

CLINICAL PAPER /

BRAIN METASTASES



A New Treatment Paradigm: Neoadjuvant Radiosurgery Before Surgical Resection of Brain Metastases with Analysis of Local Tumor Recurrence

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ABSTRACT

PURPOSE:

Resected brain metastases (BM) require radiation therapy to reduce local recurrence. Whole brain radiation therapy (WBRT) reduces recurrence, but with potential toxicity. Postoperative stereotactic radiosurgery (SRS) is a strategy without prospective data and problematic target delineation. SRS delivered in the preoperative setting (neoadjuvant, or NaSRS) allows clear target definition and reduction of intraoperative dissemination of tumor cells.

METHODS AND MATERIALS:

Our treatment of resectable BM with NaSRS was begun in 2005. Subsequently, a prospective trial of NaSRS was undertaken. A total of 47 consecutively treated patients (23 database and 24 prospective trial) with a total of 51 lesions were reviewed. No statistical difference was observed between the 2 cohorts, and they were combined for analysis. The median follow-up time was 12 months (range, 1-58 months), and the median age was 57. A median of 1

day elapsed between NaSRS and resection. The median diameter of lesions was 3.04 cm (range, 1.34-5.21 cm), and the median volume was 8.49 cc (range, 0.89-46.7 cc). A dose reduction strategy was used, with a median dose of 14 Gy (range, 11.6-18 Gy) prescribed to 80% isodose.

RESULTS:

Kaplan-Meier overall survival was 77.8% and 60.0% at 6 and 12 months. Kaplan-Meier local control was 97.8%, 85.6%, and 71.8% at 6, 12, and 24 months, respectively. Five of 8 failures were proved pathologically without radiation necrosis. There were no perioperative adverse events. Ultimately, 14.8% of the patients were treated with WBRT. Local failure was more likely with lesions >10 cc ($P=.01$), >3.4 cm ($P=.014$), with a trend in surface lesions ($P=.066$) and eloquent areas ($P=.052$). Six of the 8 failures had an obvious dural attachment or proximity to draining veins.

CONCLUSION

NaSRS can be performed safely and effectively with excellent results without documented radiation necrosis. Local control was excellent even in the setting of large (>3 cm) lesions. The strong majority of patients were able to avoid WBRT. NaSRS merits consideration in a multi-institution trial.