

## Case Report

# Report a Case of Two Spiral Rebars Impalement Injury Throughout Left Hemithorax and Neck

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## Keywords

• Rebar; Chest Injury; Hemithorax; Pericardium

## Abstract

Thoracic trauma can cause significant mortality and morbidity. Traumatic thoracic injuries are accompanied by abdominal, head and extremity injuries. Thoracic trauma is divided into two groups; penetrating and blunt. Penetrating traumas are primarily caused by gunshots and sharp objects. The lungs are the most commonly injured organ in penetrating thoracic trauma. Impalement of chest is an uncommon injury and one of the most severe types of penetrating thoracic injuries. Only a few cases have been reported in which the patient recuperated without sequelae. Impalement chest trauma are usually fatal, therefore few cases have been reported in the literature review. These injuries usually occur unilaterally. Our case report is about rebar impalement into unilateral hemithorax after falling down without any mortal injury and only a minor laceration of pericardium, lung, and the great vessels of subclavian. The fact is that such injury (as our case) without any intrathoracic catastrophic event is rare.

## INTRODUCTION

Impalement thoracic injury is very rare [1,2]. It is usually fatal and rarely compatible with life [3,4]. In the literature, a few cases have been reported [1,2,4-6]. Especially, heart and mediastinal injuries decrease the chance of survival [1,2]. The rebar penetrating neck, thorax, mediastinum such as our case, without causing intrathoracic organ injury has never been seen in the literature. The most common causes of injuries are gunshots or sharp objects [3]. Penetrating injuries include 20% - 40% of them [3]. We report case of a 26 year old man with two rebar impalement into left hemithorax after falling down without any mortal injury.

## CASE

Patient was 26-year-old man admitted to a local hospital after falling down at work on a spiral rebar (18 in size) which penetrated into the left side of the patient's chest. The rebar was cut in the building and the patient was free from the rebar. Then he was transferred with an ambulance to local hospital. He was seen at the emergency service with a CXR [Figure 1]. After insertion a chest tube in the left pleural space, the patient was referred to our

hospital and department of thoracic-vascular surgery. The spiral rebar had penetrated the left hemithorax at the anterior axillary line in sixth intercostal space and it had exited through the same side of supraclavicular region. [Figure 2,3]. In the emergency room, in patient's physical examination, blood pressure was 80/40, the pulse rate was 120 beats/minute,

respiratory rate was 24, O<sub>2</sub> saturation was 90% in room temperature and hemoglobin was 10 g/dl. After consultation with a vascular surgeon and anesthesiologist and after reservation of five units of blood pack cells, the patient was referred to the operation room. The decision was made to perform an operation without delay for further evaluations. Chest was opened with Posterior lateral and vertical thoracotomy. The Posterior lateral thoracotomy was performed with a vertical incision, which allowed the exploration of left hemithorax and pericardial region and supraclavicular region concomitantly [Figure 2], exploration showed that the two rebar, lacerated the pericardial with hematoma over the pericardium and laceration found in both lobes of lungs, major vessels subclavian and brachial plexus. The two rebar were removed in a controlled manner and the hemostasis was established and all laceration of organs were repaired [Figure 4], Hematoma of pericardium was evacuated and a pericardial window was performed. The organ damage was not severe because Clothes of the patient were made a role or a tunnel around the two rebar. Surgical procedure was completed. The Patient was discharged with good condition sixth day after operation. In follow up after discharge, the patient was perfect and the patient was stable and good condition. He returned to his job after three months and took on his normal activities (Figure 5).

## DISCUSSION

After head and extremity, the chest traumas are the third most common injuries. Thoracic injuries in general are of great importance due to their high incidence and high mortality. They



**Figure 1** CXR shows two rebar passes through the lower portion of the left hemithorax close to the pericardium.



**Figure 2** Two rebar passes through lower portion of left hemithorax close to the pericardium and traversing of supraclavicular region with her clothing.



