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Case Report

Identical Skull Fractures in a Fatal Road Traffic Accident: A Case Report

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ABSTRACT

Road traffic accidents are a human tragedy. They involve high human suffering and socioeconomic costs in terms of premature deaths, injuries, loss of productivity, and so on. Expansion in the road network, a surge in motorization and the rising population in the country contribute towards the increasing number of road accidents.

Studies on vehicular accidents provide valuable data for implementing emergency services to reduce the mortality and strengthening legal measures after math of fatal accidents. The injuries and death due to head trauma are inescapable in the modern way of life and their correct interpretation is vital to the reconstruction of the events of Forensic Medicine and their proper management for treatment of the injured. The present case study was conducted in the department of forensic medicine. Our study shows that of the victims of RTA were male of middle age group (20–40 years), succumbed to injuries while travelling on two wheeler without wearing helmets.

Keywords: Fatal vehicular accident; Head injury; Fracture.

INTRODUCTION

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". It has also been defined as physical damage to the scalp, skull or brain produced by an external force. However, such force/impact, responsible for the injury needs not be applied directly to the head. Depending upon whether or not the dura matter was torn, head injury may be termed as open or close type. The extent and degree of injury to the skull and its contents is not necessarily proportional to the quantum of force applied to the head.[1]

National statistical trends in road accidents, injuries and fatalities: A Road Traffic Accident (RTA) can be defined as, 'An event that occurs on a way or street open to public traffic; resulting in one or more persons being injured or killed, where at least one moving vehicle is involved. Thus RTA is a collision between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and geographical or architectural obstacles.[2]

During 2008, Road Traffic Injuries (RTI) ranked fourth among the leading causes of death in the world. Nearly 1.3 million people die every year on the world's

roads and 20 to 50 million people suffer non-fatal injuries, with many sustaining a disability as a result of their injury. Road traffic injuries are the leading cause of death among young people aged 15-29 years and cost countries 1-3% of the gross domestic product (GDP).[3-5] Trauma presents with variety of injuries and problems that demand rapid evaluation, discussion, improvisation and intervention to save life and prevent permanent disability.

CASE HISTORY

On 4 /12/13 at about 5pm the rider and pillon rider of a two wheeler succumbed to injuries when a speeding car collided with their two wheeler.

External examination: Deceased were of 30 and 38 years old, moderately built and nourished, wheatish in complexion, PM staining well appreciated over back. Rigor mortis present all over the body.

Injuries

Injuries	Region	Rider	Pillon rider
1.	Skull	1.Lacerated wound 2x5xbone deep over vertex. 2.Comminuted fracture of base of skull, membranes lacerated correspondingly.sub dural and subaracnoid haemorrhage present all over base of brain.	1. Abrasion 2x3 present over left parietal region. 2.Comminuted fracture of base of skull ,membranes lacerated correspondingly.sub dural and sub aracnoid haemorrhage present all over base of brain.
2.	Ribs	1.Ribs fractured at multiple sites on both sides	Intact
3.	Upper Limbs	1.Fracture dislocation of lower 1/3rdof right and left forearm 2.Lacerated wound over back of Rt wrist .	Fracture dislocation of middle 1/3 rd of left forearm

