

Exploring Chest Trauma: A Comprehensive Analysis of Injury Characteristics, Clinical Outcomes, and Management Strategies in a Tertiary Care Setting

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Abstract

Background: Chest trauma is a major cause of morbidity and mortality worldwide. Understanding the demographics, injury characteristics, clinical and investigative findings, procedural and operative findings, and outcomes of patients with chest trauma is crucial for improving patient care and reducing mortality rates.

Methods: This retrospective study included 103 trauma patients with chest trauma who were admitted to a tertiary care hospital in Ethiopia between 2018 and 2022. Data on demographics, injury characteristics, clinical and investigative findings, procedural and operative findings, and outcomes were collected and analyzed.

Results: Blunt trauma (53.4%) and stab injuries (42.7%) were the most common mechanisms of injury. Low blood pressure and low oxygen saturation levels were observed in a significant proportion of patients. Rib fractures and Hemothorax were the most common findings on chest x-rays. Tube thoracostomy was performed in 95 patients, with Hemopneumothorax being the most common finding. Exploratory laparotomy was required in a small number of patients, with penetrating trauma being the only factor associated with an increased rate of exploratory laparotomy. The mortality rate was low (3.1%), and the majority of patients were discharged to home improved.

Conclusion: This study provides important insights into the demographics, injury characteristics, clinical and investigative findings, procedural and operative findings, and outcomes of patients with chest trauma. The findings emphasize the importance of prompt and effective interventions, accurate diagnosis, and a multidisciplinary approach to care. Further research is needed to fully understand the patterns of injury, management strategies, and long-term outcomes of patients with chest trauma.

Keywords: Chest Trauma, Blunt Trauma, Stab Injuries

1. Introduction

Chest trauma is a significant cause of morbidity and mortality worldwide, with an estimated 16% of all trauma-related deaths being attributed to chest injuries (1). The management of chest trauma requires prompt and effective interventions, accurate diagnosis, and a multidisciplinary approach to care. Understanding the demographics, injury characteristics, clinical and investigative findings, procedural and operative outcomes, and long-term outcomes of patients with chest trauma is crucial for improving patient care and reducing mortality rates.

Several studies have investigated the epidemiology and management of chest trauma, particularly in high-income countries (2, 3). However, there is a paucity of data on chest trauma in low- and middle-income countries, where the burden of trauma is increasing (4). Moreover, the demographics, injury characteristics, and management strategies for chest trauma can vary depending on the regional and cultural context.

In this retrospective study, we aimed to provide insights into the demographics, injury characteristics, clinical and investigative findings, procedural and operative outcomes, and long-term out-

comes of patients with chest trauma in a tertiary care hospital in Ethiopia. We believe that our study will contribute to the growing body of literature on chest trauma and provide valuable information for improving patient care.

2. Methodology

2.1 Study Design: This study will be a retrospective analysis of patients with chest trauma who presented to a tertiary care hospital between January 2018 and December 2022.

2.2 Data Collection: Data is collected from medical records of patients who meet the inclusion criteria. The data will include demographic information, mechanism of injury, time of presentation, clinical and radiological features, interventions, and outcomes.

2.3 Data Analysis: Descriptive statistics will be used to summarize the data. Categorical variables will be presented as frequencies and percentages, and continuous variables will be presented as means and standard deviations or medians and inter-quartile ranges, depending on the distribution of the data. Inferential statistics will be used to perform uni-variable and multi-variable analyses to identify factors associated with exploratory laparotomy and thoracic and neck exploration in patients treated with tube thoracotomy for chest trauma.

3. Results

3.1 Demographics and Injury Characteristics:

- The study included 103 trauma patients, of whom 79 (76.7%) were male and had a mean age of 33.2 ± 14.3 years. The majority of patients sustained blunt trauma (53.4%), followed closely by stab injuries (42.7%), while only 4 (3.9%) patients presented after sustaining a gunshot wound.

