

Tomosynthesis used for a diagnostic mammogram identifies a true positive cancer that spot compression missed

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Background

Breast tomosynthesis, approved by the FDA in February 2011, is increasingly used for screening and diagnostic mammography in the United States. The 1-mm thin sections essentially remove overlapping breast tissue, revealing true abnormalities, while allowing one to correctly dismiss summation shadows. Studies have shown that it has superior sensitivity with enhanced specificity in the screening setting.

Diagnostic mammograms performed after an abnormal screening mammogram usually include spot compression views with or without magnification. The improved image detail, improved spatial resolution, improved contrast, noise reduction, and reduction of superimposition of tissue all combine to allow one to better assess if an asymmetry is a true mass, if suspected architectural distortion is a true finding, and better characterize margins of a mass. Spot compression has been used for over 20 years to evaluate abnormal screening mammograms with equivocal findings. Berkowitz, et al, looked at 75 spot compression views obtained to evaluate such findings and demonstrated the utility of spot compression — 65/75 appeared less suspicious, 2/75 did not change and 8 cancers looked more suspicious with spot compression.¹

Patient Information

Patient B presented to our screening facility for her first mammogram. She is a 59-year-old woman without relevant prior history. An aunt does, however,

have a history of breast cancer. She has no other risk factors. A 2-dimensional (2D) full-field digital mammogram was performed and the patient was recalled for additional images to evaluate a focal asymmetry in the left breast. Upon additional questioning, she stated that she might have felt a change in her breast.

At recall, a spot compression view and a lateral view were obtained. Three-dimensional (3D) tomosynthesis was then acquired using a Selenia Dimensions breast tomosynthesis system.

Imaging Findings

The patient's 2D full-field digital screening mammogram reveals heterogeneously dense breasts. On the cranio-caudal (CC) view (Figure 1A), no abnormality was seen, but on the medial lateral oblique (MLO) view (Figure 1B), a spiculated focal asymmetry was seen and the patient was recalled.

A spot view (Figure 2B) appeared to show no abnormality, with effacement of the area of concern, but an abnormality persisted on the lateral image (Figure 2B).

The 3D breast tomosynthesis images, as seen in Figures 3A and B, clearly show a spiculated mass in the upper outer quadrant of the left breast measuring about 2 cm.

Ultrasound confirmed the presence of the mass and was used for biopsy guidance.

Diagnosis

Infiltrating mixed ductal and lobular cancer. A lumpectomy with sentinel node dissection followed by radiation therapy is planned.

Discussion

This case illustrates the role of tomosynthesis in the workup of the recalled patient and also illustrates the benefit of screening with tomosynthesis. If one had relied on just the spot compression view, the patient might have suffered a delay in diagnosis. If tomosynthesis had been the screening exam, the next step would have been ultrasound-guided biopsy and no additional mammographic images would have been needed.

Several studies have evaluated the role of tomosynthesis in diagnostic mammography. Skaane et al, for example, evaluated 84 women who presented for diagnostic evaluation who were dismissed with normal or benign results after 2D imaging. These women also had 3D mammograms, which were interpreted separately. Some women were recalled based purely

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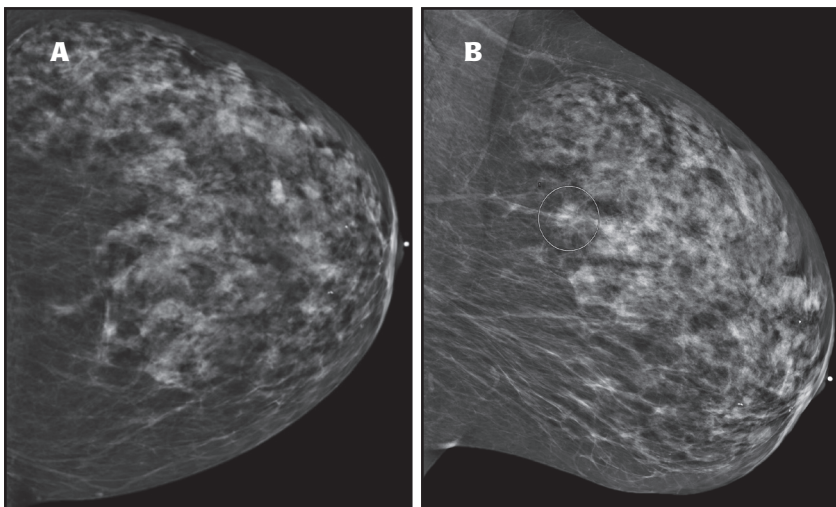


Figure 1. On the cranio-caudal (CC) view (A), no abnormality was seen. The patient's 2D mammogram shows an asymmetry posteriorly on the MLO view (B).

on the tomosynthesis imaging. That is, the 2D exams were read as BIRADS 1 or 2, while the tomosynthesis was read as BIRADS 4 or 5. Four of 84 patients were recalled for biopsy based on the tomosynthesis; 2 of these women had cancer correctly diagnosed on tomosynthesis, but missed on the 2D diagnostic exam. The increased sensitivity of tomosynthesis was attributed to higher conspicuity of the cancers presenting as spiculated masses and distortions. Without tomosynthesis 2/84 patients who had diagnostic mammograms would have had false negatives.²

Noroozian, et al in a small reader study, evaluated mammographic spot views and digital breast tomosynthesis images of 30 malignant and 37 benign masses and found that mean mass visibility was slightly better with tomosynthesis. All readers found that the masses were more obvious on tomosynthesis. The readers recommended more biopsies based on tomosynthesis. There was a mean increase of 1.8 true positives for every 1.3 false positive assessments.³

Conclusion

Tomosynthesis is useful for diagnostic mammography and may prove to be superior to conventional mammographic spot images for the recalled patient.

