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Case Report

Tuberculoma mimicking en-plaque meningioma in a 45-year-old male: A case report

Abdulgadir Talal Atteiah[1], Mosab Abbas[2], Taghreed Abdulhameed Al-Sinani[1]

[1]Department of Neurosurgery, King Fahad Hospital, Jeddah, [2]Division of Neurosurgery, Neuroscience Center, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia.

E-mail: *Abdulgadir Talal Atteiah - abdulgadiratteiah@gmail.com; Mosab Abbas - mosabmabbas@gmail.com; Taghreed Abdulhameed Al-Sinani - th-al-sinani@moh.gov.sa

***Corresponding author:**
Abdulgadir Talal Atteiah, Department of Neurosurgery, King Fahad Hospital Jeddah, Jeddah, Saudi Arabia.

abdulgadiratteiah@gmail.com

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ABSTRACT

Background: Tuberculoma mimicking en-plaque meningioma is a rare variant of tuberculoma. A few cases were reported in the literature. The radiological appearance can be mistakenly diagnosed as en-plaque meningioma.

Case Description: We report a rare case of a 45-year-old male with tuberculoma mimicking en-plaque meningioma who underwent surgical excision followed by anti-tuberculosis (TB) medications. Follow-up brain imaging after three months showed a favorable outcome.

Conclusion: Tuberculoma mimicking en-plaque meningioma should be considered in the differential diagnosis where TB is endemic.

Keywords: En-plaque tuberculoma, Leptomeningeal tuberculoma, Tuberculoma, Tuberculosis

INTRODUCTION

Tuberculosis (TB) infection of the central nervous system (CNS) carries a high risk of mortality rate and can lead to serious neurological complications and long-term consequences.[27] TB infection of the CNS manifests as tuberculoma and accounts for about 1% of those cases.[20] Tuberculomas that affect the brain tissue occur more often than those that involve the dura or skull bone.[4,5,16,17] Most of these patients are immunocompromised.[20] Intracranial tuberculomas frequently occur as a result of tuberculous infection originating elsewhere in the body through hematogenous spread; the lung is the most common site of origin.[25] Nevertheless, the absence of an extracranial source of the illness is not unusual.[5] The symptoms and signs vary between cases based on tuberculoma locations intracranially.[26] Tuberculoma with extensive dural attachment mimicking en-plaque meningioma is a rare variant of tuberculoma that was described in the literature.[18] Obtaining a proper history, physical examination, and supportive laboratory and imaging findings are necessary to reach an appropriate diagnosis, where the definitive diagnosis is made by histology examination.[2] Anti-TB medications are universally accepted as an essential treatment for tuberculoma.[14,15] In this rare case, we report a 45-year-old man with tuberculoma mimicking en-plaque meningioma and reviewing the literature.

CASE REPORT

This patient is a 45-year-old male patient who was previously well and immunocompetent. He had a new onset of generalized tonic-clonic convulsion. He denied having head trauma, fever, previous similar attacks, contact with sick patients, and malignancy. Neurological examination was normal without papilledema. Initial blood investigations showed a slightly abnormal raise in white blood cells: 11.53 × 10^9/L (normal range: 4–10 × 10^9/L) and also slightly abnormal elevation erythrocyte sedimentation rate: 21 mm/hour (normal range: 0–15 mm/hour); otherwise, the rest of laboratory results were within the normal range including electrolytes and C-reactive protein [Table 1]. The human immunodeficiency virus test was negative, and the routine chest X-ray was normal [Figure 1].

Table 1: Blood investigation.

Test name	Result	Normal range
WBC	11.53×10^9/L	4–10×10^9/L
Hemoglobin	13.50 g/dL	13–17 g/dL
Platelet	286×10^9/L	150–410×10^9/L
Sodium	137 mEq/L	136–145 mEq/L
Potassium	4.10 mEq/L	3.4–5.1 mEq/L
Blood urea nitrogen	15.80 mg/dL	6–20 mg/dL
Creatinine	0.81 mg/dL	0.8–1.3 mg/dL
ESR	21 mm/hour	0–15 mm/hour
C-reactive protein	3 mg/L	0–3 mg/L
HIV AB	Negative	
HBsAg	Negative	
Total anti-HBc	Negative	
IgM anti-HBc	Negative	
HCV AB	Negative	

HIV: Human immunodeficiency virus, AB: Antibody, HBsAg: Hepatitis B surface antigen, HBc: Hepatitis B core, IgM: Immunoglobulin M, HCV: Hepatitis C virus, WBC: White blood cell, ESR: Erythrocyte sedimentation rate

