

MRI
TUMOR

MRI Can Assess Early Tumor Response to Anti-Angiogenesis Treatment

Researchers from the University of California – San Francisco used dynamic contrast-enhanced MRI to prospectively evaluate the change in tumor vascular leakiness after treatment with an angiogenesis inhibitor. Seventeen rats with implanted human breast cancers had dynamic contrast-enhanced MRI using albumin-(Gd-DTPA)₃₀, a large-molecule contrast agent. The rats received varying levels of bevacizumab, an anti-angiogenic, every three days for a total of four doses. MRIs were performed before treatment, and again 24 hours after treatment was initiated, to assess acute changes in vascular leakiness. This change was correlated with tumor growth response at the end of the treatment course. A strong correlation was found between MR-measured change in vascular leakiness and tumor response. Tumor growth was significantly decreased in the rats that received bevacizumab as compared to the controls.¹ **Conclusion: Dynamic contrast-enhanced MRI can show very early response of tumors to anti-angiogenic treatment.**

WHAT IS DYNAMIC CONTRAST-ENHANCED MRI?

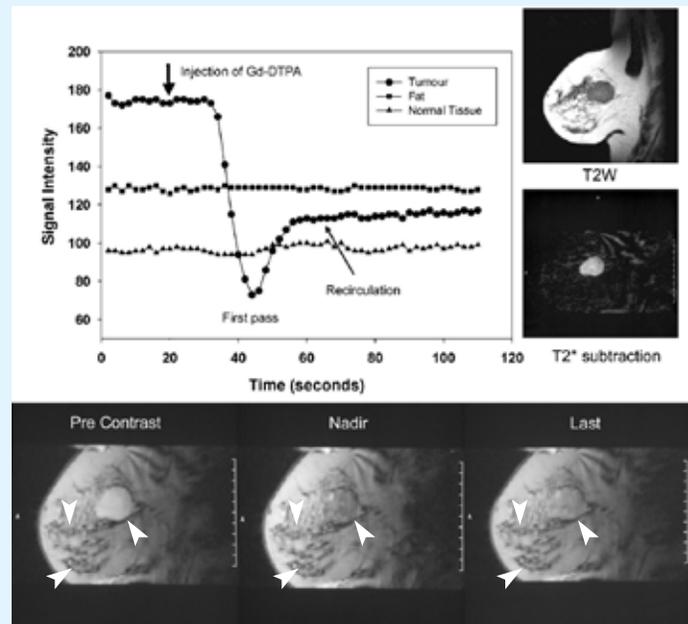
Dynamic contrast-enhanced MRI refers to rapid MRI imaging after the infusion of intravenous contrast, performed at several time points to assess the speed and intensity of contrast uptake and contrast release in a certain area.

How is it done?

1. A pre-contrast set of images is first obtained to assess the morphology and composition of tissues.
2. Intravenous contrast (usually gadolinium) is infused into the patient.
3. Sequential images are obtained at fixed intervals, anywhere from every 30 seconds to every few minutes, as the contrast comes in.
 - These images are usually obtained using gradient echo MR imaging, because this allows the speed required to image dynamically.

Why is it useful?

- Tumors
 - By following how quickly contrast is taken into a tumor (“wash-in”) and how quickly it leaves the tumor (“wash-out”), one can assess how vascular it is and how leaky the vessels are. This is a good indicator of malignancy, as malignant tumors tend to have a lot of vascularity with leaky vessels, leading to



Typical T2-weighted dynamic contrast-enhanced MRI study of invasive ductal breast cancer (arrows).

quick uptake of contrast (fast wash-in) and quick release of contrast (fast wash-out).

- Tumor response to treatment can be assessed by looking for changes in contrast enhancement, wash-in, and wash-out.
 - This technique may be used in almost any part of the body, but is most commonly used in breast, prostate, pancreas, kidney, and liver MRI.
- Other uses:
 - Evaluating for avascular necrosis of a bone – for example, the scaphoid bone of the wrist after a fracture



MRI Shows Treatment Decreases Brain Atrophy in Multiple Sclerosis

In a study led by researchers from the Multiple Sclerosis Center at Wayne State University in Michigan, MRI was performed on 275 patients with multiple sclerosis (MS) and low disability scores before initiation of treatment and again five years later. Of the 275 patients, 121 received glatiremer acetate, 101 received high-dose Interferon-B, and 53 received low-dose Interferon-B. A control group received no therapy. MRI showed that the mean annual rate of brain atrophy was lowest in the patients receiving glatiremer acetate, and highest in the control group.² **Conclusion: MRI shows the efficacy of glatiremer acetate in preventing brain atrophy in MS.**

SOURCES:

1. Raatschen HJ, Simon GH, Fu Y, *et al.* "Vascular Permeability During Antiangiogenesis Treatment: MR Imaging Assay Results as Biomarker for Subsequent Tumor Growth in Rats." *Radiology* 2008; 247:391-399.
2. <http://www.dimag.com/showNews.jhtml?articleID=207404102&cid=DIMAG-news-weekly-050608>, accessed online May 8, 2008.

NEXT ISSUE: BREAKING NEWS AND STUDIES IN CLINICAL TRIAL IMAGING



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