AMSER Case of the Month December 2025

75F with recurrent falls and meningitis

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Initial Presentation (08/24)

- HPI: Dizziness and fall with associated loss of consciousness, struck left temple
- PMHx: T2DM, GERD, seizures, HTN, repeated bouts of meningitis since 1986
- FMHx: HTN in multiple family members
- Social Hx: Cigarette use 29 years ago; no alcohol, drug use

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 2: **Acute head trauma, mild (GCS 13–15), imaging indicated by clinical decision rule. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CT head without IV contrast	Usually Appropriate	☢☢☢
Radiography skull	Usually Not Appropriate	☢
Arteriography cervicocerebral	Usually Not Appropriate	☢☢☢
MR spectroscopy head without IV contrast	Usually Not Appropriate	O
MRA head and neck with IV contrast	Usually Not Appropriate	O
MRA head and neck without and with IV contrast	Usually Not Appropriate	O
MRA head and neck without IV contrast	Usually Not Appropriate	O
MRI functional (fMRI) head without IV contrast	Usually Not Appropriate	O
MRI head with IV contrast	Usually Not Appropriate	O
MRI head without and with IV contrast	Usually Not Appropriate	O
MRI head without IV contrast	Usually Not Appropriate	O
MRI head without IV contrast with DTI	Usually Not Appropriate	O
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
CTA head and neck with IV contrast	Usually Not Appropriate	☢☢☢
HMPAO SPECT or SPECT/CT brain	Usually Not Appropriate	☢☢☢
FDG-PET/CT brain	Usually Not Appropriate	☢☢☢

