

ORIGINAL RESEARCH

Analysis Of Death In Major Trauma: An Autopsy Based Retrospective Study

¹Dr. Binod Kumar Ravi, ²Dr. Deepmala, ³Dr. Nityanand Kumar

¹Assistant Professor, Department of Forensic Medicine and Toxicology, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh, India

²Associate Professor, Department of Forensic Medicine and Toxicology, Madhubani Medical College, Madhubani, Bihar, India

³Assistant Professor, Department of Forensic Medicine and Toxicology, LCMC, Bishrampur, Palamu, Jharkhand, India

Corresponding author

Dr. Nityanand Kumar

Assistant Professor, Department of Forensic Medicine and Toxicology, LCMC, Bishrampur, Palamu, Jharkhand, India

Email: kumardrnityanand@gmail.com

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ABSTRACT

Background: In India, Traumatic brain injuries (TBI) due to road traffic accidents (RTA) are most common. The most vulnerable part of the body, which is affected by road traffic accidents, is the head. The various injuries were broadly classified apart from head into, Neck, Thoracic, Abdominal, Pelvic etc. Head related injuries were grouped into Mild, Moderate and Severe Head injury. Autopsy is the final opportunity to find out the exact cause of death. The aim of the present study is to find the most common autopsy findings. Most deaths take place within 24 hours of injury, before reaching the tertiary hospital most of the times. Clinical and radiological examination may not reveal the full extent of injuries, among RTA cases in head injuries and correlation of findings with time of survival. However, 20 to 50 million people sustain various forms of RTA injuries.

Materials and Methods: The present study was done on medicolegal autopsies conducted at the mortuary house of District Hospital Shahjahanpur, UP, from 1st July 2021 to 30st June 2022 to study the pattern of major trauma in fatal road traffic accidents. This study was done on 650 deceased of all ages had a history of RTA and death occurred due to head injury, site of injury and other organs involved, were also observed. The age, sex, time of death, history and type of the accident were noted.

Results: Out of total 1214 autopsy done at mortuary of District Hospital Shahjahanpur, UP, 650 cases were of fatal RTA out of which 53% had head injury, 28% had chest injury, 17 % had abdominal injury, 3.6% had cervical spine injury and the other had combined injuries. Three hundred forty-four (52.88%) victims were between 21-40 years of age; but only 85 (13.09%) victims were below 20 years of age. Males constituted 82.98% of the total victims, and light vehicles were involved in 60.30%. Five hundred and forty-three (55.97%) RTA occurred during the daytime, between 9 AM to 8 PM. Majority of victims were died within 24 hrs (60.37%) followed by death on spot (32.60%) and only (7.03%) victims were died after 24 hrs.

Conclusions: Proper education for the people, importance of speed limits and following the traffic regulation. The majority of deaths in this group of patients are due to the combined effects of multiple injuries in various body structures. Rapid management of patients with abdominal injuries is essential and particular consideration must be placed on those injuries involving other body parts.

Keywords: Autopsy, Incidental finding, Head injury, Chest and Abdominal Injuries.

