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NEWS

RSNA Press Release

MR Spectroscopy Helps Identify Cancerous Breast Tumors

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At A Glance

- Standard MR breast imaging is a highly sensitive tool for detecting breast tumors but is less reliable for determining if tumors are cancerous.
- Adding spectroscopy to MR imaging improves accuracy in diagnosing breast tumors.
- Spectroscopy has no known health risk and adds only seven to 10 minutes to the MR scan.

OAK BROOK, Ill.-Measuring the biochemical changes in breast tumors with magnetic resonance (MR) spectroscopy enables radiologists to more accurately distinguish benign tumors from cancerous ones, according to a study appearing in the August issue of the journal *Radiology*.

"Adding spectroscopy to breast MR examinations will not only reduce concern over possible missed cancers and unnecessary biopsy procedures, it may also improve the efficiency and quality of patient care," said co-author Sina Meisamy, M.D., a postdoctoral fellow at the University of Minnesota Center for Magnetic Resonance Research in Minneapolis.

MR imaging of the breasts has a high rate of sensitivity (94 percent – 100 percent) for detecting tumors, but a variable rate of specificity (37 percent – 97 percent) for distinguishing malignant from benign tumors. MR spectroscopy uses the same magnet and electronics as MR imaging, but with specialized methods that produce a "spectrum" identifying different chemical compounds in the tissues. MR spectroscopy has been shown to be useful for looking at various disorders, including cancer, Alzheimer's disease, diabetes and certain inflammatory and ischemic diseases. Generally used for the brain, spectroscopy poses no known health risk to patients and typically adds only seven to 10 minutes to the MR procedure.

For the study, four radiologists evaluated 55 breast MR imaging cases that had findings confirmed through earlier biopsies. The evaluations were done with and without MR spectroscopy. The addition of spectroscopy resulted in more cancerous tumors detected (from 87 percent to 94 percent), a higher success rate for distinguishing benign from malignant tumors (from 51 percent to 57 percent) and a greater agreement among the radiologists on their findings. Also, with the addition of spectroscopic readings, two of the four radiologists had significantly improved sensitivity to detect cancerous tumors and all four participants achieved significantly improved accuracy in assigning a probability of

malignancy.

"Spectroscopy gives us an additional piece of information about the biochemical composition of the tumor," explained senior author Michael Garwood, Ph.D., associate director of the Center for Magnetic Resonance Research and the Lillian Quist - Joyce Henline Chair in Biomedical Research Professor of Radiology at the University of Minnesota. "When the standard MR imaging exam is inconclusive, the spectroscopy measurement can improve the rate of detecting a cancerous breast tumor."

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"Adding in Vivo Quantitative ^{1}H MR Spectroscopy to Improve Diagnostic Accuracy of Breast MR Imaging: Preliminary Results of Observer Performance Study at 4.0 T." Collaborating with Drs. Meisamy and Garwood on this paper were Patrick J. Bolan, Ph.D., Eva H. Baker, M.D., Ph.D., Matthew G. Pollema, M.D., M.P.H., Chap T. Le, Ph.D., Frederick Kelcz, M.D., Ph.D., Mary C. Lechner, M.D., Barbara A. Luikens, M.D., Richard A. Carlson, M.D., Kathy R. Brandt, M.D., Kimberly K. Amrami, M.D., Michael T. Nelson, M.D., Lenore I. Everson, M.D., Tim H. Emory, M.D., Todd M. Tuttle, M.D., and Douglas Yee, M.D.