

IMAGING HIGHLIGHTS

Calvarial tuberculosis presenting with seizures

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Tuberculosis of skull is a rare disease, but its incidence is on rise in developing countries. Skull tuberculosis can have varied neurological presentations. Seizures are uncommon mode of presentation in these patients. We report a patient who presented with seizures and scalp swelling, which was found to be due to skull tuberculosis. Though uncommon, our patient indicates that any patient from tuberculosis endemic zone with skull swellings and neurological symptoms should be suspected and investigated for tuberculosis.

CASE REPORT

A 21 years male presented with two swellings over skull which were progressively increasing in size since last five months. He complained of multiple episodes of seizure which consisted of involuntary jerks of the left limbs that evolved to generalized convulsion since last four months. Systemic examination and neurological examinations were normal. Examination of the scalp showed a swelling over right midline frontoparietal area about 5x4x3 cm and another swelling over left parieto-occipital area about 4x3x3 cm in size. The swelling have a smooth surface, well defined margins with underlying bony defects and

without any signs of inflammation. Laboratory investigations showed raised erythrocyte sedimentation rate of 102mm in first hour. The other blood investigation and Chest X-ray were normal. Bence-jones protein was absent in urine. Mantoux test was 7mmx7mm.

Contrast enhanced computed tomography (CECT) of brain (Figure 1) showed extra-axial mildly enhancing lesions in superior high frontoparietal and posterior parietal near midline area with epidural collections, scalp swelling and bony erosion. Magnetic resonance imaging (MRI) of brain, both plain and contrast (Figure 2), showed two osteolytic lesions over superior high

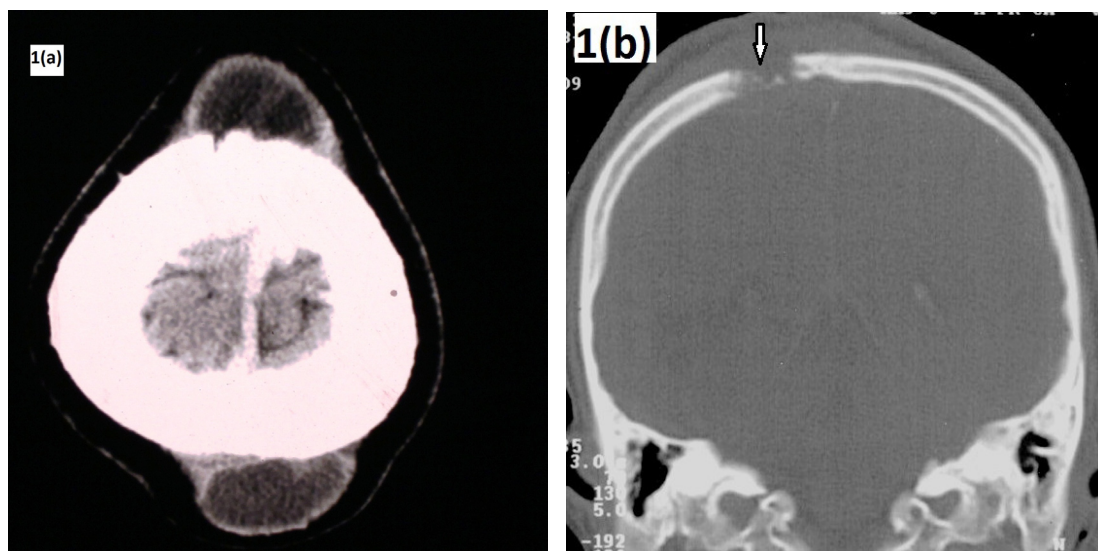


Figure 1(a). CT scan of brain axial view with contrast showing extra-axial mildly enhancing lesion in superior high frontoparietal and posterior parietal near midline area with epidural collection, scalp swelling and bony erosion. (b). CT Scan brain bone window coronal view showing erosion of both outer and inner tables of parietal bone.

