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# Pediatric Cranial Stereotactic Radiosurgery: Meta-Analysis and International Stereotactic Radiosurgery Society Practice Guidelines

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## Abstract

**Background:** There are limited data on the use of stereotactic radiosurgery (SRS) for pediatric patients. The aim of this systematic review was to summarize indications and outcomes specific to pediatric cranial SRS to inform consensus guidelines on behalf of the International Stereotactic Radiosurgery Society (ISRS).

**Methods:** A systematic review, using the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), analyzed English-language articles on SRS, published between 1989 and 2021, that included outcomes for at least 5 pediatric patients. MEDLINE database terms included tumor types and locations, and radiosurgical and age-specific terms. We excluded nonclinical reports, expert opinions, commentaries, and review articles. Meta-regressions for associations with local control were performed for medulloblastoma, craniopharyngioma, ependymoma, glioma, and arteriovenous malformation (AVM).

**Results:** Of the 113 articles identified for review, 68 met the inclusion criteria. These articles described approximately 400 pediatric patients with benign and malignant brain tumors and 5119 with AVMs who underwent cranial SRS. The rates of local control for benign tumors, malignant tumors, and AVMs were 89% (95% CI, 82%-95%), 71% (95% CI, 59%-82%), and 65% (95% CI, 60%-69%), respectively. No significant associations were identified for local control with patient-, tumor-, or treatment-related variables.

**Conclusions:** This review is the first to summarize outcomes specific to SRS for pediatric brain tumors and AVMs. Although data reporting is limited for pediatric patients, SRS appears to provide acceptable rates of local control. We present ISRS consensus guidelines to inform the judicious use of cranial SRS for pediatric patients.

**Keywords:** arteriovenous malformations; brain neoplasms; pediatric; stereotactic radiosurgery.

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