

ABSTRACT

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Radical supramaximal resection for newly diagnosed left-sided eloquent glioblastoma: safety and improved survival over gross-total resection.

Di L(1), Shah AH(1), Mahavadi A(1), Eichberg DG(1), Reddy R(1), Sanjurjo AD(1), Morell AA(1), Lu VM(1), Ampie L(2), Luther EM(1), Komotar RJ(1)(3), Ivan ME(1)(3).

Author information:

(1)1Department of Neurosurgery and.

(2)3Department of Neurosurgery, University of Virginia School of Medicine, Charlottesville, Virginia.

(3)2Sylvester Comprehensive Cancer Center, University of Miami School of Medicine, Miami, Florida; and.

OBJECTIVE: Supramaximal resection (SMR) has arisen as a possible surrogate to gross-total resection (GTR) to improve survival in newly diagnosed glioblastoma (nGBM). However, SMR has traditionally been limited to noneloquent regions and its feasibility in eloquent nGBM remains unclear. The authors conducted a retrospective multivariate propensity-matched analysis comparing survival outcomes for patients with left-sided eloquent nGBM undergoing SMR versus GTR.

METHODS: A retrospective review was performed of all patients at our institution who underwent SMR or GTR of a left-sided eloquent nGBM during the period from 2011 to 2020. All patients underwent some form of preoperative or intraoperative functional mapping and underwent awake or asleep craniotomy (craniotomy under general anesthesia); however, awake craniotomy was performed in the majority of patients and the focus of the study was SMR achieved via awake craniotomy and functional mapping with lesionectomy and additional peritumoral fluid attenuated inversion recovery (FLAIR) resection. Propensity scores were generated controlling for age, tumor location, and preoperative Karnofsky Performance Status (KPS) score with the nearest-neighbor algorithm.

RESULTS: A total of 102 patients (48 SMR, 54 GTR) were included in this study. The median overall survival (OS) and progression-free survival (PFS) for patients receiving SMR were 22.9 and 5.1 months, respectively. Propensity matching resulted in a final cohort of 27 SMR versus 27 GTR patients. SMR conferred improved OS (21.55 vs 15.49 months, $p = 0.0098$) and PFS (4.51 vs 3.59 months, $p = 0.041$) compared to GTR. There was no significant difference in postoperative complication rates or KPS score in SMR compared with GTR patients ($p = 0.236$ and $p = 0.736$, respectively). In patients receiving SMR, improved OS and PFS showed a dose-dependent relationship with extent of FLAIR resection (EOFR) on log-rank test for trend ($p < 0.001$).

CONCLUSIONS: SMR by means of awake craniotomy with functional mapping for left-sided eloquent nGBM is safe and confers a survival benefit compared to GTR obtained with lesionectomy alone while preserving postoperative neurological integrity. When tolerated, greater EOFR with SMR may be associated with improved survival.

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