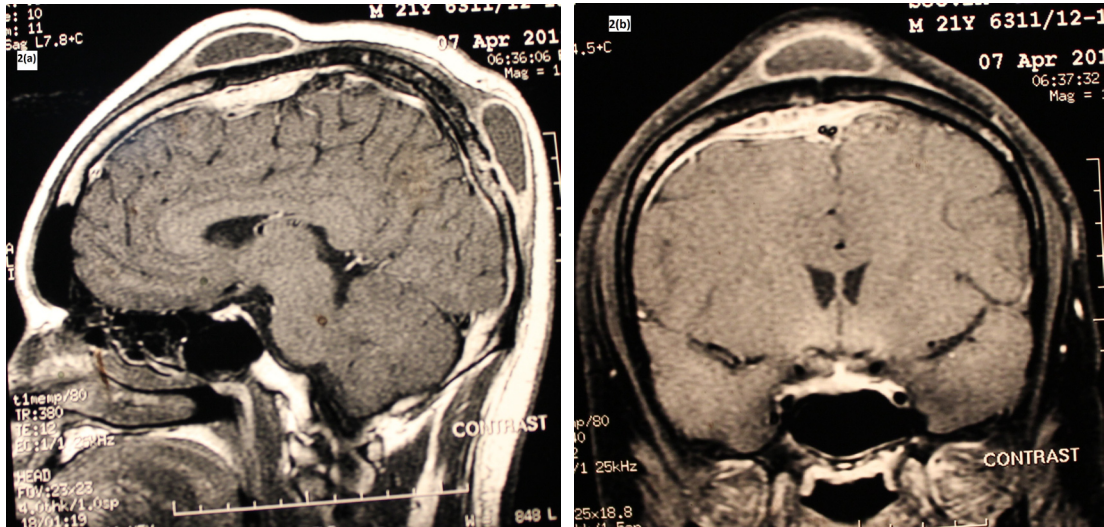


Figure 2(a). MRI brain saggital view with contrast shows two osteolytic lesion over superior high frontoparietal and midline posterior parietal area with dural enhancement. (b). MRI brain axial view showing upper frontal epidural enhancing mass extending more on right side having associated few small nodular conglomerated enhancing lesion mainly at right parasagittal region as well as posterior dural enhancement.

frontoparietal and midline posterior parietal area with dural enhancement. Upper frontal epidural enhancing mass extending more on right side. These were associated with few small nodular conglomerated enhancing lesions mainly at right parasagittal region as well as posterior dural enhancement. There were ring like extracalvarial cystic lesion at upper frontoparietal and parietal areas.

Fine needle aspiration cytology examination was inconclusive. The patient was operated for biopsy and treatment. Peroperatively it was observed that there was subgaleal collection of yellowish fluid with surrounding granulation tissue with underlying bony defects and

extradural deposition of firm granulation tissue. The collection, granulation tissue, and infected bones were removed till healthy bone margins were seen. The histopathology report of biopsy showed caseating granuloma composed of histiocytes and multinucleated giant cells of Langerhan's type suggestive of tuberculosis (Figure 3). Repeat MRI (Figure 4) one month later showed complete removal of the lesion with mild dural enhancement and post operative changes. Isoniazide, rifampicin, pyrazinamide and ethambutol were prescribed for two years along with levetiracetam. There was no recurrence of infection and seizures during follow up after one year.

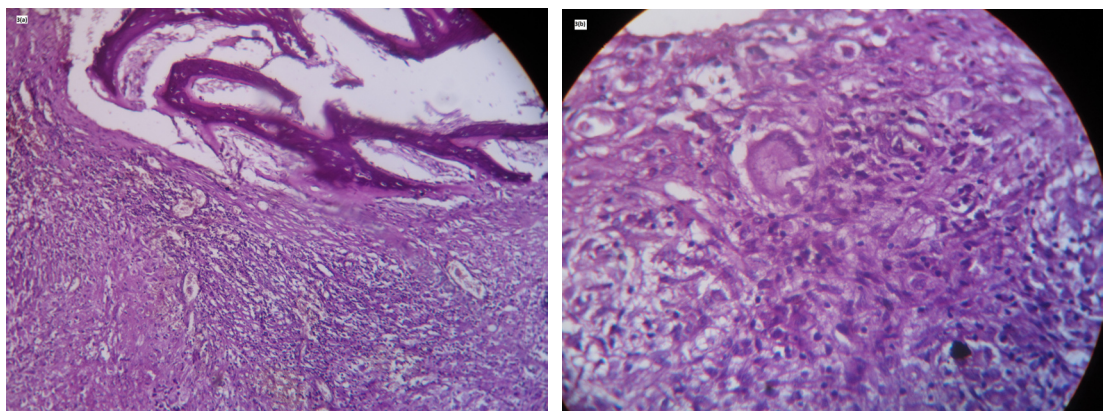


Figure 3(a), (b). Histopathological examination showing caseous granuloma overlying the bony periosteum with infiltrating lymphocytes and epithelioid cells.

