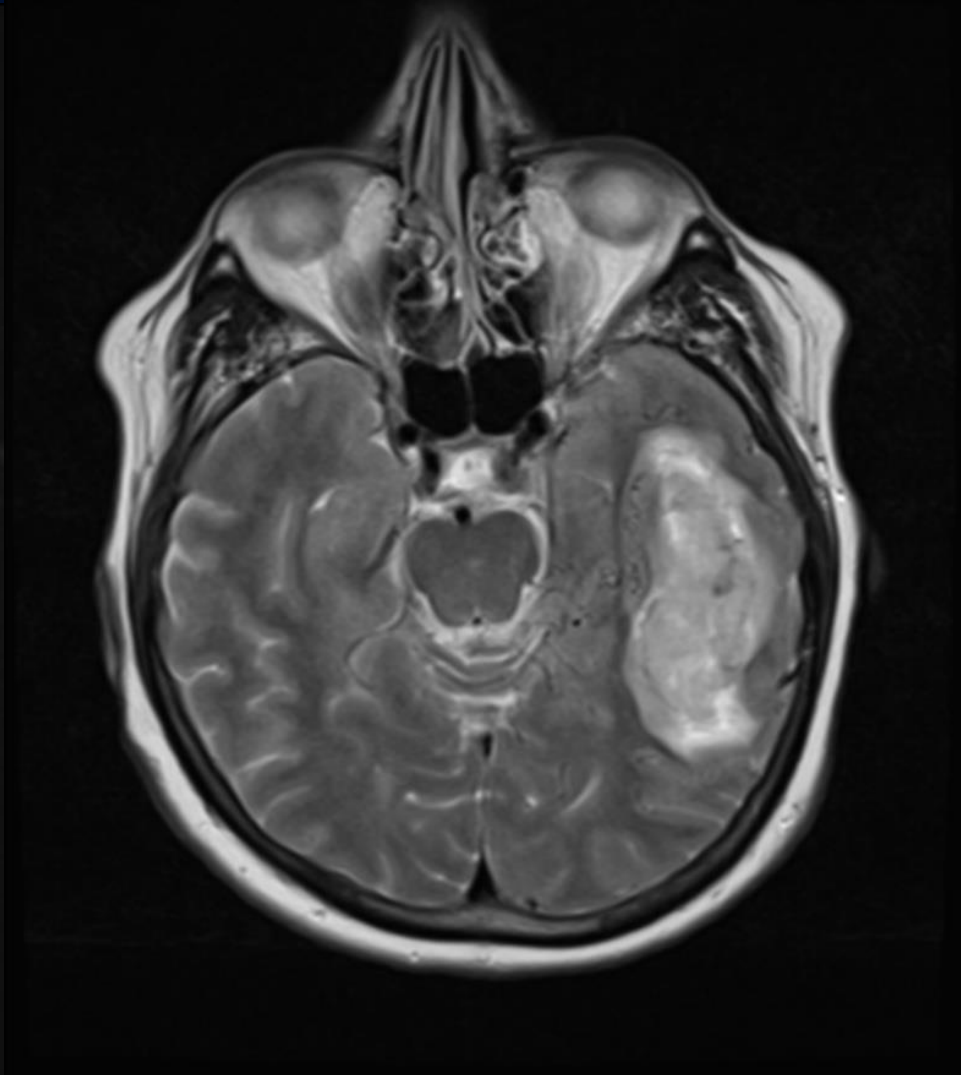
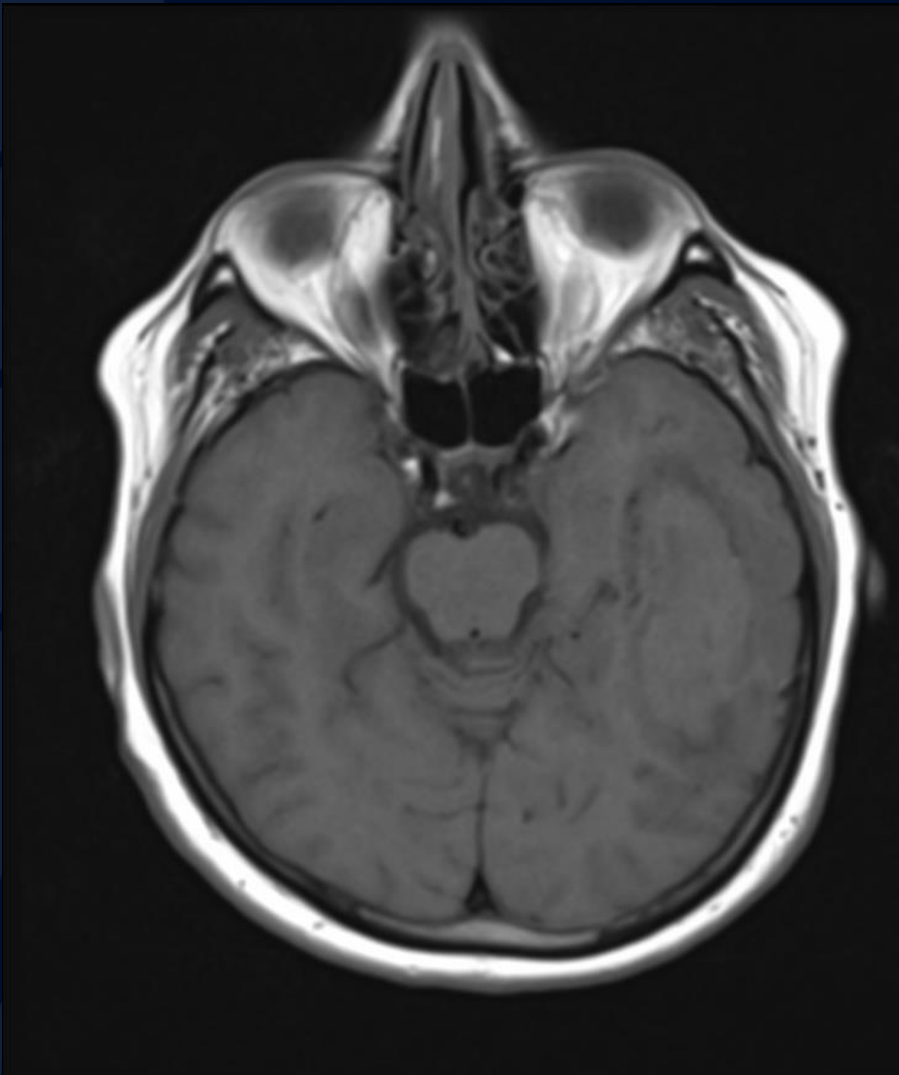
A large, stylized leaf graphic in a dark blue color, positioned on the left side of the slide. The leaf has a prominent vein structure and a wavy, serrated edge.

