# Breast Radiology
# In-Training Test Questions
# for Diagnostic Radiology Residents


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Sponsored by:
*Commission on Education*
*Committee on Residency Training in Diagnostic Radiology*



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1. A vacuum assisted needle biopsy is performed for calcifications. Follow-up excisional biopsy is recommended for which ONE of the following results?

   A. Stromal fibrosis
   B. Sclerosing adenosis
   C. Atypical ductal hyperplasia
   D. Apocrine metaplasia

Rationales:
A. *Incorrect*. Stromal fibrosis is a benign diagnosis and does not require excisional biopsy.
B. *Incorrect*. Sclerosing adenosis represents a benign finding and presents as calcifications. No further excision is needed.
C. **Correct**. Atypical ductal hyperplasia is a proliferative change, which has an association with DCIS. Excisional biopsy yields DCIS in up to one third of the cases. The upgrade to DCIS is less common with larger gauge needles but does not obviate need for excision. Sampling error is the main cause of the upgrade.
D. *Incorrect*. Apocrine metaplasia is associated with fibrocystic changes and cysts. It is a benign diagnosis.

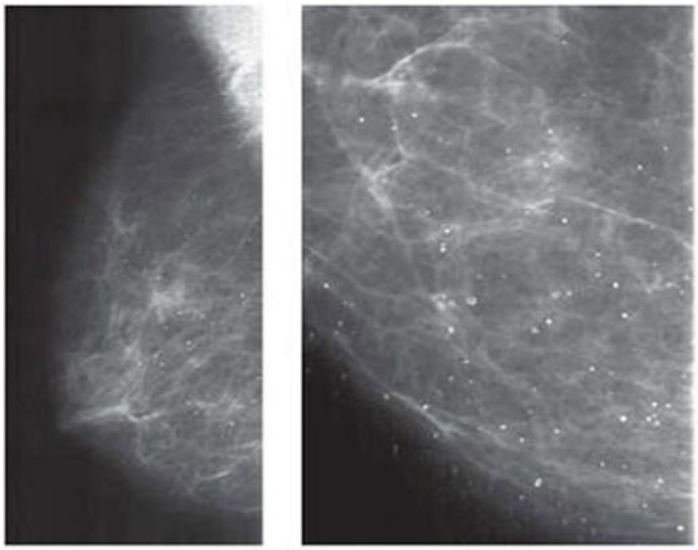
Citations:
Cardenosa G. *Breast Imaging Companion*. Philadelphia, Pa: Lippincott Williams and Wilkins; 2001:239-241.

2. Which is MOST likely to result in a NORMAL mammogram?

   A. Extracapsular silicone implant rupture
   B. Intracapsular silicone implant rupture
   C. Ruptured saline implant
   D. History of direct silicone injection

Rationales:
A. *Incorrect*. The mammogram would be abnormal because silicone outside the fibrous capsule (that which is created by the body in reaction to the implant) can be seen mammographically as streaky densities, dense masses, and bright foci within lymph nodes. Mammography is sensitive enough to diagnose silicone implant rupture when the silicone is outside the fibrous capsule.
B. **Correct**. Mammography is not sensitive enough to detect intracapsular silicone implant rupture in most cases. Breast MRI without gadolinium-enhancement is a more sensitive examination. Specific findings described for the MRI findings of intracapsular rupture include the “linguine” sign created by the collapsed silicone envelope floating within the silicone held in place by the fibrous capsule.
C. *Incorrect*. When a saline implant ruptures, the saline is resorbed leaving the collapsed silicone envelope behind. This collapsed envelope has an easily recognized abnormal mammographic appearance.
D. *Incorrect*. The striking density of the silicone within lymphatics or ducts, the silicone-related granulomatous reaction within the breasts, and fat necrosis associated with injections of paraffin or other oils that may be injected with the silicone create a very abnormal mammogram.

3. You are shown a left MLO and CC (magnification) mammogram. What is MOST descriptive of the calcifications?



A. Lucent-centered, diffuse
B. Dystrophic, segmental
C. Pleomorphic, segmental
D. Amorphous, regional

Rationales**:**

A. **Correct.** The calcifications demonstrated on these images are skin calcifications. These develop in sweat glands and are typically polygonal in shape with central umbilication or lucent centers and often pathognomonic in appearance. These are most commonly located in the skin of the medial breast, in the axilla, and in the areola. Atypical appearances may require additional imaging with tangential views. The distribution, best seen on the MLO, is generalized or diffuse.

