

Cavernous malformation hemorrhage

Accurately determining the risk of [hemorrhage](#) has been elusive. A standardized definition of hemorrhage by the [Angioma Alliance](#) has been adopted (since essentially all CMs have surrounding hemosiderin indicative of small leaks and CMs are prone to recurrent small hemorrhages that are rarely devastating).

Some CMs appear to behave more “aggressively” (i.e., tend to bleed more frequently).

Neurologic impairment following initial hemorrhage from a CM tends to be less than with other types of vascular malformations.

[Angioma Alliance](#) definition of hemorrhage in [cavernous malformations](#)

Acute or subacute symptoms (any of: [headache](#), [seizure](#), impaired [consciousness](#), or new/worsened focal neurological deficit referable to the anatomic location of the CM) accompanied by radiological, pathological, surgical, or (rarely) only cerebrospinal fluid evidence of recent extra- or intralesional hemorrhage.

This definition does not include either an increase in CM diameter without other evidence of recent hemorrhage, nor the presence of a hemosiderin halo.

Risk of hemorrhage in cerebral CMs

- risk of first-time hemorrhage among incidentally discovered CMs is very low (0.08%)
- the two factors most consistently associated with increased bleeding risk:
 - CMs initially presenting with hemorrhage: hazard ratio = 5.6
 - brainstem CMs: hazard ratio = 4.4
- inconsistent findings reported for risk differences with female gender, CM size, and CM multiplicity
- the annual risk of recurrent hemorrhage declines over time
- higher annual ICH rates are reported in familial CMs (4.3–6%) than in sporadic cases⁷⁷ but this could be artifactual
- pregnancy & parturition are not thought to be risk factors for hemorrhage
- the risk of hemorrhage from a CM may not be increased by platelet inhibitors⁷⁵ or anticoagulation- but this is based on uncontrolled studies that likely avoided treatment of patients with recent hemorrhage
- no relation of physical activity to hemorrhage from CMs has been identified.

Spinal CMs

Data is limited. Annual hemorrhage rate of 2.1% has been reported.

17% of patients with spinal CMs also have cerebral CMs, and 12% had a family history of CMs.

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