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CLINICAL OUTCOMES OF BLUNT CHEST TRAUMA AMONG IRAQI PATIENTS WITH UNDERLYING CARDIOPULMONARY DISEASE

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ABSTRACT

Background: Blunt chest trauma is the leading cause of emergency department admissions and trauma-related morbidity around the world, particularly in countries with low to middle incomes. Internal medicine specialists believe that these individuals are more likely to experience abrupt cardiac decompensation, respiratory failure, and infectious complications. **Objectives:** Is to evaluate the clinical outcomes of blunt chest trauma among Iraqi patients with underlying cardiopulmonary disease. **Methods:** The study is an observational, descriptive, cross-sectional study. It was conducted between the 10th of January 2023 to the end of November 2025 at Tuz General Hospital in Salahiddin Governorate/Iraq. The study included 50 patients with cardiopulmonary disease presented to emergency department with chest trauma. The questionnaire was composed from three parts. The first part for patients' demographic information; including patient age, gender, occupation. The second part for patients' presentation. The third part for patients' posttraumatic complication including chest infection, need for intensive care unit admission, need for mechanical ventilation and death. **Results:** The study includes 50 patients with cardiopulmonary disease, presented with chest trauma. The mean age ± standard deviation of the study participants is 48.16 ± 9.72 days. Male: Female ratio was 4.55:1. 26 (52%) patients had violence cause of chest trauma, 15 (30%) patients had blunt trauma and 9 (18%) patients had fall from height. the majority of patients had thoracic injury alone (38%) followed by thoracic associated with head injury (20%). Statistically significant difference between patients who died and those who recovered regarding their mean age (P value <0.001), ICU admission (P value < 0.001), need for mechanical ventilation (P value <0.001), thoracotomy intervention (P value <0.001), blood transfusion (P value <0.001) and need for laparotomy (P value < 0.001). Moreover, statistically significant difference between them regarding their complications (P value = 0.013), pneumonia (P value ,0.001) and wound sepsis (P value <0.001). **Conclusion:** The mortality rate in traumatic chest injury was highest in patients with advanced age, those requiring intensive care unit admission, and those requiring mechanical ventilation. In addition, patients who developed pneumonia or wound sepsis.

KEYWORDS: Cardiac, Pulmonary, Results, Thoracic, Trauma.

1. INTRODUCTION

Blunt chest trauma is the leading cause of emergency department admissions and trauma-related morbidity around the world, particularly in countries with low to middle incomes.[1] It accounts for 10-15% of all injuries and 25% of trauma-related mortality.[2]

In Iraq, traffic accidents, occupational injuries, and falls continue to be the top causes of blunt thoracic injuries, putting a significant strain on emergency and surgical services.[3] These injuries vary from minor chest wall contusions to serious disorders such pulmonary contusion, pneumothorax, hemothorax, and traumatic

cardiac damage, all of which need immediate evaluation and coordinated multidisciplinary medical care.[4-5] Chest damage can be treated with simple methods like a tube thoracostomy, but considerable percent of patients require surgical repair.[6] Urgent thoracotomy is performed within a few hours after damage and may be indicated by cardiac tamponade, excessive chest tube output, persistent air leak, or diaphragm injury.[7] Patients with pre-existing cardiac or pulmonary disorders are at a higher risk for complications after acute chest injuries.[8]

Chronic medical conditions such ischemic heart disease, heart failure, chronic obstructive pulmonary disease, and asthma are becoming more prevalent in Iraq due to population aging, smoking, environmental pollution, and a lack of preventative healthcare services. These diseases impair cardiopulmonary reserve and can considerably worsen outcomes after chest trauma, even if the original damage seems to be minor.[9]

Underlying cardiopulmonary conditions affects surgical emergency decisions such as chest tube placement, operational intervention, and intensive care unit admission.[10] Internal medicine specialists believe that these individuals are more likely to experience abrupt cardiac decompensation, respiratory failure, and infectious complications.[11-12]

Despite this crucial connection, Iraqi data on the effects of underlying cardiopulmonary disease on blunt chest trauma outcomes are limited. As a result, the aim of this study is to evaluate the clinical outcomes of blunt chest trauma among Iraqi patients with underlying cardiopulmonary disease. The findings should assist enhance early risk classification, encourage multidisciplinary medical care, and maximize the use of limited healthcare resources in Iraqi emergency settings.

2. PATIENTS AND METHODS

The study is an observational, descriptive, cross-sectional study. It was conducted between the 10th of January 2023 to the end of November 2025 at Tuz General Hospital in Salahiddin Governorate/Iraq. The study included 50 patients with cardiopulmonary disease presented to emergency department with chest trauma.

