## Radiological Appearances of Male Breast Disease

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Learning objectives

- To review the development and anatomical characteristics of normal male breast with radiological correlation

- To describe mammographic and US findings of common and uncommon lesions of the male breast.

- To highlight the imaging features that may be useful in differentiating gynecomastia from carcinoma

Background

Breast diseases in men have been historically less studied than those in women and usually there are not standardized imaging protocols

Over the last years, there has been a rise in the number of men referred for breast imaging with complaints of palpable lump, breast enlargement, or pain, and radiologists need to be familiarized with normal and pathological imaging findings of male breast

Findings and procedure details

1. NORMAL MALE BREAST ANATOMY

At birth, male and female breasts are identical, rudimentary and totipotential glands, composed of fibrofatty tissue and ducts. In the peripubertal period testosterone levels increase in males, causing involution and atrophy of these ducts. As a result, healthy men typically have predominantly fatty breasts with few retroareolar ducts and stroma. Breast lobular development, a process stimulated by estrogen and progesterone, is rare in men, and Cooper ligaments are absent.
The preponderance of skin and fat elements accounts for the typical radiological appearance of the normal male breast. (Fig. 1 on page 13)

2. MALE BREAST DISEASES

Diseases in the male breast can affect any component of the normal breast anatomy. Therefore, breast conditions related to lobular proliferation are extremely rare while those related to ductal and stromal proliferation, may occur more frequently.

We review the clinical features, imaging and pathology of benign and malignant male breast processes diagnosed at our institution.

2.1 GYNECOMASTIA

Gynecomastia is the most common form of breast swelling seen in males. It is characterized by proliferation of duct epithelium accompanied by periductal stromal hiperplasia resulting in male breast enlargement. Ginecomastia usually presents as a palpable, soft, elastic, tender mass in the retroareolar area with a subjective burning sensation. It may appear as a unilateral, bilateral symmetric, or bilateral asymmetric process.

This benign condition is believed to result from a physiologic imbalance between androgen and estrogen levels. As such, this condition has a predominantly three peaks of age, correlating to times of higher levels of estrogen (neonatal period, puberty and men over the age of 60).

Although most of gynecomastias are idiopathic there are multiple secondary causes that include endocrine disorders (hypogonadism, Klinefelter syndrome, hyperthiroidism...) systemic diseases (cirrosis, renal failure...), neoplasms (testicular, adrenal, lung...) and exogenous estrogens or other pharmacological agents.

On histopathological examination, three types of gynecomastia have been described. They represent a different degree of ductal and stromal proliferation and correlate with radiological findings. (Fig. 2 on page 14)
The differential diagnosis of gynecomastia includes both pseudogynecomastia and other breast tumors, specially primary breast carcinoma. Accurate clinical and radiological examination can more effectively establish the correct diagnosis.

Pseudogynecomastia consists in excessive fat deposition in the male breast without glandular proliferation. Clinically and radiologically demonstrates only palpable subcutaneous fat tissue. (Fig. 3 on page 14)

Gynecomastia shows spontaneously regression in most patients and observation is an appropriate form of management. More aggressive therapy may be required in a subset of patients with persistent enlargement due to associated fibrosis.

2.2. PRIMARY BREAST CARCINOMA

Male breast cancer (MBC) is a rare disease and accounts for less than 1% of all cancers in men, but during the last decades it has been reported an increase in the incidence from 0.1% to 1% of all breast cancer diagnoses worldwide.

Incidence rates for MBC increase linearly and steadily with age, with the mean age at diagnosis being between 60 and 70 years.

The etiology of male breast cancer is unclear. Many described risk factors include advanced age, family history of breast or ovarian cancer, prior irradiation of the chest and alterations in the estrogen-to-androgen ratio in the body (exogenous estrogen for prostate cancer, hypogonadism, liver disease…). Gynecomastia has been reported to be coexistent in up to 40% of cases, although it is not a proven risk factor for the development of MBC.

MBC usually presents with a palpable firm mass, located in the retroareolar area. It is often a painless mass, fixed to deeper structures and eccentric to the nipple, in contrast to gynecomastia, which is more typically a soft painful and mobile mass, in a central location. Advanced stage-related tumor characteristics such as skin involvement/ulceration and palpable axillary lymph nodes are more common in men than in women.

