

Neurocysticercosis with clinical manifestation of dizziness: A case report

Neurocisticercose com manifestação clínica de tontura: Relato de caso

Neurocisticercosis con manifestación clínica de mareos: Informe de un caso

Received: 11/26/2025 | Revised: 11/30/2025 | Accepted: 11/30/2025 | Published: 12/02/2025

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Abstract

Neurocysticercosis is an infectious disease of the central nervous system caused by *Taenia solium*. Bali is an endemic area for neurocysticercosis and is associated with the consumption of raw pork. Clinical manifestations of neurocysticercosis vary, ranging from mild to fatal. Therefore, it is important to recognize the symptoms to ensure appropriate therapy and improve patient outcomes. The current study aims to report a clinical case of a 64-year-old woman who presented with a sudden onset of dizziness for four days, which she felt upon waking. Other complaints included mild headache and nausea. She had no medical history, but she had frequently consumed pork, most recently 10 days ago. Bidirectional nystagmus was observed. A CT scan of her head revealed several focal lesions suggestive of a worm infestation. She was diagnosed with neurocysticercosis and was treated with oral albendazole, dexamethasone injection, oral folic acid, and pantoprazole injection. She reported improvement after treatment. This case demonstrates an atypical presentation of neurocysticercosis and clinical improvement after initiation of an appropriate therapeutic protocol. This case emphasizes the importance of suspecting neurocysticercosis in endemic areas with a history of exposure, even if the clinical manifestations are atypical.

Keywords: Central nervous system; Dizziness; Neurocysticercosis; Pork.

Resumo

A neurocisticercose é uma doença infecciosa do sistema nervoso central causada pela *Taenia solium*. Bali é uma área endêmica para neurocisticercose e está associada ao consumo de carne de porco crua. As manifestações clínicas da neurocisticercose variam, desde leves até fatais. Portanto, é importante reconhecer os sintomas para garantir o tratamento adequado e melhorar os resultados para o paciente. O presente estudo tem como objetivo relatar um caso clínico de uma mulher de 64 anos que apresentou início súbito de tontura com duração de quatro dias, sintoma que sentia ao acordar. Outras queixas incluíam cefaleia leve e náuseas. Ela não tinha histórico médico relevante, mas consumia carne de porco frequentemente, a última vez há 10 dias. Observou-se nistagmo bidirecional. Uma tomografia computadorizada da cabeça revelou várias lesões focais sugestivas de infestação por vermes. Ela foi diagnosticada com neurocisticercose e tratada com albendazol oral, injeção de dexametasona, ácido fólico oral e injeção de pantoprazol. Ela relatou melhora após o tratamento. Este caso demonstra uma apresentação atípica de neurocisticercose e melhora clínica após o início de um protocolo terapêutico adequado. Este caso enfatiza a importância de suspeitar de neurocisticercose em áreas endêmicas com histórico de exposição, mesmo que as manifestações clínicas sejam atípicas.

Palavras-chave: Sistema nervoso central; Tontura; Neurocisticercose; Carne de porco.

Resumen

La neurocisticercosis es una enfermedad infecciosa del sistema nervioso central causada por *Taenia solium*. Bali es una zona endémica de neurocisticercosis y se asocia al consumo de carne de cerdo cruda. Las manifestaciones clínicas de la neurocisticercosis varían, desde leves hasta mortales. Por lo tanto, es importante reconocer los síntomas para asegurar un tratamiento adecuado y mejorar la evolución del paciente. El presente estudio tiene como objetivo reportar un caso clínico de una mujer de 64 años que presentó un cuadro de mareos de inicio repentino durante cuatro días, que sintió al despertar. Otras molestias incluyeron cefalea leve y náuseas. No tenía antecedentes médicos, pero había consumido carne de cerdo con frecuencia, la última vez hacía 10 días. Se observó nistagmo bidireccional. Una tomografía computarizada craneal reveló varias lesiones focales sugestivas de una infestación por gusanos. Se le diagnosticó neurocisticercosis y recibió tratamiento con albendazol oral, inyección de dexametasona, ácido fólico oral y inyección de pantoprazol. Refirió mejoría después del tratamiento. Este caso demuestra una presentación atípica de

neurocisticercosis y una mejoría clínica tras el inicio de un protocolo terapéutico adecuado. Este caso enfatiza la importancia de sospechar neurocisticercosis en zonas endémicas con antecedentes de exposición, incluso si las manifestaciones clínicas son atípicas.

