

## 11. Other Vascular Malformations

Less common vascular malformations, such as cavernous malformations, capillary telangiectasias, and developmental venous anomalies (DVA or venous angioma), are more frequently angiographically occult than AVMs. MRI is thus the most sensitive imaging modality for their detection. Cavernous malformations are the second most common type of vascular malformation after AVMs. They consist of a collection of sinusoidal vascular spaces with no intervening brain parenchyma. Cavernous malformations are often asymptomatic but may present with hemorrhage or seizures. Supratentorial, subcortical lesions predominate, although lesions occur throughout the CNS and are multiple in up to one-third of cases. Cavernous malformations (Fig. 11.1) are classically described as having a “popcorn-like” heterogeneity on T1WI, T2WI (Fig. 11.1 A, B, white arrows), and FLAIR scans. Repeated hemorrhage leads to a characteristic thin, well-defined, low SI (on T2 weighted scans), continuous rim of hemosiderin (Fig. 11.1 A, B). Areas of hemosiderin deposition are best visualized on T2\* weighted GRE (compare Fig. 11.1 B vs C, same patient, T2 FSE vs T2\* GRE) because of the increased sensitivity of GRE to susceptibility effects. GRE is particularly advantageous over FSE MRI for revealing additional lesions in patients with multiple cavernous malformations. However, any type of lesion with a significant susceptibility effect may mimic a cavernous malformation on GRE. High-field (3 T) MRI similarly aids in the detection of hemosiderin. Due to their large vascular spaces, cavernous malformations typically enhance, often heterogeneously (Fig. 11.1 D). Cavernous

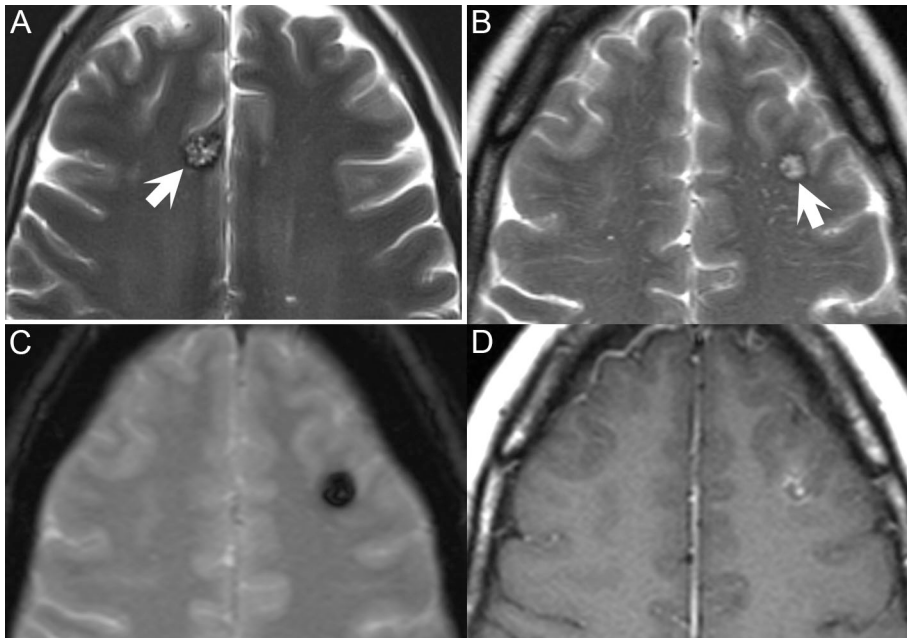


Fig. 11.1

malformations, particularly one that has recently hemorrhaged, may appear similar to a hemorrhagic neoplasm. The latter is distinguished by its mass effect, the presence of concurrent edema, and the lack of a well-defined hypointense rim. Hemorrhagic cavernous malformations are differentiated from a simple intraparenchymal hematoma principally by the orderly (temporal) changes in signal characteristics that occur in the latter.

Within the venous circulation, DVAs are the most common congenital malformation. They most frequently involve the frontal lobes and posterior fossa and are predominantly asymptomatic, non-surgical lesions. Because DVAs are highly correlated with other cerebrovascular malformations, their identification in a clinically symptomatic patient warrants careful evaluation for the presence of additional vascular abnormalities. The accurate identification of a DVA is crucial because they are physiologically competent lesions. This means that if they are removed (in error), then ischemia to the area of brain previously drained by the angioma may occur.

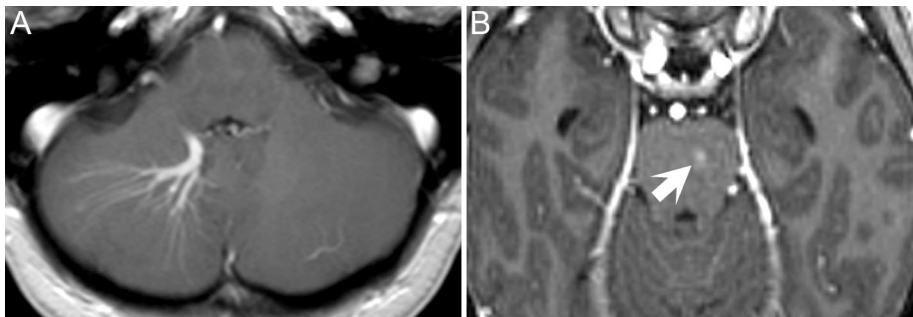


Fig. 11.2

A DVA (Fig. 11.2 A) consists of a group of dilated venous tributaries flowing into a larger draining vein in a radial pattern (classically described as a *caput medusae*). On unenhanced MR these tributaries are visualized as small, curvilinear areas of low SI arranged radially about a larger, solitary flow void—correlating with the draining vein. The flow void of the large draining vein may be the only obvious finding on conventional sequences, or the entire lesion may – due to slow flow – appear isointense to parenchyma, complicating its detection. Contrast enhanced MRI avoids this problem, offering markedly improved visualization of DVAs. DVAs typically enhance with contrast administration (Fig. 11.2 A). Feeding tributaries are also more reliably visualized with IV contrast.

Capillary telangiectasias are almost uniformly asymptomatic. These lesions consist of dilated capillaries with intervening brain parenchyma. Capillary telangiectasias are predominantly solitary lesions less than 3 cm in diameter (Fig. 11.2 B). Unlike cavernous malformations, capillary telangiectasias most frequently demonstrate no significant

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abnormality on T1 and T2WI. There may be however faint stippled foci of hyperintensity on T2WI. The defining imaging characteristics of a telangiectasia, however, are the presence of a small, lacy, nodular area of enhancement, in a lesion within the pons (Fig. 11.2 B, arrow). Other differential considerations for an enhancing lesion, such as neoplasia or inflammatory conditions, rarely occur in the absence of signal abnormality on non-enhanced MRI.