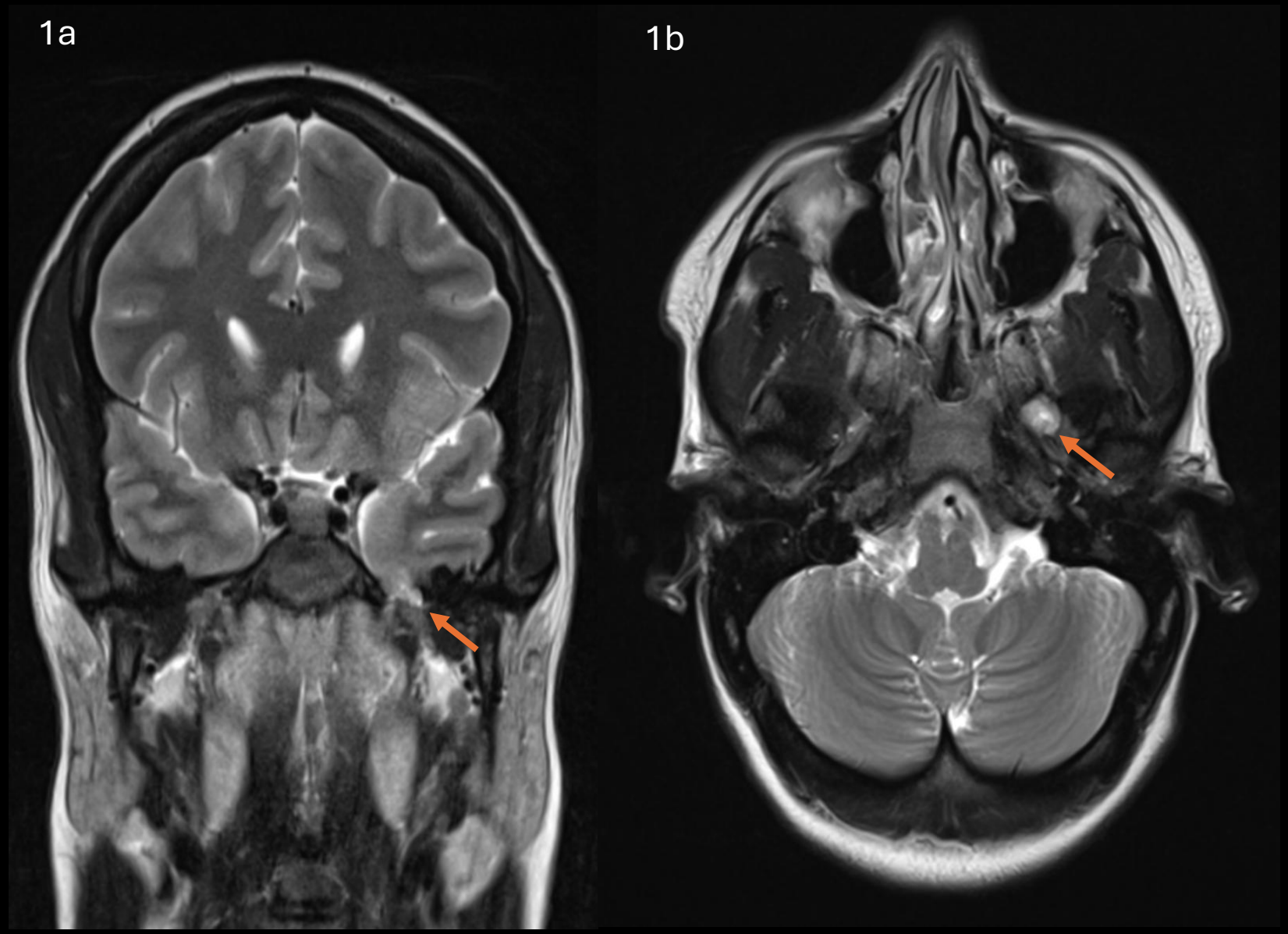
Foramen Ovale Encephalocele: An Unusual Cause of Temporal Lobe Epilepsy

Kelsey Casano, MD, Phaethon Philbrook, MD, PhD, Lora Kahn, MD, Andrew Steven, MD

Clinical Presentation

Patient is a 24-year-old female with medically intractable focal-onset seizures with secondary generalization. She began experiencing recurrent déjà vu episodes at age 21, which soon progressed to convulsive seizures.

