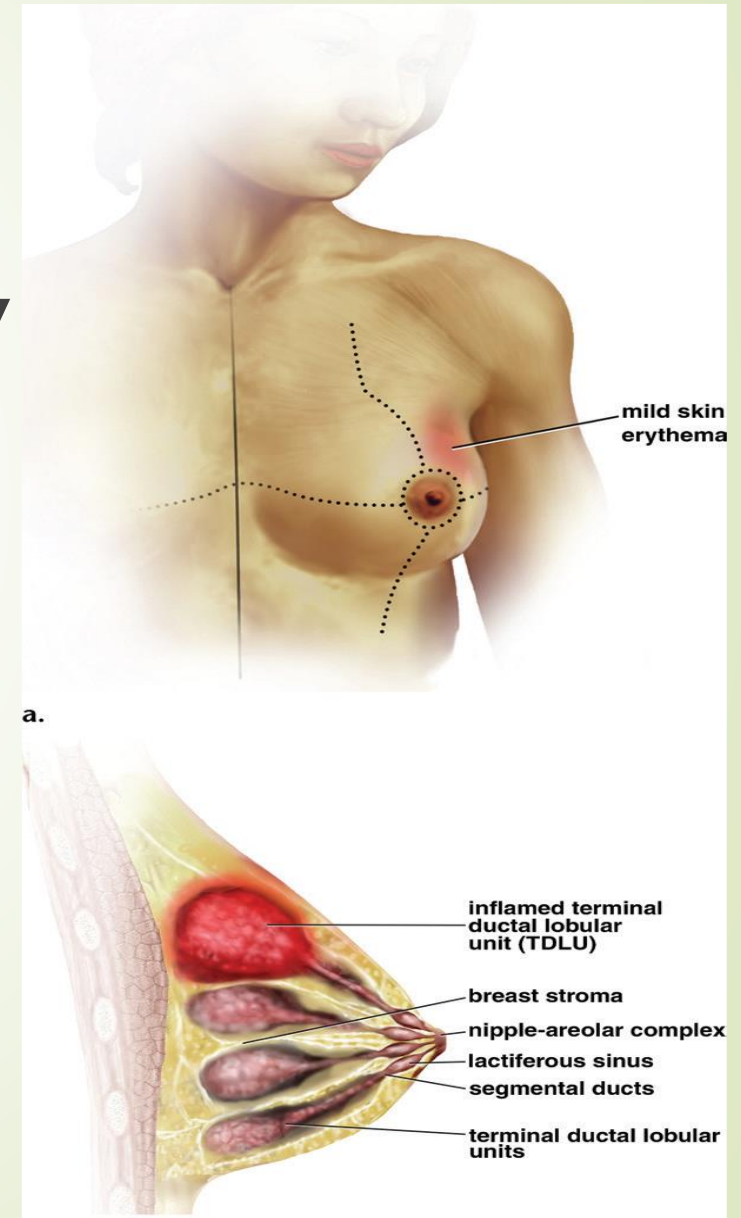




Idiopathic Granulomatous Mastitis


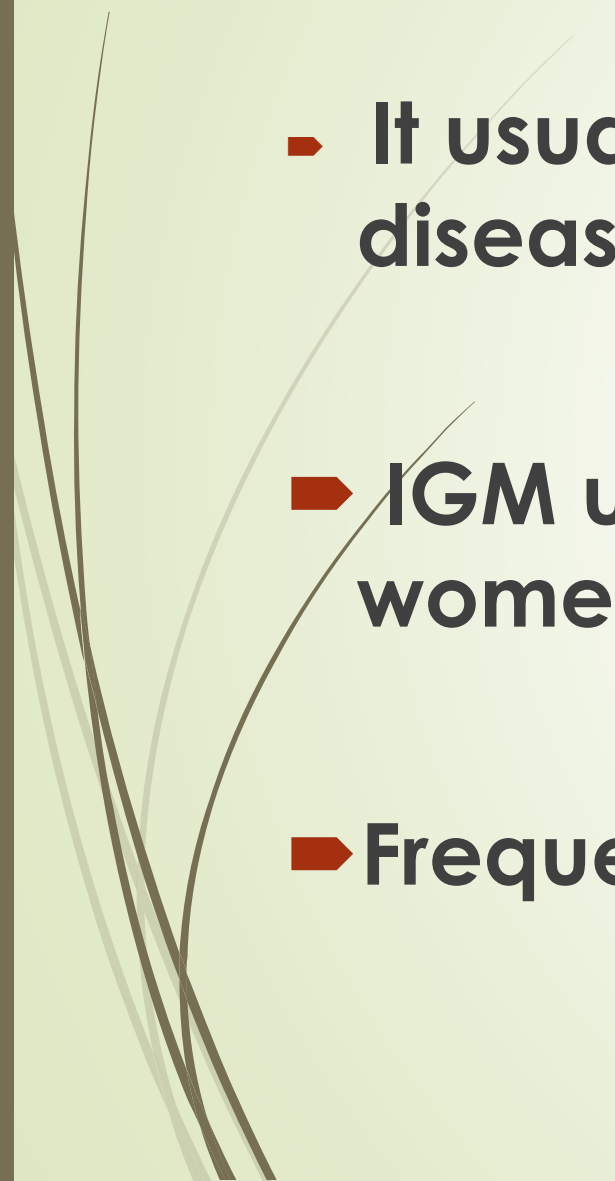
Dr.Shima Ghafourian

Radiologist, Assistant Professor of Iran University

Rasoul Akram Hospital



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- Idiopathic granulomatous mastitis (IGM), also known as nonpuerperal mastitis or granulomatous lobular mastitis
 - Rare benign chronic inflammatory breast disease
 - IGM is characterized by sterile noncaseating lobulocentric granulomatous inflammation

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- 
- It usually has a recurrent or prolonged natural disease course .
 - IGM usually affects parous premenopausal women with a history of lactation .
 - Frequently associated with hyperprolactinemia.



- 
- 
- **Overlap with those of breast cancer and several benign inflammatory breast conditions can often lead to misdiagnosis and delayed treatment.**



Pathophysiologic Features



- The most accepted theory is that an initial insult to the ductal epithelial cells in the breast causes a transition of luminal secretions to the lobular breast stroma.
- This transition causes a local inflammatory response in the connective tissue, with macrophage and lymphocyte migration to the region, and subsequently a local granulomatous response

Several precipitating factors:

- Pregnancy
- Lactation
- Hyperprolactinemia
- A1-antitrypsin deficiency
- Oral contraceptive use
- Trauma
- Diabetes
- Autoimmune disease
- Smoking
- Pregnancy, lactation, and hyperprolactinemia are the only factors with well-established associations with IGM.

- 
- 
- The majority of individuals with IGM are female, with a few reported cases in males.
 - In **males** , **gynecomastia** as a predisposing factor and trauma, smoking, and autoimmunity as exacerbating agents .
 - IGM is almost always seen in women of childbearing age.
 - Vary from late childhood to the late postmenopausal period .

- 
- 
- Strong association between IGM and history of **pregnancy and lactation**, with most patients reporting having a pregnancy within 5 years before the diagnosis
 - 2 months to 20 years after a pregnancy
 - **Nonlactating breast in a lactating female** is identified as an important risk factor for IGM development

- 
- 
- ➡ Rare cases in nulliparous and non reproductive patients
 - ➡ Increased levels of **prolactin**.
 - ➡ Bromocriptine as an optional conservative second-line therapy for patients with IGM




➤ IGM has been reported in nulliparous patients who:

- **Hyperprolactinemia** related to the use of antipsychotic agents, phenothiazine, or metoclopramide
- **Blunt trauma**
- **Pituitary neoplasms**

- 
- 
- **IGM is encountered worldwide in individuals of all races**
 - **As many of the reported cases have come from Asia, Turkey, Jordan, and Iran**

Clinical Manifestations

- The **most common** clinical manifestation: **tender palpable unilateral breast mass** of variable size (1–20 cm).
- Isolated skin induration: less common (in 20% of cases)
- Peau d'orange skin : in 40%
- Asymmetric breast heaviness or enlargement :in 20%
- Synchronous bilateral breast findings :in 1%
- **Also seen with inflammatory breast cancer (IBC).**







➤ **The nipple is seldom involved
(nipple retraction, ulceration, and secretions)**

➤ **Nipple secretions : in 12%**

➤ **Nipple-areola complex ulcerations :in 16%**

➤ **Axillary lymphadenopathy only occasionally
detected at physical exam : in 28%**



- 
- 
- IGM may manifest with **abscess formation**, with or without **draining skin sinuses**(6.6%–54.0%)
 - A cutaneous fistula can develop as a complication of prior percutaneous biopsy or aspiration

- 
- 
- Most IGM-associated abscesses are **sterile**, without bacterial growth at aspirate culture analysis
 - The presence of an abscess at clinical examination and/or imaging should not preclude tissue biopsy, as **IBC also can manifest with fluid collections**

Core-Needle Biopsy with or without Fine-Needle Aspiration

- US-guided FNA and CNB , with or without aspiration of fluid collections
- FNA may be helpful initially for distinguishing an inflammatory breast process from a malignancy, a definitive histopathology based diagnosis eventually should be rendered by using core-needle, vacuum-assisted, or excisional biopsy
- CNB has a well-established role in the diagnosis of IGM, with up to 94%–100% accuracy



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- It remains uncertain whether performing core-needle biopsy markedly exacerbates the inflammatory changes in quiescent or mildly symptomatic IGM

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- In the majority of patients: no indication for open-excision biopsy
 - It can lead to scarring, breast asymmetry or deformity, and nonhealing ulcers

- 
- The current strategy for imaging IGM includes the use of mammography and US

ACR Appropriateness Criteria for Initial evaluation of palpable breast abnormalities :


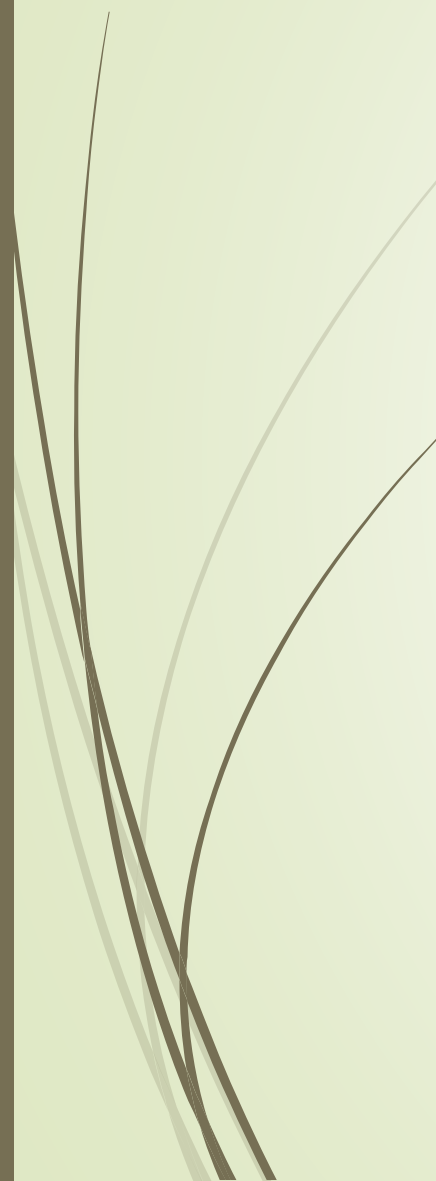
- US for patients younger than 30 years
- mammography for patients older than 40 years
- Discretionary initial evaluation of palpable breast abnormalities for patients aged 30–40 years