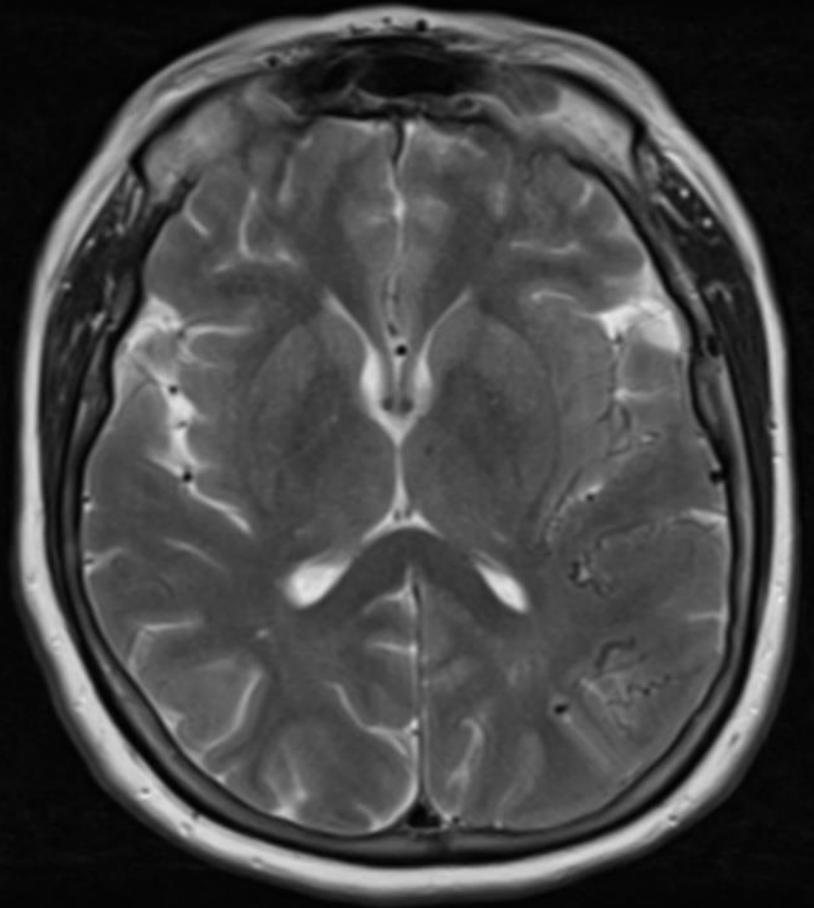
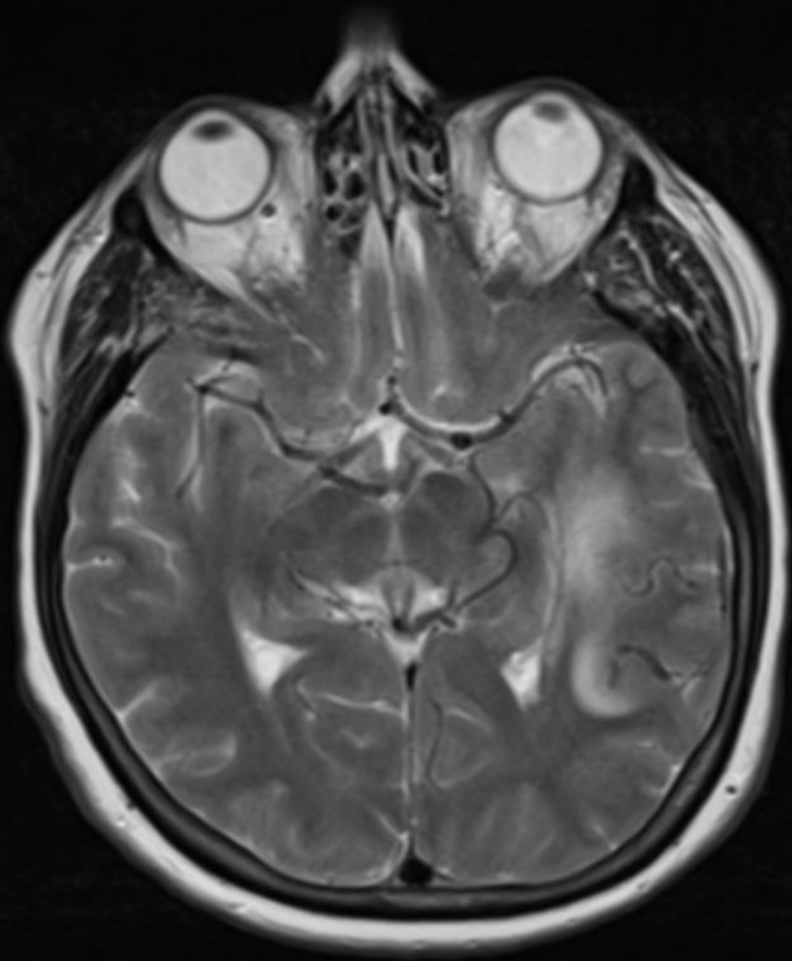
63 y/o woman presenting with headache and sudden onset of aphasia

