

## ORIGINAL ARTICLE

## PATTERN OF CHEST INJURIES IN ROAD TRAFFIC ACCIDENTS IN A TERTIARY CARE HOSPITAL

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**Background:** Road traffic accident injuries are an important cause of mortality and morbidity. It is the major public health problem in every country across the world and causing approximately 5.8 million deaths per year. The Chest trauma is a disease that has worsened long with growing urbanization and industrialization; due to worldwide increases in violence, constructions and vehicle number. **Methods:** This study was conducted at Abbas Institute of Medical Sciences (AIMS) Muzaffarabad AJ&K from August 2020 to December 2020. The study was approved by Ethical committee of AIMS hospital. Convenient sampling technique was used. Hospital based retrospective descriptive cross-sectional study designs was used to assess patterns and outcomes of chest injuries among patients based on pre designed questionnaire presented to AIMS Muzaffarabad. The collected data were entered to SPSS, version 25 for analyses. **Result:** Most affected age group was young adults (63%) between 18yr-35yr. Nearly three fourth 72% of chest trauma patients were male and 28% were females. Majority of chest trauma patient arrived to health care facilities within 1 to 2 hours of trauma. Rib fracture was the commonest types of chest injury (39%) followed by hemopneumothorax (25%) and pulmonary contusion (7%). With regard to associated body region injured, extremities were the commonest region (47%). **Conclusion:** Chest injuries due to RTA predominantly affect the male and economically productive age group with high morbidity and mortality in this environment.

**Keywords:** Chest injury, Road traffic accidents, Rib fractures, associated injuries, hemopneumothorax

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## INTRODUCTION

Road traffic accident injuries are an important cause of mortality and morbidity. It is the major public health problem in every country across the world causing approximately 5.8 million deaths per year; about 16,000 deaths per day.<sup>1</sup> Injury is affecting and putting a significant health burden on all populations, regardless of age, sex, income, or geographical region. Traffic accidents make up 1.3 million deaths, suicides responsible for 844,000 whereas homicides responsible for 600,000 deaths globally and they are considered as the leading cause of traumatic deaths.<sup>2</sup> Approximately, 91% of these deaths occur in developing countries including Pakistan.

The Chest trauma is a disease that has worsened along with growing urbanization and industrialization; due to worldwide increases in violence, constructions and vehicle number. The later results in increments of road traffic accidents. It is a major health problem especially for young males. Globally, chest trauma is the third important cause of mortality and morbidity preceded by cancer and cardiovascular diseases being responsible for 10% of all trauma admissions and 25% of trauma-related deaths across the world.<sup>3</sup>

In Europe and United states, the mortality rate as a result of blunt trauma can be as high as 60% but appropriate and timely diagnosis of chest traumas can

decrease the mortality and morbidity.<sup>4</sup> Optimal care of severely injured patients needs a multidisciplinary approach starting from the point of injury to a rehabilitation structure in order to return the patient to their maximum potential level of function within a society.<sup>5</sup>

Major thoracic injuries are known as the Deadly Dozen. Six are lethal and six are hidden. The Lethal six are immediate life threatening conditions like Airway obstruction, Tension pneumothorax, open pneumothorax, Flail chest, Massive haemothorax and cardiac tamponade. While the hidden six like tracheobronchial tree injury, pulmonary contusion, blunt cardiac injury, blunt oesophageal rupture, traumatic aortic disruption and traumatic diaphragmatic injury are potentially life threatening conditions.<sup>6</sup>

A Malaysian study reported that trauma was the third cause of admission to hospital and fifth cause of death. Chest trauma was the cause of 10% of all admissions and about a quarter number of deaths were trauma-related.<sup>7</sup>

In Pang study at Klang Valley hospitals, chest injuries accounted for 36.6% of fatalities among the fatally injured motorcyclist.<sup>8</sup> The aetiology and pattern of chest trauma that vary from one part to the other part of the world have been reported in literature. RTA is the most common cause of chest trauma in majority of studies.

In emergency, patients frequently present with both blunt and penetrating injuries. This includes a spectrum ranging from simple chest wall contusion to severe vital organ injuries.<sup>9</sup> Most patients admitted with chest trauma are managed conservatively and only a few need a thoracotomy, which is usually performed in a higher proportion of patients who sustained penetrating chest trauma.

