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Case Report

A case report of an unusual cerebral hydatid cyst

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ABSTRACT

Background: Intracranial hydatid cyst is an exceedingly uncommon condition. Typically, it manifests as hydatid cysts in the liver, lungs, kidney, and spleen. In this report, we present a rare case of a hydatid cyst located in the brain, exhibiting atypical radiological characteristics, and successfully treated with complete microsurgical excision.

Case Description: A 45-year-old male, a former smoker, presented with a new-onset seizure. Brain imaging revealed a solitary, intra-axial, and cystic lesion with wall enhancement in the right temporal region. The cyst extended into the temporal horn of the right lateral ventricle, surrounded by mild edema. Differential diagnoses included brain metastasis, abscess, and tuberculoma. However, following computed tomography (CT) scans of the chest, abdomen, and pelvis (CAP) and serological tests, the provisional diagnosis included a hydatid cyst. The CT CAP showed diffuse non-specific cystic lesions of variable sizes in the liver and spleen, along with numerous bilateral pulmonary cysts. A right temporal craniotomy was performed, and the cyst was microsurgically excised without rupture. Microscopic and histopathological examination confirmed the presence of a hydatid cyst.

Conclusion: Intracranial hydatid cyst is an extremely rare condition and should always be considered a possible differential diagnosis in cases of cerebral cystic lesions. Hydrodissection is the preferred surgical method for resection; however, in atypical cases such as the one described here, meticulous dissection of the cyst capsule from the brain parenchyma may be successful with minimal risk of intraoperative rupture.

Keywords: Brain hydatid cyst, Case report, Dowling technique, *Echinococcus granulosus*

INTRODUCTION

The incidence of intracranial hydatid disease represents 1–2% of all reported cases of hydatid disease.[10,11] *Echinococcus granulosus*, a cyclophyllid cestode, primarily infects the small intestine of canids like dogs. It develops into an adult tapeworm, releasing eggs in the feces. The eggs are then ingested by intermediate hosts, including mammals like humans, and mature into larvae or oncospheres within the intestinal wall. The larvae penetrate the intestinal wall and enter the bloodstream, eventually reaching organs such as the liver, lungs, and rarely the brain, where they form hydatid cysts.[2-4]

CASE DESCRIPTION

We present the case of a 45-year-old male with an Egyptian background and a history of smoking who was referred from another hospital due to headache, dizziness, and blurred vision. Brain imaging revealed a solitary cystic lesion in the right temporal region, extending into the temporal horn of the right lateral ventricle and surrounded by mild edema [Figures 1 and 2]. The cyst's medial wall was adherent to the right tentorium cerebelli. Differential diagnoses considered included brain metastasis, abscess, and tuberculoma. However, after conducting computed tomography (CT)

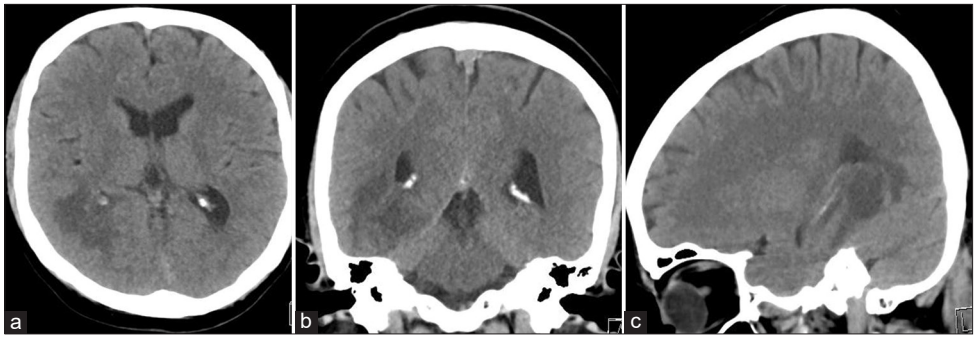

Figure 1: Computed tomography brain (a) axial, (b) coronal, and (c) sagittal cuts showing ill-defined hypodensity in the right posterior temporal region with a moderate amount of surrounding edema, exerting loco-regional sulcal and ventricular effacement.