B. *Incorrect.* Dystrophic calcifications are coarse and irregular. Segmental distribution refers to a pattern of arrangement mimicking a ductal system and while this might be suggested on the CC view alone, this distribution is not reflected on the MLO.

C. *Incorrect.* Pleomorphic calcifications vary more than the regular appearance of these calcifications.

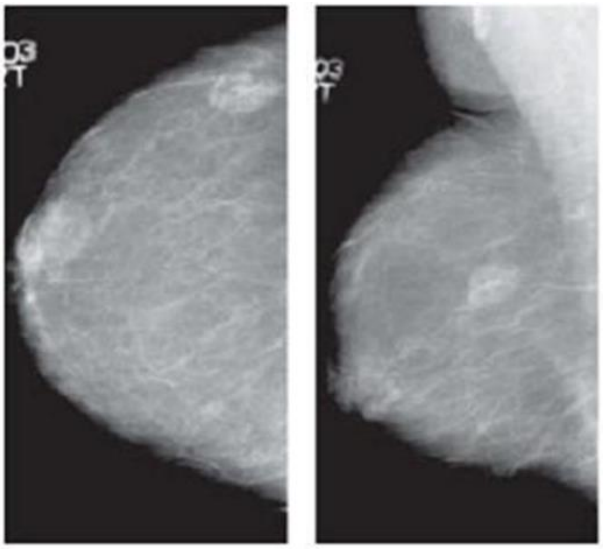
D. *Incorrect.* The BI-RADS® definition of amorphous calcifications refers to "those that are sufficiently small or hazy in appearance that a more specific morphologic classification cannot be determined." Calcifications assigned to this category are considered of intermediate concern and in some settings require biopsy. That morphologic description does not apply to the skin calcifications seen in this unilateral mammogram.

Citations**:**

American College of Radiology (ACR) BI-RADS® – Mammography. 4th Edition. In: *ACR Breast Imaging Reporting and Data Systems, Breast Imaging Atlas*. Reston, VA. American College of Radiology, 2003.

Wang S-C. Dermal calcifications. In: Birdwell RL, Morris EA, Wang S-C, Parkinson BT. *Pocket Radiologist Breast Top 100 Diagnoses*. Salt Lake City, Utah: W.B. Saunders with Amirsys; 2003:29-31.

4. You are shown the screening mammogram right CC and MLO of a 55-year-old woman. Which one of the following is the MOST likely diagnosis?



A. Fibroadenoma
B. Hamartoma
C. Hematoma
D. Galactocele

Rationales:

Evaluating the density of a mass is important in providing a differential diagnosis. Density should be compared to the surrounding breast parenchyma or, as in this case of a fatty replaced breast, to the nipple. The differential diagnosis for a mass containing both radiolucent and radiopaque components would include: Hematoma, galactocele, intramammary lymph node, and hamartoma (fibroadenolipoma). Encapsulated lesions of mixed density (fat containing) are benign and require no additional evaluation or work up.

A. *Incorrect.* While fibroadenomas may be well circumscribed as in this case, they do not contain fat and are usually isodense to fibroglandular tissue.

B. **Correct.** Hamartomas, also known as fibroadenolipomas, are of mixed density and are composed of adipose and fibroglandular elements. These masses are unusual but have a characteristic appearance. Hamartomas are usually painless and asymptomatic.

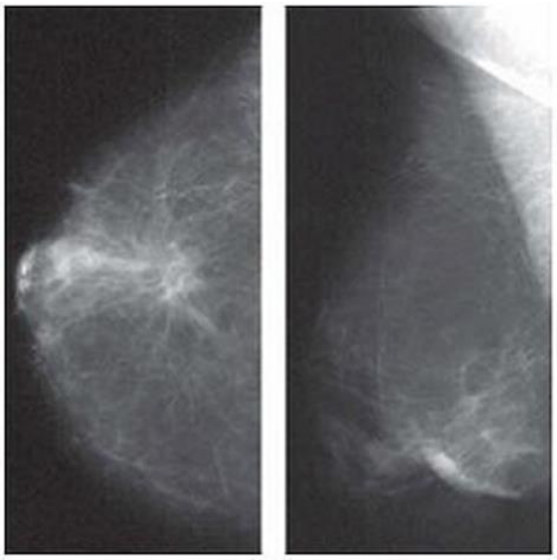
C. *Incorrect.* While hematomas may appear well circumscribed, they tend to be of moderate to high density and present in patients with a history of trauma or surgery. The history does not support this diagnosis since this patient is an asymptomatic screening patient.

