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Comparative analysis of the prognostic significance of IDH,TERT, EGFR and MGMT status in patients with adult non-H3-altered grade 4 gliomas: a prospective cohort study

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Abstract

Introduction: Gliomas continue to have a dismal prognosis. A myriad of genetic alterations has been described in this subset of tumors over the last decades. The integrative interpretation of the biomarker constellation for individual patients remains unclear. This study aims to evaluate the impact of some known genetic factors as prognostic biomarkers in grade 4 gliomas.

Methods: Adult non-H3-altered grade 4 gliomas who underwent maximal safe resection accompanied by adjuvant therapy were successively enrolled since January 2019 till January 2021. Patient data were documented preoperatively and during the follow-up visits. The genetic profiling of the tumors included IDH-1 and IDH-2 mutation, MGMT promoter methylation rate, EGFR gene amplification and TERT promoter (TERTp) mutation.

Results: Mean Overall survival (OS) and Progression-free survival (PFS) were 14.45±5.13 months (3-24 months) and 10.66±4.87 months respectively. TERTp-mutant group had a significantly lower OS (10.9 vs 15.9) and PFS (6.9 vs 12.3) than TERTp wildtype group. In the TERT-mutant group, those with concomitant IDH wildtype tumor had higher OS and PFS, comparable to those with both TERTp and IDH wildtype tumors. In multivariate analysis, IDH mutation and TERTp wildtype status were predictive of longer OS and PFS. While IDH and absence of TERTp mutation were associated with KPS>80 across the follow-ups, their predictive values were inferior to preoperative KPS scores.

Conclusion: TERTp mutation and IDH-wildtype status were associated with worse OS and PFS and lower follow-up KPS score in surgically resected gliomas, while MGMT and EGFR status did not have considerable prognostic value in this study.

Keywords: Astrocytoma; Glioblastoma; Overall survival; Progression free survival; TERT promoter; isocitrate dehydrogenase.