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Pulmonary Hernia Following Blunt Chest Trauma

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ABSTRACT: Defined as a protrusion of the lung parenchyma through the chest wall, traumatic lung hernias constitute a rarely described condition occurring more from penetrating rather than blunt trauma. We report the case of a 17-year-old patient with no prior medical history who was admitted to the emergency department following a motorcycle accident with a protruding thoracic mass. Clinical examination found a soft, reducible bulge on the left anterior 4th intercostal space. A CT scan of the chest demonstrated rib fractures with no lung or muscle laceration. Surgical correction of the defect allowed total disappearance of the bulge, as well as significant pain management, and postoperative recovery was satisfactory. Post-traumatic intercostal lung herniation is a poorly described, challenging entity for which minimally invasive surgical correction of the chest wall defect and reduction of the hernia should be considered whenever feasible.

KEYWORDS: Blunt chest trauma, Diagnosis, Surgery, Traumatic lung hernia.

INTRODUCTION

Lung hernia is a rare entity, defined as a protrusion of the lung parenchyma through a defect in the chest wall. The first case was reported in 1499 by Roland and corresponded to a supraclavicular hernia [1]. It is classified based on congenital or acquired etiology. Overall, chest trauma is the most common cause, occurring more often from penetrating rather than blunt trauma [2-3]. Pulmonary hernias may be asymptomatic or revealed by pain, or hemoptysis. We report the case of a 17-year-old patient with a chest wall hernia due to blunt chest trauma following a motorcycle accident.

CASE REPORT

A 17-year-old male with no medical or surgical history had a motorcycle collision. He crashed against a roadside wall after losing control. He was admitted to the emergency department with shortness of breath and a protruding thoracic mass. Physical examination revealed a patient in good general condition, with a circular erosion measuring approximately one centimetre on the left anterothoracic wall, opposite the fifth rib; underneath, a soft reducible bulge was noted in the left anterior fourth intercostal space with significant post-tussive expansion (Figure 1). Respiratory examination revealed mild hyper-resonant percussion on the left, and breath sounds were decreased in the left apical region on auscultation. The remaining clinical examination was unremarkable.

A thoracic computed tomography scan was ordered and revealed a non-displaced fracture of the fifth rib with no lung or muscle laceration, associated with a left pneumothorax (Figure 2).

An exploratory minimally invasive thoracotomy was indicated. Perioperative findings were consistent with a post-traumatic intercostal space defect with detachment of the latissimus dorsi muscle (Figure 3). Surgical correction consisted of closing the chest wall defect using pericostal sutures around the eighth and ninth ribs, after insertion of a chest tube drain, allowing complete disappearance of the bulge as well as significant pain relief. Postoperative recovery was satisfactory. Follow-up clinical examination and chest X-ray at 6 months post-trauma were unremarkable.

DISCUSSION

Posttraumatic lung herniation is defined as the protrusion of the lung through an abnormal opening in the chest wall, without skin invasion [4]. It has been characterized by the Morel-Lavallée classification system according to etiology and localization. Hernias can be congenital or acquired, which may be traumatic, spontaneous, or secondary to neoplastic or inflammatory processes. The locations include cervical lung hernia, diaphragmatic hernia, and mediastinal hernia [5]. Most commonly, it is the traumatic type. Regardless of their anatomic location or etiology, lung hernias are distinctly rare, and just over 300 cases have been reported in the

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literature [6]. The clinical manifestation of uncomplicated lung hernia is usually asymptomatic, but it's rare [3]. When present, the main symptoms can be hemoptysis, pain, shortness of breath, and cough, associated with a protruding mass impulsive to coughing or Valsalva manoeuvre [6].

The diagnosis can be just clinical; however, imaging approaches play a major role in diagnosing and in detecting chest and mediastinal associated injuries. CT scan, which can characterize the location, extent, and size of the defect, is the reference exam. Furthermore, the scan can provide additional information about possible fractures and the state of the underlying parenchyma [7]. All of that helps in planning to choose the appropriate therapeutic approaches, especially for planning surgery.

While there is no clear consensus on how to manage post-traumatic lung hernias, the defect in the thoracic wall can interfere with normal respiratory excursion through bony and muscular components. Over time, the hernia may enlarge and cause parenchymal injury, increasing the risk of strangulation and respiratory distress.

In pediatric patients or in some particular cases, a conservative approach can be suggested [8]. However, most studies still prefer surgery, whose main goal is to reduce the hernia and restore the continuity of the chest wall. Recent prospective studies have shown fewer pulmonary complications and better spirometry values in patients treated surgically, especially when rib fixation is performed, compared with non-operative management [9].

