Surgical Treatment of Racemose Cysticercosis in the Quadrigeminal Cistern: A Case Series

Tratamento cirúrgico de cisticercose racemosa na cisterna quadrigêmea: Uma série de casos

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Abstract

Introduction Racemose neurocysticercosis is rare and distinctive among the variety of neurocysticercosis pathologies, and it is characterized by the development of cysts in the basal subarachnoid region. This uncommon presentation involves the formation of multiple, non-encapsulated cystic membranes resembling a bunch of grapes due to the exogenous budding of aberrant proliferating *Taenia solium* larvae. Typically observed in expansive areas of the brain, such as the suprasellar, sylvian, and quadrigeminal cisterns, or around the rostral brainstem, these cysts lack scolex, do not always involve edema, and can escape detection with contrast enhancement depending on their life cycle.

Case Description In both cases presented here, the patients' multilobulated cysts had components in the posterior incisural space that extended below the mesial temporal region. Consequently, there was no need for a more complex approach to the pineal region, and cyst removal was achieved solely with the subtemporal approach. This is possible due to the cysts' lack of adherence to neurovascular structures. Following cyst drainage, their capsules were easily removed with a forceps.

Conclusion To achieve a successful outcome, these cases require a comprehensive understanding of neurocysticercosis variations as well as individualized surgical planning based on lesion characteristics and solid postoperative pharmacological management. The effective treatment of neurocysticercosis is clearly complex and still evolving, and continued vigilance and research will enhance our ability to manage the challenges this parasitic neurological condition presents.

Keywords
- racemose neurocysticercosis
- basal subarachnoid cysts
- subtemporal approach
- neurosurgery

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Resumo

Introdução A neurocisticercose racemosa é rara e distinta entre a variedade de patologias de neurocisticercose, e é caracterizada pelo desenvolvimento de cistos na região subaracnóidea basal. Essa apresentação incomum envolve a formação de múltiplas membranas císticas não encapsuladas, assemelhando-se a um cacho de uvas, devido à brotação exógena de larvas de *Taenia solium* proliferantes aberrantes. Normalmente observados em áreas expansivas do cérebro, como as cisternas supraselar, silviana e quadrigeminal, ou ao redor do tronco cerebral rostral, esses cistos não têm escólex, nem sempre envolvem edema e podem escapar da detecção com realce de contraste, dependendo do seu ciclo de vida.

Descrição do caso Em ambos os casos apresentados aqui, os cistos multilobulados dos pacientes tinham componentes no espaço incisural posterior que se estendiam abaixo da região temporal mesial. Consequentemente, não houve necessidade de uma abordagem mais complexa para a região pineal, e a remoção do cisto foi obtida apenas com a abordagem subtemporal. Isso é possível devido à falta de aderência dos cistos às estruturas neurovasculares. Após a drenagem do cisto, suas cápsulas foram facilmente removidas com uma pinça.

Conclusão Para atingir um resultado bem-sucedido, esses casos exigem uma compreensão abrangente das variações da neurocisticercose, bem como um planejamento cirúrgico individualizado com base nas características da lesão e no manejo farmacológico pós-operatório sólido. O tratamento eficaz da neurocisticercose é claramente complexo e ainda está em evolução, e a vigilância e a pesquisa contínuas aumentarão nossa capacidade de gerenciar os desafios que essa condição neurológica parasitária apresenta.

Palavras-Chave

- racemose neurocisticercose
- cistos subaracnóideos basais
- subtemporal abordagem
- neurocirurgia

Introduction

Neurocysticercosis (NCC) is the most common parasitic disease affecting the human nervous system and is a substantial public health concern throughout the developing world. The clinical presentation of NCC has many variables such as lesion quantity and location, and the host's immune response to the parasitic agent. Diagnosis primarily depends on neuroimaging and is complemented by serological detection of antibodies/antigens in the serum or occasionally in the cerebrospinal fluid.[1] Patients with exclusively intraparenchymal brain parasites typically manifest seizures, which tend to lessen over time. Conversely, parasites situated within the ventricles and the basal subarachnoid space undergo progressive growth and infiltration, potentially giving rise to hydrocephalus and/or intracranial hypertension. Such manifestations often lead to morbidity and mortality. Calcified NCC still contributes to a persistent and heavy burden of disease.[1,2]

The present case series underscores the multifaceted nature of NCC and emphasizes the importance of personalizing therapeutic strategies for each patient. This disease also poses challenges to management which must be considered. The integration of advanced diagnostic modalities and evolving therapeutic strategies reveals significant progress in addressing this rare and complex variant of NCC.