This imaging modality was ordered by the ER physician

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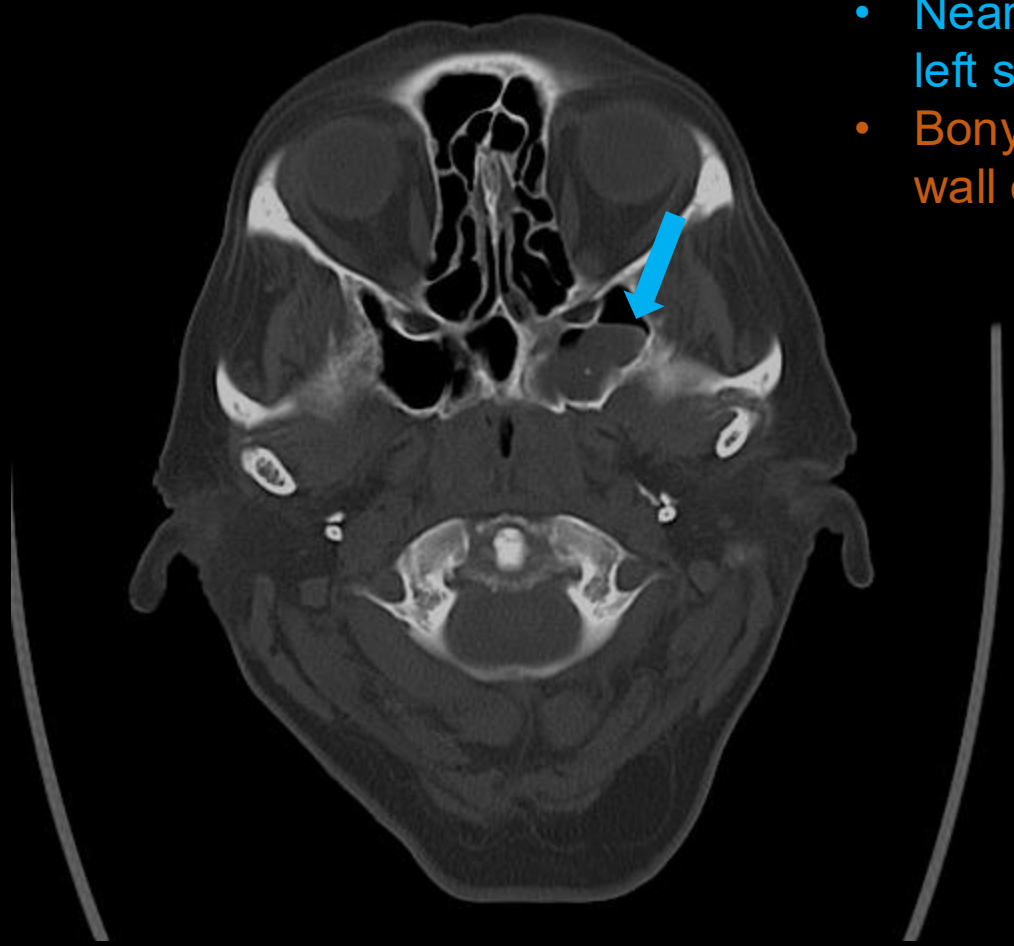
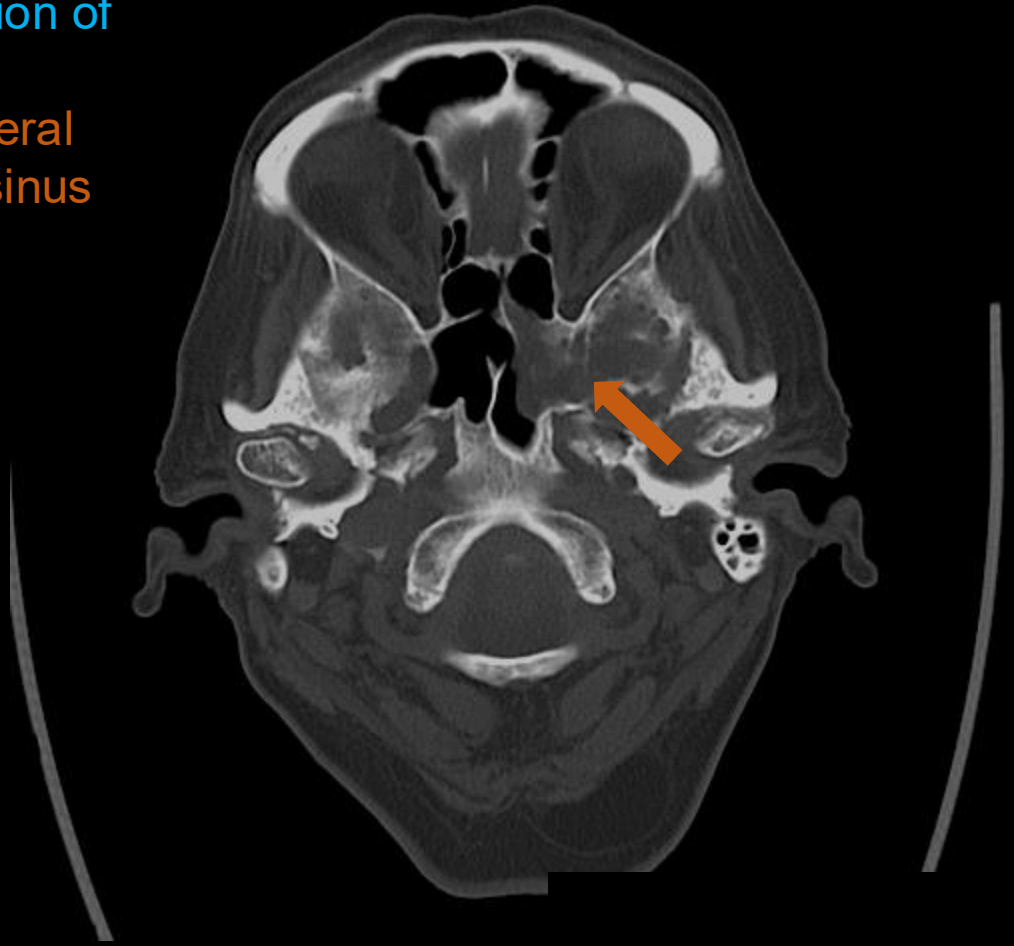
Findings (unlabeled)

Findings (labeled)

- Near complete opacification of left sphenoid sinus
- Bony defect along the lateral wall of the left sphenoid sinus





Second Presentation (05/25)

- HPI: Headache and AMS in the setting of (+) COVID test and UTI. Endorsed L frontal 10/10 headache, and neck stiffness.

- Other findings:
  - LP 3230 nucleated cells, protein 555, glucose 287 suggestive of bacterial meningitis
  - ED Sepsis criteria met

