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CASE SERIES

Cryptic consolidation on chest x-ray: A Case Series Misdiagnosis of Lung Cancer as Pulmonary Tuberculosis

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ABSTRACT

Background: Pulmonary tuberculosis (TB) and lung cancer are two major global health concerns that often present with similar symptoms, making diagnosis challenging.**Case report:**We present a case series of five patients who were initially misdiagnosed with pulmonary TB but were later found to have lung cancer.The patients presented with non-specific respiratory symptoms, and initial chest X-rays and empirical treatment for TB did not lead to a definitive diagnosis. Further investigation, including computed tomography (CT) scans, bronchoscopy, and histopathological examination, revealed underlying lung cancer. The cases highlight the importance of thorough diagnostic evaluation in patients presenting with non-specific respiratory symptoms. Misdiagnosis of lung cancer as pulmonary TB can lead to delayed diagnosis and inadequate treatment. A comprehensive diagnostic approach, including CT scans, bronchoscopy, and histopathological examination, is essential to ensure accurate diagnosis and timely management.**Conclusion:** Lung cancer is often misdiagnosed as pulmonary TB, leading to delayed diagnosis and progression of disease. A thorough diagnostic workup is essential to differentiate lung cancer from pulmonary TB and ensure timely treatment.

Keywords: Lung cancer, pulmonary tuberculosis, misdiagnosis, delayed diagnosis, comprehensive diagnostic approach.

INTRODUCTION

Tuberculosis and lung cancer are two major global health concerns that continue to exact a significant toll on human life. According to estimates, approximately 8.8 million new cases of tuberculosis emerge worldwide each year. Meanwhile, lung cancer affects over 1.61 million people globally, claiming the lives of more men than any other type of cancer.[1]

In 2023, India is estimated to have had 27 lakh TB cases, of which 25.1 lakh were diagnosed and put on treatment.[2]The high prevalence of tuberculosis in India, coupled with the overlap of its clinical presentation with lung cancer, can lead to misdiagnosis, particularly in resource-constrained settings.[3]Furthermore, the clinical symptoms and morbidity characteristics of lung cancer and TB are very similar and often misdiagnosed.[4]As a result, a significant number of early-stage lung cancer patients may be mislabeled as having tuberculosis, resulting in delayed diagnosis and treatment of lung cancer. Here, we present a case series of five patients who initially presented with lung opacities on chest X-ray (CXR) that were diagnosed as pneumonia or pulmonary tuberculosis (sputum smear-negative). Contrast-enhanced computed tomography (CECT) of the chest revealed air space consolidation. Following a 4-6 week follow-up period, the lung opacities persisted, prompting further investigation with bronchoscopy and bronchial biopsy. Histopathological examination of the biopsy specimens ultimately confirmed a diagnosis of malignancy in all five cases.

CASE 1

A 60-year-old male, a laborer by occupation, presented to our hospital with a chief complainof progressive shortness of breath, dry cough, left-sided chest pain, and significant weight loss.A chest X-ray (CXR) revealed a homogeneous opacity in the left lower zone. Subsequent contrast-enhanced computed tomography (CECT) of the chest demonstrated a large, heterogeneously enhancing consolidation in the left lower zone, with cutoff of the left main bronchus.

Empirical anti-tubercular therapy (ATT) was initiated by a private physician 10 days prior to presentation

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without undergoing any other diagnostic test including sputum acid-fast bacillus (AFB) test.

A diagnostic bronchoscopy was performed, and bronchoalveolar lavage (BAL), brushing, and biopsy samples were obtained. Histopathological examination of the biopsy specimen revealed features consistent with squamous cell carcinoma. Additionally, BAL Genexpert testing was negative for Mycobacterium tuberculosis (MTB).

