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Clinical Spectrum of CNS Neurocysticercosis

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ABSTRACT

Introduction

Neurocysticercosis is a common helminth infestation of India, china, Latin America and Africa which can present anywhere in the Cranio-Spinal axis, with or without neurological deficit. The prevalence among the developed countries is less. The disease is prevalent in all states of India.

Clinical cases

We present here the clinical spectrum of Neurocysticercosis presented with neurological deficit with specific findings in MRI common to all three cases (two cranial and one spinal case). Preoperatively all these three cases had different provisional diagnosis, but post operatively confirmed to be neurocysticercosis. All of them had some signs of cavitations or septations identified in MRI T2 weighted images. Clinical suspicion should arise in such unique presentations, especially in places where prevalence is high.

Prevention

In order to prevent infestation, good hand washing practice during food preparation should be encouraged, and also by avoiding food that might be contaminated by human faeces like vegetable salad. Most importantly deworming pets and food handlers reduce the infestation rates significantly.

Conclusion

To conclude neurocysticercosis is a common helminthic infestation of south India. Good sanitation will surely prevents disease spread. Whenever we have a case with cavitatory lesion with septations in MRI T2 weighted images, one should have clinical suspicion of Neurocysticercosis. Even though medical management is mainstay of treatment, surgery is indicated in selected cases those presenting with neurological deficit.

KEYWORDS : Neurocysticercosis; MRI-T2 weighted images; cavitations; septations

Introduction:

Neurocysticercosis is a common helminth infestation of India [10], china, Latin America and Africa [1] which can present anywhere in the Cranio-Spinal axis [5.] with or without neurological deficit. The prevalence has been reduced in the developed countries, those with better hygiene and good facilities of sanitation. The disease represents a major health problem in many of the developing countries. The disease is prevalent in all states of India [8]. Though the most common spread of neurocysticercosis is among pork eaters, in Indian scenario only 1-2% of diseased had pork consumption, and more than 95% diseased are found to be vegetarians [13]. It is due to improperly cooked vegetables or improperly washed salads, being common source of contamination [9].

Methodology and clinical presentation:

We present here three unique cases of Neurocysticercosis presented with neurological deficit with specific findings in MRI common to all three cases. Preoperatively all these three cases had different provisional diagnosis, but post operatively confirmed to be neurocysticercosis. All of them had some signs of cavitations, or septations identified in MRI T2 weighted images. Clinical suspicion should arise in such unique presentations, especially in places where prevalence is high.

Case 1 - 65 years old gentleman presented with difficulty in walking, urinary disturbances and constipation. On clinical examination he had spastic paraplegia, associated with loss of sensation below D8 level, with bowel and bladder involvement. His MRI T2 weighted images showed intramedullary cystic lesion at the D7-D8 vertebral level. Provisionally we had diagnosis of spinal intra medullary tumour pre operatively. No other lesions elsewhere or any clinical suspicion for helminth infestation.

Case 2 - 53 years old gentleman presented with complaints of headache, vomiting, hard of hearing and swaying to right side while walking. On clinical examination his higher mental functions were with in normal limits, his cranial nerve examination except for eight cranial nerve on right side all were normal and spino- motor examination did not reveal any deficit. Right sided cerebellar signs were positive. His MRI T2 weighted images revealed cystic lesion in right side cerebello-pontine angle. Provisionally we had diagnosis of right CP angle cystic schwannoma. He had no signs or symptoms suggestive of any infestations, and also no other lesion elsewhere.

Case 3 - 28 years old gentle man presented with complaints of Headache and difficulty in using right upper limb and lower limb, and also associated with speech disturbances. No significant past history. On clinical examination, he had non fluent speech, immediate memory was impaired along with Right hemiparesis. His cranial nerves examination were absolutely normal. His MRI T2 weighted images revealed lesion in left sylvian fissure which had septations. Provisionally we had diagnosis of insular SOL. This patient also did not had any signs or symptoms of infestation or any other lesion elsewhere.

Surgical management:

All these patients were admitted with neurological deficit in department of neurosurgery. They were operated in view of neurological deficit and recovered from illness subsequently with minimal post-operative complications. Their post-operative reports confirmed to be Neurocysticercosis. First case , it was a rare intramedullary Neurocysticercosis in spinal location, In second case, it was Neurocysticercosis of right CP angle, and in third case , it was Racemose Neurocysticercosis of left insular region.