Select the applicable ACR Appropriateness Criteria

Variant 7: **Headache with one or more of the following "red flags": increasing frequency or severity, fever or neurologic deficit, history of cancer or immunocompromise, older age (>50 years) of onset, or posttraumatic onset. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
MRI head without and with IV contrast	Usually Appropriate	O
MRI head without IV contrast	Usually Appropriate	O
CT head without IV contrast	Usually Appropriate	☢☢☢
Arteriography cervicocerebral	Usually Not Appropriate	☢☢☢
MRA head with IV contrast	Usually Not Appropriate	O
MRA head without and with IV contrast	Usually Not Appropriate	O
MRA head without IV contrast	Usually Not Appropriate	O
MRI head with IV contrast	Usually Not Appropriate	O
MRV head with IV contrast	Usually Not Appropriate	O
MRV head without and with IV contrast	Usually Not Appropriate	O
MRV head without IV contrast	Usually Not Appropriate	O
CT head with IV contrast	Usually Not Appropriate	☢☢☢
CT head without and with IV contrast	Usually Not Appropriate	☢☢☢
CTA head with IV contrast	Usually Not Appropriate	☢☢☢
CTV head with IV contrast	Usually Not Appropriate	☢☢☢

This imaging modality was ordered by the ER physician

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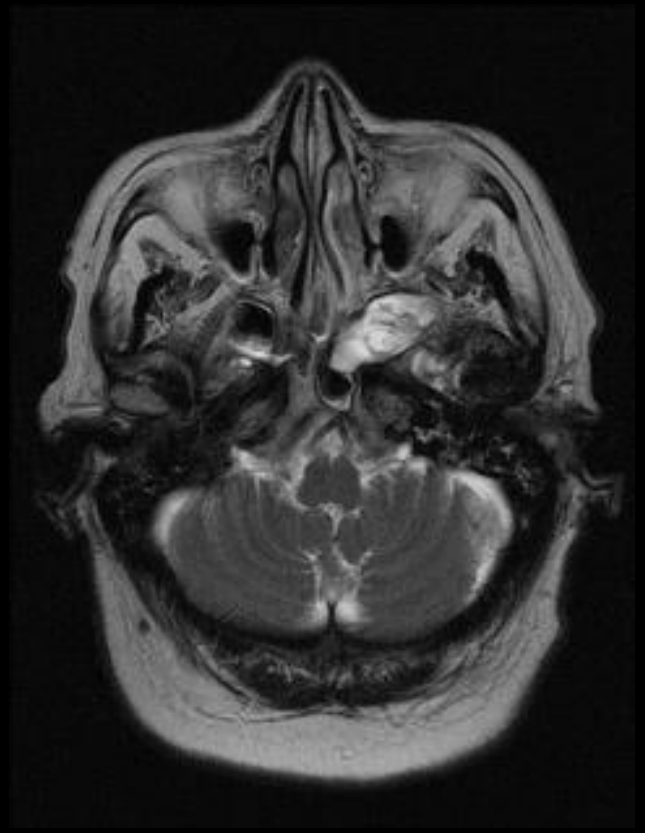
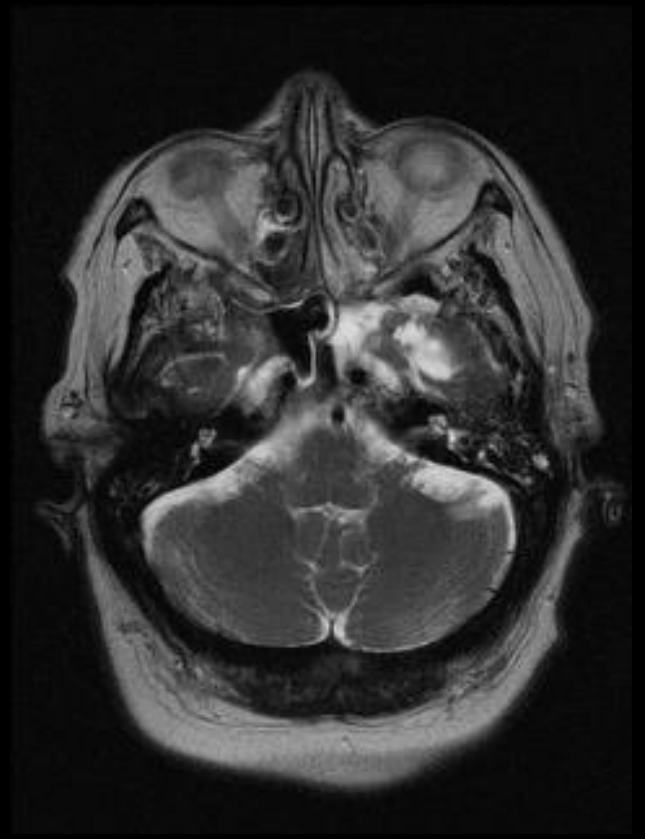
Findings (labeled)

