Penetrating chest trauma with glass: Beware of occult cardiac injuries! A case report

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Abstract

Penetrating chest trauma involving the heart is a life-threatening emergency requiring rapid diagnosis and immediate surgical intervention. While knives or firearms most commonly cause cardiac injuries, atypical foreign bodies such as glass fragments pose similar critical risks but remain rare. This case report describes a 31-year-old male who was assaulted with a broken beer bottle, resulting in a 3 cm penetrating wound in the left anterior axillary line. Initial findings included a left hemopneumothorax and a 4 cm glass fragment lodged near the right ventricle, without pericardial effusion in E-FAT and CT scan. The patient remained hemodynamically stable, and the surgery was urgently performed. A thoracotomy was performed with the extraction of the glass fragment and repair of a non-transfixing right ventricular myocardial wound. Postoperative recovery was favorable. This case highlights the importance of cautious evaluation in penetrating chest trauma, even in the absence of pericardial effusion, and the critical role of prompt surgical management to ensure survival.

Key words: Penetrating chest trauma, Cardiac injury, Emergency, Early management

Introduction

Penetrating chest trauma is a life-threatening emergency, particularly when it involves the heart. The major reported causes of cardiac wounds are knives or firearms, and the survival of these injuries depends mainly on rapid diagnosis and the availability of immediate surgery (1).

We report the case of a myocardial wound caused by a glass fragment following an assault. Injuries caused by atypical foreign bodies, such as glass fragments, remain rare but pose the same hemodynamic and prognostic risks.

Case presentation

A 31-year-old man was admitted to the emergency room after being attacked with a broken beer bottle. The initial clinical assessment documented clear upper airways, polypnea (22 cycles/min), and normal oximetry (98% with 8 liters of oxygen via mask).

Pulmonary auscultation revealed left basilar dullness, without subcutaneous emphysema. There was a 3 cm penetrating wound in the left anterior axillary line. The blood pressure was 100/60 mmHg, and the heart rate was 88 bpm and regular. Glasgow Coma Scale score was 15/15. The general examination revealed no other associated injuries. The interview did not reveal any medical history.

Within the first management, E-FAST revealed a left pleural effusion. There was no associated pericardial or peritoneal effusion. A chest and abdominal CT scan with contrast injection was performed urgently. It confirmed a left hemopneumothorax and identified a 4 cm glass fragment incarcerated in the angula, in contact with the right ventricle (Figures 1 and Video 1).

The patient was immediately transferred to the operating room. A left posterolateral thoracotomy was performed. The glass fragment was carefully extracted with resection of the lingula. Intraoperative exploration revealed a non-transfixing myocardial wound of the right ventricle, which was sutured with two patched U-shaped stitches. The postoperative outcome was favorable.

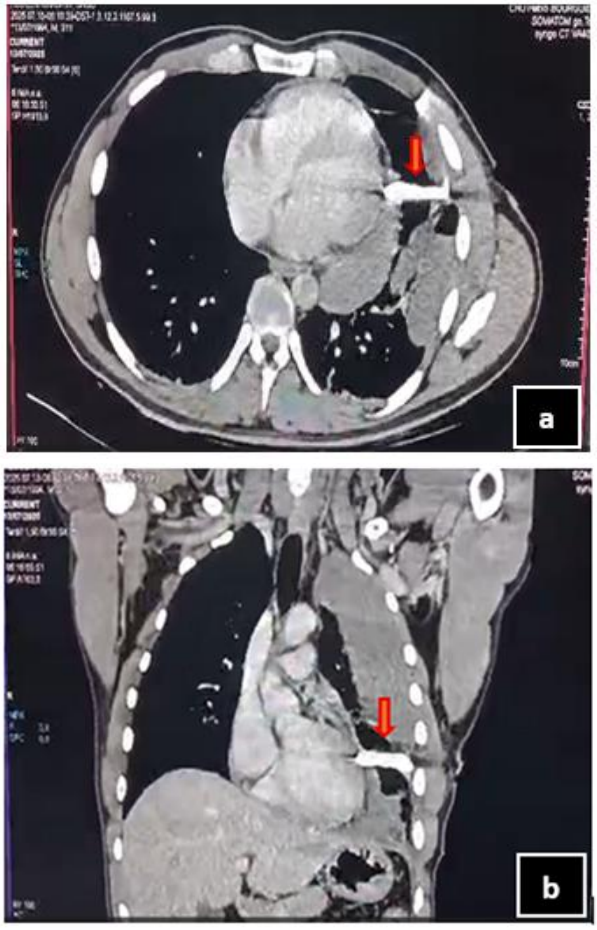


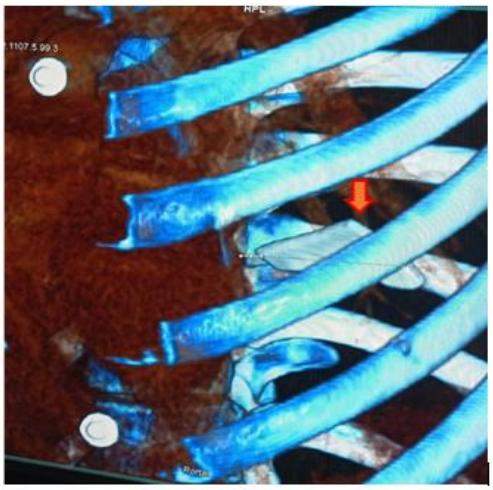
Figure 1: Transverse (a) and coronal (b) CT scans showing a 4 cm glass fragment lodged in the angula, in close contact with the right ventricle.

Discussion

Penetrating chest wounds are a life-threatening emergency due to the risk of cardiac or vascular injury. Their physiopathology is based on the direct effect of the weapon or sharp object, which can cause massive hemorrhage, tamponade, or compressive pneumothorax (1, 2).

Penetrating chest trauma accounts for a significant proportion of penetrating wounds, although its frequency varies according to geographical and socioeconomic contexts. In

the United Kingdom, a study has shown that this type of trauma accounts for 12% of all penetrating trauma cases treated in emergency departments (3).



Video 1: 3D reconstruction of the embedded glass fragment

Scan QR Code

Initial management is based on the application of Advanced Trauma Life Support principles, including securing the airway, oxygenation, hemodynamic control, and rapid additional examinations (FAST, CT scan) (4, 5). In this context, the absence of pericardial effusion on E-FAST and CT scan, particularly in stable patients, should be interpreted with great caution. Hence, the importance of close monitoring and repeating the E-FAST to look for effusion that may develop later.

Thoracotomy remains the standard surgical technique for cardiac wounds. The surgical method depends on the location of the injury and the patient's condition (anterolateral thoracotomy in extreme emergencies, and posterolateral thoracotomy in patients with stable parameters) (6).

The outcomes are mainly correlated with initial hemodynamic stability, delay to diagnosis, and the availability of an experienced surgical team (7, 8, 9). In our observation, the absence of tamponade and rapid access to the operating room allowed for a favorable outcome.

In summary, this case highlights the importance of cautious evaluation in penetrating chest trauma, even in the absence of pericardial effusion, and the significant role of early, prompt surgical management to ensure survival.

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