The investigators conducted direct interviews with the patients or with their responsible relative to complete self-administered questionnaires. The questionnaire was composed from three parts. The first part for patients' demographic information; including patient age, gender, occupation. The second part for patients' presentation. The third part for patients' posttraumatic complication including chest infection, need for intensive care unit admission, need for mechanical ventilation and death.

Statistical analysis: the demographic, clinical findings, and surgical outcomes were recorded and analyzed in Microsoft Excel. Data were entered into SPSS version 30.0, a statistical analysis tool for social sciences. Scale variables were reported as mean and standard deviation and compared using parametric testing. In all statistical tests and procedures, level of significance P value was set at ≤ 0.05 considered as significant difference or association.

3. RESULTS

The study includes 50 patients with cardiopulmonary disease, presented with chest trauma. The mean age ± standard deviation of the study participants is 48.16 ± 9.72 days. Male: Female ratio was 4.55:1.

Figure 1 shows distribution of the study patients according to the mechanism of injury. 26 (52%) patients had violence cause of chest trauma, 15 (30%) patients had blunt trauma and 9 (18%) patients had fall from height.

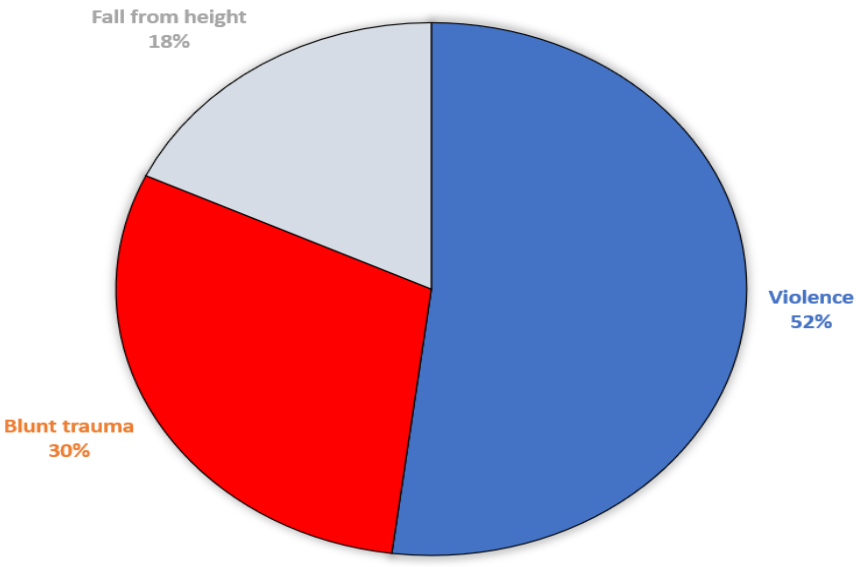

Figure 1: Distribution of patients according to their mechanism of injury.

Figure 2 shows injury characteristics of the study patients, the majority of patients had thoracic injury alone (38%) followed by thoracic associated with head injury (20%).

