Case Report

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Temporoparietooccipital Brain Hydatid Cyst in a Four-Year-Old Child: A Rare Case Report

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Running Title Large Brain Hydatid Cyst in a Four-Year-Old Child

ABSTRACT

The larval stages of Echinococcus granulosus cause hydatidosis or hydatid disease, which primarily affects children worldwide. It primarily impacts the lungs and liver, but brain hydatidosis is an infrequent condition in the pediatric population. This condition presents with non-specific signs and symptoms. Intracranial hydatid cysts can be diagnosed through brain magnetic resonance imaging (MRI) and histopathological examination of the specimen.

In this report, we describe a case of a 4-year-old boy diagnosed with a temporoparietooccipital brain hydatid cyst. The MRI revealed a thin-walled cystic lesion in the left temporoparietooccipital lobe. It showed a significant mass effect and midline shift, with no abnormal wall or solid enhancement and no surrounding edema. Based on these imaging findings, a diagnosis of a brain hydatid cyst was made. The patient underwent surgery, during which the cyst was removed entirely without rupture. Histopathological examination confirmed the diagnosis of a brain hydatid cyst. The patient had a smooth postoperative recovery, began treatment with albendazole, and was discharged in improved health.

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Introduction

The larval stages of Echinococcus granulosus cause hydatidosis or hydatid disease, which primarily affects children worldwide. The infection is acquired through contaminated food containing tapeworm eggs. Oncospheres are released from Echinococcus eggs in the intestine and enter the portal circulation. As a result, the liver is most commonly affected, followed by the lungs. Other organs, such as bones, the genitourinary system, the bowel, and even subcutaneous tissues, may also be infected.

Intracranial hydatid disease is extremely rare, accounting for 1–2% of all cystic echinococcosis [1]. Most cerebral hydatid cysts are located in

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supratentorial structures within the vascular territory of the middle cerebral artery [2]. The most common symptom of cranial hydatid cysts is headache, while clinical signs include focal neurological deficits, increased intracranial pressure, hydrocephalus, papilledema, loss of vision, altered mental status, and, rarely, seizures [3].

The best treatment for brain hydatid cysts is surgery, with the primary goal being total extirpation of the cyst without rupturing the cyst wall [4].

In this report, we present a 4-year-old child with a brain hydatid cyst in the left temporoparietooccipital lobe, successfully treated via left temporoparietal craniotomy.

Case Presentation

A 4-year-old Iranian male child presented to Mofid Children's Hospital in Tehran with a 1-month history of progressive headache and projectile, non-bilious vomiting several times a day. He had also experienced movement disorders for 2 weeks before admission. Physical examination revealed an ataxic gait. Otherwise, it showed intact cranial nerves and no sensory deficits.

Brain magnetic resonance imaging (MRI) showed a cystic signal intensity similar to cerebrospinal fluid (CSF) without ring enhancement. The axial T1-weighted brain MRI revealed a well-defined hypointense lesion in the left temporoparietooccipital lobe with a significant mass effect and a midline shift of 4 mm [Figure 1]. Coronal T1-weighted and T2-weighted brain images showed a well-defined T1 hypointense and T2 hyperintense lesion with no sign of perilesional edema [Figure 2].

Based on the presentation and brain MRI findings, the diagnosis of a giant intracranial hydatid cyst was made. To evaluate other parts of the body, he underwent a chest X-ray and an abdominal ultrasound.

