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*Research title*

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**Chest trauma management.  
chest tube vs. thoracotomy**

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A THESIS

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## **DEDICATION**

**I dedicate this work to my parents and my sister, for putting up with the stress and the complaining throughout the past six years.**

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# ABSTRACT

**Background:** A chest injury, also known as chest trauma, is any form of physical injury to the chest including the ribs, heart and lungs. Chest injuries account for 25% of all deaths from traumatic injury. Typically chest injuries are caused by blunt mechanisms such as motor vehicle collisions or penetrating mechanisms such as stabbings. Chest injuries can be classified as blunt or penetrating management conservative, chest tube and thoracotomy.

**Aim:** To know the way of management of chest trauma.

**Patients and methods:** This cross sectional study was carried out at Al-ImamainAl-kadhimain hospital eighteen patients were enrolled in this study. Each case was managed at Al-ImamainAl-kadhimain hospital. Statistical study was done by using percentage.

**Results:** A total number of 18 patients with chest trauma were enrolled in this study. The average age of patient was 34.5 years, male to female ratio was 3:1, the average of hospital stay was 5 days with longest one was 11 days and least one was 2 days, the site injury was 50 % on the left side only, 33.3 % on the right side only and 16.7 on both side. 50% of patients developed haemothorax, 33.3 % of patients developed pneumothorax, 16.6 % of patient developed haemothorax and Pneumothorax. 72.2 % of patient treated with chest tube, 5.5 % treated with thoracotomy and 22.2% managed conservatively.

**Conclusions:** Chest injuries account for 25% of all deaths from traumatic injury. Chest tube is common method of management. Thoracotomy has some indication. Haemothorax and pneumothorax is serious complication follow chest trauma

**Key words:** trauma, chest tube, thoracotomy.

# Introduction

A **chest injury**, also known as **chest trauma**, is any form of physical **injury** to the **chest** including the **ribs**, **heart** and **lungs**. Chest injuries account for 25% of all deaths from traumatic injury.<sup>[1]</sup> Typically chest injuries are caused by blunt mechanisms such as **motor vehicle collisions** or penetrating mechanisms such as **stabblings**.<sup>[2]</sup>

## Classification

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Chest injuries can be classified as **blunt** or **penetrating**. Blunt and penetrating injuries have different **pathophysiologies** and clinical courses.

Specific types of injuries include:

- Injuries to the **chest wall**
  - Chest wall **contusions** or **hematomas**.
  - **Rib fractures**
  - **Flail chest**
  - **Sternal fractures**
  - **Fractures of the shoulder girdle**
- **Pulmonary injury** (injury to the lung) and injuries involving the **pleural space**
  - **Pulmonary contusion**
  - **Pulmonary laceration**
  - **Pneumothorax**
  - **Haemothorax**
- **Injury to the airways**
  - **Tracheobronchial tear**
- **Cardiac injury**
  - **Pericardial tamponade**

- Myocardial contusion
- Traumatic arrest
- Hemopericardium
- Blood vessel injuries
  - Traumatic aortic rupture
  - Thoracic aorta injury
  - Aortic dissection
- And injuries to other structures within the torso
  - Esophageal injury (Boerhaave syndrome)
  - Diaphragm injury

## Diagnosis

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Most blunt injuries are managed with relatively simple interventions like **tracheal intubation** and **mechanical ventilation** and **chest tube** insertion. Diagnosis of blunt injuries may be more difficult and require additional investigations such as **CT scanning**. Penetrating injuries often require **surgery**, and complex investigations are usually not needed to come to a diagnosis. Patients with penetrating trauma may deteriorate rapidly, but may also recover much faster than patients with blunt injury.

Management of chest trauma can be divided into three distinct levels of care; pre-hospital trauma life support, in-hospital or emergency room trauma life support and surgical trauma life support. At each level of care recognition of thoracic injury is crucial for the later outcome. Initial resuscitation and management of chest trauma patient is based upon protocols from the Advanced Trauma Life Support (ATLS) <sup>[3]</sup> after a primary survey immediately life-threatening injuries should be excluded or treated such as:

- I. Airway obstruction;
- II. Tension pneumothorax;
- III. Open pneumothorax;
- IV. Massive haemothorax;
- V. Flail chest;
- VI. Cardiac tamponade.

Secondary survey will provide information on potentially life-threatening injuries:

- I. Pulmonary contusion;
- II. Myocardial contusion;
- III. Aortic disruption;
- IV. Traumatic diaphragmatic rupture;
- V. Tracheobronchial disruption;
- VI. Esophageal disruption.

