Pseudoprogression: Relevance With Respect to Treatment of High-Grade Gliomas.

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Abstract
OPINION STATEMENT: The post-treatment imaging assessment of high-grade gliomas remains challenging notwithstanding the increased utilization of advanced MRI and PET imaging. Several post-treatment imaging entities are recognized including: late-delayed radiation injury, including radionecrosis mimicking tumor progression; early-delayed (within 6 months of temozolomide-based chemoradiation) post-treatment radiographic changes, herein referred to as pseudoprogression (the subject of this review); early post-treatment changes following local glioma therapy (i.e. biodegradable BCNU wafer implantation or stereotactic radiotherapy); and pseudoresponse, seen following treatment with angiogenic inhibition based therapy such as bevacizumab. A literature review searched specifically for "pseudoprogression" within the last 5 years (2005-2010). Approximately 24 recent papers were identified and reviewed in detail. Eight small population-based studies demonstrate 26-58% (median 49%) of glioblastoma patients treated with chemoradiotherapy manifest early disease progression at first post-radiotherapy imaging. Patients with early radiographic disease progression continued on planned therapy, and a median of 38% (range 28-66%) showed radiographic improvement or stabilization and were defined retrospectively as manifesting pseudoprogression. In conclusion, pseudoprogression is a frequent early post-treatment imaging change that at present is not easily differentiated from tumor progression by anatomic or physiologic brain imaging. Consequently, an operational definition of pseudoprogression has been adopted by the Response Assessment in Neuro-Oncology Working Group wherein either the index (i.e. target) lesion stabilizes or diminishes in size on continued post-radiation (temozolomide) therapy as determined by follow-up radiologic imaging.

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