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# Partially Resected Gliomas: Diagnostic Performance of Fluid-attenuated Inversion Recovery MR Imaging for Detection of Progression.

Winterstein M, Münter MW, Burkholder I, Essig M, Kauczor HU, Weber MA.

Departments of Radiology and Biostatistics, German Cancer Research Center, Heidelberg, Germany; Department of Diagnostic and Interventional Radiology and Department of Radiation Oncology, University Hospital Heidelberg, Im Neuenheimer Feld 110, D-69120 Heidelberg, Germany. the 2008 RSNA Annual Meeting.

**Purpose:** To assess whether signal intensity (SI) different from that of cerebrospinal fluid (CSF) within the resection cavity during follow-up helps predict tumor progression in partially resected gliomas. **Materials and Methods:** This retrospective study had local institutional review board approval, with waiver of informed consent. Seventy-five patients with partially resected and irradiated gliomas were evaluated. SI within the resection cavity on fluid-attenuated inversion recovery (FLAIR) magnetic resonance (MR) images was qualitatively and quantitatively assessed during follow-up. Qualitative analysis comprised visual comparison of SI in the resection cavity with SI of normal CSF by two readers. SI of the cavity was quantitatively assessed with region-of-interest (ROI) analysis normalized to background noise, contralateral healthy white matter, and CSF. Normalized SI during follow-up was compared with SI immediately after resection. Tumor progression was defined as increase in longest glioma diameter of at least 20% (Response Evaluation Criteria in Solid Tumors). Sensitivity and specificity of elevated SI in resection cavities for predicting or indicating tumor progression were calculated. Wilcoxon rank-sum test, Hodges-Lehman estimates, Kaplan-Meier curves, and linear mixed-effect models for repeated-measures data were used for quantitative SI measurements. **Results:** Tumor progression at MR was seen in 44 patients (59%), and median progression-free survival was 4.1 years. Qualitative analysis showed that 25 of 44 patients with progression (57%) had SI increase in the resection cavity on FLAIR images. In 10 patients with progression (23%), SI increase was seen a mean of 5 months +/- 3 (standard deviation) before tumor size progression. In 15 patients with progression (34%), SI increase and tumor size progression were detected on the same MR study. In 19 patients with progressing glioma (43%), no SI increase was observed qualitatively. Among 31 patients without progression during follow-up (41%), no SI increase could be observed. Quantitative analysis showed no significant differences in ROI ratios at baseline (after surgery) between progressing and nonprogressing tumors, whereas significant differences in change of ROI ratios at the last measurement could be detected. Overall, SI increase on FLAIR images had specificity of 100% (95% confidence interval [CI]: 91%, 100%) and sensitivity of 57% (95% CI: 42%, 71%) for glioma progression. **Conclusion:** In partially resected gliomas, encapsulation of resection cavity, presumably by tumor cells, manifests as SI increase on FLAIR images and indicates tumor progression with very high specificity. (c) RSNA, 2010.

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