

66 year-old female presenting with altered mental status

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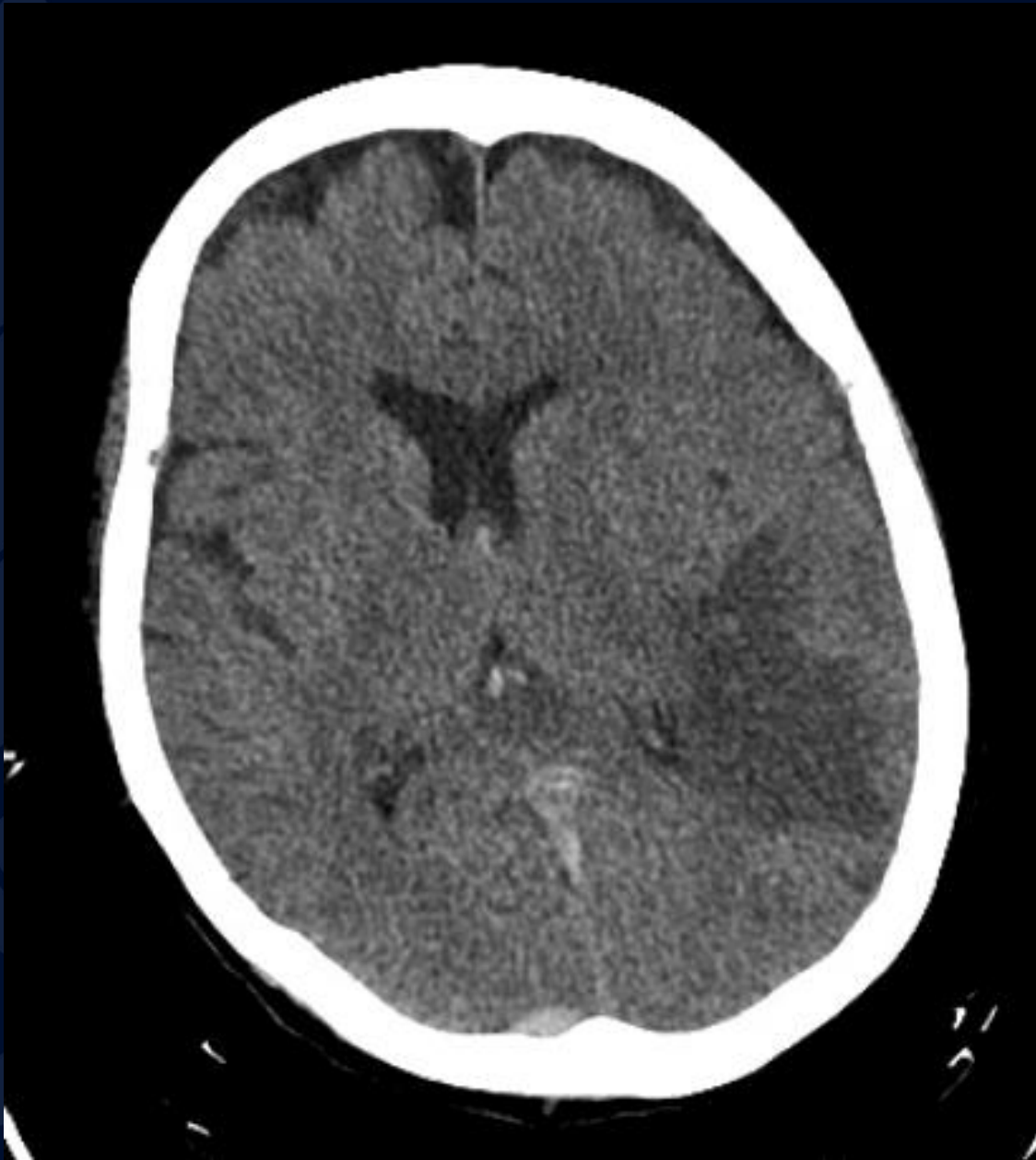
Leo Wolansky, MD