- 
- 
- **Targeted US with a high frequency linear probe is nearly always performed, as the patient often presents with a palpable area, focal pain, and/or focal skin changes**



The **limitations** of these imaging modalities:

- Largely related to pain, which limits the patient's tolerance to compression or pressure from the US transducer
- Edema, which limits evaluation of the breast parenchyma

- 
- 
- Mammography and US are often sufficient
 - MRI : **advanced, aggressive, or refractory disease**
 - MRI may be indicated when US and mammographic evaluation is limited by parenchymal or cutaneous edema and/or breast density, or for identifying a biopsy target



MRI may be useful for :

- **Evaluating possible residual disease after treatment**
 - **Monitoring disease in patients who are undergoing conservative treatment**
- 

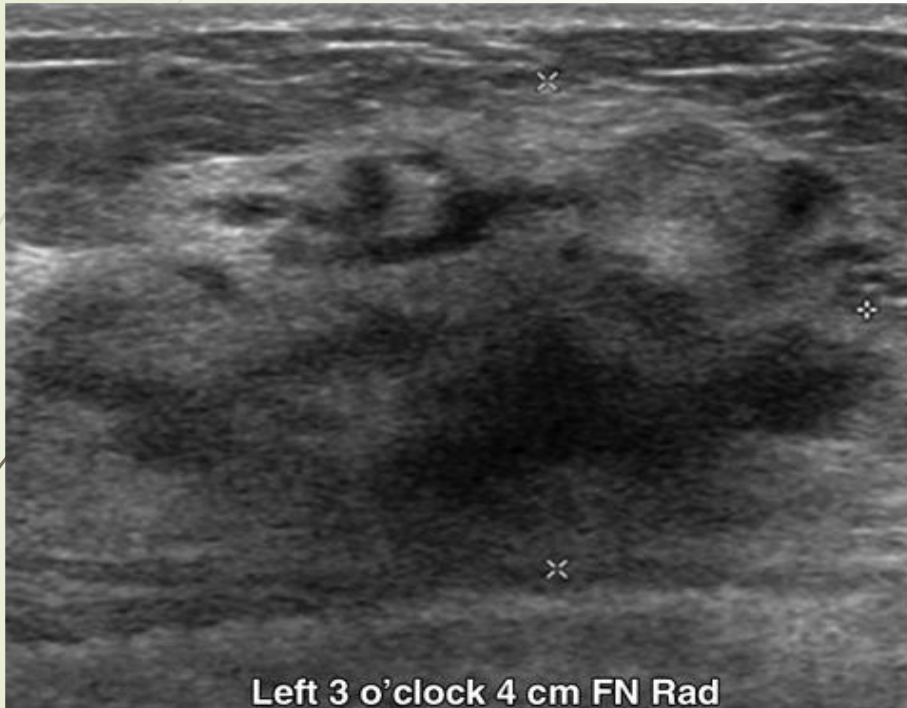
Mammography

- Focal or global asymmetry
- Irregular focal mass
- Normal findings
- Axillary adenopathy
- Skin thickening with edema or trabecular thickening
- Asymmetrically increased breast density
- Architectural distortion
- Circumscribed mass
- Calcifications Very rare

Sonography

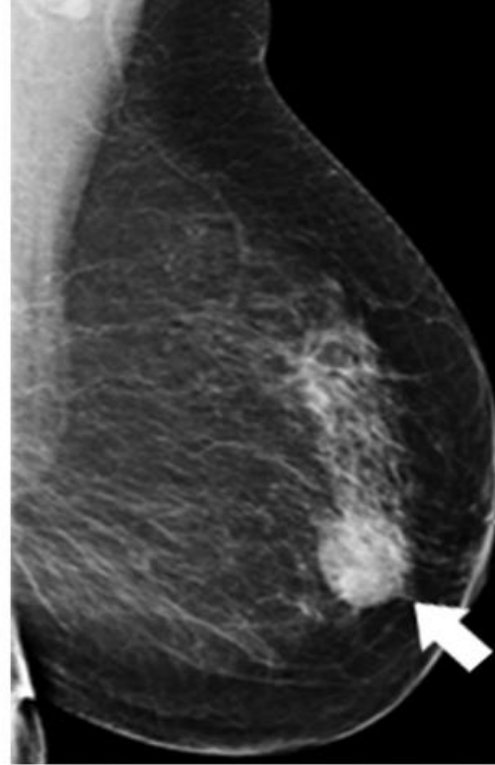
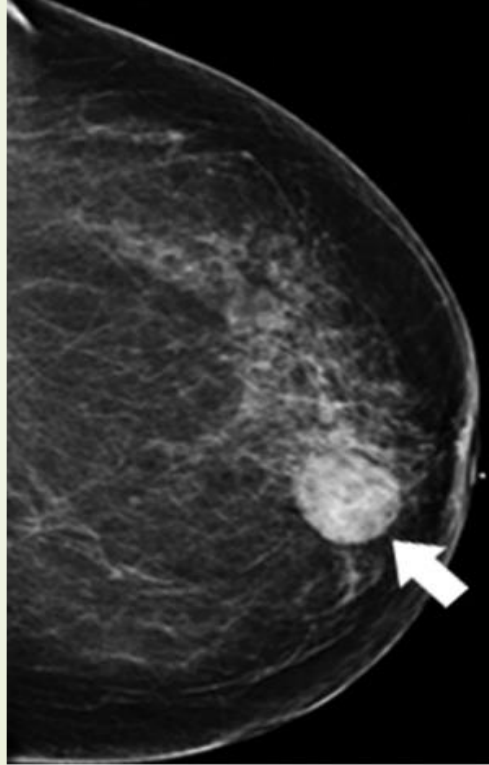
- Irregular hypoechoic mass with tubular extensions
- Axillary adenopathy
- Circumscribed hypoechoic mass
- Skin thickening and edema
- Abscess and/or sinus tract
- Heterogeneous hypoechoic mass (or confluent masses) with indistinct, lobulated, or angular margins
- Parenchymal distortion with or without acoustic shadowing , no discrete mass
- Normal findings
- Heterogeneous parenchyma or parenchymal edema

large **irregular hypoechoic lesion with tubular extensions**, which is the most common US finding of IGM. This was classified as a BI-RADS category 4 lesion.



palpable retroareolar left-breast lump

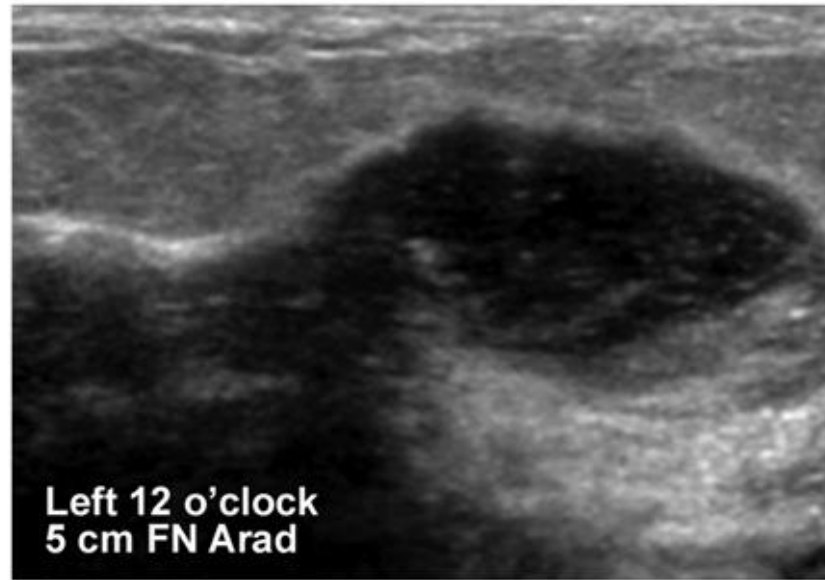
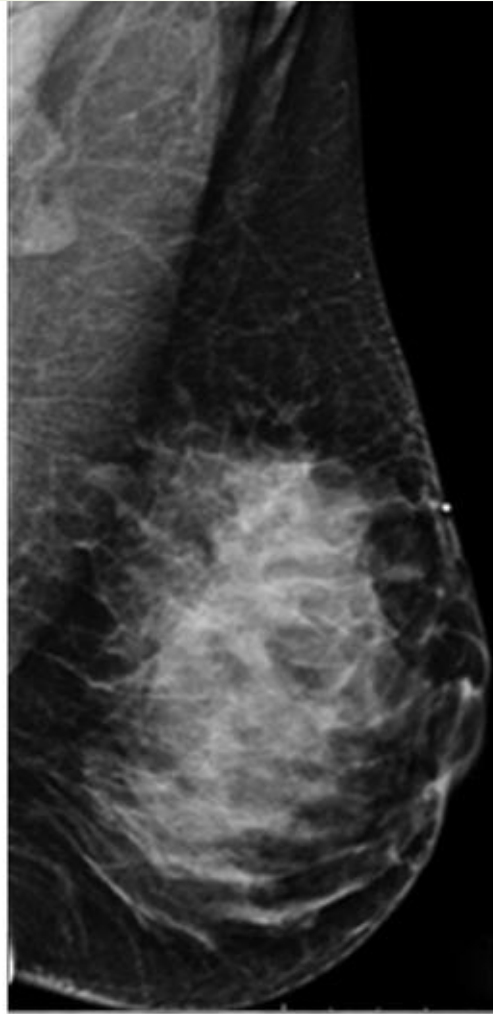
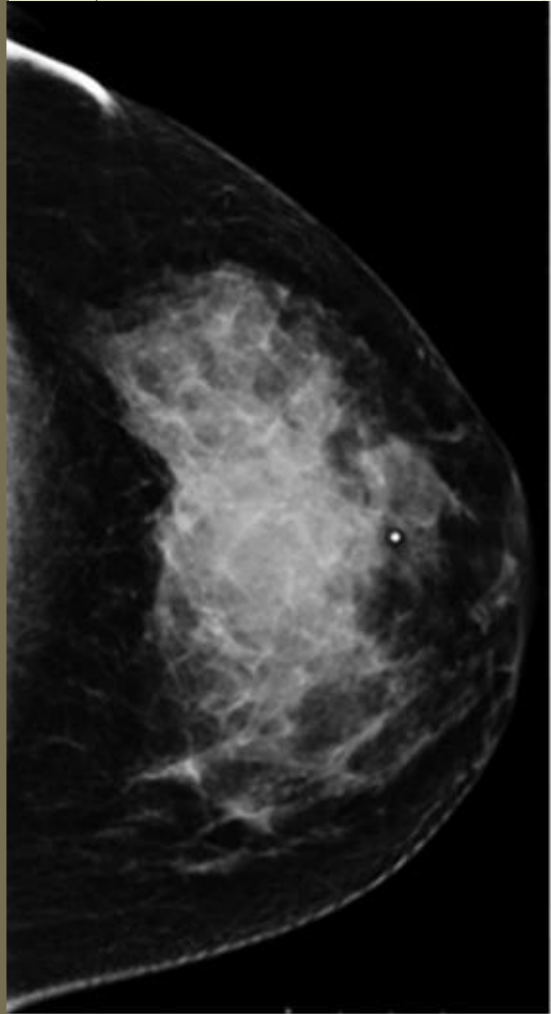
Targeted US shows a round, heterogeneously hypoechoic mass with indistinct margins and minimal ductal dilatation