Palabras clave: Sistema nervioso central; Mareos; Neurocisticercosis; Cerdo.

1. Introduction

Neurocysticercosis is a zoonotic infectious disease of the central nervous system caused by the parasitic form of tapeworm, *Taenia solium* (T. solium) (O. H. D. Brutto, 2014; Singh et al., 2024). Neurocysticercosis affects between 2.5 and 8.3 million people annually, contributing to a global burden of 2.8 million *disability-adjusted life years* (DALY) (Singh et al., 2024). Neurocysticercosis is endemic in most developing countries, where conditions favor its transmission, including pig farming with poor sanitation, poverty, and illiteracy, exist. In these areas, neurocysticercosis is one of the most common preventable causes of epilepsy and is associated with significant morbidity, mortality from epileptic seizures, and epilepsy-related deaths (O. H. D. Brutto, 2014; Singh et al., 2024). Endemic areas in Asia are China, India, and Indonesia, especially in the areas of North Sumatra, Bali, Papua, Flores, North Sulawesi, and West Kalimantan. (Sudewi, 2011) In Bali, neurocysticercosis was considered endemic more than 20 years ago. (Wandra et al., 2016) It was reported that 29 neurocysticercosis patients were treated at a referral hospital in Denpasar, Bali, from 2014 to 2018. This was related to the behavior of local residents who still consumed raw pork (Susilawathi et al., 2020).

Neurocysticercosis is referred to as “the great imitator” because it has various clinical manifestations, ranging from asymptomatic, mild to severe, disability to death. (Pranajaya et al., 2023) Seizures are the most common clinical manifestation of neurocysticercosis (O. H. D. Brutto, 2014). Other clinical manifestations that may appear include chronic headaches, hydrocephalus, increased intracranial pressure, stroke, visual disturbances, cranial nerve paralysis, psychological symptoms, and cognitive impairment (Byrnes et al., 2024; Carrey et al., 2018; Pranajaya et al., 2023). With varying clinical manifestations, the diagnosis of neurocysticercosis should be considered in patients with seizures, headache, and space-occupying lesions with increased intracranial pressure, in endemic areas (Pranajaya et al., 2023).

Understanding neurocysticercosis is crucial for early detection and appropriate therapy to improve patient outcomes. The current study aims to report a clinical case of a 64-year-old woman who presented with a sudden onset of dizziness for four days, which she felt upon waking.

