NEWSPAPER POST

TheSynapse

The Medical Professionals' Network

MEDICAL IMAGING

# Why are some cancers missed on mammography

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*Mammography is the standard of reference for the early detection of breast cancer. Screening mammography is performed to detect an abnormality, whereas diagnostic mammography is used to further evaluate the abnormality or a clinical problem.*

The purpose of screening mammography is simply to detect a potential cancer; therefore, the radiologist should not try to make a diagnosis on the basis of screening findings alone. Additional views are important in further assessing an identified abnormality and suggesting appropriate patient treatment. According to data from the Breast Cancer Detection Demonstration Project, the false-negative rate of mammography is approximately 8%–10%. However, it is generally accepted that mammography is able to detect breast cancer in 95% of cases. In other words 5% of breast cancers are missed on initial mammograms. This in itself makes mammography a very accurate test as a true positive rate of 95% is very high. However, one must take into account that there is no medical test that is 100% accurate. Recent studies have emphasized the use of alternative imaging modalities to detect and diagnose breast carcinoma, including ultrasonography (US) and magnetic resonance (MR) imaging. However, high-quality mammography performed with meticulous attention to detail and positioning can significantly enhance the accuracy of image interpretation.

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**Figure 1a.** *Invasive ductal carcinoma in a 36-year-old woman with dense breasts and a palpable mass. Left mediolateral oblique mammogram demonstrates no finding that corresponds to a palpable mass (arrow).*

## Editor's Word

Dear Colleagues,

Welcome to the 6th issue of TheSynapse Magazine for 2008. When we consider the number of new services launched during the year we can only feel great satisfaction.

For the past twelve years we have continuously provided medical professionals with news and services relevant to their practice. Our aim has always been to provide a service to our members, that is as comprehensive as possible and therefore we have purposely opted to widen the services to include even those that are not strictly medical as long as it is relevant to medical professionals. As we say … if it's relevant it's on TheSynapse.

We will be concluding the year with the launch of a revamped version of TheSynapse Internet Portal. In this version we will be adding a number of new features including an on-line diary of events and a personal Continuing Medical Education Tracker. There will also be great opportunities for interaction, quizzes and much more. So stay in tune!

Looking forward to an even better 2009.

**TheSynapse Magazine is published by Medical Portals Ltd. The Professional Services Centre, Guzi Cutajar Street, Dingli, Malta.**

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# Why are some cancers m

One of the main limitations on the accuracy of mammography is the dense breast. Breast cancers may be missed because of dense parenchyma that obscures a lesion. Young patients with abundant glandular tissue and low fat content, the latter normally separating and spacing out the breast glands, usually have dense breast. In fact, it is customary to avoid mammography before the age of 35 years for this reason. Small breasts are also usually lacking in fat content and therefore have more closely packed glandular tissue making them dense (Figure 1). Small breasts are also difficult to position on a mammography machine, which influences image quality (Figure 2). Uniformly dense breasts and breasts with areas of increased density within them must be evaluated by ultrasound. This is particularly true if a palpable nodule is present. Palpable nodules

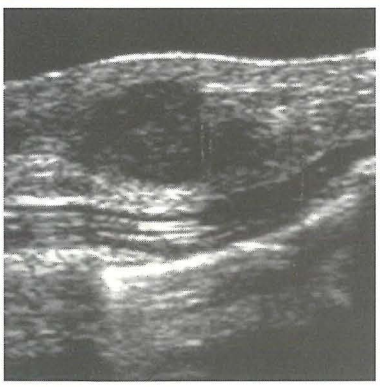

**Figure 1b.** *Invasive ductal carcinoma in a 36-year-old woman with dense breasts and a palpable mass. US image obtained in the area of the palpable abnormality reveals a heterogeneous, hypoechoic mass with irregular margins.*

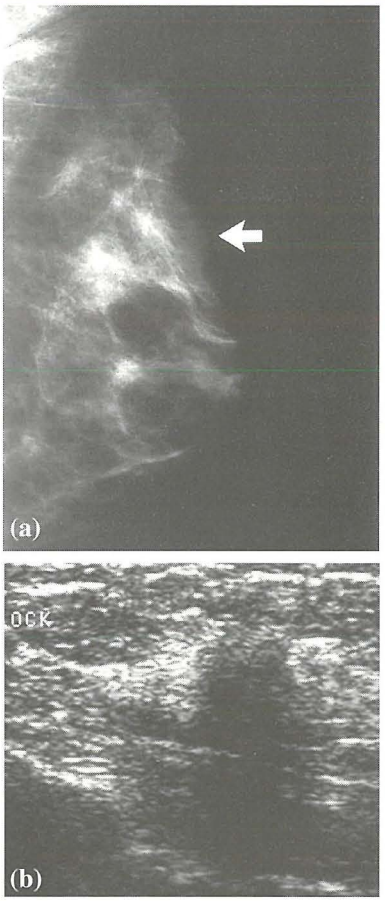


**Figure 2.** *Invasive lobular carcinoma in a 40-year-old woman with dense breasts and no palpable nodule. (a) Right mediolateral oblique screening mammogram shows a small, oval obscured mass superiorly (arrow) that was not seen on the craniocaudal view. (b) US image reveals an incidentally detected irregular mass with acoustic shadowing in the lower outer quadrant.*