Case Presentation

Case 1

A 34-year-old female patient presented with severe headache without other reported signs or symptoms. The magnetic resonance imaging (MRI) revealed a voluminous cystic lesion in the quadrigeminal cistern with subtemporal extension and involvement of the ambient cistern and pontocerebellar angle (►**Fig. 1**). A posterior petrous approach was undertaken, and, with superior traction of the temporal lobe, the voluminous cystic lesion was expelled and completely excised via the subtemporal route. Notably, there was no need to open the presigmoid dura mater or the dura mater of the posterior fossa, and the patient had an uneventful postoperative recovery. Histopathological analysis confirmed the diagnosis of NCC. Postoperative treatment included a 5-day course of albendazole.

Case 2

A 54-year-old male patient presented with bilateral papillary edema, without focal neurological signs, and a history of prior ventriculoperitoneal shunting. The gadolinium-enhanced MRI revealed multilobulated cystic lesions in the basal cisterns, left Sylvian fissure, and quadrigeminal cistern (►**Fig. 2**). A left extended frontotemporal approach was chosen, the Sylvian fissure was widely dissected, and the cysts were easily resected. Additional cysts were removed

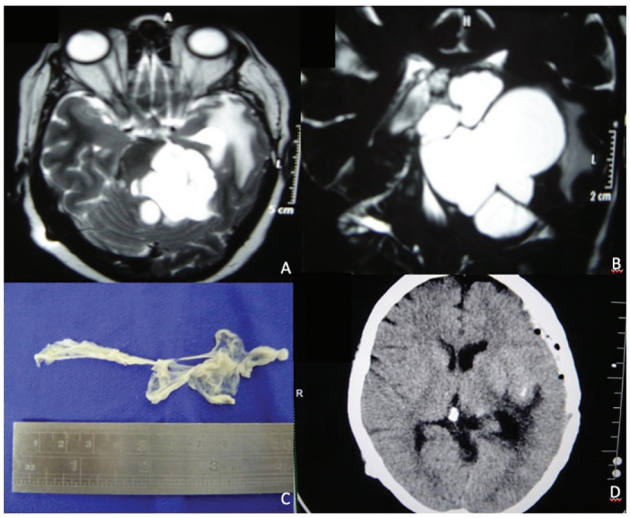

Fig. 1 Axial and coronal T2-weighted magnetic resonance imaging revealing a voluminous multiloculated cystic lesion occupying the quadrigeminal cistern (**A, B**). Resected walls of the cyst (**C**). Postoperative skull computed tomography showing cyst resection.

from the left opticocarotid and interpeduncular cisterns. After this, the posterior incisural space was approached through the subtemporal route. The exposed cyst was drained, and its capsule was excised with a forceps. The patient developed mild aseptic meningitis and experienced one episode of generalized tonic-clonic seizure. Nevertheless, he was discharged from the hospital after 7 days, asymptomatic, and put on a 5-day course of albendazole.

Discussion

In both cases presented, a multilobulated cyst exhibited a component in the posterior incisural space that extended below the mesial temporal region. As a result, a more intricate approach to the pineal region was deemed unnecessary, and cyst removal was accomplished exclusively through the subtemporal approach. This was feasible due to the cysts' lack of adherence to neurovascular structures, facilitating their straightforward removal with forceps following drainage.

The therapeutic spectrum encompasses symptomatic management, antiparasitic regimens, and surgical modalities, and a combined approach is often necessary. Notably, albendazole administered over a five-day period has emerged as a viable therapeutic option for intramedullary spinal cord cysts.[3] In cases warranting surgical intervention, options range from lesion resection to shunt placement.

