Spetzler-Martin AVM grading system

see also Supplementary Spetzler-Martin AVM grading scale and Spetzler Ponce classification

- From rupture to recovery: A case report on a multidisciplinary approach to arteriovenous malformation (AVM)-associated intracerebral hemorrhage
- Cerebral arteriovenous malformations classification systems in comparison with Spetzler-Martin: A comparative review
- The Dynamics of Seizures After Microsurgical Treatment of Brain AVMs in Patients with Symptomatic Epilepsy: A Single-Center Experience over 10 Years
- Is Supplemented Spetzler-Martin grading Superior? A comparative study in AVM microsurgery risk stratification
- Simultaneous Multiparametric Estimation of Arteriovenous Malformations Hemodynamics Using MR Fingerprinting ASL (MRF-ASL)
- Combined treatment of high-risk cerebral arteriovenous malformations according to Spetzler-Martin classification
- Curative Treatment of Brain Arteriovenous Malformations Combining Endovascular and Surgical Approaches Consecutively
- Evaluating post-treatment residual intracranial arteriovenous shunting: a comparison of arterial spin labeling MRI and digital subtraction angiography

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Judicious patient selection is essential to avoiding surgical complications and poor neurological outcomes with cerebral arteriovenous malformation surgery. The combination of nidus size, deep venous drainage, and eloquence of adjacent brain that comprises the Spetzler-Martin grading scale provides a preliminary assessment of surgical risks.

The Spetzler-Martin grading scale published in 1986 assigned one to three points for AVM size, one point for involvement of eloquent cortex, and one point for deep venous drainage for a total of five points. In their retrospective study, Spetzler and Martin retrospectively applied their scoring scale to 100 AVM patients. Higher Spetzler-Martin grade demonstrated a direct correlation between post-operative neurologic deficit as well as an inverse correlation between likelihood of surgical resection [1)].

The Spetzler-Martin AVM grading system allocates points for various features of Cerebral arteriovenous malformation to give a score between 1 and 5 in order to estimate the risk of surgery for that patient.

Size of nidus small (<3 cm) = 1

medium (3-6 cm) = 2

large (>6 cm) = 3

Eloquence of adjacent brain non-eloquent = 0

eloquent = 1

Venous drainage superficial only = 0

deep = 1

[2].

see Spetzler Martin grade 1.

see Spetzler Martin grade 3.

see Spetzler Martin grade 5.

see High-grade arteriovenous malformations

The Spetzler-Martin AVM grading system is the most widely used grading system for AVMs.

However, it is crude and has deficiencies such as lumping the heterogeneous group of grade III AVMs together without clarifying the management of subtypes [3].

The SM system also has redundancies, with low-grade AVMs managed similarly with surgery and high-grade AVMs managed conservatively.

Therefore, Spetzler and Ponce [4] condensed the original 5-tier grading system into 3 tiers and made broad treatment recommendations based on AVM class. Proponents of this simplification emphasize that the fewer classes correspond more directly with treatment recommendations. Opponents of this simplification argue that it does not simplify the analysis because the same scoring steps of the original SM scale are required along with an additional step to reclassify the AVM. Opponents also emphasize that the class-specific recommendations are vague and encumbered with exceptions. For example, the class system still does not shed light on the heterogeneous grade III lesions. Patient selection is a sophisticated process that requires more complexity, not less, which is why the supplementary grading system was proposed.

[1], [2], [4]
Spetzler RF, Martin NA. A proposed grading system for arteriovenous malformations. J Neurosurg. 1986 Oct;65(4):476-83. PubMed PMID: 3760956.
[3]
Lawton MT; UCSF Brain Arteriovenous Malformation Study Project. Spetzler-Martin grade III arteriovenous malformations: surgical results and a modification of the grading scale. Neurosurgery. 2003;52(4):740–748; discussion 748-749.