2. Methodology

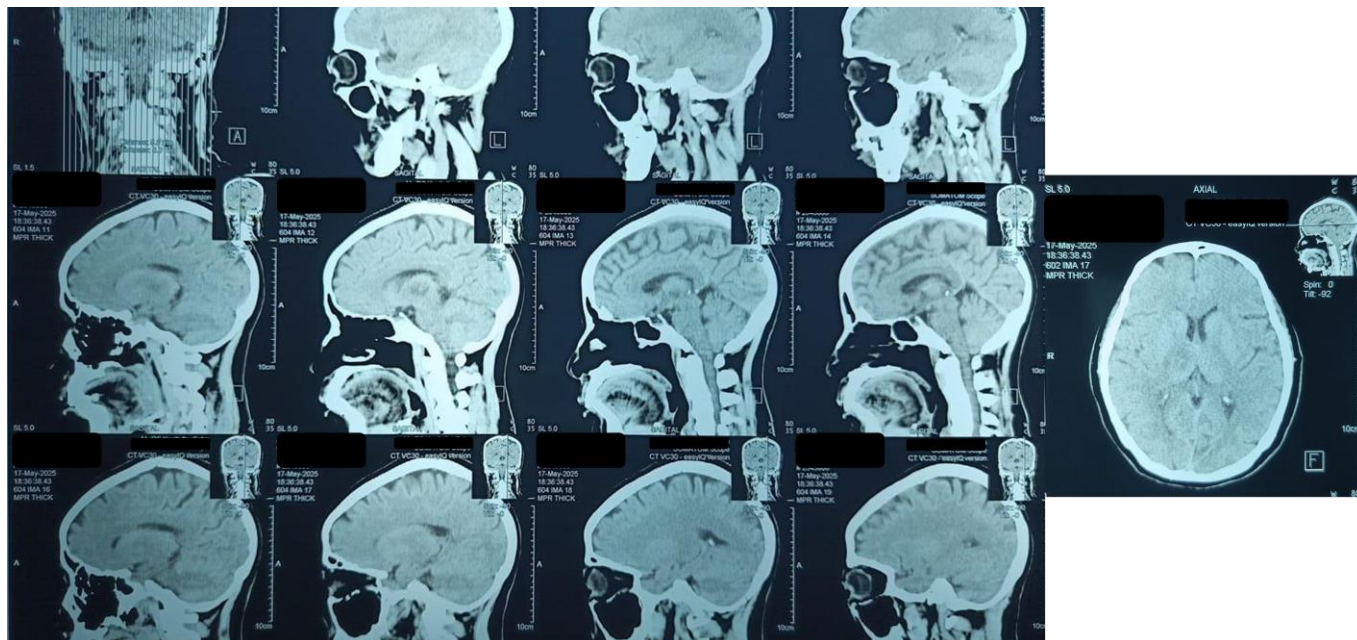
A descriptive, qualitative study was conducted (Pereira et al., 2018), specifically of the clinical case report type. (Toassi & Petry, 2021) This study is a case report written according to CARE guidelines. We report a 64-year-old female presenting to the hospital with a case of neurocysticercosis. We also performed a literature review to help readers better understand how to diagnose and treat neurocysticercosis. Ethical approval is waived for this study.

3. Case Illustration

A 64-year-old female patient presented to the emergency unit, conscious, with complaints of dizziness that had begun four days ago. She felt dizzy upon waking, feeling unsteady. She also experienced a mild headache and nausea. She denied any past medical history, including high blood pressure and diabetes mellitus. She had a history of frequent consumption of pork purchased from a local stall, having last consumed pork 10 days ago.

On physical examination, vital signs were found within normal limits. Neurological status examination found bidirectional nystagmus. Complete blood count, kidney function, and electrocardiogram were found within normal limits. The head computed tomography scan (CT-Scan) can be seen in Figure 1.

Figure 1. Head CT scan.



Source: Research data (2025).

Head CT-Scan examination found focal hypodense lesions in the right thalamus with hyperdense lesions in the center, focal hyperdense lesions in the form of dots in the thalamus, posterior fornix and corpus callosum and there were isodense lesions in the form of dots scattered in the cerebral parenchyma of the brain and brainstem suggesting an infectious process (worm larval investment) namely neurocysticercosis.

The patient was diagnosed with neurocysticercosis. The patient was given therapy in the form of bed rest with the head elevated 30 degrees, intravenous pantoprazole 40 mg once/ day, intravenous dexamethasone 5 mg three times/ day, folic acid 1 tablet twice orally/ day, and albendazole 400 mg three times orally/ day.

During the hospitalization, the dizziness subsided. The patient was declared to have improved after 7 days of treatment. She was given albendazole 400 mg three times a day for discharge.

4. Discussion

Neurocysticercosis is caused by the consumption of *T. solium* eggs, which can be acquired through the consumption of contaminated food or water and the consumption of raw or undercooked pork (Butala et al., 2021). These eggs hatch in the intestine, penetrate the gut, and then spread widely to tissues. Several body tissues can be infected, including the eyes, skin, and muscles. However, the larvae show a strong affinity for the central nervous system (Gripper & Welburn, 2017). In Bali, pig farming and the consumption of raw pork are common. The consumption of lawar, a traditional local dish made from raw beef or pork, is difficult to change. Furthermore, studies have found that active *T. solium* transmission is limited to remote mountain villages and relatively small rural areas in Karangasem. However, people in these areas often seek employment,

increasing the risk of carrying taeniasis and contracting neurocysticercosis (Wandra et al., 2015). In this case, the patient was a woman, 64 years old, from Bali, and she often consumed pork.