Other clinical presentations include nipple retraction and bloody discharge from the nipple.

If suspicious symptoms are noticed, mammography and US are the imaging modalities of choice, and final diagnosis is made by biopsy.
Up to 85% of MBCs are invasive ductal carcinomas not otherwise specified (IDC-NOS). Other reported histologic subtypes include papillary, mucinous and lobular carcinomas. Data in MBC have reported a higher rate of hormone receptor positive carcinomas and lower rate of HER-2 positive tumors compared with female breast cancers.

2.2.1 INVASIVE DUCTAL CARCINOMA

Mammography

Mammography is the initial modality for imaging and allows differentiation between benign and malignant breast disease in male patients with a high sensitivity (92%) and specificity (90%)

Mammographically, IDC are typically high-density round, oval or irregular masses, subareolar in most of cases. Margins are spiculated or indistinct, and less frequently circumscribed or microlobulated. They can be distinguished from gynecomastia by appearing as a mass, commonly with secondary features such as nipple retraction, skin involvement and presence of enlarged axillary lymph nodes. A degree of asymmetry is usually present in gynecomastia, but in cases where subareolar MBC and gynaecomastia coexist, the eccentric position of the subareolar density is suggestive of malignancy. (Fig. 4 on page 15)

The presence of ductal carcinoma in situ (DCIS) is a rare finding. It is associated with invasive carcinomas in the majority of cases. Consequently, suspicious microcalcifications are less commonly seen in males than in females and they appear coarser and less linear than in female breast cancers. (Fig. 5 on page 16)

Ultrasound

Palpable masses that are occult or incompletely imaged at mammography as well as those with suspicious mammographic findings require targeted US. US may be also helpful to determine the relationship of the mass to the nipple and to evaluate deep lesions not visible at mammography, as we have seen before (Fig. 4 on page 15)

Typical sonographic features of invasive ductal carcinoma in men include a solid, hypoechoic, subareolar mass that is eccentric to the nipple. MBC usually appears as an irregular shaped mass, non parallel to the skin, with spiculated or microlobulated margins (Fig. 6 on page 17) but up to 20% are circumscribed lesions. (Fig. 7 on page 18)
) Malignant masses in the male breast may demonstrate both posterior shadowing and enhancement.

When evaluating a suspicious breast lesion, US of the axillary region should be routinely performed. Enlarged axillary lymph nodes occur in 50% of male patients with breast cancer.

### 2.2.2 Papillary Carcinoma

Following IDC, the second most common subtype of invasive cancer in men is papillary carcinoma, accounting for approximately 2% to 4% of breast cancers in men compared with up to 1% in women.

Microscopically papillary carcinoma demonstrates a neoplastic proliferation of cells with fibrovascular cores that lack myoepithelial cells. The majority of male papillary carcinomas are intracystic and noninvasive.

Tumours typically occur in the subareolar region and may present as an irregular, circumscribed, or spiculated mass at mammography without calcifications in most of cases. Presence of focal poorly defined borders suggest an invasive component.

At sonography, invasive or in situ papillary lesions are often associated with a cyst or dilated ducts and have the appearance of a complex mixed cystic and solid mass. The solid component typically presents as a solid nodule arising along a cyst wall (Fig. 8 on page 19).

Surgical excision is recommended, and the prognosis is better than IDC.

### 2.2.3 Mucinous Carcinoma

Mucinous or colloid carcinoma, is histopathologically characterized by the presence of clusters of neoplastic cells suspended in extensive extracellular mucin. Mucinous carcinoma predominantly affects older women than IDC and its occurrence in the male breast is extremely rare.

Histologically, mucinous carcinoma can be divided into pure mucinous carcinoma (PMC) and mixed mucinous carcinoma (MMC) depending on the mucinous content...
of the tumour. PMC tends to have less aggressive behavior compared to MMC and radiologically usually has a benign appearance.

It has been reported that MMC generally appears on mammography and US as an irregular mass with indistinct margins probably due to the infiltrative nature of the non-mucinous component. On the other hand, PMC show more frequently circumscribed or lobulated margins and is sonographically homogeneous, either hypoechoic or isoechoic relative to the subcutaneous fat layer (Fig. 9 on page 20).

