MULTIFOCAL CALVARIAL TUBERCULOSIS: A RARE PRESENTATION

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ABSTRACT

BACKGROUND

Tuberculosis is still a significant public health problem and can have protean manifestations posing diagnostic problems. We are reporting a case of multifocal TB osteomyelitis, which is a rare entity. The purpose of this report is to review the epidemiology, pathophysiology and diagnosis of calvarial tuberculosis. A one and a half year old female child presented as orbital cellulitis with post-traumatic cephalo-haematoma. Investigations revealed osteitis of right parietal bone and left superior orbital wall on CECT brain. Though histopathology of the aspirates was negative for tuberculosis, CBNAAT helped in confirming the diagnosis enabling prompt therapy.

KEYWORDS

Calvarial Tuberculosis, Proptosis, CBNAAT, Multifocal.

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INTRODUCTION

Tuberculosis (TB) is endemic in developing countries. According to RNTCP Annual Status Report 2015, India contributes 2.2 million cases to the global incidence of 9 million cases of TB.¹ Extrapulmonary TB contributes to 20% of all the TB cases.² However, extrapulmonary tuberculosis involving calvarium is rare even in endemic areas.³ Trauma has been reported as one of the rare precipitating factors for skeletal tuberculosis.⁴ We present a rare case of multifocal osteomyelitis of skull precipitated by trauma in one and a half year old child.

CASE REPORT

A one and a half year old female child presented with swelling and redness of left upper eyelid associated with fever of one week duration (Fig. 1). Child also had a swelling over the right parietal region of the skull, which was preceded by a fall two weeks ago. She had contact with her paternal uncle who suffered from pulmonary tuberculosis. On examination, the child appeared sick. A diffuse erythematous tender and non-pulsatile swelling of the left upper eyelid with axial proptosis was noticed. Apart from the left eye swelling, there was a 5x5 cm cystic non-tender, soft, fluctuant swelling in the right parietal region. Systemic examination did not reveal any evidence of neurological involvement. CBC showed haemoglobin of 8 gm/dL with dimorphic picture and lymphocytosis. ESR was raised (70 mm in first hour). Chest X-ray was normal. Radiograph of skull showed a clear translucent shadow at the parietal region (Fig. 2). In view of the above findings, child was provisionally diagnosed to have pyogenic orbital cellulitis with cephalo-haematoma and was treated with broad spectrum intravenous antibiotics.

In spite of antibiotic therapy, fever persisted and the orbital swelling continued to increase in size. Child was further evaluated with Mantoux test, Contrast Enhanced CT (CECT) of brain and chest. Mantoux was positive with 11 mm induration at 72 hours. CECT of brain showed peripherally enhancing hypodense fluid attenuation lesions in right parietal region and extraconal space of left orbit along with erosion of parietal bone as well as orbital wall suggesting abscess with osteomyelitis (Fig. 3 & 4).

CECT chest revealed consolidation of superior segment of the left lower lobe. Pus from the orbital swelling was sent for Gram staining, Ziehl Neelsen staining and CBNAAT (Cartridge Based Nucleic Acid Amplification Test) for tuberculosis. No acid fast bacilli were identified in the pus, but CBNAAT for tuberculosis was positive. A diagnosis of lytic type of calvarial tuberculosis was made and the child was started on anti-tubercular treatment with intensive four drug regimen for two months and continued with two drugs for another seven months as per RNTCP guidelines. The fever subsided after a week and the swellings started showing resolution after three weeks. Child was symptom free with complete healing of the lesions, both clinically and radiologically at 1 year followup.

Fig. 1: Left Orbital Proptosis

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Fig. 2: X-Ray Skull showing Lytic Lesion Parietal Area

Fig. 3: CECT Orbit showing Erosion of Left Superior Orbital Wall (Arrow)

Fig. 4: CECT Brain showing Cystic Lesion Right Parietal Area with Erosion of Rt Parietal Bone

DISCUSSION

Calvarial tuberculosis is one of the rare manifestations of TB even in countries with high incidence of TB.³ Reid described it first in 1842.⁴ Strauss estimated its incidence to be 1% of all skeletal TB.⁴ Its incidence in the present era could be lower owing to better diagnostic and therapeutic advances in the field of TB. Half of all cases occur in children below 10 years and 2/3rds in below 20 years.^{4,5} It is rare in infancy owing to lesser cancellous bone in infants.

Primary calvarial TB is rare and mostly occurs secondary to a primary focus elsewhere. Lung is the primary focus in 2/3rd of cases.⁶ Rarely contiguous spread from the sinuses, orbits, cervical spine, etc. and direct inoculation from trauma or surgery can occur. Calvarium is thought to be infected by haematogenous seeding of the diploe spaces of the skull bone.

Parietal and frontal bones are relatively rich in cancellous bone and are more commonly affected.⁴ Various reports suggest trauma and surgery as precipitating factors for the development of calvarial tuberculosis.^{4,7} It is thought that the local inflammation and transient immunosuppression resulting from trauma increase the chances of seeding and activation of the dormant bacilli. The disease may erode either of the tables of the skull. Erosion of the outer table may present with local pain, swelling, fixation and discoloration of skin and eventually sinus formation. Erosion of inner table results in extradural collection. Duramater is relatively resistant to infection and explains the rarity of CNS involvement in the form of meningitis, tuberculoma, subdural empyema, seizures and superior venous thrombosis as complications of calvarial tuberculosis.

Depending on the nature of calvarial destruction, radiographs may show circumscribed lytic, diffuse or circumscribed sclerotic lesions. The type of lesion depends on the virulence of the organism and the immune response of the host with diffuse type more common in patients with poor immunity. Circumscribed lytic lesion also known as "Perforating tuberculosis of the skull" is a small punched-out bony defect without any periosteal reaction. Diffuse type consists of widespread destruction of inner table of skull.

If it is associated with extradural granulation tissue, it is described as spreading type. Circumscribed sclerotic type characterized by thickening of the bone due to lack of blood supply to the diseased bone is thought to represent secondary infection. CT helps in the assessment of the extent of the bone destruction, scalp swelling and the degree of intracranial involvement. MRI imaging on Proton density and T2 weighted images may show a high signal intensity soft tissue mass within the defect in the bone. This may project into subgaleal and epidural spaces. These features are highly specific and are considered to be diagnostic.⁴

Wherever possible, histopathological demonstration of caseating granuloma and acid fast bacilli should be attempted. Owing to the highly necrotic nature of some specimens, ZN staining as well as culture may not yield TB bacilli.^{4,8} and sometimes diagnosis is possible only after surgery.⁹ In such cases CBNAAT could be immensely useful in arriving at an early, accurate diagnosis.¹⁰ and would obviate the need for expensive investigations and invasive procedures.

Calvarial TB is treated by chemotherapy alone or chemotherapy with surgery depending on the extent of the disease process.

Present case of calvarial tuberculosis is rare and peculiar, as it is multifocal in nature and presenting as post-traumatic cephalo-haematoma and proptosis. Even though pus from the lesion did not yield tubercular bacilli, CBNAAT helped in early diagnosis enabling prompt institution of anti-tubercular therapy. In a patient with persistent post traumatic inflammatory swellings not responding to intravenous antibiotic therapy, tuberculosis should be considered in the differential diagnosis.

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