Clinical investigation: brain

Analysis of repeat stereotactic radiosurgery for progressive primary and metastatic CNS tumors

Ajay Bhatnagar M.D.*, Dwight E. Heron M.D.*, Douglas Kondziolka M.D.*,†, L. Dade Lunsford M.D.*,†,‡ and John C. Flickinger M.D.*,†,‡

* Department of Radiation Oncology, Center for Image-Guided Neurosurgery, University of Pittsburgh School of Medicine, Pittsburgh, PA, USA
† Department of Neurological Surgery, Center for Image-Guided Neurosurgery, University of Pittsburgh School of Medicine, Pittsburgh, PA, USA
‡ Department of Radiology, Center for Image-Guided Neurosurgery, University of Pittsburgh School of Medicine,

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Abstract

Purpose: To identify and evaluate the pretreatment and patient factors that would predict for complications after repeat radiosurgery.

Methods and Materials: The data from 26 patients who underwent reirradiation with Gamma Knife surgery after a previous procedure in the same or subjacent location were available for evaluation. The range of follow-up was 1–45 months (mean 10). The mean minimal and maximal initial dose and volume for all 26 patients was 16.2 Gy (range 12–22), 31.0 Gy (range 22.2–40.0), and 12.4 cm³ (range 1.20–70.84), respectively. The mean marginal and maximal repeated radiosurgery dose and volume for all 26 patients was 14.9 Gy (range 12–22.5), 29.7 Gy (range 18.0–45.0) and 12.8 cm³ (range 1.10–39.20), respectively.

Results: Tumor control was significantly better statistically (p = 0.0129) for benign tumors (6 of 6, 100% actuarial rate at 4 years) compared with malignant tumors (7 of 20, 35% actuarial rate at 3 years, 3 of 4 metastatic tumors and 2 of 10 primary malignant gliomas). The retreatment volume for radiosurgery correlated significantly with the probability of neurologic decline (any cause) (p = 0.0181).

Conclusion: Repeat radiosurgery can be performed for recurrent tumors with minimal central nervous system toxicity, especially for benign tumors, with reasonable tumor control.

Author Keywords: Reirradiation; Radiosurgery; CNS tumors; Gamma Knife

Reprint requests to: John C. Flickinger, M.D., Radiation Oncology B-300, 200 Lothrop St., Pittsburgh, PA 15213 USA. Tel: (412) 647-3600; Fax: (412) 647-6029; email: flickingerjc@msx.upmc.edu

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