

Delayed Presentation of a Traumatic Intercostal Lung Hernia: A Case Report and Review of the Literature

Alireza Hamidian Jahromi,^{1,*} Patton Pennington,¹ Justin Skweres,² and Mary Catherine Mancini¹

¹Department of Surgery, Louisiana State University Health Sciences Center-Shreveport, LA, United States

²Department of Radiology, Louisiana State University Health Sciences Center-Shreveport, LA, United States

*Corresponding author: Alireza Hamidian Jahromi, Department of Surgery, Louisiana State University Health Sciences Center-Shreveport, 1501 Kings Highway, LA 71103, Shreveport, United States. Tel: +1-3185184600, Fax: +1-3186754689, E-mail: Alirezahamidian@yahoo.com

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Abstract

Introduction: Lung herniation following blunt chest trauma is extremely rare and only a few hundred cases of this pathology have been reported in the English language medical literature. This type of lung hernia is divided into intercostal, parasternal, or supraclavicular subtypes based on the exact location of the chest wall defect. Traumatic intercostal lung hernia is even more uncommon. Delayed presentation of a traumatic lung hernia has been reported in two cases in the medical literature where cases had a delayed presentation of 2-29 days.

Case Presentation: We present a case of 72-year-old white male who had a delayed presentation of an intercostal post traumatic lung hernia (PTLH) 50 years after severe blunt chest trauma.

Conclusions: This is a rare case of a delayed presentation of a traumatic intercostal lung hernia. Based on our literature search, this case seems to be the first reported case with such a long delay prior to presentation. We suggest that in patients with even a remote history of blunt chest trauma, a physical examination and preoperative evaluation including assessment for possible PTLH be considered before patients undergo positive pressure ventilation. We also suggest that PTLH be considered in the differential diagnosis for patients with blunt traumatic chest injuries and rib fractures.

Keywords: Delayed Presentation, Blunt Trauma, Traumatic Lung Hernia, Hernia

1. Introduction

Post traumatic lung herniation (PTLH), protrusion of the lung tissue and the pleura through a chest wall defect (extrathoracic), is an extremely rare sequel of blunt chest trauma (1). While lung hernias can be classified into congenital or acquired types, the acquired lung hernia is further subgrouped into traumatic, spontaneous and pathologic types based on the underlying etiology. According to previous reports only a few hundred (three hundred) cases of PTLH have been reported in the medical literature (2). This type of lung hernia (PTLH) is divided into intercostal, parasternal, and supraclavicular (cervical) subtypes based on the exact location of the chest wall defect. Traumatic intercostal lung hernia is a variant of PTLH that is even more uncommon. A search of the English language medical literature revealed two previously published case reports on patients with a delayed presentation of a PTLH, and both cases were parasternal in nature (3, 4). The delay in presentation in these cases were two and 29 days post-trauma respectively. Herein we present a case of a 72-year-old otherwise healthy white male who had a delayed presentation of an intercostal post traumatic lung hernia 50 years after being involved in a motor vehicle collision (MVC) in which he

sustained severe blunt chest trauma. The radiologic findings and management options are discussed.

2. Case Presentation

A 72-year-old healthy, white male presented to our clinic with a one year history of progressive sharp pain in the right lower chest with a protrusion that had been increasing in size (first noticed a year ago). The pain was worse on exertion, coughing, and when taking deep breath. The patient was in a vehicle involved in a crash, and had sustained a single broken rib (8th rib) of his right lower chest. He did not receive any further treatment following the accident. His past medical and surgical history was otherwise unremarkable. The patient denied tobacco or drug abuse. On examination, there was a 15 × 5 cm protruding tender segment of the right lower chest wall at the antero-lateral aspect of 8th intercostal space that manifested paradoxical movement on inspiration. The patient underwent radiologic evaluation consisting of a chest x-ray and a CT scan with IV contrast (Figure 1). The patient subsequently underwent primary intercostals lung hernia repair where we released the adhesions between the hernia sac and the chest wall. Subsequently the adjacent

ribs above and below the site of the hernia were approximated using simple pericostal stitches 2-0 non-absorbable braided suture for primary repair of the hernia site. The defect was completely closed and there was no need for mesh. Muscle layers were closed in separate layers. A single chest tube was placed inferior to the original lung hernia, and it was removed two days after surgery. A thoracic epidural was used for postoperative pain management (epidural catheter in the T7-T8 space with continuous infusion of 0.2% Ropivacaine (Naropin)/fentanyl for 48 hours). The patient tolerated the procedure very well and was discharged three days after the operation. He was seen in the clinic two weeks after the surgery at which time the surgical wound was well healed and there was no evidence of recurrence.

