

# Multiple Brain Tuberculomas And Role Of Open Brain Biopsy: A Case Report And Review

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## Abstract

A 59-year-old woman renal transplanted patient presented with gradually developed headache, febrile, diplopia, left sided paresis, and decreased level of consciousness. Contrast magnetic resonance imaging revealed multiple ring enhancing lesions from medulla to cortex.

Stereotactic brain biopsy of left frontal lobe lesion was unrevealing. Open brain biopsy was performed for right temporal lobe lesion. The excised lesion was 1.5 cm firmly encapsulated, and in histological examination revealed chronic inflammatory reaction loaded with acid-fast bacteria. Patient treated with antituberculous drugs and 6 week after treatment patient neurologic condition improved.

In patients with suspected brain tuberculoma the needle of CT guided stereotactic brain biopsy may not penetrate the firm capsule of tuberculoma and only surrounding brain tissue may be obtained. In such cases we recommend considering open brain biopsy from beginning for definitive diagnosis of brain tuberculomas.

## BACKGROUND

Multiple brain tuberculomas are unusual and rare, even in immunocompromised patients (1, 2). Patients may be present without systemic evidence of tuberculosis. Diagnosis of these lesions is often difficult. We report a case of multiple intracranial tuberculomas whose diagnosis made not by CT-guided stereotactic brain biopsy (CT-SBB) but by open brain biopsy. Brain stem and cerebellar tuberculomas are rare (3,4,5,6) but our patient has multiple pontine, medullary and cerebellar lesions. The maximum reported number of tuberculoma in one patient was 100(7), our case is the second maximum reported lesions and has about forty lesions.

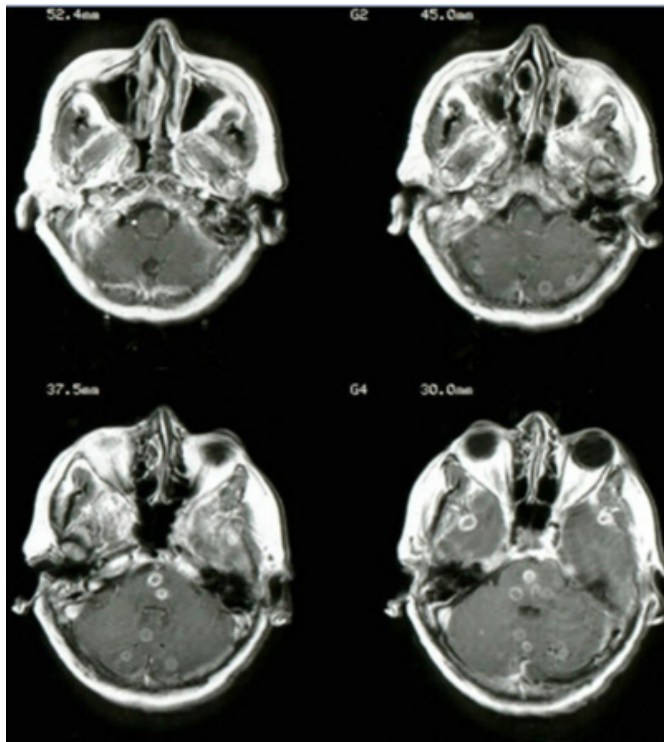
## CASE PRESENTATION

The patient was a 59-year-old woman with history of idiopathic systemic hypertension for 15 years, who had been receiving immunosuppressive agents including ciclosporin after successful renal transplantation for hypertensive nephropathy for 32 months. She has gradually developed headache, decrease level of consciousness, febrile, diplopia and left side hemiparesis. CT scan demonstrated multiple hypodens lesions in pons, white matter and gray matter of

both frontal and temporal lobes with mild enhancement after intravenous contrast (Fig. 1). Brain MRI demonstrated multiple (forty) intracranial ring enhancing lesions involving whole brain in medulla, cerebellum, pons, basal ganglia, internal capsule and bilateral frontal, temporal and parietal cortexes without significant mass effect or hydrocephaly (Fig. 2). Although the MRI finding were consistent with those of previously reported cases of intracranial tuberculomas, but it was not conglomerate ring like enhancing appearances(8), other conditions such as malignant lymphoma and toxoplasmosis were not ruled out. CSF analysis was normal. PCR of CSF for mycobacterium tuberculosis was negative.

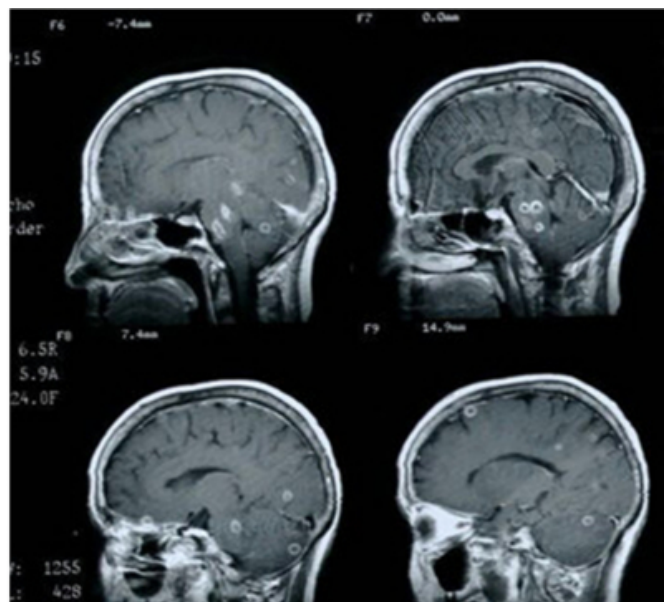
**Figure 1**

Figure 1: Axial enhanced CT scan of brain, showing three enhancing lesions in pons.



