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Residual pattern of the hyperintense area on T2-weighted magnetic resonance imaging after initial treatment predicts the pattern and location of recurrence in patients with newly diagnosed glioblastoma

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Abstract

Objective: This study examined the clinical significance of residual hyperintense area on T2-weighted magnetic resonance imaging without gadolinium-enhanced lesions at the end of initial treatment (debulking surgery, concomitant radiotherapy, and temozolomide) in patients with glioblastoma (GB).

Methods: Among 150 GB cases, 77 cases without enhanced lesions at the end of initial treatment and without factors modifying the distribution of residual hyperintense area or pattern of recurrence were included. We retrospectively reviewed the relationship of residual hyperintense area after initial treatment with progression-free survival (PFS), overall survival (OS), and pattern of recurrence.

Results: In these 77 cases, the median PFS and OS were 12.4 and 27.4 months, respectively. At the end of initial treatment, 55 (71.4%) cases had residual hyperintense area (T2 residual group, T2R), whereas 22 (28.6%) showed no hyperintense area (T2 disappeared group, T2D). Based on univariate and multivariate analyses, the residual hyperintense area after initial treatment was not a prognostic factor for PFS or OS. Distant recurrences occurred more frequently in the T2D group than in the T2R group 50.0% vs. 9.5%). In the T2R group, the recurrence site coincided with the residual hyperintense area in 36 (85.7%) of 42 recurrences.

Conclusion: The residual hyperintense area on T2WI at the end of initial treatment can predict local recurrence. However, the distant recurrence occurred frequently in T2D group. Thus, attention should be paid to local recurrences in T2R group and distant recurrences in T2D group.

Keywords: T2-weighted magnetic resonance imaging; failure pattern; glioblastoma; hyperintense area; prognosis.