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Original Research

Assessment of pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy: An observational study

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ABSTRACT:
Background: Head injury is the single most common cause of mortality in road traffic accidents; head being the most vulnerable part of the body. Hence, this study was planned for evaluating in detail, pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy. **Materials & methods:** The current research was planned in the department of Forensic medicine and Toxicology and it involved evaluation of 200 subjects that died in road traffic accidents and underwent post-mortem examination in department of Forensic Medicine and Toxicology. Dead bodies were examined in detail during post-mortem for the presence of external injuries, internal injuries including bone and joints. Compilation of all the results was done using SPSS software. Analysis was further done using statistical analysis. **Results:** Head injury alone or in combination with other organs was seen in 95 percent of the cases. Linear fracture of vertex was seen in 16.84 percent of the cases while communized fracture was seen in 15.26 percent of the cases. Depressed vertex fractures were seen in 30.53 percent of the cases while basal fracture was seen in 21.58 percent of the cases. **Conclusion:** Head injury is a recognized public health problem causing death and disability. It is essential from concerned government authority to take appropriate steps for reducing the incidence of head injury.
Key words: Head injury, Skull, Autopsy

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INTRODUCTION

Head injury is the single most common cause of mortality in road traffic accidents; head being the most vulnerable part of the body. India accounts for about 10% of road accident fatalities worldwide.[1] WHO defined the accident as, “an unexpected, unplanned occurrence that may involve injury”.[2] Head injuries are responsible for more than one-fourth of all traumatic deaths and nearly two-third of road traffic accident. In medico-legal practice blunt head trauma are most frequently caused by traffic accident, fall from height, assault, train accident etc.[3] Head injury has been defined as "a morbid state, resulting from gross or subtle structural changes in the scalp, skull, and/or the contents of skull, produced by mechanical forces". The dominance of head injuries in road traffic accidents is due to the fact that, when the victim is pushed or knocked to the ground, he/she often strikes the head and also, that the brain and its coverings are vulnerable to blunt trauma that would not so frequently be lethal if applied to other body parts. Road traffic accidents kill at least 1.3 million people and injure 50 million people per year globally.[3, 4]

The magnitude of Road traffic accidents and fatalities in India is alarming. In 2009, it reached to 4.22 lakh road traffic accidents and 1.27 lakh road traffic fatalities.[4] The rate of incidence of head injury is higher in India because of its traffic patterns and possibly the lack of preventive measures such as helmets in motor cyclists and seatbelts in automobiles, poorly controlled traffic conditions and road conditions.[5]In accordance with most of the studies the most common type of fracture of skull is linear and most common site is mixed type followed by parietal.[6- 8] Most common type of intracranial

haemorrhage is mixed type followed by subdural haemorrhage. Severe head injury, with or without peripheral trauma, is the commonest cause of death and/ or disability up to the age of 45 years in developed countries.[9]Hence, this study was planned for evaluating in detail, pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy.

MATERIALS & METHODS

The current research was planned in the department of Forensic medicine and Toxicology and it involved evaluation of 200 subjectsthat died in road traffic accidents and underwent post-mortem examination in department of Forensic Medicine and Toxicology.Exclusion criteria for the present study included decomposed bodies and bodies with no specific histories of head injury. Complete demographic and clinical along with personal information was recorded from relatives/accompanies of victim, inquest papers, and hospital records. Dead bodies were examined in detail during post-mortem for the presence of external injuries, internal injuries including bone and joints. Compilation of all the results was done using SPSS software. Analysis was further done using statistical analysis.

RESULTS

A total of 200 subjects were analysed. Mean age of the subjects was 48.6 years. 36 percent of the subjects belonged to the age group of 41 to 50 years. 26 percent of the subjects belonged to the age group of 30 to 40 years. 69 percent of the subjects were males while the remaining were females. Out of 200 cases, place of accident was urban in 69 percent of the cases.Head injury alone or in combination with other organs was seen in 95 percent of the cases.Linear fracture of vertex was seen in 16.84 percent of the cases while communized fracture was seen in 15.26 percent of the cases. Depressed vertex fractures were seen in 30.53 percent of the cases while basal fracture was seen in 21.58 percent of the cases.

