

ORIGINAL RESEARCH**Clinical outcome in chest trauma patients: A prospective study**

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Abstract

The increased incidence of vehicular accidents due to increased road traffic, availability of high-speed vehicles, and ignorance of traffic rules contribute to accidental injuries in India, resulting in chest trauma. The aim of the present study was the clinical outcome of chest trauma in tertiary care hospital in Patiala, Punjab. The study included 50 patients with chest trauma presenting to the emergency surgery ward from November 2021 to December 2022. Conservative management was done only in 25 patients. The remaining 25 underwent operative intervention, out of which 22 underwent intercostal drainage. The majority of the patients were discharged in satisfactory condition, either after conservative treatment (25) or operative treatment (24). The mortality was seen in 1 case (2%) in the study population. This study highlighted the fact that majority of the chest trauma is treatable with simple procedures and thoracotomy is rarely indicated.

Introduction

Trauma is the third leading cause of death in all age groups after cardiovascular diseases and cancer.^[1] Death in the first four decades is most commonly due to trauma.^[2] Nearly 20 million are hospitalized every year due to injuries, out of which 1 million die due to trauma-related injuries.^[3] Chest trauma causes approximately 16,000 deaths per year in India alone.^[4] The increased incidence of vehicular accidents due to increased road traffic, availability of high-speed vehicles, and ignorance of traffic rules contribute to accidental injuries in India, resulting in chest trauma.^[5] Road traffic crashes (RTCs) are the commonest cause of chest injuries in civilian practice.^[6] With the increasing use of firearms, arrows and spears, the incidence of penetrating chest injuries increased in civil society.^[7]

Chest trauma is often associated with injury to the solid abdominal organ, pelvic fracture, extremity fractures, spinal fracture and head injury. Associated injuries are more common in those subjected to falls and other accidents than traffic accidents.^[8] Timely and accurate diagnosis of trauma victims is a must. The initial evaluation of a trauma patient is based on the Advanced Trauma Life Support (ATLS) protocol. This begins with an assessment of the patient's airway, breathing, and circulation (ABCs) during the primary survey, typically in that order. The initial evaluation of the patient who has sustained blunt or penetrating thoracic trauma is similar and geared toward the rapid identification of immediately life-threatening conditions.^[9] Life-threatening injuries diagnosed during the initial trauma

evaluation require prompt intervention. The management of chest trauma involves effective analgesia, surgical fixation, chest physiotherapy, respiratory care and early mobilisation.^[10,11] However, the majority of the patient treated conservatively with no more than a chest tube. The size of the chest tube depends on the pathology on a chest x-ray. The size of the 28-Fr or 32-Fr chest tube is usually considered if both pneumothorax and hemothorax are present, as this facilitates the evacuation of both air and blood while minimizing the chance of the tube obstructing due to clot.^[12]

Positioning of a pleural drain often represent the first step of the management of chest trauma. The indication for the insertion of a chest drain has been clearly stated by international trauma management guidelines. In particular, chest tube positioning is considered necessary in case of a pleural disruption with pneumothorax; intrapleural bleeding causing haemothorax or in case of pneumo-haemothorax.^[13] Hence, the accurate identification of a patient at high risk for major chest injuries is necessary to avoid delays that may lead to significant morbidity and mortality.^[14] Aggressive management of chest trauma, along with prompt treatment of associated injuries, is essential for optimal patient outcomes.^[15] Accurate diagnosis of thoracic trauma depends on a high degree of suspicion and pattern recognition.^[16] Thus, knowledge of unique demographic patterns of presentation of thoracic trauma is invaluable in making an accurate diagnosis. Therefore, the objective of the present study was the management of chest trauma and morbidity and mortality related to it following chest trauma in tertiary care hospital in Patiala, Punjab.

Material and method

The present study was a prospective study conducted at the Department of General Surgery, Rajindra Hospital, Patiala, after taking approval from the ethical committee. The study included 50 patients with chest trauma presenting to the emergency surgery ward from November 2021 to December 2022.

Inclusion criteria

1. All the patients with chest injuries, irrespective of their age and sex.
2. Patients who had given informed consent to participate in the study.

Exclusion criteria

1. Patients who had a malignant or non-malignant space-occupying lesion of the chest or lung.
2. Patients who did not give informed consent to participate in the study.
3. The patients who left against the medical advice.

