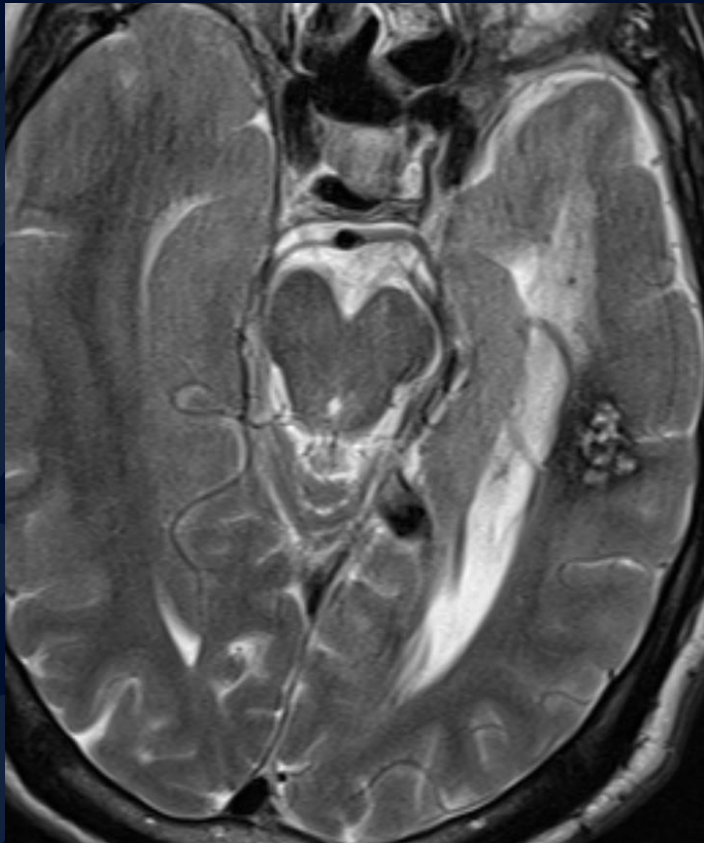


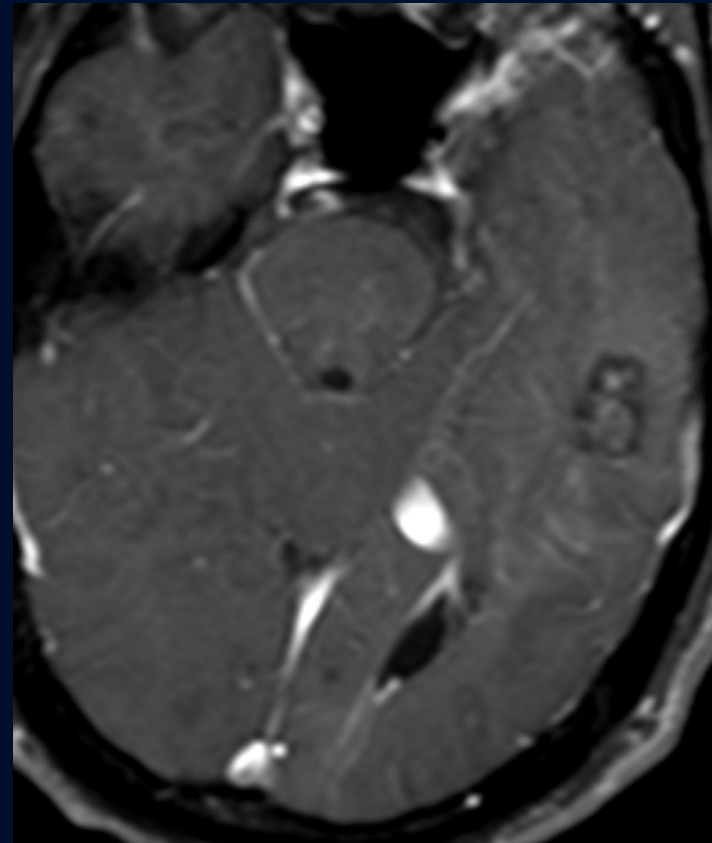
**38-year-old male with remote h/o
resected brain tumor presents for
follow-up imaging**

