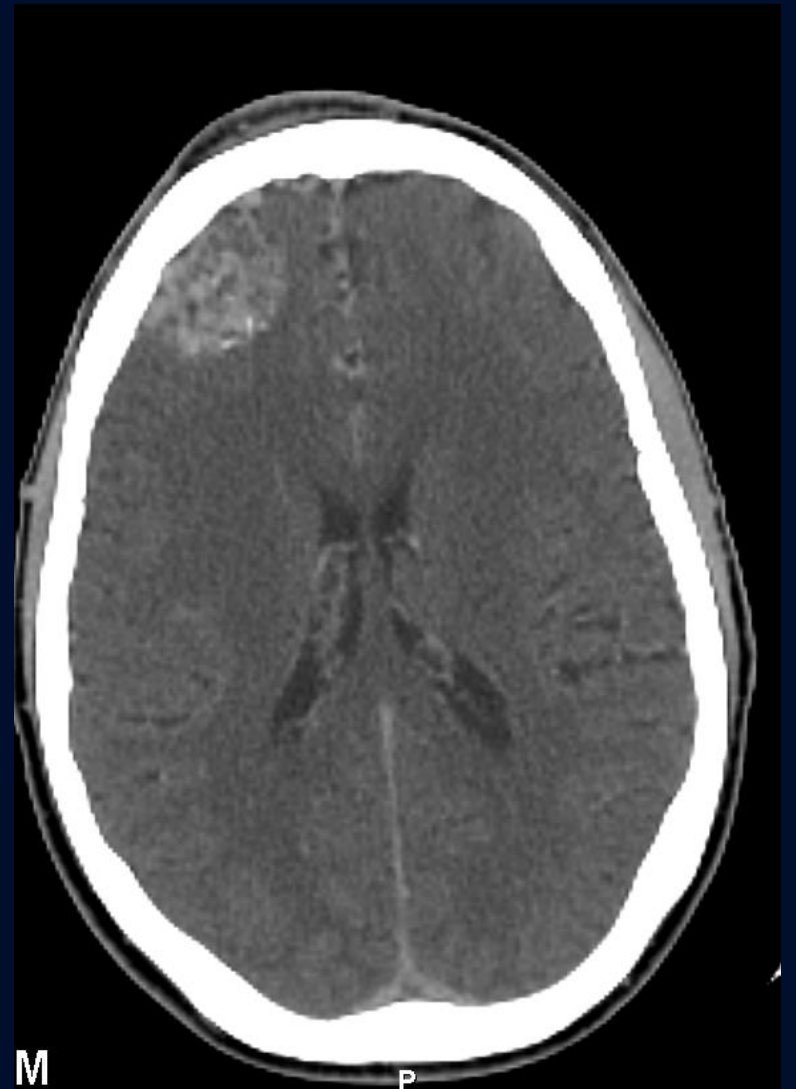
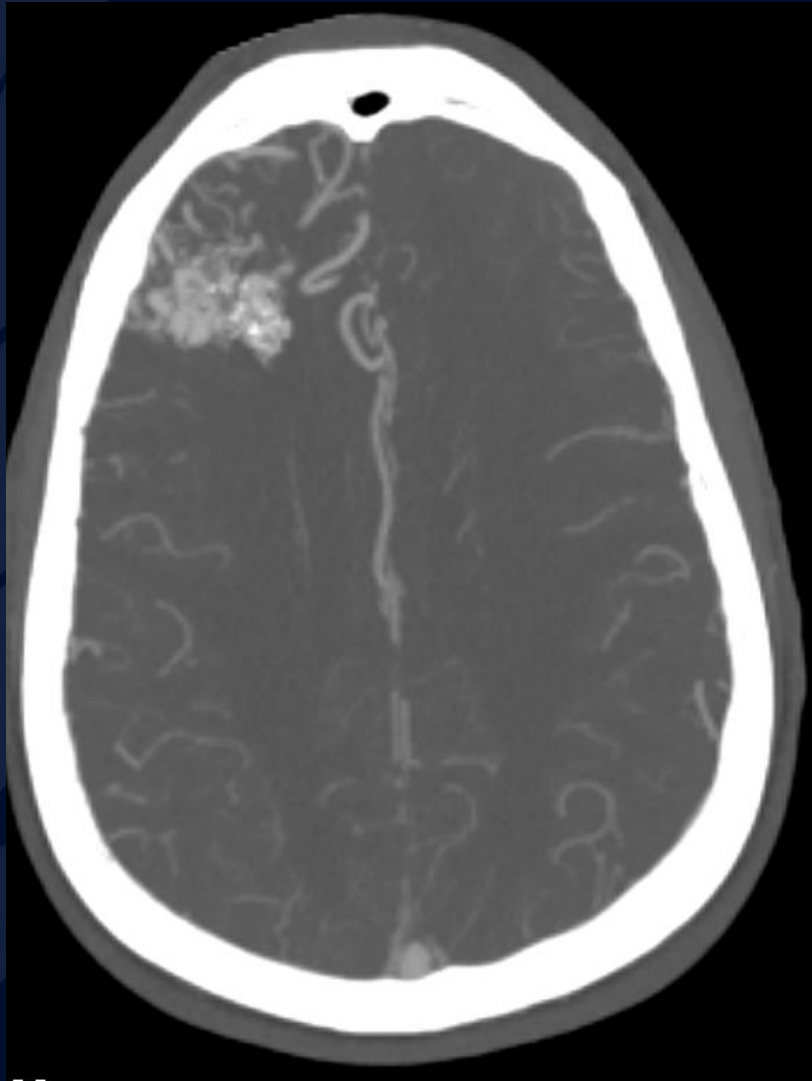


