35-year-old female presents with neck pain and vision loss

Julianna Lee, MS3

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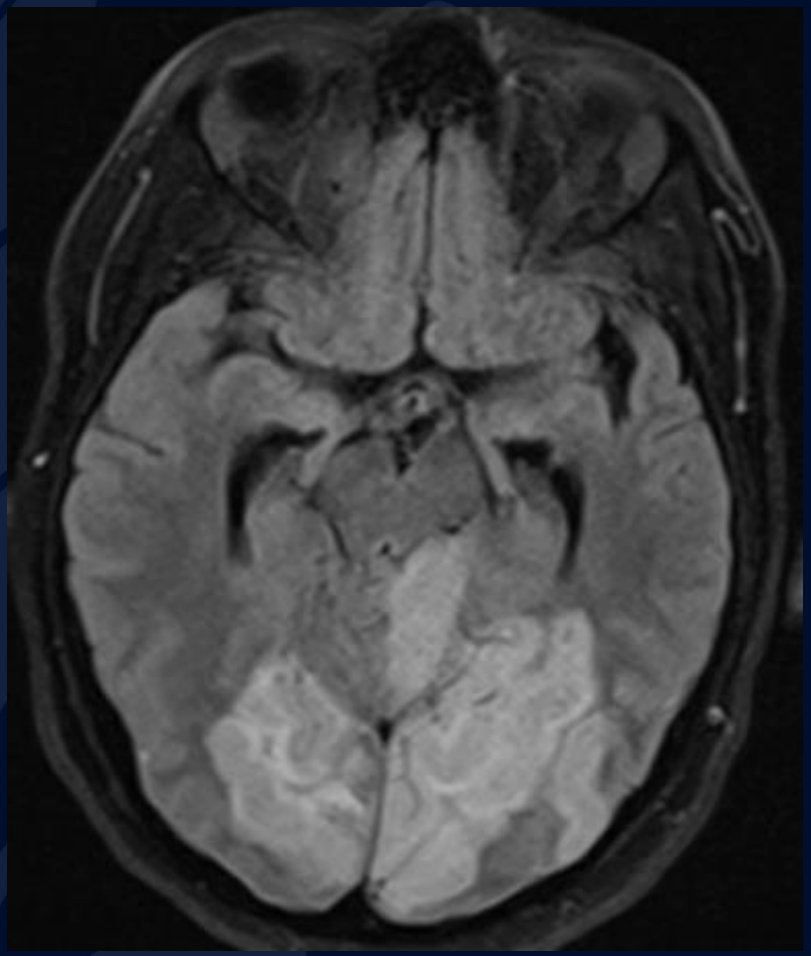
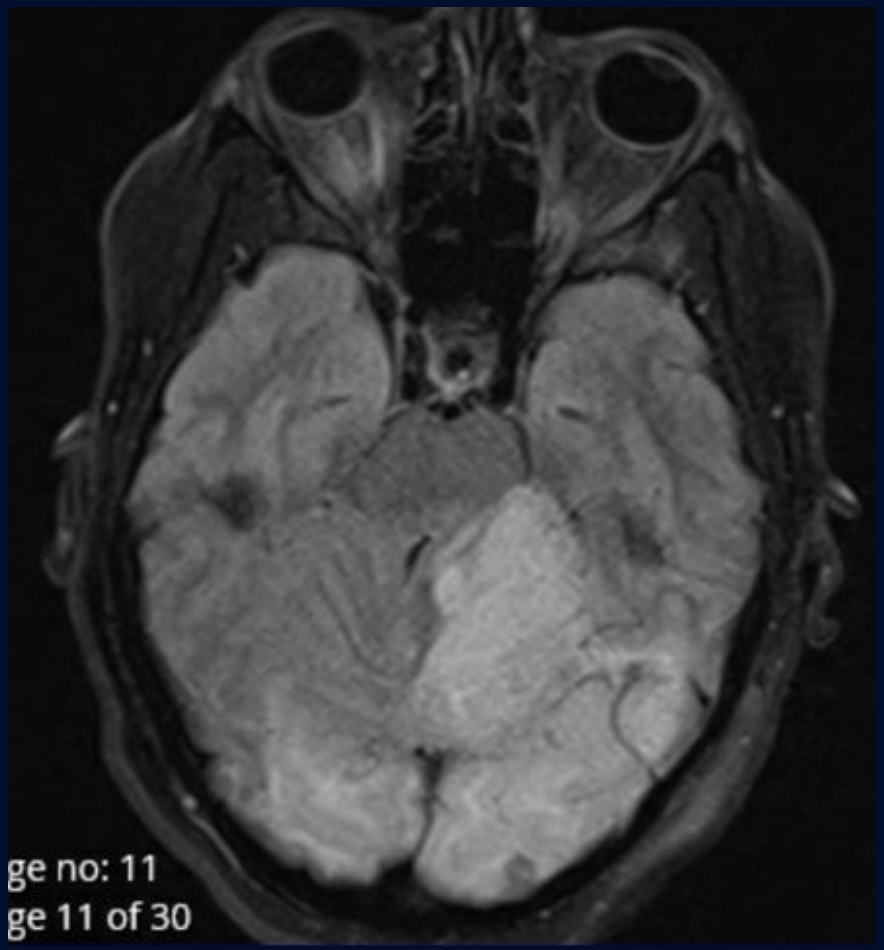
T2 Flair