Case 1 - The first patient with spinal intramedullary SOL, underwent Laminectomy. Dura was opened in a standard fashion. There was bulge in the spinal cord. Cord was opened in the DREZ Region and

greyish material with onion skin like appearance was removed and the same was sent for HPE. Histopathology came as neurocysticercosis. We confirmed the diagnosis by sending the specimen to institute of national importance and Immune histochemistry. Patient recovered well .He improved from his neurological deficit and gained control over bladder and bowel.

Case 2 - The second patient with Right CP angle SOL, underwent right sub occipital craniotomy and the lesion was approached via retro sigmoid approach and excision of the lesion done. Histopathology came as Neurocysticercosis. Patient recovered well and discharged. He did not come for follow up.

Case 3 - The third patient underwent pterional craniotomy and after sylvian fissure dissection, the lesion was found to be in the deep sylvian region resembling bunch of grapes, hence the name racemose neurocysticercosis. The lesion was excised completely with adequate precaution following microsurgical techniques. Patient recovered well. He was readmitted for hydrocephalus for which ventriculo-peritoneal shunt was performed. On follow up, patient is doing well without neurological deficit.

Discussion

Neurocysticercosis is due to infection of larval form of Tape worm Tinea Solium. Man is the definite host and pigs are intermediate host. The ova of tinea solium penetrate the intestine and enter in to the blood circulation, and disperses everywhere in the body most commonly skeletal muscles, eyes, heart and CNS. Within the CNS brain parenchyma is most commonly affected followed by subarachnoid space. Spinal cord is rarely affected.

After entering into the central nervous system, cysticercus produce inflammatory reaction in the surrounding tissue and undergo progression in a step wise manner which are grouped under four morphological stages [12], which can be identified by MRI images. They are

1) Vesicular stage
2) Colloidal Stage
3) Nodular- granular Stage
4) Calcified stage

Vesicular stage

This is the active cyst forming stage. Produce inflammation in surrounding tissues. Cyst has clear vesicle fluid and normal scolex.

Colloidal stage

This is the second stage of degeneration. Fluid becomes turbid and resembles whitish gel and scolex begins to degenerate. Brain parenchyma become infiltrated with lymphocytes, plasma cells and eosinophils. Stage of appearance of Gliosis in the brain. Cyst is surrounded by collagen capsule. Cerebral oedema ensues.

Nodular stage

Cyst wall thickens and scolex degenerates to granular tissue. Brain oedema decreases and gliosis become intense.

Calcified stage

Calcification begins in the degenerated scolex. Edema decreases and astrocytic changes are present.

Racemose type- This is a cystic form, which has no scolex and cyst wall proliferate like grapes. Loss of scolex is due to abnormal host immunologic response, which is mainly seen in the sub arachnoid spaces.

Intra ventricular type- Usually involves 4th ventricle and mostly appears as solitary cyst. It may obstruct the CSF flow and cause hydrocephalus.

Spinal type- These are due to spread of cyst in the sub arachnoid space. They are rare to occur. Extradural location are most common among them, and the intra medullary type is very rare.

Diagnosis-

Based on various criteria's which includes epidemiology of disease, appropriate symptoms, and confirmation by serologic tests. The most important would be the radiographic finding consistent with infestation.

Absolute criteria [7]

- Histological demonstration of the parasite from biopsy of a brain or spinal cord lesion
- Evidence of cystic lesions showing the scolex on neuroimaging studies
- Direct visualization of subretinal parasites by fundoscopic examination

Major criteria [7]

- Evidence of lesions highly suggestive of neurocysticercosis on neuroimaging studies
- Positive serum immunoblot for the detection of anticysticercal antibodies
- Resolution of intracranial cystic lesions after therapy with albendazole or praziquantel
- Spontaneous resolution of small single enhancing lesions

Minor criteria [7]

- Evidence of lesions compatible with neurocysticercosis on neuroimaging studies
- Presence of clinical manifestations suggestive of neurocysticercosis
- Positive CSF ELISA for detection of anticysticercal antibodies or cysticercal antigens
- Evidence of cysticercosis outside the central nervous system

Epidemiological criteria [7]

- Individuals coming from or living in an area where cysticercosis is endemic
- History of travel to disease-endemic areas
- Evidence of a household contact with Taenia solium infection

Degrees of diagnostic certainty[7]

