

Cerebral Cavernous Venous Malformations

Cerebral cavernous venous malformations are common cerebral vascular malformations, also known as cavernous haemangioma or cavernoma and are usually with characteristic appearances on MRI. According to newer nomenclature (ISSVA classification of vascular anomalies) these lesions are merely known as slow flow venous malformations.

Epidemiology: Most patients present at 40-60 years of age. Most patients have single lesions. Multiple lesions may be familial and screening of family members may be indicated.

Clinical presentation: Majority of lesions remain asymptomatic and are found incidentally. Presentation due to haemorrhage may cause a seizure or focal neurological deficit. The risk of haemorrhage is 1% per year for familial cases and somewhat less for sporadic lesions.

Pathology: Cavernous malformations are composed of a "mulberry-like" cluster of dilated thin-walled capillaries, with surrounding hemosiderin. Unlike AVMs, there is no normal brain between the interstices of these lesions.

Radiographic features:

Most cavernomas tend to be supratentorial (~80% cases) but can be found anywhere including the brainstem. They are usually single, although up to one-third of patients with sporadic lesions have more than one.

- **CT :** Small lesions are difficult to see on CT. They do not enhance on CECT scans. If large, then a region of hyperdensity can be seen, which should raise the suspicion. However, if there has been a recent bleed then it is more obvious and may be surrounded by a mantle of oedema.
- **MRI :** MRI is the choice of investigation and it demonstrates a characteristic “popcorn” or “berry” appearance with a rim of signal loss due to hemosiderin deposit. T1 and T2 signal is varied internally depending on the age of the blood products and small fluid-fluid levels may be evident.

In presence of a recent bleed, surrounding edema may be present. The lesions do not enhance; in some cases faint enhancement is possible.

Cavernous malformations can be grouped into four types based on MRI appearances using the Zabramski classification.

- Type 1= subacute hemorrhage (hyperintense on T1WI; hyper-/hypointense on T2WI)
- Type 2= mixed signal intensity on T1, T2WI with degrading hemorrhage of various ages (classic “popcorn ball” lesion).
- Type 3= chronic hemorrhage (hypo-to iso on T1, T2WI).
- Type 4= punctate microhemorrhages (“black dots”), poorly seen except on GRE / T2* sequences.

Following patient presented with a recent seizure episode and chronic headache and had multiple cavernous malformations of various types:

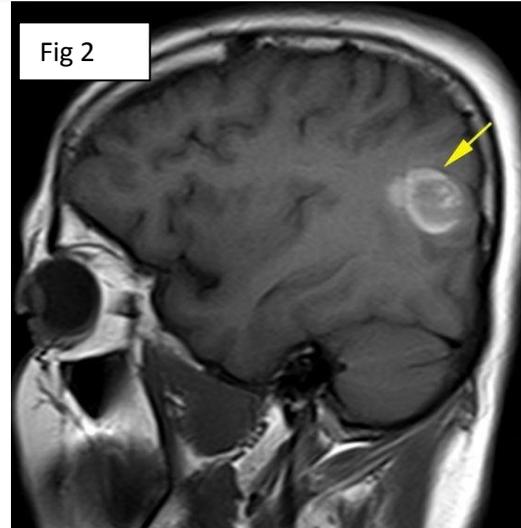
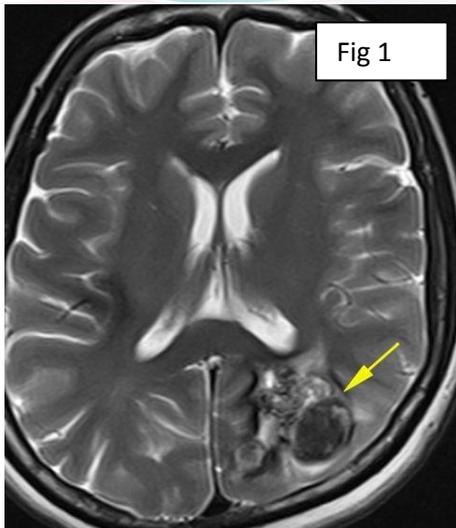


Fig 1, 2: **Type 1** lesion in left parieto-occipital lobe showing subacute hemorrhage.