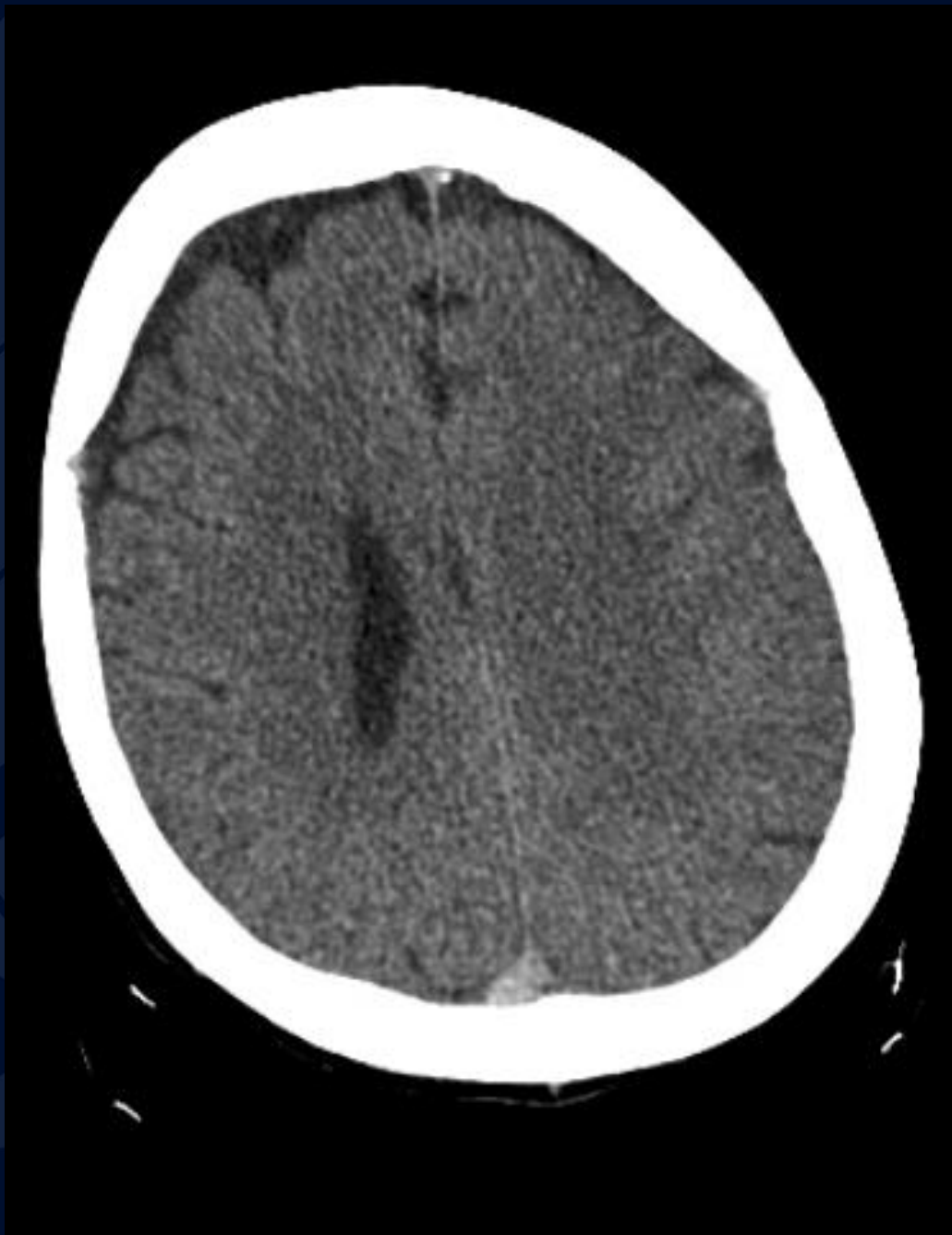
Axial CT head
(noncontrast)



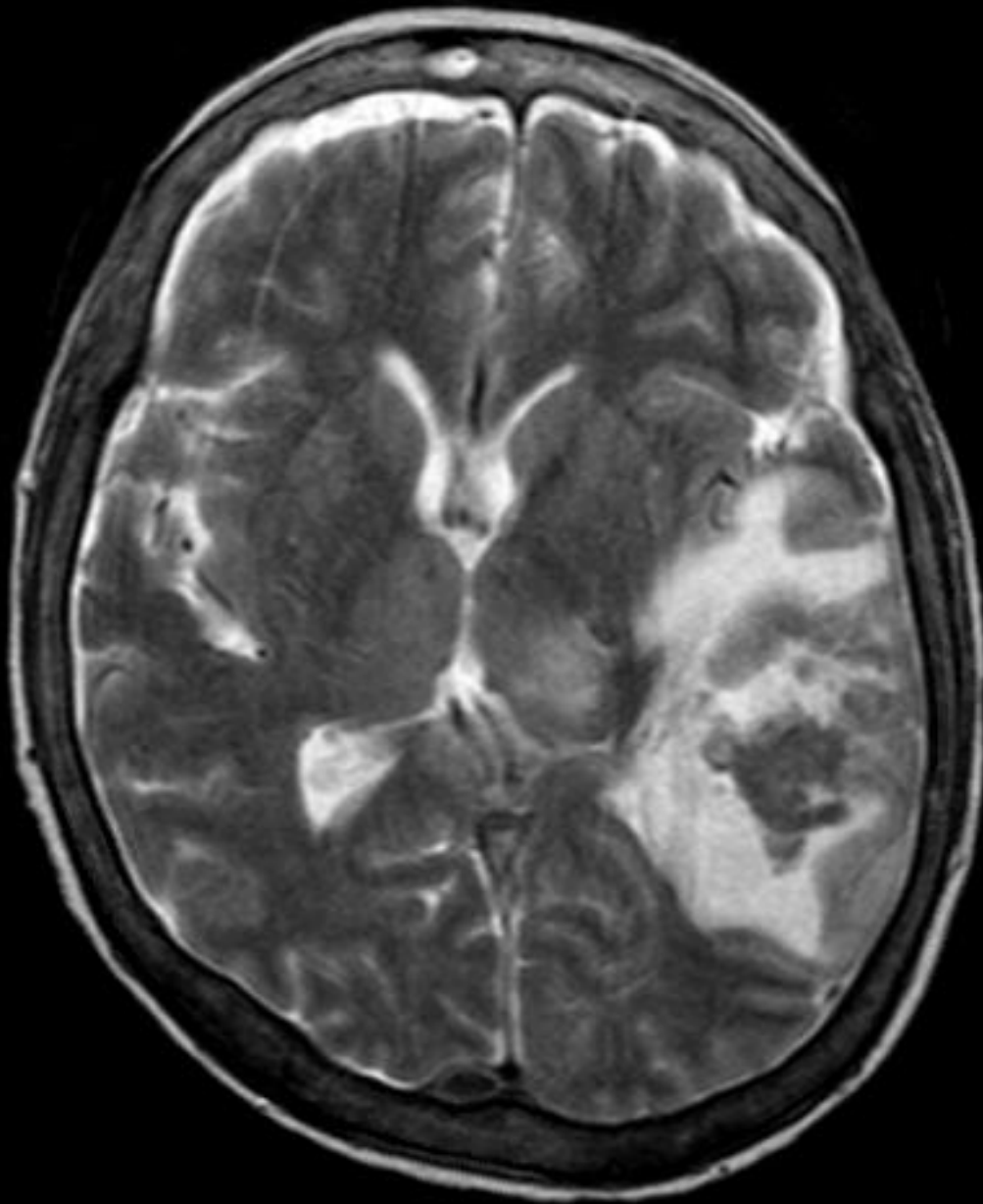
Axial CT head
(noncontrast)



