Gynecomastia and Its Mimics: Not All Male Breast Lesions are Benign

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Authors: S. A. Choudhery, P. Gupta, S. Foshee, F. Garcia-Morales, G. Rice; Dallas, TX/US
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Learning objectives

1) Understand the basic anatomy of the male breast.
2) Recognize the various appearances of gynecomastia.
3) Learn the distinguishing imaging findings of benign vs malignant male breast disease.
4) Explore some common benign and malignant etiologies of male breast disease.

Background

With increasing utilization of imaging in clinical practice, male breast lesions are being incidentally diagnosed at a rapid pace. Additionally, with awareness of 1% of breast cancers occurring in males [1], more male patients are presenting for workup of breast pain, lump, or other symptoms. Hence, understanding the anatomy of the male breast and recognizing some common male benign and malignant etiologies are essential tools for a competent radiologist. It is also vital to understand that the diseases of the male breast can affect the skin and subcutaneous tissues, breast stroma, and neurovascular and lymphatic structures [2].

The adult male breast is unique and has a different composition than the female breast. The male breast, like the female breast, extends from the second through sixth rib with its medial and lateral margins defined by the sternum and midaxillary line respectively [2]. Male breast is composed mainly of fat with few ducts and stroma with lack of Cooper's ligaments and lobular tissue, differentiating it from the female breast [3]. Development of the breast tissues explains the gender differences. At birth, both breast tissues are identical. At puberty, males experience some increase in estrogen and a much higher increase in testosterone. Estrogen causes some proliferation of ducts and stroma in the male breast which is followed by involution of these due to the stronger effects of testosterone [3]. The outcome of these hormonal changes is an adult male breast composed of mainly fat with little ducts or stroma. Lobular development requires presence of significant amount of estrogen and progesterone, and hence, is not usually seen in the male breast [3]. With age, male breast tissue becomes more palpable.

Imaging appearance of the male breast is also unique in comparison to the female breast. Mammographically, a normal male breast is radiolucent with a prominent pectoralis muscles (Figure 1). Sonographically, the male breast appears isoechoic due to the fat lobules with an underlying pectoralis muscle (Figure 2) [4]. Being familiar with the
normal mammographic and sonographic appearance is vital to recognition of male breast pathology on imaging.

Images for this section:
**Fig. 1:** MLO and CC mammographic views of a normal male breast with radiolucent texture and a prominent pectoralis muscle (arrow).

![Mammogram Image](image1)

**Fig. 2:** Sonographic image of a normal male breast demonstrates fat lobules with an underlying pectoralis muscle.

![Sonogram Image](image2)
Findings and procedure details

Gynecomastia is the most common breast pathology encountered in males. There is ductal and stromal proliferation in gynecomastia. It is usually unilateral or asymmetric and may present as a palpable mass. It classically presents as a central density underneath the nipple. There are various etiologies of gynecomastia: physiologic (senescence and puberty), hormonal (Klinefelter’s syndrome), cirrhosis, drugs such as cimetidine and spironolactone, and idiopathic among others.

There are three major patterns of gynecomastia that are recognized including nodular, dendritic, and diffuse patterns. These three patterns are displayed in Figure 3. True gynecomastia must be distinguished from pseudogynecomastia which is fat deposition in the breast seen in overweight patients (see Figure 4).

Other benign breast lesions are rare in males, but it is vital to be aware of them. Fibroadenomas are extremely rare due to lack of lobules in the male breast. They may be seen in male breasts that are under estrogenic stimulation. Similar to their appearance in female breasts, fibroadenomas present as circumscribed masses on mammograms and classically hypoechoic on ultrasound (see Figure 5).