INTRODUCTION

A rising trend was seen in total number of RTA by 18.8 % (from 146354 to 173860) in 2021 Over 2020.¹ RTA was defined as an accident, which took place on the road between two or more objects, one of which must be any kind of a moving vehicle. In India, most of the deaths due to road traffic accidents (RTAs) take place within 24 hrs of injury, mostly before reaching the hospital. Nowadays, the term “head injury” has been replaced by the new term “traumatic brain injury (TBI).” The World Health Organization (WHO) in its international conference on RTA noted the importance of adequate data on traffic injuries. Road Traffic Accident (RTA) is one among the top five causes of morbidity and mortality in South-East Asian countries.^{2,3} It was projected that, if the same trend continued it would become the 3rd leading cause by the year 2020.⁴ Amongst the RTA direct impact by the vehicle is most frequent cause of blunt trauma to the chest Lungs were found injured in all the cases of fatal chest injuries.⁵ Moreover, injuries to the chest and abdomen are commonly associated with injuries to other parts of the body, namely the head, spine, limbs etc.⁶ The results of this study could be useful for strategic planning in the control of road-traffic accidents in future. As road traffic injury epidemic is an important cause of Disability It has been estimated that without immediate effective intervention, Road Traffic Accident will become the fifth leading cause of death by 2030 resulting in an estimated 2.4 million fatalities annually.^{7,8} Lungs and heart are two major organs inside chest cavity. It means among the three pods of life (Tripod), two pods are present in this cavity.⁹ The cause responsible for injuries during RTA are usually physical factor like collision between victims and the external environment and acceleration or deceleration forces acting on victim’s internal organs. A punctured wound of lung and pleurae may result in infection and delayed death from bronchopneumonia or empyema. In closed types of wounds, the common injuries of lung are contusions and lacerations. Fatality in chest trauma cases is due to deranged cardiorespiratory function, uncontrolled bleeding, associated with injuries and sepsis. The incidence of thoracic trauma was 46%. Patient with thoracic injuries had a mortality rate of 15.7%, while those without thoracic injuries had a mortality rate of 12.8%.¹⁰ Our study revealed that among fatal head injury patients, half of them died within first 24 hours after reaching to tertiary care center.¹¹ Other associated injuries like chest trauma (30.6%), abdominal trauma (15.1%) and cervical spine injury (3.3%). Lack of first aid, delay in transfer of patients, longer transporter time and lack of facilities in hospitals are some major problems of trauma care in India.¹²

MATERIALS AND METHODS

The present study comprised of 650 deceased with an alleged history of RTA (out of total 1214 deceased), which were brought in the mortuary of the District Hospital, Shahjahanpur, UP for medico-legal autopsy during the period of 1st July 2021 to 30st June 2022. These cases were from various police stations of Shahjahanpur district. The data sources were collected from relatives and friends, and police investigation reports. All the data was thus collected, compiled, and presented in tabulated form. Types of deceased were identified (i.e. pedestrian, cyclist, motorcycle rider, car or bus occupant) and mode of transport. The inquest reports were analyzed in detail and the age, sex, time of death, history and type of the accident were noted. Type of head injury, site of injury and other organs involved, were also observed and

noted. Non-fatal cases of RTA patients who died with causes other than head injuries, those not involved in RTA and Decomposed bodies were excluded from the study. All statistical calculations were performed using SPSS software version 19.9 (SPSS Inc., Chicago, IL, USA). Statistical significance was defined as two-sided value of <0.05.

OBSERVATIONS AND RESULTS

Out of total 1214 autopsy done at mortuary of District Hospital Shahjahanpur, UP, 650 cases were of fatal RTA out of which 53% had head injury, 28% had chest injury, 17 % had abdominal injury, 3.6% had cervical spine injury and the other had combined injuries. Three hundred forty-four (52.88%) victims were between 21-40 years of age; but only 85 (13.09%) victims were below 20 years of age. Males constituted 82.98% of the total victims, and light vehicles were involved in 60.30%. Five hundred and forty-three (55.97%) RTA occurred during the daytime, between 9 AM to 8 PM. [Table-1]

Pattern of head injury in RTA, among intra cranial hemorrhages, SDH (79.31%) is dominating feature observed followed by SAH (63.33%), ICH (21.26%) and EDH (48.85%) of RTA cases found respectively. Apart from these the frequency of contusions (35.63%), diffuse axonal injury, ischemic brain damage and intracranial hematoma was similar in adult and children. [Table-2]

Among RTA cases most common cause of death was head injuries (67.93%) followed by hemorrhagic shock (21.03%), multiple cause (5.05%), Thromboembolism (3.09%), sepsis (1.95%) and least common cause of death was due to spinal injury. [Table-3]

Apart from head injury other soft tissue injury was also associated in RTA cases lung injury was (32.25%) followed by liver (25.17%), heart (12.75%), spleen (12.24), GI system and kidney. [Table-4]

In RTA cases bony injury was also associated among them rib fracture was most common (60%) and facial bone fracture was least common (3%). [Table-5]

Majority of victims were died within 24 hrs (60.37%) followed by death on spot (32.60%) and only (7.03%) victims were died after 24 hrs. [Table-6]

Table 1: Showing (Demographic profile of RTA victims)