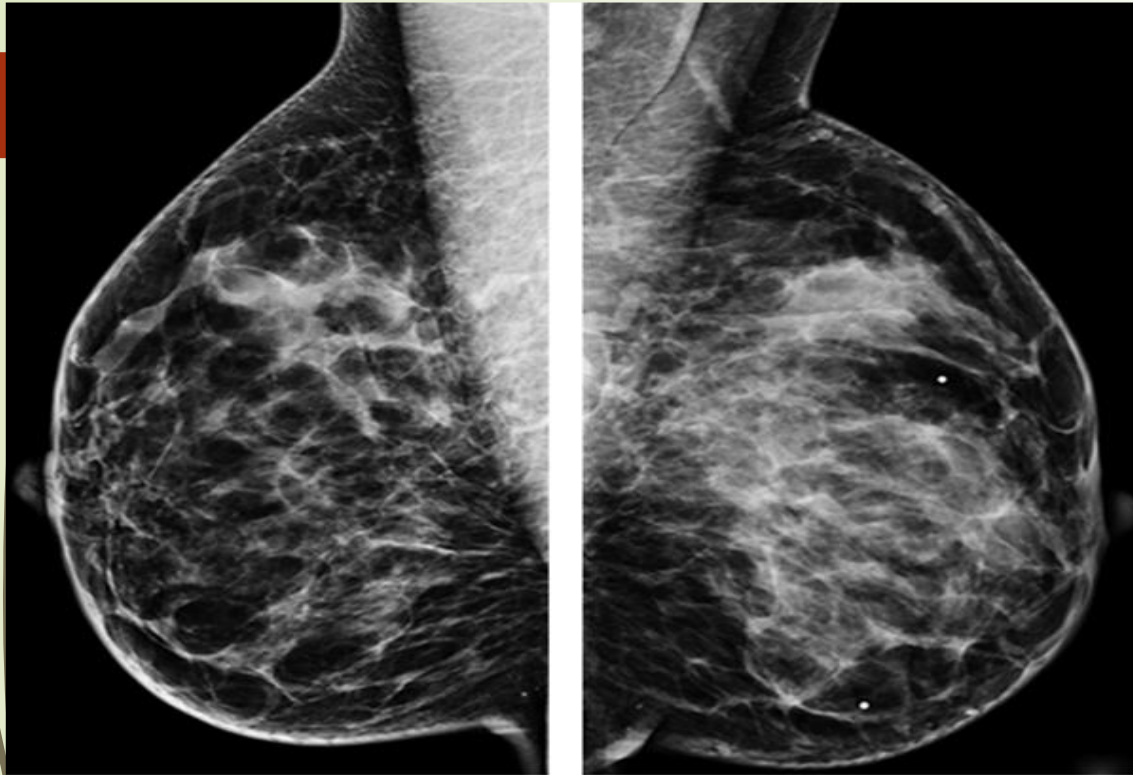


palpable left-breast mass with subjective growth during the past 3–4 months in a 30-year-old woman.

mammographic : **extremely dense left breast with no focal abnormality.**

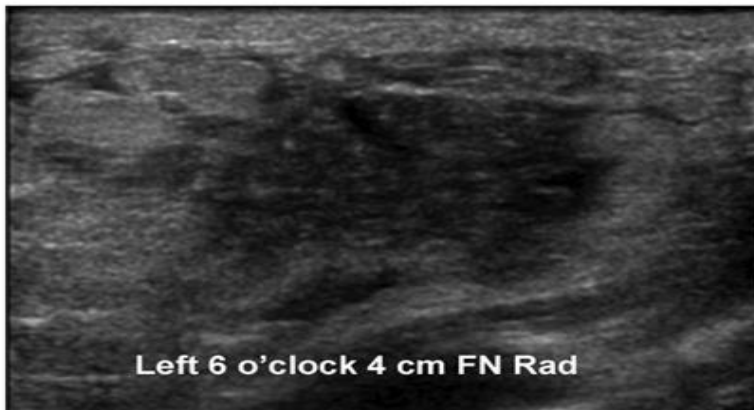
Targeted US image : **hypoechoic mass with indistinct margins.**





a.

b.



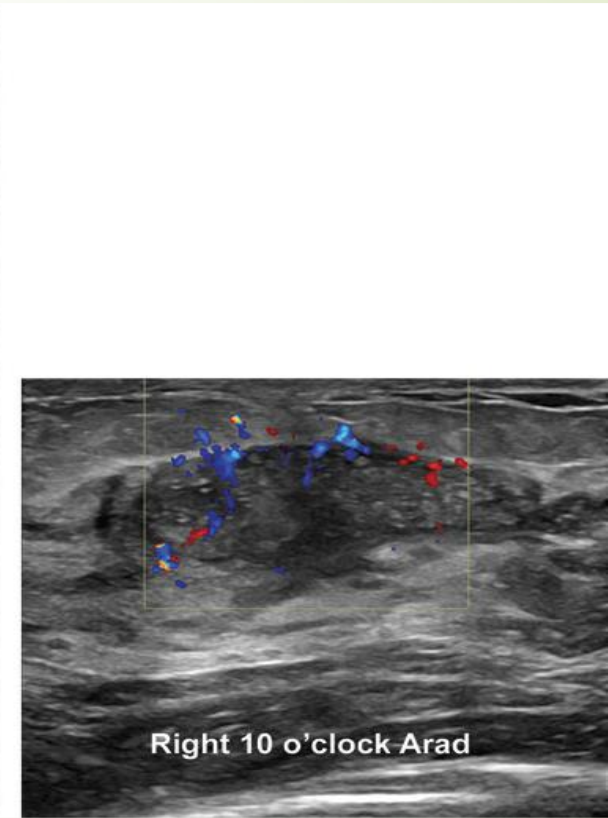
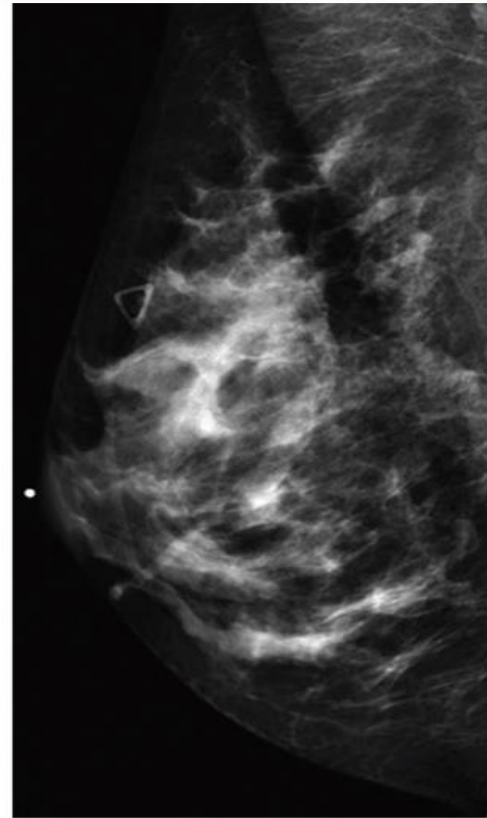
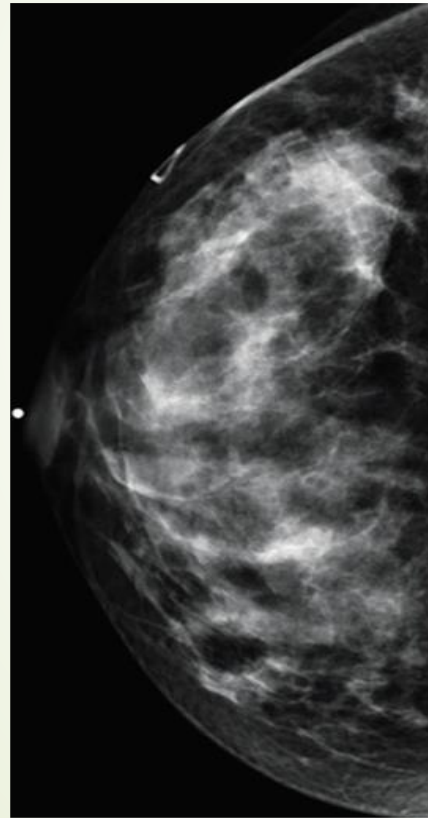
asymmetrically increased left breast density at mammography .

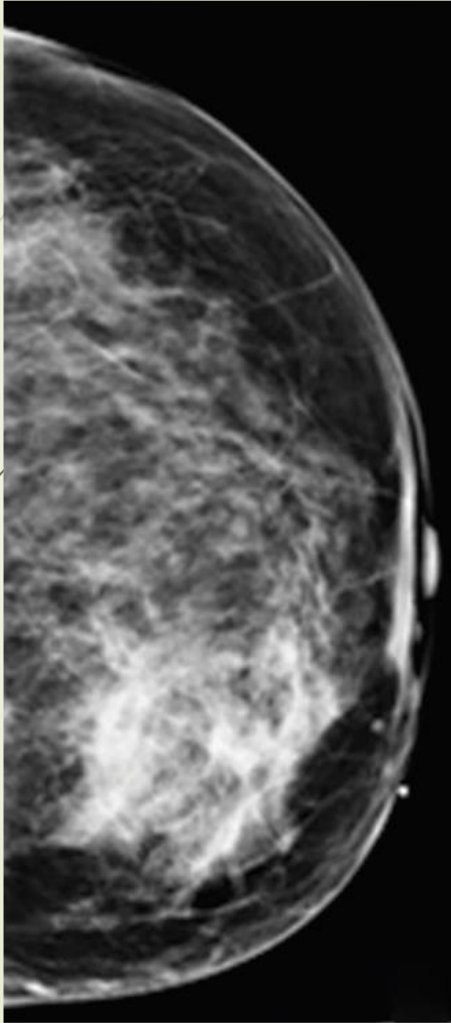
heterogeneously dense breasts, with **asymmetrically increased left breast density or global asymmetry**, more pronounced inferiorly.

