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Case Report

**Atypical imaging findings in a case of intracranial tuberculoma****Akhil Patil<sup>\*1</sup>, Rudresh S Halawar<sup>2</sup>, Ravi Badagandi<sup>3</sup>, Manaswini Pol<sup>3</sup>, Paragouda Patil<sup>3</sup> and Shantala H. R<sup>3</sup>**<sup>1</sup>Assistant Professor, Department of Radiology, SN Medical College, Bagalkot, India<sup>2</sup>Associate Professor, Department of Radiology, SN Medical College, Bagalkot, India<sup>3</sup>Senior Resident, Department of Radiology, SN Medical College, Bagalkot, India

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SN Medical College, Bagalkot, India**\*Article History:****Received:** 24/11/2017**Revised:** 25/11/2017**Accepted:** 26/11/2017**DOI:** <https://doi.org/10.7439/ijbar.v8i11.4483>**Abstract**

Tuberculosis is a major public health problem in developing nations like India. Tuberculosis of the central nervous system is not uncommon. Meningitis and tuberculoma are the two most important manifestations of tuberculosis of the CNS. Intracranial tuberculomas can present as solitary lesion or multiple lesions. Many atypical radiological findings of tuberculomas are known. They may be indistinguishable from cranial abscess or primary brain tumour. In India, tuberculoma should be considered as a differential in patients with intracranial mass lesions. We present a case of intracranial tuberculoma mimicking high grade gliomas on magnetic resonance imaging and clinical presentation. A 58-year-old male presented with one-month history of epilepsy. Cranial magnetic resonance imaging showed a in right gangliocapsular region peripheral ring-enhancing lesions with central necrosis and one of the lesion showing thick wall enhancement and highly raised choline/creatinine rat. There was a strong suspicion of glial tumour. On CSF studies of the patient, 100% lymphocytes were noted and no malignant cells were seen. The patient was treated with antituberculous chemotherapy.

**Keywords:** Tuberculoma, Glial tumor, Antituberculoma therapy.**1. Introduction**

Tuberculosis of the central nervous system (CNS) is less commonly encountered compared to the involvement of other systems and is seen in up to 10% of patients with systemic tuberculosis [1-5]. Intracranial tuberculoma might be difficult to diagnose when the patient has no evidence or history of tuberculous infection [4-10]. Intracranial tuberculomas can occur in immunocompetent and otherwise healthy individuals. It must always be considered in the differential diagnosis of intracranial mass lesions. Radiological diagnosis of a brain tuberculoma sometimes can be difficult because the imaging presentation is varied and can be non-specific [2,3]. We present a case of tuberculoma showing atypical imaging findings on magnetic resonance (MR) imaging and clinical presentation. The patient presented with one-month history of epilepsy. Cranial MR imaging showed a left occipital

peripheral ring-enhanced lesion with central necrosis. There was a strong suspicion of glial tumor. The lesion was totally excised with left occipital craniotomy. Histological examination of mass revealed a tuberculoma.

**2. Case report**

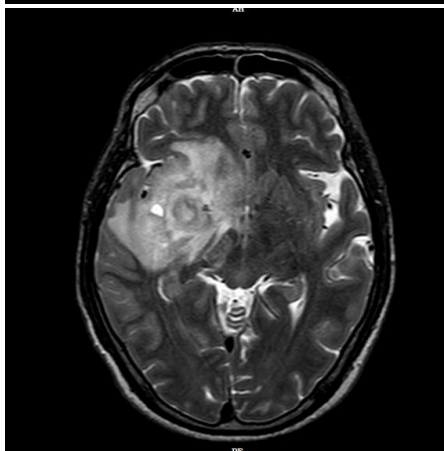
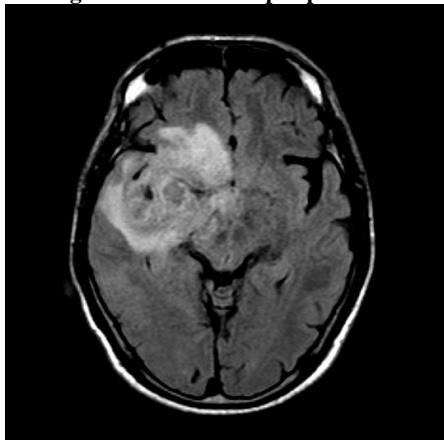
A 58-year-old man presented with history of epilepsy since 2 months. Prior history of seizures was not present. There was no previous history of tuberculosis. Hematological examination revealed a raised ESR. On MR imaging of the brain, two peripherally enhancing lesions were noted lying within the right gangliocapsular region. The larger lesion shows thick peripheral enhancement in its medial aspect (Figure 1). Leptomeningeal enhancement was seen in right frontal region.

