

Intercostal Pulmonary Hernia Secondary to Defecation Effect

Y. Ennaich^{1*}, H. Hilal¹, H. El azouazi¹, N. Benarbia¹, H. Tabakh¹, O. Kacimi¹, A. Siwane¹, N. Touil¹, N. Chikhaoui¹

¹Emergency Radiology Department, CHU Ibn Rochd, Casablanca, Morocco

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*Corresponding author: Y. Ennaich

Emergency Radiology Department, CHU Ibn Rochd, Casablanca, Morocco

Abstract

Review Article

A protrusion of the lung parenchyma through a weakness in the intercostal muscles between nearby ribs is referred to as an intercostal lung herniation. When you cough or strain, a soft, non-tender subcutaneous bulge will become visible. Lung hernias that develop are typically problems following surgery or trauma. They may appear right once following a trauma or surgery or may take time to show up. They could be asymptomatic or, in the case of imprisonment or strangulation, they might manifest as pain and hemoptysis. The present review spotlight the various case study with reference intercostals pulmonary hernia.

Keywords: Intercostal Pulmonary hernia, etiology, causes & management approaches.

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INTRODUCTION

A herniated extrathoracic lung is uncommon. The majority of hernias are discovered either at birth or following cardiothoracic surgery. Lung hernias that are small and asymptomatic are nearly always treated conservatively. Large hernias need to be fixed since they could burst and result in pain, dyspnea, recurring infection, and other symptoms. A bulging or protrusion of an organ through the muscle or structure that typically contains it is referred to as a hernia in general. Hernias come in a variety of forms. Pneumocele, often known as a pulmonary hernia, is a rare ailment. It describes a portion of a lung protruding via a chest wall rip or weak area. The majority of individuals with reported lung hernias experienced chest trauma or injury, such as a blow to the truma [1]. Intercostal lung herniation is defined as a protrusion of the lung parenchyma through a defect in the intercostal muscles between adjacent ribs. It presents as a soft, subcutaneous nontender bulge visible on coughing or straining [2]. Acquired lung hernias are usually post trauma or post-surgery complications. They can arise immediately after the trauma or surgery, or be discovered long after the initial injury [3]. They may be asymptomatic, or may be revealed by pain and hemoptysis if incarceration or strangulation is present. We present a case report of post thoracotomy intercostal lung herniation. Lung herniation can be classified as cervical, thoracic, diaphragmatic, or mediastinal according to anatomic location. Etiological classification might be congenital or acquired.

Congenital hernias frequently result from attenuation of the endothoracic fascia or costal or cartilage deformities, such as hypoplasia of the ribs or intercostals [4, 5]. They can happen at the thoracic inlet or the intercostal gaps, where the fascia is typically weak and the intercostal muscles are absent. Although the thoracic cage comprises a single layer of intercostal muscles, there is an intrinsic weakness anteriorly close to the sternum, medial to the costochondral junction, and posteriorly close to the vertebral bodies. Acquired pulmonary hernias can be divided into traumatic hernias, spontaneous hernias, and pathological hernias. Mechanisms of acquired pulmonary hernias include weakening of the intercostal muscles combined with conditions that increase intrathoracic pressure such as coughing and weightlifting. Predisposition includes both environmental and surgical trauma, chronic obstructive pulmonary disease, inflammatory or neoplastic processes, and chronic steroid use.



Physical appearance



Anatomical view

Classification of lung Hernias [6]

Description	Classification of lung hernias
Anatomic location	Cervical Thoracic Diaphragmatic Mediastinal
Etiology	Congenital Acquired Traumatic Spontaneous Pathological Postsurgical

Intercostal Lung Herniation Summary Table [7]

Etiology	It can be congenital or acquired. Acquired hernias can be classified into traumatic hernias, spontaneous hernias, and pathological hernias, depending on the etiology.
Incidence	First described in the 16th century, less than 400 cases of lung herniation have been reported in literature.
Gender ratio	No gender predominance.
Age predilection	No age predilection.
Risk factors	Congenital or acquired disorders of the enclosed chest wall. Most commonly, lung prolapse due to chest trauma (multiple rib fractures or separation of costal cartilage joints and / or rupture of intercostal muscles).
Treatment	Surgical approach is desirable with lung hernia reduction and mesh repair of chest wall defect.
Prognosis	Entire recover if promptly diagnosed and surgically treated.
Findings on imaging	Chest CT, which shows a lung component extending beyond the thoracic cage through a chest wall defect, may be helpful for the final diagnosis, while chest radiograph and chest wall ultrasound may be beneficial as a first diagnostic method.

Various diagnostic tools for screening of Intercostal Lung Herniation [8]

ENTITY	X-RAY	ULTRASOUND	CT
Intercostal lung hernia	Radiolucent area	Intensively hyperechoic region in the chest wall.	Part of lung parenchyma protruding through a chest wall defect.
Lipoma	reasonably radiolucent area.	May range from hyperechoic to anechoic depending on the degree of connective tissue and other reflective interfaces present within the lesion.	Lesion with adipose tissue density (from -250 to -50 HU).
Delayed seroma	Radiopaque chest wall lesion.	Hypoechoic circumscribed area.	Water-density circumscribed area in the chest wall.