Targeted US at the 4-o'clock to 6-o'clock position in the left breast shows a **hypoechoic appearance of the fibroglandular tissue**, without a discrete mass, cyst, or drainable fluid collection

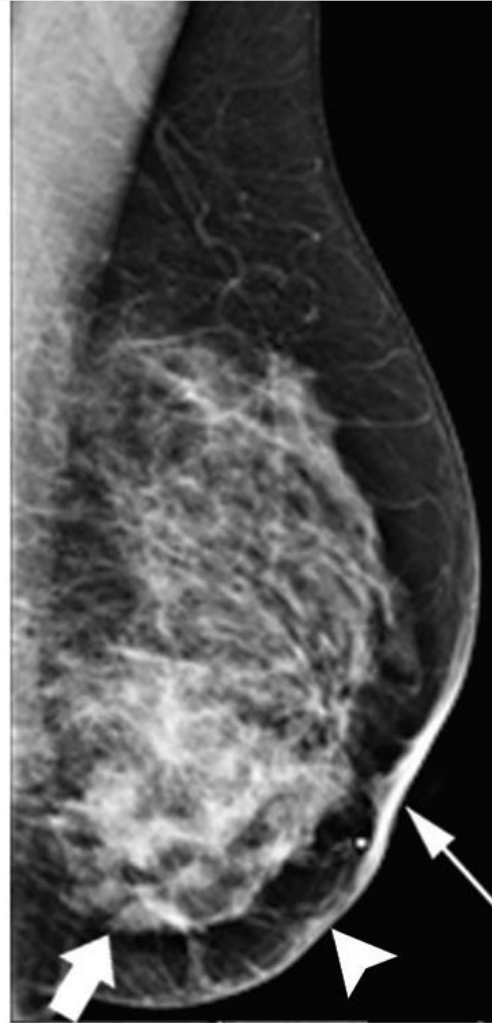
mammographic views of the right breast :**no substantial abnormality**

US image : **an oval parallel heterogeneously hypoechoic mass with indistinct margins and internal and rim vascularity** corresponding to the palpable area of concern





a.

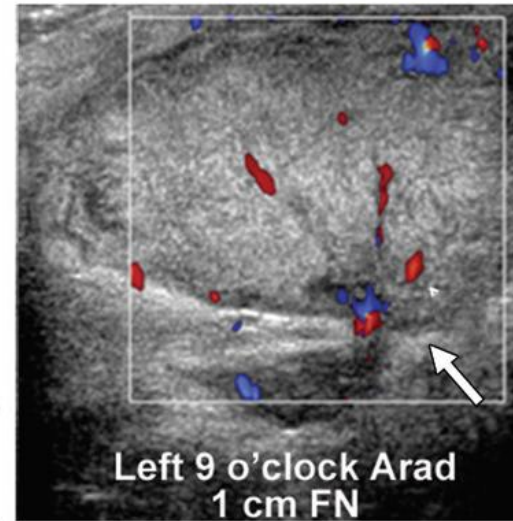


b.



Left 8 o'clock Rad

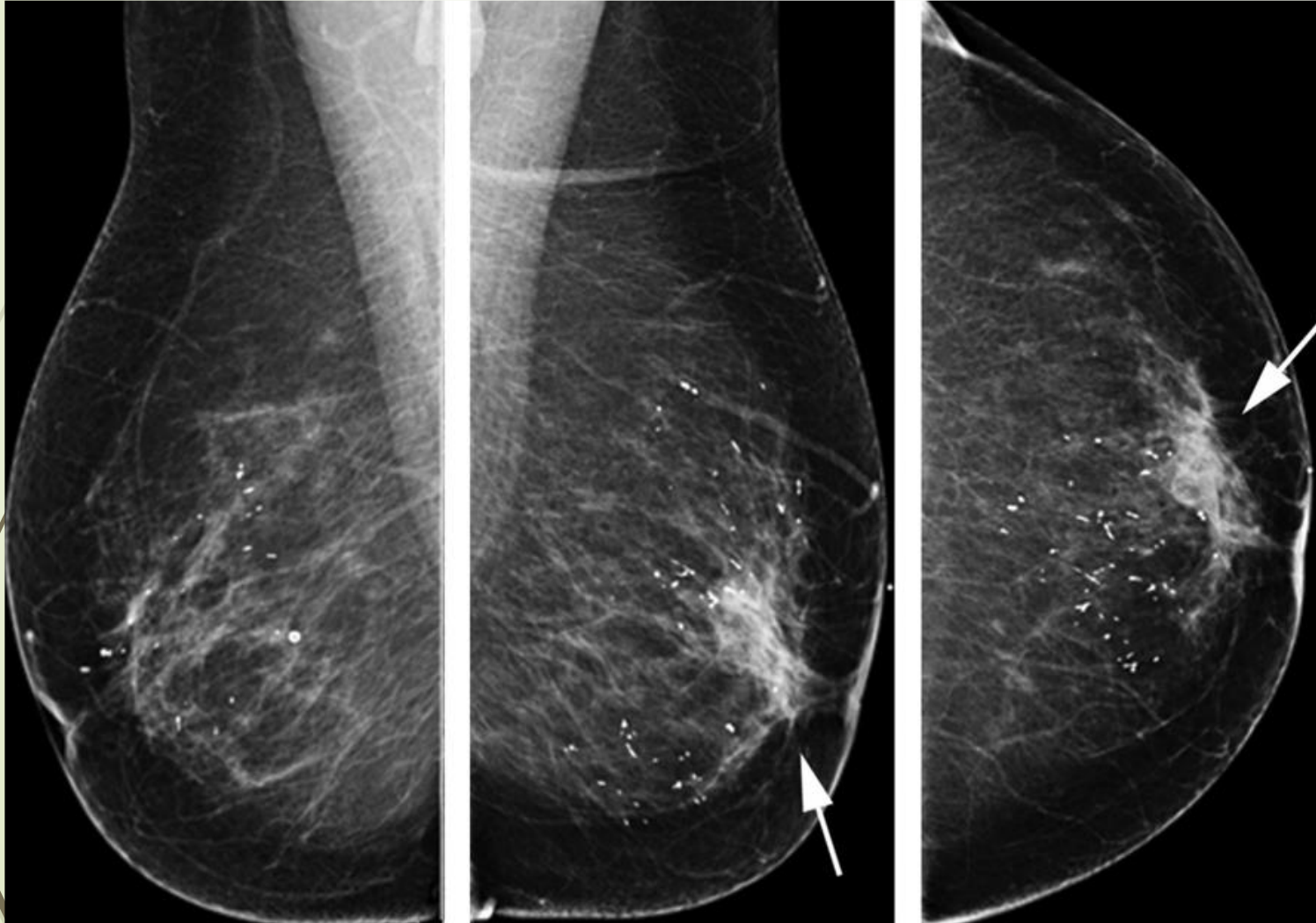
c.



Left 9 o'clock Arad
1 cm FN

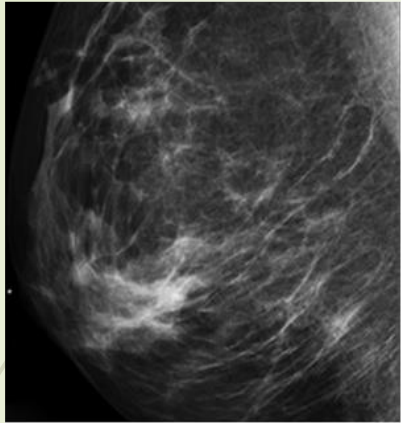
d.

IGM seen as an **irregular subareolar mass at mammography, with no correlative US finding**, in a 62-year-old woman with left-breast pain and a spontaneous yellowish nipple discharge of 2 weeks' duration. Right-breast MLO (a), left-breast MLO (b), and left-breast CC (c) mammographic views show an **equal-density irregular mass (arrow in b and c) with irregular margins in the subareolar region of the left breast**. The presence of invasive lobular carcinoma or invasive ductal carcinoma was considered, and a classification of BI-RADS category 4 lesion was recommended. Subsequent stereotactic vacuum-assisted biopsy revealed granulomatous mastitis, and the patient underwent conservative treatment.

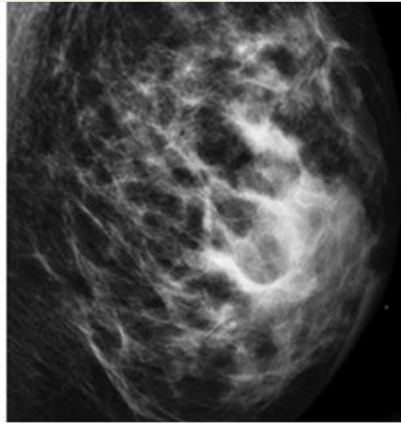


Multiparametric MR imaging

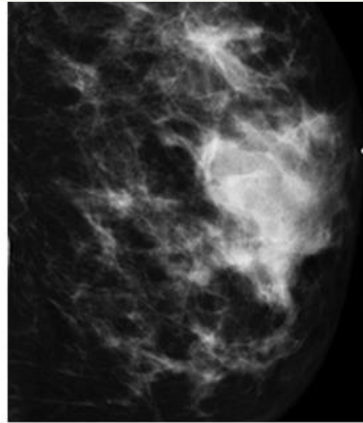
- T2 hyperintensity (edema) of breast stroma Majority
- Rim-enhancing lesions (microabscesses) or heterogeneously enhancing masses, with or without NME
- Segmental or regional NME
- Contrast enhancement with variable kinetic properties:
 - Type I
 - Type II
- T2-hypointense enhancing mass with irregular margins



a.



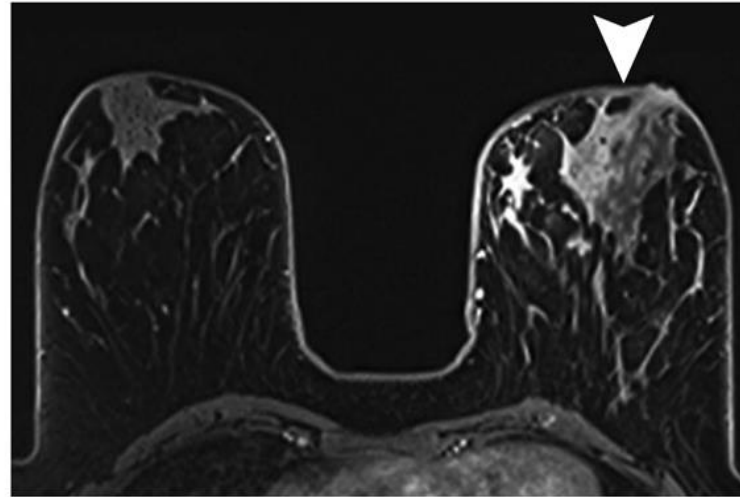
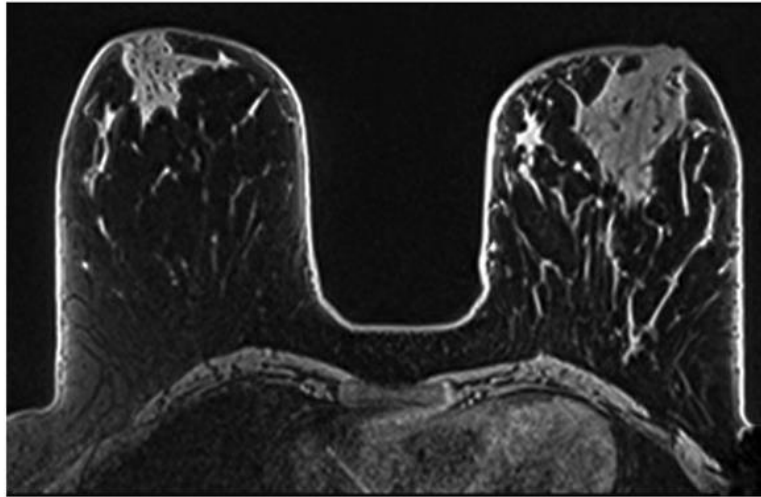
b.



c.



d.



