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Abstract

Salvage Stereotactic Radiosurgery and Hypofractionated Stereotactic Radiotherapy for Recurrent Glioblastoma Multiforme

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Objectives: Despite decades of clinical trials investigating new treatment modalities for glioblastoma multiforme (GBM), there have been no significant treatment advances in addressing the poor prognosis associated with the disease. This is particularly true for recurrent GBM, for which a standard of care has not been established and is still under debate. The purpose of this study is to examine whether stereotactic radiosurgery (SRS) or fractionated stereoradiotherapy (fSRT) provide a survival benefit for recurrent GBM patients and evaluate other potential prognostic factors related to survival outcomes.

Methods: The RSSearch Patient Registry was screened for patients with recurrent primary GBM treated with SRS or fSRT from June 2007 to July 2015. Descriptive analysis was used to report patient demographics and treatment patterns. Overall survival (OS) and potential prognostic factors were evaluated using the Kaplan-Meier method and continuous log rank analysis.

Results: Our analysis included 50 patients diagnosed with primary recurrent GBM, with 3 patients treated with SRS and 47 patients treated with fSRT (11 treated with 3 fractions and 36 treated with 5 fractions). Median doses were 18 Gy (range: 12-24 Gy), 24 Gy (range: 21-30 Gy), and 30 Gy (range: 10-35 Gy) for SRS and fSRT of 3 and 5 fractions, respectively. There was no change in median Karnofsky performance score (KPS) following SRS or fSRT (median of 80% both before and after treatment; p-value = 0.4352). Median OS following SRS or fSRT in our cohort was 7.3 months (range: 0.3 months - 38.9 months), with 6-month, one-year, and two-year OS of 60% (95% CI: 46.42% to 73.58%), 22% (95% CI: 10.52% to 33.48%), and 4% (95% CI: 0% to 9.43%), respectively. No significant difference in survival was found between SRS and fSRT treated patients (p-value = 0.855). Though median survival was greater for prescription doses of > 30 Gy for patients treated with fSRT of 5 fractions as compared to those receiving < 30 Gy (8.96 months vs. 5.65 months), this finding was not significant following log-rank analysis (p-value = 0.1247). Also, no potential prognostic factors were identified by continuous log rank analysis (such as age, initial KPS, lesion volume, lesion location, or single vs. multifocal recurrence). Twenty-four percent of patients reported treatment-related side effects, with the most common being fatigue (10%), speech impairment (8%), and mental status/cognitive changes (6%).

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Conclusions: Our results suggest that salvage SRS and fSRT is a relatively safe treatment option in the community setting (particularly fSRT) and provides a survival advantage over the historical median survival of 5 months for recurrent GBM. However, prospective studies are warranted given the poor prognosis of recurrent GBM following radiotherapy to explore concurrent and adjuvant therapies that may improve survival.