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ORIGINAL RESEARCH

Clinical Profile of Patients of Chest Trauma: A Hospital Based Prospective Observational Study

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Abstract

Introduction and aim: Acute trauma meets the criteria to classify the disease as a global pandemic. Chest injuries contribute to around 15 % of loss of disability-adjusted life years (DALYs) and they are the second leading cause of death in cases of pediatric trauma. The present study was conducted to evaluate the distribution of patients with types of chest trauma, clinical features 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. 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.

Observation and results: Blunt chest trauma (88%) was commoner than penetrating trauma (12 %).Rib fractures (62%) were the commonest clinical type of chest injury.The common symptom and sign was a pain in the chest wall (84.0 %).

Conclusion: Thoracic injuries are the common occurrence and are the major cause of morbidity and mortality in trauma victims.

Introduction

Trauma remains an enormous public health problem worldwide and it is associated with high morbidity and mortality both in developed and developing countries.[1]Acute trauma meets the criteria to classify the disease as a global pandemic because these contribute to morbidity and mortality substantially in the last decades all over the world.[2] Non-intentional traumatic injuries and violence cause approximately 5.8 million death every year which accounts for 10% of the world's deaths. A trauma-related death is reported every 1.9 minutes in India.[3] Chest injuries contribute to around 15 % of loss of disability-adjusted life years (DALYs) and they are the second leading cause of death in cases of pediatric trauma.[4] Rapid unplanned urbanization and the advent of high-speed motor vehicles became the most important cause of an enormous increase in the number of traumatic chest injuries all over the

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world. The chest is likely to get traumatized in most impact injuries as it is a large and exposed portion of the human body.[5] Most commonly, patients with chest trauma present with pain in the chest wall and respiratory distress. The disruption of respiration, circulation or both leads to morbidity and mortality in patients with chest trauma. Respiratory compromise results in ventilation-perfusion mismatch and decreased pulmonary compliance. The ventilation-perfusion mismatch results in hypoventilation and hypoxia, which may necessitate intubation. 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[6]. Chest radiography being the most commonly used during the diagnosis, but it does have limitations. extended-Focused Assessment with Sonography in Trauma (eFAST) can be done with the primary survey, especially in an unstable patient. Computed tomography (CT) is more sensitive and specific but is done mainly in hemodynamically stable patients.[35] There are many risk factors that affect morbidity and mortality in blunt chest trauma. Despite the patient's age, other important variables included the presence of bone fractures and the number of fractures, mechanical ventilation, as well as pre-existing chronic lung diseases, co-existing head injury, hypotension and extrathoracic organ injury. In addition, a low Glasgow coma scale (GCS) score in chest trauma patients is highly predictive of mortality.[7,8] Evidence-based interventions is required to improve road safety, enhance the involvement of the health system in dealing with road injuries. The objective of the present study was to see the distribution of patients with chest injury among, types of chest trauma, clinical features related to it following chest trauma in tertiary care hospital in Patiala, Punjab.

Materials and methods

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. All the patients with chest injuries, irrespective of their age and sex and Patients who had given informed consent to participate in the study were included in this study. Patients who had a malignant or non-malignant space-occupying lesionof the chest or lung, who did not give informed consent to participate in the study were excluded. All patients received in the Emergency Room (ER/Casualty) were attended immediately, and proper history, primary survey andresuscitation 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. After the chest tube insertion. The patient underwent active physiotherapy and incentive Spirometry. All thoracic as well as associated injuries were adequately addressed and documented carefully in a pre-structured performa.

Statistically analysis

The collected data was transformed into variables and entered into a Microsoft Excel spreadsheet. Analysis was done using SPSS version 20 windows software program. Descriptive statistics included the computation of percentages, means and standard deviation.

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Observation and method

Table 1: Type Of Chest Trauma (N = 50)

Type of Injury	Frequency	Percentage
Blunt Trauma	44	88.00%
Penetrating Trauma	6	12.00%

Blunt chest trauma (88%) was more commoner than penetrating trauma (12%) in our study.

Clinical Types of Injury	No. of patients	Percentage (%)
Rib fracture	31	62
Sternal fracture	00	00
Pneumothorax	18	36
Hemothorax	20	40
Hemopneumothorax	6	12
Lung Contusion	4	8
Flail chest	1	2
Diaphragmatic Injury	1	2
Spinal injury	1	2

Various Clinical Types Of Injury In The StudyPopulation (N = 50)

The rib fracture (62%) was the commonest type of chest injury, followed by hemothorax, pneumothorax, hemopneumothorax, lung contusion, flail chest, diaphragmatic injury and spinal injury. The various clinical types of chest injury as shown in table 2.

Clinical features	No. of patients	Percentage
Chest pain	42	84.00%
Respiratory distress	22	44.00%
Decreased breath sounds	6	12.00%
Surgical emphysema	5	10.00%
Hypotension	10	20.00%
Hemoptysis	00	00.00%

Table 3: Clinical Features In Chest Trauma Victims (N=50)

The pain and tenderness of the chest wall was the commonest finding which is seen in the case of fractures of ribs. Difficulty in breathing due to severe pain in the chest wall or respiratory distress due to pneumothorax or hemothorax was the second most common finding.

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. In our study we observed that road traffic accidents formed the most common cause of rib fractures, followed by falls from height, assaults, animal- related, stab injuries, etc. Increased automobile traffic and ever-increasing population, together with intentional or unintentional ignorance of traffic rules, account for the predominance of road traffic accidents resulting in chest trauma. These findings were in accordance with the study of **Helling et al.**, in which

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road traffic accidents constituted the maximum number of cases.[9] In the present study, blunt trauma (88%) was more common than penetrating trauma (12%). The high incidence of blunt chest injuries in the present study was explained by the fact that those patients who had blunt injuries were mostly involved in road traffic crashes, another common feature of increased motorization in this environment. The results in the present study were found to be comparable with the studies done by **Atri et al**.[10] and **Lema et al.**[11] and were non-comparable with the study done by **Asfaw et al.**[12] due to higher rate of fights among the people due to farming land disputes in the area. 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 the studies done by **Lema et al.**[11], **Sikander et al.**[13], **Gupta et al.**[14] and **Dehgan et al.**[15]. As the male to female ratio of the patients who underwent chest injury in the present study was 7.3:1, out of which 62 % were cases of a road traffic accident which could be attributed to males being more engaged in the external environment as well as alcohol intake, which is more common in the male population. As per the National Health Portal, road traffic injuries lead to five million deaths annually around the world. In India, one million die each year and around 20 million are hospitalized due to injuries. In 2015, theNational Crime Records Bureau (NCRB) reported 413,457 deaths in road traffic injuries.[16] **Sharma et al.** conducted a study on 314 thoracic injuries at Base Hospital Delhi Cantt. The study observed that the mechanism was blunt in the majority (89.1%) of cases. Vehicular accidents (62.2%) and assault were the most common modes of injury. Rib fracture was the most common chest injury seen in 214 out of the 314 patients, while abdominal visceral injuries were the most commonly associated injuries in polytrauma. Associated extrathoracic injuries caused a higher mortality rate in contrast to isolated chest injuries. The majority of the patients were managed non-operatively. Intercostal drainage tube insertion was the most common modality of treatment in 82% of the cases, whereas thoracotomy was required only in 3.18% of the patients. Overall mortality was 5.41%.[17]**Gupta et al.** conducted a prospective observational study at a tertiary care center in north India, including 200 patients. A road traffic accident was found to be the most common cause of chest trauma (61%), followed by a fall from height (23%). Rib fracture in 78% of patients, surgical emphysema in 31%, hemopneumothorax in 31.5%, hemothorax in 25%, and pneumothorax in 8.5% of patients. Twenty-four percent (48 out of 200) patients were managed conservatively, whereas 72.5% (145 out of 200) patients were managed by chest tube drainage. Only seven (3.5%) patients underwent surgical procedures for chest injury in terms of thoracotomy or laparotomy. The mortality rate in the study was 6.5%, whereas 9.5% of patients required ventilator support. The study found that most of the patients were managed conservatively or simply by chest tube drainage. The overall prognosis depends more on associated injuries and morbidity.[14]

Conclusion

Thoracic injuries are the common occurrence and are the major cause of morbidity and mortality in trauma victims. Since vehicular accident accounts for almost the majority of thoracic injuries, there is an immediate need to enforce strict traffic discipline and to educate society to follow the laid down traffic rules and regulations to prevent these serious and life-threatening injuries.

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