Axial CT head
(noncontrast)

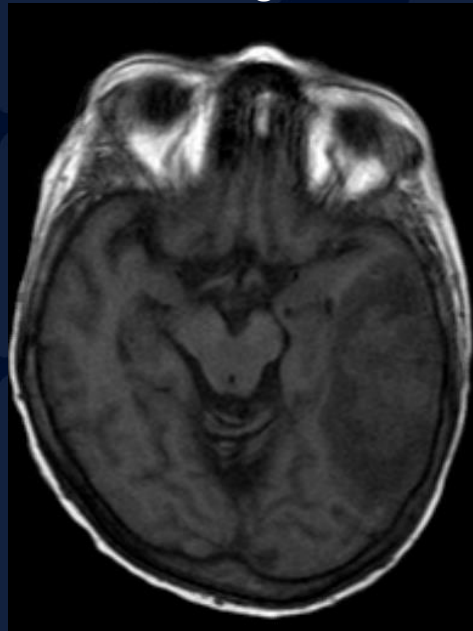


Axial CT head
(noncontrast)

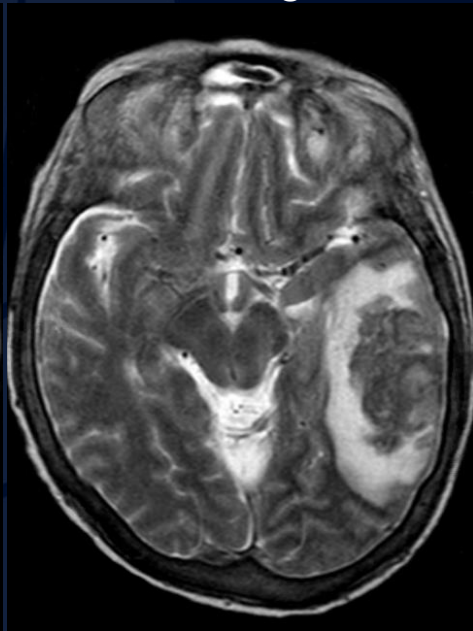


Axial slice T2
weighted MRI

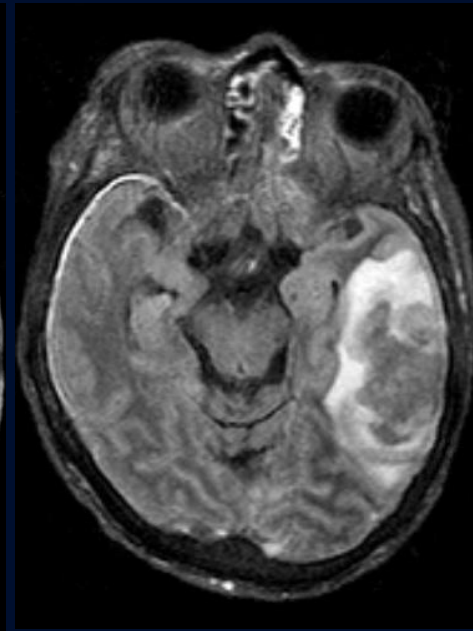