Differential Diagnoses

- Inflammatory Breast Cancer
- Infective Mastitis
- Tuberculous mastitis
- Mammary duct ectasia
- Diabetic mastopathy
- Wegener granulomatosis
- Breast sarcoidosis
- Foreign body granulomas caused by silicone, paraffin, or PAAG injections



Inflammatory Breast Cancer

- Signs and symptoms that strongly suggest IBC include erythema occupying at least one-third of the breast, rapid onset of skin edema and/or peau d'orange, and/or a warm breast with or without an underlying palpable mass.
- The onset of signs and symptoms characteristically occurs within 6 months or less of the initial presentation .
- The presence of clinically palpable axillary lymph nodes and unilateral breast enlargement increases suspicion, as these are common initial clinical manifestations of IBC and are seldom seen with IGM.



Inflammatory Breast Cancer

- Mainly affects older women (average age, **58** years, as compared with **33** years for IGM)
 - Higher prevalence in African American
- 


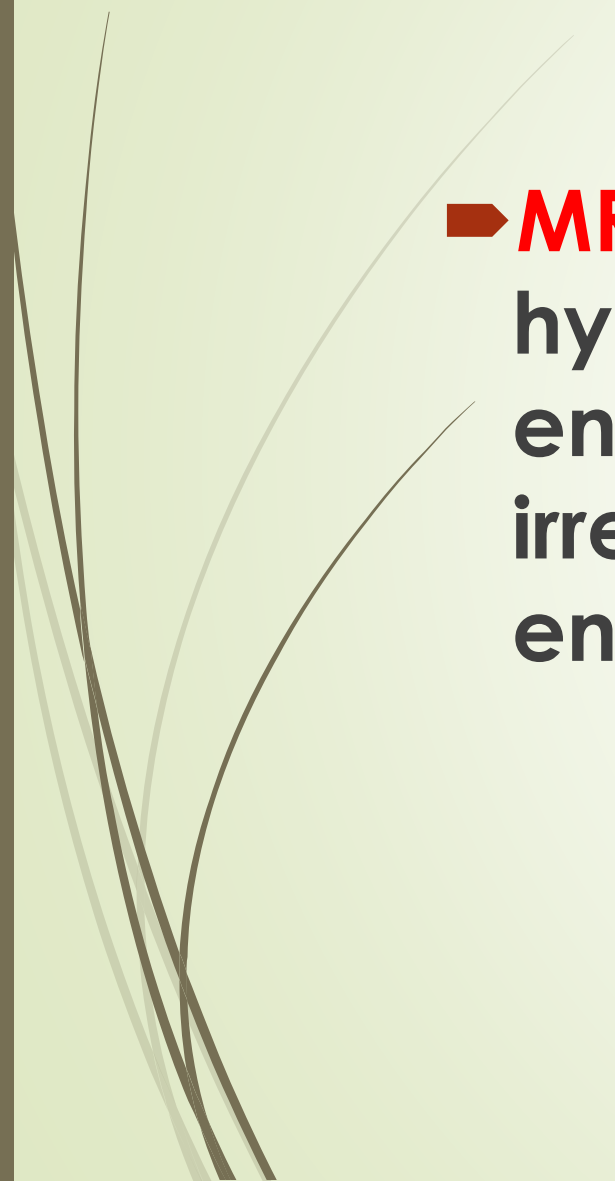


Clinical Manifestations

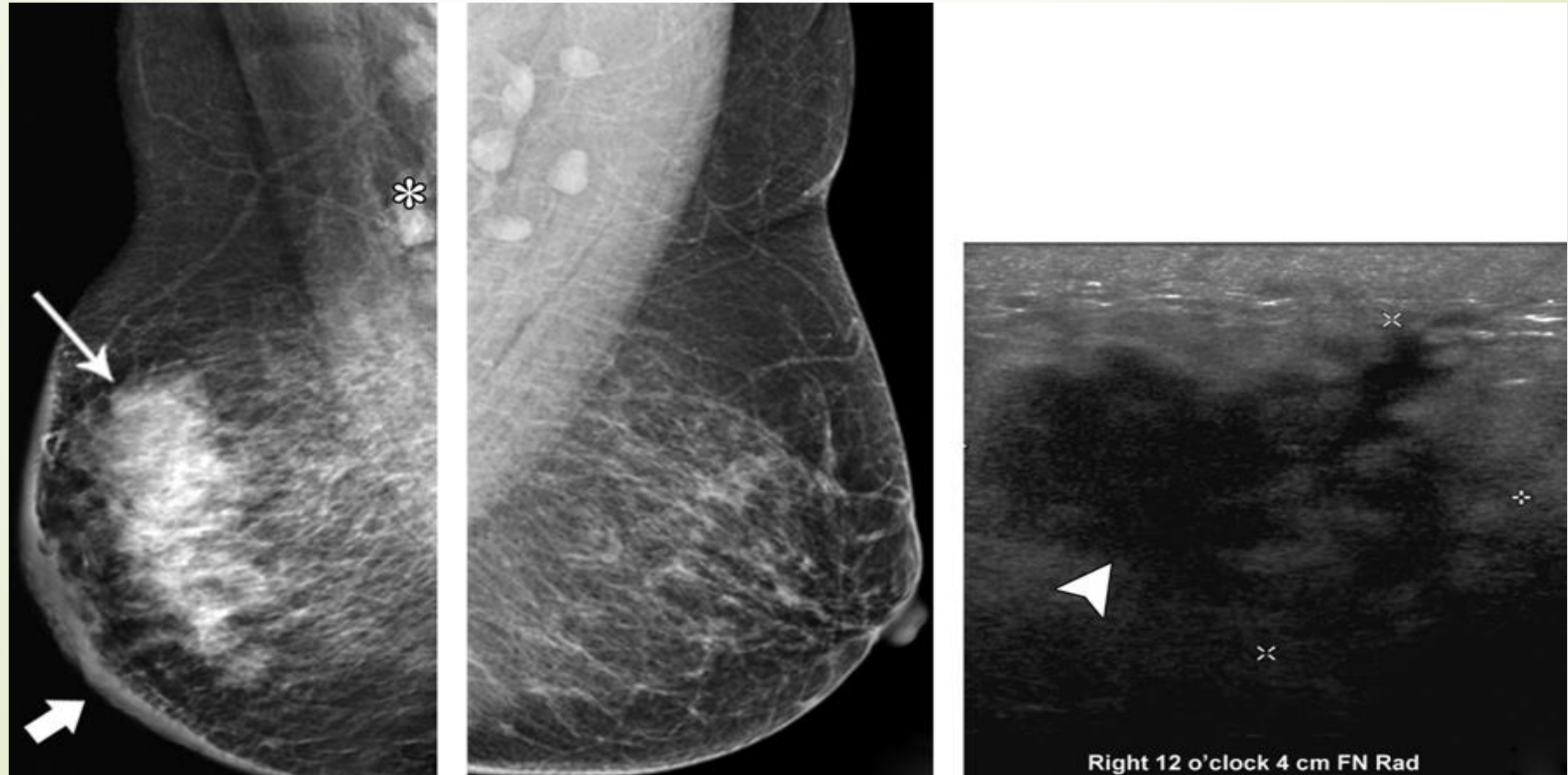
- Skin erythema in at least one-third of the breast
- Peau d'orange
- Asymmetric breast engorgement
- Onset to manifestation of symptoms, less than 3 months
- Axillary adenopathy in approximately 50%– 85% of cases

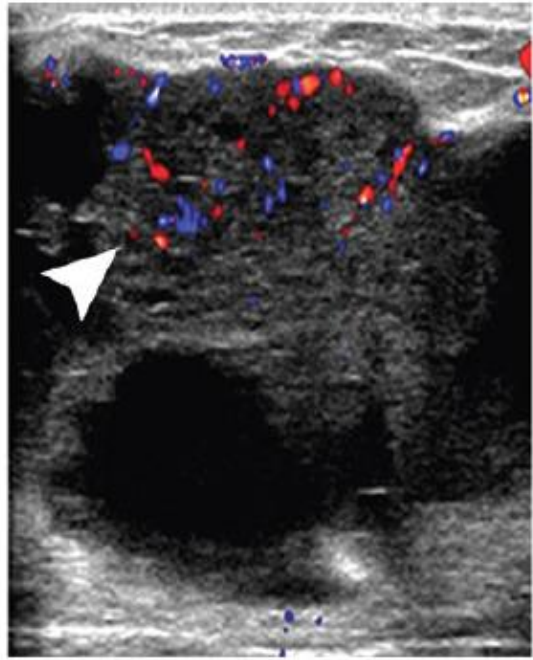
Imaging findings

- ➡ **Mammography**: skin and trabecular thickening, asymmetric increased breast density with or without focal asymmetry, irregularly shaped mass, axillary adenopathy
- ➡ **US**: extensive skin thickening and breast edema, dilated lymphatics , axillary adenopathy, heterogeneous parenchyma with or without suspicious or conglomerate masses

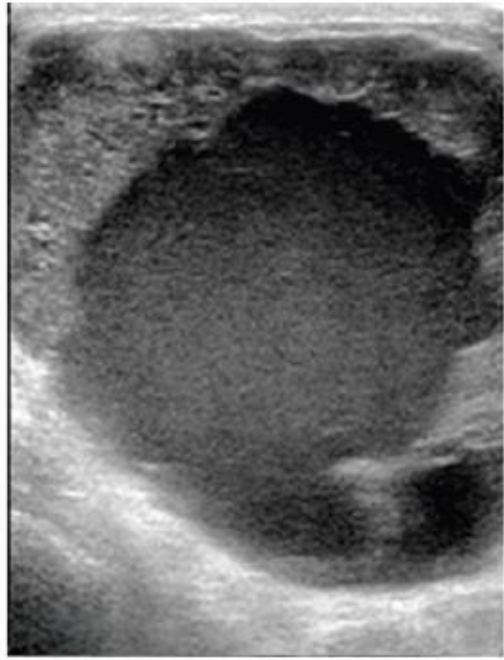
- 
- 
- ➡ **MRI:** breast and chest wall edema, streaky T2 hyperintensity, dilated lymphatics, skin enhancement, contiguous or coalescent irregular breast masses with rapid enhancement and washout kinetics (type III)

Classic **IBC** :mammographic views show **asymmetrically increased breast density**, extensive skin thickening and morphologically abnormal axillary lymph nodes, without a discrete breast mass or focal asymmetry. Targeted US image: irregular, heterogeneously hypoechoic parallel mass with overlying skin edema

