



## Surgical Management of Traumatic Lung Herniation Following Penetrating Chest Wall Injury by Atypical Vertical Thoracotomy: An Uncommon Case Presentation

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### Abstract

Traumatic herniation of intrathoracic organs after penetrating injury is uncommonly seen in medical literature. The management protocols in these cases are not well established. A 46 years old man presented with left lung herniation following accidental penetrating chest injury. After stabilisation he was managed uneventfully with lung laceration repair and removal of foreign body through atypical vertical thoracotomy. The chest wall stabilisation was established with rib fixation and anatomical muscle closure.

**Keywords:** Traumatic lung herniation; Chest wall; Vertical thoracotomy

### Introduction

Traumatic herniation of lung following penetrating chest injury is a rare and uncommon presentation. We report the case of 46 year old male who had penetrating injury to left anterior chest wall resulting into massive herniation of left lung upper lobe, left haemo-pneumothorax, multiple rib (1 to 4) fracture and fracture dislocation of clavicle. After stabilisation surgical repair and removal of foreign body through atypical transcostal vertical thoracotomy and anatomical closure of muscle resulted in uneventful recovery.

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### Case Presentation

A 46 year old man admitted to Emergency department of our hospital alleged to have injury to left anterior chest wall while he was working on electric saw used for cutting bricks. He was presented in respiratory distress, profuse bleeding from chest wound with borderline systemic blood pressure. He also had massive herniation of left lung from chest wall defect (Figure 1). The patient was awake and anxious and forced to take deep breath. Due to which lung was protruded out and irreducible. After evaluation patient was intubated with single lumen tube selectively ventilating the right lung. The local examination revealed crushed fracture of left clavicle with multiple rib (1 to 4) fractures.

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**Figure 1:** Herniation of left upper lobe lung through chest wall defect.



**Figure 2:** Foreign body found embedded in lung parenchyma.



**Figure 3:** CT scan shows open communicating wound in the chest wall with lung contusion and pneumothorax.

The major part of left upper lobe of lung was protruded outside. The lung appeared pink and healthy. Part of lung was lacerated with no active bleeding seen. Small spurts were seen from muscle and subcutaneous plane which were secured. The lung was reduced back carefully to avoid further injury by broken ends of fractured ribs. One intercostals drainage tube was inserted on the same side for drainage. Computerised tomography scan revealed chest wall defect, fracture dislocation of clavicle, multiple rib fractures, left haemopneumothorax, partial left lung collapse with foreign body in lung parenchyma and bilateral lung contusions (Figure 3). Bronchoscopy showed small blood clot with mucous plug with no evidence of intraluminal injury. After stabilisation patient was taken up for surgery in general anaesthesia. The Patients was placed in the supine position with a small roll under the left shoulder. The patient's arms were tucked. As the open wound was present in left parasternal area, lower end of wound was extended in the line of conventional anterior thoracotomy for proper exposure of left lung (Atypical transcostal thoracotomy). On exploration, besides lung no other intrathoracic organ damage was observed. Subclavian vessels and brachial plexus were exposed with no sign of injury. Medial part of left clavicle was fractured, avulsed and totally crushed. Multiple ribs from first to fourth were fractured in the line of laceration. Irregular star shaped sharp metal object was found embedded into lung parenchyma at the site of lung laceration (Figure 2). The foreign body was taken out and lung laceration was repaired with 4-0 prolene interrupted sutures. The suture was reinforced with surgical glue. No major air leak was observed. The pleural cavity was lavaged thoroughly with Betadine-saline solution. All bleeding points were secured. The ribs were approximated using steel wire. Spiculated end of clavicle was trimmed. Chest wall defect was repaired with anatomical closure by mobilising pectoralis major muscle. Aseptic closure of subcutaneous



**Figure 4:** Final picture of patient before discharge.

tissue and skin was done in usual manner.

The patient was gradually extubated on first postoperative day. Rest of the hospital stay was uneventful and he was discharged on 7<sup>th</sup> postoperative day (Figure 4).

## Discussion

Lung herniation is an uncommon presentation following chest trauma [1,5]. Massive herniation of lung is rarely seen with penetrating or blunt chest injury [2]. In cases of lung herniation anterior chest wall is the site of predilection because of deficient muscular support as normally present in the back by trapezius, latissimus dorsi and rhomboid muscle [3]. Along with this as in our case anterior thorax is frequently associated with multiple rib and clavicle fracture, especially at sternum and costochondral junction, where intercostals muscle layer is thinnest [4].

Computerised topography scan of chest is diagnostic for lung herniation. It can show the chest wall defect with herniated part of lung and also the condition of underlying lung. Management depends upon the condition of herniated lung (viable/non viable), condition of patient and site, size and type of chest wall defect [1,5]. Surgical management is treatment of choice in cases of lung herniation with open chest wall defect. For exploratory thoracotomy plan for the site of incision is important. Extending the site of laceration over chest wall into atypical transcostal vertical thoracotomy helps in avoiding the pain and morbidity of second incision in postoperative period. This incision allows complete inspection of other intrathoracic structure like heart, pericardium, Subclavian vessels, brachial plexus, phrenic nerve and diaphragm. The lung laceration has to be sutured carefully to prevent air leak and allows early recovery. For better stabilisation of chest wall, fractured ribs can be fixed with steel wire followed by muscle closure.

## Conclusion

Judicious surgical management in cases of traumatic lung hernia following penetrating injury of chest wall gives excellent post-operative results with less morbidity and mortality.

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