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Repeat resection for recurrent glioblastoma in the temozolomide era: a real-world multi-centre study

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Abstract

Introduction: In contrast to standard-of-care treatment of newly diagnosed glioblastoma, there is limited consensus on therapy upon disease progression. The role of resection for recurrent glioblastoma remains unclear. This study aimed to identify factors for overall survival (OS) and post-progression survival (PPS) as well as to validate an existing prediction model.

Methods: This was a multi-centre retrospective study that reviewed consecutive adult patients from 2006 to 2019 that received a repeat resection for recurrent glioblastoma. The primary endpoint was PPS defined as from the date of second surgery until death.

Results: 1032 glioblastoma patients were identified and 190 (18%) underwent resection for recurrence. Patients that had second surgery were more likely to be younger (<70 years) (adjusted OR: 0.3; 95% CI: 0.1-0.6), to have non-eloquent region tumours (aOR: 1.7; 95% CI: 1.1-2.6) and received temozolomide chemoradiotherapy (aOR: 0.2; 95% CI: 0.1-0.4). Resection for recurrent tumour was an independent predictor for OS (aOR: 1.5; 95% CI: 1.3-1.7) (mOS: 16.9 months versus 9.8 months). For patients that previously received temozolomide chemoradiotherapy and subsequent repeat resection (137, 13%), the median PPS was 9.0 months (IQR: 5.0-17.5). Independent PPS predictors for this group were a recurrent tumour volume of >50cc (aOR: 0.6; 95% CI: 0.4-0.9), local recurrence (aOR: 1.7; 95% CI: 1.1-3.3) and 5-ALA fluorescence-guided resection during second surgery (aOR: 1.7; 95% CI: 1.1-2.8). A National Institutes of Health Recurrent Glioblastoma Multifforme Scale score of 0 conferred an mPPS of 10.0 months, a score of 1-2, 9.0 months and a score of 3, 4.0 months (log-rank test, p -value < 0.05).

Conclusion: Surgery for recurrent glioblastoma can be beneficial in selected patients and carries an acceptable morbidity rate. The pattern of recurrence influenced PPS and the NIH Recurrent GBM Scale was a reliable prognostication tool.

Keywords: Recurrent glioblastoma; disease progression; resection; temozolomide chemoradiotherapy.

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