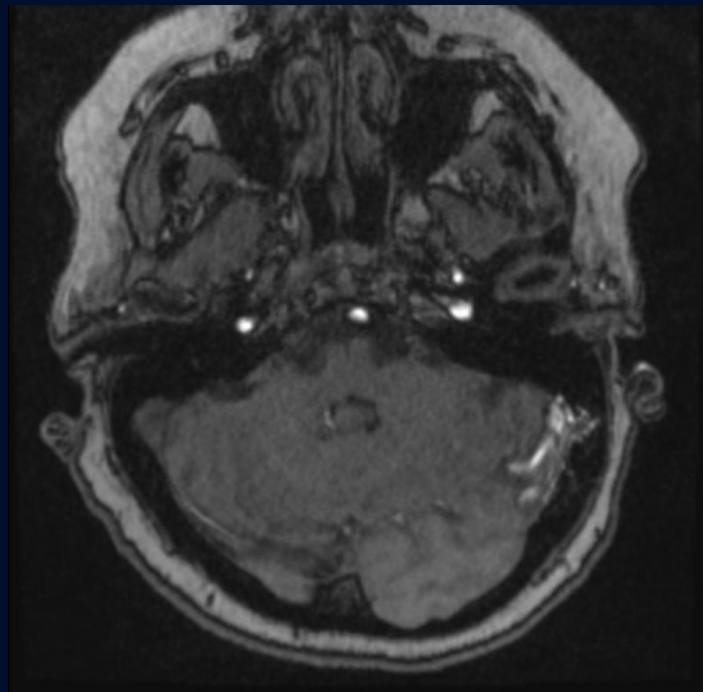
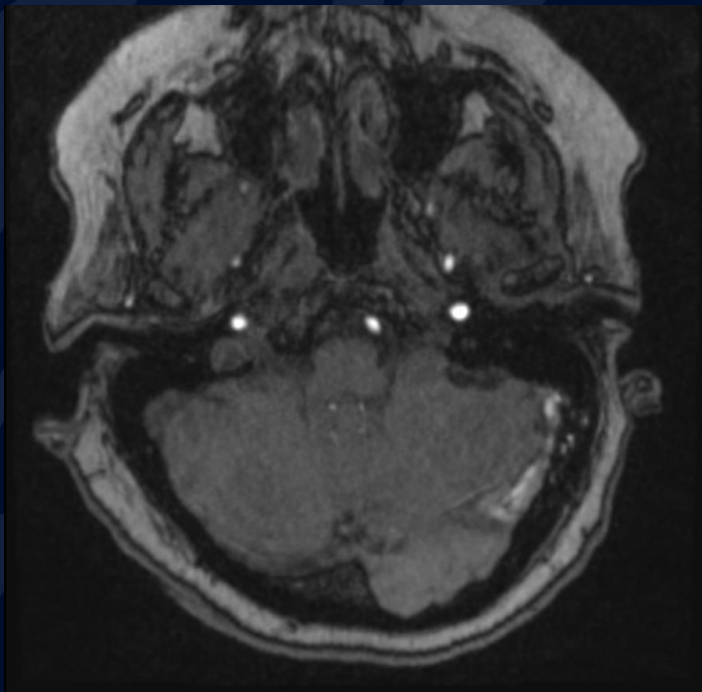
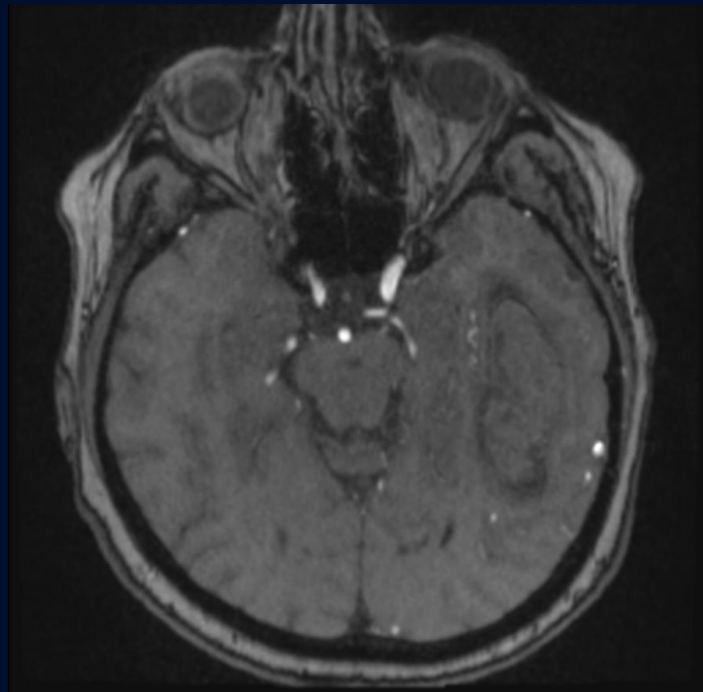
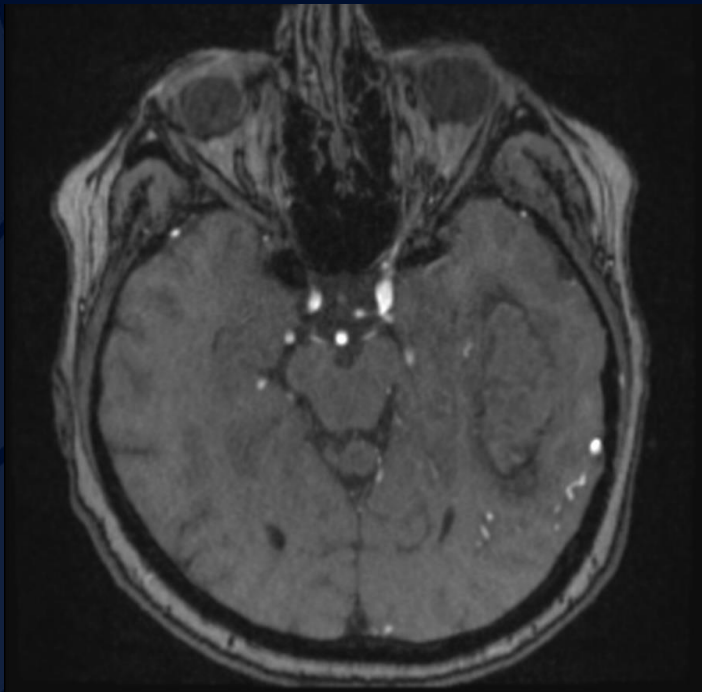
Martin Ollenschleger, MD

