

Case Report

# Neurocysticercosis: A Case of an Unusual Cause of Seizures

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## Abstract

Neurocysticercosis is a parasitic infestation of the central nervous system caused by larva of the helminth *Taenia solium*. It is a relatively uncommon aetiology for seizures with varying presentations which are dependent on the stage of the cyst, its location and the immune response of the host. Incidence is rising in developing countries due to renewed interest in piggyery. Associated risk factors include poor sanitary condition, rearing pigs or consumption of pork meat and overcrowded living conditions. Diagnostic yield has improved in recent years following relative improved health care seeking attitude, availability of neuroimaging modalities such as cranial magnetic resonance imaging and pathologic analysis of resected tissue specimen. Though prevalence has been domiciled in rural and suburban communities, an increase in global transmigration of individuals has led to some incidence in developed counties. The advent of cysticidal therapy which is complementary to surgical resection of symptomatic lesions has helped improve the prognosis and attenuate disease progression in these patients while improving clinical outcomes of treatment. We present a 23-year-old male patient with adult onset seizures who had neuroimaging and brain biopsy with histopathologic diagnosis of neurocysticercosis. The disease should be entertained in a patient with adult onset seizure residing in a potentially endemic area. We also encourage multidisciplinary management for optimal outcome.

## Keywords

Neurocysticercosis, Adult Onset Seizures, Poor Sanitary Conditions

## 1. Introduction

Neurocysticercosis is a common helminthic infestation of the central nervous system in humans [1], caused by ingestion of the larvae of the *Taenia solium* which belong to the cestode family of tapeworms [2]. It is an endemic problem in most third world countries. Pigs usually are the intermediate host and human beings can be both intermediate and definitive

hosts [3]. Its incidence is favored by certain risk factors which include but not limited to living in close proximity to pigs or livestock farming involving pigs, consumption of poorly prepared pork meat, abysmal sanitary habits, paucity of knowledge related to healthy living practices and endemic poverty [1-3]. It is therefore of public health importance in

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developing countries.

The parasite life cycle requires pigs and humans as intermediate and definitive hosts respectively with the parasite existing as taeniasis and cysticercosis entities [3]. Clinical manifestation varies depending on the size, quantity, location of the cyst and the host immune response. The common presentations are epilepsy and headaches [4].

Central nervous system involvement could be parenchymal or non-parenchymal with seizures being a hallmark of the former and accounting for up to 80% of clinical manifestations [5]. An estimated 30% of newly diagnosed epilepsy cases in endemic areas are attributable to it. [6].

Predictive factors for seizures in affected patients include presence of granulomas with resultant disruption of the blood brain barrier, presence of calcifications as a result of intermittent release of antigens embedded within the calcified lesions which cross react with the host immune system thereby leading to seizures [7].

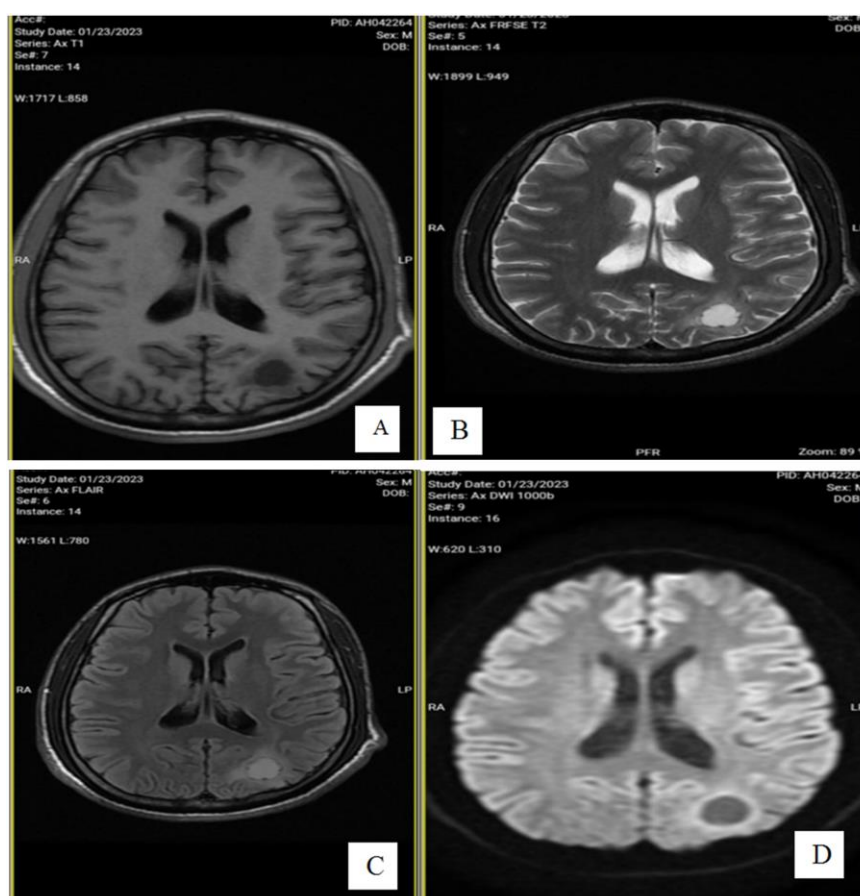
We hereby present a case report of a young male patient who presented with adult onset seizures with neuroimaging features mimicking a brain tumor but histopathology confirmed neurocysticercosis.

