e- ISSN 0976-0342
Print ISSN 2229-7456

International Journal of Pharmacy & Therapeutics

Journal homepage: www.ijptjournal.com

Case Report

CASE STUDY: PORK TAPEWORM INFECTION: NEUROCYSTICERCOSIS CYST IN LEFT MEDIAL TEMPORAL LOBE OF A YOUNG ADULT PATIENT

Monika Kapoor*

*Intern, Clinical Pharmacologist, Punjab Institute of Medical Science, Jalandhar, Punjab, India.

ABSTRACT

Neurocysticercosis is an infection that affects the central nervous system and occurs due to the larvae of *Taenia solium*. It is the most common helminthic infection and the most usual cause of acquired epilepsy in developing countries like India. The diagnostic criteria vary from being asymptomatic to life-threatening symptoms like throbbing headache, seizures, nausea, visual disturbances, diarrhea, abdominal cramps. The main cause behind NCC is accidentally ingesting eggs of tapeworm *Taenia solium* via contaminated food like partially cooked pork, beef, and uncooked and not thoroughly washed vegetables. In order to confirm the presence of lesion different diagnostic tests like Computed tomography scan, Magnetic resonance imaging of brain and serology are preferred. This study is to spotlight the case of a 23-year-old young boy who came to the medicine department with chief complaints of severe headache, dizziness, blurred vision, a lapse of memory and seizures from the past 15 days. The MRI Brain Spectroscopy with contrast indicated a cystic lesion in the left medial temporal lobe with an inflammatory granuloma-likely degenerative neurocysticercosis cyst.

Keywords: Pork tapeworm infection, Cysticercosis, Epilepsy, Brain, Taeniidae, undercooked and contaminated food.

Abbrevations: NCC- Neurocysticercosis; CNS- Central Nervous System; MRI- Magnetic Resonance Imaging; CT- Computed Tomography.

Corresponding Author

Monika Kapoor
Intern, Clinical Pharmacologist, Punjab Institute of Medical Science, Jalandhar, Punjab, India.
E-mail: **monikakapoor01.mk@gmail.com**

Access this article online

Home page: http://ijptjournal.com/

DOI: http://dx.doi.org/10.21276/ijpt.2020.10.3.1

Quick Response code

Received:05.02.2020 **Revised**:12.03.2020 **Accepted**:25.04.2020

INTRODUCTION:

Neurocysticercosis is an infection that affects the central nervous system and occurs due to the larvae of *Taenia solium*. It is the most common helminthic infection and the most usual cause of acquired epilepsy in developing countries like India. NCC infection is one of the seven neglected autochthonous zoonotic disease as intended by the World Health Organization. It is one of the leading causes of epilepsy in developing countries like India, Africa, China, Indonesia and Latin America. [(2)] Larvae of *T. Solium* are accidentally ingested due to contaminated food such as undercooked pork, beef, and vegetables. It can also be transmitted from human to human via the fecal-oral route. The infective oncosphere makes its way through the intestinal mucosa and reaches the peripheral bloodstream. After resettling, larvae get matured in about 3 months into cysticerci in the site of localization. It resides most commonly in the CNS and rarely in eyes, subcutaneous tissue, muscles or in the liver. Clinical presentation is dependent on the site of localization of the lesions, the number of parasites, size of cysts and host's immunological response. In order to confirm the presence of lesion different diagnostic tests like Computed tomography scan, Magnetic resonance imaging of brain and serology are preferred. The assay of choice is electroimmunotransfer blot via purified antigenic extracts (Syed Habeebullah Hussaini *et al*., 2011; Rizvi SA *et al*., 2016; Kurz C *et al*., 2016).

There are two forms of NCC: Intraparenchymal NCC (60-90% cases) and Extraparenchymal NCC. In many cases, the one suffering from NCC experiences a long time asymptomatic period whereas major clinical manifestations in the case of intraparenchymal NCC include focal neurological signs like seizures (70%), dementia, and headache. Seizures are observed only when the dying cyst exhibits an inflammatory reaction. In a few cases where the lesions are observed in the subarachnoid space, there is poorer prognosis, since this form of NCC is associated with severe complications manifested as stroke, obstructive hydrocephalus, hemiparesis, hyperreflexia, extraocular movement palsy and vision loss. Apart from this, a patient is likely subjected to have GI disturbance like nausea, diarrhea and abdominal cramps. In case when the CNS gets affected, it leads its path towards tubercular infection known as Intracranial Tuberculoma (ITC) (Thamilselvan *et al*., 2016; Shah S, Tyagi R, 2018).

