55F h/o “deep AVM” & word finding difficulty

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Vascular Malformation w/ Hemorrhage
Presumed Cavernoma / Venous Angioma
Hemosiderin ring in the absence of known cause is presumed cavernoma (arrows)
Presumed cavernoma (yellow arrows)
Draining vein suggests mixed angioma
Cavernoma MRI findings

- **T1WI**
  - Variable, depending on hemorrhage/stage
  - "Popcorn ball" appearance of mixed hyper-, hypointense blood-containing locules
  - Less common: Acute hemorrhage (nonspecific)
  - Central hyperintensity is classic
  - Helps differentiate CM from other hemorrhagic masses

- **T2WI**
  - **Area of mixed signal intensity with central reticulated core + peripheral rim of decreased intensity (hemosiderin rim)**
  - "Popcorn ball"
  - Locules of blood with fluid-fluid levels

- **FLAIR**
  - May show surrounding edema in acute lesions

- **T2* GRE / SWI**
  - Prominent susceptibility effect (hypointense "blooming")
  - Multiple CMs: Numerous punctate hypointense foci ("black dots") on GRE scans are most common finding
  - SWI much more sensitive than GRE

- **T1WI C+**
  - Minimal or no enhancement (may show associated venous malformation)
  - DVA often associated

- **Angiography**
  - "angiographically occult vascular malformation"
  - Usually normal unless mixed with a DVA
## Zabramski Classification Cavernous Angiomas

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<th>MR sequence</th>
<th>MR Imaging Findings</th>
<th>Histopathology</th>
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<td><strong>Type 1</strong></td>
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<tr>
<td>T1</td>
<td>Hyperintense core</td>
<td>Subacute hemorrhage</td>
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<tr>
<td>T2</td>
<td>Hyper/Hypointense core</td>
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<td><strong>Type 2 (MOST COMMON)</strong></td>
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<tr>
<td>T1</td>
<td>Reticulated, mixed signal intensity core, &quot;popcorn ball&quot; lesion</td>
<td>Lesion w/ hemorrhage and thromboses of varying ages</td>
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<tr>
<td>T2</td>
<td>Reticulated, mixed signal intensity core with hypointense rim, &quot;popcorn ball&quot; lesion</td>
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<td><strong>Type 3</strong></td>
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<tr>
<td>T1</td>
<td>Iso/Hypointense</td>
<td>Chronic hemorrhage with hemosiderin staining in and around lesion</td>
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<td>T2</td>
<td>Hypointense lesion with hypointense rim that magnifies the size of the lesion</td>
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<td><strong>Type 4</strong></td>
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<tr>
<td>T1</td>
<td>Not visible</td>
<td>Tiny lesion or telangiectasia</td>
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<tr>
<td>T2</td>
<td>Not visible</td>
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<tr>
<td>GRE</td>
<td>Punctate hypointense lesion</td>
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Cavernous Angiomas (i.e. Cavernous Malformation, Cavernous Hemangioma, Benign Vascular Hamartoma)

- Congenital vascular hamartomas consisting of sinusoidal collection of blood vessels.
  - NO interspersed brain tissue (as opposed to other vascular malformations)
  - Contain blood products of various age, calcifications, gliosis
  - NO feeding artery
- Prevalence: 0.5%-0.7%; M=F; 40-60y peak presentation
- 1/3 Familial Auto Dom (multiple lesions common; higher risk of hemorrhage) vs 2/3 Sporadic
- Presentation: seizure (50%), focal neurologic deficits (25%), symptoms after hemorrhage (which is usually small/low pressure), asymptomatic (20%), recurrent hemorrhage, chronic HA.
- Location: Hemispheres > brainstem, cerebellum
- Size: 0.5 - 4cm
- Rx: Total removal via microsurgical resection (If mixed DVA, venous drainage must be preserved)
  - Gamma knife therapy is an option if location is difficult
References

- Statdx
- Radiopaedia
- The Requisites Neuroradiology
- http://pubs.rsna.org/doi/full/10.1148/radiology.214.1.r00ja19209