



An Unusual Case of Pulmonary Tuberculosis – A Sarcoid mimic

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I. INTRODUCTION

Tuberculosis (TB), is a contagious disease usually caused by *Mycobacterium tuberculosis* (MTB) bacteria.^[4] Tuberculosis generally affects the lungs, but it can also affect other parts of the body.^[1] Most infections show no symptoms, in which case it is known as inactive or latent tuberculosis.^[4] A small proportion of latent infections progress to active disease that, if left untreated, can be fatal.^[1] Typical symptoms of active TB are chronic cough with blood-containing mucus, fever, night sweats, and weight loss.^[1] Infection of other organs can cause a wide range of symptoms.^[5]

Tuberculosis is spread from one person to the next through the air when people who have active TB in their lungs cough, spit, speak, or sneeze.^{[1][4]} People with latent TB do not spread the disease.^[1] A latent infection is more likely to become active in those with weakened immune systems.^[1] There are two principal tests for TB: interferon-gamma release assay (IGRA) of a blood sample, and the tuberculin skin test.^{[1][6]}

II. CASE REPORT

A middle aged man, farmer by occupation, hailing from Madikeri, Karnataka, chronic regular alcoholic and a chronic regular smoker, with no known comorbidities, came with complaints of intermittent high grade fever and dry cough, worsening all together since 1 month. Fever used to subside with antipyretics, but only to reappear recurrently.

No significant weight loss history. Loss of appetite and easy fatigability, hence unable to pursue his day to day activities.

No similar complaints in the past.

No complaints of chest pain, palpitations and breathlessness.

No history of jaundice, distension of abdomen or swelling of lower limbs.

No history of myalgia or arthralgia.

No history suggestive of COPD or bronchial asthma.

No other complaints.

No similar history in the family members.

Differential diagnosis – Viral pneumonia, pulmonary tuberculosis.

He was brought to AJ HRC casualty due to worsening of symptoms since previous 2 days, On arrival, patient had persistent tachycardia and tachypnea, stable blood pressure, although saturation at room air was low and hence needed oxygen supplementation. Auscultation of the chest revealed few occasional left mammary and infra axillary crepitations.

He was monitored continuously in MICU. ECG showed sinus tachycardia, 2DECHO was normal.

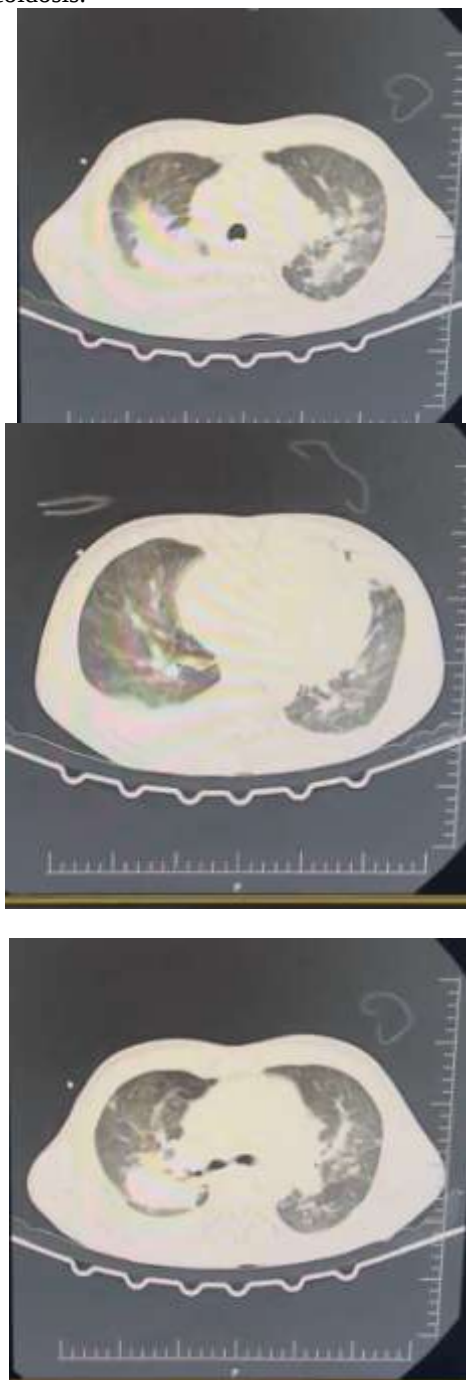
Blood investigations showed leucocytosis, neutrophilic predominant. Hypoalbuminemia as a sign of acute phase reactant. Viral Influenza panel was negative. Empirically, a broad spectrum antibiotic was started.

CXR as shown below





HRCT thorax was done as a part of further evaluation, which showed Axial calcification of bilateral lymphadenopathy, which is usually seen in sarcoidosis.