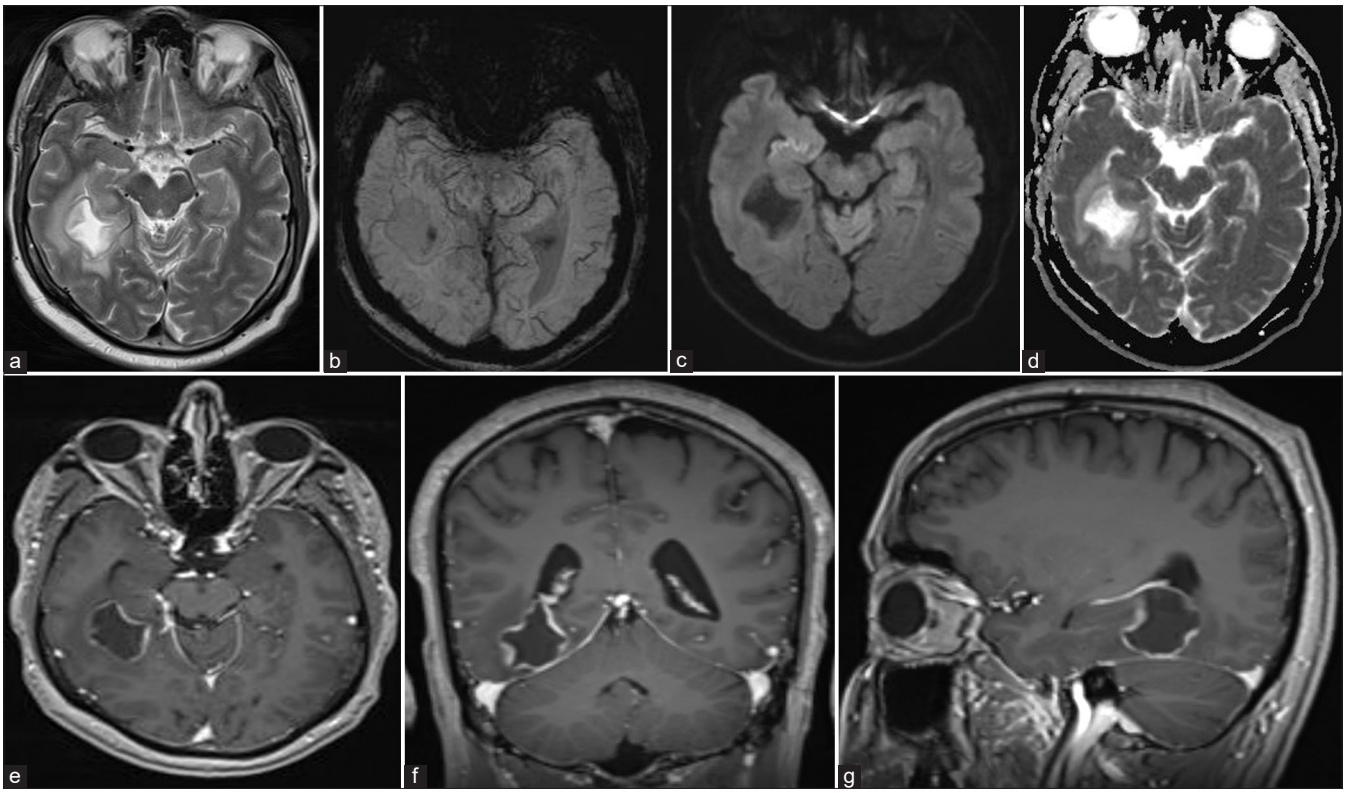

Figure 2: Magnetic resonance imaging brain (a) axial T2, (b) gradient echo, (c) diffusion-weighted imaging, (d) apparent diffusion co-efficient, (e) axial T1 postcontrast, (f) coronal T1 postcontrast, and (g) sagittal T1 postcontrast images showed an intra-axial cystic lesion in the right posterior temporal lobe with enhanced smooth undulating margins and marked surrounding vasogenic edema causing compressive mass effect on the temporal horn of right lateral ventricle, demonstrate high T2/fluid-attenuated inversion recovery, iso on T1 with peripheral wall enhancement, however, no significant restricted diffusion or blooming artifacts, approximately measuring 3.4 × 2.6 cm in anterior-posterior and transverse (AP and Ts) diameters. The rest of the brain parenchyma shows normal signal intensity with preserved gray-white matter differentiation.