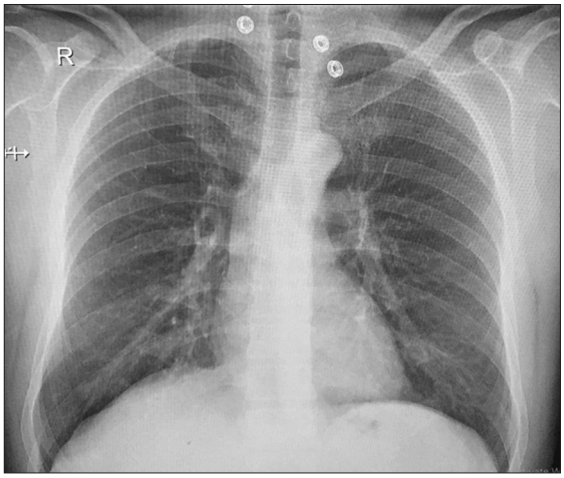

Figure 1: Chest X-ray posteroanterior view.

Computerized tomography (CT) scan of the brain without contrast showed a hypodense signal in the right frontal lobe involving the gray and white matter without mass effect or sulcal effacement that was not enhancing post-contrast administration [Figure 2]. Magnetic resonance (MR) imaging of the brain post-gadolinium demonstrated an ill-defined enhancing meningeal-based lesion [Figures 3 and 4]. The preoperative diagnosis was en-plaque meningioma. The lesion was explored through a right frontal craniotomy, and the overlying bone was normal. Intraoperatively, the lesion was avascular and firm yellowish-white mass that was in adherence to a thick dura. Total excision of the mass with the attached dura was performed, along with coagulating overlying bone. The bone flap was replaced after duraplasty. The wound was closed in layers after achieving a good hemostasis. Histological examination of the lesion revealed diffuse granulomatous inflammation with focal caseous necrosis consistent with TB [Figure 5]. The postoperative recovery period was uneventful. The purified protein derivative (PPD) test was negative. The patient was discharged from the hospital in stable condition on anti-TB medications and phenytoin.

At three months of follow-up visits, MR imaging of the brain showed total resection of the tuberculoma without recurrence, and the patient was well [Figure 6].

DISCUSSION

CNS TB is more frequently diagnosed in developing countries in comparison with other developed countries.[18] It may manifest as tuberculous meningitis, tuberculoma, tuberculous abscesses, and focal cerebritis.[6] CNS TB is an outcome of tubercle bacilli spread through blood vessels into meninges and brain tissue from an infected part of the body, usually the lungs, with tuberculous infection, which may explained that corticomedullary junction is the most common location of tuberculoma.[6] The reported cases of

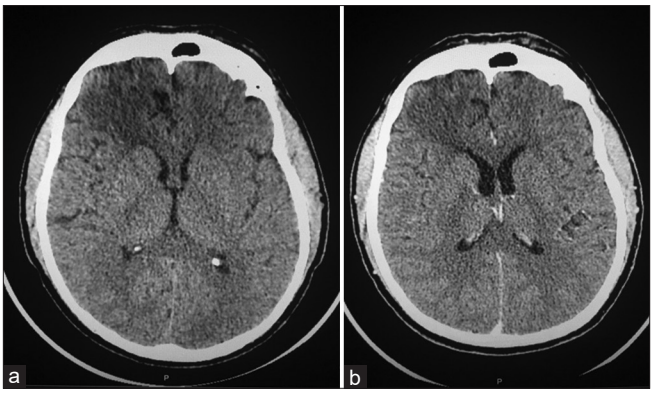

Figure 2: (a) Axial CT scan without contrast and (b) post contrast axial CT scan showed right frontal lobe hypodensity.

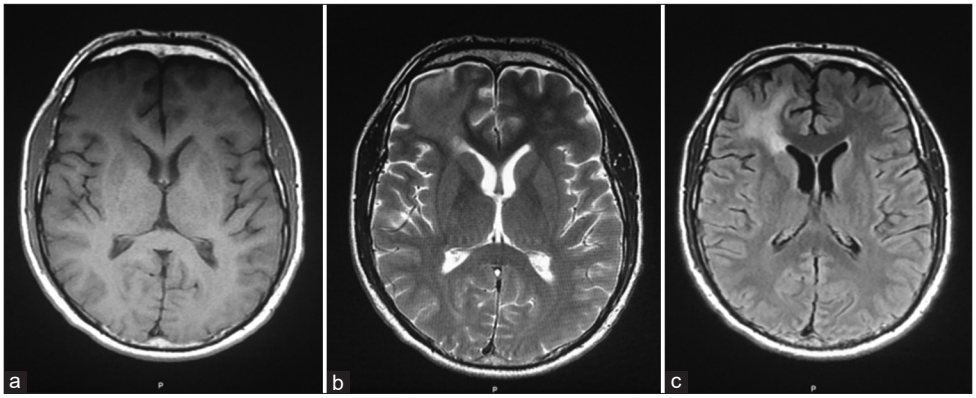

Figure 3: (a) Axial T1-weighted MR image , (b) axial T2-weighted MR image and (c) axial T2-weighted- fluid attenuated MR image.

