Breast MRI technique increases cancer detection
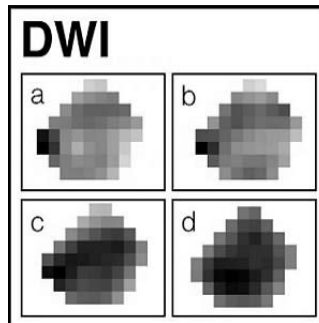

A new study published online in the journal Radiology shows that a new MRI breast imaging technique, developed by German researchers, could be effective in detecting breast cancer even without the use of contrast agents. The MRI technique, combined with sophisticated data analysis, could reduce the number of unnecessary breast biopsies, according to the researchers.

Breast MRI currently is used to screen women at high risk of breast cancer and as a diagnostic adjunct to mammography. The examination relies on gadolinium-based contrast agents that need to be injected intravenously.

The new approach involves the use of diffusion-weighted imaging (DWI) measurements derived from MRI. The technique, known as diffusion kurtosis imaging, provides a picture of breast tissue on a microstructural level.

"Diffusion kurtosis imaging has been introduced in DWI to provide important information on tissue structures at a microscopic level," said study lead author Sebastian Bickelhaupt, MD, from the German Cancer Research Centre in Heidelberg, Germany. "Since malignant lesions disrupt the tissue structures at this level, diffusion kurtosis might serve as a relevant marker of changes."

Dr. Bickelhaupt and colleagues evaluated a retrospective analysis of data collected from 222 women at two independent study sites. The women had suspicious findings on mammography that were classified under the Breast Imaging Reporting and Data System (BI-RADS) as BI-RADS 4 and 5 breast lesions. A BI-RADS 4 lesion is considered a suspicious abnormality, while a 5 is considered highly suspicious of malignancy. The women underwent DWI followed by biopsy.

For the analysis, a software algorithm was developed for lesion characterisation, and imaging features were extracted using a kurtosis-based radiomics model. Radiomics is a rapidly growing field that enables the extraction of a large amount of quantifiable data from images.

In an independent test set of 127 women, the radiomics analysis reduced false-positive findings by 70 percent, while detecting 60 of 61 malignant lesions, or 98 percent.

If the results are confirmed in larger trials, the model has potential advantages in the clinic beyond its ability to reduce unnecessary biopsies in women with BI-RADS 4 lesions. The software algorithm makes the assessment reader-independent, ensuring that its accuracy is maintained across different imaging facilities.

While the new approach is not intended to replace current contrast-enhanced breast MRI protocols, this can help expand the spectrum of options available for answering specific clinical questions, according to Dr. Bickelhaupt.

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