**Figure 3** Two rebar passes through lower portion of left hemithorax close to the pericardium and traversing of supraclavicular region with her clothing.

account for 20–30 % of trauma-related deaths [2, 3]. Most deaths occur on the crash site, resulting from injuries involving the dangerous zone associated with lesions of the central nervous system. Of those who survive the initial trauma and arrive at the hospital, 15 % have a high mortality rate, often preventable with simple and immediate diagnostic/therapeutic measures. Penetrating thoracic traumas are less frequently than blunt traumas. Less than 10% of blunt trauma and between 15

and 30% of penetrating thoracic injuries require thoracotomy [9]. Its main indications are associated with the involvement of the heart, great vessels, lung parenchyma and the inter costal vessels. Stab wounds are the most common cause of Penetrating thoracic traumas (35%) and only 5% occurs by gunshot [11]. Impalement chest injuries (rebar) are usually fatal; therefore few live cases have been reported in the literature [2]. Thoracic impalement injuries are rare but much more severe due to the combination of cause, effect and result [12]. High kinetic energy usually results in severe multiple injuries culminating in high mortality rates. Only a few cases have been reported worldwide in patients who survived without some degree of sequel [2]. The management of complex thoracic trauma demand strained and experienced staff, requiring special attention from the crash scene to intra-hospital care, preferably conducted in a trauma center [12]. These traumas generally occur unilaterally [4]. No report is found in the literature as our case which two rebars pass through one side of chest to same side of the neck [2]. Individualized care based on injury severity and affected organs [2]. The mechanism and severity of trauma must be evaluated immediately to determine appropriate resuscitation and management [12]. Reported protocols for managing impalement injuries are entirely anecdotal, with no uniformity on impaled patient's approach and management, although general principles of trauma care apply in these specific infrequent cases [13,14]. Attention to airway, breathing and circulation is paramount. The pre hospital phase of care is even more crucial. The main goals in



**Figure 4** After removal of two rebar.



**Figure 5** After discharge.

thoracic trauma resuscitation include optimizing tissues oxygen delivery, bleeding control and replacement of intravascular volume [13]. In penetrating trauma, it is essential to not remove the impaled object, so that possible vascular lesions remain buffered by the object, avoiding major bleeding and exsanguinations hemorrhage [15,16]. To maintain the airway and ventilation, early intubation may be indicated [12]. A chest tube should preferably be placed prior to initiation of mechanical ventilation in anticipation of the possibility of installing a tension pneumo thorax, severe and potentially lethal condition [16]. After ventilator and hemodynamic stabilization, the patient should be transferred to a specialist center for trauma care, as these lesions typically require complex multidisciplinary treatment. Previous contact with the trauma center is important, to the extent that the emergency team, surgery and anesthesia teams, blood bank and intensive care unit (ICU) can be prepared for the arrival of the patient [17]. The lung is the most common organ injured in penetrating thoracic traumas. Pneumothorax or hemothorax are frequently observed [3,6]. Injuries may involve the mediastinum, heart and major vessel such as present case [3,5]. Depending on the site of injury, various types of incisions can be used for surgical approach, including, median or transverse sternotomy and thoracotomy (anterior or posterior) [3,6]. We used Posterior lateral and vertical thoracotomy in our case. The posteriolateral thoracotomy is most frequently Incision used in penetrating chest injuries and allows easy explorations of pulmonary hilum [7]. Anterolateral thoracotomy is choice in emergency conditions of thoracic injury [7]. Clamshell incision is recommended in cases of heart and major vessel injuries with tracheobronchial injuries and bilateral chest injuries [8]. Although these type of rebar impalement of chest trauma seem frightening, but severe intrathoracic organ injuries are rarely observed as our case [2].

## CONCLUSION

In our case, three steps helped to save the patient:

- A: Early cutting of rebar and freeing of patient from it
- B: Early referral to the thoracic-vascular department
- C: Early decision to operation

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