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Case Report

When Pulmonary Tuberculosis Leads to Pneumothorax: An Unusual Presentation

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Abstract: Secondary spontaneous pneumothorax (SSP) is a rare but critical complication of pulmonary tuberculosis (TB), typically resulting from cavitary lung disease. A 38-year-old male presented with pleuritic chest pain and fever. Imaging revealed a left-sided pneumothorax and cavitary lesions. The diagnosis was confirmed via sputum analysis positive for Mycobacterium tuberculosis. The patient was treated with standard anti-TB therapy and a chest drain, leading to clinical improvement. SSP in TB arises due to ruptured subpleural lesions, necessitating prompt management of both pneumothorax and TB. Early diagnosis and integrated treatment are essential, especially in high-prevalence regions.

Keywords: Spontaneous Pneumothorax; Pulmonary Tuberculosis; Lung Cavitation; Thoracic Radiography; Thoracic Drainage.

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1. Introduction

Spontaneous pneumothorax (SP) is an uncommon complication of pulmonary tuberculosis (TB) that has resurged in high TB-burden regions. Approximately 1% of individuals with active TB develop secondary spontaneous pneumothorax (SSP), primarily due to significant lung destruction [1, 2]. SSP's impact is particularly pronounced in resource-limited settings where TB remains a major public health challenge. While improved diagnostics and treatment protocols have reduced TB-related pneumothorax, its resurgence necessitates a deeper understanding of its epidemiological significance and management strategies [3-5]. Although, pleural drainage remains an effective intervention for managing this complication [1].