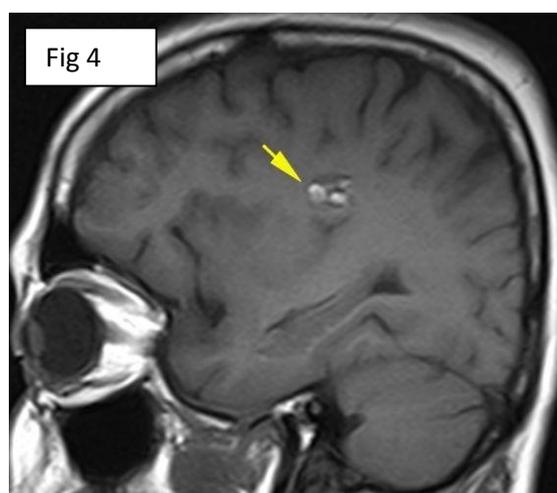
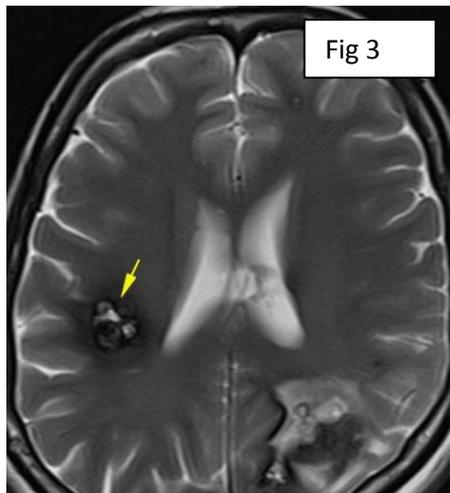


Fig 3, 4: **Type 2** lesion in right temporo-parietal lobe showing 'popcorn' appearance.

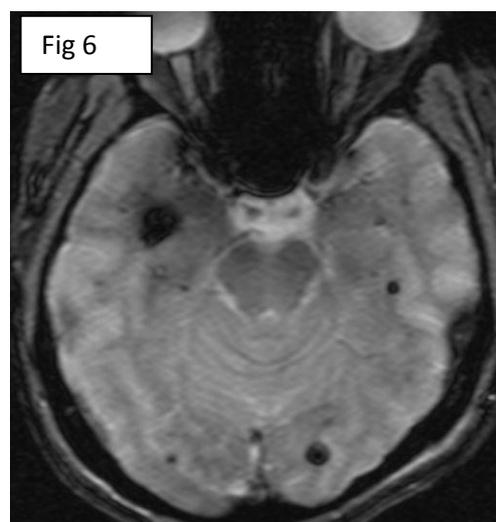
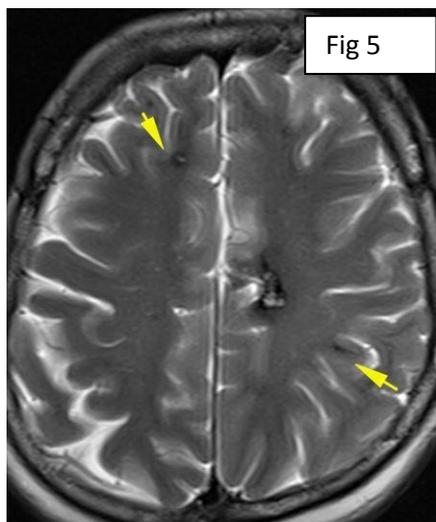


Fig. 5: **Type 3** lesions (marked yellow) in both parietal lobes.

Fig. 6: **Type 4** lesions seen as multiple black dots on GRE (T2*) images.

Regards, **Dr. Deepa S. Nadkarni / Dr. Shaikh M. Mazhar**

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