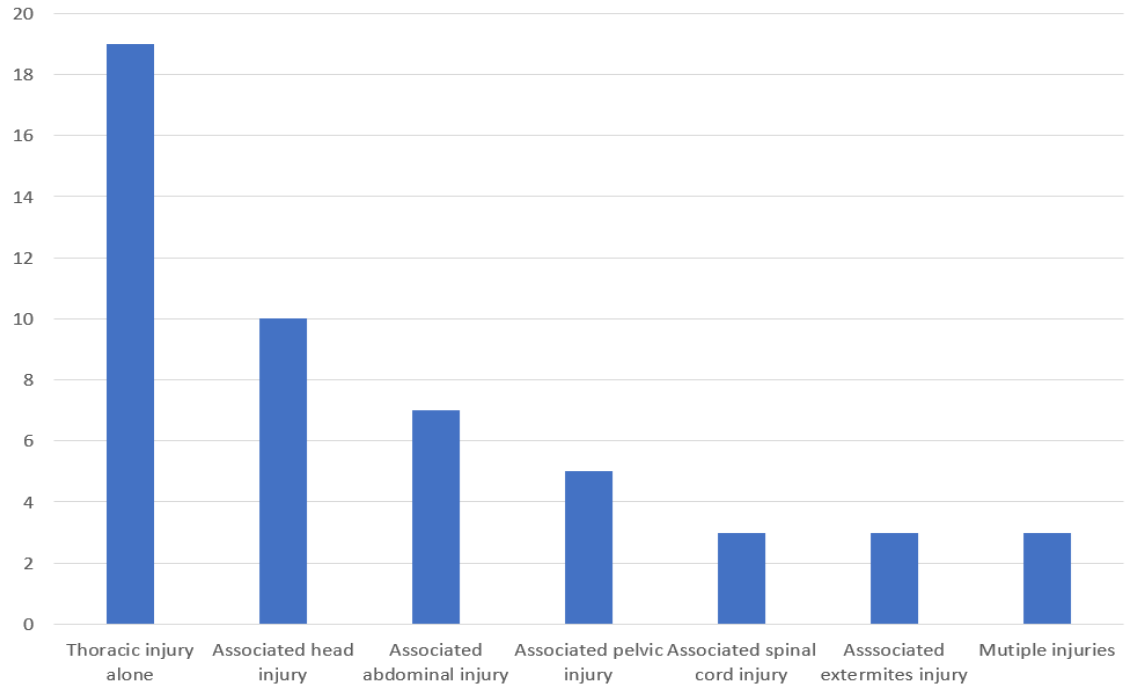

Figure 2: Distribution of patients according to their characteristics of injury.

Figure 3 shows distribution of the study patients according to their type of chest injury. The majority of patient (24%) had hemopneumothorax, followed by pneumothorax (22%) and hemothorax (16%).

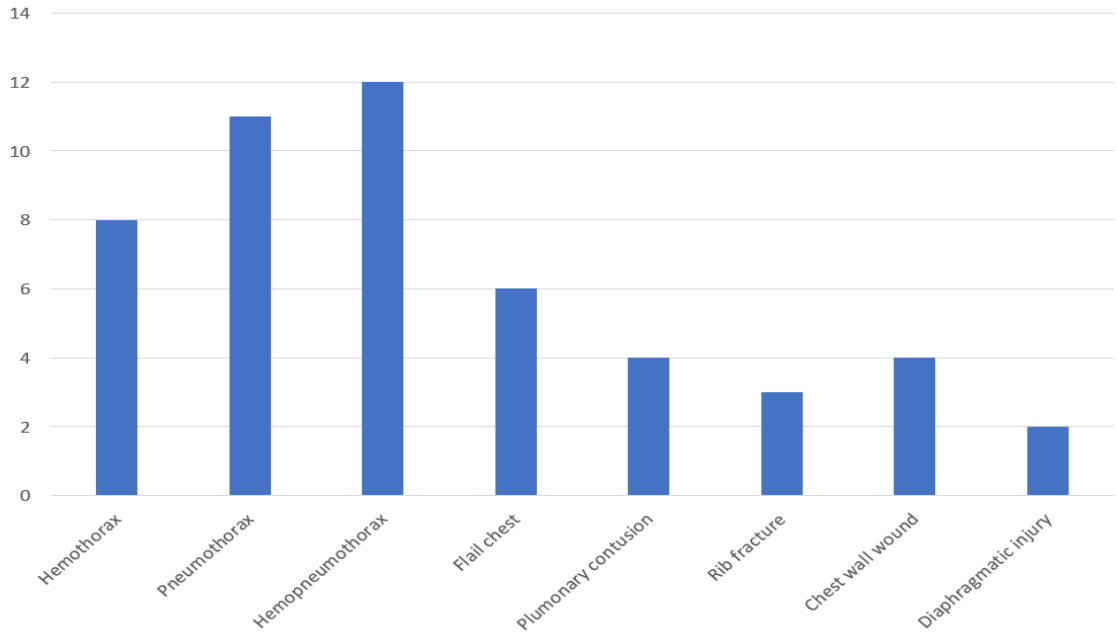

Figure 3: Distribution of patients according to their type of chest injury.

Table 3.1 shows comparison between recovered patients and those who were died after trauma regarding different interventional treatment need in hospital. Statistically significant difference between them regarding their mean age (P value <0.001), ICU admission (P value < 0.001), need for mechanical ventilation (P value <0.001), thoracotomy intervention (P value <0.001), blood transfusion (P value <0.001) and need for laparotomy (P value < 0.001).

Table 3.1: Comparison between recovered patients and those who were died after trauma regarding different interventional treatment need in hospital (number=50).

