



Male Breast

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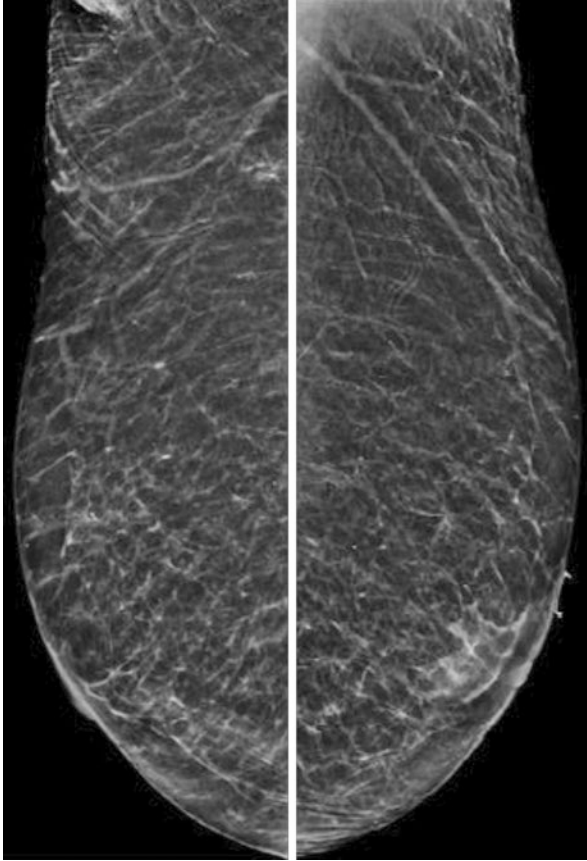
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Switzerland AG 2022
L. Chow, B. Li (eds.), *Absolute Breast Imaging Review*,
https://doi.org/10.1007/978-3-031-08274-0_8

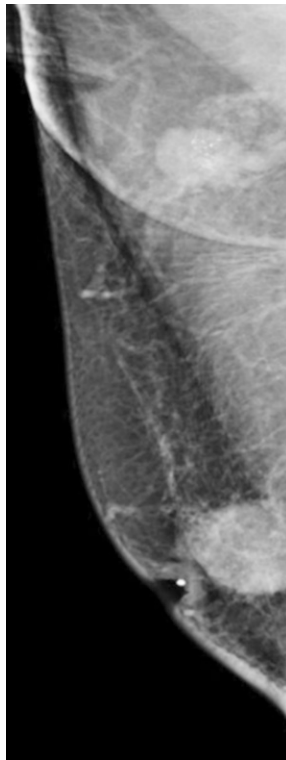
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- 1a. A 90-year-old male presented with 1 month of left breast periareolar pain and possible palpable mass. A marker was placed in the area of the palpable abnormality. What is the dominant abnormality?

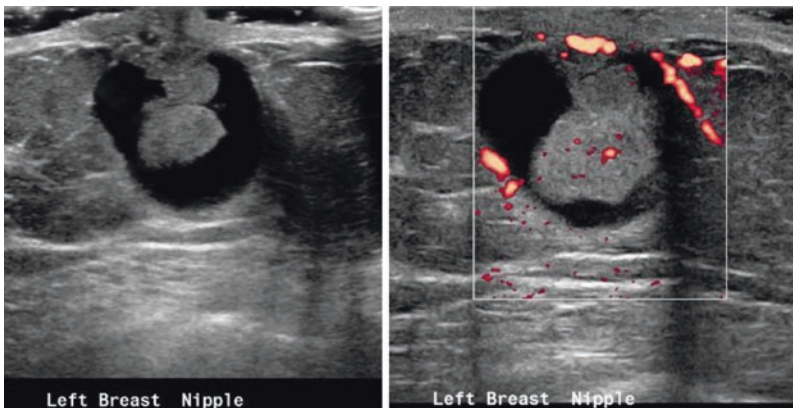


- (a) Bilateral calcifications.
 (b) Asymmetry in the left subareolar breast.
 (c) Asymmetry in the right subareolar breast.
 (d) Architectural distortion in the left breast.
 (e) No abnormality.
- 1b. What is the next step?
- (a) Ultrasound.
 (b) MRI.
 (c) Biopsy.
 (d) No additional workup.

