



Case Report

Cerebral tuberculomas: manifestation of extrapulmonary tuberculosis in an immunocompromised patient. A case report

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ABSTRACT

Tuberculosis (Tb) is, currently, the deadliest infectious disease and is caused by organisms of the Mycobacterium tuberculosis complex; the most common clinical manifestation is pulmonary involvement; however, it can also manifest as extrapulmonary affection in immunocompromised patients, especially in patients with human immunodeficiency virus (HIV) chronic infection up to 20% of the cases, despite being on adequate antiretroviral therapy. Within the extrapulmonary manifestations, affection of the central nervous system by hematogenous dissemination occurs in up to 5%, however, the finding of tuberculomas, which is a form of central nervous system involvement, is rare and an important cause in secondary hydrocephalus in these patients. We present the case of a male patient with a history of HIV infection and meningeal tuberculosis, who presented dysfunction of his ventriculoperitoneal shunt and in the imaging study multiple tuberculomas were found, a cerebrospinal fluid study was performed where multi-resistant tuberculosis (MDR) was documented, therefore despite adequate management of Tb, tuberculomas developed.

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Tuberculomas cerebrales: manifestación de tuberculosis extrapulmonar en un paciente inmunocomprometido. Un informe de caso

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RESUMEN

La tuberculosis (Tb) es, actualmente, la enfermedad infecciosa más mortífera y está causada por organismos del complejo *Mycobacterium tuberculosis*; la manifestación clínica más común es la afectación pulmonar; sin embargo, también puede manifestarse como afección extrapulmonar en pacientes inmunocomprometidos, especialmente en pacientes con infección crónica por el virus de la inmunodeficiencia humana (VIH) hasta en un 20% de los casos, a pesar de estar en tratamiento antirretroviral adecuado. Dentro de las manifestaciones extrapulmonares, la afectación del sistema nervioso central por diseminación hematológica se presenta hasta en un 5%, sin embargo, el hallazgo de tuberculomas, que es una forma de afectación del sistema nervioso central, es raro y una causa importante en la hidrocefalia secundaria en estos pacientes. . Presentamos el caso de un paciente masculino con antecedentes de infección por VIH y tuberculosis meníngea, quien presentó disfunción de su derivación ventriculoperitoneal y en el estudio de imagen se encontraron múltiples tuberculomas, se le realizó estudio de líquido cefalorraquídeo donde se encontró tuberculosis multirresistente (MDR). documentados, por lo que a pesar del manejo adecuado de la Tb, se desarrollaron tuberculomas.

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1. INTRODUCTION

Tb is an infectious disease caused by organisms of the *Mycobacterium tuberculosis complex*, according to the world health organization (WHO) it is the thirteenth cause of death and the deadliest infectious disease worldwide [1]. It typically manifests as pulmonary infection and up to 20% manifests extrapulmonary, with lymph nodes being the most frequent site, followed by pleural involvement. The most serious extrapulmonary form is the involvement of the central nervous system, this manifestation occurs in 5 to 10% of patients. In patients with HIV, they have a higher incidence of extrapulmonary manifestations; within the spectrum of extrapulmonary manifestations affecting the central nervous system, includes leptomenigeal Tb and cerebral Tb (tuberculoma); tuberculomas are caused by hematogenous dissemination or by extension of an infection of the cerebrospinal fluid (CSF) [2, 3].

2. CASE REPORT

We present the case of a 40-year-old male patient with a

history of ischemic stroke. During his approach, HIV infection and meningeal tuberculosis were diagnosed, initiating management with isoniazid, ethambutol, rifampicin, pyrazinamide, and antiretroviral therapy, leaving left hemiparesis sequelae, motor and global aphasia, and structural epilepsy, being completely dependent on family care. Subsequently, he presented clinical signs and symptoms of hydrocephalus due to the presence of obstruction due to a hypointense image found on subsequent magnetic resonance imaging (MRI) of the skull, for which a ventriculoperitoneal shunt was placed with improvement in symptoms. After two months, the patient was readmitted due to the presence of projectile vomiting on several occasions not related to food, as well as impaired consciousness. Physical examination revealed anisocoric. Glasgow coma scale 11 (Ocular 4, Verbal 1, Motor 6), generalized reduced trophism, in the left half of the body, limbs are observed with diminished muscular strength without overcoming gravity, on the other hand, the right half of the body presents with spontaneous movements in the limbs that overcome gravity, but there is muscular rigidity during passive flexion, with generalized hyperreflexia, the rest without alterations. Vital signs were within normal limits. The basic laboratory analytics were unremarkable. A computed tomography (CT)

of the skull (Figure 1) was initially performed where communicating hydrocephalus with transependymal edema was reported, being evaluated by the infectology service who requested a new skull MRI and lumbar puncture to rule out cysticercosis.

