



Radiosurgery for Secondary Epilepsy Associated with Double Brain Arteriovenous Malformation

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ISRS 2026
SYDNEY, AUSTRALIA
31ST MAY - 3RD JUNE

INTRODUCTION

- Brain arteriovenous malformations (BAVMs) are vascular lesions that may present with **secondary epilepsy (~30%)**
- Multiple BAVMs are rare (0.3–3.2%) and pose a therapeutic challenge
- Stereotactic radiosurgery (SRS) is a minimally invasive treatment option
- Evidence for **single-session treatment of multiple BAVMs for seizure control** remains limited

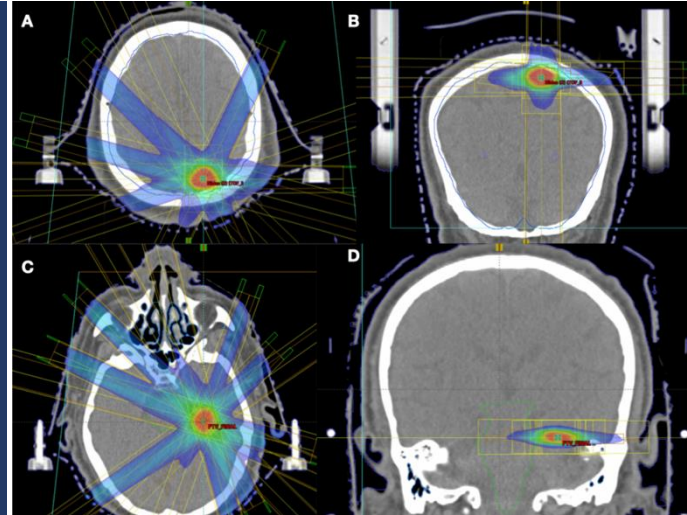
CASE PRESENTATION

A 54-year-old man with secondary epilepsy presented with refractory focal motor seizures (Jacksonian march) and progressive right-sided neurological deficits.

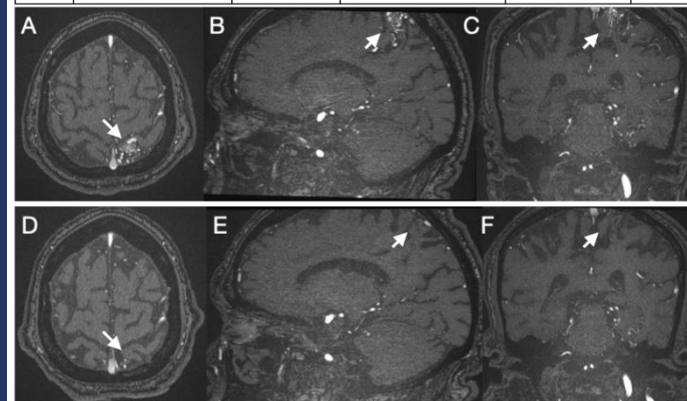
Cerebral angiography revealed two distinct brain arteriovenous malformations located in the left parahippocampal and postcentral gyri.

TREATMENT

- Single-session LINAC-based stereotactic radiosurgery (TrueBeam)
- BRAINLAB-based treatment planning**
- Conformal dose delivery with precise target delineation
- Both AVMs treated with a **22 Gy prescription dose**
- Both lesions had favorable radiosurgical profiles (**RBAS <2**)
- No procedure-related complications



| BAVM | LOCATION | SIZE AND VOLUME | ANGIO ARCHITECTURE | SPETZLER-MARTIN (SM) | RBAS |
|------|----------------------------------|---------------------------------|--------------------|----------------------|-------|
| 1 | Parahippocampal gyrus (Cortical) | 20x17 mm; 0.335 cm ³ | Compact | II | 1.29 |
| 2 | Postcentral gyrus (Cortical) | 32x11 mm; 0.779 cm ³ | Compact | III | 1.645 |



RESULTS

- Drug-refractory epilepsy at baseline.
- 50% reduction in seizure frequency at 3 months.
- Progressive reduction in antiepileptic medication.
- Engel class IB outcome at long-term follow-up.
- Complete seizure freedom achieved.
- Complete angiographic obliteration at 7 years.
- No radiation-induced toxicity.

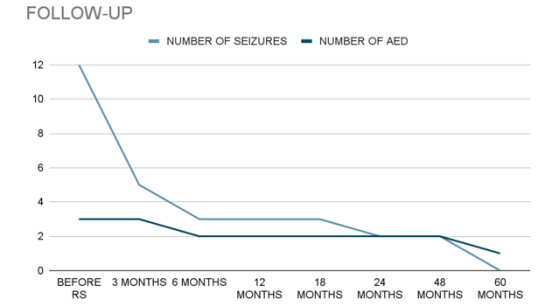


Figure 5. Five-year follow-up chart illustrating seizure frequency and corresponding adjustments to AED therapy.

DISCUSSION

- Seizures in BAVMs are related to cortical irritation, vascular steal, and gliosis
- Radiosurgery targets the nidus, promoting progressive obliteration while preserving surrounding brain tissue
- Seizure control may occur **before complete obliteration**
- Single-session treatment of multiple BAVMs** may reduce cumulative risk and avoid delays
- Favorable lesion characteristics allow safe and effective radiosurgical management

CONCLUSION

- Single-session radiosurgery is a safe and effective strategy for treating multiple BAVMs
- Enables both **seizure control** and **complete obliteration**
- Supports its role as a minimally invasive option in selected patients

KEYWORDS

Brain arteriovenous malformation, radiosurgery, epilepsy