Axial T2

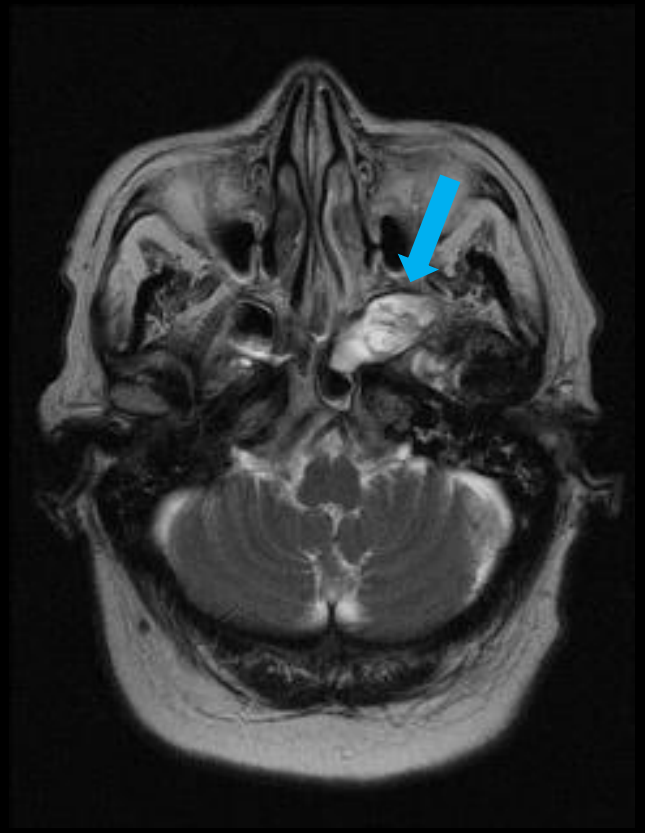


Axial T2



Findings (labeled)

Axial T2

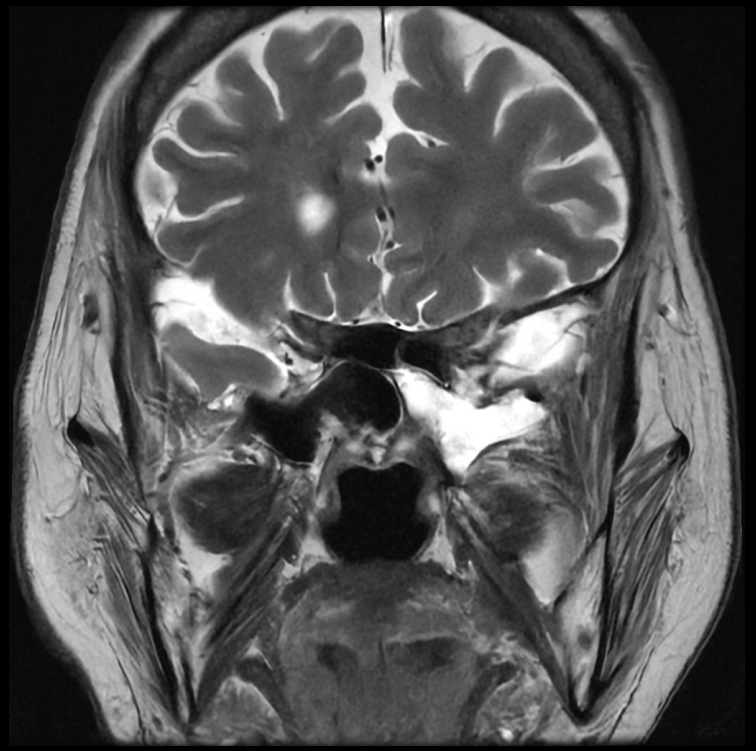


Axial T2

Axial T2-weighted MRI images demonstrating opacification of left sphenoid sinus as well as focal herniation of left temporal lobe through the lateral sphenoid wall. Findings are compatible with left sphenoid meningoencephalocele.

