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Effect of high-field iMRI guided resection in cerebral glioma surgery: A randomized clinical trial

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Abstract

Background: Extent of resection (EOR) in glioma contributes to longer survival. The purpose of [NCT01479686](https://doi.org/10.1186/1745-7214-14-9686) was to prove whether intraoperative magnetic resonance imaging (iMRI) increases EOR in glioma surgery and benefit survival.

Methods: Patients were randomized (1:1) to receive the iMRI (n = 161) or the conventional neuronavigation (n = 160). The primary endpoint was gross total resection (GTR); secondary outcomes reported were progression-free survival (PFS), overall survival (OS), and safety.

Results: 188 high-grade gliomas (HGGs) and 133 low-grade gliomas (LGGs) were enrolled. GTR was 83.85% in the iMRI group vs. 50.00% in the control group (P < 0.0001). In 321 patients, the median PFS (mPFS) was 65.12 months in the iMRI group and 61.01 months in the control group (P = 0.0202). For HGGs, mPFS was improved in the iMRI group (19.32 vs. 13.34 months, P = 0.0015), and a trend of superior OS compared with control was observed (29.73 vs. 25.33 months, P = 0.1233). In the predefined eloquent area HGG subgroup, mPFS, and mOS were 20.47 months and 33.58 months in the iMRI vs. 12.21 months and 21.16 months in the control group (P = 0.0098; P = 0.0375, respectively). From the exploratory analyses of HGGs, residual tumor volume (TV) < 1.0 cm³ decreased the risk of survival (mPFS: 18.99 vs. 9.43 months, P = 0.0055; mOS: 29.77 vs. 18.10 months, P = 0.0042). LGGs with preoperative (pre-OP) TV > 43.1 cm³ and postoperative (post-OP) TV > 4.6 cm³ showed worse OS (P = 0.0117) CONCLUSIONS: It showed that iMRI significantly increased EOR and indicated survival benefits for HGGs, particularly eloquent HGGs. Residual TV in either HGGs or LGGs is a prognostic factor for survival.

Keywords: Cerebral glioma; High-grade glioma; Intraoperative magnetic resonance imaging (iMRI); Low-grade glioma; Surgery.

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