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Surgery for recurrent GBM: a retrospective case-control study.

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**OBJECTIVE:** The role of surgery in recurrent GBM remains a controversial topic. The goal of this study was to perform a case-control analysis including time to tumor recurrence as an additional prognostic factor in order to determine which patients benefit most from repeat surgery.

**METHODS:** Our brain tumor database was reviewed over a ten-year period for all adult ( $\geq 18$  years old) patients with primary IDH wildtype GBM that received surgery for recurrent disease. These patients were then age, sex, and treatment-matched to case-controls from our institution that received medical therapy for recurrent disease.

**RESULTS:** A total of 174 adult patients with GBM were included in the study, 87 patients that received surgery for recurrent GBM (surgery cohort) and 87 patients that did not receive surgery for recurrent GBM (non-surgery cohort). The surgery cohort had longer overall survival ( $p = 0.0003$ ) and post recurrence survival ( $p = 0.001$ ) than the non-surgery cohort. When the surgery cohort was split into two groups based on time to tumor recurrence, the long time to recurrence group ( $> 6$  months) demonstrated significantly increased survival compared to the short time to recurrence group ( $p < 0.0001$ ). Multivariate analysis of both cohorts demonstrated surgery for recurrent GBM was independently significant after adjusting for age, KPS, and time to tumor recurrence ( $p < 0.0001$ ).

**CONCLUSIONS:** Surgery for recurrent GBM leads to improved survival independent of age, KPS, and time to tumor recurrence. Patients with time to tumor recurrence greater than 6 months benefit most from additional surgery.

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