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Fourth ventricular cerebral sparganosis mimicking ependymoma with obstructive hydrocephalus: a case report

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Case Report

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Abstract

Background

Cerebral sparganosis is a rare parasitic infection of the central nervous system that usually involves the cerebral parenchyma and may show migratory or tunnel-like imaging features. Direct ventricular involvement is uncommon, and a fourth ventricular mass-forming presentation can closely resemble an intraventricular neoplasm.

Case presentation:

A 48-year-old man from Yunnan Province, China, presented with more than 5 months of dizziness and headache and two syncopal episodes. Magnetic resonance imaging showed a 2.9 × 2.1 × 3.7 cm rounded lesion centered in the fourth ventricle with focal nodular enhancement and mild supratentorial hydrocephalus. Peripheral eosinophil counts were normal. Ependymoma was considered the leading preoperative diagnosis. Microsurgical resection through a midline suboccipital approach revealed a cystic lesion containing a yellowish nodular cord-like structure. Histopathological examination demonstrated parasitic tegument-like and parenchymal structures with surrounding inflammatory-cell infiltration, consistent with sparganosis. Postoperatively, the patient received praziquantel and supportive therapy. Headache and dizziness resolved, and no recurrence was identified during 5 months of follow-up.

Conclusions

Fourth ventricular cerebral sparganosis may lack classic parenchymal imaging features and mimic ependymoma. In patients from endemic regions or with relevant exposure, sparganosis should remain in the differential diagnosis of atypical fourth ventricular cystic or nodular enhancing lesions even when peripheral eosinophilia is absent. Intraoperative recognition and histopathological examination can be decisive when preoperative testing is inconclusive.

Background

Cerebral sparganosis is an uncommon central nervous system infection caused by the plerocercoid larval stage of Spirometra species. Human infection is acquired mainly by ingesting untreated water containing infected copepods, consuming raw or undercooked second intermediate or paratenic hosts such as frogs or snakes, or applying raw infected flesh to wounds or mucosa [1, 2]. Although human sparganosis has been reported worldwide, cerebral involvement is seen predominantly in Asian endemic regions [1, 2].

The typical cerebral form is parenchymal. Serial magnetic resonance imaging (MRI) may demonstrate lesion migration, and active lesions may show tunnel-like, bead-like, irregular, or ring-like enhancement [3–5]. These findings can support the diagnosis, but they are not universal. Tumor-like lesions, atypical enhancement, and incomplete epidemiological or laboratory clues may result in diagnostic confusion with glioma, lymphoma, abscess, neurocysticercosis, or other inflammatory lesions [6, 7].

Direct involvement of the ventricular system is distinctly uncommon. Reported ventricular cases have included a free intraventricular parasite, an intraventricular parasitic granuloma with hydrocephalus, and migration through the lateral ventricle and choroid plexus [8–10]. To our knowledge, a pathologically confirmed sparganosis presenting as a primary fourth ventricular mass mimicking ependymoma has not been previously well characterized. We report such a case and emphasize the diagnostic lessons arising from its atypical location, absence of peripheral eosinophilia, and tumor-like imaging appearance.

Case presentation

A 48-year-old man from Yunnan Province, China, who worked in rice and lotus-root cultivation, was admitted with dizziness and headache lasting more than 5 months and two episodes of transient loss of consciousness. The dizziness was paroxysmal, occurred more than three times per day, and was associated with unsteadiness while standing and mild difficulty walking. The headache was described as mild sharp pain lasting approximately 1–3 hours and responding poorly to self-administered analgesics. In June 2025, he experienced a brief syncopal episode lasting approximately 10 seconds, followed about 1 week later by a similar episode lasting approximately 40 seconds. Neither episode was accompanied by limb convulsions, urinary or fecal incontinence, tongue biting, postictal drowsiness, or confusion. No further syncopal episodes occurred after admission.