The prevalence of epileptic disease associated with NCC ranges from 10-15 per 1000 inhabitants of tropical countries. On an estimation, NCC causes 50000 deaths annually.

There are three treatment options available to treat NCC i.e medical therapy, removing the cyst surgically, and ventriculoperitoneal (VP) shunt placement. Medical therapy includes anthelminthic drugs like albendazole and praziquantel and corticosteroids are given along with this in order to alleviate any signs of inflammation due to the death of larvae which generally occurs 3-5 days after the initiation of anthelmintics (Maeda *et al*., 2011; Gripper LB, Welburn SC, 2017). In order to confirm complete eradication of the parasite, CT and MRI imaging is suggested after 2-3 months of therapy.

CASE REPORT

A 23-year-old male patient visited our medicine department, with chief complaints of blurred vision, severe headache, and dizziness from the past 15 days. Along with this, he also suffered from nausea and non-bilious vomiting. Initially, he used to neglect these symptoms during its initial phase and thought of getting an eye check-up and everything was normal and he decided to take paracetamol, but soon after noticing the episodes of mild seizures, the family decided to seek proper medical aid. While obtaining the medical history from the patient, he complained of blurred vision, headache and dizziness which eventually led to generalized convulsions that lasted for a few seconds to a minute. He also complained of numbness and lapse of memory. He was a vegetarian and never consumed any non-vegetarian food but used to eat packaged food many times. The patient was then advised to get his magnetic resonance imaging (MRI) of the brain with contrast done.

The CEMR imaging revealed two well-marginated ring-enhancing (measuring~ 14x13 mm and 10x9 mm)oval-shaped T2W hyperintense and T1W hypointense lesions with hypointense rim and small T2W hypointense eccentric nodule within was observed in the cortical-subcortical region of left temporal lobe with moderate adjoining vasogenic edema suggestive of granuloma-likely neurocysticercosis (NCC) in the colloidal vesicular stage. Subtle GRE hypointensity was noted within the lesion without any restricted diffusion. (Figure 1) Based upon the reports of CEMR, a provisional diagnosis of left temporal granuloma NCC. The patient was advised to get investigated for chest X-Ray, Erothrycyte Sedimentation Rate (ESR), and MRI Spectroscopy with contrast to rule out tuberculoma. Based on the provisional diagnosis drug therapy was initiated (Table1) and was asked to get back after 5 days along with other investigations done.

After four days, the patient visited again along with the reports of chest X-Ray, ESR and CEMR. MRI Brain Spectroscopy with contrast revealed Ana approx. 12 mm size ring enhancing cystic lesion in left medial temporal lobe surrounded by significant edema. MRS findings were non-specific without any significant choline/ lactate lipid peak. Findings suggested inflammatory granuloma- likely degenerative neurocysticercosis cyst. No abnormality was detected in the Chest X-Ray. However, ESR value turned out to be 23mm/1st hour which was higher than the normal. Based upon the final diagnosis of NCC, the treatment was the same as initiated earlier and albendazole a cysticidal agent was added. The duration of treatment and frequency was altered. (Table 2). On regular follow up, the patient complained of minor headaches only which is relieved after the intake of the tab. nuhenz and is seizure-free for now. MRI scan was advised after 2 months again.

Table No.1: Initial drug therapy based on the CEMR report and provisional diagnosis

DRUG	DOSE	FREQUENCY	ROUTE
Tab.levipil (levitiracetam)	500mg	BD	P/O
Tab.Dexa4 (Dexamethasone)	4mg	TID	P/O
Tab.Pantocid (Pantoprazole)	40mg	OD	P/O
Syrup Glycerol	30cc	TID	P/O
Tab. Nuhenz (Multivitamin)	1 tablet	OD	P/O

