

Case Report

Recurrent Acute Febrile Respiratory Episodes Unmasking Lower Lung Field Tuberculosis: Importance of Bronchoscopy in Early Diagnosis

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Abstract: Lower lung field tuberculosis (LLFTB) is an uncommon presentation of pulmonary tuberculosis and is often misdiagnosed as bacterial pneumonia or other lower respiratory tract infections. Its atypical radiographic pattern and transient response to empirical antibiotics can delay definitive diagnosis. We report the case of a 50-year-old male who presented with recurrent episodes of acute febrile respiratory illness, each separated by a two-week symptom-free interval. The patient required hospitalization on three occasions. Each episode showed partial remission with empirical antibiotic therapy, but symptoms recurred after antibiotic withdrawal. Chest radiography demonstrated infiltrates confined to the lower lung fields. HRCT (high resolution computerised tomography) imaging's documented nodular infiltrates in right middle and lower lobe with mild pleural effusion. Given the recurrent nature and incomplete resolution, flexible bronchoscopy was performed as a point-of-care diagnostic tool, revealing endobronchial changes suggestive of tuberculosis and yielding bronchial washings positive for *Mycobacterium tuberculosis* on GeneXpert MTB/RIF assay. The patient was initiated on standard first-line anti-tubercular therapy with marked clinical and radiological improvement, and no further relapses over a 6-month follow-up. LLFTB can mimic recurrent bacterial pneumonia. Early bronchoscopy at the point of care facilitates timely diagnosis and initiation of specific therapy, preventing repeated hospitalizations and morbidity.

Keywords: LLF TB, Pneumonia, Bronchoscopy, Bronchial Wash, Point of Care Test.

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INTRODUCTION

Lower lung field tuberculosis (LLFTB) is an uncommon presentation of pulmonary tuberculosis (TB) that often mimics community-acquired pneumonia (CAP), leading to frequent misdiagnosis and treatment delays, especially in high TB-burden settings [1, 2]. Radiographic involvement of the lower lung zones may obscure suspicion of TB, particularly when the patient exhibits partial but incomplete response to empirical antibiotics [3].

Bronchoscopy with bronchoalveolar lavage (BAL) has emerged as a critical diagnostic tool in such cases. The application of nucleic acid amplification tests (NAATs) on BAL specimens provides rapid and accurate detection of *Mycobacterium tuberculosis*, even in smear-negative or radiologically atypical presentations [4, 5]. Recent guidelines from the World

Health Organization (WHO) and the American Thoracic Society (ATS) emphasize the utility of molecular diagnostics in improving early case detection and treatment initiation [1-5].

We present the case of a 50-year-old male with recurrent acute febrile respiratory illness, admitted three times within six weeks for right lower lung field consolidation showing partial response to antibiotics. Bronchoscopic evaluation with BAL confirmed LLFTB, highlighting the importance of early endoscopic intervention and targeted microbiologic testing in patients with non-resolving or recurrent lower lung field infiltrates.

CASE HISTORY

A 50-year-old male, with no significant past medical history, presented to our center with recurrent episodes of acute febrile respiratory illness over the

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preceding six weeks. The patient reported three separate hospitalizations at two-week intervals, each episode characterized by high-grade fever, productive cough, and malaise. During each admission, laboratory workup revealed leukocytosis, and chest radiography demonstrated lower lung field opacities. He was managed in line with community-acquired pneumonia (CAP) of partial-responding type, receiving broad-spectrum antibiotics with temporary symptomatic improvement. However, symptoms recurred within days of discontinuing antibiotics. His chest imaging's

sequential follow up during first hospitalization showing ground glass opacification in right lower zone [Image 1 A], during second hospitalization inhomogeneous infiltrates in right lower zone [Image 1 B].

At the time of presentation to our center, the patient complained of persistent low-grade fever, cough with scant expectoration, anorexia, and significant weight loss suggestive of cachexia. There was no history of hemoptysis, night sweats, or known tuberculosis contact. He denied smoking or alcohol consumption.