## 2. Case Presentation

A 23-year-old right-handed male student presented to us through the accident and emergency unit after three episodes of generalized seizures which occurred three hours prior to presentation. It was spontaneous in onset, associated with upward rolling of the eyes and each episode lasting for about two minutes with no regain of consciousness in between the episodes. There was a positive history of post ictal confusion, Todd's palsy and loss of sphincteric tones. The illness was preceded by a unilateral dull aching headache aggravated by flashy lights, loud noise, poor sleep and stress. There were occasional visual hallucinations. He lives in an overcrowded residence. There was no weight loss nor contact with person with chronic cough.

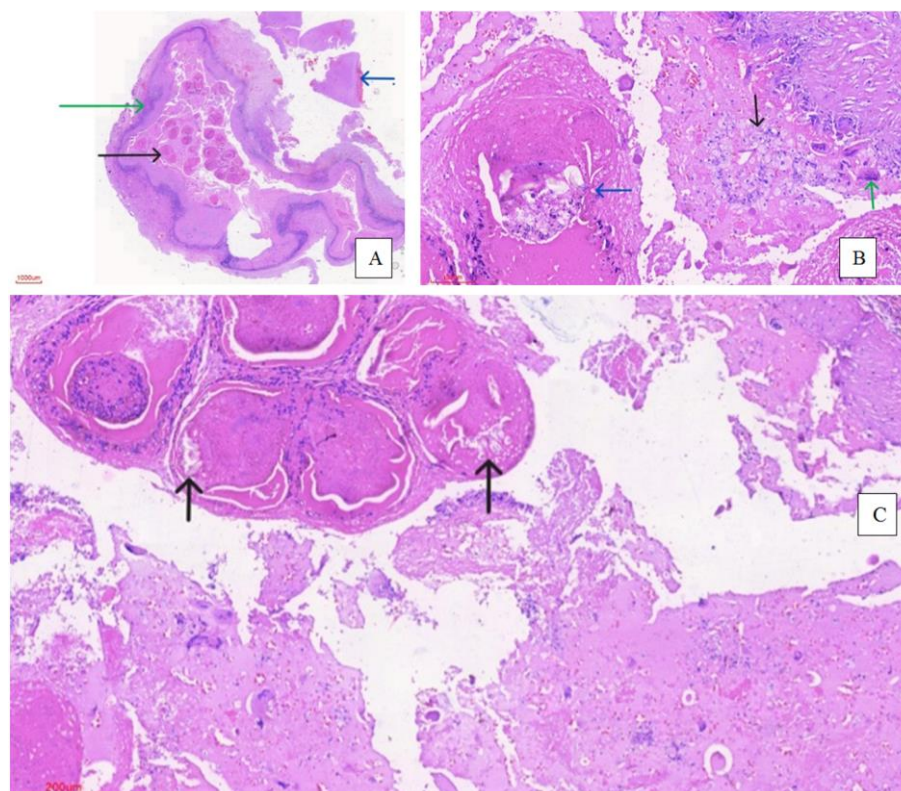
His examination including neurology was essentially normal.