2.3. BENIGN NEOPLASMS

2.3.1 LIPOMA

Lipoma is the most common benign tumor of the male breast, composed of mature fat cells. Clinically, lipomas manifest as soft, palpable, slow growing subcutaneous masses.

At mammography, a lipoma has a characteristic appearance of a well-encapsulated, radiolucent, fat-density lesion, that can be difficult to distinguish from the normal surrounding fatty background of the male breast.

US usually shows a parallel, isoechoic to slightly hyperechoic and circumscribed mass in a subcutaneous location. Internal vascular flow is usually not detectable on power Doppler imaging. (Fig. 10 on page 21)

If these imaging characteristics are not fully satisfied, core needle biopsy may be considered.

In the differential diagnosis for lipoma, another fat-containing lesion to consider is fat necrosis.

Fat necrosis is usually seen related to remote trauma or breast surgery, and may present as a tender mass. Mammography may reveal coarse and lucent-centered calcifications or can vary from a lucent nodule to an irregular spiculated mass. On ultrasound, oil cysts can appear as anechoic, hypoechoic, or hyperechoic masses, with internal fluid components (Fig. 11 on page 22).
2.3.2 PAPILLARY LESIONS

Histologically, benign papillary lesions are composed of one ductal epithelial cell layer and an underling myoepithelial cell layer supported by a vascular core. The ductal epithelium displays variable degrees of proliferation and atypia.

Breast papillomas in men usually manifest as nipple discharge or a palpable subareolar mass.

Most intraductal papillomas are solitary and are located in the central breast. Presence of multiple papillomatosis in male breast occurs very rarely. (Fig. 12 on page 23)

Papillomas may present on mammograms as discrete dense and circumscribed masses in the subareolar region of the breast. US is more sensitive for detection of papillomas, which typically present as well-defined eccentric subareolar hypoechoic masses that may be seen within an enlarged duct.

2.3.2 CYSTS

Breast cysts are fluid-filled round or ovoid masses derived from the terminal duct lobular unit.

In men breast cysts are generally solitary lesions, often associated with ginecomastia (Fig. 13 on page 24).

As in females, breast cysts can be simple, complicated, or complex. On ultrasound, simple cysts present as circumscribed anechoic structures with a thin wall and posterior acoustic shadow.

As benign cystic diseases are relatively rare in men, due to the lack of lobular units, a simple cyst in a man should be viewed with suspicion, and a complex cystic mass should prompt biopsy (Fig. 14 on page 25).

2.3.3. MYOFIBROBLASTOMA

Myofibroblastoma is an uncommon mesenchymal tumor derived from stromal fibroblasts.
It occurs with similar prevalence in both men and women, with a median age of presentation of 55 years.

Clinically, mammary myofibroblastoma tends to present as a unilateral, firm, mobile, painless mass that may demonstrate slow growth during several years or rapid growth in a few weeks.

Imaging features of myofibroblastoma are nonspecific. **Mammography** tends to demonstrate a well-circumscribed, round to oval, dense mass with variable size, but usually 1-4 cm. **Ultrasoundography** confirms the solid nature of the tumor, which appears as homogeneous or heterogeneously hypoechoic round to oval, well-delimited mass. Slight posterior enhancement may be present. (Fig. 15 on page 26)

Biopsy and pathologic analysis are necessary for a correct diagnosis.

Myofibroblastomas are surgically managed with wide local excision without local or metastatic detection reported to our knowledge.

### 2.4. BENIGN NON-NEOPLASTIC CONDITIONS

#### 2.4.1 DIABETIC MASTOPATHY

Diabetic mastopathy (DM) is a benign disease that has been described mainly in women with a history of long-standing type 1 diabetes mellitus. The pathogenesis remains unclear, but an autoimmune hypothesis has been postulated.

Histologic examination shows prominent lymphocytic ductitis and lobulitis with varying degrees of fibrosis.

Patients with DM typically present with firm, mobile breast masses, variable in size and usually bilateral, that may be irregular in contour and suspicious for malignancy.

**Mammographic findings** show the presence of a nonspecific discrete mass or regional asymmetry with no distortions or microcalcifications; findings that in men usually suggest gynecomastia.
DM may present on US as an irregular hypoechoic mass with marked acoustic shadowing, but usually findings are not as suspicious as in women, showing an hypoechoic solid mass without posterior acoustic shadow.

