Case 14794

Eurorad

Brain herniation into dural venous sinus

Published on 12.06.2017

DOI: 10.1594/EURORAD/CASE.14794
ISSN: 1563-4086
Section: Neuroradiology
Area of Interest: Neuroradiology brain Vascular
Procedure: Education
Imaging Technique: MR
Imaging Technique: CT
Special Focus: Pathology Case Type: Clinical Cases
Authors: Jose Alejandro Bacalla MD, Angel Donato MD, Ramon Figueroa MD
Patient: 31 years, male

Clinical History:

31-year-old male patient involved in a motor vehicle accident evaluated for head trauma.
Imaging Findings:

CT shows a heterogeneous oval-shaped abnormality within the distal right transverse sinus (Fig. 1).
MRI demostrates a polyploid cortical herniation from the lateral inferior right temporal occipital cortex into the superior aspect of the right transverse sinus within a large arachnoid granulation, in keeping with an internal encephalocoele. (Fig. 2 and 3).
MR venogram shows a bifid right transverse sinus enclosing a large arachnoid granulation, an anatomic variant (Fig. 4).
Discussion:

Brain herniation into dural venous sinus, according to Battal et al [1], have a prevalence of 0.32% . Its pathophysiology and clinical significance is still controversial, being a recently described entity best depicted by MRI. It is yet unclear whether it represents true brain herniation into a dural defect or brain tissue getting into a pre-existing giant arachnoid granulation. In most cases it is not pathologically possible to identify arachnoid tissue next or around the herniation, but some authors postulate that arachnoid granulation predispose to its occurrence. Cohan et al [2] called it "occult encephaloceles" because they do not cross any dura o bony defects as classic encephaloceles do. The theory that brain herniations result from increased intracranial pressure is not widely accepted, since they have been found in patients with no signs of increased intracranial pressure.

There is no clear association between clinical symptoms and brain herniations or large arachnoid granulations. Although headaches and dizziness are mentioned occasionally, most described lesions have been incidental findings not related to any pathology [2].

From the imaging point of view, 3D T1- and T2-weighted sequences are most useful in characterising herniated brain, its continuity with adjacent brain parenchyma and CSF-containing compartments. These sequences allow the radiologist to identify the CSF outlining the brain parenchyma. The occipital squama, transverse sinus, lateral lacuna of the superior sagittal sinus, and straight sinus are the most frequent sites for their appearance, with cerebellar tissue being the most frequently involved in brain herniation [3].

On MR venography or venous phase DSA, round focal filling defects are identified, usually not obstructing the dural

sinuses.

It is important to make the differentiation from dural sinus venous thrombosis, which usually reveal multiple and irregular filling defects, and from dural-based tumours (showing enhancement and diffusion restriction). Uncomplicated giant arachnoid granulation may also have similar appearance.

Brain herniation into a dural venous sinus most likely is an incidental findings with not enough supporting evidence of their clinical significance. Given the increasing amounts of MR studies being performed, they are more frequently found and should be differentiated from more ominous dural sinus pathology.
Differential Diagnosis List: Brain herniation into dural venous sinus., Dural venous sinus thrombosis, Dural-based tumour, Giant arachnoid granulation

Final Diagnosis: Brain herniation into dural venous sinus.

References:

Battal, B., Hamcan, S., Akgun, V., Sari, S., Oz, O., Tasar, M., & Castillo, M (2016) Brain herniations into the dural venous sinuses or calvarium: MRI of a recently recognized entity. European Radiology 26(6), 1723-1731. (PMID: 24571834)
Çoban G, Y?ld?r?m E, Horasanl? B, Çifçi BE, A??ldere M. (2013) Unusual cause of dizziness: occult temporal lobe encephalocele into transverse sinus. Clinical Neurology and Neurosurgery 115 , 1911–1913 (PMID:23810237)
Malekzadehlashkariani, S., Wanke, I., Rüfenacht, D.A. et al (2016) Brain herniations into arachnoid granulations: about 68 cases in 38 patients and review of the literature. Neuroradiology Volume 58, Issue 5, pp 443–457 (PMID: 26886861)

Figure 1

a

Description: Nonspecific heterogeneous lesion centred within the right posterior fossa at the level of the distal transverse sinus. **Origin:** Augusta University