Abdominal ultrasound showed multiple small cystic lesions scattered in both liver lobes, with a

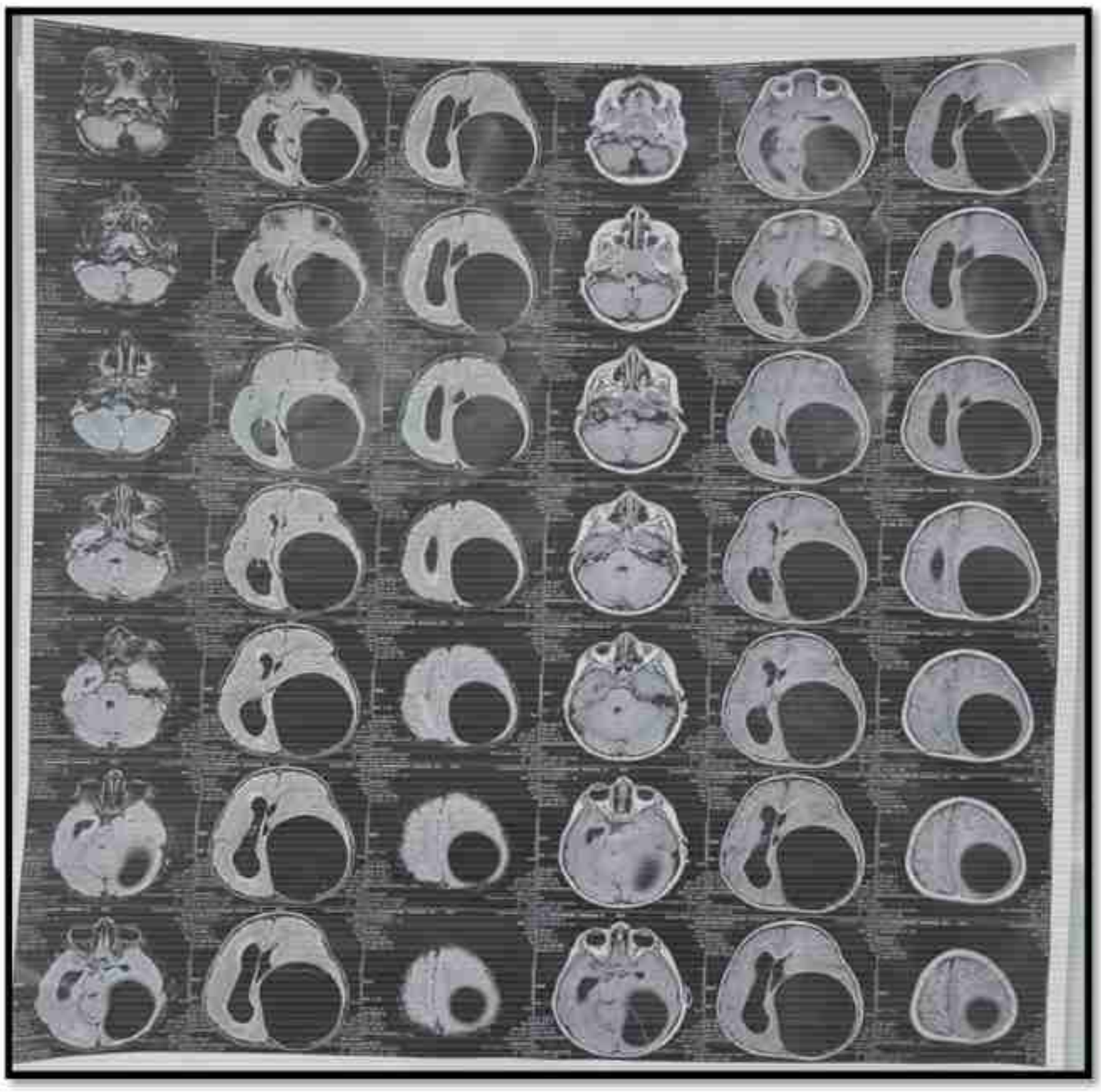

Fig. 1. Axial T1-weighted brain MRI demonstrating a well-defined hypointense lesion in the left tem poroparietooccipital lobe with significant mass effect and midline shift.