Currently, there are multiple approaches available, through thoracotomy or thoracoscopy. Small defects under 2 cm can often be repaired with primary suture closure of the overlying rib. For larger defects, a bioprosthetic material or a polytetrafluoroethylene patch may be used, with rib stabilization if needed [6]. The repair should avoid restricting normal chest mechanics.

CONCLUSION

Lung hernia is a rare condition, often induced by blunt chest trauma. The diagnosis is clinical, although imaging modalities can identify the extent of thoracic injuries. There is no consensus on management. Correction of the chest wall defect and reduction of the hernia should be considered whenever feasible and conservative treatment may be suggested for small hernias with a low risk of strangulation.

FIGURES:

Figure 1: Clinical image showing post-tussive expansion of the soft bulge.

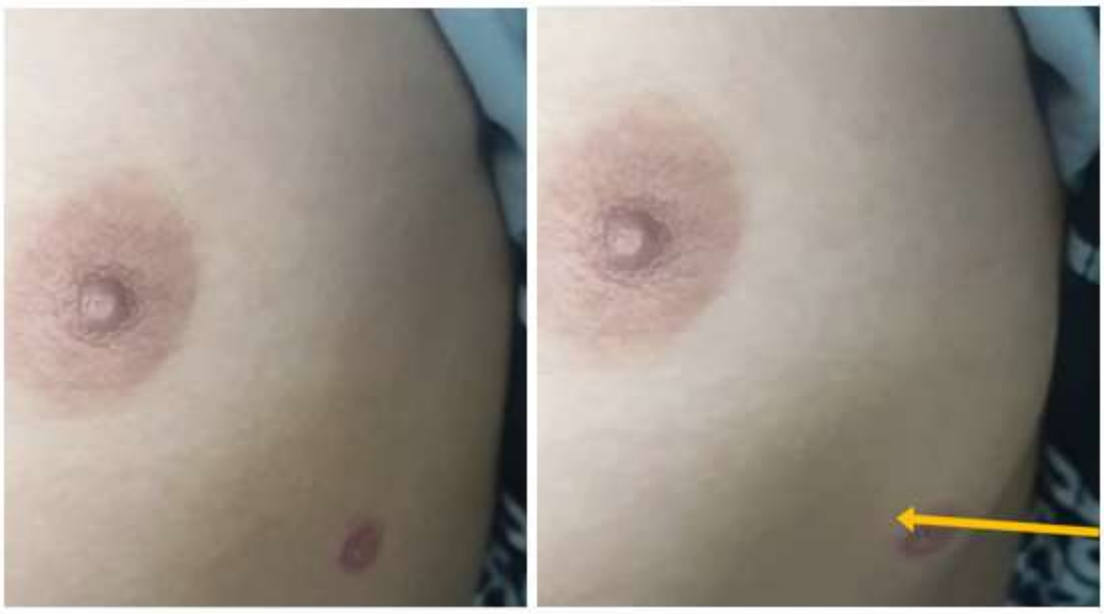

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Figure 2: CT images revealing a left pneumothorax overlooking a small parietal defect with a non-displaced 5th rib fracture.