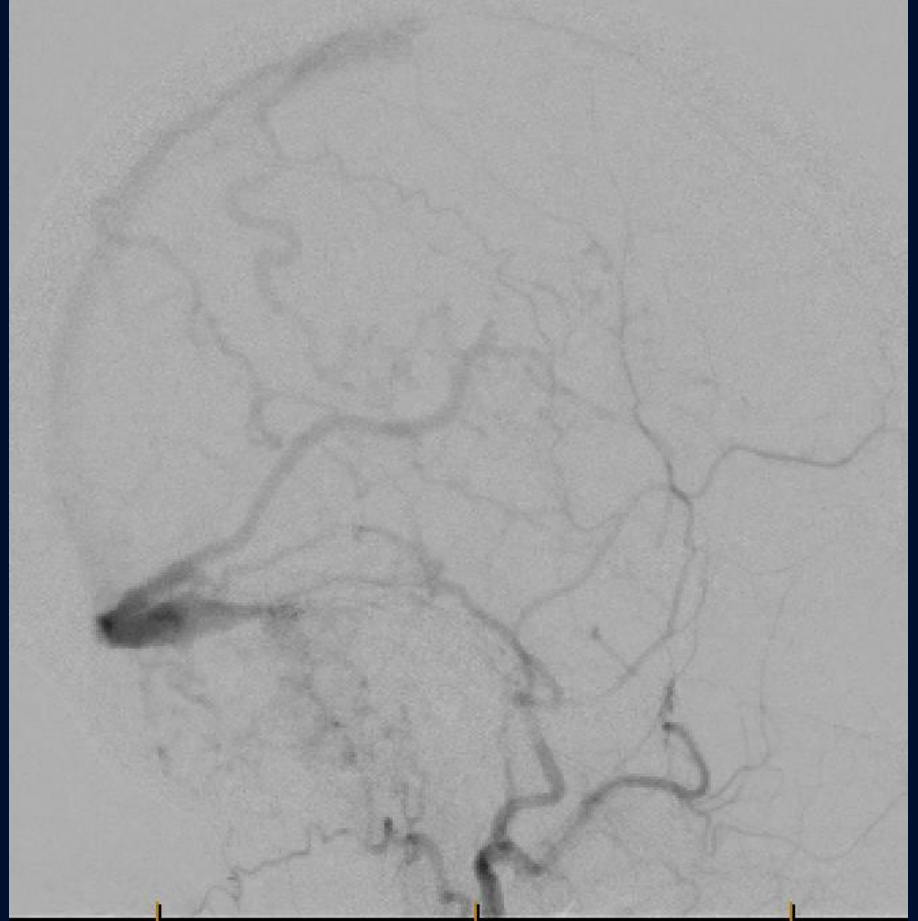
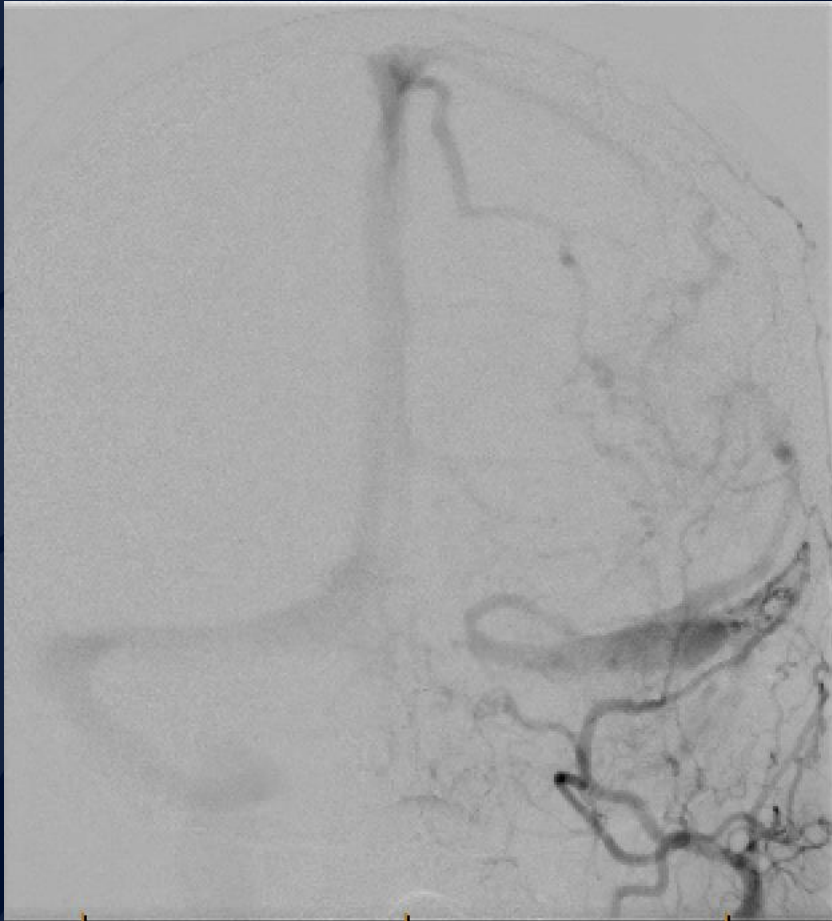