She had no additional past medical history, medications, substance abuse history, or family history of seizures.

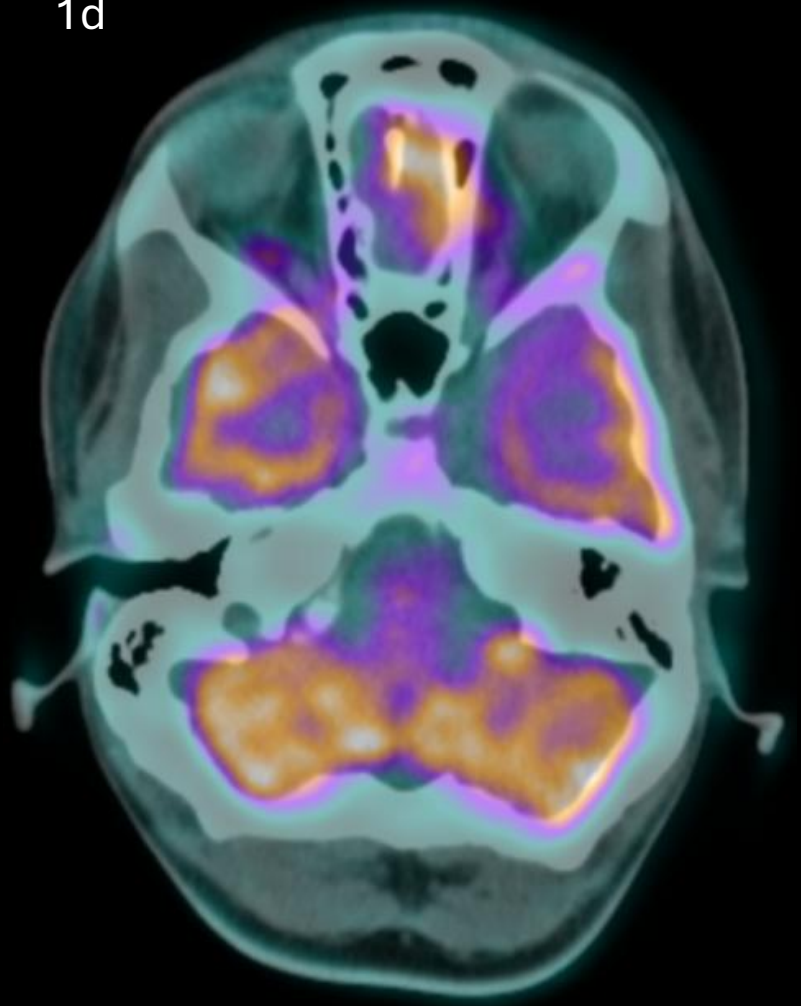


Imaging Workup

MRI images (1a,b) show extension of a small portion of the left anterior medial temporal lobe into the foramen ovale, compatible with encephalocele.

1c

1d



Imaging Workup

CT (1c) demonstrates asymmetric expansion of the left foramen ovale.

Brain FDG PET CT (1d) showed asymmetric hypometabolic activity in the left anterior temporal lobe, suggesting an epileptogenic focus based on interictal data.

Management and outcome

The patient experienced 2-3 breakthrough seizures per month despite multi-drug adherence.

