



INCIDENTAL FINDING OF NEUROCYSTICERCOSIS IN AUTOPSY CASE

Pathology

Dr. Shafak Aggarwal*	Senior Resident Department of Pathology, Maharaja Agrasen Medical College, Agroha *Corresponding Author
Dr. Aditi Baghla	Head of Department, Department of Pathology, Maharaja Agrasen Medical College, Agroha
Dr. Monika	Professor, Department of Pathology, Maharaja Agrasen Medical College, Agroha

ABSTRACT

Parasitic diseases are a growing global public health concern with severe neurological consequences. Neurocysticercosis is a condition affecting a significant number of people around the world. The etiology of this condition is a helminth parasite *Taenia solium*, which has a cycle eventually affecting the human host. This condition follows a cycle of human-to-human fecal-oral route and pigs as an intermediate host with transmission to humans. Infected humans can get dissemination of the larva through circulation and spread throughout the body. The major factor which can cause neurocysticercosis is poor sanitation and unhygienic food. The patients may have symptoms of epilepsy, headache, memory problems and thinking problems. Cysticercus undergoes different changes in the brain, subarachnoid space and spinal cord. Neurocysticercosis is preventable, and probably eradicable. Eventually, the cysts either resolve or form a calcified granuloma, which is associated with seizures if it is located in the brain. It is estimated that 30% cases will experience epilepsy. This article will review the neurocysticercosis condition, pathophysiology, mode of transmission, treatment, and complications.

KEYWORDS

Neurocysticercosis, Epilepsy, *Taenia solium*

INTRODUCTION

Neurocysticercosis is a specific form of Central Nervous System (CNS) infection caused by *Taenia Solium* (*T. solium*) usually due to the accidental ingestion of eggs of *Taenia Solium* by the consumption of contaminated food; especially raw or uncooked food. [1] Infection may affect any area of the body due to the accumulation of larval cysts of a tapeworm. [2] Symptoms vary from case to case according to the part of body affected. When the infection affects the brain the condition is called Neurocysticercosis. In developing countries, neurocysticercosis is the most common parasitic disease of CNS that results in acquired epilepsy. [3] In US neurocysticercosis is seen mainly in migrants. Neurocysticercosis is endemic in central and South America, Africa, India, Indonesia and China. This disease is rare in Europe, North America, Australia, Japan, New Zealand and Muslim countries of Asia and Africa. [4] Neurocysticercosis affects men and women equally, but the inflammation associated to the parasite is more severe in women than in men. Most commonly patients present with new onset partial seizures with or without secondary generalization due to cyst formation in various areas of the brain parenchyma. The two most common types of cysts are (1) Vesicular cysts which are less epileptogenic and have less mass effect on imaging and (2) Colloid cyst which consists of gelatinous material that exhibits ring enhancement and edema on imaging which is associated with increased epileptogenic potential [5]. Alternatively, patients may present with a generalized headache secondary to increased intracranial pressure and meningitis.

Hallmarks of NCC include variation in clinical manifestations as well as disease severity that can vary from completely asymptomatic infection to severe disease and death [6]. In addition, the number, size, location and intensity of cysts also lead to varied symptomatic presentations in patients [6].

Life cycle of *Taenia solium* starts from undercooked pork that contains cysticercus larva of *Taenia solium* when a person consumes that cysticercus larva of pork it reaches to GIT it changes its shape to bladder worm then it reaches to intestine again it changes its shape consists of scolex, neck, rostellum, 2 rows of hooks and 4 suckers. The body of tapeworm consists of strobila consists of both male and female sex organs. Strobila has 3 developed proglottid, in which the first proglottid is not fully developed, the second proglottid is fully developed and the last proglottid contains branches of eggs. These eggs of uterine branches proglottid release egg into faeces. These eggs are consumed by secondary host (pig). Eggs change its form in GI tract called encysted hexacanth then changed into hexacanth in intestine enters into blood stream changes into cysticercus larva in muscle that is again transmitted to primary host (human being). When humans take contaminated food containing eggs of *Taenia solium*

forms an intermediate host.

Case Report

Autopsy of 48 year old male was received in department with cause of death epilepsy whereas CT report of the deceased was reported as calcified granulomas in cerebral hemispheres and cerebral atrophy. On gross examination, multiple cysts were identified on grossing.