A diagnosis of adult onset seizure disorder to rule out an intracranial space occupying lesion was made. Brain MRI (Figure 1) revealed a well circumscribed oval lesion in the left occipital lobe which does not enhance with contrast, hypointense on T1 sequence, hyperintense on T2 sequence, high signal intensity on FLAIR sequence and restricted diffusion on DWI sequence.



**Figure 1.** Axial MRI images of the patient with showing a well circumscribed oval shaped lesion in the left occipital lobe. (A) T1 Image showing isointensity of the lesion. (B) T2 image showing hyperintensity. (C) T2 FLAIR image showing increased signal intensity. (D) Diffusion weighted image showing an area of restricted diffusion occupied by the lesion.

A diagnosis of left occipital low-grade glioma was entertained. He subsequently had a Left occipital craniotomy and complete tumor resection. The histopathology (Figure 2) was consistent with Neurocysticercosis.



**Figure 2.** Histology slides of the resected brain specimen. (A) Green arrow shows cyst wall, black arrow shows parasite, blue arrow shows brain tissue. (B) Black arrow shows foamy macrophages, green arrow shows giant cells, blue arrow shows parasite. (C) Black arrows show parasite structures reminiscent of hooklets.

Post-operative period was uneventful. He was placed on Praziquantel tablets 1.2g thrice daily for 3 weeks, in addition to anticonvulsant medications. He has been on follow up for more than 24 months with stable and satisfactory outcome.

### 3. Discussion

Neurocysticercosis is common in developing countries and can cause epilepsy when it affects the brain [3, 8, 9]. The risk factors identified in our patient include living in an overcrowded residence and occasional consumption of pork meat.

Documented involvement of the central nervous system include spinal [10], meningeal [11], intraventricular [12] and parenchymal forms. Seizures is the most common presentation of intraparenchymal lesions [13]. Though our patient presented with radiologic features of vesicular stage of the disease, other stages that have been described include colloid, nodular, and calcified stages [14].

Serological tests, ELISA and EITB are useful in evaluation of patients however they were not done due to its non-availability [15].

The patient had brain MRI which is one of the recom-

mended neuroimaging modalities with a diagnostic accuracy of delineating various forms of the parasite in the central nervous system [16].

Del Brutto's diagnostic criteria is a standardized set of neuroimaging, clinical/exposure and histopathologic requirements needed to confirm a diagnosis of neurocysticercosis and our patient met a minor clinical/exposure criteria, 2 major neuroimaging and one absolute/histologic criteria with a good degree of diagnostic certainty [17].

Treatment modalities include the use of cysticidal agents such as praziquantel and albendazole [18]. Corticosteroids help to mitigate the reactive neuroinflammation that could occur following massive death of larva from use of cysticidal medications. Anti-seizure medications are integral to the management of brain lesions and our patient had tabs carbamazepine 200mg twice daily for a year. However, a Cochrane database systematic review of 4 randomized control trials involving 466 subjects [19] and a similar study involving 115 children, [20] revealed no significant evidence regarding the duration of anti-seizure treatment required in the management of neurocysticercosis.

Indications for surgery include intra- and periventricular cysts obstructing the cerebrospinal fluid pathways thereby

causing hydrocephalus, intracranial hypertension, spinal cysticercosis with neurologic sequelae, cranial neuropathies attributable to the mass effect of the cyst and clinical with radiologic features of cerebral edema not responsive to medical therapy [14]. Prognosis varies but generally depends on the host immune response, the number, size, location of the cysts and severity of neurologic symptoms or deficits [14].

## 4. Conclusion

Neurocysticercosis is a faeco-orally transmitted parasitic infection of the central nervous system associated with low socio-economic indices. A first occurrence of seizure in an adult patient should raise a suspicion of the disease. Diagnosis is multimodal but histologic confirmation is the hallmark of diagnosis. Timely and multidisciplinary management is essential for good prognosis. Health education is also necessary to prevent recurrence.

## Abbreviations

MRI      Magnetic Resonance Imaging  
FLAIR    Fluid Attenuated Inversion Recovery

## Author Contributions

**Kelechi Michael Azode:** Conceptualization, Data curation, Formal Analysis, Methodology, Resources, Writing – original draft

**Babatunde Josiah Olasode:** Investigation, Software, Supervision, Validation, Visualization

**Edward Oluwale Komolafe:** Project administration, Resources, Supervision, Validation, Visualization, Writing – review & editing

## Conflicts of Interest

The authors declare no conflict of interest.

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