56 y/o man presenting after fall with head injury

Martin Ollenschleger, MD



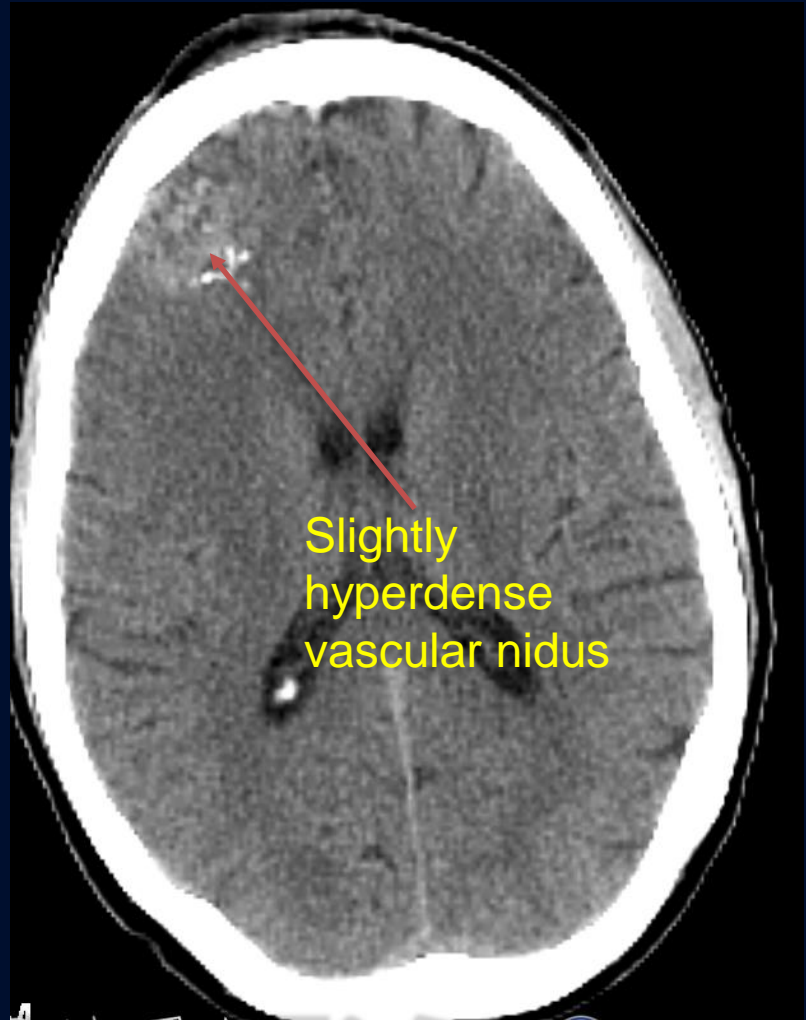
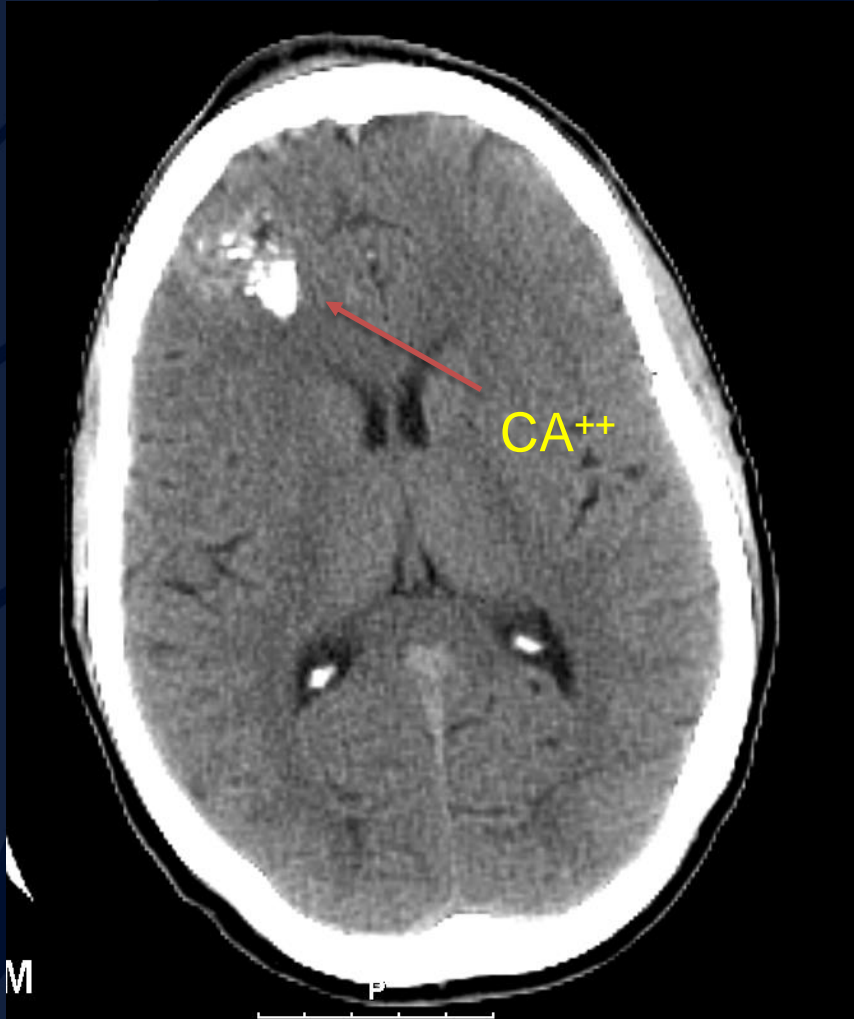


