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Control of brain metastases using frameless image-guided radiosurgery.

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OBJECT: Radiosurgery is an important and well-accepted method in the management of brain metastases. Using conventional frame-based techniques, high lesional control rates are expected. The introduction of image-guided techniques allows for improved patient comfort and workflow. Some controversy exists as to the accuracy of image-guided techniques and consequently the impact they might have on control of brain metastases (as opposed to the level of control achieved with frame-based methods). The authors describe their initial 15-month experience with image-guided radiosurgery (IGRS) using Novalis with ExacTrac for management of brain metastases. **METHODS:** The authors reviewed the cases of brain metastasis treated by means of IGRS in their tertiary regional radiation oncology service over a 15-month period. During the study period 54 patients (median age 57.9 years) harboring 108 metastases were treated with IGRS. The median time from cancer diagnosis to development of brain metastasis was 12 months (range 0-144 months). The median tumor volume was 0.98 cm³ (range 0.03-19.07 cm³). The median prescribed dose was 18 Gy to the 80% isodose line (range 14-20 Gy). Lesions were followed with postradiosurgery MR imaging every 2-3 months following treatment. **RESULTS:** The median follow-up period was 9 months (range 0-20 months). Median actuarial survival was 8.6 months following IGRS. Eight patients with 18 lesions died within the first 2 months after the procedure, before scheduled follow-up imaging. Thus 90 lesions (in 46 patients) were followed up with imaging studies. Lesions that were unchanged or reduced in size were considered to be under control. The 6-month actuarial lesion control rate was 88%. Smaller lesions (< 1 cm³) had a statistically improved likelihood of complete imaging response (loss of all contrast-enhancement $p = 0.01$). **CONCLUSIONS:** Image-guided radiosurgical treatment of brain metastases resulted in high rates of tumor control comparable to control rates reported for frame-based methods. High control rates were seen for small lesions in which spatial precision in dose delivery is critical. These data suggests that in regard to lesion control, IGRS using Novalis with ExacTrac is equivalent to frame-based radiosurgery methods.

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