- The mean time from trauma to hospital presentation was 14.9 ± 29.35 hours, with a range of 0.2 to 168 hours. A total of 38 (36.9%) patients sustained trauma to other body systems in addition to their primary injury, while 33 (32%) fulfilled the criteria for poly-trauma.

- Among patients with chest injuries, the most commonly affected anatomic compartment was the abdomen (38.8%), followed by traumatic brain injury (20.4%).

Clinical and Investigative Findings:

- Upon evaluation, a significant proportion of patients had low blood pressure, with 7 (6.8%) presenting with a systolic blood pressure below 90mmHg and 12 (11.7%) presenting with a diastolic blood pressure below 60mmHg.

- Arterial oxygen saturation was below 90% in 31 (30.1%) of patients. Additionally, 7 (6.8%) of patients had hemoglobin levels less than 9g/dl, and 9 (8.7%) had platelet counts less than 150,000/dl.

- Chest x-rays revealed rib fractures in 27 (26.2%) of the patients, while hemothorax was the most common finding in 21 (45.7%) patients.

3.2 Procedural findings

- Tube thoracostomy was performed in 95 of the 103 patients, with hemopneumothorax being the most common finding in 45 (47.3%)

of the recorded patients, followed by hemothorax in 28 (29.5%).

- Antibiotics were administered to 89 (86.4%) of the patients undergoing tube thoracostomy. - The mean volume of blood drained during the initial insertion of tube thoracostomy was 291.8 ± 305.2 ml, with a range of 20 ml to 1500 ml. The mean duration of tube thoracostomy was 7.4 ± 7.9 days, with a range of 2 to 75 days.

3.4 Operative findings

- A small number of patients (15.5%) required exploratory laparotomy, during which diaphragmatic repair was the most common procedure performed.

- Thoracotomy or neck exploration was required in 10 (9.7%) patients, with thoracotomy and hematoma evacuation being the most common procedure performed.

- Penetrating trauma was the only factor associated with an increased rate of exploratory laparotomy, with an adjusted odds ratio of 10.8 (97%CI: 2.5-51.0, p value: 0.003).

3.5 Outcomes

- A total of 96 patients had their outcomes documented, with only 3 (3.1%) reported mortality, and one referral. The majority of patients (92.7%) were discharged to home improved.

- Upon discharge, 79 patients were given oral analgesics, with 53 (51.3%) receiving tramadol as a monotherapy, followed by a combination of tramadol and diclofenac in 13 (12.9%).

3.6 Discussion

Our study provides important insights into the demographics, injury characteristics, clinical and investigative findings, procedural and operative findings, and outcomes of patients with chest trauma in a tertiary care hospital in Ethiopia. The majority of patients in our study were male, consistent with previous studies on chest trauma (5, 6). Blunt trauma was the most common mechanism of injury, followed by stab injuries. The mean time from trauma to hospital presentation was 14.9 hours, which is relatively long and may reflect delayed access to medical care or delayed diagnosis.

The most commonly affected anatomic compartment was the abdomen, followed by traumatic brain injury. This finding highlights the importance of a comprehensive evaluation of trauma patients to identify potential injuries in other body systems and improve outcomes (7). Moreover, a significant proportion of patients in our study had low blood pressure and low oxygen saturation levels, which may reflect a delay in arrival, diagnosis or inadequate resuscitation.

Chest x-ray was the primary imaging modality used to diagnose chest injuries in our study, with rib fractures and hemothorax being the most common findings. These findings are consistent with previous studies on chest trauma (8, 9). Tube thoracostomy was the most common procedure performed in our study, with hemopneumothorax being the most common finding. This finding is consistent with previous studies showing that hemopneumothorax is the most common indication for tube thoracostomy in patients with chest trauma (10, 11). Antibiotics were administered to the major-

ity of patients undergoing tube thoracostomy, which is consistent with current guidelines for the management of chest trauma (12).