The clinical manifestations of neurocysticercosis vary depending on the organ, the location of the cyst, the environment in which the organism lives or dies, and the body's response to infection. *T. solium* cysts are most commonly found in the brain parenchyma, but they can also be found in extraparenchymal locations (subarachnoid, intraventricular, spinal, and ocular) (O. H. Del Brutto, 2022; Sudewi, 2011). A systematic review reporting on neurocysticercosis patients seen in neurology clinics showed that seizures/epilepsy were the most common manifestation (78.8%, 95%CI: 65.1%–89.7%) followed by headache (37.9%, 95%CI: 23.3%–53.7%), focal deficits (16.0%, 95%CI: 9.7%–23.6%) and signs of increased intracranial pressure/hydrocephalus/papilledema (11.7%, 95%CI: 6.0%–18.9%), while other manifestations occurred in less than 10% of symptomatic neurocysticercosis patients. (Carabin et al., 2011). Involuntary movements, Parkinsonism, language disorders, and brainstem dysfunction may occur in some cases and are most commonly found in patients with subarachnoid cysts compressing the brain parenchyma (O. H. Del Brutto, 2022).

Dizziness is an atypical presentation of neurocysticercosis but should not be ignored. The underlying mechanism of dizziness in neurocysticercosis remains unclear. The patient in this case report had experienced dizziness for the past 4 days. Reports of dizziness as a manifestation of neurocysticercosis are rare in the literature. The first reported case was a 52-year-old woman with dizziness for 1 month, who was found to have early hydrocephalus due to subarachnoid neurocysticercosis obstructing cerebrospinal fluid circulation. Interestingly, the patient had a habit of consuming raw vegetables, which is suspected to be the source of infection. The patient's complaints improved after surgical intervention. (Li et al., 2019). Another reported case involved a 20-year-old man who complained of a “the room spinning around” sensation that had worsened over the past three weeks. Magnetic resonance imaging (MRI) in this patient revealed a cystic-appearing lesion in the fourth ventricle with associated mass effect on the posterior brainstem and mild periventricular edema, as well as positive anti-cysticercus IgG antibodies, confirming the diagnosis of neurocysticercosis. The patient's response to oral albendazole 400 mg twice daily and oral dexamethasone 6 mg daily for 14 days showed improvement in symptoms, even up to two weeks after discharge (Mesa et al., 2023).

The supporting examinations used in this case are a CT scan. Neuroimaging is recommended for all patients with suspected neurocysticercosis. CT is generally more sensitive in detecting calcified lesions, while MRI is more sensitive in detecting scolexes, edema, small parenchymal lesions, posterior fossa lesions, and subarachnoid and ventricular involvement. (White et al., 2018). Other diagnostic tests that can be performed include Enzyme-Linked Immunosorbent Assay (ELISA) and Western Blot Lentil-Lectin Purified Glycoprotein-Enzyme-Linked Immunoelctrotransfer Blot (LLGP-EITB) examinations to detect anticysticercal antibodies (O. H. Del Brutto, 2022).

The diagnosis of neurocysticercosis is based on absolute criteria (histological confirmation of the parasite, evidence of subretinal cysts, and the presence of a scolex within the cyst), neuroimaging criteria (major, confirmatory, minor), and clinical/exposure criteria (major and minor) that suggest definitive or probable neurocysticercosis. (O. H. Del Brutto et al., 2017). The patient in this case report is included in probable neurocysticercosis based on one major neuroimaging criterion (enhancing lesion) and two clinical/exposure criteria (clinical manifestations suggestive of neurocysticercosis and individuals originating from or residing in cysticercosis endemic areas).

