

Distribution of injuries among road traffic accident victims: An institutional experience

C Sainath

Associate Professor, Department of Forensic Medicine and Toxicology, SVS Medical College, Mahaboobnagar, Telangana, INDIA.
 Email: papillonsainadh@gmail.com

Abstract

Road traffic accidents are a major cause of death and injury globally. The aim of this study is to identify the injury pattern, and ascertain the cause of death. The present study was conducted at the Department of Forensic Medicine and Toxicology Deccan College of Medical Sciences, Hyderabad. It included all cases of RTA's brought for autopsy to the mortuary during the period of April 2014 to June 2015. This study includes 174 cases of road traffic accidents brought for medico-legal post-mortem examination. In the present study, maximum number (37.8%) of cases was observed in 11-30 years of age. The maximum site of injuries in head and face were observed (68.9%) when compared with other sites. In the present study, majority of the fractures were seen on right side, skull, Upper and Lower Limbs of the body has shown right sided fractures more commonly. Most of the cases have shown abrasions and bruises very commonly. Out of 46 autopsy cases in the present study, Intracranial haemorrhage was maximum 12% among all deceased cases followed with the commonest thoracic cavity and Lung injury. To conclude, the result of this study explains the types of fracture and site of injury associated with the RTA's.

Key Words: Road traffic accidents; Intracranial haemorrhage; Abrasions; Bruises; Lacerations.

Address for Correspondence:

Dr. C. Sainath, Associate Professor, Department of Forensic Medicine and Toxicology, SVS Medical College, Mahaboobnagar – 509001 Telangana, INDIA.

Email: papillonsainadh@gmail.com

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INTRODUCTION

Roads provide very important means of transport and communication throughout the world. However, recent years have witnessed an increasing burden of traffic on the roads led to increased opportunities for road traffic accidents¹. World Health Organisation have indicated that globally, road traffic accidents (RTA) have led to as high as 1.27 million deaths in 2004, which have been found to be equivalent to all the deaths caused by communicable diseases. Currently ranked ninth, RTAs are predicted to be the fifth leading cause of death in 2030. Every year,

more than one million people die worldwide because of RTA's, more than 2500 deaths every day². There is some evidence that the numbers of RTAs are plateauing, but this is more visible in high-income countries than in low and middle income countries.^{3,4} RTA's most commonly affect the economically productive age group and is the leading cause of death among young people aged between 15 and 29 years^{5,6}. RTA's is due to the tremendous increase in the number of vehicles, high-speed technology along with other contributing factors like, poor roads, intoxicating influence of alcohol or drugs, inexperienced drivers without having proper driving license, ignorance or intentional violation of traffic rules etc⁷. Victims in RTA's sustain varieties of injuries; external as well as internal injuries, may be abrasions, lacerations, contusions etc.⁸ Research on RTA's has a long tradition in western countries, there has been research ever since there have been motorized vehicles. In low and middle income countries, road safety research is still in its infancy and researchers argue whether or not it is possible to apply road safety measures from western high income countries in low and middle income countries⁹. The forensic expert is entrusted with the assessment of the

injuries, mechanism of injuries by which they have been induced, the cause of death, presence of disease if any. A careful and detailed study of injuries helps in the reconstruction of RTA's, and the study of injuries associated with fatal outcome helps in implementation of measures to prevent fatalities due to RTA's. In this regard, the aim of this study is to identify the injury pattern, and ascertain the cause of death.

MATERIALS AND METHODS

This was a retrospective study was conducted at the Department of Forensic Medicine and Toxicology Deccan College of Medical Sciences, Hyderabad. It included all cases of RTAs brought for autopsy to the mortuary during the period of April 2014 to June 2015. The material in the present study included 174 cases of road traffic accidents brought for medico-legal post-mortem examination. Information regarding the particulars of the victim, the date, time and place of accident, type of offending vehicle, and the survival time of the victim following the injuries were collected by examining the inquest report and other relevant papers brought by the police, hospital records, and also interviewing the relatives of the victim. Decomposed bodies were excluded from the study.