His medical history included hypertension diagnosed 6 months earlier, treated with felodipine sustained-release tablets (5 mg once daily), and a remote appendectomy. He reported drinking untreated water but denied eating raw or undercooked frog or snake meat and denied applying raw frog flesh to wounds. There was no relevant family history or known hereditary disease.And The table shows the patient's entire timeline.(Table 1)

Table 1
Clinical timeline of the reported case

Clinical timeline of the reported case	
Time	**Clinical event**
Approx. June 2025	Dizziness and headache began; first brief syncopal episode occurred.
1 week later	Second syncopal episode lasting approximately 40 seconds; no convulsive or postictal features.
November 8, 2025	Outside-hospital MRI showed a fourth ventricular lesion; ependymoma was suspected.
November 12, 2025	Repeat MRI at our institution confirmed a 2.9 × 2.1 × 3.7 cm fourth ventricular lesion with focal nodular enhancement and mild hydrocephalus.
November 17, 2025	Microsurgical resection through a midline suboccipital approach; cystic lesion and yellowish cord-like parasitic structure completely removed.
Early postoperative period	Histopathology supported sparganosis; praziquantel and supportive therapy administered; early postoperative MRI showed lesion removal.
5-month follow-up	Headache and dizziness resolved; no new neurological deficits and no radiological recurrence.

On admission, temperature was 36.6°C, pulse 100 beats/min, respiratory rate 20 breaths/min, and blood pressure 122/89 mmHg. He was alert and fully oriented. Cranial-nerve examination was unremarkable; muscle strength was 5/5 in all extremities, tone and tendon reflexes were normal and symmetric, and no pathological reflexes were elicited. Coordination was intact, there were no signs of meningeal irritation, and the Romberg test was negative.

Routine preoperative laboratory tests were largely unremarkable. The white blood cell count was 5.51 × 10^9/L, the absolute eosinophil count was 0.11 × 10^9/L, and eosinophils accounted for 2% of leukocytes. Because of financial limitations, parasite-specific serology and other dedicated etiological tests were not performed preoperatively.

Brain MRI obtained at an outside hospital on November 8, 2025 showed a fourth ventricular lesion, and ependymoma was suspected. Repeat MRI at our institution on November 12, 2025 included conventional and contrast-enhanced sequences, diffusion-weighted imaging (DWI), perfusion imaging, magnetic resonance angiography, and magnetic resonance venography. A rounded lesion measuring approximately 2.9 × 2.1 × 3.7 cm was centered in the fourth ventricle and extended partly toward the inferior aspect of the ventricular outlet region. The lesion showed low T1 and high T2 signal intensity, low signal on DWI without convincing diffusion restriction, and focal nodular enhancement after contrast administration. Mild supratentorial ventricular dilatation with periventricular interstitial edema was present, consistent with obstructive hydrocephalus (Fig. 1). Ependymoma remained the leading diagnosis; neurocysticercosis was also considered.

On November 17, 2025, the patient underwent microsurgical resection through a midline suboccipital approach. After dural opening, a thin-walled cystic lesion was identified dorsal to the medulla near the foramen magnum and in continuity with the fourth ventricular lesion. The lesion was closely related to the posterior inferior cerebellar artery. The cyst wall ruptured during gentle traction and released clear cystic fluid. After removal of the cystic component, a yellowish nodular cord-like structure suggestive of a parasite was identified and completely removed (Fig. 2). Estimated intraoperative blood loss was approximately 100 mL.

Histopathological examination with hematoxylin and eosin staining showed band-like and irregular parasitic tissue composed predominantly of eosinophilic homogeneous material. Tegument-like and parenchymal structures were identified, with surrounding inflammatory-cell infiltration consisting mainly of lymphocytes with scattered eosinophils and macrophages. Focal tissue degeneration and necrosis were also present. No typical scolex of cysticercosis was identified. In the context of the gross operative findings and morphology, the diagnosis was intraventricular parasitic infection consistent with sparganosis (Fig. 3). No molecular species identification was performed.

Postoperatively, the patient had no new neurological deficit. He received mannitol (125 mL three times daily for 5 days), praziquantel (1 g three times daily for 3 days), analgesia, and other supportive care. He developed a transient low-grade fever with a maximum temperature of 38.4°C and a temporary rise in C-reactive protein, both of which resolved with symptomatic management. Early postoperative MRI showed removal of the fourth ventricular lesion and improvement of local ventricular obstruction (Fig. 4). At 5-month follow-up, headache and dizziness had resolved completely, neurological examination remained stable, and follow-up brain MRI showed no evidence of recurrence.

