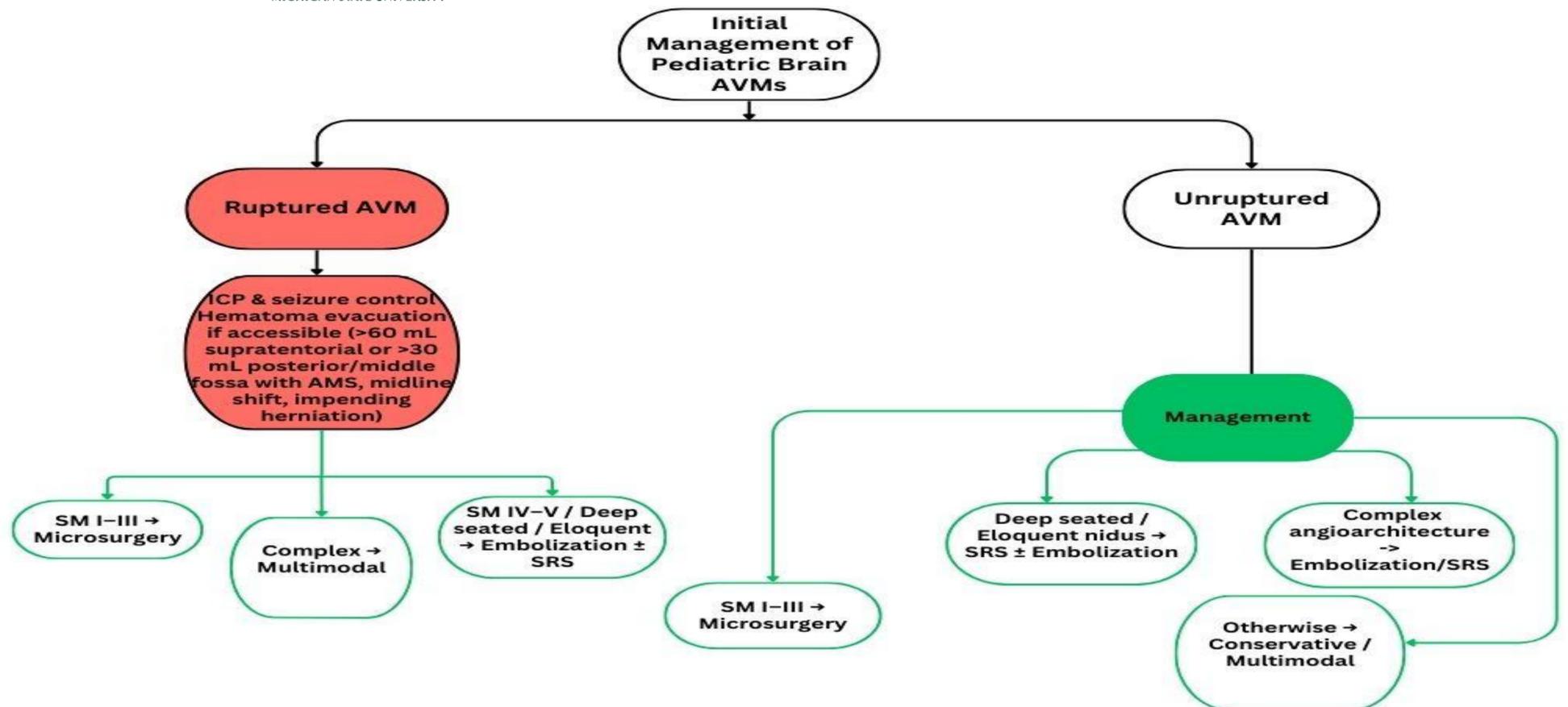


# Advances in the Multimodal Management of Pediatric AVMs: A 10-Year Review

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## Introduction

Pediatric brain arteriovenous malformations (AVMs) carry a higher lifetime hemorrhage and recurrence risk than adult AVMs. This review summarizes 10 years of evidence on microsurgery, stereotactic radiosurgery, embolization, and multimodal strategies to guide durable, individualized pediatric AVM management.

## Methods and Materials

- Narrative review of pediatric AVMs
- Databases: PubMed, Scopus, Embase
- 30 papers were included
- Inclusion
  - 2015-2025
  - Patient <18 with reported outcomes
- Modalities:
  - Microsurgical resection
  - Stereotactic radiosurgery (SRS)
  - Endovascular embolization
  - Multimodal approaches
- Outcomes: obliteration, hemorrhage, complications, recurrence, follow-up duration

## Results

- **Microsurgical Resection**  
Immediate obliteration 89–100% [1]  
Largest pediatric series: 97.8% cure, 0% peri-operative mortality [1]  
Recurrence up to 29% in children [2,3]  
Best suited for ruptured, low-grade, accessible AVMs [1]
- **Stereotactic Radiosurgery (SRS)**  
Obliteration 63–72% overall [4,5]  
Spetzler-Martin I–III lesions show best outcomes [4]  
Latency hemorrhage risk persists for 2–3 years [4,5]  
Recurrence <1% after confirmed obliteration [4,5]
- **Endovascular Embolization**  
Standalone cure ~30–42% [6]  
Complication rates 15–20% [6]  
Pre-SRS embolization associated with lower obliteration and higher radiation effects [6]  
Most effective as adjunctive therapy [6]
- **Multimodal Management**  
Overall obliteration up to 88% in complex lesions [7]  
Improves safety in high-grade or eloquent AVMs [7]  
Favored over single-modality therapy [7]

## Discussion

Pediatric AVM outcomes differ from adults due to higher recurrence and longer lifetime hemorrhage risk. Optimal management requires lesion-specific selection of microsurgery, SRS, and adjunctive embolization with emphasis on long-term durability and neurological preservation [2,3,4,6]

## Conclusions

- Pediatric AVM management Favors individualized multimodal strategies [7]
- Microsurgery offers high immediate cure for low grade lesions [1]
- SRS provide durable cure with Minimal recurrence [4,5]
- Lifelong surveillance is essential due to high recurrence risk [2,3]

## Contact

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