- 1c. What is your assessment and recommendation?
- (a) BI-RADS 1—Negative.
 - (b) BI-RADS 2—Benign.
 - (c) BI-RADS 3—Probably Benign.
 - (d) BI-RADS 4—Suspicious.
2. Which of the following is not a cause of gynecomastia?
- (a) Testosterone.
 - (b) Marijuana.
 - (c) Cirrhosis.
 - (d) Renal Failure.
 - (e) Hypothyroidism.
3. Which of the following is not a pattern of gynecomastia?
- (a) Nodular.
 - (b) Interstitial.
 - (c) Dendritic.
 - (d) Diffuse Glandular.
- 4a. A 74-year-old male presented with firm, immobile right breast mass which has reportedly been enlarging for the past two years. What mammographic finding is most concerning for malignancy in this patient?

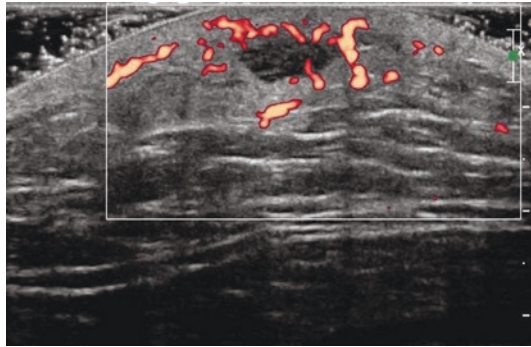


- (a) Subareolar mass.
 - (b) Lipoma.
 - (c) Nipple inversion.
 - (d) Gynecomastia.
 - (e) A and C.
- 4b. What is the next step?
- (a) Ultrasound.
 - (b) MRI.
 - (c) CT.
 - (d) PET.
5. Which of the following is not considered a risk factor for male breast cancer?
- (a) Gynecomastia.
 - (b) BRCA2 Mutation.
 - (c) Cirrhosis.
 - (d) Klinefelter syndrome.
 - (e) Crypto-orchidism.
6. A 67-year-old male presented with a left breast palpable abnormality. An ultrasound was performed. What is the next best step for this patient?

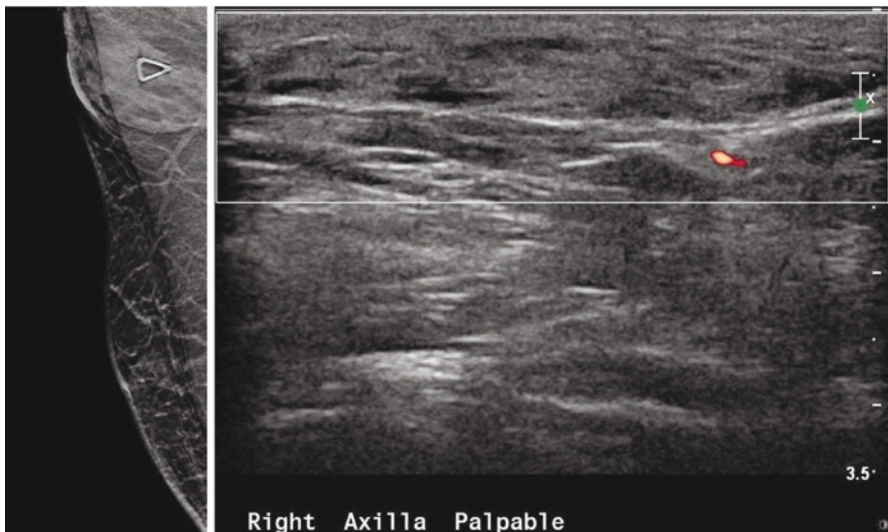


- (a) Short-term US follow-up.
- (b) Mammographic evaluation.
- (c) MRI.
- (d) Biopsy/Aspiration.

7. A 53-year-old male patient presented with low-grade fever. Targeted ultrasound evaluation of the chest wall was performed. What is the most likely etiology of the finding in the male breast?

