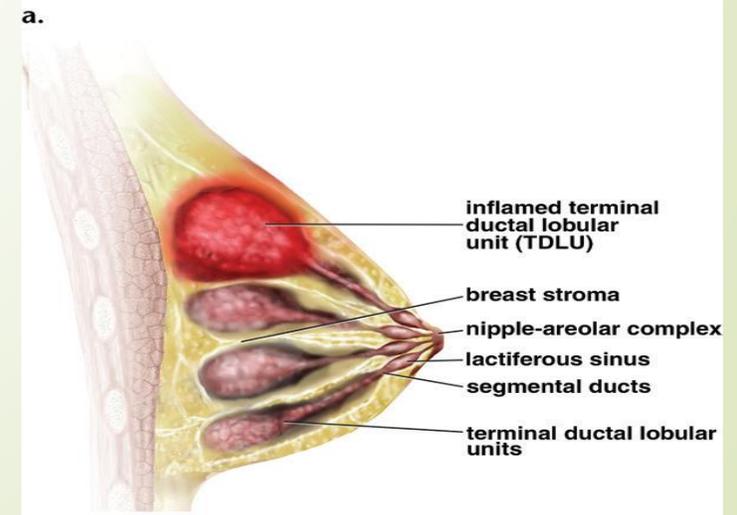
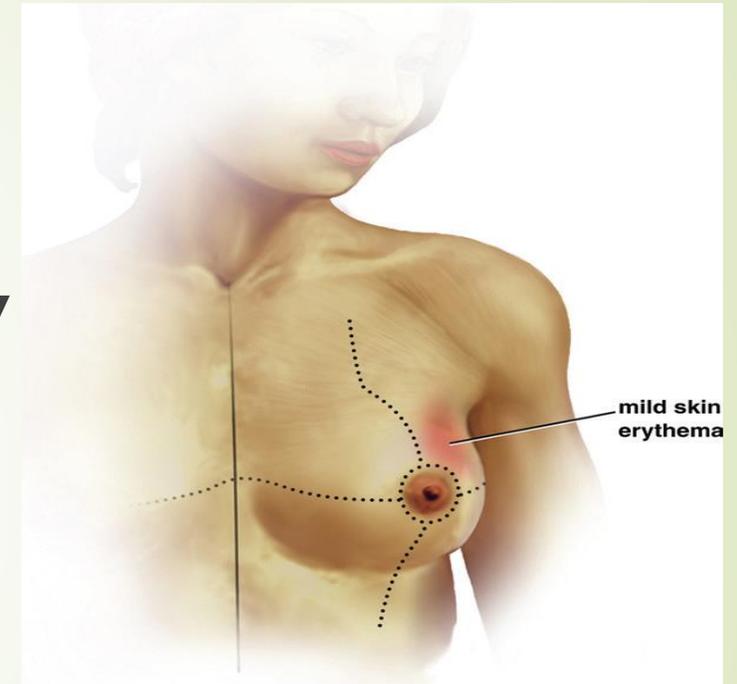


# Idiopathic Granulomatous Mastitis

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**

- 
- **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

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

- 
- **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**
- 

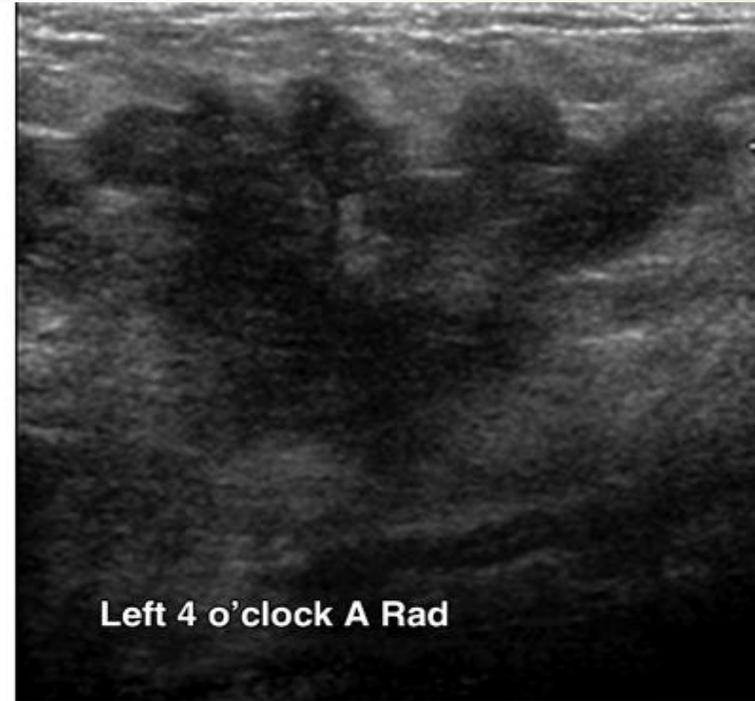
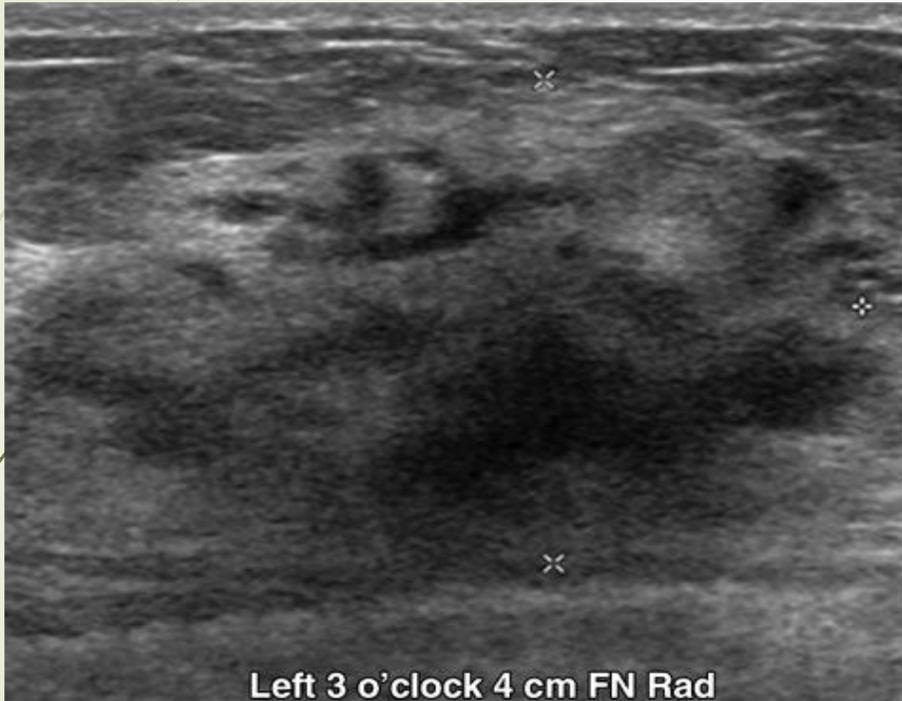
# ***Mammography***