Findings (labeled)

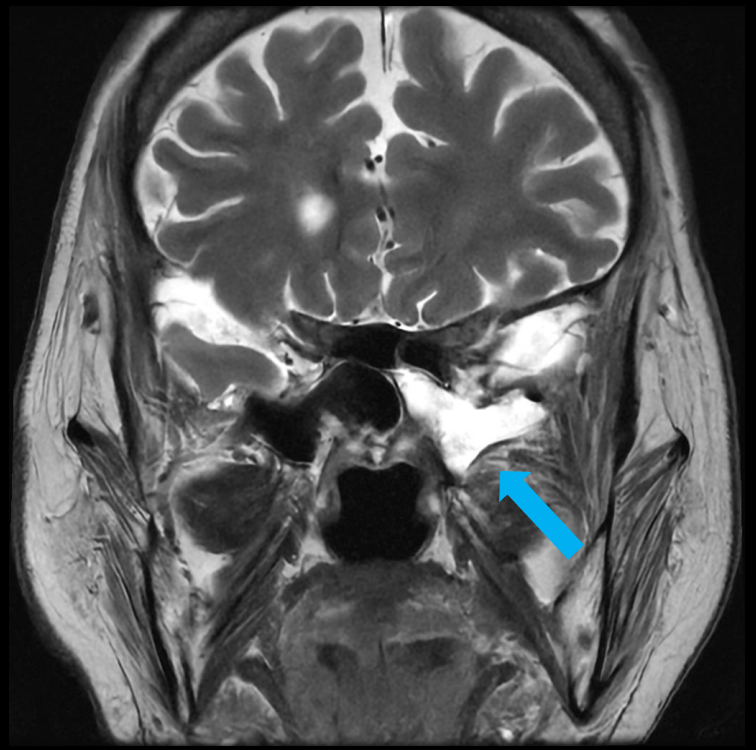
Coronal T2



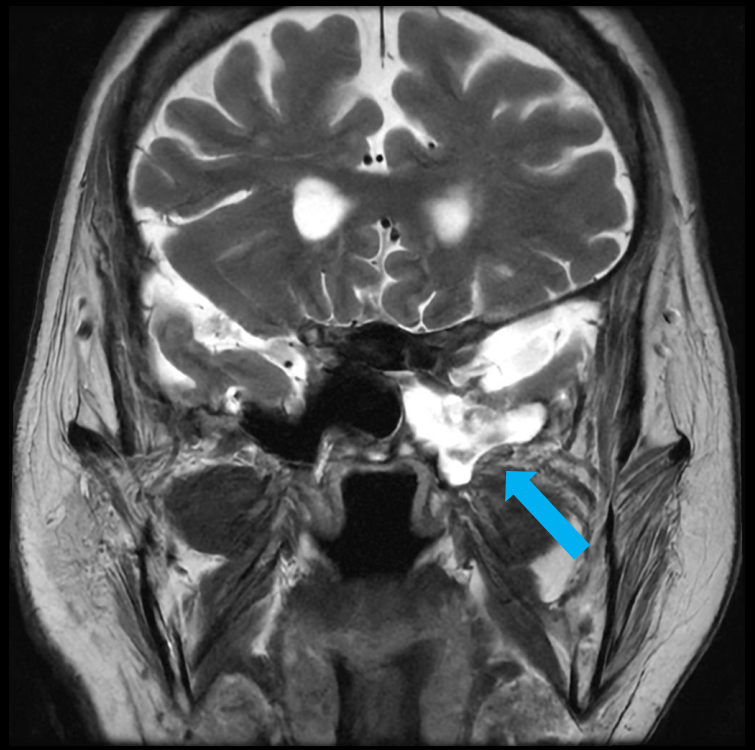
Coronal T2

Findings (labeled)

Coronal T2



Coronal T2



Coronal T2-weighted MRI images of the sella for preoperative staging further demonstrating focal herniation of left temporal lobe into the left sphenoid sinus through a cranial defect, consistent with left sphenoid meningoencephalocele.