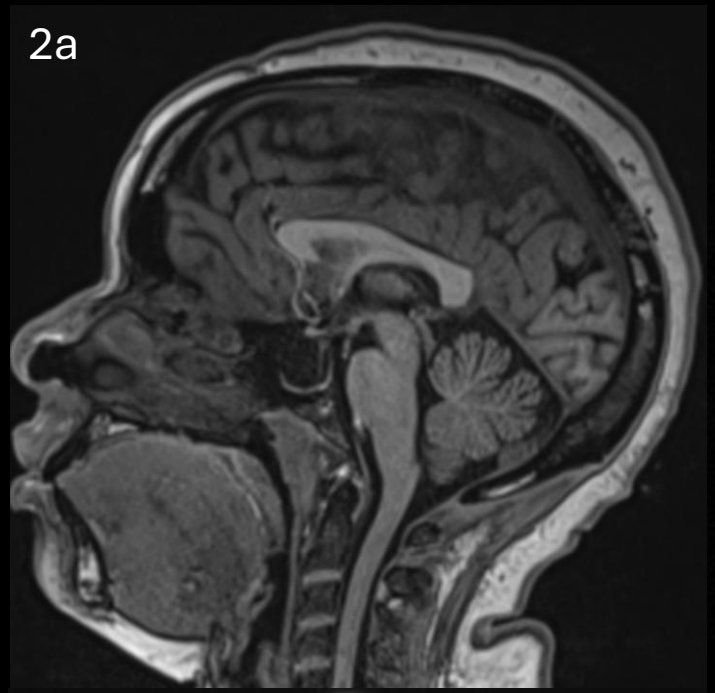
She underwent sEEG placement for seizure-onset localization. Four right and eight left-sided electrodes were placed in a temporal-plus paradigm, including at the left foramen ovale encephalocele. During the monitoring period, she had several provoked seizures from stimulation of both the encephalocele and left mesial temporal structures; other sites were silent.

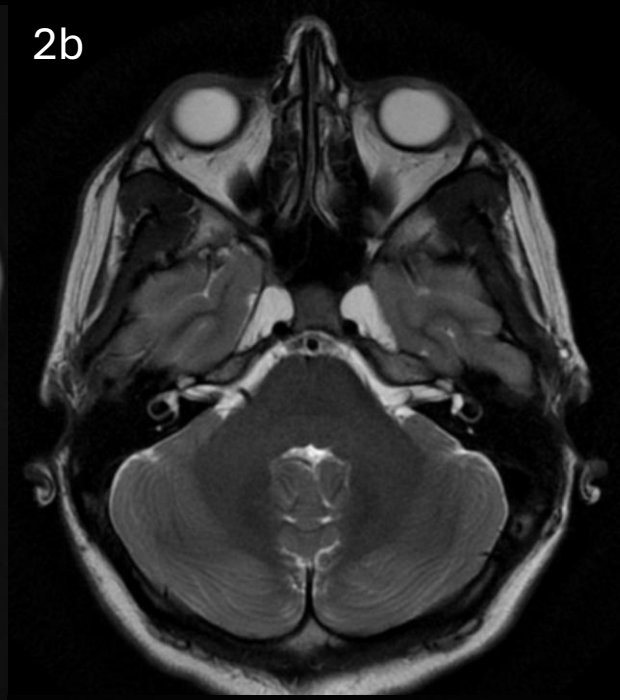
Left anterior temporal lobectomy with encephalocele repair was recommended and is pending additional neuropsychological testing.