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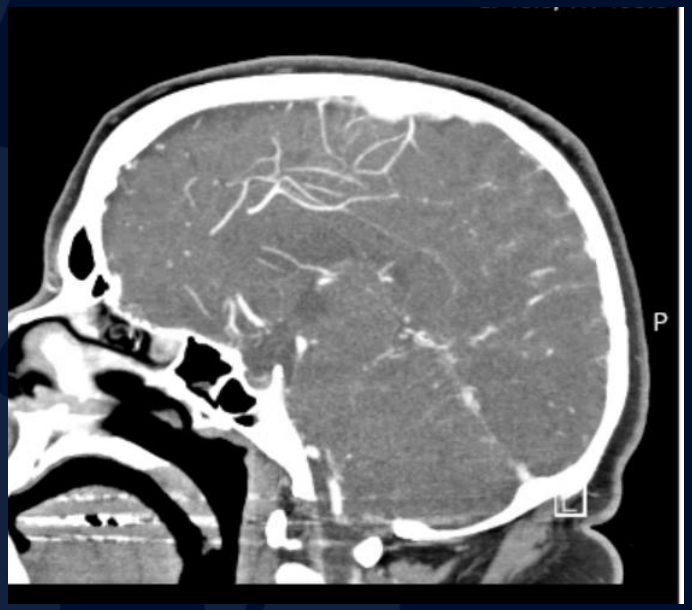
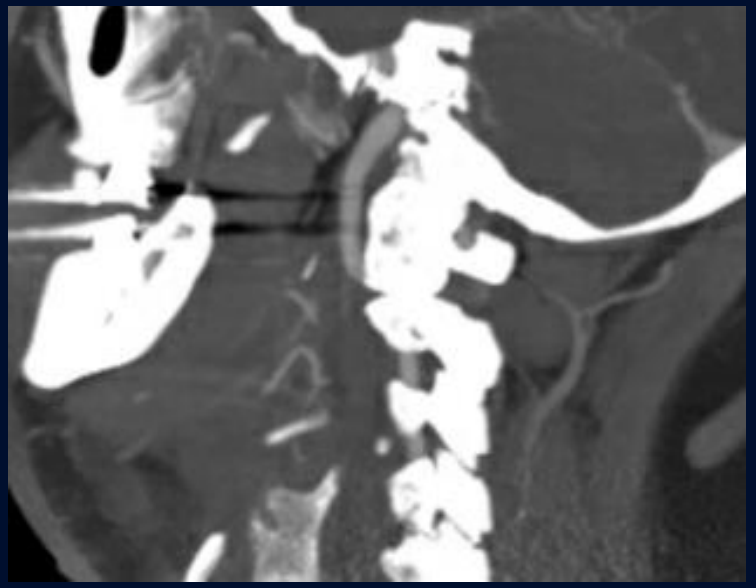
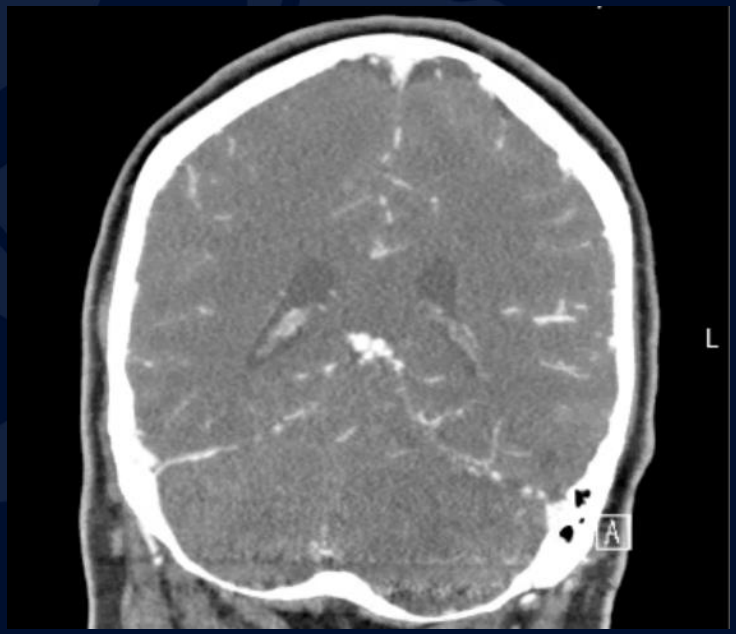
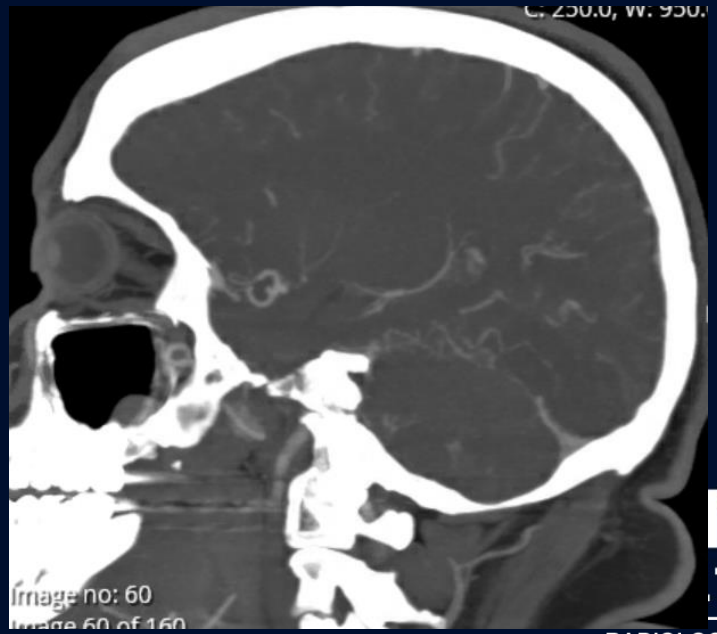
CTA