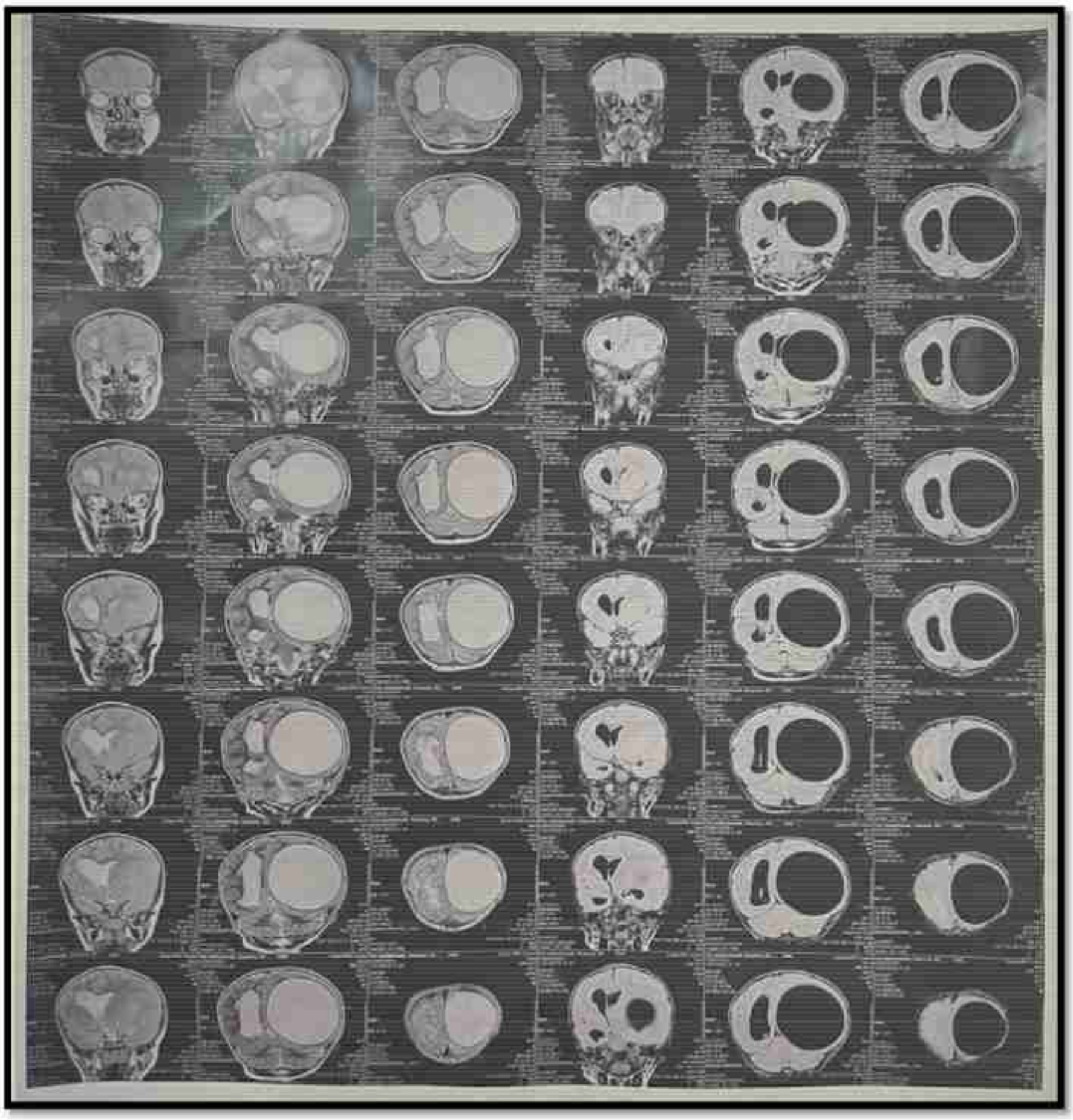

Fig. 2. Coronal T1-weighted and T2-weighted images of the brain showing a well-defined T1 hypointense and T2 hyperintense lesion with no sign of perilesional edema in the left temporo-parieto-occipital lobe with significant mass effect and midline shift.

maximum diameter of 15 mm, and a large 75 × 50 mm supradiaphragmatic cyst above the liver in the lower lateral aspect of the right hemithorax, with some internal debris. The radiologist suggested that the mentioned findings, along with the patient's history, were indicative of a hydatid cyst and recommended further evaluation with a chest X-ray.

