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Original Research Article

A Hospital-Based Study to Analyse and Evaluate in Detail, Pattern of Head Injury and Skull Fractures in Victims of Road Traffic Accidents

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Abstract

Aim: The study was planned in the department of forensic medicine, to analyse and evaluate in detail, pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy.

Material & Methods: The present study was conducted in the department of Forensic medicine and Toxicology and it included assessment of consecutive 100 victims using non-probability purposive sampling who died in road traffic accidents and underwent post-mortem examination in department of Forensic Medicine and Toxicology

Results: Highest incidence of 44% cases was noticed in age group of 21 to 30 years. On considering sex profile 15% cases were those of females and 85% was that of male. In road traffic accidents when data was analyzed among the type of road users, two wheeler motor vehicle occupants were maximum, which accounted for 60% cases, 35% were pedestrians, 3% were four wheeler and 2% were other types of road users like bicycle riders. Most common injuries were noticed was laceration in 52% cases followed by abrasion in 34% cases. On considering types of fracture sustained to skull most common being fissured in 48% cases followed by comminuted fracture in 36% cases. Meningeal involvement commonly is subdural haemorrhage that was in 64% cases, subarachnoid haemorrhage was seen in 58% cases. On considering injuries to brain contusion was commonly noticed in 20% cases, followed by laceration and contusion. Parietal lobe of brain is commonly involved followed by frontal bone. Cause of death was shock and haemorrhage is most cases followed by coma, then there are other causes which includes instantaneous, respiratory failure, cerebral oedema, infection, brain stem dysfunction.

Conclusion: Head injury due to RTA is a recognized public health problem causing death and disability. It is required from concerned government authority to take appropriate and immediate measures for reducing the incidence of head injury. At the same time, people should be educated for taking good preventive actions to avoid head injury.

Keywords: Road Traffic Accidents, Head Injuries, Fatality, Subdural Hemorrhage.

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Introduction

India is undergoing major economic and demographic transition with increased urbanization, industrialization, construction projects and motorization. All these have increased rate of trauma, of which, head trauma is amongst commonest, vital and inescapable consequence. [1] Correct interpretation of head injuries is vital for reconstruction of events for forensic medicine as well as for providing correct data to policy makers. [2]

Road traffic accidents form a major part of accident & emergency care not only in cities but also in rural areas. Head injury is the result of variety of mechanisms including motor vehicle and motor cycle accidents, pedestrians being struck by motor vehicles, falls from heights, occupational hazards, assaults, riots and bomb blasts. [3,4] Improved affordability, changed socio economic conditions, personality and mind set of the younger generation, etc. have influenced the behavioral pattern directly & indirectly and these have resulted in increased head injuries. [5]

The head injuries, sustained from vehicular accident is an ever-increasing trend, due to increase in population, number of vehicles on the road, speed of the vehicles, ignorance of traffic rules, avoidance of protective equipments and poor road conditions. As road traffic accidents contribute to 60 to 70% of all traumatic brain injury. [6] Worldwide, road traffic accidents are the 9th cause of death. In developed regions, road traffic accidents are the 8th cause of death. [7] Because a head injury occurs

every 15 seconds and a patient dies from head injury every 12 minutes, a day does not pass that an emergency physician is not confronted with a head injured patient. [8,9]

Every 4 minutes, a person killed or injured in India due to RTA. Head injuries account for one quarter to one third of all accidental deaths, and for two thirds of trauma deaths in hospitals. Road traffic injures account for 2.1% of global mortality. India accounts for about 10% of road accident fatalities worldwide. [10]

Head injury is a morbid state where there are gross or subtle structural changes in scalp vault and or the content of the skull. The application of blunt force may result in injury to the skull and its contents. [11] Early and proper treatment is essential to save the life of the victims, especially in cases of head injury. [12-15]

Hence, this study was planned in the department of forensic medicine, to analyse and evaluate in detail, pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy.

Material & Methods

The present study was conducted in the department of Forensic medicine and Toxicology of Lord Buddha Koshi Medical College and Hospital , Saharsa Bihar, India and it included assessment of consecutive 100 victims using non-probability purposive sampling who died in road traffic accidents and underwent post-mortem examination in department of Forensic Medicine and Toxicology Taking into consideration of previous years i.e. autopsy rates of victims of road traffic accidents, a sample of 100 victims was taken up for the study. Data were collected for duration of one year. The material in the present study included the cases of road traffic accidents brought for medico-legal post-mortem examination.

Inclusion Criteria:

- Victims who died in road traffic accidents

Exclusion Criteria:

- Decomposed bodies and bodies with no specific histories of head injury.

Methodology

In all these cases detailed personal information was recorded from relatives/accompanies of victim, inquest papers, and hospital records. The history regarding the circumstances of the accidents and other relevant data about injuries to the victims, the site of impact was obtained from inquest papers. Dead bodies were examined in detail during post-mortem for the presence of external injuries, internal injuries including bone and joints. All cases were thoroughly analysed considering parameters like age and sex, time and manner of accident, profile of victims, offending vehicles, survival period of victims, area of the body injured, fatal injuries and cause of death. Pattern of skull fracture, intracranial haemorrhage and their distribution was recorded during post-mortem examination.

