

MedPeer Publisher

Abbreviated Key Title: MedPeer

ISSN : 3066-2737

homepage: <https://www.medpeerpublishers.com>

Spontaneous Rupture of a Temporal Dermoid Cyst: An Uncommon Cause of Acute Neurological Deterioration

DOI: 10.70780/medpeer.000QGXS

AUTHOR AND AFFILIATION

Fatma El Mabrouk¹, Kamal Hlioui¹, Salma Tabati¹, Wafa Khatibi¹, Karima Sif Nasr¹, Hamza Retal¹, Habiba Kadiri², Meriem Fikri¹, Amina El Khamlichi¹

¹ Department of Neuroradiology, Rabat Specialty Hospital, Rabat, Morocco.

² Department of Pathology, Rabat Specialty Hospital, Rabat, Morocco.

Corresponding author: Fatma El Mabrouk

ABSTRACT

Intracranial dermoid cysts are rare, benign congenital lesions arising from ectodermal inclusions during embryogenesis. They typically grow slowly and may remain asymptomatic until they exert mass effect on adjacent structures. Spontaneous rupture is an uncommon but important complication that may result in dissemination of lipid-rich contents into the cerebrospinal fluid spaces, chemical meningitis, seizures, and acute neurological deterioration.

We report a 50-year-old man admitted with agitation, recurrent seizures, impaired consciousness, and focal neurological signs. Previous brain MRI had revealed a large left temporal mass. Emergency CT demonstrated a predominantly fat-attenuation lesion with scattered fat droplets in adjacent subarachnoid spaces, strongly suggesting rupture of an intracranial dermoid cyst. Left temporal lobectomy and subtotal cyst-capsule removal were performed, preserving the portion adherent to the left middle cerebral artery. No intraoperative complications occurred.

This case emphasizes the diagnostic value of CT in detecting disseminated intracranial fat following dermoid cyst rupture and the complementary role of MRI in lesion characterization. Histopathological correlation is essential, particularly when the reported microscopic findings overlap with those of an epidermoid cyst.

KEYWORDS

Intracranial dermoid cyst; Spontaneous rupture; Fat droplets; Neuroimaging; Histopathology

MAIN ARTICLE

INTRODUCTION

Intracranial dermoid cysts are uncommon, benign congenital inclusion cysts caused by sequestration of ectodermal tissue during embryonic development. Their walls may contain skin appendages, including sebaceous glands and hair follicles, and their contents often include lipid-rich secretions, keratin, and hair. They are usually slow-growing and are often located near the midline, although lateral locations can occur.

These lesions may remain clinically silent until they become large or rupture. Spontaneous rupture releases lipid-rich material into the subarachnoid spaces or ventricular system, potentially producing chemical meningitis, seizures, hydrocephalus, or acute neurological deterioration.

We report a case of a spontaneously ruptured left temporal intracranial lesion with imaging findings characteristic of a dermoid cyst, emphasizing the CT and MRI appearances, surgical management, and the need for careful radiologic–pathologic correlation.

CASE PRESENTATION

A 50-year-old man with diabetes mellitus and hypertension, previously followed for an incompletely characterized left temporal lesion, was admitted to the emergency department with agitation and recurrent seizures. On initial examination, he was confused and psychomotorically agitated, with a Glasgow Coma Scale score of 11, limiting the neurological assessment. Nevertheless, focal neurological deficits were identified.

Images from a previous brain MRI (Figure 1), obtained during the investigation of memory impairment and headaches, were subsequently retrieved. They showed a large, apparently extra-axial, well-circumscribed round mass in the left temporal region, with heterogeneous T2 and FLAIR hyperintensity, marked hyperintensity on diffusion-weighted imaging (DWI), and subtle peripheral capsular enhancement on postcontrast T1-weighted images. There was marked mass effect on the left temporal lobe without subfalcine herniation.

No previous histopathological findings were available.

