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> [World Neurosurg](#). 2023 Jan 19;S1878-8750(23)00066-9. doi: 10.1016/j.wneu.2023.01.050.
Online ahead of print.

The efficacy and safety of intraoperative radiotherapy in the treatment of recurrent high-grade glioma: a single-center prospective study

Liangbin Li ¹, Kun Qin ², Yi Pan ³, Chengliang Mao ², Wahafu Alafate ², Peixin Tan ³, Ni Zhang ⁴, Kai Tang ⁵

Affiliations

PMID: 36682529 DOI: [10.1016/j.wneu.2023.01.050](#)

Abstract

Background: High-grade gliomas are treated following standard protocol; However, tumor recurrence is almost inevitable. Recurrent high-grade gliomas have an extremely poor prognosis, and there are no clear treatment guidelines. In this study we evaluated the safety and effectiveness of intraoperative radiotherapy for recurrent high-grade glioma.

Patients and methods: In this prospective, randomized study begun April 2018, patients ≥ 18 years of age with a Karnofsky function status > 50 , and recurrent high-grade glioma were randomly assigned in a 1:1 ratio to tumor resection and IORT or tumor resection alone.

Results: There were 22 patients allocated to the IORT group and 21 patients allocated to receive surgery only (Operation group). And finally clinical data of 42 enrolled patients were involved in the analysis. The progression-free survival (PFS) of the IORT group was 9.6 months and of the operation group was 7.3 months ($P=0.018$), and the overall survival of the two groups was 13.5 months and 10.2 months, respectively ($P=0.054$). Univariate and multivariate analysis indicated that preoperative KPS > 70 and IORT were protective factors for patients with recurrent high-grade glioma. A patient who underwent conventional fractionated radiotherapy within 6 months of receiving IORT died on the ninth day after undergoing tumor resection and IORT because of severe cerebral edema. The total operation time was longer in the IORT group, but there were no differences in intraoperative bleeding or adverse events between the two groups.

Conclusions: IORT with low-energy x-ray at a dose of 30-40 Gy is generally safe and effective for patients with recurrent glioma. However, IORT should not be performed for patients who have received conventional fractionated radiotherapy within 6 months.

Keywords: Intraoperative radiotherapy; efficacy; high-grade recurrent glioma; safety.

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