Characteristics		Number of victims (%)
Age- (in years)	< 20	85 (13.09%)
	21-40	344 (52.88%)
	41-60	162 (24.94%)
	>60	59 (9.07%)
Sex	Male	539 (82.98%)
	Female	111(17.01%)
Vehicles	Heavy	258 (39.69%)
	Light	392 (60.30%)
Position of during RTA	Occupant	208 (31.95%)
	Driver	111 (17.01%)
	Pedestrian	331 (51.03%)
Time	9 AM-8 PM	364 (55.97%)
	9 PM-8AM	286 (44.02%)

Table2: Showing (Head injury of victims)

Injuries	Number of victims (%)
Skull fracture	68.85%
EDH	48.85%
SDH	79.31%
SAH	63.33%

ICH	21.26%
Contusion	35.63%

Table3: Showing (Cause of death of victims)

Cause of death	Number of victims (%)
Head injury	441 (67.93%)
Hemorrhagic shock	137 (21.03%)
Multiple cause	33 (5.05%)
Thromboembolism	20 (3.09%)
Spine injury	6 (0.92%)
Infection/ Sepsis	13 (1.95%)

Table 4: Showing (Associated soft tissue injury)

Soft tissues injuries	Number of victims (%)
Heart	83 (12.75%)
Liver	163 (25.17%)
Lung	209 (32.25%)
Spleen	80 (12.24%)
Gastrointestinal system	73 (11.20%)
Kidney	42 (6.36%)

Table5: Showing (Other associated Bony injury)

Bony injury	Number of victims (%)
Sternum	9%
Clavicle	6%
Rib	60%
Facial bone	3%
Spine	4%
Pelvis	6%
Upper limb	5%
Lower limb	7%

Table 6: Showing (Period of survival of victims)

Period of survival	Number of victims (%)
Spot death	212 (32.60%)
Death within 24 hrs	392 (60.37%)
Death after 24 hrs	46 (7.03%)

DISCUSSION

India is a developing country. Some of the cities of our country have shown tremendous development while many other cities are also in the process of urbanization. One of the result of this urbanization is underdeveloped traffic systems, unplanned roads, and overpopulation of people and vehicles. Irregular and reckless driving has resulted in danger on the roads. The majority of the persons deceased in our study were males accounting for 78.5% of the cases. They reported the cause to be due to the greater presence of the males on the urban roads. A 7.33:1 male to female ration was observed in another study by Shivakumar et al.¹² Most of the people affected were between 21-40 years of age accounting to more than 60% of the cases. In a similar study by Arvind Kumar et al, maximum victims were observed in the 21-30 years age group followed by the 31-40 years age group, corroborating our study.¹³⁻¹⁶ The

younger age group are most commonly affected as they are normally the earning members of the family and most of the times on roads. Those between 21-30 years are probably more affected as many of these consist of students who are more reckless and adventurous in their driving, leading to accidents. Contusions and lacerations were present on the scalp, membrane and brain in the cases. Contusions were present on the brain in all the cases, in 97.2% of the scalp and 90.2% of the membranes, while lacerations were present on 36.3% of the scalps, 28.9% of the membranes and 35% of the brains.¹⁶ Skull fractures were detected in 88.1% of the cases This preponderance of males in road traffic accident deaths was reported in a study by Arvind Kumar et al., where a huge number of around 88% involved were males.¹⁷

CONCLUSION

The majority of TBI victims of RTA survived less than 24 hours. Immediate resuscitation, early transportation to health care facilities and strict adherence to traffic rules reduce mortality. The first reported human fatality associated with a motor vehicle was a pedestrian killed in 1899. Since then, number of RTA cases has increased and has now become the chief cause of death affecting the most active and productive age group. Various preventive measures like avoiding high speed, restricting driving under influence of alcohol, promoting the use of helmets, seat belts and other restraints, constructions of motor vehicles with safety airbags, prohibition of use of mobile phone while driving. We also strongly recommend the implementation of pre-hospital emergency medical system. This can be done by introducing the well-established pre-hospital life support programme, like emergency medical technician-Ambulance (EMT-A), emergency medical technician -Intermediate (EMT-I), emergency medical technician - Paramedics (EMTP). Lastly establishment of "High-tech trauma centre" having services of emergency medicine at every district head-quarter and on highways at definite intervals is the present need because the management of thoraco-abdominal injuries and at such centres significantly reduces the mortality rate.

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