Patient perspective

A formal narrative patient-perspective statement was not collected. At follow-up, the patient reported complete resolution of the presenting headache and dizziness.

Discussion and Conclusions

This case is unusual because the lesion presented as a mass centered in the fourth ventricle rather than as the more typical migratory parenchymal form of cerebral sparganosis. Classic imaging clues such as a tunnel sign, multiloculated ring enhancement, or documented migration were absent. Instead, the lesion was rounded, relatively well defined, and focally enhancing, with associated hydrocephalus—features that reasonably favored an intraventricular neoplasm before surgery [3–7]. The anatomical location further strengthened the initial impression of ependymoma.

Ventricular involvement has been reported only sporadically. A Thai case reported in 1984 and summarized in a later national review described a 7-cm sparganum found in the left lateral ventricle during craniotomy [9]. Wong and Ho subsequently reported a 67-year-old woman with a calcified intraventricular parasitic granuloma in the cavum septi pellucidi, intraventricular hemorrhage, and

obstructive hydrocephalus [10]. More recently, Chen et al. documented a child in whom cerebral sparganosis migrated through the corpus callosum into the lateral ventricle and choroid plexus before continuing into the occipital white matter [8]. These reports show that ventricular involvement may occur as a free parasite, a granulomatous mass, or part of a migratory trajectory. In contrast, the present case manifested as a fourth ventricular tumor-like lesion without documented parenchymal migration (Table 2).

The absence of peripheral eosinophilia represented an additional diagnostic pitfall. Eosinophilia may raise suspicion for helminthic infection, but normal values do not exclude a chronic or localized parasitic lesion. Likewise, the epidemiological history can be incomplete. Our patient denied the better-known exposures of eating raw frog or snake meat or using raw flesh as a poultice, yet reported drinking untreated water, a recognized route of Spirometra infection [1, 2]. In endemic settings, exposure history should therefore be interpreted collectively rather than used as an all-or-none criterion.

The diagnosis in this patient was established by the intraoperative appearance of a parasite-like structure and compatible histopathology. The lack of parasite-specific serology before surgery and the absence of molecular identification are important limitations. Molecular techniques can support definitive species identification when adequate material is available [11, 12]. Accordingly, we describe the diagnosis as cerebral sparganosis and avoid assigning a specific Spirometra species to this patient.

Surgical resection in this case was undertaken because the lesion caused cerebrospinal-fluid obstruction and could not be reliably distinguished from an intraventricular tumor preoperatively. The operation simultaneously relieved the local obstruction and provided tissue for definitive diagnosis. The subsequent short course of praziquantel was adjunctive; this single case is not intended to establish comparative treatment efficacy, and management decisions should be individualized according to lesion location, accessibility, diagnostic certainty, and clinical status.

The principal strength of this report is the clinicoradiological, operative, gross pathological, and histopathological correlation of an exceptionally unusual fourth ventricular presentation. Limitations include the absence of preoperative parasite serology, lack of molecular species confirmation, and relatively short follow-up. Nevertheless, the case provides a practical diagnostic lesson: in patients from endemic regions or with compatible exposure, sparganosis should be considered among the differential diagnoses of atypical fourth ventricular cystic or nodular enhancing lesions, even when peripheral eosinophilia is absent and classic migratory MRI findings are not seen. When preoperative studies remain inconclusive, careful intraoperative inspection and histopathological examination may be decisive.

