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MR Imaging, MGMT Promoter Methylation Features and Prognostic Analysis of Subventricular Zone Contacting IDH Wild-type Glioblastoma

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Abstract

Background: As the largest concentration of neural stem cells in adult brain, the subventricular zone (SVZ) is considered to be a potential source of glioblastoma (GBM) occurrence in recent years.

Methods: In this study, 116 patients with glioblastoma treated at PLA General Hospital were retrospectively reviewed. The features of SVZ contacting glioblastoma were analyzed in terms of MR imaging and MGMT promoter methylation. We also evaluated the prognostic value of SVZ contacting in GBM patients.

Results: GBM with SVZ involvement on MRI is more likely to grow across the midline(36.8% vs 6.9%,P=0.002), more often multifocal lesion(35.6% vs. 6.9%,P=0.003) and have a lower proportion of MGMT promoter methylation (36.8% vs. 69.0%, P=0.003). The median overall survival and progression-free survival of patients in the SVZ contacting group were 12 months and 7 months, while 25 months and 17 months in the non-contacting group(P<0.001, respectively). There was no significant difference in overall survival (P=0.229) and progression-free survival (P=0.808) between patients with different SVZ contacting regions. Multivariate survival analysis indicated that patients with MRI SVZ involvement showed worse overall survival (HR=2.060, 95%CI 1.195-3.550, P=0.009) and progression-free survival (HR=3.021, 95%CI 1.788-5.104, P < 0.001).

Conclusion: This study suggested that MRI SVZ involvement at diagnosis is an independent risk factor for overall survival and progression-free survival in IDH wild-type glioblastoma patients. Based on MR imaging, we also found that SVZ contacting glioblastomas had a larger proportion of crossing midline tumors and multifocal lesions. In addition, patients with SVZ contact in our research presented a lower proportion of MGMT promoter methylation.

Keywords: Glioblastoma; MGMT Promoter Methylation; MR Imaging Feature; Prognosis; Subventricular Zone.

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