

## Autopsy Findings in Head Injuries from Road Traffic Accident

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### Abstract

**Introduction:** Head injury is a leading public health problem causing loss of life and limb particularly among young population throughout the world and our country is not an exception to this. Now-a-days, the term "head injury" has been replaced by the new term "traumatic brain injury (TBI)." The incidence of head injury is rising day by day worldwide because of inadequate traffic education, increased mechanization, and less implementation of road safety rules. **Materials and Methods:** The present study was undertaken on fatal head injury cases of road traffic accidents autopsied at Al-Ameen Medical College and District Hospital, Bijapur. The aim of this study was to describe in detail all the autopsy findings in head injury due to RTA. **Results:** Two-wheelers was the most commonly involved vehicle 114 (63.4%) cases. Next in the order was Pedestrians 47 (26.2%). In 54.9% victims facial injury was seen. Abrasion was seen in 61 (33.9%) victims (Isolated or in combination with other injures). In majority of the victims, contusion of the scalp was seen -137 (76.1%) (Isolated or in combination with other injures). Laceration was seen in 24 (13.3%) victims. In this study 166 (92.2%) had skull fracture. Fracture of vault and base together was seen in 121 (67.2%) Fracture of base alone was seen in 31 (17.2%) and in combination with vault constitute 152 (84.4%). In majority of victim comminuted fracture was seen 112 (70.0%). **Conclusion:** From this study it is definite that head is one of the most accessible, vital and vulnerable part of the body in road traffic accidents and so good things to avoid accident or to protect from accident, wear helmet and avoid alcohol during driving. Following road safety rules is atmost important to avoid accidents and head injury related to accident.

**Keywords:** Head Injury; Road Traffic Accident; PM Examination; Fracture of Skull.

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### Introduction

Head injury is a leading public health problem causing loss of life and limb particularly among young population throughout the world and our country is not an exception to this. Now-a-days, the term "Head Injury" has been replaced by the new term "Traumatic Brain Injury (TBI)." TBI is defined as "Cerebral insult not degenerative or congenital nature, due to external mechanical force that possibly leads to permanent or temporary disabilities of cognitive, physical, and psychosocial functions with or without altered level of consciousness".<sup>1</sup> The incidence of head injury is rising day by day worldwide because of inadequate traffic education, increased mechanization, and less implementation of road safety rules. According to a study in India, most of the deaths due to road traffic accidents (RTAs) occur within 24 hours of injury, before reaching the hospital. This is said to be due to delay in shifting

to a healthcare facility.<sup>2</sup> Lack of first aid, delay in same transfer of patients, longer transit time, lack of knowledge about triage, and lack of facilities in hospitals are some major problems of casualty centers in India.<sup>2-4</sup> Postmortem examination is carried out for finding the exact cause of death. In cases of head injuries, confirmatory diagnosis only by the clinical and radiological tools (CT, MRI) may not reveal the full extent of injuries. In fatal RTA cases, autopsy may detect the lacunae in clinical diagnosis and investigation. This is a unique and time tested method to identify the exact cause of death.<sup>5</sup> This study is an attempt to know the possible causes and mechanisms of the trauma to the head in fatal RTA cases.

## Materials and Methods

This descriptive study was conducted in a tertiary care hospital in South India from July 2015 to December 2016. All patients with suspected head injuries who were admitted to our Emergency dept, died and underwent autopsy were included in the study. The aim of this study was to describe in detail all the autopsy findings in head injury due to RTA. A pretested structured proforma was used for collecting data. History and socio-demographic characters such as age, gender, cause of head injury, first aid details, time lag, severity of head injury, and pattern of head injury were collected from the patients' case records. This study was approved by Institutional Ethics Committee of our institute. This study included 180 fatal head injury cases of RTA cases subjected to autopsy at of Al-Ameen Medical College and District Hospital, Bijapur for medico-legal autopsy between Oct 2003–Sep 2005.

## Results

**Table 1:** Showing the distribution of the vehicles involved in fatal road traffic accidents.

Decreased Vehicle	No. of Victims	Percentage (%)
4 Wheelers	05	2.7
3 Wheelers	03	1.7
2 Wheelers	114	63.4
Cyclist	04	2.2
Pedestrians	47	26.2
Pedestrians	05	2.7
Unknown	02	1.1
Total	180	100

In this study, two-wheelers was the most commonly involved vehicle 114 (63.4%) cases. Next in the order was Pedestrians 47 (26.2%) in two cases (1.1%) the vehicle was not known (Table 1).

**Table 2:** Showing the distribution of the facial injuries in fatal road traffic accidents.

Type of Injuries	No. of Victims	Percentage (%)
No. Injuries	83	46.1
Abrasion	43	23.9
Contusion	09	05.0
Laceration	24	13.3
Abrasion + Contusion	04	2.2
Abrasion + Laceration	11	6.1
Contusion + Laceration	03	1.7
Abrasion + Contusion + Laceration	03	1.7
Total	180	100

In 54.9% Victims facial injury was seen. Abrasion was seen in 61 (33.9%) victims (Isolated or in combination with other injuries). No injury to face was seen in 83 (46.1%) victims. Out of 54.9% cases of facial injuries 33.9% had facial bone fracture (Table 2).