Table 2. Previously reported ventricular involvement in cerebral sparganosis

Previously reported ventricular involvement in cerebral sparganosis			
Report	**Ventricular site**	**Key findings**	**Pattern**
Promakup and Chayaphum, 1984; summarized in Anantaphruti et al. [9]	Left lateral ventricle	Headache and vomiting; a 7-cm parasite was found during craniotomy.	Direct intraventricular parasite.
Wong and Ho, 1994 [10]	Cavum septi pellucidi / ventricular region	Calcified mass with intraventricular hemorrhage and obstructive hydrocephalus; excision showed a parasitic granuloma compatible with sparganosis.	Tumor-like intraventricular granuloma.
Chen et al., 2023 [8]	Lateral ventricle and choroid plexus	Serial MRI documented migration from parenchyma through the corpus callosum into the lateral ventricle/choroid plexus and onward to occipital white matter.	Ventricular passage during migration.
Present case	Fourth ventricle	Rounded fourth ventricular mass with focal enhancement and hydrocephalus; operative removal and histopathology supported sparganosis.	Primary tumor-like fourth ventricular presentation.

Abbreviations

DWI: diffusion-weighted imaging

H&E: hematoxylin and eosin

MRI: magnetic resonance imaging

Declarations

Ethics approval and consent to participate

Formal ethics committee approval and consent to participate were not required for this retrospective single-patient case report, which describes routine clinical care and did not involve a prospective research intervention, in accordance with the institutional policy of the First Affiliated Hospital of Kunming Medical University.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and the accompanying images. The signed consent form is available for review by the journal on request.

Availability of data and materials

All data generated or analysed during this case report are included in this article. Additional de-identified information is available from the corresponding author on reasonable request, subject to applicable privacy requirements.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Yang Ge and Qiujian Yu wrote the main manuscript text ,Fangying Su and Jing Xu prepared figures 1-3 and Jiang Long and Sunjiang Liu are responsible for completing the operation. All authors reviewed the manuscript.

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References

1. Liu Q, Li MW, Wang ZD, Zhao GH, Zhu XQ. Human sparganosis, a neglected food-borne zoonosis. Lancet Infect Dis. 2015;15(10):1226–35. 10.1016/S1473-3099(15)00133-4.
2. Liu W, Gong T, Chen S, Liu Q, Zhou H, He J, et al. Epidemiology, diagnosis, and prevention of sparganosis in Asia. Anim (Basel). 2022;12(12):1578. 10.3390/ani12121578.
3. Song T, Wang WS, Zhou BR, Mai WW, Li ZZ, Guo HC, et al. CT and MR characteristics of cerebral sparganosis. AJNR Am J Neuroradiol. 2007;28(9):1700–5. 10.3174/ajnr.A0659.
4. Li YX, Ramsahye H, Yin B, Zhang J, Geng DY, Zee CS. Migration: a notable feature of cerebral sparganosis on follow-up MR imaging. AJNR Am J Neuroradiol. 2013;34(2):327–33. 10.3174/ajnr.A3237.
5. Chu S, Lu X, Wang Y, Gao G, Xv F, Zee CS, et al. Magnetic resonance imaging features of pathologically proven cerebral sparganosis. J Int Med Res. 2013;41(3):867–77. 10.1177/0300060513480925.
6. Yang E, Lee J, Patel V. Diagnosis and management of cerebral sparganosis: an uncommon parasitic infection of the brain. Radiol Case Rep. 2022;17(6):1874–80. 10.1016/j.radcr.2022.02.084.
7. Zhu Y, Ye L, Ding X, Wu J, Chen Y. Cerebral sparganosis presenting with atypical postcontrast magnetic resonance imaging findings: a case report and literature review. BMC Infect Dis. 2019;19(1):748. 10.1186/s12879-019-4396-2.
8. Chen X, Wu H, Lu L, Zhou N, Chen Z, Zhang X, et al. Cerebral sparganosis in a child with corpus callosum invasion: a case report. BMC Infect Dis. 2023;23(1):350. 10.1186/s12879-023-08322-9.
9. Anantaphruti MT, Nawa Y, Vanvanitchai Y. Human sparganosis in Thailand: an overview. Acta Trop. 2011;118(3):171–6. 10.1016/j.actatropica.2011.03.011.
10. Wong CW, Ho YS. Intraventricular haemorrhage and hydrocephalus caused by intraventricular parasitic granuloma suggesting cerebral sparganosis. Acta Neurochir (Wien). 1994;129(3–4):205–8. 10.1007/BF01406506.
11. Meng Y, Kuang Z, Liao L, Ma Y, Wang X. Case report: morphologic and genetic identification of cerebral sparganosis. Am J Trop Med Hyg. 2019;101(5):1174–6. 10.4269/ajtmh.19-0468.
12. Miyahara R, Akiyama O, Yoshida N, Suzuki M, Ashizawa K, Kodama T, et al. A case of cerebral sparganosis diagnosed by surgical resection and molecular analysis. Surg Neurol Int. 2025;16:512. 10.25259/SNI_1111_2025.

