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NEWS

RSNA Press Release

MR Spectroscopy Identifies Breast Cancer, Reduces Biopsies

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At A Glance

- With proton MR spectroscopy (^{1}H MRS), the need for biopsy of suspicious, non-mass enhancing breast lesions is reduced significantly.
- When using ^{1}H MRS, a radiologist can differentiate the chemical make-up of a malignant versus a benign breast tumor.
- In the study, ^{1}H MRS identified all of the cancers present.

OAK BROOK, Ill.-Proton magnetic resonance spectroscopy (^{1}H MRS) used in conjunction with magnetic resonance imaging (MRI) can aid radiologists in diagnosing breast cancer while reducing the number of false-positive results and invasive biopsies, according to a study focusing on non-mass enhancing breast lesions. The study, conducted at Memorial Sloan-Kettering Cancer Center in New York City, appears in the October issue of the journal *Radiology*.

"All of the cancers present in this study were identified with MR spectroscopy," said the study's lead author, Lia Bartella, M.D., director of breast imaging at Eastside Diagnostic Imaging in New York City.

The American Cancer Society estimates that 212,920 women will be diagnosed with breast cancer in the United States this year. MRI is playing an increasingly important role in the screening of women at high risk for breast cancer. However, while MRI depicts more abnormal findings than other breast screening procedures, it is not 100 percent accurate in distinguishing benign from malignant lesions, resulting in a large number of breast biopsy procedures recommended on the basis of imaging findings. Currently, approximately 80 percent of breast lesions biopsied are found to be benign.

Non-mass enhancing lesions are characterized by enhancement of an area that is not a mass or lump and may extend over large or small regions. Non-mass lesions occur with benign hormonal changes, but can also signify malignancy. Biopsy is often required to distinguish benign non-mass lesions from cancer.

With MR spectroscopy, which adds only 10 minutes to a standard MRI exam, the radiologist is able to see the chemical make-up of a tumor. In most cases, the results indicate whether or not the lesion is cancerous without the need for biopsy.

"Non-mass enhancing lesions frequently pose a dilemma to the radiologist when evaluating

the breast for the presence of cancer, especially in premenopausal women," Dr. Bartella said. "Potentially, the use of proton MR spectroscopy may help decrease the number of benign biopsies for non-mass enhancing lesions."

For the study, Dr. Bartella and colleagues performed ^{1}H MRS on 32 non-mass enhancing breast lesions in 32 women, age 20 to 63. Twenty-five of the patients had lesions that had been labeled suspicious at MRI.

^{1}H MRS can provide radiologists with chemical information about a lesion by measuring the levels of choline compounds, which are markers of an active tumor. In the study, positive choline findings were present in 15 of 32 lesions, including all 12 cancers, giving ^{1}H MRS a specificity of 85 percent and a sensitivity of 100 percent. If only the lesions with positive choline findings had been biopsied, 17 (68 percent) of 25 lesions may have been spared invasive biopsies and none of the cancers would have been missed.

"By performing MR spectroscopy of the suspicious lesion after an MRI scan, we can noninvasively see which tumors show elevated choline levels and are likely malignant," Dr. Bartella said. "This chemical information added to the information provided by MRI can eliminate the need for biopsy to find out what the lesion is made of."

Dr. Bartella hopes that in the future, MR spectroscopy will be incorporated into routine diagnostic breast MRI procedures, significantly decreasing the need for needle biopsies.

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"Enhancing Nonmass Lesions in the Breast: Evaluation with Proton (1H) MR Spectroscopy." Co-authors of the paper are Sunitha B. Thakur, Ph.D., Elizabeth A. Morris, M.D., D. David Dershaw, M.D., Wei Huang, Ph.D., Eugenia Chough, B.A., Maria C. Cruz, B.A., and Laura Liberman, M.D.