Sellar Neurocysticercosis: A Literature Review

Neurocisticercose Selar: Uma revisão de literatura

Mateus de Sousa Rodrigues[1] Camila Maciel Martins Coelho[2] Camila Rodrigues de Sousa[3] Echeley Islany da Silva Oliveira[2] Atalana Sofia da Silva Sales[4] Renato Bispo de Cerqueira Filho[5] Antonio Vinicius Ramalho Leite[6] Samuel Miranda de Moura[6] José Carlos de Moura[6]

[1] Department of Neurosurgery, Restauração Hospital, Recife, PE, Brasil
[2] Department of Nursing, Universidade de Pernambuco (UPE), Petrolina, PE, Brasil
[3] School of Medicine, Estácio-IDOMED, Juazeiro, BA, Brazil
[4] Department of Pharmacy, Universidade Federal do Vale do São Francisco (UNIVASF), Petrolina, PE, Brasil
[5] Department of Neurology, Neurocardio Hospital, Petrolina, PE, Brasil
[6] Department of Neurosurgery, Neurocardio Hospital, Petrolina, PE, Brasil

Address for correspondence Mateus de Sousa Rodrigues, Neurosurgery Resident, Department of Neurosurgery, Restauração Hospital, Av. Gov., Agamenon Magalhães, s/n, Derby, Recife, PE, Brazil, Zip Code: 52171-011 (e-mail: mateus.kamloops@gmail.com).

Arq Bras Neurocir 2024;43(4):e315–e318.

Abstract

The objective of this study was to carry out a literature review on neurocysticercosis. In this sense, a literature review was performed based on articles published on Bireme and Pubmed in the period 2018–2024. The descriptor was used: "intrasellar cysticercosis." Five studies met the eligibility criteria. Headache was the main symptom observed. The prevalence of the disease by age profile occurred mainly in young adults. The lack of general knowledge and the lack of resources for prevention, diagnosis, and early treatment may be factors that contribute to the persistence of the disease in the population. Furthermore, the lack of resources, such as neuroimaging exams and neurological care, makes it difficult to diagnose and treat the disease; thus, delaying diagnosis contributes to the spread of the infection.

Keywords
- neurocysticercosis
- sellar
- intraventricular cyst
- racemose
- subarachnoid space

Resumo

O objetivo deste estudo foi realizar uma revisão de literatura sobre neurocisticercose. Nesse sentido, foi realizada uma revisão de literatura baseada nos artigos publicados na Bireme e Pubmed no período de 2018–2024. Foi utilizado o descritor: "Intrasellar cysticercosis." Cinco estudos preencheram os critérios de elegibilidade. Cefaleia foi o principal sintoma observado. A prevalência da doença por perfil etário se deu principalmente em adultos jovens. A falta de conhecimento geral e carência de recursos para prevenção, diagnóstico e tratamento precoce podem ser fatores que corroboram para a permanência da doença na população. Ademais, a falta de recursos, como exames de neuroimagem e cuidados neurológicos dificultam o diagnóstico e tratamento da doença, com isso, a demora no diagnóstico contribui para disseminação da infecção.

Palavras-chaves
- neurocisticercose
- selar
- cisto intraventricular
- racemose
- espaço subaracnóide

received
February 10, 2024
accepted
October 18, 2024

DOI https://doi.org/10.1055/s-0044-1795073.
ISSN 0103-5355.

Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil

Introduction

Worms are caused by worms that parasitize the host's body. In this context, human cysticercosis is a clinically relevant verminosis with a high incidence, especially in underdeveloped countries.[1] According to the World Health Organization (WHO), Taenia solium is a zoonotic parasite with global distribution but high transmission and is hyperendemic in parts of Latin America, South and Southeast Asia, and sub-Saharan Africa.[2]

The main risk factors for neurocysticercosis are poor environmental conditions, a lack of basic sanitation, and hygienic dietary habits. It is believed that contamination is transmitted via the oral-fecal route, either through food contaminated with parasite eggs or through ingestion of raw or undercooked pork meat.[3] After ingesting T. solium eggs, the cysticerci reach the adult stage in the small intestine. In the muscles, skin, and eyes, the resulting larvae form cysts. In the Central Nervous System (CNS), this same differentiation occurs; however, infection in this system refers to neurocysticercosis.[4]

Patients with neurocysticercosis may present symptoms associated with increased intracranial pressure, seizures, chronic headaches, focal neurological deficits, hydrocephalus, and focal epilepsy.[4] For diagnosis, neuroimaging tests, such as magnetic resonance imaging (MRI) and computed tomography (CT), are considered essential for the diagnosis of neurocysticercosis.[5,6] Thus, the management of this patient varies according to the severity of the clinical condition, with the use of drug therapy and/or surgical intervention in severe cases.[7]

The present study aims to carry out a literature review on neurocysticercosis.