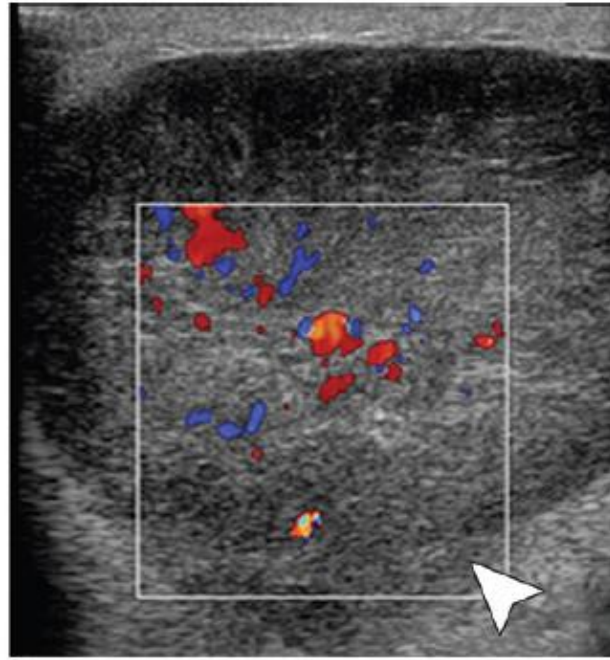




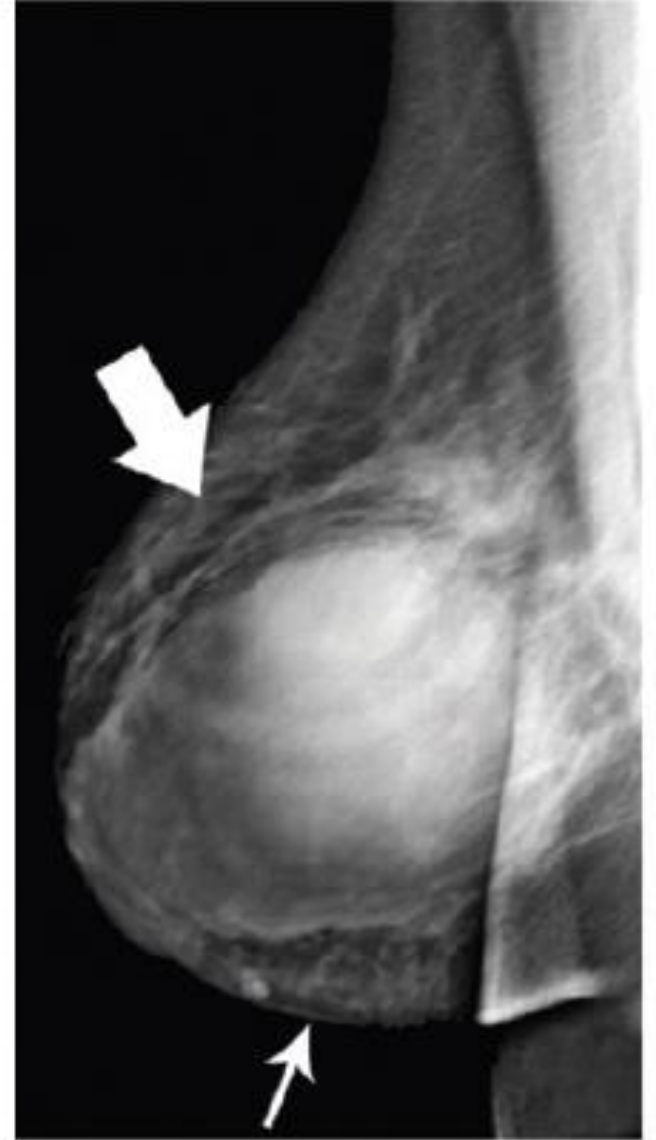
a.



b.



d.



c.

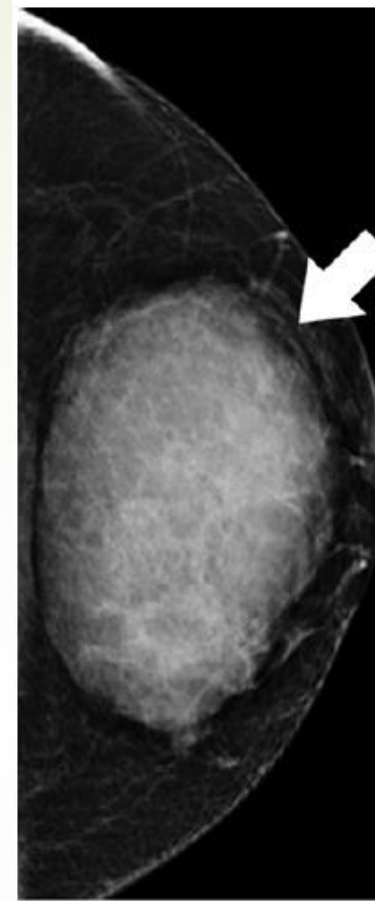
Infective mastitis

- Common in females of reproductive age, but seen in persons of all ages
- **Clinical Manifestations :**
 - Noncyclical breast pain and/or tenderness ,Erythema ,Fever with or without abscess .
 - Clinical unresponsiveness to empiric antibiotics in the presence of positive microbial stains and/or cultures suggests an atypical or resistant organism

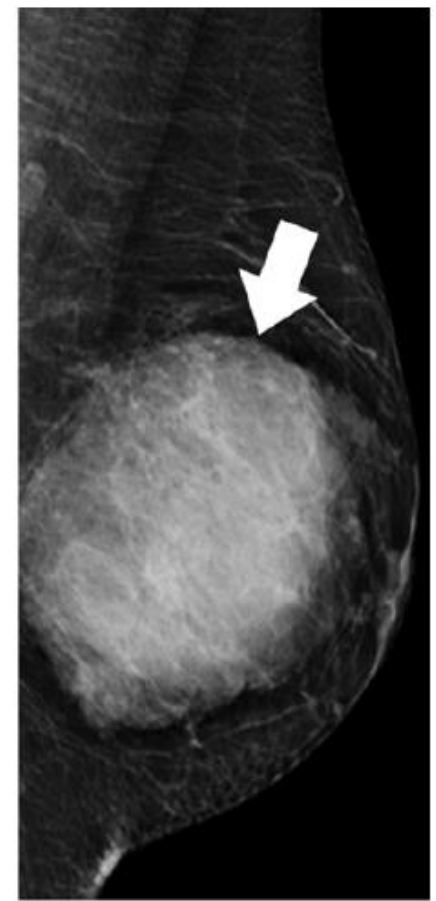
Imaging findings

- **Mammography** (often not performed): trabecular and skin thickening, asymmetric increased breast density
- **US**: diffuse or focal skin thickening, inhomogeneous breast tissue with or without irregular hypoechoic mass (with or without fluid collection) (particularly lactation mastitis)

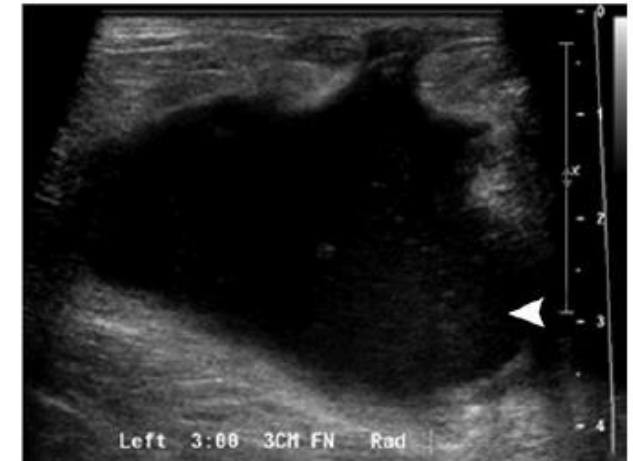
Infective mastitis with abscess



a.



b.



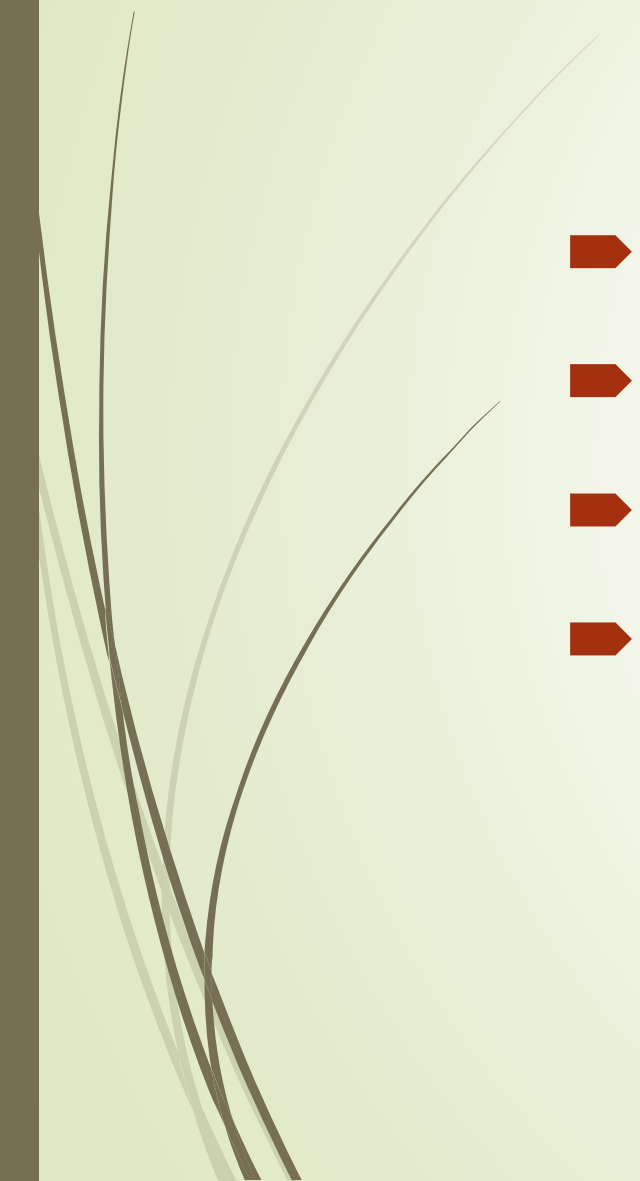


Tuberculous mastitis

- In endemic areas
- High-risk populations
- Persons with a history of pulmonary tuberculosis (50% of cases)




Clinical Manifestations

- Palpable breast mass
 - Axillary lymphadenopathy
 - Unilateral involvement
 - **Less mastalgia** compared with the mastalgia occurring with IGM
- 




Imaging findings

- **Mammography**: findings similar to those of infectious mastitis
 - **US**: heterogeneous hypoechoic irregular mass, axillary lymphadenopathy with or without fluid collections
- 



