Radiology Case Reports 19 (2024) 310–314

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journal homepage: www.elsevier.com/locate/radcr

Case Report

Intramedullary tuberculoma of the thoracic spine presented as paraparesis: A rare case report ☆

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ARTICLE INFO

Article history:
Received 20 July 2023
Revised 3 October 2023
Accepted 5 October 2023

Keywords:
Intramedullary tuberculoma
Paraparesis
Tuberculous meningitis

ABSTRACT

Tuberculosis (TB) is a bacterial infection with *Mycobacterium tuberculosis* which primarily affects the lungs; however, it can affect any organ in the body. Brain tuberculous infection usually comes via hematogenous spread from a pulmonary focus and rarely via direct spread from ear, cranial vault or spine. It can present in various conditions including the following: tuberculous meningitis (TBM), brain or spinal cord tuberculoma, miliary TB, tuberculous abscess, tuberculous encephalopathy, and even intracranial hemorrhage. Here, we report an extremely rare case of intramedullary spinal cord tuberculoma in a 30-year-old man presented with paraparesis in a patient under treatment for TBM. Our case report highlights that tuberculoma should be considered as a differential diagnosis for intramedullary space occupying lesions. The clinical features and medical imaging supplemented by advanced magnetic resonance imaging techniques helps in evaluating different types of tuberculous lesions and in making the diagnosis of brain and spine TB confidently.

Introduction

Tuberculosis (TB) is a bacterial infection with *Mycobacterium tuberculosis (M. tuberculosis)* which forms a universal medical problem. Brain tuberculous infection usually comes via hematogenous spread from a pulmonary focus and rarely via direct spread from ear, cranial vault or spine. It can manifest in various conditions including the following: tuberculous meningitis (TBM), tuberculoma, miliary TB, tuberculous abscess, tuberculous encephalopathy, and even intracranial hemorrhage [1]. TBM is the most serious manifestation of TB

☆ Competing Interests. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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https://doi.org/10.1016/j.radcr.2023.10.015

with poor outcomes due to lack of rapid, accurate, and affordable diagnostic tests [2]. Clinically, the diagnosis of TBM still forms a challenge for physicians as it presents similar to other forms of meningitis and commonly leads to a delay in treatment and subsequent worse complications including lifelong disability or mortality [3]. Until recently, the microscopic diagnosis of TBM was restricted to the isolation of *M. tuberculosis* from a smear of cerebrospinal fluid (CSF) and microbiological culture. The former is of low sensitivity and the latter renders a result too late [2,3]. Medical imaging plays an important role with exponential growth in diagnosing TB and TBM and evaluating its complications. Both computed tomography (CT) and Magnetic resonance imaging (MRI) are highly valuable in evaluating of TBM complications, however, MRI is considered better [4].

In this report, we present an extremely rare case of intramedullary cord tuberculoma in the cervical spine that presented as paraparesis in a known case of TBM. This case report aims to elucidate that TB can masquerade as any benign or malignant intramedullary space occupying lesion causing devastating conditions and diagnostic dilemmas for clinicians and radiologists and MRI can reach the diagnosis.

Case report

A 30-year-old man with a known TBM on treatment presented to the emergency department with progressive bilateral lower limb for 3 days. It was significantly weaker on the right side associated with urinary and fecal retention and impotence. He also complained of band like sensation around the abdomen.

On examination, the patient was alert, oriented (15/15 Glasgow Coma Scale [GGS]), equal and reactive pupils, intact cranial nerves, upper limb motor = 5/5, lower limb reflexes = 4/5 except for dorsiflexion = 3/5. Absent proprioception in the right lower limb and in left up to the knee. Temperature was 36.2°C (Oral), Respiratory rate was 20 cycle/minute, Blood Pressure was 108 / 66 mmHg, and blood oxygen saturation of the patient was normal (SpO_2 was 97%).

Brain magnetic resonance imaging (MRI) showed enhanced lesion at the medial surface of the right cerebellar hemisphere adjacent to the vermis on post contrast T1-weighted images (Fig. 1A) with adjacent vascularity posterior to the lesion (Fig. 1B). No significant pachymeningeal or leptomeningeal enhancement.

