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CASE REPORT

Magnetic Resonance Spectroscopy for the Diagnosis of Unusual Case of Cystecercal Meningoencephalitis

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Abstract:

Neurocysticercosis (NCC) is the most common infestation of Central Nervous System (CNS) in India. CNS involvement is seen in 60–90% of all infested patients with wide variations in clinical manifestations. Here we report a case of NCC in a young female who presented as meningoencephalitis which is a very rare initial presentation of the disease. Clinical history and cerebrospinal fluid examination were more suggestive of either viral or tuberculous cause. MRI showed only two ring enhancing lesions. Later Magnetic Resonance Spectroscopy (MRS) was done, which showed findings suggestive of neurocysticercosis. MRS is a latest non invasive technique to differentiate two common causes of ring enhancing lesions in India i.e tuberculoma and neurocysticercosis. MRS plays a very important role when diagnostic dilemma occurs between these two conditions.

Keywords: Neurocysticercosis, Ring enhancing lesion, Magnetic resonance spectroscopy

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Key Messages:

1. Cysticercal meningoencephalitis is a rare presentation of disseminated neurocysticercosis but it can be seen with few ring enhancing lesion on imaging which was confirmed by magnetic resonance spectroscopy (MRS).
2. MRS plays a very important role when diagnostic dilemma occurs between two common conditions of ring enhancing lesions.

Introduction

Neurocysticercosis (NCC) is the most common cause of central nervous system infestation in the world. The clinical features of NCC are myriad which depends not only on the number, size, and topography but also on stage of lesions, and status of the host's immune response to the parasite. Seizures are the most common clinical feature while other common manifestations being headache, neurological deficit,

hydrocephalus and raised intracranial pressure (1). Rare neurological manifestations are spinal cysticercosis, progressive cord compression, ophthalmic cysticercosis, migraine, meningitis and altered mental state.¹ The most common radiological finding in a case of NCC is a ring enhancing lesion. However, in endemic country like India, the two most common causes of ring enhancing lesions on CT or MRI are

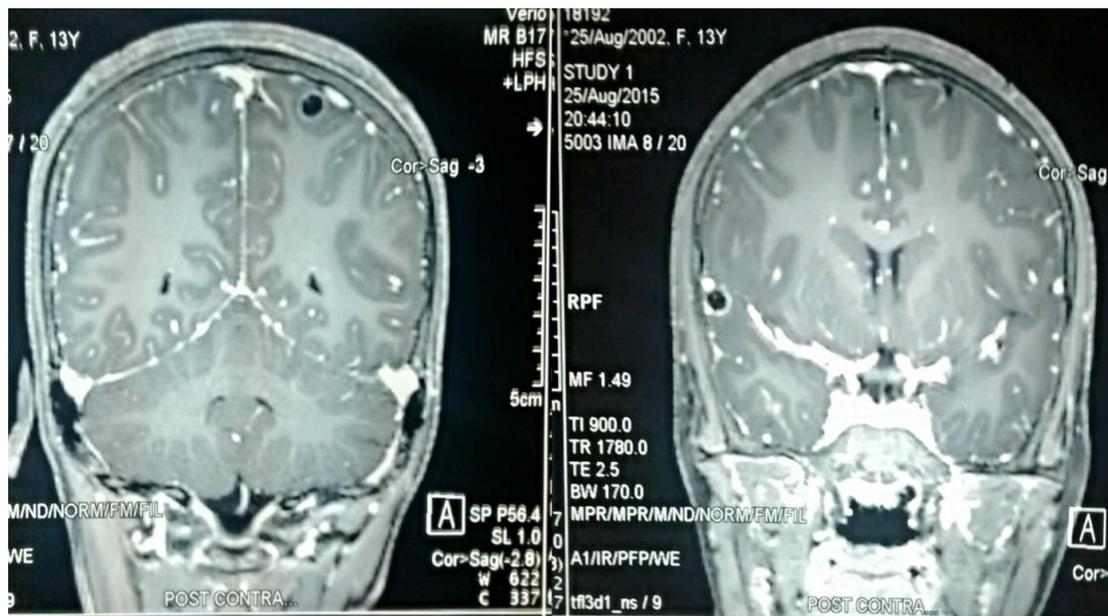


Figure 1. MRI of brain showing two well defined ring enhancing lesion with minimal perifocal edema in superior temporal and left high parietal cortex.

neurocysticercosis (NCC) and tuberculomas (2). Usually these conditions are differentiated on basis of clinical history and neuroimaging but in some cases differentiation between the two defies these conventional methods. In such situation the magnetic resonance spectroscopy (MRS) plays a significant role. We herein report a case of cysticercal meningoencephalitis in a young female with only two ring enhancing lesions unlike other reports of encephalitic presentation of NCC having multiple intraparenchymal lesions. The diagnosis was confirmed by MRS which emphasized its importance in diagnostic dilemma occurring between the two most common conditions causing ring enhancing lesion.

