

Dedicated Breast Camera: Is It the Best Option for Scintimammography?

TO THE EDITOR: We read with great interest the article of Coover et al. (1) on the use of a dedicated camera to detect and localize occult breast cancer with ^{99m}Tc -sestamibi imaging. They evaluated 37 patients with dense breasts but normal findings on both clinical examination and mammography and reported that scintimammography performed with this dedicated detector was able to image 3 previously unknown tumors.

Planar scintimammography using standard γ -cameras has proven useful in the evaluation of patients with breast lesions, especially when mammography is indeterminate and in women with dense breasts (2). Nevertheless, this technique shows a high sensitivity only for tumors > 1 cm in diameter (3), and so it cannot be considered a screening procedure.

The issue of detecting small tumors is critical for the future development and clinical usefulness of scintimammography, because the other breast-imaging modalities are increasingly used for early identification of small abnormalities. Some studies have evaluated the capability of SPECT scintimammography to improve the sensitivity of planar imaging for the detection of suggestive breast lesions, especially when ≤ 1 cm (2). The results reported are not univocal. However, SPECT performed with the patient supine has recently demonstrated a significantly higher sensitivity both for nonpalpable and T1b carcinomas (4).

The development and the clinical use of high-resolution dedicated cameras for breast imaging are probably the best options to improve the detection of small tumors with scintimammography. The use of a detector with a small field of view allows greater flexibility in patient positioning, with the availability of projections similar to those of mammography (craniocaudal and true lateral), thus improving breast imaging by limiting the field of view and reducing image contamination from other organs (i.e., liver and heart). Moreover, the detector can be placed directly against the breast, and mild compression is possible, with resulting reduced breast thickness, increased target-to-background ratio, and increased camera sensitivity (5).

Our first preliminary clinical results using the same dedicated camera described by Coover et al. (1) were very satisfactory. The imaging device was easily mounted on a mammography unit in our department, and a pilot study has been started. Till now, 21 patients with BI-RADS category III and IV lesions ≤ 1 cm were prospectively evaluated with scintimammography using a conventional γ -camera and the dedicated device. Three tumors were detected only with the high-resolution camera, which was also able to reveal the primary breast tumor in a patient with carcinoma, unknown primary. In particular, use of the same views for acquisition of both scintigraphic images and mammographic images simplifies comparison of the 2 kinds of images.

In conclusion, we think that the routine clinical use of dedicated cameras such as that of Coover et al. (1) will positively affect the role of scintimammography as a diagnostic tool for identification of early-stage breast cancer.

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Scintimammography with a Pinhole Collimator

TO THE EDITOR: We read with great interest the paper by Coover et al. (1) regarding scintimammography using a dedicated breast camera. The results seem to be fascinating. In line with the authors, we agree that efforts to improve the imaging technique may lead to a higher sensitivity for scintimammography, particularly in the selected patient group of women with dense breast tissue. Preliminary experience obtained in other studies (2,3) has shown that use of a pinhole collimator might also improve visualization of breast lesions examined by scintimammography. Just for localization of the tumor, we would prefer the use of a γ -probe (4) for patient convenience instead of the scintimammographic needle localization described by the authors (1).

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REPLY TO SCHILLACI ET AL.: Our initial study assessed the utility of scintimammography using a dedicated breast camera as an adjuvant screening modality and as a diagnostic tool for further assessment of ambiguous or suggestive findings. Seventy-nine nonpregnant, nonlactating women (mean age, 52 y; range, 34–80 y) were divided into 2 groups: group A (screening) and group B (diagnosis).

Group A comprised 37 women with negative findings on clinical breast examination, BI-RADS category I or II mammography findings, BI-RADS parenchymal patterns of “heterogeneously dense” and “extremely dense,” and a family or personal history of breast cancer. As we described (1), dedicated-camera results were positive in 13.5% (5/37) of patients in group A. Biopsy of these 5 patients yielded 3 carcinomas, including 1 invasive lobular carcinoma, 1 ductal carcinoma in situ (DCIS), and 1 invasive tubular carcinoma. These 3 carcinomas were undetectable by clinical breast examination or mammography, even on retrospective review. Only 1 was detectable on the standard γ -camera. Table 1 of our article (1) summarized these results.

