

# Cerebral LOE in Young HIV-Negative Patient - Case Report

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## Abstract

**Objective:** To describe the case of a young woman with previously diagnosed pulmonary tuberculosis, under chronic corticosteroid therapy, that presents with focal seizures refractory to medical treatment associated to cerebral expansive lesion.

**Description:** Female 21 years old patient with previously diagnosed pulmonary TB, who received full treatment protocol, presents with focal seizures. Patient had been studied before in a different hospital, where a head CT and CE MRI were indicated, revealing the presence of a cortico-subcortical lesion in the right Rolandic fissure, compatible with cerebral tuberculoma. Such lesion is still present after performing new diagnostic imaging.

**Intervention:** A programmed surgery took place for tuberculoma resection, in which the lesion was successfully enucleated. Post op was uneventful and symptoms remitted.

**Conclusion:** Total surgical excision of cerebral tuberculoma was key in diagnosis and prognosis of the disease.

**Keywords:** *Cerebral tuberculoma, Neurotuberculosis, Resection of tuberculoma 6*

## Introduction

Tuberculosis is a multisystem disease caused by the airborne pathogen *Mycobacterium Tuberculosis*, endemic in our country. New cases are on the rise since 2012, with a major peak after the COVID-19 pandemic. In 2023, 14,914 total cases were reported (rate: 32/100,000 inhabitants, 62.8% concentrated in the AMBA) and mortality remains stable 733 cases in 2022<sup>1</sup>. Compared to the previous report, total cases increased by 18.6%.<sup>2</sup>

It is estimated to cause approximately 2 million deaths annually worldwide. It is the second leading cause of death from an infectious microorganism after HIV.

Its intracranial central nervous system (CNS) involvement comprises:

- Tuberculous meningitis
- CNS tuberculoma
- Tuberculous brain abscess
- Tuberculous encephalopathy
- Tuberculous vasculopathy

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It may also have presentations with spinal involvement:

- Spinal meningitis
- Spinal arachnoiditis
- Spinal tuberculoma
- Tuberculous spondylitis (Pott's disease)

It is a preventable and treatable disease. It is estimated that in its most severe forms, it involves the CNS in 5 to 10% of cases, and constitutes 1% of all cases of tuberculosis.<sup>3</sup>

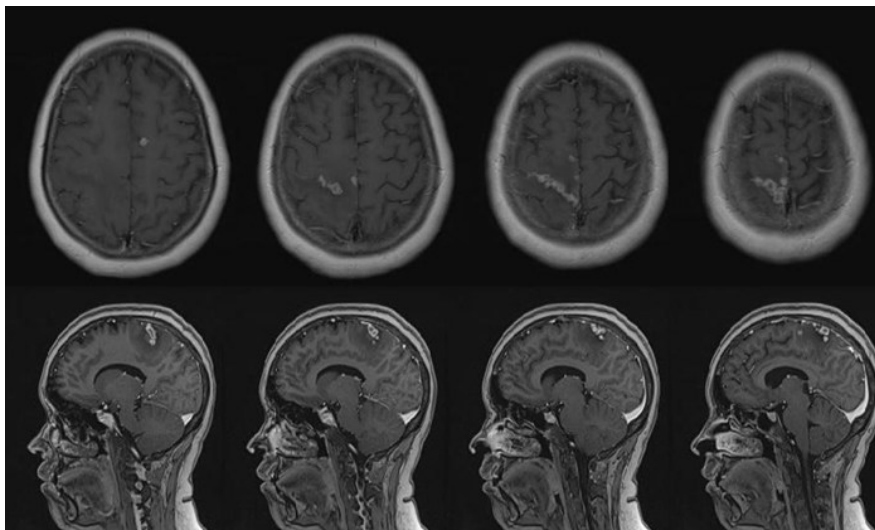
Among its risk factors are socioeconomic conditions predisposing factors (malnutrition), (overcrowding, immunosuppression, oncological disease and HIV co-infection).<sup>4</sup>

Cerebral tuberculoma is a well-defined granulomatous lesion that is firm, avascular, and is about 4cm in size, with edema and perilesional gliosis. They are usually seen in the frontotemporal region and basal ganglia, rarely found in other locations.<sup>5</sup>

They present clinically as slow-growing masses and may cause headache, seizures, nausea and vomiting, and focal deficits. Fever may be present in approximately 25% of patients.

## Case Presentation

21-year-old female patient with a personal pathological history of disseminated tuberculosis: pulmonary bacillary, pleural, cerebral, hepatic and splenic, diagnosed in August 2021. She completed treatment with quadruple scheme (HRZE) for 2 months in the intensive phase and dual scheme (HR) in the follow-up phase for 9 months. She was also prescribed phenytoin for seizure treatment, which due to therapeutic failure was later switched to levetiracetam, and corticosteroids, meprednisone 25mg c/12hs, with progressive dose reduction. However, the patient continued taking corticosteroids at full dose until the present.