**Figure 2**

Figure 2: Sagittal T1-weighted MRI scans with gadolinium showing multiple ring enhancing lesions.



Hematological and biochemical examination results were normal. Radiological examination indicate normal chest finding. Therefore, CT-SBB targeting the left frontal lobe lesion was done for definitive diagnosis, but it was

unrevealing. With presumptive diagnosis of tuberculoma, the patient treated with antituberculous drugs, including isoniazid(300 mg/d), rifampin(600mg/d), pyrazinamide(1g/d), and ethambutol(800mg/d). One week after treatment, patient developed hepatic toxicity and treatment discontinued. Because of progressive deterioration of patients with presumptive diagnosis of toxoplasmosis, patients treated with pyrimethamine(50mg/d), sulfadiazine(4g/d), and folinic acid(5mg/d). Two week later no improvement was noted and patient refer to our center for further evaluations. On examination patient was febrile(axillary T=38.5 C), stuporic, left side hemiparesis(2-3/5), right side abducens palsy. Hematologic and biochemistry results were normal, except for mild elevated hepatic enzymes(AST=60, ALT=75). Chest radiograph was normal. An intradermal tuberculin test yielded negative results. In our center patient was admitted in intensive care unite and treatment with antitoxoplasmosis drugs, ciclosporin, phenytoin, and dexamethazone were continued, and low dose antituberculous drugs was reinitiated. Then MRI of brain was done, and revealed previous ring enhancing lesions from medulla to cortex with no improvement. For definite diagnosis of the lesions, we performed open brain biopsy of right temporal lobe lesion.

The excised lesion was 1.5 cm firmly encapsulated, and in histological examination revealed chronic inflammatory reaction loaded with acid fast bacteria. PCR for mycobacterium tuberculosis of specimen was also positive. Further administration of increasing dose of antituberculous drugs was continued and antitoxoplasmosis therapy discontinued. Six week after treatment eventually patient fully awake, and patient neurologic conditions including left hemiparesis and diplopia were improved.

## DISCUSSION

Brain tuberculomas make up 5 to 8 per cent of intracranial masses in person in developing countries(9). Before effective chemotherapy was available for tuberculosis, tuberculoma made up 20 per cent of intracranial lesions in one large series(10). The incidence of neurotuberculosis in the United States is less than 0.5 per cent(11). The incidence of neurotuberculosis in any given community is directly related to the incidence of tuberculosis in general, and this, in turn, is related to socioeconomic conditions of that community(12). Although these tuberculous lesions are located in areas where blood flow is greatest, they can occur anywhere in the brain, mainly in the cerebral or cerebellar hemispheres but rarely in the brain stem and basal ganglia(11).Another

interesting feature of our case is multiple pontine, medulla and cerebellar lesions. The increasing prevalence of atypical mycobacterial infections in patients with AIDS and other immunocompromised patient, will undoubtedly lead to a higher incidence of symptomatic tuberculosis of the central nervous system, including tuberculose meningitis and tuberculomas. The diagnosis of tuberculoma is often difficult. Patients present with signs and symptoms of increased intracranial pressure or with focal neurologic deficits over month to years<sup>(9,10,13,14)</sup>. Moreover, up to two thirds of patients will not have evidence of systemic tuberculosis and 50 per cent of patients will have normal chest radiographs<sup>(9)</sup>. Cerebrospinal fluid analysis is often not helpful, with slightly elevated protein levels and normal glucose concentrations<sup>(15)</sup>. Tuberculoma have been reported to mimic glioma, CPA lesions, pinealoma and meningioma<sup>(1,17,18,19)</sup>. Modern imaging is often not helpful in differentiating tuberculoma from glioma or metastatic lesions<sup>(9,20)</sup>. Because the different therapeutic plan in immunocompromised patients, the diagnosis of brain lesion is very important. For this reason many authors perform surgical biopsy (open or stereotactic brain biopsy) for surgically accessible lesions<sup>(21)</sup>. To provide histological diagnosis of brain lesions, CT-guided stereotactic brain biopsy has been widely used, because its less invasive technique compared with open brain biopsy (OBB)<sup>(22)</sup>. However as recommendation has been made previously by two Japanese groups<sup>(23, 24)</sup> CT-SBB is not always diagnostic and early open brain biopsy may be considered.

### CONCLUSION

In clinical studies brain tuberculomas are commonly single, but as many as 100 lesions have been found in one patient<sup>(7)</sup> and our case is the second after that and has 40 lesions. In case of intracranial tuberculoma, the needle of CT-SBB may not penetrate the firm capsule of tuberculoma and only surrounding brain tissue may be obtained as in our case. Therefore, if brain tuberculoma is one of the primary differential diagnosis of ring enhancing lesions we recommend considering open brain biopsy from the beginning for definitive diagnosis of intracranial tuberculoma. As in our case brain tuberculoma may involve brain stem and cerebellum.

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Written consent was obtained from the patient for publication of the patient's details.

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