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## An uncommon association of Pott's spine with pyogenic meningitis - A rare case report

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### Abstract

Tuberculosis, a millennium-old disease continues to be a major threat to mankind. Atypical presentation especially in extrapulmonary tuberculosis (EPTB) poses challenges to clinical and laboratory diagnosis leading to delay in initiation of therapy which adds to the morbidity and mortality of the patient. The clinical course may further be deteriorated by coinfection with other bacterial organisms though the occurrence is rare. Herewith we present a case report of a 48-year-old man a known diabetic and hypertensive who presented with fever, neck pain, and back pain for 1 week. Culture of cerebrospinal fluid (CSF) yielded a pure growth of *Staphylococcus aureus* which was susceptible to oxacillin. MRI of the brain and spine showed the para- vertebral collection in the cervico-dorsal junction (C7-T1). Histopathological examination (HPE) of the aspirate showed caseating granuloma with Langhans giant cell suggestive of Pott's spine. Blood culture and urine culture yielded *Staphylococcus aureus* susceptible to oxacillin. The patient was started on intravenous ceftriaxone and vancomycin for Staphylococcal meningitis and sepsis. Cartridge-based nucleic acid amplification test (CBNAAT) for CSF did not yield *Mycobacterium tuberculosis*. As per Index TB guidelines, the patient was started on Antitubercular therapy with fixed-dose combinations on the basis of histopathology. The patient was treated for diabetes and hypertension. The patient tolerated the therapy well and improved with no complications and hence discharged. The patient is being continued on a fixed drug combination of antitubercular therapy. On follow up the patient showed no signs and symptoms of recurrence or neuro deficits.

This case report emphasizes the varying clinical presentation and the need for high clinical suspicion in the diagnosis of concomitant EPTB and pyogenic meningitis.

Multiple diagnostic approaches and prompt initiation of appropriate antibacterial and antitubercular therapy for a better clinical outcome as in this patient. In patients with an atypical clinical presentation of meningitis, one should consider concomitant infections of TB and pyogenic organisms. Early detection and timely intervention are important to reduce morbidity and mortality. Individual complications associated with pyogenic meningitis and Pott's spine can lead to catastrophic incident which further increases the fatality rate. Missing either infection causes permanent neurological deficits and septic shock.

**Keywords:** Pulmonary tuberculosis, coinfection, extra pulmonary tuberculosis, tubercular meningitis, pyogenic meningitis

### Introduction

Tuberculosis (TB) is a contagious disease that predominantly affects the lungs, caused by acid-fast bacilli *Mycobacterium tuberculosis*. Traditionally it was believed that majority of cases involve the lungs but in recent times data shows huge variation in the proportion of extra pulmonary tuberculosis around the world, ranging from 15 to 53% [1]. The affection of the central nervous system (CNS) is one of the catastrophic manifestations of extra pulmonary TB (EPTB). The infectious process of CNS coinfections by CNS pyogenic organisms and *Mycobacterium tuberculosis* is rare, with only a small number of cases reported to date [2]. The diagnosis of concurrent CNS coinfections with TB can be a major challenge, but it should be suspected in cases with atypical clinical manifestation [1]. Early diagnosis and appropriate treatment are vital for improving the outcome as it can cause long-term morbidity as well as mortality.

We would like to share a rare case of concurrent CNS co-infection with Pott's spine and *Staphylococcus aureus* meningitis.

### Case report

48-year-old gentleman known diabetic and hypertensive presented to casualty with the complaints of neck pain and high-grade fever for 1 week of duration with no history of projectile vomiting, seizures. Additionally, the patient reported intermittent upper back pain, for which he got treated with over-the-counter medications. The patient denied history of tuberculosis or significant events in the past. Basic blood investigations revealed neutrophilia with an elevated total count. *Staphylococcus aureus* sensitive to oxacillin was identified in blood cultures. In view of suspected meningitis lumbar puncture was done, showed increased total count and culture of *Staphylococcus aureus* sensitive to oxacillin were detected in CSF analysis.

MRI brain with whole spine screening showed pachymeningeal enhancement and incidentally there was a bilateral paravertebral collection with pre-vertebral and anterior epidural enhancing soft tissue components at C7-D1 vertebra suggestive of Pott's spine

Subsequently CT guided transpedicular biopsy was done at C7-D1 level and sent for histopathological examination which showed epithelioid granuloma and caseating necrosis and lymphocytosis, conclusive of Tuberculosis

The patient was initially treated with empirical antibiotics, antipyretics and supportive care. After the diagnosis of C7-D1 tuberculous spondylodiscitis and pyogenic meningitis patient was started on Anti tubercular therapy and IV vancomycin and ceftriaxone. Patient improved symptomatically and being discharged with warning signs. At the end of 1 month follow up patient was pain free with no evidence of any recurrence.

### Discussion

Tuberculosis remains to be one of the challenging diseases adding to the morbidity and mortality in developing countries like India. Though pulmonary involvement is the most common, extra-pulmonary manifestations of TB aren't that uncommon. Extra-pulmonary sites include brain, abdomen, lymph nodes (scrofula), spine (Pott's disease), genitourinary tract etc. [3]. Spinal TB constitutes 1% of all TB cases. Cervical spinal TB is rare and accounts for only 3–5% of spinal TB, the most common being thoracolumbar spinal TB [4]. TBM is one of the most severe manifestations of tuberculosis and its diagnosis is often delayed because of diverse ways of presentations and poor sensitivity of the available diagnostic modalities [3].

