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Case Report

Starry sky appearance of tuberculoma

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ABSTRACT

CNS tuberculosis accounts for only 10% of all cases of tuberculosis, carries a high mortality and morbidity. Tuberculoma of the brain is an important clinical entity. The main challenge in the management of brain tuberculoma is its diagnosis. Hereby, referring case of a 12 years old male child who presented with clinical picture of tuberculosis but radiologically NCC, hence posing a diagnostic dilemma as clinically it was in the favor of tuberculosis whereas radiologically inclination was towards neurocysticercosis. Based on clinical manifestations it was suggestive of meningitis, CSF picture was suggestive of hypoglycorrhachia. CT chest showed miliary pattern and neuroimaging showing multiple ring enhancing lesions. High index of clinical suspicion is required to make a diagnosis and evaluation with reports.

Keywords: CECT thorax, MRI brain, Miliary pattern in CECT, MR spectroscopy, Neurocysticercosis, Starry sky appearance, Tuberculoma

INTRODUCTION

Tuberculosis (TB) is a contagious, airborne disease that typically affects the lungs. TB is caused by a bacterium called *Mycobacterium tuberculosis.* Central nervous system (CNS) involvement is an uncommon, yet undoubtedly a devastating manifestation of tuberculosis.

CNS tuberculosis accounts for only 10% of all cases of tuberculosis, carries a high mortality and a distressing level of neurological morbidity.[1] Central nervous system tuberculosis in children presents commonly as tubercular meningitis, post-tubercular meningitis hydrocephalus, and much more rarely as space-occupying lesions known as tuberculomas.[1]

Spinal TB is uncommon in the Western world and, hence, often overlooked by clinicians. There exist certain risk factors that should raise suspicion of TB. Agreeably, the same factors that predispose individuals to TB also increase their risk for spinal TB. These involve socioeconomic factors such as poverty, overcrowding, and illiteracy as well as conditions including malnutrition, alcoholism, diabetes mellitus, HIV, and other immunosuppressive states.

Tuberculoma of the brain is an important clinical entity. The main challenge in the management of brain tuberculoma is its diagnosis. Appearance in computed tomography (CT) scan of brain is common and consists of solitary or multiple ring-enhancing lesions with moderate perilesional edema, but these are not specific for tuberculoma as neurocysticercosis (NCC), coccidiomycosis, toxoplasmosis, metastasis and few other diseases may also have similar appearance on CT scan brain.[2]

Hereby, referring case of a 12 years old male child who presented with clinical picture of tuberculosis but radiologically NCC, hence posing a diagnostic dilemma.

High index of clinical suspicion is required to make a diagnosis and evaluation with reports.

CASE REPORT

A 12 years old, right handed male 1st born child from a non-consangious marriage with an average built, came to us with the complaint of high grade fever and cough since one and half months. Fever was high grade in intensity and was associated with headache which was accompanied by episodes of non-bilious, projectile vomiting with undigested food particles and cough was present since one month without expectoration and breathlessness.

There is a significant history of trivial head injury 2 months back.

History was suggestive of meningitis in the form of headache and vomiting. There was no history of koch's contact, viral illness, HIV, chronic steroid therapy or any other immunosuppressants.

No compressive features were present such as radiculopathy, papilledema, paraplegia.

At the time of admission, patient had altered sensorium and the reflexes were brisk and signs of meningeal irritation were positive such as neck rigidity, kernig's sign and brudzinski's neck sign although tone was normal.

Then routine investigations were done along with special tests like-

Figure 1: Cobweb appearance in CSF.

CSF routine microscopy gram stain and ZN stain was done which showed no cobweb, high protein level of 121, low glucose of 28, total cells 38 which were 100% lymphocytic, no RBCs and pandy's test was negative. MRI-brain contrast and spine screening was also done which showed the following;

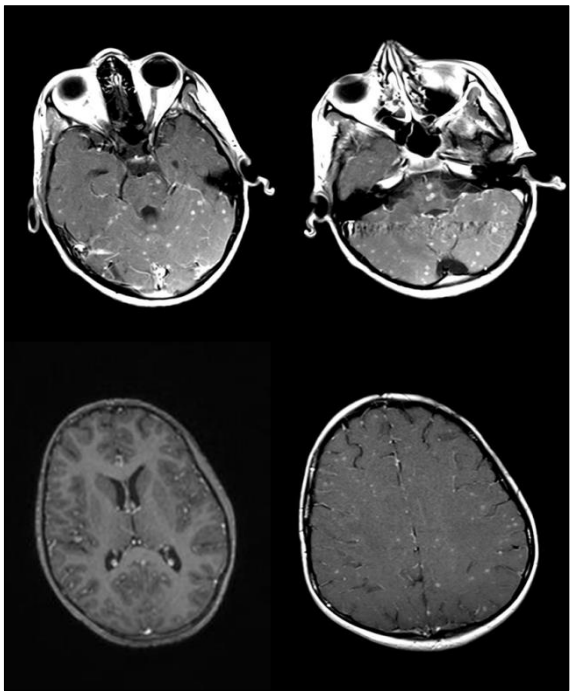

Figure 2: MRI brain (axial view) showing starry sky appearance pattern.