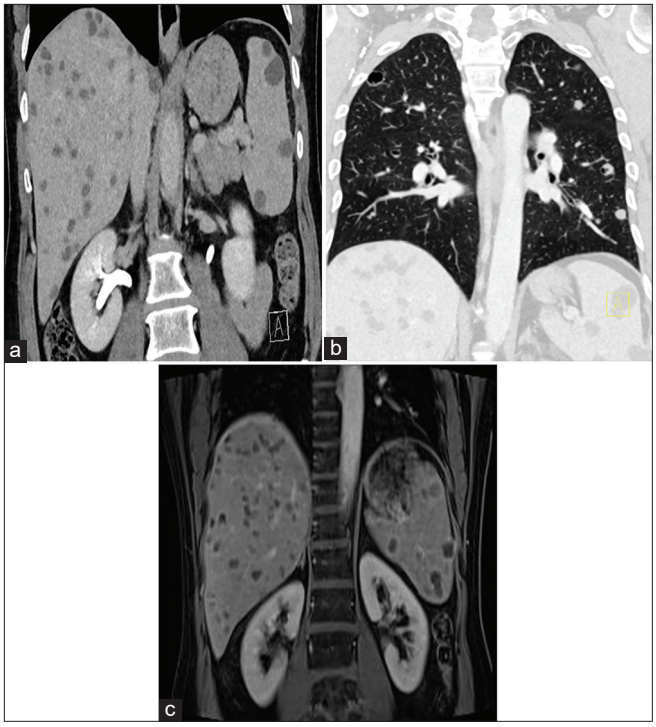

Figure 3: (a) Computed tomography abdomen, (b) chest, and (c) magnetic resonance imaging abdomen showing diffuse non-specific variable sized hepatic/splenic cystic lesions with similar bilateral innumerable pulmonary nodules/cysts, some of them showed definite cavitations.

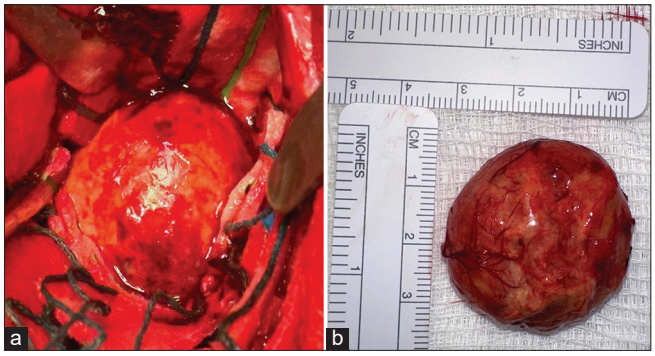

Figure 4: Intraoperative image showing (a) the dissection and (b) the excised cyst over the surgical gauze.

scans of the chest, abdomen, and pelvis, a hydatid cyst was also suspected. The CT scan [Figure 3] showed diffuse non-specific cystic lesions in the liver and spleen, as well as numerous pulmonary nodules/cysts. Microbiology and immunology panels were negative, but the *E. granulosus* antibody titer was elevated, confirming the diagnosis of a brain hydatid cyst. The patient was initiated on albendazole therapy before surgery. A right temporal craniotomy was performed using neuronavigation for localization. The cyst, measuring 3.0 × 3.0 × 1.0 cm, was successfully excised without rupture using microsurgical techniques [Figure 4]. Cyst fluid