Following acute clinical deterioration, the intensive care team was involved and an urgent brain CT was performed for further assessment (Figure 2). CT revealed a large, well-defined, heterogeneous extra-axial mass in the left temporal region, predominantly containing fat-attenuation material with coarse intralesional calcifications.

The lesion exerted mass effect on the adjacent temporal parenchyma, with mild effacement of the surrounding subarachnoid spaces. Multiple fat-attenuation droplets were visible in the adjacent subarachnoid spaces, consistent with spontaneous rupture and dissemination of lipid-rich cyst contents. The CT findings strongly favored a ruptured intracranial dermoid cyst.

Given the progressive deterioration in the patient's neurological condition, neurosurgical intervention was indicated. A left temporal lobectomy was performed together with resection of the cyst capsule. Capsular removal was intentionally incomplete because a portion was firmly adherent to the left middle cerebral (Sylvian) artery; this portion was preserved to avoid vascular injury. No intraoperative complications occurred. Histopathological examination of the surgical specimen confirmed an epidermoid cyst (Figure 3).

DISCUSSION

Intracranial dermoid cysts are congenital ectodermal inclusion cysts characterized by a squamous epithelial lining that may contain skin appendages, including sebaceous glands and hair follicles. Their lipid-rich contents account for the characteristic imaging appearance and dissemination of fat after rupture.

These lesions are rare and typically grow slowly. They are often discovered in children or young adults, although delayed presentation in adulthood is possible.

Dermoid cysts tend to occur near the midline, particularly in the suprasellar, frontonasal, and posterior fossa regions; a lateral temporal location is less typical.

Clinical manifestations depend on lesion size, location, and complications. Headache, seizures, focal neurological deficits, and cognitive or behavioral symptoms may occur because of mass effect. Rupture can cause a sudden change in the clinical presentation.

Spontaneous or traumatic rupture may disseminate lipid-rich material through the subarachnoid spaces or ventricles. This may cause aseptic chemical meningitis, seizures, hydrocephalus, or, rarely, vasospasm and ischemic complications. Disseminated fat droplets are an important radiological clue to rupture.

Other potential complications include local inflammatory reactions and recurrence following incomplete resection. The surgical strategy must balance maximal removal with the risk of injury to adjacent neurovascular structures.

On computed tomography (CT), intracranial dermoid cysts usually appear as well-circumscribed, low-attenuation lesions owing to their fat content; peripheral calcifications may be present. Following rupture, multiple fat-attenuation droplets may be identified within the subarachnoid spaces or ventricles. This combination is highly suggestive of a ruptured dermoid cyst and closely matches the findings in our patient.

On MRI, the appearance of dermoid cysts depends on the proportions of lipid, keratin, and other components. Many lesions are hyperintense on T1-weighted images and show signal loss on fat-suppressed sequences, although heterogeneous signal characteristics are common. T2 and FLAIR appearances are variable. MRI helps define the lesion, assess mass effect, and detect complications.

Diffusion-weighted imaging (DWI) is useful in the differential diagnosis: epidermoid cysts commonly show marked DWI hyperintensity, whereas dermoid cysts have variable diffusion characteristics. The marked DWI hyperintensity in the previously available MRI in our case is therefore atypical for a classic lipid-rich dermoid cyst and requires correlation with the CT and histological findings.

Enhancement is usually absent or limited to the capsule. Fat-suppressed T1-weighted sequences are particularly helpful in confirming the lipid nature of the lesion and disseminated droplets.

Histopathological examination is important for distinguishing dermoid from epidermoid cysts. Both may show a keratinizing squamous epithelial lining and lamellated keratin, but the identification of skin appendages in the cyst wall supports a dermoid cyst. The available histological description in this case documents squamous epithelium and lamellated keratin but does not document skin appendages. Consequently, the imaging diagnosis of a ruptured dermoid cyst should be correlated with a targeted review of the original pathology slides before the final pathological classification is asserted.

The main imaging differential diagnosis is an epidermoid cyst, which typically shows marked DWI hyperintensity and generally lacks macroscopic fat droplets. Other fat-containing lesions include intracranial lipoma and, depending on location, teratoma. Fat suppression and CT attenuation measurements help characterize the lesion.