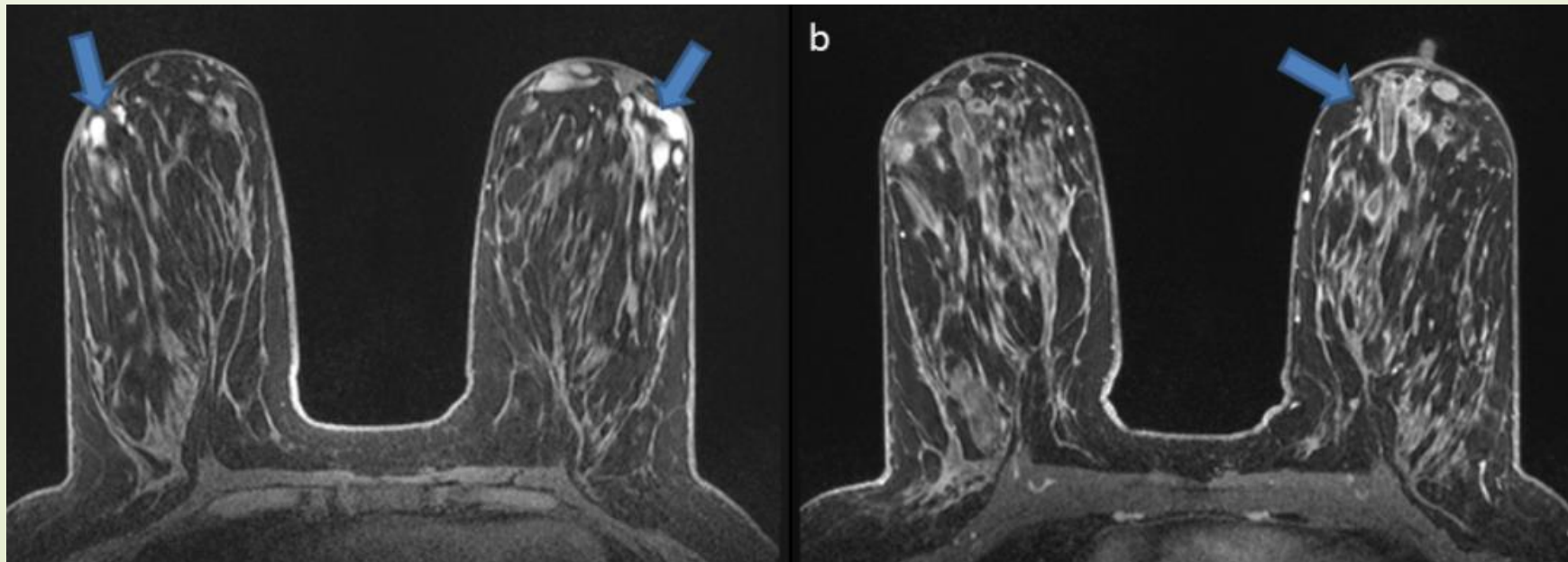
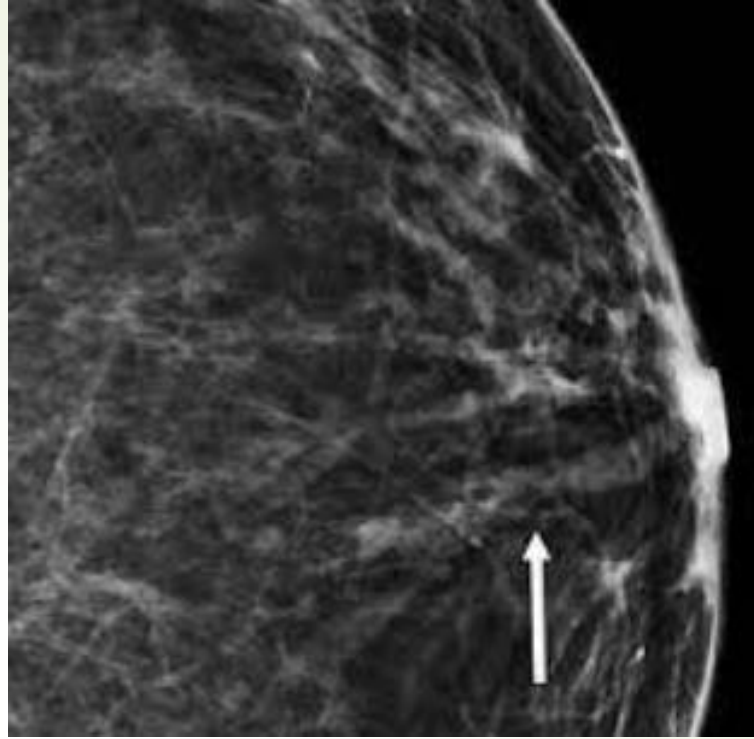
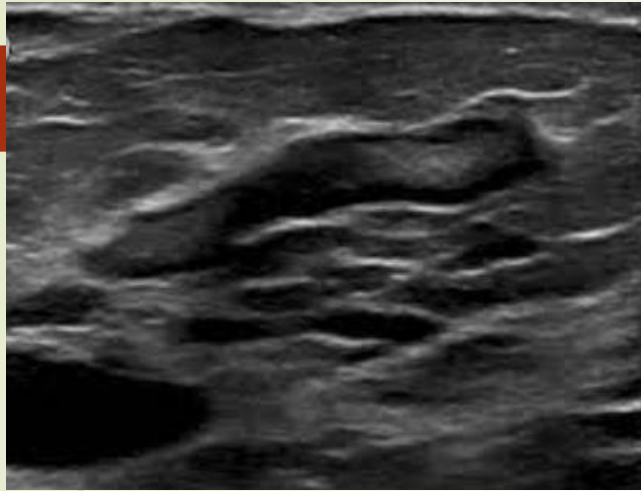
Mammary duct ectasia

- **Mainly affects perimenopausal and postmenopausal women**
 - **Clinical Manifestations:**
 - **Often incidental Subareolar breast mass with or without noncyclical breast pain**
 - **Unilateral or bilateral Nipple involvement**
 - **Non bloody nipple discharge**
- 

Imaging findings

- ➡ **Mammography**: tubular or branching retroareolar structures with thick rodlike (secretory) calcifications
- ➡ **US**: dilated subareolar ducts, thick walls, anechoic fluid collections with debris (with or without intraductal mass or filling defects)
- ➡ **MRI**: retroareolar T2 bright tubular structures

- 
- 
- A helpful diagnostic feature is **movement** of the intraductal secretions during real-time US; this is not commonly seen with IGM





Diabetic Fibrous Mastopathy

- Affects longtime insulin-dependent females, persons with a history of autoimmune or endocrine disease (thyroid), and premenopausal women

➤ **Clinical Manifestations:**

Hard palpable mass(es)

Non tender

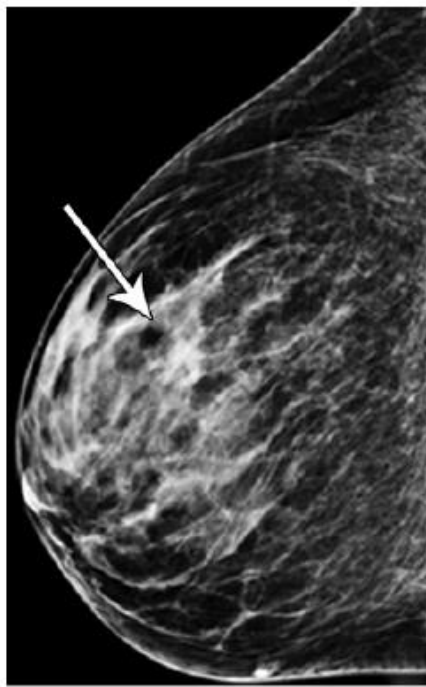
Usually multiple and bilateral



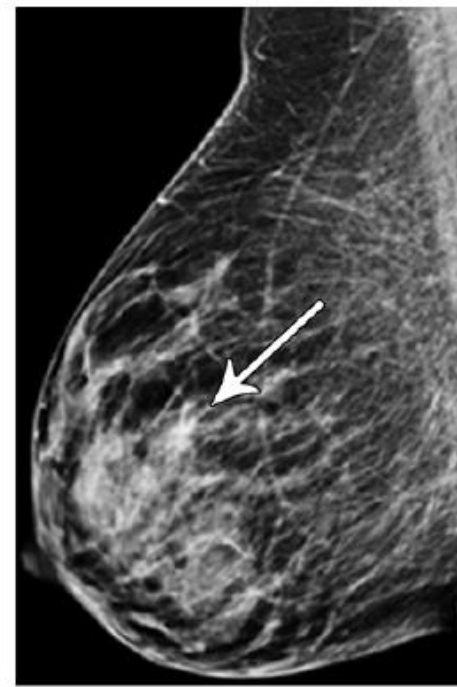
Imaging findings

- **Mammography**: ill-defined, dense, noncalcified mass(es) or asymmetric densities
- **US**: irregular hypoechoic mass, strong posterior acoustic shadowing, absent Doppler color flow
- **MRI**: T2-hypointense tissue when breast is densely fibrotic, nonspecific stromal enhancement

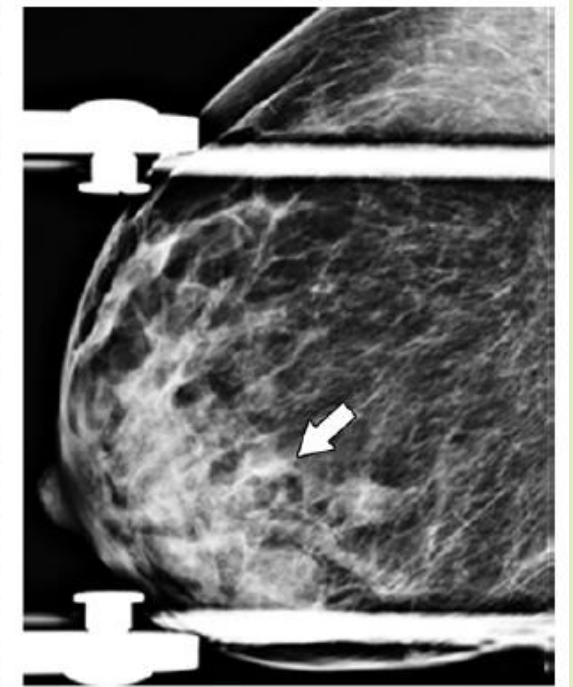
Diabetic fibrous mastopathy



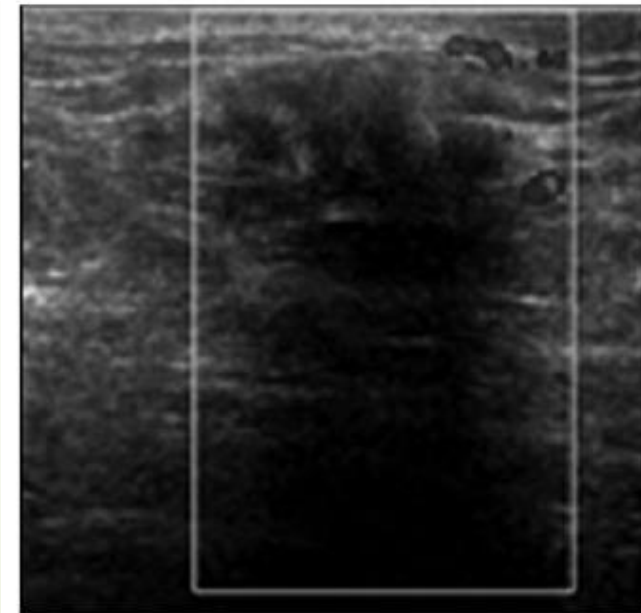
a.



b.



c.



d.