D. *Incorrect.* These milk-filled cysts may be well circumscribed with high fat content and demonstrate a mixed density appearance. However, history is again of importance, since this is a postmenopausal patient and galactoceles occur in younger nursing women.

Citations:

Tabar L, Dean PB. *Teaching Atlas of Mammography*. 3rd ed. New York, NY: Thieme Stuttgart; 2001.
Kopans DB. *Breast Imaging.* 2nd ed. Philadelphia, Pa: Lippincott Raven; 1998.

5. You are shown a mammogram of an asymptomatic woman who had lumpectomy and radiation therapy two years ago (Figures 3A and 3B). Which one of the following is the MOST appropriate recommendation?



A. Follow-up in one year
B. Ultrasound evaluation
C. Surgical biopsy
D. MRI of the breast

Rationales:

A. **Correct.** The findings on the current mammogram demonstrate the expected changes from lumpectomy and radiation therapy. The spiculated area and distortion are in the area of the biopsy and should not be concerning based on patient history. There is a different appearance of the distortion on two views, which is also a clue that this is indicative of postop changes from lumpectomy and radiation therapy.

B. *Incorrect.* Ultrasound is not indicated in the evaluation of normal post-surgical scarring. If the patient had not had a history of a biopsy then the decision of biopsy should be based on the most suspicious findings.

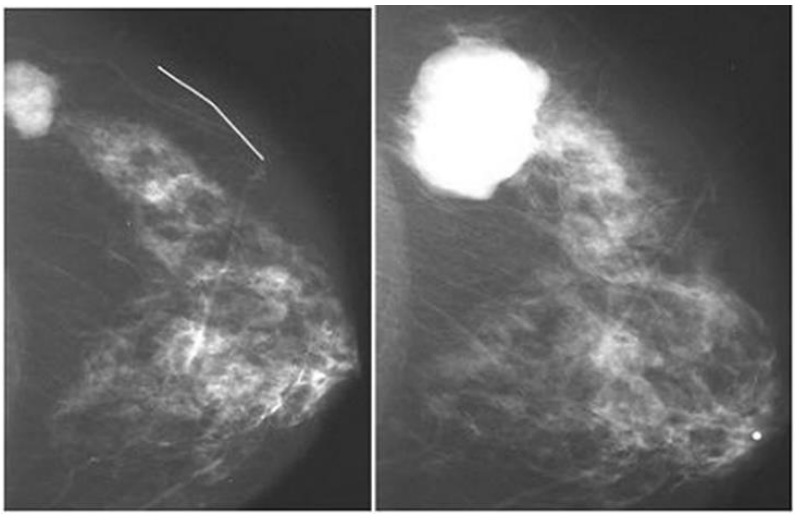
C. *Incorrect.* There is no rationale for a surgical biopsy. The findings on the mammogram are expected after surgery and radiation therapy. The only time when rebiopsy would be indicated would be if the surgical changes demonstrate increase in size of distortion or the development of a new mass or suspicious calcifications.

D. *Incorrect.* MRI is not indicated because there is no indication that the patient has a change in symptoms. MRI would be useful for evaluation of possible recurrence.

Citations:

Kopans DB. *Breast Imaging*. 2nd ed. Philadelphia, Pa: Lippincott Raven; 1998.

6. You are shown a CC view of the right breast following which a needle biopsy yielded fibroadenoma. A follow-up CC view of the right breast was obtained 6 months later. What is the MOST LIKELY diagnosis?



