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Intraoperative radiotherapy in recurrent IDH-wildtype glioblastoma with gross total resection: A single-center retrospective study

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Abstract

Background: Isocitrate dehydrogenase-wildtype (IDHwt) glioblastoma (GBM) is one of the most aggressive primary brain tumors. The recurrence of GBM is almost inevitable. As an adjuvant option to surgery, intraoperative radiotherapy (IORT) is gaining increasing attention in the treatment of glioma. This study is aimed to evaluate the therapeutic efficacy of IORT on recurrent IDHwt GBM.

Methods: In total, 34 recurrent IDHwt GBM patients who received a second surgery were included in the analysis (17 in the surgery group and 17 in the surgery + IORT group).

Results: The progression-free survival and overall survival after the second surgery were defined as PFS₂ and OS₂, respectively. The median PFS₂ was 7.3 months (95% CI: 6.3-10.5) and 10.6 months (95% CI: 9.3-14.6) for those patients who received surgery and surgery + IORT, respectively. Patients in the surgery + IORT group also had a longer OS₂ (12.8 months, 95% CI: 11.4-17.2) than those in the surgery group (9.3 months, 95% CI: 8.9-12.9). The Kaplan-Meier survival curves, analyzed by log-rank test, revealed a statistically significant difference in PFS₂ and OS₂ between both groups, suggesting that IORT plays an active role in the observed benefits for PFS₂ and OS₂. The effects of IORT on PFS₂ and OS₂ were further confirmed by multivariate Cox hazards regression analysis. Two patients in the surgery group developed distant glioma metastases, and no radiation-related complications were observed in the IORT group.

Conclusions: This study suggests that low-dose IORT may improve the prognosis of recurrent IDHwt GBM patients. Future prospective large-scale studies are needed to validate the efficacy and safety of IORT.

Keywords: Glioblastoma; IDH; Intraoperative radiotherapy; Prognosis; Recurrence.

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