ENTITY	X-RAY	ULTRASOUND	CT
Subcutaneous emphysema	Radiolucent subcutaneous areas, usually multiple.	Hyperechoic subcutaneous regions.	Hypodense, air-density subcutaneous regions.
Bronchopleural fistula	An air-fluid level that typically extends from pleural cavity to the chest wall.	May show only pleural effusion collections – of little value in showing the fistula directly.	Areas of pulmonary consolidation that appear to be in direct contact with the apparently damaged visceral pleura (usually a tumor or empyema).
Pectoralis main tendon rupture	Can disclose loss of the pectoralis major shadow.	MSK ultrasound can demonstrate intra-muscular injury or loss of continuity of the tendon (tear location).	Can sketch the muscle, but has difficulty visualizing the distal soft tissue of the pectoralis (MRI reliably identify injury to the muscle and distal tendon).
Abscess	Radiopaque lesion, may have air-fluid level at its center and thick walls.	Intermediate echogenicity. In case of fluid-air level internal areas of low and high echogenicity may be detected.	Areas of poor lung sclerosis that appear to be in direct contact with the apparently disturbed visceral pleura (soft-density lesions with low-density centers due to liquefied necrosis, or thick walls containing high-density fluid with or without air density Accompanied by spongy lesion areas, usually from tumors or empyema).
Metastases	Radiopaque lesion.	Intermediate echogenicity.	Soft tissue density lesions. In some cases, there may be a low density center due to central necrosis.

Predisposing factors of Intercostal lung Herniation

- Obesity
- chronic obstructive pulmonary disease (COPD)
- Chronic use of corticosteroids

Recent update in Intercostal lung Herniation as per case study

Intercostal lung hernias are rare and are usually the result of trauma or surgery. True spontaneous pulmonary hernias are extremely rare, with only 51 cases confirmed in the last four and a half years. Kollipara, Venkateswara *et al.*; 2021 report a case of non-traumatic ecchymosis of the chest wall secondary to spontaneous posterolateral lung prolapse, followed by a literature review. An interesting X-ray image is displayed. Describe the pathophysiology and treatment options for this disease. This case emphasizes that advanced chronic obstructive pulmonary disease (COPD) may be the cause of the development of this rare condition, where cough is the starting event. Given the increasing prevalence of COPD, the authors believe that awareness of this condition needs to be further increased [9].

David Manthey *et al.*, 2017 studied a case history of 51-year-old man with sympathetic nerves began to experience discomfort in the right chest wall about a month before appearing in the emergency department (ED). He had a history of chronic obstructive pulmonary disease (COPD) and had a broken rib in his ribs as a result of his coughing attack. He had no history of direct trauma to his chest. He

developed an acute recurrence of pain and was presented to the emergency room. He reported coughing and developing his right posterolateral chest pain. Examination revealed a soft, palpable mass on his back chest, with a associated crepitus, which expanded with inspiration. A portable chest x-ray showed rib fractures at various stages of healing and the right lung outside the chest without pneumothorax. He underwent chest computer tomography (CT) and confirmed an acute posterolateral rib fracture of ribs 8 and 9 and a chest wall fracture through the 8th intercostal space [10].

Efstathios E. Detorakis *et al.*, 2014 studied a case of a 40-year-old man with a history of bronchial asthma and blunt chest trauma. The man complained of acute onset chest pain that began after five days of severe coughing. Physical examination revealed a clear deformity covering the third intercostal space in his upper left anterior chest. Chest CT scan showed that part of the anterior bronchopulmonary segment of the left upper lobe escaped through a chest wall defect. Chest computer tomography with the role of imaging, especially multiplanar image reconstruction and maximal (MIP) and minimal intensity projection (MinIP) reformatting, clearly confirms the presence of lung prolapse, hernia sac, and hernia opening in the chest wall. And the possibility can be ruled out by complications such as strangulation of lung tissue [11].

The X-ray and MDCT findings are described in a series of six cases by Z. Zia *et al.*, 2013. Diagnostic signs of intercostal lung hernia on chest X-rays and

cross-sectional images are evidence of lung parenchyma or intrathoracic contents beyond the chest. Multi-detector computer tomography (MDCT) enables in-depth study of the underlying anatomy and helps plan further management [12].

Co-morbidities of Intercostal Lung Hernias [13]

- Arterial hypertension
- Congestive heart failure
- Type II diabetes mellitus
- Chronic obstructive pulmonary diseases.

CONCLUSION

It is important to note some exacerbating factors for postoperative intercostal pulmonary hernia. Additional fixation of the ribs with monofilament sutures for patch repair is very effective in repairing lung hernias in patients with combined lung prolapse and rib fractures.

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