RESULTS

Table 1: Age distribution of the victims

| Age Group | Number of Victim Cases (n=174) | Percentage (%) |
|-----------|--------------------------------|----------------|
| <10 | 25 | 14.8 |
| 11-30 | 65 | 37.8 |
| 31-50 | 51 | 29.3 |
| >51 | 33 | 18.9 |

In the present study, the distribution of age varied from <10 to >50 years. Maximum number (37.8%) of cases was observed in 11-30 years of age. Whereas, the age group 31-50 years (29.3%) and >51 (18.9%) (Table 1).

Table 2: Sites of injuries in road traffic accidents

| Fatal injuries | No. of cases | Percentage (%) |
|--------------------|--------------|----------------|
| Head and Face | 120 | 68.9 |
| Upper limbs | 89 | 51.3 |
| Lower limbs | 105 | 60.8 |
| Abdominal injuries | 63 | 36.4 |
| Thoracic Injuries | 37 | 21.6 |
| Spinal Injuries | 9 | 5.4 |
| Multiple injuries | 14 | 8.1 |

In the present study, the sites of injuries in various parts were involved, in which injuries to head and face were observed in 68.9% of all injuries next common injuries were observed in lower limb in 60.8% victim and in

upper limb in 51.3%. Injuries to thoracic were seen in 21.6%, to abdomen in 36.4% and spinal includes 5.4% and multiple sites include 8.1 % cases.

Table 3: Distribution of fractures sustained in road traffic accident cases

| Site of Fracture | No of cases | Right Side (%) | Left Side (%) |
|--------------------|-------------|----------------|---------------|
| Skull | 68 | 41 (60) | 27 (40) |
| Upper limbs | 72 | 47 (65) | 25 (34) |
| Lower limbs | 86 | 59 (68) | 27 (31) |
| Ribs | 14 | 7 (50) | 7 (50) |
| Spinal | 11 | 7 (64) | 5 (45) |
| Pelvic | 5 | 4 (80) | 1(20) |
| Multiple fractures | 9 | 6 (67) | 3 (33) |

In the present study, the distribution of fractures sustained in road traffic accident cases was also studied, Majority of the fractures were seen on right side on all sites observed. Skull, Upper and Lower Limbs of the body has shown right sided fractures more commonly. Whereas, in the Ribs fracture involved both the sides equally. Further, bones involved were of Spinal and Pelvic sites has shown 11 (64%), 4 (80%) and 6 (67%) on right side and 5 (45%), 1 (20%) and 3 (33%) on left sides, respectively (Table 3).

Table 4: Distribution of cases according to type of external injuries

| Type of Injury | No. of cases | Percentage (%) |
|----------------|--------------|----------------|
| Abrasions | 127 | 73.2 |
| Bruises | 95 | 54.5 |
| Lacerations | 72 | 41.3 |
| Blunt | 8 | 4.5 |
| Crush | 5 | 2.8 |

In the present study, most of the cases have shown abrasions and bruises very commonly. Abrasions were the commonest seen in 73%, followed by bruises seen in 54% and laceration seen in 41 % of all cases. Blunt and Crush were seen in 4.5 and 2.8 % cases only respectively (Table 4). Out of 46 autopsy case in the present study, Intracranial haemorrhage was maximum 12% among all deceased cases followed by Hemorrhagic shock 5.1% cases Septecemia 6.3% cases, Spinal cord injury 4% cases and Pulmonary embolism was seen in 1 case (Figure 1).

