

Tuberculosis – the master masquerader – presenting as posterior fossa mass lesions

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Section: Neuroradiology

Area of Interest: Head and neck

Procedure: Computer Applications-General

Imaging Technique: MR

Special Focus: Infection Case Type: Clinical Cases

Authors: Dr. Zalak J Panchal¹, Dr. Jyoti Gupta²

Patient: 2 years, male

Clinical History:

A 2-year-old boy presented with nausea, vomiting and convulsion for the past seven days. Physical and neurological examinations revealed no abnormality. MRI brain showed lesions in the posterior fossa. Occipital craniotomy was done followed by excisional biopsy which showed partially calcified tuberculomas. The patient received AKT with antiepileptic drugs and has improved till date.

Imaging Findings:

MRI brain shows an approximately 23 x 50 x 27 mm (AP x TR x CC) sized well-defined lobulated altered signal intensity lesion involving posterior lobes of bilateral cerebellar hemispheres and lower part of cerebellar vermis, which appears mildly hyperintense on T1W images and heterogeneously hypointense on T2W and T2W FLAIR images with whorled or striped appearance.

The lesion shows ring enhancement on post-contrast study.

Abnormal T2 hyperintensity is seen surrounding the lesion, a possibility of vasogenic oedema.

On MR Spectroscopy elevated lipid-lactate peak is seen at 1.3 ppm and reduced NAA/Cr measuring 0.14.

The lesion shows mass effect in the form of compression of fourth ventricle with resultant proximal dilatation of bilateral lateral and third ventricles, suggestive of obstructive hydrocephalus.

Discussion:

Tuberculosis remains a major public health issue in developing countries. The most common form of tubercular infection is primary lung infection. Other organ systems may be affected either primarily or in disseminated disease. CNS involvement is thought to represent 1 % of patients with tuberculosis [1] and up to 15% [2, 3] of those with AIDS-related tuberculosis. The route of infection is either haematological dissemination or direct extension via craniofacial infections. It is a disease of all age groups but children and young adults are most commonly involved [2]. Risk factors for tuberculous CNS involvement include young age (children>adults), immunocompromised status and malnutrition.

Most common intracranial presentation is basilar meningitis with hydrocephalus [3]. The most frequent form of parenchymal TB is tuberculoma. Other presentations are tubercular pseudo abscesses, focal cerebritis, microinfarctions and encephalopathy. CNS tuberculoma accounts for 5–10% of intracranial space-occupying lesions in the developing world. Cerebellar involvement is slightly more common in children (6 months to 6 years).

Radiological evaluation plays an important role in the diagnosis, monitoring of the response to drug therapy and for assessment of complications [3].

On CT scan, tuberculomas appear as small ring or nodular-enhancing lesions with surrounding mild oedema and

mass effect. Old healed granulomatous lesions may appear as calcified lesions. MRI appearance depends on the stage of maturation. On MRI, classical tuberculoma appears as T2-weighted hypointense lesion with a peripheral rim enhancement on post-contrast images. Multiple conglomerated ring enhancing lesions are classical of tuberculomas. As the disease progresses, pseudoabscesses may form that appear as T2W hyperintense lesions with central complete restriction on diffusion-weighted images. They are known as pseudoabscesses as they do not contain neutrophils seen in classical pyogenic abscesses. Tubercular bacilli may cause microvascular obstruction with resultant infarcts which show restriction on DWI in acute stage [4]. On MR spectroscopy, the lesions show decreased NAA/Cr ratio, slight decrease in NAA/Cho ratio and elevated lipid-lactate peaks. Newer techniques like magnetisation transfer ratio (MTR) may be helpful in conflicting cases which shows greater reduction in cases of neurocysticercosis [5]. Efforts should be made to find extracranial focus of infection in all patients with CNS TB as it may help in diagnosis and treatment. The outcome in patients with CNS TB depends on the clinical stage and on the age of the patient. Diagnosing CNS tuberculosis is of prime importance as timely initiation of therapy can lead to reduced morbidity and mortality.