Methodology

- The admitted patients were attended according to the ATLS protocol, using integrative management by a team of specialists, including a general surgeon, orthopaedician, physician and anesthetist. This begins with an assessment of the patient's airway, breathing, and circulation (ABCs) during the primary survey, typically in that order.
- All patients received in the Emergency Room (ER/Casualty) were attended immediately, and proper history, primary survey and resuscitation was done simultaneously.
- All the vital parameters were recorded, history about the type of injury, site of injury was obtained from the patient / accompanying person. An inquiry was made about the preexisting chronic illness and documented.
- After resuscitation and hemodynamic stability, the patient was shifted for necessary radiological investigations and then to the ward or ICU.

Observation and results**Table 1: Mode of Injury In The Study Population (N=50)**

Mode of Injury	No. of patients	Percentage (%)
Assault	5	10.00%
Fall From Height	8	16.00%
Gun Shot Injury	1	2.00%
Hit by animal	4	8.00%
Industrial Accident	1	2.00%
Road Traffic Accident	31	62.00%

Road traffic accidents were the most commonest (62%), followed by the fall from height, assault, hit by an animal, industrial accidents and gunshot injury. The various modes of injuries as represented in table 1

Table 2: Treatment Given To Chest Trauma Patients (N=50)

Treatment	No. of patients	Percentage (%)
Conservative Management	25	50
Intercostal Drainage	22	44
Thoracotomy	02	04
Laparotomy for diaphragmatic injury	01	02

25 out of 50 (50.00%) needed only conservative management, whereas the remaining 25 patients underwent operative intervention, out of which 22 underwent intercostal drainage. The different types of treatment received as shown in table

Table 3: Descriptive Analysis Of Associated Injury InThe Study Population (N=50)

Associated Injury	Frequency	Percentage
Abdominal Injury	11	22.00%
Head Injury	4	8.00%
Musculoskeletal Injury	18	36.00%
Spinal Injury	1	2.00%
No associated injury	16	32.00%

The most commonly associated injury in patients with chest trauma was Musculoskeletal Injury (18 out of 50 cases). The various associated injuries as shown in table 4

Table 4: Outcome Of Chest Trauma Patients (N=50)

Outcome	Number Patients	Percentage
Discharged after conservative treatment	25	50 %
Discharged after ICD removal	22	44 %
Discharged after operative treatment	2	4%
Death due to chest injury	1	2 %
Total	50	50 %

Twenty-five cases were discharged in satisfactory condition after conservative treatment. Twenty-four were discharged after operative intervention and one patient died during the course of treatment. The different outcomes of the patient in the study population as shown in table

Discussion

The present study was designed to analyze the characteristics of the patients with thoracic trauma who had come to the emergency department of a tertiary care hospital and because the study includes all patients who come to the emergency room during the study period, it gives a real idea of its characteristics, which can be extrapolated to the rest of the population. The mode of chest injuries varies from country to country and also varies within the same country. RTA was the commonest mode of chest injury noted in the present study, which was in accordance with, **Ibrahim et al.** conducted a study on 888 patients at University hospital in Damascus, Syria. There were 773 males (87%) and 115 females (13%), male to female ratio was (6.7:1). The mean age was 31 ± 17 years, ranging from a few months to 95 years. Blunt and penetrating injuries were documented in 58% (n = 513) and 42% (n = 375) patients, respectively. The study reported that the majority of the cases were due to assault 41% (365 out of 888), followed by traffic accidents 33% (292 out of 888).^[17]

In the present study, a conservative line of management was observed in 50.0% of patients and operative management was done in 48.00% of patients. Among the operative treatment, the majority of the patients required ICD insertion (44%), while thoracotomy was done in 4% of the patient during the present study. **Atri et al.**^[18] reported similar findings, with 42.6% of patients managed conservatively and 48.4% required chest tube drainage. However, in the study of **Khan et al.**^[19] 62% of patients required chest tube insertion and only 29% managed conservatively. This could be due to the high number of open chest wall injuries. The comparison of the line of management in the various study. The majority of the patients with chest trauma had a favorable outcome in our study, only one death was recorded in our study. The majority of patients were discharged in satisfactory condition. The mortality rate was 2% which may be possibly due to the small sample size. **Ekpe et al.** reported that mortality in chest trauma is determined by associated extrathoracic organ injury, late presentation beyond 24 hours posttrauma and severe chest injury with bilateral chest involvement.^[20] The outcome of chest trauma in terms of mortality was comparable to the studies done by **Asfaw et al.**^[21], **Mu et al.**^[22], **Gupta et al.**^[23] and **Walia et al.**^[24]

Conclusion

The present study was to reiterate and highlight the fact that majority of the chest trauma is treatable with simple procedures and thoracotomy is rarely indicated. Furthermore, the vast majority of complications and potential mortality is preventable. Timely diagnosis, intervention and referral to appropriate centers can add to the overall survival and better quality of life of these patients.

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