56 y/o man presenting after fall with head injury

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Pial Arteriovenous Malformation
Slightly hyperdense vascular nidus
Enhancing nidus
Abnormal “tangle” of enlarged blood vessels

AVM Nidus

AV shunting into sagittal sinus

Enlarged ACA and MCA feeders
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