**Figure 1:** Post contrast axial T1 weighted image shows two peripherally enhancing lesions lying within the right gangliocapsular region. The larger lesion shows thick peripheral enhancement in its medial aspect



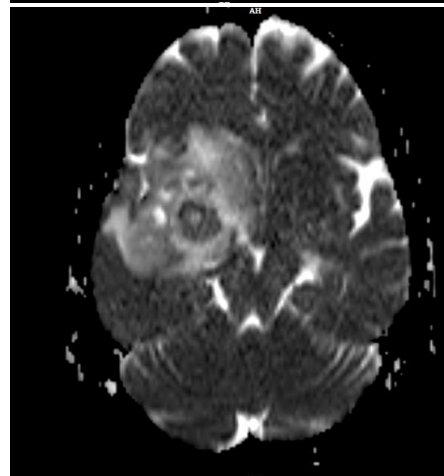
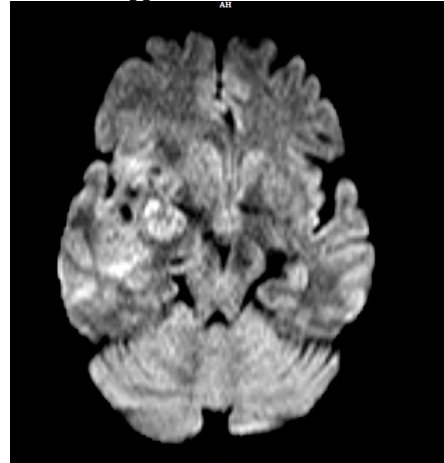
They appeared hyperintense on T2 weighted images with isointense peripheral rim, isointense with hyperintense rim on FLAIR images (Figure 2) and isointense to hypointense on T1 weighted images.

**Figure 2:** The lesions appear isointense with hyperintense rim on axial FLAIR images and hyperintense on axial T2 weighted images with isointense peripheral rim



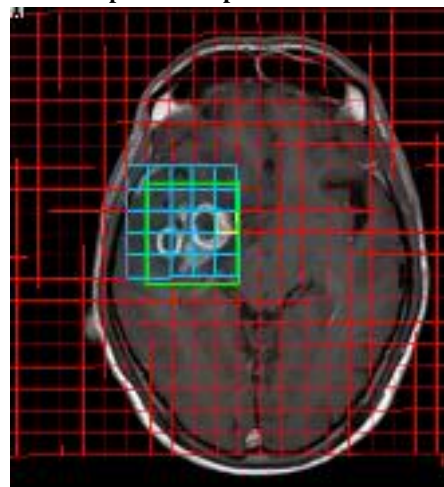
The larger lesion showed restricted diffusion on diffusion weighted images with corresponding hypointense signal on ADC (apparent diffusion coefficient) images. (Figure 3)

**Figure 3:** The larger lesion showed restricted diffusion on diffusion weighted images with corresponding hypointense signal on ADC (apparent diffusion coefficient) images

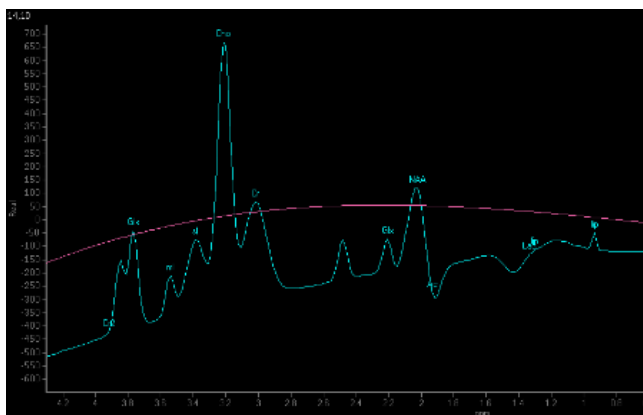


MR spectroscopy demonstrated a decrease in NAA/Cr and highly increased in Cho/Cr of more than 7. Small lipid/lactate peak was also noted. (Figure 4a and 4b)

