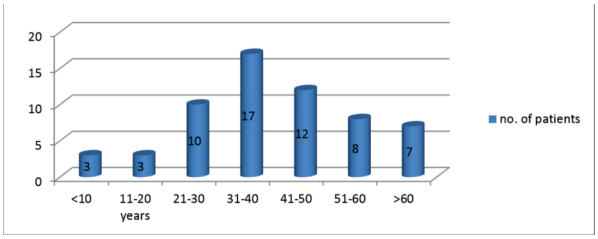
The data entered into spread excel sheet for analysis. Descriptive quantitative variables were expressed as numbers, percentages etc.

RESULTS

Among 70 blunt head injury cases we studied in this period, 60 (85.7%) were due to road traffic accidents (RTA), 8 (11.4%) cases had fall from height and remaining 2 (2.8%) deceased patients had assault. In this study we have highlighted about road traffic accident head injuries.

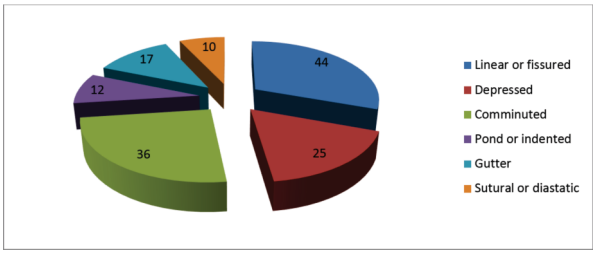
Male preponderance was noted, i.e., 49 (81.6%) out of 60 deceased patients. Out of 60 RTA fatal head injuries, 17 (28.3%) were in the age group of 31-40 years, 12 (20%) were in the group of 41-50 years, 10 (16.6%) were 21-30 years of age, 8 (13.3%) were in 51-60 years, 7 (11.6%) were >60 years of age, 3 (5%) in each were in the ages of < 10 years and 11-20 years (Fig 1).

Fig 1. Age wise distribution of RTA fatal head injured deceased patients



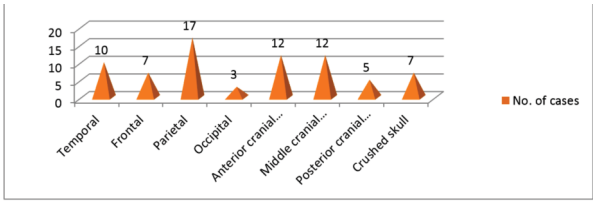
On examination of skull injuries of studied population, it showed that majority of the patients had linear or fissured fracture, it was about 73.3% followed by 60% comminuted fracture, 41.6% of depressed fracture, 28.3% patients had gutter fracture, 20% pond or indented fracture and 16.6% had sutural or diastatic fractures (Fig 9).

Fig 9. Various types of skull injuries among road traffic accidents



28.3% of parietal bones, 20% of middle cranial fossa, 20% of anterior cranial fossa, 11.6% of frontal bones, 16.6% of temporal bones, 8.3% of posterior cranial fossa and 5% of occipital bones were observed in RTA head injury cases. 11.6% of RTA cases had crushed skull (Fig 3).

Fig 3. Skull bones involved in fatal RTA head injuries



Majority of the RTA fatal head injuries had subdural hemorrhage which was accountable up to 71.6% (Table 1).

Table 1. Various types of hemorrhage in RTA skull injuries

Type of hemorrhage	No. of patients	Percentage
Extradural hemorrhage	17	28.3%
Subdural hemorrhage	43	71.6%
Subarachnoid hemorrhage	16	26.6%
Intracerebral hemorrhage	8	13.3%
Intraventricular hemorrhage	3	5%

DISCUSSION

Traumatic Brain Injury (TBI) can be prevented by implementation of best practices in emergency department and intensive care/critical care units, provision of neurorehabilitation support, adequate services and funding to systematic approach of management of TBI patients. Precautionary measures like wearing a helmet, decrease speed limit need to be followed to avoid head injuries. Traumatic Brain Injury has been posing a major public health problem since many years, still it can result in many more deaths and disabilities in future.

Male preponderance was noted, i.e., 49 (81.6%) out of 60 deceased patients. In similar to this study, majority of RTA fatalities were noted in males compared to females, as observed by Ravi Kumar Sharma et al [7], Reddy NB et al [8], Singh SK et al [9], Sharma SM et al [10], Mushtaq Ahmad et al [11]. Male preponderance in RTA fatalities is the sole head of family income in majority of families and the men has freedom and dare to work in far areas which needs travelling to earn money. One more reason might be few young males, have habituation of rash driving and not adhering to traffic rules.