Associated extra thoracic organ injury, late presentation beyond 24 h post trauma and severe chest injury with bilateral chest involvement were found to be determinants of mortality in chest trauma.<sup>10</sup>

Majority of chest trauma is preventable. A clearer understanding of the aetiology, injury patterns and outcome of these patients is important for establishment of prevention strategies and treatment protocols. A clearer understanding of the aetiology, injury patterns and outcome of these patients is important for establishment of prevention strategies and treatment protocols. The objective of this study was to assess the patterns and outcomes of chest injuries among adult patients admitted with chest trauma in AIMS Hospital Muzaffarabad over 4 months period.

## METHODOLOGY

It was a retrospective quantitative descriptive cross sectional study. The study was conducted at surgical department of Abbas Institute of Medical Sciences (AIMS), Muzaffarabad from August 10, to December 10, 2020. The study was approved by Ethical committee of AIMS hospital. The sampling technique used was a convenient sampling. 100 patients between the age of 18–80 years having chest injury during road traffic accident reaching alive in Accident and Emergency of AIMS hospital were included in the study. Between the ages of 18–35 years were labelled as young adults, 35–60 years middle age adults and above 60 years as old patients. Written informed consent was taken from all the patients in the study. Data was based on predesigned questionnaire presented to patients arriving in accident and emergency in AIMS Muzaffarabad. The collected data analysed using SPSS-25.

## RESULTS

A total of 100 chest injured patients were enrolled to the study during period of 4 months (August 10, 2020–December 10, 2020). Most affected age group was young adults (63%) between 18–35 years. Nearly three fourth 72% of chest trauma patients were male and 28% were females. Among these patients motorcyclists were the most frequent road users who sustained chest injuries as shown in Table-1.

Majority of chest trauma patient 63% received blunt injuries while 37% received penetrating injuries as shown in Table-2.

Most of the patients (92%) arrived to health care facilities within 1 to 2 hours of trauma. The average duration for hospital stay was 1 to 7 days. Concerning outcome of the patient, 77 were recovered, 15 were referred (with associated injuries) and 8 died in AIMS during treatment (Table-3). Those who died (8%) were the ones with advanced age (over 60 years), had associated injuries (head and neck) and presented late in hospital (after 2 hours).

Rib fracture was the commonest types of chest injury, it accounted for (39%) of chest injuries followed by hemopneumothorax (25%) and pulmonary contusion (7%) as shown in Table-4.

**Table-1: Distribution of cases according to types of road users**

Valid	Frequency	Percent
Vehicle driver	25	25.0
Passenger	23	23.0
Pedestrian	11	11.0
Motorcyclist	41	41.0
Total	100	100.0

**Table-2: Distribution of cases according to nature of chest injury**

Valid	Frequency	Percent
Blunt	63	63.0
Penetrating	37	37.0
Total	100	100.0

**Table-3: Distribution of cases according to outcomes**

Valid	Frequency	Percent
Recovered	77	77.0
Referred	15	15.0
Death	8	8.0
Total	100	100.0

**Table-4: Distribution of cases according to pattern of chest injuries**

Valid	Frequency	Percent
Rib fracture	39	39.0
Clavicle fracture	10	10.0
Sternal fracture	6	6.0
Pneumothorax	17	17.0
Hemothorax	8	8.0
Cardiac tamponade	5	5.0
Pulmonary contusion	7	7.0
Myocardial contusion	2	2.0
Chest wall contusion	4	4.0
Airway obstruction	2	2.0
Total	100	100.0

## DISCUSSION

In this study chest injuries predominantly affected male and economically productive age group. In agreement with the present study, other studies reported similar findings.<sup>7,11–14</sup>

A detailed literature search is suggestive of RTAs as the main cause of chest injuries worldwide, more so in the developing world.<sup>2</sup> In the present study also, motor vehicle accidents accounted for almost 62%

of all thoracic injuries. This mechanism of injury is rarely reported in the western literature but is seen more often in developing countries such as our and other Asian and African nations.

Blunt chest injuries were more frequent than penetrating chest injuries in present study. Similarly, the same pattern reported from previous studies in Syria by Al-koudmani, in Tanzania by Lema and in Iran by Mohammadzadeh.<sup>6,7,13</sup>

Early presentation after a chest injury coupled with prompt and effective management at a trauma centre is the key to a good outcome. However, this study found that most of patients were presented to health care facilities within 1 hours of injury. Our observation is in agreement with a study from Nigeria.<sup>11</sup>

Moreover, late presentations to hospital (after 2 hours) were highly associated with mortality in the present study. This could be as a due to grossly inadequate ambulance service that usually resulted in a long interval between the accident and the arrival of the victims at the hospital, this needs further exploration in future studies.