This diagnosis should be considered in men presenting with suspicious palpable breast masses and imaging findings suggestive of gynecomastia. (Fig. 16 on page 27) Core needle biopsy is required for diagnosis.

If typical histopathological features of DM are found, surgery should be avoided because the recurrence tendency of this disease and because there is no associated increased risk of malignancy.

**2.4.2 SUBAREOLAR ABSCESS**

A subareolar abscess is a localized infection secondary to ductal ectasia and chronic obstruction.

Common clinical features include pain, nipple swelling, and nipple discharge.

On mammography an abscess often appears as an ill-defined subareolar mass with or without calcifications, that can be difficult to distinguish from malignancy or gynecomastia. The presence of skin thickening and other inflammatory changes can be a helpful clue to the diagnosis. On US, it usually appears as an incompletely circumscribed mass with heterogeneous internal structure. Sonography can be particularly helpful in showing increased vascularity in the surrounding tissue, seen as increased color Doppler flow in the periphery of the lesion (Fig. 17 on page 28).

Correlation with clinical history is important to establish the correct diagnosis.

Percutaneous drainage of abscesses is often performed in an effort to improve the effectiveness of antibiotic therapy. However, recurrent abscesses are treated with surgical excision of the abscess and regional lactiferous ducts to prevent recurrence.

**2.4.3 EPIDERMAL CYSTS**

Epidermal cysts are common in men and represent the third most common benign lesions in the male breast.
Epidermal inclusion cysts and sebaceous cysts typically present as intradermal or partially dermal lesions or lesions in the subcutaneous tissue.

- **Sebaceous Cyst**

A sebaceous cyst is a benign intradermal lesion secondary to an obstructed sebaceous gland. Sebaceous cysts are typically smaller and less common than epidermal inclusion cysts. These two entities are often indistinguishable at imaging.

At **mammography**, they usually appear as circumscribed low-density masses. At **US**, they appear as round or oval, well-circumscribed masses, that arise in the dermis but they may expand to the subcutaneous fat. They range from cystic to more solid in appearance, depending on the internal contents. (Fig. 18 on page 29)

- **Epidermal inclusion cysts**

EIC typically arise from sites of previous skin trauma, or may be the result of obstructed hair follicles. They have been reported to occur after reduction mammoplasty in the dermis or ectopically, within breast parenchyma deep to the dermis, as a result of epidermal displacement during surgery. (Fig. 18 on page 29)

Histologically, an epidermal inclusion cyst is characterized by a cystic cavity filled with keratinous material and lined by squamous epithelium. If the cysts rupture, an inflammatory reaction starts, which may make it difficult to distinguish from malignancy at mammography or US.

They usually present as smooth palpable masses in a superficial location. The orifice of the gland may be seen as a blackhead over the mass and patients may report occasional whitish discharge from this opening.

On **mammography**, an epidermal inclusion cyst presents as a round or oval, circumscribed, dense mass. On tangential images, they are contiguous with the dermis.

**Sonographically**, it is a round or oval, circumscribed, hypoechoic mass, contiguous with the epidermis. Continuity with the epidermis can sometimes be seen as a tract may leading from the lesion toward the skin. They can have an onion skin appearance corresponding to the lamellated keratin with alternating concentric hyperechoic and hypoechoic rings.
2.4.4 AUGMENTED MALE BREASTS

In male-to-female transsexuals, hormonal therapy is generally used before breast augmentation surgery (body contours gradually becomes more feminine with estrogens and hormonal therapy produces modest breast enlargement), or may be a nonsurgical alternative for breast augmentation.

In addition, in some cultures subcutaneous injection of high viscosity fluids is offered to male-to-female transsexuals as a minor procedure to feminize breasts, buttocks or the face. (Fig. 19 on page 30)

2.5. OTHER MALIGNANT CONDITIONS

Men very rarely present with metastasis to the breast from nonbreast primary malignancies with the most common including melanoma, non-Hodgkin lymphoma, lung carcinoma, sarcoma, and carcinomas of the stomach, kidneys and prostate gland.

Typically, these secondary tumors occur in older patients.

Mammographic features of metastatic disease to the breast most commonly include multiple or bilateral round to well-circumscribed masses without calcification. Irregularly shaped masses with spiculated borders may also occur. (Fig. 20 on page 31) Metastases to the breast are often found in the subcutaneous fat, whereas primary breast cancers develop in the glandular tissues.

