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CASE REPORT

A Rare Case of Acute Meningitis in Underlying Untreated Neurocysticercosis

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ABSTRACT

Neurocystecercosis (NCC) is one of major endemic zoonotic disease in India. NCC is a common disease of the central nervous system, caused by *Taeniasolium*, a parasite spreading after consumption of undercooked pork. NCC majorly presents as epilepsy, an is diagnosed by radiological support like the computed tomography (CT) and magnetic resonance imaging (MRI). The most common presentation of NCC is headache and seizure. The treatment is usually cysticidal drugs initiation like albendazole and praziquantel *etc*, but neurosurgical intervention is also advocated at regular intervals depending on the disease presentation and clinical profile of the patient. The presentation of NCC with acute meningitis is minimally reported in the literature and has very less occurrence in the field. In this case report, we discuss an interesting case of acute meningitis due to underlying neurocysticercosis, the challenges in diagnosis and treatment protocol, the final outcome in acute meningitis with NCC.

KEYWORDS

• Neurocysticercosis (NCC) • Taeniasolium • Acutemeningitis • Ruptured cyst

INTRODUCTION

Neurocysticercosis (NCC) is one of the most common parasite central nervous system infections in human beings[1]. It occurs after ingestion of cystericus cellulose (larval stage) of tapeworm *Taenia solium* and contaminated water.

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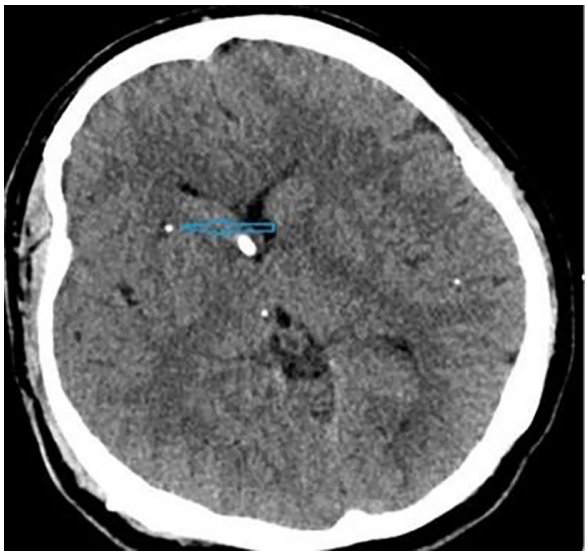
NCC is the major reason for secondary seizure disorders. As per WHO and CDC data, central and south-east Asia are endemic to *taeniasis* and approximately 50 million people die due to NCC related seizure and other complications in these regions[2,3]. The disease transmits from consumption of undercooked pork, faeco-oral route and consumption of contaminated food and water[2]. The most common complications of NCC are seizure disorder[4], while various other presentations are headache, vision loss, stroke, dementia[4]. The occurrence of meningitis in NCC is extremely rare not widely reported in literature. NCC generally has 2 forms parenchymal NCC (ParNCC) and extraparenchymal NCC (ExPNCC)[5]. The ParNCC, involving the parenchyma has better prognosis whereas, ExPNCC, involving the spinal, subarachnoid and ocular, has poor prognosis[5]. In this case report, we discuss the occurrence, diagnosis by clinical and radiological methods and treatment of acute meningitis with underlying NCC.

CASE

A 38-year-old young male, labourer by profession from Chattisgarh, presented to our emergency room with complaints of high-grade fever with severe headache. As per his contract manager, patient has been not well for last 3-4 days and today morning, while working, patient had headache and a syncope event at his workplace. He was immediately rushed to our emergency for further management. Patient was taken on monitored bed and vitals recording was done. Apart from high temperature (101*F) and dehydration, all other vitals were within normal limits. The patient himself gave history of brain surgery in the past, 4-5 years back. He was not having his medical records and has kept this information hidden from his superiors.

