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## Abstract

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## Outcomes of Radiosurgery for Brain Metastases in the Motor Cortex

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**Abstract****Objectives:**

To study the clinical, imaging, and survival outcomes in patients with motor cortex brain metastases managed with stereotactic radiosurgery (SRS).

**Methods:**

We used our prospective patient registry to obtain data imaging and clinical outcomes. Additional volumetric measurements were made from imaging data.

**Results:**

The outcomes of 208 patients with metastatic tumors involving the motor cortex that underwent SRS between 2012 and 2021 were analyzed. A total of 279 motor cortex metastases varied in volume from 0.01 cm<sup>3</sup> to 12.18 cm<sup>3</sup> with a mean volume of 0.74 cm<sup>3</sup>. The SRS margin dose varied from 10 Gy to 20 Gy, with a mean dose of 16.9 Gy. The overall tumor control rate after SRS was 97.8%. Perilesional edema was seen in up to 25% of tumors at presentation. After SRS, adverse radiation effects (ARE) were noted in 6% of all tumors, but were symptomatic only in 1.4%. Median time to appearance of symptomatic ARE was 8 months. All patients with ARE exhibited perilesional edema post treatment. Edema without ARE was seen in an additional 13%. New focal seizures were seen in 5 patients (2%), and new generalized seizures in 1 (0.3%). Thirty-six patients presented with motor deficits. At final follow up, 85% were improved or unchanged – 13 (41%) had a normal exam, 10 (31%) had mild deficits, and 9 (28%) still had moderate deficits. New remote brain metastases were found in 31% of patients at a median of 8 months. Karnofsky performance scores improved following SRS in 24%. Median survival after radiosurgery was 10 months. Patients with incidentally found brain metastases had significantly better survival than those who presented with symptoms and deficits (median 13 vs 9 months) (p=0.047). Absence of a neurological deficit, RPA Class I and II, and margin dose > 18 Gy were each associated with a significant survival advantage.

**Conclusion(s):**

Stereotactic radiosurgery for motor cortex brain metastases is safe in most patients and effective in providing tumor control. Patients identified with tumors before onset of neurological deficits have better outcomes.