Calvarial Tuberculosis with Skin Tuberculosis in a Child: A rare Case report

Shikha Swaroop 1, Preeti Srivastava 2, Kumar Diwakar 3, Summet Biswal 4

1. Assistant Professor, Pediatrics, Manipal Tata Medical College, MAHE, Tata Main Hospital, Jamshedpur, IND  
2. Assistant Professor, Pediatrics, Manipal Tata Medical College, MAHE, Tata Main Hospital, JAMSHEDPUR, IND  
3. Assistant professor, Pediatrics,Manipal Tata Medical College,MAHE, Tata Main Hospital, Jamshedpur , IND  
4. Assistant professor, Pediatrics,Manipal Tata Medical College,MAHE, Tata Main Hospital, Jamshedpur, IND

Corresponding author: Shikha Swaroop, shikha.swaroop@tatasteel.com

Abstract

Calvarial tuberculosis is rare even in endemic areas. They are difficult to diagnose in the early phase and may present with diagnostic dilemma. Tuberculosis verrucosa cutis is also uncommon form of skin tuberculosis. Here we describe a case where both this rare form were seen together and successfully treated with first line anti tubercular treatment.

Categories: Pediatrics, Neurology, Infectious Disease
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Introduction

Mycobacterium tuberculosis (TB) infection is endemic in developing countries. Resurgence of immunocompromised states like human immunodeficiency virus infection (HIV) has increased the incidence of TB in developed countries. Calvarial tuberculosis (CTB) and skin tuberculosis both are rare. Skeletal Tuberculosis affecting skull bones are rarer (0.1-3.7% of the skeletal TB) [1]. Cutaneous TB accounts for about 1.5% of extrapulmonary cases [2].

CTB usually begins in the diploic space and affects the inner and outer table slowly. If the outer table is affected, it presents as subgaleal swelling with discharging sinuses. If the inner table is affected, it leads to deposition of extradural granulation tissue. If left undiagnosed it can extend beyond duramater and affect meninges leading to meningitis. The diagnosis relies upon a good clinical acumen and timely radiological investigations. X-ray and computed tomography (CT) head disclose punched out lesions in the frontal and parietal bones.

Here we will discuss a rare case where CTB led to Tuberculous Meningitis (TBM) and there was coexisting cutaneous TB as well.

Case Presentation

CASE REPORT:

A 10-year-old boy presented with fever and vomiting for 7 days. On further evaluation, parents informed that fever was gradual in onset and vomiting is more since last 3 days. One and half year back he had history of headache for which CT head was done and some injections were given. On general examination, child vitals were normal, BCG scar was present. Right supraorbital and submandibular swelling was present. There was a rough skin lesion over the left knee. Patient was awake but speech was incoherent. Glasgow comas scale was 14/15. On CNS examination neck rigidity was present, tone was increased in all four limbs and bilateral planter was upgoing. Other system examination was within normal limit. Pus aspiration was done from the submandibular swelling and sent for culture, which was sterile. CSF examination showed neutrophilia with high protein and low blood glucose (CSF glucose=11, CSF protein =221, CSF cells=160, 70% neutrophils). Patient was started on intravenous antibiotics suspecting pyogenic meningitis. There was no improvement in fever spike and sensorium of the patients after 7 days of antibiotics. Repeat CSF examination was done which showed CSF protein-197.6 mg/dl, CSF sugar-27 mg/dl and CSF cells=140, 100% lymphocyte. Skin consultation suggested left knee lesion to be tuberculous verrucous cutis. CT brain with contrast was done which showed osteolytic skull lesions with some granulations most probably infectious aetiology (Fig 1). Other work up for tuberculosis (TB) was done like X-ray chest and nebulized sputum for gene X-pert. Xray chest was normal but nebulized sputum for CBNAAT (Cartridge Based Nucleic Acid Amplification Test) was positive. Based on repeat CSF finding, skin lesion and CBNAAT positive sputum, patient was started on antituberculosis treatment (ATT), fever gradually responded, and patient was discharged with plan to give ATT for minimum twelve month.
Patient was readmitted after one and a half month with one episode of generalized tonic clonic convulsion which was treated with injection phenytoin. Skin lesion showed considerable improvement (Fig 2 and Fig 3) and patient general condition was improved on follow up. Since last one year patient is on regular follow up. He has completed course of ATT and is asymptomatic.

**Discussion**

Most of the CTB cases occur in younger age group, less than 20 years [3]. Parietal and frontal bones are most affected [4]. Such disease is seen in immunocompetent patients. There is direct hematogenous spread of bacteria from the primary focus, as lymphatic vessels in skull bones are sparse [5]. TB bacteria sits in the diploic space of bone, grows slowly, and causes osteolytic lesions in the bones. It can infect both outer and inner table. Outer table is affected first. Dura mater protects the spread to brain. Eventually inner table also gets affected. Skull TB to spread across dura mater affecting meninges takes long time and is also very rare.

In our case patient had symptom of headache one and a half year back for which he was investigated and treated. But at that time, diagnosis of TB was missed. Gradually infection spread extradural causing orbital swelling and meningitis. Interesting part was sputum for CBNAAT to come positive with normal X-ray chest finding. Tuberculous verrucous cutis is a rare form of cutaneous TB which occurs when TB bacteria is directly inoculated after minor trauma. Our case was a tribal who keep sustaining minor trauma. This case was amalgam of rare TB with both calvarial TB leading to TB meningitis and Tuberculosis verrucous cutis occurring simultaneously in the same patient. Patient responded well to medical management as there was no large intracranial collection requiring surgery.

Diagnosis of skull TB based on neuroimaging becomes difficult as it mimics other diseases like malignancy. In cases where there is no other focus of the disease and CSF is normal, skull biopsy of the lesion is required to confirm the diagnosis which requires good infrastructure. Patient symptoms initially are mild like headache. Hence, early diagnosis of skull TB is difficult.

In early case of Tuberculous meningitis neutrophilia has been reported in the CSF finding. This may confuse clinician with pyogenic meningitis [6]. In our case patient had CTB since long time as suggested by previous history of hospitalisation for headache but patient presented to us with acute history of seven days. This must be the time when TB bacteria invaded dura and started to affect meninges. CSF examination done after seven days showed lymphocytic pleocytosis with sugar and protein characteristic of TBM.

Tuberculosis verrucous cutis is a paucibacillary form that occurs in sensitized immunocompetent individual due to exogenous skin inoculation with TB bacteria. Such skin TB is uncommon to see. This is a clinical diagnosis for an experienced clinician. Skin Biopsy may be done in case of doubt.

**Conclusions**

Calvarial tuberculosis and skin TB like Tuberculosis verrucous cutis is rare in endemic country like India. In early-stage CSF picture of TBM may be similar to pyogenic meningitis. A good clinical acumen and awareness is required for its accurate diagnosis in early stage.

**Appendices**
FIGURE 1: Skull CT showing parietal bone erosion.
FIGURE 2: Skin tuberculosis (Tuberculosis verrucosa cutis)
FIGURE 3: Healing skin tuberculous lesion in the patient post forty five days of anti tubercular treatment

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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