A large, stylized oak leaf graphic in a dark blue color, positioned on the left side of the slide. It features detailed vein patterns and a lobed edge.

?

Acute ICH Secondary to Dural Arteriovenous Fistula

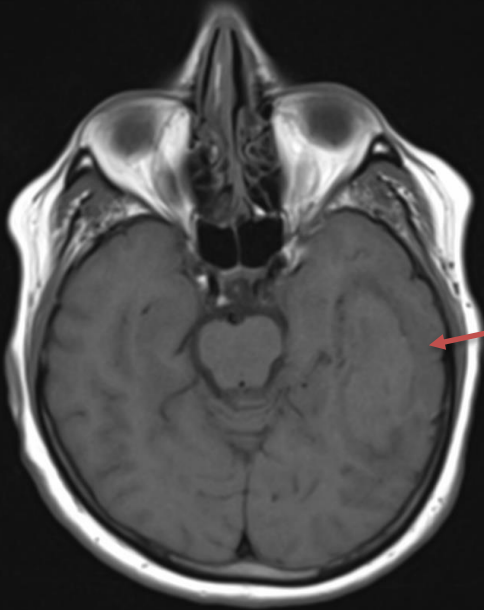


Acute
parenchymal
hematoma



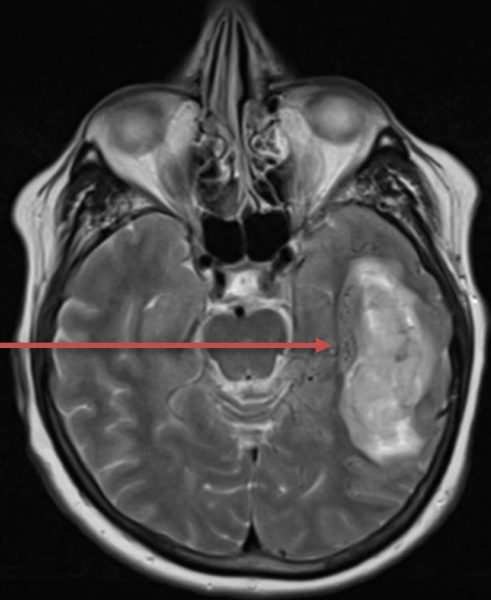