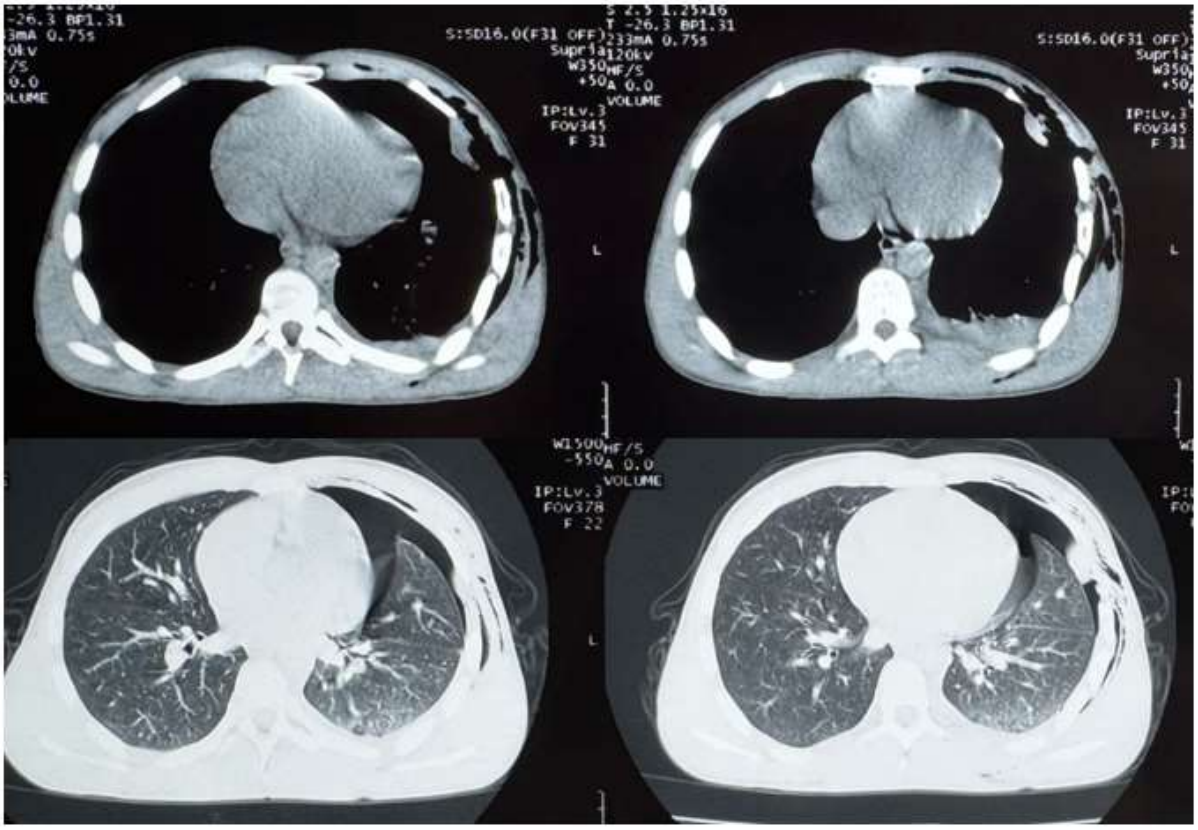
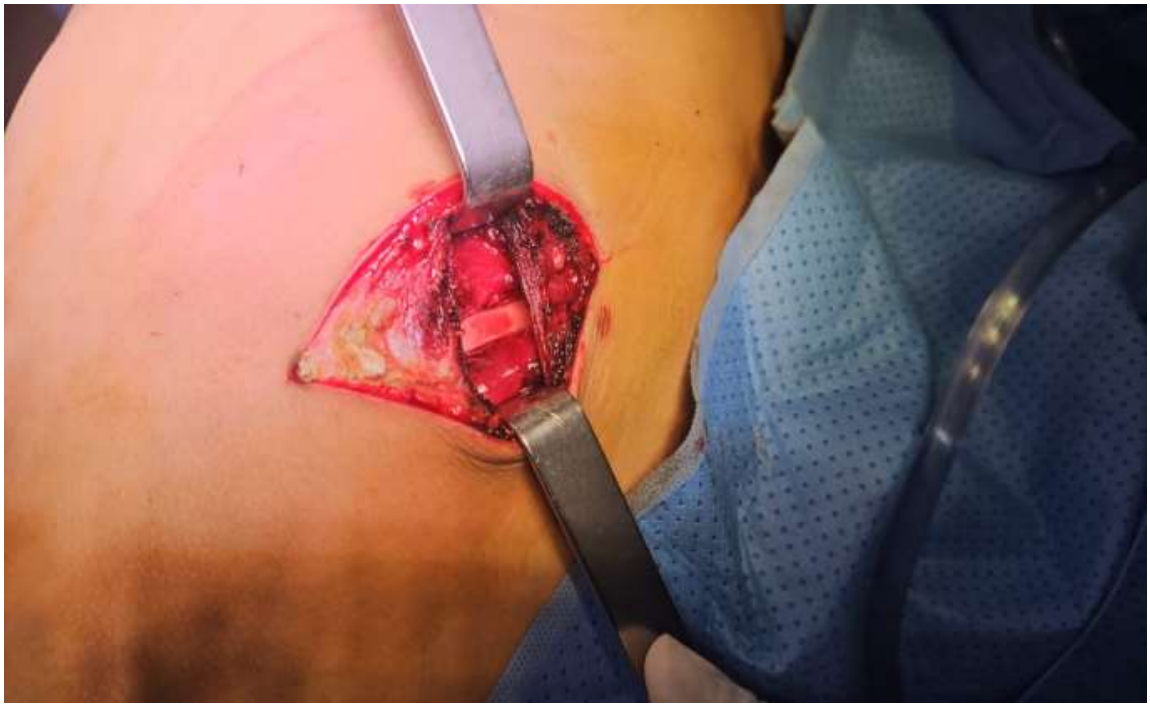


Figure 3: Peroperative image showing a post-traumatic intercostal space defect with detachment of the latissimus dorsi muscle



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