References

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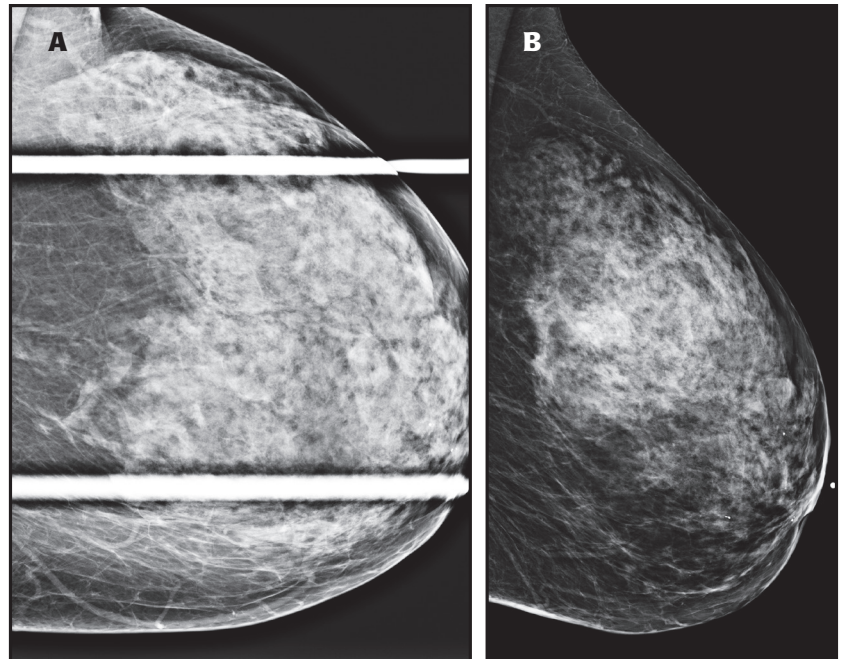


Figure 2. The patient's spot view and lateral view (A and B).

2. Skanne P, Guillen R, Bjorndal H, et al. Digital breast tomosynthesis (Tomosynthesis): Initial experience in a clinical setting. *Acta Radiol*. 2012;53:524-9.

3. Noroozian M, Hadjiiski L, Rahnama-Moghadam S, Klien KA, et al. Digital breast tomosynthesis is comparable to mammographic spot views for mass characterization. 2012 Jan;262:61-68. Epub 2011 Oct 13.

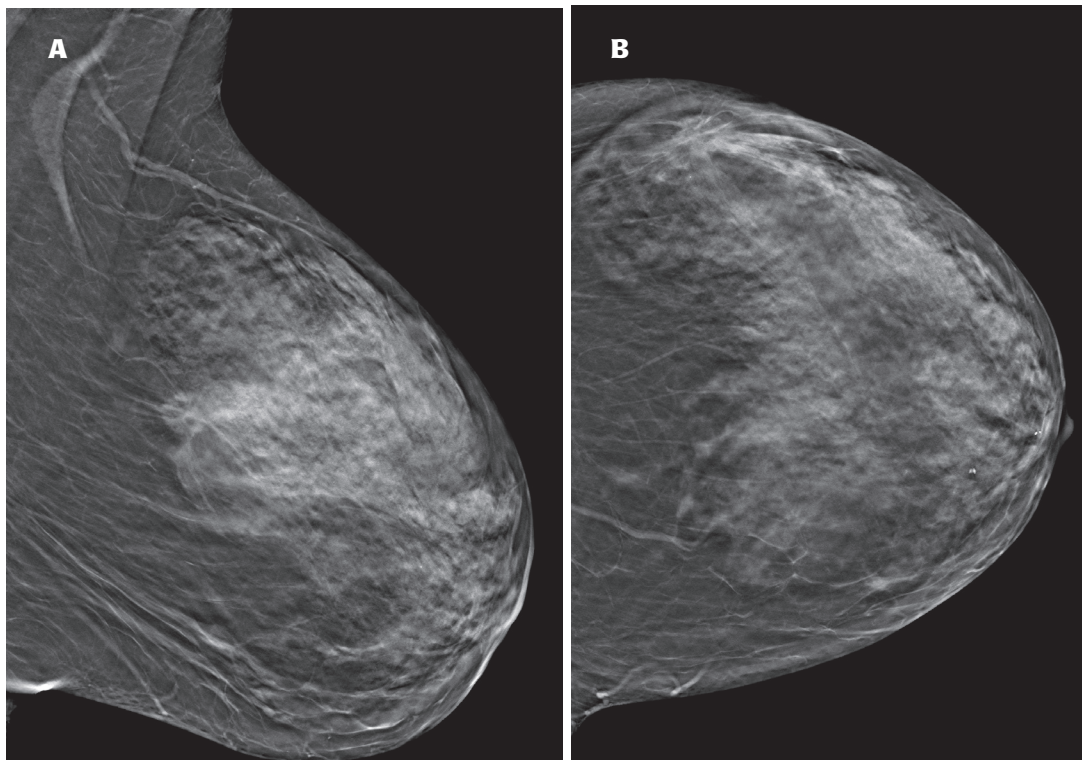


Figure 3. The 3D images (A and B) clearly show a spiculated mass in the CC and MLO projections.

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