A small number of patients in our study required exploratory laparotomy, with penetrating trauma being the only factor associated with an increased rate of exploratory laparotomy. This finding is consistent with previous studies showing that penetrating trauma is a risk factor for intrabdominal injuries (13, 14). Thoracotomy or neck exploration was required in a small number of patients, with thoracotomy and hematoma evacuation being the most common procedure performed.

The mortality rate in our study was low, with the majority of patients being discharged home improved. This finding is consistent with previous studies showing that mortality rates for chest trauma have decreased over time due to improvements in management strategies (15, 16). Upon discharge, the majority of patients were given oral analgesics, with tramadol being the most common medication prescribed.

Our study has several limitations. First, the study was conducted in a single center, which may limit the generalization of our findings

to other settings. Second, our study was retrospective, which may have led to incomplete data collection and selection bias. Third, we did not evaluate the long-term outcomes of patients with chest trauma, which could provide valuable information about the impact of chest trauma on quality of life and functional status.

Conclusion

Our study provides valuable insights into the demographics, injury characteristics, clinical and investigative findings, procedural and operative outcomes, in a tertiary care hospital in Ethiopia. The findings of our study emphasize the importance of prompt and effective interventions, accurate diagnosis, and a multidisciplinary approach to care in the management of chest trauma.

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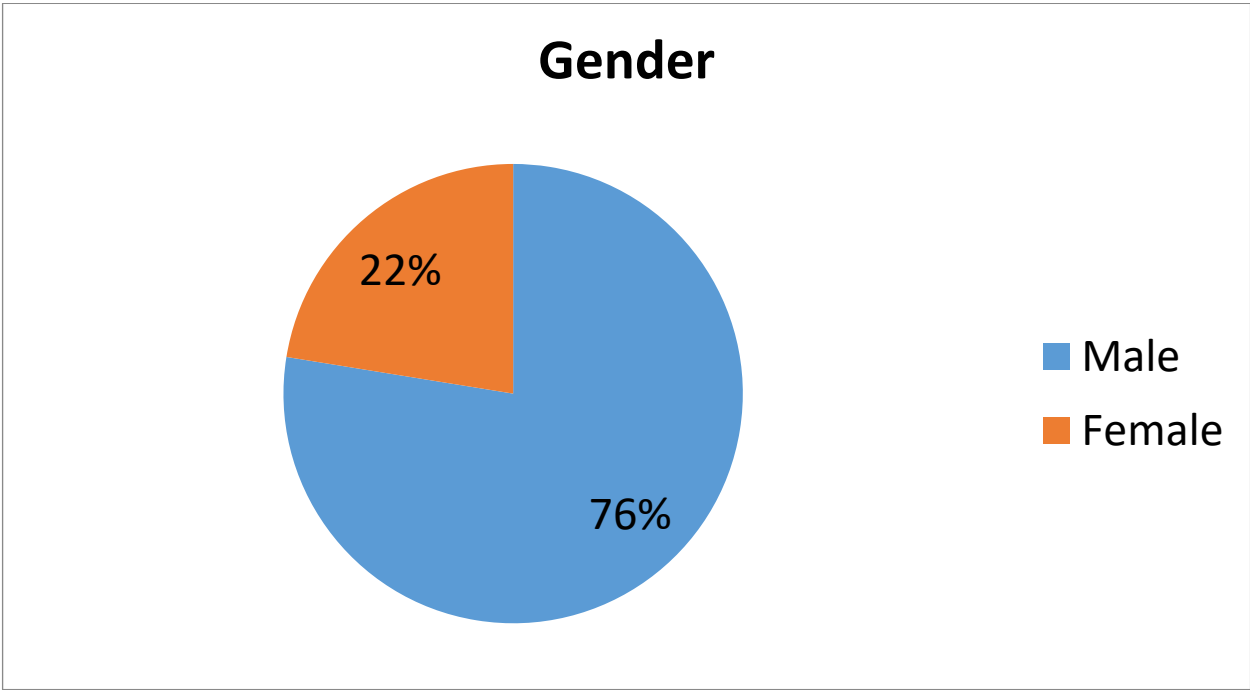


