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NEWS

RSNA Press Release

Digital Mammography Improves Population-Based Breast Cancer Screening

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At A Glance

- Digital mammography has a higher sensitivity at detecting breast cancer while keeping overdiagnosis low.
- More DCIS and invasive cancers are detected with the use of digital mammography compared to screen film mammography.
- Researchers found a greater amount of high-grade lesions, which are regarded as a precursor of high-grade invasive tumors.

OAK BROOK, Ill. — New research from the Netherlands shows that the switch from screen film mammography (SFM) to digital mammography (DM) in large, population-based breast cancer screening programs improves the detection of life-threatening cancer without significantly increasing detection of clinically insignificant disease. Results of the study are published online in the journal *Radiology*.

DM's higher sensitivity at detecting breast cancer raised concerns that its introduction into screening programs would increase the diagnosis of clinically unimportant cancers—cancers that, if left undetected and therefore untreated, would never have surfaced clinically in the person's lifetime. Data analysis showed an increased incidence of ductal carcinoma in situ (DCIS), a precursor for invasive breast cancer, in the years after the introduction of population-based screening with DM. The development of low-grade DCIS can extend over more than three decades; however, high-grade DCIS is associated with far more rapid cancer invasion.

"More DCIS and invasive cancers are detected with the use of DM in breast cancer screening compared to SFM," said Adriana M.J. Bluekens, M.D., from the National Expert and Training Centre for Breast Cancer Screening in Nijmegen and St. Elisabeth Hospital in Tilburg, both in the Netherlands. "In the mix of low- to high-grade DCIS lesions, there is no shift to the detection of low-grade lesions in digital screening. Instead of this, we noticed a larger amount of high-grade lesions, which are regarded as precursors of high-grade invasive tumors."

To learn more about the impact of DM on screening programs, Dutch researchers compared it with SFM in screening mammograms performed between 2003 and 2007. Recall was indicated in 18,896 cases out of nearly

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1.2 million mammograms studied, and 6,410 women were diagnosed with breast cancer. As expected, DM had a higher initial sensitivity for detecting cancer, with a detection rate per thousand of 6.8, compared with 5.6 for SFM.

Adriana M.J. Bluekens, M.D.

Detection of high-grade DCIS with DM was 58.5 percent, compared with 50.5 percent for SFM.

"This gain is largely due to enhanced depiction of microcalcifications with DM resulting in improved detection of DCIS and invasive carcinoma with an intraductal component," Dr. Bluekens said.

The initial recall rate was higher with DM: 4.4 percent, compared with 2.6 percent for SFM. However, the transition to digital mammography did not result in a disproportionate increase in low-grade DCIS lesions, which are linked to possible overdiagnosis.

The findings provide further evidence of the benefits of population-based breast cancer screening programs that use DM, according to Dr. Bluekens.

"The follow-up period of the different digital screening programs is not sufficiently long enough to analyze mortality effect separately from that of SFM," she noted. "However, surrogate parameters, such as stage distribution and tumor characteristics of DM-detected cancers, do indicate the continuation of mortality decrease with the transformation of SFM to DM in screening programs."

Researchers cautioned that the results were based on analysis of data from the Dutch screening program, with its focus on balancing the rates of detection, recall and false-positives. Numbers from the U.S. screening program, which focuses more on a high detection rate, would likely be different.

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"Comparison of Digital Screening Mammography and Screen-Film Mammography in the Early Detection of Clinically Relevant Cancers: A Multicenter Study." Collaborating with Dr. Bluekens were Roland Holland, M.D., Ph.D., Nico Karssemeijer, Ph.D., Mireille J.M. Broeders, Ph.D., and Gerard J den Heeten, M.D., Ph.D.

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