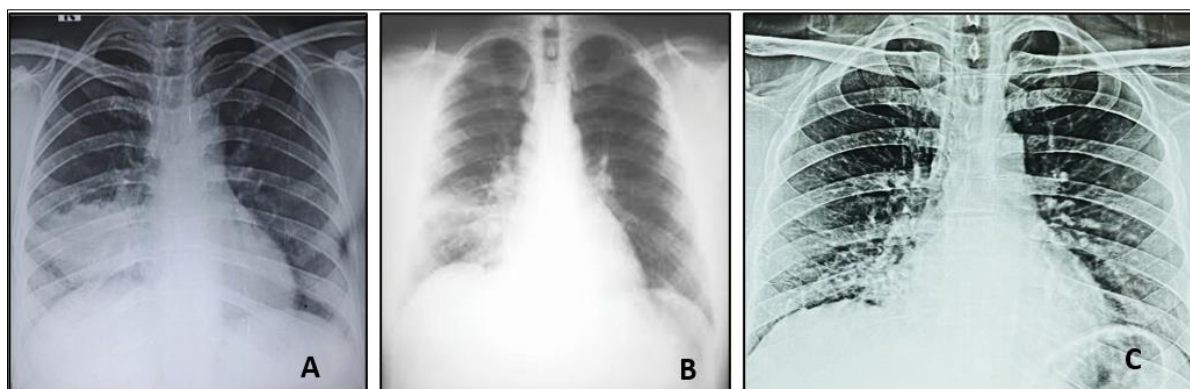


Image 1: Chest x-ray posteroanterior view showing consolidation [A], Infiltrates [B] & Infiltrates with nodules [C]

On general examination, the patient appeared ill and undernourished, with a body mass index of 17.8 kg/m². Vital signs were notable for a temperature of 38.2 °C, pulse rate 98/min, blood pressure 110/70 mm Hg, and respiratory rate 22/min. Oxygen saturation on room air was 94%.

Respiratory system examination revealed diminished breath sounds with coarse crepitations over the right lower lung field. No clubbing, cyanosis, or peripheral lymphadenopathy was observed. Cardiovascular, abdominal, and neurological examinations were unremarkable.

Investigations at presentation showed leukocytosis (total leukocyte count 14,800/mm³, neutrophil predominant), erythrocyte sedimentation rate (ESR) of 58 mm/hr, and C-reactive protein (CRP) elevated at 46 mg/L. HIV serology was negative. Chest imaging's this time showing infiltrates with nodular opacities in right lower zone. [Image 1 C]. Radiological assessment is consistent with partial response to medical treatment with reappearance of clinical symptoms after withdrawal of antibiotics as per patients' treatment records. HRCT imaging's showing nodular infiltrates in right middle and lower lobe with pleural effusion right thoracic cavity. [Image 2]

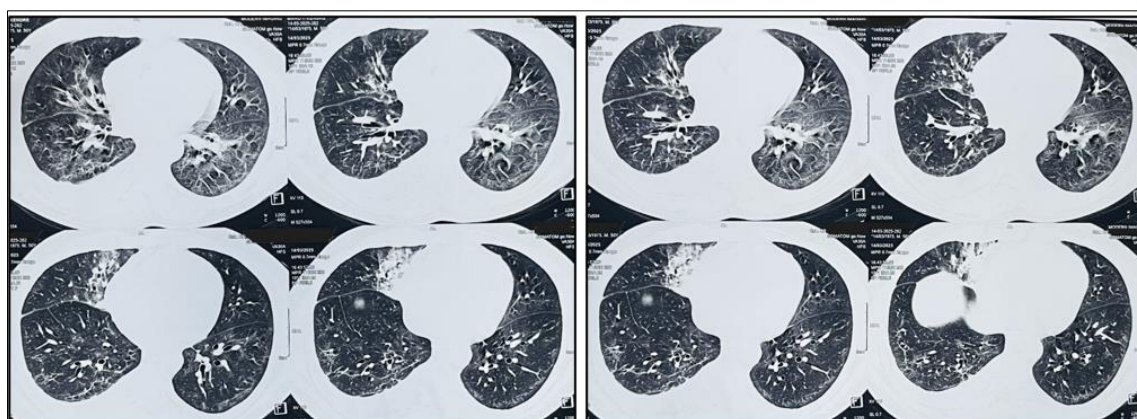


Image 2: HRCT imaging's showing nodular infiltrates in right middle lobe and lower lobe with pleural effusion right side

Given the recurrent nature of symptoms, lower lung field involvement, and partial response to empirical antibiotic therapy, a diagnostic flexible bronchoscopy

was performed. The bronchoscopic examination revealed inflamed unhealthy mucosa with narrowing of the right middle lobe bronchus and increased rugosity

right lower lobe bronchus [Image 3] Bronchoalveolar lavage (BAL) fluid was sent for microbiological evaluation, including Gram stain, culture, and nucleic acid amplification test (NAAT) for *Mycobacterium*

tuberculosis. The NAAT returned positive for *M. tuberculosis*, and Ziehl–Neelsen staining demonstrated acid-fast bacilli.