We obtained a representative histopathological section from an autopsy specimen harbouring multiple neurocysticerci. Paraffin-embedded 3 micron sections of a parasite with grossly identifiable features were stained with H&E, mounted and studied at 40× magnification. Microscopic examination showed parasite with irregular shaped membrane foldings and scolices representing cysticercous larvae, surrounding area shows presence of dense chronic inflammatory infiltrates mainly comprising of lymphocytes.



Fig. 1: Gross Shows Presence Of Cyst (Neurocysticercosis)



Fig 2: Cyst On Gross



Fig 3: Microscopic Examination (10x Magnification) Shows Irregular Shaped Membrane Foldings And Scolices Representing Cysticercous Larvae

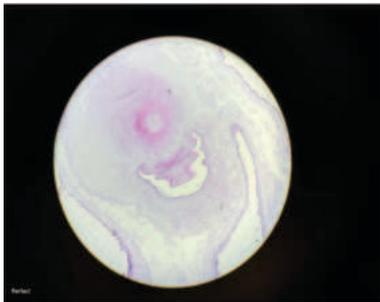


Fig 4: Microscopic Examination At 40x Shows Multilayered Cyst Wall Composed Of Outer Cuticle, middle Nuclear And An Inner Parenchymal Layer.

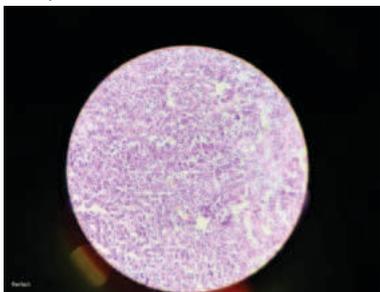


Fig 5: Microscopy At Higher Magnification(40 X) Shows Lymphocytic Infiltration Around Cyst.

Diagnosis of neurocysticercosis remains challenging, and is often made presumptively on the basis of typical radiologic features, supported by consistent epidemiologic exposure and clinical presentation. NCC is the most common parasitic infection of the brain, and it is transmitted by the ingestion of *Taenia solium* eggs shed in the stool of a human tapeworm carrier. *Taenia solium* can cause both taeniasis (infection with adult tapeworm) and cysticercosis (infection with cysts). A common misconception is that humans can acquire NCC by consuming undercooked pork. Consumption of undercooked pork will only lead to taeniasis because infected pork contains the larval cysts that develop into adult worms in the human intestine, but does not contain the eggs that cause cysticercosis. The recognition of NCC in the acute setting can be challenging in countries outside of the endemic areas since there is no specific diagnostic finding on routine blood work, including peripheral eosinophilia. Stool examination is also insensitive because several years pass between exposure to *Taenia solium* eggs and the onset of clinical presentation. The approach to diagnosis is based on clinical manifestations, neuroimaging findings, and epidemiologic exposure. The most common clinical manifestation of NCC is a seizure and/or headache. Patients can also present with confusion, vision changes, focal neurologic signs, stroke, and meningitis. Fever is typically absent. The manifestations of neurocysticercosis depend on the location of implantation of cysticercoids, which can be intraparenchymal or extra parenchymal. Intraparenchymal neurocysticercosis typically presents with seizure, whereas extra-parenchymal neurocysticercosis presents with hydrocephalus and raised intracranial pressure.

Excision Biopsy: Biopsy is usually achieved by excision of the subcutaneous cysticerci, which are found in 4–25 % of patients with NCC. However, radiologic and serologic tests are required for confirmation of diagnosis, unless biopsy of a CNS lesion is possible (Carlton et al. 1997). **Neuroimaging:** The disease is commonly diagnosed with CT and MRI. With the advent of CT and MRI, the contribution of NCC in seizure disorders has significantly increased (Rajshekhar et al. 2006). However, neither MRI nor CT is fully specific and reliable and may even predict suboptimal values, especially in endemic settings. Moreover, CT and MRI often miss out thin-walled cysts and require dedicated, skilled, and specialized personnel.

CONCLUSION

We presented a case of neurocysticercosis which was missed out on CT findings due to which patient was not given proper antiparasitic medication. Neurocysticercosis should be kept as a differential diagnosis of all seizure cases even in the nonendemic regions without relevant travel history. Multiple neurocysticercosis infestations can present with an acute encephalitic picture, complicating the diagnosis.

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DISCUSSION