- **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*

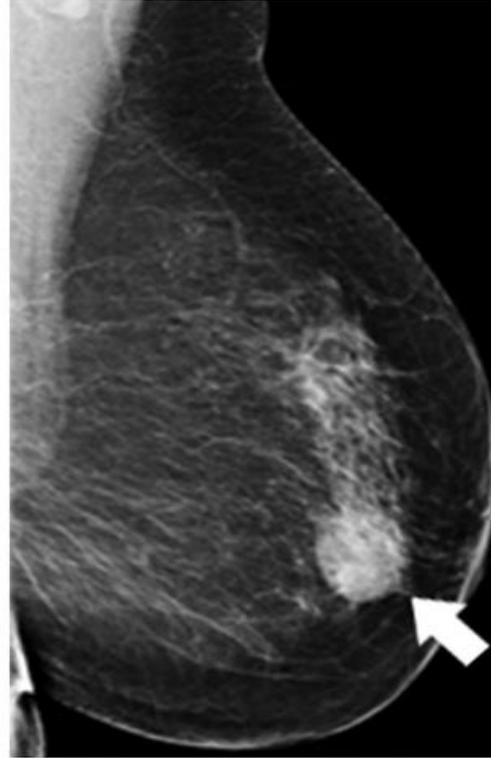
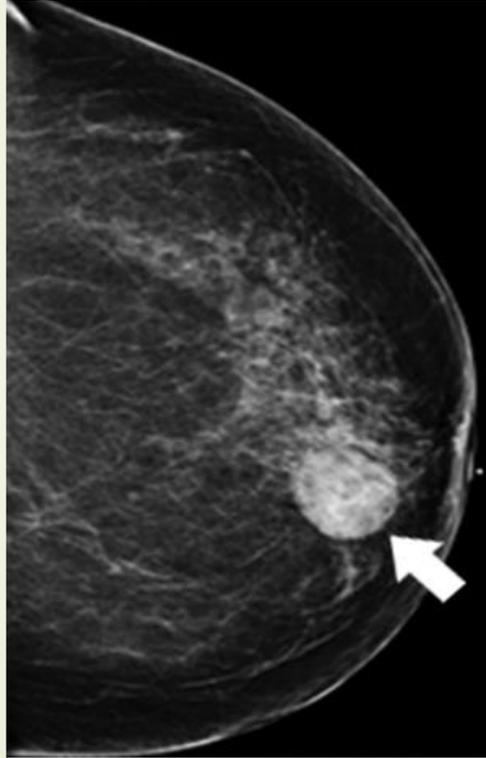
- Irregular hypoechoic mass with tubular extensions
- Axillary adenopathy
- Circumscribed hypoechoic mass
- Skin thickening and edema
- Abscess and/or sinus tract
- Heterogeneous hypoechoic mass (or confluent masses) with indistinct, lobulated, or angular margins
- Parenchymal distortion with or without 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

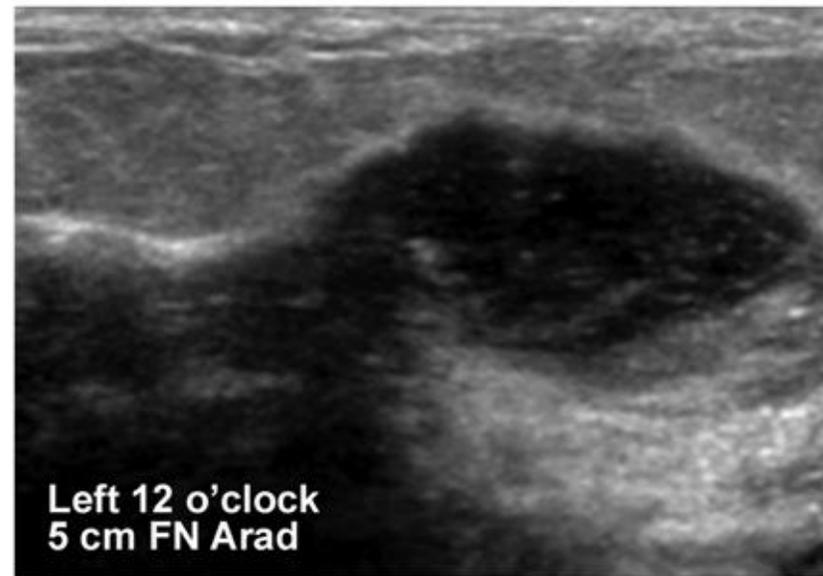
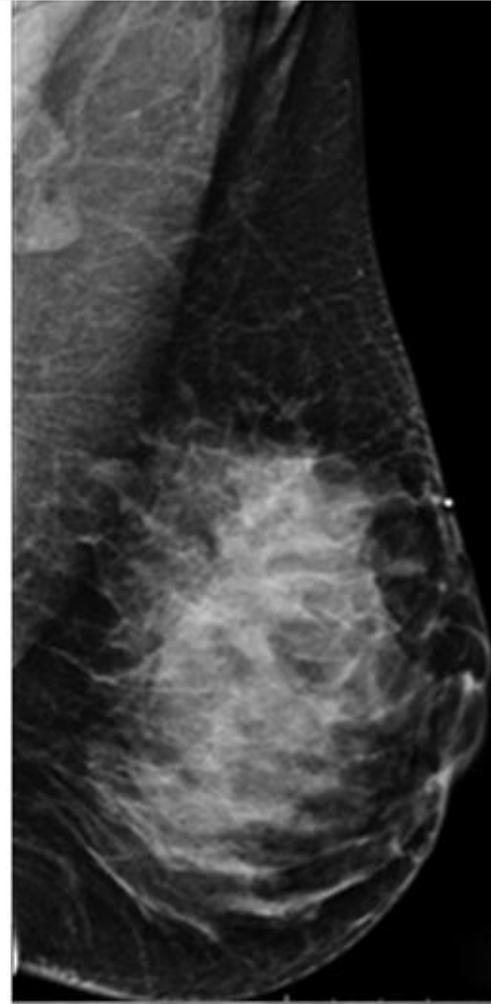
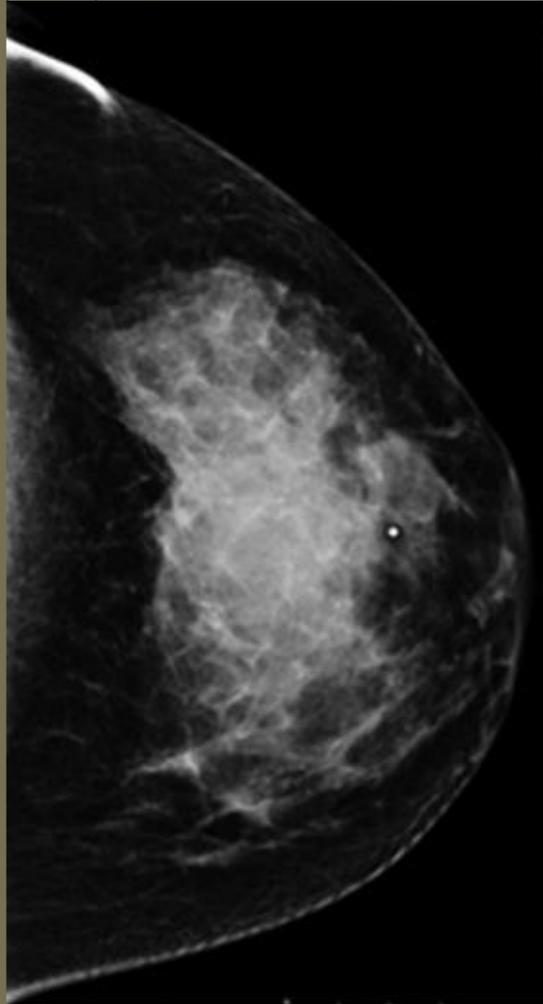
Targeted US shows a round, heterogeneously hypoechoic mass with indistinct margins and minimal ductal dilatation