Wegener granulomatosis

- Affects persons known to have systemic disease of upper and lower respiratory tracts and sometimes the kidneys
- Breast involvement is rare

➤ **Clinical Manifestations:**

- Unilateral or bilateral breast masses
- Breast abscesses
- Necrotic lesions
- skin ulcerations



Imaging findings

- Very nonspecific
- **Mammography**: ill-defined irregular masses
- **US**: irregular hypoechoic masses



Breast sarcoidosis

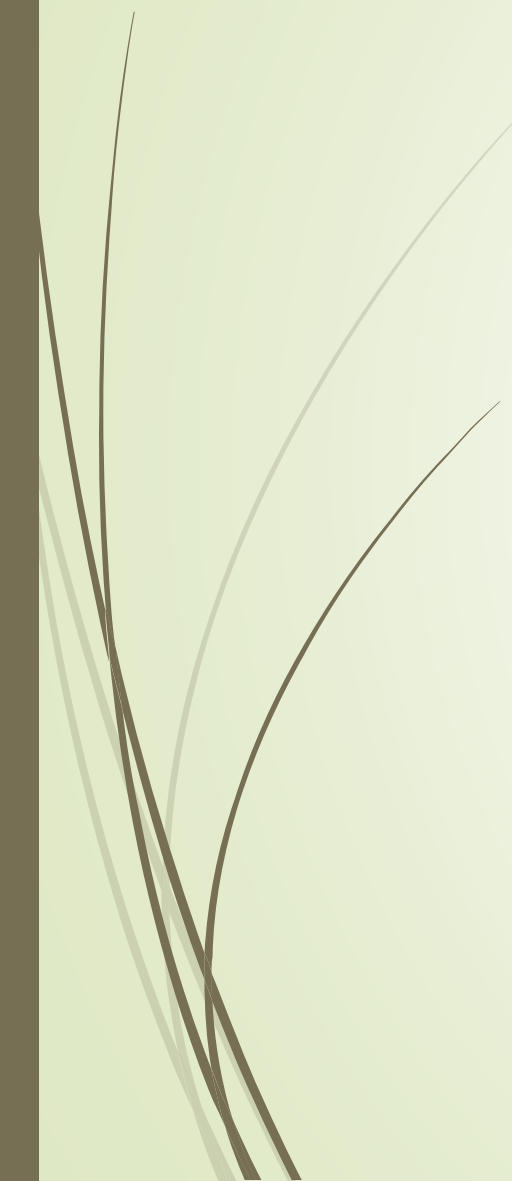
- Affects persons known to have systemic disease and women in the 3rd or 4th decade of life


➤ **Clinical Manifestations:**

- Palpable mass
- Usually less inflammation
- Abscess formation is uncommon



Imaging findings

- **Mammography**: irregular, illdefined, spiculated, or circumscribed round masses
 - **US**: irregular hypoechoic masses
- 




Foreign body granulomas caused by silicone, paraffin, or PAAG injections

- ➡ **Affects persons with a history of direct breast cosmetic enhancement and transexual males**





Clinical Manifestations:

- Focal or diffuse lumps
 - Induration
 - Breast deformity
 - Pain and tenderness
 - Skin ulceration
 - Draining sinuses
 - Axillary lymphadenopathy if material migrates
- 

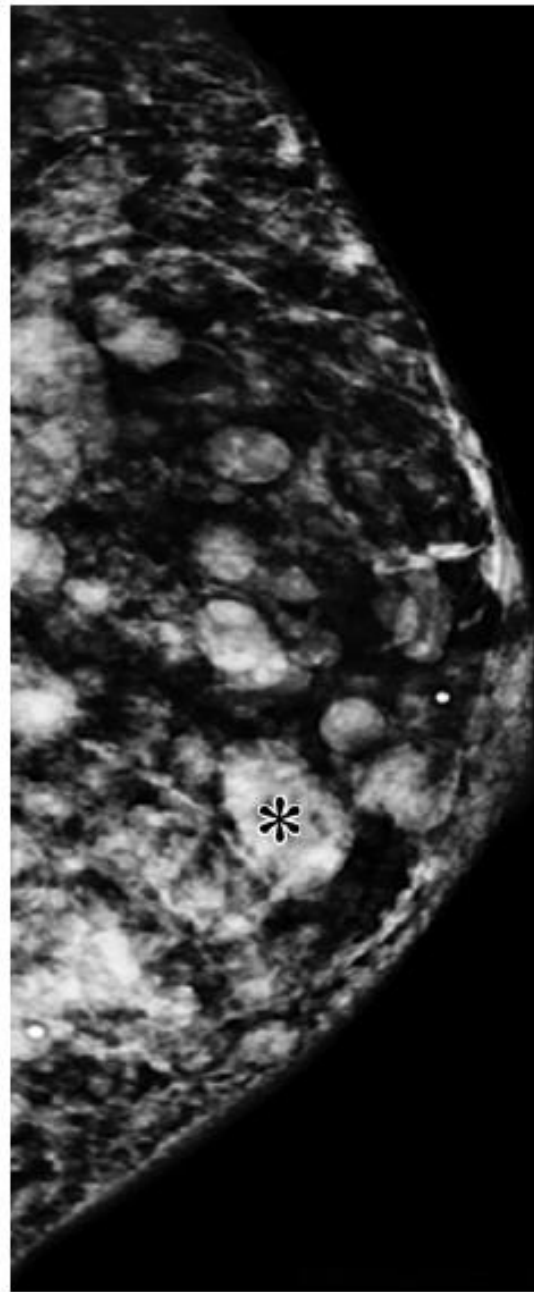


Imaging findings

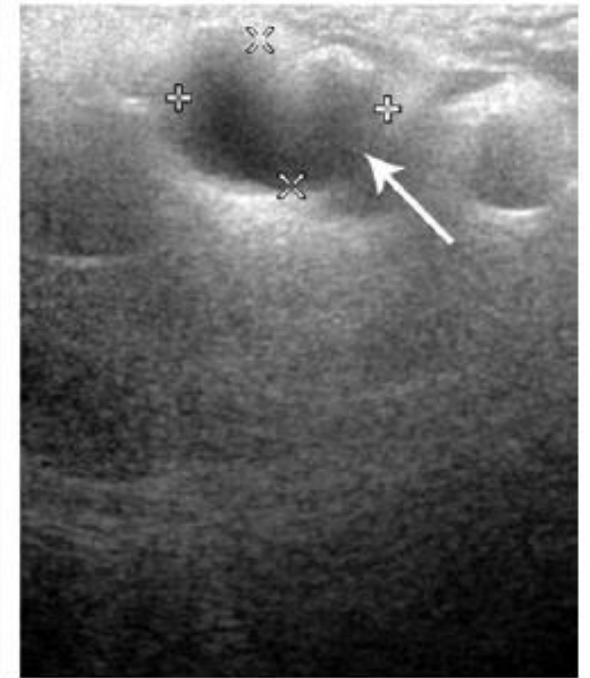
- ➡ **Silicone:** round or oval dense masses with rim calcifications on mammograms, “snowstorm” appearance on US images
- ➡ **Paraffin:** irregular or round hypoechoic masses, parenchymal distortion, dystrophic or ring like calcifications on mammograms; posterior shadowing mass on US images

- 
- 
- **PAAG**: discrete fluid collections that are denser than adjacent tissue on mammograms
 - Circumscribed fluid
 - Anechoic to hyperechoic collections with a thick capsule,
 - And/or patchy areas of mixed or granular echoes on US images

Bilateral silicone granulomas

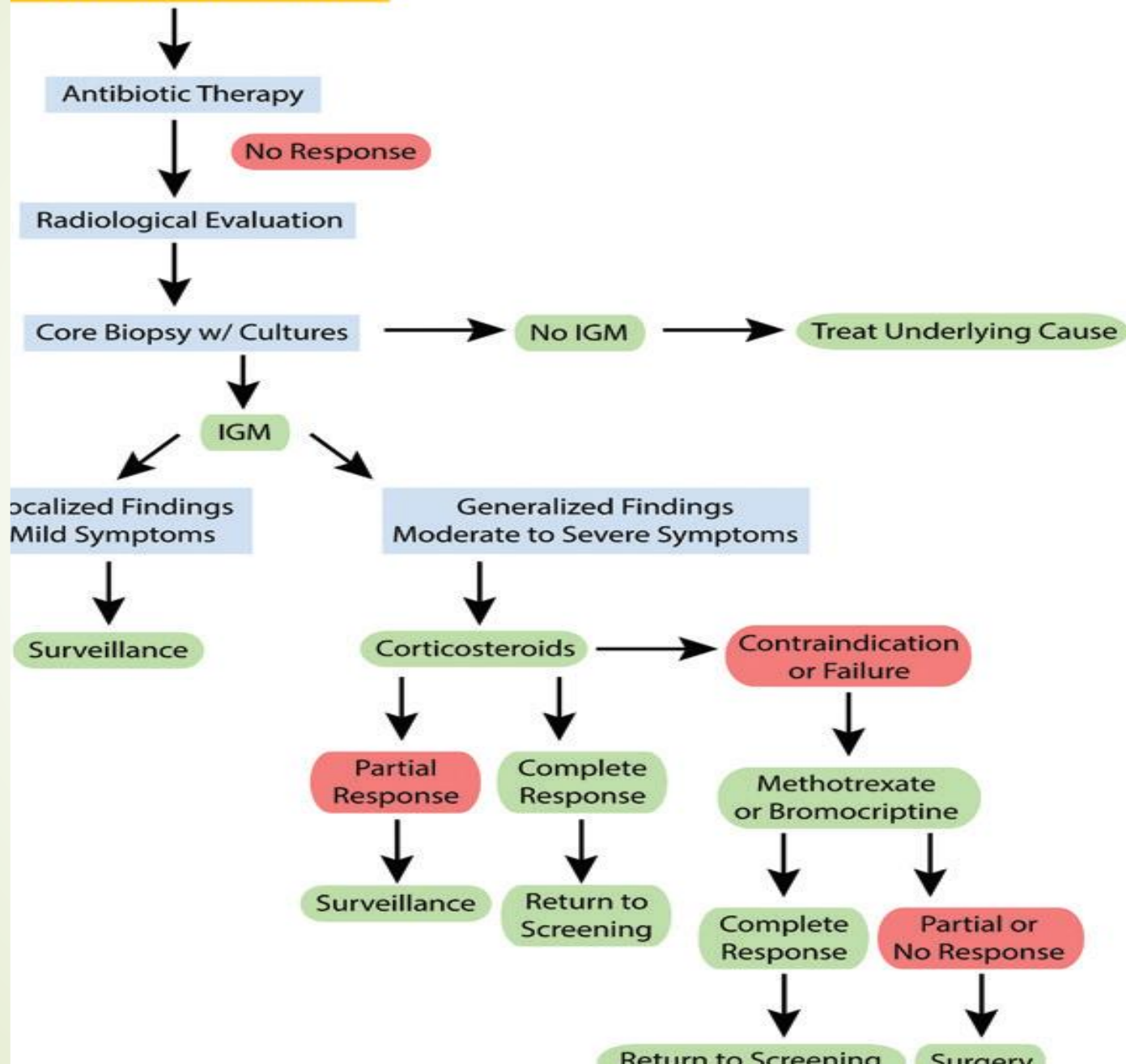


a.



b.

Suspected Infectious Mastitis



Surveillance

- Conservative treatment involving regular follow-up **every 2–3 months**, complete regression of IGM in 50% of the patients after a period of 2–24 month.
- Close surveillance alone may be appropriate for a subgroup of patients, especially those in whom IGM is discovered **incidentally during screening mammography** and those in whom IGM manifests as a **painless or mildly tender palpable mass**.

Role of imaging in the evaluation of biopsy-confirmed IGM

- Multiplicity and location of IGM lesions
- Size of lesions
- Identify abscess formation and the associated possibility of intervention
- Stability of or interval change in lesions
- Treatment response
- Metachronous disease and local recurrence

***THANKS FOR
YOUR ATTENTION!***