A. Invasive lobular carcinoma
B. Ductal carcinoma in situ
C. Phyllodes tumor
D. Tubular carcinoma

Rationales:

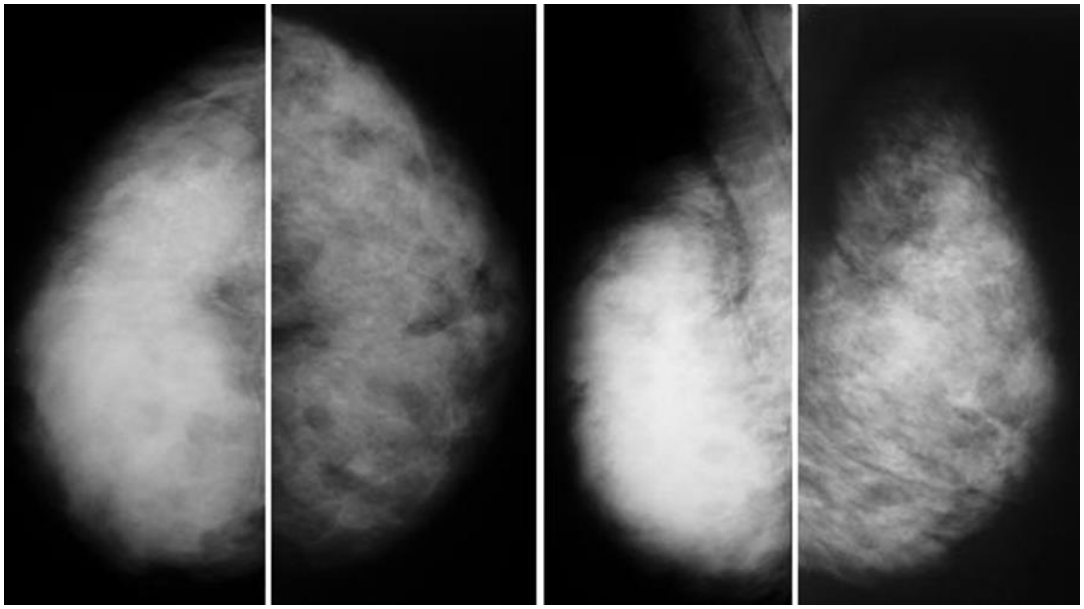
A. *Incorrect*. The most common presentations of invasive lobular carcinoma are a spiculated mass, an ill-defined or obscured mass and architectural distortion. Occasionally, lobular carcinomas are diffusely infiltrating and may show only subtle findings on mammography.

B. *Incorrect*. Ductal carcinoma in situ (DCIS) is usually detected on mammography with calcifications being the mammographic hallmark. The calcifications are typically fine, linear, discontinuous, and branching, often in a ductal distribution. In about 10% of cases, only a soft tissue mass can be seen on mammography.

C. **Correct**. Mammographically, most phyllodes tumors are large, circumscribed, noncalcified masses that are round, oval, or lobulated. When small, the appearance may be identical to a fibroadenoma. When large, the size may suggest the diagnosis. The most common clinical presentation is a large rapidly growing mass.

D. *Incorrect*. Tubular carcinomas are usually small, irregularly shaped, and have spiculated margins. They are typically slow growing and small at the time of diagnosis. Due to the small size and slow growth, most tubular carcinomas are detected on mammography rather than on palpation.