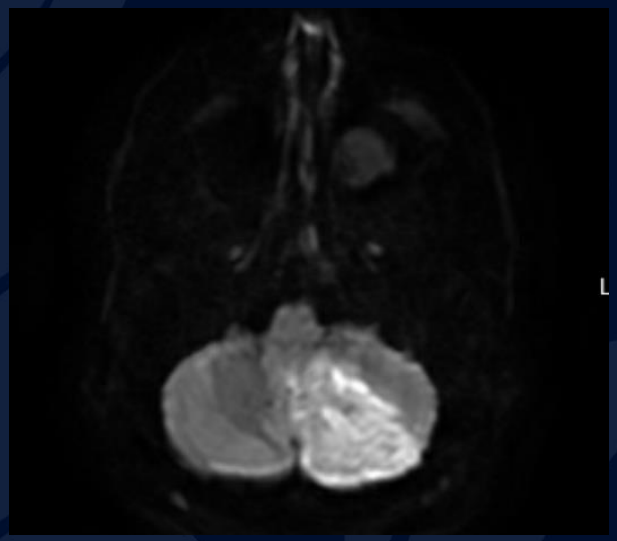


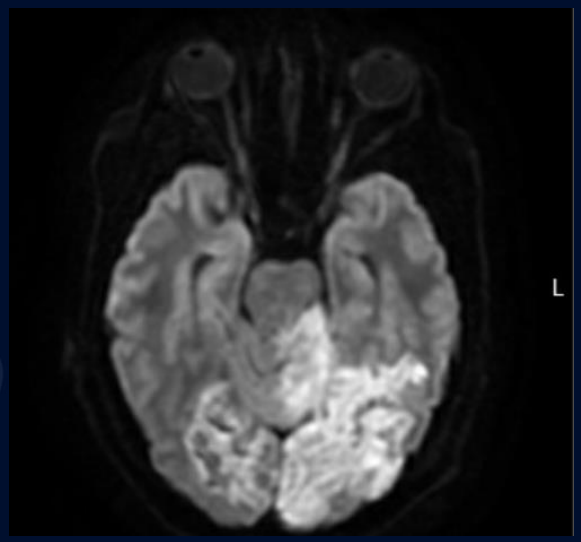


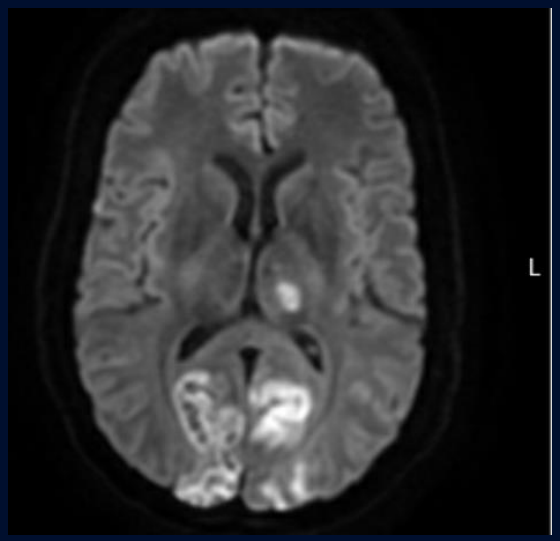


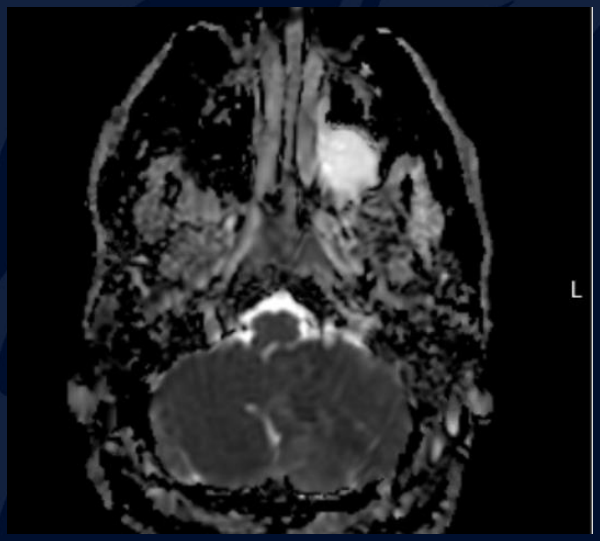


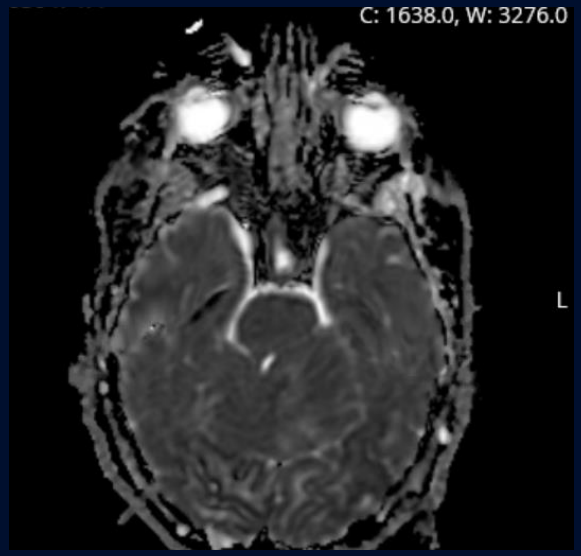
Follow up MRI (1 day later)