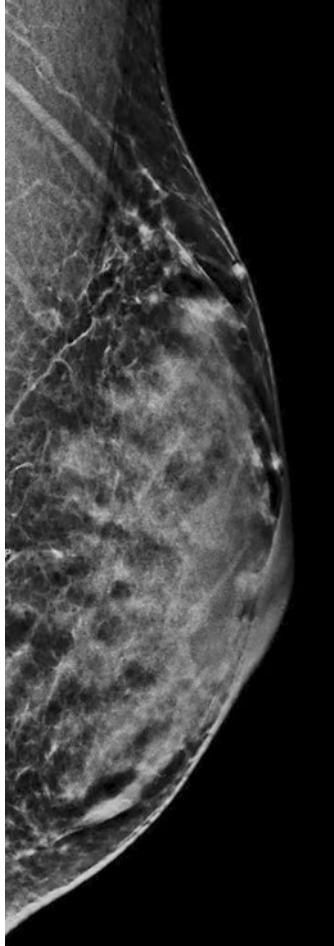


- (a) Infectious.
 (b) Neoplastic.
 (c) Endocrine.
 (d) Traumatic.
8. A 30-year-old male presented with a palpable abnormality in the right axilla. Mammogram and ultrasound were performed. What is the next step for the following mammographic and ultrasound findings corresponding to the palpable abnormality?



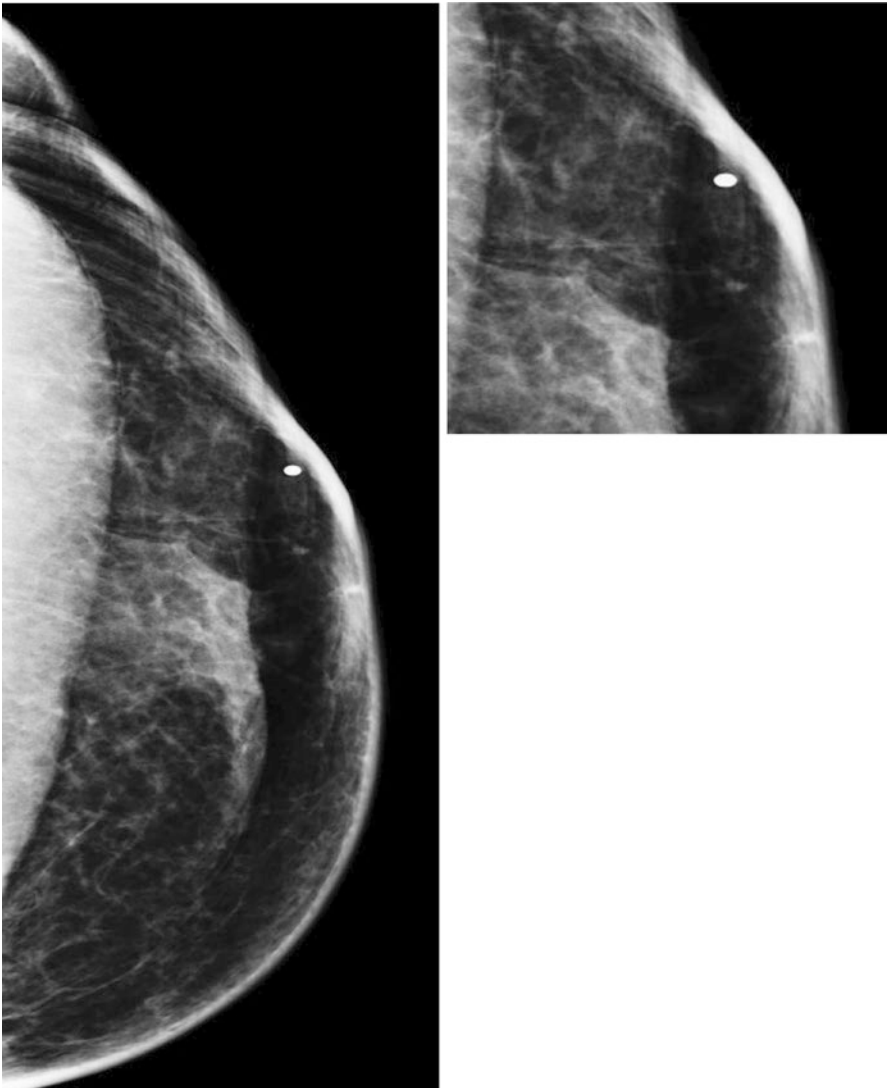
- (a) MRI.
 (b) Stereotactic biopsy.
 (c) US biopsy.
 (d) No further workup.