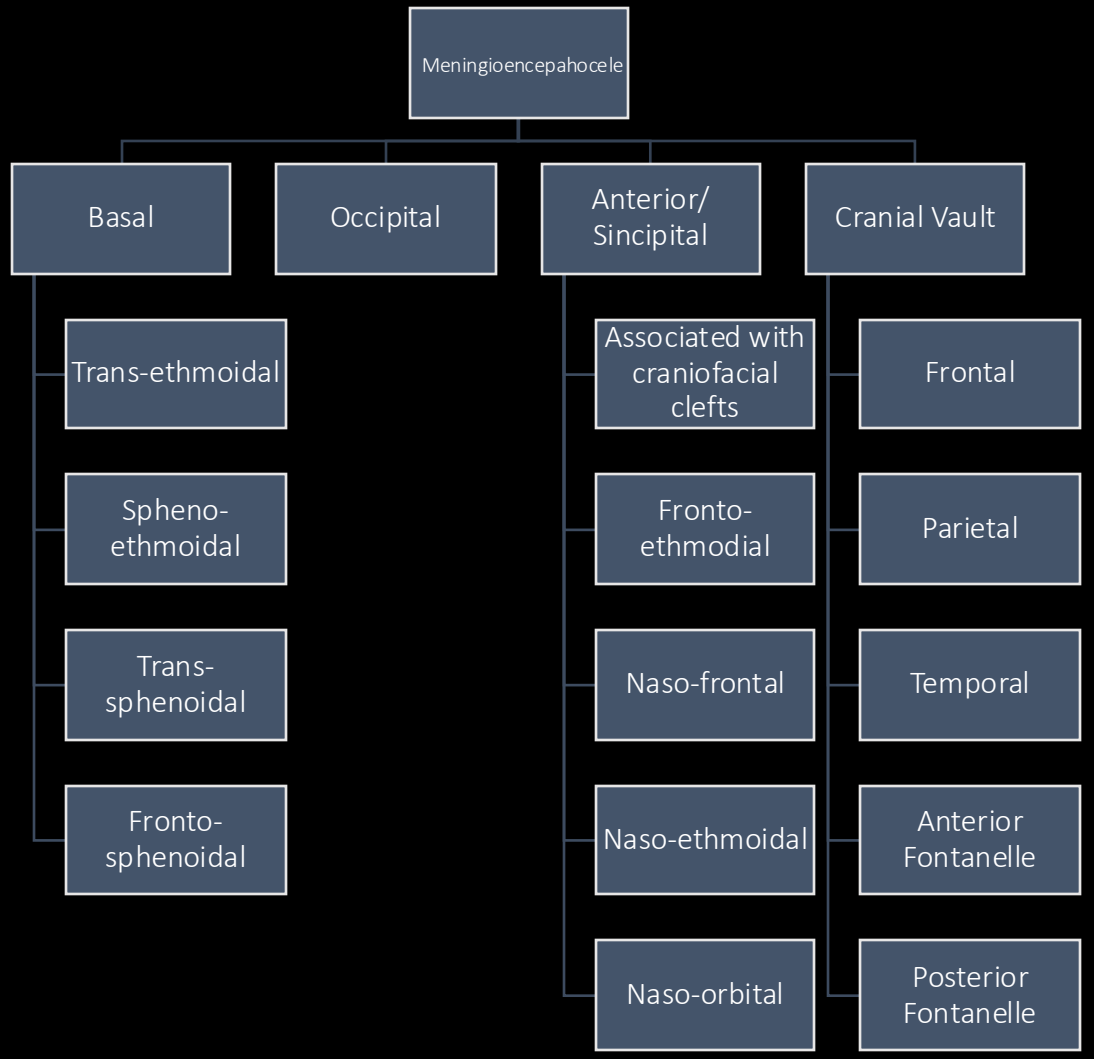
Final Dx:

Left sphenoid meningoencephalocele

Left sphenoid meningoencephalocele

- Definition: Herniation of brain and meningeal tissue via a cranial bony defect.
- Epidemiology: 1 in 4000 live births (varies by type, frontoethmoidal most common).
- Pathophysiology: May be associated with congenital defects (Chiari malformation, Dandy-Walker malformation, Meckel-Bruber syndrome). In adults, the origins are mainly traumatic or iatrogenic (as in idiopathic intracranial hypertension).

Classification



Pontell et al.

- Classified based on location and herniated contents
- Can cause increased risk of meningitis

Radiographic Features

- CT: Demonstrates opacification of sinus as well as identifies bony defect. High-resolution CT may also be used for preoperative planning to visualize bone anatomy.
- MRI: Demonstrates meningeal/brain content and extent of tissue herniation for diagnosis and treatment. Essential for establishing intracranial connection.
- Treatment is primarily surgical and tailored to location, size, and associated complications

References

- Radswiki T, Campos A, Gaillard F, et al. Encephalocele. Reference article, Radiopaedia.org (Accessed on 19 Aug 2025) https://doi.org/10.53347/rID-12522
- Pontell, M.E., Niklinska, E., Bonfield, C.M. et al. Management of an open nasofrontal encephalocele during the first day of life. Childs Nerv Syst 38, 207–210 (2022). https://doi.org/10.1007/s00381-021-05102-1
- Roumeliotis G, Wiberg A, Thomas G, Magdum S, Jayamohan J, Wall S, Johnson D. An Integrated Approach to the Management of Meningoencephalocoeles. J Craniofac Surg. 2021 May 1;32(Suppl 3):1280-1284. doi: 10.1097/SCS.0000000000007678. PMID: 33770051.