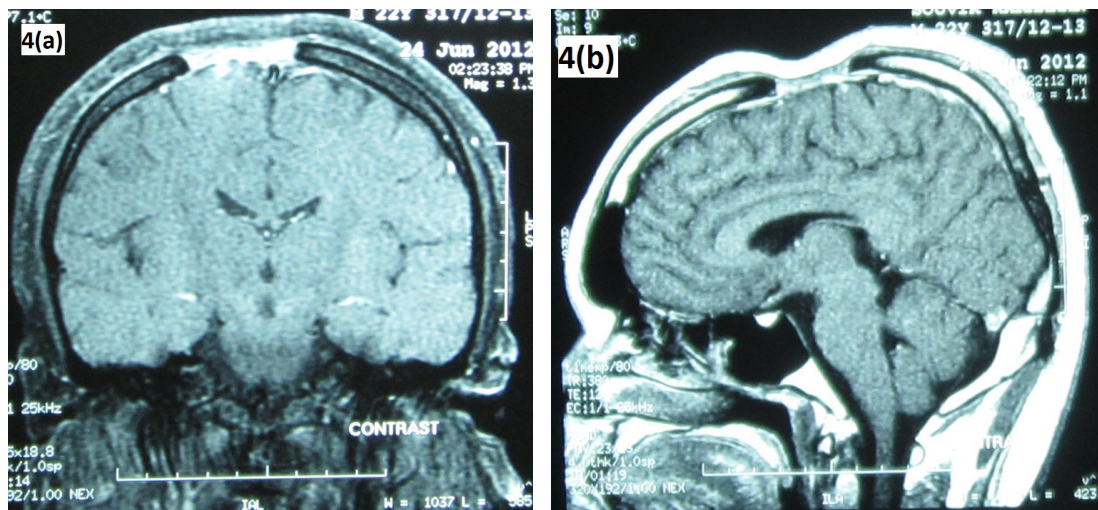


Figure 4. Postoperative MRI brain coronal view (a) and sagittal view (b) with contrast showing complete removal of the lesions and postoperative changes.

DISCUSSION

Although rare, incidence of tuberculosis of skull is on the rise in developing countries in the endemic zone, associated with poor socioeconomic condition and immunodeficiency syndromes.¹ Skull is involved in about 0.01% cases of tuberculous infection.² Most of the patients of calvarial tuberculosis are of younger age group.³

Calvarial tuberculosis is usually secondary and occurs by hematological spread of bacilli from a primary active or latent focus which is typically located in lung. Though uncommon primary tuberculosis of skull can occur.⁴ Trauma is a predisposing factor in the formation of bony lesion because of increased vascularity, decreased resistance, and unmasking of latent infection secondary to trauma.⁴ Moreover inflammatory cells are attracted to the site of trauma and acts as a vectors.⁵ The common sites of involvement are frontal and parietal bone followed by the occipital and sphenoid bones. This occurs due to greater amount of cancellous bone with diploic channels at these sites.⁶

Depending upon the nature of calvarial destruction, three types of skull tuberculosis are described at conventional radiography: circumscribed lytic, diffuse spreading, and circumscribed sclerotic type. The presence of sclerosis is thought to represent secondary infection.⁷ CT scan demonstrates soft tissue swelling with accompanying bony destruction of one or both skull tables. It can also show bony sequestrum, spread of disease in extradural space,

surrounding meninges and brain parenchyma. MRI can give highly specific imaging characteristics of this entity that can lead to conclusive diagnosis. Proton density and T2-weighted show a high signal intensity soft tissue mass within the defect of bone. This may project into subgaleal and/or epidural spaces and show peripheral capsular enhancement on contrast enhanced image. MRI is also sensitive in demonstrating changes in the meninges and the ventricular walls and in detecting parenchymal foci of involvement.³

The differential diagnosis of multiple osteolytic lesions of skull includes metastases, multiple myeloma, histiocytosis, osteomyelitis, dermoid, and epidermoid. Surgical indication in calvarial tuberculosis are large extradural collection causing neurodeficit, scalp swelling with sinus formation leading to fulminant infection⁵, and when there is diagnostic dilemma.⁸ Current trends advocate the administration of antituberculous drugs for at least 24 months of duration.⁹

In conclusion, in patients having osteolytic lesions of calvaria from tuberculous endemic part of the world, there should be a high index of suspicion of tuberculosis. A definitive diagnosis require an assessment of the clinical, radiological and biopsy finding. Though involvement of skull in tuberculosis is rare, it has very good prognosis after treatment.

DISCLOSURE

Conflict of interest: None

REFERENCES

1. Raut AA, Nagar AM, Mazumdar D, *et al.* Imaging features of calvarial tuberculosis: a study of 42 cases. *AJNR Am J Neuroradiology* 2004; 25:409-14.
2. Strauss DC. Tuberculosis of flat bone of vault of skull. *Surg Gynecol Obstet* 1933; 57: 384-98.
3. Mohanty S, Rao CJ, Mukherjee KC. Tuberculosis of skull. *International J Surgery* 1981; 66:81.
4. Leroux PO, Griffin GE, Marsh HT, Winn HR. Tuberculosis of skull-A rare condition. Case report and review of literature. *J Neurosurg* 1990; 26(5):851.
5. Jadhav RN, Palande DA. Calvarial tuberculosis. *Neurosurgery* 1999; 45:1345-50.
6. Davidson PT, Horowitz I. Skeletal tuberculosis. *Am J Med* 1970; 48:77-84.
7. Mukherjee KK, Kaushik R, Nada R, Khosla VK, Khandelwal N, Kak VK. Calvarial tuberculosis. *Surg Neurol* 2002; 57:195-202.
8. Tyagi AK, Kirolos RW, Rang NV. Tuberculosis osteitis of skull: A case report and review of literature. *Br J Neurosurg* 1996; 10(4):399.
9. Goel A, Pandya SK, Satoskar AR. Whether short course chemotherapy for tuberculosis meningitis? *Neurosurgery* 1990; 27:418-21.