**Figure 4a and 4b:** MR spectroscopy demonstrated a decrease in NAA/Cr and highly increased in Cho/Cr of more than 7. Small lipid/lactate peak was also noted



**Figure 4a**



**Figure 4b**

Hence, possibility of a neoplastic etiology could not be ruled out. On CSF studies of the patient, 100% lymphocytes were noted and no malignant cells were seen. No evidence of bacilli was seen in CSF studies. Chest radiograph revealed no significant abnormality. A serological test for HIV was negative. The patient was discharged from the hospital and treated for 9 months with multi-drug antituberculous therapy, including streptomycin, isoniazid, rifampicin, ethambutol, and pyrazinamide. The patient was symptom-free at the 12-month follow-up examination.

### 3. Discussion

Tuberculosis can affect any part of the CNS. Tuberculosis of the central nervous system is not uncommon. Meningitis and tuberculoma are the two most important manifestations of tuberculosis of the CNS. Intracranial tuberculomas can present as solitary lesion or multiple lesions. There is a direct relationship between the degree of immunosuppression and the presence of multiple brain tuberculomas [11]. Only 30% of patients diagnosed with brain tuberculoma have a positive chest radiograph [7]. The absence of features of tuberculosis on chest X-rays cannot rule out the possible existence of brain tuberculomas. The chest X-ray of our patient was normal with no evidence of tuberculosis. The foci may have been quite small and unidentifiable on routine radiographs. Some authors have concluded that the imaging findings of intracranial tuberculomas are nonspecific, and they have to be differentiated from other causes of space-occupying lesions such as high grade gliomas, pyogenic abscess, metastases, toxoplasmosis, neurocysticercosis, and lymphoma [2,4,10].

MR imaging findings vary according to the stage of the lesion. Tuberculomas consisting of non-caseating granulomas are usually hypo-intense compared with normal brain tissue on T1 weighted images, and hyper-intense on T2 weighted images. Caseating granulomatous lesions with

a solid centre appear relatively hypo- or iso-intense on T1 weighted images, and isointense- or hypo-intense on T2-weighted imaging. With gadolinium injection, T1 weighted images often show ring-enhancing lesion [6]. The 'target sign' has been described as characteristic of tuberculomas, consisting of a ring-enhancing lesion with an additional central area of enhancement or calcification [11]. MR spectroscopy may be helpful in differentiating tuberculomas from other intracranial mass lesions. MR spectroscopy is characterized by a prominent decrease in NAA/Cr and slight decrease in NAA/Cho [6]. The choline/creatine ratio is greater than 1 but usually less than 3 in tuberculomas [8]. Tuberculomas have a high peak of lipids, more choline, and less N-acetylaspartate and creatine at MR spectroscopy [8]. The polymerase chain reaction (PCR) is a useful and effective adjunct in the diagnosis of CNS tuberculosis. A combination of PCR and the MRI can enable making a diagnosis of neurotuberculosis [9].

Tuberculous bacilli are not always evident in the CSF and even the excised mass [10]. Negative results from the bacterial examination do not eliminate the tuberculous infection. Multidrug chemotherapy is highly efficacious in the management of intracranial tuberculomas and total cure rates are very high. Intracranial tuberculoma can occur in otherwise healthy individuals and should always be considered in the differential diagnosis of solitary intracranial mass lesions. Diagnosis of intracranial tuberculomas may be difficult because the imaging presentation can be varied and can be non-specific. Hence the knowledge of atypical imaging findings and other parameters may be required to establish the definite diagnosis. We conclude that tuberculomas can present atypically clinically and can have an atypical radiological appearance that can be suggestive of brain neoplasms like high grade glioma, metastasis. The only way to distinguish between these two lesions sometimes can be surgical excision and histological diagnosis.

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