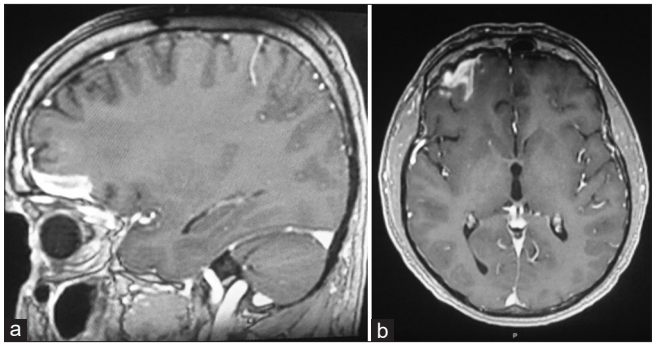

Figure 4: (a) Sagittal T1-weighted MR images , (b)axial T1-weighted MR images post gadolinium showed dural based hyperintense enhanced lesion.

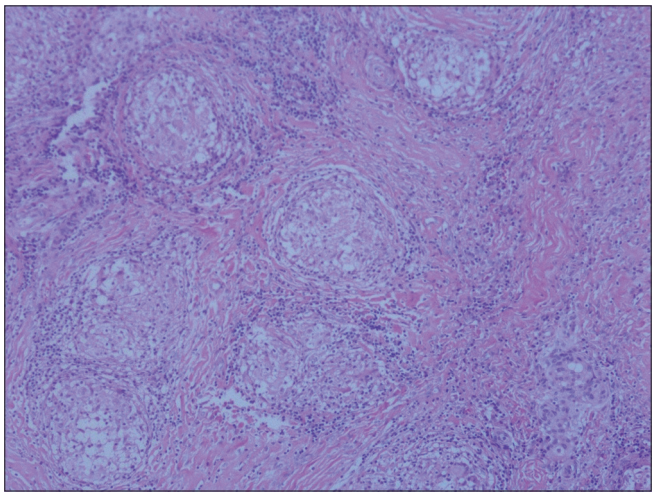

Figure 5: Microscopic image showed the histological features of tuberculoma.

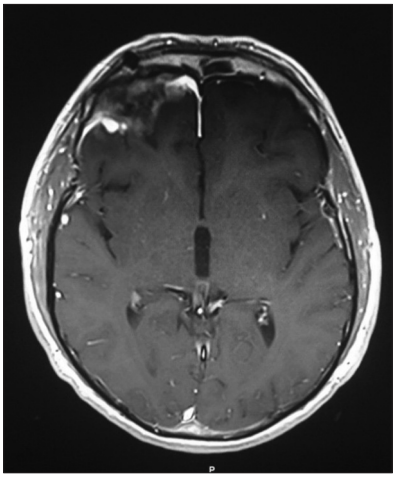

Figure 6: Axial T1-weighted magnetic resonance image post-gadolinium showed total resection of the tuberculoma with postoperative changes.

intracranial tuberculoma with an extracranial source of infection are 30–50% of all intracranial tuberculoma cases. [8] However, intracranial tuberculoma with no extracranial causes is not rare.[8] The diagnosis of intracranial tuberculoma is made based on brain imaging and clinical correlation.[5] Arseni published a case series of 201 patients with intracranial tuberculoma; 85% of patients complained of seizure, 72% of the patients had symptoms of intracranial hypertension, and 68% had focal neurological deficits.[3] The literature showed that the clinical presentation of en-plaque tuberculoma varies based on the location of the lesion.[1,5,9,10,18,21,24,30] The most common reported presentations are headache, vomiting, and seizure. In our reported case, he had a seizure with a normal nervous system examination; otherwise, there were no suggestive symptoms of TB infection, such as fever, respiratory symptoms, weight loss, night sweats, or recent contact with TB patients. The PPD skin test could be negative in intracranial tuberculoma as in our reported case. [19] According to our literature search, there are eight reported cases of tuberculoma mimicking en-plaque meningioma [Table 2].[1,5,9,10,18,21,24,30] Tuberculoma has several features on CT scans and MR imaging.[5] This could be a result of the

