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1: [J Neurosurg.](#) 2008 Oct 10. [Epub ahead of print] [Related Articles](#), [Links](#)



Independent association of extent of resection with survival in patients with malignant brain astrocytoma.

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Object With recent advances in the adjuvant treatment of malignant brain astrocytomas, it is increasingly debated whether extent of resection affects survival. In this study, the authors investigate this issue after primary and revision resection of these lesions. Methods The authors retrospectively reviewed the cases of 1215 patients who underwent surgery for malignant brain astrocytomas (World Health Organization [WHO] Grade III or IV) at a single institution from 1996 to 2006. Patients with deep-seated or unresectable lesions were excluded. Based on MR imaging results obtained < 48 hours after surgery, gross-total resection (GTR) was defined as no residual enhancement, near-total resection (NTR) as having thin rim enhancement of the resection cavity only, and subtotal resection (STR) as having residual nodular enhancement. The independent association of extent of resection and subsequent survival was assessed via a multivariate proportional hazards regression analysis. Results Magnetic resonance imaging studies were available for review in 949 cases. The mean age and mean Karnofsky Performance Scale (KPS) score at time of surgery were 51 +/- 16 years and 80 +/- 10, respectively. Surgery consisted of primary resection in 549 patients (58%) and revision resection for tumor recurrence in 400 patients (42%). The lesion was WHO Grade IV in 700 patients (74%) and Grade III in 249 (26%); there were 167 astrocytomas and 82 mixed oligoastrocytoma. Among patients who underwent resection, GTR, NTR, and STR were achieved in 330 (35%), 388 (41%), and 231 cases (24%), respectively. Adjusting for factors associated with survival (for example, age, KPS score, Gliadel and/or temozolomide use, and subsequent resection), GTR versus NTR (p < 0.05) and NTR versus STR (p < 0.05) were independently associated with improved survival after both primary and revision resection of glioblastoma multiforme (GBM). For primary GBM resection, the median survival after GTR, NTR, and STR was 13, 11, and 8 months, respectively. After revision resection, the median survival after GTR, NTR, and STR was 11, 9, and 5 months, respectively. Adjusting for factors associated with survival for WHO Grade III astrocytoma (age, KPS score, and revision resection), GTR versus STR (p < 0.05) was associated with improved survival. Gross-total resection versus NTR was not associated with an independent survival benefit in patients with WHO Grade III astrocytomas. The median survival after primary resection of WHO Grade III (mixed oligoastrocytomas excluded) for GTR, NTR, and STR was 58, 46, and 34 months, respectively. Conclusions In the authors' experience with both primary and secondary resection of malignant brain astrocytomas, increasing extent of resection was associated with improved survival independent of age, degree of disability, WHO grade, or subsequent treatment modalities used. The maximum extent of resection should be safely attempted while minimizing the risk of surgically induced neurological injury.

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