Table 1: Age and gender-wise distribution

Variable		Number	Percentage
Age group (years)	Less than 30	29	14.5
	30 to 40	52	26
	41 to 50	72	36
	More than 50	47	23.5
Gender	Males	138	69
	Females	62	31

Table 2: Place of accidents

Place	Number	Percentage
Rural	62	31
Urban	138	69
Total	200	100

Table 3: Area of the body injured

Area of the body injured	Number	Percentage
Head	113	56.5
Head+ Chest	37	18.5
Head+ limbs	29	14.5
Abdomen	11	5.6
Head+ Chest+ abdomen	10	5
Total	200	100

Table 4: Pattern of skull fracture

Pattern of skull fracture	Number	Percentage
Linear fracture of vertex	32	16.84
Comminuted fracture	29	15.26
Depressed vertex fracture	58	30.53
Basal fracture	41	21.58
Crush fracture of skull	30	15.79
Total	190	100

DISCUSSION

Head injury is the leading cause of morbidity and mortality in India, as well as in other developing countries. Each year in India, nearly two million people are injured with about one million deaths due to head injury. Sixty per cent of the total cases are due to road traffic accidents, followed by falls, and violence. Computerised tomography (CT) scan is the

primary screening modality of investigations in head trauma victims. The merits of CT for assessment of head injury are its sensitivity for demonstrating bone injuries apart from mass effect, ventricular size, configuration, and acute haemorrhage.[6- 9]Hence, this study was planned in the department of forensic medicine to analyse and evaluate in pattern of head injury and skull fractures in victims of road traffic accidents undergoing autopsy.

A total of 200 subjects were analysed. Mean age of the subjects was 48.6 years. 36 percent of the subjects belonged to the age group of 41 to 50 years. 26 percent of the subjects belonged to the age group of 30 to 40 years. 69 percent of the subjects were males while the remaining were females. Out of 200 cases, place of accident was urban in 69 percent of the cases.Head injury alone or in combination with other organs was seen in 95 percent of the cases.Jha et al in their study assessed 77 people who died in road traffic accidents. They found a marked male preponderance (78%). The most vulnerable age group was young adults between the ages of 21-40 years (38%). Pedestrians were the most commonly involved victims (48%). Skull fractures were present in 85.7% of the cases. Fractures of the vault were found in 93.9% and those of the base of the skull were found in 57.50% of the cases. Comminuted fractures were found (45.16%) in a maximum number of cases, followed by depressed and linear fractures (38%) in almost the same numbers of cases. Among intra-cranial haemorrhages, subdural Haemorrhage was found in 50.6%, extradural in 48% and subarachnoid haemorrhage in 35% of the cases. More than half of the victims (57.1%) suffered injury to the cerebrum and 18.1% to the cerebellum. Contusions and lacerations of brain were found equally (35%) in the cases.[9]

In the present study, Linear fracture of vertex was seen in 16.84 percent of the cases while communized fracture was seen in 15.26 percent of the cases. Depressed vertex fractures were seen in 30.53 percent of the cases while basal fracture was seen in 21.58 percent of the cases.Pathak A et al found that the dominant type of skull fracture found was the linear (fissured) fracture in 40% cases followed by basilar fracture counting 29.17% and being the 2nd common type. The depressed, comminuted and crush fracture shared a percentage of' among all showing their lesser and uncommon existence. In rest 10 cases no skull fracture was found. Linear fracture is comparatively more common in the thin areas of temporal and parietal bones, while on basal region basilar fracture is more commonly involving the anterior and middle cranial fossa. Comparative study shows that linear fractures are more common in cases of RTAs while basilar fractures are comparatively more common in cases of fall from height.[10]Farooqui et al in their study on 98 victims found that the most commonly affected age group was 20-39 years. Men died in road traffic accidents more than women. Fatal road traffic accidents were more prevalent on the secondary road system (47.97 %) and especially involved pedestrian and two wheeler vehicle users. Large numbers (n=63, 64.28%) of victims either died on the scene or during transportation. Numbers of skeletal injuries (199) and internal organ injuries (202) exceeded the total number of victims (98) clearly indicating the multiplicity of injuries. The majority of road traffic accidents victims (46.93%) died due to head injury. The study showed that most deaths in road traffic accidents, brought to a tertiary care rural hospital, took place either on the spot or within 24 hours of injury which is very alarming.[11]

CONCLUSION

Head injury is a recognized public health problem causing death and disability. It is essential from concerned government authority to take appropriate steps for reducing the incidence of head injury.

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