Keerthana Sharma Anand, MBBS

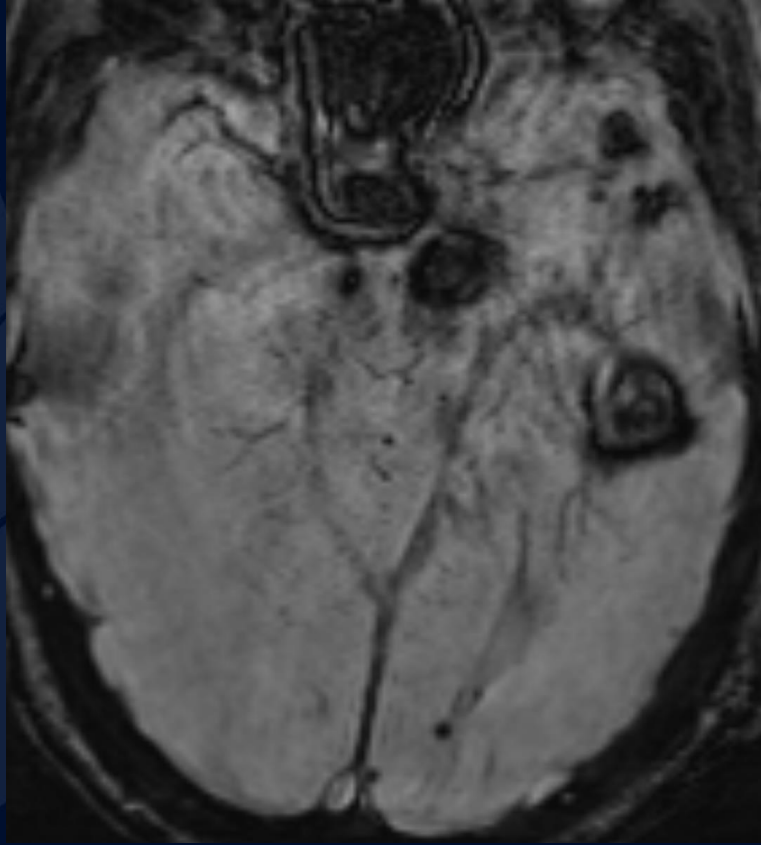
Clifford Yang, MD



T2 Axial




Gd-T1 Axial

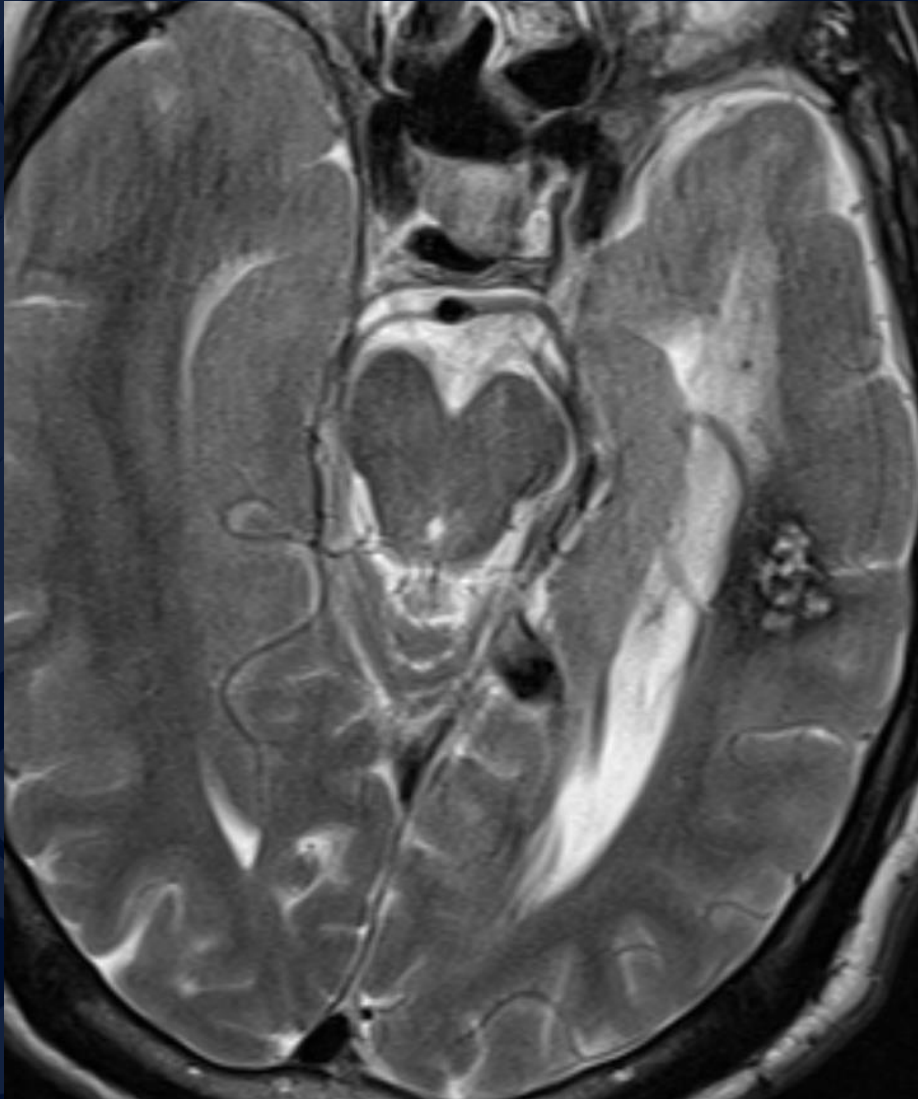


SWI Axial



A large, stylized oak leaf graphic in a dark blue color, positioned on the left side of the slide, partially overlapping the text.