Multiple small rounded flair hyperintense lesions, seen in pons, both cerebellar hemispheres, bilateral fronto-parietal subcortical white matter.

Screening of the whole spine does not reveal any marrow abnormality, vertebral collapse, cord abnormality or nerve root compression. In a given clinical setting, described findings suggest multiple tuberculomas / tubercular etiology." Gadolinium enhanced coronal T1W images of MRI brain showing multiple ring enhancing lesions with thick rims appeared as 'Starry Sky'. The investigations were suggestive of tuberculoma? Neurocysticercosis?

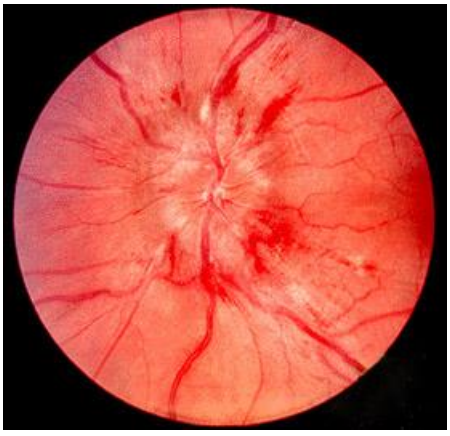

Figure 3: Fundus showing papilledema.

Fundus examination was done which showed papilledema. Patient was started on anti-tubercular drugs along with oral steroids.

Then, during the course of stay, CSF CBNAAT was sent which was negative for tuberculosis. Serum cysticercus IgG antibodies by ELISA were sent which were negative for neurocysticercosis. CECT Thorax was done, which showed;

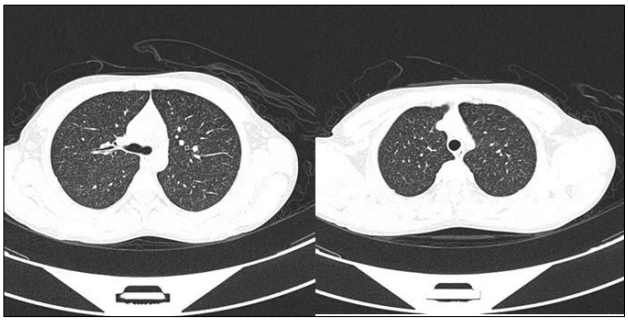

Figure 4: CECT thorax showing miliary tuberculosis.

Suggestive of infectious etiology- miliary TB/ pulmonary koch's.

MR spectrometry was planned but wasn't done due to financial constraints.

DISCUSSION

Tuberculoma has been defined as a mass of granulation tissue made up of a conglomeration of microscopic tubercles.

The tuberculoma may be single or less commonly multiple, and their sizes may vary from a few millimeters to a diameter of 3-4 cm. Ring-enhancing lesion in brain imaging is a common feature on the Indian subcontinent.

The two most common etiologies of inflammatory granulomas encountered in pediatric clinical practice include neurocysticercosis (NCC) and tuberculomas.

Common characteristics of cysticerci are round in shape, 20 mm (or smaller) in size, and with ring enhancement or visible scolex. by contrast, are usually irregularly shaped, solid, and greater than 20 mm in size.[3]

Intracranial tuberculomas are the least common presentation of CNS TB, found in 1% of these patients. They are multiple in only 15%-33% of the cases.

