



FREQUENCY OF CLOTTED HEMOTHORAX IN PENETRATING CHEST TRAUMA

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Abstract:

Objectives: To determine the frequency of clotted hemothorax in penetrating chest trauma.

Materials and Methods: This descriptive study was conducted at Department of Cardiothoracic Surgery, Lady Reading Hospital/ MTI. After ethical approval and informed consent, 114 chest trauma patients were examined clinically and radiologically, and data were collected prospectively to record demographics, injury details, and presence of clotted hemothorax, which was confirmed either intraoperatively or on imaging. Data were then analyzed to determine its frequency.

Results: The mean age of patients was 35.82 ± 12.48 years, with an mean time since injury was 7.85 ± 3.54 hours. Most were males (65.8%), and stab wounds were the most common cause (47.4%). Clotted hemothorax occurred in 27.2% of cases. No significant association was found between clotted hemothorax and age group, gender, mechanism of injury, or side of chest involvement ($p > 0.05$).

Conclusion: It was concluded that Clotted hemothorax was found to be a frequent complication in penetrating chest trauma, affecting over one-quarter of patients. Since no strong links with demographic or injury factors were observed, careful evaluation is needed in all cases. Early imaging and timely surgical input can help reduce related complications.

Key words: Clotted hemothorax, chest trauma, stab wounds.



INTRODUCTION: Penetrating thoracic injuries are a significant cause of morbidity and mortality worldwide.(1) They often result from stab or gunshot wounds and can lead to serious intrathoracic complications.(2) One of the most common consequences is hemothorax, the accumulation of blood in the pleural cavity.(3) In some cases, a clotted hemothorax can develop, in which the blood cannot drain freely and localized blood collections form.(4) This condition makes effective drainage via chest tubes difficult and can lead to persistent respiratory distress, infection, pleural empyema, or fibrothorax, often requiring surgical intervention.

The incidence of clotted hemothorax varies depending on the type of trauma, the time of clinical presentation, and the diagnostic and therapeutic measures employed.(5) Early detection and treatment are crucial to prevent complications and improve functional outcomes. Despite its clinical significance, only limited data are available in our region, particularly regarding penetrating chest injuries. Chest trauma represents about 25% of all traumatic injuries,(6) and the associated mortality has been reported to be approximately 20–25%. Thoracic injuries occur in approximately 60% (7) of all polytrauma cases and are responsible for 15–30%.(4) Factors contributing to clotted hemothorax in penetrating chest trauma include the severity and depth of the injury, involvement of major blood vessels, delayed medical intervention, incomplete drainage, underlying coagulopathy, infection, patient age and comorbidities, and the body's natural clotting response to trauma, all of which can lead to blood accumulation and clot formation in the pleural space.(5)

Therefore, the aim of this study is to determine the prevalence of clumped hemothorax in patients with penetrating chest trauma and thus contribute to improved clinical assessment and treatment of this patient group.

Objective: To determine the frequency of clotted hemothorax in penetrating chest trauma.

MATERIALS AND METHODS:

Study Design: Descriptive study.

Study setting: Department of Cardiothoracic Surgery, Lady Reading Hospital/ MTI.

Duration of the study: Duration of the study was 3 months (from July 2025 to Oct 2025).

Sampling Technique: Non-probability Consecutive sampling technique was used for the recruitment of patients.

Sample size: The sample size of 114 patients was calculated by using the WHO sample size calculator, based on 17.6% (8) Anticipated proportion of clotted hemothorax in penetrating chest trauma, a 95% confidence level and a 7.0% absolute precision.

Inclusion Criteria:

- Patients with Chest Trauma.
- Both gender
- Patients of 16-60 years of age.

Exclusion Criteria:

- Patients required emergency thoracotomy due to hemodynamic instability or any cause other than retained hemothorax.
- Patients with pre-existing pulmonary pathology.