Chest X-ray showed a well-defined round opacification in the lower zone of the right lung, which was compatible with ultrasound findings. A cystic lesion with an air-fluid level in the middle zone of the right lung was also seen [Figure 3].

The patient was diagnosed with a brain hydatid cyst and underwent surgery. A left temporoparietal craniotomy was carried out, and a huge cyst, measuring 20 × 17 × 15 cm, was removed with an intact capsule, with maximum care taken to avoid rupture and spillage [Figure 4]. The cyst was excised, totally intact.

We sent the excised cyst for histopathological examination. The gross section showed a 20 × 17 × 15 cm whitish cystectomy specimen with a smooth outer surface. On the cut section, it was found to be a unilocular cyst filled with clear fluid and a rough inner surface. Microscopically, the histological sections showed a laminated acellular cyst wall with a nucleated germinal layer. No protoscolices were seen. It confirmed the diagnosis of a brain hydatid cyst.

Postoperatively, the patient was stable. Albendazole (15 mg/kg, twice a day) and praziquantel (40 mg/kg, twice a week) were initiated and continued for 4 weeks. The patient showed significant improvement, with resolution of his symptoms.

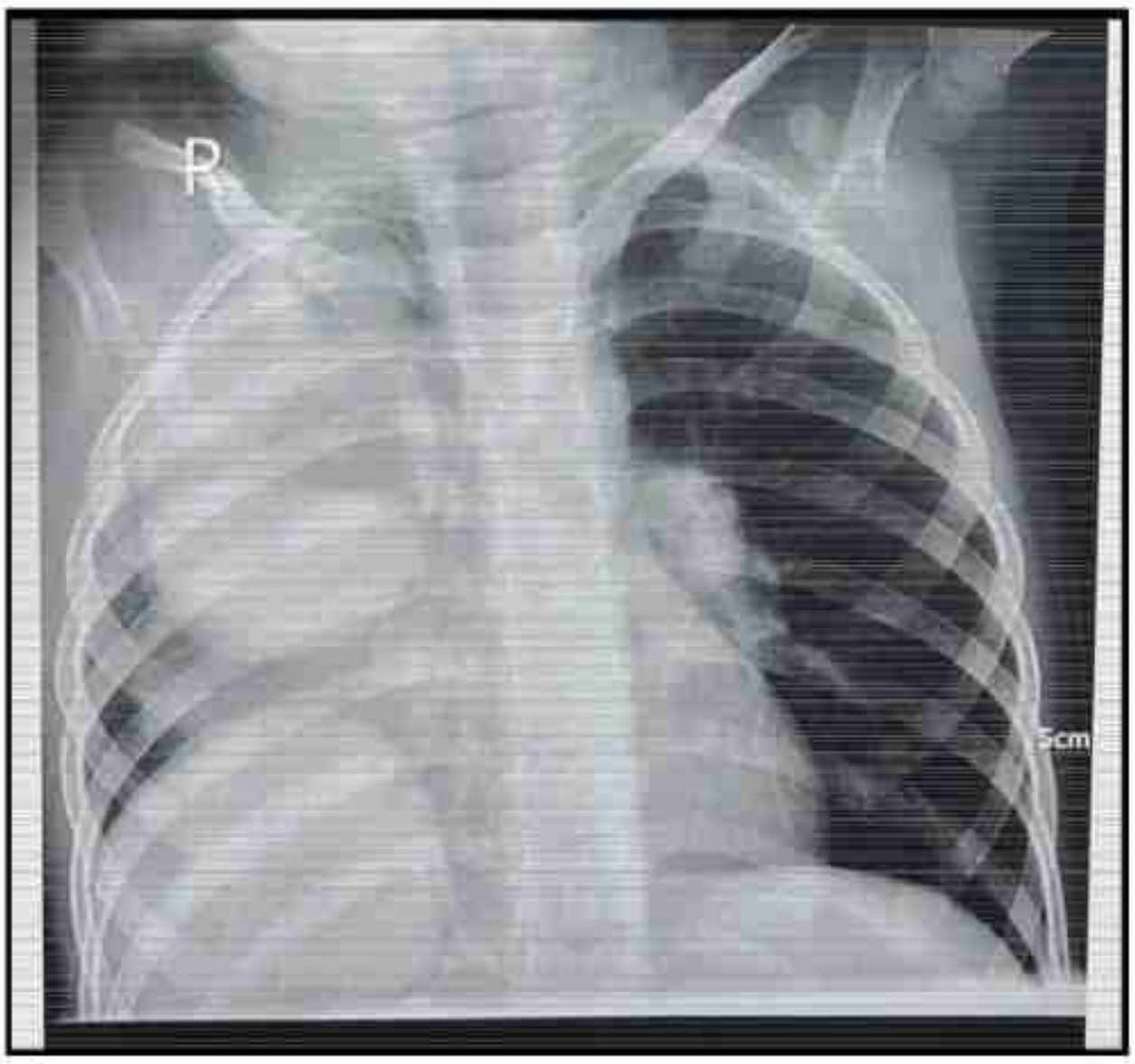

Fig. 3. Chest X-ray showing a well-defined round opacification located in the lower zone and a cystic lesion with an air-fluid level in the middle zone of the right lung.

Fig. 4. The removed giant intracranial hydatid cyst during the operation

Discussion

Intracranial hydatid cysts are rare mass lesions that occur mostly in children and male patients. Symptoms vary depending on size and location. Common symptoms include headache, vomiting, body weakness, abnormal body movements, behavioral alterations, and skull deformity [1–3].

Many differential diagnoses can be made for intracranial cysts, ranging from cystic and necrotic neoplasms, abscesses, and tumor-associated non-neoplastic cysts to non-neoplastic cysts, depending on the patient's past medical history and clinical presentation.