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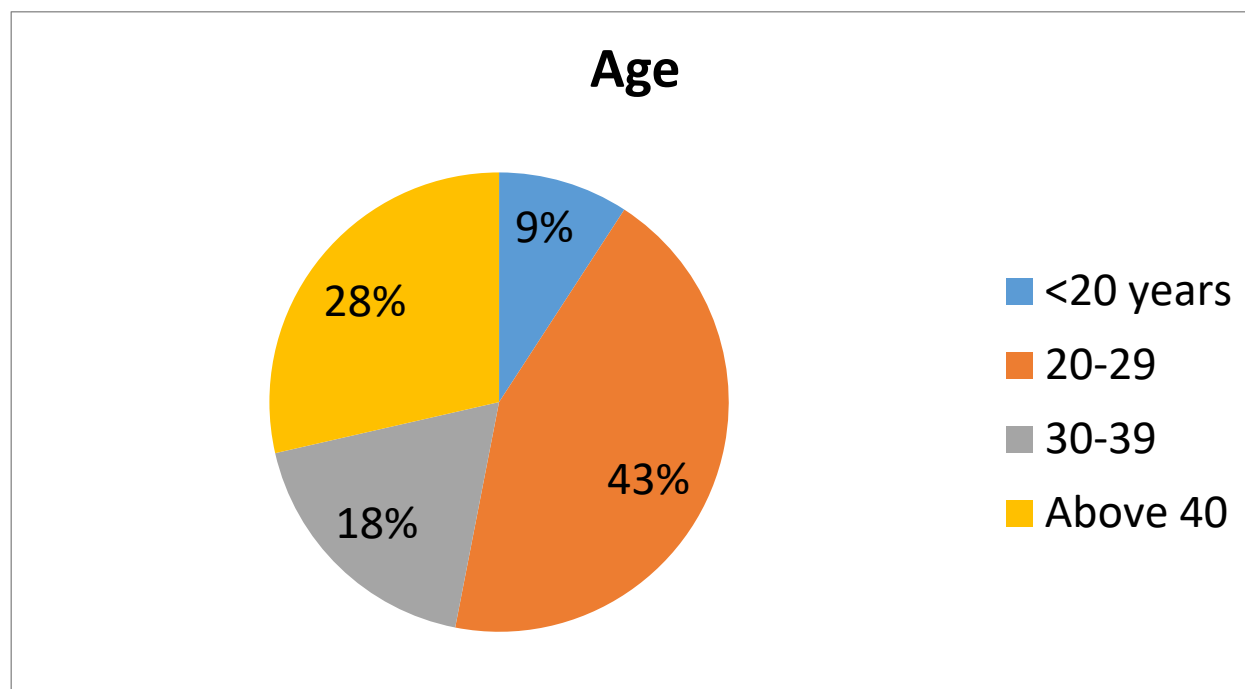


