

## Journal Article



## Gamma Knife radiosurgery for brainstem metastases: the UCSF experience

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**Abstract** *Purpose:* To assess clinical and imaging outcomes in patients treated with Gamma Knife stereotactic radiosurgery (SRS) for brainstem metastases. *Materials and methods:* We reviewed all patients with brain metastases treated with SRS at the University of California, San Francisco from 1991–2005 to identify patients who had SRS to a brainstem metastasis. Survival time and freedom from progression (FFP) were calculated from date of SRS using the Kaplan–Meier method. Prognostic factors were evaluated using the log-rank test and Cox proportional hazards model. *Results:* From 1991 through 2005, 42 consecutive patients with brainstem metastases had SRS to 44 lesions (seven midbrain, 31 pontine, and six medullary) in 42 sessions. Primary diagnoses included 14 cases of lung cancer (one small-cell), 10 melanoma, 12 breast cancer, five renal cell, and one unknown. The median age was 55 years (range, 25–79). The median survival time was 9 months after SRS. Longer survival time was associated with single metastasis, non-melanoma histology, and extracranial disease control. The median target volume was 0.26 ml (0.015–2.8 ml) and the median prescribed dose was 16.0 Gy (10.0–19.8 Gy). Brainstem lesion FFP was 90% at 6 months and 77% at 1 year. Four patients had brainstem complications following treatment. Poor brainstem outcome was associated with melanoma and renal cell histology as well as brainstem lesion volume  $\geq 1$  ml. *Conclusions:* In this series, SRS using a median dose of 16 Gy provided excellent local control with relatively low morbidity in patients with brainstem metastases less than 1 ml or non-melanoma, non-renal cell histology.

**Keywords** Brain metastasis - Brainstem - Gamma Knife - Stereotactic radiosurgery

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