Tubercular Abscess Presenting as Unilateral Proptosis — A Diagnostic Challenge

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Abstract

Tubercular brain abscess (TBA) is a rare manifestation of CNS tuberculosis. We report a case of tuberculous brain abscess in an adolescent girl who developed unilateral proptosis while on treatment of abdominal tuberculosis. Her diagnosis was confirmed on staining of pus that was drained and she improved after surgical drainage of abscess. Ziehl-Neelsen and immunofluorescence staining of pus /fluid are simple and quick techniques to confirm diagnosis.

Introduction

Tuberculosis in children presents as a vast and diverse spectrum of clinical presentations. Tuberculous involvement of the central nervous system usually appears as tuberculous meningitis or tuberculomas and rarely as tuberculous abscess. Here we present a rare case of TB abscess in an immunocompetent child who presented with unilateral proptosis and who recovered completely with medical and neurosurgical intervention.

Case History

An eleven year old female child presented with headache, blurring of vision and occasional episodes of vomiting since last 3 months. Mother noticed that her left eye was looking unusually prominent since one week. There was no history of fever, head injury, neurological deficit or any bleeding. She had a past history of single unprovoked generalized seizure 2 years ago for which she did not seek any medical help, and so never been investigated for the same. One year prior to diagnosis of present entity she was being diagnosed as multiple tubercular lymphadenitis mainly cervical and abdominal lymphadenitis.

Diagnosis of same was confirmed by fine needle aspiration cytology and CT abdomen respectively. When she presented with above complaints she was on anti tubercular therapy for 9 months with good compliance.

General examination and CNS examination was unremarkable except for left sided mild proptosis and bilateral grade IV papilloedema and flame shaped haemorrhages. There was no focal neurological deficit or cranial nerve palsy. A tentative diagnosis of space occupying lesion was made. Investigations revealed a normal X-ray chest, strongly positive Mantoux reaction (20 x 18 mm) and raised ESR (120 mm at end of one hour). Neuroimaging (CT brain) revealed large left parieto-temporo-occipital abscess with perilesional oedema and midline shift (Fig. 1) and there were no granulomas, arteritis, exudates or other vasculitic changes. Urgent neurosurgical intervention was done and 170 ml of thick whitish yellow pus was aspirated. Bacteriological examination of pus revealed acid fast bacilli, however, culture did not show any growth. After neurosurgical and supportive therapy the patient had remarkable symptomatic improvement and proptosis regressed after few days after drainage. Significant reduction in the size of abscess was seen on repeat neuroimaging (Fig. 2) and patient was discharged on antituberculous therapy and is doing well.

Discussion

Incidence - CNS tuberculosis has a wide spectrum of manifestations ranging from tubercular meningitis, tuberculomas,
encephalopathy, arteritis to abscesses. Tubercular brain abscess (TBA) is a rare manifestation of CNS tuberculosis.\(^1\)\(^-\)\(^3\) TBA was first described by Evans and Rand in early 1930s.\(^3\) A meta-analysis done by Whitner revealed that 59 cases of tuberculous abscess had been documented in the world literature and in only 18 cases amongst these, fulfilled the criteria laid down by him in 1978. TBA has been observed in immunocompromised as well as immunocompetent individuals. Among immunocompetent patients, children and the elderly are most commonly affected.\(^4\)

**Definition** - A tuberculous abscess is defined as an encapsulated collection of pus, containing viable tubercular bacilli without evidence of tubercular granulomatous reaction.\(^5\)\(^,\)\(^6\) Diagnostic criteria laid down by Whitener include (i) evidence of a true abscess formation within the brain, as confirmed during surgery or autopsy; (ii) histological proof of presence of inflammatory cells in the abscess wall; and (iii) demonstration of AFB in the pus or abscess wall.\(^1\)\(^,\)\(^2\)

**Pathogenesis** - It is not known why tubercular abscess forms in some individuals instead of the usual tuberculoma. TBA formation is influenced by many factors like the state of body immunity, dose of infecting agent, nature of the involved tissue and anti tuberculosis therapy and these perhaps decide the type of tissue reaction.\(^2\)\(^,\)\(^7\) A majority of the tuberculous brain abscesses have a thicker wall compared with pyogenic abscesses. The capsule of TBA is formed of vascular granulation tissue containing acute and chronic inflammatory cells, particularly polymorphs.\(^1\)\(^,\)\(^2\) Abscess walls are usually devoid of epitheloid and giant cells, which are characteristic of tuberculoma, but if present are not in the form of organized follicles.\(^7\) Tubercular abscess should be differentiated from cystic tuberculoma and in the latter the pus cyst contains yellowish fluid and cyst wall has typical tuberculous pathology.\(^6\)