Subarachnoid
blood products



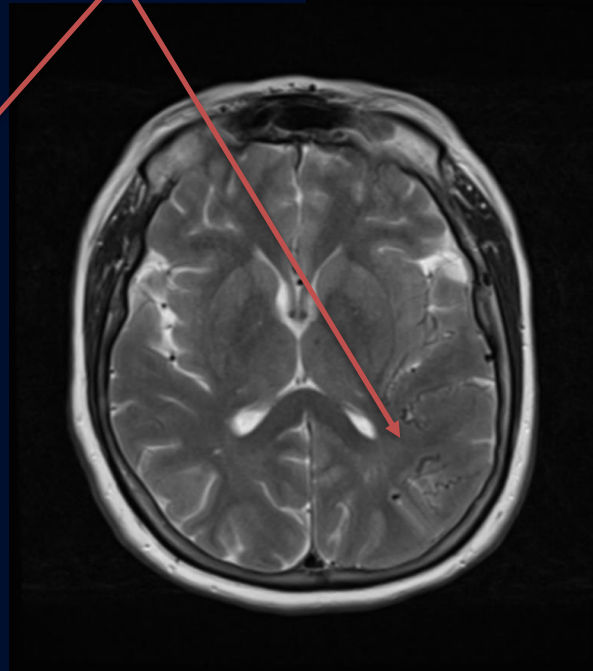
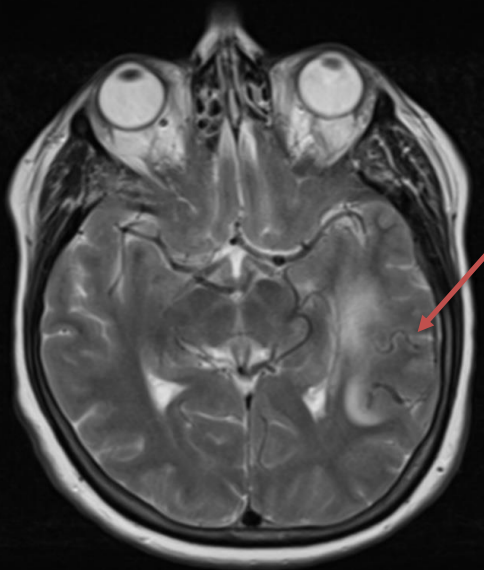


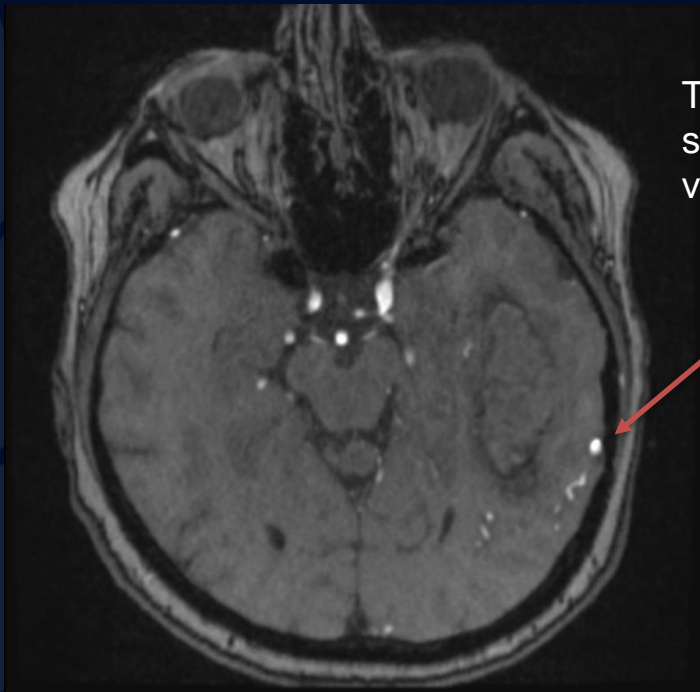
Hyperacute Blood Products

T1: isointense
T2: iso to hyper-intense

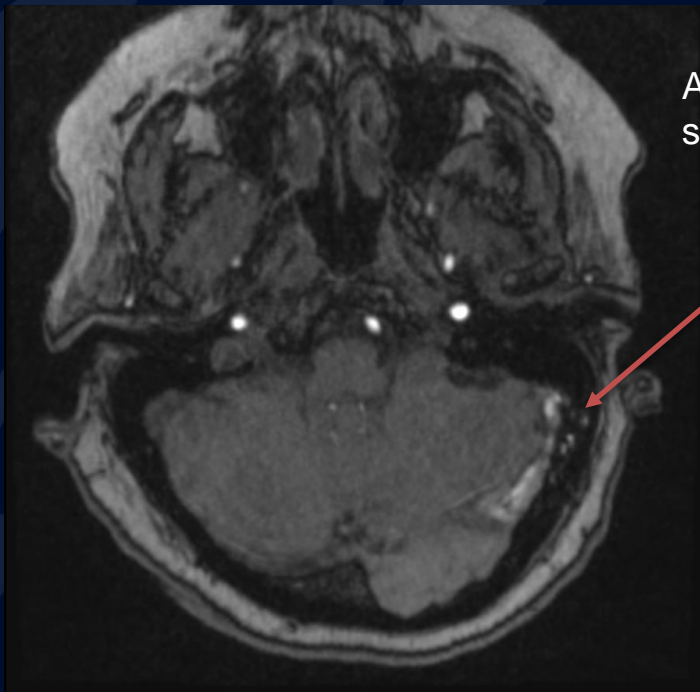
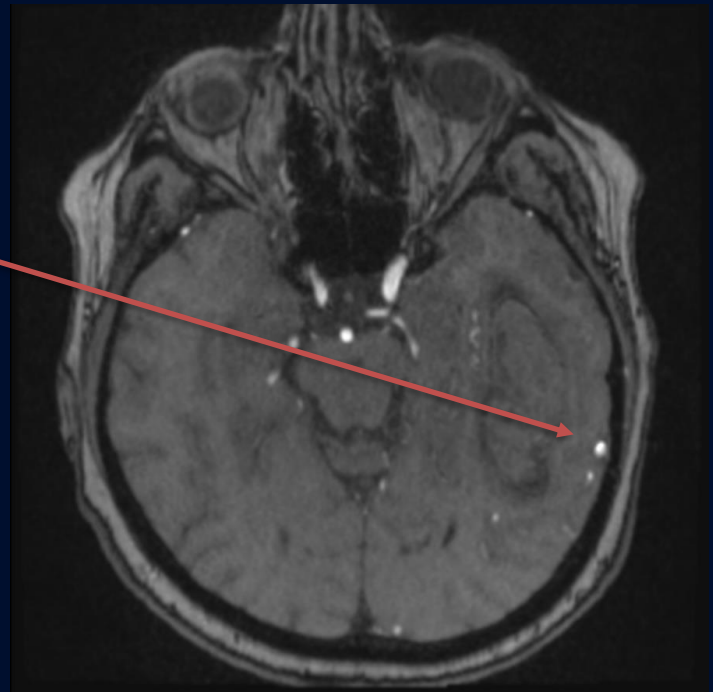


