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Case Report

Coexistence of lung cancer in a patient with non-tuberculous mycobacteria

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ABSTRACT

Nontuberculous mycobacteria (NTM) may mimic lung carcinoma as a solitary mass or miliary nodules, the coexistence of NTM and lung carcinoma is rare. The diagnosis may be delayed due to a high initial index of suspicion for mycobacterium tuberculosis complex rather than malignancy in an endemic country like India. We report a rare case of 47-year-old male who presented with exertional dyspnea, cough with expectoration and fever was initially treated with anti-tuberculous drugs following a mycobacterium avium complex growth in BAL cultures. Despite treatment, patient's condition worsened, and computed tomography (CT) guided biopsy was done which showed adenocarcinoma. This case report highlights that a lung biopsy is a necessity for accurate diagnosis, and a positive NTM culture doesn't always exclude a concomitant lung carcinoma.

Keywords: Nontuberculous mycobacteria, Lung carcinoma, Bronchoscopy, Biopsy

INTRODUCTION

Mycobacterial pulmonary diseases and lung cancer are two of the most common diseases causing morbidity and mortality worldwide. In India nontuberculous mycobacteria (NTM) isolation rates has increased from 0.9% to 1.6% with a prevalence of 1.1% in the past decade while lung carcinoma has a prevalence of 5.9%.[1,2] Although certain studies have shown a significant relationship between previous tuberculosis infection and lung cancer, concomitant existence of both entities has been rarely documented. In this case report, we present a rare case of NTM with coexistent lung carcinoma and the need for advanced invasive procedures in prompt diagnosis.

CASE REPORT

A 47-year-old male, a coir worker by occupation presented with complaints of exertional dyspnea of 1-week duration, which progressed to grade 4 over a period of 4 days. He also had cough associated with scanty, mucoid expectoration and low-grade intermittent fever. He was a chronic smoker with a smoking index of 200. Radiological imaging showed multiple centrilobular nodules arranged in tree in bud pattern and few coalescing into consolidation seen scattered diffusely in both lungs and a thin rim of loculated effusion seen adjacent to superior segment of right lower lobe with costal pleural thickening. Sputum for acid-fast bacilli (AFB) smear was negative. Sputum cartridge based nucleic acid amplification testing (CB-NAAT) showed *Mycobacterium tuberculosis* (MTB) not detected. Ultrasonography (USG) thorax- a thin rim of fluid anterior aspect of right chest with volume of 50 ml. Pleural fluid analysis showed a low adenosine deaminase (ADA) (26.3) exudative lymphocyte (90%) predominant effusion, fluid cytology was negative for malignancy and CBNAAT showed MTB not detected. Patient was consequently initiated on anti-tubercular therapy based on clinical and radiological suspicion of miliary tuberculosis.

On general examination patient was malnourished (BMI of 14.8 kg/m^2), tachycardic, tachypneic and had a room air saturation of 84%. A physical examination revealed

muscle wasting. On auscultation, diminished intensity of breath sounds were heard bilaterally. Scattered coarse end inspiratory crepitations and tubular bronchial breath sound heard over bilateral interscapular, infra-axillary areas. Routine blood investigations showed total leucocyte count of 9050 cells/mm^3, predominantly neutrophilic, erythrocyte sedimentation rate (ESR)-31 mm/hour, glycated haemoglobin (HbA1c) of 6.4. Repeat chest X-ray showed bilateral heterogenous and reticulonodular opacities in bilateral lung fields.

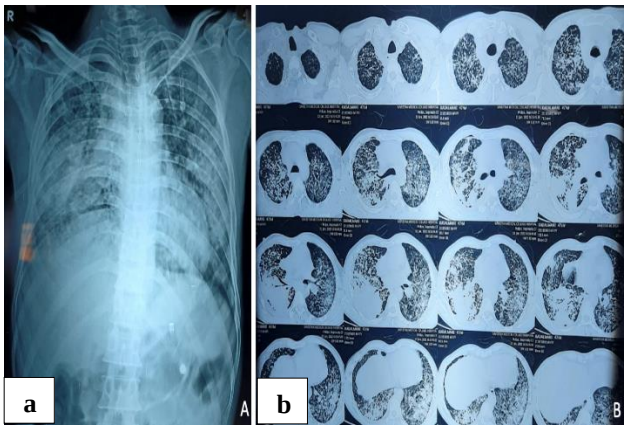

Figure 1: (a) Chest X-ray, and (b) CT thorax.