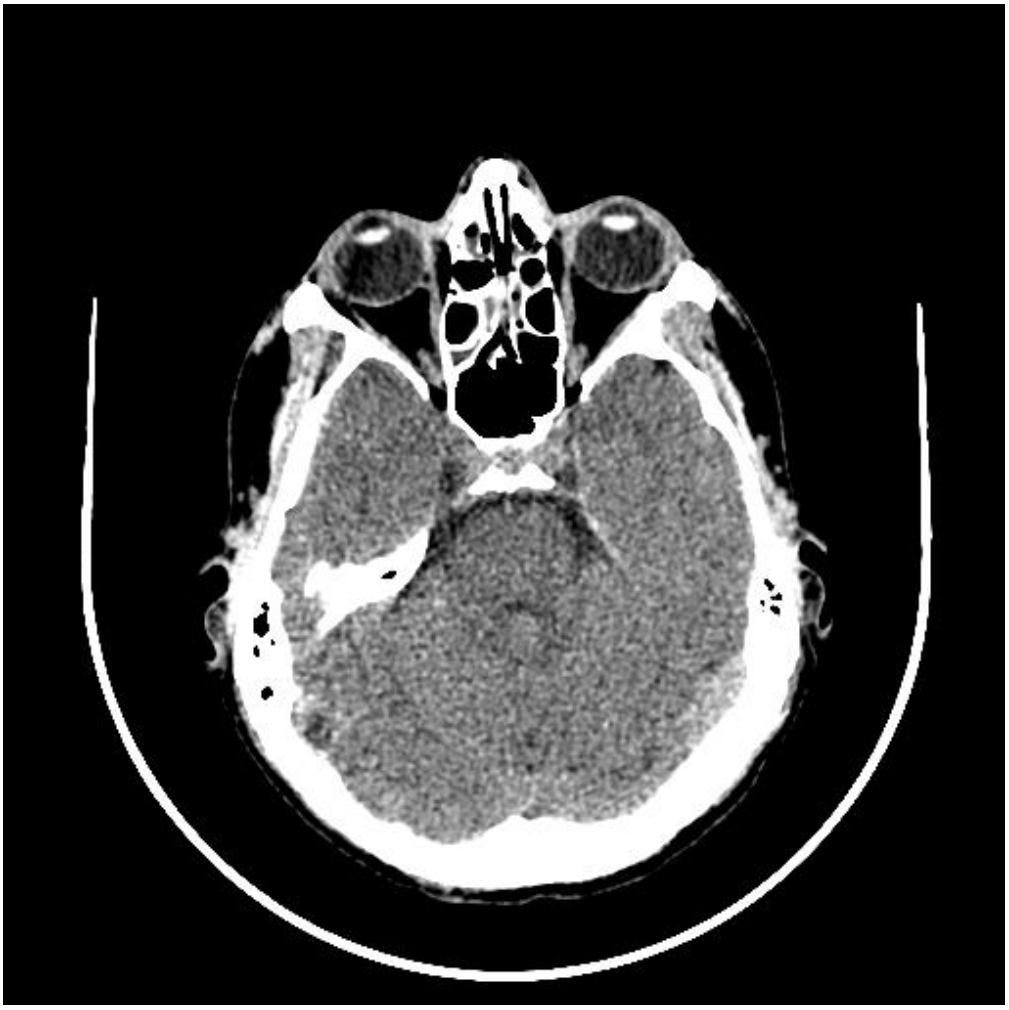
b

Description: Nonspecific heterogeneous lesion centred within the right posterior fossa at the level of the distal transverse sinus. **Origin:** Augusta University

c

Description: Nonspecific heterogeneous lesion centred within the right posterior fossa at the level of the distal transverse sinus. **Origin:** Augusta University

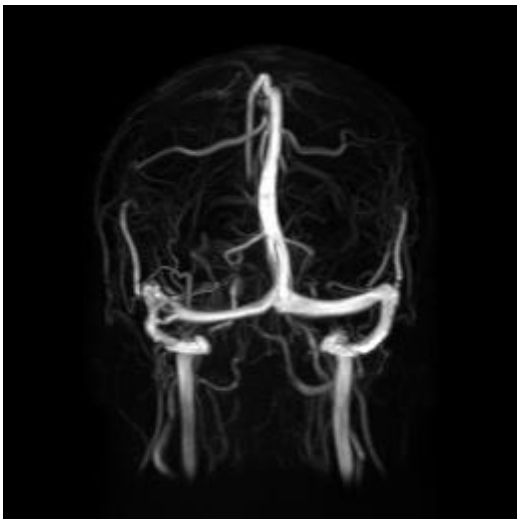
d



Description: Nonspecific heterogeneous lesion centred within the right posterior fossa at the level of the distal transverse sinus. **Origin:** Augusta University