On further clinical examination, patient Kernig's and Brudunzski sign (meningeal signs) were found positive. An immediate diagnosis of meningitis was made based on clinical findings. Patient had an episode of seizure in the emergency which was managed by anti-epileptics. Urgent CT head was done which was suggestive of multiple calcified lesion (*figure 1*).

Lumbar puncture (LP) revealed cerebrospinal fluid (CSF) white blood cell (WBC) count of 3,380/cu mm (81% neutrophils, 11% lymphocytes, no eosinophils), red blood cell (RBC) of 80/cu mm, glucose of 10 mg/dL (glucose in blood of 198 mg/dL) protein of 698 g/dL (serum protein of 6.4; normal range: 6.0-8.0 g/dL). CSF from LP blood cultures did not reveal any organisms, and CSF polymerase chain reactions (PCRs) were negative for varicella-zoster, herpes simplex, adenovirus, and enterovirus and cytomegalovirus. CSF NCC antigen in the blood (done at the CDC centre in Delhi) and CSF were negative; however, EITB (enzyme linked immune electrotransfer blot) NCC antibody was positive in CSF and serum.

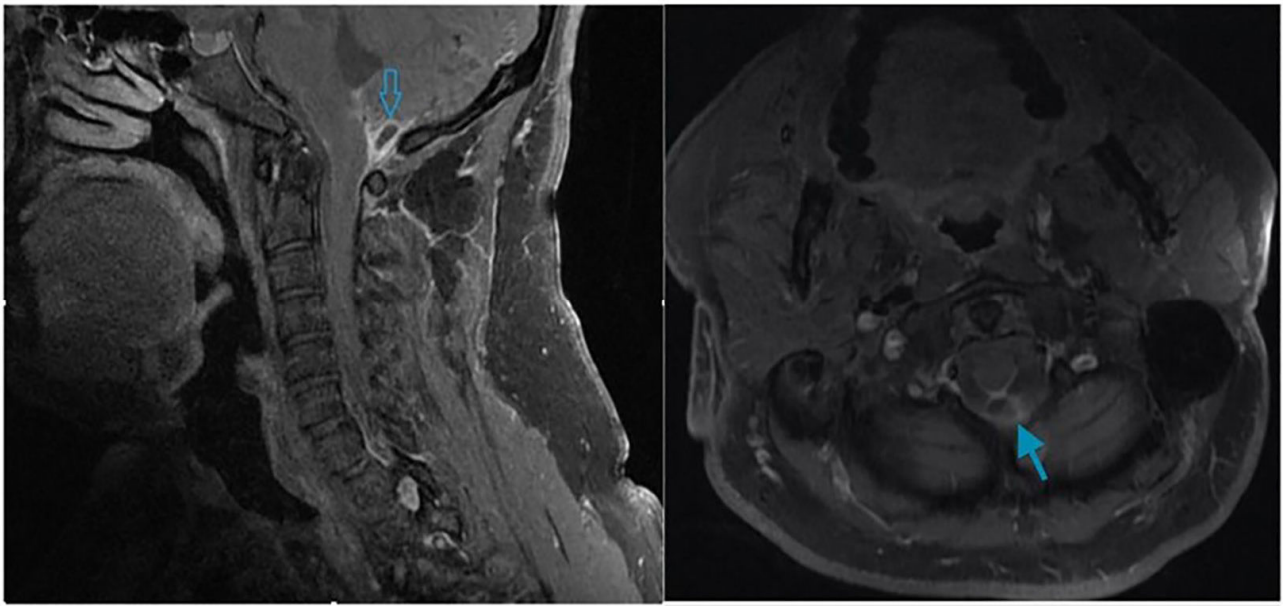


Contrast MRI brain and spinal cord (*Figure 2&3*) showed peripherally enhancing cystic lesion measuring 2 cm with irregular mural nodule measuring 4-6 mm identified along the dorsal surface of upper cervical cord at the level of the foramen magnum. Local leptomeningeal enhancement was also present along the dorsal surface of the upper cervical cord extending inferiorly to the C1 level and superiorly into the foramen of Magendie.

