Unusual presentation of more common disease/injury

Tuberculous cerebellar abscess in immunocompetent individuals

V R Roopesh Kumar,¹ Sudheer Kumar Gundamaneni,¹ Rakhi Biswas,² Venkatesh S Madhugiri¹¹Department of Neurosurgery, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry, India²Department of Microbiology, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry, India

Correspondence to Dr Roopesh Kumar V R, roops1975@gmail.com

Summary

Tubercular abscess of the brain is a rare form of central nervous system tuberculosis. These lesions usually occur in the supratentorial compartment. They are associated with a state of immune deficiency. We report two immunocompetent individuals with tubercular abscess of the cerebellum and discuss the management of these lesions.

BACKGROUND

Central nervous system (CNS) tuberculosis (TB) remains common in India and other developing countries. The continued incidence of new cases of CNS TB in developing countries and the resurgence of CNS TB in developed countries is attributed to the HIV pandemic.¹ Infection of the CNS with *Mycobacterium tuberculosis* is almost always secondary to a primary focus elsewhere in the body; the most common primary focus is pulmonary.^{2–3} The usual manifestations of CNS TB are tubercular meningitis and tuberculoma. Tubercular abscess is a rare entity. The abscess form of CNS TB is usually encountered in immunocompromised individuals and in the brain, these lesions usually occur in the supratentorial space. Cerebellar tubercular abscesses are very rare.

CASE PRESENTATION

Case 1

A 33-year-old man presented with complaints of headache, vomiting and blurring of vision since 10 days. The patient was receiving a course of antitubercular therapy (ATT) for pulmonary tuberculosis diagnosed 2 months back. He had tested negative for HIV 1 and 2 by ELISA. Contrast-enhanced CT scan (CECT) of the brain at the current admission revealed a large hypodense lesion in the right cerebellar hemisphere with a thin enhancing capsule. The fourth ventricle was compressed and distorted (figure 1A). The patient underwent an emergency surgery—burr hole and aspiration (BHA) of the abscess. At surgery, 15 ml of thick, yellow, non-foul smelling pus was aspirated. Bacterial cultures of the pus were negative (aerobic and anaerobic). Ziehl-Neelsen (ZN) staining demonstrated multiple acid-fast bacilli (AFB) suggestive of *M tuberculosis*. This was confirmed by culture. CECT at follow-up 6 weeks later showed a small residual collection. As the patient was clinically asymptomatic, he was managed conservatively and ATT continued. The abscess demonstrated radiological resolution on a CECT at 3-month postsurgery (figure 1C).

Case 2

A 21-year-old man presented with progressively worsening headache since 2 weeks. He gave a history of exposure to a coworker who had been diagnosed with pulmonary TB 3 months previously and started on ATT. CECT of the brain revealed a hypodense multiloculated lesion in the left cerebellum with a thick enhancing capsule (figure 1B). He tested negative for HIV 1 and 2. The patient underwent an emergency midline suboccipital craniectomy and excision of the abscess. The abscess contained 20 ml of thick yellow pus. Postoperative recovery was uneventful and repeat CECT 1 week after surgery revealed no residual enhancing lesion. ZN staining of the pus demonstrated AFB; culture confirmed the organism to be *M tuberculosis*. Bacterial cultures were negative (figure 1D).

TREATMENT

ATT was instituted for both patients; the course consisted of an intensive phase of four drugs for 3 months (isoniazid, rifampicin, pyrazinamide and ethambutol) followed by a maintenance phase with two drugs for 15 months (isoniazid and rifampicin) with pyridoxine supplementation throughout. Testing for resistance to the first-line ATT drugs was not carried out since both patients responded to treatment.

OUTCOME AND FOLLOW-UP

Both patients remain asymptomatic and neurologically stable 1 year after surgery. No fresh lesions were seen on follow-up CT scans.

DISCUSSION

CNS TB is an infection that usually occurs due to haematogenous spread of bacteria from a primary focus, most often in the lungs.^{1–2} TB infection of the brain and spinal cord can result in a variety of lesions/clinical syndromes—these include leptomeningitis, pachymeningitis, tubercular granuloma, encephalopathy, vasculitis and abscess.^{3–4} TB abscess (TBA) is a rare form of CNS TB occurring in approximately 4.8% of patients with CNS TB. These lesions are most often found in the supratentorial

Figure 1 (A) Preoperative CT brain showing a thin-walled right cerebellar abscess (patient 1); this patient underwent free hand tapping of the abscess. (B) Thick-walled, multiloculated abscess (patient 2). This patient underwent upfront excision of the lesion. (C) Month follow-up CT showing complete resolution of the abscess (patient 1). (D) Ziehl-Neelsen staining (40 $\times$) showing acid-fast pink bacilli.

compartment.¹ TBA of the cerebellum is very rare and there are only a few case reports describing this condition.

TBA is usually a focal collection of pus containing abundant AFB on ZN staining. The abscess cavity is surrounded by a dense capsule comprising vascular granulation tissue. The formation of an abscess (rather than the more common tuberculoma) is postulated to be due to various factors including the immune status of the host, the size of the bacterial inoculum and resistance to chemotherapy. A small inoculum in an immune-competent individual results in the formation of a tuberculoma. A larger inoculum elicits an excessive exudative reaction and results in central caseation. Polymorphonuclear leucocytic infiltration may lead to liquefaction of the caseous material, leading to pus formation. In immunocompromised individuals, defective cell-mediated immunity leading to a poor inflammatory response may also result in abscess formation.^{2–4} The radiological appearance of TBA is much the same as that of other bacterial abscesses. On CECT, they demonstrate a central area of hypodensity with an enhancing capsule and may be unilocular or multilocular.⁵

Antitubercular chemotherapy remains the most important component of treatment. Surgical drainage of pus is only necessary to relieve mass effect in patients with large lesions. The choice of surgical procedure—BHA or excision of the abscess, will depend on the radiological appearance of the lesion. TBA is often multiloculated and thick walled; such lesions should be managed by excision.² BHA is a viable alternative if the abscess capsule is thin, as was the case in one of our patients. BHA should also be considered for those abscesses that are deep seated or located in eloquent regions of the brain. It would not be possible to drain a multiloculated abscess through a single burr hole and hence, upfront excision would be the procedure of choice for such lesions.

TBA is usually encountered in the setting of immunodeficiency. However, both patients in this report had no discernible cause for immune deficiency. The abscess was thick-walled in one patient, mandating excision; BHA sufficed for the thin-walled lesion in the other patient. Immune status does not seem to influence abscess formation or the thickness of the lesion capsule.

Learning points

- ▶ Tuberculous abscess may occur in immune competent as well as immunocompromised persons.
- ▶ Cerebellar tuberculous abscess is a rare entity.
- ▶ Surgical options include burr hole and aspiration and craniectomy and excision of the lesion. The choice would be made based on the thickness of the abscess capsule.
- ▶ Antitubercular chemotherapy is an important part of treatment and may need to be continued for 15–18 months.

Competing interests None.

Patient consent Obtained.

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Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Roopesh Kumar VR, Gundamaneni SK, Biswas R, Madhugiri VS. Tuberculous cerebellar abscess in immunocompetent individuals.

BMJ Case Reports 2012;10.1136/bcr-2012-006984, Published XXX

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