Table 2: Reported cases summery of tuberculoma mimicking en-plaque meningioma

Study	Age, Sex	Clinical Presentation	Imaging findings	Management	Outcome
Welchman	Not mentioned	Not mentioned	Mass effect; poor to no peripheral definition; isodense to slightly hyperdense on CT scan without calcification	Surgical resection	Not mentioned
Elisevich *et al*.	33, male	Seizure, transient loss of consciousness, and anosmia	Enhancing lesion, white matter edema and sulcal enhancement	Surgical resection and ATM	Full recovery apart of anosmia
Bauer *et al*.	34, male	Headache, Weakness, and numbness	Hypointense of T1 MR imaging, hyperintense on T2 MR imaging; mass effect	Surgical resection and ATM	Full recovery
Ng *et al*.	35, female	Headache, vomiting, and syncope	Densely enhancing mass with mass effect and calcifications	Surgical resection and ATM	Moderate recovery with right-hand weakness
Singh *et al*.	62, male	Headache, vomiting, seizure and stiff neck	Not mentioned	ATM and steroids	Full recovery
Dubey *et al*.	14, female	Headache and visual symptoms	tentorial enhancing lesion without any evidence of hydrocephalus	Surgical resection and ATM	Full recovery
Alkan *et al*.	25, female	Headache, hearing loss, neck pain and fever	Hypointense lesion on T1 MR imaging; hypointense centrally and hyperintense peripherally on T2 MR imaging	ATM and steroids	Full recovery
Kumar *et al*.	73, male	Headache, seizure, and hemiparesis	Hypointense on T1 MR imaging; Hyperintense on T2 MR imaging	Surgical resection and ATM	Full recovery
Current case	45, male	Headache and seizure	Hypointense on T1 MR imaging; Hyperintense on T2 MR imaging Hyperintense post contrast on MR imaging	Surgical resection and ATM	Full recovery

ATM = anti-tuberculosis medications

tuberculoma evolving granulomatous process. Therefore, the lesion has various imaging features according to the evolution stage.[28] In the early stage, the intracranial tuberculoma may not enhance on CT scan.[28] On MR imaging, this early lesion and edema appear hypointense on T1-weighted MR images and hyperintense on T2-weighted images.[13,23] In the next phase of evolution, the granulomatous stage with central necrosis, the tuberculoma showed as an isodense or slightly hyperdense with surrounding edema with variable enhancement post-contrast on CT scan.[29] On MR imaging, this later-stage tuberculoma showed similar features as in early stage on T1-weighted MR imaging. However, on T2-weighted MR imaging appear as an isointense capsule with hypointense necrotic center.[23] The lesion enhancement on CT scan and MR imaging may appear as a homogenous solid enhancement, ring enhancement, or mixed enhancement of the previously mentioned.[5,28] Almost 50% of intracranial tuberculomas have some attachment to the dura, but broad dural attachment mimicking en-plaque lesion is rare.[1,5,9,10,18,21,24,30] The tuberculoma with a dural base mimics en-plaque meningioma and is difficult to distinguish from a true meningeal neoplasm based on the imaging.[11] CT scan and MR imaging of en-plaque tuberculoma had been described as a dural-based enhancing mass, with other findings having been reported as white matter edema and sulcal enhancement.[7,10,22,30,31] In our patient, his CT imaging showed a hypodense signal in the right frontal lobe involving the gray and white matter with no mass effect or sulcal effacement that was not enhanced post the contrast administration [Figure 2]. On T1-weighted MR imaging, post-gadolinium appears ill-defined dural-based hyperintense-enhanced lesion [Figure 3]. The diagnosing of en-plaque tuberculoma preoperatively is challenging, especially in the absence of an extracranial source, as in our patient. The majority of reported cases were diagnosed postoperatively based on histology examination of the lesion.[5,9,10,18,21,30] Pathognomonic of tuberculoma diagnosis histologically is a caseous center surrounded by a granulomatous reaction.[12] Medical therapy is effective for

intracranial tuberculoma.[18] The management of reported cases either by anti-TB medications and steroids or surgical excision followed by anti-TB medications. Most of the reported cases had full recovery.

CONCLUSION

Tuberculoma mimicking en-plaque meningioma should be considered in the differential diagnosis where TB is endemic. The anti-TB treatment is the effective management of en-plaque tuberculoma when the diagnosis is made.

Ethical approval

The Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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