Tumor progression in patients receiving adjuvant whole-brain radiotherapy vs localized radiotherapy after surgical resection of brain metastases.


Abstract

BACKGROUND: Surgery followed by adjuvant radiotherapy is a well-established treatment paradigm for brain metastases.

OBJECTIVE: To examine the effect of postsurgical whole-brain radiotherapy (WBRT) or localized radiotherapy (LRT), including stereotactic radiosurgery and intraoperative radiotherapy, on the rate of recurrence both local and distal to the resection site in the treatment of brain metastases.

METHODS: We retrospectively identified patients who underwent surgery for brain metastasis at the Cleveland Clinic between 2004 and 2012. Institutional review board-approved chart review was conducted, and patients who had radiation before surgery, who had nonmetastatic lesions, or who lacked postadjuvant imaging were excluded.

RESULTS: The final analysis included 212 patients. One hundred fifty-six patients received WBRT, 37 received stereotactic radiosurgery only, and 19 received intraoperative radiotherapy. One hundred forty-six patients were deceased, of whom 60 (41%) died with no evidence of recurrence. Competing risks methodology was used to test the association between adjuvant modality and progression. Multivariable analysis revealed no significant difference in the rate of recurrence at the resection site (hazard ratio [HR] 1.46, P = .26) or of unresected, radiotherapy-treated lesions (HR 1.70, P = .41) for LRT vs WBRT. Patients treated with LRT had an increased hazard of the development of new lesions (HR 2.41, P < .001) and leptomeningeal disease (HR 2.45, P = .04). Median survival was 16.5 months and was not significantly different between groups.

CONCLUSION: LRT as adjuvant treatment to surgical resection of brain metastases is associated with an increased rate of development of new distant metastases and leptomeningeal disease compared with WBRT, but not with recurrence at the resection site or of unresected lesions treated with radiation.

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