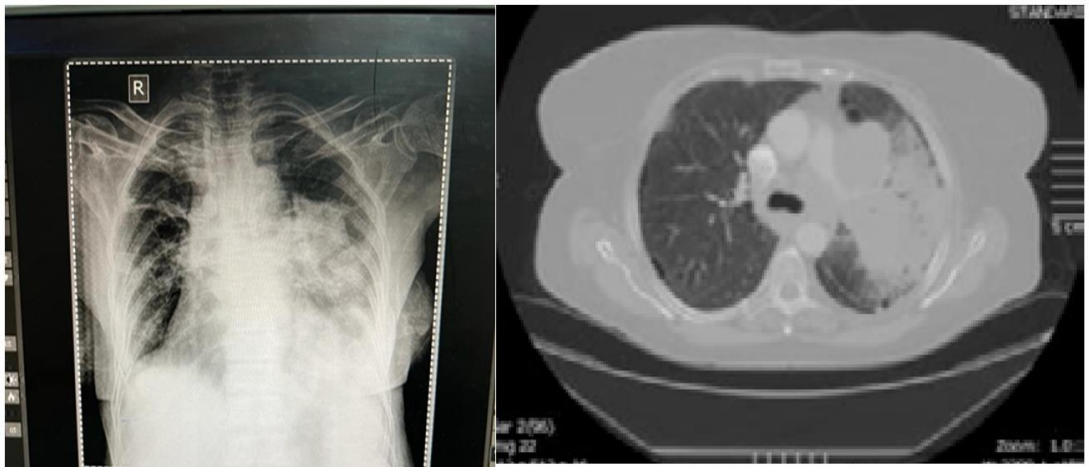

Figure 1:Chest X-ray (CXR) showing a homogeneous opacity in the left lower zone. Figure 2: Contrast-enhanced computed tomography (CECT) of the chest demonstrating a large, heterogeneously enhancing consolidation in the left lower zone, with cutoff of the left main bronchus.

CASE 2

A 52-year-old male presented to our hospital with a 6-month history of antitubercular therapy (AKT), initiated empirically based on radiological findings. Despite treatment, the patient complained of persistent fever, chronic cough with mucoid expectoration, left-sided chest pain, and hoarseness of voice.

A fresh chest X-ray (CXR) was obtained, which revealed no significant radiological improvement compared to previous imaging studies. The CXR showed a persistent homogeneous opacity in the left upper zone. Subsequent contrast-enhanced computed tomography (CECT) of the chest demonstrated a mass lesion in the left upper lobe, with encroachment on the left main stem bronchus.

Sputum acid-fast bacillus (AFB) testing was negative. To further investigate the cause of the patient's symptoms and radiological findings, a diagnostic bronchoscopy was performed. Bronchoalveolar lavage (BAL), brushing, and biopsy samples were obtained. Histopathological examination of the biopsy specimen revealed features consistent with epithelial malignancy. Immunohistochemical (IHC) staining confirmed the diagnosis of non-small cell lung cancer (NSCLC), likely adenocarcinoma. Additionally, BAL Genexpert testing was negative for Mycobacterium tuberculosis (MTB).

