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Cerebral Hydatid Cyst in Children: A Case Report

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Abstract **Case Report**

Cerebral hydatid disease is very rare, representing only 2% of all hydatid locations in the body even in the countries where the disease is endemic. Intracranial hydatid cysts are more common in children and occur more frequently in the supratentorial space. The aim of this paper is to describe the characteristic features of computed tomography [CT] and magnetic resonance imaging [MRI]. We report a case of one pediatric patient of 10 years operated for intracranial hydatid cyst in the neurosurgical department with no history of note, who was admitted to hospital with intracranial hypertension syndrome and right hemiparesis. Computed tomography showed a cystic lesion in the left frontal-parietal lobule.[1],[2].

Keywords: Cerebral hydatid disease, Echinococcus granulosus, Computed tomography, Magnetic resonance imaging, Pediatric neurosurgery, Arana-Iniguez method.

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INTRODUCTION

Hydatid disease is a parasitic infestation caused by Echinococcus granulosus, affecting both children and adults. Its intracranial form is extremely uncommon and can present a diagnostic and therapeutic challenge.

Its definitive host is dogs and other wild canids, and sheep predominate as the intermediate host; humans act as an accidental intermediary. In man, the most frequently affected organs are the liver and the lung, only in 1-2% there is brain involvement.[3] The key paraclinical examination for diagnosis is brain CT, which provides highly suggestive but not definitive diagnostic elements. Hydatid serology is another suggestive factor, although it is rarely positive. Brain MRI can be useful for differentiating hydatid cysts from other cerebral tumor processes. All patients underwent surgical treatment using the forced expulsion technique, which involves introducing hypertonic saline solution around and beneath the cyst, as per the Arana-Iniguez method.[10]

Imaging plays a crucial role in helping surgeons plan interventions. A hydatid cyst typically appears as a solitary, intraparenchymal, supratentorial lesion, well-demarcated, often spherical in shape, with a density similar to that of cerebrospinal fluid. Its wall is thin and does not enhance with contrast agents. Additionally, there is no associated perilesional edema. [11]

CASE REPORT

The patient is a 10-year-old female, with a history of cerebral hydatid cyst operated in October 2023, presents with epileptic seizures affecting the right hemibody.

The computed tomogram [CT] scan, performed with helical acquisition and contrast injection, reveals a left fronto-parietal intra-axial cystic lesion located subcortically. It has a rounded shape with well-defined and regular borders and a thin wall partially calcified in places. The lesion enhances after contrast injection and contains multiple contiguous vesicular formations.

The lesion exerts a mass effect on the frontal horn of the ipsilateral lateral ventricle and displaces the midline by 6 mm.

There is a lesion with similar characteristics in the form of "finger-like" projections surrounding it, but no evidence of herniation. Additionally, the CT identifies a few adjacent cystic formations, at least four, with similar topographic dispositions, some of which contain calcifications.

The CT also shows the presence of a perilesional edema causing a mild mass effect. The skull base structures are free of abnormalities, and no

anomalies are observed in the posterior cranial fossa. A left fronto-parietal operative flap is also noted.