Methods: After obtaining approval from the Ethical Committee of Lady Reading Hospital/MTI, Peshawar, patients who were diagnosed and met the inclusion criteria were enrolled in the study after obtaining written informed consent from them or their guardians. A detailed history and complete



physical examination of all patients were conducted. Chest X-ray or CT scan was performed for each patient. A total of 114 chest trauma patients were included in the study. Data were collected prospectively using a structured proforma, which included demographic information, mechanism and site of injury, and confirmation of clotted hemothorax. The presence of clotted hemothorax was determined either intraoperatively or through radiological findings suggestive of loculated or non-drainable blood collections. The collected data were analyzed to determine the frequency of clotted hemothorax among the total patients presenting with penetrating chest trauma.

RESULTS: The mean age of the patients was 35.82±12.48 years, and the mean time since injury was 7.85±3.54 hours. Most patients were between 18–30 years (33.3%) and 31–40 years (32.5%), followed by 41–50 years (17.5%) and those older than 60 years (16.7%). The majority of the participants were male (65.8%), while females comprised 34.2%. Stab wounds were the most common mechanism of injury (47.4%), followed by gunshot wounds (29.8%) and other causes (22.8%). The right side of the chest was involved in 59.6% of cases, the left side in 27.2%, and bilateral involvement was observed in 13.2% of patients. Clotted hemothorax was present in 27.2% of the cases, whereas 72.8% had no clotted hemothorax (Table 1). Among patients with clotted hemothorax, 41.9% were aged 18–30 years, 19.4% were 31–40 years, another 19.4% were 41–50 years, and 19.4% were above 50 years, while in patients without clotted hemothorax, 30.1% were 18–30 years, 37.3% were 31–40 years, 16.9% were 41–50 years, and 15.7% were above 50 years ($p=0.32$). Males constituted 67.7% of cases with clotted hemothorax compared to 65.1% among those without it, while females accounted for 32.3% and 34.9% respectively ($p=0.78$). Stab wounds were observed more frequently among patients with clotted hemothorax (58.1%) than those without (43.4%), followed by gunshot wounds at 19.4% vs. 33.7%, and other mechanisms at 22.6% vs. 22.9% ($p=0.27$). The right side of the chest was involved in 67.7% of clotted hemothorax cases compared to 56.6% of non-clotted cases, while left-sided injuries accounted for 22.6% vs. 28.9% and bilateral injuries for 9.7% vs. 14.5% ($p=0.55$) (Table 2).

Table 1: Descriptive characteristics of the participants ($n=114$)

Variables	
Age (Years)	35.82±12.48
Time since injury (Hours)	7.85±3.54
Age Groups	
18-30 years	38(33.3%)
31-40 years	37(32.5%)
41-50 years	20(17.5%)
>60 years	19(16.7%)
Gender	
Male	75(65.8%)
Female	39(34.2%)
Mechanism of injury	
Stab wound	54(47.4%)
Gunshot wound	34(29.8%)
Other	26(22.8%)
Side of Chest Involved	
Right	68(59.6%)
Left	31(27.2%)
Bilateral	15(13.2%)



Clotted hemothorax	
Yes	31(27.2%)
No	63(72.8%)

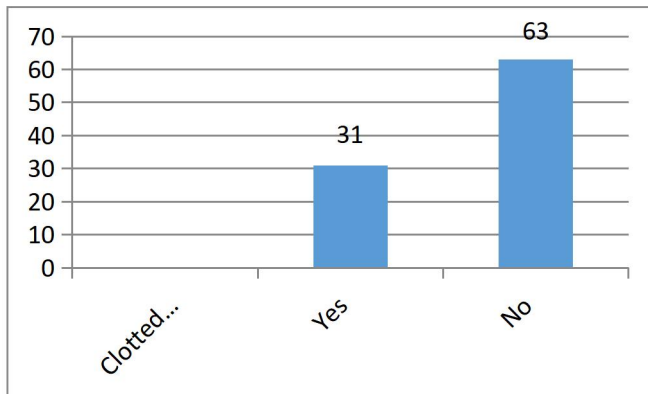


Fig 1: Frequency of participant on the basis of Clotted hemothorax

Table 2: Stratification of Clotted hemothorax on the basis of demographic characteristics ($n=114$)