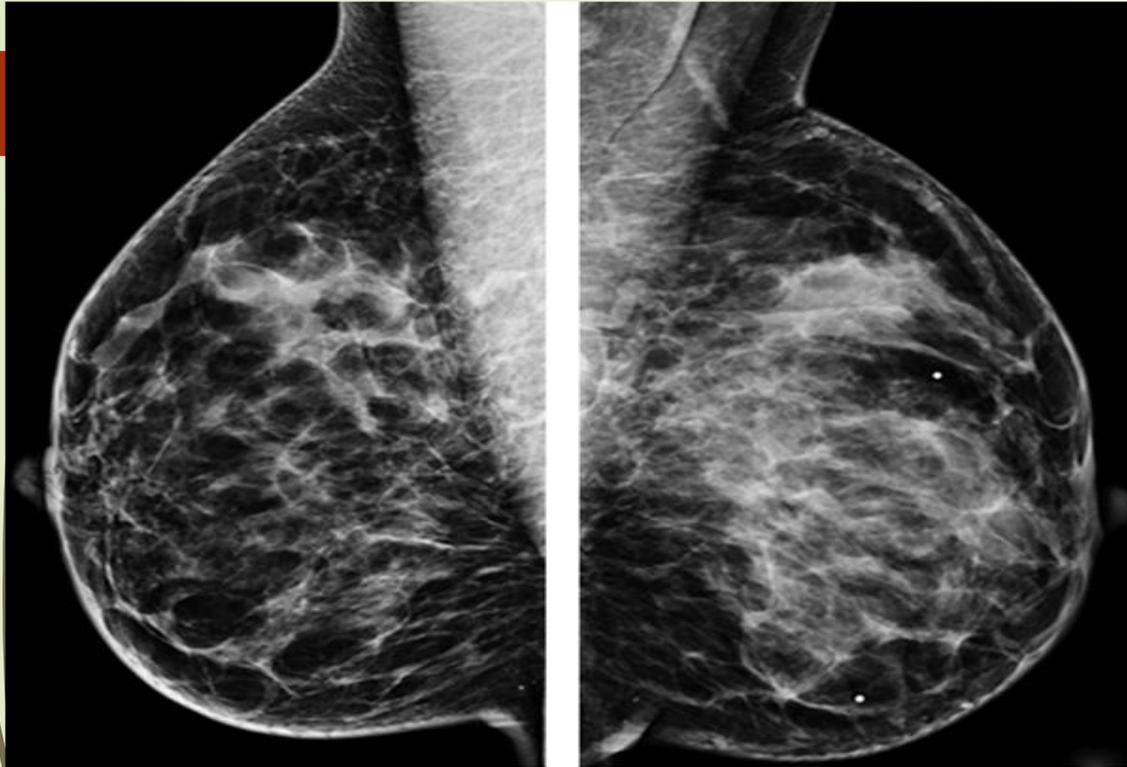


palpable left-breast mass with subjective growth during the past 3–4 months in a 30-year-old woman.

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

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





a.

b.



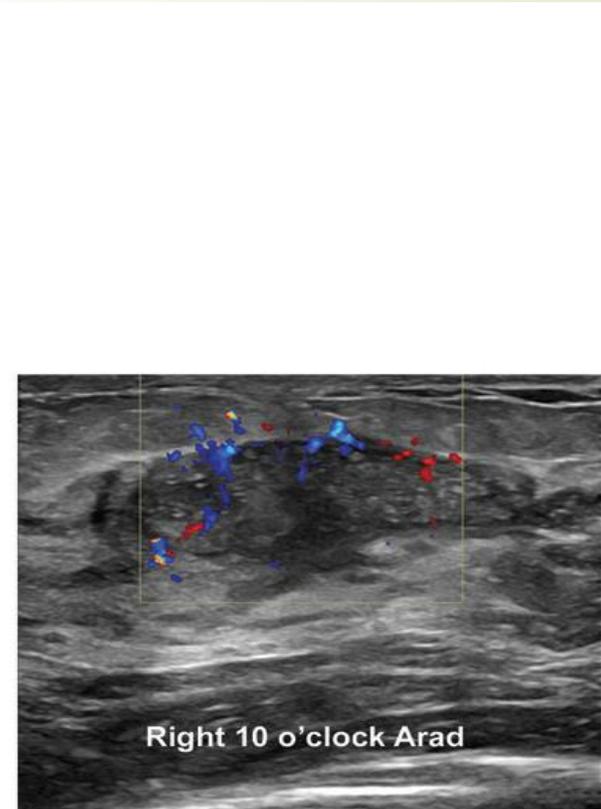
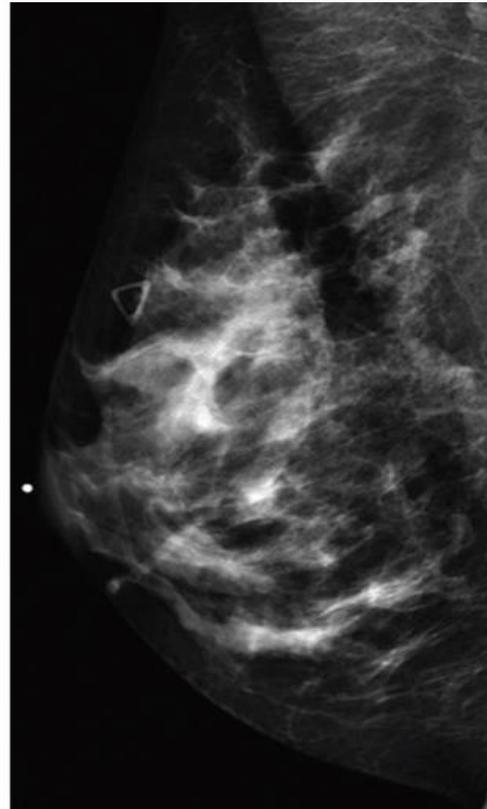
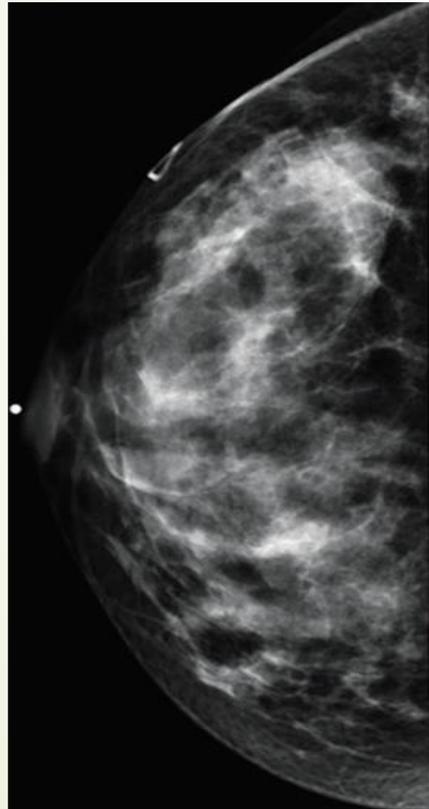
Left 6 o'clock 4 cm FN Rad

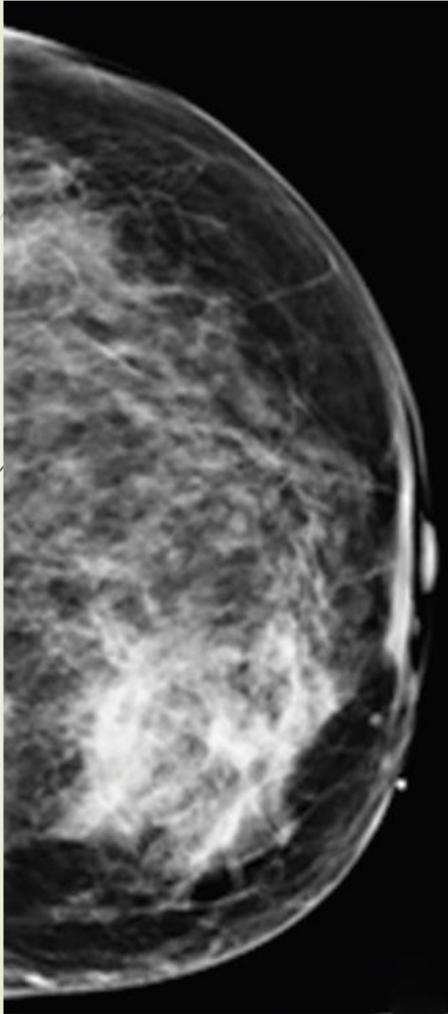
asymmetrically increased left breast density at mammography . heterogeneously dense breasts, with **asymmetrically increased left breast density or global asymmetry**, more pronounced inferiorly.