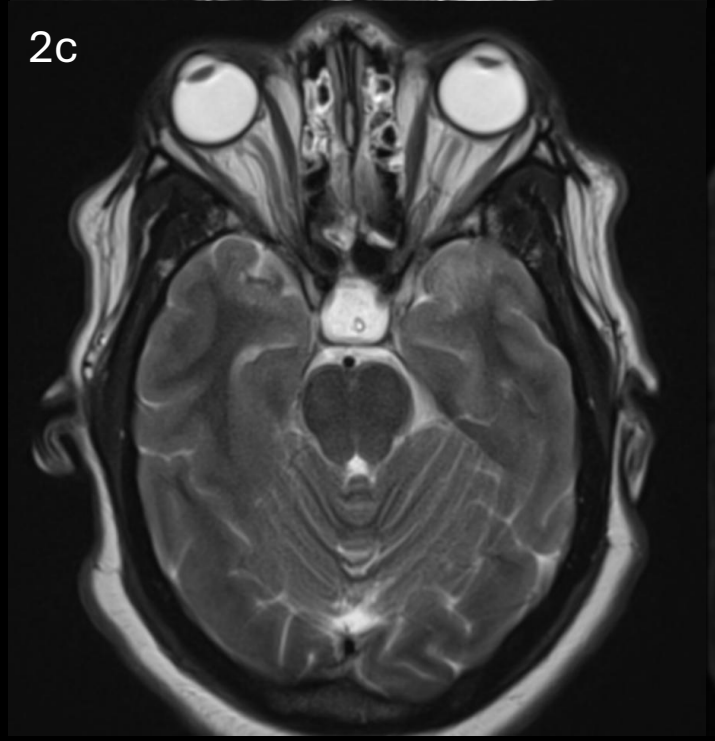
Take home points

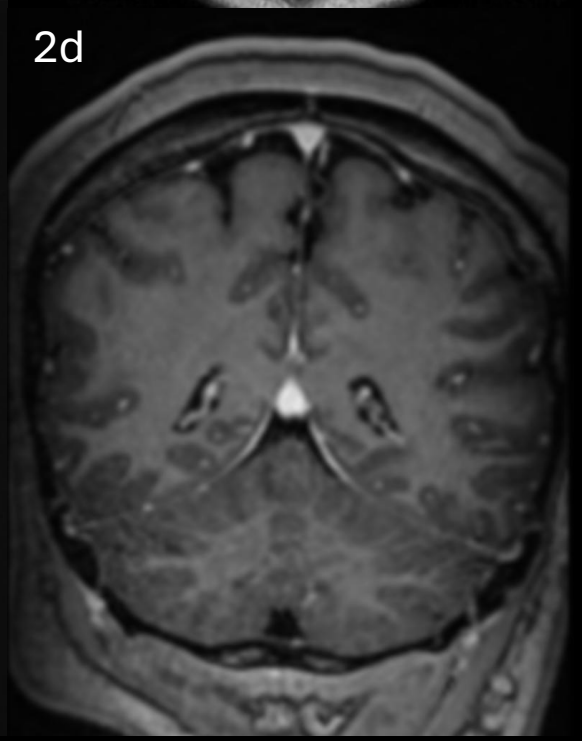
Temporal encephaloceles (TEs) are an increasingly reported cause of refractory temporal lobe epilepsy. While TEs may be congenital, they can be acquired in the setting of calvarial remodeling in patients with intracranial hypertension (IIH). These acquired TEs protrude into prominent arachnoid granulations in the middle cranial fossa.

Patients tend to be obese, middle aged women with adult-onset epilepsy and usually have other neuroimaging findings of IIH including partially empty sella, narrowed transverse sinuses, distended optic nerve sheaths, and enlarged arachnoid outpouchings with meningoencephalocele formation through the middle cranial fossa.