Management of neurocysticercosis includes antiparasitic drugs, symptomatic treatment, and surgery. Therapy in this case is albendazole 400 mg three times a day, dexamethasone injection 5 mg three times a day, folic acid one tablet two times a day, and pantoprazole injection 40 mg once a day. Antiparasitics that can be given for neurocysticercosis include albendazole or praziquantel, which are *cysticidal* or destroy the cyst that has formed (O. H. Del Brutto, 2022; Sudewi, 2011). Albendazole

has better penetration into cerebrospinal fluid, and its levels are not affected by steroids. (Sudewi, 2011) Treatment with a combination of these two antiparasitic drugs may be optimal in some cases. (Butala et al., 2021) Symptomatic and anti-inflammatory therapy in the form of steroids can be given to control edema and increased intracranial pressure, as well as to overcome local inflammation and exacerbation of neurological symptoms due to parasite death. (Sudewi, 2011; White et al., 2018) Other symptomatic therapies given are anti-epileptic drugs and analgesics. (Gripper & Welburn, 2017) Surgical procedures such as cyst resection, ventricular shunt placement to treat hydrocephalus, and decompressive craniotomy may be performed in some cases (O. H. Del Brutto, 2022).

Infection prevention is also a crucial step in neurocysticercosis management. It is important for patients, families, and the community to be educated about completing treatment to prevent infection, avoiding consumption of food contaminated with tapeworm eggs, and observing proper sanitation, meat inspection, and proper cooking and handling of pork (Sudewi, 2011; White et al., 2018.) Other things that can be done include improving pig husbandry practices, vaccination and treatment of pigs to break the chain of transmission (Wandra et al., 2015; White et al., 2018).

5. Conclusion

This case report demonstrates another variation in the clinical manifestations of neurocysticercosis, which typically presents with seizures. Optimal therapy to destroy the cysts and reduce the resulting inflammation successfully resolved the patient's symptoms. This case emphasizes the importance of considering neurocysticercosis even when symptoms are atypical, especially in patients living in endemic areas and consuming pork.

References

- Brutto, O. H. D. (2014). Neurocysticercosis. *The Neurohospitalist*, 4(4), 205. <https://doi.org/10.1177/1941874414533351>
- Butala, C., Brook, T. M., Majekodunmi, A. O., & Welburn, S. C. (2021). Neurocysticercosis: Current Perspectives on Diagnosis and Management. *Frontiers in Veterinary Science*, 8, 615703. <https://doi.org/10.3389/FVETS.2021.615703/BIBTEX>
- Byrnes, E., Shaw, B., Shaw, R., Madruga, M., & Carlan, S. J. (2024). Neurocysticercosis Presenting as Migraine in the United States. *American Journal of Case Reports*, 25. <https://doi.org/10.12659/AJCR.943133>
- Carabin, H., Ndimubanzi, P. C., Budke, C. M., Nguyen, H., Qian, Y., Cowan, L. D., Stoner, J. A., Rainwater, E., & Dickey, M. (2011). Clinical Manifestations Associated with Neurocysticercosis: A Systematic Review. *PLOS Neglected Tropical Diseases*, 5(5), e1152. <https://doi.org/10.1371/JOURNAL.PNTD.0001152>
- Del Brutto, O. H. (2022). Human Neurocysticercosis: An Overview. *Pathogens*, 11(10), 1212. <https://doi.org/10.3390/PATHOGENS11101212>
- Del Brutto, O. H., Nash, T. E., White, A. C., Rajshekhar, V., Wilkins, P. P., Singh, G., Vasquez, C. M., Salgado, P., Gilman, R. H., & Garcia, H. H. (2017). Revised diagnostic criteria for neurocysticercosis. *Journal of the Neurological Sciences*, 372, 202–210. <https://doi.org/10.1016/J.JNS.2016.11.045>
- Gripper, L. B., & Welburn, S. C. (2017). Neurocysticercosis infection and disease—A review. *Acta Tropica*, 166, 218–224. <https://doi.org/10.1016/J.ACTATROPICA.2016.11.015>
- Carrey, M., Suseno, E., Spicano Joprang, F., Darmawan, O., & Widayanti, Rr. J. R. (2018). Current trends of diagnosis and management of neurocysticercosis. *JKKI : Jurnal Kedokteran Dan Kesehatan Indonesia*, 9(3), 187–194. <https://doi.org/10.20885/JKKI.VOL9.ISS3.ART9>
- Li, H., Sun, J., & Nan, G. (2019). Nonspecific dizziness as an unusual presentation of neurocysticercosis: A case report. *Medicine*, 98(30), e16647. <https://doi.org/10.1097/MD.00000000000016647>
- Mesa, E., Ruprecht, V., Nguyen, M. C., & Casadesus, D. (2023). Vertigo: An Atypical Presentation of Neurocysticercosis Successfully Treated With Albendazole. *Cureus*, 15(9), e45722. <https://doi.org/10.7759/CUREUS.45722>
- Pereira, A. S. et al. (2018). Metodologia da pesquisa científica. [free ebook]. Santa Maria: Editora da UFSM.
- Pranajaya, I. G. B. A. A., Suryaprabha, A. A. A., Dewi, V. T., Sudarmaja, I. M., Swastika, K., Sudewi, A. A. R., & Susilawathi, N. M. (2023). The diversity of neurocysticercosis clinical manifestations in Bali, Indonesia: a case series. *Egyptian Journal of Neurology, Psychiatry and Neurosurgery*, 59(1), 110–. <https://doi.org/10.1186/S41983-023-00711-W/FIGURES/5>
- Singh, G., Garcia, H. H., Del Brutto, O. H., Coyle, C., & Sander, J. W. (2024). Seizures and Epilepsy in Association with Neurocysticercosis: A Nosologic Proposal. *Neurology*, 103(9), e209865.