### **Emergency room trauma life support**

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Repetition of clinical examination in primary survey together with anamnestic information on the mechanism of thoracic trauma will provide information on potential severity of thoracic injury <sup>[4]</sup>. When the extent of trauma cannot be defined it is recommend to perform contrast-enhanced CT scan <sup>[5]</sup>.

As the sensitivity of a chest X-ray in the emergency room is only 58.3% <sup>[6]</sup>.

Thoracic ultrasound examination is valid when CT scan is not necessary, in comparison with chest X-ray it shows equivalent sensitivity and specificity for diagnosis of pneumothorax <sup>[7-9]</sup>. Ultrasonography in the emergency room is also a reliable method to exclude pleural/pericardial effusion <sup>[10-11]</sup>.

Chest tube drainage is necessary when pneumothorax is relevant, progressive or when the patient is mechanically ventilated <sup>[12-13]</sup>. Large bore chest tubes compared with smaller chest tube have no advantage in treatment of severely injured patients <sup>[14]</sup>.

When should the thoracic surgeon definitely be involved?

According to the ATLS guideline this is recommended as follows <sup>[3]</sup>:

- I. Blood loss over the chest TD >1,500 mL initially or >200 mL/hour over 2–4 hours;
- II. Hemoptysis;
- III. Massive subcutaneous emphysema;
- IV. Important air-leakage over the chest tub;
- V. Uncertain images on the chest X-ray or CT thorax;
- VI. Penetrating chest trauma.

Indications for an immediate thoracic surgical intervention are <sup>[3]</sup>:

- I. Blood loss  $\geq$ 1,500 mL initially/>200 mL/hour over 2–4 hours;
- II. Endobronchial blood loss; massive contusion with significant impairment of mechanical ventilation;
- III. Tracheobronchial tree injury (air-leakage/hemothorax);
- IV. Injury of the heart or large vessels (blood loss/pericardial tamponade).



## **AIM OF STUDY**

To know the way of management of chest trauma.

## **Patients and methods**

This cross sectional study was carried out at Al-ImamainAl-kadhimain hospital, throughout the period from January 2018 till January 2019.

Eighteen patients were enrolled in this study.

Each case was managed at Al-Imamain Al-kadhimain hospital.

Statistical study was done by using percentage.

The questionnaire provided relevant points to the patient's condition, which were all collected after management.

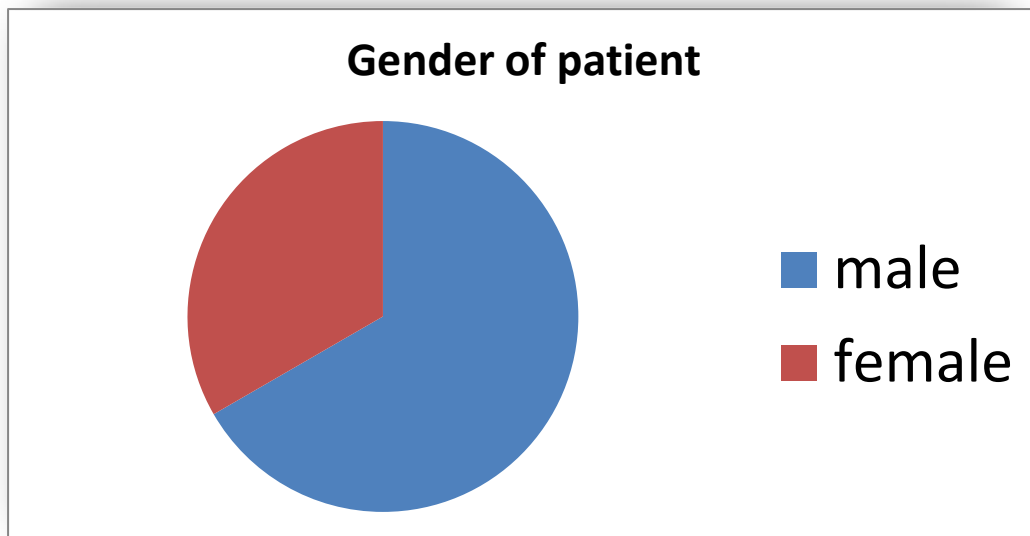
## Results

A total number of 18 patients with chest trauma were enrolled in this study.