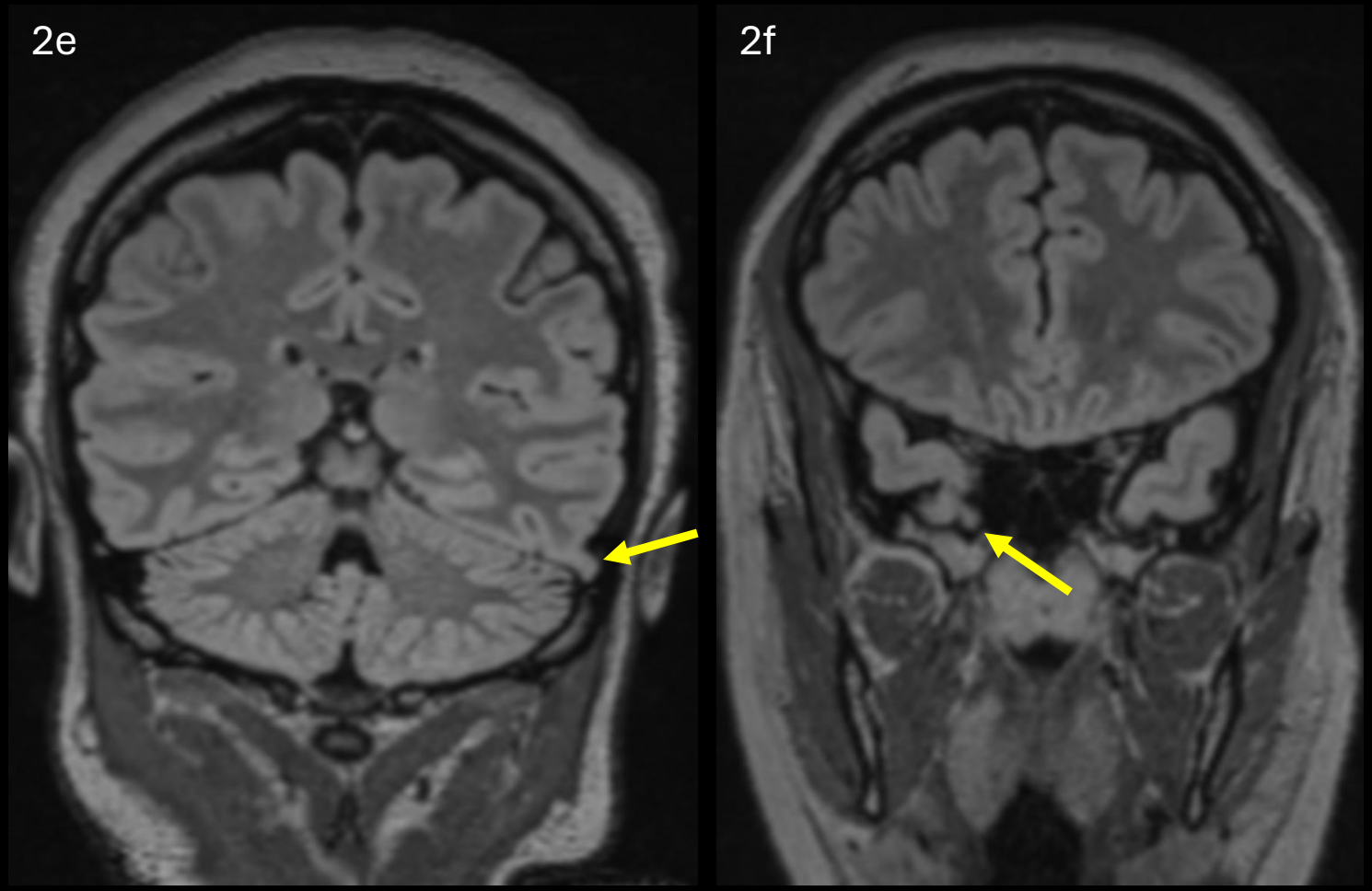




Example Case 1

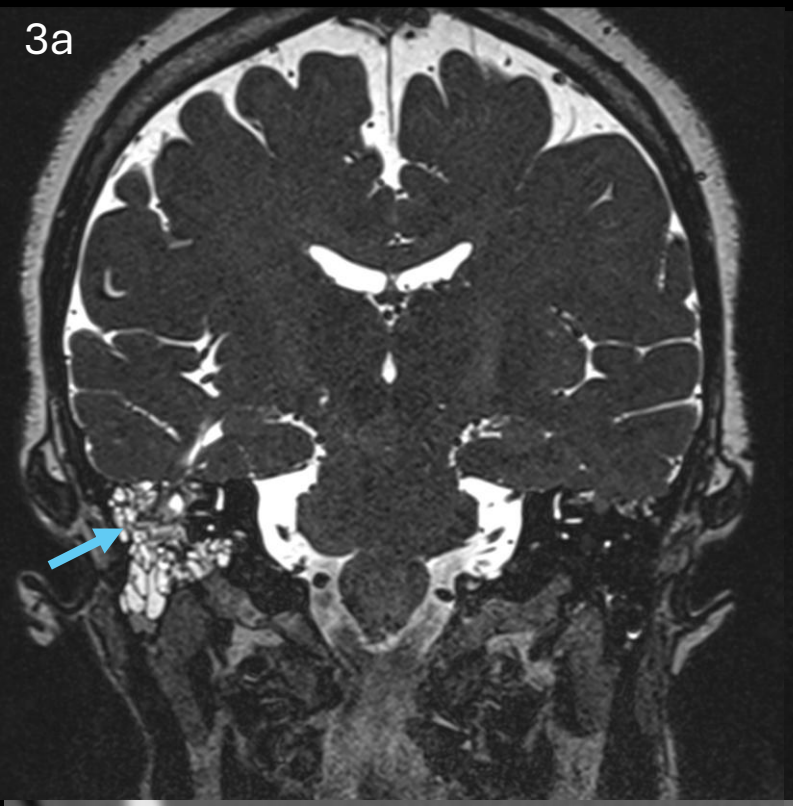
32-year-old female with seizures.