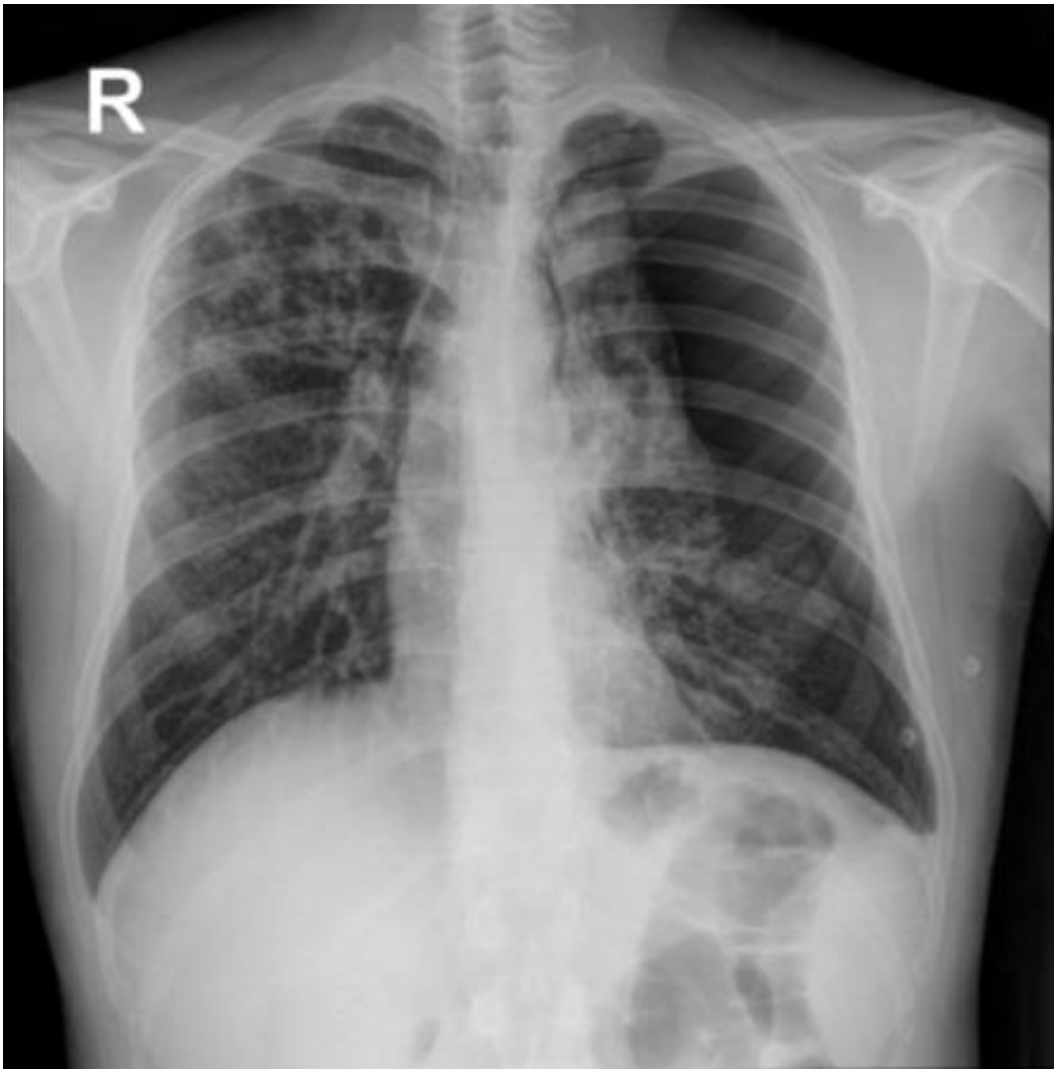
2. Case Report

A 38-year-old male presented to the emergency department with pleuritic chest pain, tearing pain, and fever. On admission, the patient was eupneic with an oxygen saturation of 98% on room air. Pulmonary auscultation revealed absent vesicular breath sounds over the left hemithorax. Imaging findings on a posteroanterior chest radiograph included a left-sided pneumothorax accompanied by partial collapse of the left lung and patchy opacities in the upper zones of both lungs. In contrast, the lower lung zones appeared relatively clear but exhibited mild diffuse opacities on the left side (Figure 1).

The thoracic CT revealed tree-in-bud and irregular centroacinar and centrilobular nodularities in both lungs, with areas of coalescence forming foci of consolidation, more extensive in the left lung. There were also cavitary lesions with irregular walls in the upper segment of the left lower lobe and the upper lobes, which were bigger in the left upper

lobe and measuring approximately 3 cm. These lesions were found to communicate with the bronchial tree via drainage bronchi, and small bronchiectasis was observed in the left upper lobe.

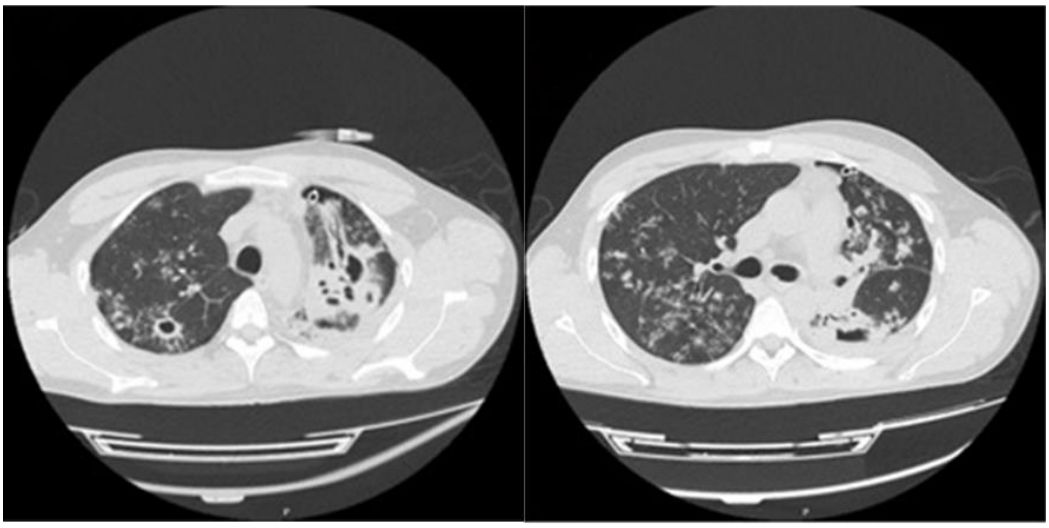
Figure 1. Posteroanterior chest radiograph showing a left-sided pneumothorax, with a well-defined visceral pleural line and partial lung collapse. Nodular opacities are evident in the upper thirds of both lungs.