(FLAIR), showing predominantly peripheral diffusion restriction, nodular enhancement to contrast medium and adjacent leptomeningeal compromise. The two largest, measuring 12 x 12 x 17 mm and the second measuring 12 x 16 x 9 mm, are accompanied by perilesional vasogenic

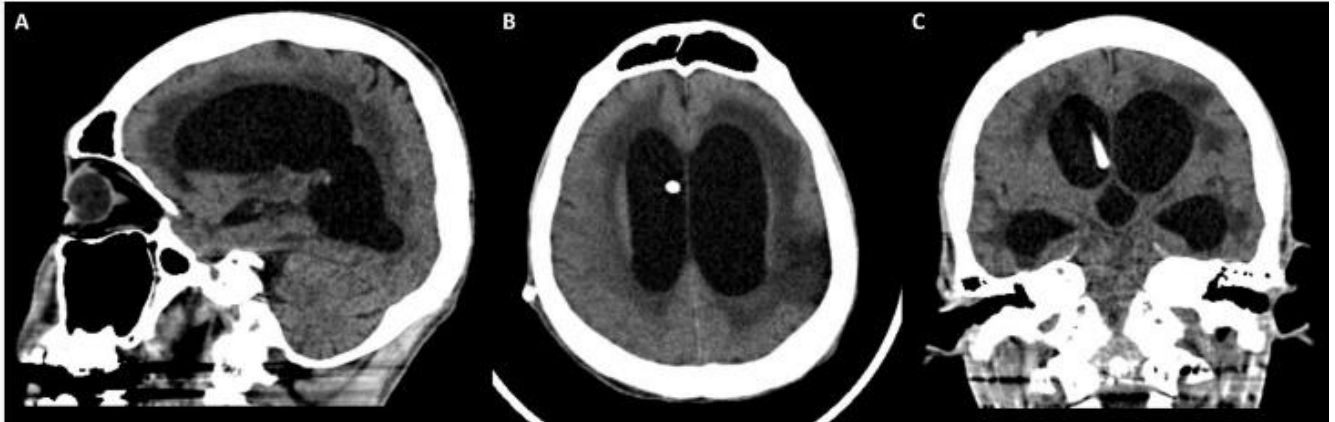


Figure 1: Computed tomography of the skull A) Sagittal B) Axial C) coronal. Right precoronal trephine with ventricular shunt probe, communicating hydrocephalus with transependymal edema and left mastoiditis.

Analytics of the CSF was performed which included cytology and culture of CSF where they report colorless transparent macroscopic aspect, leukocytes 8% with a predominance of mononuclear cells 80%, negative GRAM staining, negative Chinese ink, glucose 35.5 mg/dl, microproteins 63.80 and bacterial culture was negative.

On the MRI (Figure 2), it was reported the presence of multiple extra-axial, supratentorial and infratentorial lesions, which are hypointense and isohypointense on T1, hypointense on T2/fluid attenuated inversion recovery

edema, causing a significant mass effect on the adjacent parenchyma, ruling out cysticercosis based on imaging studies and previous diagnosis of meningeal Tb.

He was evaluated by the neurosurgery service that performed the replacement the ventriculoperitoneal valve and biopsies from the lesions were taken and sent to GeneXpert together with a sample of cerebrospinal fluid where resistance to isoniazid and rifampicin was demonstrated, therefore, a notification to the inter-institutional committee for the management of MDR

