

Post traumatic tubercular osteomyelitis of skull vault

Sir,

Tuberculosis of the skull is a rare entity with occurrence of 1 in 10,000 cases of tuberculosis.^[1] Calvarial tuberculosis was first reported by Reid in 1842. Tuberculous osteomyelitis of the skull is a rare manifestation of extra-pulmonary disease. An eighteen years old male presented to the emergency as a case of road traffic accident following which he was paraplegic. The patient was conscious, oriented with a Glasgow coma scale score of 15/15. He had a lacerated wound in the right frontal region, multiple rib fractures on right side and

spinal tenderness from D7-D11. A right sided Inter-costal drainage (ICD) was inserted and on further evaluation by magnetic resonance imaging (MRI) patient was found to have compression fracture of D8-D10 vertebral bodies with cord contusion, computed tomography (CT) brain showed comminuted fracture in right zygomatic process of frontal bone and right supra orbital plate. Chest X-ray showed no evidence of tuberculosis. Patient was taken up for surgery and underwent D8-D10 laminectomy with cord decompression and hook/rod fixation between D7 and D11. Debridement and suturing of right frontal scalp wound was also done by plastic surgery team. Patient was discharged a few days later after removal of ICD. Three months later patient presented with persistent serous discharge from the right supra orbital wound. Plain X-ray showed osteolytic lesion over right supra orbital region [Figure 1]. CT brain showed osteolytic lesion of right supra orbital frontal bone and mild soft tissue swelling over the region [Figure 2]. There was no epidural or parenchymal collection [Figure 3]. The patient

underwent surgical curettage and debridement of the right frontal bone and the tissue was sent for HPE and Culture sensitivity. The C/S came negative and the HPE picture showed langhans giant cells, epithelioid cells and lymphocytes suggestive of tuberculosis [Figure 4]. Patient was discharged on anti tubercular therapy and on last follow up of two months the surgical wound has healed well. A repeat CT brain was performed and was normal.

Tuberculosis is quite prevalent in India with around 1.5% of its population being infected. Skeletal tuberculosis accounts for 1-3% of all cases of tuberculosis,^[1] of which calvarial involvement is seen only in 0.2-1.3% of which 1% involves the middle ear cavity.^[2] Almost half the reported cases are younger than 10 years, and 70-90% are younger than 20 years,^[3] however infants are rarely affected, probably because of the paucity of cancellous bone in the skull.^[4] There is no sex predilection. The frontal and the parietal bones are usually involved. Calvarial



Figure 1: Plain X-ray skull showing osteolytic lesion

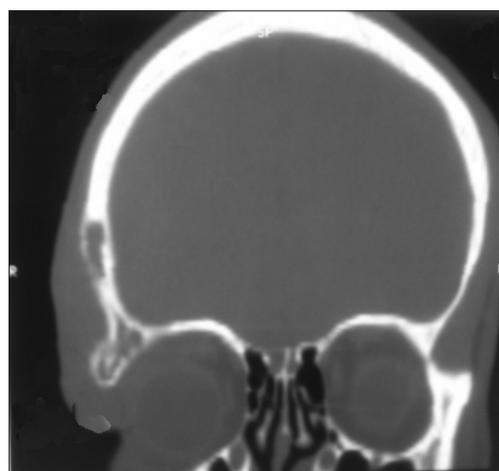


Figure 2: CT brain (Bone window, coronal cut) showing lytic lesion and soft tissue swelling

