

# Cerebral tuberculosis mimicking intracranial tumour

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## ABSTRACT

Cerebral tuberculoma is a rare entity and is one of the causes of intracerebral mass lesions. A rapid diagnosis based on pathological findings improves its prognosis. We describe two cases where the tuberculoma was located in the cavernous sinus and prepontine cistern, respectively. The first case was a 36-year-old man who was admitted with progressive headache, left ptosis and diplopia. Computed tomography showed a solid enhancing mass in the left cavernous sinus. Diagnosis of meningioma was proposed and a left pterional craniotomy was performed. Histopathological examination revealed granulomatous inflammation with areas of caseation necrosis. The second case was a 20-year-old man who presented with headache, new-onset strabismus, diplopia, malaise, weight loss and low-grade fever. The lesion mimicked an aggressive meningioma on imaging. The patient was operated for primary diagnosis of cerebral tumour. The histopathological examination of the excised lesion revealed a tuberculoma. Although the incidence of tuberculosis is decreasing, a high index of suspicion must be maintained for the diagnosis of intracranial masses in the presence of risk factors for tuberculosis.

**Keywords:** cerebral tuberculoma, intracerebral mass, tuberculoma, tuberculosis

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## INTRODUCTION

In the early 20<sup>th</sup> century, central nervous system (CNS) tuberculoma constituted 34% of all intracranial mass lesions identified at autopsy<sup>(1)</sup>. This ratio was found to be 0.2% in all biopsied brain tumours between the years 1955 and 1980 at a neurological institute in a developed country<sup>(2)</sup>. Although large series from developing countries continue to be reported<sup>(3)</sup> and incidence has increased for the last 20 years due to human immunodeficiency virus (HIV) infection and drug-resistant micro-

organisms, some intracranial locations such as cavernous sinus, hypothalamus, sellar area, Meckel's cave, cerebello-pontine angle, intraventricular area<sup>(4-13)</sup> are infrequently seen, and differential diagnosis with other tumoural pathologies has become very difficult. We report two cases in which the tuberculomas were located in cavernous sinus and prepontine cistern, respectively, with their preoperative findings and the outcome of therapeutic management.

## CASE ONE

A 36-year-old man was admitted to our clinic due to progressive headache for two months, with left ptosis and diplopia. Neurological examination revealed left ptosis, gaze limitation in the medial, upward and lateral directions in the left eye, left hemifacial hypoaesthesia in the cranial nerve V1 innervating area. There were no signs of infection and no chest radiograph abnormality. Serological tests for HIV was negative and there was no significant previous medical history. Computed tomography (CT) showed an enhancing solid mass in the left cavernous sinus and magnetic resonance (MR) imaging showed a T1- and T2-hypointense lesion that enhanced homogeneously (Fig. 1).

Diagnosis of meningioma was proposed, and a left pterional craniotomy using the transylvian approach was performed. The lesion was mildly fragile, whitish in colour, and the third cranial nerve with V1 branch was seen hardly infiltrated preoperatively. At the end of the operation, the excision was nearly total and V1 was sacrificed while the third cranial nerve was left anatomically intact. Histopathological examination revealed granulomatous inflammation with the areas of caseation necrosis. No bacilli could be obtained either from the lesion or its culture, and cerebrospinal fluid (CSF) culture yielded negative results. Anti-tuberculous chemotherapy consisting of isoniazid (INH), rifampin and ethambutol was begun within the first postoperative week. MR imaging performed at two months showed complete resolution of the lesion, and the third cranial nerve function was normal in postoperative follow-up visit at four months.