T1 weighted



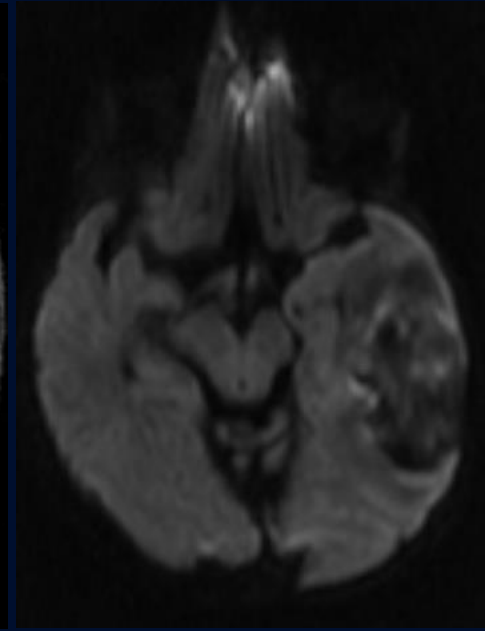
T2 weighted



FLAIR



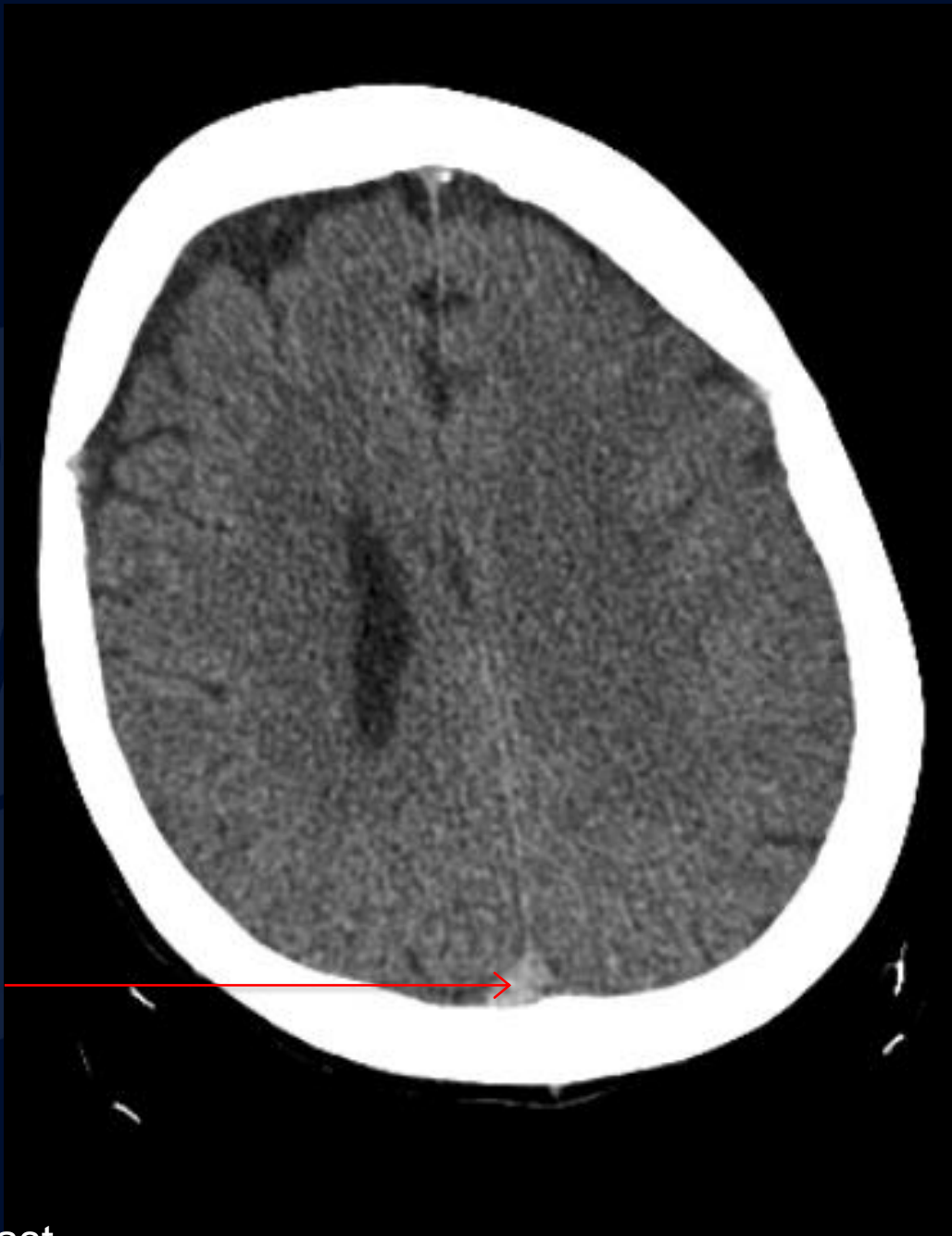
DWI



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.

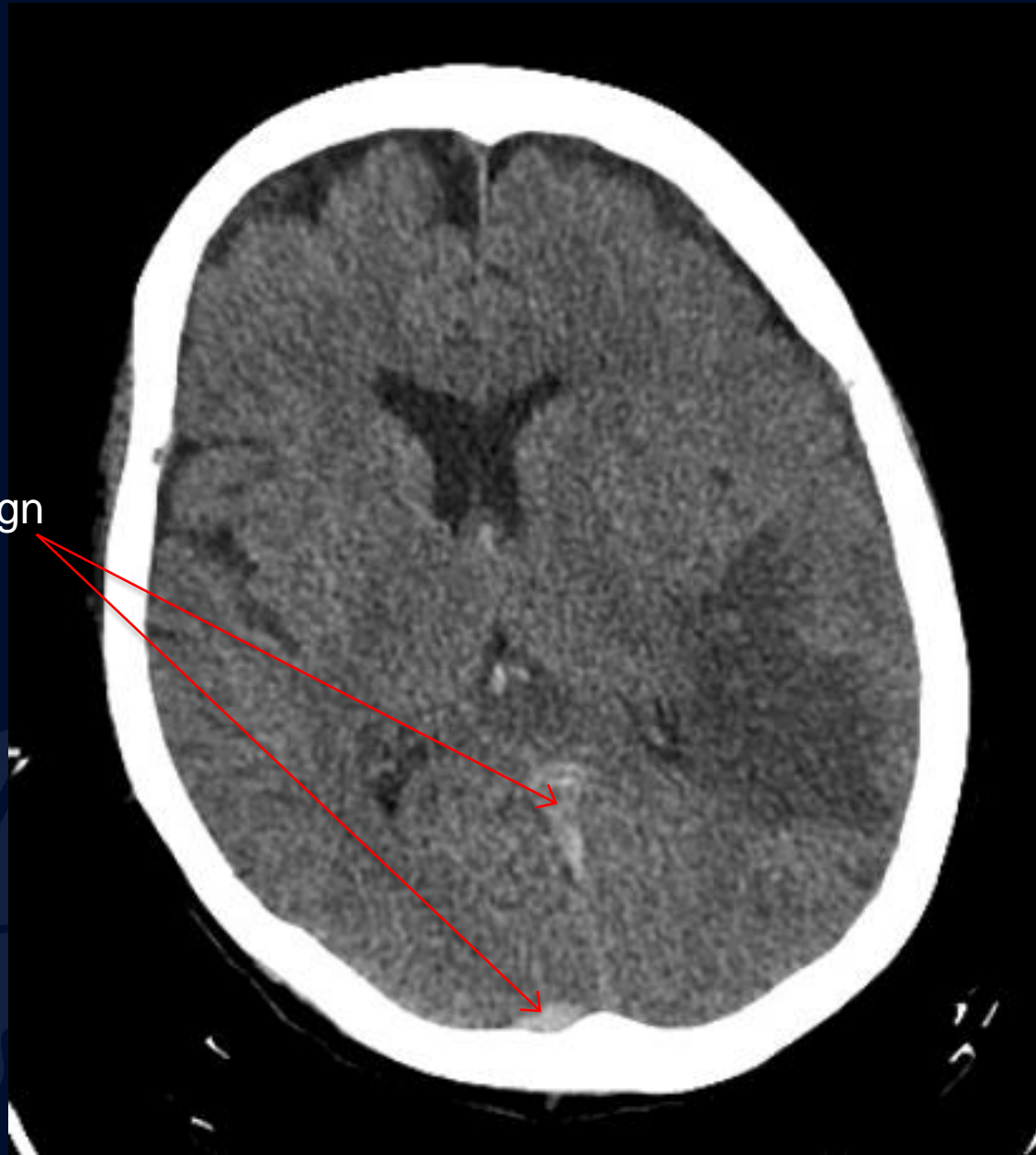
?

