



Complete Resection of Contrast Enhancing Tumor Volume is Associated with Improved Survival in Recurrent Glioblastoma – Results from the DIRECTOR Trial

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Introduction

The role of reoperation for recurrent glioblastoma is still unclear due to lack of prospective studies. Here, we report on the association of clinical outcome with surgery for recurrent glioblastoma including volumetric extent of resection in the well characterized patient cohort of the DIRECTOR trial. This prospective randomized multicenter study evaluated the effect of two different dose-intensified temozolomide regimens at first recurrence of glioblastoma.

Methods

We analyzed prospectively collected clinical, molecular and imaging data from the DIRECTOR cohort (N = 105). Imaging data were available from 87 patients. Volumetric analysis was performed based on gadolinium (Gd) enhancement on MRI and correlated with progression-free survival (PFS) and overall survival (OS). Proportional hazard models were applied to obtain prognostic factors.

Results

71 of 105 patients received surgery at recurrence. Prognostic factors such as age ($p = 0.358$), MGMT promoter methylation ($p = 0.965$), IDH-1 mutation ($p = 0.724$), Karnofsky performance score ($p = 0.880$), or steroid intake before randomization ($p = 0.950$) were balanced between patients with and without reoperation. Mean tumor volumes at study entry were smaller in patients who had received surgery than in patients without (3.0 cm³ [range 0-37] versus 6.8 cm³ [range 1-23], $p < 0.001$). The outcomes in patients with/without surgery at recurrence were similar for PFS (2.0 months vs. 1.9 months, $p = 0.1974$) and OS (9.2 months vs 9.4 months, $p = 0.9538$). Among patients who underwent reoperation, post-surgery imaging was available in 59 cases. In these patients, complete resection of Gd-enhancing tumor (N = 39) versus residual detection of Gd enhancement (N = 20) was associated with significantly improved OS (11.5 months [95% CI 9.3-15.1] vs. 6.7 months [95% CI 5.2-9.5], $p = 0.006$).

Conclusions

Surgery at first recurrence of glioblastoma seems to improve outcome if complete resection of Gd-enhancing tumor volume is feasible.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) describe the effect of tumor resection of recurrent glioblastoma on overall survival 2) discuss prognostic factors in recurrent glioblastoma 3) report on the effect of dose intense rechallenge with temozolomide in recurrent glioblastoma

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