The most common location is the parietal lobe, around the middle cerebral artery. Sometimes, large single

Table 1. previous case reports of brain hydatid cyst

Author	Patient Profile		Presentations			Cyst Characteristics				Treatment		Outcome
	Sex	Age	Symptoms	Signs	Duration	Location	Size	Description	Systemic Spread	Craniotomy	Medical	
2025 – Redhu and Kallianpur [9]	F	10y	Headache	Vomiting	N/A	Right lateral ventricle Right temporal & sub-temporal Extradural	N/A	Initially extradural with subsequent dural breach and, parenchymal and intraventricular spread	None	Temporal	N/A	CT-confirmed complete excision
2025 – Jangir et al. [10]	F	12y	Headaches	Seizures	4 years	Parieto-occipital	47	Well-defined multiloculated solid cystic, preoperatively diagnosed as a malignant lesion	None	Temporal	N/A	N/A
2023 – Thakar and Sunil [11]	M	14y	Headache	Vomiting Papilledema	1 month	Temporoparietal	60 ×62 ×58	N/A	None	Performed	Albendazole, 3-month course post-discharge	Symptom-free at two weeks
2022 – Pulavarty et al. [12]	F	16y	Headache	Seizures	1 year	Frontotemporal	50 ×49 ×48	A large cyst containing several daughter cysts Midline shift of 9mm	None	Frontotemporal	Albendazole, 10mg/kg twice daily for 3 cycles of 14 days with 1 week intervals	Cyst rupture during hydro-dissection Asymptomatic & no evidence of recurrence at six months
2022 – Ashraf et al. [13]	M	10y	Headache	Vomiting Vertigo Unilateral weakness Papilledema	N/A	Frontotemporoparietal		Mass effect with midline shift	N/A	Frontotemporoparietal	Albendazole, 10mg/kg twice daily for 1 month	Lesion-free at three months
2019 – Kandemirli et al. [14]	M	6y	Headache	Unilateral weakness Vomiting Anisocoria Unilateral ptosis Facial paralysis	2 months	Frontal	96 ×76 ×69	Midline shift of 25mm	None	Frontal	Preoperatively: mannitol, corticosteroids, anticonvulsives Postoperatively: albendazole, 7.5mg/kg for 30 days	SIADH 7 days postoperatively Asymptomatic at five months
2019 – Gok and Baskurt [15]	F	10y	Headache	Unilateral weakness Facial paralysis	N/A	Temporoparietal	80 ×75 ×70	N/A	None	Performed	Albendazole, initiated preoperatively for six months	Asymptomatic at ten days