9. Mammographic images of a 50-year-old transfeminine patient (male-to-female) are provided below. Which of the following patients may be appropriate or are usually appropriate for screening mammography?



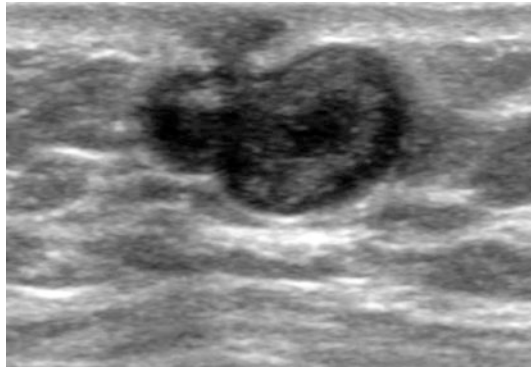
- (a) A 55-year-old transfeminine (male-to-female) patient with current hormone use of 7 years.
- (b) A 63-year-old transfeminine (male-to-female) patient with no current or past hormone.
- (c) A 37-year-old transmasculine (female-to-male) patient with history of bilateral mastectomies.
- (d) A 45-year-old transmasculine (female-to-male) patient with no history of chest surgery.
- (e) A and D.

10. A 55-year-old male presents with a palpable abnormality. A BB marker is placed in the area of the palpable abnormality. What is the BI-RADS for the palpable mammographic finding? CC views, with and without magnification are provided.

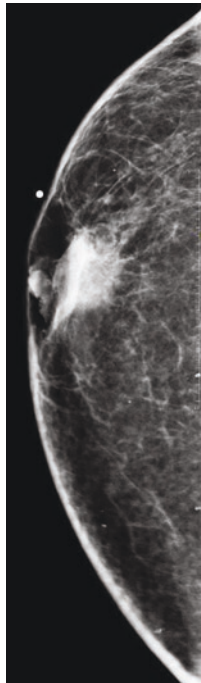


- (a) BI-RADS 1—Negative.
- (b) BI-RADS 2—Benign.
- (c) BI-RADS 3—Probably Benign.
- (d) BI-RADS 4—Suspicious.

11. A 45-year-old male presented with a painful, palpable abnormality in his right breast. What is the most appropriate management of the ultrasound lesion?



- (a) Image-guided biopsy.
 - (b) MRI.
 - (c) Clinical follow-up.
 - (d) Mammogram.
12. A 70-year-old male presented with a growing palpable abnormality in the peri-areolar region of his breast. An irregular mass was identified. A biopsy was performed and the pathology demonstrated an invasive ductal carcinoma. Which statement regarding male breast cancer is false?

