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Tuberculosis Mimicking As Lung Cancer

Dr. Nisha Salim Parveen[1*], Dr. Bushra Khan[2]

[1]Senior Resident, Department of Pulmonary Medicine, ANIIMS Port Blair, MPFW+7Q6 Pant Hospital, Old Ayush Building, Near DHS Annexe Building Near Rear Gate Of G.B, Atlanta Point, Port Blair, Andaman and Nicobar Islands 744104
[2]Junior Resident, Department of Pulmonary Medicine, ANIIMS Port Blair, MPFW+7Q6 Pant Hospital, Old Ayush Building, Near DHS Annexe Building Near Rear Gate Of G.B, Atlanta Point, Port Blair, Andaman and Nicobar Islands 744104

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***Corresponding author:** Dr. Nisha Salim Parveen
Senior Resident, Department of Pulmonary Medicine, ANIIMS Port Blair, MPFW+7Q6 Pant Hospital, Old Ayush Building, Near DHS Annexe Building Near Rear Gate Of G.B, Atlanta Point, Port Blair, Andaman and Nicobar Islands 744104

Abstract **Case Report**

Confusing lung masses constitute a challenging clinical problem for differentiating between cancer and lung infections. Tuberculosis as a diagnostic mimicker can resemble malignancy. Cases of PTB that mimic lung cancer are encountered on occasion. TB often gets misdiagnosed because of its varied clinical presentations, which results in delay in treatment initiation and unnecessary diagnostic procedures. Here, we report a case of 65 year old male smoker who presented with hemoptysis and a right hilar mass on chest x-ray which was subsequently proven to be tuberculosis with the help of invasive diagnostics and responded to a six months course of anti-tubercular medications. The clinical symptoms and radiologic features of PTB are nonspecific and resemble lung cancer, therefore accurate diagnosis of these two diseases remain a diagnostic dilemma in the clinic [1-5].

Keywords: Tuberculosis, lung mass, malignancy, diagnostic mimicker.

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INTRODUCTION

Tuberculosis continues to be a major cause of morbidity and mortality worldwide. In 2020, the World Health Organization (WHO) estimated that approximately 5.8 million individuals were diagnosed with TB disease, with 1.5 million deaths [6]. Accordingly, TB has killed more humans than any other pathogen, after prolonged coevolution to optimize its pathogenic strategies [7]. It is the top global infectious pandemic after coronavirus disease 2019 (COVID-19) caused by the pathogen *Mycobacterium tuberculosis* [7]. TB greatly mimics malignancy as clinical symptoms and radiographic characteristics of both the diseases are quite similar [8]. Since the treatment of TB and cancer is entirely different, it is critical to find out the distinctions between neoplasm and TB to provide an accurate and timely diagnosis. In the present report, we describe the case of a 65-year-old male with pulmonary TB who was on the verge of being misdiagnosed with lung cancer.

CASE REPORT

A 65-year-old male came with chief complaints of hemoptysis along with unintended weight loss of 5 kg in the past 2 months. He had no history of fever, cough, sputum production, chest pain, dyspnoea and had no relevant past medical history. The person was a smoker and had estimated 20 pack-years with no family history of lung cancer or any other type of cancer. There were no abnormalities reported on physical examination. Laboratory evaluation, including leukocytes (L) and C-reactive protein (CRP), were within normal limits. Urine complete examination revealed normal findings. On the sputum, acid-fast bacilli were not detected, gene xpert tested negative for MTB and malignant cytology was not identified. An X-ray of the chest showed a right hilar mass.

CECT chest showed evidence of a large centrally placed irregularly marginated mass lesion involving right upper lobe, middle and lower lobe with pleural, vascular and mediastinal infiltration along with mediastinal lymphadenopathy suggestive of lung carcinoma.

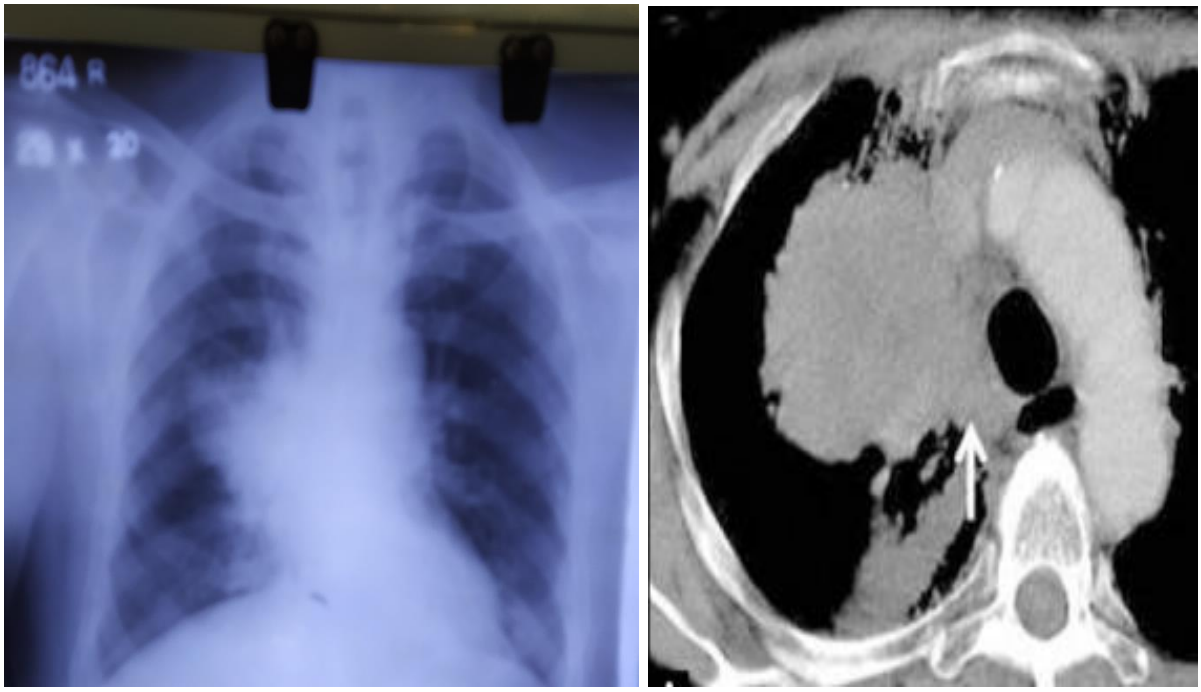

Figure 1: a) Chest X-ray PA view of the patient showing right hilar enlargement, b) CT chest of the same patient showing centrally located mass with irregular margins and mediastinal invasion

