Missed Cancers at Mammography: A Practical Case Review
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SAM Questions

1. What is the most appropriate BI-RADS assessment for the following case scenario:
architectural distortion not present 1 year ago, located at the site of a benign surgical biopsy performed 6 years ago?

   A. Negative (BI-RADS 1)
   B. Benign (BI-RADS 2)
   C. Probably benign (BI-RADS 3)
   D. Suspicious (BI-RADS 4)
   E. Highly suggestive of malignancy (BI-RADS 5)

   Answer: D. Suspicious (BI-RADS 4)

Architectural distortion is a nonspecific mammographic finding that may indicate the presence of breast cancer. It is nonspecific because most such findings are benign, most commonly post-surgical or post-traumatic scarring, or radial scar. Architectural distortion located at the site of a previous surgical biopsy usually represents a characteristically benign finding; it should be evident within a year after the surgical biopsy was performed. However, in this case scenario, the architectural distortion was not present last year, yet the surgical biopsy was performed 6 years ago. Therefore, the new architectural distortion, although located at the site of previous biopsy, is not a manifestation of that biopsy. It should be assessed as suspicious (BI-RADS category 4). The other choices are incorrect for the following reasons.

BI-RADS 1: This assessment is inappropriate when there is a non-normal finding that should be described in the breast imaging report.

BI-RADS 2: The architectural distortion, although located at the site of previous biopsy, is not a manifestation of that biopsy. Therefore, it would be incorrect to render a BI-RADS 2 assessment.

BI-RADS 3: Architectural distortion is not a probably benign mammographic finding, so it would be incorrect to render a BI-RADS 3 assessment.

BI-RADS 5: Architectural distortion is a nonspecific mammographic finding, representing a manifestation of underlying malignancy in fewer than 25% of cases. It would be incorrect to
render a BI-RADS 5 assessment, because such an assessment indicates a much higher likelihood of malignancy, specifically ≥ 95%.


2. What is the most appropriate BI-RADS assessment for the following case scenario: grouped calcifications in the rim of an oil cyst, newly apparent 4 years after lumpectomy for breast cancer?
   A. Incomplete (BI-RADS 0)
   B. Benign (BI-RADS 2)
   C. Probably benign (BI-RADS 3)
   D. Suspicious (BI-RADS 4)
   E. Known biopsy-proven malignancy (BI-RADS 6)

   Answer: B. Benign (BI-RADS 2)

An oil cyst is a characteristically benign mammographic finding, representing an area of fat necrosis. Calcifications may or may not develop in an oil cyst, as it ages, often several years following the trauma that produced the fat necrosis. When newly developed calcifications, even if grouped, are determined to be in the rim of the oil cyst, then they also are characteristically benign. Therefore, the appropriate BI-RADS assessment is benign (category 2). The other choices are incorrect for the following reasons.

   BI-RADS 0: Neither the oil cyst nor the calcifications that have developed in its rim are mammographic findings that justify recall for additional imaging, so it would be incorrect to render a BI-RADS 3 assessment.
   BI-RADS 3: Neither the oil cyst nor the calcifications that have developed in its rim are probably benign mammographic findings, so it would be incorrect to render a BI-RADS 3 assessment.
   BI-RADS 4: Neither the oil cyst nor the calcifications that have developed in its rim are mammographic findings of malignancy, so it would be incorrect to render a BI-RADS 4 assessment.
   BI-RADS 6: Neither the oil cyst nor the calcifications that have developed in its rim are mammographic findings of malignancy, so it would be incorrect to render a BI-RADS 6 assessment.


3. What is the most appropriate BI-RADS assessment for the following case scenario: 1 cm focal asymmetry in each breast, one of which is stable for 3 years, the other somewhat larger?
   A. Negative (BI-RADS 1)
   B. Benign (BI-RADS 2)
   C. Probably benign (BI-RADS 3)
   D. Suspicious (BI-RADS 4)
   E. Highly suggestive of malignancy (BI-RADS 5)

   Answer: D. Suspicious (BI-RADS 4)

A focal asymmetry seen at baseline examination (or when no previous examinations are available for comparison) is a probably benign finding, which after 2-3 years of stability, is
considered to be benign. So the stable focal asymmetry in this scenario should be assessed as benign. A developing asymmetry is defined as a focal asymmetry that is new, larger, or more conspicuous than on a previous examination, an apt description of the contralateral lesion in this scenario. Because the likelihood of malignancy for developing asymmetry is substantially greater than 2% (15% at screening mammography, 25% at diagnostic mammography), developing asymmetry is an inherently suspicious mammographic finding. So the contralateral developing asymmetry should be assessed as suspicious. When more than one mammographic finding is present in a given examination, the overall assessment should be based on the more abnormal finding. Therefore, the correct BI-RADS assessment in this scenario is suspicious (category 4). The other choices are incorrect for the following reasons.