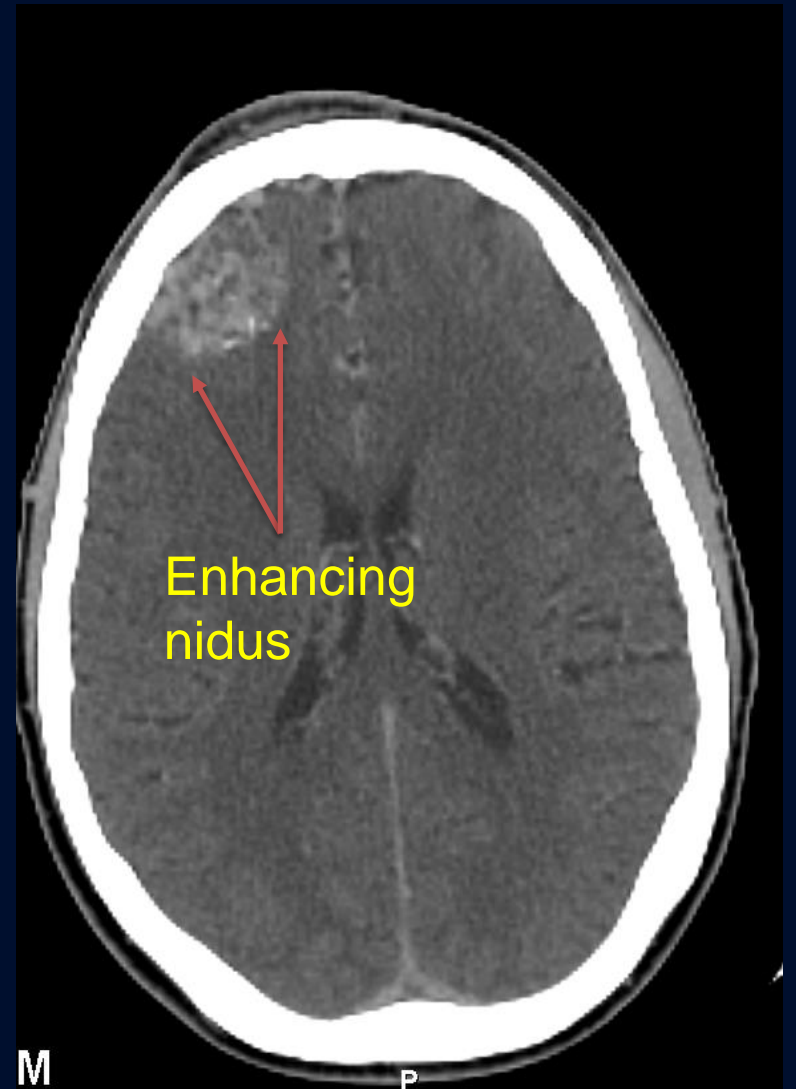


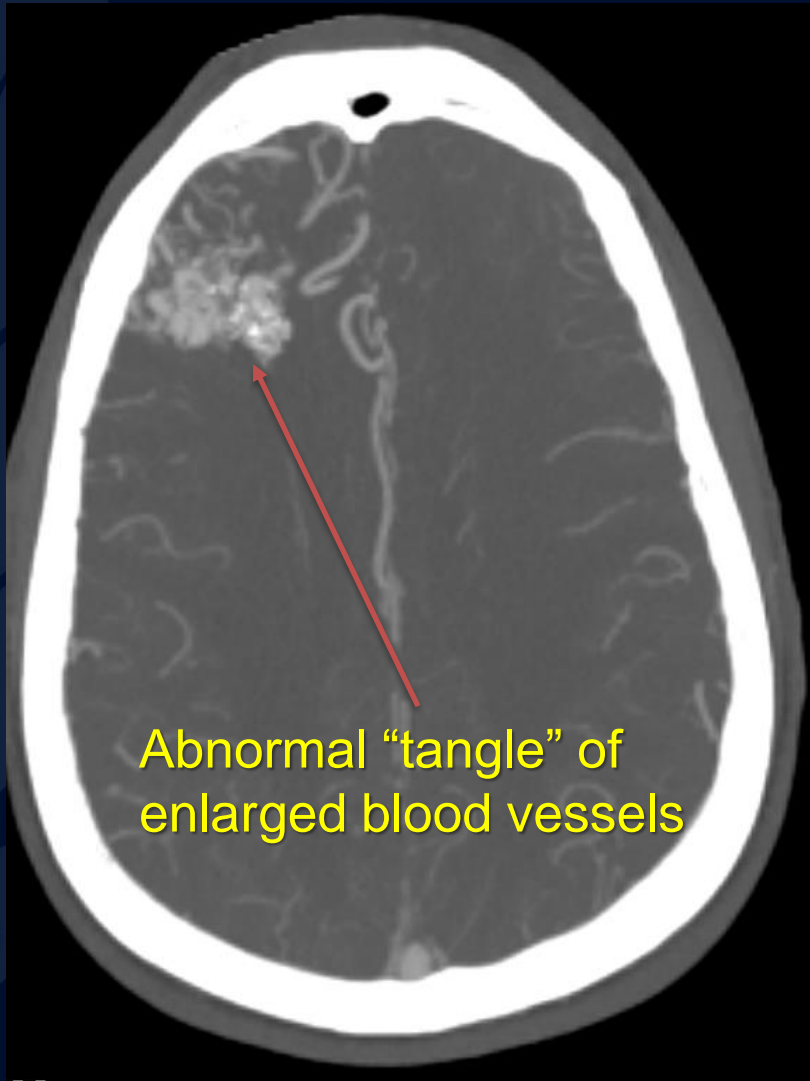


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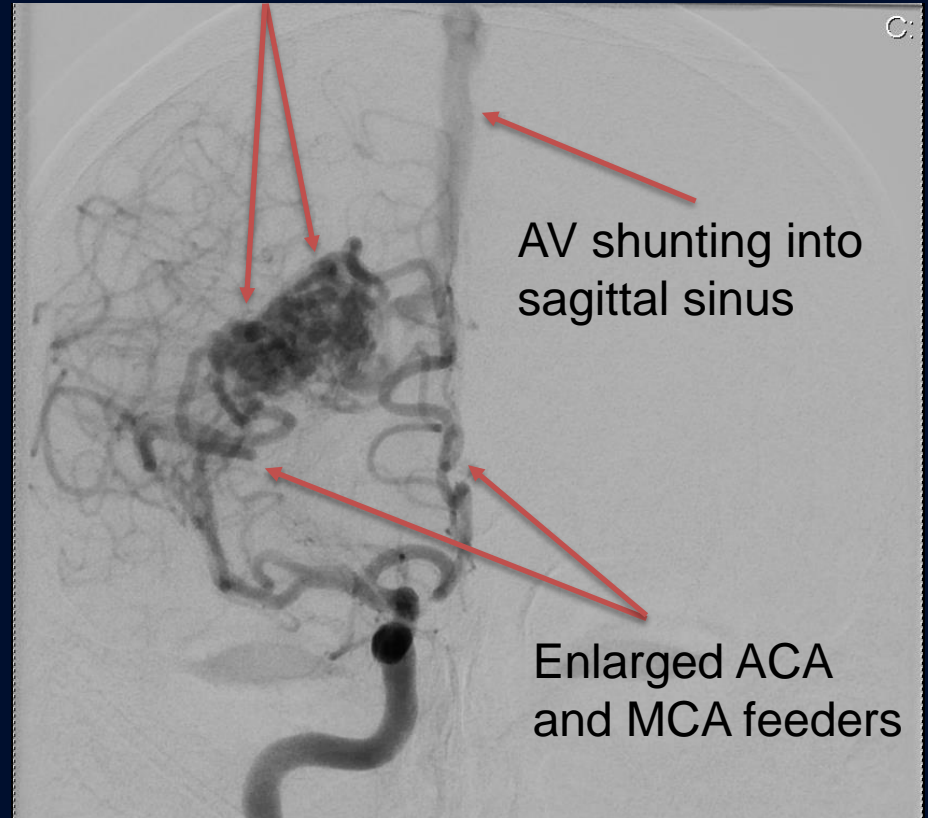
Pial Arteriovenous Malformation







AVM Nidus



Arteriovenous Malformation

- Collection of aberrantly formed blood vessels
 - Nidus with direct connection between arteries and veins without intervening capillary bed
 - Usually congenital

Arteriovenous Malformation

- Imaging Features
 - CT/CTA
 - Slightly hyperdense nidus and associated feeding and draining vessels
 - Calcification may be present within or near the nidus
 - Enhancing nidus and associated vasculature on post contrast CT and CTA

Arteriovenous Malformation

- Imaging Features

- MRI/MRA