Differential Diagnosis List: Cerebellar tuberculosis, Fungal granuloma, Neurocysticercosis, Posterior fossa tumours - Astrocytoma/ dysplastic cerebellar gangliocytoma, Cerebellar toxoplasmosis, Brain metastases

Final Diagnosis: Cerebellar tuberculosis

References:

- R. Bryan Rock,* Michael Olin, Cristina A. Baker, Thomas W. Molitor, and Phillip K. Peterson (2008) Central Nervous System Tuberculosis: Pathogenesis and Clinical Aspects. Clin Microbiol Rev 21(2): 243–261 (PMID:[18400795](#))
- Inbasekaran V, Natarajan M.Pravin Jha et al. (1991) Tuberculosis intracranial manifestations radiopaedia Tuberculous brain abscess. J Indian Med Assoc 89:207–9. (PMID: [1940419](#))
- Burrill J, Williams CJ, Bain G et-al. (2007) Tuberculosis: a radiologic review. Radiographics 27 (5): 1255-73 (PMID: [17848689](#))
- Osborn (2013) Brain-Imaging, pathology and anatomy. 1st edition
- Berry, Comprehensive textbook of Diagnostic Radiology.

Figure 1

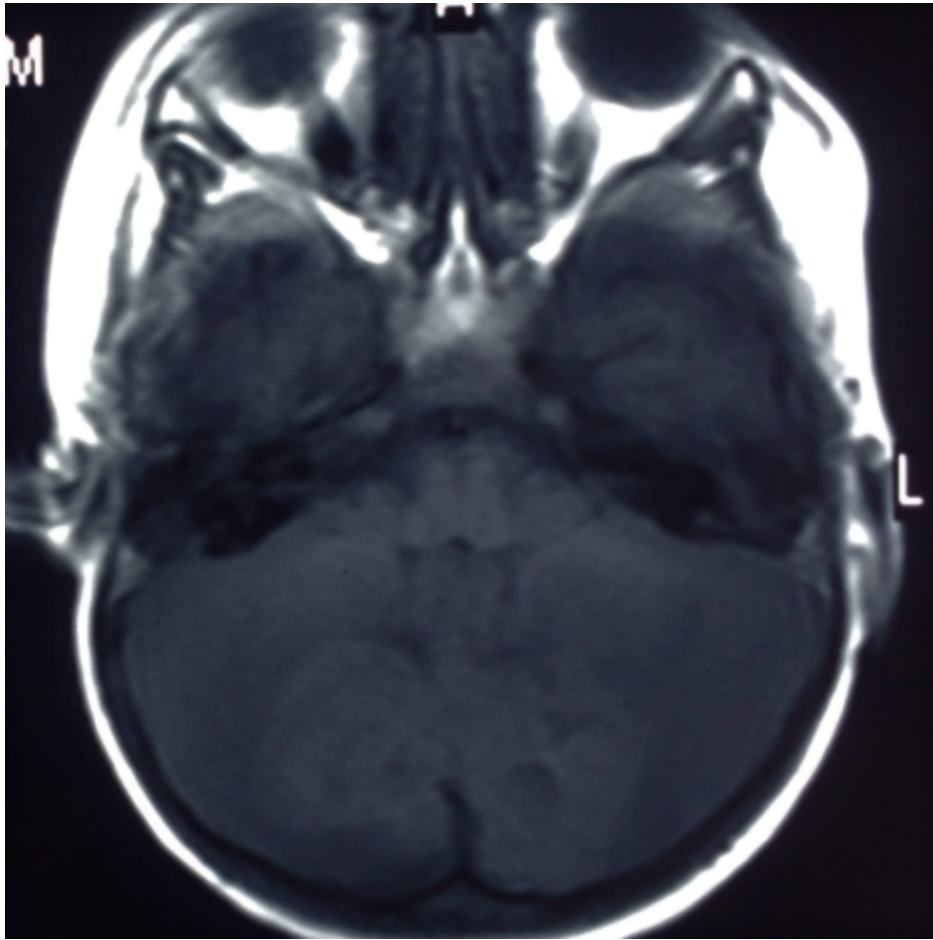
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Description: Plain T2WI axial image shows lobulated heterogeneously hypointense lesion in the posterior aspect of cerebellum. **Origin:** Radiology Department, Civil Hospita