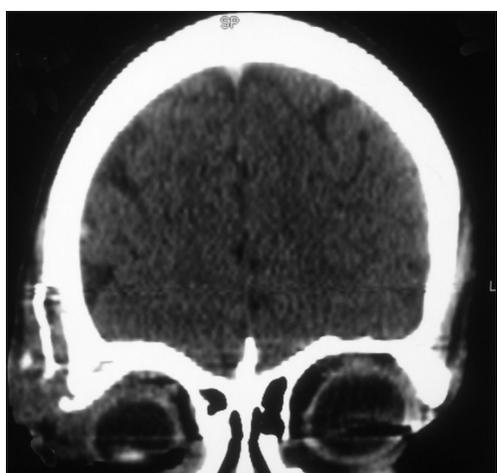


Figure 3: CT brain plain demonstrating absence of epidural/parenchymal lesion

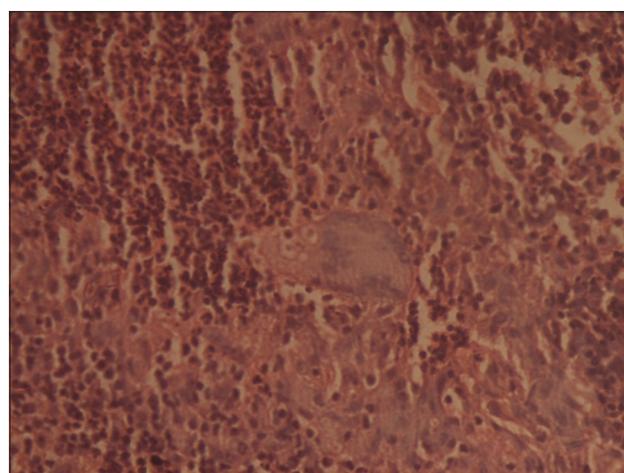


Figure 4: HPE image showing langhans giant cells, epithelioid cells and lymphocytes

tuberculosis usually occurs due to haematogenous spread from a primary focus elsewhere in the body that may not always be evident unless there has been direct inoculation of the bone by a penetrating injury or surgery.^[5,6]

Trauma (surgery or injury) has been hypothesized to predispose patients to bony lesions by causing increased vascularity and transient immunosuppression.^[2,3] This may help specific lodging of bacilli facilitated by the inflammatory cells which are attracted to the site of trauma and act as vectors for the bacilli.^[7] The tuberculous focus in the skull starts in the diploe where concentrically placed proliferating fibroblasts encircle the tuberculous granulation tissue and prevent its further extension through the diploe.^[3] If the process is not arrested, extension then takes place through either table. Outer table destruction leads to scalp swelling and sinus formation while involvement of the inner table results in extradural granulation tissue. The dura matter forms an excellent protective barrier. When the response to the infection is good, the lesion develops slowly, while decreased resistance will rapidly lead to subgaleal or extradural collections.

If the process is rapid, sequestration may occur which appears as “bone sand” on radiography. The rarity of calvarial tuberculosis is explained by the poor lymphatics of skull thus preventing lymphatic dissemination which is common in other bones.^[8] The usual radiological feature of calvarial tuberculosis is a single lesion in the frontal or parietal region with both osteolytic and osteoblastic features. Lesions that are usually lytic at first can normally be seen on plain X-ray images of the skull which are helpful in screening high risk patients.^[3]

Depending on the nature of calvarial destruction, three radiological types of the lesions of tuberculosis osteitis described are circumscribed sclerotic, circumscribed lytic and diffuse type. 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 lesions also known as “perforating tuberculosis of the skull” are small punched-out lesions with granulation tissue covering both surfaces of the calvaria. There is no periosteal reaction as it tends not to spread. Circumscribed sclerotic type is least common,^[3] thought to represent secondary infection.^[8] Cold abscesses, commonly associated with this form of tuberculosis, are known to precede destructive changes in bone. CT is helpful in demonstrating soft tissue swelling, bony destruction, sequestrum and spread of the disease process to the extradural space, meninges, and brain parenchyma.

The surrounding meninges enhance intensely following contrast medium administration. The highly specific imaging characteristics of this technique can, in most cases, lead to a conclusive diagnosis.

