Lung Herniation*

A Cause of Chronic Chest Pain Following Thoracotomy

Anthony F. DiMarco, MD, FCCP; Oscar Oca, MD; and Jeffrey P. Renston, MD, FCCP

Chronic chest pain is a common complication following thoracotomy, which is generally attributed to intercostal neuritis or neuralgia. Response to medical treatment is poor. We report a case of persistent chest pain following open lung biopsy, which was found to result from lung herniation, a rare, but surgically correctable complication of thoracotomy. Since lung herniation may be easily overlooked, this disorder should be considered more often in the differential diagnosis of persistent postthoracotomy chest pain.

(CHEST 1995; 107:777-79)

Key words: pneumonia; intercostal neuralgia; intercostal muscle

Persistent postthoracotomy chest pain, necessitating long-term treatment with analgesic medications, occurs more commonly than is generally appreciated. As many as 10% of patients may experience prolonged chest pain as a complication of thoracic surgical procedures. The cause of such pain is believed to result from intercostal nerve irritation or injury. Generally, the response to therapy is poor.1,2

We describe a patient with persistent chest pain after an open lung biopsy. On evaluation, he was discovered to have herniation of lung parenchyma through the chest wall incisional defect. Thoracic lung herniation is rare after thoracotomy and may not be apparent on routine physical examination or chest radiograph. Therefore, this diagnosis may be easily overlooked and underdiagnosed. However, it is amenable to corrective surgical repair and may result in complete resolution of symptoms. We believe that this complication should be considered more often in the differential diagnosis of persistent postthoracotomy chest pain.

CASE REPORT

A 48-year-old man with a medical history of mild chronic obstructive pulmonary disease and coronary artery bypass graft surgery in 1988 was admitted to the hospital for treatment of bilateral pneumonia. Initial therapy included intravenous cefuroxime and erythromycin. All cultures, including sputum, urine, and blood, were negative. Antibodies to HIV were not detectable. Despite treatment, the patient required intubation and mechanical ventilation for worsening respiratory failure. An open lung biopsy was performed via a right thoracotomy incision on the fifth hospital day in an attempt to establish a diagnosis. Two wedge resections were taken from the right lower lobe. Pathologic examination revealed diffuse alveolar damage and early bronchiolitis obliterans organizing pneumonia. Special stains for fungi, Pneumocystis, and acid-fast bacilli were negative. Corticosteroids were added to the treatment regimen.

The patient's condition gradually improved over the next few days, and he was extubated 48 h following thoracotomy. On the eighth hospital day, a chest tube, which had been placed intraoperatively, was expelled during a forceful cough. A subsequent chest radiograph revealed a 20% pneumothorax that resolved without further therapy. The patient's condition continued to improve, with gradual resolution of his pulmonary infiltrates. He was discharged from the hospital complaining only of mild right-sided chest discomfort. On follow-up at 3 weeks, and again 2 months after hospital discharge, he continued to complain of persistent right lateral chest wall pain in the area of the thoracotomy incision. The pain was described as a gnawing, burning sensation along the incision site over the right lower lateral chest wall, with radiation anteriorly across the abdomen. The pain was made worse with coughing and movement of the right shoulder and chest. Physical examination demonstrated clear lung fields; a chest radiograph was interpreted as normal (Fig 1). The patient was diagnosed as having intercostal neuritis, resulting from the thoracotomy. He was referred for local intercostal nerve block, but this was not effective in relieving his pain. Repeated physical examination, done while the patient performed a Valsalva maneuver, demonstrated a prominent bulging and pressure sensation palpable over the right lateral chest wall near the incision site. A chest radiograph, also performed during a Valsalva maneuver, revealed lung parenchyma in the subcutaneous tissue of the right chest wall, with spaying of the ribs bordering the defect (Fig 2). Lung herniation into subcutaneous tissue was diagnosed based on these findings.

The chest wall defect was corrected surgically. Intraoperatively, the herniation was visualized between the seventh and eighth ribs, extending about 5 cm in length just under the skin, with pleural tissue surrounding the hernia sac. The lung parenchyma was not adherent to the chest cavity, and there was no pleural fluid or evidence of lung trapping. Although there was a thin layer of pleural reaction. The hernia was easily and completely reduced and repaired using intercostal muscle to close the defect. Three weeks following surgical repair, the chest pain had completely resolved.

DISCUSSION

Persistent postthoracotomy chest pain following thoracic surgical procedures has been generally attributed to intercostal neuritis or neuralgia.1 Although the actual incidence is uncertain, such chronic chest pain is believed to occur in only 1 to 3% of patients, based on anecdotal reports.2 However, Dajczman et al1 recently assessed the frequency of chronic postthoracotomy chest pain in 56 patients. In their series, 55% of patients had persistent chest pain lasting more than 1 year following surgery. Although the pain was generally mild in intensity, five patients (approximately 9%) complained of severe pain requiring medical therapy, including daily analgesics and nerve blockade. Response to medical therapy of this condition, however, is generally poor.1,2 In the patient described herein, persistent postthoracotomy chest pain developed following an open lung biopsy, which was due to herniation of lung parenchyma through the chest wall, a rare complication of thoracotomy. In this case, however, chest pain associated with lung herniation completely resolved.