3. Discussion

Extrathoracic acquired lung hernias can be classified by etiology into traumatic, spontaneous, and pathologic (5). PTLH is further divided into three subtypes based on the exact location of the chest wall defect: intercostal (space between the ribs), parasternal (space between the ribs and the sternum), and supraclavicular (superior thoracic aperture). Diaphragmatic lung hernias, either post-traumatic or congenital, are generally categorised separately due to their separate and different etiological, underlying defect mechanism, and management plan.

Chest wall weakness due to muscle disruption and or bone fractures (ribs, sternum, clavicle) and increased intrathoracic pressure (coughing, heavy lifting, chronic obstructive pulmonary disease) are the cornerstones for posttraumatic lung hernia formation (6). Increased intra-abdominal pressure can also be transmitted to the chest, causing increased intrathoracic pressure. Due to the strong support of the paraspinal and back muscles (trapezius, rhomboids and latissimus dorsi), the anterior and lateral sides of the chest wall are considered to be the weakest points of this cavity and herniation of the lung more frequently occurs in these locations.

The three point immobilization of the chest through the seat belt with the shoulder harness and the lap belt and relative immobilization of the left chest compared with the right chest combined with the subsequent shear force across the intercostal, clavicolosternal and sternocostal junctions (seat belt injury) have been proposed as a possible mechanism for PTLH (3).

Although spontaneous regression of the PTLH has been reported in the pediatric population (5), in the majority of the cases, especially in sizable hernias, the regression of the hernia sac and adequate coverage by the scarred tissue is extremely unlikely. The observation that most of the

PTLH do not resolve spontaneously and the fact that thoracic strapping would impair chest wall motion increase the risk of atelectasis and subsequent infection and reduce the pulmonary compliance. These facts have forced the medical community to abandon this old-fashioned management of PTLH (6).

Early detection and management of the PTLH is important in preventing incarceration and strangulation of the herniated lung segment and decreasing the longterm sequelae of the hernia including pain, cough spells, and chest wall bulging or deformity. The possibility of the intercostal PTLH becoming further complicated by formation of a pneumothorax or even tension pneumothorax, especially if the patients require positive pressure ventilation, is a real concern in cases where the diagnosis or management is delayed (7).

While CT scan with multiplanar image reconstruction and maximum and minimum intensity projection re-formats is the most accepted radiologic tool for evaluation of these patients, plain chest radiograph with tangential views and valsalva maneuver can be very helpful and should be the first approach in radiologic evaluation (4). In cases where CT scan is unavailable, transthoracic ultrasound can assist with the diagnosis (4). In situations where the lung tissue is severely compressed against a small hernia orifice (chest wall defect), contrast enhanced CT scan is mandatory to evaluate for possible strangulation or lung infarction (CT pulmonary angiography protocol) (4). In cases where inspiratory chest CT is nondiagnostic, an expiratory exam with valsalva maneuver may help to establish the final diagnosis.

While conservative management in supraclavicular PTLH is generally deemed a sufficient approach by most authors (larger thoracic wall defect in such cases reduces the risk of strangulation) (1, 7), surgery is the most acceptable management in intercostal or parasternal PTLH (1). Indications for surgery include relief of pain, incarceration or strangulation prevention, nonviability of the lung tissue, optimization of pulmonary function, prevention of respiratory failure, and cosmetic reasons (3). In some previous reports PTLH patients presented with shortness of breath and even respiratory failure (2, 3).

The spectrum of reported surgical approaches varies from primary repair with pericostal stitches (similar to our case), or concurrent placement of wire sutures (3) to repair using prosthetic grafts (intrathoracic polytetrafluoroethylene Gore-Tex patch) (3, 5, 8), mesh (synthetic/biologic) (9), or periosteal/muscle flaps (8). A hernia sac is generally not present in these cases since the pleura is usually disrupted. If a sac is present then it should be removed. Video assisted open repair can be used and is helpful in further assessment of lung segment viability following the hernia reduc-