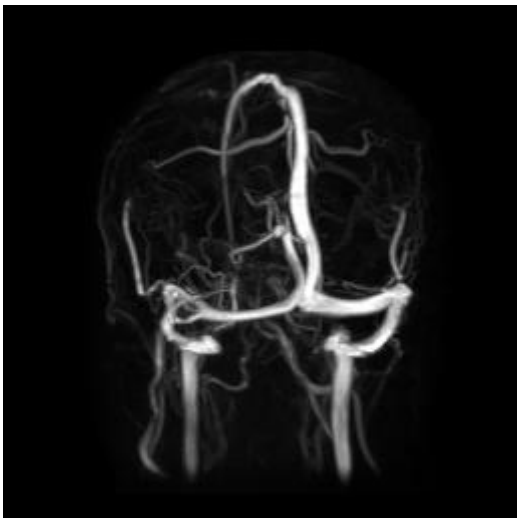
Figure 2

a



Description: MR Venogram shows a bifid right transverse sinus enclosing the "sac" of the brain herniation. The sigmoid sinus and the internal yugulary vein are normal in calibre. **Origin:** Augusta University

b



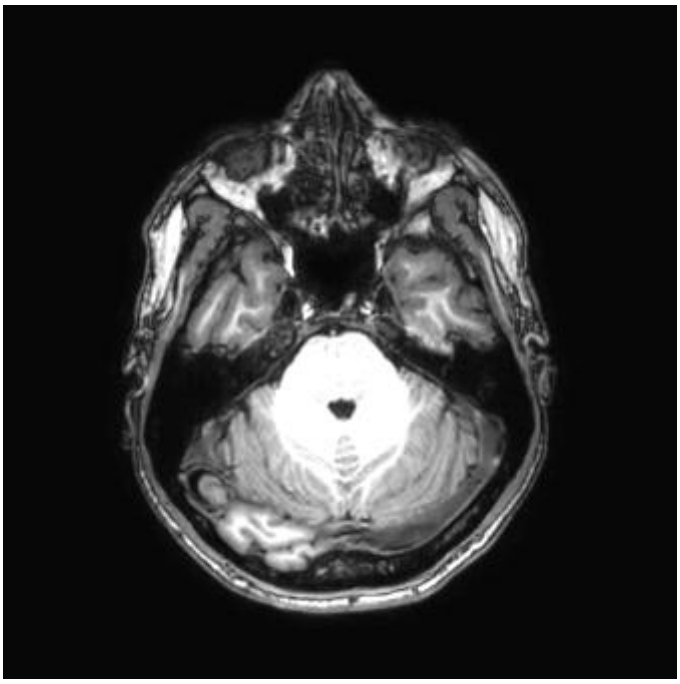
Description: MR Venogram shows a bifid right transverse sinus enclosing the "sac" of the brain herniation. The sigmoid sinus and the internal yugulary vein are normal in calibre. **Origin:** Augusta University

c

Description: MR Venogram shows a bifid right transverse sinus enclosing the "sac" of the brain herniation. The sigmoid sinus and the internal yugulary vein are normal in calibre. **Origin:** Augusta University