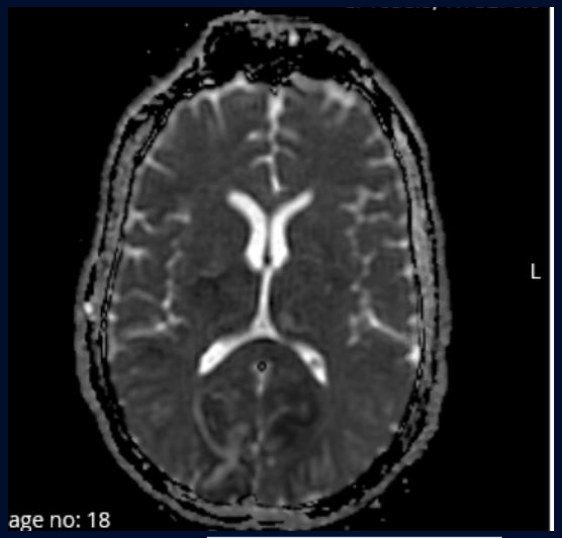












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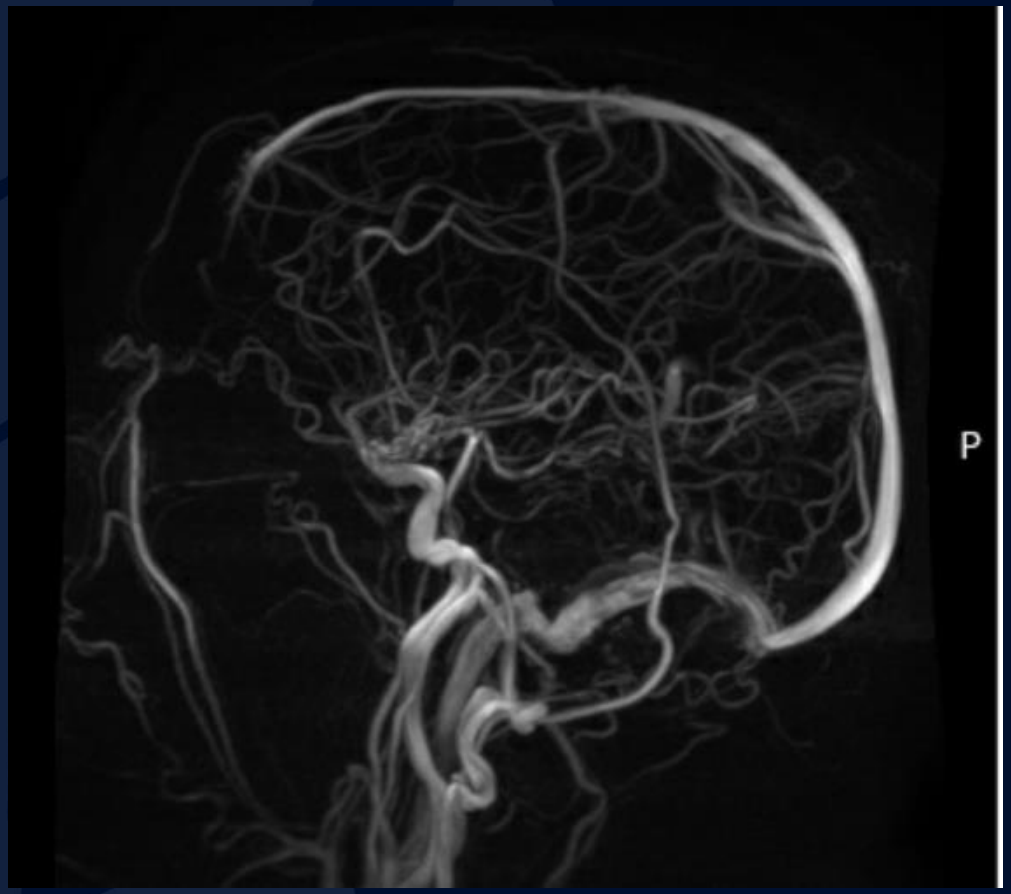
MRV



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Bilateral Posterior Ischemic Stroke