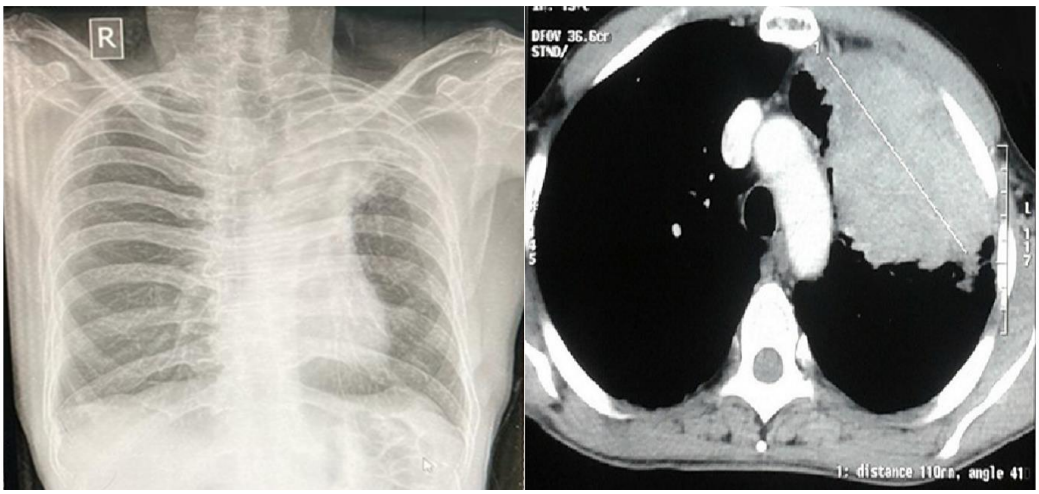

Figure 3: Chest X-ray (CXR) showing a persistent homogeneous opacity in the left upper zone. Figure 4: Contrast-enhanced computed tomography (CECT) of the chest demonstrating a mass lesion in the left upper lobe, with encroachment on the left main stem bronchus

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CASE 3

A 50-year-old malewith a history of alcoholism and no smoking habit, presented to our hospital with a chief complainof progressive shortness of breath, dry cough, and freshly developed chest pain. Additional symptoms included hoarseness of voice and episodes of giddiness.Initial chest X-ray (CXR) was reported as normal. However, due to high clinical suspicion, a contrast-enhanced computed tomography (CECT) scan of the chest was performed. The CECT scan revealed a large mass lesion (measuring 10.1 cm x 7.5 cm x 9.1 cm) in the anterior segment of the right upper lobe, associated with a bronchial cutoff sign and encasement of the upper lobe pulmonary artery.

The patient also presented with headache, loss of consciousness, and episodes of seizures. A neurology consultation was sought, and a magnetic resonance imaging (MRI) scan of the brain was performed. The MRI revealed thick, ring-enhancing lesions with perilesional disproportionate edema in the right thalamus and left occipital areas, suggestive of hemorrhagic metastasis.

A diagnostic bronchoscopy was performed to investigate the cause of the patient's respiratory symptoms and radiological findings. Bronchoalveolar lavage (BAL), brushing, and biopsy samples were obtained. Histopathological examination of the biopsy specimen revealed highly dysplastic cells with few vascular emboli. Bronchial brushing and BAL cytology were consistent with epithelial malignancy. Immunohistochemical (IHC) staining confirmed the diagnosis of probable adenocarcinoma. Additionally, BAL Genexpert testing was negative for Mycobacterium tuberculosis (MTB).

Figure 5:CECT scan revealed a large mass lesion (measuring 10.1 cm x 7.5 cm x 9.1 cm) in the anterior segment of the right upper lob

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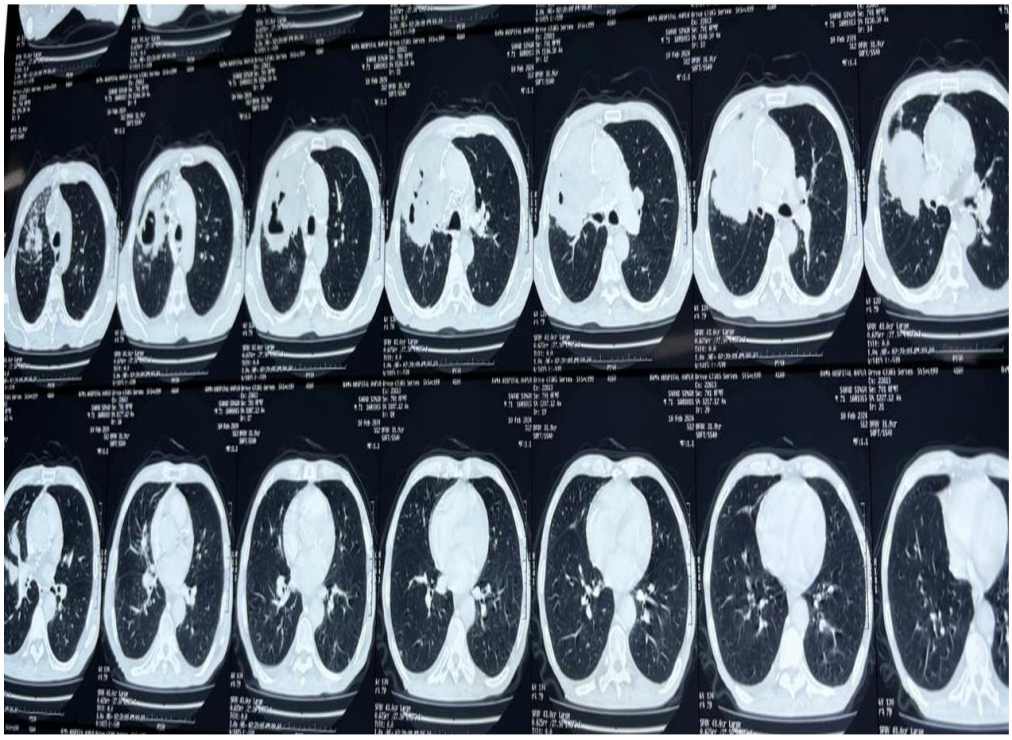