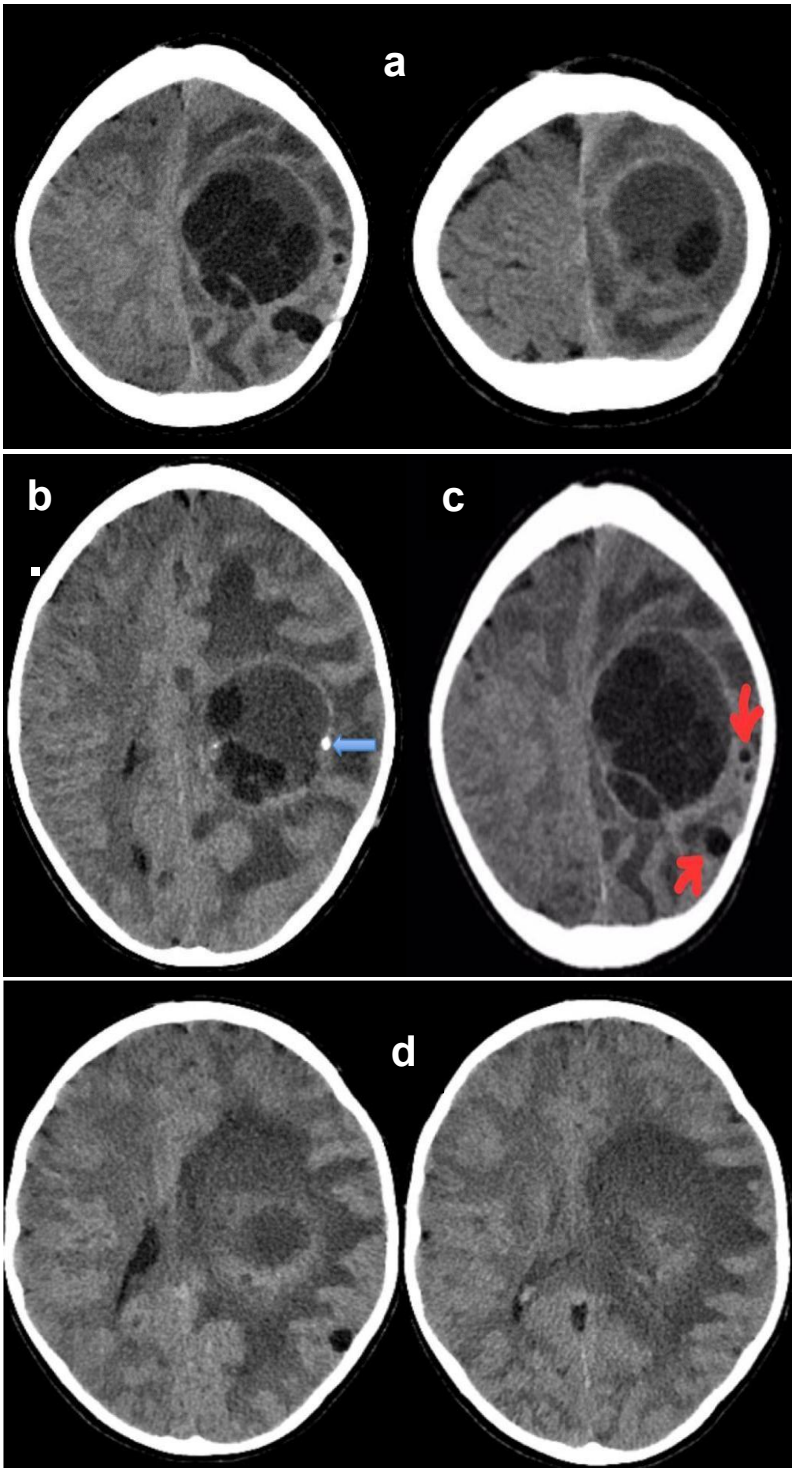


Figure 1: a. Left fronto-parietal cystic lesion, well-defined, with regular contours and a thin wall, enhancing after contrast injection, containing multiple vesicular formations within. b. Hydatid cyst with partially calcified walls. c. Several cystic formations adjacent to the cyst with similar characteristics. d. Perilesional finger-like edema

DISCUSSION

In Morocco, transmission of Echinococcus granulosus occurs mainly between dogs, sheep and humans. When humans ingest the eggs of the parasite, they hatch and release the oncosphere, which is a larval form of the cestode. This larva crosses the intestinal wall and enters the blood vessels, reaching different organs or tissues where the hydatid cyst forms.[9]

The most frequently affected organs are the liver [in 59-75% of cases] and the lung [843%], while brain involvement is rare [1-2%], this rarity can be attributed to the presence of two filters, the liver and the lungs, which prevent the parasite.[3,4,9]

In cases of cerebral hydatidosis, the most common locations are typically supratentorial and subcortical, particularly in the territory of the middle cerebral artery in the parietal lobe [90-95%] with rare cases of intraventricular and posterior fossa locations have been reported.

It has been observed that brain cysts tend to grow at a faster rate than liver cysts, approximately in a ratio of 3:1, which is due to the fact that the brain is a more compressible organ and it occurs mostly in the pediatric population [50-75%], where it usually presents with single and unilocular cysts. However, in some adults, multilobulated lesions with multifocal dissemination can be observed, which is attributed to the formation of fistulas due to spontaneous or iatrogenic ruptures, resulting in secondary cysts.[3,4]

The diagnosis of human hydatidosis is based on clinical and epidemiological criteria, imaging techniques and microbiological studies. Although it is a disease with worldwide distribution, there are endemic areas, such as Central Asia, North and East Africa, Australia, South America and the European Mediterranean basin, where it is crucial to maintain a high level of suspicion in patients from these regions.[8]

In the imaging study for cerebral hydatid disease, the main techniques used are CT and magnetic resonance imaging [MRI]. It has been observed that both CT and MRI adequately demonstrate cerebral hydatid cysts. Although a conventional x-ray can also be performed, it only detects calcified cysts, which occur in approximately 1% of cases.

Cerebral CT remains the imaging modality of choice to initially diagnose cerebral hydatid cysts. It helps determine the location, number, volume, and content of the cyst. In most cases, the CT appearance is typical: a well-defined, spherical or oval cystic formation, often large, with a thin wall and cerebrospinal fluid density, located within the cerebral parenchyma. It exerts a mass effect on the midline structures and lateral ventricles, without perilesional edema or enhancement after contrast injection. The presence of a floating membrane is pathognomonic, and calcifications are extremely rare, occurring in less than 1% of cases. [4,5,13]

Cerebral MRI may be indispensable in cases of altered or complicated cysts, as it helps to eliminate differential diagnoses and reveals details that cannot be seen on CT. On Magnetic resonance imaging [MRI] is increasingly used and shows a hypointensity on T1 and a hyperintensity on T2. It is better at detecting multiple cerebral hydatid cysts and provides a clearer definition of the relationship between the lesion and adjacent structures, which aids in surgical planning. Additionally, perilesional edema is more clearly visible on MRI. However, computed tomography [CT] is superior in detecting calcifications. [13]

The differential diagnosis challenges primarily arise when the cyst undergoes modifications and can be confused with other similar lesions, such as porencephalic and arachnoid cysts, tumors, and other infectious cysts [such as abscesses and neurocysticercosis]. Porencephalic and arachnoid cysts are usually not spherical and are not completely surrounded by brain tissue. Tumor cysts show contrast-enhancing tissue on images and wall thickening. In other infectious cysts, such as bacterial abscesses caused by bacteria such as Streptococcus pyogenes, it is common to observe cerebral edema and satellite lesions. [6,7] [11]

The World Health Organization [WHO] has established a classification for hydatid cysts based on their activity, which facilitates the choice of the therapeutic strategy and appropriate follow-up.

CONCLUSION

Intracranial hydatid disease should be suspected in case of intracranial hypertension in children and adolescents from endemic countries. The diagnosis is confirmed by head CT. Treatment is mainly surgical and prognosis is favorable. Prevention is the most effective way of addressing this disease and we therefore stress the importance of investing in population education and animal control. [1]

Conflict of interest: None

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