

# Tuberculous meningomyelitis: Report of a case

Fábia Cruz, Diana Brites, Sara Sintra, Maria Eugénia André

## CASE REPORT

The authors report the case of a 26-year-old Senegalese male, who moved to Portugal eight months ago. He had a recent history of tuberculosis (TB) contact, with a positive interferon gamma release assay (IGRA) test. The patient presented to the emergency department with pyrexia, dizziness, mental confusion, complaints of decreased strength in lower limbs, and urinary incontinence lasting for two weeks. At observation, he was confused with paraplegia. Brain computed tomography showed hydrocephalus. Lumbar puncture findings revealed turbid cerebrospinal fluid (CSF) with lymphocytic pleocytosis (810 cell/ $\mu$ L), elevated protein concentration (>250,000 cell/ $\mu$ L), low glucose levels (14% of blood glucose), and high adenosine deaminase (ADA) levels (181.7 U/L). Blood cultures and serologies were negative for viral, bacterial, and fungal infection (negative for Human immunodeficiency virus (HIV) 1 and 2, Syphilis, Hepatitis C and E, immunity to *Toxoplasma gondii*, Cytomegalovirus, Hepatitis A and B, and negative Huddleson and Paul-Bunnell test). Acid-fast bacilli stain and culture of CSF were also negative (multiplex study in CSF negative to: HIV, Syphilis, *Toxoplasma gondii*, Cytomegalovirus, Herpes Simplex Virus 1 and

2, Enterovirus, Varicella-Zoster virus, Human Herpes Virus 6, Human Parechovirus, *Neisseria meningitidis*, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Escherichia coli*, *Streptococcus agalactiae*, *Listeria monocytogenes*, *Cryptococcus neoformans/gattii*). Chest radiography was normal. Brain magnetic resonance imaging (MRI) with gadolinium contrast revealed hydrocephalus and diffuse leptomeningeal enhancement with basal cistern involvement (Figure 1). It also revealed acute ischemic lesions in the mesencephalon and left middle cerebellar peduncle (Figure 2) consistent with infarctions due to small perforating vessels occlusion. Spine MRI with gadolinium contrast revealed diffuse cervical, thoracic, lumbar, and sacral enhancement of meninges overlying spinal cord and cauda equina nerve roots (Figure 3). These images suggested TB infection.

Although TB bacilli identification was negative, a presumptive diagnosis of tuberculous meningomyelitis (TB-M) was made by the authors in the setting of relevant clinical and epidemiologic factors in combination with typical CSF and MRI findings. The patient soon started (three weeks after symptoms presentation) an initial intensive phase of anti-tuberculous drug regimen (66 days of rifampicin, isoniazid, pyrazinamide, and ethambutol then rifampicin and isoniazid until one year treatment) with adjunctive glucocorticoid therapy, with gradual clinical and follow-up imaging improvement. He was discharged to a rehabilitation center after 100 days. After five months of treatment, the patient made full recovery.

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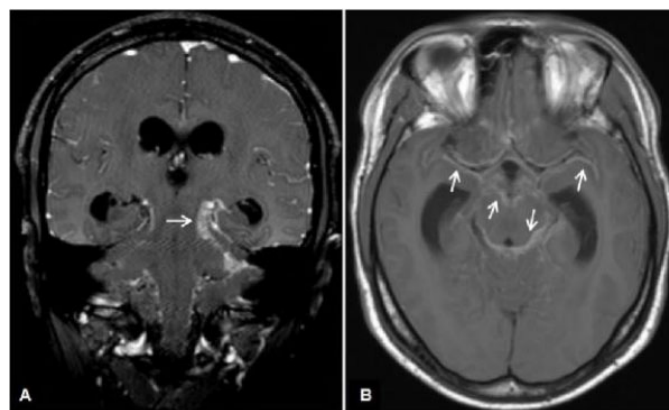


Figure 1: Brain MRI T1 with gadolinium contrast images. (A) Coronal view and (B) Axial view: meningeal enhancement (white arrows).