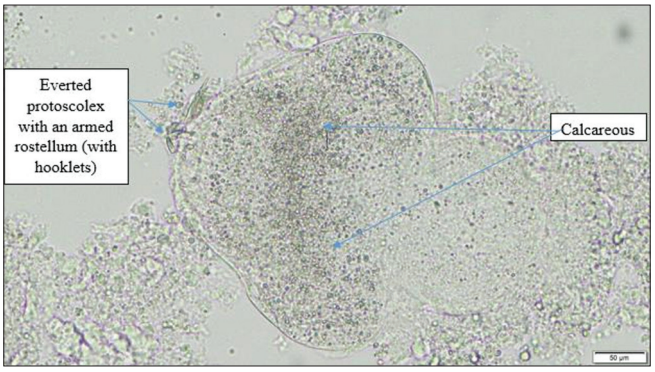

Figure 5: Light microscopy of the cyst fluid (wet mount) demonstrating many protoscolices of *Echinococcus granulosus* with rows of hooks and numerous free detached hooks with refractile structures.

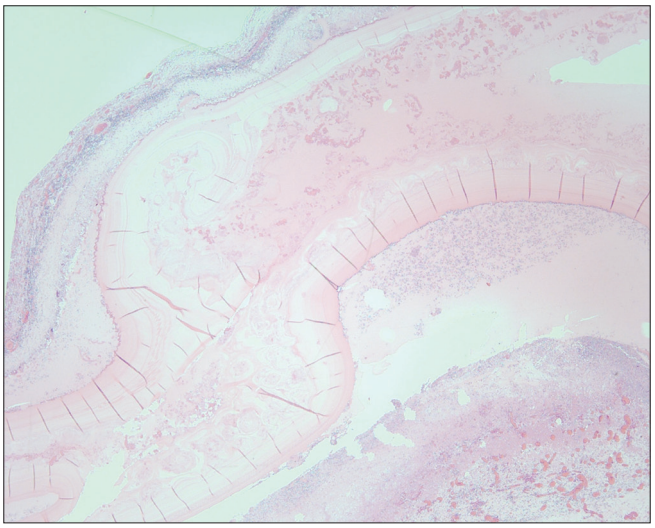

Figure 6: Microscopic examination (hematoxylin and eosin stain ×10) of the cyst shows a laminated acellular wall with a nucleated germinal layer.

was examined microscopically, revealing protoscolices of *E. granulosus* with hooks and refractile structures [Figure 5]. Histopathological examination confirmed the diagnosis of a hydatid cyst [Figure 6]. Postoperatively, the patient showed significant improvement in symptoms, and follow-up imaging confirmed complete resection of the cyst without complications [Figures 7 and 8].

DISCUSSION

Intracranial hydatid cysts can be classified as primary or secondary.[1] Primary cysts result from direct infestation of larvae in the brain, while secondary cysts are usually multiple and occur following the involvement of other organs.[2-10] Cerebral hydatid cysts are commonly found in the middle cerebral artery territory, particularly in the parietal lobe. The radiological presentation typically

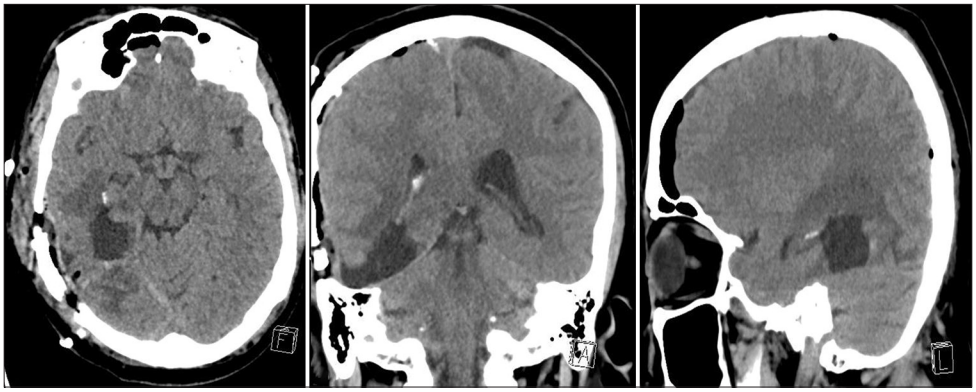

Figure 7: Post right temporoparietal craniotomy and right temporal cystic lesion resection. Apparent complete resection of the lesion with expected post operative pneumocephalus and surgical bed hemorrhagic changes.