**Figure 1.** MRI image in T1 sequence with contrast, axial and sagittal planes, showing a multilobulated serpiginous lesion in the depth of Rolando's fissure, reinforcing in a ring, surrounded by perilesional edema.

She was admitted to the central ward in April 2024, referred from another hospital with a diagnosis of partial seizure. Physical examination revealed a frankly cushingoid habitus, with the presence of central obesity, full moon facies, cervical hump, and violaceous striae. Examination of probable granulomatous sequelae origin.

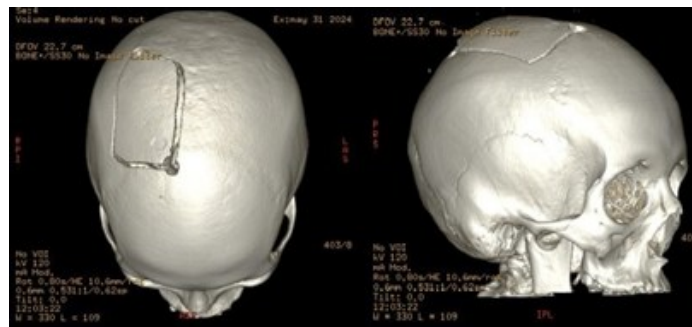
Lumbar puncture was performed, observing normal opening pressure and extracting clear liquid, rock crystal color. Samples were sent for bacteriology, virology, BAAR, mycology and filmarray encephalitis, with negative results.

Brain MRI with Gadolinium shows a cortico-subcortical image in the depth of the right Roland's fissure, multilobulated and surrounded by perilesional edema in all sequences. Hyperintense in T2 and FLAIR, with hypointense center, hypointense in T1 with ring enhancement in contrast sequences. Various entities such as venous infarction, lymphoma, fungal abscess, or cerebral glioma were proposed as differential diagnoses.

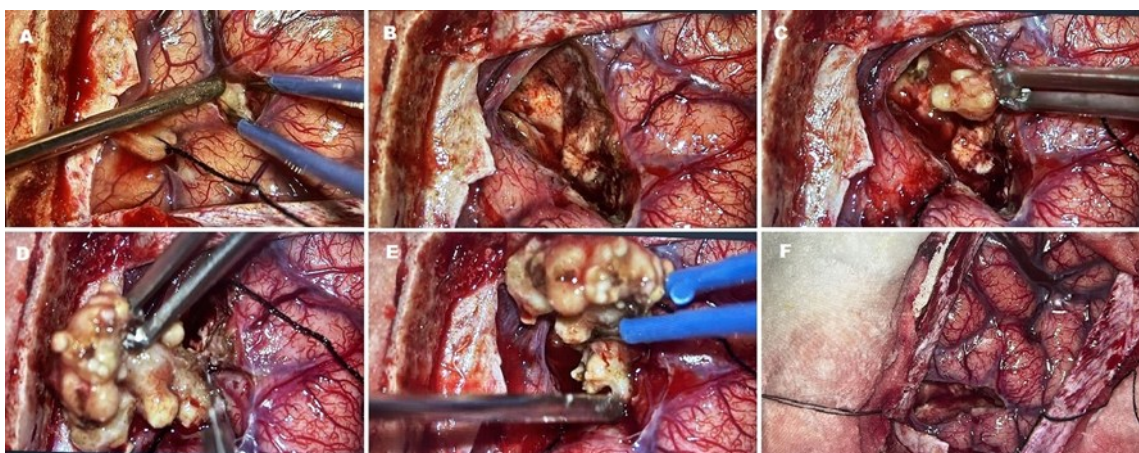
Surgical intervention was decided for biopsy of the space-occupying lesion and, if possible, total resection. With the patient under general anesthesia, a right frontoparietal incision was made in the lower base horseshoe, craniotomy centered on the lesion and durotomy in H. The region of interest was located by cortical reading (Rolando's fissure), and a venous sulcus was observed, where microsurgical dissection was performed using three-dimensional exoscopy. Total resection of a firm, grayish-white, multilobulated lesion, compatible with cerebral tuberculoma, was achieved. The patient tolerated the procedure and was sent to the ICU. Samples were sent for culture and pathological anatomy, and a quadruple antituberculosis regimen (Rifampicin - Isoniazid - Pyrazinamide - Ethambutol) was started.