Surgical treatment aims to remove the cyst contents and capsule as safely as possible. When the capsule is densely adherent to major vessels or other critical structures, leaving a small

residual portion may be safer than attempting complete removal. In our patient, the portion adherent to the left middle cerebral artery was preserved.

CONCLUSION

Spontaneous rupture of an intracranial dermoid cyst is an uncommon but potentially serious event. CT demonstration of a fat-containing mass with disseminated subarachnoid fat droplets is a key diagnostic clue. MRI provides complementary anatomical and tissue characterization. Surgical management should prioritize preservation of critical neurovascular structures. Because the reported histological features are not specific for a dermoid cyst, pathological re-evaluation is important to resolve the radiologic–pathologic discrepancy.

FIGURES :

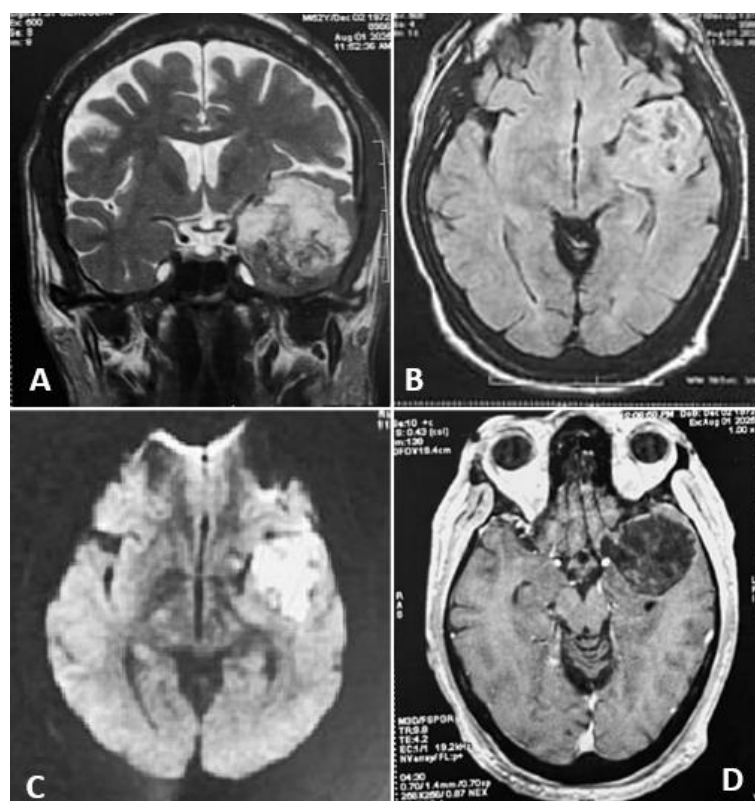


Figure 1. Brain MRI. (A) Coronal T2-weighted image demonstrates a well-defined heterogeneous left temporal extra-axial lesion with predominantly high T2 signal and marked mass effect on the adjacent temporal lobe. (B) Axial FLAIR image shows heterogeneous hyperintensity of the lesion with incomplete CSF suppression. (C) Diffusion-weighted imaging (DWI) demonstrates marked hypersignal. (D) Contrast-enhanced axial T1-weighted image reveals only minimal thin peripheral capsular enhancement without enhancing solid components.