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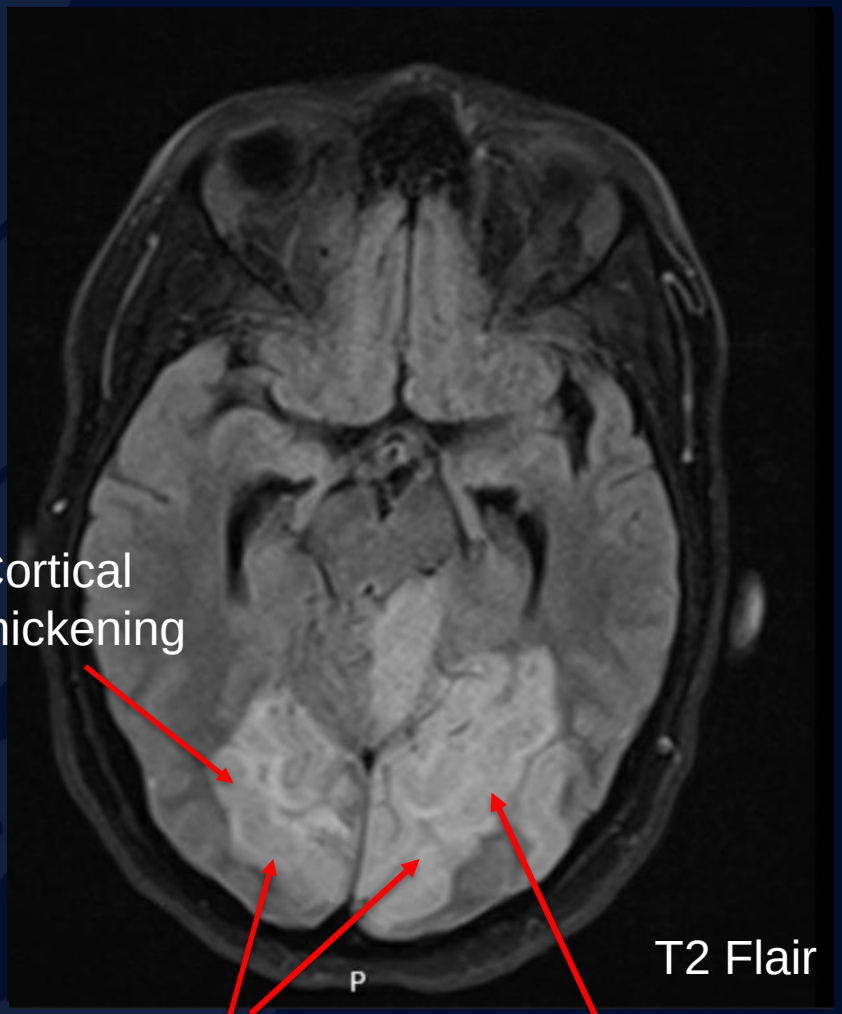
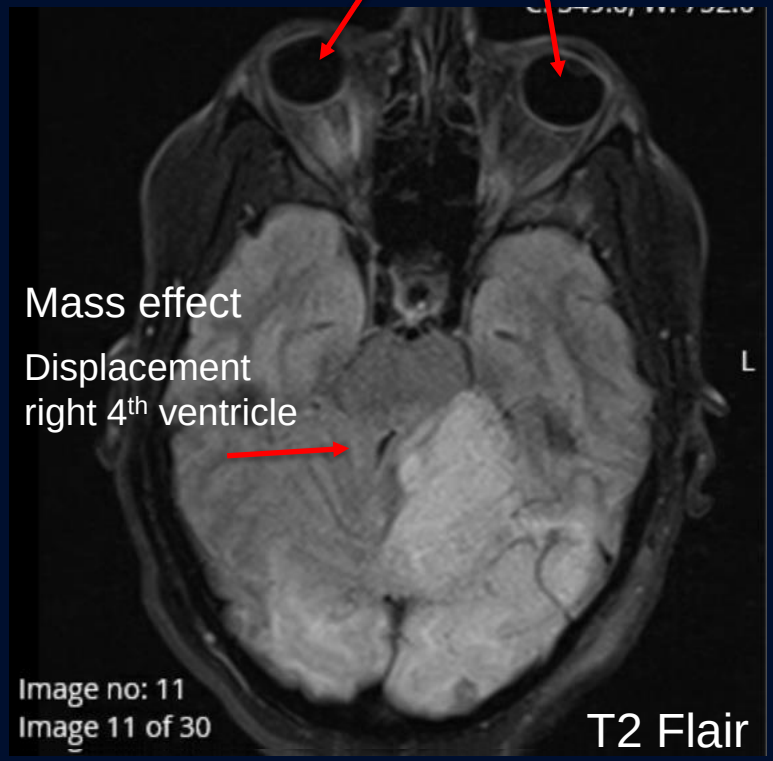
Bilateral occipital lobe involvement