MRI of the spine showed medium sized oblong shape lesion within the posterior aspect of the spinal cord spanning T2 and T3 vertebral bodies. The lesion showed avid enhancement on post contrast T1-weighted images (Fig. 2A), and heterogeneously low signal intensity on T2-weighted images (Fig. 2B). Spine MRI showed extensive edema and widening of the spinal cord starting from the C2 down to the level of the distal thoracic cord which appear of low signal intensity on T1WIs and high signal intensity on T2WIs (Figs. 2A and B). There was no epidural component or adjacent leptomeningeal enhancement and no adjacent bone marrow destruction within the anterior or posterior elements (Figs. 3A and B). The condition was diagnosed as representing concomitant cerebellar and spinal cord tuberculomas with cervicothoracic cord expansion and myelopathy. The patient was admitted as a case of transverse myelitis.

The patient underwent a laminectomy from T1 to T3 and lesion resection was done. *M. tuberculosis* was detected on Xpert MTB. T1-3 laminoplasty with almost complete spinal lesion resection was done. Biopsy and histopathology results showed fibro vascular tissue with necrotizing granulomatous inflammation consistent with the patient's history of tuberculosis.

Histopathology, gross examination showed a piece of firm dark tan tissue measuring 2 × 1.5 × 0.5 cm. Microscopic examination showed several granulomas with the typical appearance of epithelioid histiocytes, lymphocytes, rare giant cells and central necrosis in some granulomas (Figs. 4A-C).

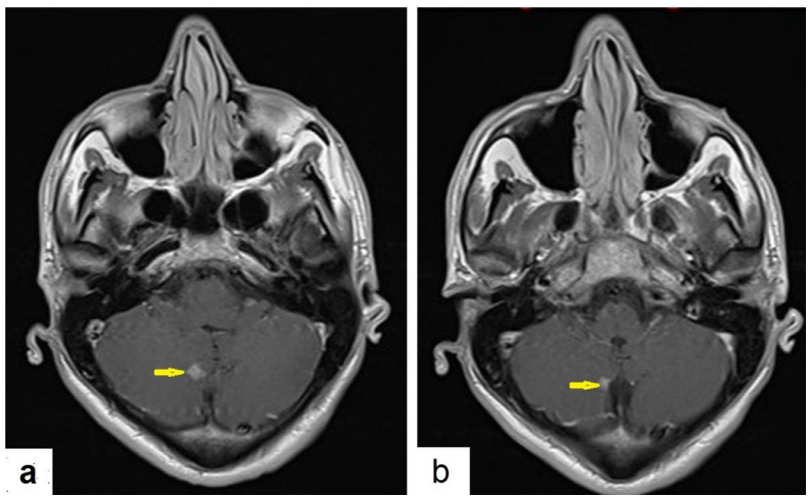

Fig. 1 – Selected axial images of magnetic resonance imaging of a 30-year-old male patient (A) postcontrast T1-weighted images of the posterior fossa revealed small enhancing lesion in the medial aspect of the right cerebellar hemisphere (arrow) likely represents small tuberculoma by the given history of patient TB meningitis, and (B) adjacent vascularity posterior to the lesion.

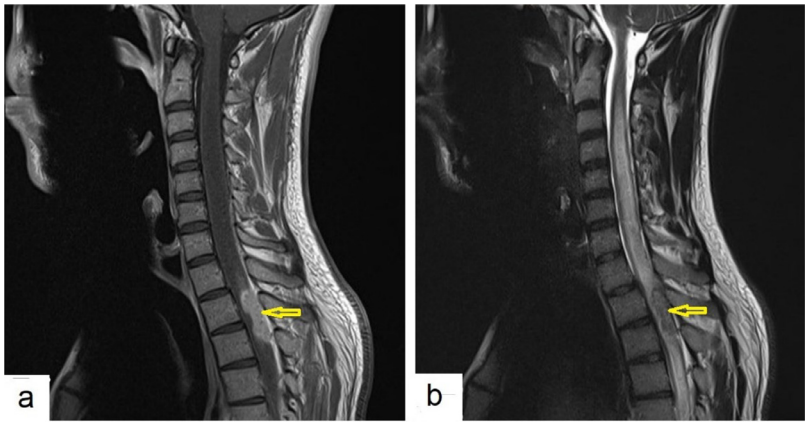

Fig. 2 – Selected sagittal images of magnetic resonance imaging of a 30-year-old male patient (A) T1-weighted image with IV contrast of the cervical and thoracic spine demonstrated a medium size oblong shape intramedullary lesion in the posterior aspect of the thoracic cord spanning <2 vertebral bodies (arrow), with cord expansion at T2-T3 level with avid enhancement with no epidural component or adjacent leptomeningeal enhancement, and (B) sagittal T2-weighted image of the cervical and thoracic spine shows a medium size oblong shape heterogeneously low T2 signal intensity intramedullary lesion in the posterior aspect of the thoracic cord spanning <2 vertebral bodies, (arrow) with cord expansion at T2-T3 level. There is a large surrounding high signal intensity of the cord reach to cervical region upward to C2 level and distal thoracic cord concerning with cord edema.

