A rare entity of primary hydatid cyst located between the two laiers of the intracranial dura in a child: a case report

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ABSTRACT

Background: Hydatid disease is a parasitic infection caused by the tapeworm *Echinococcus granulosus*. Intracranial hydatid cysts are rare and account for less than 3% of all cases of hydatid disease. Typically, these cysts are found in the intracerebral spaces. However, this study presents an extremely rare intradural hydatid cyst.

Case Presentation: This study presents the case of an 8-year-old boy presented with a 3-month history of headache and vomiting without any neurological deficit. Full radiological investigations were performed, and only brain magnetic resonance imaging showed a large cerebral hydatid cyst located within the dura layers between the periosteal and the endosteal layers. Surgery was performed without cyst rupture, confirming the intracerebral intradural location.

Conclusion: Early diagnosis and treatment for intracranial hydatid cysts are crucial to prevent complications such as neurological deficits, seizures, and even death. In this case, the intracerebral intradural location of the cyst is extremely rare.

Keywords: Intracranial, intradural, hydatid cysts, *Echinococcus*.

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Background

Hydatid disease is a parasitic infection caused by the larval cysts of the tapeworm *Echinococcus granulosus*, which can form in various human tissues. The disease is acquired through the fecal-oral route, with humans being an incidental intermediate host. Central nervous system involvement in hydatid disease is rare, with 2%-3% of cases showing such involvement [1]. The disease can manifest as intracerebral and is more common in certain parts of the world, such as South America, Australia, the Middle East, and parts of North Africa [2].

In the northeast of Syria, hydatid cysts are relatively common, but most of these are found in the chest, liver, and abdomen. While hydatid disease has been eradicated in some countries, it remains a serious health problem in certain parts of the world, particularly in areas where livestock is raised close to humans [3]. Hydatid cysts can cause severe neurological symptoms, such as elevated intracranial pressure signs, seizures, and other neurological deficits, and require timely diagnosis and appropriate surgical management [4,5].

Case Report

We report the case of an 8-year-old male child who presented to the neurology department with complaints of headache and vomiting. Physical examination did not reveal any focal neurological deficits. The patient was referred to neurosurgery and underwent brain magnetic resonance imaging (MRI) (Figure 1). The imaging findings revealed a well-defined supratentorial cyst measuring approximately 4 × 5.5 × 6 cm located in the left occipital region. The cyst was isointense to CSF in all sequences, with faint isointensity in the fluid-attenuated inversion recovery sequence, and was surrounded by a thin hypointense rim in T2* and T2WI. Minimal edema was noted anterior to the cyst, and there was no evidence of abnormal enhancement after contrast injection. However, the 3D thin slices showed meningeal enhancement around the upper margin of the lesion, suggesting that the cyst was located between meningeal layers. The posterior wall of the cyst appeared irregular and was associated with prominent enhancement at adjacent meninges, with irregular erosions of the adjacent occipital bone. The cyst was causing pressure effects on the straight and superior venous sinuses and the splenium of the corpus callosum and left lateral ventricle, and was deviating the midline to the right by approximately 8 mm. Radiological investigations of the chest and abdomen did not reveal any abnormalities.

The patient underwent a craniotomy (Figure 2). While retracting the bone, a thin layer of periosteal layer of the dura

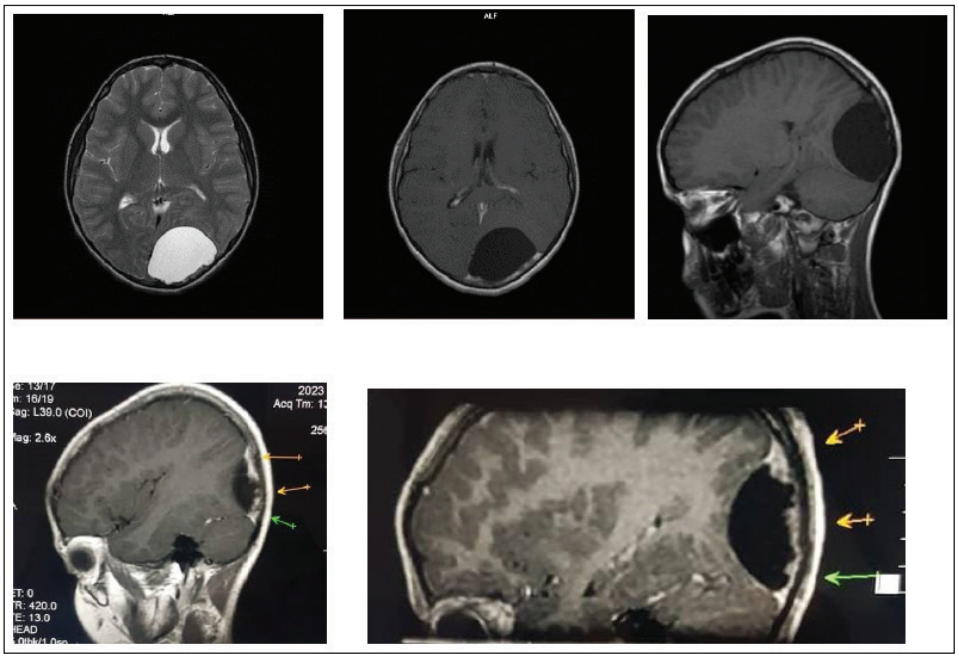

Figure 1. *Brain MRI scan of the hydatid cyst. Meningeal enhancement around the posterior margin of the cyst is seen as suggestive of intradural location, the cyst is not exceeding the mid line as well.*

