

Case Report

A rare complication of tuberculosis: chronic empyema thoracis with bronchopleural fistula - a case report

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ABSTRACT

Bronchopleural fistula associated with chronic empyema thoracis is an uncommon and potentially fatal tuberculosis (TB) complication. Bronchopleural fistula remains one of the most serious life-threatening complications but is fortunately rare. We report a case of a 24-year-old male who presented with cough with expectoration, breathing difficulty, pain at right side of chest. Lab investigations and intraoperative findings revealed thickened pleura with calcifications, caseating material, adhesions and fluid build-up with a bronchopleural fistula. The patient underwent surgical decortication of right lung and fistula closure, followed by antitubercular therapy. This case emphasizes how critical it is to identify and treat this uncommon issue as soon as possible. It also underscores the need for a multidisciplinary approach in the treatment of such complex cases. Early treatment is key to reducing the risk of death and other complications.

Keywords: Chronic empyema thoracis, Bronchopleural fistula, Tuberculosis, Decortication, Thoracotomy

INTRODUCTION

Empyema thoracis is defined as the presence of pus in the pleural space or a purulent pleural effusion.^{1,2} Pneumonia is the most common cause of empyema, where it can also be caused by tuberculosis, lung abscess, chest surgery, chest injuries, or trauma. Empyemas that are four weeks and above in duration are chronic by definition. They go through three distinct phases: the acute exudative stage (stage I), the subacute fibrinopurulent phase (stage II), and the chronic organizing phase (stage III) of empyema. Thickened visceral and parietal peels are characteristic of chronic empyema. They hinder any further expansion of the affected lung and consequently mandate definitive surgical intervention: decortication with or without lung resection; pleural obliteration procedures such as myoplasty and/or thoracoplasty.³ BPF has been defined as direct communication between the bronchus and pleural space.⁴ BPF may develop from a number of unusual

conditions involving lung resection, lung necrosis, persistent spontaneous pneumothorax, trauma, chemotherapy or radiotherapy, tuberculosis, and infections among others.⁵ Tuberculosis (TB) is a bacterial infection usually affecting the lungs, but it may also spread to other tissues. One rare but potentially life-threatening complication of TB is chronic empyema thoracis with bronchopleural fistula (BPF). Here, we report a case of chronic empyema thoracis with BPF complicating pulmonary TB, highlighting the diagnostic and therapeutic challenges associated with this rare condition.

CASE REPORT

A 24-year-old male patient was admitted to the cardiothoracic vascular surgery department with chief complaints of cough with expectoration, pain on the right side of the chest, and breathing difficulty for 3-4 weeks. The patient had a past medical history of pulmonary

tuberculosis and has been on anti-tubercular treatment (ATT) for one month. Clinical findings of the patient showed the presence of pus drainage and an air leak from the ICD tube. The physician advised lab investigations such as X-ray and culture tests based on subjective evidence. Culture and sensitivity tests for pus showed plenty of pus cells with gram-negative bacilli, and the organism isolated was *Pseudomonas aeruginosa*. X-ray shows presence of broncho-pleural fistula at right side of lung base, and impression is suggestive for chronic empyema thoracis.

Intraoperative findings show overcrowding of right-sided ribs and thickened (1.5 cm), hard, and calcified parietal pleura at all areas around the chest wall, thickened visceral pleura, which is adherent to the lung surface, and the right lung is fibrosed and shrunken in size; a BP fistula is noted in the lower lung, and caseous material is found in the pleural cavity. Pleural fluid analysis for ADA and proteins was increased, but pleural fluid for sugar is reduced, which is suggestive for chronic empyema thoracis. Other lab investigations, such as complete blood picture, PTINR, blood urea, serum creatinine, bleeding and clotting time, and pleural fluid analysis, were performed. Abnormal values were shown in Tables 1-3. X-ray defining the disease was depicted in Figure 1. The patient was finally diagnosed with chronic empyema thoracis with broncho-pleural fistula on the right side.

Table 1: Complete blood picture.

Parameters	Result	Normal range
Hb (g/dl)	13.2	13-18
Polymorphs (%)	85	50-70
Lymphocytes (%)	11	25-40
Eosinophils (%)	01	1-4
Monocytes (%)	03	3-8
Platlet count (lakhs/cmm)	5,08,000	1.5-4
PCV (%)	37	40-54

Table 2: Pleural fluid analysis.

Parameters	Result	Normal range
Pleural fluid for ADA (IU/l)	145	<30
Pleural fluid for proteins (gm/dl)	4.8	<2.0
Pleural fluid for sugar (mg/dl)	58	60-100

Table 3: PTINR test values.