Variable	Recovered = 40 (%)	Death = 10 (%)	P value
Patient age, mean ± standard deviation	42.22 ± 9.29	61.89 ± 9.87	**<0.001**
ICU admission: -Yes -No	 30 (75%) 10 (25%)	 10 (100%) 0 (0%)	**0.013**
Need for mechanical ventilation: -Yes -No	 15 (37.5%) 25 (62.5%)	 9 (90%) 1 (10%)	**<0.001**
Non operative Intervention: -Yes -No	 12 (30%) 28 (70%)	 4 (40%) 6 (60%)	0.128
Need for chest tube: -Yes -No	 18 (45%) 22 (55%)	 5 (50%) 5 (50%)	0.422
Thoracotomy intervention: -Yes -No	 9 (22.5%) 31 (77.5%)	 7 (70%) 3 (30%)	**<0.001**
Blood transfusion: -Yes -No	 11 (27.5%) 29 (72.5%)	 8 (80%) 2 (20%)	**<0.001**
Need for laparotomy: -Yes -No	 10 (25%) 30 (755%)	 6 (60%) 4 (40%)	**<0.001**

Table 3.2 shows comparison between recovered patients and those who were died after trauma regarding different complication developed in hospital. Statistically significant difference between them regarding their complications (P value = 0.013), pneumonia (P value, 0.001) and wound sepsis (P value <0.001).

Table 3.2: Comparison between recovered patients and those who were died after trauma regarding different complication developed in hospital (number=50).

Variable	Recovered = 40 (%)	Death = 10 (%)	P value
Presence of complication: -Yes -No	 16 (40%) 24 (60%)	 10 (100%) 0 (0%)	**0.013**
Pneumonia: -Yes -No	 12 (30%) 28 (70%)	 7 (70%) 3 (30%)	**<0.001**
Atelectasis: -Yes -No	 5 (12.5%) 35 (87.5%)	 2 (20%) 8 (80%)	0.369
Wound sepsis: -Yes -No	 3 (7.5%) 37 (92.5%)	 8 (80%) 2 (20%)	**<0.001**

4. DISCUSSION

The study found the mortality rate of chest trauma among patients with cardiopulmonary disease was 20% which higher than what was found by a study conducted in United Arab Emirates (7.2%)[13] and slightly smaller than what was found by a study conducted in Ethiopia.[1] which depend on the severity of injury, received treatment and patients' general condition before injury. On the other hand, the study found violence the most common cause of chest trauma and the majority of patients presented with hemopneumothorax, hemothorax or pneumothorax, which runs with a retrospective study done in Syria.[14] Anyhow, other studies showed rib fracture was the commonest types of chest injury.[15-16] The disparity might be related with the difference in cause of injury. Furthermore, isolated chest trauma was the most common presentation of the study participants which similar to Al-Koudmani et al study findings,[14] indicating high assaults rate in the study area.

Patient's age was significant factor linked to death according to the study result, as the mean age of dead patients was significantly higher than those who recovered. In essence, while chest trauma affects all ages, older individuals face a disproportionately higher risk of death due to reduced physiological reserve and

higher rates of associated medical conditions, making them more vulnerable to severe outcomes. Kapicibasi et al[17] and Martínez et al[18] studies' findings. In the same way, the study found patients who died were significant admitted to intensive care and received mechanical ventilation that patients recovered from chest trauma, which agrees Refaely et al study results.[19] Additionally, the study illustrated died patients were significantly received blood than those who were recovered, which consistent with Yimam et al study results.[1] Furthermore, the study showed died patients significantly higher rate of laparotomy in comparison to recovered patients. This higher rate is associated with a range of severe clinical factors rather than the procedure itself being the sole cause of death. Baseer et al showed similar results.[20]

The study found the presence of pneumonia was significantly related to death among chest trauma patients. Similarly, a meta-analysis showed significant linked between patients' mortality and pneumonia.[21] As well as, the found wound sepsis significantly associated with patients' mortality, wound sepsis can obviously lead to multi organ failure which compound the risk of death. Tong et al showed comparable results.[22]

The current study's limitations should be noted when interpreting the findings. First, because to the small sample size, the results may not be as easily generalized to other groups. Second, the study was conducted in a single hospital setting, which may have limited the external validity of the findings.

5. CONCLUSIONS AND RECOMMENDATIONS

The mortality rate in traumatic chest injury was highest in patients with advanced age, those requiring intensive care unit admission, and those requiring mechanical ventilation. In addition, patients who developed pneumonia or wound sepsis.

To effectively treat patients with severe chest injuries, we advocate developing standard care strategies and improving trauma team abilities. The study highlights the necessity for raising awareness within society about health-seeking behavior and dispute resolution initiatives. It is proposed that coordinated prehospital services be established, as well as the provision of a sustainable ambulance service with qualified workers.

Conflict of Interest

The authors of this study report no conflicts of interest.

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