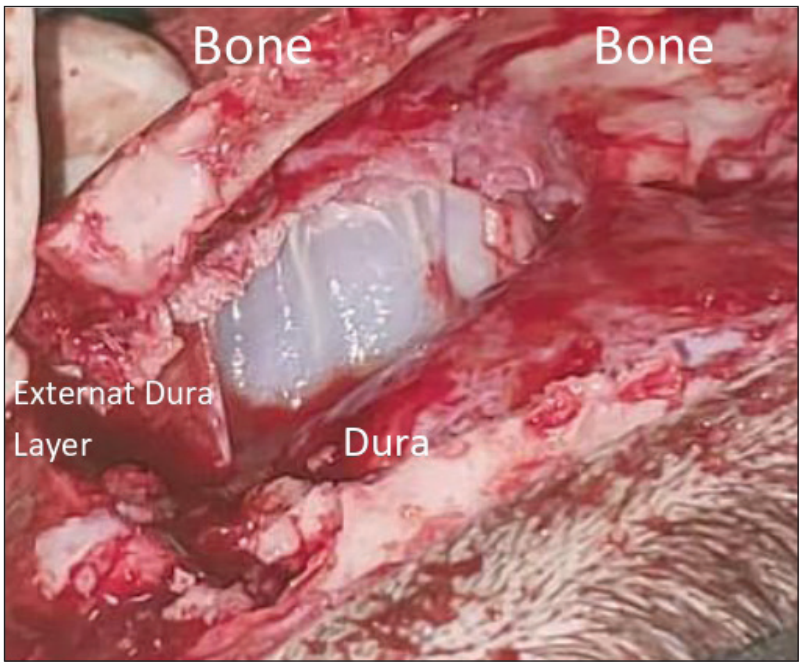

Figure 2. *Intraoperative view of the cyst surrounded by the dura.*

covering a cyst was noticed. The dura was gently retracted, and the cyst was visualized. No rupture was noted, and the cyst was successfully removed, leaving the inner layer of the dura intact. Postoperatively, patients had a completely normal neurological examination, he was referred to internal medicine for medical treatment with albendazole. The follow-up lasted for 3 months without any complications (Figure 3).

Discussion

Hydatid cysts, also known as *E. granulosus*, are parasitic infections that can affect various organs in the body, including the brain. Although less than 3% of hydatid cysts occur in the brain, they are predominantly seen as intracerebral [6]. However, rare cases of primary multiple intracranial extradural hydatid cysts have been reported [7,8]. A location in the extradural space of the posterior fossa was also described [9], and the presence of the primary cyst in the extradural space was seen as associated with other pathologies like nephrotic syndrome [10]. In addition, there have been reports of intracranial intraosseous hydatid cysts [11]. Only a few cases have been reported to occur in the spine, accounting for

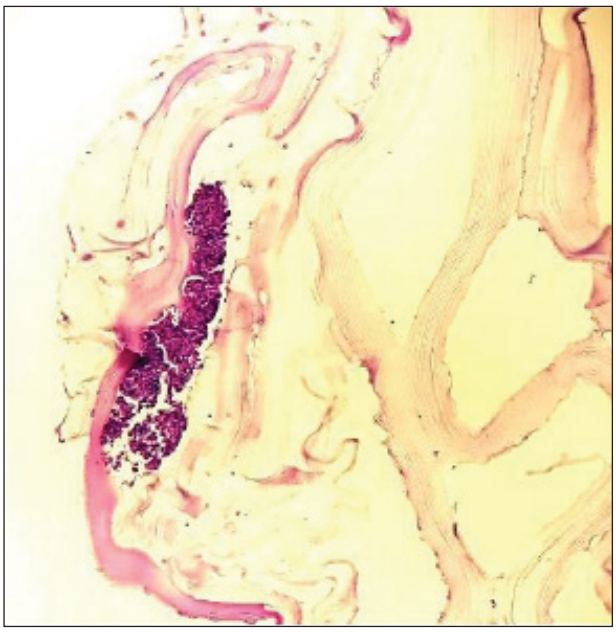

Figure 3. *Hydatid cyst wall (40× magnification), showing cyst wall with three components, outer acellular lamellated membrane, germinal membrane, and attached protoscolices. Increased eosinophils are seen in the image.*

approximately 1% of all hydatid cysts [12,13]. Rupture or infection of the cyst is a serious complication that requires special management [9,10]. Although diagnosing hydatid cysts can be challenging, imaging studies, including computed tomography and MRI, are essential for diagnosis [14,15].

Here, we report a case of an 8-year-old boy from a northeast region of the country known for its endemicity of *E. granulosus*. He developed a hydatid cyst in an unusual location of the brain that was extracerebral intradural, which is an extremely rare occurrence.

Conclusion

Intradural hydatid cysts of the brain are extremely rare but can cause serious neurological complications. Early diagnosis and prompt treatment are essential for a favorable outcome. A high index of suspicion is necessary for patients from endemic areas who present with neurological symptoms. The treatment of choice is complete surgical excision of the cyst, followed by albendazole therapy. Surgeons should be aware of the cyst's superficial location when removing the bone flap to avoid rupturing it. These cysts can be located under the external layer of the dura, which is very fragile.

What is new?

The presented case revolves around an unusual occurrence where a hydatid cyst was found within the dural space, a location rarely reported in medical literature. This finding is of great significance as it sheds light on a less-explored aspect of hydatid cyst localization.

Conflict of interests

The authors declare that they have no conflict of interest regarding the publication of this case report.

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Consent for publication

Written informed consent was obtained from the patient.

Ethical approval

Ethical approval was obtained from the Children's University Hospital in Damascus and the Children's Department of the Faculty of Medicine at Damascus University before conducting this research.

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