ABSTRACT

The imaging features and prognosis of gliomas involving the subventricular zone:
An MRI study.

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RATIONALE AND OBJECTIVES: As the largest concentrated region of neural stem
cells in the adult brain, the subventricular zone (SVZ) is considered to have a
close relationship with the origin of gliomas. An in-depth study of the
characteristic manifestations associated with SVZ involvement in glioma may
provide new ideas for individualized diagnosis and treatment of this fatal
disease.

MATERIALS AND METHODS: All 279 patients with glioma who underwent surgical
treatment in our department from January 2016 to December 2021 were included.
Clinical and imaging data were collected, and telephonic follow-up was conducted
to analyze the overall survival and progression-free survival. Prognostic
factors including SVZ involvement on glioblastoma patients' survival were
analyzed. Next, the relationship between SVZ involvement, a set of unique
imaging features and gene status were determined respectively. The chi-squared
test, logistics regression, and Cox regression were used for statistical
analysis.

RESULTS: The patients were divided into the SVZ involvement group (n = 198,
70.97 %) and SVZ non-involvement group (n = 81, 29.03 %). The median overall
survival and progression-free survival were 13 months and 7 months for the SVZ
involvement group, but 25 months and 17 months for the SVZ non-involvement
group, respectively. In multivariate Cox survival analysis, MRI SVZ involvement
proved an independent risk factor for the survival of patients with
glioblastoma. The patients with SVZ involvement sign had a lower rate of cystic
lesion (32.32 % vs. 48.48 %, p = 0.029), and a larger mean maximum diameter
(5.88 ± 1.28 vs. 3.28 ± 1.65 cm). Compared with high grade gliomas (HGG), T1
enhancement (25.25 % vs. 10.42 %, p = 0.041) and homogeneous signal on T2WI
(14.14 % vs. 43.75 %, p = 0.025) were independently associated with SVZ
involvement in WHO grade 2 gliomas(LGG). In the gene status analysis, the SVZ
involvement group showed the lower rate of MGMT promoter methylation (57.58 %
vs. 79.17 %, p = 0.017).

CONCLUSION: SVZ involvement in MRI at diagnosis is an independent negative
prognostic indicator for the survival of glioblastoma patients. Some image signs
are associated with SVZ involvement in HGG and LGG respectively. The unique
imaging and gene features of gliomas with SVZ involvement indicate that this
kind of tumor maybe a unique subgroup of gliomas.