



Staged Stereotactic Radiosurgery for Large Brain Arteriovenous Malformation: A Review of the Literature

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Introduction

Aside from microsurgical resection and endovascular embolization, stereotactic radiosurgery (SRS) for brain arteriovenous malformations (bAVMs) has gained a reputation since the 1970s for successful obliterations of these brain lesions. Our objective is to conduct a systematic literature review on Staged RS for bAVMs to assess potential outcomes and major drawbacks of the procedure.

Methods

We conducted a search of the PubMed database according to PRISMA criteria using the following algorithm: [(Staged Stereotactic Radiosurgery) OR (Staged Gamma Knife)] AND [(Arteriovenous malformation) OR AVM]. The abstract of each article was examined carefully and after including papers that reported on factors in treatment success and treatment failure, outcomes of the procedure, post-procedural complications and morbidities, and innovative approaches, while excluding editorials and review papers, our search was narrowed.

Results

We found 409 related articles in total of which 370 articles were written in the English language. After careful examination of the abstract we narrowed the search to 6 articles. Overall, 111 patients underwent Staged Stereotactic Radiosurgery for AVMs; 79% of the lesions were supratentorial. The median Spetzler Martin Grade was 4.5. 45% of patients presented with hemorrhage. Seizure was reported in 32% of the cases. The number of stages ranged from 2 to 4 and the time between stages procedure ranged from 4.9 to 6.9 months. The mean per session radiation total (margin) dose ranged from 15-18.6 Gy. Complete Obliteration ranged from 50-89% of the cases after a follow up of 47 months. Complications occurred in 29% of the patients where hemorrhage was the most common complication (53%).

Conclusions

Staged radiosurgical resections for AVMs may be an acceptable option for select large AVMS but complication rates are high and obliteration rates appear relatively low. Embolization to treat associated aneurysms may be a strategy to reduce hemorrhage during the latency period.

Learning Objectives

Learn about staged stereotactic radiosurgery as an option to treat large bAVMs