Case Report

Multiple Tubercular Brain Abscesses with Obstructive Hydrocephalus in an Immunocompetent Child: A Case Report

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**Abstract**

Tubercular brain abscesses are rare manifestations in children, and very few cases have been reported till date. It is characterized by an encapsulated collection of pus, containing viable tubercular bacilli. Antitubercular treatment (ATT) is the mainstay of treatment along with surgical drainage or aspiration or excision of the abscess. We hereby report a case of a 15-month-old child with multiple tubercular brain abscesses with obstructive hydrocephalus, managed with ATT and ventriculoperitoneal shunt.

**Keywords:** Brain abscess, central nervous system, tuberculosis

**Introduction**

Tubercular brain abscess (TBA) is a rare manifestation of central nervous system (CNS) tuberculosis (TB) (CNSTB) in children or adults. The clinical presentation usually mimics pyogenic meningitis and poses a diagnostic challenge. Though commonly observed in immunocompromised patients, few cases have been reported in immunocompetent hosts too. Burr hole aspiration along with antitubercular treatment (ATT) remains the mainstay of management in these cases. We report a case of 15-month-old immunocompetent child presenting with multiple TBAs with hydrocephalus. She was managed conservatively with ATT, as aspiration could not be carried out in view of close proximity of the abscess with the ventricles.

**Case Study**

A 15-month-old child, born to non-consanguineous parents, presented to us with complaints of regression of milestones since the last 3 months. No history of fever, vomiting, seizure, weakness of any limbs, ear discharge, feeding difficulty or choking episodes, cough, or weight loss was observed. There was no history of any episode of loss of consciousness or hospitalization. There was a history of contact with pulmonary TB. General examination was essentially normal. On examination of the CNS, the child looked drowsy with right-sided third and seventh cranial nerve palsy, tone and power in all four limbs were grade 4/5 with brisk deep tendon reflexes and bilaterally extensor plantar response. No signs of meningeal irritation were observed with a normal fundus examination. Non-contrast computed tomography (NCCT) of brain carried out elsewhere before admission showed gross hydrocephalus with multiple hypoechoic lesions in bilateral parietal regions and around the brain stem. We kept our provisional diagnosis as brain abscess or intracranial space-occupying lesion. Ventriculoperitoneal (VP) shunting was carried out by the neurosurgery department but abscess drainage could not be performed due to the possibility of ventriculitis owing to the proximity of the abscesses to the ventricular system. The child was started on broad-spectrum antibiotics in antimeningitic doses, and simultaneously TB workup was carried out. Cerebrospinal fluid (CSF) study (conducted during the placement of VP shunt) neither showed any pleocytosis nor high protein and low sugar. Gastric aspirate for cartridge-based nucleic acid amplification test (CBNAAT) and acid-fast bacilli (AFB) was negative but Mantoux test was positive (12 × 13 mm). Chest...
X-ray showed a miliary pattern. Contrast-enhanced magnetic resonance imaging (CEMRI) of the brain showed multiple thick-walled irregular lesions in the cerebrum, cerebellum, and brain stem [Figure 1A and B]. Magnetic resonance spectroscopy (MRS) showed a high lipid lactate peak. Parental screening for TB confirmed pulmonary TB in the mother too. Hence, ATT along with steroids was started with the diagnosis of multiple TBAs causing obstructive hydrocephalus. After few days of starting ATT, the child developed isoniazid-induced hepatitis, and she was given modified ATT regimen with rifampicin, pyrazinamide, and ethambutol with levofloxacin. Subsequently, she tolerated feeds, gained weight, and attained milestones. Right-sided ptosis and weakness also improved gradually. On follow-up after 5 months, the child was walking with support, achieved pincer grasp, uttering disyllables, feeding normally, and there was no focal neurological deficit. Repeat NCCT of brain [Figure 2] also showed resolution of brain abscesses.

**Discussion**

CNSTB constitutes almost 10% of all cases of extrapulmonary TB. Tubercular meningitis and tubercular granuloma of brain are the common presentations in CNSTB. TBA is a rare manifestation of TB, both in children and adults. It is rare even in a country such as India where TB is highly prevalent. It is characterized by an encapsulated collection of pus, containing viable tubercular bacilli without any evidence of tubercular granuloma. The capsule of TBA is formed of vascular granulation tissue containing acute and chronic inflammatory cells, particularly polymorphs, unlike that of granuloma, which contains predominantly epithelioid and giant cells. Proof of tubercular origin is usually shown either by the presence of AFB in culture or staining of pus or wall. Though the exact cause of abscess formation is still to be elucidated, a number of factors have been attributed to it, including host immunity, bacillary load, nature of involved tissue, and response to ATT. TBA is commonly observed in immunocompromised patients who were not able to develop adequate immune response. It has been reported in 20% of the patients of human immunodeficiency virus infection with CNSTB in adults, but the data for children are scarce. Though uncommon, in literature, there are a few case reports of TBA in immunocompetent adults and children.

In his excellent review of the subject of TBA, Whitner gave the following diagnostic criteria:

1. Microscopic evidence from surgical or autopsy material of true abscess formation within the brain substance, characterized by cavity formation and central pus
2. Sufficient histological description to ensure that the inflammatory reaction in the abscess wall is predominantly a vascular granulation tissue containing acute and chronic inflammatory cells, particularly polymorphs
3. Proof of tuberculous origin by either a positive pus culture for *Mycobacterium tuberculosis* or by demonstration of AFB in the pus or abscess wall

**Figure 1:** (A and B) MRI brain showing multiple abscesses with hydrocephalus (arrows pointing to tubercular abscess)
Most symptoms of TBA follow a more indolent time course than those of other bacterial infections, evolving in 1 week to 3 months. TBA usually presents with features of raised intracranial tension, focal neurological deficits, seizures, and so on. Diagnosis of TBA can be made with contrast CT or MRI or MRS along with histological evidence of AFB. Tubercular abscess usually appears as hypodense lesion with peripheral edema and mass effect on CT, whereas on MRI, it appears as a circular or elliptical lesion with T1-weighted hypointensity and T2-weighted hyperintensity images and classical ring enhancement on contrast administration. Treatment options include simple puncture, continuous drainage, fractional drainage, repeated aspiration through a burr hole, stereotactic aspiration, and total excision of the abscess. Total excision usually becomes necessary in multilocular, noncommunicating, and thick-walled abscesses. ATT is the mainstay of management. The development of fulminant tubercular meningitis is sometimes problematic following the surgical excision of TBA. In our index case, we were not able to aspirate the abscess in view of close proximity to ventricles and hence managed with ATT.

**Conclusion**

TBA may sometimes become difficult to diagnose in cases where no histological evidence is available. In our child, the only suggestive points in favor were the presence of slowly evolving disease, long duration of symptoms, a chest X-ray suggestive of TB, a positive Mantoux test, and a positive history of contact with a case of TB. Though in our case, the gastric aspirate was negative for CBNAAT and AFB, CSF study was normal but CEMRI and MRS were consistent with TBA. Hence on clinical suspicion, ATT was started after which the child improved dramatically.

Though early surgical intervention is needed for treatment, the decision has to be individualized carefully based on the condition of the patient, anatomical location, and number of abscesses as in our case. Histological evidence may not always be possible, so diagnosis of TBA requires high degree of clinical suspicion. ATT should be started as early as possible in all cases to limit the extent of complications even before planning for surgery if TBA is considered as the diagnosis.

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**Conflicts of interest**

There are no conflicts of interest.

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