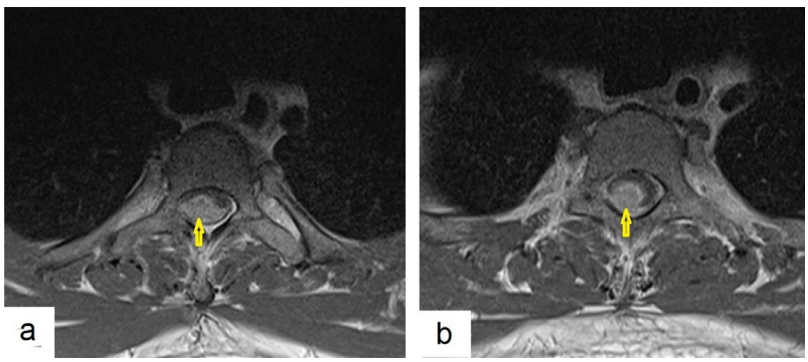

Fig. 3 – Selected axial images of magnetic resonance imaging of a 30-year-old male patient (A and B) postcontrast T1-weighted images demonstrated avid enhancing scaphoid-shape intramedullary cord lesion (arrows). There is no epidural component or adjacent leptomeningeal enhancement.

Special stains including grocott methenamine silver, periodic acid–Schiff and Ziehl-Neelsen stains were negative for fungal organisms and evident mycobacteria. CD163 immunohistochemically stain highlighted the histiocytes (Fig. 4D). The diagnosis of necrotizing granulomatous inflammation of the spine was confirmed.

Follow-up MRI showed remarkable regression in the size of the focal enhancing lesion at the medial aspect of the right cerebellar hemisphere with no new abnormal cerebral or meningeal enhancement. Post T1-3 laminectomy showed small nodular residual enhancement in the posterior aspect of the spinal cord with remarkable interval improvement of the spinal cord edema (Figs. 5A and B).

Discussion

Central nervous system TB is the most devastating form of TB causing sequelae with high morbidity and mortality. It causes a strong granulomatous inflammatory response which can usually be appreciated by MRI. However, the cardinal challenge in diagnosis is the wide spectrum of MRI appearances and clinical features according to the affected region and the complications [5]. TBM is the most common manifestation of brain TB, and the most common radiological manifestation is abnormal meningeal enhancement mostly pronounced in the basal cisterns. Tuberculoma is the most common brain parenchymal lesion which may be solitary, multiple, or present as miliary dissemination anywhere in the brain with different morphology on CT and MRI according to the stage. Miliary TB is usually associated with TBM and appears as innumerable tiny (up to 2 mm) foci on MRI. Tuberculous abscess is rarely seen and can be similar to liquid-centered caseating tuberculomas [6]. The frequency of the subtypes of brain TB has been reported as following sequence: meningitis, tuberculomas, infarctions, hydrocephalus, and epidural lesions [7].