Normal orbits



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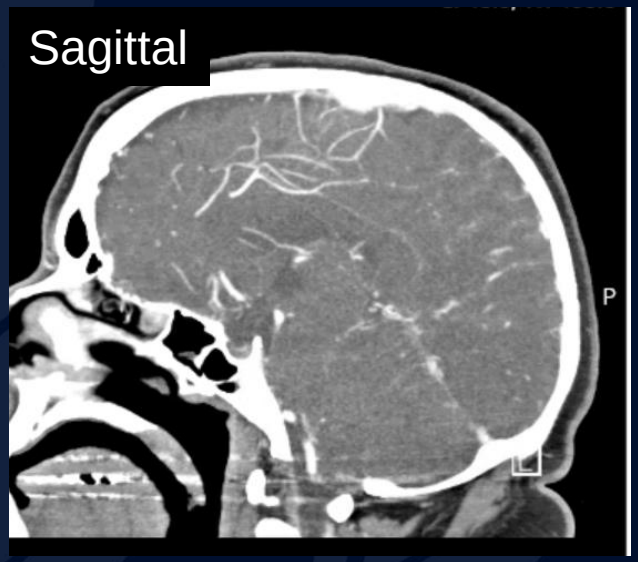
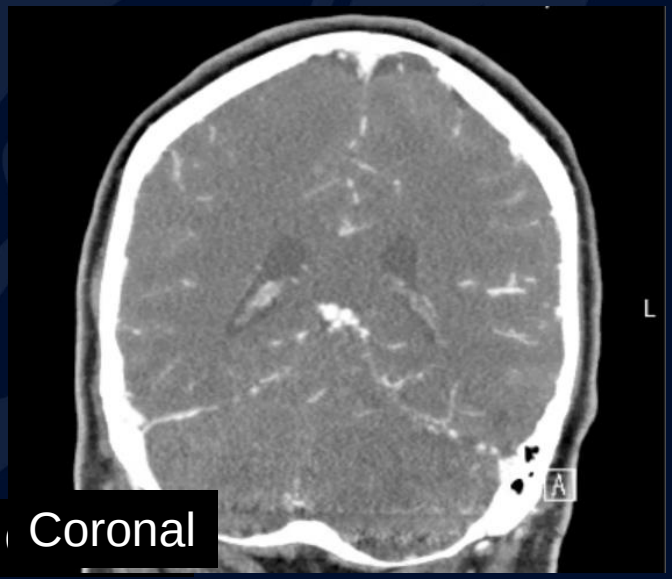
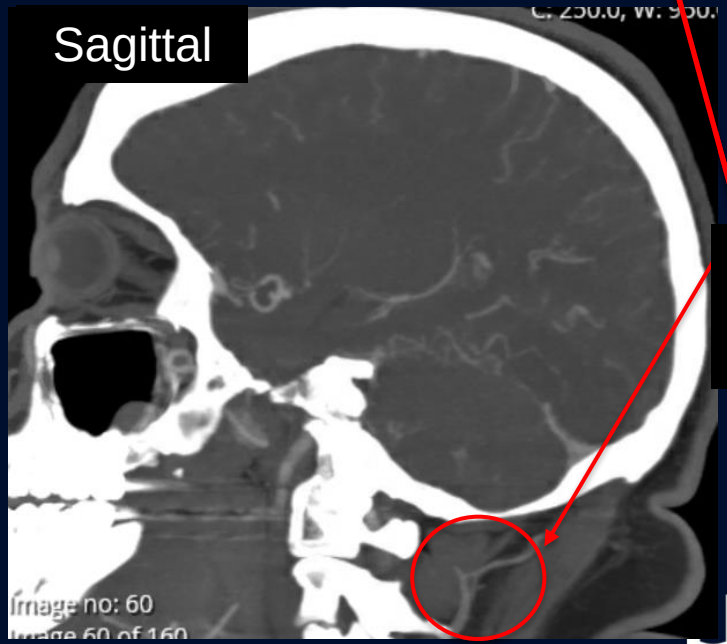


Subtle diffuse low attenuation in the bilateral occipital lobes and left cerebellum; no hemorrhage





Intraluminal defect in proximal L vertebral artery

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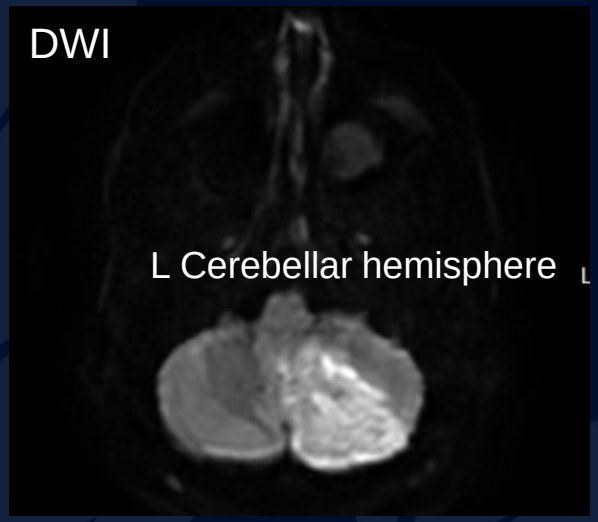
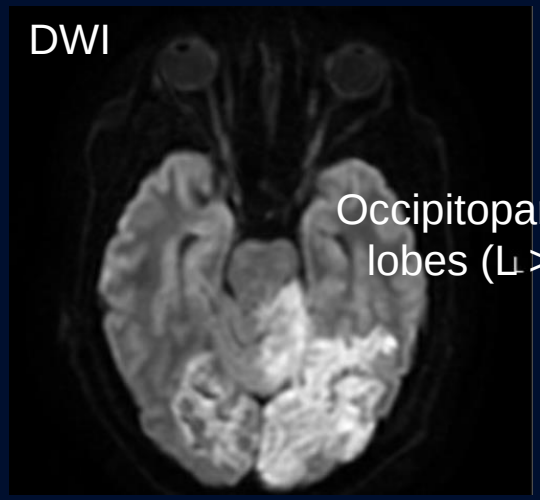
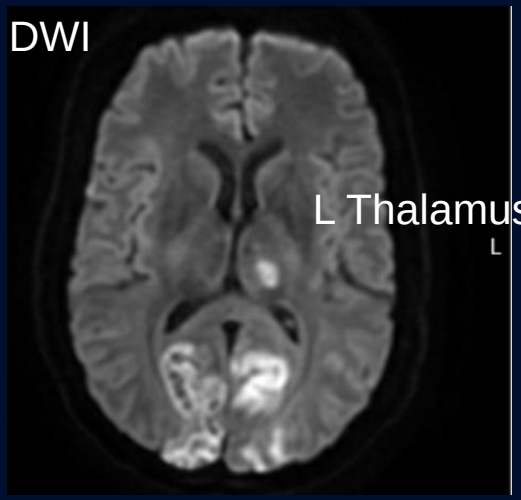
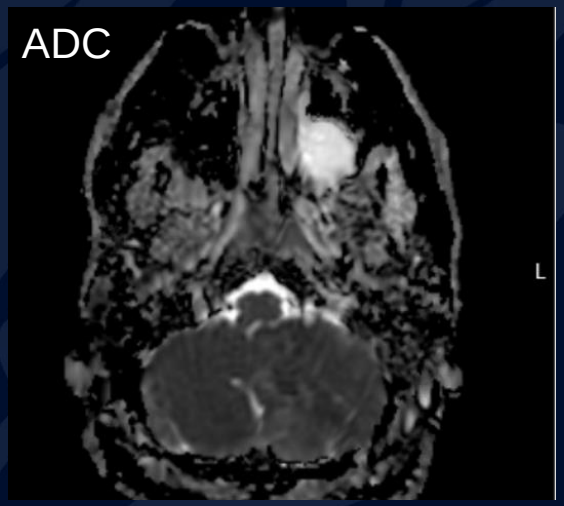
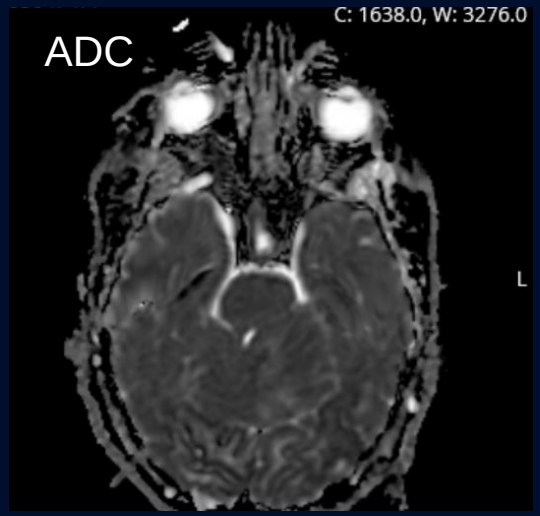
Follow up MRI (1 day later)