Group B (diagnosis) comprised 42 women referred to a surgeon for evaluation of a questionable or suggestive clinical finding or BI-RADS category III or IV mammography findings (unpublished data). In group B, biopsies were performed on 21.4% (9/42) of patients. The remaining 78.6% (33/42) of patients did not undergo biopsy, as the referring surgeon’s opinion was that biopsy was not indicated for these patients. None of these 33 patients had positive scintimammography findings.

In the 9 patients in group B who underwent biopsy, standard γ -camera results were positive for 1 and dedicated breast camera results were positive for 2. Biopsy results for these 2 patients indicated 1 case of fibrosis and 1 of fibroadenoma. The remaining 7 biopsies yielded 3 cases of carcinoma, including 1 of infiltrating ductal carcinoma and 2 of DCIS, as well as 4 cases of benign disease, including 2 of fibroadenoma, 1 of fibrosis, and 1 of reactive lymphoid hyperplasia. Of the 3 cases of carcinomas in group B, none was detectable by either the standard γ -camera or the dedicated breast camera.

The current indication for scintimammography is further evaluation of indeterminate clinical or mammographic findings (diagnosis). The current rationale is that a negative scintimammographic result could be used as a justification to preclude biopsy. All 3 cases of carcinoma discovered in group B were undetectable by scintimammographic examination. The false sense of confidence engendered by using scintimammography as a diagnostic modality to evaluate indeterminate lesions could potentially lead to increased morbidity.

The value of screening scintimammography as an adjuvant to standard screening modalities (mammography and clinical examination) is in the early detection of breast carcinoma. Screening scintimammography may be appropriate for the subset of women whose breasts are difficult to examine by conventional means, including women with increased mammographic density, fibrocystic changes, breast implants, or scarring from previous surgery or radiation.

We concluded that scintimammography with a dedicated breast camera may augment mammography and clinical breast examination as an adjuvant screening modality for a subset of women with dense breast tissue who are at increased risk of breast cancer. Scintimammography may be inappropriate for further evaluating questionable clinical or mammographic findings (diagnosis). Study results were derived from a very small patient population,

and larger studies should be undertaken to validate the potential use of scintimammography as an adjuvant screening modality in a subset of women whose breasts are difficult to examine by conventional screening modalities. Only 1 of the 3 carcinomas detected with the dedicated camera was detectable with a conventional γ -camera. Scintimammography may be inappropriate for diagnosis. When used to further evaluate questionable clinical or mammographic findings, a negative scintimammography result may inappropriately preclude biopsy in patients with breast carcinoma.

REPLY TO MIRZACI ET AL.: Koukouraki et al. (2) described 25 patients with known malignancies who underwent ^{99m}Tc -sestamibi (Cardiolite; Dupont) scintimammography using parallel and pinhole collimation in assessing response to radiation therapy. The investigators concluded that tumor avidity for sestamibi could successfully be assessed with pinhole scintimammography.

Tornai et al. (3) used pinhole apertures with small but very high stopping power to evaluate dedicated mammothomography with pinhole incomplete circular orbit (PICO) SPECT of 1 breast that was uncompressed and pendant. This 1 breast had 2 lesions. They compared this method to planar pinhole scintimammography. They concluded that both lesions of the 1 breast were better visualized with PICO SPECT than with planar pinhole imaging.

Barbera et al. (4) performed planar scintimammography and SPECT with ^{99m}Tc -sestamibi on patients presenting with axillary lymphadenopathy. Positive findings led to use of a γ -detecting probe to locate the lesion and guide its surgical removal. Five cases were described.

In reference to our study, comparison and comment are not possible because of the different detection techniques and different patient selection criteria. Our study population was quite different from the populations of each of these 3 studies. Our technique was used for screening a population of women with mammographically dense breasts, category 1 or 2 mammography findings, unremarkable clinical examinations, and a strong family history of breast cancer.

The lesions detected in our screening population were small, and only 1 of the 3 was detected using planar imaging with the standard camera. Considering the relatively low target-to-background ratio of the 3 lesions detected in our study, further studies evaluating γ -probe detection of these types of lesions may be warranted.

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