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

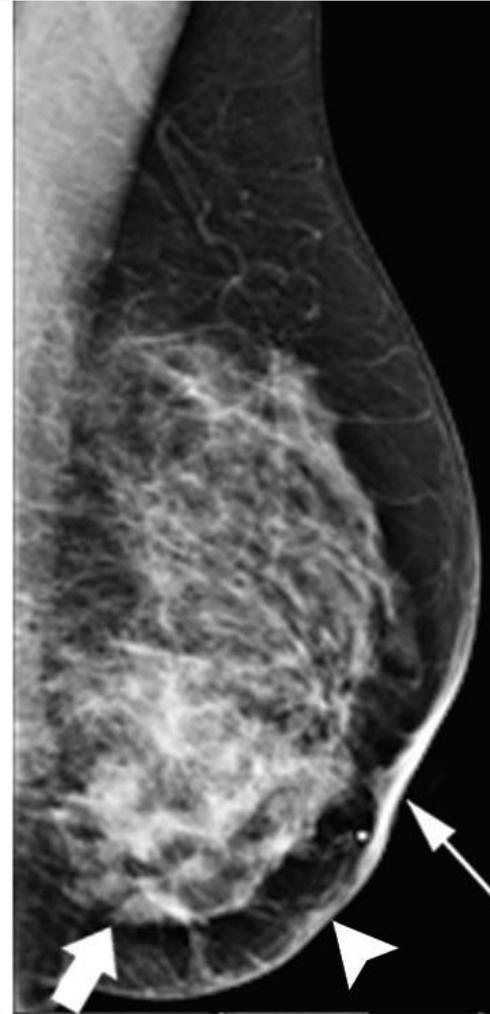
mammographic views of the right breast : **no substantial abnormality**

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





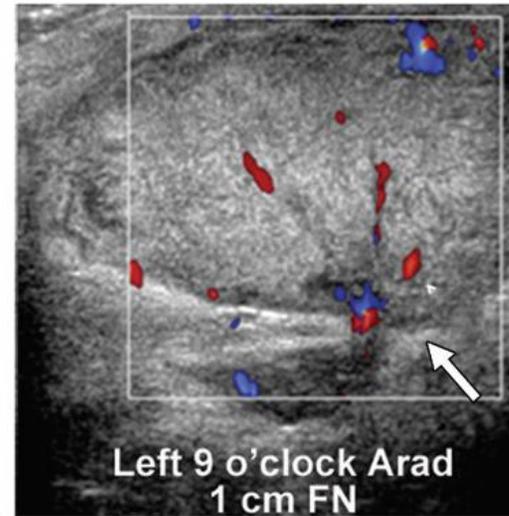
a.



b.

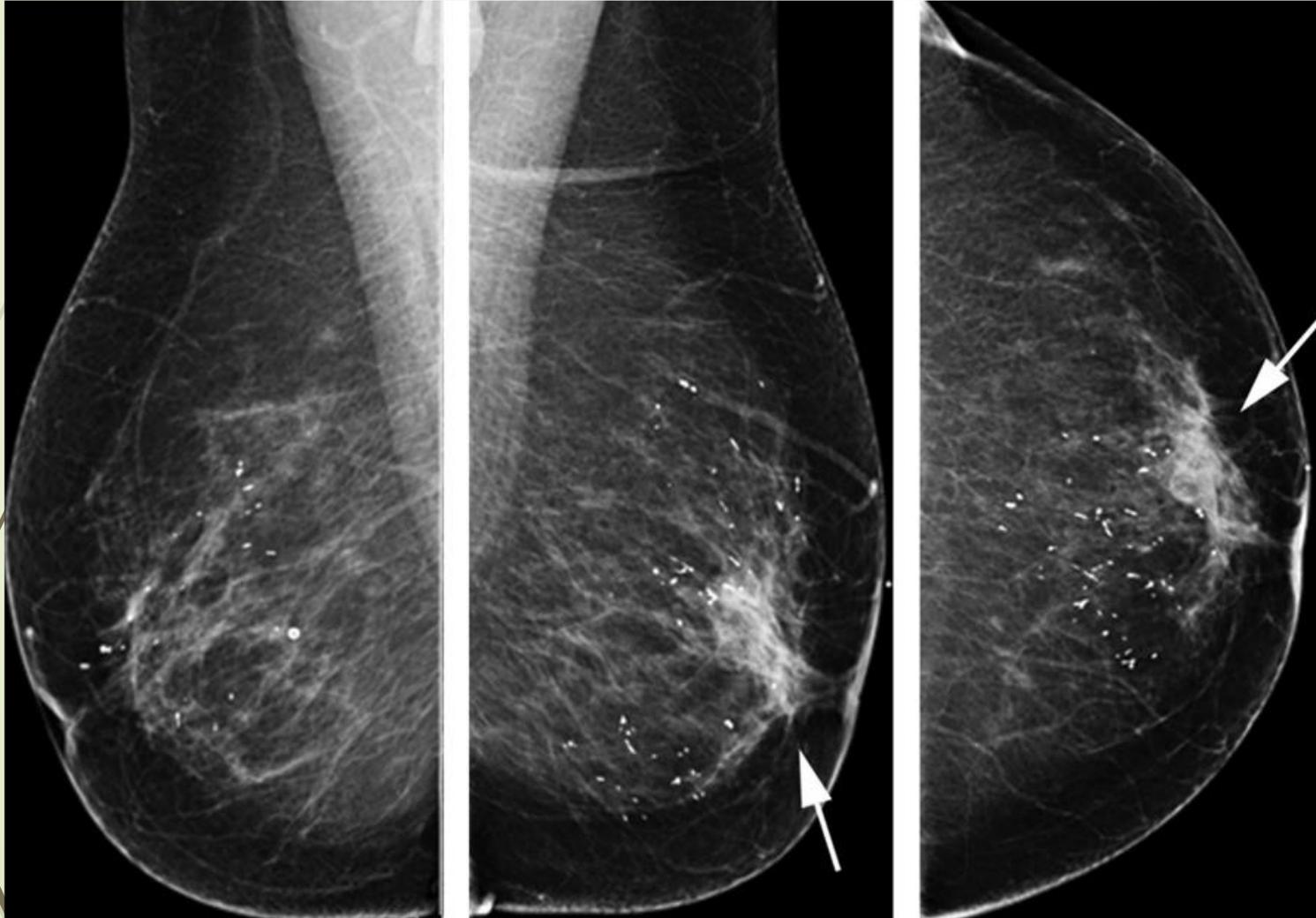


c.



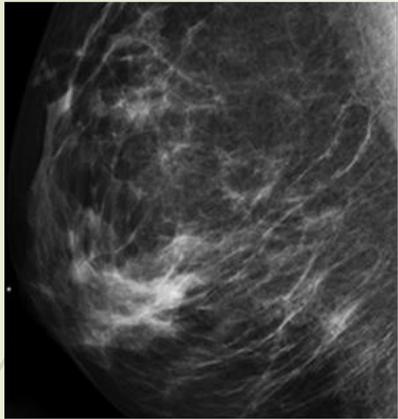
d.

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.

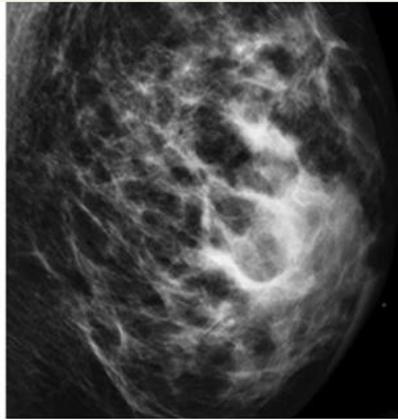


# Multiparametric MR imaging

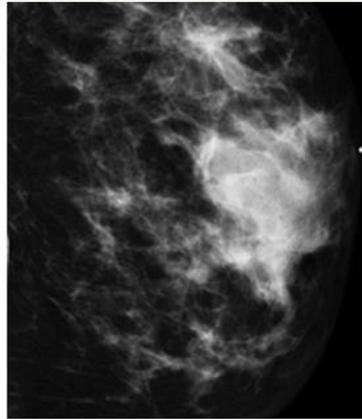
- T2 hyperintensity (edema) of breast stroma Majority
- Rim-enhancing lesions (microabscesses) or heterogeneously enhancing masses, with or without NME
- Segmental or regional NME
- Contrast enhancement with variable kinetic properties:
  - Type I
  - Type II
- T2-hypointense enhancing mass with irregular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



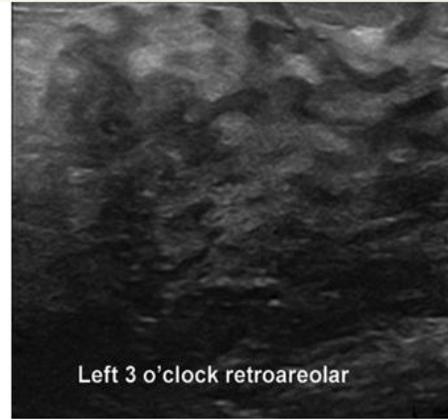
a.



