

MRI
PROSTATE

Prostate MRI Can Determine Cancer's Responsiveness to Radiation Therapy

In a study published in *Radiology*, researchers from the University of California at San Francisco retrospectively analyzed pre-treatment prostate MRIs done on 80 men with biopsy-proven prostate cancer. After blinded analysis by two different radiologists, the results were correlated with patient outcome after external-beam radiation therapy. After follow-up, four patients developed metastases. The development of metastatic disease had significant correlation with both baseline PSA level and the presence and degree of extracapsular extension on MRI. In particular, five patients showed extracapsular extension of more than 5 millimeters on the pretreatment MRI; three of these five later developed metastases after treatment. **Conclusion: Pre-treatment prostate MRI may determine which patients at high risk for post-treatment recurrence and/or spread may benefit from more aggressive therapy.**¹

PROSTATE MRI: THE BASICS

MRI of the prostate is a relatively new technique used to evaluate patients with prostate cancer. Before MRI was available, the techniques physicians relied upon for detecting and assessing prostate cancer included ultrasound, digital rectal examination, and prostate-specific antigen (PSA).

- **Ultrasound (US)** – prostate US is performed endorectally (the transducer is inserted into the rectum) to get a closer look at the prostate gland. It is stronger in evaluating the peripheral gland, where most cancers occur. The central portion of the gland is more difficult to see on US.
- **Digital rectal examination (DRE)** – DRE is a screening physical examination technique in which the physician palpates the prostate gland through the rectum with one finger to feel for masses that may be prostate cancer.
- **Prostate-specific antigen (PSA) levels** – High or rising levels of PSA in the blood are an indication of prostate cancer. PSA levels can also be used to monitor patients with known cancer to evaluate response to treatment or watch for recurrence.

Prostate MRI is usually performed with an endorectal coil, a small device inserted into the rectum that allows the prostate gland to be seen in more detail. It also can be performed without the endorectal coil and using a pelvic coil (placed on the patient's skin) alone.

Today, prostate MRI is used mostly to assess the extent of the tumor in a patient with known prostate cancer. This can be used in conjunction with MR spectroscopy, a technique used to analyze the chemical content of specific areas within the image to identify tumor. MRI/MRS has high accuracy in determining whether the tumor has extended outside of the capsule of the prostate gland (extracapsular



Coronal T2-weighted STIR (Short Tau Inversion Recovery) imaging demonstrates extracapsular extension (arrow).

extension). This can have a profound effect on the therapy needed, often necessitating external-beam radiation therapy.

Other uses of prostate MRI include:

- Evaluation for prostate cancer in a patient with rising PSA levels in the blood, but a normal biopsy
- Evaluation of tumors in the central portion of the prostate gland, which is difficult to visualize on ultrasound or access by biopsy
- Detecting recurrent cancer after treatment²

**MRI
PLUS
PET**

MRI and PET Successfully Combined in One Scanner

A team headed by researchers from the University of California and the California Institute of Technology has integrated magnetic resonance imaging (MRI) and positron emission tomography (PET) technologies into one machine that can obtain the two exams simultaneously. They were able to overcome problems with interference between the two units, and found that the PET component had little effect on the signal-to-noise of the MR images. The MRI component caused less than 10% decrease in the fraction of radioactive decay events in the PET scanner, with no change in spatial resolution. So far, the new device is being used only for research applications, mostly on mice. **Conclusion: The new MRI/PET scanner can obtain both types of images simultaneously, with little effect on image quality.**³

SOURCES

1. McKenna DA, Coakley FA, Westphalen FC, *et al.* "Prostate Cancer: Role of Pretreatment MR in Predicting Outcome after External-Beam Radiation Therapy – Initial Experience." *Radiology* 2008; 247:141-146.
2. Cornfeld DM, Weinreb JC. "MR Imaging of the Prostate: 1.5T versus 3T." *Magnetic Resonance Imaging Clinics of North America* 2007; 15:433-448.
3. Catana, C., Procissi, D., Wu, Y., *et al.* "Simultaneous *in vivo* Positron Emission Tomography and Magnetic Resonance Imaging." *Proceedings of the National Academy of Sciences*, published online March 4, 2008, 10.1073/pnas.0711622105.

NEXT ISSUE: MORE NEWS AND TRENDS IN CLINICAL TRIAL IMAGING

WorldCare Clinical
A ProScan Imaging Company

THE WCC NOTE™: Volume 2, Number 9 – April 14, 2008

Contributing Editors: Resham R. Mendi, M.D. (newsletter@wcclinical.com)
and Stephen J. Pomeranz, M.D. (newsletter@wcclinical.com)
Managing Editor: Rod Willis (newsletter@wcclinical.com)
Designer: Tom Anneken

Contents of this electronic newsletter are copyright © 2008 by WorldCare Clinical, LLC, 7 Bulfinch Place, P.O. Box 8908, Boston, MA 02114. All article summaries are compiled from public sources. For more information on WorldCare Clinical, please go to www.wcclinical.com.