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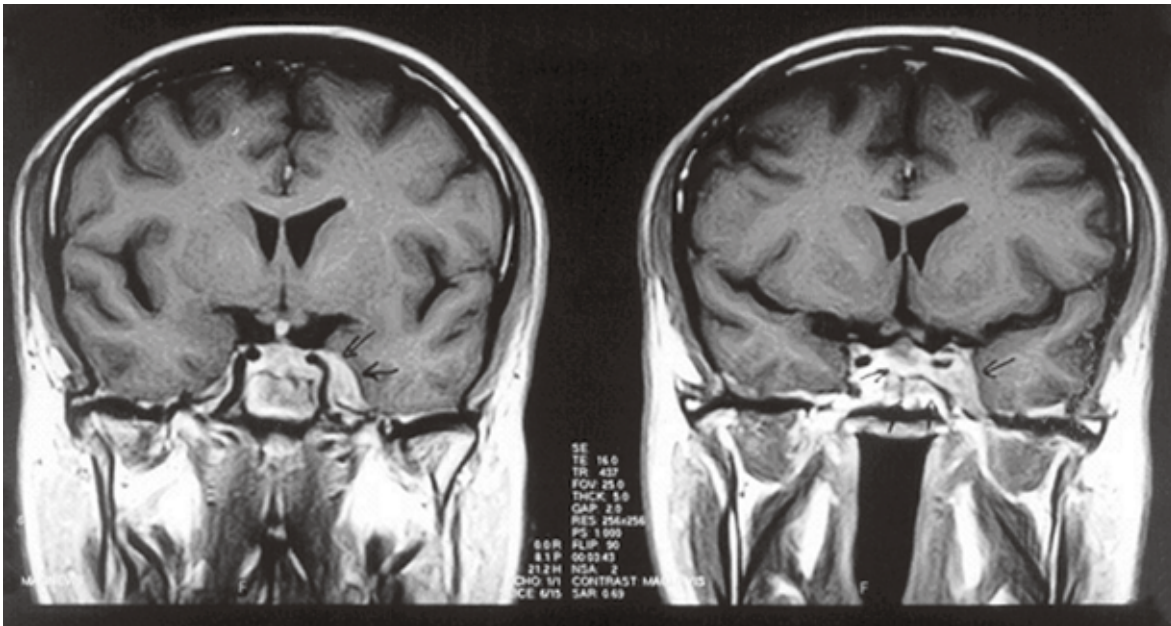


Fig. 1 36-year-old man with progressive headache, diplopia and ptosis in the left eye. T1-weighted coronal MR images show an enhancing lesion in the left cavernous sinus.

## CASE TWO

A 20-year-old man was admitted to our clinic because of increasing headache for the last two months, right ptosis and diplopia. Neurological examination revealed ptosis in the right eye, and gaze limitation in the upward and medial direction in the right eye. There was no sign of infection and the chest radiograph was normal. Serological test for HIV was negative. The patient had a previous history of headache for ten years that responded to analgesics. CT showed a homogeneously-enhancing solid mass in the right prepontine cistern. The lesion appeared isointense on T1-weighted and hypointense with T2-weighted MR images, and it was strongly enhancing (Fig. 2).

The diagnosis of meningioma was considered, and surgical excision with pterional craniotomy using the transsylvian approach were performed. The fragile and whitish-gray lesion underwent near total excision. Histopathological examination revealed granulomatous inflammation with areas of caseation necrosis. No bacilli could be obtained from lesion and CSF. Anti-tuberculous chemotherapy with INH, rifampin and ethambutol was begun in the first postoperative week, and complete resolution of the cranial nerve palsy and lesion were achieved postoperatively after two months.

## DISCUSSION

The frequency of CNS involvement of tuberculosis ranges from 0.5% to 5.0% in the literature<sup>(4,14)</sup>, and is seen most commonly in the developing countries. The most frequent manifestation of CNS tuberculosis