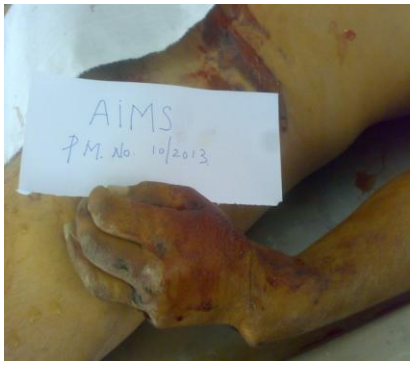

Fig 1

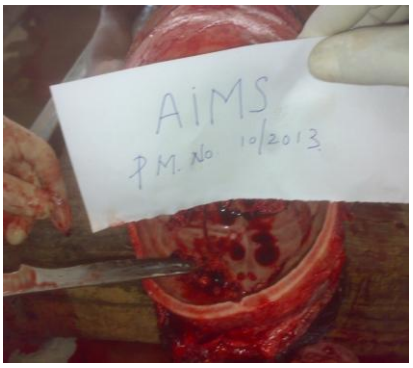

Fig. 2

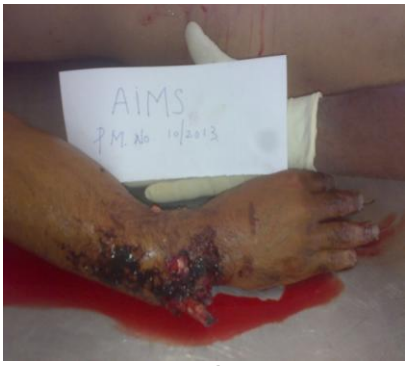

Fig 3


Fig 4

Stomach contents of both victims were partially digested food particles with no unusual smell and normal mucosa.

Cause of Death; Death is due to shock and hemorrhage as a result of multiple injuries sustained.

DISCUSSION

Brain injury is the most common cause of death in trauma victims accounting for about half of deaths at the accident site. The injuries are generally blunt and motor vehicle accidents are most frequent. Of particular significance are motorcycle accidents involving passengers without helmet, which produce severe injuries. As

many as two thirds of all motor vehicle accident victims sustain some head injury. Complications from closed head injuries are the single largest cause of morbidity and mortality in patients who reach the hospital alive. Estimates of mortality following head injury vary from 10–36 per 100,000 population, accounting for up to 70,000 deaths per year in the United States. Head injuries are responsible for 2% of all deaths and 26% of injury deaths in this country. Furthermore, approximately half of the nearly 4 million days of hospitalization per year from motor vehicle trauma are for head injuries.

Severe head injury is associated with high mortality and morbidity. Destruction of the brain is the fundamental medical and legal standard for human death. Permanent cessation of heartbeat and breathing produces death because, without resuscitative, efforts, destruction of the whole brain occurs. The term "brain death" refers to temporary conditions where the whole brain has been destroyed but heartbeat and organ and tissue metabolism are maintained via technologic support of cardio-respiratory functions.

Unsalvageability usually refers to brain damage so profound that one of three outcomes is inevitable (a) the patient will be declared brain dead within 24 hours when formal brain-death testing is carried out, (b). the patient is not initially brain dead but will become brain-dead during the hospital admission or (c) the patient will not be declared brain-dead but will have suffered permanent brain damage so profound that, in the opinion of the clinician, he would be better off had he died initially. [6]

A head injury, as defined by the National Advisory Neurological Diseases and Stroke Council, is a morbid state resulting from gross or subtle structural changes in the scalp, skull, and/or the contents of the skull, which is produced by mechanical forces'. To be complete, however, it should be taken into account that the impact which is responsible for the injury need not be applied directly to the head .Of all the regional injuries, those of the head are the most common and the most important ones in forensic practice. 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. Early and proper treatment is essential to save the life of the victims, especially in cases of head injury. By analyzing the pattern of the head injury, we can attempt to find a means to achieve this goal. Therefore, this problem needs serious attention for the prevention of unnatural deaths on roads by vehicles, which requires a worldwide epidemiological, medico- legal and clinical study on such victims. [7]

The road network in India, the numbers of registered motor vehicles in the country and the country's population have increased at a compound annual growth rate (CAGR) of 3.4%, 9.9% and 1.6% respectively, during the decade 2001 to 2011. During the same period, the number of road accidents in the country increased at a CAGR of 2.1%. Similarly, the number of accident fatalities and the number of persons injured in road accidents in the country between 2001 and 2011 increased by 5.8% and 2.4% respectively. Even as the CAGR of the number of accidents and the number of road accident injuries has moderated during the decade 2001 to 2011, as compared to the previous decade 1991 to 2000 there has been a spurt in the CAGR of the number of road accidents