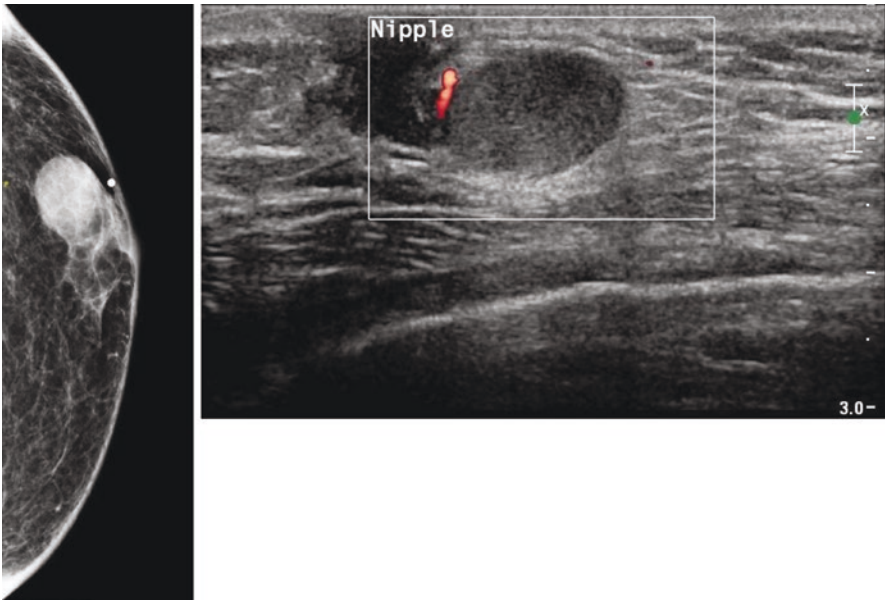


- (a) The most common histologic subtype is invasive ductal carcinoma (IDC).
- (b) The majority of male breast cancers are hormone positive.
- (c) The tumor grade correlates with overall survival.
- (d) The disease-free survival and overall survival at 10 years with breast cancer are less in males than that of stage-matched females.

13. What is the least likely origin of male breast cancer?

- (a) Lobular.
- (b) Ductal.
- (c) Mucinous.
- (d) Tubular.

14. Mammographic and sonographic views of a palpable growing mass in an elderly male presenting for diagnostic evaluation. What imaging feature is most *inconsistent* with a benign process in the male breast?

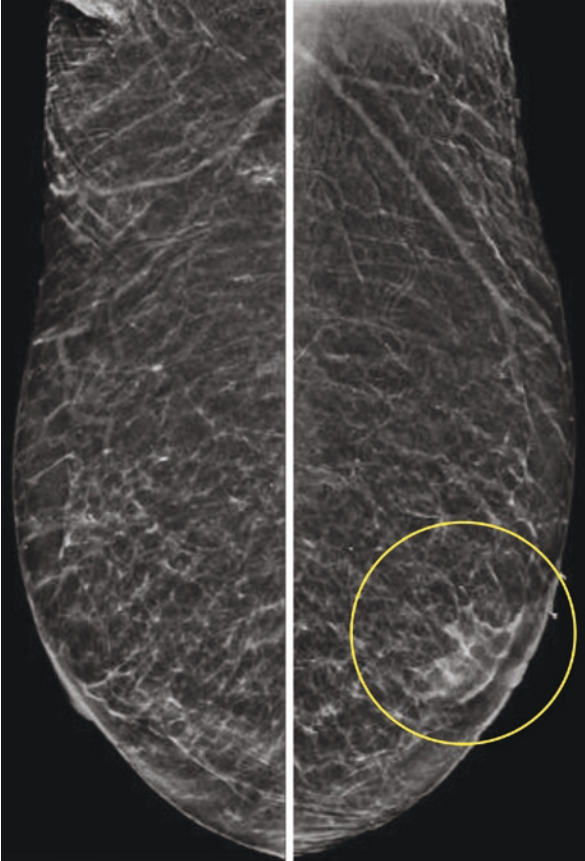


- (a) Density/Echogenicity.
- (b) Size.
- (c) Eccentricity to nipple.
- (d) Circumscribed margins.

Answers

1a. b. Asymmetry in the left subareolar breast.

There is an asymmetry in the left subareolar breast seen on the MLO view.



1b. d. No additional workup.

No additional workup is needed. This finding represents gynecomastia. Gynecomastia in the majority of patients appears unilaterally and/or asymmetrically.

1c. b. BI-RADS 2—Benign.

Though the differential includes breast cancer, the clinical presentation and mammographic findings are benign. Gynecomastia is a common diagnosis with at least 30% of men being affected in their lifetime. Gynecomastia results from an imbalance between estrogen and androgen. The causes are multifactorial and include iatrogenic and other underlying pathologies. Though the diagnosis may lead to anxiety or discomfort, it is benign and does not require imaging workup or biopsy if a clinical diagnosis can be confidently made. However, if there is any concern for malignancy, the initial imaging exam should be mammography. If the diagnosis is made mammographically (majority of cases), no further imaging is warranted. Ultrasound is generally reserved if there are any suspicious findings or if the mammographic findings are indeterminate and should not be the first exam of choice for suspected gynecomastia. Gynecomastia has a pathognomonic appearance on mammography of increased subareolar glandular density, sometimes flame-shaped, and may be asymmetric and/or unilateral [1].