Figures

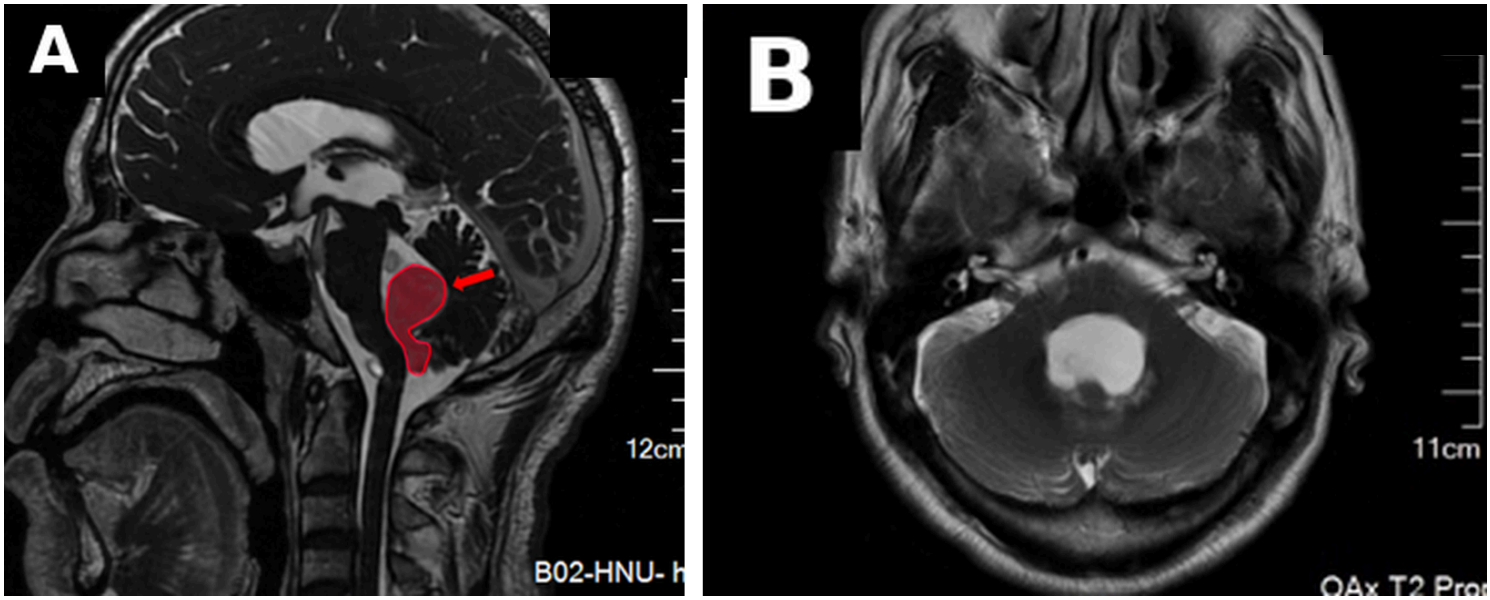


Figure 1

Preoperative MRI of the fourth ventricular lesion. A, Sagittal MRI demonstrates a mass centered in the fourth ventricle (outlined and indicated by the arrow). B, Axial MRI shows the rounded fourth ventricular lesion. All visible patient identifiers have been removed.