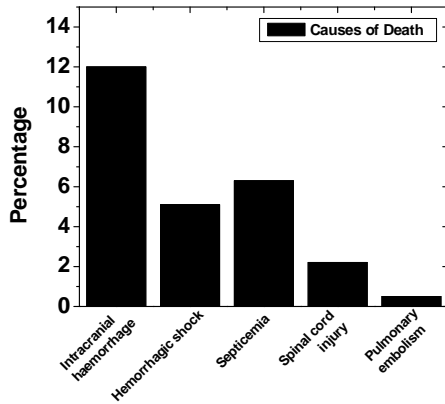


Figure 1: Types of fatal injuries

Table 5: Distribution of types of internal injuries

| Structure | Injury Pattern | No of cases | Percentage (%) |
|--------------------------------|----------------------------|-------------|----------------|
| Thoracic cavity and Lung | Lung laceration | 11 | 6.3 |
| | Lung collapse | 3 | 1.7 |
| | Hemothorax | 21 | 12 |
| | Pneumothorax | 3 | 1.7 |
| Liver | Liver laceration | 8 | 4.5 |
| | Gross destruction of liver | 4 | 2.2 |
| | Liver contusion | 1 | 0.5 |
| Diaphragm | Rupture | 0 | 0 |
| | Contusion | 1 | 0.5 |
| Pelvic fracture or dislocation | | 5 | 2.8 |

A total of 174 cases were studied the commonest thoracic cavity and Lung injury was Hemothorax, which occurred in 21 (12%) cases while lung laceration and lung collapse accounted for 6.3% and 1.7% respectively. Eight cases had Liver laceration, while four had Gross destruction of liver. When considering Diaphragm, Contusion had occurred in only one case. Pelvic fracture or dislocation was seen in 5 (2.8%) (Table 5).

DISCUSSION

Human factors have been reported to account for the occurrence of 90 % of all RTAs leading causes of death in developing countries¹⁰. Research in several countries shows that, 90 percent of all road traffic accident are caused by human error and only a small portion's caused by vehicle defect, poor road design and inadequate maintenance and also driver impairment is the most crucial component of road traffic accident worldwide¹¹. In the present study, a total of 174 cases of fatal road traffic accidents have been studied in respect to distribution, nature and type of injuries. The present study, majority of the victims (37.8%) belonged to the age group 11-30 years. This result is similar to that of a

survey conducted by other authors, where a majority of victims were below 30 years old¹². Considering the cause of death in various road users, 68.9% of head and face injuries in this study were the commonest types of injuries among the external injuries noted. Similar results were also observed by other researchers¹³. Common sites for injuries were the lower and upper limbs and face¹⁴. Among fractures, present study found that the commonest site of fracture was the right side of lower limb 59 (68%), followed by right side upper limb 47 (65%) and skull/maxillofacial 68 cases. The more fractures on lower extremity is again due to interaction of gravitational force and velocity of the vehicle at the time of accidents¹⁵. The present study also indicates that injuries and fractures were more common on right side in all the extremities when compared with left side¹⁶. Present study also shows the involvement of the Ribs fracture on both the sides equally. Multiple injuries and multiple body parts were found involved in all the cases in the present study. The injuries sustained were abrasions, contusions, lacerations, incised wounds, fractures and injuries involving internal organ. All types of injuries were common in road accidents victims. Abrasions, lacerations and contusions were more common. In the present study, abrasions were the commonest seen in 73% followed by bruises of 54% respectively. In this study, majority (12%) of deaths occurred by intracranial haemorrhage followed by Hemorrhagic shock 5.1% cases. This similar pattern was observed in other studies well as¹⁷. In the present study, the commonest thoracic cavity and Lung injury was Hemothorax, which occurred in 21 (12%) cases while lung laceration and lung collapse accounted for 6.3% and 1.7% respectively. Eight cases had Liver laceration, while 4 cases had Gross destruction of liver. Similarly liver laceration was the commonest abdominal injury noted by several authors^{18,19} and reported that laceration of the liver was commonly seen abdominal injury. However, in a study on pattern of thoraco-abdominal injuries by Shetty and co-workers²⁰ reported that kidney was the most commonly involved abdominal organ followed by the liver. In another study by Govekar and co-workers, observed that most commonly injured abdominal organ was spleen²¹. To conclude, most of RTA's are caused by human errors. Road safety education is therefore the need of the hour. The result of this study explains the types of fracture and site of injury associated with the RTA's. So there is urgent need to address the road safety regulations and improving emergency medical services may prevent untimely deaths and disabilities caused by RTAs.

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