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Short Communication

Breast Cancer and Contrast-Enhanced Mammography

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ABOUT THE STUDY

Randomized controlled trials conducted in the 1960s and 1970s demonstrated that screen-film mammography for breast cancer screening results in a decrease in breast cancer mortality. Digital Mammography (DM), which has gradually supplemented screen-film mammography since the early 2000s, has increased performance, particularly in women under the age of 50 and in cases of thick breasts, while having substantially lower spatial resolution. Digital breast tomo synthesis significantly increased the rate of cancer detection and decreased the recall rate over the past two decades. The combination of X-ray mammography with intravenous infusion of an iodinated contrast agent is known as contrast-enhanced mammography. It was initially attempted using a digital subtraction technique, but this method was quickly dropped due to issues with co-registering images that had been contrast-enhanced and those that had not [1].

Contrast-Enhanced Spectral Mammography (CESM), which was developed in the last two decades, eliminates the need for pre-contrast exposure by using dual-energy breast exposure (about 26–33 kVp and 44–50 kVp) following contrast injection. Utilizing the enhanced contrast uptake of tumors, CESM enables the visualisation of enhancing discoveries above the normal, non-enhancing breast tissue. The application of CESM in several contexts, including the evaluation of symptomatic women, screening recalls, local staging, pre and post-operative evaluations, and neoadjuvant chemotherapy response monitoring, has been the subject of original studies. A first meta-analysis on CESM published in 2016 noted a high pooled sensitivity (98%) but a low specificity (58%), the latter of which was in part due to inexperience [2].

A more recent meta-analysis suggested CESM as an alternative to contrast-enhanced Magnetic Resonance Imaging (MRI) and even suggested CESM as a good triage test for first breast lesions assessment after reporting generally satisfying data for CESM-pooled sensitivity and specificity [3]. Many factors, including the definition of indications and the reproducibility of data, are predicted to cause a delay between the introduction of new imaging techniques and their integration into diagnostic practice. Technique specifics including contrast agent concentration, dose and injection rate, breast compression and posture, exposure parameters, and acquisition protocol have a significant impact on the latter. A developing method called Contrast-Enhanced Mammography (CEM) makes use of iodinated contrast materials to visualize breast neovascularity in a manner similar to Magnetic Resonance Imaging (MRI) [4].

The contrast material frequently leaks from the angiogenesis-related vessels, diffuses into the tumor tissue, and produces an iodine-enhanced picture. This makes it possible to see a malignant tumor despite the presence of thick breast tissue above. Contrast-enhanced spectral mammography, contrast-enhanced digital mammography, and contrast-enhanced dual-energy mammography are further names for CEM. Digital Breast Tomo synthesis (DBT) and Full-Field Digital Mammography (FFDM) rely on anatomic alterations in the breast brought on by breast cancer. Currently, they are essential for symptomatic patient assessment and breast cancer screening, despite their low accuracy in women with thick breasts. According to one study, mammography sensitivity, for instance, is 87.0% in women with completely fatty breasts but drops to 62.9% in those with highly thick breasts.

CONCLUSION

Digital mammography was used in a more recent investigation that likewise showed that sensitivity decreased as breast density increased. CEM is less expensive and might be available to more women, even though additional imaging using MRI can be utilized to better assess women with thick breasts and those at an intermediate risk of breast cancer. Approximately two minutes after the intravenous injection of iodinated contrast material, a dual-energy mammography is obtained using CEM. Two images are given to the radiologist for each breast and each view: One is similar to a standard mammography and the other highlights areas of contrast uptake. The advantage of CEM is that it can show anatomical alterations as well as regional variations in breast perfusion, most likely brought on by tumor angiogenesis.

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