*Original Research*

# Study of Pattern of Vertebral Column Fractures in Victims of Two Wheelers Due to Road Traffic Accidents -Autopsy Based Study

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**Abstract**

Continuous growth in the number of motor vehicle, increase in population and poor access to healthcare are some of the important factors infatalities due to vehicular accidents. Low income and middleincome countries accounts for 85% of the death, and for the 90% of the annual disability adjusted life years lost because of road traffic injuries. Incidences are more common among the two wheeler vehicles. As motorized two wheeler vehicles constitute a large portion of the vehicle fleet inIndia. Therefore, the current study is under taken to analyze the pattern of vertebral column fractures due to two wheeler accidents with respect to site, situation, number, size, severity and extent which helps in reconstruction of manner and also cause of death. This study is an attempt to help the law enforcement authorities and policy makers regarding road safety measures and need for trauma care system even at the remote places. Early intervention and referral will make the difference in outcome of fatalities.

***Key words:*** vertebral fracture; road traffic accidents; two wheeler accidents.



## Introduction:

Below the skull the central axis of the body is formed by the backbone or vertebral column. The vertebral column is made up of a large number of bones of irregular shape called vertebrae. There are seven cervical vertebrae in the neck. Below these there are twelve thoracic vertebrae that take part in forming the skeleton of the thorax. Still lower down there are five lumbar vertebrae that lie in the posterior wall of the abdomen. The lowest part of the vertebral column is made up of the sacrum, which consists of five sacral vertebrae that are fused together; and of a small bone called the coccyx. The coccyx is made up of four rudimentary vertebrae fused together. There are thus thirty-three vertebrae in all. Taking the sacrum and coccyx as single bones the vertebral column has twenty- six bones.

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## Objective of the study

To determine the pattern of vertebral column fractures

## Materials and Methods

The current study is a cross-sectional, autopsy-based descriptive study. Samples for the current study were drawn from the victims of road traffic accident (RTA) who presented or were referred to Rajarajeswari Medical college and Hospital, Bengaluru. Ethical clearance for the present study was obtained from the Institutional Ethics Committee. From the above sources, all consecutive victims of fatal RTA who fulfilled the selection criteria during the study period were included into the study.

Thus a total sample size of 80 cases was collected.

**Inclusive Criteria**: All cases of deaths due to fatal road traffic accidents involving riders and pillion riders of two wheelers of both sexes all age groups, treated and untreated, irrespective of duration of survival was included in the study.

**Exclusive Criteria**: Cases other than two wheeler road traffic accidents.

A self-designed proforma was prepared accordingly to collect the data based on the deceased's characteristics. Information of the deceased regarding age, sex and various characteristics reflecting circumstances of accident like mode of travel, type of offending vehicle, time of accident, place of accident was gathered from all possible sources like hospital records and police records during medico-legal autopsy. Radiographs and other images of RTA victims for the vertebral fracture were reviewed from the hospital records in all cases, except those victims who were brought dead and underwent autopsy at the hospital. During the autopsy the findings of the radiographs were confirmed and the respective fractures (Figure 1 and 2) were noted down.

**Figure 1: Fracture of C5 - C6 cervical vertebra**

Data from the proforma was compiled, tabulated, and analysed by descriptive statistics by calculating means, percentages and proportions using Statistical Package for Social Sciences (SPSS) version 21. Appropriate inferences were drawn and compared with other similar studies. The strengths and limitations of this study along with possible explanations and recommendations are discussed.

**Figure 2: Fracture dislocation of T10 T11 thoracic vertebra**

**Results:**

In the study, data showed that the cervical vertebral fracture is more common in both rider and pillion rider accounting 5% and 2.5% respectively as shown in Table 1.

Proportionately in riders, thoracic vertebral fracture is high amounting to 11.25% followed by cervical fracture 5%, least is of lumbar vertebral fracture accounting 1.25%. Sacral vertebra fracture is observed in either riders or pillion riders. In pillion rider only cervical vertebral fracture is present.

**Table 1: Vertebral Fracture in Victims of Fatal Two Wheeler Accidents**

| Type of Victim | Cervical | Thoracic | Lumbar | Sacral |
|---|---|---|---|---|
| Rider | 04 (5%) | 09 (11.25%) | 01 (1.25%) | 00 (0%) |
| Pillion Rider | 02 (2.5%) | 00 (0%) | 00 (0%) | 00 (0%) |

**Discussion:**

In present study vertebral fracture is more common in riders which is of 14 (17.5 %) deceased. Among them, majority is of thoracic vertebra 09 (11.25%), next is cervical 04 (5%) and the least is of lumbar 01 (1.25%). In pillion rider only cervical fracture is seen i.e. 02 people (2.50%). In the study of JakkamSurender (2009 )[2], the spinal injuries are seen in 37 (12.45%) deaths. In the study of Ranjit M. Tandleet al[3], thoracic vertebral fracture is more seen in riders 11.25%, whereas in pillion riders cervical fracture is commonly seen 2.50%.

In present study out of 80 cases the evidence of alcohol was recorded in 06 cases (7.5%). The rest of cases 74 (92.5%) did not have it. Villaveces A et al (2002) [4] observed where 26% of the deaths due to traffic crashes in the United States were attributed to alcohol use. Anna.N. Taylor et.al[5] observed that alcohol intoxication increases the risk of TBI and may affect the morbidity and mortality associated with head injury. Gururaj G (2004)[6] observed alcohol consumption is known to be a major contributing factor for the occurrence of TBI in both developing and developed countries.

In present study peak timing of occurrence of RTA were 06.00 PM to 12.00 midnight followed by 12.00noon to 06.00PM which is probably due to heavy and unequal distribution of the traffic at these closing hours of the people. And the rider is generally exhausted after days' work. Sirathanont (2003)[7] demonstrated most of motorcycle crashes were between 06.00 PM – 09.00 PM. & highest number of accidents during 06.00 –10.00 PM in study by Jain.et.al (2009).[8]

**Limitations of the study**

1. The study recruited relatively small sample size of eighty cases. The reason for this was time constraint.
2. As the study was autopsy-based, reliable information regarding use of psychoactive substances except alcohol at the time of accident was not evaluated.

**Conclusion**

WHO predicts that RTA will rise to become the fifth leading cause of death by 2030.[1] Considering the fact that 'prevention is better than cure', the implications of the emerging findings of the study emphasize the need for stringent traffic and motor vehicle legislations, and its proper implementation in order to have control over the increasing vehicular accidents Preventive measures of all epidemic diseases are based on the cause. Similarly, for reducing fatalities among victims of two wheeler road traffic accidents, it is essential to study the cause of RTAs, which revolve around factors responsible Viz Human errors, Machine(Vehicle) errors, and environment.

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