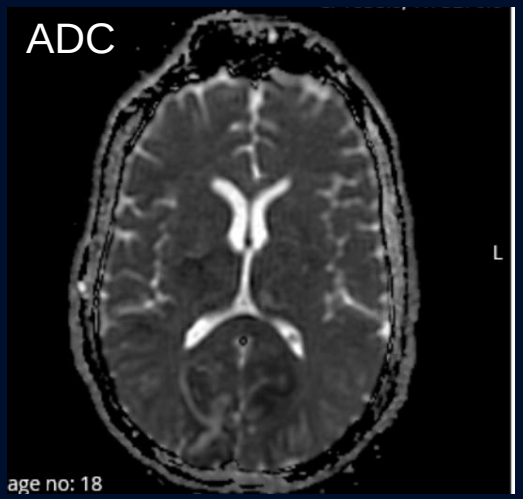












Hyperintensity on DWI corresponding to low ADC values indicative for restriction; evolution of early cytotoxic edema

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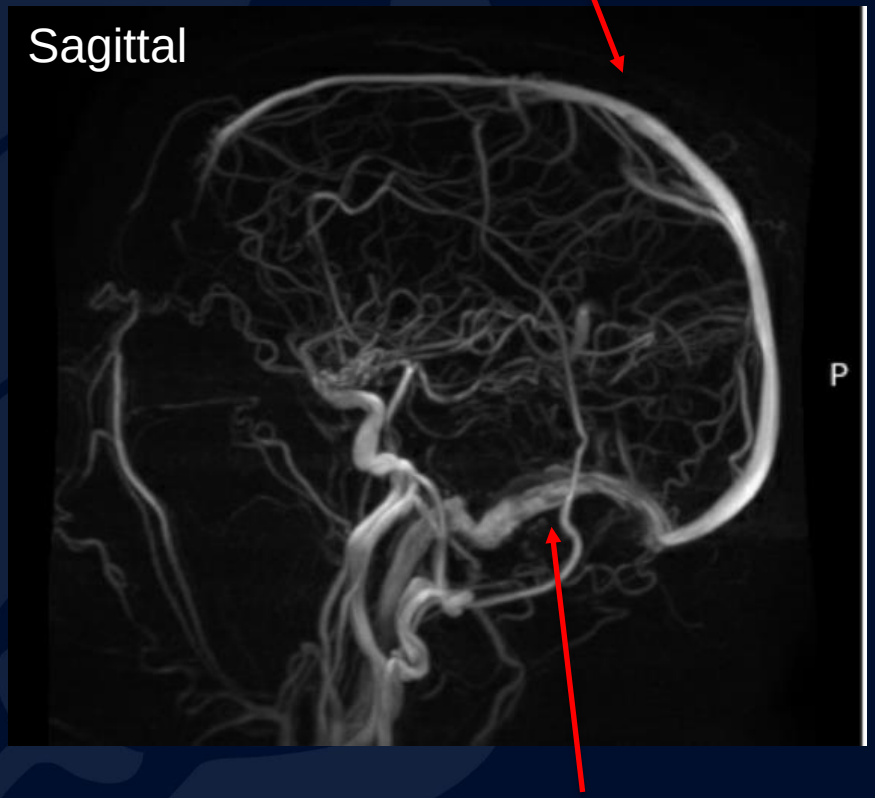
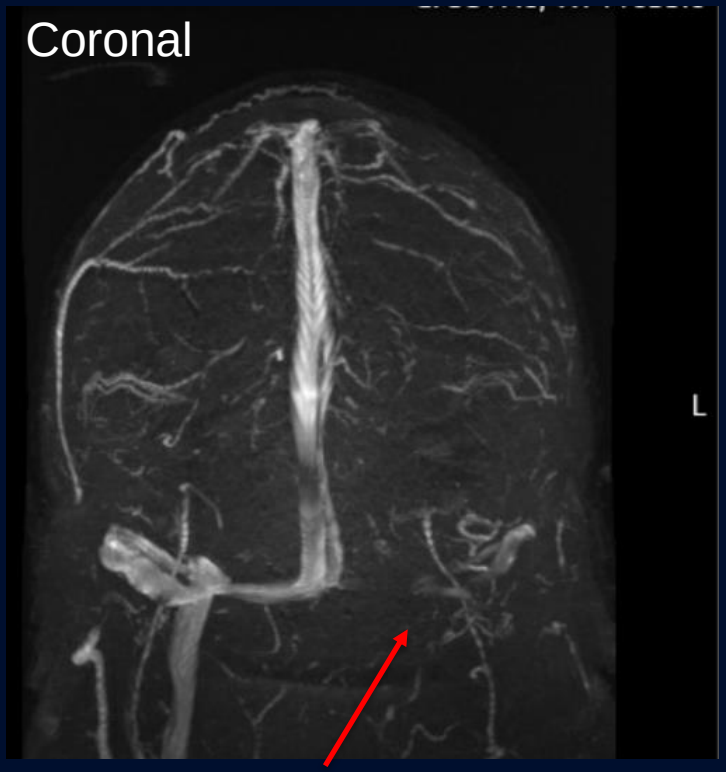
Normal flow signal in superior sagittal sinus



