Early results on 3D breast imaging

Scarce a month goes by without some media outlet declaring “new hope” for breast cancer treatment or detection. It’s understandable then why Dartmouth radiologist Stephen Poplack, M.D., expresses only restrained enthusiasm for a new mammography method he’s studying. “The diagnostic value” of the new technology, called tomosynthesis, says Poplack, appears to be “very impressive.” But, he cautions, “we’re looking at very early results.”

View: Unlike conventional mammography, which produces two-dimensional images, tomosynthesis uses several low-dose x-rays to create a three-dimensional view of the breast. This helps eliminate many of the usual imaging problems—such as shadows and overlapping tissue—that often make diagnosis difficult.

To evaluate the potential of tomosynthesis, Poplack compared the diagnostic mammograms of 98 women with matching tomosynthesis views. (Women have a diagnostic mammogram when their screening mammogram reveals an abnormality.) In 88% of the cases, tomosynthesis provided views equivalent or superior to conventional mammography, according to Poplack. An image was deemed “superior” if it allowed Poplack, and his fellow researcher Helene Nagy, M.D., to see an abnormality better and to gather more information to make a diagnosis. Because the results are “certainly open to bias by the interpreter,” Poplack readily admits, the study needs to be replicated. It’s also worth noting that Hologic, the manufacturer of the tomosynthesis machine used in the study, funded the research.

Poplack, who serves on Hologic’s scientific advisory board, says he doesn’t “stand to gain” if the technology is accepted or not. In fact, for several years he has been working with Dartmouth engineer Keith Pauelsen, Ph.D., on several unrelated breast cancer screening and diagnostic technologies (see page 5 in the Fall ’04 DARTMOUTH MEDICINE). Those technologies still hold promise “in terms of getting really new insights into breast disease,” he says. Since tomosynthesis builds off mammography, a well-established and well-studied technology, comparing it with the newer, alternative modalities is a bit like comparing apples and oranges, he adds.

Size: What tomosynthesis can and can’t do will be clearer after the company finishes a larger, multicenter study that includes DHMC and is aimed at gaining FDA approval. For now, the technology’s diagnostic capabilities appear strong. As for its screening merits, Poplack believes tomosynthesis is likely an effective screening tool as well. For example, if tomosynthesis had been used instead of screening mammography on the 98 women in the study, nearly half would not have needed further imaging. But because of the study’s size and structure, “you can’t really translate our results for screening,” says Poplack.

Yet to the extent that small discoveries fuel larger discoveries, perhaps Poplack’s study offers a nugget of “new hope” for improving the detection of breast cancer.

Jennifer Durgin