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Tomosynthesis: The Future of Breast Cancer Screening

Digital breast tomosynthesis, or 3-D mammography, provides a 3-D image of the breast, allowing radiologists to view the breast in detailed 1mm slices, instead of as a large single image. This is important because with routine mammography, breast tissue is compressed and overlying tissue can look like a suspicious finding, requiring the patient to come back for more testing and causing what may be unnecessary anxiety. With tomosynthesis, however, these questions can be resolved immediately. With more views of the breast the radiologist can zoom in on the area in question and determine whether or not more testing is needed. This not only results in a decreased number of patient recalls, but there is also data to indicate that tomosynthesis increases cancer detection rates.

Liane Philpotts, MD, Professor of Diagnostic Radiology and Chief of Breast Imaging for the Breast Center at Smilow Cancer Hospital at Yale-New Haven, commented, “We have seen a 20% increase in cancer detection rates over 2-D mammography. In addition to that, before tomosynthesis we were calling back more than 10% of all women, which is a huge number.

One of the immediate benefits that we have seen is that this number has been reduced by 30%, which is wonderful.”

Currently breast tomosynthesis is being used in combination with 2-D screening mammography, as the larger picture of the breast is still necessary. However, Dr. Philpotts explained that researchers are working on ways to extract a 2-D image out of the 3-D data, known as 2-D synthetic mammography, and when that happens, there may no longer be a need for the 2-D examination. This will lessen the concern over the small increased amount of radiation patients are exposed to when using 3-D and 2-D together.

Smilow Cancer Hospital was the first center in Connecticut to offer tomosynthesis and many major centers have yet to acquire it. The benefits of the technology were realized immediately, and patients noticed no difference. Women are in the same position, with the same compression as the 2-D mammography is performed; meanwhile the tomosynthesis arm takes a sweep of the breast.

One strong advocate for the technology was a Smilow Technologist with 35 years of experience. She has watched mammography develop from film, to digital, to now 3-D. She is also one of the many patients that have benefited from this advanced technology. She commented, “I have

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been diligent about getting my annual screening from the age of 35, because I have dense breast tissue. Last year I had my routine ultrasound and utilized the 3-D mammography as well, both were normal. This year I once again received an ultrasound and the 3-D mammography and a small tumor was found that wasn’t visible on the 2-D image.” She was diagnosed with a rare form of breast cancer, invasive tubular carcinoma, which developed between screenings. “I can’t imagine what would have happened had my cancer not been detected at such an early stage,” she said. As it did for her, this technology can prevent more advanced cancers from developing.

“There has been controversy regarding screening recommendations since the U.S. Preventive Services Task Force (USPSTF) released new guidelines. But with tomosynthesis, this may change,” Dr. Philpotts said. “All the literature supports the fact that women benefit from this technology. It’s a game changer. This could shift the risk/benefit ratio of mammographic screening.”

Screening is not the only benefit that 3-D mammography has over 2-D.

It can also be used to improve diagnostic mammography as it better characterizes lesions as benign or cancerous. It also makes it easier to localize things in the breast so when it comes time for an ultrasound or biopsy, the radiologist already knows where the lesion is located and what the margins are. For the Smilow Technologist this capability was a blessing not only for her, but for her patients. She commented, “I get so excited for patients when they come in and I try to make them realize what an amazing tool this is. I am a success story and know it is due to this 3-D mammography. It gives us a fighting chance against the disease.”

Dr. Philpotts commented that once you see the results and how well 3-D mammography works, there is no going back. “Mammography is a great tool, it is not terribly painful for patients, and it works well. This is just building on what we already have and making it better. This will become the gold standard for breast cancer screening and diagnosis. We have embraced it here at Smilow and more importantly, our patients have too.”