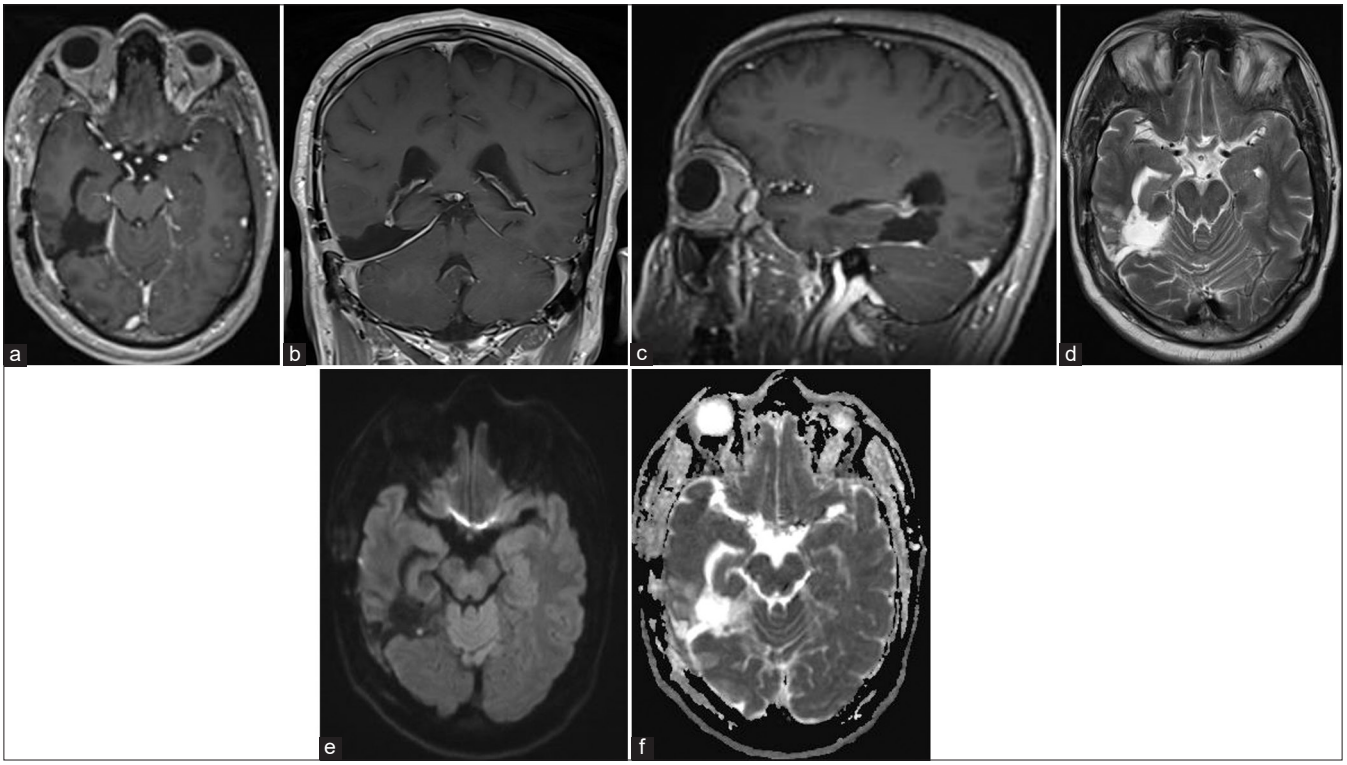

Figure 8: A follow-up magnetic resonance imaging brain done after 3 months (a) axial T1 postcontrast, (b) coronal T1 postcontrast, (c) sagittal T1 postcontrast, (d) axial T2, (e) Diffusion-weighted imaging, and (f) apparent diffusion co-efficient showed complete resection of the lesion with no evidence of recurrence.

includes a well-defined, non-enhancing cystic lesion without peripheral edema. However, our case exhibited atypical features, such as cystic wall enhancement and surrounding edema, likely due to a ruptured hydatid cyst triggering an inflammatory reaction.[4]