Variables	Clotted hemothorax		p-Value
	Yes	No	
Age Groups			
18-30 years	13(41.9%)	25(30.1%)	0.32
31-40 years	6(19.4%)	31(37.3%)	
41-50 years	6(19.4%)	14(16.9%)	
>50 years	6(19.4%)	13(15.7%)	
Gender			
Male	21(67.7%)	54(65.1%)	0.78
Female	10(32.3%)	29(34.9%)	
Mechanism of injury			
Stab wound	18(58.1%)	36(43.4%)	0.27
Gunshot wound	6(19.4%)	28(33.7%)	
Other	7(22.6%)	19(22.9%)	
Side of Chest Involved			
Right	21(67.7%)	47(56.6%)	0.55
Left	7(22.6%)	24(28.9%)	
Bilateral	3(9.7%)	12(14.5%)	

Discussion: This study assessed the frequency of clotted hemothorax among patients presenting with penetrating chest trauma. Chest trauma accounts for 25% of all trauma cases. (6) The findings



demonstrated that 27.2% of the patients developed clotted hemothorax, indicating that it is a relatively common complication following penetrating injuries to the chest. This frequency is comparable to previously reported rates, which range from 20% to 30% in various studies evaluating retained or clotted hemothorax in trauma patients.(8, 9) The substantial proportion observed in this study underscores the importance of early recognition, timely intervention, and appropriate management to prevent further morbidity.

The majority of patients in the present study were young adults, particularly those between 18 and 40 years of age, which aligns with literature indicating that chest trauma predominantly affects the economically active and socially mobile segments of the population.(10) The demographic predominance of males (65.8%) is also consistent with global patterns, as males are more frequently involved in violent encounters, occupational hazards, and high-risk activities that predispose them to penetrating injuries.(11)

Stab wounds were identified as the most common mechanism of injury (47.4%), followed by gunshot wounds. This distribution reflects the pattern of interpersonal violence prevalent in the region and is in accordance with other local and international studies showing that stab injuries are major contributors to penetrating chest trauma.(12, 13) Interestingly, patients with clotted hemothorax had a higher proportion of stab injuries (58.1%) compared to those without, although this difference was not statistically significant. The tendency of stab wounds to create narrow tracts with potential for localized blood accumulation may contribute to the increased likelihood of clot formation.

The right side of the chest was more frequently involved (59.6%), and clotted hemothorax occurred more often on the right side as well (67.7%).

No statistically significant associations were identified between age, gender, mechanism of injury, or side of injury and the presence of clotted hemothorax. This indicates that clotted hemothorax may occur across a broad spectrum of patients regardless of demographic or injury-related factors. This finding emphasizes that clinicians should maintain a high index of suspicion for clotted hemothorax in all cases of penetrating chest trauma, particularly when initial drainage is inadequate or when imaging suggests loculated collections.

The overall frequency of clotted hemothorax in this study highlights the ongoing clinical challenge associated with the diagnosis and management of this condition. If left unrecognized, a clotted hemothorax can lead to complications such as infection, fibrothorax, lung entrapment, prolonged hospital stay, and the need for surgical intervention. Early imaging—especially CT scanning—and timely surgical evacuation can significantly improve patient outcomes.

Conclusion: It was concluded that clotted hemothorax is a common complication in penetrating chest trauma, occurring in more than one-quarter of affected patients. The absence of strong associations with demographic or injury-related factors highlights the need for routine and vigilant assessment in all cases. Improved imaging protocols and early surgical consultation may aid in reducing morbidity associated with this condition.

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