Continued Table 1. previous case reports of brain hydatid cyst

Author	Patient Profile		Presentations		Cyst Characteristics					Treatment		Outcome
	Sex	Age	Symptoms	Signs	Duration	Location	Size	Description	Systemic Spread	Craniotomy	Medical	
2018 – Tanki et al. [16]	5 M 4 F	11.5y	3 headache, nausea	7 seizure 4 hemiparesis 3 vomiting	1 month to 2 years	7 parietal 2 frontal	N/A	7 single lesion 2 multiple lesions	None	Performed	Albendazole, 10mg/kg for two months postoperatively	Recurrence in two patients within one year Good recovery in other patient at a mean follow-up of three years
2018 – Regaieg et al. [17]	M	5y	Headache	Decreased visual acuity Altered mental status Seizure Unilateral hemiparesis Bilateral papilledema	2 months	Frontotemporal	N/A	Mass effect with cingulate herniation	None	Performed	Albendazole, for six weeks	Asymptomatic at three months
2018 – Randev et al. [18]	M	4.5y	None	Seizures	1 day	Temporal	50	Cystic lesion causing mass effect	Liver involvement	Performed	Albendazole, for one week	Complete surgical extirpation of the cyst and uneventful one week postoperatively
2017 – Nie et al. [19]	F	6y	None	Vision loss Unilateral strabismus	3 months	Temporoparietooccipital	70 ×65 ×60	Mass effect with midline shift	N/A	Performed	Anthelminthic therapy	N/A
2016 – Taslakian and Darwish [20]	M	12y	Headache Blurred vision	Vomiting	6 months	Parietal		Strongly adherent to dura	None	Parietal	Albendazole	Asymptomatic at three months
2016 – Tzili et al. [21]	M	12y	N/A	Unilateral upper eyelid swelling Reduced visual acuity Papilledema Hemiparesis Frontal lobe syndrome	10 days	Multiple frontotemporoparietal	N/A	Multiple cystic lesions with mass effect and midline shift	Palpebral cyst	Performed	Albendazole, 10mg/kg daily for six months	Palpebral surgery not feasible due to anesthetic difficulties Regression of the palpebral cyst, regression of paresis at two months

Continued Table 1. previous case reports of brain hydatid cyst

Author	Patient Profile		Presentations			Cyst Characteristics				Treatment		Outcome
	Sex	Age	Symptoms	Signs	Duration	Location	Size	Description	Systemic Spread	Craniotomy	Medical	
2015 – Ijaz et al. [22]	M	8y	N/A	Seizures Hemiparesis	2 years	Left cerebrum	100 ×80	Mass effect with midline shift, collapse of the ipsilateral ventricle, and dilation of the contralateral ventricle	Liver involvement	Performed	Albendazole, stated ten days preoperatively for six months	N/A
2015 – Basarslan et al. [23]	F	14y	Headache	Unilateral papilledema	N/A	Left cerebrum	N/A	Three cystic lesions from the left frontal region to the occipital lobe	N/A	Frontotemporoparietal	Albendazole	N/A