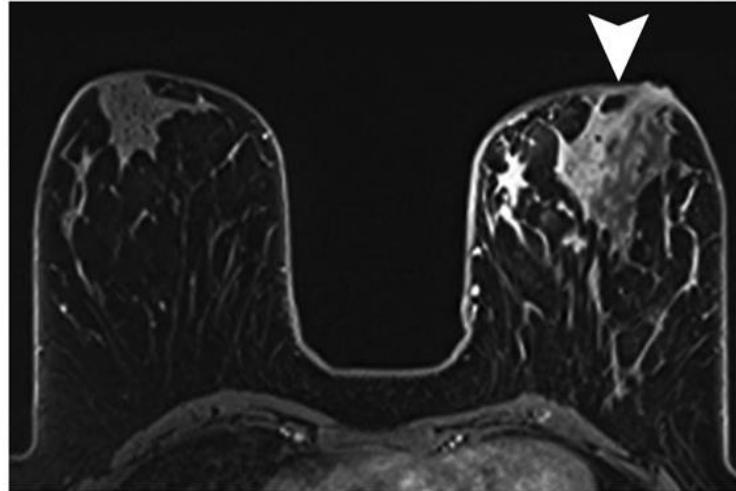
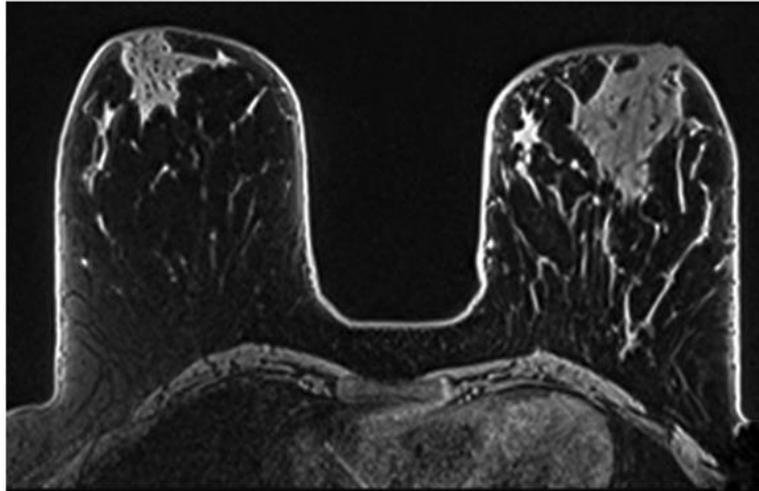
b.



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

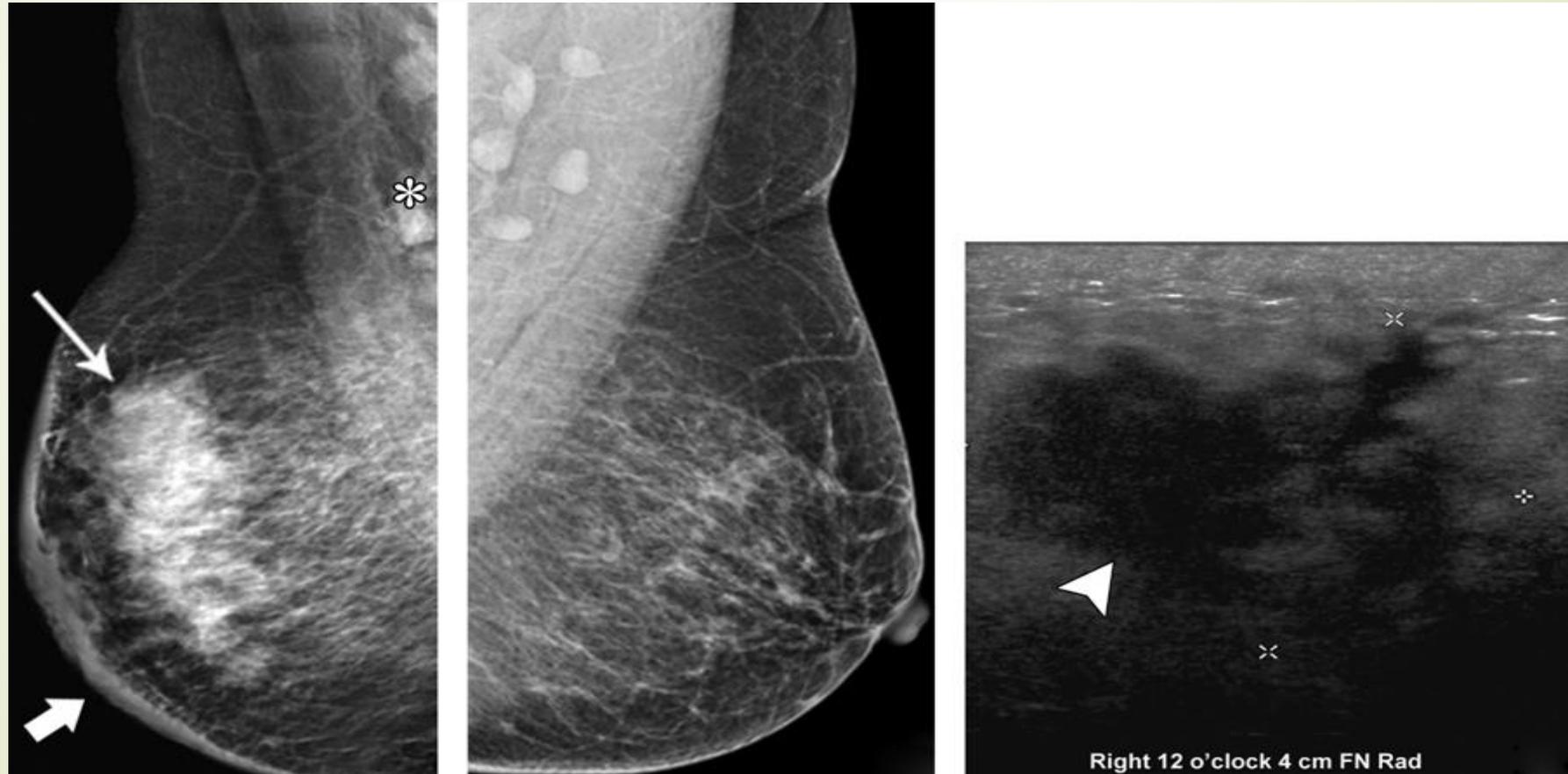
- Skin erythema in at least one-third of the breast
- Peau d'orange
- Asymmetric breast engorgement
- Onset to manifestation of symptoms, less than 3 months
- Axillary adenopathy in approximately 50%– 85% of cases