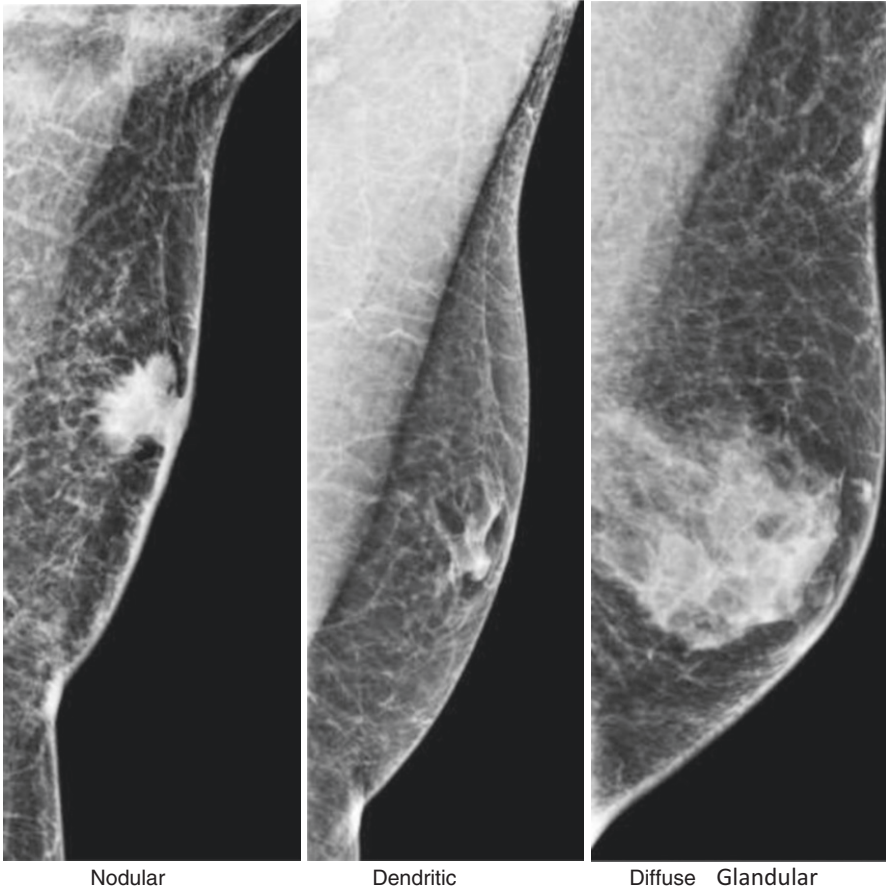
2. e. Hypothyroidism.

Increased testosterone exposure may lead to Leydig cell damage and inhibition resulting in elevation of estradiol. Marijuana has been shown to result in androgen receptor blockade. Cirrhosis may lead to increased androstenedione which is eventually converted to estradiol. Additionally, the liver is unable to clear adrenal androgens resulting in increased binding globulins and decreased free testosterone levels. Gynecomastia is seen in approximately 50% of dialysis patients which is thought to result from Leydig cell dysfunction as well as hormonal abnormalities, namely decreased testosterone and increased estradiol. Hyperthyroidism, not hypothyroidism, is associated with gynecomastia which is thought to result from direct stimulation of the enzyme aromatase and increased binding globulin resulting in increased concentration of estradiol and decreased free testosterone [2].

3. b. Interstitial.

There are three mammographic patterns of gynecomastia: nodular, dendritic, and diffuse glandular. Nodular pattern tends to be present in early stages of gynecomastia and manifests as a nodular subareolar density. Dendritic pattern appears in patients with gynecomastia for greater than 1 year and owes its

appearance to fibrosis. This often appears as a dendritic subareolar density with linear projections radiating into the surrounding tissue. Diffuse glandular is commonly seen in patients receiving estrogen supplementation and presents as enlargement and diffusely increased density of the breast tissue with both dendritic and nodular features [3].



4a. e. a and c.