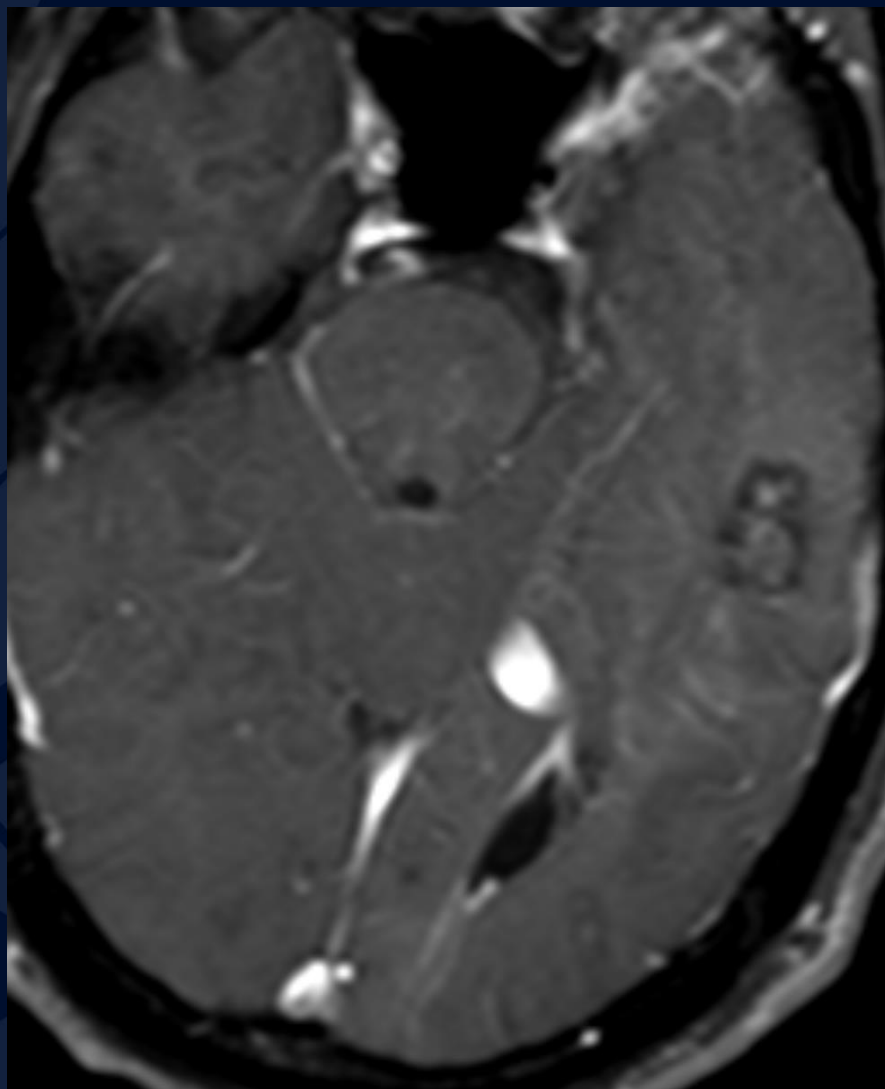
Cerebral Cavernous Malformation (Cavernous angioma, Cavernoma)



T2 Axial

Lesion exhibits mixed central signal intensity, typical of the “popcorn” lesions seen in classical cavernous angioma.

Reticulated, heterogeneous popcorn-core appearance is due to loculated areas of hemorrhage of varying ages.