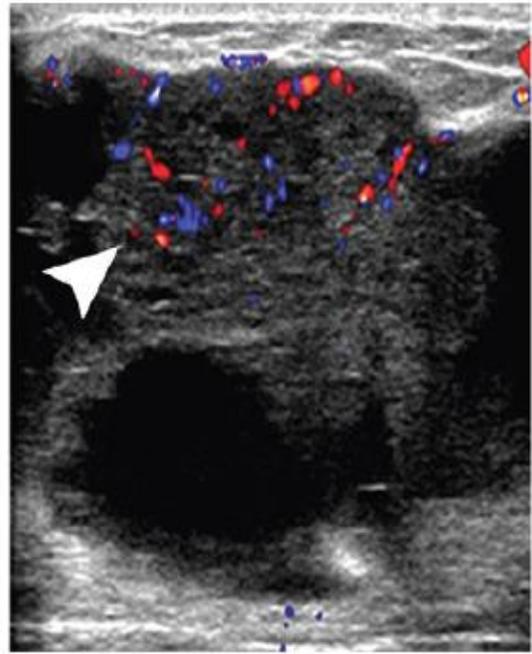
# Imaging findings

- ➔ **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

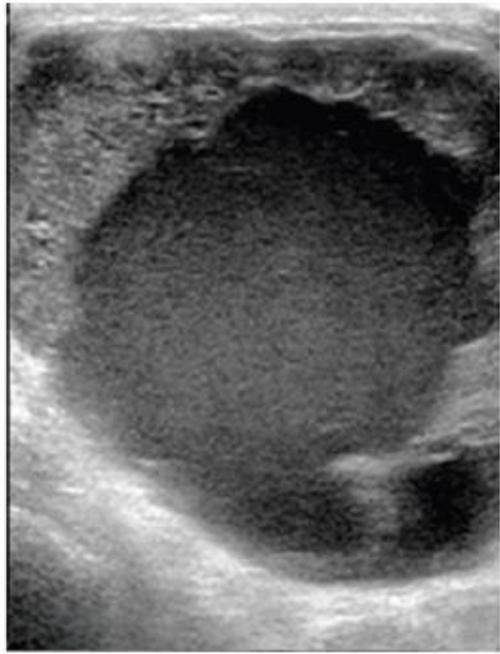
- 
- 
- ➔ **MRI:** breast and chest wall edema, streaky T2 hyperintensity, dilated lymphatics, skin enhancement, contiguous or coalescent irregular breast masses with rapid enhancement and washout kinetics (type III)

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

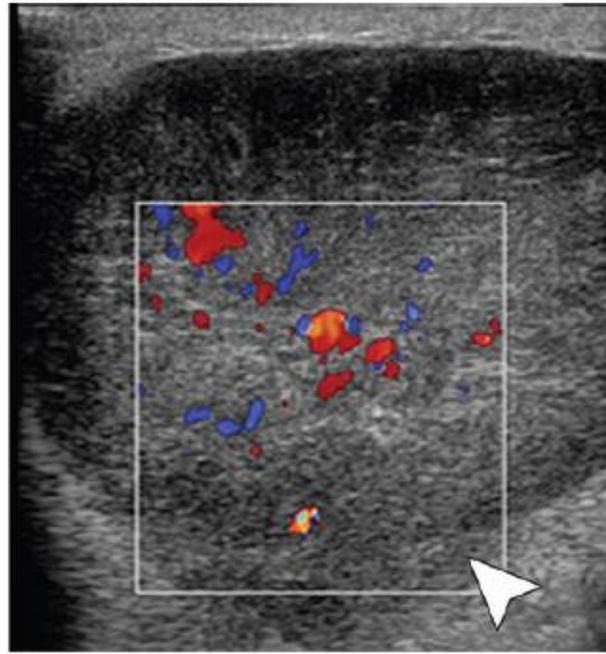




a.



b.



d.



c.

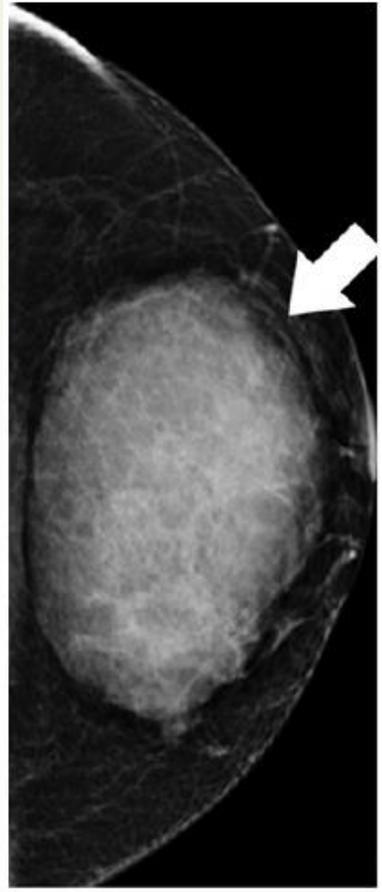
# *Infective mastitis*

- 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

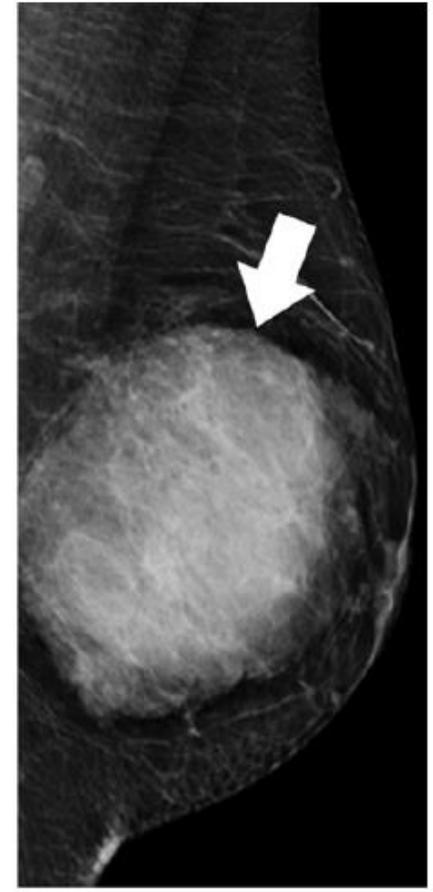
# Imaging findings

- **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)