Decreased flow in left sigmoid/transverse sinus



Loss of normal flow in left internal jugular vein

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Bilateral Posterior Ischemic Stroke

- Bilateral Posterior Ischemic Stroke
  - A decrease in blood flow (infarct) to the brain due to either a thrombotic or embolic event involving the posterior circulation
    - Vertebral arteries, posterior inferior cerebellar arteries, basilar arteries, anterior inferior cerebellar arteries, posterior cerebral artery (PCA), and/or posterior communicating arteries
- Clinical presentation
  - Based on the region supplied by posterior circulation infarcted
    - Superficial PCA supplies the occipital lobe and inferior portion of the temporal lobe → visual and somatosensory deficits such as homonymous hemianopsia
    - Deep PCA supplies the thalamus, posterior limb of the internal capsule and deep brain structures → hemisensory loss and hemiparesis
  - *Bilateral infarction of the occipital lobes can cause cortical blindness*
- Epidemiology
  - Incidence of PCA strokes between 5-10% with pure PCA strokes accounting for 6.1% of stroke cases

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Posterior Ischemic Stroke

Causes:

- Thrombotic event
  - Blood flow to brain is obstructed *within* the blood vessel secondary to vessel dysfunction
    - Atherosclerotic disease, arterial dissection, fibromuscular dysplasia, or underlying inflammatory disease
- Embolic event
  - Blood flow is blocked due to clot from elsewhere in the body
    - PCA infarction is most often from cardiac source, vertebrobasilar atheromatous disease, or unknown source

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Imaging Findings in Ischemic Stroke

Imaging in acute strokes used for diagnosis and treatment planning including non-contrast CT +/- CT perfusion and CT angiography

Imaging after (CT and MRI) demonstrate the regions of brain affected and timing of the stroke as features evolve in a predictable manner

- CT- done first to rule out intracranial hemorrhage or other intracranial pathologies +/- identification of early signs of ischemia
  - Acute: loss of grey-white matter differentiation, cortical hypodensity and parenchymal swelling → mass effect
  - Chronic: gliosis replaces swelling, low hypodensity without mass effect
- MRI- more time consuming but higher sensitivity for acute ischemic infact
  - DWI – increased signal and reduced ADC values within minutes of occlusion → over time ADC values increase
  - T1 – low signal → contrast enhancement seen after day 5
  - T2 – progressively increasing signal → can persist for 2-4 months

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Differential Diagnosis

- Hemorrhagic Stroke
- Ischemic stroke of different origin (anterior/middle circulation)

Other stroke mimics:

- Posterior Reversible Encephalopathy Syndrome (PRES)*
  - Clinical syndrome of *reversible* subcortical vasogenic edema predominantly of the bilateral parieto-occipital regions
- Reversible Cerebral Vasoconstrive Syndrome (RCVS)
  - Reversible segmental and multifocal constriction of the cerebral arteries presenting with severe headaches +/- focal neurological deficits
- Seizures
- Toxic/Metabolic Disturbances
  - Hypoglycemia (< 45 mg/dL)
  - Acute hyperglycemia
    - Hyperglycemia hyperosmolar syndrome and diabetes ketoacidosis
  - Hyper/hyponatremia
  - Hyperammnonemia
- Brain tumors
- Infection
- Migraine
- Conversion/functional (psychiatric) disorder

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