This patient has several suspicious findings on mammogram including a spiculated, irregular subareolar mass and an axillary mass with amorphous calcifications. Nipple inversion in the setting of an adjacent breast mass is malignancy until proven otherwise.

4b. a. Ultrasound.

Additional evaluation of the masses is warranted and best accomplished with ultrasound. Though the patient is a male, the next diagnostic steps are the same as in female patients. Male breast cancer is an uncommon but not entirely rare

diagnosis and most commonly presents as a palpable lump [4]. Male breast cancers are most commonly invasive ductal carcinoma and present at a more advanced stage. Evaluation of the contralateral breast should also be performed given increased association of contralateral disease. Secondary features of malignancy are often common and may be evident on imaging including nipple retraction, skin thickening, skin ulceration, and axillary adenopathy.

5. a. Gynecomastia.

Gynecomastia does not inherently increase risk of male breast cancer. In fact, it is the most common benign entity of the male breast. BRCA2 gene mutation results in increased risk of breast cancer in males of approximately 50–80 per 10,000 men (relative to approximately 1 in 769 in the general male population) [5, 6]. Patients with Klinefelter syndrome have a 20-fold increased risk of breast cancer due to elevated estrogen-to-androgen ratio. Similarly, in crypto-orchidism and cirrhosis, relative hyperestrogenism predisposes to risk of breast cancer [2, 7].

6. d. Biopsy/Aspiration.

Cystic lesions in men commonly yield malignant pathologic findings. All cysts and complex masses in men should be considered potentially malignant. In particular, a mass with cystic components is suspicious for papillary ductal carcinoma in situ [8].

7. a. Infectious.

Ultrasound imaging demonstrates a heterogeneous fluid collection with marked increased peripheral vascularity, most consistent with abscess. There is also diffuse thickening of the overlying soft tissues and skin. Though rare, male breast abscess has been reported in numerous case reports. Cultures of aspirate often yield *S. aureus* and *S. epidermidis* as the dominant pathogens. Risk factors include malignancy, diabetes, smoking, vitamin A deficiency, and immunosuppression [9].

8. d. No further workup.

The palpable abnormality in the patient's right axilla corresponds to accessory fibroglandular tissue. This is best confirmed on ultrasound which demonstrates heterogeneous tissue consistent with intermixed fat and glandular tissues. Accessory breast tissue is not entirely uncommon in male patients with a reported incidence of 1–3%. Approximately 2/3 of these cases present along the "milk line," commonly just caudal to the inframammary fold. The second most common location is the axilla, representing approximately 20% of cases. This tissue is at risk for the same pathologies as orthotopic breast tissue, but the incidence of breast cancer in ectopic breast tissue is low (approximately 0.3%) [10, 11].

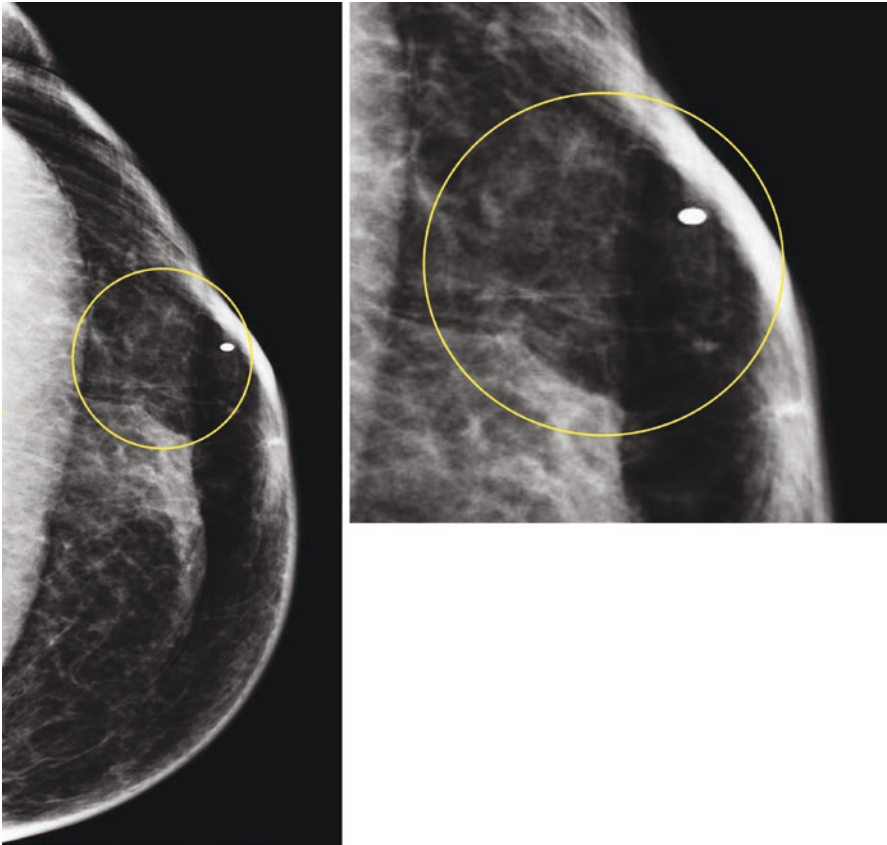
9. e. a and d.