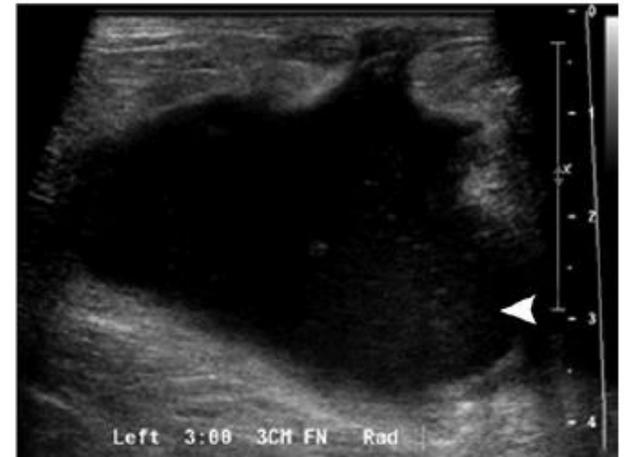
# Infective mastitis with abscess



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

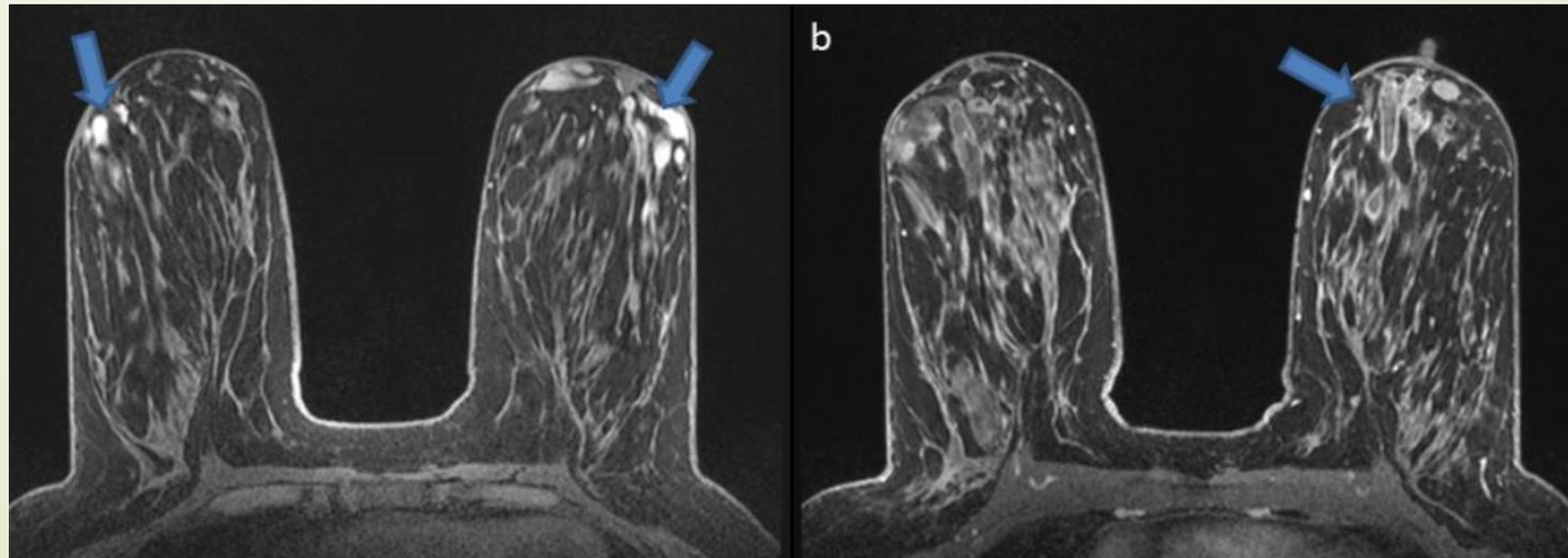
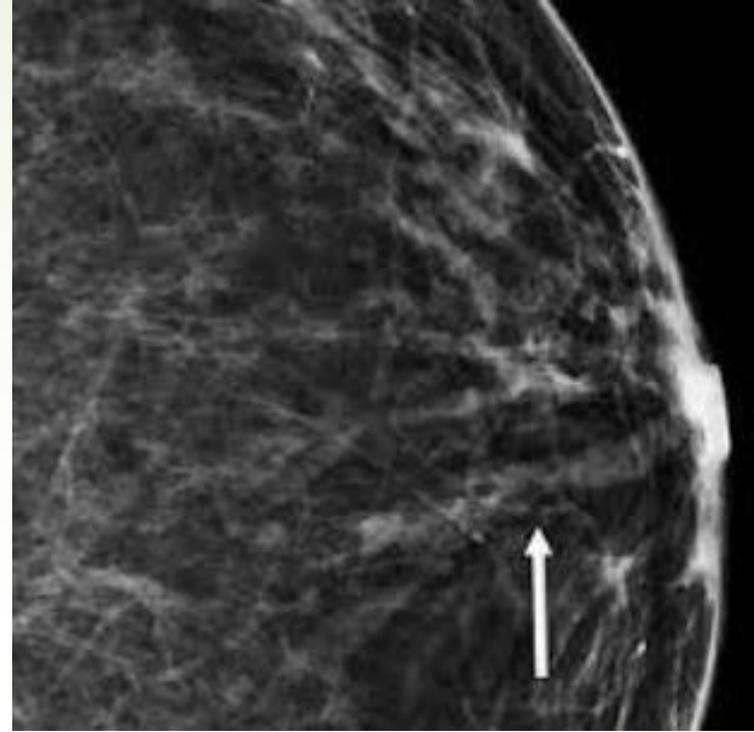
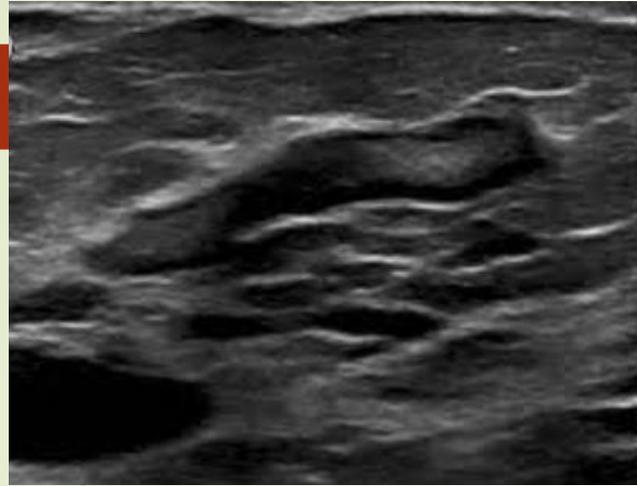
# *Mammary duct ectasia*

- **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

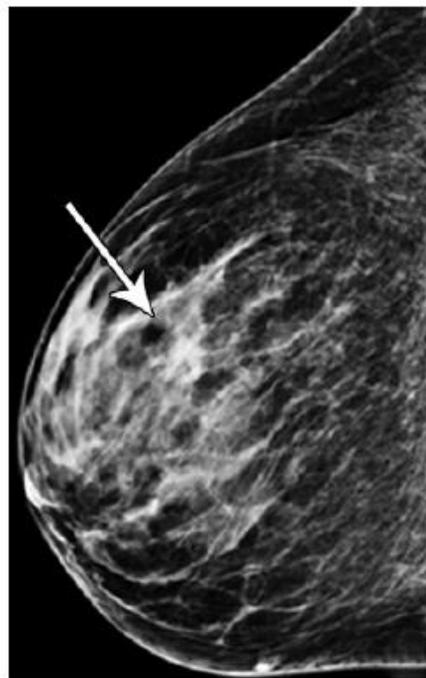
Usually multiple and bilateral



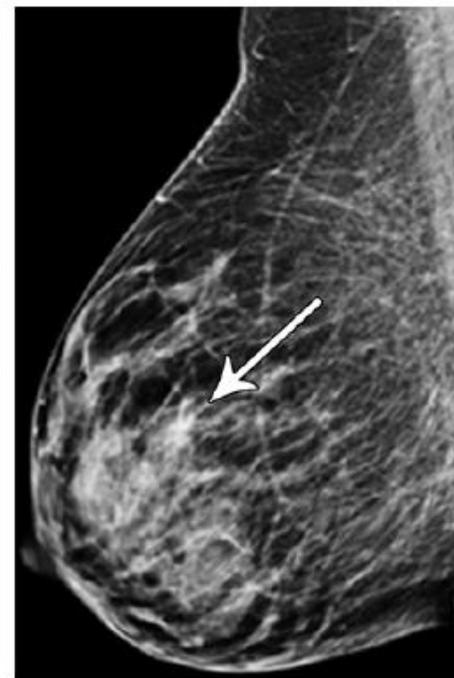
# Imaging findings

- **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

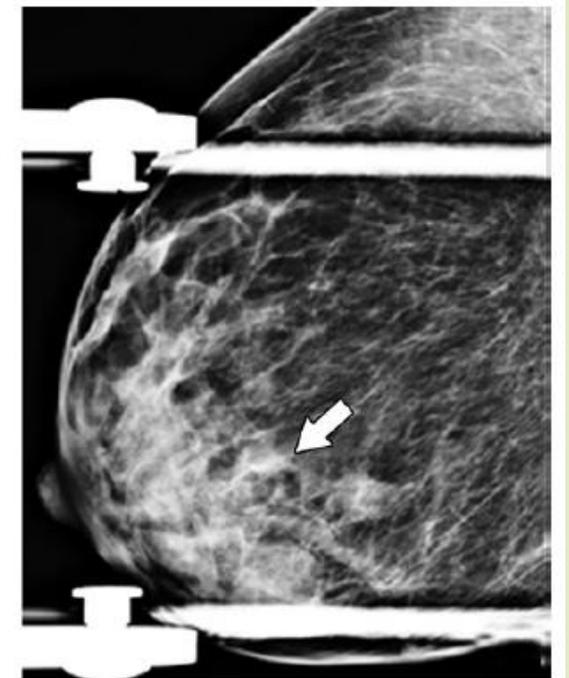
# Diabetic fibrous mastopathy



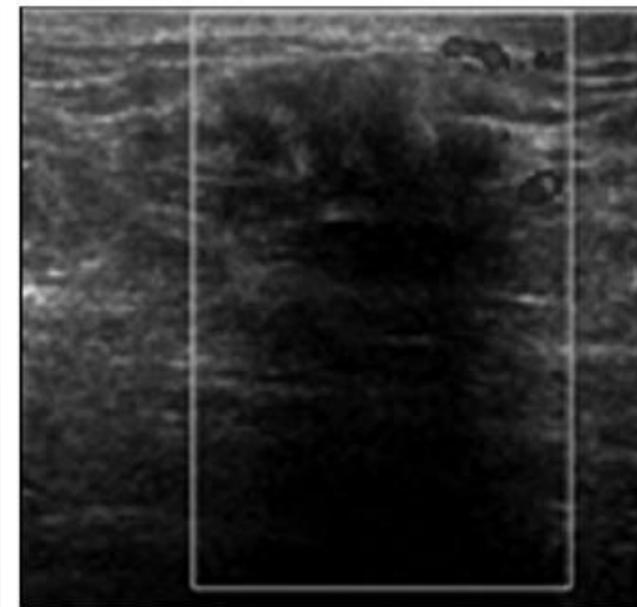
a.



