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Relevance of T2 signal changes in the assessment of progression of glioblastoma according to the Response Assessment in Neurooncology criteria.

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Abstract

Background: According to the Response Assessment in Neurooncology (RANO) criteria, significant nonenhancing signal increase in T2-weighted images qualifies for progression in high-grade glioma (T2-progress), even if there is no change in the contrast-enhancing tumor portion. The purpose of this retrospective study was to assess the frequency of isolated T2-progress and its predictive value on subsequent T1-progress, as determined by a T2 signal increase of 15% or 25%, respectively. The frequency of T2-progress was correlated with antiangiogenic therapy. Patients and Methods: MRI follow-up examinations (n = 777) of 144 patients with histologically proven glioblastoma were assessed for contrast-enhanced T1 and T2-weighted images. Examinations were classified as T1-progress, T2-progress with 15% or 25% T2-signal increase, stable disease, or partial or complete response. Results: Thirty-five examinations revealed exclusive T2-progress using the 15% criterion, and only 2 examinations qualified for the 25% criterion; 61.8% of the scans presenting T2-progress and 31.5% of the scans presenting stable disease revealed T1-progress in the next follow-up examination. The χ^2 test showed a highly significant correlation ($P < .001$) between T2-progress, with the 15% criterion and subsequent T1-progress. No correlation between antiangiogenic therapy and T2-progress was shown. Conclusion: Tumor progression, as determined by both contrast-enhanced T1 and T2 sequences is more frequently diagnosed than when considering only contrast-enhanced T1 sequences. Definition of T2-progress by a 15% T2-signal increase criterion is superior to a 25% criterion. The missing correlation of T2-progress and antiangiogenic therapy supports the hypothesis of T2-progress as part of the natural course of the tumor disease.

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