Screening dense breasts with contrast-enhanced mammography: the CMIST project

Dr. Maxine JOCHELSON

Screening mammography reduces breast cancer mortality by 30-40%. Sensitivity of mammography is 75-80%. However, sensitivity drops precipitously to 35-50% in women with dense breast tissue as the dense tissue obscures underlying masses. In this situation, cancers are often larger at presentation and there is an increase in the number of interval cancers, with worse prognoses.

The breast imaging community is aware of this limitation of mammography and recognized a need for supplemental imaging to limit the missed cancers. Initially, the supplemental imaging was anatomic imaging. Ultrasound is the most used form of supplemental imaging as it is “inexpensive”, readily available and does not expose women to radiation. It can detect an additional approximately 3.5 cancers/ 1000 women but has a high false positive rate, leading to a considerable number of additional biopsies (which adds significantly to the cost).

Tomosynthesis, another anatomically based examination, was originally used for supplemental imaging but is now standard of care for screening, at least in the United States. However, multiple studies have shown that even when adding ultrasound to mammography, a considerable number of cancers are not detected.

Enter vascular imaging: initially with Contrast Enhanced Breast MRI (CE-MRI). CE-MRI is the most sensitive method of breast cancer detection. Its exquisite sensitivity is due to adding contrast administration to the anatomic evaluation of the breast. Contrast enhances cancer neovascularity, allowing cancers to be detected even before a discrete mass can be identified.

Yearly CE-MRI has been recommended for women at high (>20%) lifetime risk for developing breast cancer since 2007. Women at intermediate risk and/or dense breasts have been screened with CE-MRI and more recently Abbreviated MRI. With significantly improved cancer detection rates. Recently the DENSE trial demonstrated that women with extremely dense breasts who received CE-MRI had a significant decrease in interval cancer rates.

Despite the successes of CE-MRI, it’s use is limited by inflated costs, and limited availability. That is where Contrast Enhanced Mammography (CEM) can be effective. CEM is an advanced digital mammography based vascular imaging tool developed with the idea of using iodinated contrast to enhance neovascularity, just as with MRI, in the setting of mammography.

CEM was originally used as a diagnostic imaging tool in the setting of calling patients back from abnormal screening mammography or symptomatic patients, to preoperatively stage new breast cancers, and later to evaluate response to neoadjuvant chemotherapy. As the totality of its success in these settings became established, it was apparent that it might also be of value in the screening setting.

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An early limited prospective trial compared it to MRI demonstrating probable improved specificity but with too few cancers to assess sensitivity. Subsequently, many retrospective studies have demonstrated a significant improvement in the cancer detection rate of CEM compared to mammography alone.

More investigators and clinical breast imagers began to use screening CEM in women at increased risk, women who had prior lumpectomies and women with dense breasts with promising results. A BIRADS Lexicon has been developed, necessary if screening is to be performed.

And now, the next critical step is Contrast enhanced Mammography Screening Trial (CMIST): This is a multicenter prospective screening trial comparing CEM to tomosynthesis in ~2000 women, 40-74 years, with dense breasts, seen at both academic and private practices.

Data will be obtained at baseline and one year follow up. enough data to a) get a billing code and b) convince breast imagers that this can be an accurate, accessible, less expensive tool to screen women with dense breasts and / or higher risk of developing breast cancer.

Results are expected in 2025. This will hopefully provide enough data to a) get a billing code and b) convince breast imagers that this can be an accurate, accessible, less expensive tool to screen women with dense breasts and / or higher risk of developing breast cancer.

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