Parameters	Result	Normal range
Prothrombin time (sec)	17.2	13-15
INR	1.32	0.8-1.2

Treatment

Numerous procedures were present to treat chronic empyema thoracis and broncho-pleural fistula. The patient's treatment plan was right lung decortication and transpleural broncho fistula closure. The patient received a transfusion of one unit of red blood cells. An antibiotic sensitivity test was performed on the patient. Initially, the patient was treated with injection Magnex forte 1.5 gm IV BD, Pantop DSR capsule OD, tablet Doxomax-XP BD, tablet Dytor plus 10/50 mg OD, tablet Livogen-Z OD, tablet Anxit 0.25 mg HS, tablet Dulcolax HS, and nebulization with Duolin 6th hourly. Deep breathing and spirometry exercises were also performed. After 3 days, surgery was performed by right posterolateral thoracotomy; right lung decortication and broncho-pleural fistula in the lower lobe were closed with Surgicel and 3.0 silk sutures after debridement.

Metronidazole was added to cefoperazone and sulbactam postoperatively. Other drugs include 40 mg of Pantop IV OD, 100 mg of Tramadol in 100 ml NS IV TID, 1 gm of Paracetamol IV TID, 5 mg of Lasix IV BD, 4 mg of Emeset IV TID, and nebulization with Duolin 6th hourly. Spirometry was also performed. Later, syrup Ascoril LS, ATT tablet OD, tablet Chymoral forte, 40 mg of Benadone tablet OD, and Fourt B tablet were added. Lasix was replaced with the tablet Dytor plus. Protein powder with milk was also administered later. Patient was stable during discharge.

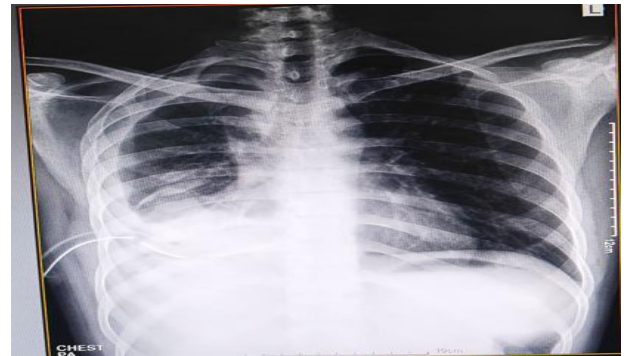


Figure 1: X-ray of the patient at the time of admission.

DISCUSSION

Empyema thoracis from the Greek is defined as collection of pus in the chest.⁶ Acute condition of the disease can be treated by antibiotics and thoracentesis, VATS therapy whereas chronic condition is treated by decortication, thoracoplasty, open window thoracostomy and rib resection. In the management of empyema thoracis, both VATS and open thoracotomy decortication may be recommended. However, failed or converted VATS and advanced-stage empyema patients can be managed quite well with open thoracotomy decortication.⁸ Decortication was performed in this case, which is consistent with

previous reports highlighting the importance of surgical intervention in the management of chronic empyema thoracis.⁸

BPF is an abnormal passageway between the bronchial tubes and the pleural space in the lungs. BPFs have a high morbidity and mortality and can be difficult to control. BPF is also frequently caused by infection, while treatment consists of drainage, antibiotics, and either surgical or bronchoscopic closure of the fistula.^{7,9} Different methods, from aggressive combinations of thoracoplasty, myoplasty, omentoplasty, and complete pneumonectomy, have been employed to achieve these ends.⁹ That means without timely intervention, serious sepsis, multiorgan failure, contamination of the contralateral lung, and even death can occur. BPF was closed surgically after debridement by using surgical and silk sutures in this case. Tuberculosis is the main cause in this case in both chronic empyema thoracis and BPF.

Zhongliaung et al concluded that multidisciplinary approach combining open-window thoracostomy, endoscopic Amplatzer device implantation, and pedicled muscle flap transfer is the better treatment option for elderly patients with bigger fistulas and empyema.¹⁰ In contrast, our patient undergone decortication of right lung and BPF is closed surgically which probably helped to achieve a positive outcome.

Histopathological report of excised pleura (decortication of lung) of the patient is suggestive for caseating granulomatous lesion of Koch's etiology of right pleura which was removed during surgery. Culture and sensitivity test of tissue after surgery shown negative for bacterial growth, which indicates that the infection was effectively controlled with antibiotic therapy. ICD tube was inserted to drain the fluid. The patient responded well to treatment, which included anti-tubercular and antibiotic medication, as seen by the notable improvement in radiographic findings and symptoms.

Goals of therapy of eradicating infection, re-expanding lung, fistula closure and fluid drainage were achieved. To our knowledge there were no case reports of chronic empyema thoracis associated with bronchopleural fistula which are complicated by tuberculosis. Early diagnosis and treatment help to prevent further complications.

CONCLUSION

Chronic empyema thoracis with bronchopleural fistula is a rare and serious TB complication that makes it hard to diagnose and treat. This example emphasizes the need for early detection and treatment of this illness to avoid future

problems and enhance patient outcomes. Managing such situations requires a multidisciplinary strategy that includes pulmonologists, thoracic surgeons, and infectious disease experts. Despite the difficulties, with proper treatment and care, individuals with this condition can have considerable clinical improvement and quality of life.

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