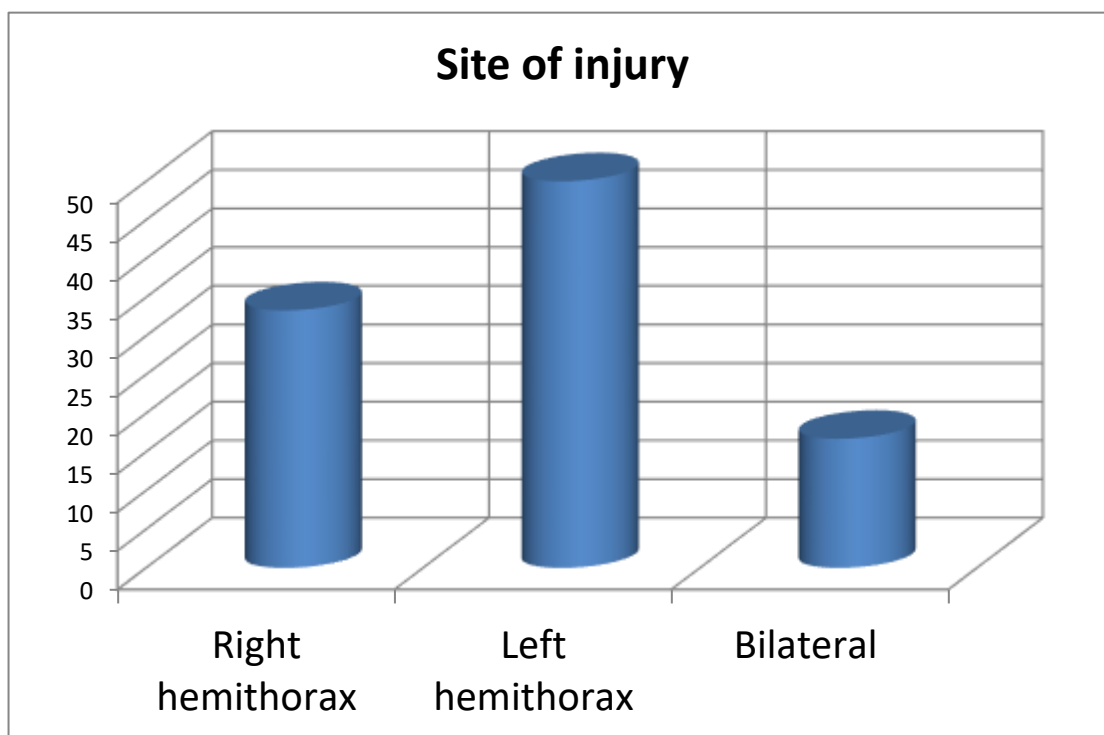
- The average age of patient was 34.5 years as shown in table (1)
- Male to female ratio was 3:1 as shown in figure (1)
- The average of hospital stay was 5 days with longest one was 11 days and least one was 2 days
- The site injury was 50 % on the left side only , 33.3 % on the right side only and 16.7 on both side as shown in figure (2)
- 72.2 % of patient treated with chest tube , 5.5 % treated with thoracotomy and 22.2 % managed conservatively as shown in figure (3)
- 50% of patients developed haemothorax , 33.3 % of patients developed pneumothorax and 16.6 % of patient developed haemothorax and Pneumothorax as shown in figure (4)

**Table (1): Age of patients.**

Case	Age (year)
A	52
B	46
C	55
D	59
E	9
F	43
G	5
H	56
I	70
K	14
J	21
L	40
M	18
N	15
O	18
P	18
q	47
R	35