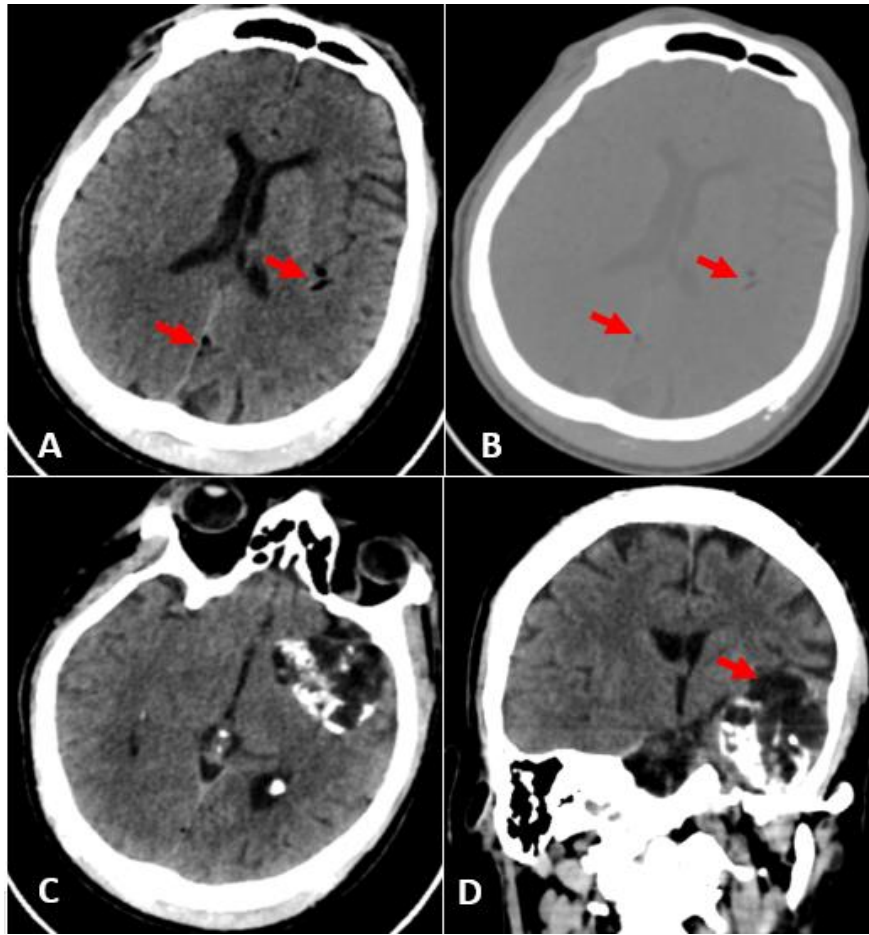


Figure 2. Non-contrast brain CT. Axial soft-tissue (A, C) and bone-window (B) images, together with a coronal reconstruction (D), demonstrate a well-defined heterogeneous left temporal extra-axial mass, predominantly composed of fat attenuation with coarse peripheral calcifications. Multiple fat droplets are seen disseminated within the adjacent subarachnoid spaces (red arrows), consistent with rupture of the lesion.