Dural venous sinus thrombosis
(cerebral venous thrombosis)
complicated by cerebral
hemorrhage

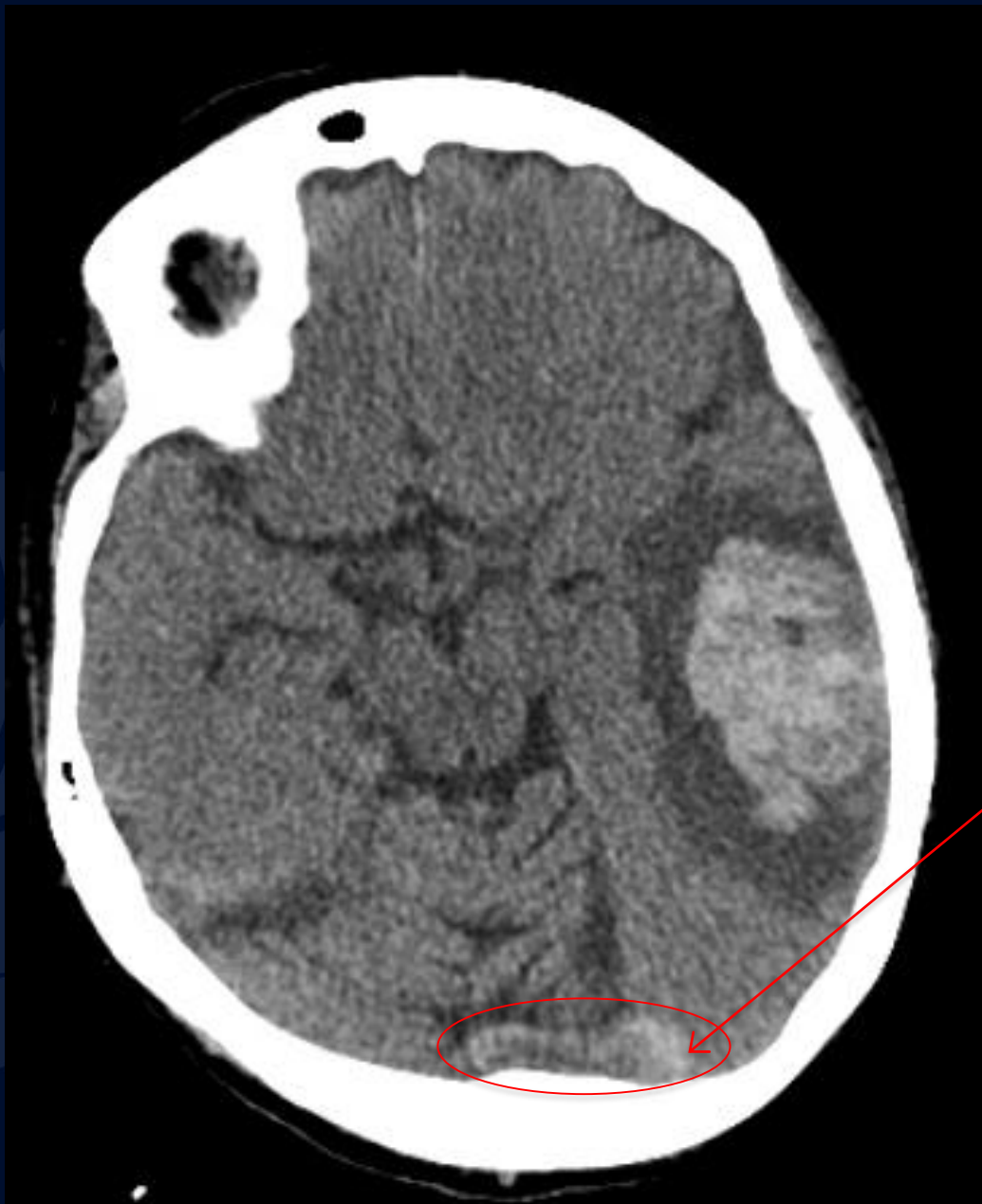


Dense vessel sign
(visualization of
thrombosis)

