

# Outcomes Following Stereotactic Radiosurgery for the Treatment of Sarcomatous Brain Metastasis

Tobias Chapman <sup>1</sup>

1. Department of Radiation Oncology, University of Washington

✉ **Corresponding author:** Tobias Chapman, tchapm01@uw.edu

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## Abstract

**Objectives:** Intracranial brain metastases from sarcomatous tumors are a relatively rare manifestation, and are typically considered refractory to conventional treatment approaches, including fractionated radiotherapy. Given their radioresistant nature, many clinicians treat primarily with stereotactic radiosurgery (SRS). We sought to investigate outcomes with SRS either alone, or in combination with other treatment modalities.

**Methods:** With IRB approval, we retrospectively reviewed the records of patients treated with SRS utilizing Cobalt-60 therapy for metastatic intracranial sarcoma from 2000–2015. We identified 27 patients, with 67 treated lesions (10 resection cavities). Histologies included alveolar soft part sarcoma (ASPS; n=5), leiomyosarcoma (n=5), undifferentiated sarcoma (n=5), liposarcoma (n=4), primitive neuroectodermal tumor/Ewing sarcoma (n=3) and other (n=5). Overall survival (OS) and progression free survival (PFS; time to death or any brain progression) were measured from the date of first SRS treatment. Survival estimates were calculated using the Kaplan-Meier method with the log-rank test to compare groups. Treatment response was assessed using Response Assessment in Neuro-Oncology (RANO) criteria.

**Results:** Patients included 14 men and 13 women, with a median age of 43 years (range, 14 to 78 years) and median KPS of 90 (range, 50-100). Eleven patients had prior surgical resection. Eleven patients (41%) had single, 12 (44%) had 2-3, and 4 (15%) had 4 or more intracranial metastases. Median lesion volume was 0.43cc (range, 0.004-64.3 cc) and prescription dose 19 Gy (range, 14-24 Gy), covering the 50% isodose surface. With a median follow-up of 11 months, median OS was 12 months (95% confidence interval [CI] 6-48months) and median PFS 7 months (95% CI 2-11 months) for all patients. Five patients with ASPS had a statistically significant longer median OS of 54 months (p=0.01) and PFS of 18 months (p=0.005). Forty-two lesions were assessed for response, with 17% complete responses, 12% partial responses and 14% with progressive disease. The remainder were either too small to measure (21%) or stable (36%). Of the 5 patients with progression of treated lesions, time to progression was 3, 7, 18, 31 and 67 months. Twelve patients had at least one salvage therapy, including surgical resection, repeat SRS or whole brain radiation therapy. No patients developed leptomeningeal disease.

**Conclusions:** To our knowledge, this is the largest reported cohort of patients treated with SRS for metastatic intracranial sarcoma. Our OS compares favorably with the limited published literature and SRS appears to be a safe and efficacious treatment for these patients with or without other treatment modalities. Even in patients that ultimately progress, durable control

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can be seen. Of interest, patients with ASPS have extended survival and freedom from recurrence in comparison with other histologies, suggesting that aggressive treatment in these cases is warranted.