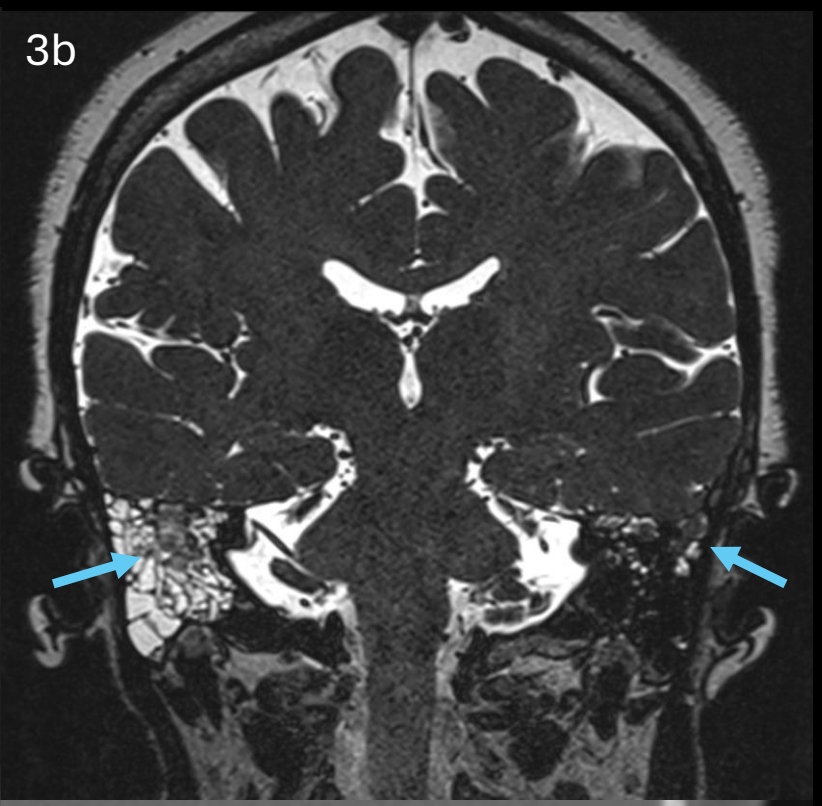
MRI images demonstrate findings of IIH including partially empty sella configuration (2a), expansion of Meckle's cave bilaterally (2b), distended optic nerve sheaths (2c), and markedly narrowed transverse sinuses (2d)