At ultrasound, metastatic breast masses have been described as circumscribed or ill-defined hypoechoic masses having occasionally posterior acoustic enhancement.

Therapies for these tumors vary, depending on the type and extent of the primary malignancy.

Breast Lymphoma may be primary or secondary, with secondary breast lymphoma related to non-Hodgkin B-cell type being more common than primary breast lymphoma

Men typically present with a painless, palpable abnormality.
Imaging techniques may suggest the disease, but they are not usually diagnostic because the appearance of breast lymphoma may be variable. Diagnosis is almost always made on a histopathologic basis.

On mammography, the majority of breast lymphomas appear as solitary or multiple circumscribed masses. Multiple dense intramammary and axillary lymph nodes may be seen. Whereas most cases of unilateral axillary lymphadenopathy are due to a benign process, bilateral adenopathy should raise suspicion for secondary breast lymphoma.

US typically shows a circumscribed or irregular, hypoechoic or heterogeneously hypoechoic mass with posterior acoustic enhancement (Fig. 20 on page 31) Other US features include a hyperechoic margin and hypervascularity on Doppler images

Images for this section:
Fig. 2

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Fig. 3

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Bilateral mediolateral oblique mammograms show enlarged and homogeneously radiolucent breasts, due to fat deposit. In contrast to gynecomastia, there is no proliferation of ducts or stromal tissues.
61 year-old man with alcoholic chronic liver disease, who presented with a painless palpable mass in his left breast. Physical breast examination demonstrated no suspected malignancy.

A. Mammography shows glandular opacity radiating from behind the left nipple into the fatty tissue, secondary to gynecomastia. There is also an eccentric mass with microlobulated and partially obscured margins only visible on mediolateral oblique view because of its deep location.

Breast biopsy was performed (Fig. 3) and demonstrated an IDC grade 2.

B. Ultrasound shows a subareolar and central hypoechoic tissue suggestive of gynecomastia (g). A hypoechoic irregular mass (m) with hyperechogenic halo and posterior acoustic shadow (Fig. 2) is also visible in deep layers of the union of outer quadrants. Note that the lesion is eccentric to the nipple.

Fig. 4

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**Mammographic and US findings**

57 year-old man with a palpable mass in upper outer quadrant of left breast, skin retraction and bloody nipple discharge.

**Fig. 1** Mammography showed an eccentric irregular mass, with spiculated margins. Skin retraction, pleomorphic and coarse microcalcifications and suspicious axillary lymph nodes were also associated.

Bilateral central retroareolar flame-shaped increase of density is also visible secondary to gynecomastia.

**Fig. 2** Breast US revealed a hypoechoic mass with hyperecogenic halo, indistinct margins and posterior shadow.

**Fig. 3** Axillary US showed a suspicious adenopathy with focal increased cortical thickness.

Breast biopsy and fine needle aspiration of axilla were performed. Breast IDC grade 2 was diagnosed with invasion of ipsilateral axillary lymph node.

This patient underwent mastectomy, which confirmed the diagnosis of IDC with DCIS associated, and lymphadenectomy, with only one lymph node affected by carcinoma.
**Fig. 6**

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Mammographic and US findings

68 year-old man with a palpable mass in upper outer quadrant of left breast.

Fig. 1 Mammography showed an eccentric round mass, with partially circumscribed margins. Bilateral central retroareolar flame-shaped increase of density is also visible secondary to gynecomastia.

Fig. 2 US demonstrated an ovoid solid mass, with high vascularity and circumscribed margins.

Biopsy was performed and breast IDC grade 2 was diagnosed. This patient underwent mastectomy and sentinel lymph node biopsy (negative result).

Fig. 7

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Papillary carcinoma

61 year-old man with palpable lump in his left breast.

Fig. 1 Mediolateral oblique mammogram showed a dense oval circumscribed subareolar mass.

Fig. 2 Sonogram showed a circumscribed complex cystic mass, containing intracystic solid component with colour Doppler arising along the cyst wall.

Papillary lesion was diagnosed by FNAC. Final pathological analysis after surgery demonstrated intracystic papillary carcinoma with DCIS.

68 year-old man, who presented with a palpable lump and bloody discharge from left nipple.