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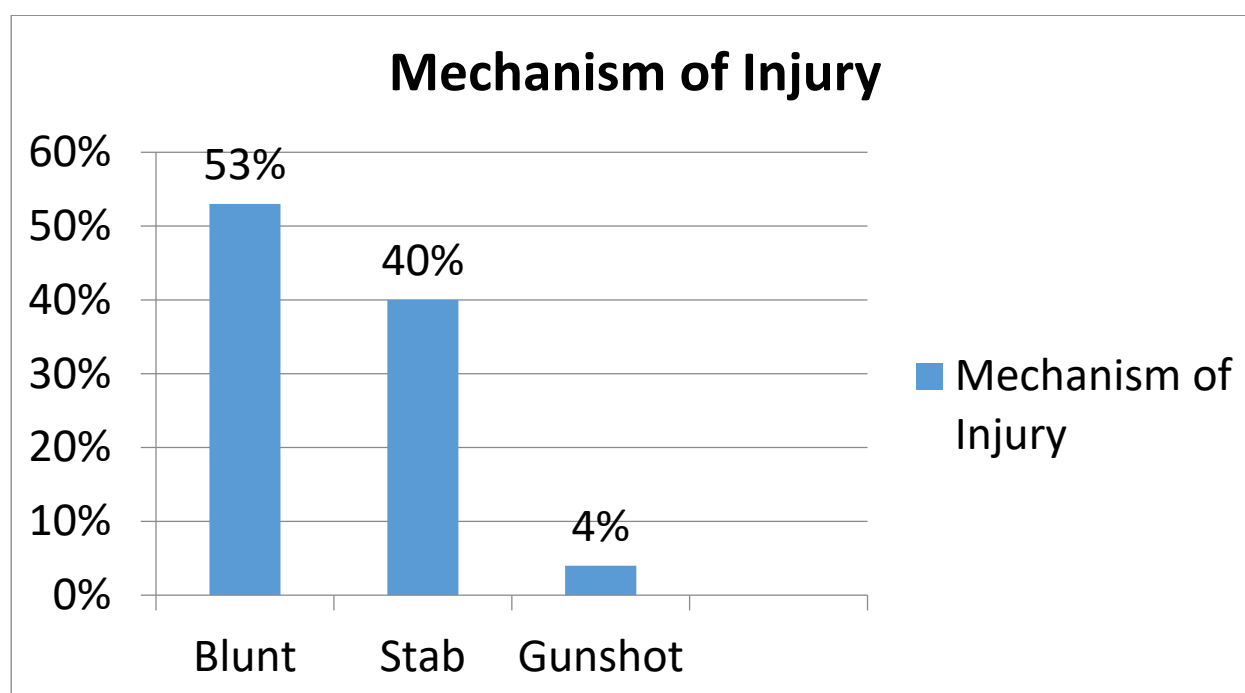


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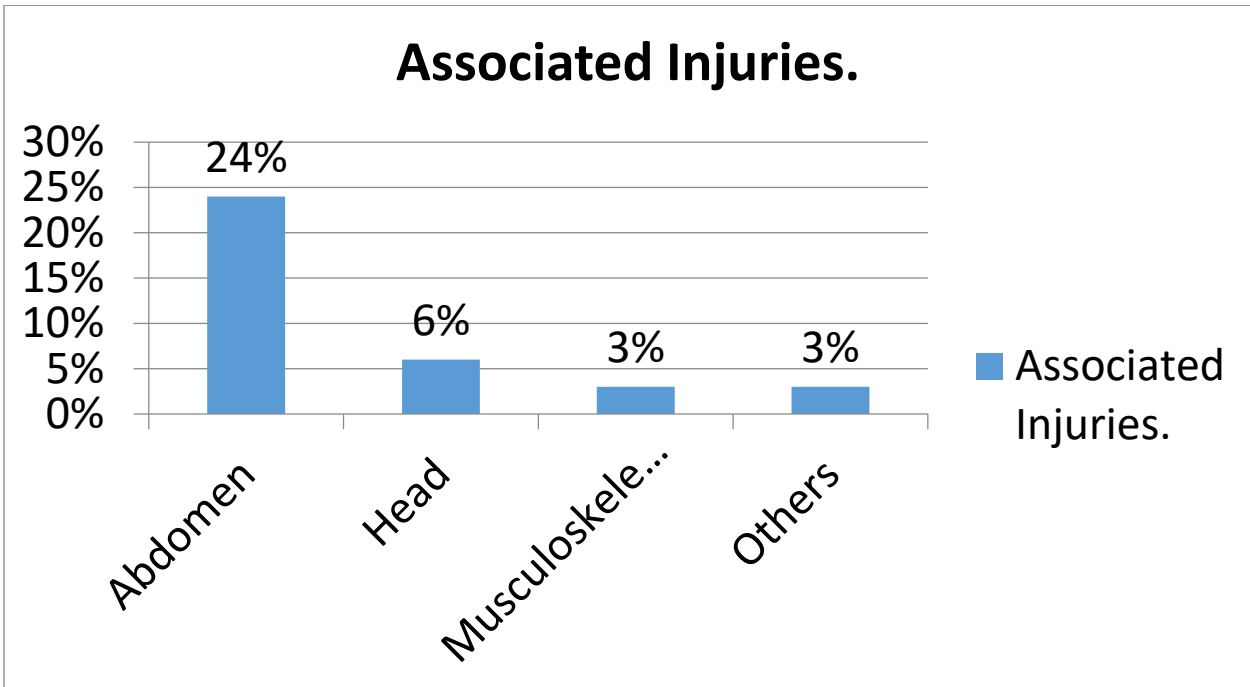