Abnormal Flow Voids

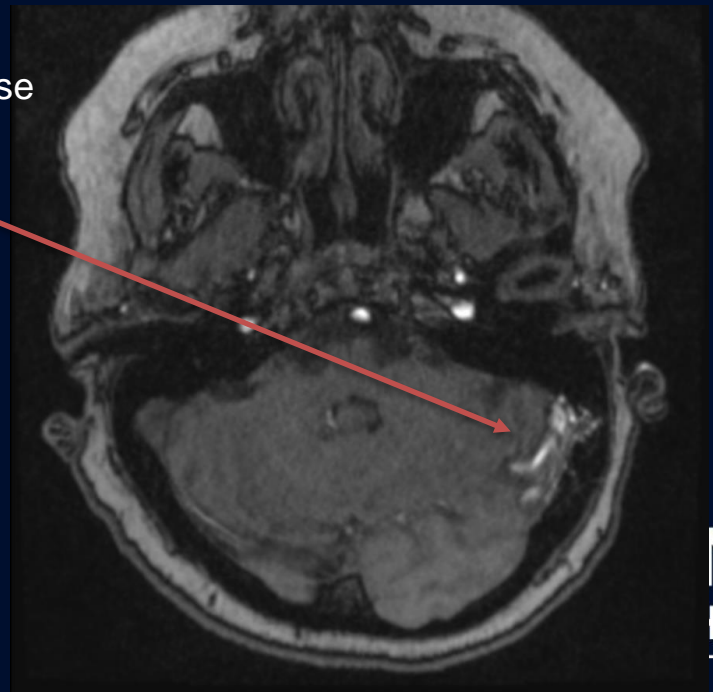




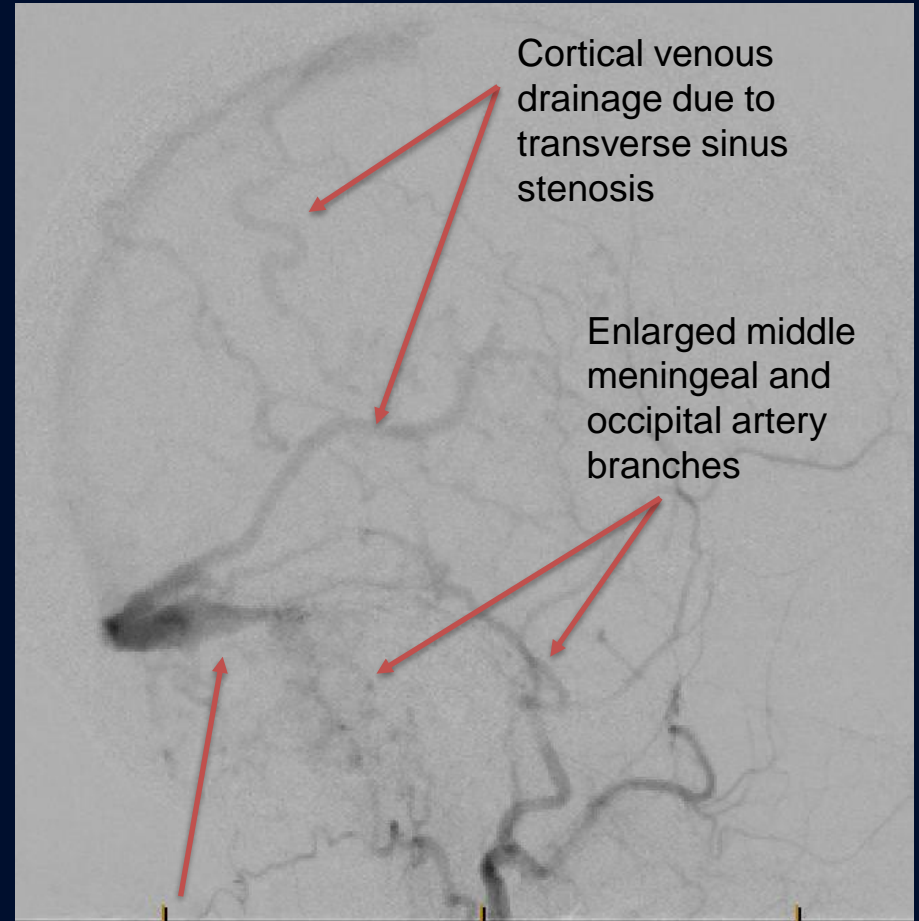
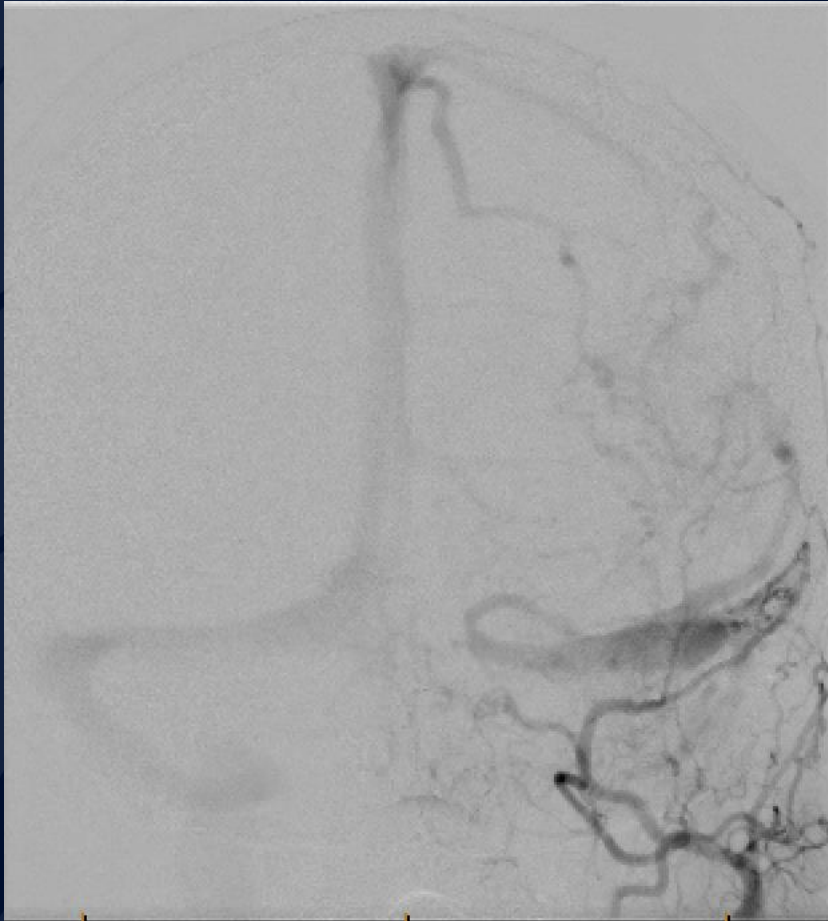
Time of Flight MRA
shows arterialized
veins



Arterialized transverse
sinus



Left external carotid artery angiogram



Cortical venous
drainage due to
transverse sinus
stenosis

Enlarged middle
meningeal and
occipital artery
branches

Arteriovenous shunting into transverse
sinus

Dural Arteriovenous Fistula

- Dural AVFs are acquired, pathological connections between dura supplying arteries and a dural venous sinus or cortical vein. Arteriovenous shunting through the fistula results in arterialized flow into the normally low pressure venous system, which may lead to hemorrhage.
- Usually seen in adults, middle age or older. Rare in children.
- Common symptoms for transverse sinus dAVF include:
 - Hemorrhage, including subarachnoid, subdural, or parenchymal
 - Pulsatile Tinnitus
 - Neurological deficits from venous hypertension
 - Focal deficit, seizures, encephalopathy, progressive dementia

Dural Arteriovenous Fistula

- MR imaging findings include:
 - T2/FLAIR: Enlarged flow voids; vasogenic edema
 - GRE: Microhemorrhages within brain parenchyma
 - Post contrast T1: dilated leptomeningeal and medullary vessels, venous ectasia, and parenchymal enhancement. Dural sinus occlusion or stenosis may also be seen.
