Radiother Oncol. 2024 Jul 14:110437. doi: 10.1016/j.radonc.2024.110437. Online ahead of print.

Re-irradiation treatment regimens for patients with recurrent glioma - Evaluation of the optimal dose and best concurrent therapy

Daniel F Fleischmann [1], Laura Gajdi [2], Stefanie Corradini [2], Stephan Schönecker [2], Sebastian Marschner [2], Raphael Bodensohn [3], Jan Hofmaier [2], Sylvia Garny [2], Robert Forbrig [4], Niklas Thon [5], Claus Belka [6], Maximilian Niyazi [7]

PMID: 39013502 DOI: 10.1016/j.radonc.2024.110437

Abstract

Purpose: Re-irradiation (reRT) is an effective treatment modality for patients with recurrent glioma. Data on dose escalation, the use of simulated integrated boost and concomitant therapy to reRT are still scarce. In this monocentric cohort of n = 223 patients we investigated the influence of reRT dose escalation as well as the concomitant use of bevacizumab (BEV) with regard to post-recurrence survival (PRS) and risk of radionecrosis (RN).

Patients and methods: Patients with recurrent glioma treated between July 2008 and August 2022 with reRT with BEV, reRT with temozolomide (TMZ) and reRT without concomitant systemic therapy were retrospectively analyzed. PRS and RN-free survival (RNFS) were calculated for all patients using the Kaplan-Meier estimator. Univariable and multivariable cox regression was performed for PRS and for RNFS. The reRT Risk Score (RRRS) was calculated for all patients.

Results: Good, intermediate and poor risk of the RRRS translated into 11 months, 9 months and 7 months of median PRS (univariable: p = 0.008, multivariable: p = 0.013). ReRT was applied with a dose of ≤36 Gy (n = 140) or >36 Gy (n = 83). Concomitant bevacizumab (BEV) therapy was performed in n = 122 and concomitant temozolomide (TMZ) therapy in n = 32 patients. Median PRS was 10 months in patients treated with >36 Gy and 8 months in patients treated with ≤36 Gy (univariable: p = 0.032, multivariable: p = 0.576). Regarding concomitant TMZ therapy, median PRS was 14 months vs. 9 months for patients treated with or without TMZ (univariable: p = 0.041, multivariable: p = 0.019). No statistically significant influence on PRS was seen for concomitant BEV therapy in this series. RN was less frequent for reRT with concomitant BEV, (17/122; 13.9 %) than for reRT without BEV (30/101; 29.7 %). Regarding RNFS, the hazard ratio for reRT with BEV was 0.436 (univariable; p = 0.006) and 0.479 (multivariable; p = 0.023), respectively. ReRT dose did not show statistical significance in regards to RN (univariable: p = 0.073, multivariable: p = 0.404). RNFS was longer for patients receiving concomitant BEV to reRT than for patients treated with reRT only (mean 31.7 vs. 30.9 months, p = 0.004).

Conclusion: In this cohort, in patients treated with concomitant BEV therapy RN was less frequently detected and in patients treated with concomitant TMZ longer PRS was observed. Based on these results, the best concomitant therapy and the optimal dose should be decided on a patient-by-patient basis.

Keywords: Dose escalation; Glioblastoma; Re-irradiation; Recurrent glioma.