CASE REPORTS

REPAIR OF A PULMONARY HERNIA AFTER THORACOTOMY WITH AN INTRAPLEURAL MESH: A CASE REPORT

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Abstract

Introduction: *Pulmonary hernias are rare. They can be congenital, but mostly are acquired. Usually asymptomatic, they are diagnosed on physical examination or, incidentally, on imaging exams. Surgical treatment is required for large, increasing, or symptomatic hernias, and incarcerated or strangulated ones.*

This is a clinical case of a symptomatic postoperative pulmonary hernia. It occurred two years after a posterolateral thoracotomy for the resection of an intercostal myxolipoma. The tumor was resected en bloc with a partial segment of the 10th left rib and immediate reconstruction was made with an onlay polypropylene mesh. The postoperative hernia was successfully treated with a double-faced mesh of polypropylene and ePTFE.

This surgery provided a functional and aesthetic enhancement for the patient, greatly improving his quality of life. This approach is, therefore, considered safe and effective..

Keywords: *lung, hernia, thoracotomy, surgical mesh, muscle flap*

INTRODUCTION

Lung hernia is uncommon. Etiologically, in about 20% of the cases this entity is congenital while the majority is acquired by chest trauma or chest surgery. It can also occur spontaneously or due to pulmonary pathology.[1]

Anatomically, lung hernia can be cervical, being the supraclavicular ones the most frequent congenital lung hernias. They can also be intercostal, which normally are traumatic and usually occur on the anterior thoracic wall, near the sternum or posteriorly, near the vertebrae, where there is only a single layer of intercostal muscle and muscles are weaker. Less frequently hernias can be mediastinal or diaphragmatic.

Lung herniation manifests as a protrusion in the chest wall triggered by Valsalva maneuvers. Often asymptomatic, may present with a variety of symptoms like dyspnea, hemoptysis, chest pain, subcutaneous emphysema and chest wall instability.[2,3] They may also compromise aesthetically and affect the quality of life.

Diagnosis is clinical, with the identification of a crackling, soft and elastic mass which varies in size with the respiratory cycle. It expands with the Valsalva maneuver and decreases with inspiration.[4] It is sometimes incidentally diagnosed by imaging. Chest radiography does not always show the herniation, therefore, when suspected, it is recommended to perform during a Valsalva maneuver. Contrast-enhanced computed tomography (CT) during a Valsalva maneuver is the preferred imaging method to obtain the best anatomical definition of the chest wall defect and for surgical planning.[5,6] Chest ultrasound can be useful in cases where CT is not available, or the image is atypical.[5]

Given the paucity of lung hernia cases there are no

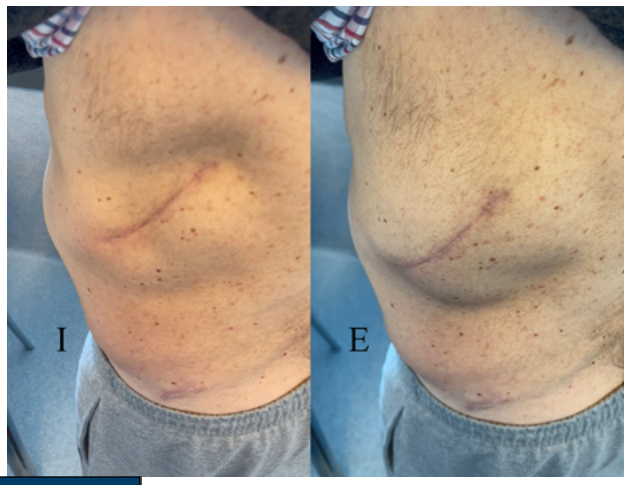

Figure 1 *Pulmonary herniation with respiratory movements (I - inspiration; E - expiration).*

sufficient evidence-based studies to recommend a standard management. Usually, for asymptomatic cases, a close surveillance regimen may suffice, however, surgical treatment is recommended in symptomatic, large, growing hernias, and in incarcerated or strangulated ones.[6]

We present a clinical case of a pulmonary hernia that was successfully treated with a double-faced mesh of polypropylene and ePTFE positioned alongside the parietal pleura, in the intrapleural space.

CLINICAL CASE

Male patient, 74 years-old, with a medical history of arterial hypertension, dyslipidemia, ischemic heart disease, and obstructive sleep apnea. In 2020, he presented with a painful and growing left thoracic wall tumor, along the 10th intercostal space. CT scan and magnetic resonance imaging revealed a 7 cm height, 6 cm length and 2.7 cm width, tumor adherent to the 10th rib. A corebiopsy was made suggesting a myxoid tumor.

A posterolateral thoracotomy over the 10th intercostal space was performed and the tumor was resected en bloc with a lateral-posterior segment of the 10th left rib, with placement of an onlay polypropylene mesh over the defect. Pathology was compatible with a myxolipoma, an uncommon, benign, type of lipoma with myxoid (mucus-like) components, with clear resection margins.

On the first month after surgery, he presented with a large mass (when performing Valsalva maneuvers) protruding at the site of the previous thoracotomy, associated with mild respiratory distress. (Fig.1) A chest CT was performed and confirmed an uncomplicated lung herniation with a chest wall defect measuring 9x13 cm, with displacement of the previous onlay mesh and ipsilateral pleural effusion. (Fig.2) Given the symptomatology and dimension of the defect, surgery was proposed.

The surgery performed was a hernioplasty with a double-faced mesh of polypropylene, positioned facing the parietal pleura, and an ePTFE non-adhesive side facing towards the visceral pleura, thus in an intrapleural position, with an overlap of 3 cm in relation to the defect, anchored with transmuscular sutures in the superior and inferior intercostal spaces of the defect. (Fig.3) There was no pleural effusion by the time of the surgery.