Clinical presentation and risk factors

Patients presenting with less than 5 days of symptoms are more likely to have bacterial or viral meningitis than TBM. However, it should be noted that TBM can present acutely with a short duration of illness, and this acute presentation is not uncommon [5].

Neck pain and restriction of neck movement were the most common symptoms of cervical TB. [6]. our patient presented with neck pain and upper back ache for duration of a week. Namrata *et al* describe a case report where in a patient presenting with typical features of acute pyogenic meningitis and was diagnosed with TB meningitis later as the patient did not respond to antibiotics [2]. In a case series of CNS TB and pyogenic bacterial coinfections published

by Patricia *et al* a middle aged female presented with features of oral herpes and otitis media and later developed neurological manifestations such as papilledema, upgaze paralysis, bilateral sixth nerve paresis and hemiparesis.

The other patient presented with 48 hours of fever, asthenia, headache, and progressive nuchal rigidity.

This patient had undergone allogeneic HCT 3 years ago. A 15-year-old boy in this case series had typical manifestations of fever and weight loss but later developed otorrhea 2 months later. A 33-year-old HIV patient presented with headache and seizures [7]. Clinical features of meningism, otorrhea, gait abnormalities, hydrocephalus and neural palsies have been documented as presenting symptoms of concomitant CNS TB and pyogenic meningitis [7, 8, 9].

This emphasizes the need of high clinical suspicion in the diagnosis concomitant TB and pyogenic central nervous system involvement.

### Risk factors

HIV, T2DM and myelodysplastic syndrome have been the major risk factors [7]. Our patient is a known diabetic for 10 years. Increasing age, sickle cell disease associated with hyposplenism, pulmonary TB and miliary TB have also been implicated as risk factors for concomitant TB and pyogenic meningitis. [8, 2, 10].

### Diagnostic modalities

Multiple modalities of diagnosis have to be considered to diagnose a concomitant case of TB and Pyogenic meningitis. CSF analysis, CSF culture sensitivity, imaging studies and histopathology along with clinical consideration aid in diagnosis, monitoring of response to treatment and follow up of the patient.

### CSF cultural characteristics

The most common organism implicated in the TB meningitis coinfection with pyogenic meningitis is *Streptococcus pneumonia* especially in background of immunocompromised state, prematurity and hyposplenism [7]. *Neisseria meningitis* and *Listeria monocytogenes* are the common organisms followed by. *Listeria* is known to be associated with presentations involving hydrocephalus [10]. *Candida* and cryptococcal meningitis coinfecting TB meningitis is noted in patients with AIDS. Neurosyphilis associated with cryptococcal meningitis and TB meningitis has also been documented in patients with AIDS [11]. *Staphylococcus aureus* susceptible to Oxacillin was isolated in our patient from both CSF and blood samples. Though rare it's not uncommon to isolate *Staphylococcus aureus*, *Nocardia* and *Moraxella* in patients with such coinfections. [7, 8].

In our patient CBNAAT for CSF was not positive for tubercle bacilli. WHO recommends CB NAAT on conditional recommendation that it can be used as an adjunctive test for diagnosis of TBM. It is because pooled sensitivity of CBNAAT is 80.5% whereas pooled specificity against culture was found to be 97.8%. Hence a negative result does not rule out TBM [5].

Histopathological examination plays an important role in diagnosing TB especially in EPTB. Index TB guidelines recommend initiation of therapy with tissue based evidences. CT biopsy showed epithelioid granuloma and

caseating necrosis and lymphocytosis suggestive of Pott's spine<sup>[12]</sup>.

### Radiology

MRI is preferred over CT in diagnosing TBM as it detects vasculitic changes, leptomeningeal enhancement, basal exudates and infarcts in most patients. Role of CT is mainly limited in acutely deteriorated setting, to look for hydrocephalus and need for surgical intervention<sup>[3]</sup>. MRI of the brain with a complete spine scan, plays an important role. Ct guided biopsy aided us to further confirm the diagnosis by histopathology.

### Treatment

Anti-Tubercular therapy and surgical debridement form the main stay of treatment. Rebuilding of the stability of the spine forms main approaches for rehabilitation<sup>[6]</sup>. Our patient tolerated the therapy well and improved with no complication. Our patient was started on ATT as per index TB guidelines though CBNAAT was negative for tubercle bacilli.

The patient was also started on ceftriaxone and vancomycin along with dexamethasone. The diagnosis was prompt with multiple modalities and appropriate therapy helped us to prevent complications in our patient.

### Complications

Concomitant TB and pyogenic meningitis increase the risk of neurological sequelae due to atypical presentations and delay in diagnosis and is not as such associated with increase in mortality. It is to be noted that presence of comorbidities and lack of treatment lead to mortality in such patients<sup>[7]</sup>.

### Conclusion

In patients with an atypical clinical presentation of meningitis, one should consider concomitant infections of TB and pyogenic organisms. Early detection and timely intervention are important to reduce morbidity and mortality. Individual complications associated with pyogenic meningitis and Pott's spine can lead to catastrophic incident which further increases the fatality rate. Missing either infection causes permanent neurological deficits and septic shock.

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