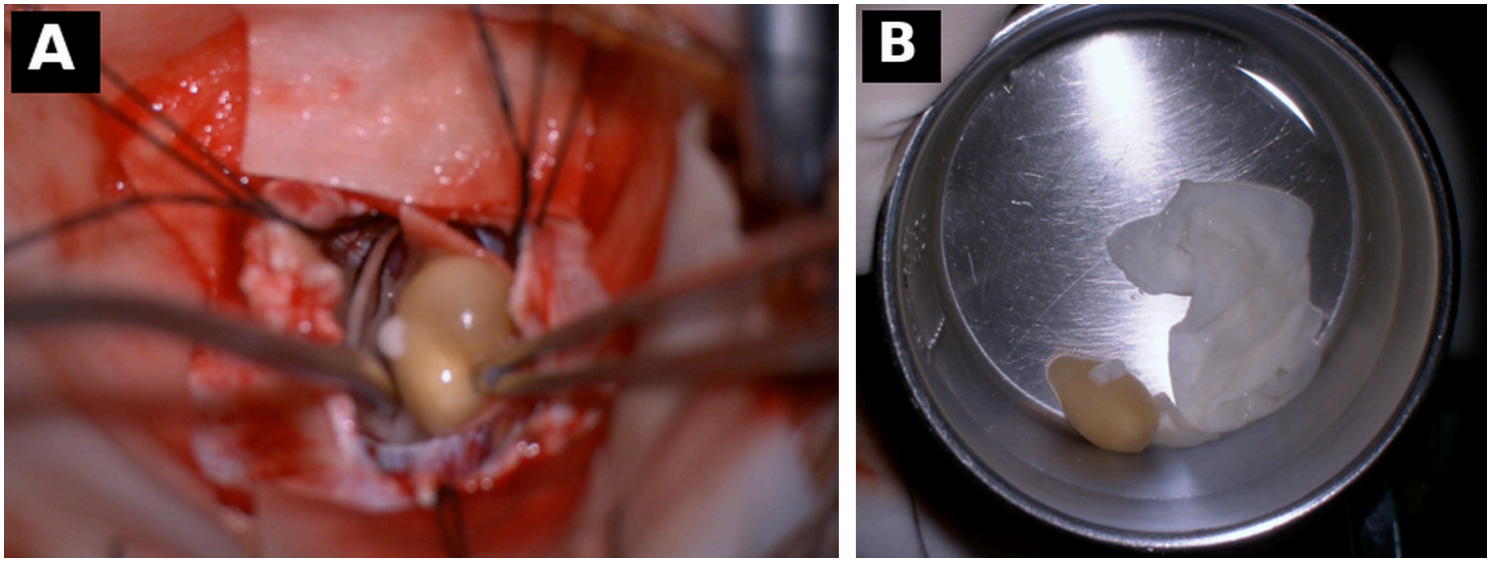


Figure 2

Intraoperative appearance and gross specimen. A, Intraoperative view of the cystic lesion and parasite-like structure. B, Gross specimen showing the removed cord-like parasitic tissue and cystic component.