<https://doi.org/10.1212/WNL.0000000000209865/ASSET/EC42932B-38E5-4AED-93C8-4BC55D2E0859/ASSETS/IMAGES/LARGE/WNL.0000000000209865F2.JPG>

Sudewi, R. A. A. (2011). Neurocysticercosis. In R. A. A. Sudewi, P. Sugianto, & K. Ritarwan (Eds.), *Infeksi pada Sistem Saraf*. Airlangga University Press.

Susilawathi, N. M., Suryaputra, A. A., Soejitno, A., Asih, M. W., Swastika, K., Wandra, T., Budke, C. M., Ito, A., & Sudewi, A. R. (2020). Neurocysticercosis cases identified at Sanglah Hospital, Bali, Indonesia from 2014 to 2018. *Acta Tropica*, 201, 105208. <https://doi.org/10.1016/j.actatropica.2019.105208>

Toassi, R. F. C. & Petry, P. C. (2021). Metodologia da pesquisa aplicada à área de saúde. (2ed). Editora de UFRGS.

Wandra, T., Sudewi, R., Susilawati, N. M., Swastika, K., Sudarmaja, I. M., Diarthini, L. P. E., Purba, I. E., Okamoto, M., Budke, C. M., & Ito, A. (2016). Neurocysticercosis Diagnosed in a Patient with Taenia saginata Taeniasis after Administration of Praziquantel: A Case Study and Review of the Literature. *Primary Health Care: Open Access*, 6(3), 1–4. <https://doi.org/10.4172/2167-1079.1000231>

Wandra, T., Swastika, K., Dharmawan, N. S., Purba, I. E., Sudarmaja, I. M., Yoshida, T., Sako, Y., Okamoto, M., Eka Diarthini, N. L. P., Sri Laksemi, D. A. A., Yanagida, T., Nakao, M., & Ito, A. (2015). The present situation and towards the prevention and control of neurocysticercosis on the tropical island, Bali, Indonesia. *Parasites & Vectors*, 8(1), 148. <https://doi.org/10.1186/S13071-015-0755-Z>

White, A. C., Coyle, C. M., Rajshekhar, V., Singh, G., Hauser, W. A., Mohanty, A., Garcia, H. H., & Nash, T. E. (2018). Diagnosis and Treatment of Neurocysticercosis: 2017 Clinical Practice Guidelines by the Infectious Diseases Society of America (IDSA) and the American Society of Tropical Medicine and Hygiene (ASTMH). *Clinical Infectious Diseases*, 66(8), e49–e75. <https://doi.org/10.1093/CID/CIX1084>