Case report

A 13 year old female was brought in emergency room with the complaint of altered sensorium since 24 hours after one episode of generalised tonic clonic seizure. She had history of (h/o) fever, vomiting and headache from past 4 days but there was no h/o head trauma or ear discharge. No h/o contact with tuberculosis in past. On examination her Glasgow coma scale was 9/15, neck stiffness present, Kernig's sign was positive. Pupil, deep tendon reflexes were

normal with extensor planter response. Pulse 116/minute, Respiratory rate 32/minute, Blood Pressure was low 96/62 mm Hg. Random blood sugar 77 mg/dL. Cardio respiratory and abdominal examinations were normal. Probable diagnosis of post ictal phase, meningo-encephalitis, cerebral malaria or any space occupying lesion was made. Laboratory investigation showed Haemoglobin 10.9 gm/dL, leukocyte count $6.2 \times 10^9/L$, platelet $1.65 \times 10^9/L$ and C Reactive Protein <0.6 mg/dL respectively. Blood urea was 42 mg/dL, creatinine 0.5 mg/dL, Na 137mmol/L, K 3.6 mmol/L, Ca 9.4 mg/dL and peripheral blood smear for malaria parasite was negative. Cerebrospinal fluid (CSF) analysis revealed sugar 69 mg/dL, protein 57 mg/dL, Adenosine deaminase 4 U/L and cells 660/cmm (Neutrophil 8%, Lymphocyte 92%). Prothrombin time 15.4 sec (C 15 sec) and SGPT 12U/L. Urine analysis, mantoux test and blood culture were negative. No papilloedema on fundus examination was noted. Magnetic Resonance Imaging of brain showed two ring enhancing lesion (Figure 1). Although clinical features and CSF findings were suggestive of tuberculous meningitis (TBM) but low adenosine deaminase (ADA), negative mantoux, inconclusive chest x ray (CXR) and negative history of contact did not correspond to TBM.

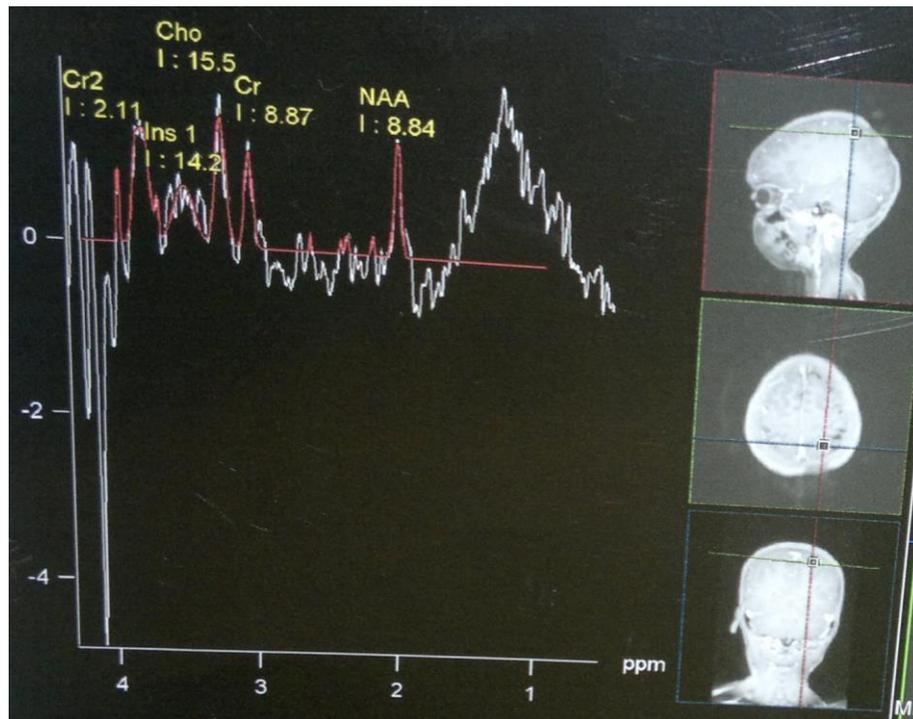


Figure 2. The magnetic resonance spectroscopy of brain showing normal to moderately diminished N- acetylaspartate peak and absence of lipid peak.