7. You are shown CC and MLO mammograms (Figures 2A through 2D). What is the MOST likely clinical presentation?

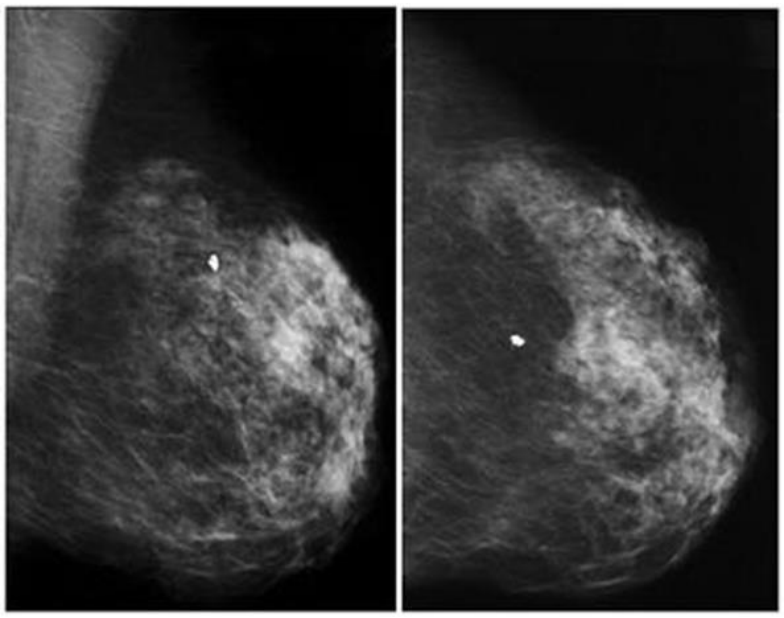


A. Peau d'orange skin in the left breast
B. No symptom; patient presented for routine screening mammography
C. Nipple discharge from the left breast
D. Pruritus in the left breast

Rationales:

A. **Correct**. The left mammogram is markedly dense compared with the right mammogram, and malignant calcifications are present in the left mammogram. The ultrasound image of the left breast shows thickened skin and a solid mass containing malignant calcifications. This is a case of inflammatory breast cancer. Hence, peau d'orange skin would be the most appropriate choice.
B. *Incorrect*. This is an incorrect choice because of all the reasons enumerated above.
C. *Incorrect*. Nipple discharge is not a usual presentation of inflammatory breast cancer.
D. *Incorrect*. Pruritus is not a usual presentation of inflammatory breast cancer.

8. You are shown a screening mammogram. What does the calcification in the upper central breast MOST LIKELY represent?



A. Ductal carcinoma in-situ
B. Skin calcification
C. Milk-of-calcium
D. Dystrophic calcification

**Rationales:**
A. *Incorrect*. The calcification shown is not clustered or of suspicious morphology (e.g. not amorphous, linear, branching, or pleomorphic).
B. *Incorrect*. The calcification shown is not lucent or geometric-shaped, and does not project near or in the skin.
C. *Incorrect*. Milk-of-calcium calcifications are linear, meniscal, layering, or discoid in the lateral projection, and smudgy, round, or amorphous in the craniocaudal projection. The calcification shown does not meet the criteria for milk-of-calcium.
D. **Correct**. The calcification shown is coarse, chunky, distinct – it has the classic morphology of dystrophic calcification.

<u>Citations:</u>
Sickles EA. Breast calcifications: mammographic evaluation. Radiology 1986; 160:289-293Linden SS, Sickles EA. Sedimented calcium in benign breast cysts: the full spectrum of mammographic presentations. Am J Roentgenol 1989; 152:967-71

9. What is the primary advantage of using an 11-gauge directional vacuum-assisted as compared to a 14-gauge automated core biopsy needle

A. Less chance of bleeding
B. Less chance of infection
C. Less underestimation of disease
D. Less expensive needle

Rationales:
A. *Incorrect*. The 11-gauge vacuum needle is not associated with less bleeding.
B. *Incorrect*. The 14-gauge automated needle is not associated with less chance of infection.
C. **Correct**. The larger samples obtained with the 11-gauge directional vacuum-assisted core biopsy needle allow for a more accurate histologic diagnosis. For example, atypical ductal hyperplasia (ADH) diagnosed with 11-gauge vacuum is less likely to upgrade to DCIS or invasive cancer at surgical excision, when compared with ADH diagnosed with 14-gauge automated core needle.
D. *Incorrect*. The 11-gauge vacuum needle is more expensive than the 14-guage automated needle.

Citations:
Liberman L. Perctuaneous image guided core biopsy. Radiol Clin North Am 2002; 40:483-500.

10. Concerning screening for breast cancer, which does the American Cancer Society recommend?

A. Annual mammogram beginning at age 50
B. Baseline mammogram at age 35
C. Screening before age 40 for women with high risk
D. Clinical breast exam every 3 years from age 20 to 49

Rationales:
A. *Incorrect*. Should begin at age 40.
B. *Incorrect*. Baseline is no longer recommended at age 35, but rather start routine, yearly screening at age 40 and yearly thereafter.
C. **Correct**. Women in high-risk category should begin screening before age 40. It is recommended 10 years prior to history of breast cancer in first degree relative.
D. *Incorrect*. Clinical exam should begin every 3 years 20-39 and annually at age 40.

Citations:
American Cancer Society