

Neuroimaging: 7135 - Integrated Comprehensive Approach to the Brain Tumor Patient: A Case Study (Monday 22 April 2013).

Title of Talk: Addressing the Oncologist's Concerns with MR Imaging: Now & Future

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Highlights:

- The traditional response metrics for brain tumors (Macdonald criteria) rely on bi-dimensional measurements of enhancing tumor only; the new RANO criteria now include qualitative assessment of non-enhancing tumor.
- Anti-angiogenic therapies can have a profound impact on the appearance of recurrent tumor, and make it more difficult to accurately assess tumor response to therapy.
- Pseudo-progression, in which treatment effect mimics tumor growth, is a common occurrence for patients with malignant gliomas treated with standard protocols. Pseudo-response is a recently recognized phenomenon in patients treated with anti-angiogenic therapy in which decreased enhancement mimics tumor regression. Recent imaging research has focused on identifying both these processes to enhance evaluation of disease status.

The current and future role of MR imaging in postsurgical diagnosis & postsurgical management of brain tumors during radiation and chemotherapy

Magnetic resonance imaging (MRI) is the standard tool to evaluate disease status in patients with recurrent glioma following surgical resection. Tumor size defined by bi-dimensional measurement of enhancing areas has been the common method for determining disease progression and regression. Recently developed therapies that target angiogenic molecules result in diminished permeability of the blood-brain-barrier, which can result in tumor that may enhance faintly or not at all. This de-coupling of enhancement from tumor burden increases the difficulty in assessing disease status. New response criteria that rely on the evaluation of both enhancing and non-enhancing tumor are now being routinely used in clinical practice and drug trials. Quantification of non-enhancing tumor remains a challenge. To address this issue, physiologic imaging has been tested as a means to distinguish non-enhancing tumor from other causes of FLAIR signal change. Another difficulty in evaluating disease status occurs in patients following tumor resection and chemotherapy/radiation therapy: pseudoprogression is a phenomenon in which treatment effect mimics tumor growth. Perfusion and diffusion MRI, MR spectroscopy and non-fluorodeoxyglucose (FDG) PET have all been evaluated for their ability to differentiate pseudoprogression from true tumor growth. This lecture will review the application of physiologic and metabolic imaging to address common dilemmas in the assessment of tumor status of recurrent malignant glioma in the era of chemoradiation and anti-angiogenic therapy.