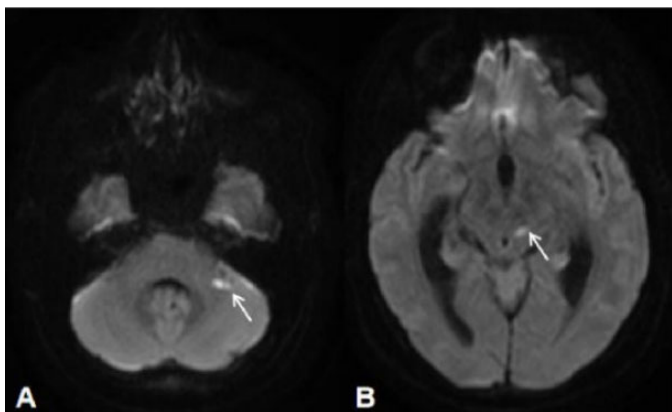


Figure 2: Brain diffusion-weighted MRI images, axial view: (A) left middle cerebellar peduncle acute ischemic lesion. (B) Mesencephalon acute ischemic lesion consistent with infarctions due to small perforating vessels occlusion (white arrows).



Figure 3: Spine MRI with gadolinium contrast, sagittal view: diffuse cervical, thoracic, lumbar, and sacral enhancement of meninges overlying spinal cord (white arrows) and cauda equina nerve roots.

## DISCUSSION

Central nervous system tuberculosis (CNS-TB) is one of the most challenging clinical diagnosis, with high morbidity and mortality. Estimated global prevalence of CNS-TB is 2/100,000 inhabitants, and mortality is as high as 42% in hospitalized patients [1].

Tuberculous meningomyelitis often presents with a TB history or contact [2]. This disease is caused by invasion of the spinal cord or the spinal meninges due to hematogenous spread [2, 3]. The most common clinical symptoms are urinary and intestinal symptoms (urinary retention and urinary and bowel incontinence) (90%), fever (70%), and paraplegia (60%) [3].

Early evidence for TB-M includes lymphocytic pleocytosis and normal or low glucose levels on CSF and a positive IGRA test [4]. Central nervous system infarctions, communicating hydrocephalus and basal meningeal, and spinal cord enhancement on post-contrast are common findings in MRI [3, 5–7].

Diagnostic tools for patients with suspected tuberculous meningitis include CSF examination, neuroimaging, and chest radiography [8]. In addition, for patients with signs and symptoms of suggestive of TB at other sites, diagnostic evaluation should be pursued accordingly [9].

A presumptive diagnosis of CNS-TB may be made in the setting of relevant clinical, epidemiologic factors and typical CSF findings without definitive microbiologic confirmation [7]. The diagnosis may be definitively established in the setting of CSF with positive smear for acid-fast bacilli (AFB), CSF culture positive for *Mycobacterium tuberculosis* or CSF with positive nucleic acid amplification test (NAAT) [8].

Early treatment has a clear effect, delayed diagnosis, and treatment will cause irreversible spinal cord injury [2]. Therefore empirical anti-tuberculosis therapy should be started promptly in all patients in whom the diagnosis of CNS-TB is suspected [9]. Treatment that is started in the first week of onset of the disease results in 70% successful recovery chances [2]. Treatments for all forms of CNS-TB should consist of four drugs (isoniazid, rifampicin, pyrazinamide, and ethambutol) for two months followed by two drugs (isoniazid and rifampicin) for at least ten months, also adjunctive corticosteroids should be given to all patients [9].

Central nervous system tuberculosis differential diagnosis includes fungal and bacterial meningitis, neurobrucellosis, and neurosyphilis. All patients with suspected or proven tuberculosis should be offered testing for HIV infection [9, 10].

In this case the patient had a recent positive contact with TB and developed the most common clinical features described in literature—fever, urinary incontinence, and paraplegia. The laboratory and radiographic findings (CSF, IGRA, and brain and spine MRI) also showed multiple pertinent alterations in favor of TB. Therefore, the authors assumed the diagnosis of tuberculous meningomyelitis

despite the absent TB bacilli identification. After the initiation of anti-tuberculous treatment, the patient has shown a good clinical, laboratorial, and radiographic response, favoring TB diagnosis. Despite of its advanced disease on presentation, the patient had a positive outcome.

## CONCLUSION

The authors want to arouse awareness of this disease by sharing this case, in order to enable more patients to be timely diagnosed and treated and help in achieving a 95% reduction by 2035 in number of TB deaths—target World Health Organization.

**Keywords:** Meningeal tuberculosis, Myelitis, Tuberculosis

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## Author Contributions

Fábia Cruz – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Diana Brites – Conception of the work, Design of the work, Acquisition of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Sara Sintra – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Maria Eugénia André – Design of the work, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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The corresponding author is the guarantor of submission.

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## Consent Statement

Written informed consent was obtained from the patient for publication of this article.

**Conflict of Interest**

Authors declare no conflict of interest.

**Data Availability**

All relevant data are within the paper and its Supporting Information files.

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