CT head noncontrast

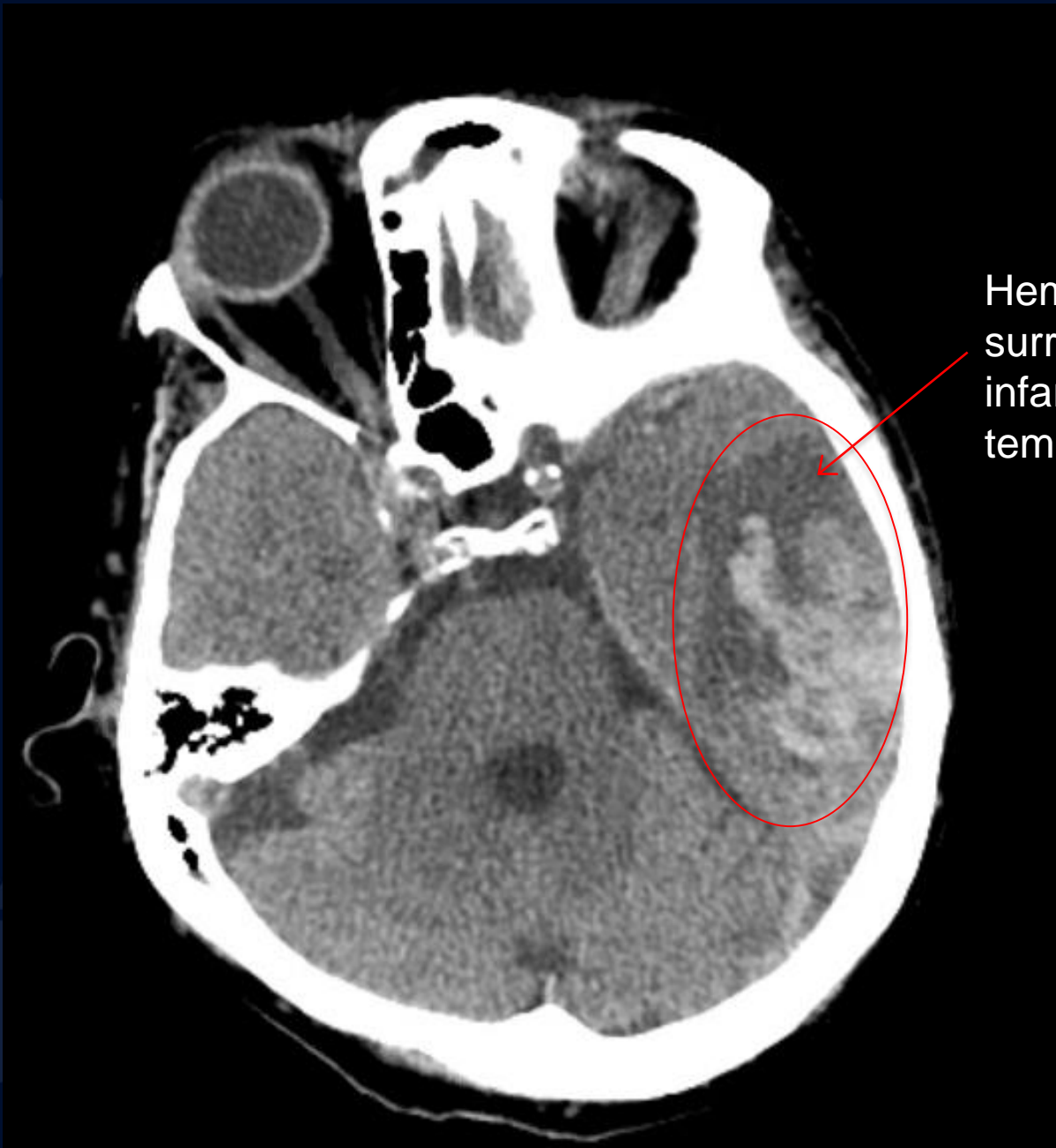


Dense vessel sign



Cord sign (cord-like hyperdensity within dural venous sinus due to thrombosis)