Fig. 3 Mammography showed a dense subareolar mass with focal poorly defined borders.

Fig. 4 Ultrasound demonstrated a complex mixed cystic and solid mass with lobulated margins and posterior enhancement.

Papillary invasive carcinoma was diagnosed by biopsy. This patient underwent mastectomy with sentinel node biopsy (negative result).

Fig. 8

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**Mucinous carcinoma**

87 year-old man with a palpable mass in right subareolar region.

**Fig. 1** Mammography showed a well defined round mass in subareolar region of the right breast with circumscribed margins.

**Fig. 2** US demonstrated an ovoid solid mass, homogeneously hypoechoic, with well-defined margins and posterior enhancement.

**Fig. 3** Suspicious lymph nodes were visible on axillary US with absence of the fatty hilum.

**Fig. 4 Biopsy** was performed and demonstrated clusters of neoplastic cells with enlarged nuclei floating within rich mucinous material. An invasive mucinous carcinoma grade 2 was diagnosed and axillary involvement was demonstrated by FNAC.

This patient refused surgery and is actually being treated with hormone therapy.

**Fig. 9**

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Lipoma

A. Right cranio-caudal and mediolateral oblique views show a well encapsulated radiolucent fat density lesion; typical mammographic characteristics of lipoma

B. Left cranio-caudal view demonstrates a circumscribed, radiolucent mass marked with a triangular marker, with a thin radiopaque capsule, difficult to distinguish from the normal surrounding fatty background

US at the palpable sites revealed in both cases subcutaneous, oval, parallel and circumscribed masses, slightly hyperechoic (A) or isoechoic (B) to surrounding subcutaneous fat. These are classic imaging appearances of lipomas

Fig. 10

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BENIGN NEOPLASMS

Lipoma  
Differential Diagnosis

77 year-old man with a palpable right breast lump.

Fig. 1 Bilateral mammography showed mild bilateral gynecomastia. No anomalies were detected underlying the radiopaque triangular marker. Imaging features suggested fat necrosis, but as there was no history of previous trauma biopsy was performed. Histologic examination confirmed fat necrosis.

Fig. 2 US at the palpable site revealed a hyperecogenic lesion, with an internal anechoic component and moderate skin thickening.

Fig. 11

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**Multiple papillomatosis**

49 year-old man, who presented with bloody discharge from his left nipple.

**Fig. 1 Mammography** demonstrated an asymmetrical density in outer upper quadrant of the left breast, with partially circumscribed nodular images associated.

**Fig. 2 US** showed dilated ducts in outer upper quadrant of the left breast with multiple small intraductal mixed cystic masses, with extension towards the nipple.

Papillary lesion was diagnosed by biopsy. Surgery was performed and the lesion was entirely removed. Pathological analysis revealed multiple papillomatosis with IDC foci.

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**Fig. 12**

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Benign Neoplasms

Simple cysts

A. This patient presented with abdominal pain and CT scan was performed. Thoracic axial CT images exhibit diffuse increased volume and density of both breasts corresponding to diffuse gynecomastia. A hypodense circumscribed nodule is also present in deep layers of the left breast.

B. Mammography showed a pattern similar to heterogeneously dense female breasts, corresponding to diffuse gynecomastia, with circumscribed and low density masses in outer upper quadrant of the left breast.

C. US demonstrated signs of bilateral gynecomastia (Fig. 1) containing anechoic circumscribed nodules with posterior enhancement (Figs. 2 and 3). These sonographic features are characteristic of simple cysts.

Fig. 13

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**Other cystic lesions**

77 year-old man with familiar history of breast cancer and a soft palpable lump in his left breast.

**Fig. 1** Mammography showed signs of bilateral gynecomastia. A focal asymmetry density is seen in the left breast containing multiple circumscribed nodules and tubular structures.

**Fig. 2** US confirmed bilateral gynecomastia and demonstrated multiple dilated ducts in left subareolar region, with extension to inner quadrants and presence of associated cystic lesions.

This lesion is characterized by the formation of cystically dilated ducts containing a homogeneous eosinophilic secretion that resembles thyroid colloid. It has been reported that DCIS and rarely invasive carcinoma can arise in this setting.