BI-RADS 1: This assessment is inappropriate when there is a non-normal finding that should be described in the breast imaging report.

BI-RADS 2: The 3-year-stable focal asymmetry indeed is a benign finding, but this is superseded by the contralateral finding that is more abnormal. Therefore, it would be inappropriate to render a benign (category 2) assessment.

BI-RADS 3: Neither the 3-year-stable focal asymmetry nor the developing asymmetry in this scenario is a probably benign mammographic finding. Therefore, it would be inappropriate to render a probably benign (category 3) assessment.

BI-RADS 5: Developing asymmetry is a nonspecific mammographic finding, representing a manifestation of underlying malignancy in no more than 25% of cases. It would be incorrect to render a BI-RADS 5 assessment, because such an assessment indicates a much higher likelihood of malignancy, specifically ≥ 95%.

Catherine S. Giess, MD  
Problem solving and strategies in stereotactic and ultrasound Breast Biopsy  
SAM Questions

1. Which of the following techniques can help position more posterior tissue during stereotactic biopsy?
   a. Putting the patient’s arm through the hole in the table
   b. Taping the breast to make it thicker
   c. Injecting lidocaine deep to the lesion
   d. Using the double paddle technique to position the breast
   e. Firing the biopsy needle outside the breast

Answer (a)  
Answers b, d, and e are techniques used to successfully biopsy the thin or small breast. Answer c is a technique used in US core biopsy to perform biopsy in very deep lesions.

References:
Soo MS, Walsh R, Patton J. Prone table stereotactic breast biopsy: facilitating biopsy of posterior lesions using the arm-through-the-hole technique. AJR 1998; 171: 615-617
Parker SH, Burbank F. A practical approach to minimally invasive breast biopsy. Radiology 1996; 200: 11-20

2. Which of the following techniques is the best way to confirm accurate needle placement through a small (< 1 cm) lesion during US core biopsy?
   a. Examining the tissue cores for a visible change in tissue composition
   b. Injecting lidocaine deep to the lesion prior to placing the core needle
   c. Turning orthogonally on the needle after firing but before withdrawing it
   d. Checking for air within the lesion
   e. Placing the needle halfway through the lesion before firing the needle

Answer (h)  
Answer a is an unreliable way to determine adequate sampling. Answer b is used for biopsy of deep lesions. Answer d is less reliable than actually visualizing the needle within the lesion in 2 orthogonal planes, since air could have been introduced during anesthesia administration. Answer e is incorrect because placing the needle halfway into a small (< 1 cm) lesion may result in biopsy of the tissue on the far side of the lesion rather than through middle of the lesion, and also does not eliminate the problem of potential volume averaging in a small lesion giving the impression that a needle is within a lesion rather than skimming the side of it.

References:
Parker SH, Burbank F. A practical approach to minimally invasive breast biopsy. Radiology 1996; 200: 11-20
3. You are performing stereotactic biopsy of clustered microcalcifications in a 62 year old patient. After obtaining 6 samples in a clockwise fashion, specimen xray demonstrates no calcifications within the specimen cores. The next best step is:
   a. Place a marker clip and send the cores to pathology for analysis
   b. Repeat a stereotactic pair of images for re-targeting and re-sampling
   c. Place the patient into short term mammographic surveillance if the pathologic results are benign
   d. Stop the stereotactic biopsy and refer the patient for wire localized surgical excision
   e. Repeat sampling of the region without re-imaging the breast

Answer (b)
Answers a and c are incorrect because the stereotactic biopsy was not successful and the lesion of concern was not adequately sampled. Answer d is incorrect because usually re-targeting and adjustment of the needle during biopsy will lead to technical success if calcifications are not initially retrieved. Answer e is incorrect because you are unlikely to retrieve calcifications without re-imaging the breast and making the appropriate corrections to needle position.