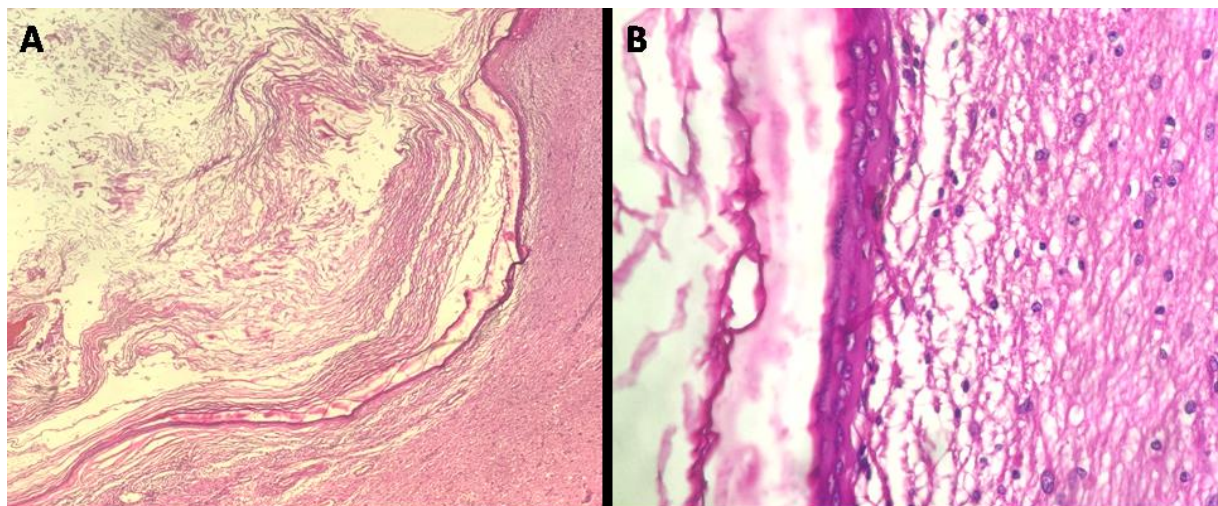


Figure 3. Histopathological features of the resected intracranial cyst.

(A) Low-power overview showing a cystic lesion filled with abundant laminated keratinous material, bordered by a thin squamous epithelial lining, and adjacent to compressed cerebral parenchyma. Hematoxylin and eosin stain, original magnification $\times 40$.

(B) Higher-power view showing the cyst wall lined by keratinizing stratified squamous epithelium with a granular layer, associated with lamellated keratin debris. Hematoxylin and eosin stain, original magnification $\times 100$.

ACKNOWLEDGEMENTS

ACKNOWLEDGEMENTS

The authors would like to thank the medical, radiological, neurosurgical, and pathology teams involved in the diagnosis and management of this patient.

FUNDING

The authors received no financial support for this work.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ETHICAL APPROVAL

Ethical approval was not required for this single case report according to institutional policy.

PATIENT CONSENT FOR PUBLICATION

Written informed consent was obtained from the patient for publication of this case report and the accompanying clinical, radiological, and histopathological images.

REFERENCES

- 1- 1. Epidermoid cyst of central nervous system: A case series and review of literature, Sana Ahuja , Meenakshi Shankar and al, international journal of surgery case reports, 2024 Jan 22;115:109293. doi: 10.1016/j.ijscr.2024.109293
<https://doi.org/10.1016/j.ijscr.2024.109293>
- 2- 2. Complete endoscopic resection of a pituitary stalk epidermoid cyst using a combined infrasellar interpituitary and suprasellar endonasal approach: case report, Nakassa A.C.I., Chabot J.D., Snyderman C.H., Wang E.W., Gardner P.A., Fernandez-Miranda J.C. J. Neurosurg. 2018;128:437-443. doi: 10.3171/2016.11.JNS161605
<https://doi.org/10.3171/2016.11.JNS161605>
- 3- 3. A Complicated Case of An Intracranial Epidermoid Cyst, Abdelkader Dib , Johny Salem , Marwan Haddad , Omar Awar , Mirna Fares, European journal of case reports in Internal Medicine, 2025 Jan 27;12(2):005121. doi: 10.12890/2025_005121
https://doi.org/10.12890/2025_005121
- 4- 4. Ruptured intracranial dermoid cyst manifesting as new onset seizure: a case report, Jennifer Neville Kucera , Pinakpani Roy , Ryan Murtagh, Journal of radiology case reports, PMID: 22470786
- 5- 5. multiple complications from an intracranial epidermoid cyst: case report and literature review, abramson, morawetz, schlitt, , neurosurgery. 1989, vol 24, num 4, pp 574-578; ref : 39 ref.
<https://doi.org/10.1227/00006123-198904000-00014>

6- 6. Brain Epidermoid Cyst (Epidermoid Tumor) Imaging, John G Short, MD William F Marx, MD , Bernard D Coombs, MB, ChB, PhD, Eugene C Lin, MD , Lucien M Levy, MD, PhD, Medscape, Jun 26, 2020 .

7- 7. Experience with cerebellopontine angle epidermoids, Mohanty A, Venkatrama SK, Rao BR, Chandramouli BA, Jayakumar PN, Das BS. Neurosurgery 1997;40:24-9; discussion 29-30; DOI: 10.1097/00006123-199701000-00004.

<https://doi.org/10.1097/00006123-199701000-00004>