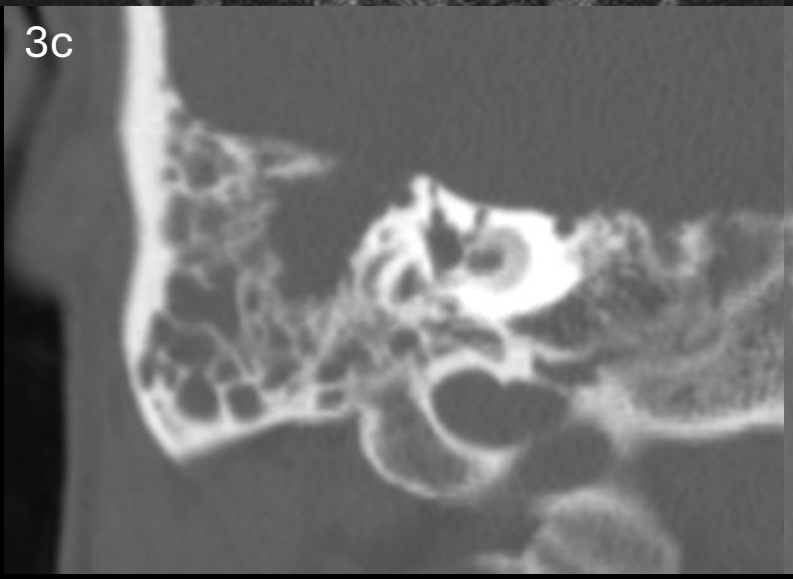


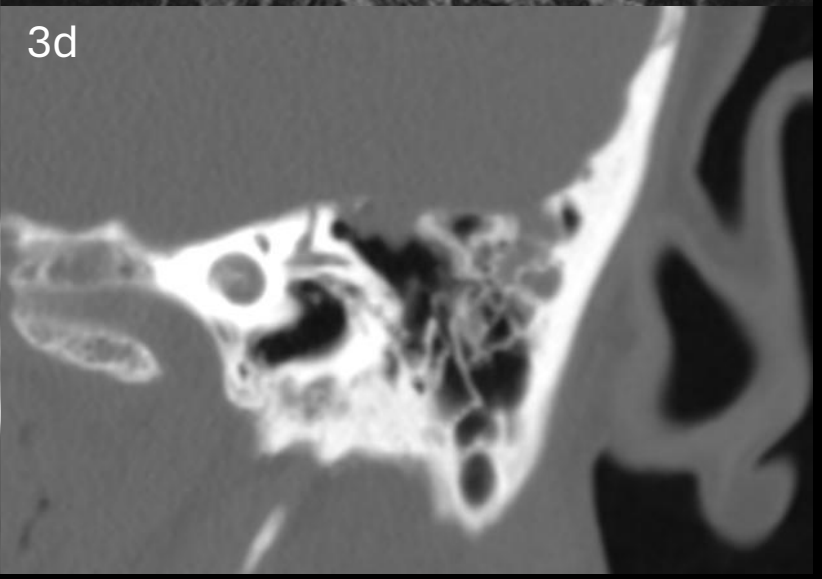
Example Case 1

3D FLAIR images showed a small encephalocele with the left posterolateral temporal lobe herniating into the sigmoid sinus (2e). A small right anteromedial temporal lobe encephalocele was also identified (2f).









Example Case 2

40-year-old female with IIH.

High-resolution T2 images (3a,b) show defects in the tegmen mastoideum with bilateral encephaloceles (arrows) and evidence of CSF leak with a right-sided mastoid effusion.

CT (3c,d) demonstrates sequelae of IIH with diffuse thinning of the tegmen tympani and tegmen mastoideum bilaterally with encephalocele formation.

Take home points

TEs may be subtle and overlooked on initial review, but detection has significantly improved in recent years due to increasing awareness and improved imaging techniques. Careful interpretation of high-resolution CT and MRI by an experienced neuroradiologist is crucial for diagnosis, especially in patients with unexplained temporal lobe epilepsy.

Recent studies have shown up to 12.5 % of patients with refractory temporal lobe epilepsy may have an occult TE, which may be a treatable cause of medication-refractory seizures.

Take home points

While TEs are a known cause of refractory temporal lobe epilepsy, TEs extending through the foramen ovale have not been previously reported in the literature.

We report this case of a foramen ovale encephalocele, which was proven as a seizure focus by sEEG, to raise awareness of the foramen ovale as a potential site for TE to further aid in their detection.

References

Cepeda De Jesus GN, Nitz D, Damisah E, et al. Magnetic resonance (MR) and computed tomography (CT) imaging of temporal lobe encephalocele-associated epilepsy: a pictorial review. *Clin Radiol*. 2025;87:106980. doi:10.1016/j.crad.2025.106980

Campbell ZM, Hyer JM, Lauzon S, et al. Detection and characteristics of temporal encephaloceles in patients with refractory epilepsy. *AJNR Am J Neuroradiol*. 2018;39(8):1468-1472. doi:10.3174/ajnr.A5704

Ortiz AV, Eisma JJ, Martin D, et al. Detection challenges of temporal encephaloceles in epilepsy: a retrospective analysis. *Magn Reson Imaging*. 2025;115:110272. doi:10.1016/j.mri.2024.110272

Tse GT, Frydman AS, O'Shea MF, et al. Anterior temporal encephaloceles: elusive, important, and rewarding to treat. *Epilepsia*. 2020;61(12):2675-2684. doi:10.1111/epi.16729

Saavalainen T, Jutila L, Mervaala E, et al. Temporal anteroinferior encephalocele: an underrecognized etiology of temporal lobe epilepsy? *Neurology*. 2015;85(17):1467-1474. doi:10.1212/WNL.0000000000002062