

## ABSTRACT

### **Purpose:**

The main treatment of the limited number of brain metastasis is surgical resection followed by whole brain radiotherapy. In an effort to minimize the potential long term neurotoxicity of whole brain radiation, Stereotactic Radiosurgery (SRS) was used alone for 1-3 lesions. The primary objective of this study was to determine the local control of brain metastases by SRS and secondary objectives were to determine the occurrence of intracranial recurrences (new or distant/local), their salvage treatments and overall survival.

### **Material and Methods:**

An institutional retrospective review of patients with 1-3 brain metastases was performed. A total of 129 patients were treated with SRS alone to the metastases site, from January 2001 to June 2007. Pre- and post-SRS clinical and imaging information were available for analysis for 126 lesions in 82 patients. 69 patients were treated with SRS alone for all their lesions, and 13 patients received surgery plus SRS to the surgical bed for one of their lesions and rest of lesions treated with SRS alone. Median SRS dose was 18 Gy (10-20Gy) and median tumor volume was 1.61 cm<sup>3</sup> (0.09-25.0cm<sup>3</sup>). No margins were used for SRS planning. The SRS dose was typically prescribed to 90% isodose line. Median follow up was 6.9 months (1-32 months). Patients were followed with clinical visits and imaging studies.

### **Results:**

Local tumor control rate was 87%. SRS dose was a significantly important factor for tumor control. Local tumor control rate was 84% for 16Gy, 85% for 18Gy and 100% for 20Gy SRS dose. Tumor volume of  $\leq 4$  cm<sup>3</sup> had 89%, and  $> 4$ cm<sup>3</sup> had 84% local tumor control rate. The number of lesions, age, and sex did not affect the outcome. New intracranial metastases were seen in 31 patients (38%). Median time to develop intracranial recurrences was 6.6 months (95% confidence interval 1.6-11.5 months). The salvage treatments included SRS to the new lesions in 15 patients (48 %) and whole

brain radiotherapy in 11 patients (35 %). Overall median survival was 9.3 months (95% confidence interval 7.1-11.5 months)

**Conclusion:**

Local therapy with SRS achieved excellent local control in patients with 1-3 brain metastases. Patients who developed new intracranial metastasis were salvaged with SRS or whole brain radiotherapy. The results suggest that local therapy can be used as the initial treatment modality for selected group of patients with limited number of brain metastases.

**Key words:** Stereotactic Radiosurgery, Brain metastases