The hemithorax exhibited asymmetry, with the left side being smaller. A thoracic drain was observed on the left, inside a pneumothorax with maximum pericentimetric thickness, and a small pleural effusion of millimetre thickness was found in the left costophrenic sinus. (Figure 2). Differential diagnoses, such as necrotising pneumonia or malignancies, were considered but excluded based on clinical, radiologic, and the following microbiologic findings.

A sputum sample confirmed pulmonary TB via positive acid-fast bacilli and *Mycobacterium tuberculosis* without rifampicin resistance using PCR (GeneXPERT). The patient began treatment with isoniazid, rifampicin, pyrazinamide, and ethambutol, with favourable clinical and radiologic outcomes. A chest drain inserted in the fifth intercostal space along the mid-axillary line facilitated lung re-expansion and was removed after one week.

Figure 2. Axial thoracic CT scan demonstrating thick-walled cavitary lesions in the left upper lobe with surrounding ground-glass opacities and consolidation. A chest drain is visible in the left pleural space.



3. Discussion

SSP represents a life-threatening complication resulting from underlying lung diseases, including chronic obstructive pulmonary disease (COPD), cystic fibrosis, necrotising pneumonia, and malignancies. Historically, SSP was prevalent in advanced pulmonary tuberculosis (TB) due to extensive lung destruction. Recent advancements in TB management have reduced its occurrence; however, SSP remains a significant challenge in regions with high TB prevalence [1, 5]. In tuberculosis, SSP arises from ruptured subpleural caseous lesions or cavitary pulmonary disease, which compromises pleural integrity and allow air to leak into the pleural cavity. This phenomenon is particularly common in multi-drug-resistant TB (MDR-TB) or co-infections such as HIV, exacerbating disease severity and complicating management [8,9].

Effective SSP management requires a dual approach: resolving the pneumothorax and addressing the underlying TB infection. Standard interventions include chest tube placement to re-expand the lung and anti-TB regimens consisting of rifampicin and isoniazid. Advanced cases may necessitate surgical options like pleurodesis or pleurectomy to prevent recurrence [10]. Updated WHO guidelines emphasise integrated care pathways that prioritize early diagnosis and multidisciplinary management for such cases [4]. Imaging remains indispensable in SSP diagnosis and follow-up. Chest radiographs can detect pneumothorax and related abnormalities, while CT scans provide detailed visualisation of cavitary lesions, their dimensions, and associated complications [6]. Differential diagnoses—such as necrotising pneumonia or pulmonary malignancies—must be carefully considered to avoid misdiagnosis and ensure appropriate treatment [7].

This case illustrates the critical role of radiological assessment and microbiological confirmation in diagnosing SSP caused by TB. Chest radiography identified pneumothorax and suspicious opacities, prompting further investigation with CT imaging. The identification of cavitary lesions, combined with sputum analysis, confirmed TB as the underlying cause. Public health considerations are paramount in TB-related SSP, especially in resource-limited settings where diagnostic and treatment facilities may be constrained. Training healthcare workers in recognising and managing SSP, coupled with strengthening TB control programs can mitigate associated morbidity and mortality. This case underscores the importance of comprehensive TB care models that address not only the primary disease but also its severe complications.

4. Conclusion

SSP is a rare but critical complication of active TB, marked by significant lung destruction. Clinical vigilance and radiologic expertise are paramount for timely diagnosis and management. This case emphasizes the importance of integrated TB care, especially in high-prevalence regions. Future research should explore long-term outcomes, surgical interventions, and strategies for managing SSP in resource-constrained environments.

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Conflicts of Interest: The authors declare no conflicts of interest.

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