**Site and Location** - Tuberculous abscesses are more often supratentorial and are believed to result from localized extension of infection from the sinuses, mastoids, or bone.\(^4\) The brain stem is a rare site of a focal tuberculous lesion; although Rajkumar *et al* had reported three children of brain stem tuberculous abscesses.\(^4\)\(^,\)\(^8\) Berthier reported four cases of large intraventricular tuberculoma in children.\(^4\) Tuberculous abscess may be unilocular or multilocular. Pulmonary focus of infection is usually present in only 30% of cases.\(^9\)

**Signs and Symptoms** - Patients with tubercular abscess may present with features of raised intracranial pressure and focal neurological deficit commensurate with the
site of the abscess.\textsuperscript{4} Review of world literature shows focal neurological deficit as commonest presentation, while headache was the second most common symptom followed by other symptoms like fever, seizures and altered mentation.\textsuperscript{1} 

Investigations - Proof of tubercular origin must be demonstrated either by presence of acid fast bacilli in culture or staining of pus or wall.\textsuperscript{5} Mycobacteria are only infrequently isolated from the CSF and pus perhaps due to the small number of organisms in the CSF. Polymerase chain reaction is a rapid, sensitive, and specific diagnostic method in CSF with tuberculous meningitis though the value of this technique in the diagnosis of tuberculous abscess needs evaluation.\textsuperscript{5} 

The conventional neuroimaging (CT and MRI brain) studies reveal the abscess and help in planning therapy. MR spectroscopy is good modality to differentiate tuberculous aetiology from pyogenic. TBA may be unilocular or multilocular on contrast CT scan. A relatively long clinical history and an enhancing capsule with thick wall are suggestive of TBA. In contrast pyogenic abscess, has a thin rim on contrast CT.\textsuperscript{8} Tuberculous brain abscesses show significantly lower magnetization transfer (MT) ratios compared with those of pyogenic abscesses with no evidence of amino acids at in vivo MR spectroscopy, a spectral hallmark of the pyogenic abscess.\textsuperscript{9} FDG-PET shows intense tracer uptake at the periphery of the lesion in a ring-like or ‘doughnut’ pattern, with low uptake within the abscess cavity.\textsuperscript{11} 

Management - Treatment options include simple puncture, continuous drainage, fractional drainage, repeated aspiration through a burr hole, stereotactic aspiration and total excision of the abscess.\textsuperscript{4} Although CT stereotaxy and ultrasound guided needle aspiration seem to be the less invasive procedures, open operation and drainage of abscess under direct vision is not necessarily associated with a higher mortality/morbidity.\textsuperscript{8} Total excision usually becomes necessary in multilocular noncommunicating and thick-walled abscesses. The development of fulminant tubercular meningitis is sometimes problematic following surgical excision of TBA. Antitubercular therapy is the mainstay of management. Some attempt intralesional anti-TB chemotherapy suggested but multiple TB brain abscesses developing along the path of the catheter has been reported.\textsuperscript{11} Paradoxical responses to intracranial tuberculoma can occur at any time even up to 1 year during chemotherapy despite a regular standard antitubercular treatment. New granuloma(s) or abscess(es) may appear in children receiving antitubercular treatment for TBM during the follow-up.\textsuperscript{1,7,12,13} 

Prognosis – TBA has a good prognosis if early diagnosis and accurate localization is done by neuroimaging, with prompt institution of antitubercular drugs and neurosurgical interventions. All these measures have resulted in significantly reducing morbidity and mortality in children, as was also demonstrated in our case who responded well to therapy.

References

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**Tuberculoma of Left Lateral Rectus in Orbit**

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Swelling in the orbital muscles is not an uncommon presentation. One of such cases is described below.

1. Tuberculoma involving the extra ocular muscle is a very rare presentation.
2. It is not surprising that in our case this swelling of the lateral rectus turned out to be tuberculoma.