**“Benign cystic lesion with ductal ectasia”** was the result of FNAC and core biopsy. This patient underwent surgery and the entire lesion was removed. Final pathological diagnosis was **cystic hypersecretory hyperplasia with atypia.**

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Two patients who presented with palpable breast lumps. Mammograms showed fatty breasts with an oval dense mass with well defined margins.

Ultrasound images revealed heterogeneous and circumscribed solid masses with colour Doppler signal and posterior enhancement.

CT scan showed a solid and homogeneous circumscribed mass located in the right subareolar area.

MRI images showed an oval circumscribed mass, with low signal intensity on T1 weighted sequences (a) and heterogeneous signal on T2 sequences (b).

Subtle peripheral enhancement was also evident on T1 weighted post contrast sequences (c).

Myofibroblastoma was diagnosed by core biopsy and the entire lesion was removed.

A: Gross specimen: soft, well-delimited, lobulated mass
B: Histologically myofibroblastoma is characterized by the presence of bands of hyalinized collagen separating short fascicles of bland spindle cells.
Diabetic mastopathy

53 year-old man with long standing uncontrolled diabetes who presented with an irregular and firm palpable lump in his left breast.

Fig. 1 Bilateral mammography showed subareolar masses, more prominent and with increased density on the left breast.

Fig. 2 Ultrasound revealed bilateral ovoid hypoechocic masses without posterior acoustic shadow.

Although imaging findings may suggest bilateral nodular gynecomastia, clinical examination of the left breast was suspicious and core biopsy was performed. Histologic examination showed a combination of stromal fibrosis and lymphocytic infiltration that was diagnostic of diabetic mastopathy.

Fig. 16

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**Abscess**

60 year-old man who presented with a painful palpable mass in subareolar area of his left breast.

**Fig. 1** Bilateral mammography showed a dense subareolar mass with indistinct margins in left subareolar location.

**Fig. 2 Ultrasound** of the left retroareolar region showing a hypo- to anechoic lesion with irregular margins and posterior acoustic enhancement, corresponding to the palpable mass. Doppler image showing predominantly peripheral increased vascularity.

Inflammatory signs were not present on mammography or US and imaging findings were suspicious of malignancy. Core biopsy was performed and histologic examination demonstrated chronic inflammatory changes with reactive fibrosis.

Fig. 17

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BENIGN NON-NEOPLASTIC CONDITIONS

Epidermal cysts

- Sebaceous cysts
  - 40 year-old man with painful lump on his left breast
    - Bilateral mammography shows an irregular low-density superficial lesion in the outer upper quadrant of the left breast. Ultrasound demonstrates a lobulated circumscribed lesion that arises from the dermis and expands to the subcutaneous fat.
    - FNAC revealed an inflamed sebaceous cyst

- Epidermal inclusion cysts
  - Epidermal inclusion cyst in a 30 year old man with previous breast reduction to treat gynecomastia.
    - Mammogram shows a dense oval lesion with circumscribed margins marked with radiopaque triangular marker. US shows an hypoechocic mass with hyperechocic internal contents and posterior acoustic enhancement.
  - Subareolar epidermal inclusion cyst.
    - Mammogram showed an irregular lesion with skin thickening.
    - US revealed an oval circumscribed mass with the characteristic onion skin appearance corresponding to the lamellated keratin with alternating concentric hyperechocic and hypoechocic rings, and posterior acoustic enhancement.
    - In both cases FNAC demonstrated an epidermal inclusion cyst

Fig. 18

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**Augmented male breasts**

**Fig. 1** Bilateral mammography in a 40 year old male-to-female transsexual showed bilateral implants and extremely dense breasts with multiple round and lobulated masses as a result of silicone injections.

**Fig. 2** US demonstrated a dirty acoustic shadowing, consistent with the characteristic “snowstorm” pattern of free silicone.

**CT scan** images showed signs of gynecomastia (Fig. 3) and diffuse increased density of subcutaneous fat tissue in both breasts (Fig. 4) Similar findings were visible in the subcutaneous tissue of the buttocks (Fig. 5) as a result of free silicone injections in this location.

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**Fig. 19**

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**Fig. 20**

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Conclusion

Although male breast is not routinely imaged unless there is a particular clinical concern, it can be the site of a wide variety of benign and malignant lesions, which have to be known to ensure accurate diagnosis and treatment.

It is important to recognize benign and malignant radiological features in order to avoid unnecessary procedures

Personal information

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