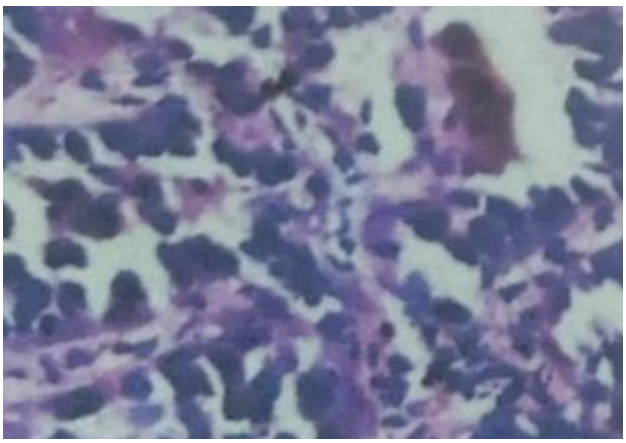

Figure 2: Lung pathology specimen.

Since there was no clinical or radiological improvement, we then proceeded with a fiberoptic bronchoscopy. A bronchoscopy guided biopsy could not be carried out as the patient desaturated and hence only a bronchial wash was taken. His bronchial wash fluid examinations for AFB were positive, CBNAAT revealed MTB not detected, MGIT culture showed growth of NTM (*Mycobacterium avium* complex). Patient was started on treatment with daily dosage of azithromycin, ethambutol and rifampicin and thrice weekly dosage of amikacin. Repeat chest radiography done after 1 month of treatment showed radiological worsening. Repeat CT thorax showed diffuse interstitial thickening with reticulonodular opacities and diffuse consolidation with air bronchogram in bilateral lung fields. In view of worsening radiological and clinical condition of patient, a CT guided biopsy was done. The final results of the pathological examination of the lesion showed adenocarcinoma and *Mycobacterium avium* complex was detected in the tissue culture. Patient was initiated on chemotherapy (cisplatin and paclitaxel) and is on follow up.

DISCUSSION

NTM are also known as atypical mycobacteria, mycobacteria other than tuberculosis, potentially pathogenic environmental mycobacteria. Approximately, 150-200 species have been described.

There is an increase in the number of cases which can be attributed to increase in number of susceptible and immunocompromised individuals and the availability of better technology for diagnosing the disease. As isolation of the organism does not always indicate clinical infection, it is difficult to precisely determine the incidence and prevalence of NTM pulmonary infections. Furthermore, unlike tuberculosis, NTM infections do not need to be reported to the public health system. Based on radiologic characteristics, NTM pulmonary disorders are divided into fibrocavitary disease and nodular bronchiectatic disease. The radiologic characteristics of nodular bronchiectatic illness are bronchiectasis and branching centrilobular nodules, whereas those of fibrocavitary disease are heterogeneous nodular and cavitary opacities. In immunocompromised individuals, pulmonary and disseminated infections are more common while cervical lymphadenitis is more common among children.

Hong et al investigated individuals with NTM pulmonary disease manifesting as a solitary tumour, solitary mass, or mass-like consolidation that mimicked lung cancer.[3] They discovered that the lesions typically showed poor contrast-enhancement (75%) and internal calcification (43%), which are more commonly encountered in benign lesions, including NTM pulmonary disease. However, they also noticed that the CT characteristics of solitary lesions, such as a lobulated border (71%) or pleural retraction (28%), overlapped with those of primary lung cancer. Although this patient had adenocarcinoma, prior researches found a larger proportion of squamous cell carcinoma.[4,5]

One of the most difficult aspects of lung cancer is obtaining an accurate and timely diagnosis. Unfortunately, radiographic findings and clinical symptoms of TB and lung cancer are similar, including persistent cough, haemoptysis, weight loss, fever, chest discomfort, dyspnea, and lack of appetite.

For the diagnosis of NTM species, laboratories under the National TB Elimination Program (NTEP) should be well-equipped with newer techniques like targeted gene and whole genome sequencing, line probe assays (LPA), and matrix assisted laser desorption ionization-time of flight mass spectrometry (MALDI-ToF MS).[6]

Based on radiological results, it can be difficult to differentiate lung cancer from NTM pulmonary illness. Therefore, in general, procedures such as TBLB and brushing, or lavage during bronchoscopy or a CT guided biopsy, are important for the diagnosis.

This case report highlights that a positive sputum or bronchial lavage fluid culture result does not rule out the possibility of concurrent lung cancer, and a tissue biopsy is always advised to reach a final diagnosis, as was the case for this patient.[3]

CONCLUSION

NTM pulmonary disease can lead to radiologic findings similar to lung cancer and it is of utmost importance to follow up the patients regularly and look for signs of clinical and radiological improvement. When cancer develops against the background of active disease, common symptoms are worsening of patients' general status and further evaluation must be done. Early detection of lung cancer can also raise the likelihood of tumour resectability, and prompt chemo-radiotherapy may improve quality of life.

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