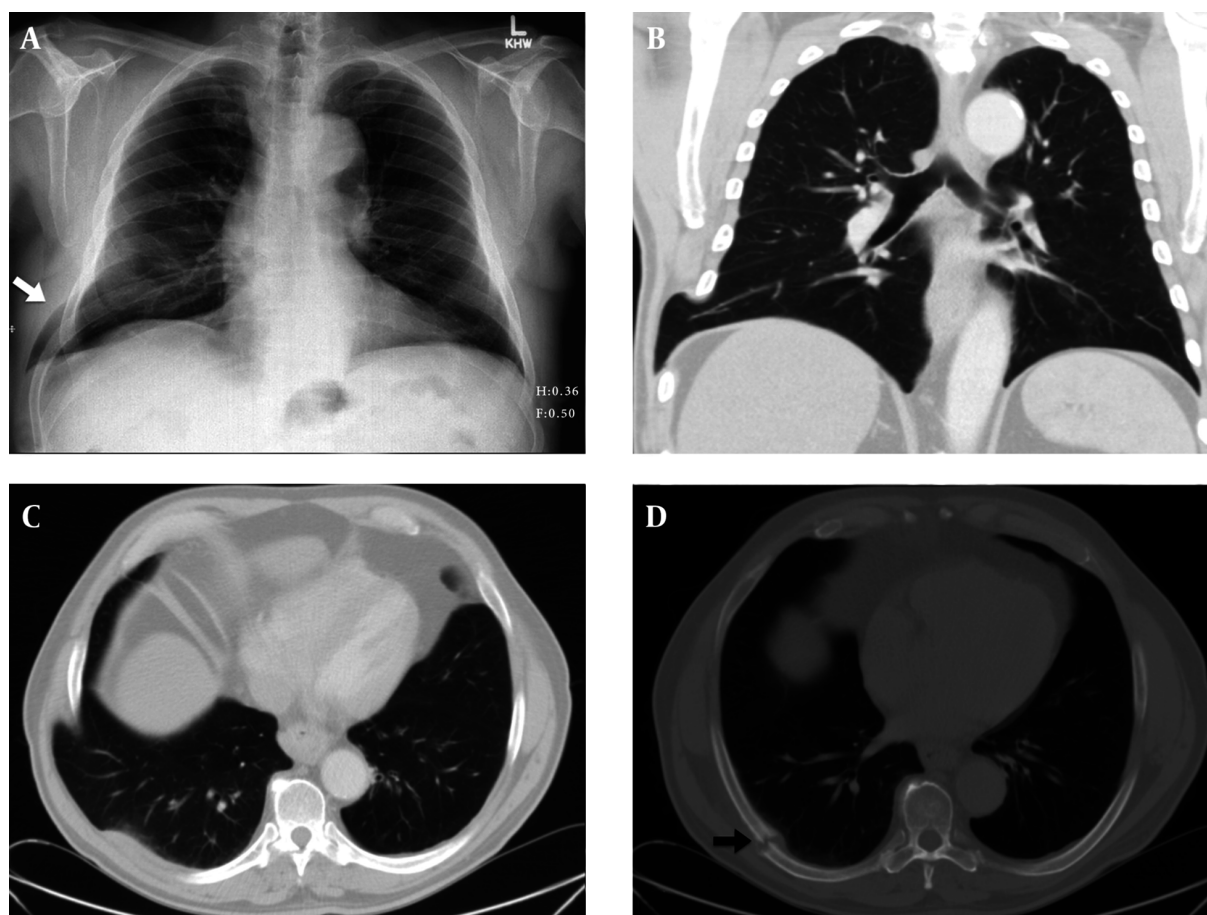


Figure 1. Admission PA chest radiograph; A, shows the right lung field extending outside the chest wall between the right 8th and 9th ribs laterally (white arrow). Coronal reformat image from subsequent contrast enhanced CT of the chest; B, (lung window) displays the traumatic herniation of the right lower lobe through a muscular defect in the 8th intercostal space to advantage. Axial images from the same CT at the level of the 8th intercostal space; C, (lung window) and a few slices higher; D, (bone window) again show the herniated portion of the right lower lobe and the subacute right 8th rib fracture associated with this injury (black arrow). Notice the widening of the 8th intercostal space on the radiograph and CT images relative to the left.

tion, evacuation of hematoma, and evaluation of the inner surface of the cavity and the diaphragm for any small missed injuries and to ensure adequate lung expansion (1). The efficacy of the surgical approaches remains to be confirmed by further studies.

The current case is an example that PTLH can have delayed presentation even up to a few decades following trauma. The fact that the patient had a remote history of severe chest wall trauma at the exact same place of the lung herniation and lack of any recent injuries to explain the hernia has made us believe that this case is an example of delayed presentation of PTLH although spontaneous origin especially in an adult is always a very unusual possibility. Patient and medical team education is warranted to help with early detection of such cases. Surgical repair, especially in the cases with intercostal or parasternal hernia,

is mandatory to prevent further complications. We suggest that in patients with even a remote history of blunt chest trauma, physical examination and preoperative evaluation including assessment for possible PTLH be considered before patients undergo positive pressure ventilation. We also suggest that PTLH be considered as a differential diagnosis for the patients with blunt traumatic chest injuries and rib fractures as this would affect the surgical management.

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Footnote

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