Figure 1: CEMR revealing lesion in the left temporal lobe of the brain

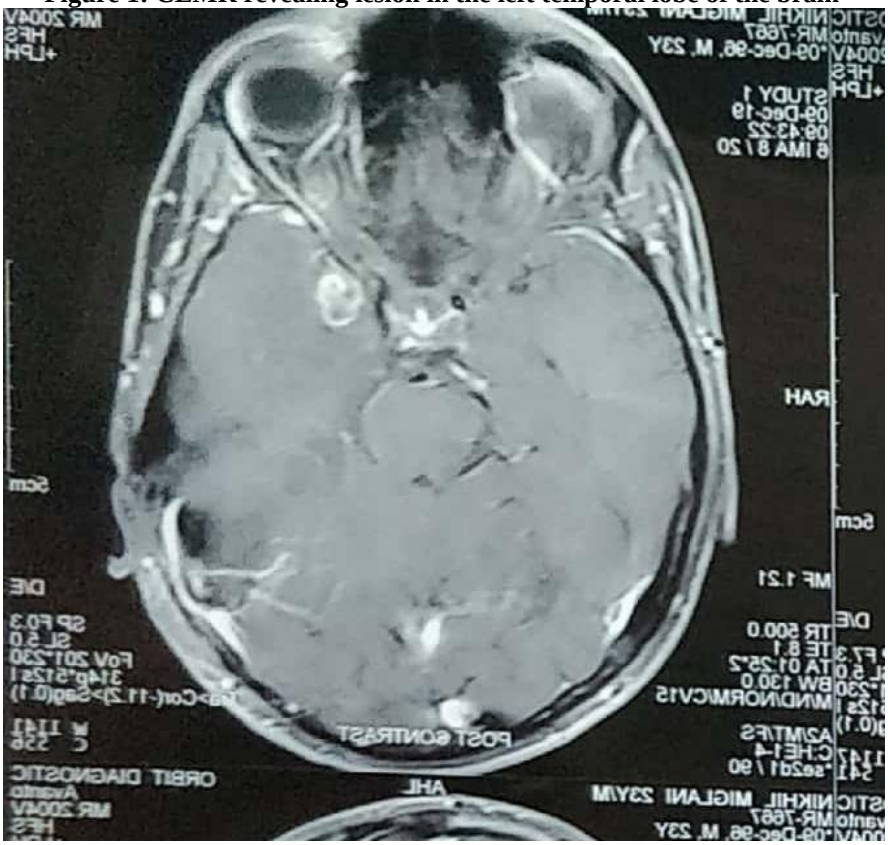

Table 2: Drug therapy based on final diagnosis

DRUG	DOSE	FREQUENCY AND DURATION	ROUTE
Tab. levipil (levitiracetam)	500mg	BD x 2weeks	P/O
Tab. Dexa A4 (Dexamethasone)	4mg	TID x 4days BD x 7days OD x 7 days	P/O
Tab. Pantocid (Pantoprazole)	40mg	OD x 18days	P/O
Syrup Glycerol	30CC	TID x 15 days	P/O
Tab. Nuhenz (Multivitamin)	1 tablet	OD x 15 days	P/O
Tab. Albendazole	400mg	BD x 3weeks	P/O

OD- Once a day; **BD-** Twice a day; **TID-** Thrice a day

DISCUSSION

Cysticerci infection that affects the tissues of the nervous system leads to NCC (Naseha Iffath *et al*., 2019; Sorvillo *et al*., 2011). NCC is a common disease that is seen in developing countries. The prevalence is higher in rural areas where the pigs are raised in suboptimal sanitary conditions. Anthelminthic drugs, albendazole or praziquantel show a great effect in reducing the number of cystic lesions in NCC. Especially, in the endemic country like India, patients who present with lesions in CT scans can be suggestive of NCC. The drug therapy with anticonvulsants and a 2-week course of anthelminthic (albendazole) along with steroids is initiated (Singhi P, 2011). Due to known effects of neurological aggravation during the second or fifth day of therapy, steroids like dexamethasone or prednisone are given along with anthelminthic agents to reduce inflammation. It is very important to educate people regarding routes of transmission and maintaining good personal hygiene like washing hands before preparation and also before eating food, avoiding street food, uncooked food and raw vegetables.

CONCLUSION

Neurocysticercosis has a probability of becoming one of the most prevailing diseases with a high

social and individual cost. The spread of this disease may be reduced by implementing various strategies such as averting human tapeworm infection due to consumption of pork, improving sanitary conditions to prevent transmission of cysticerci infections from humans to pigs and measures to intrude transmission of eggs between humans. Public education campaigns must be conducted and standard measures must be laid down for inspecting the quality of global food supply.

ETHICAL DECLARATION

Informed consent was taken from the patient before the data collection stating that no identity of the patient will be disclosed.

CONFLICTS OF INTEREST

Authors declare that they have no conflicts of interest.

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Cite this article:
Monika Kapoor. Case Study: Pork Tapeworm Infection: Neurocysticercosis Cyst In Left Medial Temporal Lobe of A Young Adult Patient. *International Journal of Pharmacy & Therapeutics*, 11(1), 2020, 31-37.
DOI: http://dx.doi.org/10.21276/ijpt.2020.10.1.7