The typical analysis of CSF from patients with CNS tuberculosis demonstrates a moderate lymphocytic pleocytosis, moderately elevated protein levels, and hypoglycorrachia (low glucose).[4]

Tuberculomas and neurocysticercosis lesions resemble in many aspects in CECT and contrast MRI but the differentiation can be made on the basis of location, number of lesions, enhancement pattern and constitutional symptoms.[5]

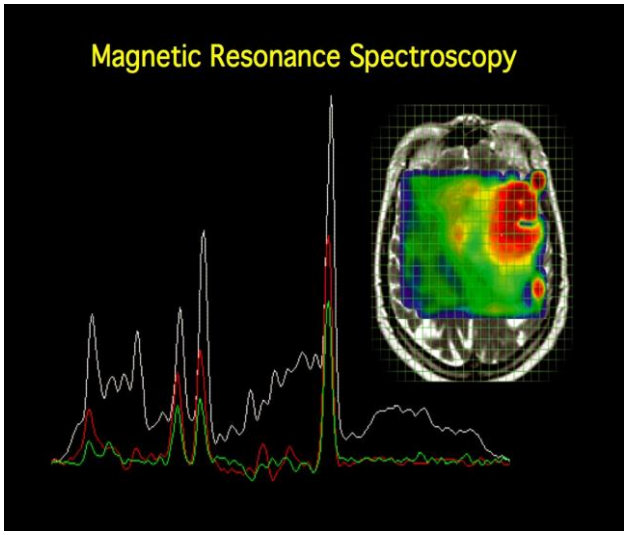

Figure 5: MR spectroscopy view.

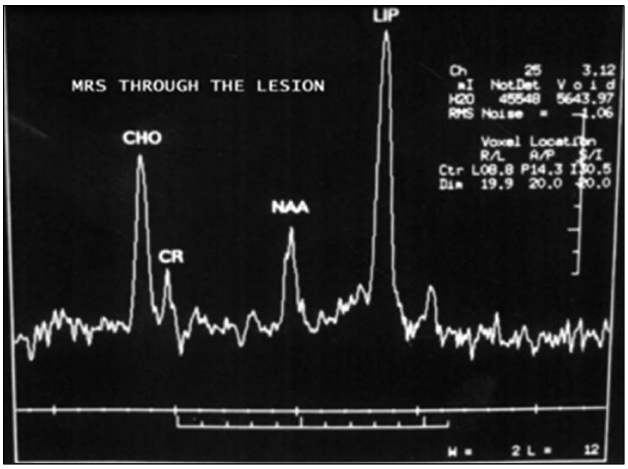

Figure 5: MR Spectroscopy showing lipid peak.

The differences between neurocysticercosis and tuberculoma lesions on MRI are such as: neurocysticercosis lesions are less than 20mm in size and fewer in number whereas tuberculoma lesions are often multiple and more than 20mm in size. In neurocysticercosis, T2W shows hyperintensity with hypointense scolex in it and no midline shift and ring enhancement is present whereas in tuberculoma hypointensities are seen in T2W and midline shift may be present. In neurocysticercosis, features of menigitis are present whereas features of meningitis are absent in tuberculoma. In neurocysticercosis, MR spectroscopy shows multiple aminoacid peaks whereas in tuberculoma, it shows lipid peak.[5]

MR spectroscopy identified lipid peaks in all the lesions and raised the suspicion of tuberculoma. MR Spectroscopy was used to differentiate single enhancing brain lesions as due to tuberculomas or neurocysticercosis. Tuberculomas (n=4) had a high peak of lipids, more choline and less N acetylaspartate and

creatine. The choline/ creatine ratio was greater than 1 in all tuberculomas but in none of the cysticerci (n=6).[6]

A singlet peak at ~3.8 ppm is present in the majority of tuberculomas and absent in most malignant tumors, potentially a marker to differentiate these lesions.[7]

Assignment of the peak is difficult from our analysis; however, guanidinoacetate (Gua) is a possibility. Higher Cho/Cr and mI/Cr ratios should favor malignant lesions over tuberculomas.

As immunological tests, the two methods of antibody detection and antigen detection have been recognized, and serum and cerebrospinal fluid (CSF) samples are mainly utilized as diagnostic specimens.

For antigen detection, it has been shown and accepted that the use of CSF was suitable. For antibody detection, however, some studies have suggested that the use of CSF was more sensitive than the use of serum, while other studies have suggested that there was no difference in diagnostic performance between CSF and serum.[8]

Therefore, we still need to determine which diagnostic specimen, serum or CSF, should be used, because a consensus has not yet been obtained.

Hence, it became a diagnostic dilemma as clinically it was in the favor of tuberculosis whereas radiologically inclination was towards neurocysticercosis.

Based on clinical manifestations it was suggestive of meningitis, CSF picture was suggestive of hypoglycorrhachia. CT chest showed miliary pattern and neuroimaging showing multiple ring enhancing lesions. (Though CT brain was not done to rule out calcifications). Hence, disseminated TB was kept as final diagnosis and treated accordingly

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