Out of 60 RTA fatal head injuries, 17 (28.3%) were in the age group of 31-40 years, 12 (20%) were in the group of 41-50 years, 10 were 21-30 years of age, 8 were in 51-60 years, 7 were >60 years of age, 3 in each were in the ages of < 10 years and 11-20 years. These findings were congruent with Goyal A et al [12], Reddy NB et al [8], Seid M et al [13], Singh SK et al [9], Sharma SM et al [10]. Sachin Chourasia et al [14] showed that 46% of 21-40 years and 28% of 61-80 years, this is supported by Banerjee [15]. Peak incidence of RTA head injuries in the age group of 21-50 years, it shows that adult group population are more exposed to outdoor activities like duties, household chors etc., while extreme age groups including children and elders remain indoors in most of their times.

Jitender Kumar Jakhar et al [16] observed 71.69% head injuries, Hajek S et al [17] noted 73% head injuries, Graham et al [18] and Adams et al [19] both of their studies concentrated or non-missile head injuries showed that incidence of skull fracture in fatal head injuries was 79% and 75% respectively.

In this study 73.3% had linear or fissured fracture followed by 60% comminuted fracture, 41.6% of depressed fracture, 28.3% patients had gutter fracture, 20% pond or indented fracture and 16.6% had sutural or diastatic fractures. Mushtaq Ahmed et al [11] revealed that in the skull, Linear/fissured fracture was the commonest type of fracture (36%), followed by comminuted fracture (18%). Temporal bone was observed most prone to be fractured (23%), followed by parietal bone (17%).

28.3% of parietal bones, 20% of middle cranial fossa, 20% of anterior cranial fossa, 11.6% of frontal bones, 16.6% of temporal bones, 8.3% of posterior cranial fossa and 5% of occipital bones were observed in RTA head injury cases; 11.6% of RTA cases had crushed skull in this study. Akang EEU [20] et al noted 12.4% of frontal bone involvement and Anand M et al [21] noted 22% of parietal bone involvement in head injuries. Elesha et al [22] observed 18.9% had anterior cranial fossa fractures. A study from Nigeria and India documented that 26.4% and 26% of middle cranial fossa fractures respectively [23,21].

In the present study, in most of the head injuries sub dural hemorrhage was noted predominantly it was 71.6%, followed by 28.3% extradural hemorrhage, 26.6% subarachnoid hemorrhage, 13.3% intracerebral hemorrhage and 5% had intraventricular hemorrhage. Sachin chourasia et al [14] autopsy study ion fatal cranio-cerebral injuries due to blunt force trauma revealed that among intracranial injuries, subarachnoid hemorrhage was the commonest noticed in 82% of study population followed by subdural hemorrhage in 76%, 44% had intracerebral hemorrhage, 20% extradural hemorrhage and 14% intraventricular hemorrhage patients were observed. Chandra J et al [24] observed that 66.9% subarachnoid hemorrhage in majority of intracranial hemorrhages followed by 58.2% intracerebral hemorrhages, 22.5% intracerebral hemorrhage and 14.2% extradural hemorrhage. Tyagi et al [25] documented that the incidence of subarachnoid hemorrhage was 81% and 69.3% of subdural hemorrhage. A study from Nigeria [23] did a study on fatal head injuries documented that 88.5% subgaleal haematoma, 84.1% skull fractures, 74.3% sud dural haemorrhage, 67.5% sub arachnoid haemorrhage, 25.3% cerebral contusions, 25.2% cerebral oedema, 14% intracerebral haemorrhage and 10.4% cerebral laceration. Mushtaq Ahmad et al [11] observed that most of the victims had subdural hemorrhage (43%) followed by sub arachnoid hemorrhage (36%).

Ravi Kumar Sharma et al [7] noted 41.2% had coma without hemorrhage and shock which is the most common cause of death followed by hemorrhage and shock without coma in 32.6% and death was instantaneous in 13.9% of cases.

Kamdar BA [26] did a study on road traffic accidents fatalities in 1970's on review of 142 post mortem reports observed 79% males. 34% of cases were in 30-60 years of age group; 14.8% died on admission. 23.2% of deceased patients had intracranial hemorrhage which is the major cause of death followed by 17.6% of deaths due to multiple injuries. They stated that improving accident services by giving training to rescue workers in methods of resuscitation and

maintenance of a clear airway and replenishment of the lost blood volume of injured patients are of paramount importance.

CONCLUSION

Traumatic brain injury causes devastating consequences such as death and disability which is responsible for major loss to their family members. At individual level focusing a traffic rules, practicing work place protocols need to be strengthen government authorities should develop design, legislating and funding to prevent RTA and falls; stake holders should also take responsibility of multidisciplinary approach for managing TBI patients on emergency basis.

Autopsy on deceased patients can evaluate the cause of death accurately which is more important in unnatural deaths. Knowing the underlying cause of death, manner of death and impact of death can help in framing or developing new regulations or policies to prevent future occurrences.

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