As the CXR shows bilateral hilar lymphadenopathy, a probable diagnosis of ? Sarcoidosis was made and hence was evaluated for serum calcium and ACE levels, which showed no abnormality.

Sputum was induced using 3% saline nebulisation and was tested for AFB and CBNAAT, gram stain and bacterial and fungal culture, as a routine, which turned out to be positive.

Patient was immediately started on ATT. Patient subsequently showed signs of improvement, oxygen requirement also reduced in 2-3 days, and no fever spikes were recorded. Once stable, patient was discharged with ATT medications and is on regular follow up for the same.

III. DISCUSSION

The main cause of TB is *Mycobacterium tuberculosis* (MTB), a small, aerobic, nonmotile bacillus.^[5]

Mycobacteria have a complex, lipid-rich cell envelope, with the high lipid content of the outer membrane acting as a robust barrier contributing to their drug resistance.^{[12][13]} If a Gram stain is performed, MTB either stains very weakly "Gram-positive" or does not retain dye as a result of the high lipid and mycolic acid content of its cell wall.^[14] MTB can withstand weak disinfectants and survive in a dry state for weeks. In nature, the bacterium can grow only within the cells of a host organism, but *M. tuberculosis* can be cultured in the laboratory.^[15]

Tuberculosis spreads through the air when people with active pulmonary TB cough, sneeze, speak, or sing, releasing tiny airborne droplets containing the bacteria. Anyone nearby can breathe in these droplets and become infected. The droplets can remain airborne and infective for several hours, and are more likely to persist in poorly ventilated areas.^[19]

Risk factors for TB include exposure to droplets from people with active TB and environmental-related and health-condition related factors that decrease a person's immune system response such as HIV or taking immunosuppressant medications.^[20]

Close contact

Prolonged, frequent, or close contact with people who have active TB is a high risk factor for becoming infected; this group includes health care workers and children where a family member is infected.^{[21][22]} Transmission is most likely to occur from only people with active TB – those with latent infection are not thought to be contagious.^[17] Environmental risk factors which put a person at closer contact with infective droplets from a person infected with TB are



overcrowding, poor ventilation, or close proximity to a potentially infective person.^{[23][24]}

Immunodeficiencies

The most important risk factor globally for developing active TB is concurrent human immunodeficiency virus (HIV) infection; in 2023, 6.1% of those becoming infected with TB were also infected with HIV.^[15] Sub-Saharan Africa has a particularly high burden of HIV-associated TB.^[11] Of those without HIV infection who are infected with tuberculosis, about 5–15% develop active disease during their lifetimes;^[25] in contrast, 30% of those co-infected with HIV develop the active disease.^[26] People living with HIV are estimated 16 times more likely to fall ill with TB than people without HIV; TB is the leading cause of death among people with HIV.^[1]

Environmental factors which weaken the body's protective mechanisms and may put a person at additional risk of contracting TB include air pollution, exposure to smoke (including tobacco smoke), and exposure (often occupational) to dust or particulates.

Diagnosis

Diagnosis of tuberculosis is often difficult. Symptoms manifest slowly, and are generally non-specific, e.g. cough, fatigue, fever which could be caused by a number of other factors.^[20] The conclusive test for pulmonary TB is a bacterial culture taken from a sample of sputum, but this is slow to give a result, and does not detect latent TB. Extra-pulmonary TB infection can affect the kidneys, spine, brain, lymph nodes, or bones - a sample cannot easily be obtained for culture.^[19] Tests based on the immune response are sensitive but are likely to give false negatives in those with weak immune systems such as very young patients and those coinfecting with HIV. Another issue affecting diagnosis in many parts of the world is that TB infection is most common in resource-poor settings where sophisticated laboratories are rarely available.^{[18][21]}

A diagnosis of TB should be considered in those with signs of lung disease or constitutional symptoms lasting longer than two weeks.^[11] Diagnosis of TB, whether latent or active, starts with medical history and physical examination. Subsequently a number of tests can be performed to refine the diagnosis.^[12] A chest X-ray and multiple sputum cultures for acid-fast bacilli are typically part of the initial evaluation.^[11]

Chest Xray

In active pulmonary TB, infiltrates (opaque areas) or scarring are visible in the lungs on a chest X-ray. Infiltrates are suggestive but not necessarily diagnostic of TB. Other lung diseases can mimic the appearance of TB; and this test will not detect extrapulmonary infection or a recent infection.^[11]

Microbiological studies

A definitive diagnosis of tuberculosis can be made by detecting *Mycobacterium tuberculosis* organisms in a specimen taken from the patient (most often sputum, but may also be pus, cerebrospinal fluid, biopsied tissue, etc.).^[12] The specimen is examined by fluorescence microscopy.^[13] The bacterium is slow growing so a cell culture may take several weeks to yield a result.^[14] NAAT and PCR can also be used.

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