Methods

This is a literature review on neurocysticercosis. The databases consulted were Bireme and Pubmed, using the following descriptor: "intrasellar cysticercosis." The inclusion criteria adopted were: i) studies performed in the last six years (2018–2024); ii) original articles. Studies were excluded: i) literature review. The inclusion criteria were: (i) studies performed in the last six years (2018–2024); (ii) original articles.

Results

Based on the chosen descriptors, in BIREME, 9 articles were initially identified. However, only 1 article met the eligibility criteria. In the Pubmed database, 30 articles were identified, but only 7 articles met the eligibility criteria. The sum of articles from BIREME and Pubmed totaled 8 articles. After excluding duplicates ($n = 1$)), 7 articles remained. With the exclusion of non-original articles ($n = 2$)), 5 articles were selected (►**Fig. 1**).

►**Table 1** presents the classification of the studies analyzed, according to year, symptoms, affected areas, and therapeutic approaches. It was observed that, in the cases analyzed, all the patients described presented with headaches. However, only a

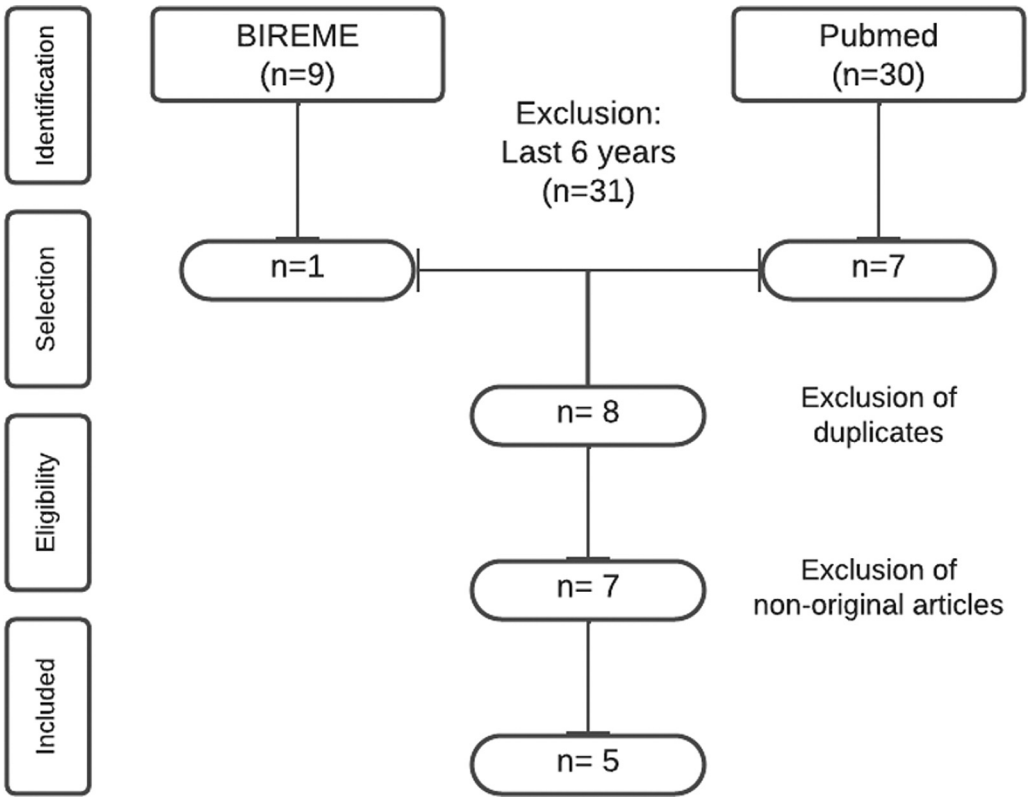

Fig. 1 Flowchart of selection of literature review citations.