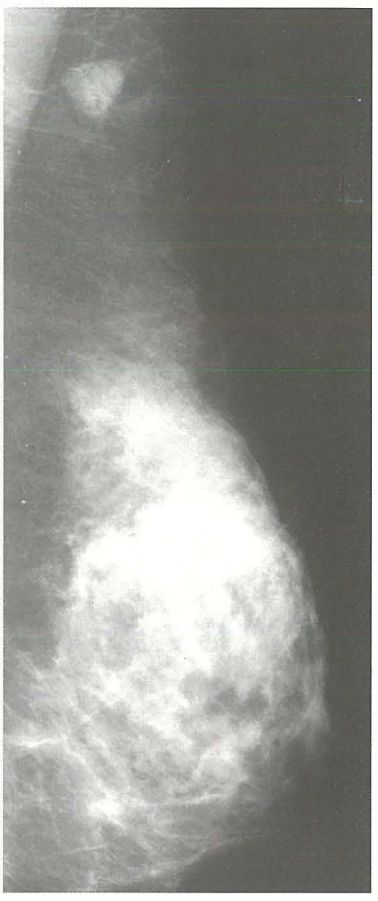

**Figure 3.** *Circumscribed cancer in a 63-year-old woman. Right exaggerated craniocaudal lateral mammogram demonstrates a nonpalpable mass in the axillary tail. The mass is lobulated and circumscribed and has high density. Spot compression mammography would help verify the characteristics of the margins. Pathologic analysis demonstrated mucinous carcinoma.*

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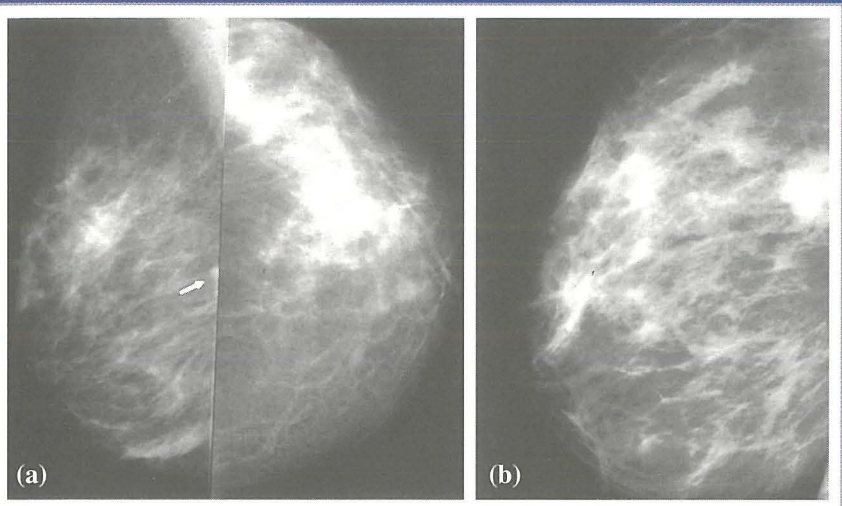


**Figure 4.** *Proper positioning. (a) Left mediolateral oblique (left) and craniocaudal (right) mammograms obtained with improper positioning demonstrate poor visualization of the posterior tissue. The margin of a mass is barely perceptible at the edge of the mediolateral oblique image (arrow). (b) On a left mediolateral oblique mammogram obtained with improved positioning, a cancer is seen near the chest wall. An exaggerated craniocaudal view may also help demonstrate such a mass.*

in dense breasts are often cysts; simple cysts of the breast are easily confirmed by ultrasound and do not require further investigation as they are always benign. However if a palpable nodule is not definitely confirmed to be a cyst on ultrasound, biopsy is required. This holds particularly true for solid nodules with irregular margins and those presenting in women over the age of 30 years of age. In women under the age of 30 years most solid nodules are lobulated and show smooth margins and abundant internal echoes and are most likely fibroadenomas. The latter should be followed by sequential ultrasound exams. Although well-circumscribed cancers are relatively uncommon, they do exist. Medullary, colloid (mucinous), and papillary carcinoma commonly manifest as well-circumscribed masses (Figure 3), so depending on the patient's age and mammographic / ultrasound feature, biopsy should be performed at the least suspicion.