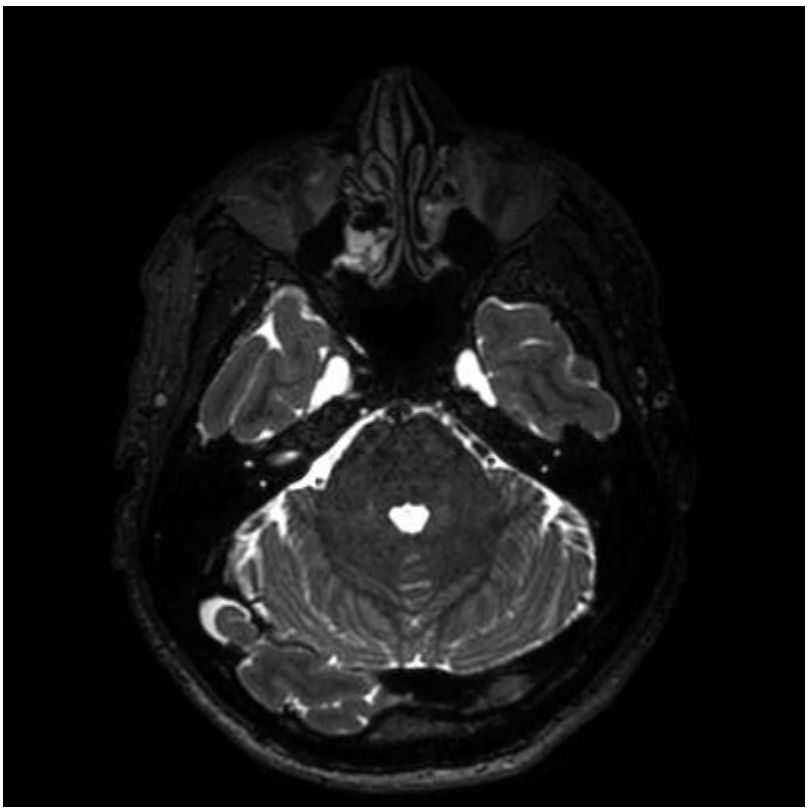
Figure 3

a



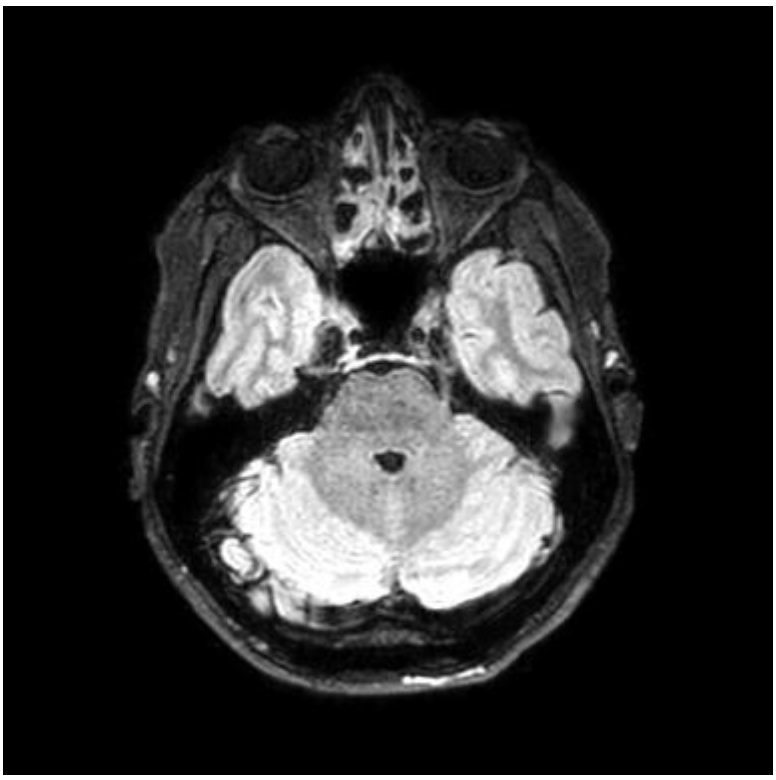
Description: MRI demostrates a polypoid cortical herniation from the lateral inferior right temporal occipital cortex into the superior aspect of the right transverse sinus in keeping with brain herniation into the tranverse sinus. **Origin:** Augusta University

