RT-08. PROTON THERAPY (PT) LARGE-VOLUME RE-IRRADIATION FOR RECURRENT GLIOMA: OVERALL SURVIVAL (OS) AND TOXICITY OUTCOMES

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BACKGROUND: The therapeutic benefit of targeting T2/FLAIR in addition to contrast-enhancing (CE) tumor during re-irradiation for recurrent glioma can be attenuated by augmented toxicity. Given its steep dose fall-off and narrow penumbrae, PT minimizes volume of brain parenchyma outside target volume, potentially permitting a less toxic delivery of large-volume re-irradiation. METHODS: From 2/2011 to 12/2013, 19 consecutive adult patients with recurrent glioma treated with PT re-irradiation at a single institution were retrospectively analyzed. Planning target volume (PTV) included T2/FLAIR and CE abnormalities. Covariates assessed were age, gender, KPS at time of PT, number of salvage treatments, grade at initial diagnosis, interval between prior radiotherapy and PT, PT dose, PT PTV, bevacizumab failure, concurrent use of temozolomide and/or bevacizumab, and post-PT radiation necrosis. OS time from PT start was estimated with Kaplan-Meier analysis; comparisons used log-rank statistic. Multivariate analysis used the Cox proportional hazards model. RESULTS: Median age was 42 and median KPS was 90. Median salvage treatments was 2 (range 1-9). Median interval between prior radiotherapy and PT was 36.1 months (mos) (range 6.9-162.9). 12 patients (63%) were bevacizumab-refractory. Median PT dose was 50.4 CGE and median PTV was 224.2 cc. 5 patients (26%) remain alive. Median OS was 9.4 mos overall, 6.6 mos amongst bevacizumab-refractory patients, and 12.3 mos amongst bevacizumab-naive patients. Prior bevacizumab failure (hazard ratio (HR) 3.79; P = 0.047), shorter interval since prior radiotherapy (HR 1.04; P = 0.02), and Grade 4 disease (HR 4.17; P = 0.03) were prognostic of inferior OS. One patient had grade 3 radiation necrosis in the setting of PT re-irradiation for progressive brainstem glioma. One patient had grade 2 radiation necrosis, and another had grade 2 stroke. No other grade ≥3 toxicities were observed. CONCLUSION: Large-volume PT re-irradiation for recurrent glioma is safe and associated with promising OS outcomes, particularly in the setting of bevacizumab-refractory tumors.

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