Any solid nodule that has remained unchanged in size and texture over a period of 2 years is assumed to be benign as a cancer would not remain dormant for this period of time. However slow growing cancers are rare but do exist and biopsy should be performed even on stable lesions if these show imaging features of malignancy.

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# Why are some cancers missed on mammography

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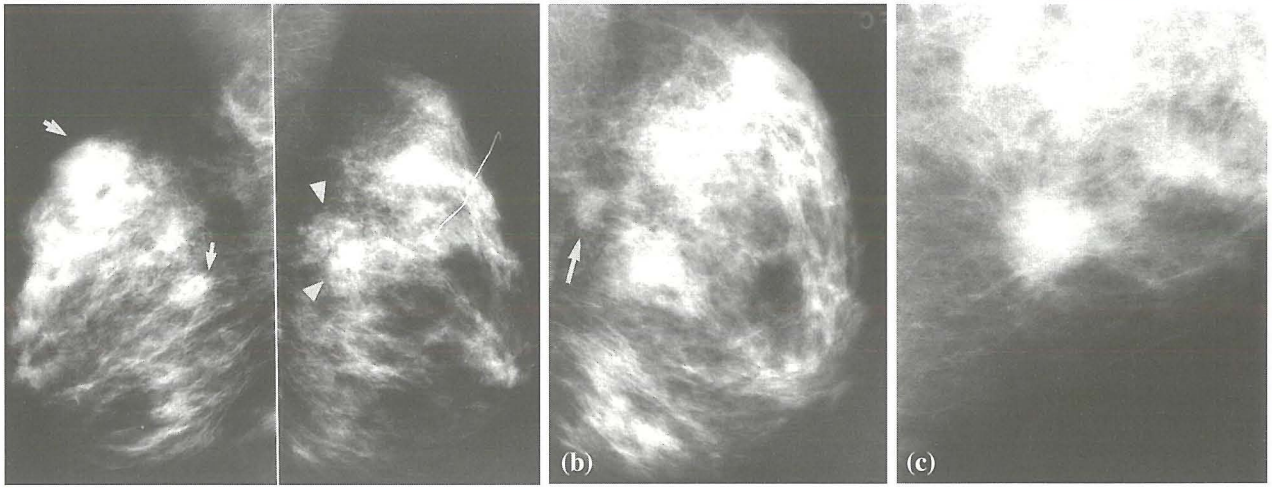


**Figure 5.** *Creative positioning for lesion detection. (a) Bilateral mediolateral oblique mammograms show dense parenchyma with well-defined masses (arrows) and a focal irregular density superoposteriorly on the right side (arrowheads). The well-defined masses proved to be cysts at US. (b) On a right lateromedial mammogram, the irregular density (arrow) has moved upward, a finding that indicates a medial location. At lateromedial mammography, the medial aspect of the breast is closer to the film and can therefore be better evaluated. (c) Spot magnification mammogram (right cleavage view) demonstrates a spiculated mass. Pathologic analysis revealed invasive ductal carcinoma.*

Poor positioning or technique may also result from chest wall deformities and patient respiration during the mammographic exposure. Sometimes a lesion may be located outside the normal field covered by mammography. Standard mammographic images are designed to try to include as much of the breast tissue as possible in planes and 90degrees to each other (mediolateral oblique and craniocaudal: MLO and CC). In these cases, one should obtain mammographic images in positions that differ from the standard view in order to include any palpable nodule (Figure 4); this is sometimes referred to a creative positioning. Emphasis on the upper outer quadrant, which demonstrates the greatest proportion of breast cancers, is necessary.