Inclusion criteria: case reports or series describing patients with cerebral parenchymal hydatid cyst, English language, Feb 2015 to Apr 2025. Exclusion criteria: solely intraventricular or extradural hydatid cyst. SIADH: syndrome of inappropriate anti-diuretic hormone secretion.

cysts can be observed in the frontoparietotemporal region. The less common sites of involvement are the cerebellum, pons, ventricles, and cavernous sinus. The most critical complication of a brain hydatid cyst is cyst rupture into the subarachnoid space, which leads to widespread dissemination followed by a severe inflammatory or anaphylactic response [4].

Our case report showed a rare presentation in a 4-year-old Iranian male child with a well-defined T1-weighted hypointense lesion in the left temporoparietooccipital lobe. Brain hydatidosis should be considered as a differential diagnosis in cystic cerebral mass lesions in the pediatric age group. He underwent a left temporoparietal craniotomy, and the cyst was entirely removed without rupture. Histopathological examination showed a laminated acellular cyst wall with a nucleated germinal layer. Postoperatively, he had no complications and was discharged home with albendazole and praziquantel therapy.

Imaging methods such as brain CT scans and MRIs play an important role in the diagnosis of brain hydatidosis. These modalities provide valuable insights into the nature and location of the lesion, aiding in accurate diagnosis and treatment planning. They show a well-defined, spherical, homogeneous cystic lesion with a thin wall and smooth margins, and imaging characteristics of the cystic component are similar to those of CSF. CT detects calcification in the lesion better than MRI, whereas MRI is superior for assessing the lesion's exact location and anatomic relationships. On MRI, the cyst wall usually has low signal intensity in T1-weighted images and high signal intensity in T2-weighted images. These modalities help surgeons localize the cyst. Finally, the diagnosis is confirmed by histopathological examination of the specimen [5].

Therapeutic options include surgical excision and chemotherapy with an anthelmintic agent (albendazole). Conservative treatments are also useful in cases of inactive cysts. Surgery is the primary treatment for intracranial hydatid cysts. The cyst should be excised carefully without rupture to prevent recurrence and an anaphylactic reaction. Postoperatively, albendazole therapy is recommended for 1–3 months [6].

Other studies do not support medical treatments such as albendazole and mebendazole for brain hydatid cysts. Some previous studies have raised concerns about the ability of these drugs to cross the blood-brain barrier and penetrate the cyst capsule. Moreover, albendazole has been reported as ineffective in cases of large cerebral hydatid cysts [7].

Table 1 provides a summary of previous case reports, detailing the characteristics of the cyst, the treatments administered, and the final outcomes [9–23].

Supratentorial cystic lesions such as arachnoid cysts, cystic tumors, abscesses, and porencephalic cysts can be considered differential diagnoses. Arachnoid cysts are not spherical, porencephalic cysts are usually connected to the ventricular system, and neither are surrounded by brain tissue. Cystic tumors usually have solid components that enhance after contrast injection, and abscesses typically demonstrate rim enhancement and surrounding white matter edema [7,8].

Conclusion

In conclusion, intracranial hydatid cysts, especially those located in the supratentorial region, are a rare condition, and neurosurgeons should consider them a differential diagnosis for cystic cerebral lesions, especially in young male patients who have contact with farm dogs and cattle or live in an endemic area. The diagnosis should be made early using different modalities to avoid acute life-threatening complications or long-term sequelae. Also, neurosurgical excision without rupturing the cyst is the best way to treat this significant issue.

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The author has nothing to report.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this article.

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Conflict of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethics Statement

This case report was carried out in compliance with the principles stated in the Declaration of Helsinki.

Patient consent

Written informed consent was obtained from the patient's parents for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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