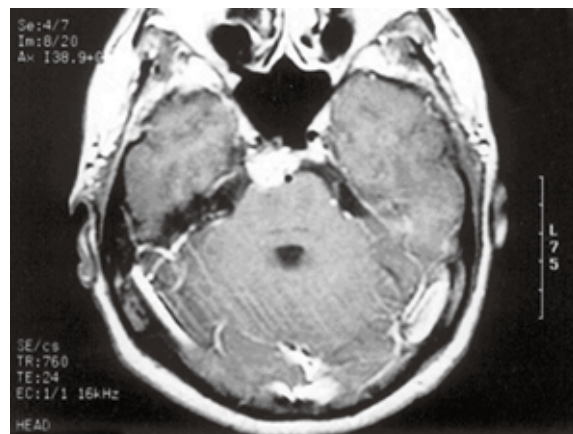


Fig. 2 20-year-old man with headache, diplopia and ptosis in the right eye. The lesion is seen as a homogeneously-enhancing mass in the right prepontine cistern on the enhanced axial T1-weighted MR image.

is tuberculous meningitis, followed by tuberculoma and tuberculous abscesses<sup>(4,15)</sup>. Tuberculoma is encountered in only 15% to 30% cases of CNS tuberculosis<sup>(4)</sup> and are mostly hemispheric<sup>(3,16)</sup>. The cavernous sinus location is exceptional and only four cases have been reported in the literature so far<sup>(6,17-19)</sup>. The other rare locations are the sellar area, cerebellopontine angle, Meckel's cave, suprasellar cistern, hypothalamic region<sup>(4,5,8-10,12)</sup>. Tuberculoma located solely in the prepontine cistern has not been reported in the literature.

Even though tuberculoma is seen more commonly in developing countries<sup>(3)</sup>, and it may be increasing in the developed countries due to the effect of HIV infection on the clinical expression of tuberculosis<sup>(18,20)</sup>, its differential diagnosis from other

tumoural lesions is very difficult. Findings of systemic infection and many of the usual laboratory correlates of infection may be absent<sup>(15)</sup> because tuberculous bacilli are not always evident in the CSF and even in the excised mass<sup>(6,16,21)</sup>. Therefore, negative results from the bacterial examination do not eliminate the possibility of tuberculous infection.

Neuroradiological imaging with CT and MR imaging are highly sensitive for tuberculoma, but their specificity for a definite diagnosis is low<sup>(6,16,22)</sup>. Tuberculoma may be seen as a hypo- or hyperdense, round or multilobar lesion on CT, and shows homogeneous or ring enhancement<sup>(16)</sup>. T1-weighted MR images may show areas of hypo- or isointensity, and T2-weighted images may show hypointense, isointense or a central hyperintense zone surrounded by a hypointense rim<sup>(23)</sup>. Thus, the neuroradiological misdiagnosis of meningioma, neurinoma, even with metastasis, is usual. In one case cited in the literature, a mass located in the suprasellar cistern has been reported to be misinterpreted as an aneurysm by CT<sup>(8)</sup>. In the recent years, it is reported that proton magnetic resonance spectroscopy may be helpful in differentiating tuberculomas from other intracranial mass lesions which have diagnostic difficulties on MR imaging<sup>(7)</sup>.

CNS tuberculosis is generally secondary to the activation of the initial infection, even after many years<sup>(15,16)</sup>. Thus, the lesions seen in chest radiographs attributed to the sequelae of tuberculosis and serological results are requisites for suspicion of tuberculoma in the preoperative period<sup>(6,20)</sup>. When the diagnosis of tuberculoma is strongly suspected, treatment with anti-tuberculous agents may be preferred to surgical intervention<sup>(24)</sup>, and regression of the lesion on regular radiological follow-up may confirm the diagnosis. But in some less typical cases, biopsy may prevent erroneous diagnosis of lesion (e.g. meningioma) and prevent the patient from the harmful effects of unnecessary treatment (e.g. radiotherapy)<sup>(10,11,25)</sup>. As a result, most of the unusually-located tuberculomas reported in the literature were misdiagnosed preoperatively, as it was in our two cases. Therefore, its extraordinary location capability in the CNS, ability to mimic other frequent lesions of the CNS, and increasing incidence in the developed countries render it as an “always suspicious pathology” in the differential diagnosis.

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