Definitive criteria

- Presence of one absolute criterion
- Presence of two major plus one minor and one epidemiological criteria
- Probable criteria
- Presence of one major plus two minor criteria
- Presence of one major plus one minor and one epidemiological criteria
- Presence of three minor plus one epidemiological criteria

Management:

Management depends upon the location, clinical presentation and stage of cyst. Mainstay of treatment is antihelmithic therapy with albendazole or praziquantel. Steroids are useful to suppress the inflammatory reaction. Anti-epileptics are useful to control seizures

Praziquantel [1] 50 mg/kg/day for 15 days or
Albendazole [3] 15mg /kg/day for 15 days are used

Albendazole seems too superior in killing live neurocysticerci compared to praziquantel

Surgery is indicated in intraventricular [2] neurocysticercosis and racemose types were brain herniation is imminent [6]. Surgery plays a role when there is a gross neurological deficit. Spinal locations presenting with paraplegia or major deficits needs surgical

decompression and excision 4.

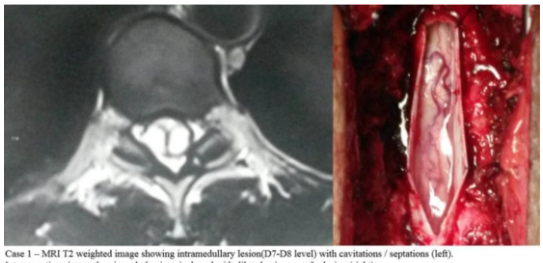
Prevention and control:

In order to prevent infestation, good hand washing practice during food preparation should be encouraged [11], and also by avoiding food that might be contaminated by human faeces like vegetable salad. Most importantly deworming pets and food handlers, which will reduce the infestation rates significantly[11].

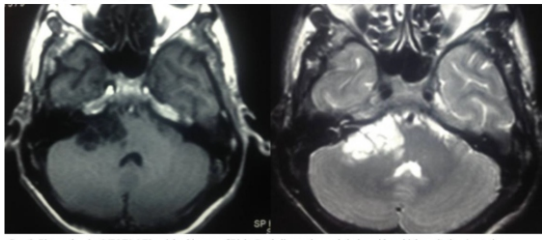
Conclusion:

To conclude neurocysticercosis is a common helminthic infestation of south India. Good sanitation will surely prevents disease spread. Whenever we have a case with cavitatory lesion with septations in MRI T2 weighted images, one should have clinical suspicion of Neurocysticercosis. Even though medical management is mainstay of treatment, surgery is indicated in selected cases.

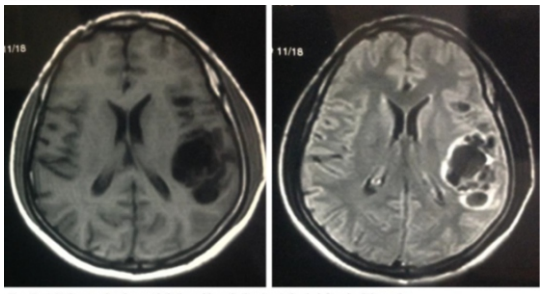
Figures



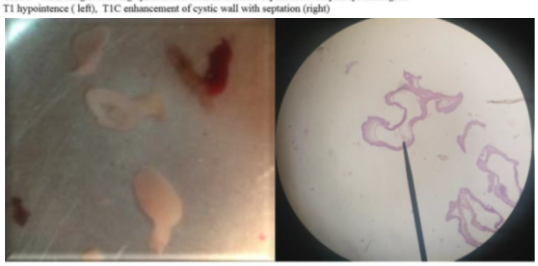
Case 1 – MRI T2 weighted image showing intramedullary lesion(D7-D8 level) with cavitations / septations (left).
Intraoperative picture showing a bulge in spinal cord with dilated veins over the lesion (right).



Case 2- Picture showing MRI T1 &T2 weighted images of Right Cerebello-pontine angle lesion with multiple cavitations/ septations.
Hypointense in T1 (left) Hyperintense in T2 (right).



Case 3 – MRI images showing cystic lesion with cavitation / septation in left peri sylvian region
T1 hypointence (left), T1C enhancement of cystic wall with septation (right)



Case 3- Macroscopic picture of the intra operative cystic nature of the lesion in left sylvian fissure region (left).
Microscopic picture (10x) of cyst wall identified as neurocysticercosis (right).

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