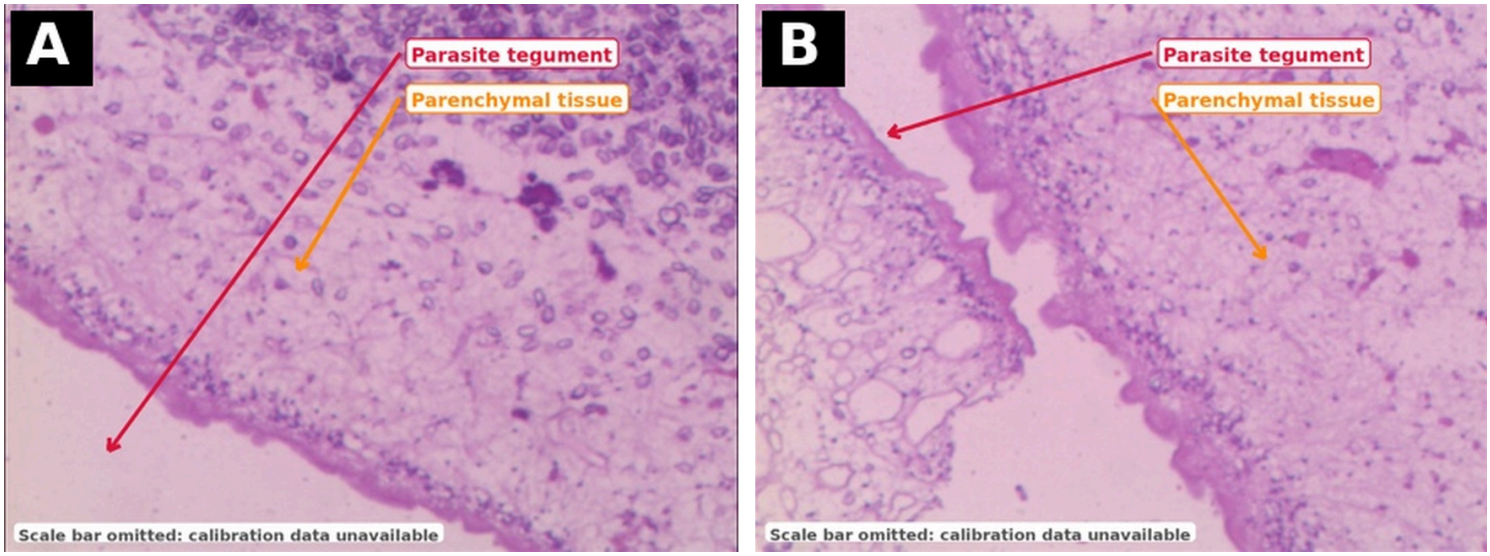


Figure 3

Histopathological findings of the resected lesion. A-B, Hematoxylin and eosin staining shows parasitic tegument-like and parenchymal tissue with surrounding inflammatory-cell infiltration, consistent with sparganosis.

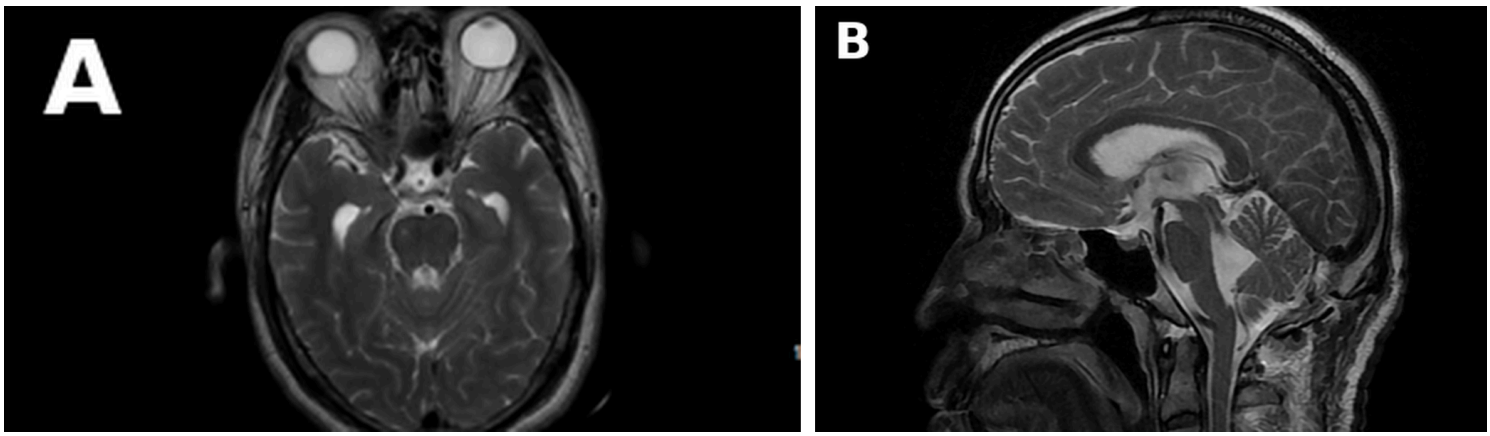


Figure 4

Early postoperative MRI after lesion removal. A, Axial and B, sagittal postoperative MRI demonstrate removal of the fourth ventricular lesion and relief of local obstruction. All visible patient identifiers have been removed.

Supplementary Files

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