Various skin and subcutaneous breast lesions can also occur in the male breast. Breast lipomas present as fat density lesions on mammogram with an isoechoic to hyperechoic appearance usually on ultrasound (see Figure 6). Sebaceous cysts are also common breast subcutaneous lesions. They may present as oval or round high density lesions on mammograms. On ultrasound, they appear as hypoechoic, circumscribed masses which may have increased through transmission (see Figure 7). Potential complications include inflammation and cyst rupture. Breast hematomas may present in patients with coagulopathy or on anticoagulants. On mammograms, they are radiopaque masses that are circumscribed or irregular. On ultrasound, a hyperacute hematoma is hyperechoic but it becomes hypoechoic over time (see Figure 8). A key to diagnosis is an evolving appearance of the lesion with resolution often seen in 3-4 weeks.

Malignant lesions also occur in the male breasts. They present clinically as masses and/or bloody nipple discharges. Prognosis of male breast cancer is worse than female breast cancer. Some risk factors for male breast cancer include chest irradiation, liver disease, family history, BRCA mutation, and use of exogenous estrogen. Majority of the male breast cancers are of the invasive ductal type. It is essential to distinguish male breast cancer from gynecomastia or other benign male breast lesions. Some key features may help distinguish gynecomastia from male breast carcinoma. Firstly, gynecomastia is usually centrally located underneath the nipple whereas breast carcinoma may be eccentric to
the nipple. Additionally, there is no skin thickening or nipple retraction in gynecomastia but it may be seen in male breast cancer (see Figure 9). Male breast cancer can be recurrent as well (see Figure 10). Primary or disseminated lymphoma can also occur in the male breast (see Figure 11), and it is indistinguishable often from primary breast carcinoma.

Images for this section:

![Images](image1.png)

**Fig. 3:** Three different appearances of gynecomastia are demonstrated.
Fig. 4: MLO and CC views of the right breast in a male patient demonstrate pseudogynecomastia, fat deposition in the breast.
Fig. 5: An axial slice from a chest CT scan shows a soft tissue mass (arrow) incidentally in the left breast of a male patient. MLO and CC mammograms show mild dendritic gynecomastia and a lobular, circumscribed, isodense mass (arrows). Ultrasound shows an oval circumscribed lobulated, hypoechoic mass. This mass was a fibroadenoma.
Fig. 6: A mammogram from a male patient demonstrates a fat density lesion in the male breast. Corresponding CT confirms the fat density of this lesion and ultrasound shows an isoechoic to hyperechoic lesion, classic for a lipoma.
Fig. 7: Mediolateral oblique and craniocaudal mammograms show a dense, circumscribed mass in the upper outer quadrant (arrows) close to the skin. Ultrasound shows a superficial hypoechoic mass (arrow). This lesion was a sebaceous cyst.
**Fig. 8:** Mammograms show an irregular mass (arrows). Ultrasound shows an ill-defined, hyperechoic mass with central irregular hypoechoic Incidentally seen is mild gynecomastia on mammograms. This was a hematoma that resolved upon follow-up imaging.

**Fig. 9:** The first figure demonstrates skin thickening (arrowhead) as seen in a male patient with left breast cancer. The second figures shows skin thickening (arrowhead) and eccentric location of cancer in a male patient with right breast cancer (arrows).

**Fig. 10:** Images from a male patient with previously resected invasive ductal carcinoma. The mammograms show a posterior mass (arrow). Scar from the prior tumor resection is seen anteriorly (arrowhead). On ultrasound, the mass is irregular and hypervascular. On
CT chest, the mass is posterior and fixed to the chest wall (arrow). An enlarged internal mammary lymph node is also seen (arrowhead). The biopsy showed recurrent invasive ductal carcinoma.

![Images of mammograms and ultrasound](image)

**Fig. 11:** In a male patient, MLO and CC mammograms show a large, irregular mass (arrows). The first US image shows a hypoechoic mass. The second US image shows an abnormal appearing lymph node with thickened cortex and loss of fatty hilum. Biopsy revealed lymphoma.
Conclusion

Male breast lesions are being diagnosed increasingly with increasing awareness of male breast cancer and increasing utilization of thoracic imaging. Although majority of the male breast lesions are benign with gynecomastia being the most commonly encountered entity, male breast cancer cannot be missed by a radiologist. In this presentation, we present a variety of benign and malignant male breast lesions and provide imaging clues to assist in management.

Personal information

References