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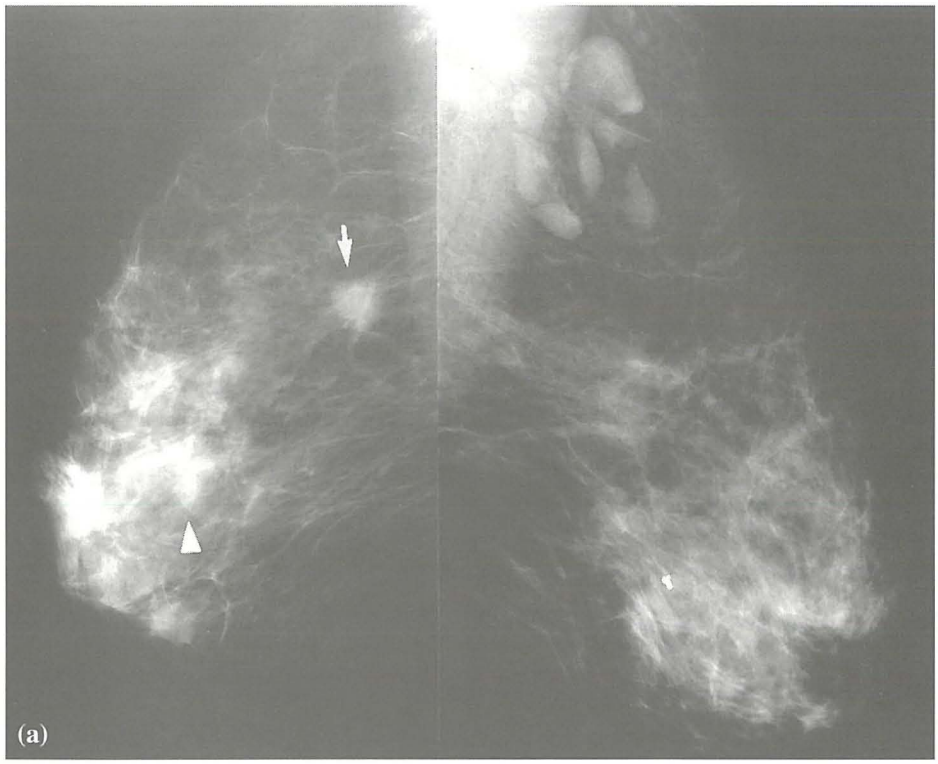
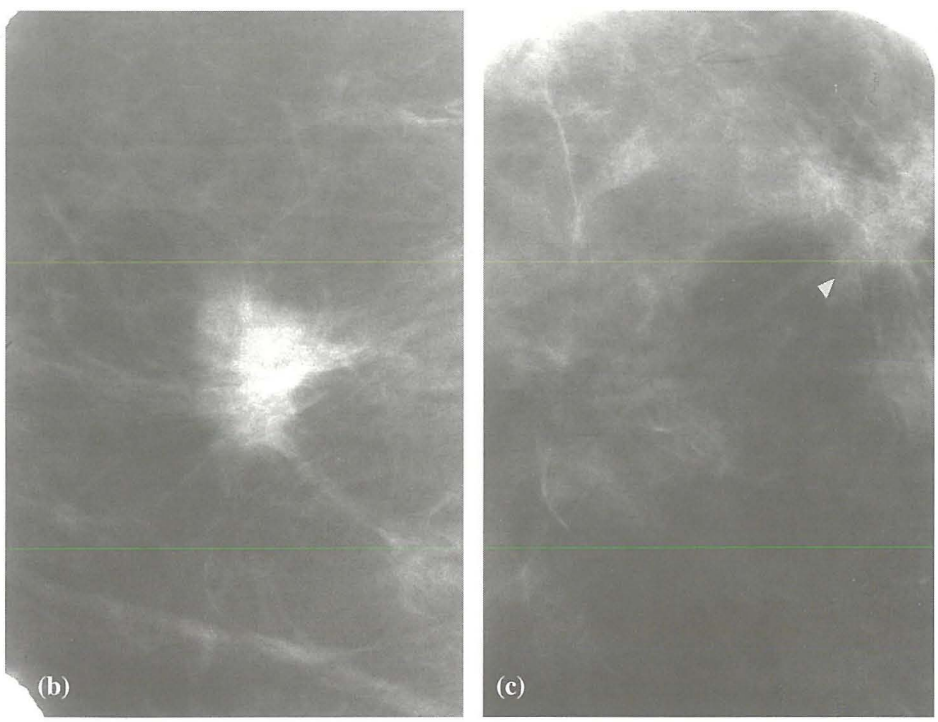



**Figure 6.** *Mirror image interpretation. (a) Bilateral mediolateral oblique mammograms reveal an irregular mass posteriorly on the left side with a highly suspect appearance (arrow). In addition, a subtle distortion is noted more inferiorly (arrowhead), a finding that becomes more evident with mirror image interpretation. (b, c) On left craniocaudal spot compression mammograms, the posterior (b) and anterior (c) lesions demonstrate a spiculated appearance (arrowhead in c). Pathologic analysis demonstrated multicentric invasive ductal carcinoma.*




Special view including rolled views, spot views and views with skin markers aid visualisation of mammographically difficult lesions (Figure 5).