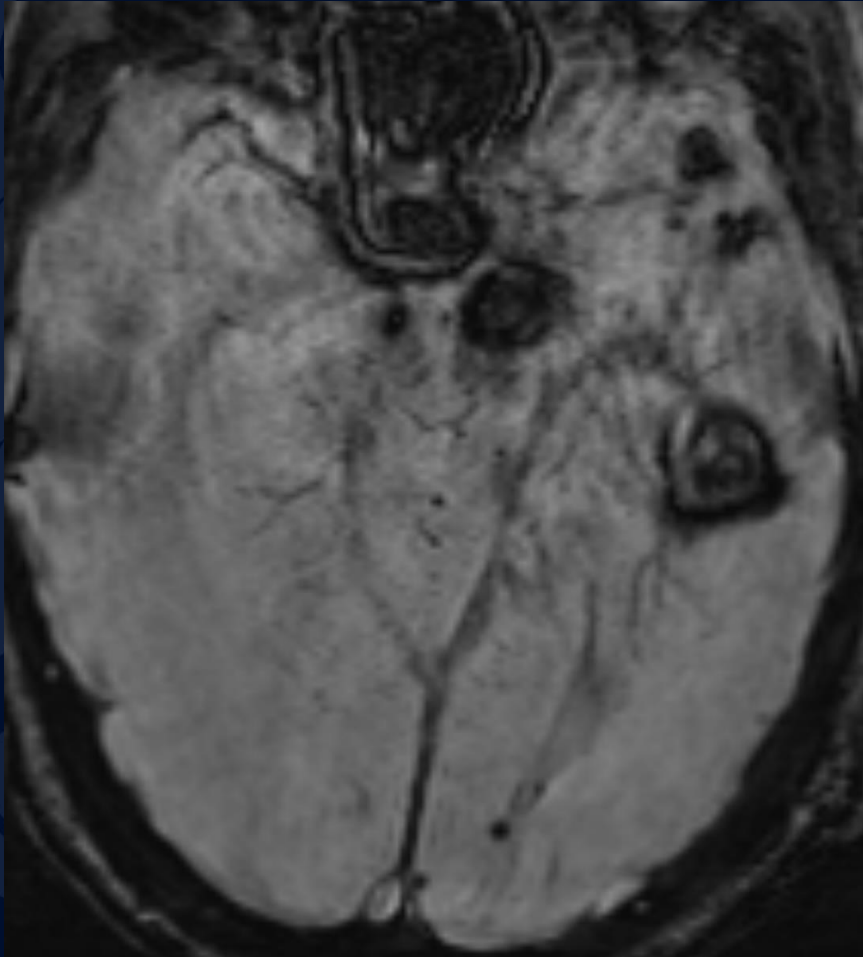


T1 Axial Post-Contrast

The lesion again shows central signal of mixed intensity, similar to previous T2 image.

There is no enhancement.

Surrounding hypointense rim seen here is due to hemosiderin deposition.



SWI Axial

Prominent blooming seen due to susceptibility effects from hemosiderin-laden rim.

Cerebral Cavernous Malformation

Terminology:

Cerebral Cavernous Malformations (CCM), are common cerebral vascular malformations which consist of vascular spaces lined by a single layer of endothelium with no interspersed neural tissue.

Also commonly known as cavernous hemangioma/cavernoma; however, it is recommended that these latter terms be avoided as these lesions are non-neoplastic.

CCMs are often found to be intimately associated with developmental venous malformation (DVM), in which case the lesion is called a **Mixed Vascular Malformation**.

DVAs have been found to have a direct causal relationship in the development and growth of CCMs. These lesion also carry a **higher risk of hemorrhage**.

Imaging Findings

Location: Most commonly supratentorial (~80%)

Number: Usually solitary. Multiple lesions may be found in Familial Cavernous Malformation Syndrome

CT: Difficult to see on CT unless large, or complicated by hemorrhage/calcification

MRI: Modality of choice; typical popcorn appearance with surrounding rim of hypointensity.

- Zabramski Classification identifies 4 types of CCM based on MRI appearance. Type 2 shows the classic popcorn lesions of **heterogenous intensity** on T1 & T2.
- Prominent blooming seen on T2* GRE and SWI.
- Absent/ minimal enhancement seen post-contrast.
- Absent edema on FLAIR or T2.

Angiography: **occult on angiography.**

Clinical Features

- Most commonly seen in 3rd-6th decades, M:F=1:1
- Usually asymptomatic, but when complicated by hemorrhage, can present with headache, seizures, focal neurological deficits.
- Asymptomatic lesions are managed with regular follow-up.
- Surgical resection is preferred for CM presenting with intractable seizures, progressive neurological deficits and severe hemorrhages.
- When surgically inoperable or high-risk, stereotactic radiosurgery can be performed.

Differential Diagnoses

- AV malformation: CMs do not have a large feeding artery and draining vein and are also angiographically occult, unlike AVMs.
- Multiple sclerosis: MS may mimic spinal CMs, however no hemosiderin products seen.
- Differentials for multiple cavernous malformations:
amyloid angiopathy, hemorrhagic cerebral metastases, cerebral vasculitis
- Neurocysticercosis or Tuberculoma: when lesion is calcified.

References

- Idiculla PS, Gurala D, Philipose J, Rajdev K, Patibandla P. Cerebral Cavernous Malformations, Developmental Venous Anomaly, and Its Coexistence: A Review. Eur Neurol. 2020;83(4):360-368. doi: 10.1159/000508748.
- Radiopaedia: Cerebral Cavernous Venous Malformation. <https://radiopaedia.org/articles/cerebral-cavernous-venous-malformation?lang=us>
- STATdx: Cavernous Malformation.
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