

Multicenter Study *Neurosurg Rev.* 2026 Jan 27;49(1):163. doi: 10.1007/s10143-025-04104-w.

Surgical treatment of recurrent glioblastoma: a multicenter perspective from the Italian society of neurosurgery (SINch[®]) and a systematic review

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PMID: 41591525 DOI: 10.1007/s10143-025-04104-w

Abstract

Given the lack of effective second-line oncotherapy, the role of reoperation and the optimal treatment strategy for recurrent glioblastoma (rGBM) remains controversial. For this reason, we conducted a multicenter retrospective study joined with a systematic literature review to investigate the role of reoperation in patients with rGBM, to identify key factors for the selection of patients that can benefit from reoperation. A retrospective analysis of 236 surgically treated patients with rGBM from 14 different neurosurgical centers between 2012 and 2019 was performed. In addition, a systematic review of the literature was conducted with 87 papers (72 retrospective and 15 prospective) included in the final analysis. In our multicenter cohort, variables significantly relating with a longer post-recurrence survival (PRS) were Karnofsky Performance Status (KPS) at recurrence ($p = 0.001$), tumor volume at recurrence ($p = 0.011$), absence of ependymal involvement at recurrence ($p = 0.022$), MGMT methylation both at first ($p = 0.024$) and second surgery ($p = 0.030$), supramaximal contrast-enhancing (CE) resection (RANO Class 1) both at first ($p = 0.010$) and second surgery ($p = 0.002$). After a review of the literature, reoperation and a higher preoperative KPS at recurrence were considered statistically significant variables for improved OS in 46/68 studies (68%) and 47/60 studies (78%), respectively. Maximal CE resection at first and second surgery was associated with a longer OS in 37/51 (73%) and 23/34 (68%) studies, respectively. RANO Class 1 resection and a Karnofsky Performance Status ≥ 70 at recurrence appear to be key predictors to improved post-recurrence survival and preserving quality of life in rGBM patients. Additional factors, including tumor volume at recurrence, ependymal involvement, and MGMT promoter methylation status, should be carefully integrated into the multidisciplinary assessment of suitability for reoperation in rGBM patients.

Keywords: Glioblastoma; Multicenter; Recurrence; Recurrent glioblastoma; Second surgery.