

A rare association of myocarditis in a case of tuberculous meningoencephalitis

By Dasi Sharath Chandra

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Abstract:

Tuberculosis (TB) poses a significant global health threat, often affecting extrapulmonary sites. We present a rare case of TB presenting initially as tuberculous meningoencephalitis, complicated subsequently by myocarditis in a previously healthy 35-year-old female. Clinical evaluation revealed systemic involvement, including respiratory distress and cardiac abnormalities. Diagnosis confirmed tuberculous meningitis and myocardial involvement. Treatment involved anti-tubercular therapy, cardiac medications, and supportive care. Serial monitoring showed gradual improvement in neurological and cardiac parameters, culminating in normalized cardiac function post-therapy. This case emphasizes the varied clinical presentations of TB and underscores the importance of considering myocarditis in patients with tuberculous meningitis and cardiac symptoms. Early recognition and multidisciplinary management are essential for optimal outcomes in such cases.

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Introduction:

Tuberculosis (TB) remains a significant global health concern, with diverse clinical presentations.¹ Tuberculous meningoencephalitis is a severe form of central nervous system TB, presenting with a range of neurological symptoms. It is a severe form of extrapulmonary tuberculosis that affects the CSF. It typically presents with symptoms such as altered sensorium, fever with chills and rigors, and severe headaches. In this case, a 35-year-old female with no comorbidities experienced a sudden onset of altered sensorium. The diagnosis was confirmed through CSF analysis, revealing positive results for *Mycobacterium tuberculosis*. TB meningitis is a medical emergency requiring prompt intervention, as delayed treatment can lead to serious complications, including neurological deficits and death. The co-existence of myocarditis with tubercular encephalitis is a rare phenomenon. This case highlights involvement of myocardium in a patient presenting with tuberculous meningoencephalitis.

Case:

A 35-year-old female with no known comorbidities presented to the emergency department with altered sensorium, accompanied by a five-day history of high-grade fever, chills, rigors, and diffuse, dull-aching headache associated with neck pain. The altered sensorium had a sudden onset on the day of presentation, with no complaints of numbness, paresthesia, bowel or bladder abnormalities, diplopia, facial weakness, dysphagia, trauma, or fall.

There was no significant medical history, including cardiovascular, respiratory, genitourinary, gastrointestinal, or musculoskeletal abnormalities. She had no comorbidities, no history of TB contact, and a normal vaccination history, having received two doses of COVID-19 vaccination. On examination, the patient was febrile, with pallor, altered sensorium, and tachypnoea. Vitals signs revealed a GCS of E1V1M3, a heart rate of 153 bpm, blood pressure of 140/100 mm Hg, respiratory rate of 26/min, and oxygen saturation of 46% on room air.

Physical examination indicated bilateral diminished air entry in the lungs, soft abdomen, and neck rigidity. ABG analysis revealed respiratory alkalosis. Due to the low GCS and impending respiratory arrest, the patient was intubated. An ECG showed sinus tachycardia with ST elevation in chest leads V3, V4, and V5. A 2D echo demonstrated global hypokinesia of the left ventricle, severe left ventricular systolic dysfunction (EF: 25%), and mild mitral regurgitation.

Baseline investigations on day 1 of admission revealed microcytic hypochromic anemia, leukocytosis, elevated ESR (100), and CRP (278).(Table 1) CSF analysis confirmed the diagnosis of TB meningitis, with GeneXpert showing resistance to rifampicin. The patient was initiated on anti-tubercular therapy (ATT) along with supportive measures and cardiac medications. Her ATT regimen included 4HRZE at night as a part of the initiation phase. CT brain showed no significant abnormalities, but HRCT thorax revealed bilateral patchy consolidatory changes and pulmonary edema.

During the hospital course, serial echocardiography and ECG monitoring showed improvement in left ventricular function and resolution of ST and T-wave changes, leading to a diagnosis of TB myocarditis. Patient was initiated on fluid restriction, with injection furosemide 10 mg, Tab Ivabradine 5mg, atypical antibiotics, and other supportive medications. The patient's condition gradually improved with multidisciplinary management, completing the ATT course, and achieving a normalized cardiac function (EF: 64%) on follow-up echocardiography.

During the course, serial ECG was taken which showed resolution of ST, T changes and serial echocardiography showed improvement in ejection fraction levels EF- 60%. (Table 2) A Diagnosis of clinically probable myocarditis was made based on early improvement in EF and ECG. Patient completed ATT course and was symptomatically better with an EF of 64%.