**Table 3:** Showing the distribution of scalp injuries in fatal road traffic accidents.

Type of Injuries	No. of Victims	Percentage (%)
No. Injuries	31	17.2
Contusion	121	67.2
Laceration	12	6.7
Contusion + Laceration	12	6.7
Abrasion + Contusion	04	2.2
Total	180	100

In majority of the victims, contusion of the scalp was seen -137 (76.1%) (Isolated or in combination with other injuries). Laceration was seen in 24 (13.3%) victims (Table 3).

**Table 4:** Showing the distribution of skull bone fracture in fatal road traffic accidents.

Site of Fracture	No. of Victims	Percentage (%)
Vault	14	7.8
Base	31	17.2
Vault + Base	121	67.2
No Fracture	14	7.8
Total	180	100

In this study 166 (92.2%) had skull fracture. Fracture of vault and base together was seen in 121 (67.2%) Fracture of base alone was seen in

31 (17.2%) and in combination with vault constitute 152 (84.4%). In 14 (7.8%) victims fracture of vault only was seen (Table 4).

**Table 5:** Showing types of skull bone fracture in road traffic accidents.

Type of Fracture	No. of Fracture	Percentage (%)
Fissured Fracture	34	21.2
Comminuted Fracture	112	70.0
Depressed Fracture	04	2.5
Diastatic Fracture	06	3.7
Ring Fracture	02	1.3
Comminuted + Diastatic Fracture	02	1.3
Total	160	100

In majority of victim comminuted fracture was seen 112 (70.0%). In two cases 2 (1.3%) ring fracture was observed (Table 5).

## Discussion

This study included 180 fatal head injury cases of RTA cases subjected to autopsy at of Al-Ameen Medical College and District Hospital, Bijapur for medico-legal autopsy between Oct. 2003–Sep 2005.

### Victims

In this study it was observed that most of the victims 44 (63.4%) were two wheeler riders and in this group no one was wearing the helmet at the time of accident. Pedestrian 47 (26.2%) were the second commonest victims.

Similar findings are reported by Lee *et al.*<sup>6</sup> who reported that motorcyclist (53.6%) were the commonest victim followed by pedestrian (29.5%). Present is not in accordance with the study conducted by Patel<sup>7</sup> Agarwal & Agarwal<sup>8</sup>, Shrivastava *et al.*<sup>9</sup> and Chandra *et al.*<sup>10</sup>, according to whom the pedestrians were most commonly involved that the motor cyclist.

The reasons for above findings probably due to the students and office commuters preferring two wheelers for easy movements due to inconvenience of time and comfort and the credit facilities are directed towards the middle class people. This is responsible for increased number of two wheelers on the road in more number of deaths.

### Facial Injuries

In this study 54.9% of showed facial injuries like abrasion, contusion and laceration. In 83 victims (46%)

no injuries is seen at all. Commonest injury seen out study is abrasion 43 (23.9%) seen along face region as seen in 24 (13.3%) is alone of 97 cases of facial injuries 61 (33.9%) cases had facial bone fracture.

Abrasion is commonly seen in the above study since in road traffic accidents face is usually involved where the body hits the hard, rough, flat surface of the ground. These findings are consistent with observations by Shrivastava *et al.*<sup>9</sup> and Chandra *et al.*<sup>10</sup>.

### Scalp Injuries

In the present study scalp injury was seen in 82.8% of cases in the form of abrasion, contusion and laceration. Contusion was seen in 76.1% of cases either isolated or in association with other type of injuries. Laceration was seen in 13.3% of cases either alone or in combination with other type of injuries. According to Tonge *et al.*<sup>11</sup> injury to scalp and ear was seen in 25.8% and this is not in agreement with findings of the present study.

Contusion may be more common because extravasations of blood occur in the loose connective tissue of the scalp due to blunt. Abrasion is least common because of a protection provided by hairs. Laceration is less common than contusion because the scalp is less elastic and presence of galea aponeurotica.

### Types of Skull Fracture

In present study, skull fracture was seen in 92% of cases, of which 28 had crush injury. The combination of calveria and base of skull fracture was the commonest (67%) and skull base fracture alone is seen in 17% and vault alone in 15% victims.

In basal skull fracture, commonest (21%) was seen in middle cranial fossa, where as other sites (Anterior and posterior) was seen in 5% cases. Fracture of squamous temporal bone was seen in 3%, occipital in one case and no fracture is seen other sites of skull (Parietal and Frontal bones).

Commonest fracture (70%) seen our study was comminuted type followed by fissure type in 21% of cases. Hence we can conclude comminuted fracture was the most common type of skull fracture seen our study followed by fissure fracture. Reasons for this may be due to heavy vehicles causing the accidents with greater force and compact leading to comminuted fracture. This finding is consistent with the finding of Freitag<sup>12</sup>, Solheim<sup>13</sup>, Sevitt<sup>14</sup> and Chandra *et al.*<sup>10</sup>

## Conclusion

Most of the victims were two wheeler riders in this most victim were drivers while very few pillion riders. Majority of victims showed facial injuries, abrasion being the commonest type of facial injury seen (alone or in combination). Scalp injury was seen in 82% of cases with contusion as most common injury (alone or in combination). In 92% of cases Skull fracture was seen, commonest being combination of both vault and skull base. Commonest type of fracture was the commonest skull fracture seen (70.0%). From this study it is definite that head is one of the most accessible, vital and vulnerable part of the body in road traffic accidents and so good things to avoid accident or to protect from accident, wear helmet and avoid alcohol during driving.

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