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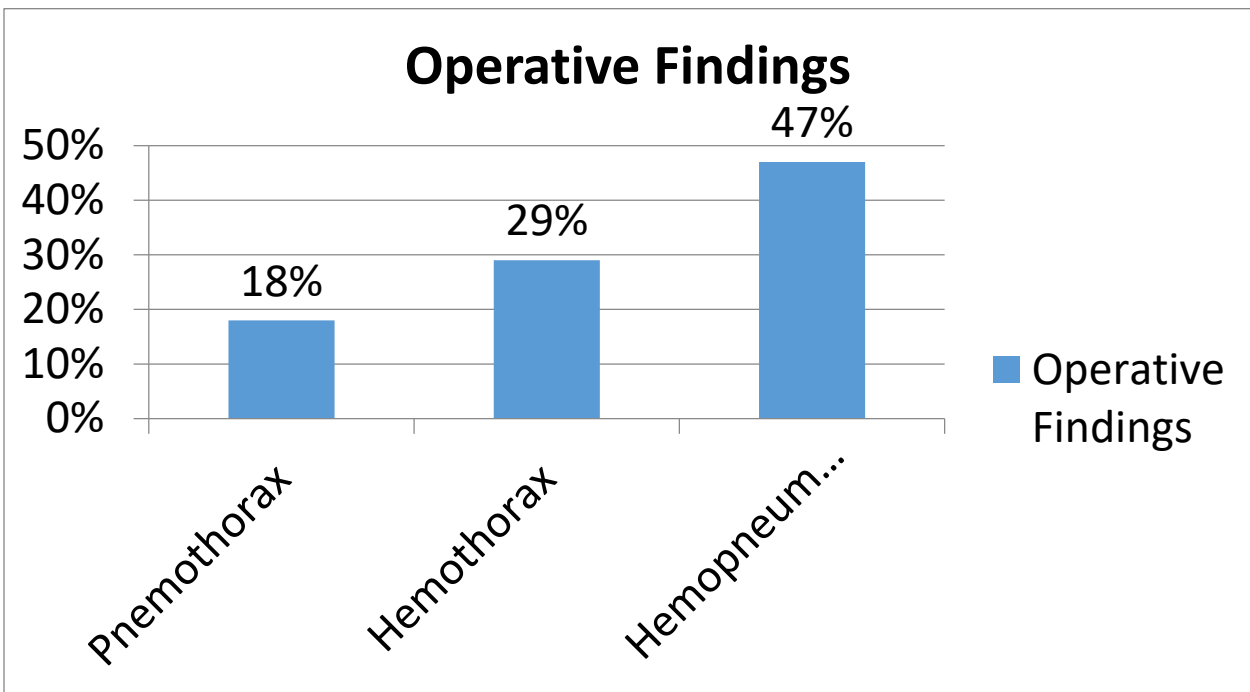


Table: 3

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