Table 1 Characterization of selected studies, second year, symptoms, affected areas and approaches

Author	Yeah	Age	Symptomatology	Affected areas	Approaches
Goulart, et al.[10]	2022	26	Progressive frontal headache, dizziness episodes	Space subarachnoid	Endonasal endoscopic, medicated: dexamethasone (12 mg/day) and albendazole (30 mg/kg/day)
Zhang, et al.[12]	2022	20	Headache and nausea	Visual acuity of the left eye of 6/30 and temporal hemianopsia of the left eye	Medication (Albendazole and Praziquantel))
Shakya, et al.[14]	2021	28	Rapid progressive loss of vision and headache	Visual acuity of the left eye of 6/30 and temporal hemianopsia of the left eye	Medication and pterional craniotomy surgery
Hernandez, et al.[15]	2020	45	Intense chronic headache, progressive deterioration of visual acuity for 6 months and bitemporal hemianopsia	Visual acuity in the right eye 20/60 and in the left eye 20/80 and bitemporal hemianopsia	Surgery transciliary supraorbital keyhole.

few presented vision impairments at different degrees of progression. Furthermore, 1 of the 4 patients had manifestations related to nausea or dizziness; in the same proportion, a manifestation of subarachnoid or disseminated neurocysticercosis was also observed. Concerning the other affected areas, 2 of the 4 patients presented impaired visual acuity, whether bilateral or not. The approach varied, according to the severity and location affected, that is, there were surgical and/or pharmacological interventions.

Discussion

The present study verified the scientific production regarding the time interval between 2018 and 2024 regarding the NCC. Among the 5 selected studies, the following aspects related to the disease were mainly evaluated: clinical manifestations, approach, treatment, and clinical outcome.

According to the results, it was observed that distribution of the infection may occur, affecting neurological and other tissues. This is because the parasite has a tropism for the blood-brain barrier (BBB) and the blood-ocular barrier, which triggers the manifestations of the cases. These manifestations of neurocysticercosis depend on the location where the parasite settles in the human CNS. When the cysts are outside the brain parenchyma (extra parenchymal NCC), they grow and spread, causing conditions related to mass effect, hydrocephalus, chronic arachnoiditis, and vasculitis. Thus, it is the cause of the greatest morbidity and mortality.[8]

Parenchymal cysts rarely grow beyond 2 cm in diameter and establish themselves as small cysts, presenting a more positive prognosis. In this sense, the most common symptoms are headache and seizures, which are commonly of the same type, and their location is related to a parasitic lesion. The occurrence of the manifestations and affected areas described in the literature was observed in the clinical cases of the selected studies.[8]

Neurological symptoms lead patients to seek specialist care, and medical management is defined based on the presentation of symptoms. For symptomatic patients, such as those in the cases described, therapy is based on surgical intervention and/or the use of drugs to minimize symptoms and prevent the development of the parasite.[9]

Before starting treatment with antiparasitic drugs, it is important to establish pharmacological therapy to manage symptoms. The indication of mannitol, steroids, analgesics, and antiepileptics is generally necessary. The use of antiparasitics aims to eliminate cysticerci, although improvement is not immediate. In addition to the possibility of developing inflammation around the lesion, this can lead to the emergence or progression of neurological manifestations. To regulate these unwanted symptoms, the simultaneous administration of steroids is valid.[9]

The NCC of the patient described by Goulart et al.[10] affected the subarachnoid space, the most common site of infection. In these cases, antiparasitic medications are also used to resolve the lesions. Albendazole (ABZ) is the first option due to the drug's potential to reach higher levels in the subarachnoid space.[11]

In the approach chosen in the clinical case of disseminated cysticercosis described by Zhang et al.,[12] a combination of ABZ and praziquantel (PZQ) was chosen. Antiparasitics have different mechanisms of action but are used in combination due to evidence of parasiticidal superiority when compared with monotherapy.[13]

Furthermore, some cases require surgical approaches, among which the most common is the insertion of a ventriculoperitoneal shunt to treat hydrocephalus. Diagnosis and surgery must be performed as soon as possible to minimize the risk of sequelae or death. Others suggest that removing the cysts through surgery is a viable alternative only in situations where the patient has intracranial hypertension. In general, for most patients with neurocysticercosis with giant subarachnoid cysts, surgical procedures, and their potential complications can be avoided.[11]

Therefore, community health and education interventions are important to reduce cases of cysticercosis caused

by T. solium, as it is still a neglected disease, according to the WHO. The lack of information regarding the correct hygiene of food and the forms of contamination are the main factors in the spread of the parasite.