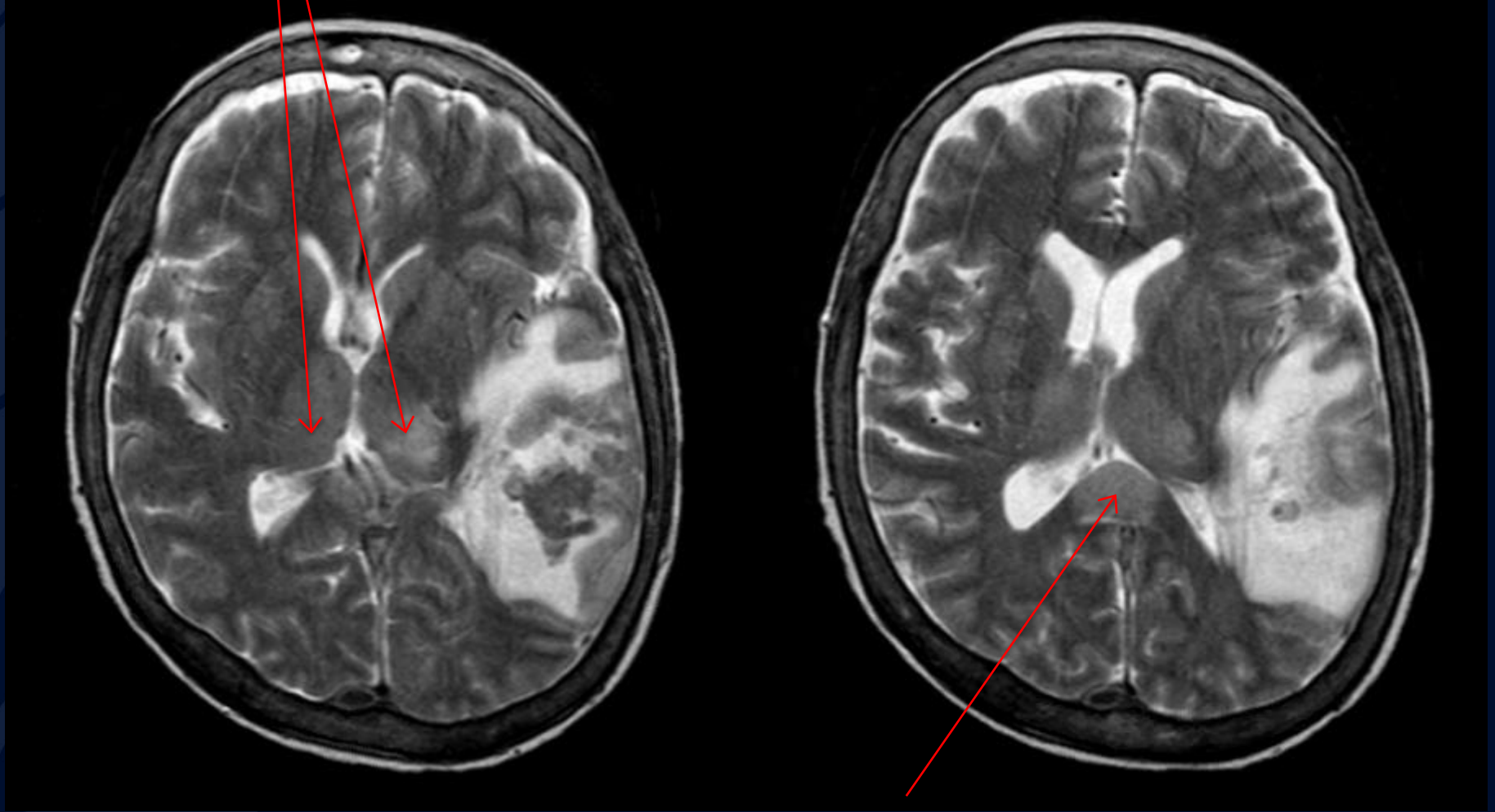
CT head without contrast



Hemorrhage with surrounding infarct/edema in left temporoparietal lobe

CT head without contrast

Venous congestion related edema in thalamus bilaterally



Venous congestion related edema in splenium of corpus callosum

Hemorrhage in posterior left temporal lobe

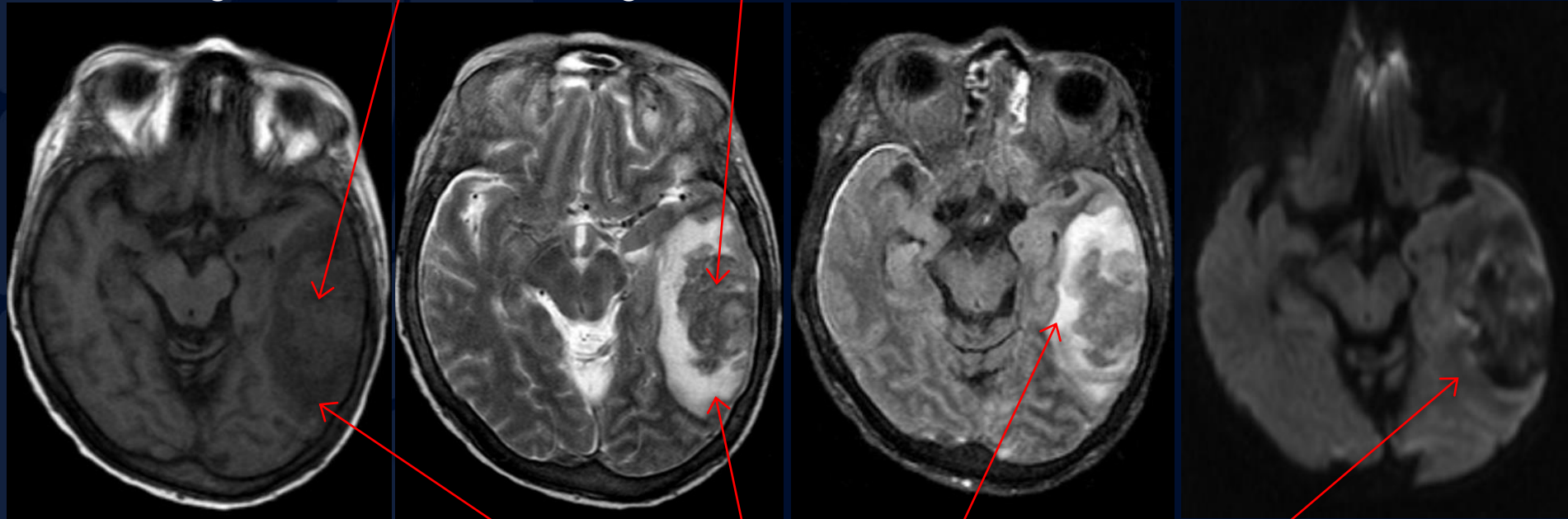
- Acute hematoma: Isointense on T1, hypointense on T2