The sample sent reports Mycobacterium Tuberculosis complex detected, 32 BAAR in 100 fields observed. No resistance to rifampicin or isoniazid. Patient presented two generalized tonic-clonic convulsive episodes 4 days after surgery, so it was indicated to increase the dose of corticosteroids and Levetiracetam 1000mg c/12hs.

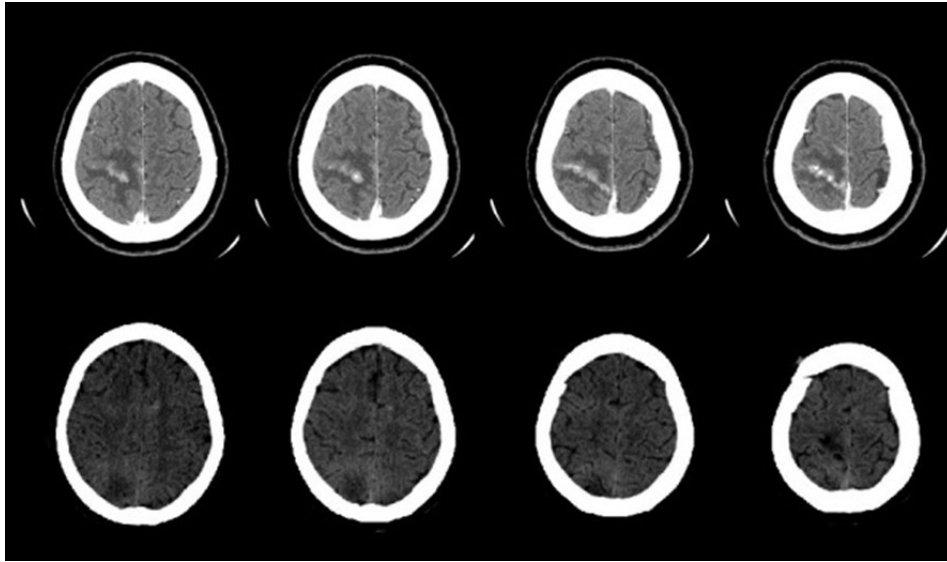
Due to good clinical evolution and no new seizure episodes, the patient was discharged from the institution.



**Figure 2.** 3D reconstruction of post-surgical control CT, illustrating size, shape and location of craniotomy.



**Figure 3.** A. Deep dissection to cortical vein trajectory, where the lesion of interest can be seen. B. Exploration and complete exposure of the lesion. C. Meticulous resection. D and E. Removal of multilobulated grayish-white lesion in one piece. F. Surgical bed free of lesion.



**Figure 4.** Axial CT of the brain (sup. with contrast, inf. without contrast) comparing immediate pre-surgical images with evolutionary control at 5 months, with no evident recurrence of lesions.

## Discussion

Although the first line of treatment for cerebral tuberculoma is medical, according to the consensus of multiple interdisciplinary societies, surgical resolution in case of therapeutic failure or progression of neurological deficit is a mandatory option to be considered in order to reduce patient morbidity and mortality, especially in cases with relative immunocompromise or immunosuppression due to different causes. As extrapulmonary tuberculosis is a form of presentation of limited incidence, the tools available in terms of complementary methods, both imaging and laboratory, are sometimes insufficient to define a precise etiological diagnosis and, consequently, to determine an adequate treatment. In our particular case, the surgical objectives were to take a biopsy in the first place, and total resection if possible, always prioritizing patient safety. The presentation of two episodes of tonic-clonic seizures on the 4th postoperative day was attributed to cortical stress secondary to surgical manipulation. After starting anticonvulsant medication, no new seizures were observed. There is no consensus on whether the permanence of the tuberculoma in MRI studies, or the increased contrast uptake, is significant to define it as a marker of unfavorable evolution<sup>5</sup>, but total surgical resection of the lesion is considered curative and with low risk of local seeding during surgery. It is the opinion of all the professionals who constitute our service that the treatment of any pathology must be adapted to each patient individually, but the good result obtained in this case constitutes a tool to be taken into account in cases where the neurological symptoms or the possibility of permanent sequelae is pressing and waiting for the effect of the conventional treatment scheme becomes unacceptable.

## Conclusion

The total resection of the lesion allowed an accurate etiological diagnosis, while it was therapeutic for the epileptic seizures that the patient suffered from the onset of her disease, in a context of immunocompromise secondary to inadequate intake of corticosteroids. Being a complex and multisystemic pathology, it required the joint and coordinated work of the medical clinic, pneumonology, infectious diseases, intensive care and neurosurgery services, which makes clear the interdisciplinary approach needed for the integral treatment of the patient in order to reduce the morbimortality of a pathology that, given its natural history, predicts an ominous prognosis.

## Conflicts of Interest

None declared.

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