Postoperative evolution was uneventful, and the patient was discharged asymptomatic on day 5. Nine months after surgery he remained asymptomatic, without hernia recurrence and with an improvement in his quality of life. (Fig.4)

DISCUSSION AND CONCLUSION

Given the low incidence of pulmonary hernias, and the lack of any guidelines, their treatment is not always straightforward. It is, however, an entity that has become more frequent with the advent of thoracoscopy, in theory explained by

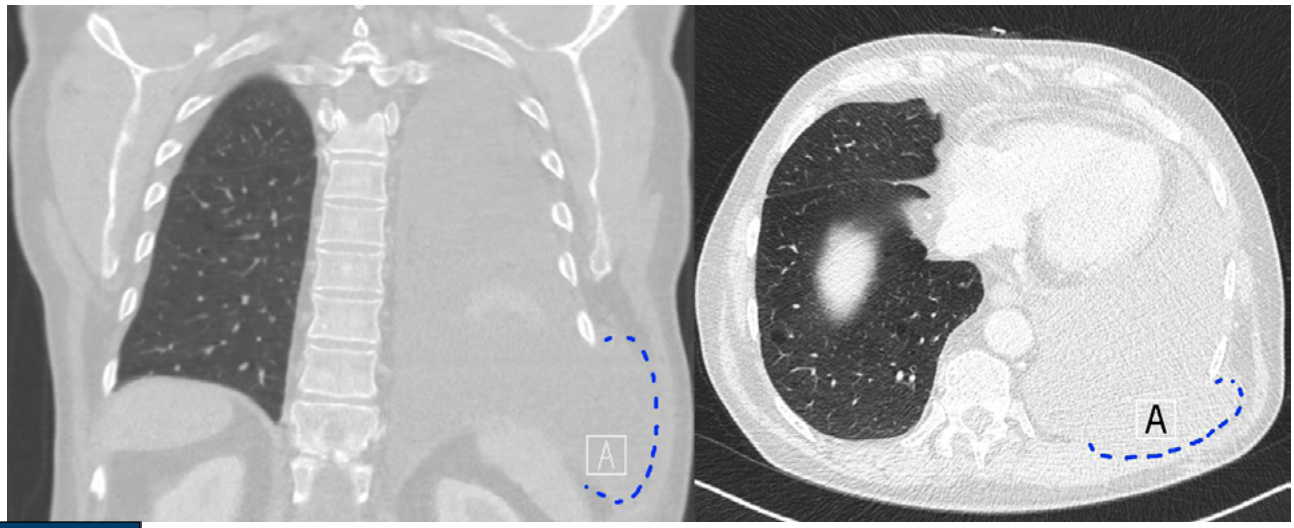

Figure 2 *Coronal and axial chest CT sections with left pleural effusion and ipsilateral pulmonary hernia (A) The blue dashed line delineates the hernia defect*

Figure 3 *Image of hernia correction with double-faced mesh*

less care with incision closure compared to thoracotomies.[7]

Risk factors for pulmonary herniation are increased intrathoracic pressure such as in obese patients or patients with chronic obstructive pulmonary disease, corticosteroid therapy, malnutrition, diabetes, smoking or collagen diseases.[1,8] The use of CPAP in patients with sleep apnea, as in the case described, also appears to be a risk factor for herniation.[9]

The management of patients with lung hernia must be on an individual basis. Asymptomatic, small hernias can be treated conservatively with short interval repeat imaging to evaluate spontaneous cure or worsening. Surgery should be considered when the hernia is increasing in size, is symptomatic or shows signs of incarceration. Cosmesis can also be considered.

Small defects (less than 2 cm) can be corrected by direct closure with approximation of the ribs. For wounds with loss of tissue, muscle or bone, the use of meshes and/or muscle flaps to fill the defect can offer a better functional and aesthetic result. Muscle flaps are preferred when there is no tissue to adequately cover the defect, however there is no evidence of the best treatment.[8]

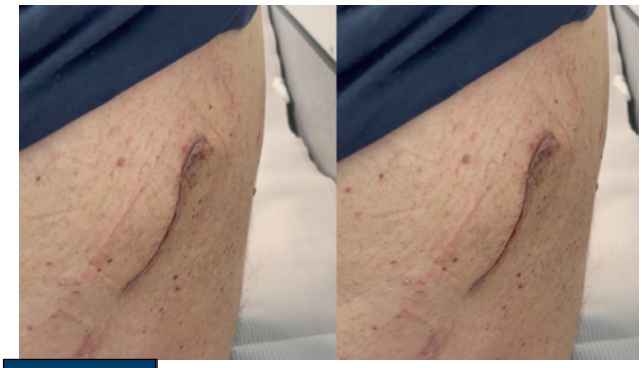

Figure 4 *Absence of herniation at the 9-month consultation (I - inspiration; E - expiration).*

In the presented case, given the size of the defect and symptoms, with the previous partial resection of a rib, it was decided to correct the hernia with an intrapleural mesh, thus functioning as a barrier to intrathoracic pressure. The double-faced mesh of polypropilene and ePTFE promotes parietal side tissue granulation and prevents visceral side pulmonary adhesions. The 3 cm overlap in relation to the defect provides a margin of safety, attending to the contraction of the mesh, thus decreasing the risk of recurrence.[10]

So far, the surgery performed has provided the patient a functional and aesthetic improvement, greatly favoring his quality of life. Similar to what is done in abdominal wall hernia surgery where intraperitoneal meshes are highly proven, this approach with an intrapleural mesh seems to be a safe and effective surgical option in pulmonary hernia.

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