Concerning pattern of chest injury majority of the patients sustained rib fracture, i.e., 39% followed by hemopneumothorax and pulmonary contusion i.e., 25% and 7% respectively. In agreement with the present finding study in England reported rib fracture as the most common type of chest injury.<sup>12</sup> Contrasting to the present finding another study in Iran reported hemothorax as the most common type of chest injury.<sup>14</sup>

Injury to extremities was the most common extra-thoracic associated body region injured among patients presented with chest injury. This finding was consistent with the study conducted in Syria.<sup>6</sup> Grave outcome; mortality of 8% were the ones with advanced age (over 60 years), had associated injuries of head and neck was found in this study, this is in agreement with other National and International studies.<sup>15,16</sup>

## CONCLUSION

Road traffic accidents involving motor vehicles are the most common cause of blunt chest injuries predominantly affecting the young male age group. Rib fractures were the commonest pattern of chest injury. Mortality is high in patients with advanced age, associated injuries and late presentation in hospital.

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**ZAK:** Conceptualization, data collection, analysis and drafting

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## REFERENCES

1. Haagsma JA, Graetz N, Bolliger I, Naghavi M, Higashi H, Mullany EC, *et al.* The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the global burden of disease study 2013. *Inj Prev* 2016;22:3–18.
2. World Health Organization. Violence, injuries, and disability: Biennial 2006–2007 Report. Geneva: Switzerland; 2008.
3. Krug EG, Sharma GK, Lozano R. The Global Burden of Injuries. *Am J Public Health* 2000;90(4):523–6.
4. McQueen KA, Hagberg C, McCunn M. The global trauma burden and anesthesia needs in Low and middle income countries. *Am Soc Anesth (News Letter)* 2014;78(6):16–9.
5. Whizar-Lugo V, Saucedo-Gastelum A, Hernández-Armas A, Garzón-Garnica F, Whizar-Lugo V, Saucedo-Gastelum A, Hernández-Armas A, Garzón-Garnica F, Granados-Gómez M. Chest Trauma: An Overview. *J Anesth Crit Care Open Access* 2015;3(1):82.
6. Al-koudmani I, Darwish B, Al-kateb K, Taifour Y. Chest trauma experience over eleven-year period at al-mouassat university teaching hospital- Damascus: a retrospective review of 888 cases. *J Cardiothorac Surg* 2012;7(1):35.
7. Lema MK, Chalya PL, Mabula JB, Mahalu W. Pattern and outcome of chest injuries at Bugando Medical Centre in Northwestern Tanzania. *J Cardiothorac Surg* 2011;6:7.
8. Pasha MA, Mokhtar MF, Ghazali MZ. A 10-year retrospective review of chest trauma in Hospital Universiti Sains Malaysia. *J Dent Med Sci* 2015;14(8):68–74.
9. Flint S, Darwin CD. An analysis of injury patterns following road traffic collisions in the Northern Territory. *North Territ Dis Control Bull* 2010;17(1):18–24.
10. Ekpe EE, Eyo C. Determinants of mortality in chest trauma patients. *Niger J Surg* 2014;20(1):30–4.
11. Okugbo S, Okoro E, Irhibogbe P. Chest trauma in a regional trauma centre. *J West Afr Coll Surg* 2012;2(2):91–101.
12. Khorsandi M, Skouras C, Prasad S, Shah R. Major cardiothoracic trauma: Eleven-year review of outcomes in the North West of England. *Ann R Coll Surg Engl* 2015;97(4):298–303.
13. Mohammadzadeh M, Hosseinpour M, Mirzadeh AS, Jazayeri H, Ghannae Arani M. Chest injury evaluation and management in two major trauma centers of Isfahan Province, IR Iran. *Arch Trauma Res* 2012;1(2):54–7.
14. Hemmati H, Kazemnezhad-Leili E, Mohtasham-Amiri Z, Darzi AA, Davoudi-Kiakalayeh A, Dehnadi-Moghaddam A, *et al.* Evaluation of chest and abdominal injuries in trauma patients hospital-ized in the surgery ward of Poursina Teaching Hospital, Guilan, Iran. *Arch Trauma Res* 2013;1(4):161–5.
15. Edgecombe L, Sigmon DF, Galuska MA, *et al.* Thoracic Trauma. [Updated 2021 Jul 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK534843/>
16. Mazcuri M, Ahmad T, Abid A, Thapaliya P, Ali M, Ali N. Pattern and outcome of thoracic injuries in a busy tertiary care unit. *Cureus* 2020;12(10):e11181.