The was small extra-axial fluid collection extends posteriorly into the inferior left posterior fossa along the inferior medial margin of the left cerebellar hemisphere, directly posterior to the left cerebellar tonsil measuring 13x6mm, without marginal enhancement, which felt to be reactive to ruptured cyst inflammation. These findings were compatible with NCC cyst rupture.

The patient completed six months of praziquantel 1800 mg three times daily and albendazole 400 mg twice daily therapy with long-term prednisolone slowly tapered with

good tolerability. Anti-epileptics were given for 1 week with levetiracetam 500mg three times a day. The follow up MRI of brain and spinal cord had resolution of the enhancing cystic lesion along the upper cervical cord at the level of the foramen magnum, leptomeningeal enhancement and inflammatory signs. The patient was discharged after 5 days of hospitalisation with medications and for further follow-up's, MRI findings remained unchanged. The anti-parasitic therapy was discontinued after 6 months, the patients then remained asymptomatic.



DISCUSSION

NCC is a common disease seen in developing countries. Cysticercosis is an endemic disease in the Indian sub-continent. It is generally found in rural population, unhygienic sanitary condition and places with poor quality of life (poor drinking water). Our patient belonged to one of the low-income states and the standard of life was low, hence predisposing him to this condition. Our patient presentation was similar to ExPNCC.

The occurrence of ExPNCC (subarachnoid, meningeal *etc*.) is rare when compared to ParNCC[6]. The presentations of ExPNCC ranges from asymptomatic lesions to stroke, meningitis and hydrocephalus[6,7]. ExPNCC (subarachnoid NCC) may present with signs like - meningitis, hydrocephalus, focal neurologic deficits (FND's) and/or stroke[7]. Cysticercal meningitis represents an inflammatory response between the host and the parasite, which is generally chronic in nature and occurs in less than 9% of adult NCC cases[6,8]. There are very few cases of NCC presenting as acute meningitis[8,9], although it is probably an underreported presentation. We are unclear if any of the reported cases were due to ruptured NCC cyst, which was present in our patient.

The most recommended EITB assay (enzyme linked immune electrontransfer blot - test for the detection of antibodies specific for *Taenia solium* antigens in serum or CSF) has excellent specificity around 100% and a sensitivity varying from 70% to 90% depending on the number of cysts present[1,2,12,13]. However, a positive cysticercosis test antibody doesn't differentiate between previous or current infection. India, being endemic region, there is always a positive background seroprevalence of 5-20%[2,3,14]. Antigen assays are more sensitive when done in CSF, which, in turn, can be false negative typically due to even a single intracranial cysticerci[13,15]. Therefore, the parasite antigen detection assays are useful for both diagnosis and treatment monitoring (parasite antigens typically decrease after successful treatment).

The treatment with anti-parasitic medications like albendazole +/or praziquantel has been proved effective in reducing the number of cystic lesions in NCC. Also, there are instances

of neurological exacerbation during the second to fifth day of therapy. Hence, it is recommended to administer anti- parasites with a steroid to decrease inflammation[10]. Our patient was treated with albendazole and praziquantel (both anti parasitic / cysticidal) along with prednisolone (steroid) for a long 6 months, as per the guidelines by the American Academy of Neurology[11]. The rigorous treatment with anti- parasites with steroid therapy and regular follow-ups with MRI scans shows the disease resolution over a brief period of time.

CONCLUSION

NCC is a common disease mostly left unattended in the Indian population. Acute presentation of NCC in the emergency department like meningitis or stroke is usually missed due to various other aetiologies of this presentation.

The prompt ability of history taking and clinical assessment, correct interpretation of the radiological findings and prompt treatment initiation played the crucial role in the therapy of the patient. All patients with high risk factors for NCC should be evaluated including brain and spinal MRI. Spinal MRI is often missed in routine investigations with patients with NCC but we have shown how important it is in the diagnosis and treatment of the patient.

Antigen testing is best from CSF sample obtained from LP, having better results than serum samples. Antiparasitic therapy with steroid therapy has overall a good outcome in patients with NCC.

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