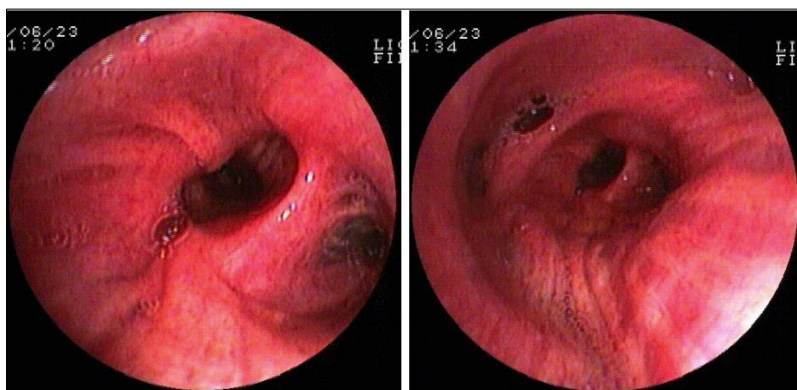


Image 3: Fiberoptic bronchoscopy showing narrowed right middle lobe bronchus with unhealthy mucosa

Based on these findings, a final diagnosis of lower lung field tuberculosis was established. The patient was initiated on standard four-drug antitubercular therapy (isoniazid, rifampicin, pyrazinamide, ethambutol) under the national TB control program. He was counselled regarding adherence, nutritional supplementation, and infection control measures.

DISCUSSION

Lower lung field tuberculosis (LLFTB) is an uncommon presentation of pulmonary TB, accounting for approximately 7–18% of adult pulmonary TB cases in various series [6]. The lower lung zones are anatomically defined as the areas below a horizontal line drawn through the hila on a standard posteroanterior chest radiograph. This definition is important because the lower lung fields on a frontal radiograph do not correspond strictly to the lower lobes anatomically; portions of the upper lobes can project into the lower zones on frontal imaging [6].

Lower lung field tuberculosis (LLFTB) is an uncommon radiological manifestation of pulmonary TB, more frequently observed in elderly individuals, diabetics, and those with immunosuppressive conditions [1]. The pathophysiology is not fully understood, but hypotheses include preferential oxygen distribution to lower lung segments in certain physiologic states, gravitational effects, and prior lung injury predisposing to mycobacterial colonization [7].

Clinically, LLFTB often mimics bacterial pneumonia, particularly when presenting with acute febrile illness, productive cough, and localized crepitations [3]. Partial response to antibiotics, as seen in our patient, can mislead clinicians toward prolonged bacterial pneumonia rather than TB. This diagnostic delay is significant because atypical site involvement may be associated with higher bacillary load and more rapid radiologic progression [5].

Radiologically, LLFTB can present as segmental or lobar consolidation, volume loss, or pleural effusion in the lower zones, often without cavitation [8]. This makes the differentiation from other lower lung pathologies—such as bacterial pneumonia, lung abscess, or aspiration pneumonia—challenging [9].

In cases of non-resolving or recurrent pneumonia, guidelines recommend early bronchoscopy with BAL to obtain material for microbiological and molecular testing [8]. NAATs, such as Xpert MTB/RIF, on BAL specimens have demonstrated sensitivity exceeding 85% in smear-negative pulmonary TB and can significantly shorten the diagnostic interval [10]. Our patient's diagnosis was confirmed by BAL NAAT, highlighting the value of targeted endoscopic investigation in recurrent lower lung field infiltrates.

Early diagnosis is crucial not only for initiating effective therapy but also for reducing transmission and preventing unnecessary antibiotic exposure, which contributes to antimicrobial resistance. This case reinforces that in endemic areas, LLFTB should remain high in the differential for recurrent or partially responsive lower respiratory tract infections, especially when constitutional symptoms such as weight loss and anorexia are present.

Key Features of Tb in This Scenario:

- **Initial Response to Antibiotics** – TB infections can sometimes show partial improvement with broad-spectrum antibiotics due to their anti-inflammatory effects, leading to a false sense of resolution.
- **Relapse After Antibiotic Withdrawal** – Since TB is caused by *Mycobacterium tuberculosis*, which requires specific anti-TB treatment, standard antibiotics do not provide a lasting cure, leading to recurrent symptoms.

- **Prolonged or Undiagnosed TB** – TB can mimic other infections, and in cases where fever persists despite multiple antibiotic courses, further investigations such as sputum culture, TB PCR, Mantoux test, or imaging (e.g., chest X-ray, CT scan) are needed.
- **Extrapulmonary TB Possibility** – If pulmonary TB symptoms are absent, other forms such as lymph node, bone, or disseminated TB (miliary TB) should be considered.

Key Learning Points from the Case:

- LLFTB can masquerade as recurrent lower-lobe pneumonia, leading to diagnostic delays.
- Radiographic patterns are non-specific and require microbiological confirmation.
- Risk factors such as diabetes and immunosuppression should heighten suspicion.

CONCLUSION

Lower lung field tuberculosis is an uncommon but important differential diagnosis in patients with recurrent or partially resolving lower respiratory tract infections, especially in TB-endemic regions. Early consideration of bronchoscopy with BAL and NAAT can facilitate rapid confirmation, prevent diagnostic delay, and enable timely initiation of anti-tubercular therapy. This case highlights the value of maintaining a high index of suspicion for atypical TB presentations to improve patient outcomes.

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