MRI T1 and T2-weighted images show a high-signal-intensity soft tissue mass within the defect in bone projecting into the subgaleal and/or epidural spaces and show peripheral capsular enhancement on the contrast-enhanced image. MRI is more sensitive in detecting changes in the meninges, ventricular walls and parenchyma. A solitary discrete round or oval punched out osteolytic defect with minimal surrounding sclerosis in the frontoparietal bones is the commonest presentation of skull tuberculosis. The greater amount of cancellous bone at the frontal and parietal regions makes them the commonest sites of involvement, followed by the occipital and sphenoid bones.^[9] The type of clinical presentation depends perhaps on the immunity of the individual. Systemic manifestations such as fever are rarely present and the appearance of fluctuant swelling, painless mass or ulcer with headache is the usual initial symptom. The swelling has a soft, fluctuant center with a surrounding firmly attached base, and can thus be differentiated from cephalohematoma. Microbiologic or histological confirmation is essential before starting chemotherapy because radiology and clinical findings are not confirmatory. Microscopic examination reveals caseation, Langhans giant cells and multiple epithelioid and polymorphonuclear cells with proliferating blood vessels. The presence of caseous granulomas is most conclusive. Diagnosis is further supported by positive acid-fast bacilli staining in pus smear by using Ziehl Nelsen stain. Polymerase chain reaction has a high sensitivity and specificity in the diagnosis of tuberculosis. Isolation of mycobacteria from culture though tedious is diagnostic. The available treatment options are antituberculous therapy and surgery. Before the advent of modern antituberculosis chemotherapy, surgical excision was the mainstay of treatment. Current indications for surgery include the treatment of a subperiosteal abscess, removal of a sequestrum, lesions causing mass effect or when the patient has a large collection of caseous material. In such cases, complete excision of diseased bone and granulation tissue with extirpation of the sinus tract is recommended. A further indication would be excision biopsy of the lesion to establish the diagnosis, where there is high index of suspicion and other results are inconclusive. However, the treatment of tubercular osteomyelitis is primarily medical, in the form of antituberculous chemotherapy along with appropriate antibiotics for secondary infection. Current trends advocate the administration of five drugs in the treatment of calvarial tuberculosis for

a period of at least twenty four months.^[10] Because the role of anticonvulsants is controversial, its use in most cases is avoided. Tuberculosis of the skull, though rare, should be suspected in cases where persistent sterile discharge occurs from non healing wounds especially after local trauma. It is important to differentiate tubercular osteomyelitis from the more common pyogenic osteomyelitis because of the difference in treatment regimens.

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References

1. Pandey AS, Surana A. Tuberculosis osteomyelitis of the bone flap following craniotomy; Indian J Tuberc 2011;58:129-31.
2. Suchanda B, Alugolu R, Purohit A, Lakshmi V, Sundaram C. A rare concomitant tubercular and Fonsecaea pedrosoi fungal infection of the skull base. J Neurosci Rural Pract 2012;3:189-91.
3. Raut AA, Nagar AM, Muzumdar D, Chawla AJ, Narlawar RS, Fattepurkar S, *et al.* Imaging features of calvarial tuberculosis: A study of 42 cases. AJNR Am J Neuroradiol 2004;25:409-14.
4. Bhandari B, Mandowara SL, Harish J. Tuberculous osteomyelitis of skull. Indian J Pediatr 1981;48:113-5.
5. LeRoux PD, Griffin GE, Marsh HT, Winn HR. Tuberculosis of the skull-a rare condition: Case report and review of literature. Neurosurgery 1990;26:851-5.
6. Biniwale SN, Rajshekhkar V. Tuberculous osteomyelitis of bone flap following craniotomy for a glioma. Neurol India 2000;48:91-2.
7. Jadhav RN, Palande DA. Calvarial tuberculosis. Neurosurgery 1999;45:1345-50.
8. Mukherjee KK, Kaushik R, Nada R, Khosla VK, Khandelwal N, Kak VK. Calvarial tuberculosis. Surg Neurol 2002;57:195-202.
9. Patankar T, Varma R, Krishnan A, Prasad S, Desai K, Castillo M. Radiographic findings in tuberculosis of the calvarium. Neuroradiology 2000;42:518-21.
10. Goel A, Pandya SK, Satoskar AR. Whither short course chemotherapy for tuberculous meningitis? Neurosurgery 1990;27:418-21.

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