Figure 6:CECT chest

CASE 4

A 60-year-old male laborer, with a history of chronic bidi smoking and no alcohol consumption, presented to our hospital with a chief complain of progressive shortness of breath, intermittent fever, left-sided chest pain, and significant weight loss.Initial chest X-ray (CXR) revealed a non-homogeneous opacity in the left upper zone. Subsequent contrast-enhanced computed tomography (CECT) of the chest demonstrated a large soft tissue attenuation mass with heterogeneous enhancement and irregular spiculated margins, measuring 87 mm x 86 mm x 58 mm.

The patient was initially treated for community-acquired pneumonia with antibiotics. However, due to lack of improvement, empirical anti-tubercular therapy (ATT) was suggested. A respiratory medicine opinion was sought, and we deferred empirical ATT.

A diagnostic bronchoscopy was performed to investigate the cause of the patient's respiratory symptoms and radiological findings. A biopsy sample was obtained, and histopathological examination revealed poorly differentiated non-small cell carcinoma. Bronchoalveolar lavage (BAL) Genexpert testing was negative for Mycobacterium tuberculosis (MTB).

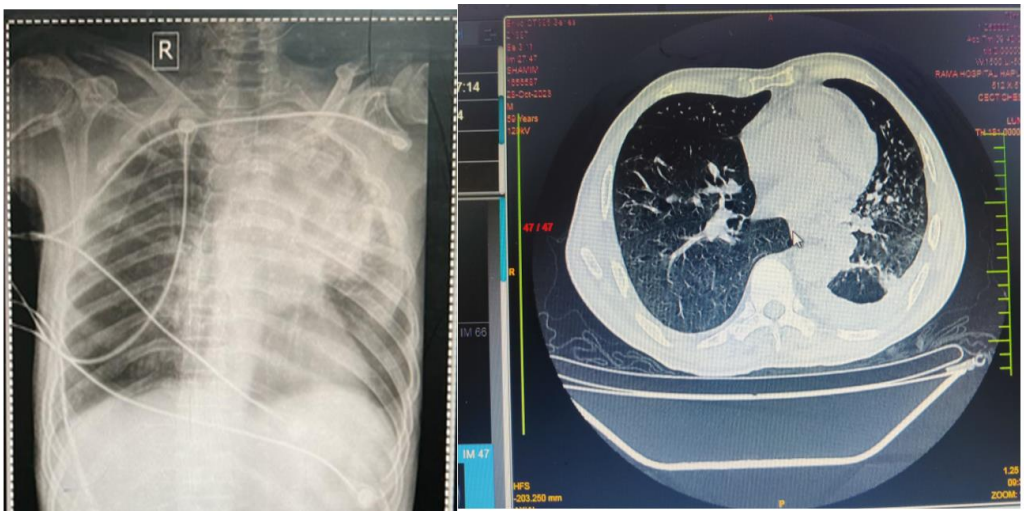

Figure 7: Chest X-ray (CXR) showing a non-homogeneous opacity in the left upper zone (arrow). Figure 8: Contrast-enhanced computed tomography (CECT) of the chest demonstrating a large soft tissue attenuation mass with heterogeneous enhancement and irregular spiculated margins in the left upper lobe (arrow), measuring 87 mm x 86 mm x 58 mm.

