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Symptomatic intercostal lung hernia secondary to sternal dehiscence surgery

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Patient: Male, 60
Final Diagnosis: Iatrogenic intercostal lung hernia
Symptoms: —
Medication: No medication
Clinical Procedure: Surgically corrected
Specialty: Thoracic surgery

Objective: Unusual clinical course

Background: Iatrogenic intercostal lung hernia is a rare thoracic pathology. Injury of intercostal muscles and costochondral separation during median sternotomy and sternal dehiscence surgery are important factors in the development of hernia. We report for the first time a case of a 60-year-old man with acquired lung hernia after sternal dehiscence surgery, presenting as chest pain and exertional dyspnea.

Case Report: A 60-year-old man presented with a 6-week history of progressive exertional dyspnea, particularly following vigorous coughing. Past medical history included slight chronic obstructive pulmonary disease and coronary artery bypass grafting surgery 8 weeks previously, using the left internal mammary artery for the left anterior descending artery via median sternotomy and sternal dehiscence by the Robicsek method. A chest X-ray showed intact sternal and parasternal wires, but the bilateral lung parenchyma appeared normal. A spiral computed tomography scan of the chest found intercostal herniation of the anterior segment of the left upper lobe. The lung hernia was repaired surgically to relieve exertional dyspnea and incarceration, and to improve respiratory function. The postoperative course was uneventful and the patient recovered well.

Conclusions: Intercostal lung hernia after median sternotomy and sternal dehiscence surgery is rare, and it has been previously reported on. Preventive techniques include gentle manipulation of the sternal retractor, avoidance of rib fractures, and using a protective method of intercostal arteries and nerves such as Sharma technique. Thoracic surgeons should be aware of this rare complication in sternal dehiscence surgery.

Key words: postoperative • iatrogenic • intercostal • anterior • lung • hernia

Full-text PDF: <http://www.amjcaserep.com/download/index/idArt/883950>

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Background

Extrathoracic lung hernia is rare. Most hernias are diagnosed either congenitally or after cardiothoracic surgery. Small and asymptomatic lung hernias are almost always managed conservatively. Large hernias should be repaired because they may cause pain, dyspnea, and recurrent infection, and may rupture.

Case Report

A 60-year-old man presented with a 6-week history of progressive exertional dyspnea, particularly following vigorous coughing. His medical history included slight chronic obstructive lung disease and coronary artery bypass grafting surgery 8 weeks previously, using the left internal mammary artery for the left anterior descending artery via median sternotomy and sternal dehiscence by the Robicsek method. On chest examination, a 5 cm focal bulge was observed during coughing in the left upper hemithorax (Video: Focal bulge during coughing in the left upper hemithorax; at website).

A chest X-ray showed intact sternal and parasternal wires, but the bilateral lung parenchyma appeared normal. A spirometry showed slight obstruction and a moderate restrictive respiratory pattern. Forced expiratory volume in 1 second (FEV1) was 60% of predicted and forced vital capacity (FVC) was 65% of predicted. A spiral computed tomography scan of the chest found intercostal herniation of the anterior segment of the left upper lobe (Figure 1). Only a thin layer of parietal pleura covered the hernia, reaching directly under the skin, at the beginning of the operation. The patient was operated on using polypropylene mesh (Prolen, Ethicon, Johnson & Johnson) to close the herniation. The defect in the third intercostal space was 5×6×7 cm. The lung freed completely without resection and reduced into the thorax. The polypropylene patch was placed deep against the bony thorax and fixed to the rib margins medially and laterally with 0 prolene (Ethicon, Sommerville, NJ) sutures. The patient was discharged from the hospital 4 days later. After 12 months, he was asymptomatic with no recurrent lung hernia; his FEV1 was 67% of predicted and FVC was 82% of predicted.

Discussion

Lung hernia is defined as a protrusion of the lung parenchyma outside the thoracic cage through a musculoskeletal wall defect. Most hernias are diagnosed as either congenital or acquired (post-surgery, traumatic). Post-thoracotomy lung herniation usually develops secondary to surgical resection of a chest wall component and inappropriate reconstruction. Intercostal lung hernias were also reported by authors after video-assisted thoracoscopic surgery, tube removal, pectus bar removal,

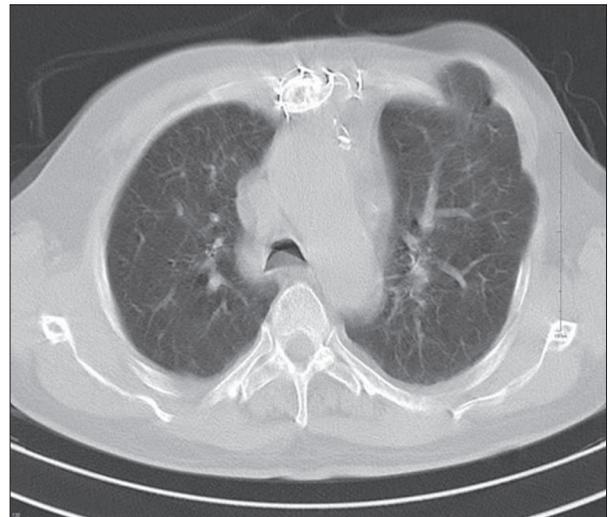


Figure 1. A spiral computed tomography confirmed intercostal herniation of the anterior segment of the left upper lobe.

harvesting of internal mammary artery, minimally invasive direct coronary artery bypass grafting surgery, and thoracotomy [1–5].

We described a case of intercostal lung hernia that developed secondary to sternal dehiscence surgery. The cardiac surgeon operated for sternal dehiscence using the Robicsek method. Parasternal steel wires used in this technique may damage the blood supply to intercostal muscles and nerves [6,7]. They may also cause costochondral separation and intercostal muscular tear. On the other hand, harvesting left internal mammary artery for coronary artery bypass grafting may also damage the intercostal arteries and lead to local tissue ischemia [3]. As a result, thoracic wall resistance decreases and a subsequent hernia may occur, particularly during vigorous coughing.

The diagnosis of lung hernia is sometimes difficult, especially in asymptomatic cases. If selective chest radiographs do not confirm the diagnosis, as in our case, a 3-dimensional computed tomography scan should be taken for precise location and evaluation of the area surrounding the hernia for operative planning. Treatment of symptomatic lung hernia is surgical and should be decided by factors such as size, pain, respiratory distress, recurrent chest infections, and the risk of incarceration of the lung. However, there is controversy regarding the role of surgery, because spontaneous regression may occur.

The type of reconstruction depends on the status of the pleural cavity and the requirement for skeletal support and soft-tissue coverage. McCormack stated that any defect greater than 5 cm should be reconstructed [8]. A variety of materials have been used for lung hernia repair, including Marlex, Vicryl, Prolene mesh, expanded polytetrafluoroethylene patch, or a composite of Marlex mesh and methyl methacrylate.

Conclusions

Intercostal lung hernia after median sternotomy and sternal dehiscence surgery is rare, and it has been previously reported on.

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Preventive techniques include gentle manipulation of the sternal retractor, avoidance of rib fractures, and using a protective method of intercostal arteries and nerves such as Sharma technique [9]. Thoracic surgeons should be aware of this rare complication in sternal dehiscence surgery.