Magnetic resonance (MR) and CT scans of the brain characteristically show a spherical, well-defined, and non-enhancing cystic lesion without peripheral edema.[5-12] The fluid density is generally equal to that of cerebrospinal fluid on both CT and MR scans. MR spectroscopy studies show pyruvate peaks besides lactate, alanine, and acetate.[9]

Surprisingly, the radiological finding of our case was atypical; it showed cystic wall enhancement and perilesional edema, which is unusual for a brain hydatid cyst. Moreover, it was reported as a ruptured hydatid cyst leading to an inflammatory reaction of the surrounding brain tissue, causing edema.

Surgical excision without rupture is the preferred treatment approach to prevent recurrence and anaphylactic reactions. The Dowling-Orlando technique is frequently employed for this purpose. Nevertheless, in our particular case, we carefully separated the cyst capsule from the brain parenchyma through precise dissection. This was necessary because the cyst was situated deep within the brain, extending into the lateral ventricle, and its capsule was thick, opaque, and firmly attached to the surrounding brain tissue. Medical treatment with albendazole and praziquantel can be considered, particularly in recurrent cases or when rupture occurs during surgery.[2,10]

CONCLUSION

Neurosurgeons have to bear in mind hydatid cysts when evaluating cystic lesions in the brain. In atypical cases, surgical techniques may vary, and careful dissection of the cyst capsule from the brain parenchyma can be successful with minimal risk of intraoperative rupture.

Ethical approval

The Institutional Review Board approval is not required.

Declaration of patient consent

Patient's consent was not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Altas M, Serarslan Y, Davran R, Evirgen O, Aras M, Yilmaz N. The Dowling-Orlando technique in a giant primary cerebral hydatid cyst: A case report. Neurol Neurochir Pol 2010;44:304-7.
2. Arana Iniguez R. *Echinococcus*. Infection of the nervous system. In: Vinken PJ, Bruyn GW, editors. Hand book of clinical neurology, part III. Amsterdam: Elsevier/North Holland Biomedical Press; 1978. p. 175-208.
3. Binesh F, Mehrabanian M, Navabii H. Primary brain hydatosis. BMJ Case Rep 2011;2011:bcr0620103099.
4. Bükte Y, Kemaloglu S, Nazaroglu H, Ozkan U, Ceviz A, Simsek M. Cerebral hydatid disease: CT and MR imaging findings. Swiss Med Wkly 2004;134:459-67.
5. Coates R, von Sinner W, Rahm B. MR imaging of an intracerebral hydatid cyst. AJNR Am J Neuroradiol 1990;11:1249-50.
6. Erashin Y, Muthuer S, Guzelbag E. Intracranial hydatid cysts in children. Neurosurgery 1993;33:219-25.
7. Gök H, Başkurt O. Giant primary intracranial hydatid cyst in child with hemiparesis. World Neurosurg 2019;129:404-6.
8. Karak PK, Mittal M, Bhatia S, Mukhopadhyay S, Berry M. Isolated cerebral hydatid cyst with pathognomonic CT sign. Neuroradiology 1992;34:9-10.
9. Kohli A, Gupta RK, Poptani H, Roy R. *In vivo* proton magnetic resonance spectroscopy in a case of intracranial hydatid cyst. Neurology 1995;45:562-4.
10. Nurchi G, Floris F, Montaldo C, Mastio F, Peltz T, Coraddu M. Multiple cerebral hydatid disease: Case report with magnetic resonance imaging study. Neurosurgery 1992;30:436-8.
11. Singounas EG, Leventis AS, Sakas DE, Hadley DM, Lampadarios DA, Karvounis PC. Successful treatment of intracerebral hydatid cysts with albendazole: Case report and review of the literature. Neurosurgery 1992;31:571-4.
12. Todorov T, Vutova K, Petkov D, Balkanski G. Albendazole treatment of multiple cerebral hydatid cysts: Case report. Trans R Soc Trop Med Hyg 1988;82:150-2.

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