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NEWS

RSNA Press Release

Electromagnetic Breast Imaging Tested as Alternative to Mammography

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At A Glance

- Researchers are testing a combination of new electro-magnetic breast imaging techniques.
- The new techniques together create a computerized image of breast tissue.
- Electromagnetic imaging poses no radiation risk and causes less discomfort than mammography.

OAK BROOK, Ill. - Researchers are testing three promising new electromagnetic imaging techniques to help detect breast abnormalities, including cancer. The findings of the benchmark study will be published in the May issue of the journal *Radiology*. For the study, which is part of the five-year Alternative Breast Imaging Project funded by a grant from the National Cancer Institute, researchers at Dartmouth Medical School in Lebanon, N.H., imaged the breasts of 23 women using a combination of three new techniques:

- electrical impedance (EI) spectroscopy
- microwave imaging (MI) spectroscopy
- near-infrared (NIR) spectroscopy

The new imaging techniques use low-frequency electrical currents, microwaves and infrared light, respectively, to create a computerized image of a cross-section of breast tissue. Each technology can identify various properties, including the amount of oxygenated blood flow in the breast and how the tissue absorbs light and stores and conducts an electrical charge. These properties help researchers estimate specific breast characteristics, which differ in normal and diseased tissue.

"This study was the first stepping stone in our ongoing research to gain a better understanding of the electromagnetic properties of breast tissue," said Steven Poplack, M.D., professor of radiology at Dartmouth Medical School and co-director of breast imaging and mammography at Dartmouth-Hitchcock Medical Center. "Once we establish normal ranges for specific breast characteristics, we'll begin working on recognizing breast abnormalities, including cancer."

The research team is exploring alternative breast imaging techniques to address some of the limitations of mammography, a diagnostic exam recommended for women over age 40 as a screening for breast cancer.

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"If we can offer an alternative screening technique that addresses radiation concerns and is also more comfortable, the hope is that more women may elect to be screened for breast cancer," Dr. Poplack said.

Electromagnetic imaging does not expose women to potentially harmful radiation. To obtain an electromagnetic image, the patient lies facedown on the exam table, which eliminates the need to rigorously compress the breast, as is necessary with mammography. Young women who are at genetically high risk for breast cancer may also be good candidates for the new breast imaging techniques, according to Dr. Poplack.

"Teenagers and young women are not typically candidates for mammography, but electromagnetic imaging could be used to screen high-risk women in their 20s and 30s to help detect breast cancer early," Dr. Poplack said.

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"Electromagnetic Breast Imaging: Average Tissue Property Values in Women with Negative Clinical Findings." Collaborating with Dr. Poplack on this paper were Alexander Hartov, Ph.D., Paul M. Meaney, Ph.D., Brian W. Pogue, Ph.D., Tor D. Tosteson, Sc.D., Margaret R. Grove, M.S., Sandra K. Soho, R.N., Wendy A. Wells, M.D., and Keith D. Paulsen, Ph.D., professor of engineering at the Thayer School of Engineering at Dartmouth College and principal investigator on the Alternative Breast Imaging Project.

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