Influence of location and extent of surgical resection on survival of patients with glioblastoma multiforme: results of three consecutive Radiation Therapy Oncology Group (RTOG) clinical trials.

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Abstract

PURPOSE: The influence of tumor site, size, and extent of surgery on the survival of patients with glioblastoma multiforme treated on three consecutive prospectively randomized Radiation Therapy Oncology Group trials employing surgery and irradiation plus or minus chemotherapy was studied.

METHODS AND MATERIALS: Six hundred forty-five patients with a diagnosis of glioblastoma multiforme on central pathological review were analyzed for survival with respect to known prognostic factors, that is, age and Karnofsky Performance Status, as well as extent of surgery, site, and size. Surgical treatment consisted of biopsy only in 17%, partial resection in 64%, and total resection in 19%. Tumors were located in frontal lobe in 43%, temporal lobe in 28%, and parietal lobe in 25%. Maximum tumor diameter as determined on computed tomography or magnetic resonance imaging scans was less than 5 cm for 38%, between 5-10 cm for 56% and greater than 10 cm for 6% of patients. The extent of surgical therapy was the same for tumors greater than 5 or greater than 10 cm, whereas total resection was more often performed for tumors less than 5 cm. The extent of surgery did not appear to vary with age or site.

RESULTS: Patients undergoing total resection had a median survival of 11.3 months compared to 6.6 months for patients with a biopsy only. A significant difference in median survival was also found for partial resection versus biopsy only treatment (10.4 vs. 6.6 months). There was no difference in survival for the different tumor sizes. Patients with frontal lobe tumors survived longer than those with temporal or parietal lobe lesions (11.4 months, 9.1 months, and 9.6 months, respectively) (p = 0.01). A Cox multivariate model confirmed a significant correlation of age, Karnofsky Performance Status, extent of surgery, and primary site with survival. The best survival rates occurred in patients who had at least three of the following features: < 40 years of age, high Karnofsky Performance Status, frontal tumors, and total resection (17 months median).

CONCLUSION: We conclude that biopsy only yields inferior survival to more extensive surgery for patients with glioblastoma multiforme treated with surgery and radiation therapy.

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