Residual tumor volume and patient survival following reoperation for recurrent glioblastoma.

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Abstract

Object Maximal safe tumor resection is part of the standard of care for patients with newly diagnosed glioblastoma. The role of reoperation in the care of patients with recurrent glioblastoma is less clear, and less than a quarter of patients undergo a second surgery. Previous studies have identified preoperative variables associated with the improved survival of patients following reoperation, and guidelines for the selection of patients for reoperation have been devised and validated. In this study, the authors analyzed the relative survival benefit of maximal safe tumor removal in a series of patients with recurrent glioblastoma who all underwent reoperation. Methods In this longitudinal study, the clinical and radiological data of 97 consecutive patients who underwent reoperation for recurrent glioblastoma were prospectively collected. Multiple regression analyses and Kaplan-Meier plotting were performed to identify pre- and postoperative clinical and radiological variables associated with increased survival following reoperation. Results The median postoperative survival of all patients following reoperation was 12.4 months (95% confidence interval [CI] 9.0-15.6 months). Multiple Cox regression analysis revealed that patients with large (> 3 cm³) residual tumors following reoperation had significantly decreased survival relative to those with residual tumors that were small (> 0-3 cm³; hazard ratio [HR] = 3.10, 95% CI 1.69-5.70; p < 0.001) or radiologically absent (0 cm³; HR = 5.82, 95% CI 2.98-11.37; p < 0.001). Large residual tumors had faster rates of subsequent regrowth than small (odds ratio [OR] = 4.22, 95% CI 1.19-14.97; p = 0.026) or radiologically absent (OR = 11.00, 95% CI 2.79-43.43; p = 0.001) residual tumors, and a faster regrowth rate was significantly associated with decreased survival (HR = 4.01, 95% CI 2.26-7.14; p < 0.001). Conclusions The overall survival of patients with recurrent glioblastoma who underwent reoperations increased with decreasing postoperative residual tumor volumes. For patients meeting prognostic criteria for reoperation, the surgical goal should be to minimize residual tumor volume to maximize overall survival. Clinical trial registration no.: NCT00060541 (ClinicalTrials.gov).

KEYWORDS: AUC = area under the curve; CI = confidence interval; HR = hazard ratio; KPS = Karnofsky Performance Scale; MCA = middle cerebral artery; MGMT = O6-methylguanine-DNA methyltransferase; OR = odds ratio; glioblastoma; oncology; recurrent tumor; reoperation; survival

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