 - MRA: Enlarged dural arteries; arterialized flow related signal in dural sinuses and cortical veins

Dural Arteriovenous Fistula

- Catheter-based cerebral angiography
 - Assess arterial supply (full 6-vessel study)
 - Predominantly ECA branches (MMA, ascending pharyngeal, occipital)
 - May also be supplied by meningeal branches from ICA, vertebral, PCA and SCA
 - Assess venous drainage pathway and flow direction
 - Which sinuses are involved
 - Anterograde or retrograde flow
 - Stenotic? Occluded?
 - Identify cortical venous drainage and ectasias

Dural Arteriovenous Fistula

- Classification based on location of shunt (dural or direct cortical vein) and presence or absence of cortical venous drainage (CVD)
 - Low grade fistulas, no CVD (Borden type I, Cognard type I or IIa)
 - Usually benign, low risk of ICH
 - Treated only if bothersome symptoms
 - High Grade Fistulas, +CVD (Borden type II and III, Cognard type IIb, III, IV, V)
 - Higher risk of ICH, usually treated

References

- Ollenschleger M. Acute left temporal lobe ICH secondary to dural arteriovenous fistula. Radiology Online (2021)
- Reynolds MR, Lanzino G, Zipfel GJ. Intracranial Dural Arteriovenous Fistulae Stroke. 2017;48(5):1424-1431