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Quantitative assessment of residual tumor is a strong and independent predictor of survival in methylated glioblastoma following radiochemotherapy with CCNU/TMZ

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Abstract

Background: Maximum tumor resection improves overall survival (OS) in patients with glioblastoma. The extent of resection (EOR) is historically dichotomized. The RANO resect group recently proposed criteria for volumetry-based EOR assessment in patients that were treated according to Stupp's protocol. The purpose of this study was (1) to investigate the prognostic value of EOR in patients receiving combined chemotherapy with lomustine (CCNU)/temozolomide (TMZ), and (2) to analyse the prognostic performance of binary EOR assessment compared to volumetric assessment.

Methods: 78 patients with newly diagnosed MGMT-methylated GBM undergoing tumor resection followed by radiochemotherapy with CCNU/TMZ were included in this study. Residual contrast-enhancing (CE) tumor volume after the first resection was measured and its influence on OS and PFS was analysed using uni- and multivariable Cox regression analysis as well as two-sided log rank test. Patients were divided into RTV ≤ 1 cm³, > 1 cm³ - ≤ 5 cm³ and > 5 cm³ following the proposed criteria of the RANO resect group.

Results: Prolonged OS was associated with age < 60 years, low RTV, and gross total resection (GTR). Residual tumor volume (RTV) had a superior prognostic value compared to binary EOR assessment. Patients with total or near total resection of CE tumor (≤ 1 cm³ RTV) showed prolonged OS (median 54.4 months, 95% CI 46.94-not reached), with a 5-year survival rate of 49%.

Conclusion: Low RTV is associated with increased survival in glioblastoma patients undergoing radiochemotherapy with CCNU/TMZ. This study demonstrates the applicability of the recently proposed RANO resect criteria in this subgroup of patients.

Keywords: MGMT-promotor; extent of resection; glioblastoma; residual tumor volume.

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