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CASE 5

A 71-year-old male presented to our hospital with a 2-month history of progressive breathlessness, cough with minimal expectoration, and right-sided chest pain. He also reported significant weight loss and worsening breathlessness over this period. The patient had been empirically started on anti-tubercular therapy (ATT) by a private physician, but unfortunately developed ATT-induced hepatitis.

A chest X-ray (CXR) revealed air space consolidation involving the left mid and lower zones. Subsequent contrast-enhanced computed tomography (CECT) of the chest demonstrated air space consolidation in the left upper and lower lobes, accompanied by mediastinal lymphadenopathy.

A diagnostic bronchoscopy was performed to investigate the cause of the patient's respiratory symptoms and radiological findings. Bronchoalveolar lavage (BAL), brushing, and biopsy samples were obtained. Histopathological examination of the biopsy specimen revealed features consistent with epithelial malignancy. BAL Genexpert testing was negative for Mycobacterium tuberculosis (MTB).

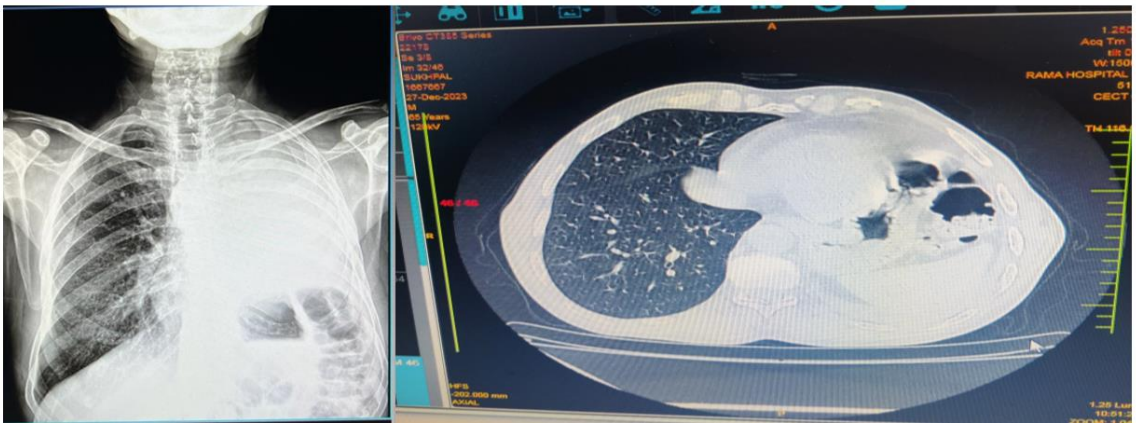

Figure 9: Chest X-ray (CXR) showing air space consolidation involving the left mid and lower zones.
Figure 10: Contrast-enhanced computed tomography (CECT) of the chest demonstrating air space consolidation in the left upper and lower lobes, accompanied by mediastinal lymphadenopathy.

DISCUSSION

The cases presented here highlights the importance of thorough diagnostic evaluation in patients presenting with non-specific respiratory symptoms. Despite initial empirical treatment for tuberculosis, further investigation revealed an underlying diagnosis of squamous cell carcinoma in case 1, non-small cell lung cancer (NSCLC), likely adenocarcinoma in case 2, adenocarcinoma in case 3, revealed poorly differentiated non-small cell carcinoma in case 4 and epithelial malignancy in case 5. These cases underscores the need for a comprehensive diagnostic approach to ensure accurate diagnosis and timely management.

Misdiagnosis of pulmonary tuberculosis (TB) in patients with cancer is a significant concern in clinical practice, leading to delayed diagnosis and inadequate treatment. Kabashi-Muçaj S et al[5] reported the case that highlighted the importance of accurate diagnosis, including a patient who was misdiagnosed with TB for nearly two years before being correctly diagnosed with pulmonary mucinous adenocarcinoma. Similarly, a study by Shu CC et al[6] analyzing 6,683 misdiagnoses of TB as lung cancer found that similar imaging findings and positive sputum acid-fast staining were common contributing factors. Another case report by Luo T et al[7] documented a case of a man with a history of close contact with TB who exhibited clinical symptoms and lung CT scan findings that strongly indicated pulmonary TB. However, the diagnosis was ultimately confirmed to be lung adenocarcinoma on endoscopic biopsy.