For the above options, ACR appropriateness criteria for transgender breast cancer screening published in 2021 states the following:

- Mammography may be appropriate in transfeminine (male-to-female) patients over 40 years of age with at least 5 years of past or current hormone use.
- Mammography is usually not appropriate for transmasculine (female-to-male) patients with history of bilateral mastectomies.
- Mammography is usually appropriate for transmasculine (female-to-male) patients older than 40 years of age with no history of chest surgery [12].

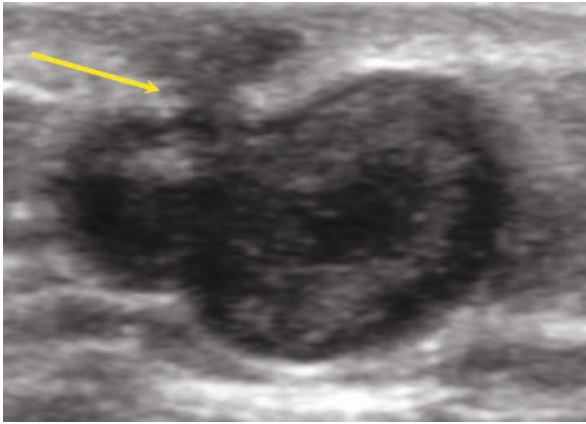
10. b. BI-RADS 2—Benign.

The mammographic finding corresponding to the palpable abnormality as indicated by the metallic marker demonstrates a circumscribed fat density mass. This is most consistent with a benign lipoma. Lipoma is the second most common benign lesion of the male breast.



11. c. Clinical follow-up.

The ultrasound lesion is most consistent with an epidermal inclusion cyst or sebaceous cyst, the third most common benign lesion of the male breast. Most frequently, epidermal inclusion cysts present as a hypoechoic oval mass contiguous with the epidermis. Supporting sonographic features include increased through transmission, sinus tract to the skin (arrow), and the so-called claw-sign demarking epidermal origin.



12. c. The tumor grade correlates with overall survival.

Tumor grade in male breast cancer has not been shown to correlate with survival as is the case in female breast cancer. The most common histologic subtype of male breast cancer is IDC, representing greater than 90% of cases. The majority of male breast cancer is hormone positive with greater than 90% estrogen receptor positive and greater than 80% progesterone receptor positive. Less than 0.5% of male breast cancers are triple negative. Stage-matched male breast cancers demonstrate a 10-year disease-free survival and overall survival of 40–52% and 32–71% respectively, as compared to 52–67% and 59–84% in women respectively [13].

13. a. Lobular.

The most common histologic subtype in the male breast is invasive ductal carcinoma not otherwise specified (NOS). Though mucinous and tubular breast cancers are exceedingly rare, lobular histology in male is even rarer. This is due to the inherent paucity of lobules in the male breast.

14. c. Eccentricity to Nipple.

The mammographic and sonographic images demonstrate a mass that is eccentric to the nipple. The most common benign entity in the male breast is gynecomastia, which is retroareolar in location. Any eccentricity of a mass to the nipple should be interpreted as inconsistent with a benign process.

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