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**Case Report**

# The Rod that Missed the Heart: A Case of Bilateral Chest Wall Penetration in a Young Trauma Survivor

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## ABSTRACT

Penetrating thoracic injuries from impalement are rare but potentially catastrophic due to the concentration of vital structures within the chest cavity. We report the case of a 24 year old male who sustained a trans thoracic impalement from a metallic rod following a road traffic accident. The entry wound was located 6 cm below the right nipple on the anterolateral chest wall, with an exit point just lateral to the left nipple. Despite the dramatic mechanism of injury, the patient arrived hemodynamically stable with a GCS of 15. Prompt trauma team activation, targeted imaging and emergency thoracotomy enabled successful removal of the rod, with no injury to cardiac or major vascular structures. Post-operative intensive care involved mechanical ventilation, targeted analgesia and gradual mobilization. The patient was discharged in stable condition. This case underscores the critical role of rapid, coordinated trauma care and highlights the possibility of positive outcomes even in seemingly critical injuries.

## KEYWORDS

• Trans thoracic impalement • Penetrating Chest Trauma • Emergency Thoracotomy • Multidisciplinary Trauma Care

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## INTRODUCTION

Impalement injuries are a rare and dramatic subset of penetrating trauma, most often caused by high-energy mechanisms such as vehicular collisions or falls from height. Thoracic impalements are particularly lethal, given the compact arrangement of vital organs including the heart, lungs and great vessels. Survival is often contingent on the absence of direct injury to these structures and the speed and precision of medical and surgical intervention.[1,2]

While reports of such injuries are uncommon in literature, each case provides valuable insight into trauma system readiness, surgical technique and postoperative management. Here, we describe the extraordinary case of a young adult male with a trans-thoracic impalement who survived without major organ injury, highlighting the importance of a structured, multidisciplinary approach in trauma care.

## CASE

**Patient Profile and Presentation:**

A 24-year old previously healthy male was brought to the emergency department (ED) following a high-speed road traffic accident. He had been impaled by a metallic construction rod, which entered the right anterolateral chest wall approximately 6 cm below the nipple and exited on the left anterolateral side, roughly 1 cm lateral to the nipple. The rod remained in situ upon arrival. The patient was alert, oriented and breathing spontaneously. He complained of localized chest pain but denied shortness of breath or abdominal pain. Abrasions were also noted on both upper limbs.

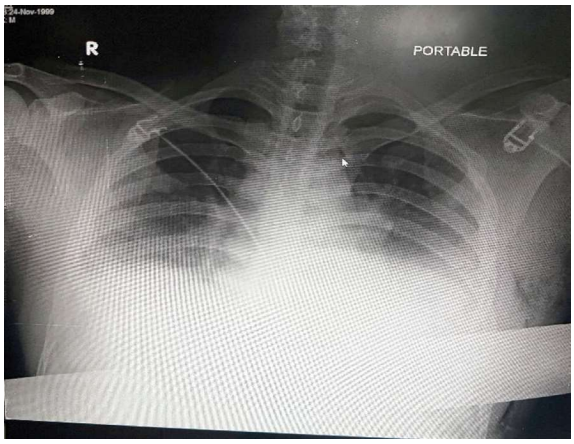

**Primary Survey and ED Management:**

- **Airway:** Patent
- **Breathing:** Bilateral air entry present, no crepitus or tracheal deviation
- **Circulation:** BP 80/50 mmHg, HR 140 bpm, $SpO_2$ 90% on room air
- **Disability:** GCS 15/15
- **Exposure:** Multiple abrasions on both hands, impaled metallic rod visible

Initial management included oxygen supplementation, IV access, broad-spectrum antibiotics, IV colloids, tetanus toxoid and cross-matching of blood. ECG revealed sinus tachycardia with occasional ventricular premature complexes. ABG analysis was within normal limits.

**Focused Imaging**:

- **FAST:** Mild bilateral pleural effusion, no intra-abdominal fluid
- **Chest X-ray and Ultrasound:** Confirmed rod trajectory, no pneumothorax
- **Bedside echocardiography:** Cardiac views were obscured due to metallic artifact



**Surgical Intervention:**

Given the potential for occult cardiac or vascular injury and artifact-obscured imaging, the patient was taken emergently for exploratory thoracotomy.

**Surgical Findings:**

- The rod had traversed the thoracic cavity, narrowly avoiding the heart and major vessels.
- Mild contusion of the right lung with no lacerations
- No injury to the diaphragm, pericardium or abdominal contents

**Procedures Performed:**

- Controlled rod extraction (Emergency Exploratory Thoracotomy)
- Hemostasis achieved
- Bilateral chest tube insertion
- Chest wall reconstruction with closure of muscular planes

## DISCUSSION

Trans-thoracic impalement injuries are exceedingly rare and often fatal due to the density of critical structures in the thoracic cavity. In this case, the rod's trajectory miraculously avoided the heart, great vessels, and diaphragm. While the imaging was limited due to metallic interference, intraoperative TEE played a pivotal role in excluding occult cardiac injury. The role of early trauma team activation and preemptive surgical planning was critical. Airway control, hemodynamic support and multidisciplinary communication ensured rapid and safe surgical intervention. Postoperative outcomes were significantly improved by proactive physiotherapy, effective pain control and early mobilization.[3,4] Such cases demand not only surgical expertise but also the seamless coordination of emergency physicians, anesthesiologists, intensivists and nursing teams.

## CONCLUSION

This case illustrates the extraordinary resilience of the human body and the lifesaving potential of a coordinated trauma response. The successful outcome in a young man with a trans-thoracic impalement injury demonstrates that even high-risk trauma can result in full recovery when managed with urgency, expertise and multidisciplinary precision. Awareness and preparedness for such rare events remain integral to modern trauma care.

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