- Prominent flow voids, best seen on T2 weighted images
 - Blooming artifact on gradient echo from calcification and/or blood products
 - Gliosis within adjacent tissue on T2 and FLAIR
 - Enlarged vessels converging on a complex vascular nidus on time of flight MRA

Arteriovenous Malformation

- Imaging Features
 - Cerebral Angiography
 - Gold standard to define angioarchitecture and flow pattern of AVM
 - Enlarged feeding arteries converging on a complex vascular nidus
 - Arteriovenous shunting with early visualization of draining veins

Arteriovenous Malformation

- Clinical presentation
 - Spontaneous ICH (50%)
 - Seizures
 - Headache
 - Focal deficit
- Treatment often multi-modal
 - Embolization with liquid embolic material
 - Onyx
 - N-BCA
 - Surgical resection
 - Gamma knife or stereotactic radiosurgery

Arteriovenous Malformation

- Spetzler-Martin grade predicts risk for surgical resection
 - Size (<3 cm = 1; 3-6 cm = 2; >6 cm = 3)
 - Location (eloquent = 1; non-eloquent = 0)
 - Venous drainage (deep = 1; superficial = 0)
 - Add together for final grade of 1 to 5
- Risk factors for hemorrhage (shift toward treatment if present)
 - Venous outlet stenosis (particularly if single draining vein)
 - Intranidal or perinidal aneurysms
 - Feeding artery aneurysms (often regress with AVM treatment)

References

- E Tranvinh, et al. Contemporary Imaging of Cerebral Arteriovenous Malformations. AJR 2017 Jun;208(6):1320-1330
- Ollenschleger M. Pial Arteriovenous Malformation. Radiology Online (2021).