Lack of perception of an abnormality that is present, incorrect interpretation of a suspect finding, subtle features of malignancy, or a slowly changing malignancy may all lead to a cancer being missed or detected late. Breast cancers are easily missed when they appear as focal areas of asymmetry or distortion (eg, invasive lobular carcinoma) or when their appearance suggests a benign cause (eg, medullary and mucinous [colloid] invasive ductal carcinomas, which usually manifest as mostly well-defined masses. Mirror image interpretation of mammograms, with corresponding images of the right and left breast being placed side-by-side, helps with detection of breast asymmetry (Figure 6). Ultrasound is very useful in such cases and if this does not explain what is seen on mammography, a biopsy must be performed.

Another special circumstance that can present a perception problem involves a patient with a palpable node in the axilla that is evaluated with biopsy and represents metastatic adenocarcinoma, likely of breast origin. The primary breast cancer may be occult or very subtle at mammography (Figure 7).

In conclusion, although mammography is the standard of reference for the detection of early breast cancer, cancers may be missed. To reduce the possibility of missing a cancer, the following steps

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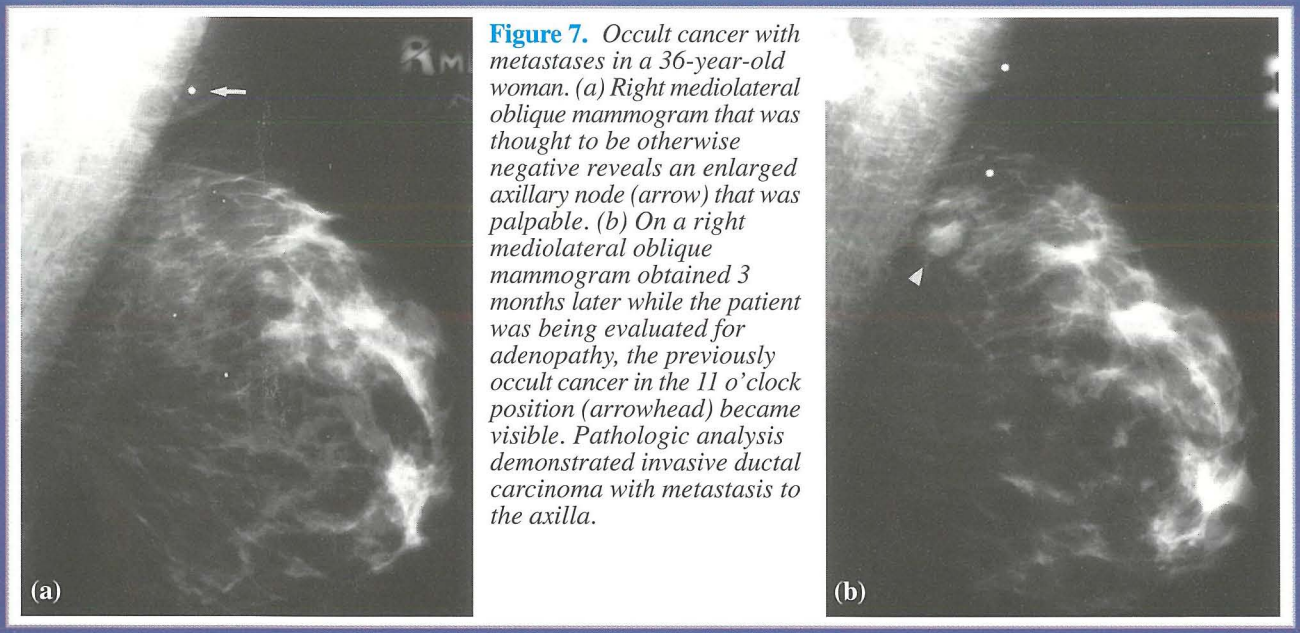


**Figure 7.** *Occult cancer with metastases in a 36-year-old woman. (a) Right mediolateral oblique mammogram that was thought to be otherwise negative reveals an enlarged axillary node (arrow) that was palpable. (b) On a right mediolateral oblique mammogram obtained 3 months later while the patient was being evaluated for adenopathy, the previously occult cancer in the 11 o'clock position (arrowhead) became visible. Pathologic analysis demonstrated invasive ductal carcinoma with metastasis to the axilla.*

are required when interpreting mammographic findings:

1. Do not rely on screening views alone to diagnose a detected abnormality; complete the evaluation with diagnostic mammography.

2. Review clinical data and use US to help assess a palpable or mammographically detected mass.

3. Correct positioning and technical requirements to optimize image quality.

4. Be alert to subtle features of breast cancers.

5. Compare current images with multiple prior studies to look for subtle increases in lesion size.

6. Look for other lesions when one abnormality is seen.

7. Judge a lesion by its most malignant features. □

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