Physicians primarily rely on chest X-rays as the initial step for detecting the LC or PTB. One of the major reasons of misdiagnosis may be the unremembered art of examination of chest X-rays and its mis-interpretation by clinicians in the era of advanced magnetic resonance imaging (MRI) and computed tomography (CT) scan. Lack of awareness, high cost of diagnosis and limited availability of high-end diagnosis machines in developing countries adds to wrong judgment.[8]

Pulmonary tuberculosis and lung cancer often present with similar symptoms, making diagnosis challenging. However, careful history-taking and physical examination can help clinicians suspect lung cancer. Key distinguishing features include a history of tobacco smoking, sudden weight loss, and non-specific fever. Lung cancer often presents with a persistent cough, hemoptysis, dyspnea, hoarseness of voice, chest pain, and unexplained weight loss. A new cough lasting more than two weeks in patients over 40 with a smoking history should raise suspicion of lung cancer. Hemoptysis, dyspnea, and chest pain are also alarming symptoms that warrant thorough investigation. Lung cancer can also present with metastatic symptoms, such as bone pain, pathological fractures, and progressive neurological symptoms. A thorough diagnostic workup is essential to

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differentiate lung cancer from pulmonary tuberculosis and ensure timely treatment.[1,9]

The relationship between lung cancer and pulmonary tuberculosis is complex and multifaceted, making differential diagnosis a significant challenge. Accurate identification of these two conditions is crucial, as they require distinct treatment approaches. Ultimately, histopathological examination remains the gold standard for definitive diagnosis of both tuberculosis (TB) and lung cancer, providing a clear and reliable basis for guiding treatment decisions.[4]

Bronchoscopy is a valuable diagnostic tool in cases of tuberculosis, particularly when sputum is non-productive or smear examination is negative.[10] During bronchoscopy, various findings may be observed, including granulomatous ulcers, solitary ulcers, hyperplastic lesions, and fibrostenotic lesions.[11] The use of fiber optic bronchoscopy (FOB) and analysis of bronchoscopic secretions (BAL, brushing) and transbronchial lung biopsy (TBLB) material can aid in the diagnosis of sputum smear-negative pulmonary tuberculosis. Conventional diagnostic methods, such as acid-fast bacillus (AFB) smear, mycobacterial culture, and histopathology, can be complemented by molecular methods like polymerase chain reaction (PCR) to confirm the diagnosis.[12]

The present cases serve as a reminder that a definitive diagnosis of TB requires positive pathology results. Clinicians should exercise caution when diagnosing TB, particularly in patients with symptoms suggestive of TB but without pathogenetic evidence, to avoid misdiagnosis and ensure timely and appropriate treatment.

CONCLUSION

A clinician or general practitioner's failure to accurately diagnose lung cancer can result in treatment delays, incorrect treatments, or no treatment at all. Additionally, misinterpretation of chest radiograph results and the initiation of anti-tubercular treatment for suspicious chest opacities without proper evaluation using appropriate investigative methods such as CT scans, sputum cytology, and bronchoscopy contribute to the delay.The high cost and inaccessibility of diagnostic investigations such as CT scan, and bronchoscopy may contribute to their inadequate utilization early enough. An additional disturbing fact was that only a small proportion of these patients had a conclusive microbiological diagnosis of tuberculosis.

Collectively, these factors contribute to delayed diagnosis and disease progression. This phenomenon highlights the frequent misdiagnosis of lung cancer as pulmonary tuberculosis, resulting in patients receiving presumptive anti-tubercular therapy (ATT) without microbiological confirmation. Consequently, this leads to significant delays in diagnosing cancer. In the current era of evidence-based medicine, it is imperative that we adhere to a rigorous diagnostic approach, requiring concrete microbiological evidence before initiating ATT. By doing so, we can minimize the likelihood of misdiagnosing malignant cases that mimic infectious lesions.

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