Conclusion

The lack of general knowledge and the lack of resources for prevention, diagnosis, and early treatment may be factors that contribute to the persistence of the disease in the population. Furthermore, the lack of resources, such as neuroimaging exams and neurological care, makes it difficult to diagnose and treat the disease; thus, delaying diagnosis contributes to the spread of the infection.

Conflict of Interest
None.

References

1 Toledo RCC, Franco JB, Freitas LS, Katielli C, Freitas ARF. Taeniasis/cysticercosis complex: a review. Food Hygiene 2018; 32(282/283):30–34
2 World Health Organization. World Health Organization guidelines for the management of Taenia solium neurocysticercosis. Pan American Health Organization,; 2022
3 Mital AK, Choudhary P, Jain RB. Prevalence and risk factors for neurocysticercosis in children with a first-onset seizure in rural North India. Paediatr Int Child Health 2020;40(03):158–165. Doi: 10.1080/20469047.2020.1739381
4 Del Brutto OH, Garcia HH. Neurocysticercosis. Handb Clin Neurol 2013;114:313–325. Doi: 10.1016/B978-0-444-53490-3.00025-X
5 García HH, Del Brutto OH. Imaging findings in neurocysticercosis. Acta Trop 2003;87(01):71–78. Doi: 10.1016/s0001-706x(03)00057-3
6 Hernández RD, Durán BB, Lujambio PS. Magnetic resonance imaging in neurocysticercosis. Top Magn Reson Imaging 2014; 23(03):191–198. Doi: 10.1097/RMR.0000000000000026
7 Garg RK. Drug treatment of neurocysticercosis. Natl Med J India 1997;10(04):173–177
8 Garcia HH, Gonzalez AE, Gilman RH. Taenia solium Cysticercosis and Its Impact in Neurological Disease. Clin Microbiol Rev 2020; 33(03):e00085-19
9 Singh AK, Singh SK, Singh A, et al. Immune response to Taenia solium cysticerci after antiparasitic therapy. Int J Parasitol [Internet]. 2015;45(12):749–59. Available in: https://www.sciencedirect.com/science/article/pii/S0020751915002192
10 Goulart LC, Vieira Netto LA, Dias CRG, et al. Endoscopic endonasal approach for isolated subarachnoid neurocysticercosis in basal cisterns and its complications: illustrative case. J Neurosurg Case Lessons 2022;3(15):2229. Doi: 10.3171/case2229
11 Proaño JV, Madrazo I, Avelar F, López-Félix B, Díaz G, Grijalva I. Medical treatment for neurocysticercosis characterized by giant subarachnoid cysts. N Engl J Med 2001;345(12):879–885. Doi: 10.1056/nejmoa010212
12 Zhang HY, Wang GX, Xing YY, Xie MR. Case report: Disseminated cysticercosis due to intentional ingestion of parasitic worm eggs for weight loss. Am J Trop Med Hyg 2021;106(02):710–713. Doi: 10.4269/ajtmh.21-0760
13 Garcia HH, Lescano AG, Gonzales I, et al. Cysticidal efficacy of combined treatment with praziquantel and albendazole for parenchymal brain cysticercosis. Clin Infect Dis [Internet]. 2016 [quoted on January 5, 2024];62(11):1375–9. Available in: https://academic.oup.com/cid/article/62/11/1375/174512
14 Shakya S, Gurung P, Shrestha D, Rajbhandhari P, Pant B. A case of sellar/suprasellar neurocysticercosis mimicking a craniopharyngioma. Asian J Neurosurg 2021;16(01):204–207. Doi: 10.4103/ajns.ajns_423_20
15 Cuellar-Hernandez JJ, Valadez-Rodriguez A, Olivas-Campos R, et al. Intrasellar cysticercosis cyst treated with a transciliary supraorbital keyhole approach - A case report. Surg Neurol Int 2020;11(436):436. Doi: 10.25259/sni_755_2020