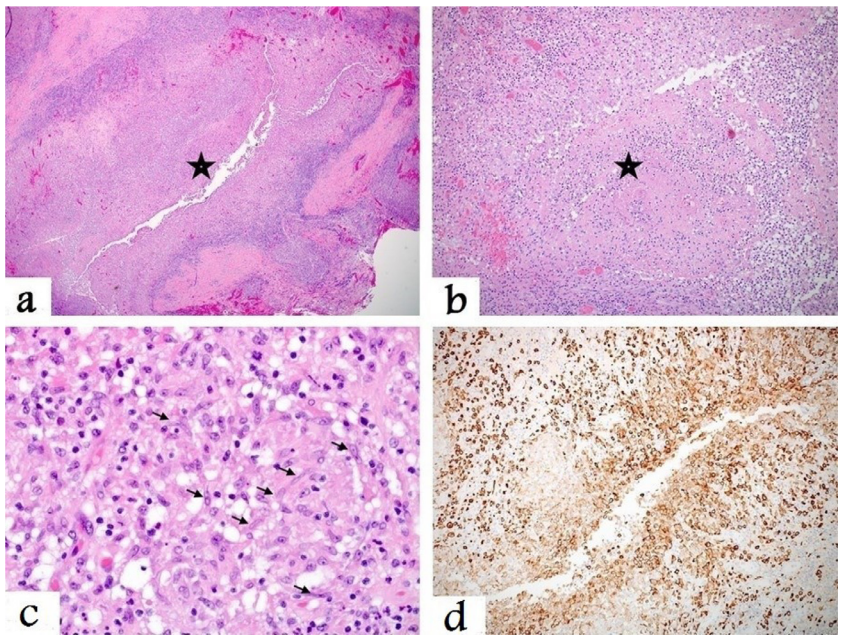

Fig. 4 – Histopathological microscopic images of hematoxylin and eosin (H&E) stain (A) a low magnification view showing pieces of fibro fatty tissue with a large central granuloma (star), (H&E stain × 20), (B) a granuloma showing an area of central necrosis (star), (H&E stain × 100), (C) a high-magnification view showing the characteristic epithelioid histiocytes (arrows) in a granuloma (H&E stain × 400), and (D) CD163 immunohistochemically stain highlighting the membranes of the histiocytes (CD163 stain × 100).

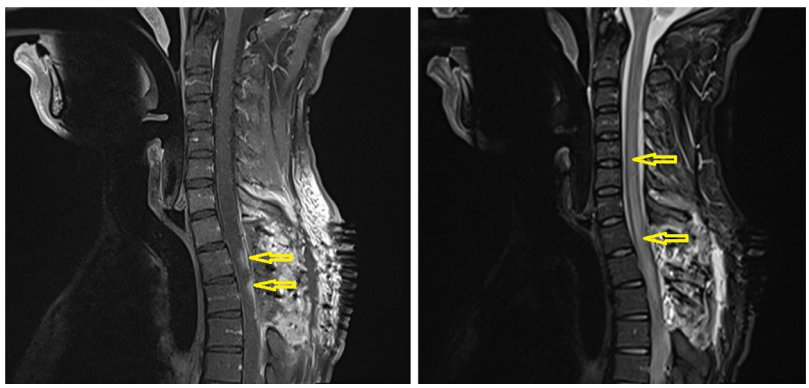

Fig. 5 – Selected sagittal images of magnetic resonance imaging of a 30-year-old male patient (A) postcontrast T1-weighted image of the spine revealed resection of intraspinal mass with residual minimal enchantment noted along the dorsal aspect of the thoracic cord (arrows), and (B) sagittal T2-weighted image of the spine demonstrated postoperative changes with notable improvement of cord edema (arrows).

In our case, provisional diagnosis was totally based on clinical findings and medical imaging. This is in line with Mohammadian who reported that diagnosis of brain tuberculomas were mostly based on clinical findings and brain imaging with MRI is the technique of choice [8]. The magnetization transfer (MT) of MRI is a technique recently used to improve image contrast and tissue specificity which can detect abnormal white matter properties that cannot be detected on the conventional spin-echo (SE) images [9].

In this report, we present a rare case of brain TB started as TBM and tuberculomas were formed in the cerebellum and in the cervical spinal cord. In the literature, we found reports of a tuberculoma mimicking intramedullary tumor was reported in a 19-year-old man with similar presentation for 3 months [10]. Synchronous involvement of the spinal cord and the brain helps to reach the correct diagnosis in our case. In addition, our patient was known case of TBM under treatment. However, intramedullary tuberculomas are extremely rare and are seen only in 2 cases of 1000 cases of CNS TB [11]. Ultimately, TB can affect any region of the brain and spinal cord which can mimic any brain and cord benign or malignant lesions and causing disastrous conditions and diagnostic challenges

[12]. Further studies to improve laboratory and radiological investigations to accurately and rapidly diagnose TB are recommended.

Conclusion

TB can present and masquerade as any benign or malignant brain or spine lesion, even as an intramedullary space occupying lesions, and need a great hypothetical sense and ability to correlate between clinical manifestations and radiological features to reach the diagnosis.

Author contributions

AMA collected and interpreted data. SAA wrote the final draft of the manuscript. MAA did histopathological examination. AMH interpreted and revised data. MK revised the final version.

Patient consent

This study was done in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Before data collection, written informed consent was acquired after the study was well explained. The laboratory procedure was done with the essence of beneficence and data were kept confidential.

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