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increase of lung herniation, this feature radiographic pulsion of tissue in the cage. For lung herniation, this most likely results from parietal pleural irritation. The parietal, but not the visceral pleura, has pain fibers and is innervated predominantly by the intercostal nerves. Consequently, the quality of chronic chest pain due to intercostal nerve irritation or injury may overlap significantly with that of lung herniation, leading to underdiagnosis of this disorder.

Initial assessment of our patient, including routine physical examination and chest radiographs (performed at total lung capacity), did not yield a specific diagnosis, and intercostal nerve injury or irritation was assumed. Routine evaluation, therefore, would have resulted in a misdiagnosis. Careful examination, including palpation of the incision site during performance of a Valsalva maneuver, was necessary in order for lung herniation to become apparent. A chest radiograph performed during the Valsalva maneuver confirmed the diagnosis (Fig 2). Forced expiration, particularly against a closed glottis, and the consequent increase in intrathoracic pressure, results in the expulsion of lung tissue across the chest wall defect, which is readily evident on a chest radiograph. Another interesting radiographic feature is the splaying apart of the ribs, enlarging this defect (Fig 2). This most likely occurred as a result of contraction of the internal intercostal muscles of the lower rib cage in the interspaces above and below the incision, causing abduction of the ribs away from the defect. Since internal intercostal muscle tissue in the area of the defect is damaged and nonfunctional, the space becomes enlarged.

Herniation of lung tissue through a thoracic interspace is rare, usually resulting from chest trauma.5-7 Surprisingly, in most large series reporting morbidity associated with thoracotomy, lung herniation is never mentioned as a complication.8-10 Possibly, this disorder may be overlooked, due to difficulty in diagnosis and a lack of consideration of lung herniation as a cause of chronic chest pain.

FIGURE 1. Routine chest radiograph. At total lung capacity, there was no indication of lung herniation.

FIGURE 2. Chest radiograph during a Valsalva maneuver. Herniated lung tissue is indicated by the arrows.

Lung Herniation Causing Pain After Thoracotomy (DiMarco, Renston, Oca)
In summary, the signs of lung herniation may be subtle, and specific physical examination techniques, such as performance of a Valsalva maneuver, may be necessary to elicit findings of this disorder. Since the symptoms of lung herniation appear to overlap those resulting from intercostal neuritis or neuralgia, we recommend that lung herniation be considered in the differential diagnosis of all patients with persistent postthoracotomy chest pain.

REFERENCES


Acute Sarcoid Myositis With Respiratory Muscle Involvement*

Case Report and Review of the Literature

David Ost, MD; Anjana Yeldandi, MD; and David Cugell, MD, FCCP

A 61-year-old woman with a history of sarcoidosis presented with acute sarcoid myositis affecting the respiratory muscles. The patient responded to prednisone therapy with improved pulmonary function test results and resolution of her symptoms. Acute myositis is a rare manifestation of sarcoidosis and should be treated with steroids.

(Chest 1995; 107:879-82)

Key words: myositis; myopathy; respiratory muscle weakness; sarcoidosis

Muscle involvement in sarcoidosis is relatively common, with noncaseating granulomas demonstrated in 50 to 80% of all patients with sarcoid. Clinically significant muscle involvement is rare, however, with less than 0.5% of all patients in several large series reporting any type of symptomatic muscle involvement. Acute myositis is the least frequent form of sarcoid muscle involvement, with only 18 cases reported. Because it is so unusual, its natural history, prognosis, and optimal management are poorly defined. We describe a patient with known sarcoidosis for 2 years who developed an acute inflammatory myositis with mildly elevated creatine phosphokinase (CPK) values and respiratory muscle involvement in whom extensive noncaseating granulomas with inflammation and degeneration of muscle fibers was found on muscle biopsy specimens. Treatment with prednisone led to dramatic clinical improvement.

CASE REPORT

A 61-year-old black woman presented with increasing upper and lower extremity weakness over a 3-week period. Two years earlier, she developed uveitis and was noted to have liver disease. A liver biopsy specimen revealed noncaseating granulomas and a diagnosis of sarcoidosis was made. She was treated with a prednisone taper and then prednisolone acetate (Forte) ophthalmic drops and did well until approximately 7 months prior to hospitalization when hypercalcemia was found.

After further evaluation, including parathyroid hormone levels, this was thought to be secondary to her sarcoidosis. With prednisone treatment, her calcium level returned to normal. The prednisone dosage was tapered and then discontinued after 6 months. Two weeks after stopping the prednisone therapy, she noted progressive weakness of her arms and legs, more so in the lower than in the upper extremities. The weakness progressed over the next 3 weeks and she had to use a cane and then a walker to ambulate.

When admitted to the hospital, she was no longer able to walk or get up from a sitting position without assistance. She also complained of myalgias, especially in her shoulders and hips, and increasing dyspnea on exertion for the last 2 days. She denied fevers, chills, or arthralgias. Her medications were prednisolone ophthalmic drops and atropine ophthalmic drops. The family

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*FVC=forced vital capacity; FEV₁=forced expiratory volume in 1 s; TLC=total lung capacity; RV=residual volume; MVV=maximum voluntary ventilation.

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