b



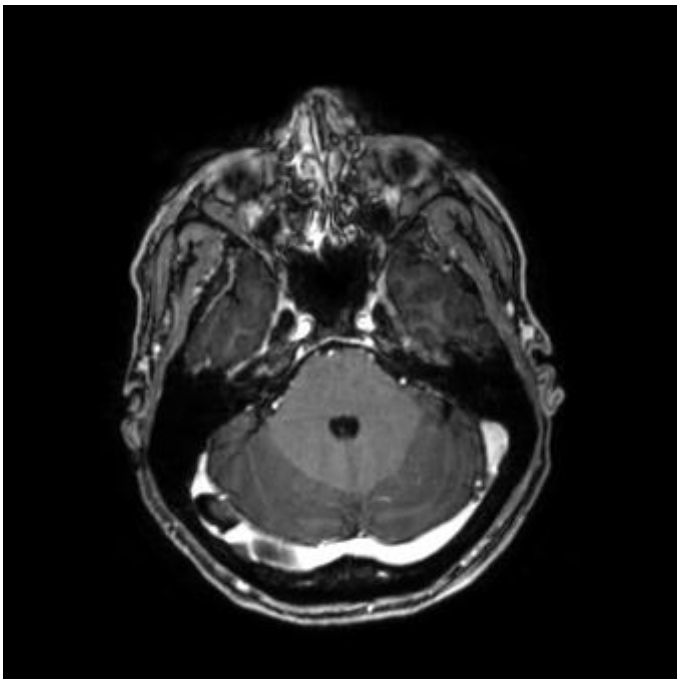
Description: MRI demonstrates that the cortical herniation is sorrounded by CSF. **Origin:** Augusta University

c



Description: MRI demostrates a polypoid cortical herniation from the lateral inferior right temporal occipital cortex into the superior aspect of the right transverse sinus in keeping with brain herniation into the tranverse sinus. **Origin:** Augusta University

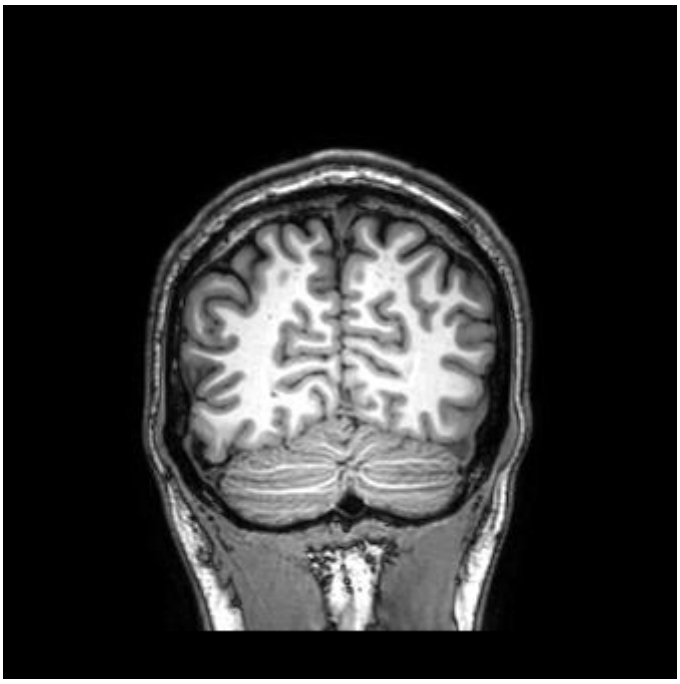
d



Description: MRI demostrates a polypoid cortical herniation from the lateral inferior right temporal occipital cortex into the superior aspect of the right transverse sinus in keeping with brain herniation into the tranverse sinus. **Origin:** Augusta University