Figure 2

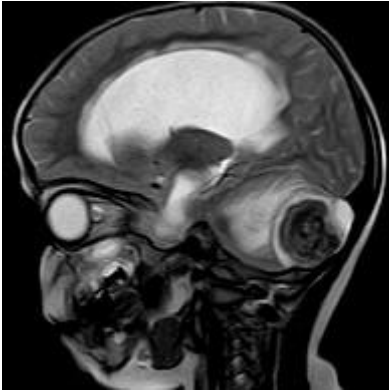
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Description: On T1WI the lesion appears iso to hyperintense to surrounding brain parenchyma. **Origin:** Radiology Department, Civil Hospital, Ahmedabad

Figure 3

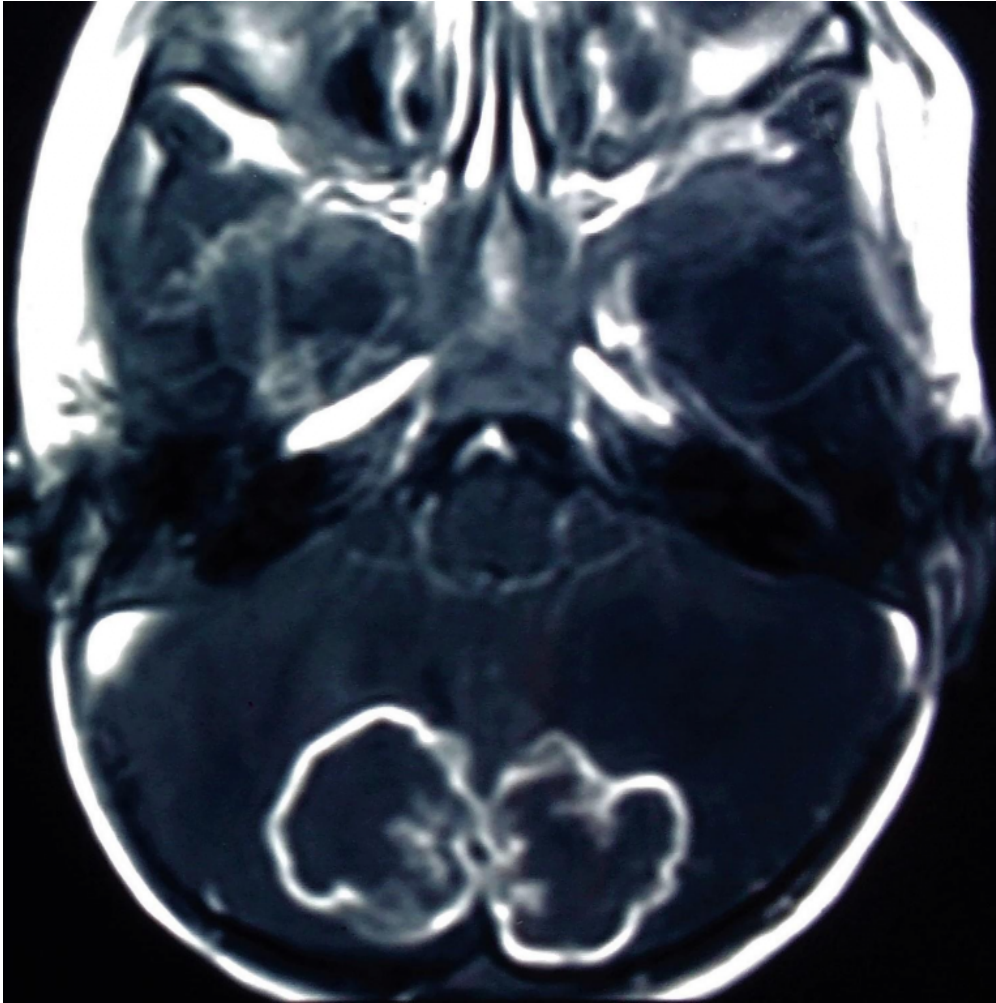
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Description: Plain T2WI sagittal image shows a lesion in the cerebellum and resultant upstream obstructive hydrocephalus due to mass effect of the lesion. **Origin:** Radiology department, Civil Hospital, Ahmedabad

Figure 4

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Description: On post contrast study, the lesion shows ring enhancement. **Origin:** Radiology Department, Civil Hospital, Ahmedabad

Figure 5

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Description: MR Spectroscopy shows elevated lipid lactate peak, reduced NAA level and reduced NAA/Cho ratio **Origin:** Radiology Department, Civil Hospital, Ahmedabad