During 2011, a total of 4, 97,686 road accidents were reported by all States/UTs. The proportion of fatal accidents

in the total road accidents has consistently increased since 2002 from 18.1 to 24.4% in 2011. The severity of road accidents measured in terms of persons killed per 100 accidents has also increased from 20.8 in 2002 to 28.6 in 2011. [2]

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. According to one study in Chandigarh head injury accounted for 73% of all fatal road traffic accident cases. In a comparative study conducted by the authors, head injury was responsible for 63% road traffic accident fatalities in Jammu, 60% in Delhi and 58% in Chandigarh. It was a contributing factor to death in 11%, 13% and 15% of cases, respectively, at these places. [8,9]

The detailed age profile of accident victims other than the drivers, for the year 2011, revealed that the age group between 25 and 65 years accounted for the largest share, 51.9%, of total road accident casualties, followed by the age group between 15 and 24 years, with a share of 30.3%. More than half of the road traffic casualties were in the wage-earning age group. During 2012, road traffic accidents shared 35.2% of the accidental deaths; 23.2% of the victims of road accidents were occupants of 'two wheelers'. Although the break-up of total government and private vehicles is not available, it is pertinent to note that the majority of victims were traveling in private vehicles. During 2012, Delhi city, among the 53 mega cities, accounted for 16.1% of the deaths of pedestrians', 10.0% deaths due to car accidents and 9.5% deaths due to two wheelers. [10]

According to study done by Muhammad TK, Usman H, Sheeba I, Tariq S, Most of the deceased suffered from multiple skull bone fractures (n=24, 42.1%). There was no skull bone fracture in 26.4% of cases. Out of the cases which suffered from single bone fractures, the most frequent bone fractured was temporal bone (n=8, 44.4%), followed by occipital bone (n=5, 27.8%). The multiple compartment hemorrhages were more frequent as compared to single compartment hemorrhages. Most of the deceased (n=30, 52.6%) suffered from combinations of vascular hemorrhages. The most frequent combination was of extradural and intracerebral hemorrhage. Out of the remaining cases with single compartment hemorrhages, the most frequent was extradural hemorrhage followed by subdural hemorrhage. [11]

Road traffic injuries account for 2.1% of global mortality. The developing countries bear a large share of burden and account for about 85% of the deaths as a result of road traffic crashes. India accounts for about 10% of road accident fatalities worldwide. [2] Road accident contributed 30.2 percent to all kind of natural and unnatural accidental deaths during2005. According to the Institute of Road Traffic Education (2006) Institute of road education, New Delhi, out of the estimated 1.4 million serious road accidents/collisions occurring annually in India, hardly 0.4 million are recorded4. This indicates that the surveillance system for vehicular accidents is not well established in India. Epidemiological data on road traffic accidents in India have been reported but there is no proper correlation with head injury. [12]

CONCLUSION

To minimize the morbidity and mortality resulting from head injury there is a need for better maintenance of roads, improvement of road visibility and lighting, proper mechanical maintenance of automobile and other vehicles, rigid enforcement of traffic rules, compulsory

wearing of crash helmets by motor cyclist and scooterists and shoulder belt in cars and imparting compulsory road safety education to school children from primary education level. Moreover, appropriate medical care facilities (including trauma centres) need to be established at district level, sub-divisional and block levels to provide prompt and quality care to head injury patients

Appropriate medical care facilities (including trauma centres) need to be established at district level, sub-divisional/tehsil level and block levels to provide prompt and quality care to head injury patients. The facilities at referral centre (SKIMS) for the treatment of head injury patients need to be upgraded to cater to ever-increasing number of such patients.

There is a need for the medico-legal and forensic experts to spread awareness about the severity of the fatal head injuries which are caused due to the road traffic accidents. The forensic experts must not only be able to analyze the various fatal injuries as to their nature and the mechanism of causation of such injuries at the postmortem examination, with a view to suggest measures for their prevention; and also in enlightening the law enforcing agencies such as the police and the judiciary, with a view to help them, not only in bringing the defaulting automobile drivers. Being experts, we should contribute our knowledge to reduce the number and the severity of the accidents and to encourage and undertake research activities and studies on different aspects of the accidents.

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