Brain vascular malformation

Brain vascular malformations have traditionally been divided into the four categories:

1.- arteriovenous malformations (AVMs)

2.- cavernous malformations (CCMs), also known as cavernomas or cavernous hemangiomas

3.- venous angiomas

4.- capillary telangiectasias, in descending order of incidence.

Brain vascular malformations are resource-intensive to manage effectively, are associated with serious neurological morbidity, lack specific medical therapies, and have no validated biomarkers for disease severity and progression. Investigators have tended to work in “research silos” with suboptimal cross-communication.

see Brain Vascular Malformation Consortium.

Vascular malformations of the brain are often found in the workup of intracranial hemorrhage, seizures, focal neurological deficits, or headaches.

Diagnosis

Although CT-angiography may reveal an underlying cerebral arteriovenous malformation (AVM) or arteriovenous fistula (AVF), other vascular malformations are not easily evaluated on CT and are better seen on magnetic resonance imaging. For the evaluation of AVMs and AVFs, formal digital subtraction angiography remains the gold standard. In the case of AVMs, AVFs, or cavernous malformations (CMs), the lesion may serve as the etiologic source of the symptoms and thus warrant treatment.

The use of radiological imaging studies is a critical element for treatment of such neurosurgical cases. As imaging modalities continue to evolve at a rapid pace, it is imperative for neurological surgeons to be familiar with current imaging modalities essential for a precise diagnosis. Better understanding of these cerebrovascular lesions along with their associated imaging findings assists in determining the appropriate treatment options [1)].

Treatment

When feasible, microsurgical resection is the optimal treatment option for AVMs and CMs. Endovascular embolization may serve as a crucial adjunct to microsurgery in the treatment of AVMs. Depending on their vascular anatomy, AVFs may be treated by either endovascular embolization or microsurgery. For inoperable AVMs and dural AVFs necessitating treatment, stereotactic radiosurgery (SRS) may serve as a viable treatment alternative.

Capillary telangiectasias and developmental venous anomalies (DVAs) are often incidental findings; they may be found in association with CMs but are not generally considered targets for treatment [2)].

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Zafar A, Fiani B, Hadi H, Arshad M, Cathel A, Naeem M, Parsons MS, Farooqui M, Bucklin AA, Leone MJ, Baig A, Quadri SA. Cerebral vascular malformations and their imaging modalities. Neurol Sci. 2020 Apr 25. doi: 10.1007/s10072-020-04415-4. [Epub ahead of print] Review. PubMed PMID: 32335778.
2)
Gross BA, Du R. Diagnosis and treatment of vascular malformations of the brain. Curr Treat Options Neurol. 2014 Jan;16(1):279. doi: 10.1007/s11940-013-0279-9. PubMed PMID: 24318447.