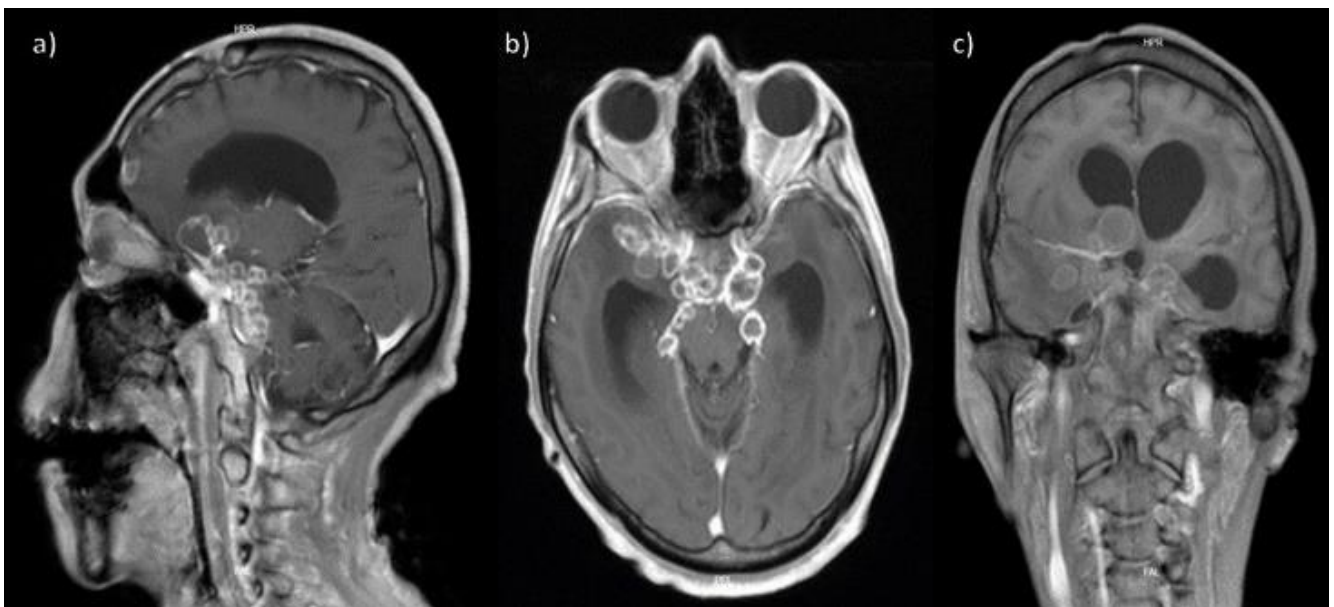


Figure 2: Contrast-enhanced magnetic resonance imaging of the brain in T1 A) Sagittal B) Axial C) coronal. Multiple extra-axial, supra- and infratentorial lesions were observed, with localization from dorsal to adjacent ventral in regions: right frontal, bilateral temporal (Silvio's aqueducts), in suprasellar, perimesencephalic, pontine, right cerebellopontine angle, and bulbar cisterns.

tuberculosis was performed. Finally, it was decided to transfer the patient to a third-level infectious diseases hospital to continue with targeted treatment for multidrug-resistant tuberculosis.

3. DISCUSSION

HIV pathogen is a retrovirus of the lentivirus genus that causes acquired immunodeficiency syndrome (AIDS), a condition described three decades ago. These patients have between 15 and 22 times more likely to develop Tb than people without HIV. In people with HIV, it can occur despite receiving antiretroviral treatment, and is one of the main HIV-related causes of death [4].

The *Mycobacterium tuberculosis* complex is composed of different species, including *Mycobacterium tuberculosis*, *Mycobacterium canettii*, *Mycobacterium africanum*, *Mycobacterium bovis*, *Mycobacterium microti*, *Mycobacterium caprae*, and *Mycobacterium pinnipedii* [1]. It typically manifests as a pulmonary infection and up to 20% manifests extrapulmonary, with lymph nodes being the most frequent site, followed by pleural involvement. The most serious extrapulmonary form is central nervous system involvement, occurring in 5% and reaching up to 15% in subjects with AIDS [2].

Cerebral tuberculoma is a presentation that results from hematogenous dissemination or by extension of a CSF infection through cortical veins and small penetrating arteries. They can be solitary or multiple and are more frequently observed in the basal parts of the brain. The clinical presentation can be subacute or chronic, on some occasions it can be asymptomatic, but if the lesions are multiple or large, it can present as fever, vomiting, headache, focal neurological deficits, seizures, hydrocephalus, signs of meningeal irritation and intracranial hypertension with papilledema [5-7]. Only 30% of patients with cerebral tuberculomas have a suggestive chest X-ray; In the CSF analysis in some cases, tuberculosis bacilli are not detected. The neuroimaging picture depends on the type of lesion. It is divided into non-caseating tuberculomas, solid caseating tuberculomas and tuberculomas with central liquefaction; in noncaseating granulomas, the lesion is usually hypointense or isointense to gray matter on T1-weighted images and hyperintense on T2-weighted MRI images, whereas caseating granulomas usually have a solid center that is hypointense or isointense on T2-weighted images. When contrast is administered, peripheral ring enhancement is observed due to vasogenic edema. In MRI spectroscopy it is useful to differentiate tuberculomas from other lesions, a decrease in N-acetylaspartate/creatinine and prominent lipid

and lactate peaks are observed [8-10].

The definitive diagnosis can be established with a biopsy of the lesion with histopathology and staining and culture for acid-fast bacilli.

Treatment is based on anti-tuberculous drugs, but a long course of 9-18 months is required, surgical management is necessary in case of acute complications such as obstructive hydrocephalus, large lesions with significant mass effect, brainstem compression or when the diagnosis is not secured. Dexamethasone is believed to reduce cerebral and vascular inflammation and therefore lower intracranial pressure [5, 8].

4. CONCLUSIONS

Extrapulmonary tuberculosis, especially meningeal Tb, is a rare disease caused by blood dissemination, being more common in immunosuppressed subjects with high mortality. Tuberculomas can mimic a variety of diseases and can present in a subacute or chronic course, from asymptomatic to intracranial hypertension as in the case of our patient, diagnosis is based on imaging studies (CT and MRI) and in some cases a cerebral biopsy. The treatment is mainly medical and the duration of brain tuberculoma can vary from six to 36 months and in some cases require resection of the lesion.

5. CONFLICT OF INTERESTS

The authors have no conflict of interest to declare. The authors declared that this study has received no financial support.

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