Later MR spectroscopy was done which revealed two well defined ring enhancing lesion with minimal perifocal edema in right antero supine temporal cortex and left parietal cortex. The choline to creatine ratio was normal and no significant metabolic peak could be identified within the lesion (NAA peak was normal) (Figure 2). There was no evidence of acute diffusion restriction on DWI. Her consciousness improved after four days of treatment with intravenous fluids, steroids and phenytoin. Repeat lumbar puncture showed fall in cell count from previous report. Later albendazole (15 mg/kg/d) was initiated and given for 8 days. Her consciousness improved remarkably but speech loss was persistent. Follow up after 3 months revealed significant improvement in speech while a repeat CT after six months showed a grossly normal scan with no evidence of any ring enhancing lesion (Figure 3).

Discussion

The initial clinical presentation was consistent with the diagnosis of meningoencephalitis as she had short clinical history of fever, headache,

vomiting, seizure along with signs of meningeal irritation and altered sensorium. The CSF analysis was suggestive of either viral or tuberculous cause. However CXR, MT and ADA were negative after which magnetic resonance imaging (MRI) brain was done. The presence of only two ring enhancing lesion on MRI and no features of basal exudates, meningeal enhancement or hydrocephalus was surprising. On reviewing the literature the CSF findings were found to be compatible with that of Neurocysticercosis which consist of pleocytosis (usually lymphocytic but could be polymorphonuclear or eosinophilic), reduced glucose and elevated protein (3). Cysticercal encephalitic is a severe and rare form of neurocysticercosis. Only a handful of clinical reports have been published on this relatively rare presentation (4). This occurs when there is massive cysticerci infection of the brain parenchyma and the host's immune system actively reacts against the parasites. In most of the reported cases till date multiple cysticercal lesions were identified unlike the present case with only two intraparenchymal cysts leading to

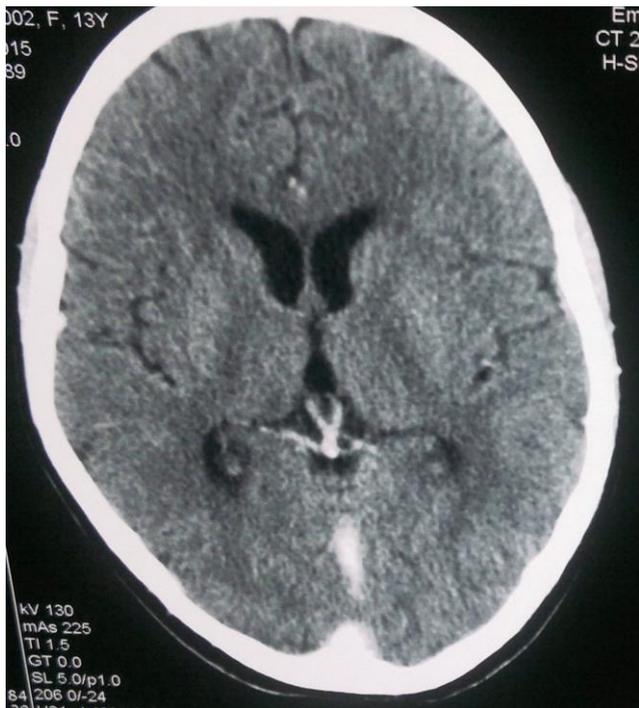


Figure 3. Normal CT scan of brain after six months of therapy.

meningoencephalitis (5). Other common causes of inflammatory granulomas include tuberculosis, toxoplasmosis, cerebral abscess and fungal lesions. Magnetic resonance spectroscopy of normal brain shows predominant peaks of N-acetylaspartate (NAA), choline, creatinine and myo-inositol with the highest peak being NAA (6). NAA is a healthy neuronal marker, choline represents energy store and choline is a marker of cellular turnover. NCC demonstrates a high lactate and proteins like alanine, succinate, glutamate, glycine levels with some reduction of NAA and creatinine. While tuberculoma demonstrates a very high lipid peak, reduction in NAA and creatinine and a choline/creatinine ratio of >1.7 Lipid peak in MRS in the context of a ring-enhancing lesion is very much specific for tuberculoma and has not been seen in any cases of NCC (7). In a study by Kumar, et al. MR Spectroscopy was used to differentiate few ring enhancing brain lesions as due to tuberculomas or neurocysticercosis (8). Similar findings in tuberculomas have been reported by Jayasunder, et al (9).

Cysticidal therapy has been often considered as contraindicated in presence of raised intracranial

pressure. However, appropriate management of raised intracranial hypertension and judicious use of corticosteroids followed subsequently by cysticidal therapy proved effective as well as safe in this patient. This report highlights the importance of suspecting neurocysticercosis in cases presenting as meningoencephalitis especially in tropical countries like India and to use MRS when diagnostic dilemma occurs.

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