Persistent Diffusion-Restricted Lesions in Bevacizumab-Treated Malignant Gliomas Are Associated with Improved Survival Compared with Matched Controls.

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Abstract

BACKGROUND AND PURPOSE: A subset of patients with malignant glioma develops conspicuous lesions characterized by persistent restricted diffusion during treatment with bevacizumab. The purpose of the current study was to characterize the evolution of these lesions and to determine their relationship to patient outcome.

MATERIALS AND METHODS: Twenty patients with malignant glioma with persistent restricted-diffusion lesions undergoing treatment with bevacizumab were included in the current study. Mean ADC and the volume of restricted diffusion were computed for each patient during serial follow-up. Differences in TTP, TTS, and OS were compared between patients with restricted diffusion and matched controls by using Kaplan-Meier analysis with the logrank test and Cox hazard models.

RESULTS: Mean ADC values were generally stable with time (mean, 5.2 ± 12.6% change from baseline). The volume of restricted diffusion increased a median of 23% from baseline by 6 months. Patients with restricted-diffusion lesions had significantly greater TTP (logrank, P = .013), TTS (logrank, P = .008), and OS (logrank, P = .010) than matched controls. When available, advanced physiologic imaging of restricted-diffusion lesions showed hypovascularity on perfusion MR imaging and decreased amino acid uptake on (18)F-FDOPA PET scans. Atypical gelatinous necrotic tissue was confirmed in the area of restricted diffusion in 1 patient.

CONCLUSIONS: Restricted-diffusion lesions in malignant gliomas treated with bevacizumab are generally stable with time and are associated with improved outcomes. These results combined with physiologic imaging and histopathologic data suggest that these lesions are not consistent with aggressive tumor.

PMID: 22538078 [PubMed - as supplied by publisher]