Statistical Analysis

A pretested Performa was used for the purpose to collect data. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software version 17.0. Chi- square test and one way ANOVA was used for assessment of level of significance. A p value of <0.05 was considered as significant

Results

Table 1: Baseline characteristics

Age of incidence	**Number of cases**
1-10years	4
11-20years	10
21-30years	44
31-40years	12
41-50years	13
51-60years	7
61-70years	8
71-80years	2
Sex profile	
Male	85
Female	15
Type of road users	
Two wheelers	60
Pedestrians	35
Four wheeler	3
Others	2

Highest incidence of 44% cases was noticed in age group of 21 to 30 years. On considering sex profile 15% cases were those of females and 85% was that of male. In road traffic accidents when data was analyzed among the type of road users, two wheeler motor vehicle occupants were maximum, which accounted for 60% cases, 35% were pedestrians, 3% were four wheeler and 2% were other types of road users like bicycle riders.

Table 2: Type of injury, skull fractures

Scalp and face	**Number of cases**
abrasion	34
contusion	3
laceration	52
Crush injury to head	3
Healing wound	3
Suture wound	5
Type of fracture	
comminuted	36
Fissure	48
Depressed	12
Diastitic	1
Hinge	2
Fissure + Depressed	1

Most common injuries were noticed was laceration in 52% cases followed by abrasion in 34% cases. On considering types of fracture sustained to skull most common being fissured in 48% cases followed by comminuted fracture in 36% cases.

Table 3: Meningeal involvement and Injury to brain

Meningeal involvement	**Number of cases**
Extra dural	10
Subdural	64
Subarachnoid	58
Intra ventricular	1
Injury to brain	
Contusion	20
Laceration	18
Oedema	18
Drained out	11

Meningeal involvement commonly is subdural haemorrhage that was in 64% cases, subarachnoid haemorrhage was seen in 58% cases. On considering injuries to brain contusion was commonly noticed in 20% cases, followed by laceration and contusion.

Table 4: Areas of brain involved and cause of death

Areas of brain involved	**Number of cases**
Frontal	14
Temporal	12
Parietal	15
Occipital	6
Diffuse	9
Cause of death	
Shock and haemorrhage	56
Coma	22
others	22

Parietal lobe of brain is commonly involved followed by frontal bone. Cause of death was shock and haemorrhage is most cases followed by coma, then there are other causes which includes instantaneous, respiratory failure, cerebral oedema, infection, brain stem dysfunction.

Discussion

Traumatic brain injury (TBI) is a significant public health problem leading to mortality, morbidity, and socioeconomic losses in India. The majority (60%) of TBI cases are a result of road traffic accidents (RTA). [16] Head injury is a morbid state where there are gross or subtle structural changes in scalp vault and or the content of the skull. The application of blunt force may result in injury to the skull and its contents. [11] As per History head trauma did not take long to be realized by human, the head has always been seen by both assailant and defender as a region of particular vulnerability, where an incapacitating blow might most effectively be landed. This is well attested by the creation of protective helmet (iron hat) worn by the warriors far back in the antiquity and now as well, at war and at peace, while at work and in variety of sport-connected activities. It is learnt from heroic poems of Greek and Roman literature that the cranial wounds of antiquity did not differ a great deal in their lethal or disabling effects from the cranial wounds of our times; the change that had been seen over ages is method of injury both accidental and intentional assault, basic reason for change is continuous upgrading of "force". [17]

Highest incidence of 44% cases was noticed in age group of 21 to 30 years. On considering sex profile 15% cases were those of females and 85% was that of male. The male predominance in current study and also age of occurrence of RTA being common in 20 to 30 years is consistent with the other studies. [18-20] In road traffic accidents when data was analyzed among the type of road users, two wheeler motor vehicle occupants were maximum, which accounted for 60% cases, 35% were pedestrians, 3% were four wheeler and 2% were other types of road users like bicycle riders. Most common injuries were noticed was laceration in 52% cases followed by abrasion in 34% cases. Among the injuries to face and the head, similar results were drawn in a study where scalp laceration was noticed as the most common injury. [21] Freytag E (1962) in her study found that 41% of the cases of head injuries were due to fall and 23% were due to road traffic accidents. [22] Liko O et al (1996) found that 49% cases were due to traffic accidents and 17% from fall from height. [23]

On considering types of fracture sustained to skull most common being fissured in 48% cases followed by comminuted fracture in 36% cases. Meningeal involvement commonly is subdural haemorrhage that was in 64% cases, subarachnoid haemorrhage was seen in 58% cases. On considering injuries to brain contusion was commonly noticed in 20% cases, followed by laceration and contusion. Parietal lobe of brain is commonly involved followed by frontal bone. Cause of death was shock and haemorrhage is most cases followed by coma, then there are other causes which includes instantaneous, respiratory failure, cerebral oedema, infection, brain stem dysfunction. On considering the anatomical location of the skull fracture present study had showed involvement of all bones in majority of cases followed by involvement of facial bones which is then followed by frontal involvement, in contrast to Chandigarh based study which had showed parietotemporal area being common followed by parietal area. [21] The common meningeal haemorrhage in current study is subdural followed by subarachnoid haemorrhage, this is consistent with a previous study where the subdural haemorrhage is commonest followed by subarachnoid haemorrhage. [24]

Conclusion

Head injury due to RTA is a recognized public health problem causing death and disability. It is required from concerned government authority to take appropriate and immediate measures for reducing the incidence of head injury. At the same time, people should be educated for taking good preventive actions to avoid head injury.

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