References:

MICHAEL N. LINVER, MD
THE BREAST IMAGING AUDIT: BEYOND THE BASICS
SAM Questions

1. The MQSA legislation governs the practice of which of the following?

A. Mammography and Breast ultrasound
B. Mammography, Breast ultrasound, and Breast MRI
C. Mammography alone
D. Breast Ultrasound alone
E. Breast MRI alone

Answer: C (mammography alone)

Rationale: When the MQSA (Mammography Quality Standards Act was passed by Congress in 1994, it specifically targeted and applied to mammography alone. Ideally, it would be useful to have the legislation cover Breast ultrasound and MRI as well, but it will literally take a new act of Congress to include those in the legislation.


2. In the mammography audit, how is Sensitivity defined?

A. The number of False Negatives, divided by the number of True Positives plus the number of False Negatives.
B. The number of True Positives, divided by the number of True Positives plus the number of False Negatives.
C. The number of False Positives, divided by the number of True Positives plus the number of False Negatives.
D. The number of True Positives, divided by the number of True Positives plus the number of False Positives.
E. The number of False Negatives, divided by the number of True Positives divided by the number of False Positives.

Answer: B (The number of True Positives, divided by the number of True Positives plus the number of False Negatives)

Rationale: Sensitivity is defined as the percent of all patients found to have breast cancer within one year of a screening mammogram (i.e., all the True Positives and all the False Negatives) that were correctly diagnosed as having breast cancer (the True Positives) at the time of the screening mammogram. The only formula that meets this description is B.

3. According to the AHCPR publication, “Quality Determinants of Mammography”, what should be the range of the mix of prevalent and incident cancers found by screening mammography per 1000 women screened in an average risk population?

A. 1-2 per 1000  
B. 2-5 per 1000  
C. 8-10 per 1000  
D. 2-10 per 1000  
E. 10-15 per 1000

Answer: D (2-10 per 1000)

RATIONALE: A review of 15 major screening mammography studies published as part of the “Quality Determinants of Mammography” publication in 1994 showed a range of 6 to 10 prevalent cancers (those found on the first screening) per 1000 women screened, and a range of 2 to 4 incident cancers (those found on subsequent screening) per 1000 women screened. Therefore, it was recommended at that time that the goal of any screening mammography program should be to find an overall range of 2 to 10 cancers per 1000 women screened in an average risk population.

An Update on High Risk Lesions

SAM Questions

1. Which of the following is true?
   A. ADH shares cytologic similarities with DCIS.
   B. FEA is a lobular neoplasia
   C. ADH most frequently is seen as a mass at ultrasound
   D. FEA can be followed because it is not upgraded to cancer at surgery
   E. ADH usually has no mammographic findings

   Answer: A

2. Which of the following is the most appropriate next step in a patient diagnosed with ADH by stereotactic breast biopsy?
   A. 6 month follow up mammography to show stability
   B. Annual mammography
   C. MRI for extent evaluation
   D. Repeat biopsy to ensure no malignancy
   E. Surgery to ensure no upstage to malignancy

   Answer: E

3. Which of the following is true regarding LCIS?
   A. It fills less than 50% of the lumen of the acinus.
   B. It does not require surgical excision.
   C. Most typically it is seen as an asymmetry on mammography.
   D. Calcifications associated are typically clustered and punctate
   E. LCIS does not increase risk of future breast cancer.

   Answer: D

4. Which of the following is true?
   A. Radial scars are not visible on MRI.
   B. Radial scars are frequently associated with invasive cancer.
   C. Radial scars cannot be seen with ultrasound.
   D. Radial scars are most typically seen as architectural distortion.
   E. Radial scars do not have associated calcifications.

   Answer: D
5. Which of the following is true regarding papillomas?
   A. Peripheral duct papillomas are not located in the subareolar breast.
   B. Central duct papillomas are typically multiple.
   C. Central duct papillomas typically contain fine pleomorphic calcifications.
   D. Central duct papillomas often enhance with washout kinetics on MRI.
   E. Peripheral duct papillomas are rarely associated with atypia.

Answer: D