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A Case of Severe Penetrating Thoracic Trauma and the Rationale for Multidisciplinary Intervention: A Case Report

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Abstract

A 32-year-old male who presented to the emergency department with a life-threatening penetrating chest injury. The patient was in profound hypovolemic shock and respiratory distress due to a sharp foreign body lodged in his posterior chest wall, which had caused a bilateral hemopneumothorax. His initial vitals, including a blood pressure of 80/50 mmHg and a heart rate of 132 bpm, necessitated the immediate application of Advanced Trauma Life Support (ATLS) protocols. Urgent bedside x-rays confirmed the presence of the foreign body and a hemopneumothorax, prompting the rapid placement of bilateral intercostal drainage tubes for pleural decompression.

Surgical intervention was deemed necessary due to the patient's ongoing instability and the nature of the impacted foreign body. A posterolateral thoracotomy was performed to access the injury site. A critical and unique step in the procedure involved the removal of the left T3 transverse process to safely extract the foreign body without causing further damage to the spinal structures. This manoeuvre underscores the complexity of managing deeply impacted objects and the need for adaptable surgical techniques. The patient's postoperative period was uneventful, and he was discharged on postoperative day 18. This case highlights the critical importance of a rapid, multidisciplinary approach and precise surgical intervention in achieving a successful outcome in severe penetrating thoracic trauma.

Keywords: sharp foreign body, haemothorax, radiology, intercostal drainage tube, posterolateral thoracotomy.

Introduction

Injury to the chest wall can cause several lifethreatening conditions and emergency surgical intervention is usually required. A large foreign body can easily be located, however if the foreign body gets impacted between the soft tissues, there may only be skin and soft tissue damage in the outside but serious vascular, nervous or musculoskeletal complications[1,10]. A multidisciplinary approach of radiologists, anaesthesiologists and surgeons are needed for the localization, planning and surgery of the patients, and to prevent the complications.

Case History

A 32-year-old male carpenter presented to the Emergency Department with a stab injury to the back, presenting with signs of hypovolemic shock and

respiratory distress. The patient was hypotensive (BP 80/50 mmHg), tachycardic (HR 132 bpm), and tachypnoeic (RR 38/min). He was severely hypoxic with SpO2 of 82% on room air, which only improved to 88% with a Venturi mask at 5 L/hr. A clinical examination revealed a foreign body penetrating the thorax through a wound located just to the left of the vertebral column.

Following initial resuscitation, which included the administration of volume expanders (normal saline, hydroxyethyl starch, and blood products), the patient's vital signs were continuously monitored. Bedside chest radiographs were performed, revealing an opaque foreign body within the left hemithorax and a bilateral hemopneumothorax (FIGURE 1 & 2). Laboratory investigations showed a haemoglobin level of 9 gm/dl after the transfusion of two units of packed red blood cells, with other laboratory values being within normal limits.

Urgent bilateral chest tubes were inserted to address the hemopneumothorax. The chest tube outputs were 300 mL from the right side and 1500 mL from the left side in one hour. Than an urgent posterolateral thoracotomy was performed with the patient in the right lateral decubitus position. A sharp foreign body was successfully removed after a left transverse process of the T3 vertebra was excised. There was oozing of blood from small vessels which was stopped after suturing and cauterization. Postoperatively, the patient's condition stabilized, with a blood pressure of 108/70 mmHg, a pulse rate of 102 bpm, and an SpO2 of 96% on nasal prong oxygen. Bilateral breath sounds were present, and the chest tube outputs were 300 mL from the right side and 500 mL from the left side.

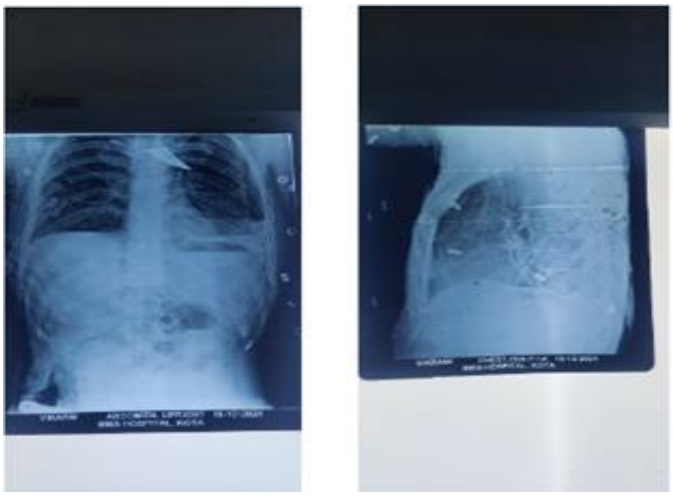

Figure 1 & 2: Chest radiograph 1. frontal and 2. lateral view showing white opacity in left anterior chest wall.

Figure 3: Foreign body extracted from thoracic cavity

Discussion

The diagnostic process, initiated with a bedside chest x-ray, provided critical information for initial triage and intervention (4). The patient's survival underscores the importance of a coordinated, multidisciplinary trauma team, where the seamless collaboration between emergency medicine, radiology, anaesthesiology, and surgery ensure that all aspects of the patient's critical condition are addressed without delay. The unique aspect of this case, the specific surgical manoeuvre involving the removal of the T3 transverse process, demonstrates that even in a high- stake, emergent scenario, a surgeon's ability to adapt and apply specialized techniques can be a life-saving differentiator. The patient underwent a foreign body removal procedure and had their intercostal drainage tubes removed on postoperative days 6 (right) and 8 (left). The patient was discharged on postoperative

day 18, following an uneventful recovery. A repeat chest x-ray showed complete resolution of the previously noted opacities. At a follow-up appointment on postoperative day 25, the patient remained asymptomatic

Figure 4: Postoperative chest radiograph showing absence of any opacity suggesting successful removal.

It reinforces the principle that protocols are essential for providing a framework for care, but a surgeon's judgment and adaptability remain paramount. The prolonged hospitalization, despite the "uneventful" postoperative period, highlights the extensive care required for recovery from polytrauma and the need to consider potential long-term complications such as chronic pain and psychological trauma, which are integral to a holistic approach to patient care. This report therefore serves as a valuable educational tool, illuminating the critical synergy between clinical acumen, established protocols, and interdisciplinary collaboration in achieving optimal patient outcomes in the face of profound traumatic injury.

Conclusion

The successful outcome was the product of a series of rapid, coordinated, and expert decisions based on established trauma protocols and a flexible, highly skilled surgical approach. The patient's initial presentation in frank hypovolemic shock and respiratory distress mandated the immediate application of Advanced Trauma Life Support principles, with concurrent resuscitation and pleural decompression.

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