T1 weighted

T2 weighted

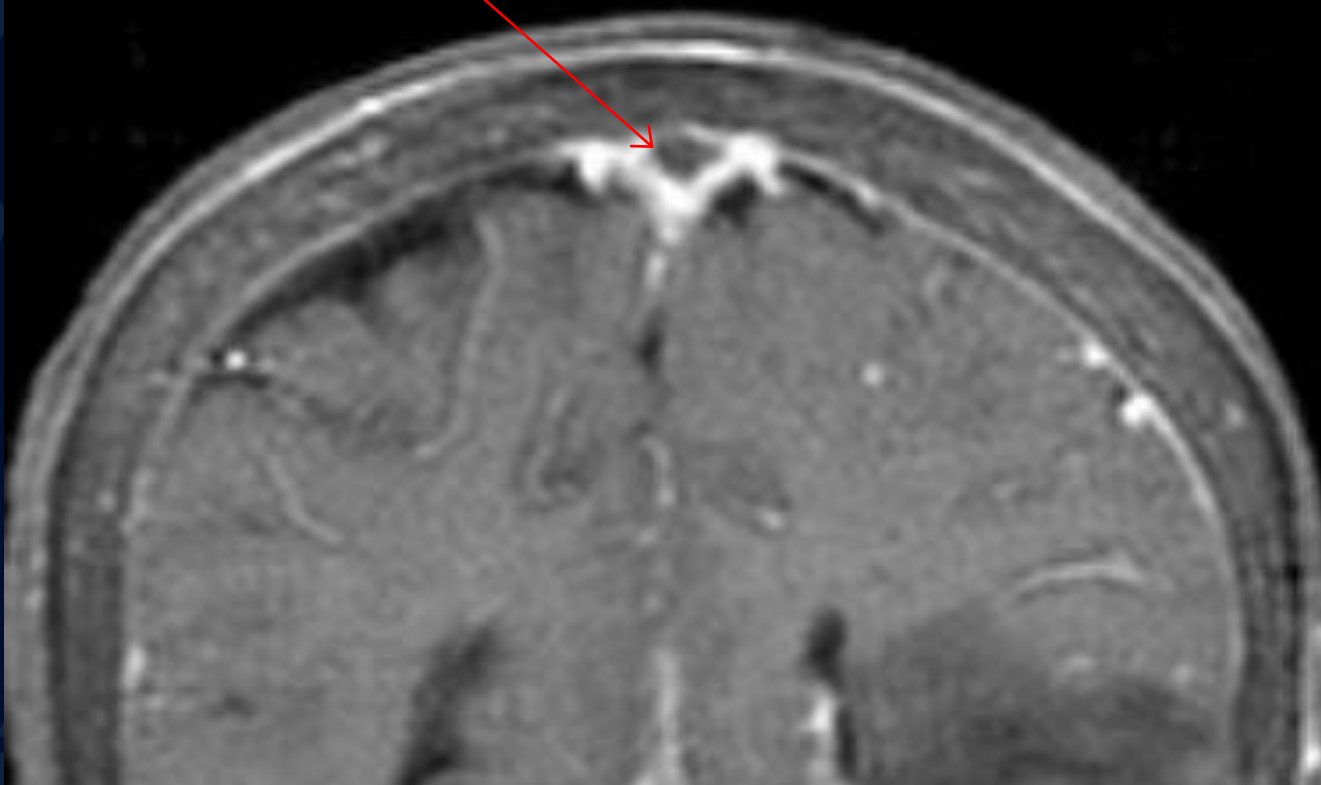
FLAIR

DWI



Vasogenic edema: Hyperintense on T2 and FLAIR, hypointense on T1, hypointense on DWI (unrestricted diffusion)

Thrombosis of superior sagittal sinus presenting as a filling defect highlighted by gadolinium



T1 weighted MRI of brain

Cerebral venous thrombosis (CVT)

Epidemiology

- Typically occurs in patients < 50 years old
- More common in females than males (3:1 ratio)
- Accounts for 0.5%-1% of all strokes; incidence of approximately 3-5 cases per 1 million people per year

Etiology and risk factors

- Prothrombic state: Genetic and/or acquired conditions that affect either stasis of blood, endothelial dysfunction and/or injury, or hypercoagulable state (Virchow triad)
- High-risk thrombophilias (e.g. antithrombin III, protein C and S deficiency, homozygosity for factor V Leiden or prothrombin G20210A mutations)
- Oral contraceptive use
- Pregnancy
- Malignancy
- Infection
- Trauma

Cerebral venous thrombosis (CVT)

Complications:

- Intracranial hemorrhage (in up to 40% of cases)
- Neurologic worsening after diagnosis, e.g. new focal deficit or seizure (in up to 23%)
- Mortality (3-15%)

Presentation:

- Clinical presentation is highly variable depending on location and extent of thrombosis
- Possible symptoms include: headache, diplopia, visual impairment (with papilledema), sixth nerve palsy, reduced level of consciousness, hemiparesis, motor weakness, aphasia, sensory deficit, encephalopathy, seizures, somnolence
- Most common presentation is motor weakness, including hemiparesis in up to 40%

Cerebral venous thrombosis (CVT)

Diagnosis:

- Based on clinical suspicion with imaging confirmation
- If hypercoagulable state, clinical suspicion increases
- CT head or MRI brain useful for initial evaluation, but CVT is not ruled out if normal
- If CT or MRI negative and CVT is still suspected, or if need to further define extent of thrombosis, perform CT venography or MR venography

Management

- Initial anticoagulation with unfractionated heparin or LMWH, followed by vitamin K antagonist (regardless of presence of intracerebral hemorrhage)
- If infected CVT, antibiotics and surgical drainage
- If seizures and parenchymal lesions present, initiate antiepileptic drugs for defined duration
- Consider endovascular intervention if deterioration occurs despite intensive anticoagulation treatment

References

1. Cerebral venous thrombosis (CVT) in adults. In: *DynaMed Plus*. Updated: Jun 06, 2018.
2. Leach, J. L., et al. Imaging of Cerebral Venous Thrombosis: Current Techniques, Spectrum of Findings, and Diagnostic Pitfalls. *RadioGraphics*. October 2006, 26, S19-S41.
3. Leach, J. L., et al. Partially Recanalized Chronic Dural Sinus Thrombosis: Findings on MR Imaging, Time-of-Flight MR Venography, and Contrast-Enhanced MR Venography. *American Journal of Neuroradiology*. Apr 2007, 28 (4) 782-789.
4. Linn, J., et al. Diagnostic Value of Multidetector-Row CT Angiography in the Evaluation of Thrombosis of the Cerebral Venous Sinuses. *American Journal of Neuroradiology*. May 2007, 28 (5) 946-952.
5. Tseng L, Chen D, Wolansky L, Dural venous sinus thrombosis (cerebral venous thrombosis) complicated by cerebral hemorrhage. *Radiology Online* (2019)