Figure 2: c) PET-CT shows the mass was intensely FDG avid, with a SUV_{max} of 15.5, d) Chest X-ray of the patient at the end of the course of anti-tubercular treatment showing complete resolution of the right hilar mass

Under the presumptive diagnosis of malignancy, a whole-body ^{18}F-labeled fluoro-2-deoxyglucose positron emission tomography (^{18}F-FDG-PET) and CT scan was ordered which indicated high metabolic activity in the lesion. Hence, on the basis of clinical history and radiological findings a provisional diagnosis of lung cancer was made. The patient underwent bronchoscopy with brush and forceps biopsies. Histopathological examination revealed caseous granulomatous inflammation with no evidence of malignancy. GeneXpert performed on BAL revealed the presence of Mycobacterium tuberculosis. Thus, pulmonary tuberculosis (PTB) diagnosis was established by pathological and microbiological examination. The patient was initiated on standard anti-TB treatment constituting of isoniazid, rifampicin, pyrazinamide and ethambutol. The patient continued with standard antituberculous therapy for a period of six months and gradually improved clinically and radiologically.

DISCUSSION

Tuberculosis (TB) is the main cause of death worldwide among the various infectious diseases of adults. Pulmonary TB and lung metastasis have been found to mimic each other with clinical and radiological features [8]. Typical manifestations of PTB are generally easy to diagnose as they have defined clinical characteristics and radiographic findings. However,

many symptoms of PTB, including cough, hemoptysis and weight loss are also common in lung cancer [9]. Meanwhile, typical radiographic features indicating lung cancer, including thick-walled cavities and high fluorodeoxyglucose (FDG) uptake on PET are also seen in PTB [10], and so patients exhibiting asymptomatic PTB mimicking lung cancer are often misdiagnosed with lung cancer.

The common symptoms observed in both the diseases are persistent cough, severe weight loss, weakness (fatigue), loss of appetite, chest pain and fever. However, age of the patient, history of smoking, mediastinal symptoms such as hoarseness of voice, Superior Vena Cava (SVC) obstruction, and dysphagia favor the diagnosis of lung cancer. On examination, there may be signs of collapse or mass, clubbing and metastatic and non-metastatic complications of lung cancer. In the present case, the classic symptoms of TB, such as fever and cough, were not present, and hemoptysis and weight loss in a chronic smoker signalled more towards lung cancer. The best and most cost-effective way to reduce diagnostic error to deal with chameleon TB is the AFB test examining three sputum specimens over three consecutive days, which in this case turned out negative as the patient didnot have cough or sputum production. As pulmonary tuberculosis can present with any radiological appearance in countries like India where tuberculosis is rampant, sometime tuberculoma on CT scan can be misdiagnosed as lung cancer or metastasis due to its appearance resembling mass. PET-CT imaging relies on radiopharmaceutical FDG accumulation in increased glucose metabolic areas, so may be used to detect active TB and evaluate the response to anti-tuberculosis therapy in patients [11]. Generally, malignant lesions have a significantly higher FDG uptake than benign lesions. The SUV_{max} cut-off of 2.5 was considered to be a diagnostic threshold for differentiating benign and malignant lesions [12]. However, TB has an extensive range of SUVs, which may be due to its varying degree of granulomatous inflammation. It is not uncommon for TB lesions have a SUV_{max} >2.5, thus false-positive diagnoses may be made, particularly in tuberculosis-endemic areas. To increase the diagnostic accuracy in the assessment of confusing lung masses, SUV values as well as other clinical and radiological results should be integrated. In the present report, even CECT chest and PET-CT findings could not differentiate between TB and lung cancer. Bronchoscopy is another useful diagnostic modality for aiding the diagnosis of both pulmonary tuberculosis as well as lung cancer. Performing Fiber Optic Bronchoscopy (FOB), and subjecting the bronchoscopic secretions (BAL, brushing)/TBLB material to conventional diagnostic methods of AFB smear, mycobacterial culture and histopathology is helpful in the diagnosis of sputum smear negative pulmonary tuberculosis. In our case, an early use of FOB turned out to be the best course of action to reach a definite diagnosis of tuberculosis. Through anti-TB treatment, the patient was cured, which in turn supported our diagnosis.

CONCLUSION

To conclude, tuberculosis is a great mimicker and diagnostic chameleon and is prone to be diagnosed as cancer [13]. Patients with PTB mimicking lung cancer usually exhibit abnormal chest CT presentation and increased glucose uptake, which may be extremely similar to lung cancer. The misdiagnosis may result in delayed treatment for PTB and unnecessary operations, further increasing the severity and complications of PTB. To increase the diagnostic accuracy in the assessment of confusing lung masses, dynamic thinking should be adopted by the clinicians and the value of biopsy and ^{18}F-FDG-PET in distinguishing TB and cancer should be emphasized and the results of clinical, radiological and histopathological examination should be integrated to reach a definite diagnosis.

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