Multiple resections for patients with glioblastoma: prolonging survival.

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Abstract

Object Glioblastoma is the most common and aggressive type of primary brain tumor in adults. These tumors recur regardless of intervention. This propensity to recur despite aggressive therapies has made many perceive that repeated resections have little utility. The goal of this study was to evaluate if patients who underwent repeat resections experienced improved survival as compared with patients with fewer numbers of resections, and whether the number of resections was an independent predictor of prolonged survival. Methods The records of adult patients who underwent surgery for an intracranial primary glioblastoma at an academic tertiary-care institution between 1997 and 2007 were retrospectively reviewed. Multivariate proportional hazards regression analysis was used to identify an association between glioblastoma resection number and survival after controlling for factors known to be associated with survival, such as age, functional status, periventricular location, extent of resection, and adjuvant therapy. Survival as a function of time was plotted using the Kaplan-Meier method, and survival rates were compared using log-rank analysis. Results Five hundred seventy-eight patients with primary glioblastoma met the inclusion/exclusion criteria. At last follow-up, 354, 168, 41, and 15 patients underwent 1, 2, 3, or 4 resections, respectively. The median survival for patients who underwent 1, 2, 3, and 4 resections was 6.8, 15.5, 22.4, and 26.6 months (p < 0.05), respectively. In multivariate analysis, patients who underwent only 1 resection experienced shortened survival (relative risk [RR] 3.400, 95% CI 2.423-4.774; p < 0.0001) as compared with patients who underwent 2 (RR 0.688, 95% CI 0.525-0.898; p = 0.0006), 3 (RR 0.614, 95% CI 0.388-0.929; p = 0.02), or 4 (RR 0.600, 95% CI 0.238-0.853; p = 0.01) resections. These results were verified in a case-control evaluation, controlling for age, neurological function, periventricular tumor location, extent of resection, and adjuvant therapy. Patients who underwent 1, 2, or 3 resections had a median survival of 4.5, 16.2, and 24.4 months, respectively (p < 0.05). Additionally, the risk of infections or iatrogenic deficits did not increase with repeated resections in this patient population (p > 0.05). Conclusions Patients with glioblastoma will inevitably experience tumor recurrence. The present study shows that patients with recurrent glioblastoma can have improved survival with repeated resections. The findings of this study, however, may be limited by an intrinsic bias associated with patient selection. The authors attempted to minimize these biases by using strict inclusion criteria, multivariate analyses, and case-control evaluation.

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