Discussion:

Extra-pulmonary tuberculosis (TB) refers to the manifestation of TB outside the lungs, involving various organs and tissues. Unlike pulmonary TB, which primarily affects the lungs, extra-pulmonary TB can impact areas such as the lymph nodes, bones, joints, meninges, and genitourinary tract. The simultaneous occurrence of tuberculosis (TB) meningitis and TB myocarditis presents a rare and complex medical challenge. TB meningitis affects the membranes around the brain, leading to altered mental status, while TB myocarditis involves inflammation of the heart muscle, causing cardiac abnormalities. This coexistence underscores the systemic nature of TB. Diagnosis involves cerebrospinal fluid analysis for TB meningitis and cardiac evaluations for myocarditis. Early recognition and a multidisciplinary approach, including anti-tubercular therapy and supportive care, are crucial for optimal outcomes in managing this intricate interplay of TB affecting both the central nervous and cardiovascular systems.¹⁻³

The coexistence of tuberculosis (TB) meningitis and TB myocarditis suggests a systemic dissemination of *Mycobacterium tuberculosis*. In TB meningitis, the bacteria breach the blood-brain barrier, infecting the meninges. Simultaneously, in TB myocarditis, hematogenous spread or direct extension from pulmonary foci leads to cardiac involvement. The pathogenesis involves immune response dysregulation, granuloma formation, and tissue damage. Mycobacterial dissemination triggers inflammation in both the central nervous and cardiovascular systems. The intricate interplay of host responses, bacterial virulence, and tissue

tropism contributes to the rare but severe manifestation of TB involving both the meninges and the myocardium.^{4,5}

Diagnosing the coexistence of tuberculosis meningitis and TB myocarditis requires a comprehensive approach CSF analysis, including PCR and culture, aids in confirming TB meningitis. Cardiac evaluations, such as echocardiography and electrocardiography, are crucial for detecting myocardial involvement. Imaging studies like CT scans and MRIs contribute to assessing the extent of organ damage. Simultaneous presentation of neurological and cardiac symptoms prompts clinicians to consider both manifestations. GeneXpert testing and targeted biopsies may confirm the presence of Mycobacterium tuberculosis. A multidisciplinary diagnostic strategy ensures timely and accurate identification, facilitating prompt initiation of anti-tubercular therapy and supportive measures.^{6,7}

The treatment of tuberculosis meningitis coexistent with TB myocarditis necessitates a comprehensive and multidisciplinary approach. Anti-tubercular therapy with a combination of drugs is essential to target both organ systems. First-line drugs like isoniazid, rifampicin, and ethambutol address systemic TB, including meningitis, while adjunctive corticosteroids may be used for inflammation control. Management of TB myocarditis involves diuretics, fluid restriction and monitoring for potential complications. Regular follow-ups with imaging studies and cardiac evaluations guide therapeutic adjustments. This integrated strategy ensures optimal outcomes by effectively addressing the complex interaction of TB affecting both the central nervous and cardiovascular systems.⁸⁻¹⁰

7 Conclusion:

We present a rare case of 35 year-old female with TB meningoencephalitis and myocarditis. The initial presentation included altered sensorium, fever, and cardiac abnormalities. Early recognition and multidisciplinary management, including anti-tubercular therapy and supportive care, led to the gradual improvement of the patient's condition, including normalization of cardiac function. Her ejection fraction improved from 30% at the time of admission to 60% at discharge. Tuberculosis meningitis and myocarditis collectively pose a rare and challenging medical scenario. TB meningitis involves inflammation of the membranes around the brain and spinal cord, leading to altered mental status and severe headaches. Simultaneously, TB myocarditis affects the heart muscle, causing cardiac abnormalities. In the presented case, a 35-year-old female exhibited both conditions, emphasizing the uncommon coexistence of these manifestations. Timely diagnosis, including cerebrospinal fluid analysis for TB meningitis and cardiac evaluations for myocarditis, allowed for prompt initiation of anti-tubercular therapy and supportive care. This underscores the necessity for comprehensive management in addressing the complex interplay of tuberculosis across different organ systems.

Table 1: In-hospital investigations

Investigations	Values
Total count (cells/cu.mm):	575 cells
Neutrophils (%):	40%
Lymphocytes (%):	60%

Gram stain	Occasional inflammatory cells, no organisms
AFB	Negative
Glucose	20
Protein	79.55
ADA	21.370
LDH	432

AFB – acid fast bacilli; LDH – Lactate dehydrogenase; ADA – adenosine deaminase.

Table 2: Serial echocardiography recordings

Echo date	5/1/23	7/1/23	10/1/23
Ejection fraction	25%	48%	64%

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