**Figure (1):** Gender of patient.



**Figure (2):** Site of injury.

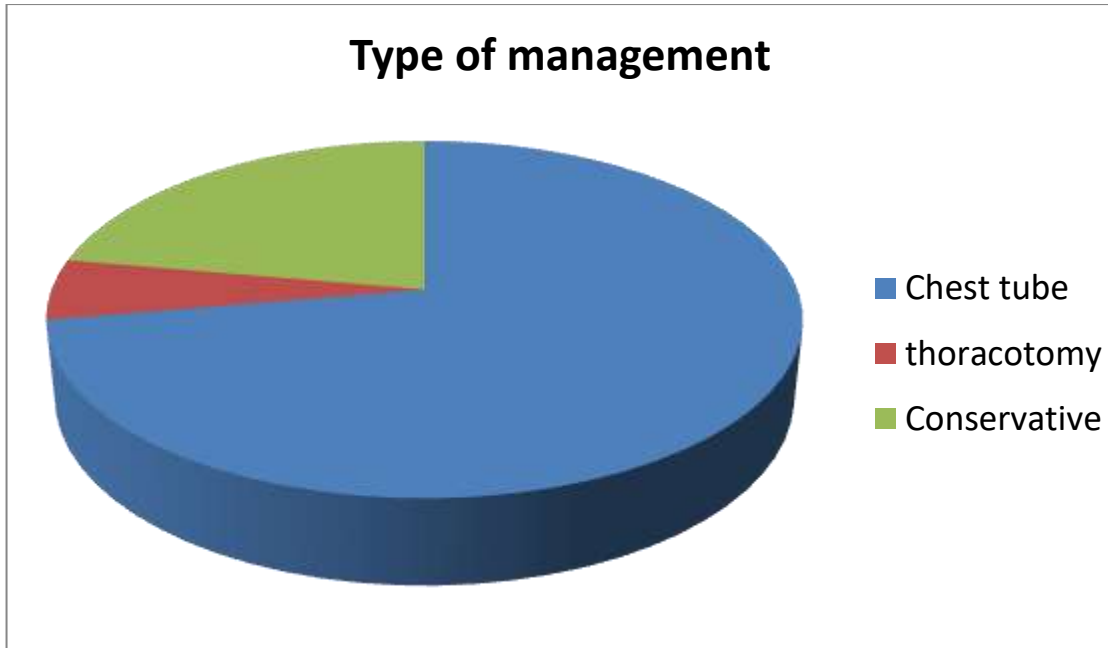


Figure (3): Type of management.

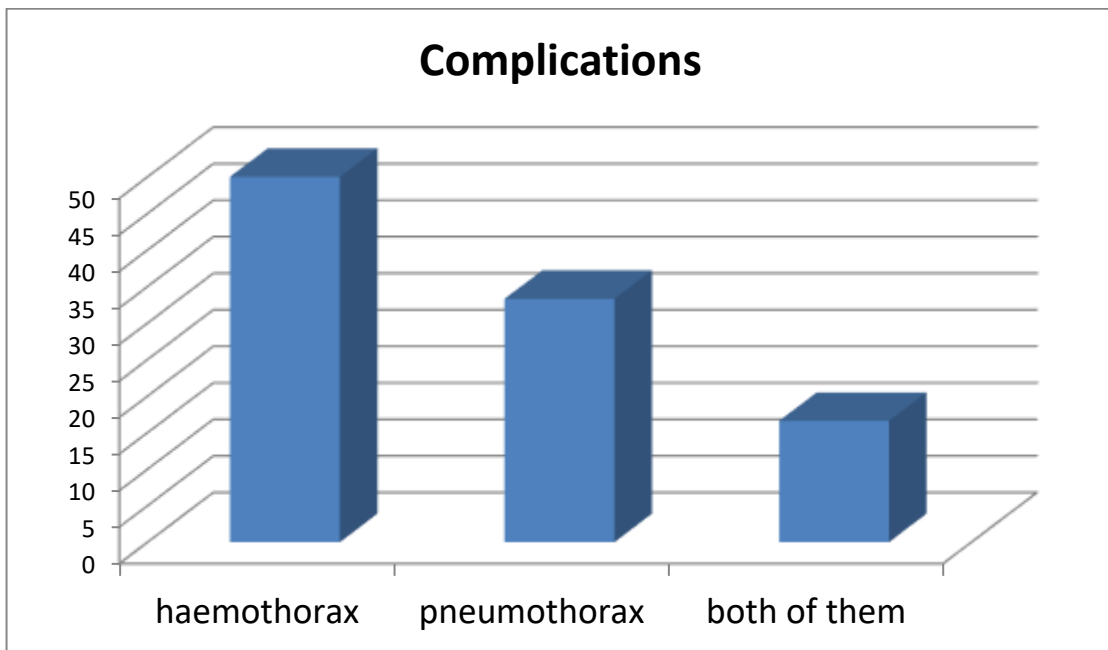


Figure (4): complications.

## DISCUSSION

- This study showed that young is more commonly affected age group which is same as other literature (Urgent and emergent thoracotomy for penetrating chest trauma) <sup>(15)</sup>.
- This study showed that males were more commonly affected by which was consistent with literature that concluded male is more susceptible for trauma (Evaluation of the patient with blunt chest trauma) <sup>(4)</sup>.
- This work showed that chest trauma in left side was more than right side which is same as other literature (Role of thoracoscopy in acute management of chest injury) <sup>(16)</sup>.
- This study proved that most cases treated by chest tube which same as other literature (Thoracic trauma) <sup>(12)</sup>.

## **CONCLUSION**

- Chest injuries account for 25% of all deaths from traumatic injury.
- Chest tube is common method of management.
- Thoracotomy has some indications.
- Haemothorax and pneumothorax is serious complications follow chest trauma.

## **Recommendations**

- Chest trauma is common condition receive in emergency.
- Every doctor must know how to deal with such condition in atlas protocol before thoracic surgeon come.
- Also we need to educate people about the safety measure in our life such as seat belt.
- We need longer duration for study about chest trauma and a more number of patients.



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