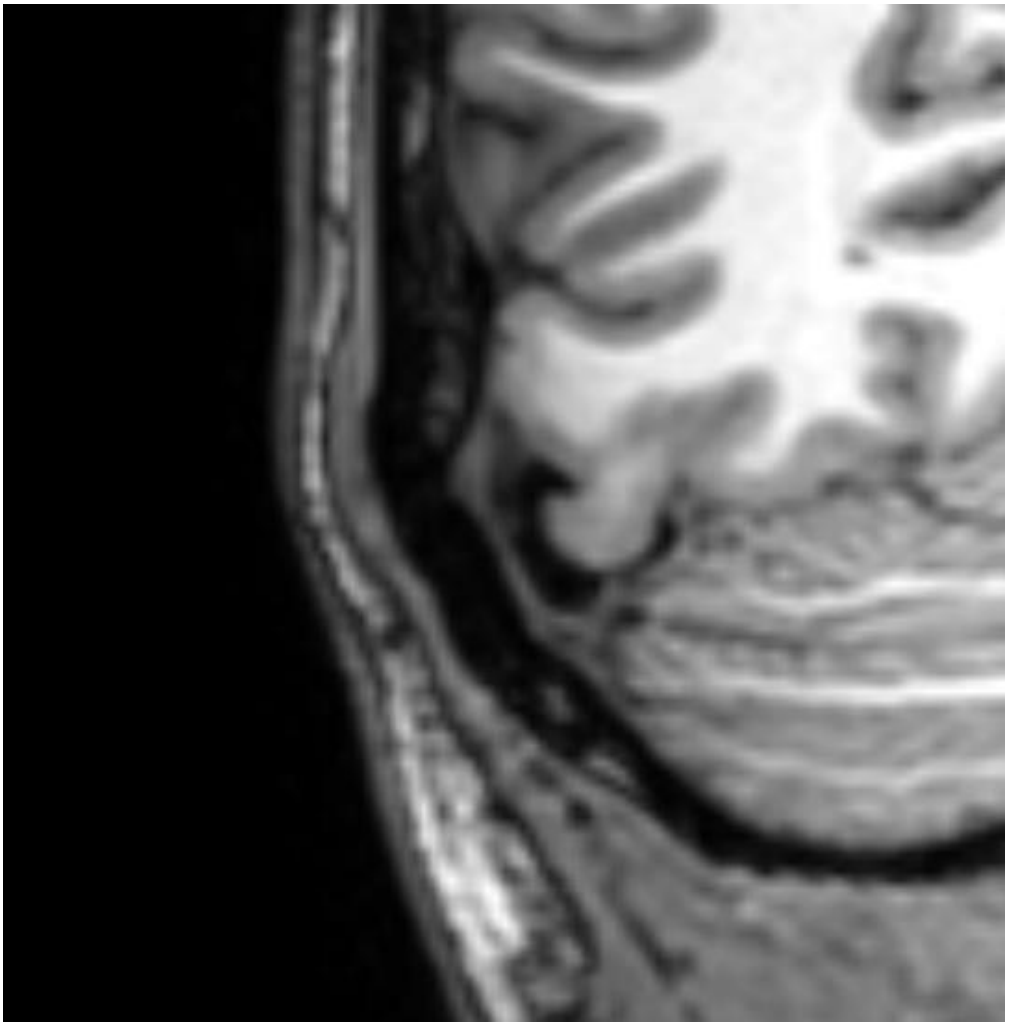
Figure 4

a



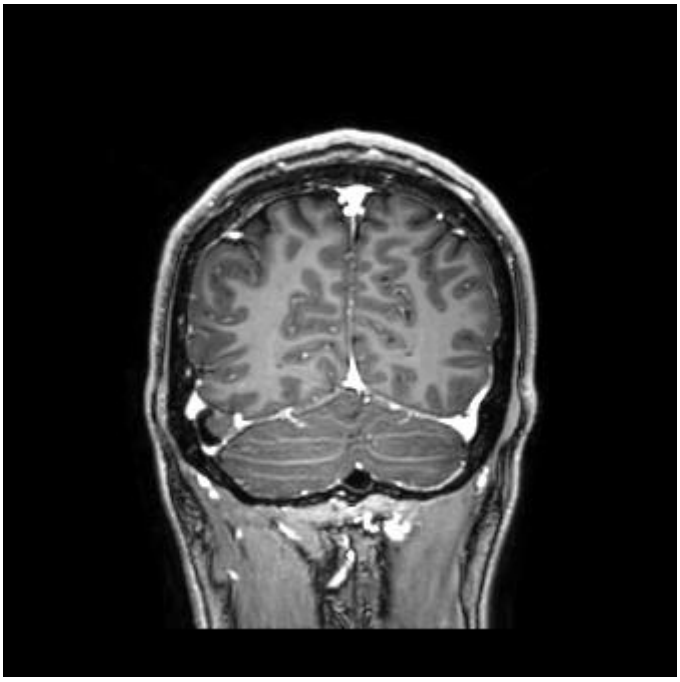
Description: MRI demostrates a polypoid cortical herniation from the lateral inferior right temporal occipital cortex into the superior aspect of the right transverse sinus. **Origin:** Augusta University