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

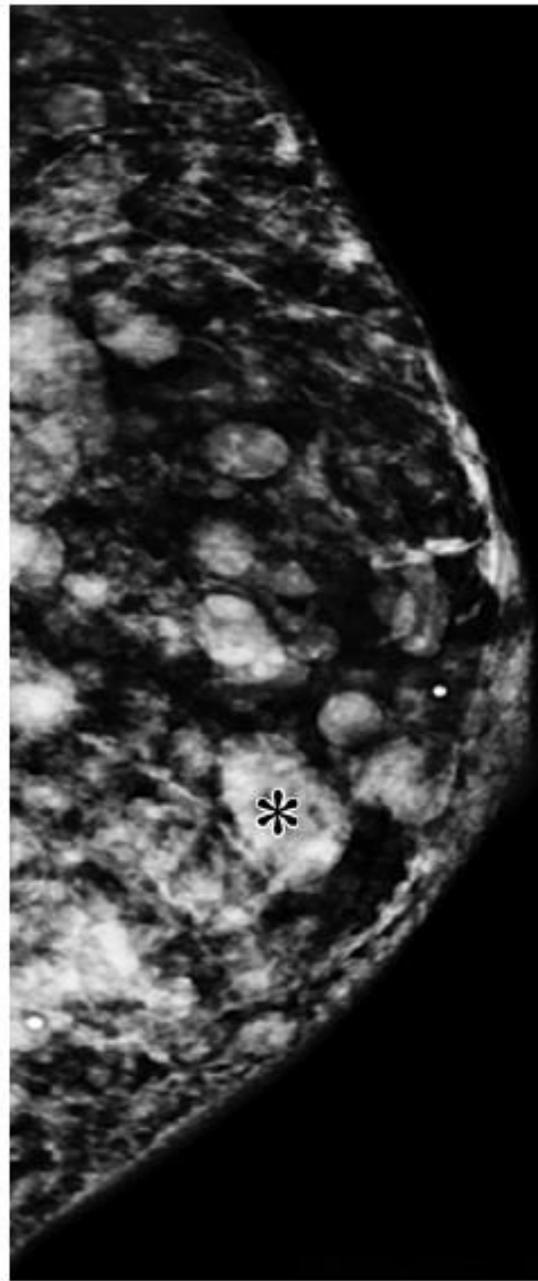


## Imaging findings

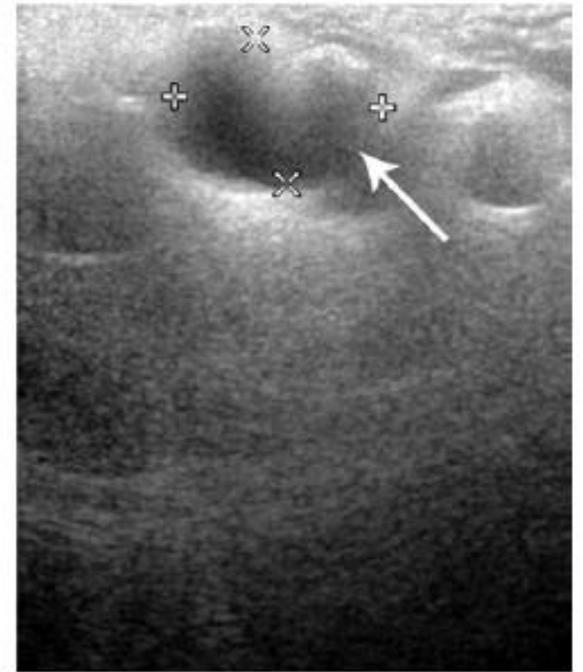
- ➔ **Silicone**: round or oval dense masses with rim calcifications on mammograms, “snowstorm” appearance on US images
- ➔ **Paraffin**: irregular or round hypoechoic masses, parenchymal distortion, dystrophic or ring like calcifications on mammograms; posterior shadowing mass on US images

- 
- 
- **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

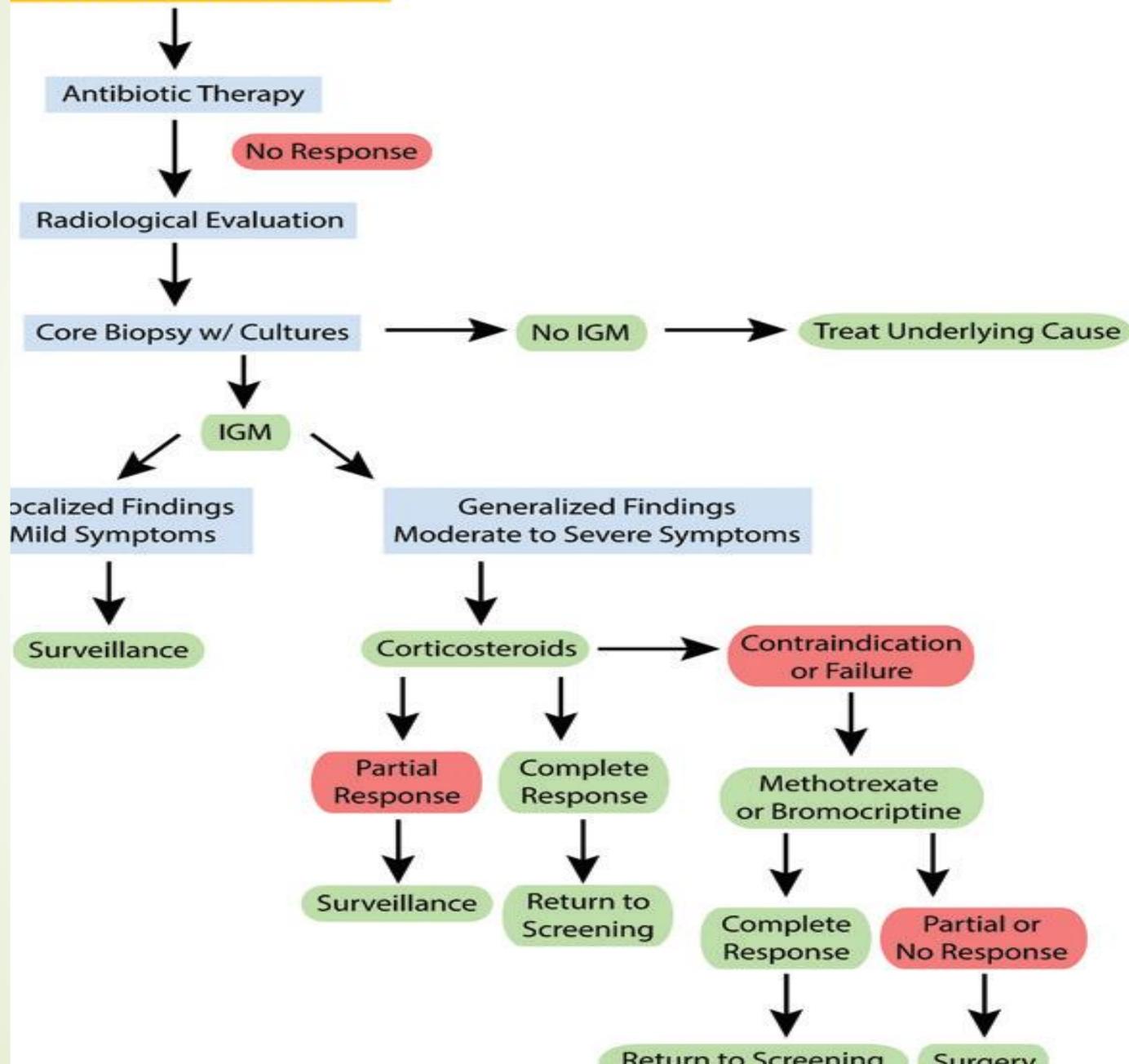


a.



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!***