Racemose NCC presents a distinctive and rare manifestation within the NCC pathology spectrum. It is characterized by cyst development in the basal subarachnoid region. This uncommon presentation involves the formation of multiple non-encapsulated cystic membranes that resemble a bunch of grapes. These are the exogenous budding of aberrantly proliferating *Taenia solium* larvae. Typically observed in expansive brain regions, such as the suprasellar, Sylvian, and quadrigeminal cisterns, or around the rostral brainstem, these cysts lack scolex, do not always involve edema, and can escape detection with contrast enhancement depending on their life cycle.[4]

Clinical consequences of racemose NCC include mass effect, cranial nerve entrapment, arachnoiditis leading to meningeal inflammation and/or hydrocephalus. Less frequently, small-vessel infarcts may occur secondary to occlusive endarteritis. These manifestations are often challenging to detect on computed tomography (CT) scans and so require MRIs for accurate diagnosis. Treatment challenges are not uncommon, and multiple courses of antiparasitic therapy may be required for parasitic clearance. In instances of intraventricular NCC, neuro-endoscopic procedures may be essential for optimizing outcomes.[5]

Advancements in NCC management over the past few decades include the use of anti-parasitic drugs, improved antiinflammatory treatments, and minimally invasive neurosurgical interventions. However, prognosis remains contingent upon the specific location and burden of parasites, with subarachnoid and intraventricular NCC exhibiting heightened rates of morbidity and mortality.[6]

These cases illustrate the intricacies of NCC and emphasize the significance of carefully chosen surgical approaches, along with the crucial role of postoperative pharmacological treatment, for effective treatment and recovery. Ongoing

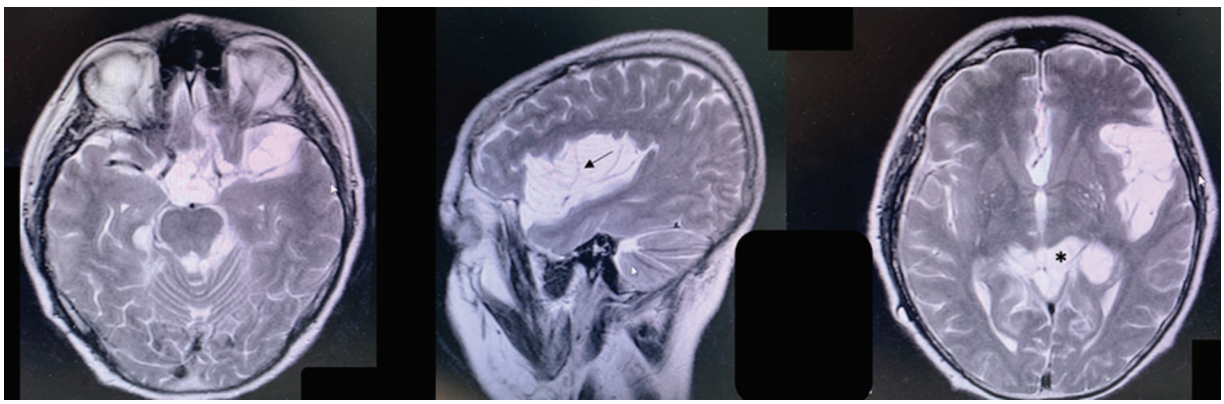

Fig. 2 Axial T2-weighted magnetic resonance imaging (left and right), sagittal (middle), revealing multiple loculated cystic lesions in the territory of the Sylvian fissure (arrow) and in the quadrigeminal cistern (asterisk).

clinical monitoring is imperative to identify and manage potential complications.

Conclusion

The cases of NCC herein presented exemplify the nuanced nature of this parasitic affliction and underscore the importance of personalized surgical approaches guided by the specific characteristics of the lesions. Notably, the multilobulated cysts in both cases exhibited extensions into the posterior incisural space, requiring a meticulous surgical strategy.

The decision to employ a subtemporal approach proved effective in both instances, obviating the need for more intricate procedures involving the pineal region. Success was attributed to the unique property of these cysts, which did not adhere to neurovascular structures. Furthermore, the ease of cyst capsule removal with forceps postdrainage contributed to the overall surgical success.

These cases highlight the significance of a comprehensive understanding of NCC variations and reinforce that the effective treatment of NCC is still evolving. Continued vigilance and research in this domain will further enhance our capabilities in managing the complexities associated with this parasitic neurological condition.

Conflict of Interests
The authors have no conflict of interests to declare.

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