

DAI provides potential imaging biomarker to indicate brain tumor response to RT

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Diffusion abnormality index (DAI) shows promise as an imaging biomarker to measure brain tumor response to radiation therapy, according to research being presented at the 2013 Cancer Imaging and Radiation Therapy Symposium. This Symposium is sponsored by the American Society for Radiation Oncology (ASTRO) and the Radiological Society of North America (RSNA).

The study included 20 patients who had brain metastases and were treated with whole brain radiotherapy. The total of 45 lesions among the patients was further categorized as 16 responsive, 18 stable and 11 progressive lesions. Diffusion measurements were taken prior to radiation treatment, two weeks after the start of treatment and one month after treatment completion. For each patient, a normal tissue apparent [diffusion coefficient](#) (ADC) histogram was used to divide the tumor ADC histogram into three regions: low (high cellularity), normal and high (edema and necrosis) diffusion. Analyzing the complex behavior in ADC of [brain metastases](#) from pre-radiation therapy to two weeks after starting treatment, investigators developed a new diffusion index, the DAI, which included both low and high ADC contributions, for prediction of post-treatment [tumor response](#).

Sensitivity and specificity of the change in DAI from pre- to the end of therapy were evaluated and compared with the changes in gross tumor volume from pre-treatment to the end of therapy. The changes were valuable in predicting non-responsive lesions post-treatment. Early prediction of brain tumor response to radiation therapy is vital in

providing the most appropriate radiation doses to each lesion.

"While this review included a small number of patients, the data demonstrate that DAI may be a good biomarker to predict brain tumor response," said lead study author Reza Farjam, a PhD candidate in biomedical engineering focused on cancer functional imaging at the University of Michigan in Ann Arbor, Mich. "Further study of this method is needed to improve early prediction of tumor response to radiation therapy and to help us provide brain cancer patients with more accurate information about their treatment progress."

More information: The abstract, "Diffusion Abnormality Index: A New Imaging Biomarker for Early Assessment of Tumor Response to Therapy," will be presented in detail during a scientific session titled "The Role of Biologic Imaging for Evaluating Post-treatment Response" at 10:30 a.m. Eastern time on Saturday, February 9, 2013.

Provided by American Society for Radiation Oncology

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