b



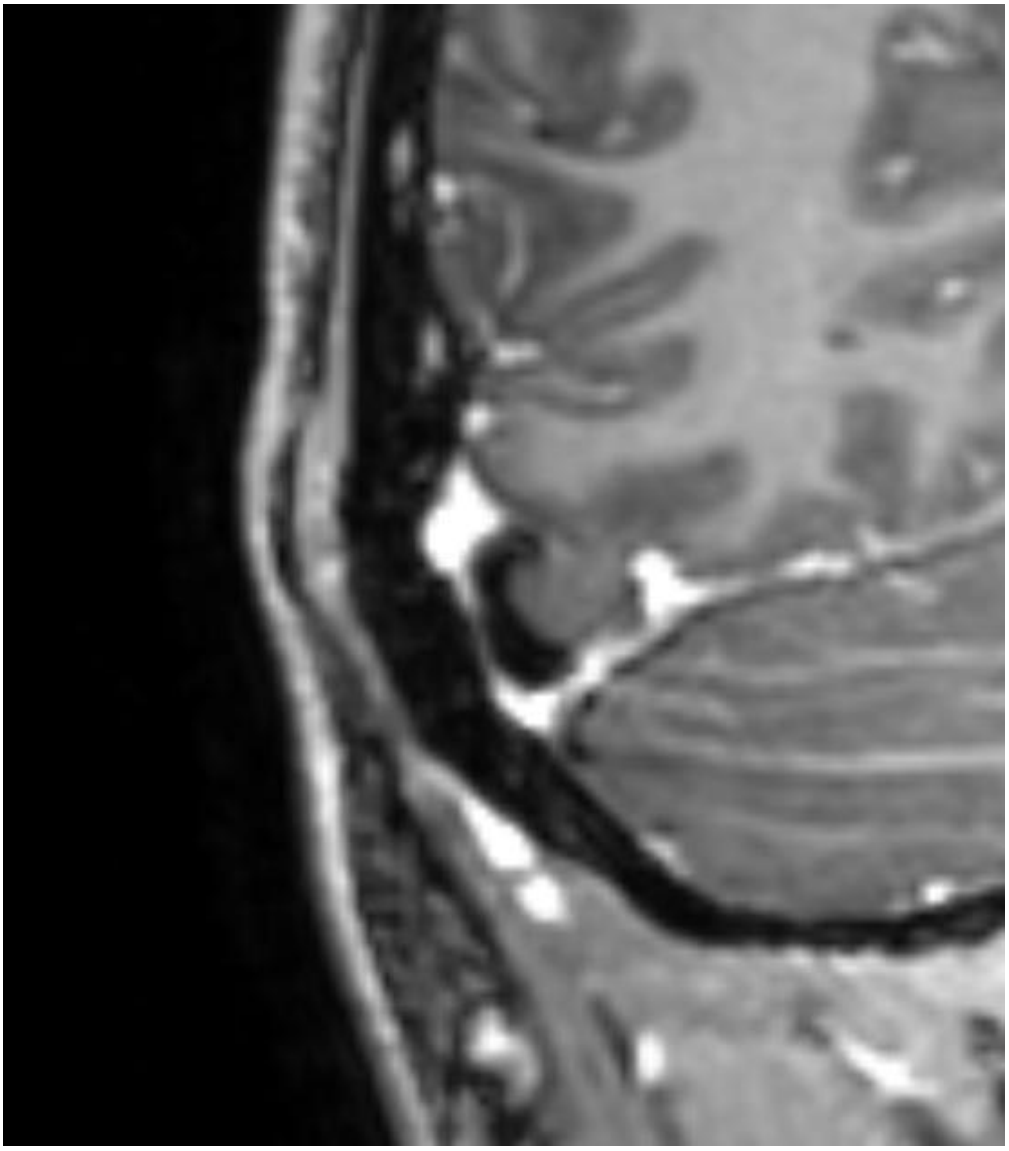
Description: MRI demostrates a polypoid cortical herniation from the lateral inferior right temporal occipital cortex into the superior aspect of the right transverse sinus. **Origin:** Augusta University

c



Description: MRI demostrates a polypoid cortical herniation from the lateral inferior right temporal occipital cortex into the superior aspect of the right transverse sinus. **Origin:** Augusta University

d



Description: MRI demostrates a polypoid cortical herniation from the lateral inferior right temporal occipital cortex into the superior aspect of the right transverse sinus. **Origin:** Augusta University