Breast Radiology
In-Training Test Questions
for Diagnostic Radiology Residents

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Commission on Education
Committee on Residency Training in Diagnostic Radiology
1. Which one of the following is the MOST likely diagnosis?

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

Findings:
Well-circumscribed mass of mixed attenuation containing fat.

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:

2. You are shown a mammogram of an asymptomatic woman who had lumpectomy and radiation therapy two years ago. 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:

3. You are shown a gadolinium-enhanced, fat-suppressed subtraction MR image of the left breast. Which is the BEST description?

A. Round mass, heterogeneous enhancement
B. Spiculated mass, rim enhancement
C. Irregular mass, homogeneous enhancement
D. Oval mass, central enhancement

Rationales:
A. Incorrect. The mass has an uneven or irregular shape with spiculated margins and homogeneous enhancement.
B. Incorrect. The enhancement is not rim but homogeneous.
C. Correct.
D. Incorrect. The mass is not oval but irregular with some spiculated borders.
4. Concerning breast cancer recurrence after lumpectomy and radiation therapy, which is TRUE?

A. About 75% are in the same quadrant as the original tumor.
B. The long term risk is 3% of patients per year.
C. It usually occurs in the first two years post-treatment.
D. The risk is greater in post-menopausal women.

Rationales:
A. Correct. Tumors that recur early, less than 3 years, typically recur within the original tumor bed, while those occurring later are more likely to be remote from the original tumor.
B. Incorrect. Long-term risk of recurrence is 1-2% in the first 5-10 years and falls to 1% per year thereafter.
C. Incorrect. Mean time to recurrence is 3.5 years. Recurrence is most likely to occur 2-5 years post lumpectomy.
D. Incorrect. Risk of recurrence is greatest in premenopausal women, those with an extensive intraductal component, tumors with vascular invasion, multicentric tumors, positive surgical margins or inadequate treatment of the original tumor.

5. Concerning galactoceles, which one is TRUE?

A. Generally seen in women over 60
B. Horizontal x-ray beam may show a fat-fluid level.
C. Mammographically seen as an a spiculated mass
D. Biopsy is usually required for diagnosis

Rationales:
A. Incorrect. Galactoceles are seen in younger pregnant or lactating patients and although they may be seen for up to several years, they would not commonly be seen in women over 60.
B. Correct. Since the milk has a high fat content, a fat fluid level can be found with the separation of the milk fat and protein.
C. Incorrect. Mammograms generally show a well circumscribed rounded mass.
D. Incorrect. As with other radiolucent lesions of the breast, galactoceles are always benign and in the appropriate clinically setting requires no further work up.
6. You are shown a screening right MLO and magnification views in the MLO and CC projections. Which is the MOST appropriate BI-RADS code?

A. Category 0
B. Category 2
C. Category 3
D. Category 4

RATIONALES:
B. Correct. Hamartomas are unusual circumscribed benign breast lesions composed of variable amounts of fat, glandular tissue, and fibrous connective tissue. The classic mammographic appearance is virtually diagnostic. The lesion is circumscribed and contains both fat and soft-tissue density surrounded by a thin radiopaque capsule. When diagnostic features are present, routine annual mammography is appropriate and this should be coded BI-RADS category 2.

References:
7. Which one of the following is an indication for evaluation of the breast with contrast-enhanced MRI?

A. Suspected implant rupture
B. Extent of tumor in dense breasts
C. Cystic masses in both breasts
D. Cloudy discharge with negative galactogram

RATIONALES:
A. Incorrect. Contrast is not necessary for evaluation of implant rupture. Images with fat saturation and silicone and water saturation would be helpful.
B. Correct. Contrast can help to locate other foci of tumor and more accurately evaluate tumor size as well as lymph node involvement.
C. Incorrect. Cystic masses do not require the use of contrast but can be detected by T1 and T2 imaging.
D. Incorrect. White discharge is usually benign. Bloody or clear discharge could be evaluated with MRI and contrast may be helpful.

8. Regarding Paget’s disease, which one of the following is CORRECT?

A. It is characterized by bleeding and ulceration of the nipple-areolar complex.
B. It is classically diagnosed as an irregular mass on mammography.
C. It results from a chronic irritation of the nipple-areolar complex epidermis.
D. It is typically treated with partial breast irradiation.

RATIONALES:
A. Correct. Paget’s disease is characterized by a chronic erythematous, ulcerating and bleeding nipple-areolar complex. These findings may cause itching, bleeding or a burning sensation of the nipple.
B. Incorrect. Paget’s is classically diagnosed when there is a high degree of clinical concern based on physical exam findings. This is confirmed with skin biopsy. While, mammographic findings may include skin or nipple thickening, calcifications or a retroareolar mass, as many as one third of all patients have no mammographic finding.
C. Incorrect. Paget’s may appear similar to dermatitis with chronic inflammation but the disease results from the extension of malignant cells up thru the ducts to the nipple surface epithelium.
D. Incorrect. Depending on the extent of involvement, treatment routinely includes surgery. Surgical options include: a breast conserving procedure if the area of involvement is small and there is little or no invasive component or a total mastectomy with or without axillary sampling if the mass is larger and has a significant invasive component. Breast irradiation as a single method of treatment is not considered adequate or appropriate treatment and should be considered only in conjunction with a definitive surgical procedure.
9. Concerning complex sclerosing lesions (radial scars), which one of the following is TRUE?

A. They are typically related to prior trauma or an invasive surgical procedure.
B. They usually present as palpable masses at clinical exam.
C. Mammographic features include a circumscribed mass with a central lucency.
D. They have been shown to be associated with tubular carcinoma and atypical hyperplasia.

RATIONALES:
A. Incorrect. Complex sclerosing lesions, radial scars, are not related to prior trauma or surgery and are not in fact “scars” at all. The etiology of radial scars is unknown.
B. Incorrect. Radial scars are typically seen on mammography or are incidentally found at excisional biopsy but are not characteristically palpable on physical exam.
C. Incorrect. Classic mammographic features of a complex sclerosing lesion include a spiculated mass with a central lucency. This is often considered to represent entrapped fat.
D. Correct. Radial scars do have an association with tubular carcinoma, invasive ductal carcinoma, DCIS and atypical hyperplasia. Because of this relationship and to avoid sampling error at core needle biopsy, it is often felt that surgical excision is required to exclude any related malignancy.

References:

10. Regarding phyllodes tumor, which one of the following is TRUE?

A. Benign and malignant phyllodes tumors can be distinguished using ultrasonography.
B. Phyllodes tumors typically occur in women younger than age 40.
C. Up to 15% of malignant phyllodes tumors will have lymphatic metastasis.
D. Approximately 20% of all phyllodes tumors will recur locally after surgical excision.
RATIONALES:
A. Incorrect. Benign and malignant phyllodes tumors are indistinguishable on mammography and ultrasound. When small, there are also indistinguishable from fibroadenomas. If the mass is larger in size with an inhomogeneous echotexture and peripheral cystic spaces, the malignant variant may be suggested.
B. Incorrect. Phyllodes tumors typically occur 10-20 years later than fibroadenomas with an age of presentation between 40 and 50.
C. Incorrect. While less than 20% of malignant phyllodes tumors will metastasize, metastasis is classically via a hematogenous route to the lungs and bone.
D. Correct. There is a high recurrence rate, 20% or greater, with phyllodes tumors. The borderline and malignant types have the highest rate of recurrence. Recurrence is more likely if surgical margin is less than 2 cm.

References: