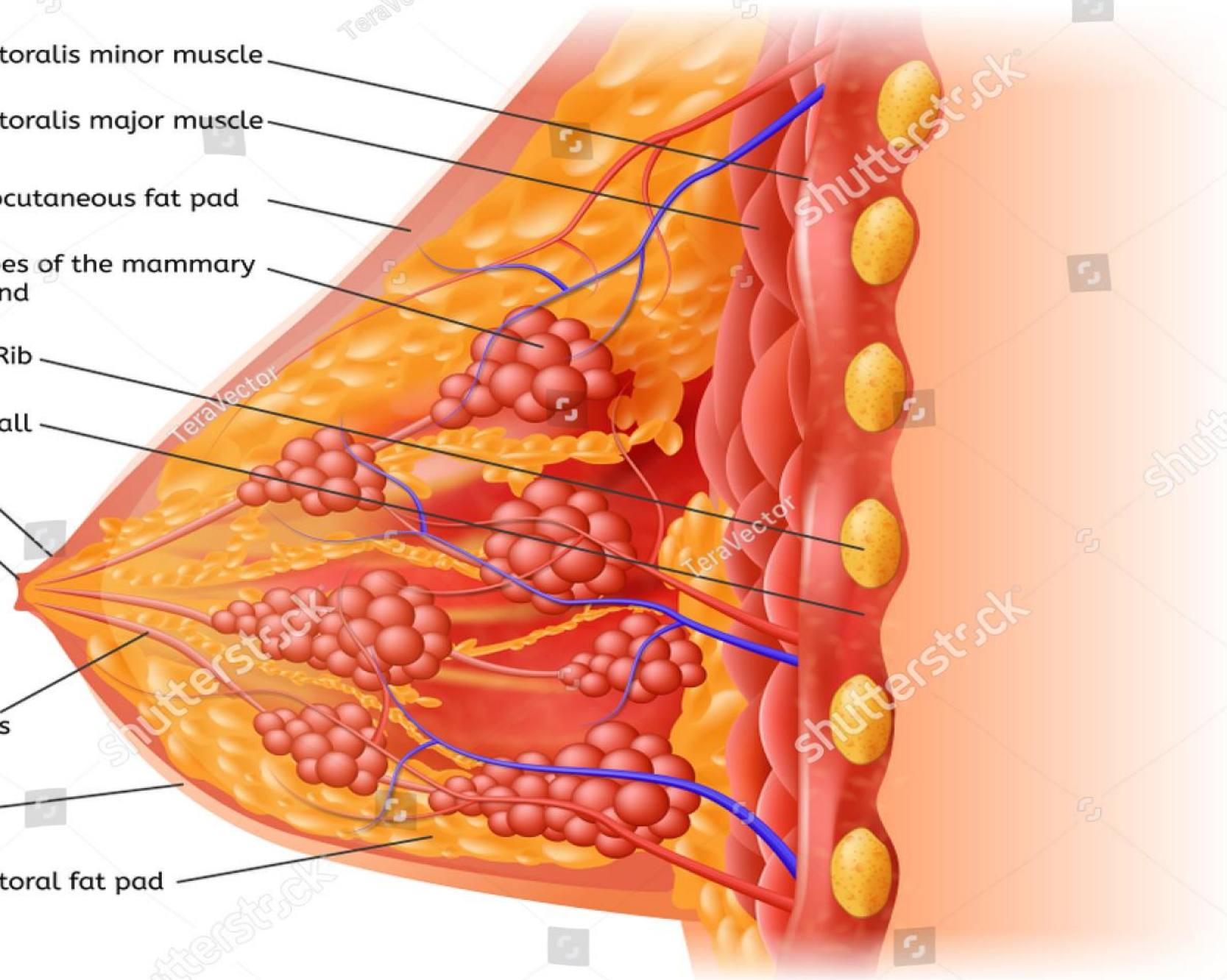


# ***BREAST IMAGING***

**Dr. FAIZA M. KUTRANI**

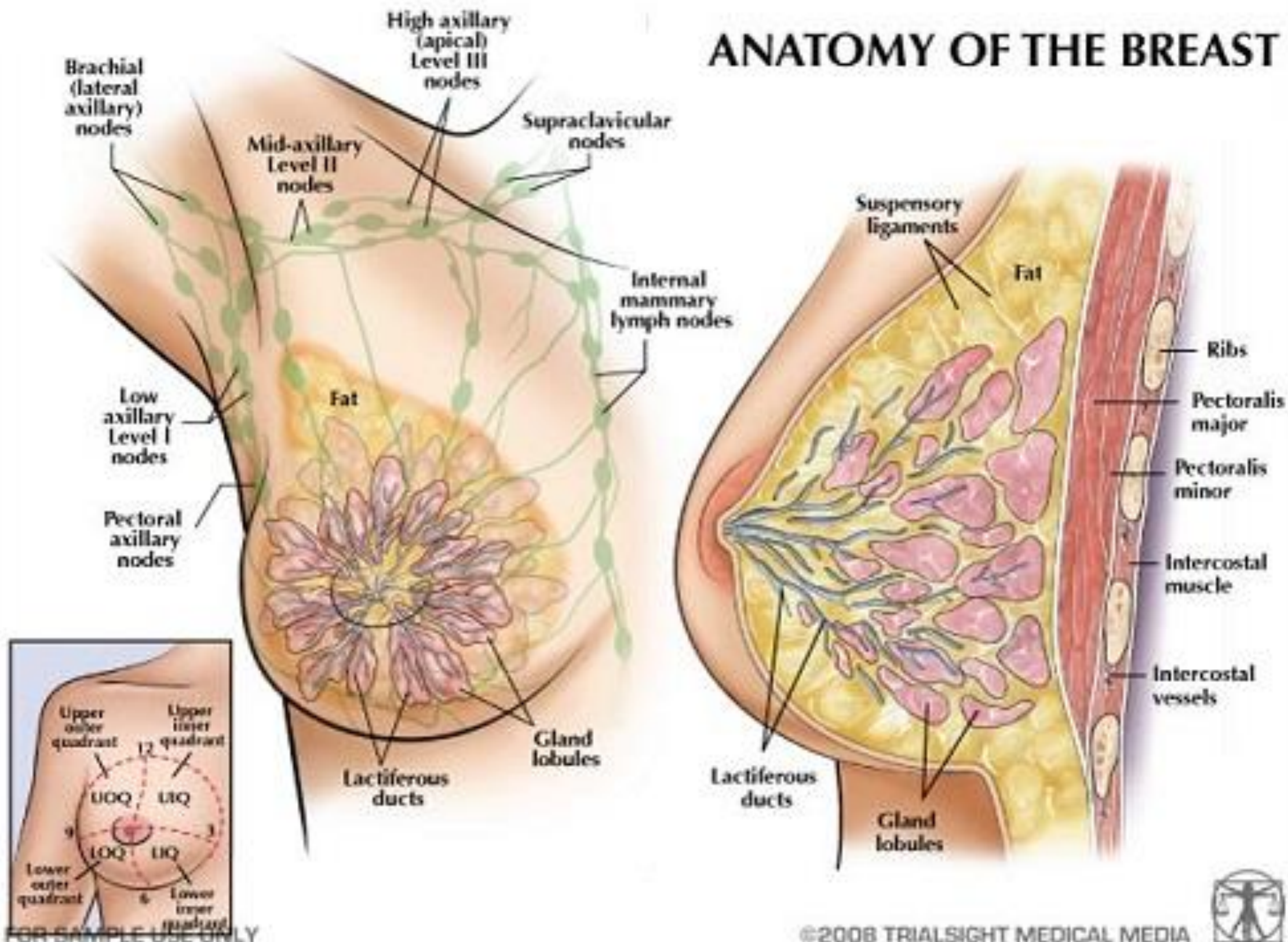
# Female breasts anatomy

- Pectoralis minor muscle
- Pectoralis major muscle
- Subcutaneous fat pad
- Lobes of the mammary gland
- Rib
- Chest wall
- Areola
- Nipple
- Lactiferous sinus
- Skin
- Pectoral fat pad

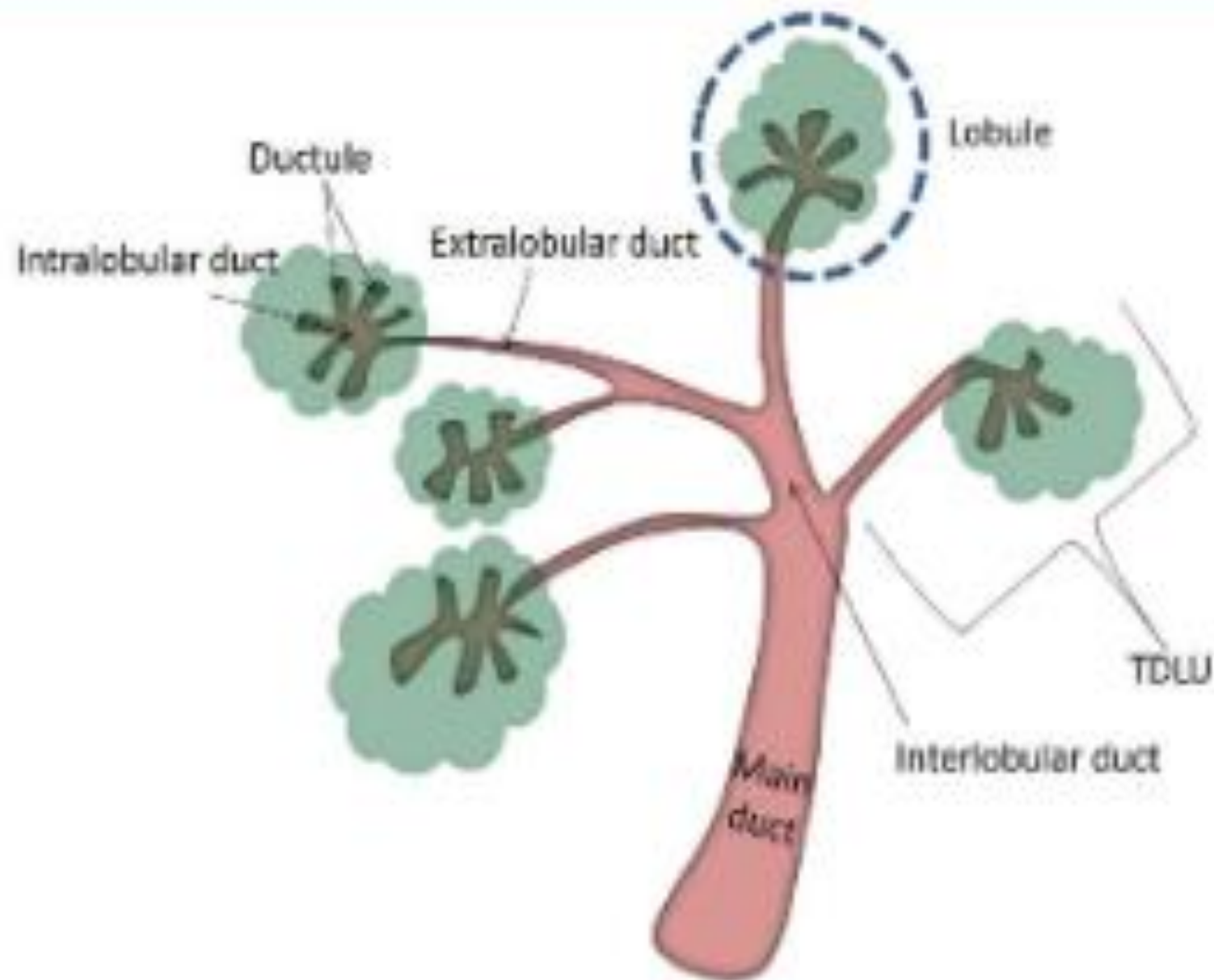




# ANATOMY OF THE BREAST



# Ductal Anatomy



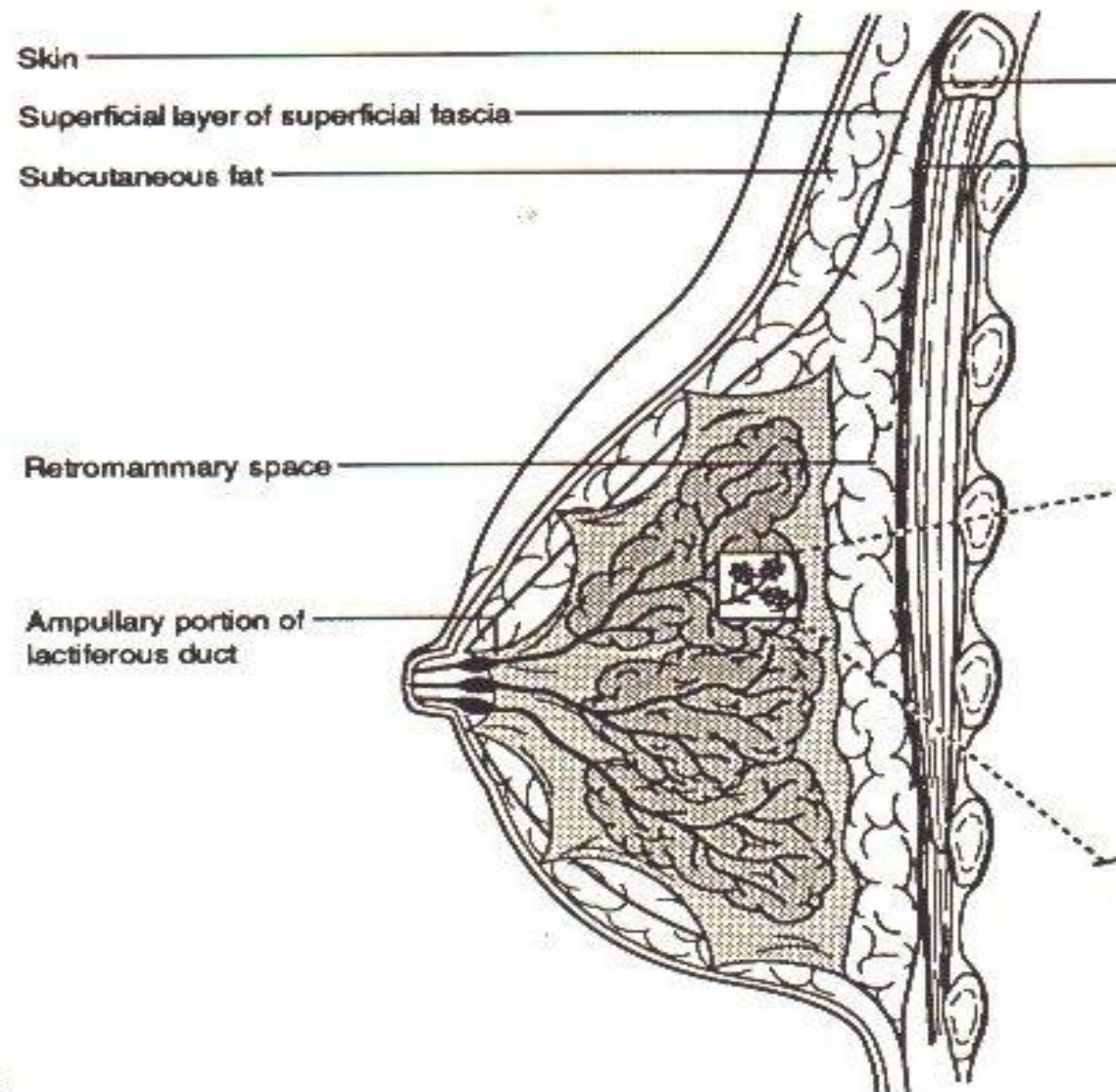


# SKIN

- ◎ The **skin** is 0.5-2mm thick.
- ◎ **Superficial fascia** lies Just beneath the skin, where it divides at the level of the breast into superficial & deep layers. The breast develops between the split layer of fascia and is enveloped by it



- The deep layers of this split fascia forms the retromammary fascia; and this lies immediately on the fascia that overlies the pectoralis major muscle (prepectoral fascia)
- providing a surface that permit some movement of breast on the chest wall.
- BVs.+lymphatics penetrate the fascial layers, coursing between the muscle& the breast





- ◎ **Subcutaneous fat** lies immediately beneath the skin. This layer varies with individuals. In some females it is clearly separate from the parenchymal cone of the breast. In others it cannot be distinguished from fat between the glandular structures.

# AREOLA

- The pigmented tissues of the areola contain numerous sweat and sebaceous glands. The skin of the areola is thicker than the rest of the breast skin; tapering down towards the limbus of the areola. The small raised nodular structures that are distributed over the areola are **Morgagni's tubercles** and define the openings of Montgomery's (sebaceous) glands.



# NIPPLE

There are between **8-20** major ducts that open on the nipple.

The width of each duct is **0.5-2mm**

The ducts and its tributaries defines a lobe of the Breast. Beneath the nipple openings; the major ducts dilate into their ampullary portions (**lactiferous sinuses**).

# THE NORMAL BREAST

- ◉ Menstrual Variation, Lactation and Aging
- ◉ *Imaging of the breast is further complicated by physiologic changes that occur in relationship to the patient's age and stage in the menstrual cycle.*
- ◉ *The breast in young women is extremely dense and consists mostly of glandular tissue. In lactation, the glandular tissue is more dense.*
- ◉ *In later part of menstrual cycle, the glandular tissue increases in density and size:*
- ◉ *As a woman ages, the glandular tissue is slowly replaced by fat*

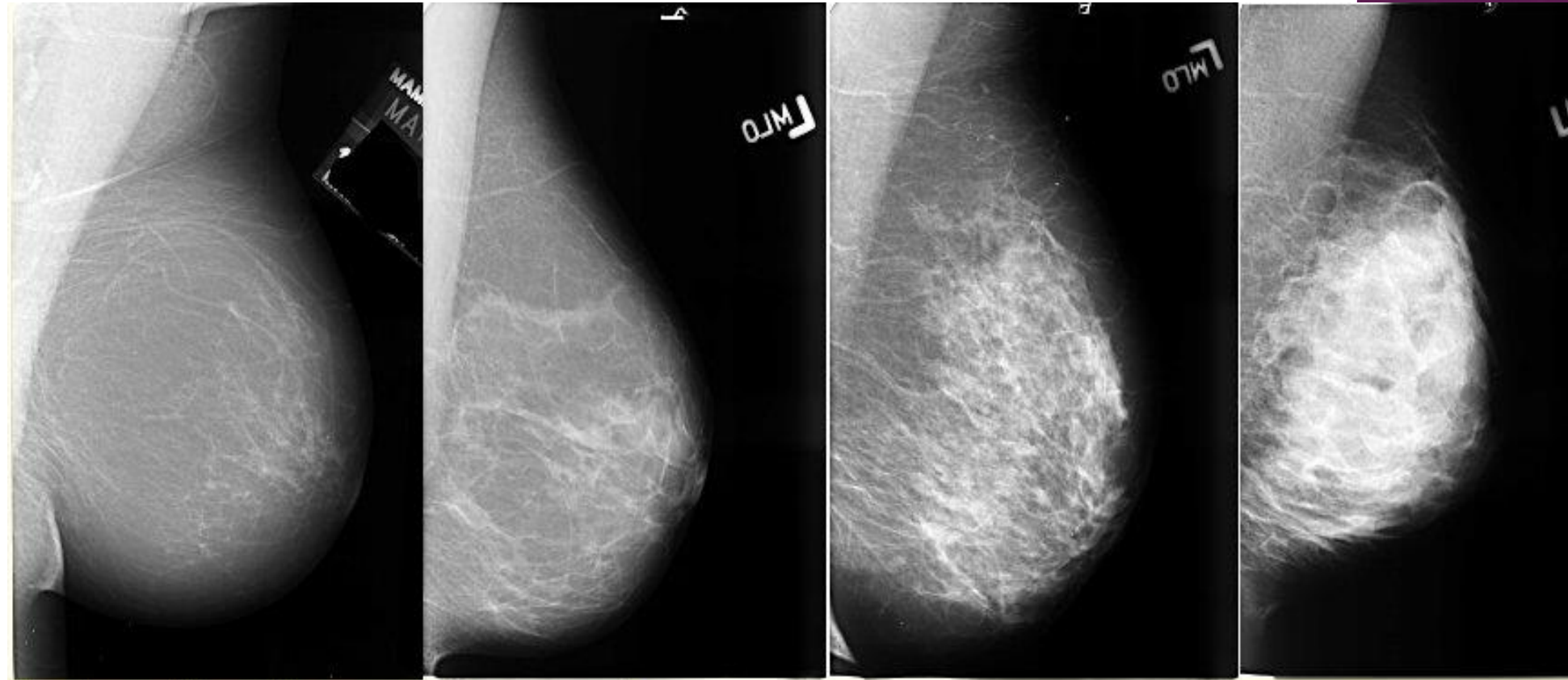


## ◉ Breast Composition

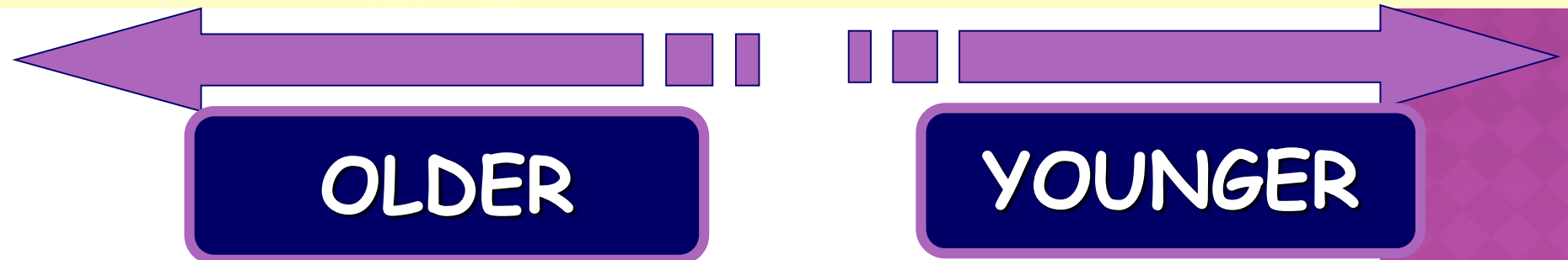
- ◉ • Almost entirely *fat*
- ◉ • *Scattered fibroglandular densities*
- ◉ • *Heterogeneously dense ,which could obscure detection of small masses.*
- ◉ • *Extremely dense .This may lower the sensitivity of mammography.*

# VARIABLE PATTERNS OF NORMAL BREAST PARENCHYMA

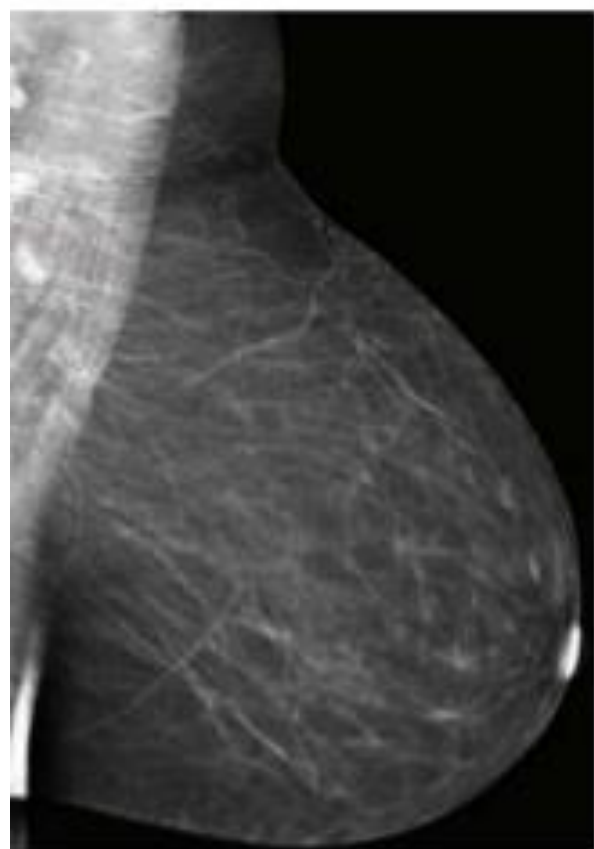
- Normal mammographic appearances vary widely, with a variable proportion of low density adipose tissue and higher density fibroglandular parenchyma and stroma



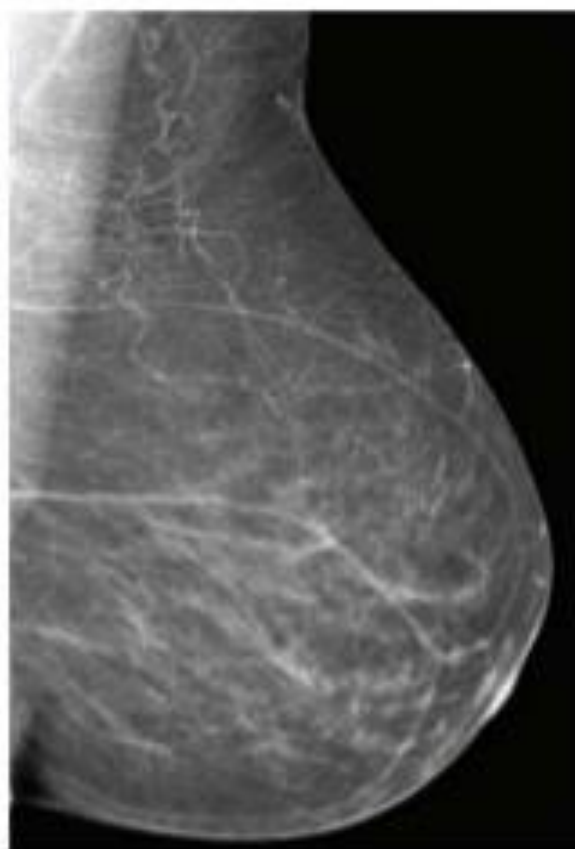
Breast composition and its mammographic appearance.<sup>1</sup>



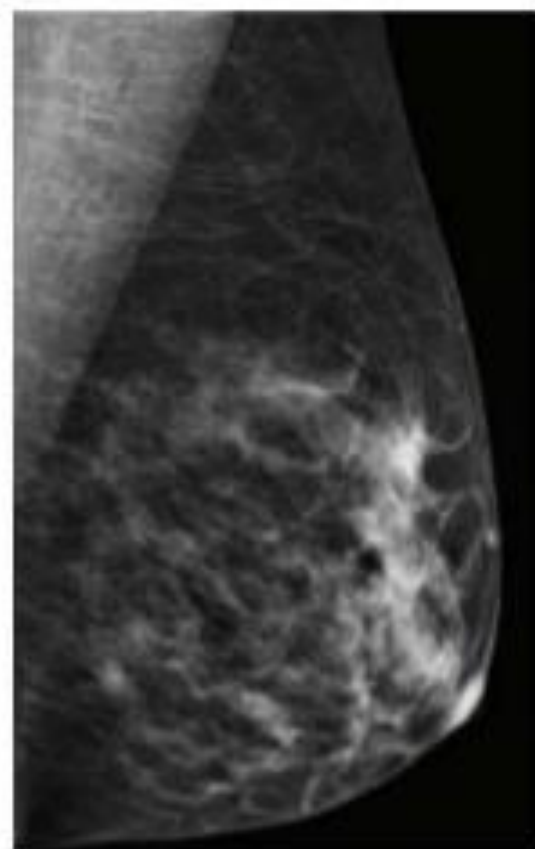
## FIBROGLANDULAR DENSITY



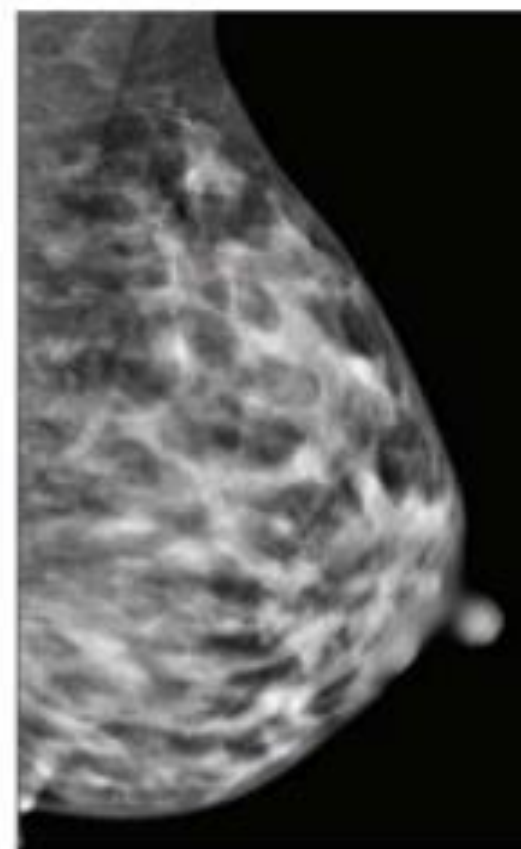
**Almost entirely fat**  
( $\leq 25\%$  fibroglandular)



**Scattered fibroglandular densities**  
( $25\% - 50\%$  fibroglandular)



**Heterogeneous fibroglandular densities**  
( $51\% - 75\%$  fibroglandular)



**Extremely dense**  
( $> 75\%$  fibroglandular)

In BI-RADS 2013 the use of percentages is discouraged, because in individual cases it is more important to take into account the chance that a mass can be obscured by fibroglandular tissue than the percentage of breast density as an indicator for breast cancer risk.



# BREAST IMAGING

- ◉ Mammography :
- ◉ Mammography is **a low dose x-ray** examination of the breast obtained using a dedicated x-ray unit designed to maximize the contrast between the various soft tissues of the breast. Screening and Diagnostic.
- ◉ US & colour Doppler .
- ◉ Galactography .
- ◉ MRI (dynamic contrast enhanced).
- ◉ CT.
- ◉ Scintigraphy .

# Screening mammography

- Mammography is the mainstay of breast imaging in women aged over 50 years and is the only method of population based screening that has been shown to result in a mortality reduction.
- Study performed in asymptomatic women to detect breast cancer at an earlier stage to disease
- **ACR SCREENING GUIDELINES**
  - •Baseline Mammogram by age 40
  - •Mammogram every year beginning at age 40
  - •Clinical Breast exam every year beginning at age 40 decrease breast cancer mortality

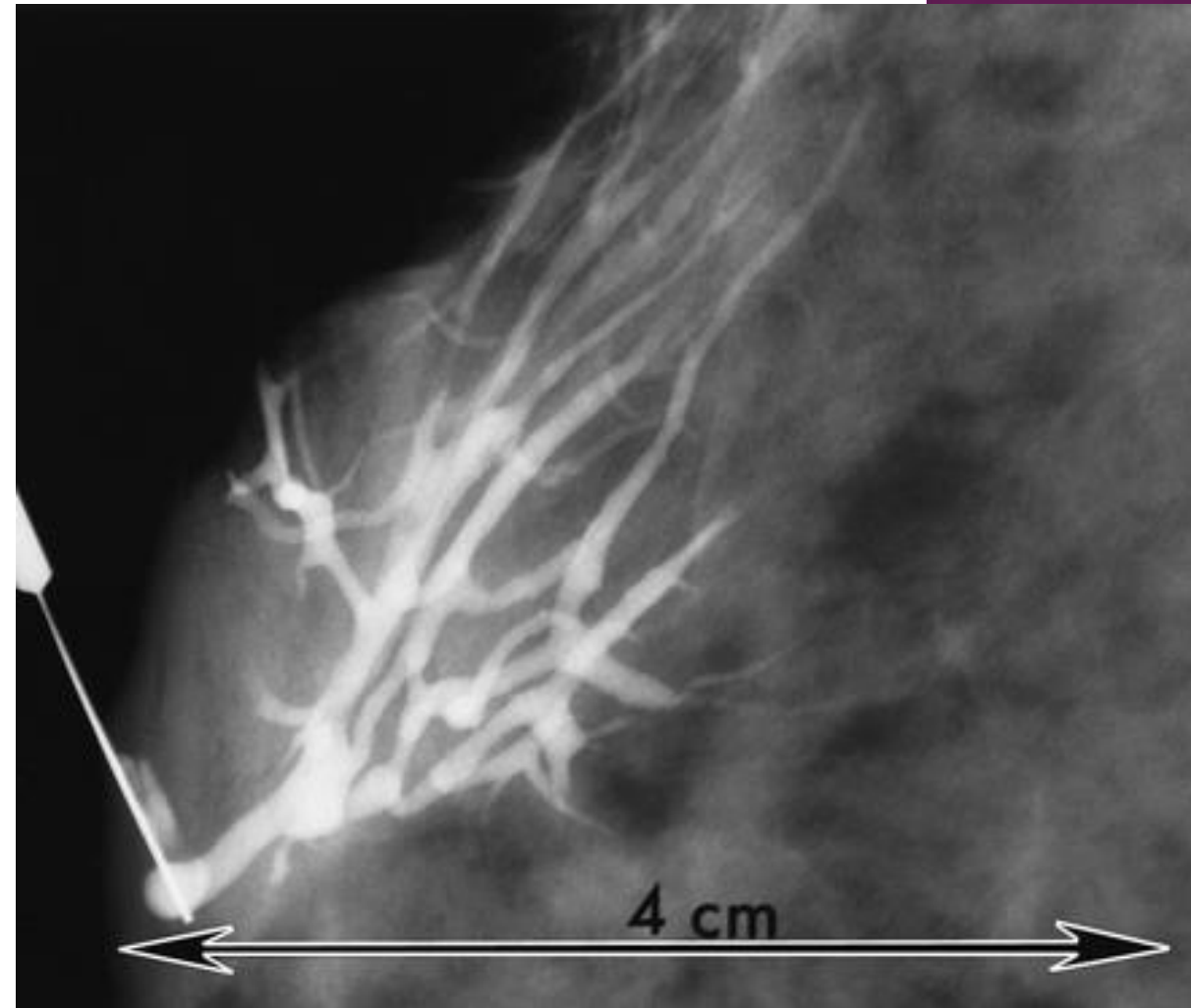
## DIAGNOSTIC MAMMOGRAPHY

- Study performed in women with signs or symptoms of breast.
- It helps evaluate the clinical area of concern AND the remaining breast tissue for occult Breast cancer.



## GALACTOGRAPHY

- Involves the retrograde injection of water soluble contrast in conjunction with mammography to evaluate nipple discharge.
- It cannot differentiate benign from malignant intra-ductal tumors



# Breast MRI

- MRI is highly sensitive in detecting breast cancer, but high cost and low specificity have continued to limit the use of MRI as a screening tool. Another problem is that **MRI cannot identify malignant calcifications**
- **Potential roles for contrast-enhanced MRI of the breast:**
  - determining the size and extent of known invasive cancers.
  - identifying multi-centric lesions.
  - evaluating the ipsilateral breast of a woman who comes initially to attention with axillary metastases.
  - identifying a recurrent carcinoma in a conservatively treated breast. .

# RADIONUCLIDE IMAGING

- ◉ Breast scanning after the injection of radionuclide-labeled substances which concentrate in areas of high metabolic activity, including some tumors:
  - $^{99m}\text{Tc}$  methoxy isobutyl isonitrile (MIBI) breast scintigraphy ("scintimammography")
  - positron emission tomography (PET) after the injection of fluorine-18 2-deoxy-2-fluoro-D-glucose (FDG).
  - $^{99m}\text{Tc}$  sulfur colloid have shown early promise in clinical practice for the identification of the so-called "sentinel nodes" in the axillae prior to surgery.



# BREAST ULTRASONOGRAPHY

- ◉ is the first line investigation in symptomatic women :
- ◉ under 40 years, in whom the breast tissues are generally dense .
- ◉ in whom it is desirable to avoid irradiation of the breast tissue.
- ◉ It is also extremely useful in characterizing mammographic findings in older women since these are often indeterminate, complementary with mammography.
- ◉ It should not be used for screening for any age group, but when properly employed it can increase the overall diagnostic accuracy of breast imaging.
- ◉ The important role of ultrasound is the differentiation of a cyst from a solid mass. In this role, its accuracy is in the range of 96% to 100%

- ① US should be performed with 7.5-10 MHz real time system.
- ① US has been recommended as the primary imaging technique for women < 30yrs. with breast problems, this is because:
  1. Lower prevalence of breast Ca
  2. The breast , will be dense and poorly identified by mammography.
  3. Susceptibility to radiation induced malignancy.

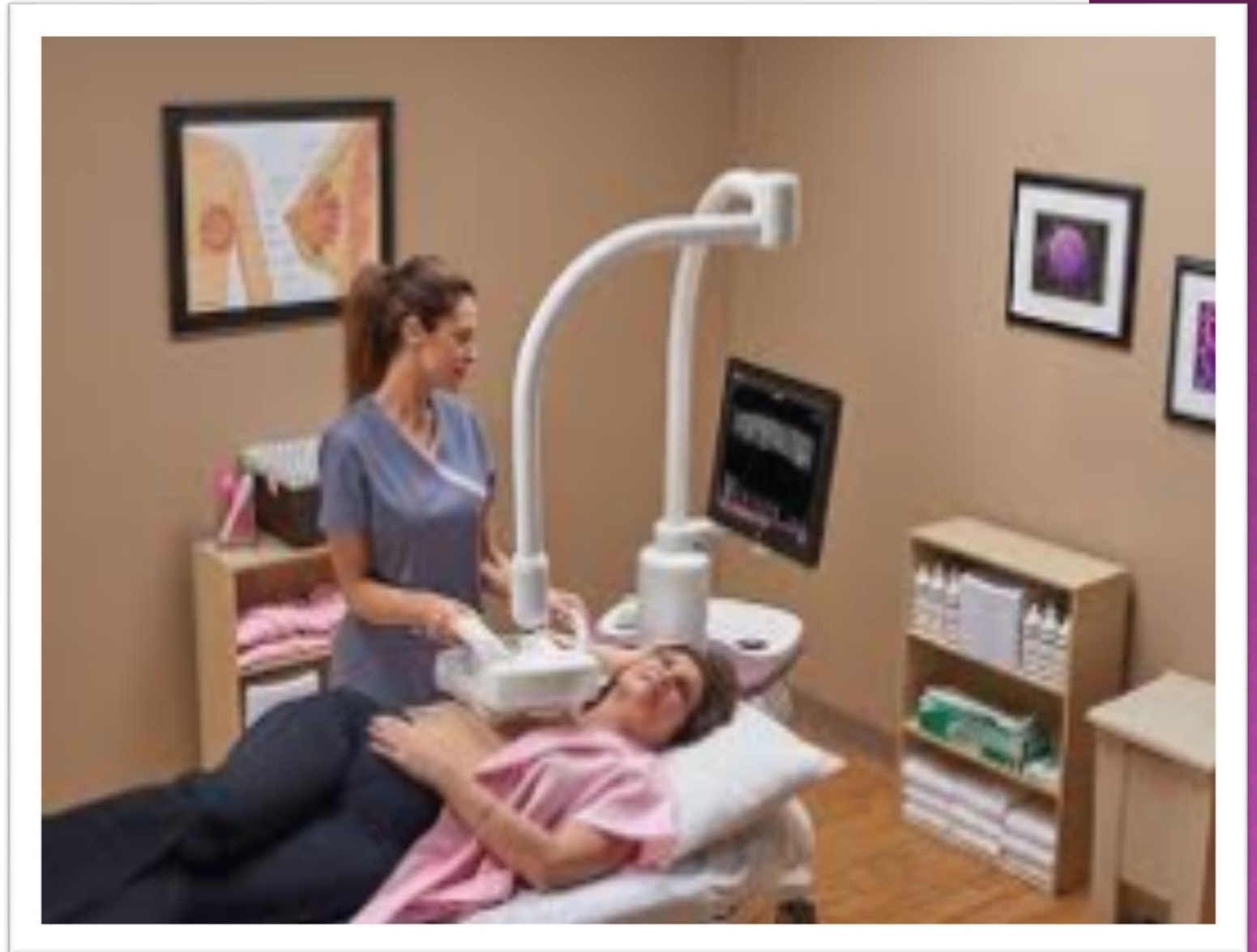
# ADVANTAGES OF US

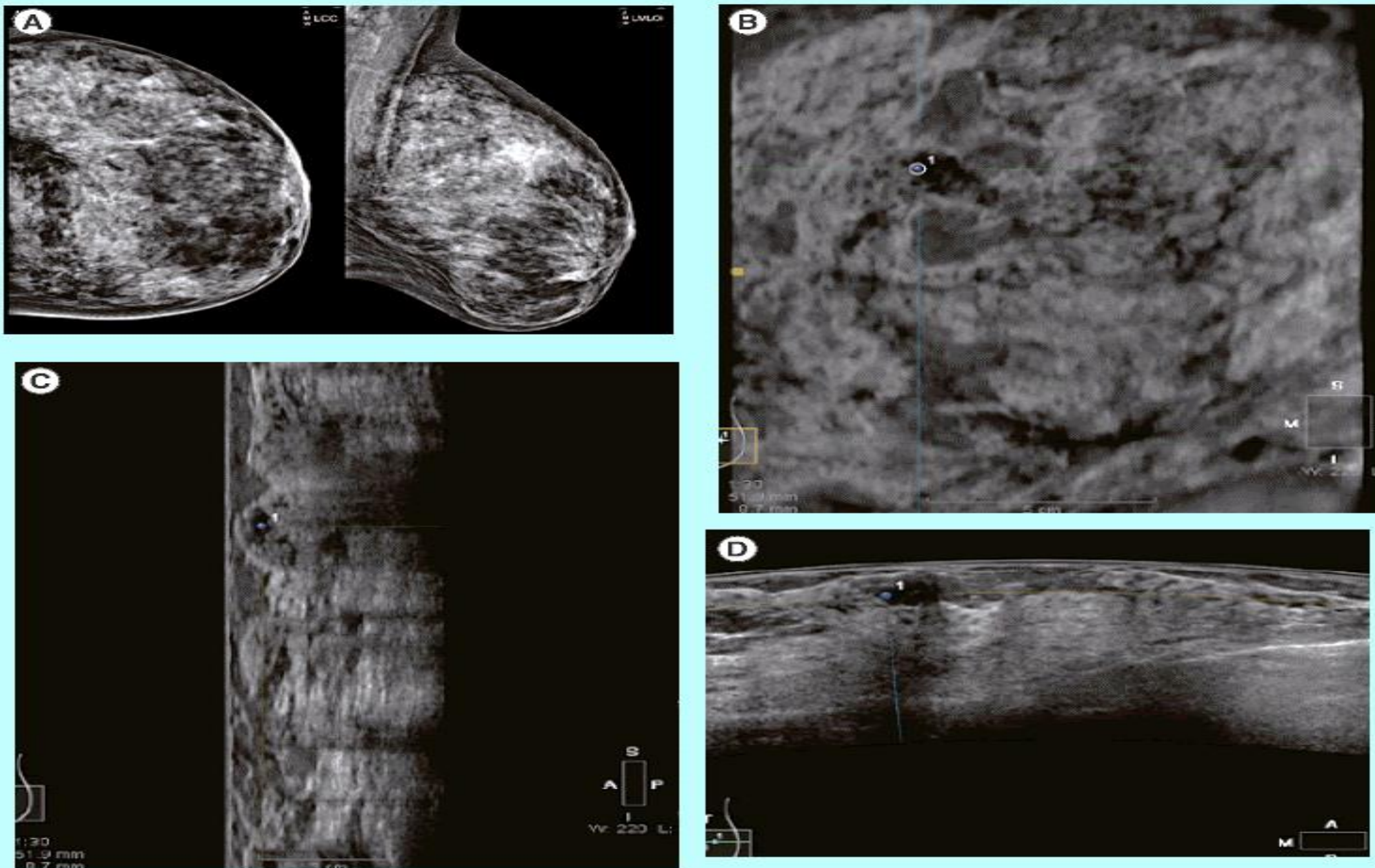
- ◉ Availability :
  - Widely available technology .
  - Mobile equipment .
  - Cost effective technique.
  - No film developing
- ◉ No radiation exposure



# AUTOMATED BREAST ULTRASOUND

- (ABUS) is a newer approach to finding up to 30 percent more cancers in women who have dense **breast tissue** (more fibrous or glandular than fatty)



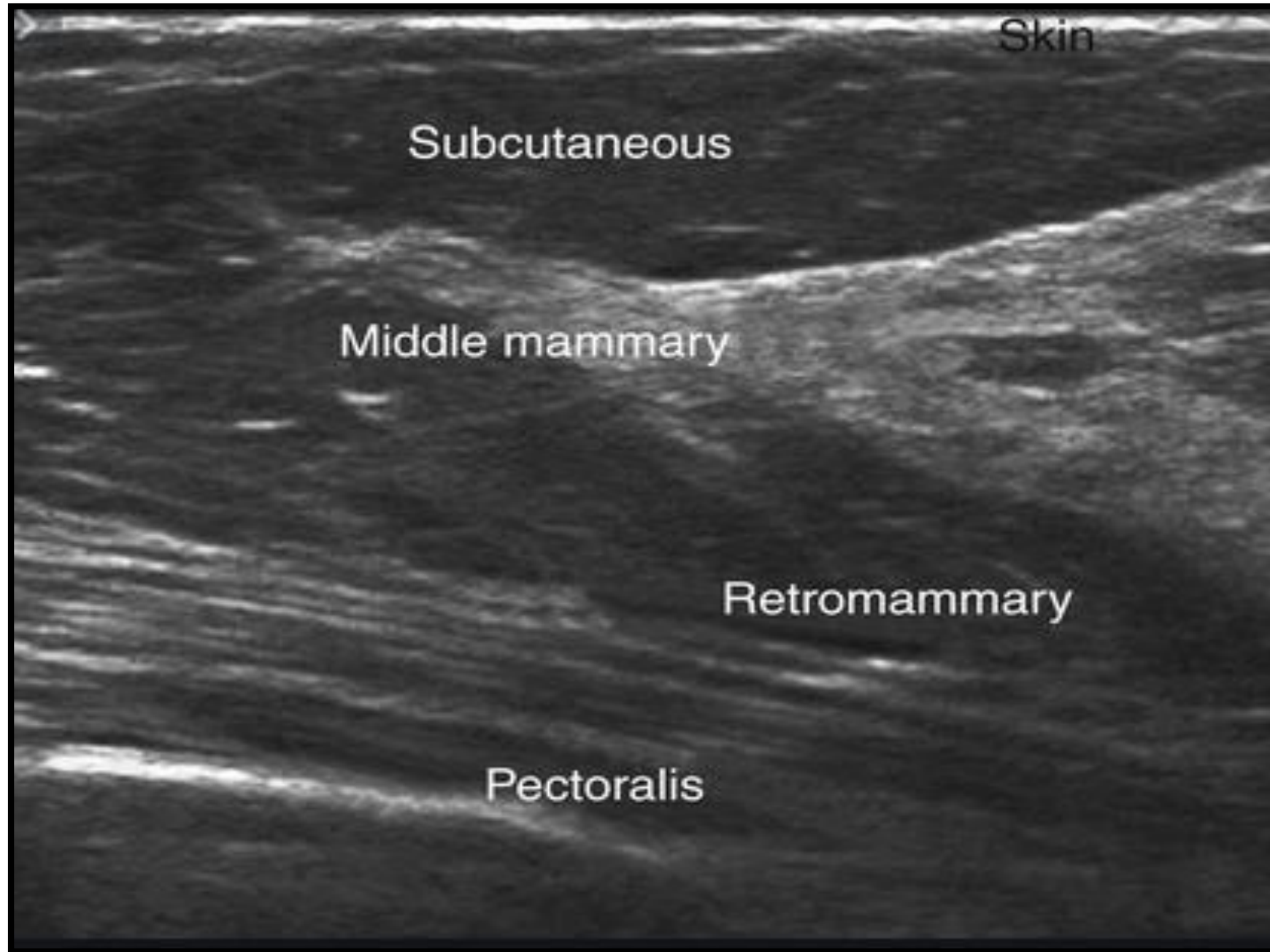


**Figure 2. Cancer detected by Automated Breast Ultrasound System only.** (A) 60-year-old female with stable screening mammogram, left cranio-caudal and mediolateral-oblique views, Breast Imaging-Reporting and Data System density 4. Cancer in the same patient, seen on automated breast ultrasound only, appears as a hypoechoic mass in (B) coronal, (C) sagittal and (D) transverse views in the left breast at the 2 o'clock position. Pathology revealed invasive mammary carcinoma.





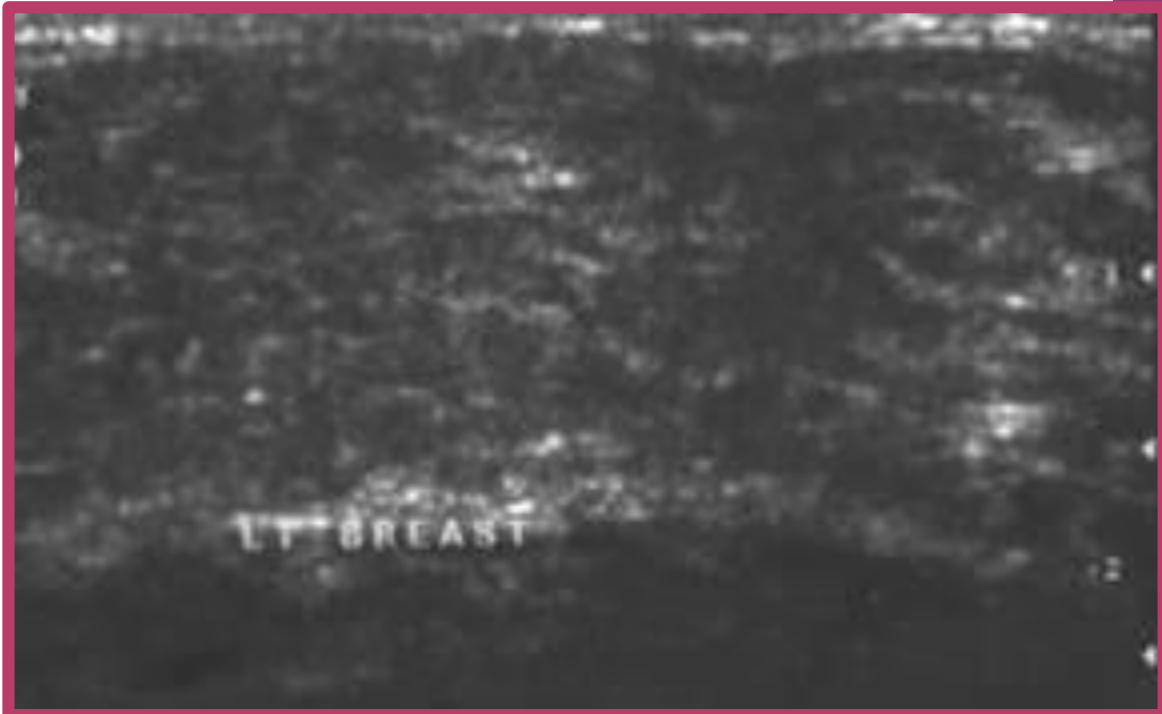
# NORMAL BREAST US





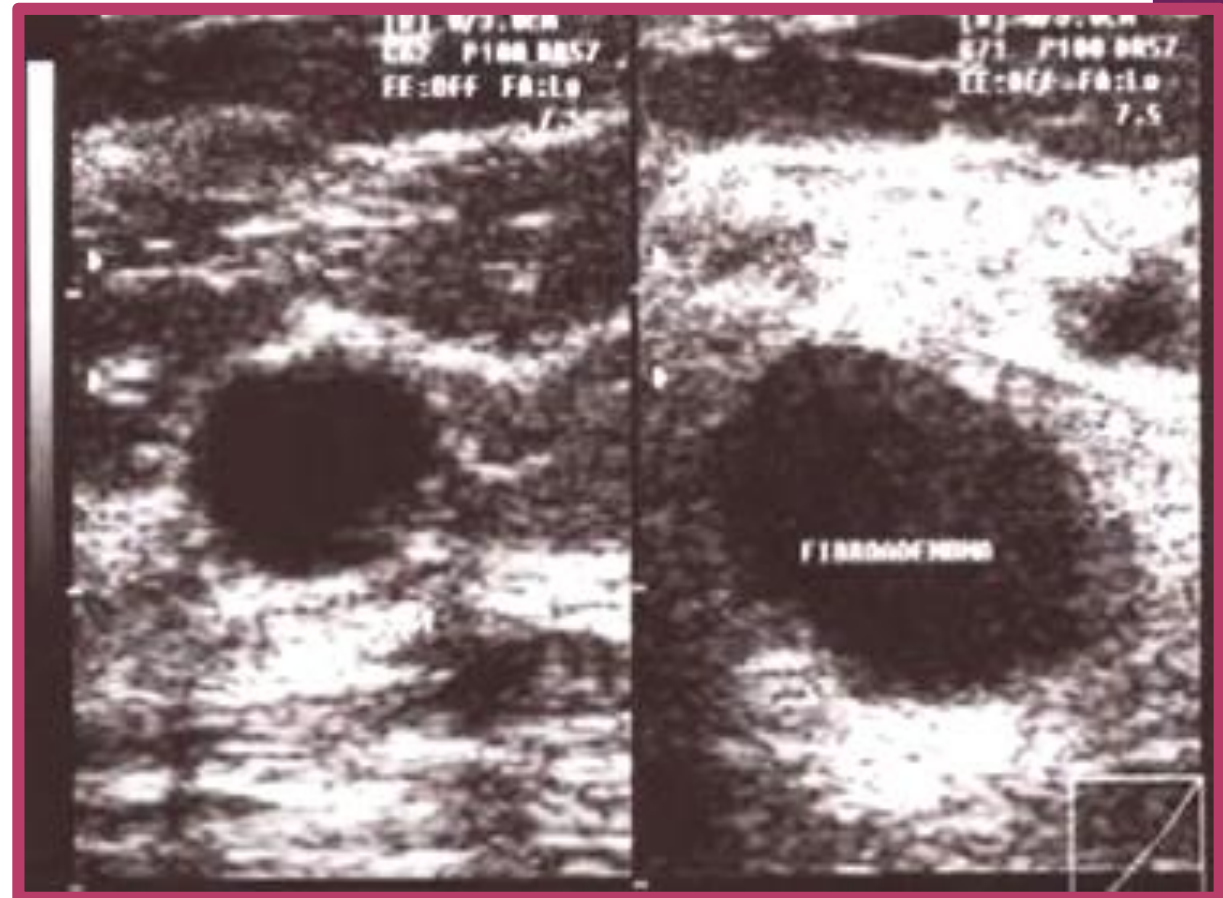
# ADVANTAGES OF US

- Good sound penetration in dense glandular tissue :
  - young women ( up to 30 years).
  - Benign breast diseases .
  - Post menopausal women on hormone replacement therapy .



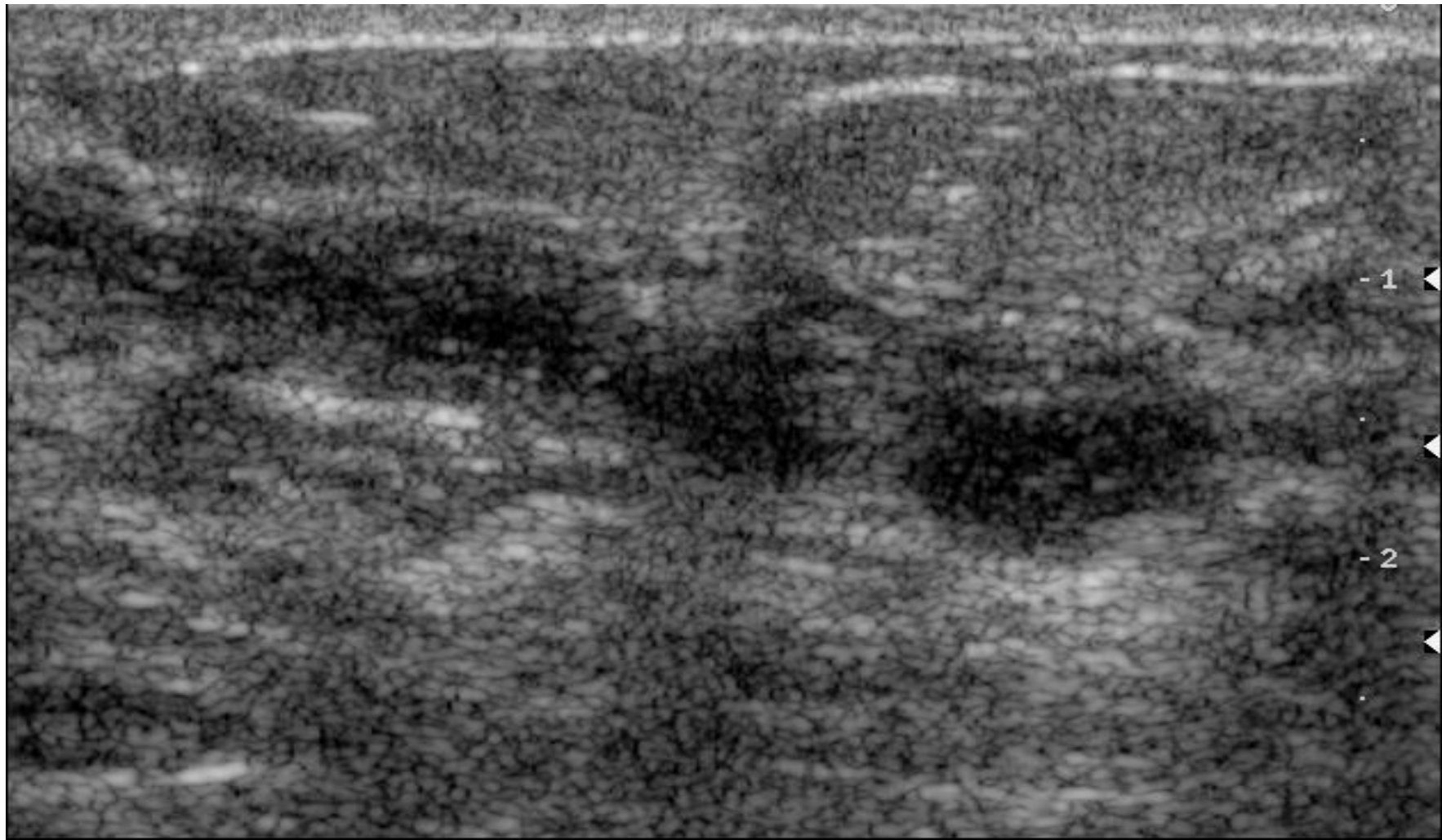
# ADVANTAGES OF US

- Differentiation of cystic and solid masses .
- Good soft tissue discrimination .
- Detect multifocal lesions
- Precise measurement of tumor extent .



# ADVANTAGES OF US

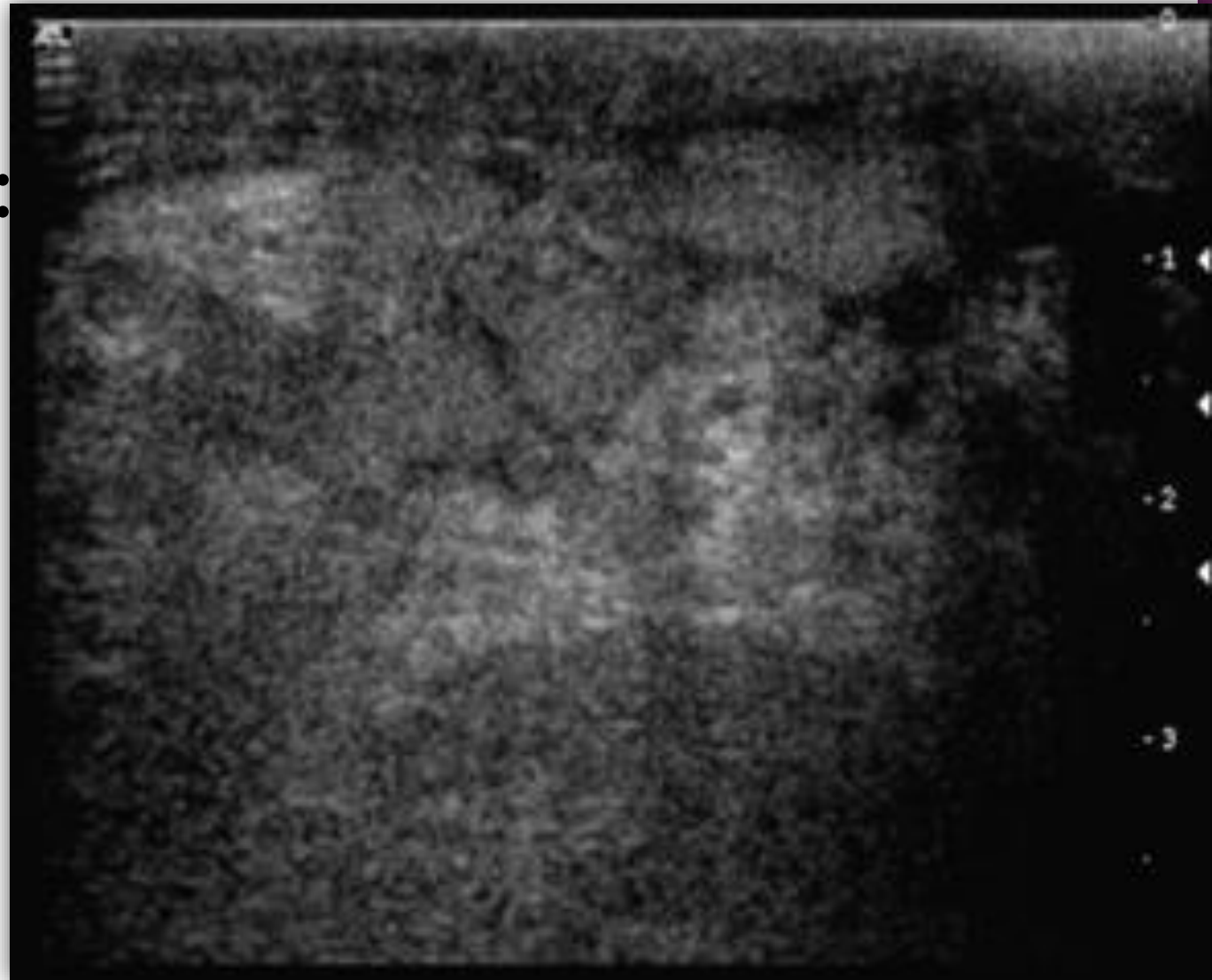
- ◉ Inflammatory breast lesions



# ADVANTAGES OF US

Dynamic examination:

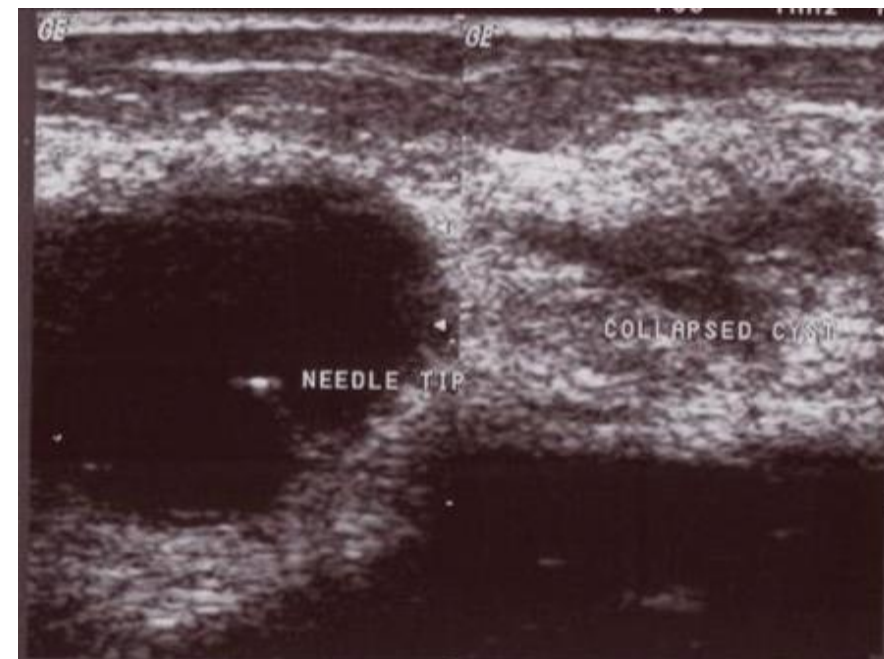
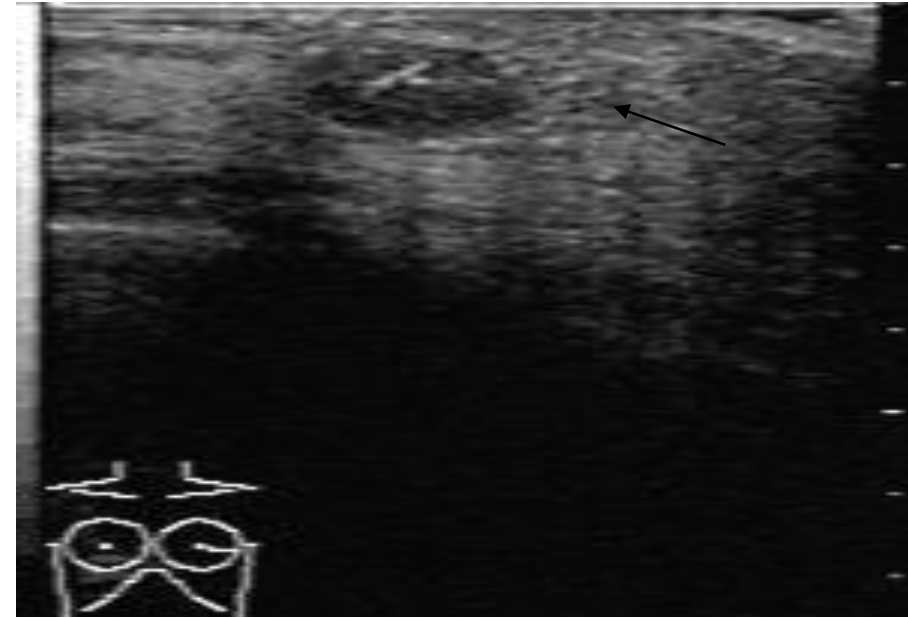
- Compressibility .
- Moving internal contents .





# ADVANTAGES OF US

- ◉ Accurate guidance of interventional procedures .
- ❖ Needle localization.
- ❖ Tissue sampling :
  - FNAC .
  - Core biopsy .



# *INDICATIONS*

- ◉ Differentiation of cysts from solid masses
- ◉ Evaluation of a palpable mass not visible in radiographically opaque breast
- ◉ Evaluation of palpable mass in young patient
- ◉ Evaluation of an inflamed breast for the presence of an abscess
- ◉ Evaluation of a mass that cannot be completely evaluated by mammography because of its deep location.
- ◉ Guidance for interventional procedures
- ◉ For duplex color flow

# DISADVANTAGES OF US

- ◉ Operated dependent .
- ◉ Equipment dependent :quality , transducer used ,settings .
- ◉ Large fatty breast .
- ◉ Microcalcification .
- ◉ Screening .

# BI-RADS(BREAST IMAGING REPORTING AND DATA SYSTEM) CATEGORIES

- BI-RAD 1 Negative (N): No comments, breasts are normal
- BI-RAD 2 Benign Finding
- BI-RAD 3 Probably Benign Finding A finding is on an image and it is most certainly benign, but needs to be observed for changes
- BI-RAD 4 Suspicious Abnormality (S): Possibility of lesion in breast being malignant
- BI-RAD 5 Highly Suggestive of Malignancy (M): High probability of cancer, actions should be taken.
- BI\_RAD 6 Proven maligantant.





# MAMMOGRAPHY

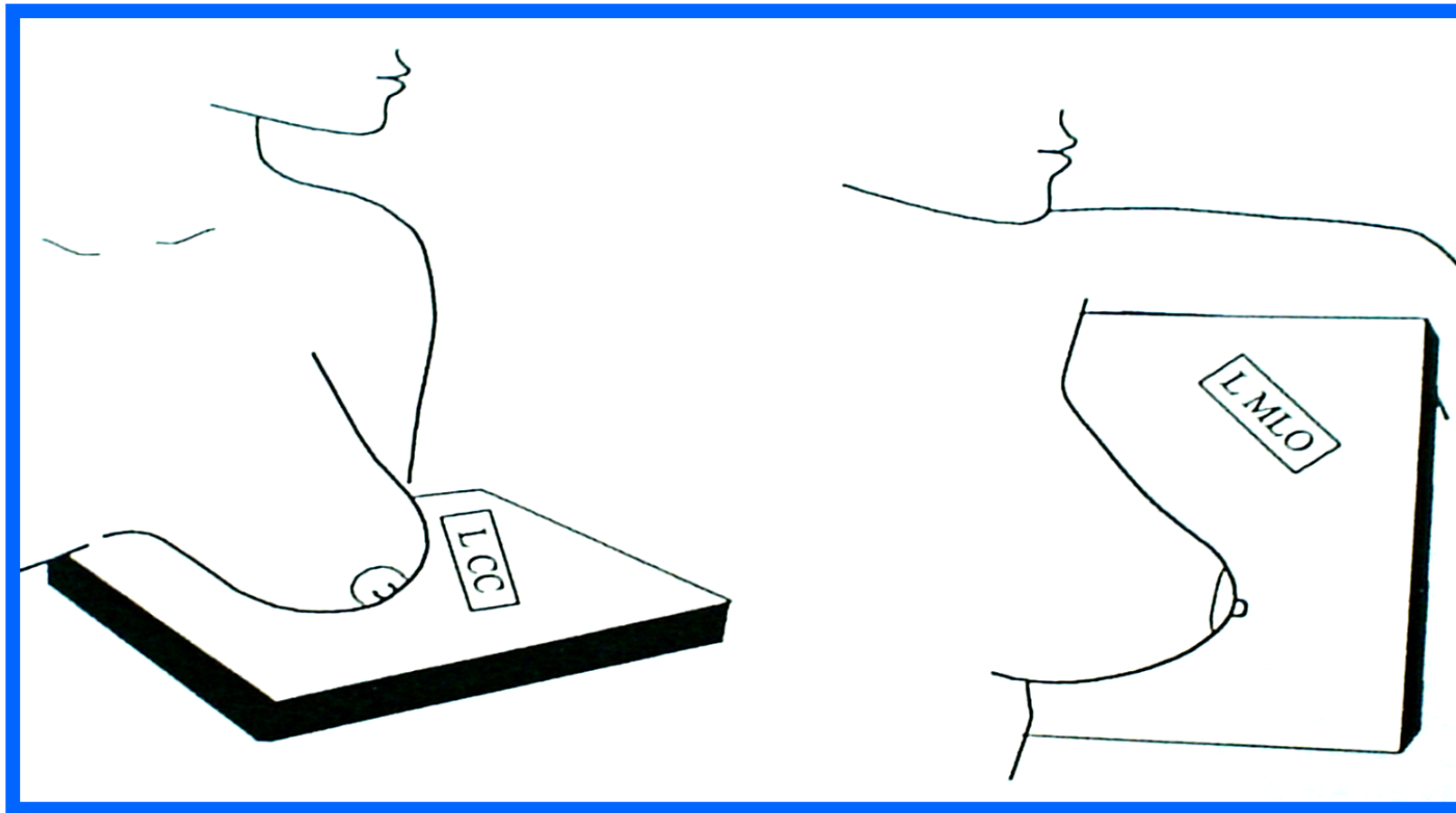
⦿ How do we perform mammography?

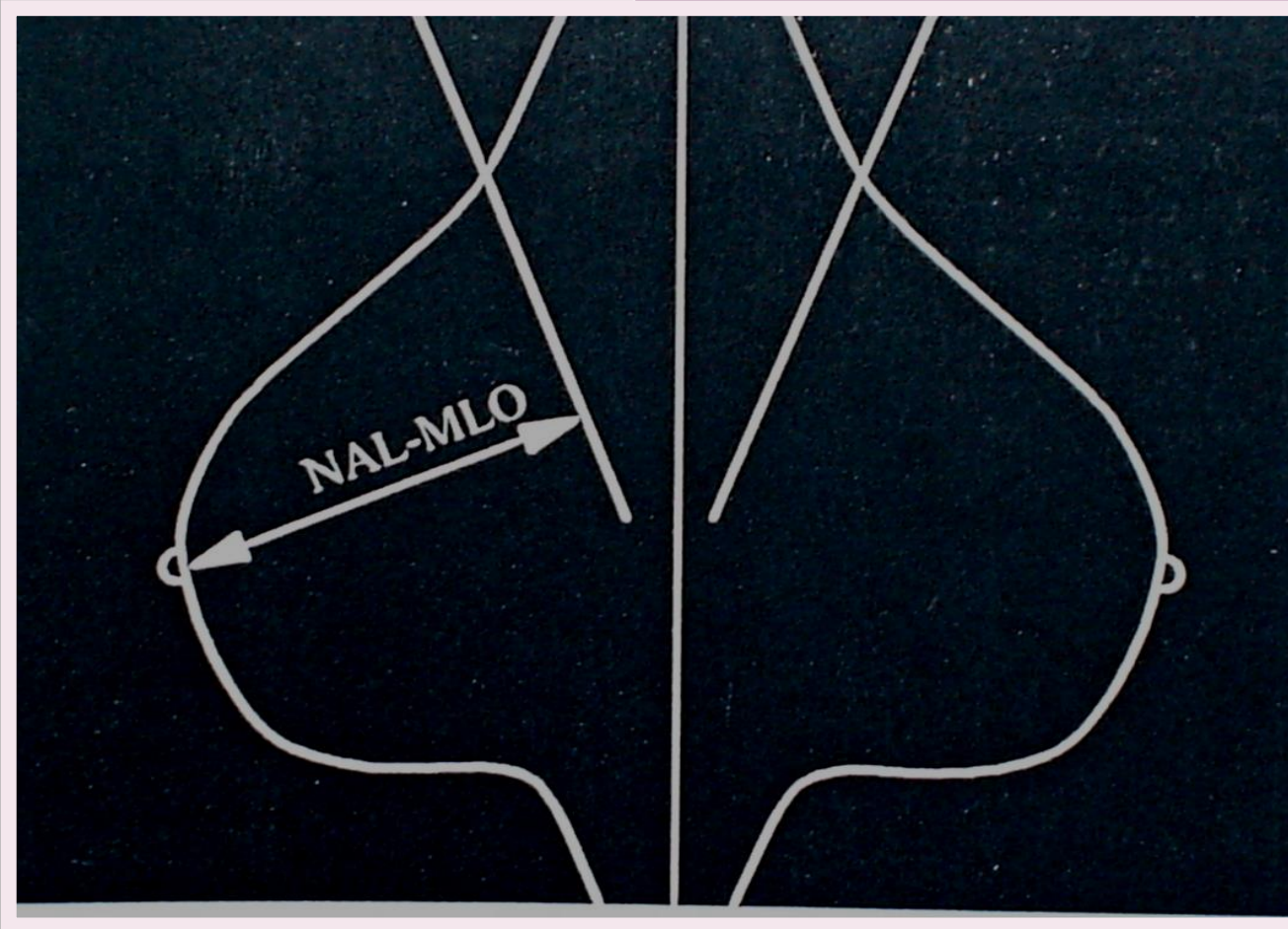


# Mammogram Standard Views

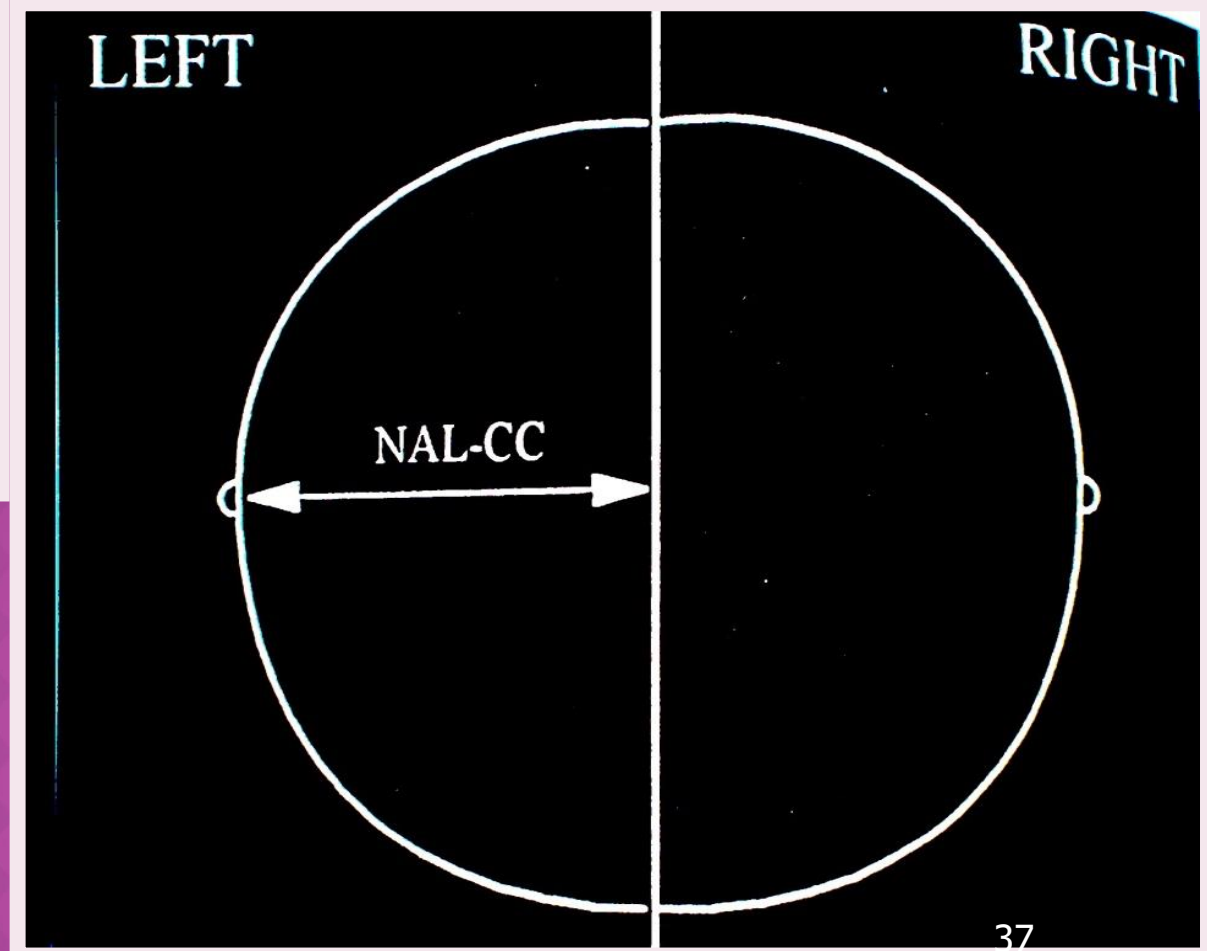
CRANIOCAUDAL (CC).

MEDIOLATERAL OBLIQUE(MLO)





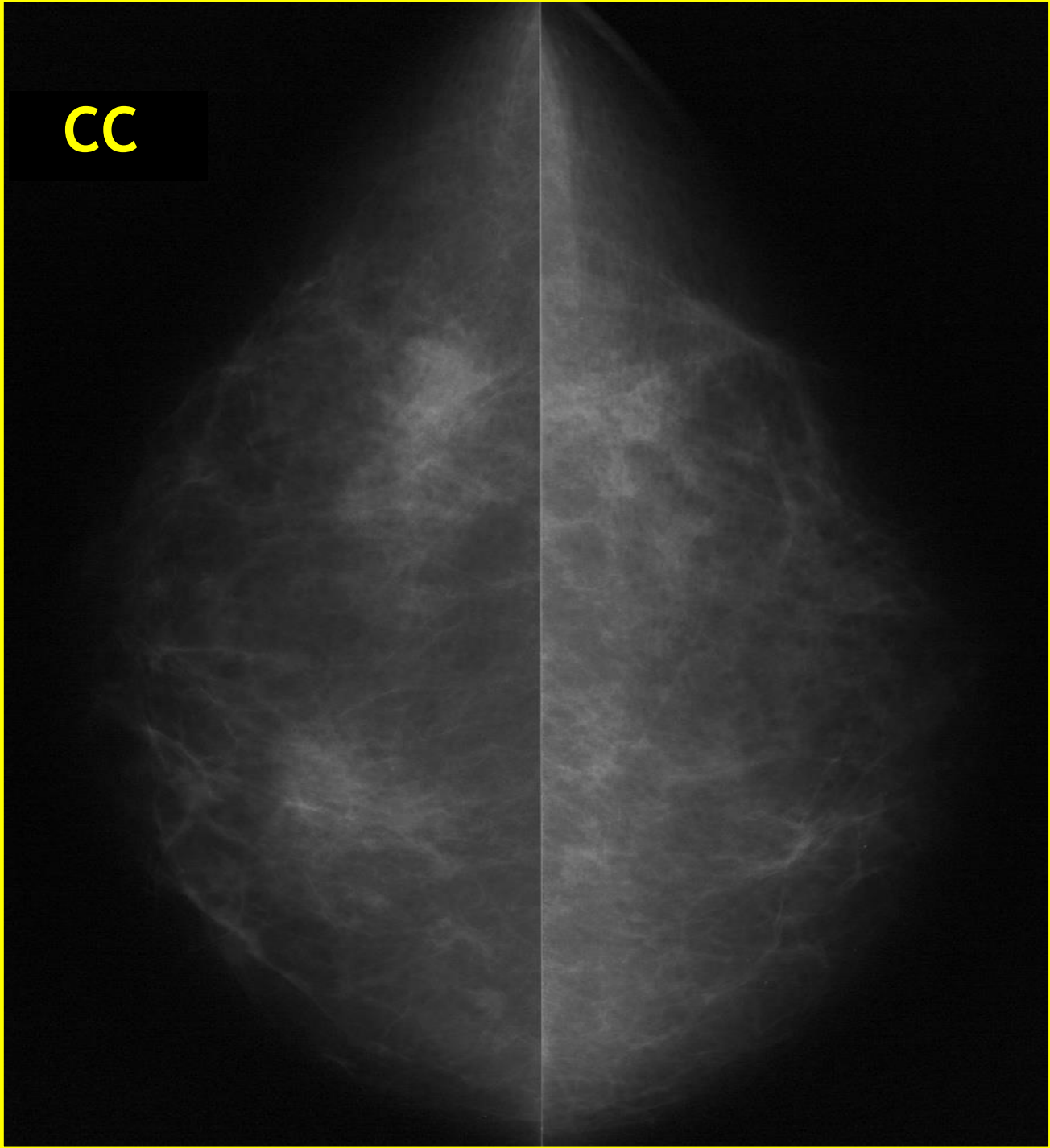
MIRROR IMAGE



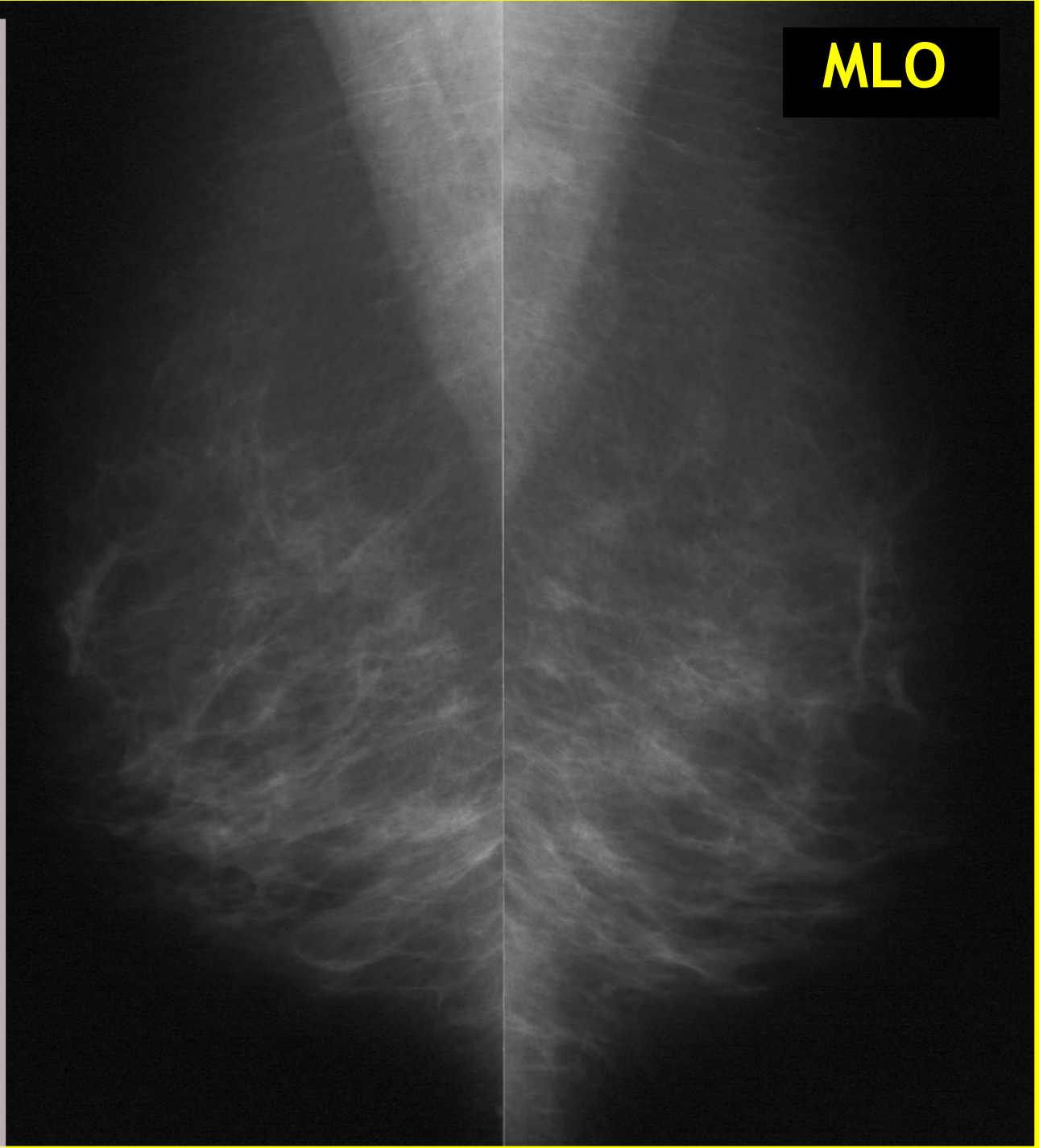
COMPARE SIMILAR AREAS



CC



MLO





# SENSITIVITY OF MAMMOGRAPHY

- ⦿ 85% - 90% in fatty replaced breasts
- ⦿ 65% in dense breasts

Mass 1 | Mass 2 | Mass 3

### Site in Breast

side

segmental

depth in tissue

peri-aereolar

right

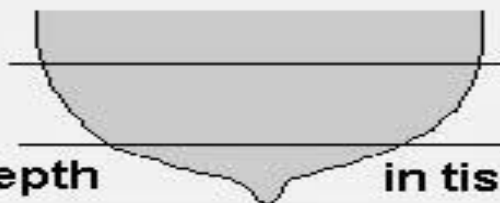


side



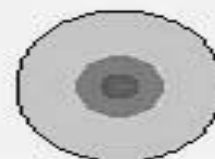
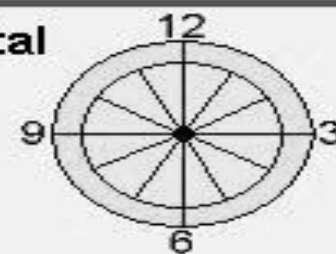
left

depth



in tissue

segmental



peri-aereolar

### Shape



round



oval



irregular



macro-lobulated



micro-lobulated



spiculated

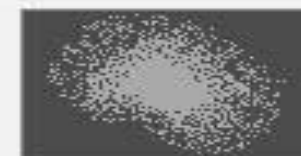
### Margins



circumscribed



obscured



indistinct

### Density



hyperdense



isodense



hypodense



fat containing

### Texture



homogeneous



heterogeneous

Change

YES

NO

# WHAT ARE WE LOOKING FOR???

THE RADIOLOGIST SHOULD SEARCH THE IMAGES FOR

MASSES

CALCIFICATIONS

AREAS OF  
ASSYMETRY

CHANGES FROM  
PREVIOUS EXAMINATIONS

## ***BI-RADS DEFINITION OF “MASS”***

- Space-occupying lesion
- See in two projections
- Convex outward borders
- “ASYMMETRY” if only in one projection (new)



# MASSES

LOCATION

SIZE

SHAPE

MARGINS

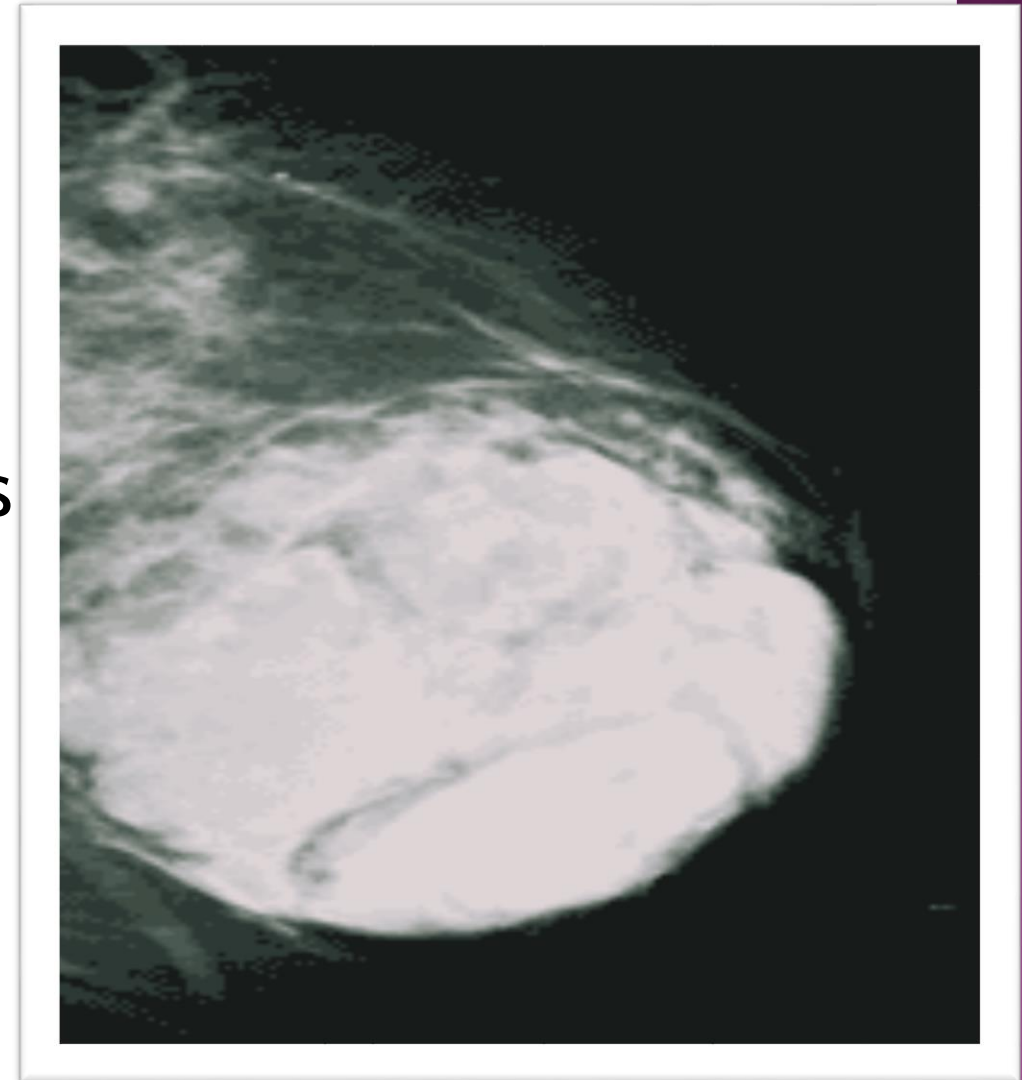
OTHER SIGNS

# MAMMOGRAPHIC MASSES

A mass is localized collection of tissue

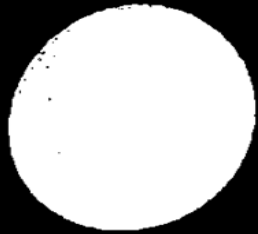
Characteristics:

- **Shape:** a smooth defined lobule is usually benign, but a ragged edge can be malignant
- **Margins:** characterization of the edge or transition between a mass and surrounding normal fatty tissue
- **Density:** degree of X-ray attenuation is defined relative to the expected attenuation of an equal volume of normal glandular breast tissue (the majority of breast cancers have high attenuation)



# MASSES

## SHAPE



Round



Oval



Lobulated



Irregular

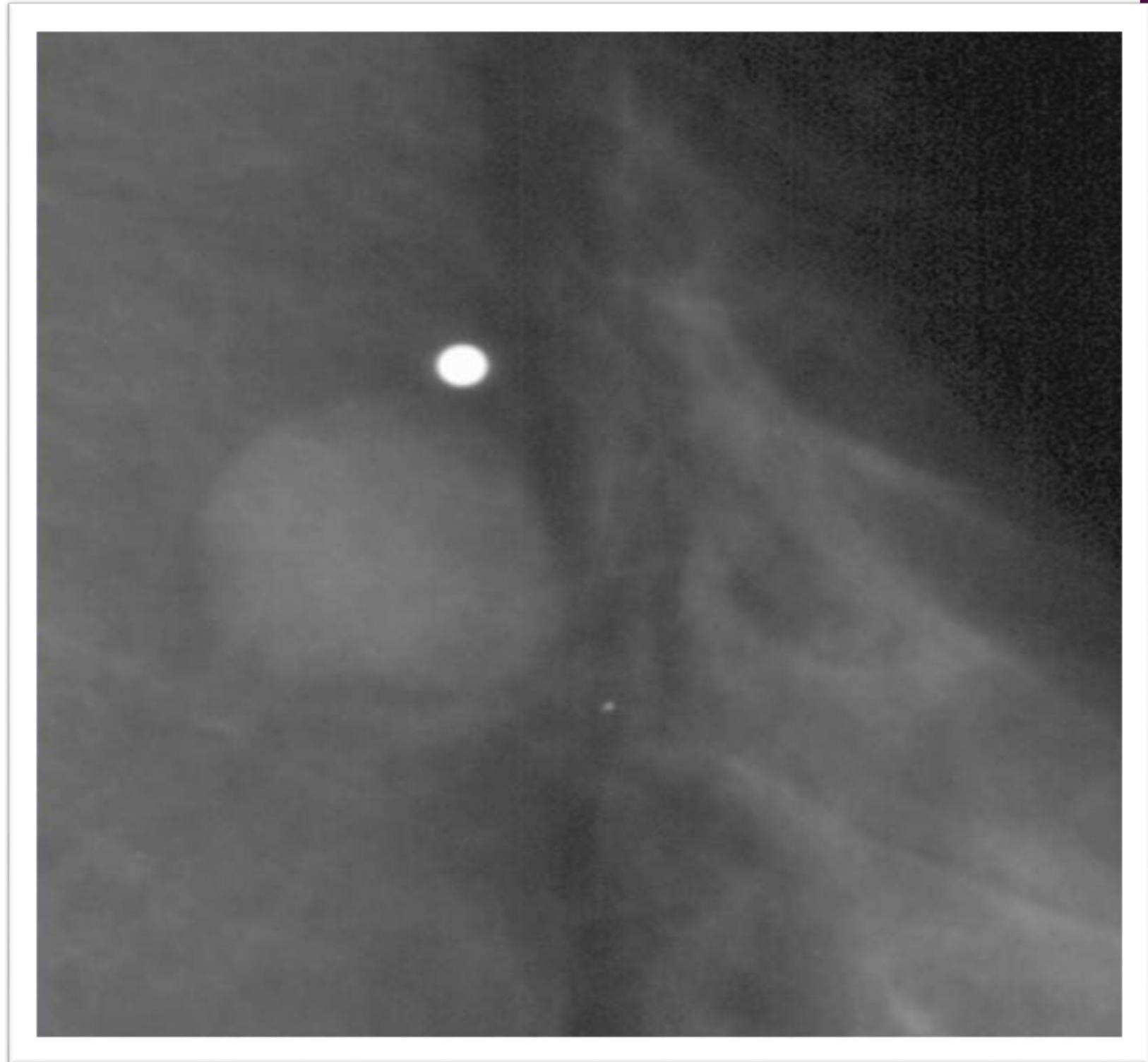


Architectural  
Distortion

**BENIGN**

**MALIGNANT**

- ◉ MASS SHAPE
- ◉ ROUND
  
- ◉ Spherical
- ◉ Circular
- ◉ globular



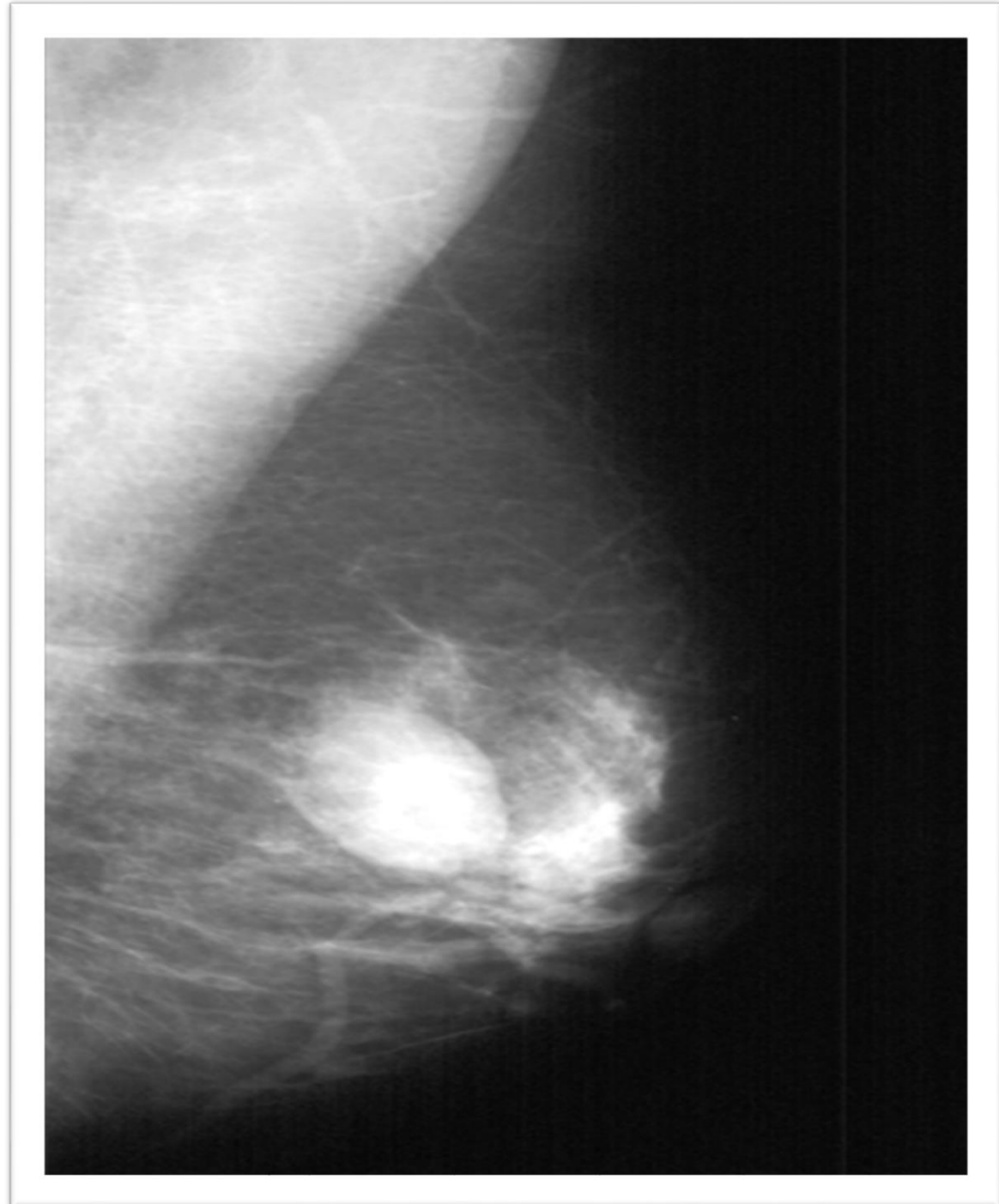


- **MASS SHAPE**

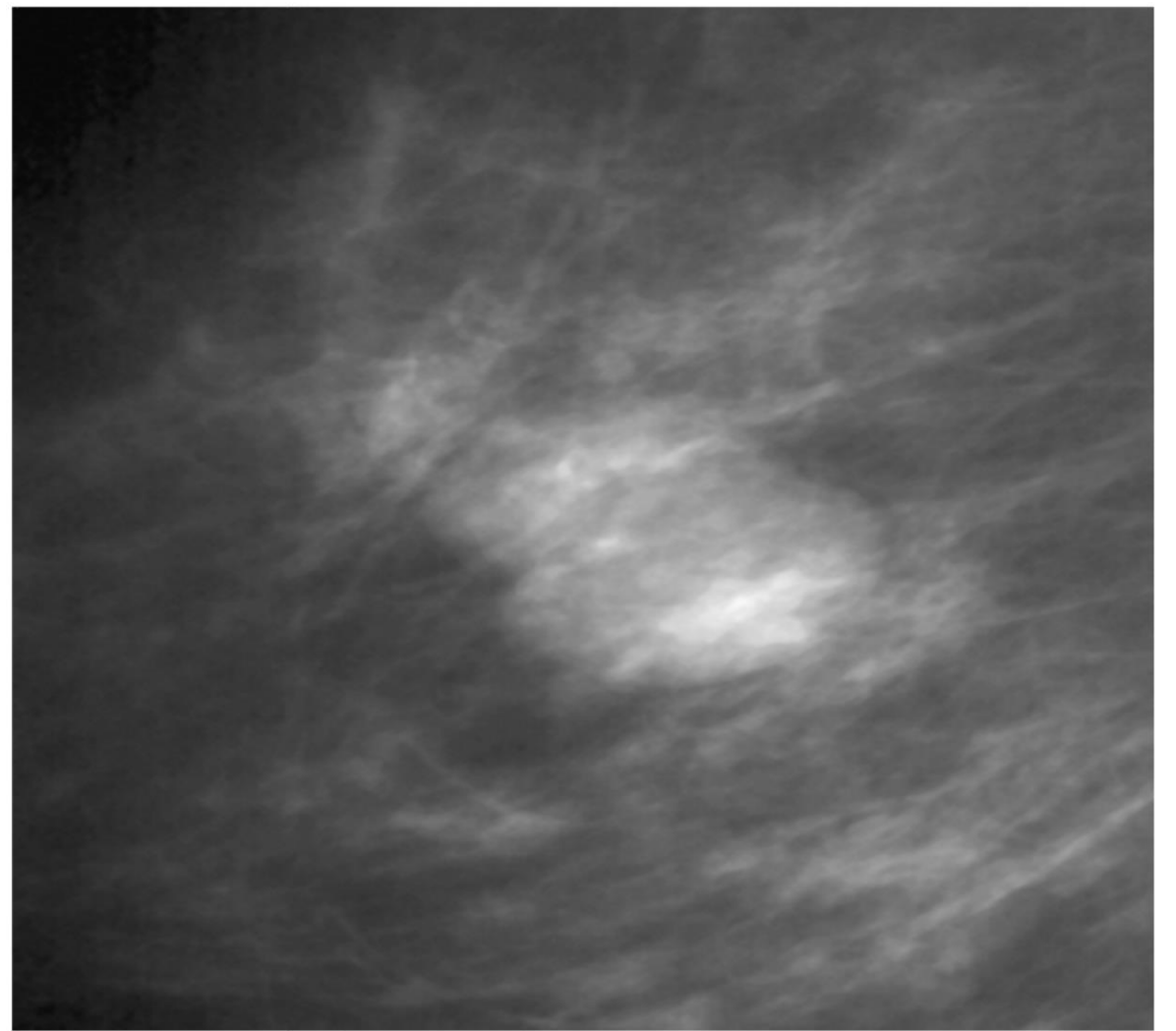
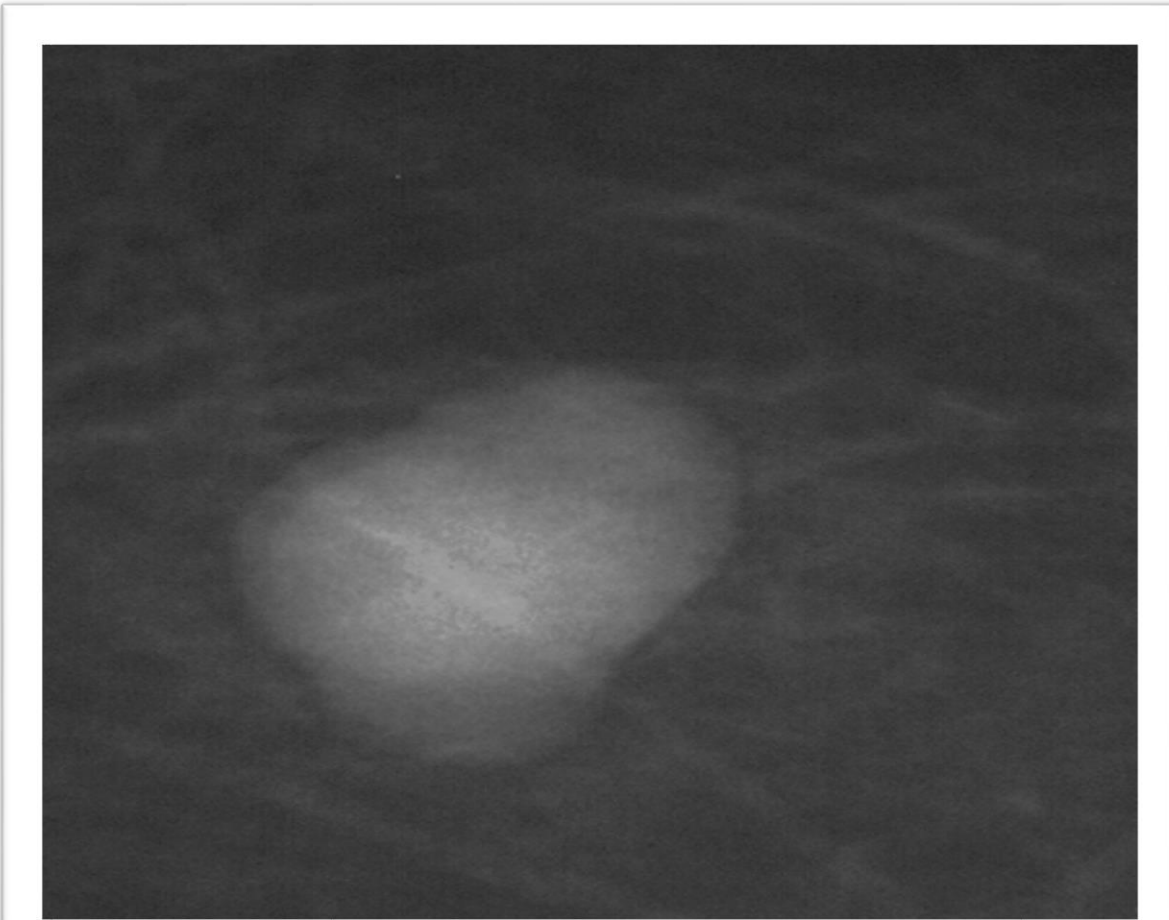
**OVAL**

**ELLIPTICAL**

**EGG-SHAPED**



# MASS SHAPE : LOBULAR CONTOURS WITH UNDULATIONS



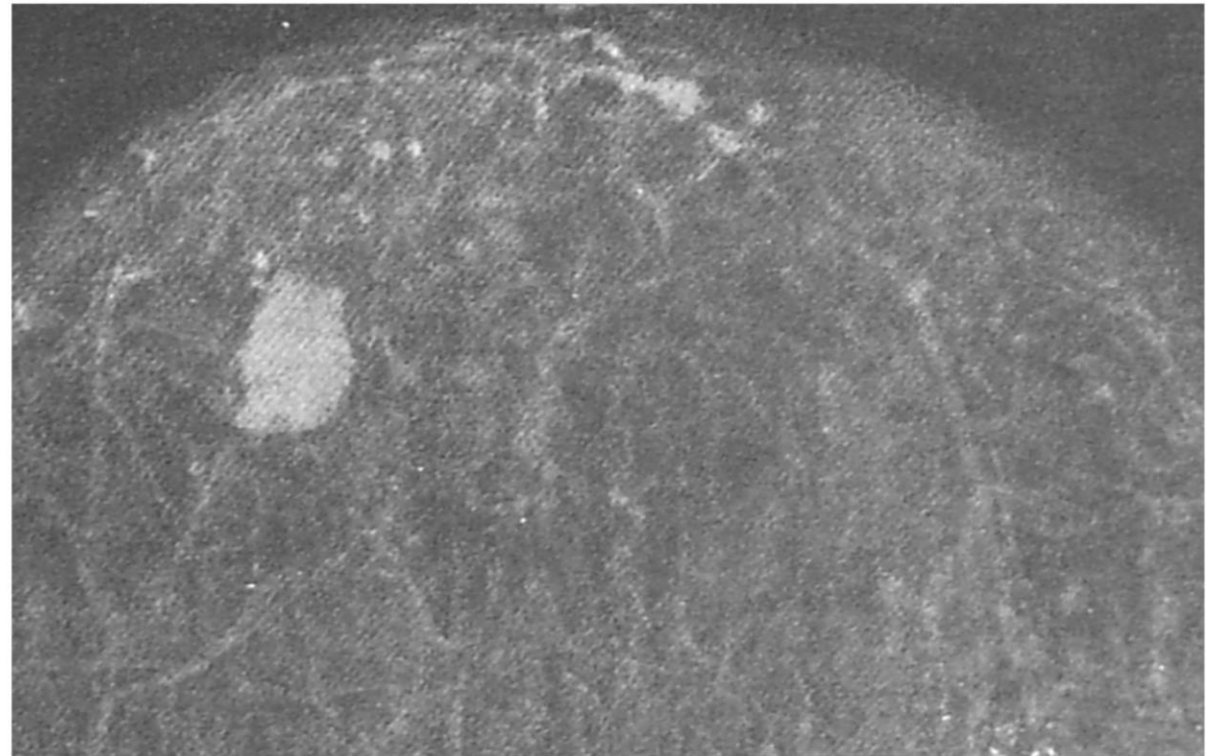
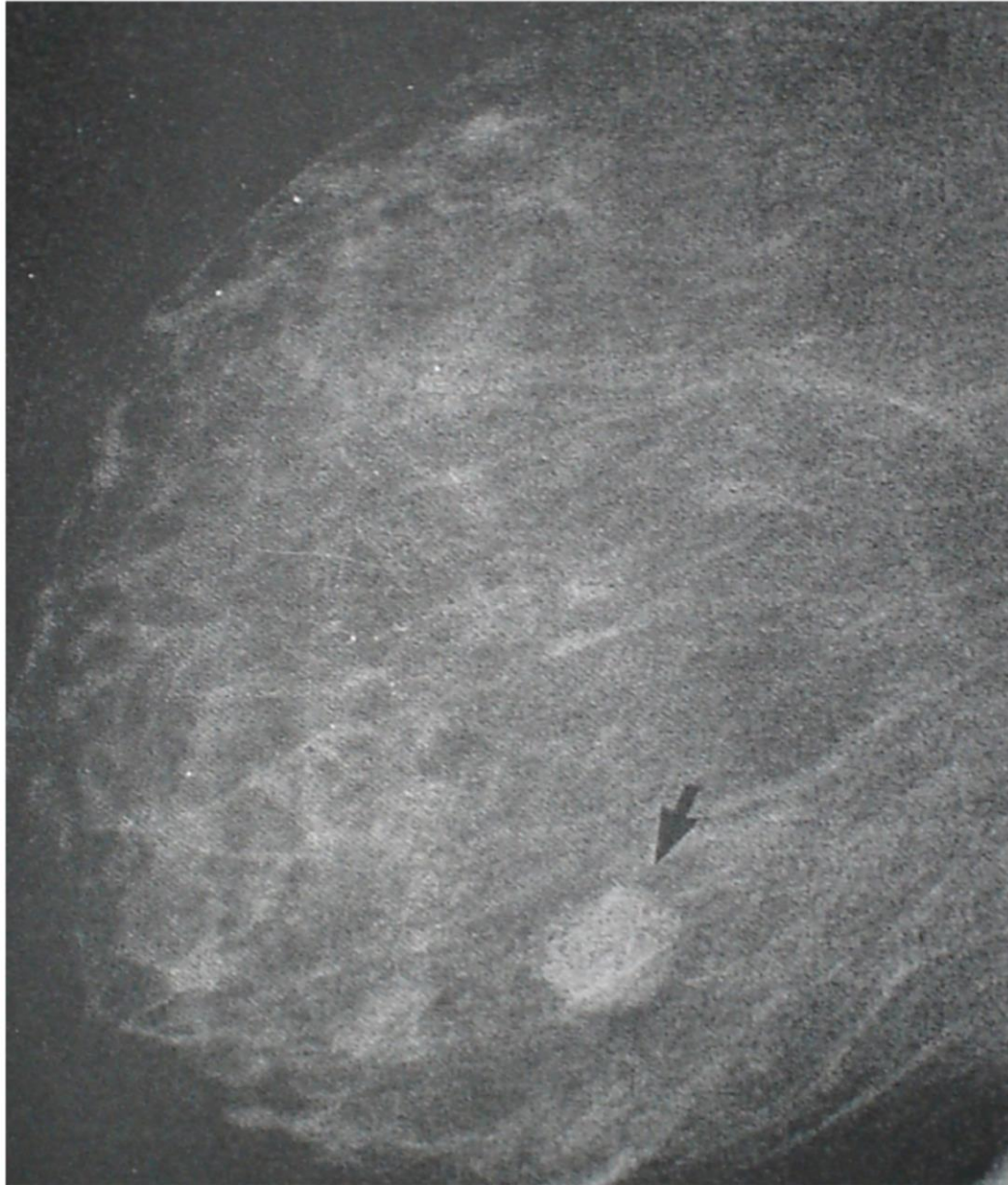
# MASS SHAPE..ROUND, OVAL, LOBULAR

- ⦿ DDX: -Cyst
- ⦿ Fibroadenoma
- ⦿ Papilloma
- ⦿ Sebaceous Cyst
- ⦿ Other Benign
- ⦿ *Cancer*



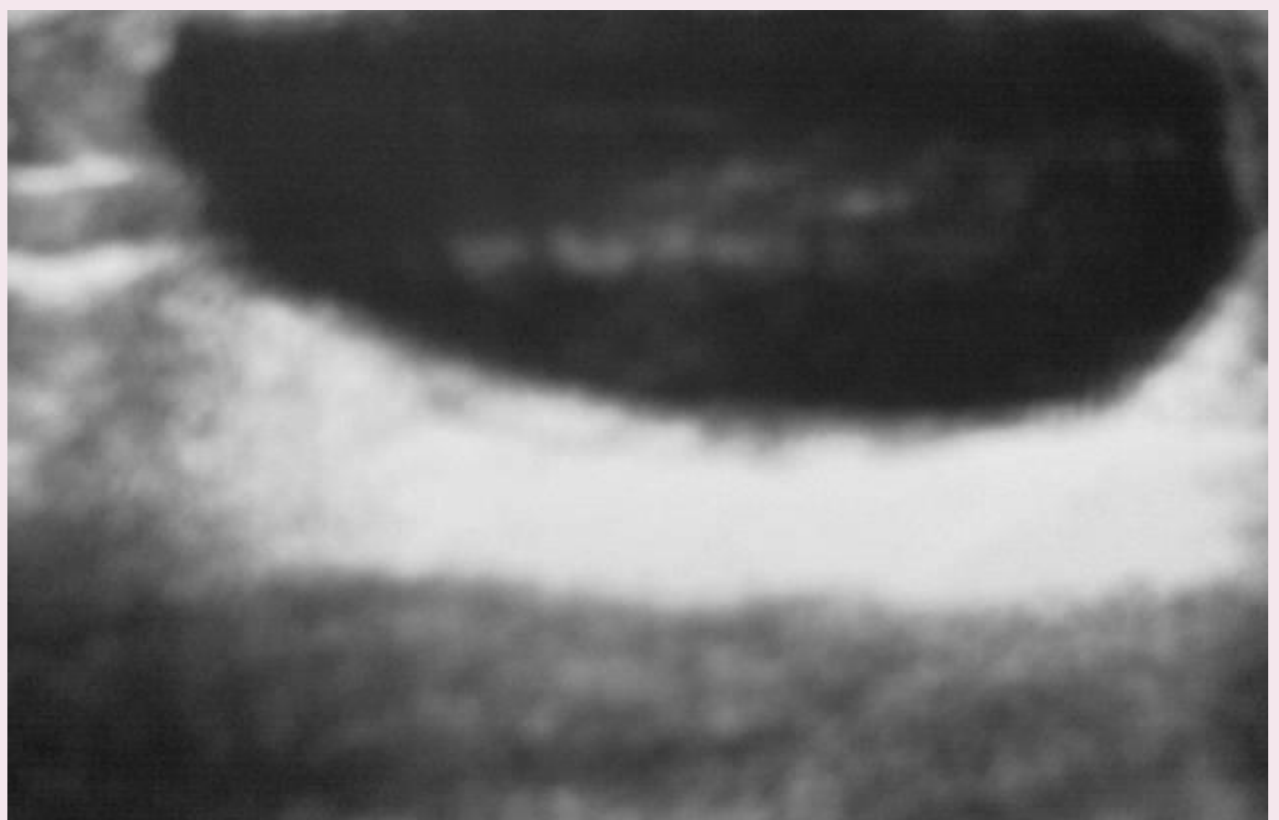


# SHAPE



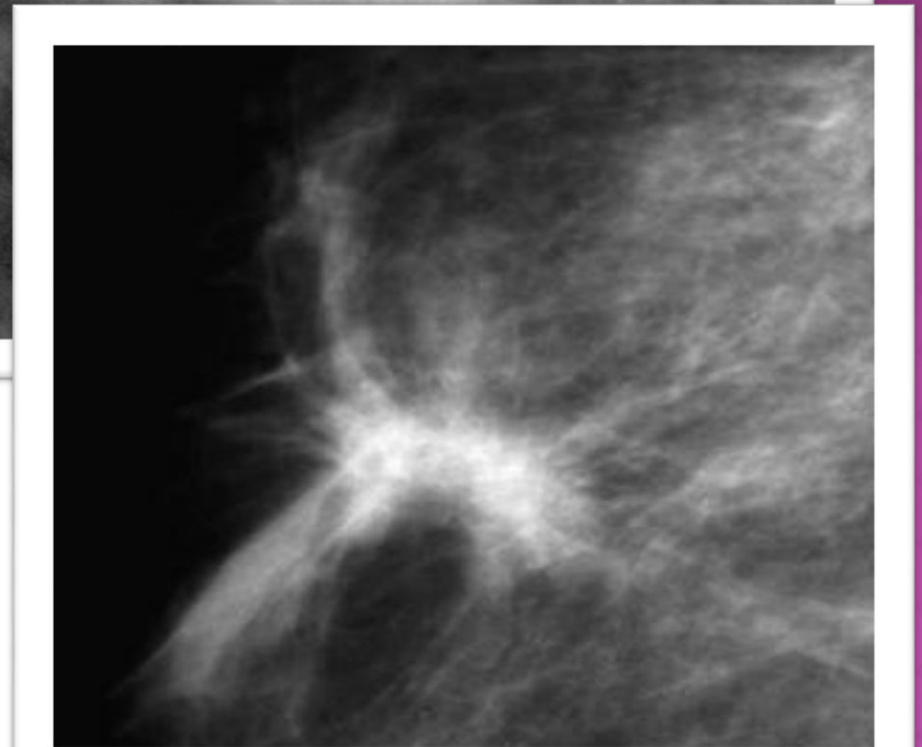
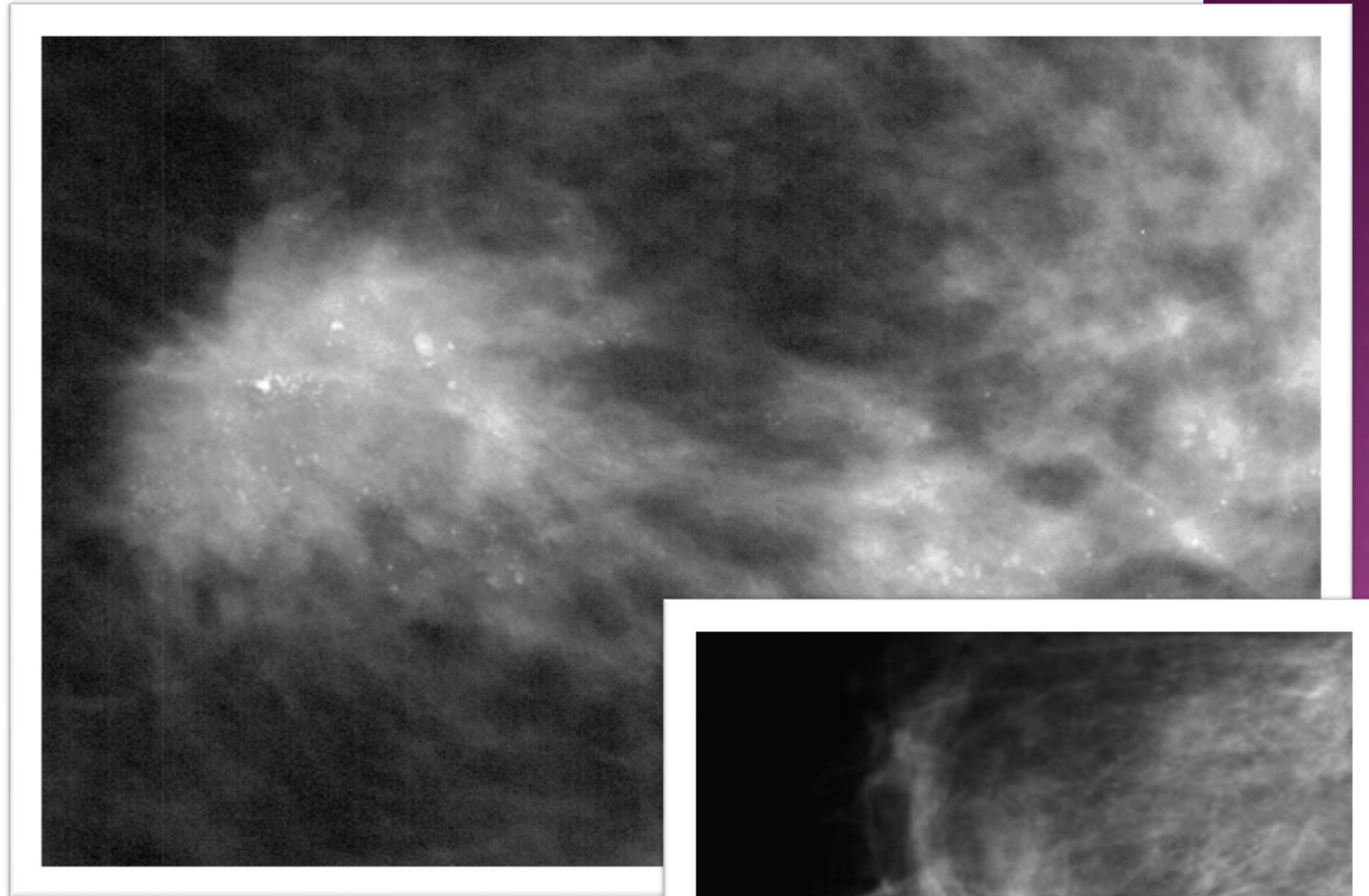


# SHAPE



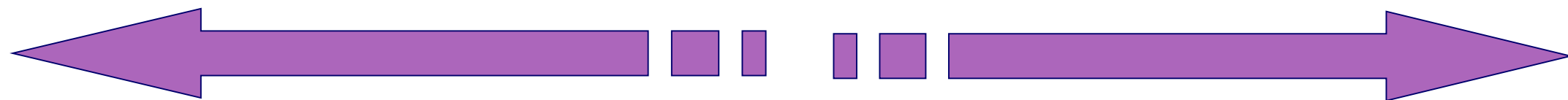
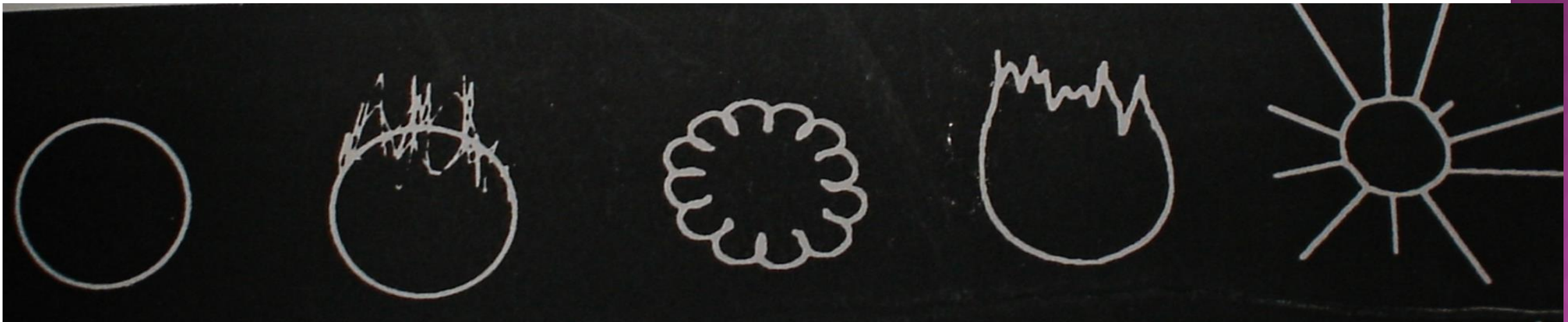
# MASS SHAPE -IRREGULAR

- shape cannot be characterized
- DDx:-
- Post operative scar
- Radial scar
- Fat necrosis
- Phyllodes tumor
- *Cancer until proven otherwise*



# MASSES

## MARGINS

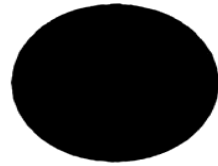


BENIGN

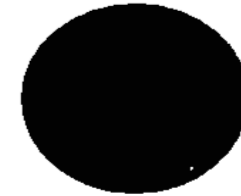
MALIGNANT

# Masses:

Circumscribed



Round



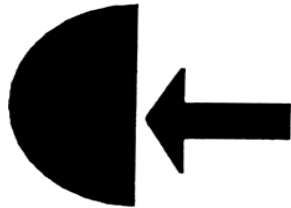
Microlobulated



Oval



Obscured



Lobulated



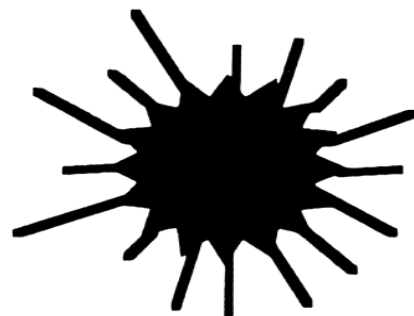
Ill-defined



Irregular

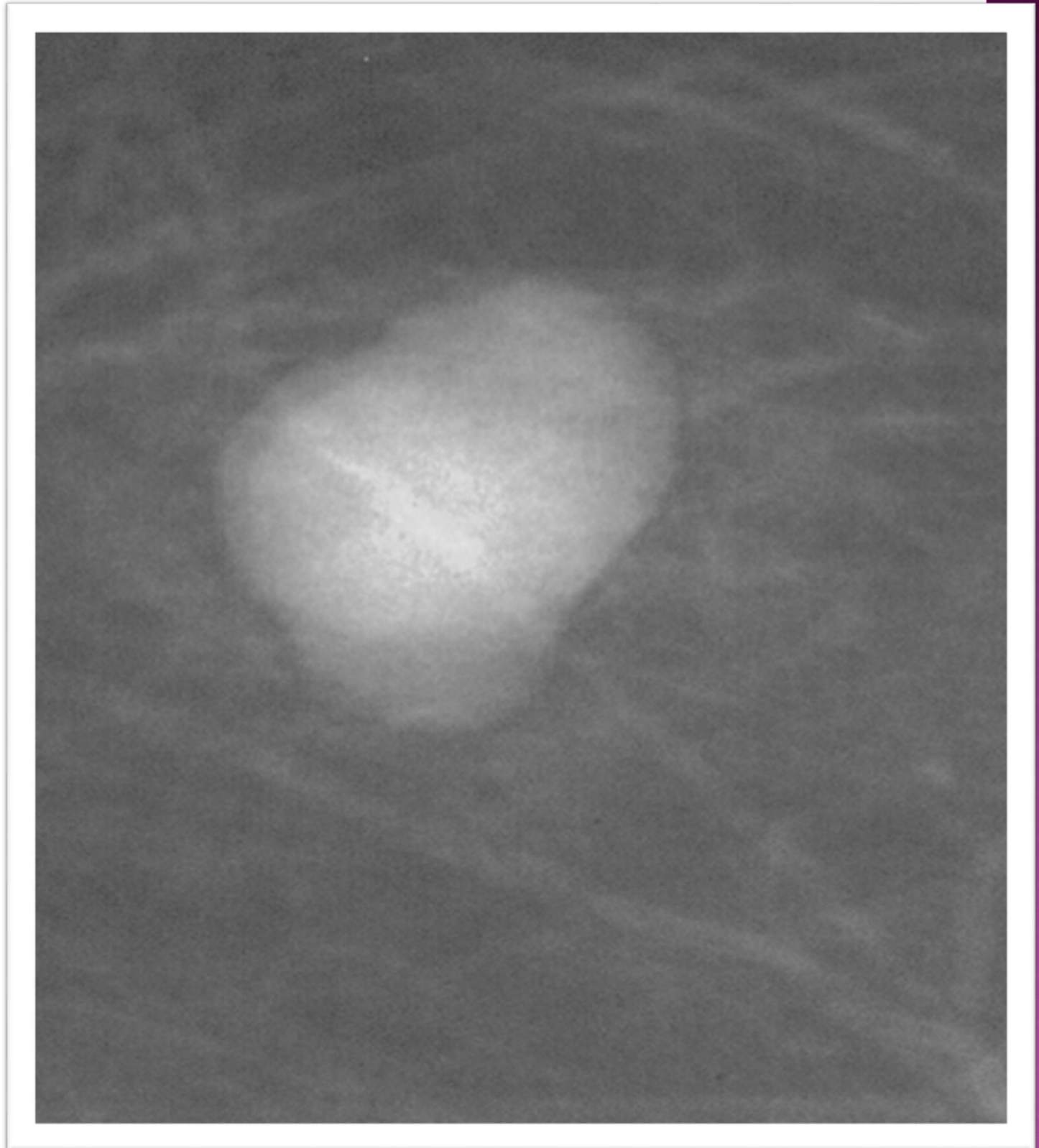


Spiculated

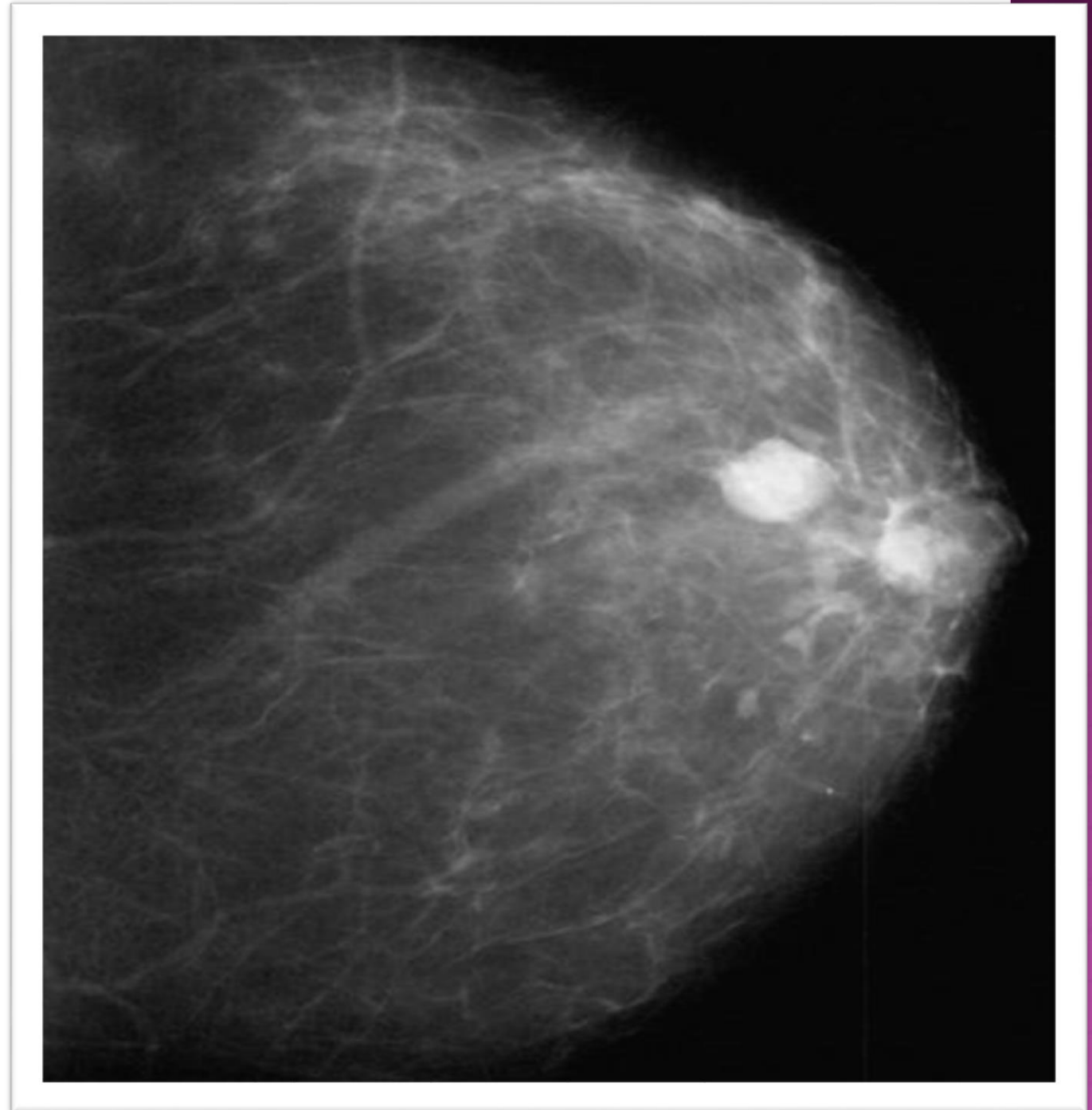




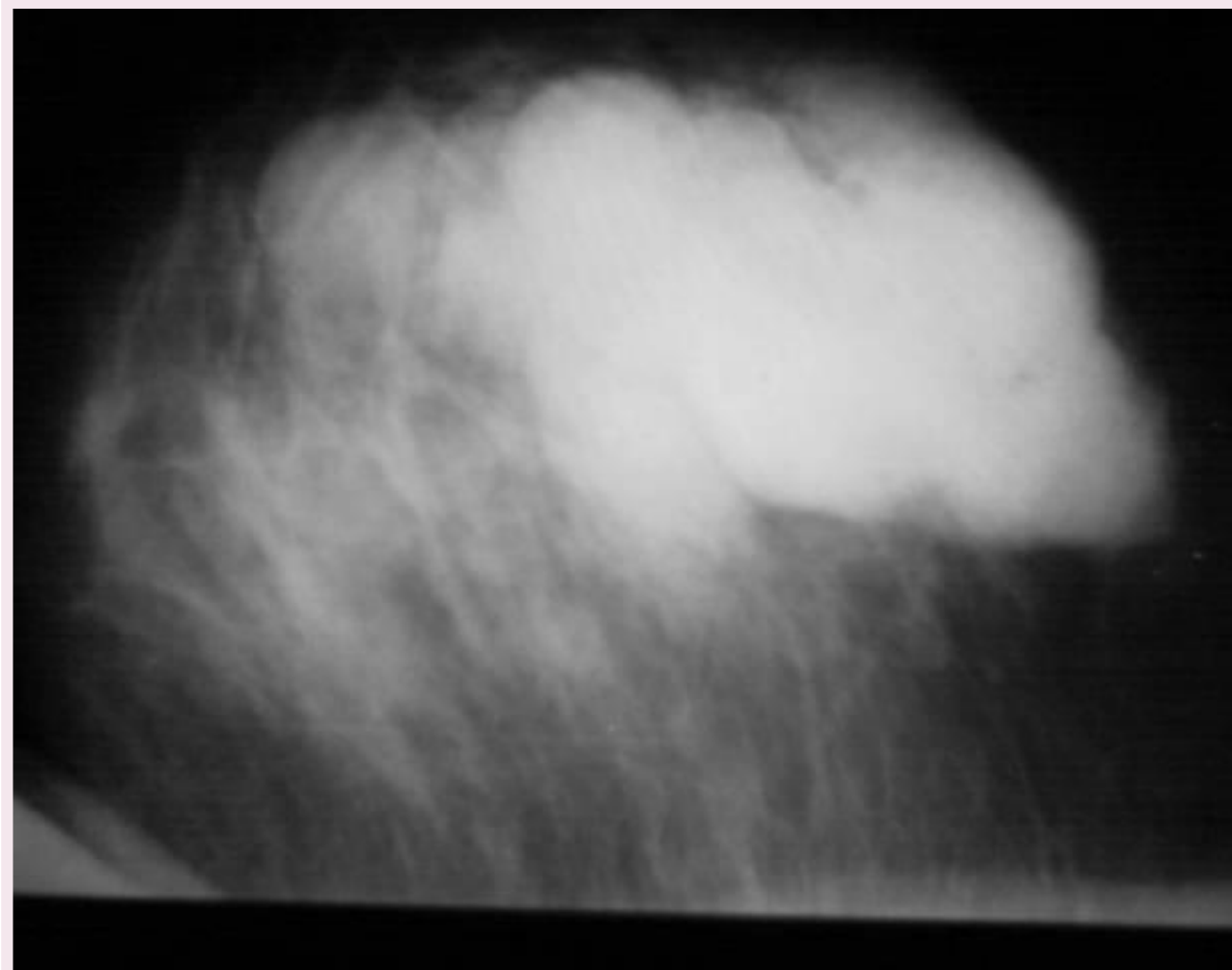
- Mass margins-circumscribed
- abrupt transition between lesion and tissue
- $\geq 75\%$  sharply demarcated



- ◉ DDx: “circumscribed cancers”
- ◉ Peanut M&Ms
- ◉ Papillary Carcinoma
  - .Medullary carcinoma
  - .Mucinous carcinoma



# CYSTS

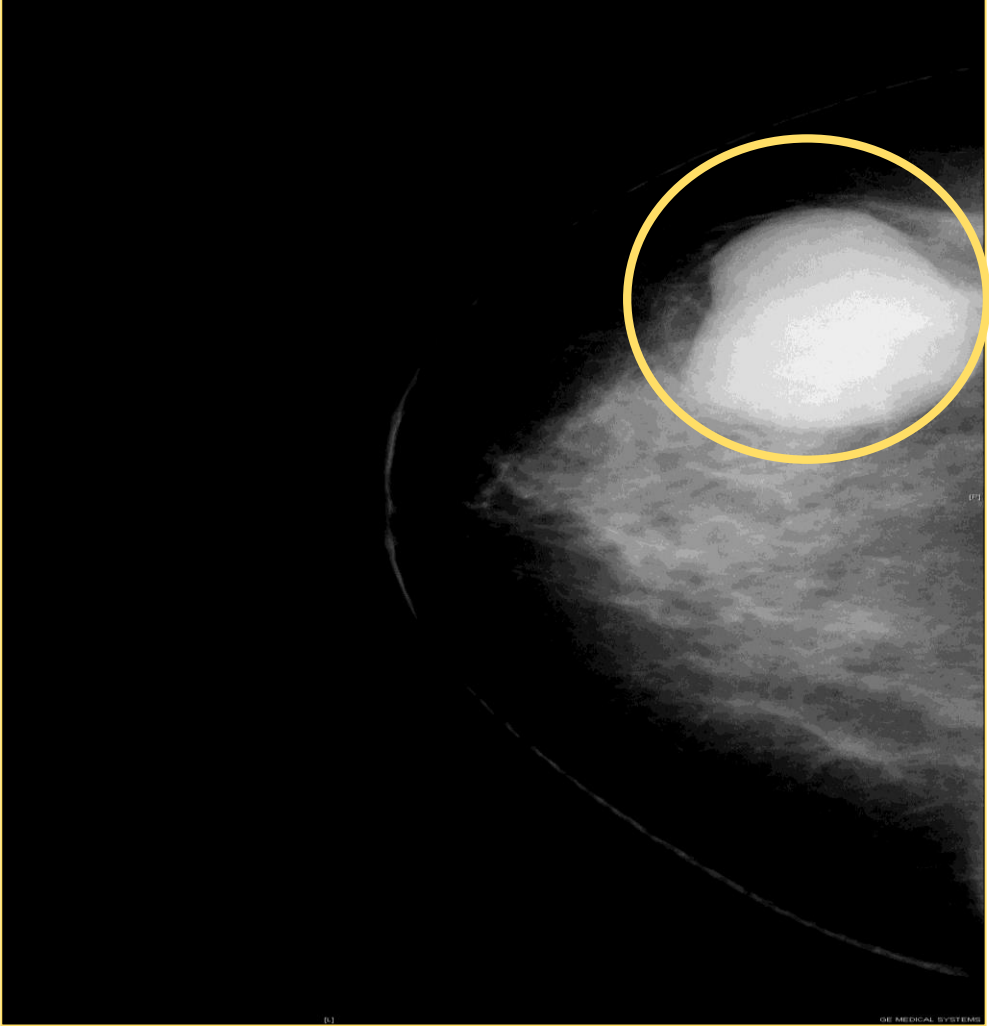
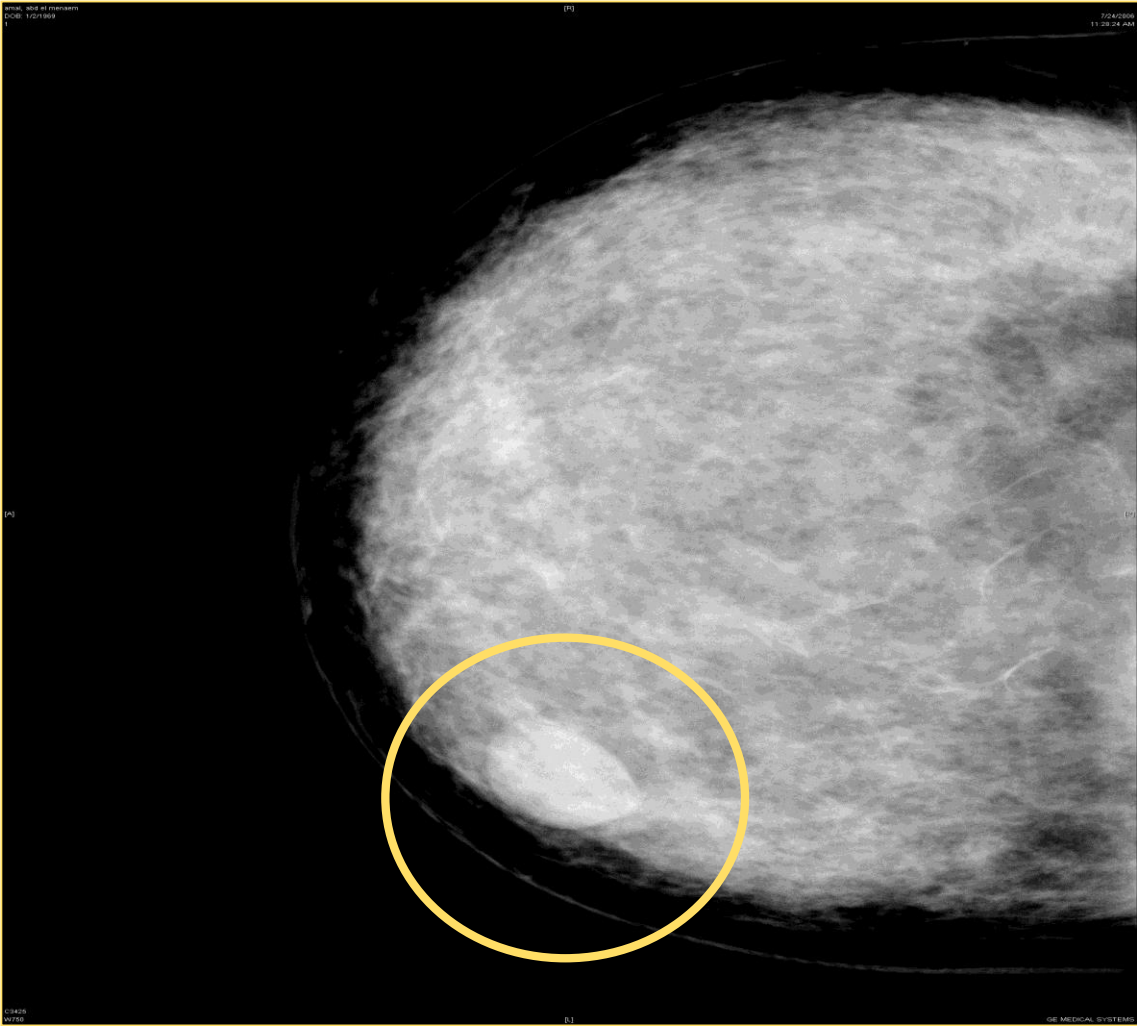


# HAMARTOMA

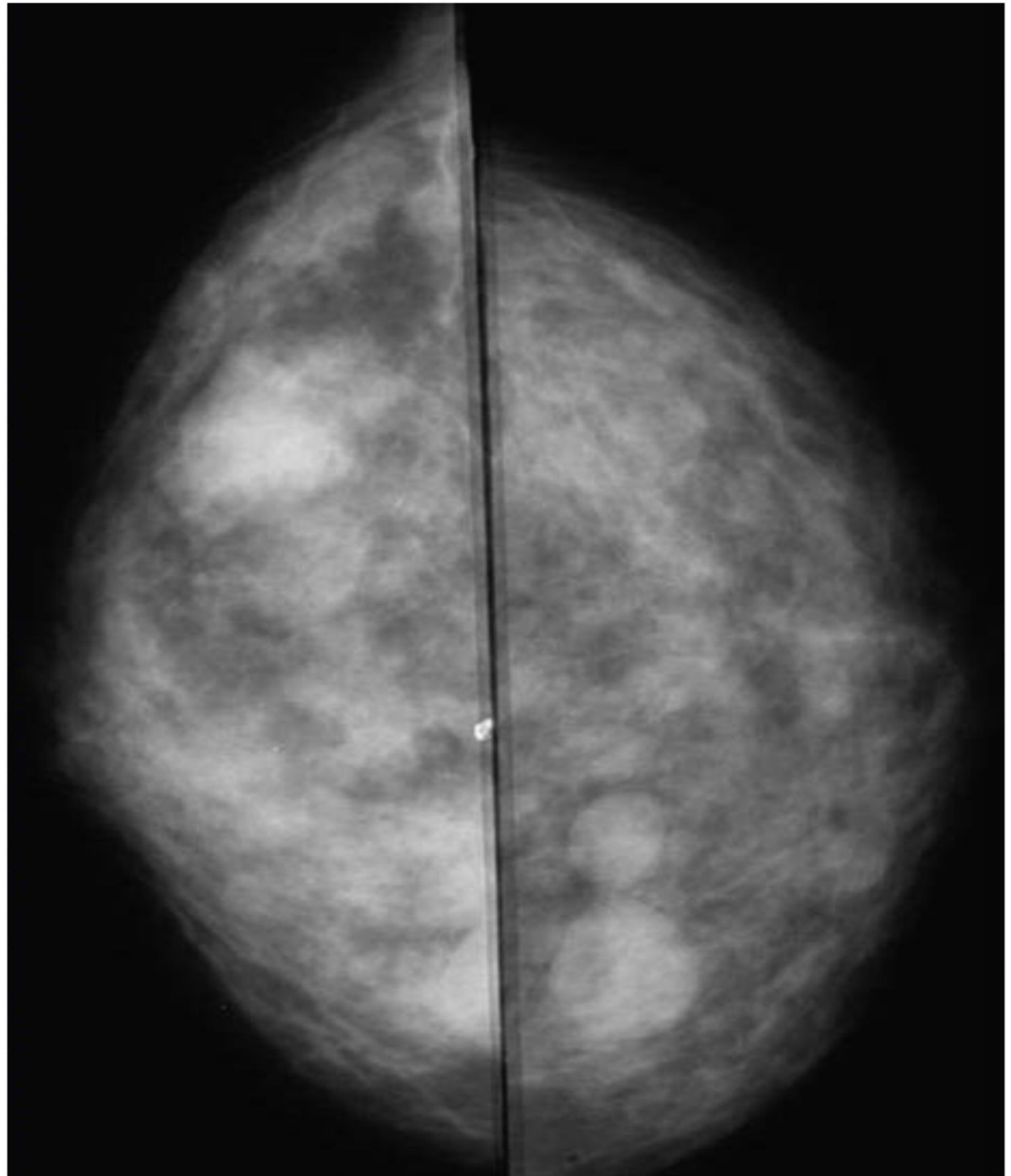


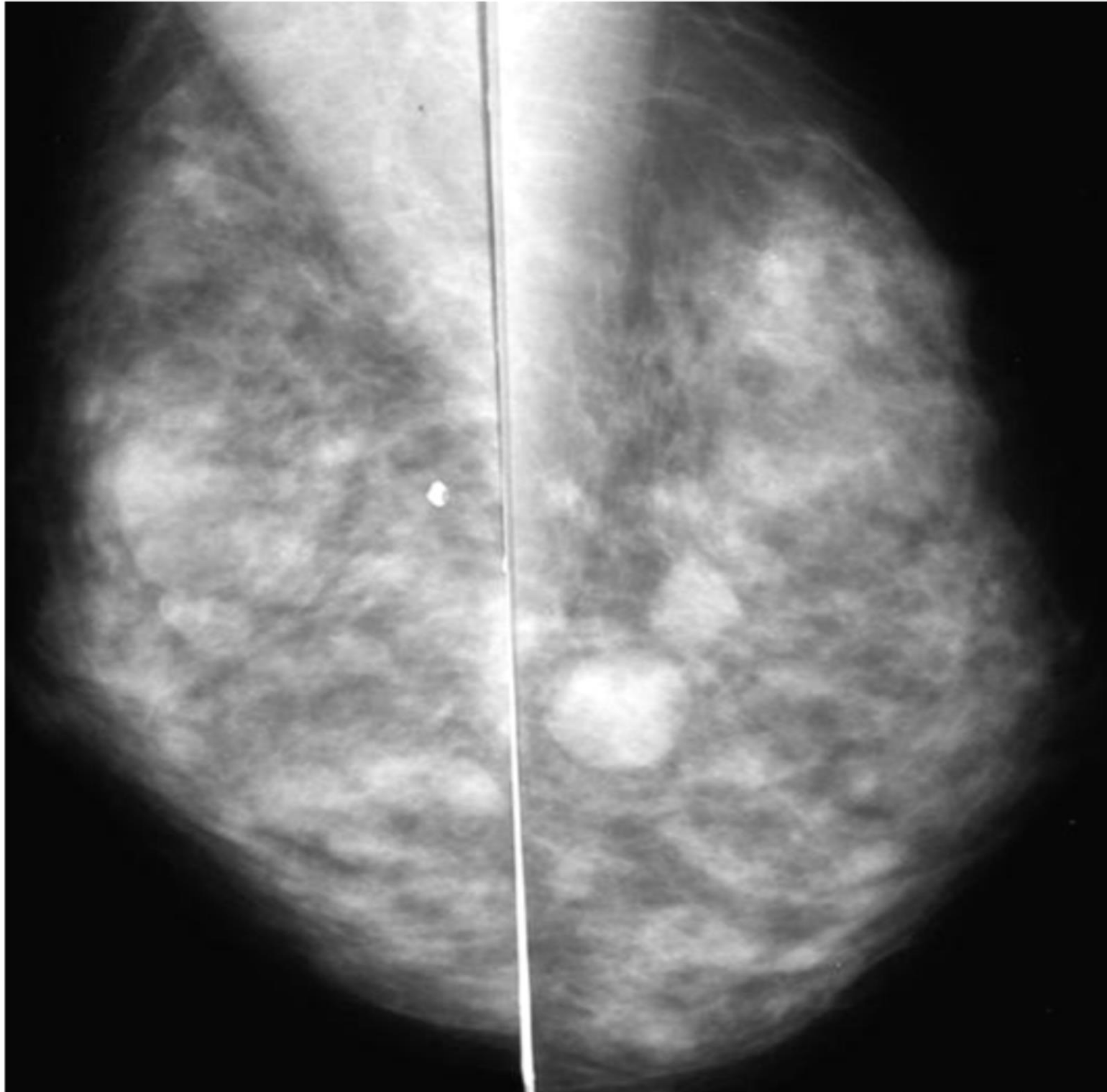


# MARGINS



- “multiple bilateral partially circumscribed similar-appearing masses”
- BIRADS 2, benign
- “*Recommend routine screening in one year.*”

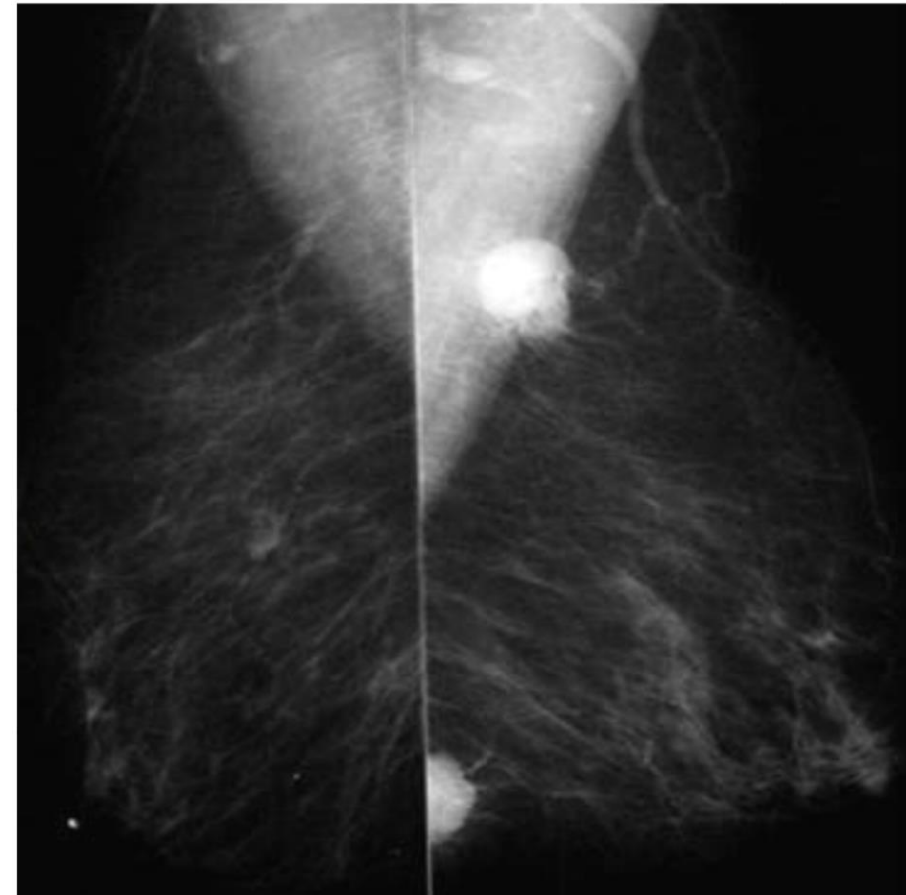
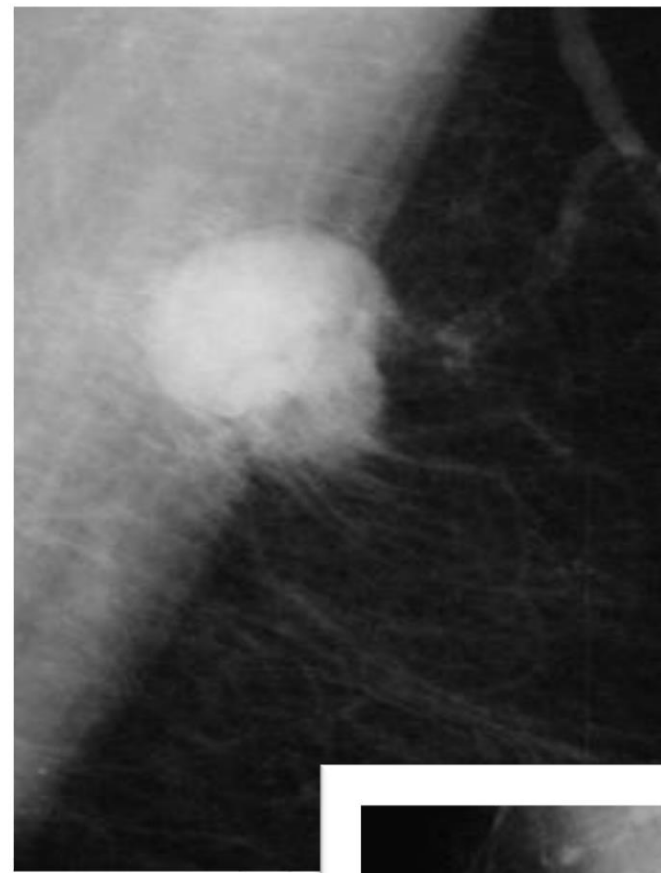




**DDx:**  
**Cyst vs**  
**Fibroadenomas**

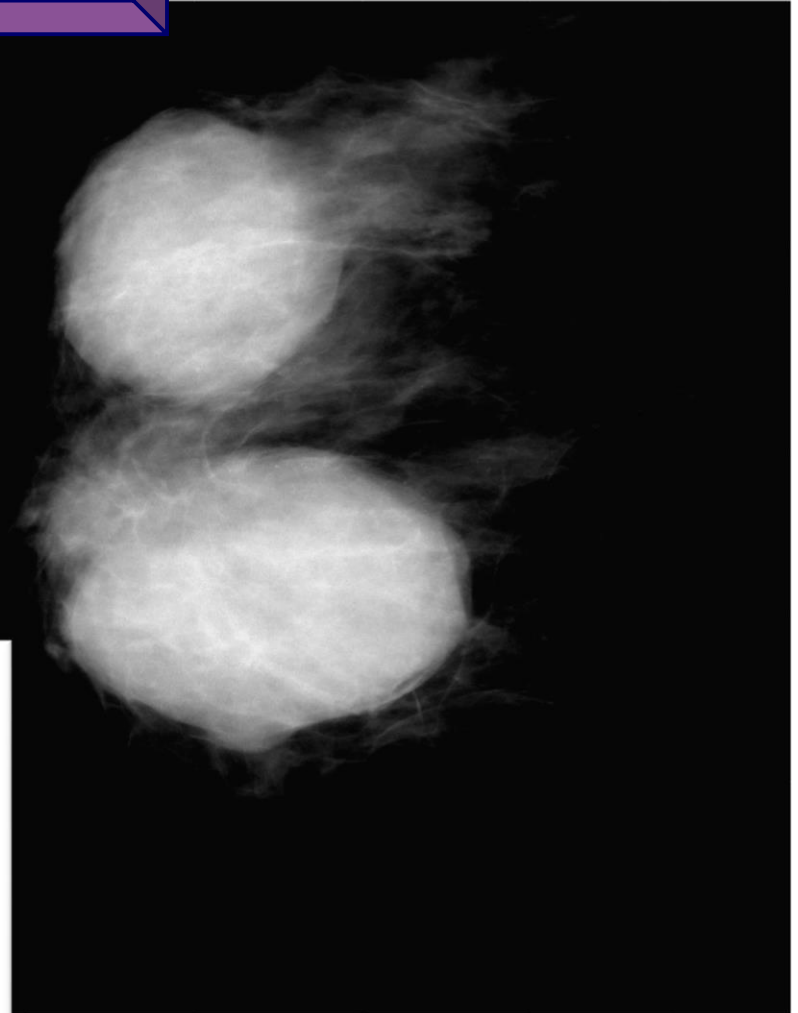
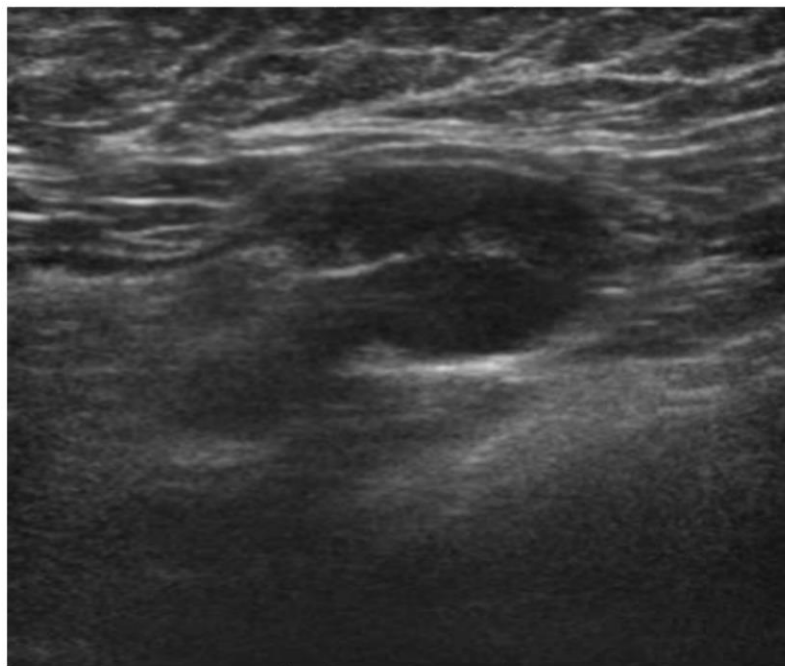
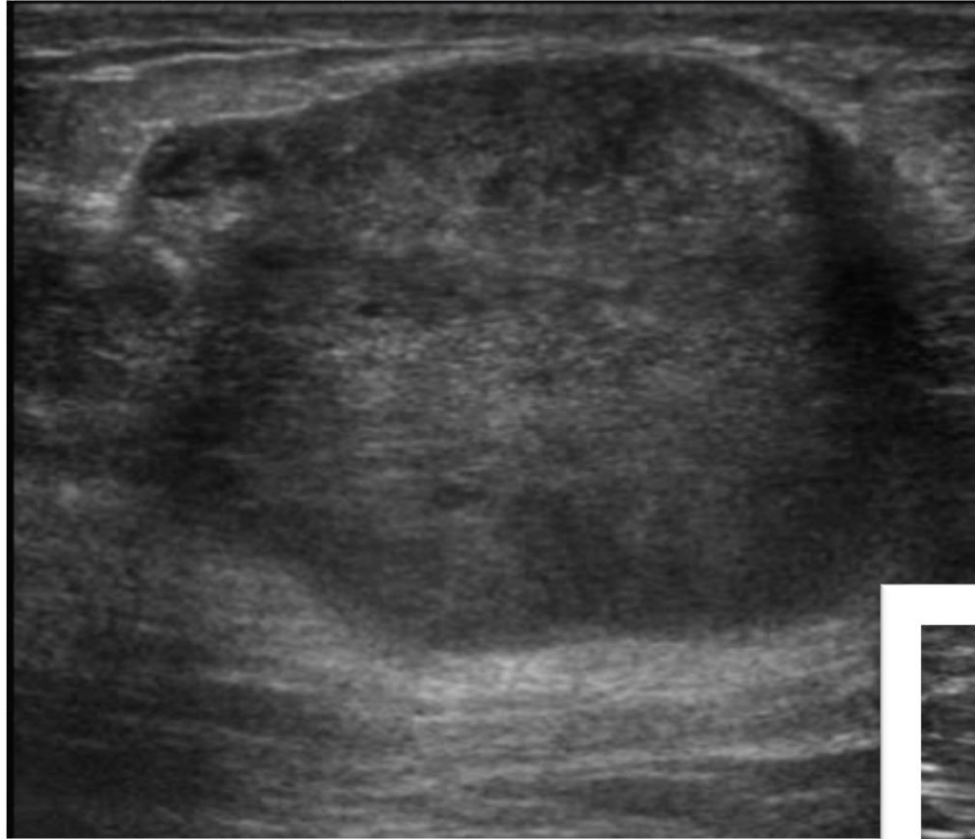
## Metastatic Disease to the Breast

- very uncommon
- Most common met: from contralateral breast
- History of non-breast primary?
- Lymphoma, melanoma, lung, ovarian

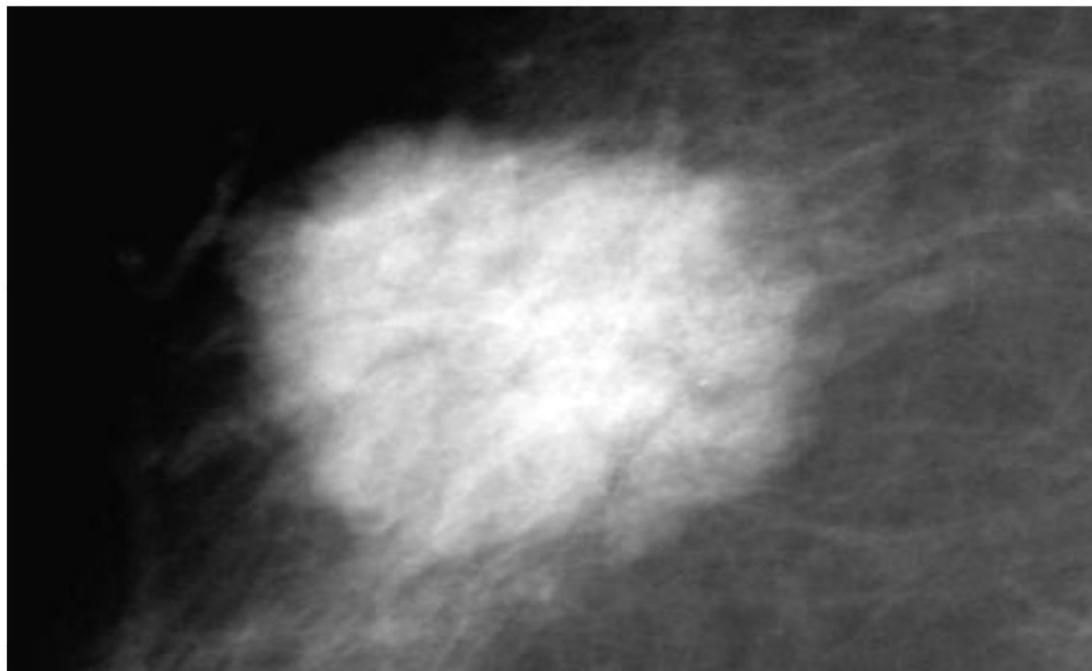
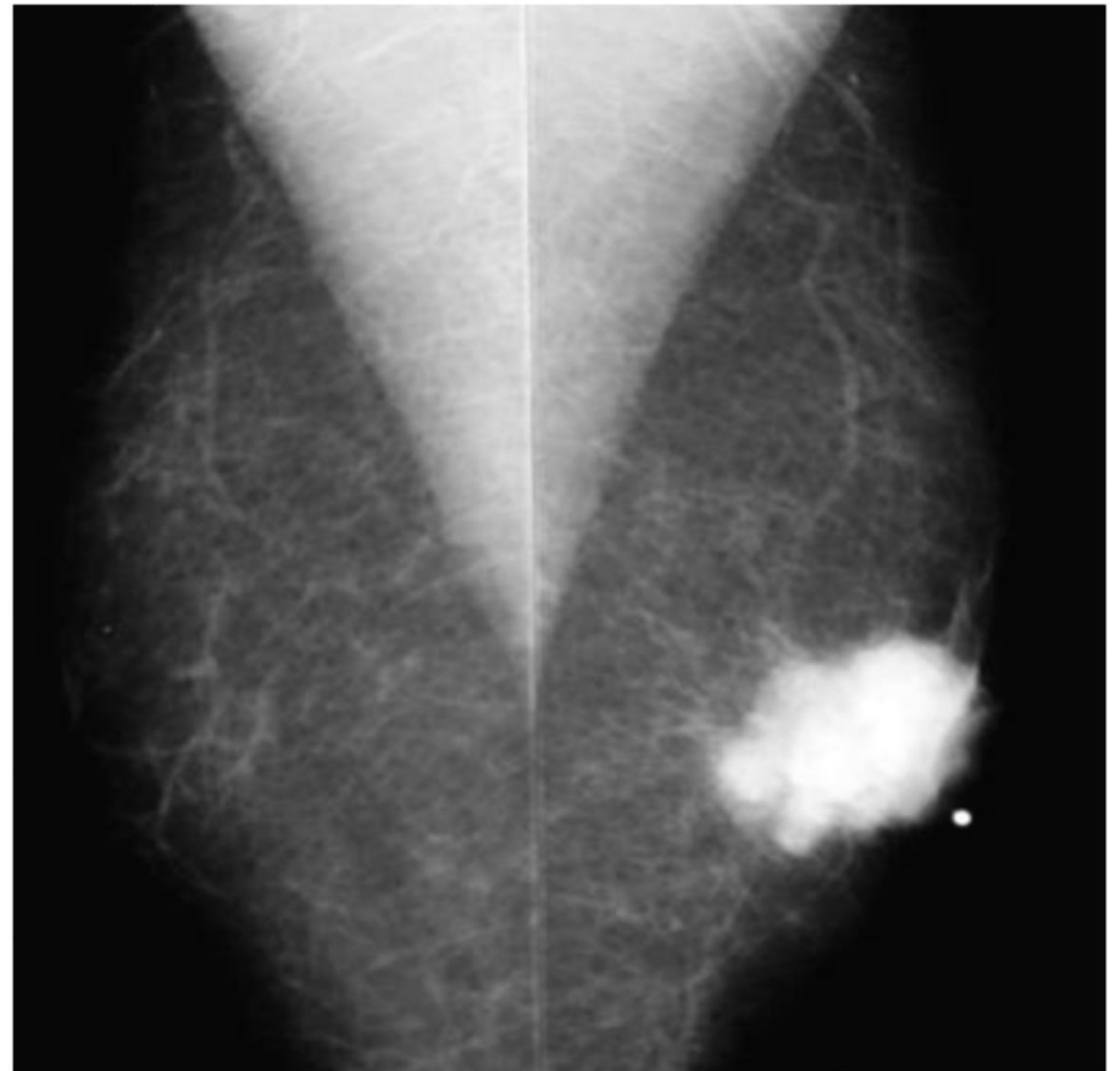




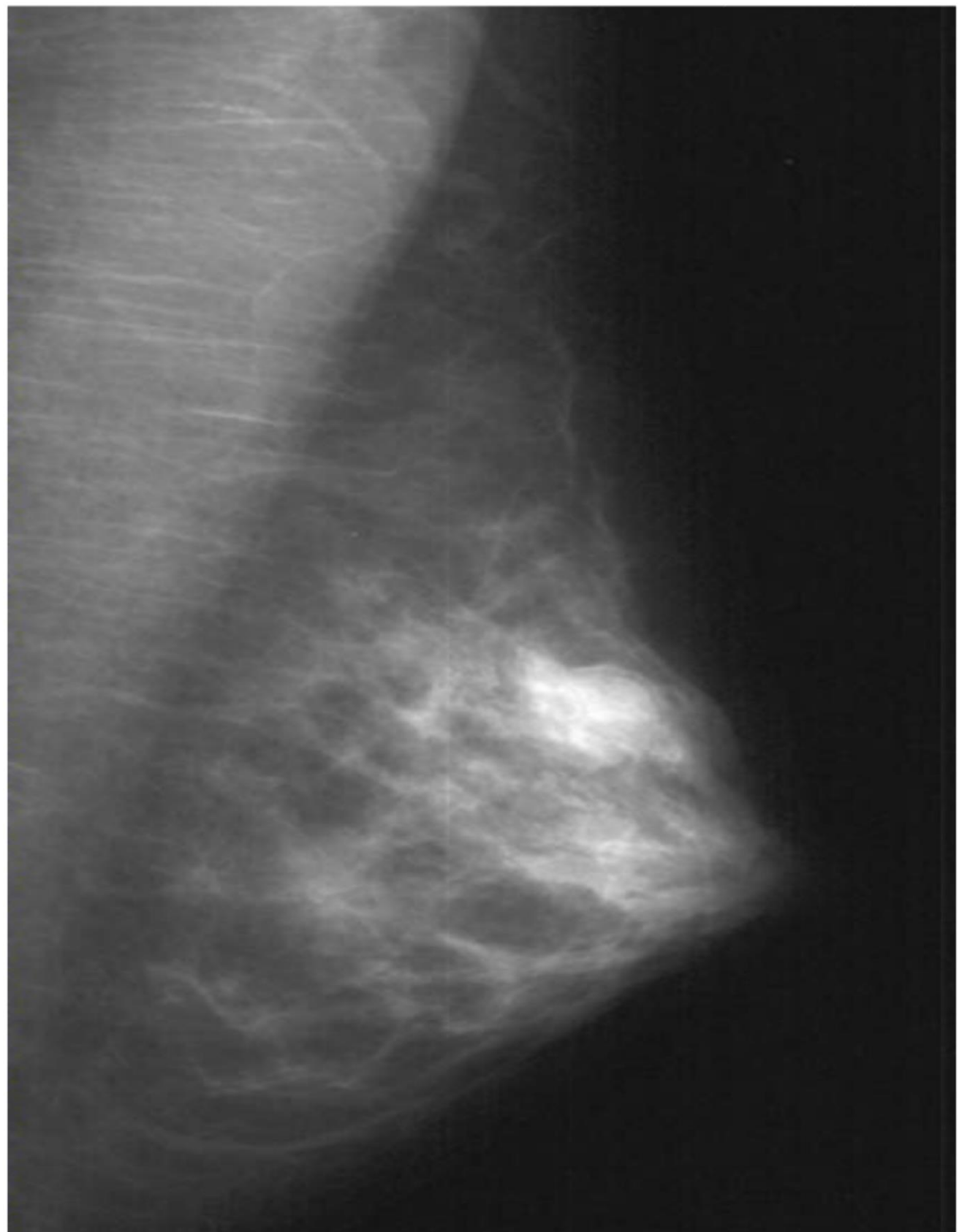
# MARGINS



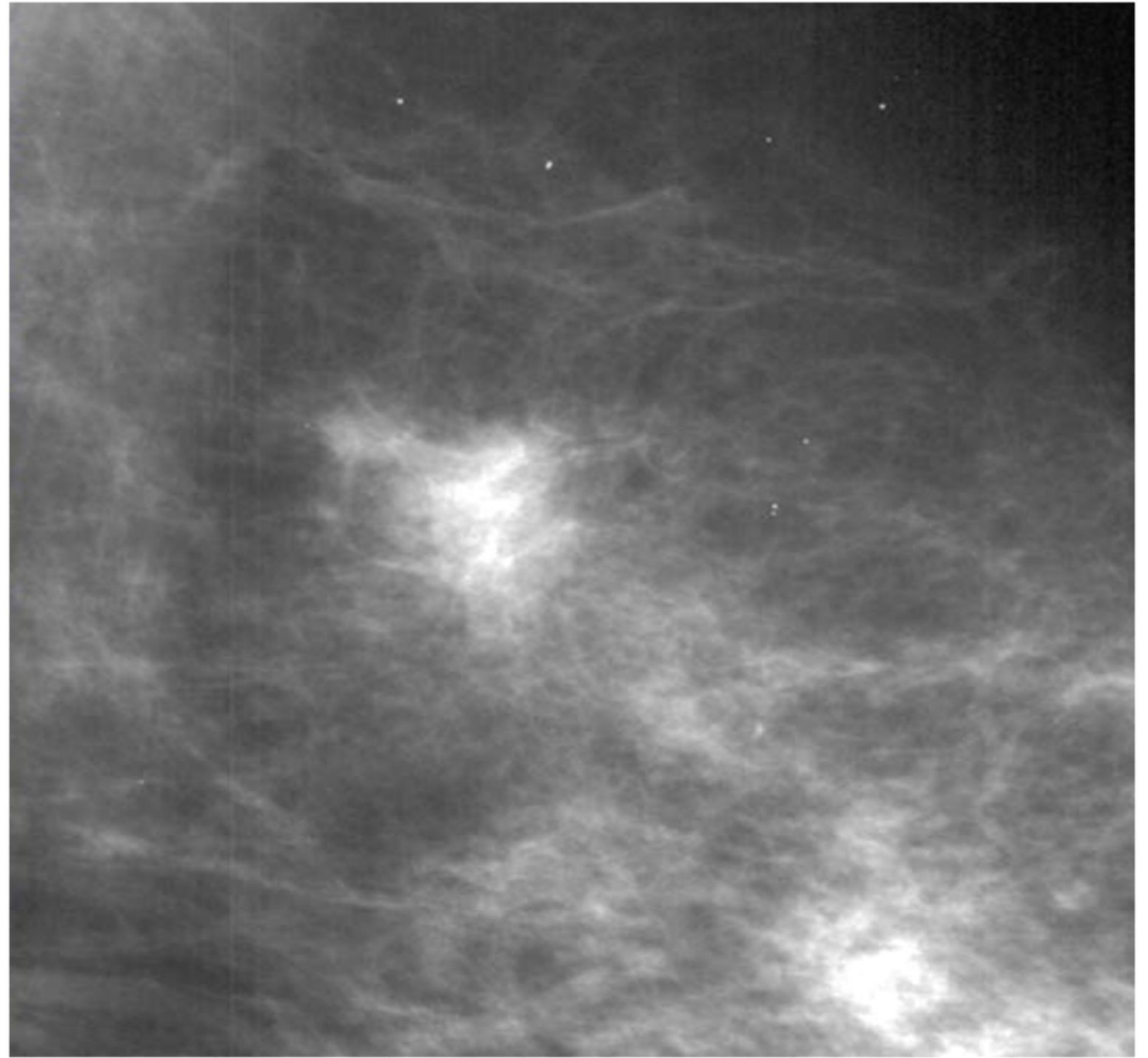
- ◉ Mass Margin - ***Microlobulated***
- ◉ margins undulate with short cycles (1-2 mm)•
- ◉ ***Note: more worrisome, but NOT highly suspicious***



- ◉ Mass Margin -***Obscured***
- ◉ Margins (*suspected to be circumscribed*)
- ◉ *hidden by adjacent or superimposed normal tissue*

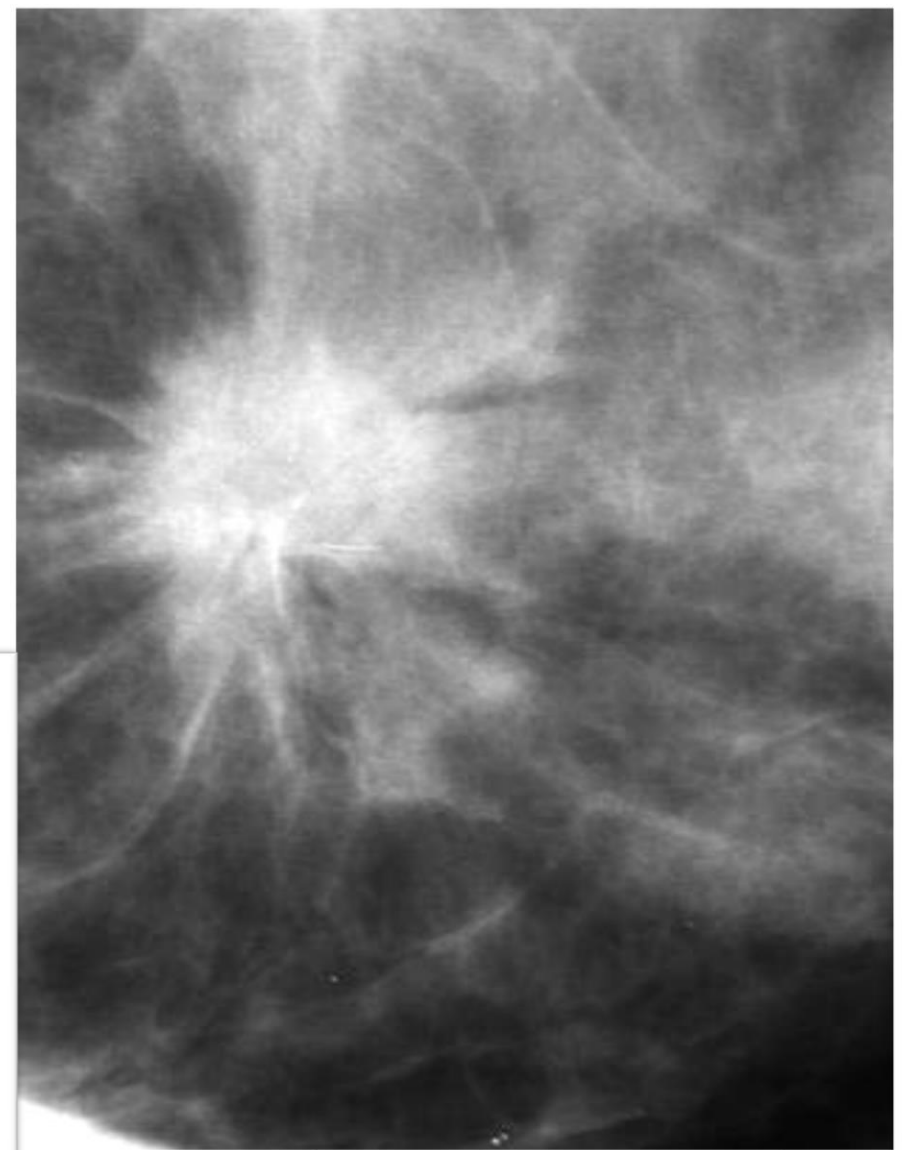
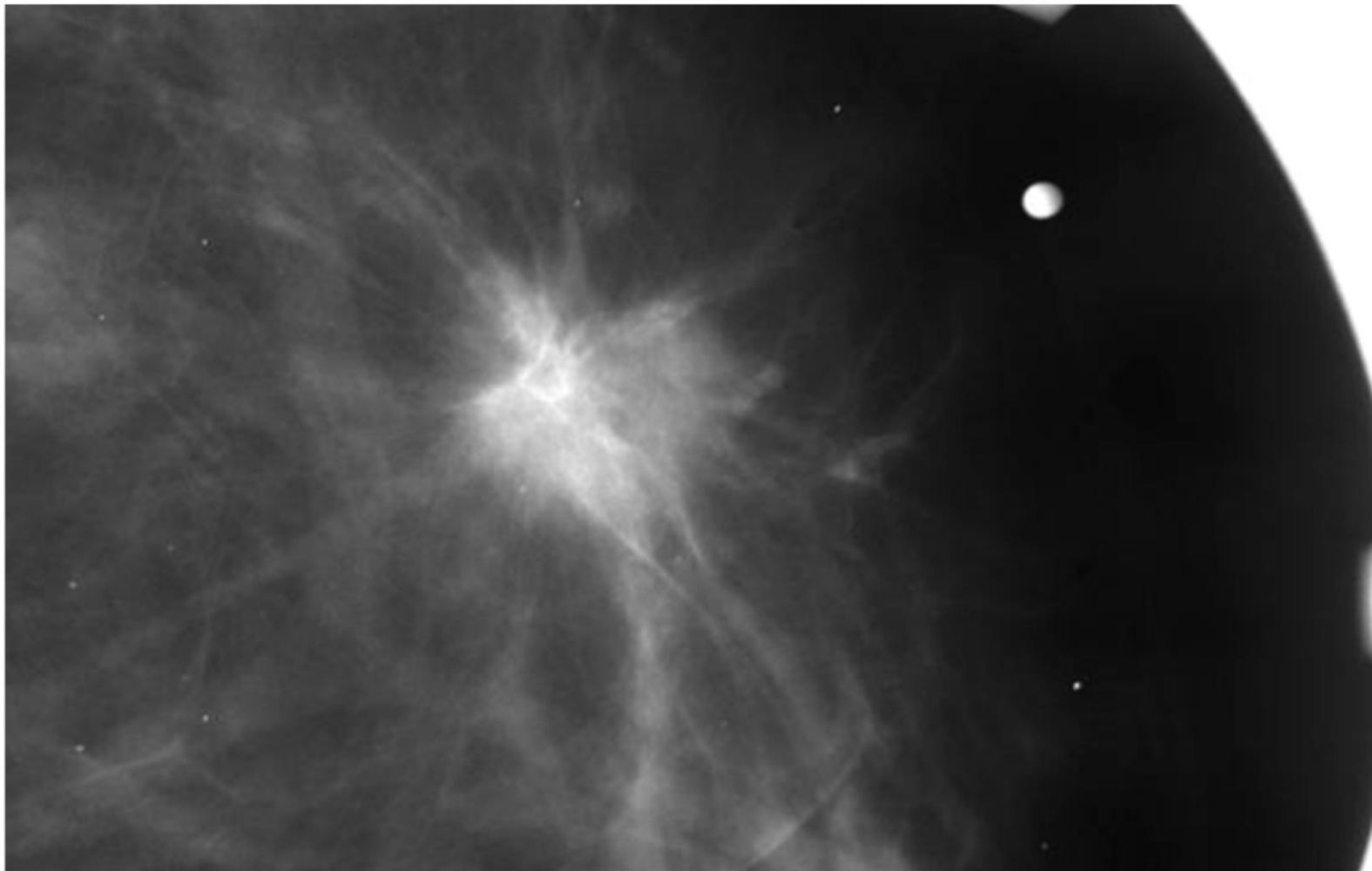


- Mass Margin - ***Indistinct(ill-defined)***
- ***margins poorly defined (not obscured,***
- ***possible infiltration***



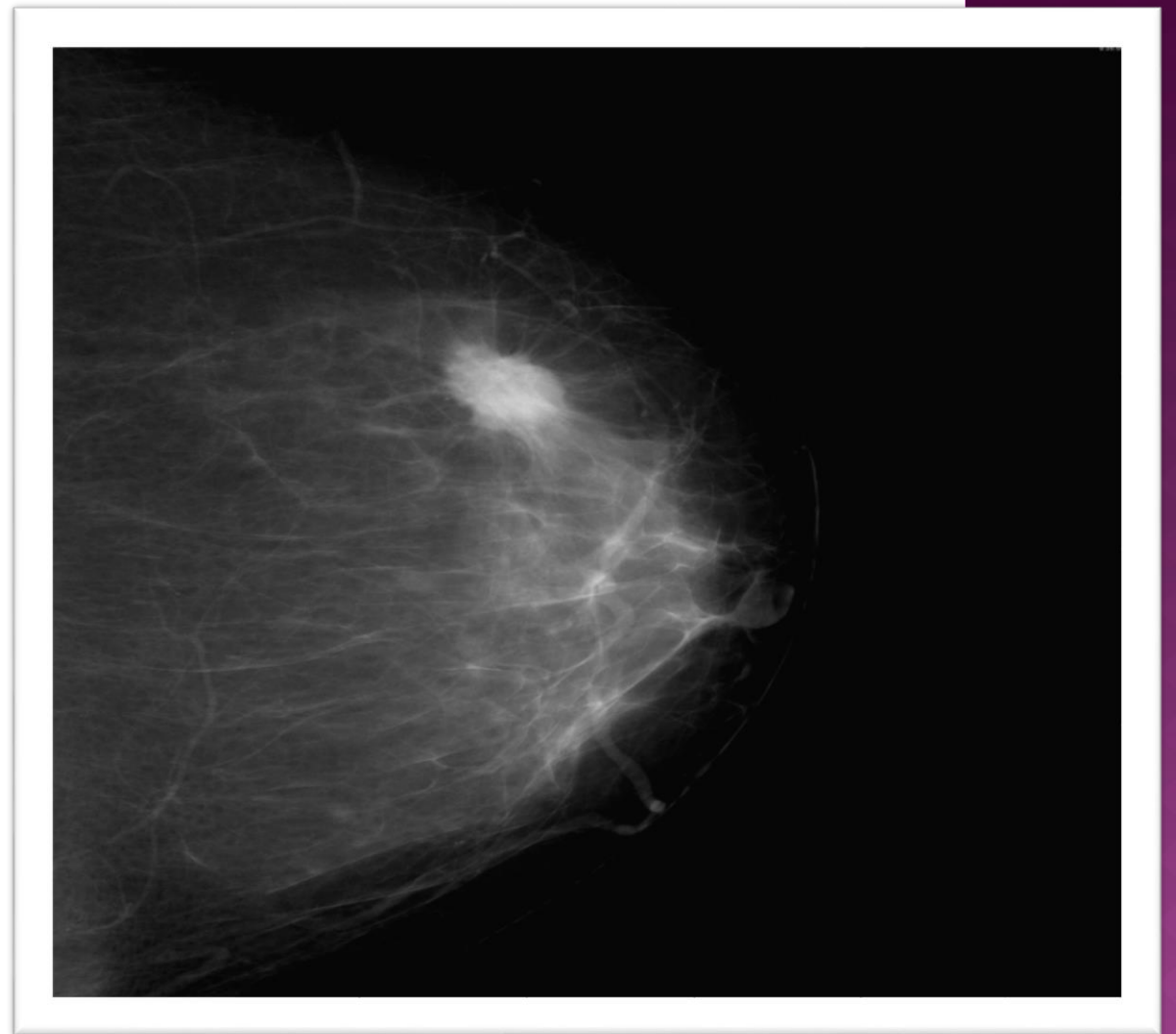
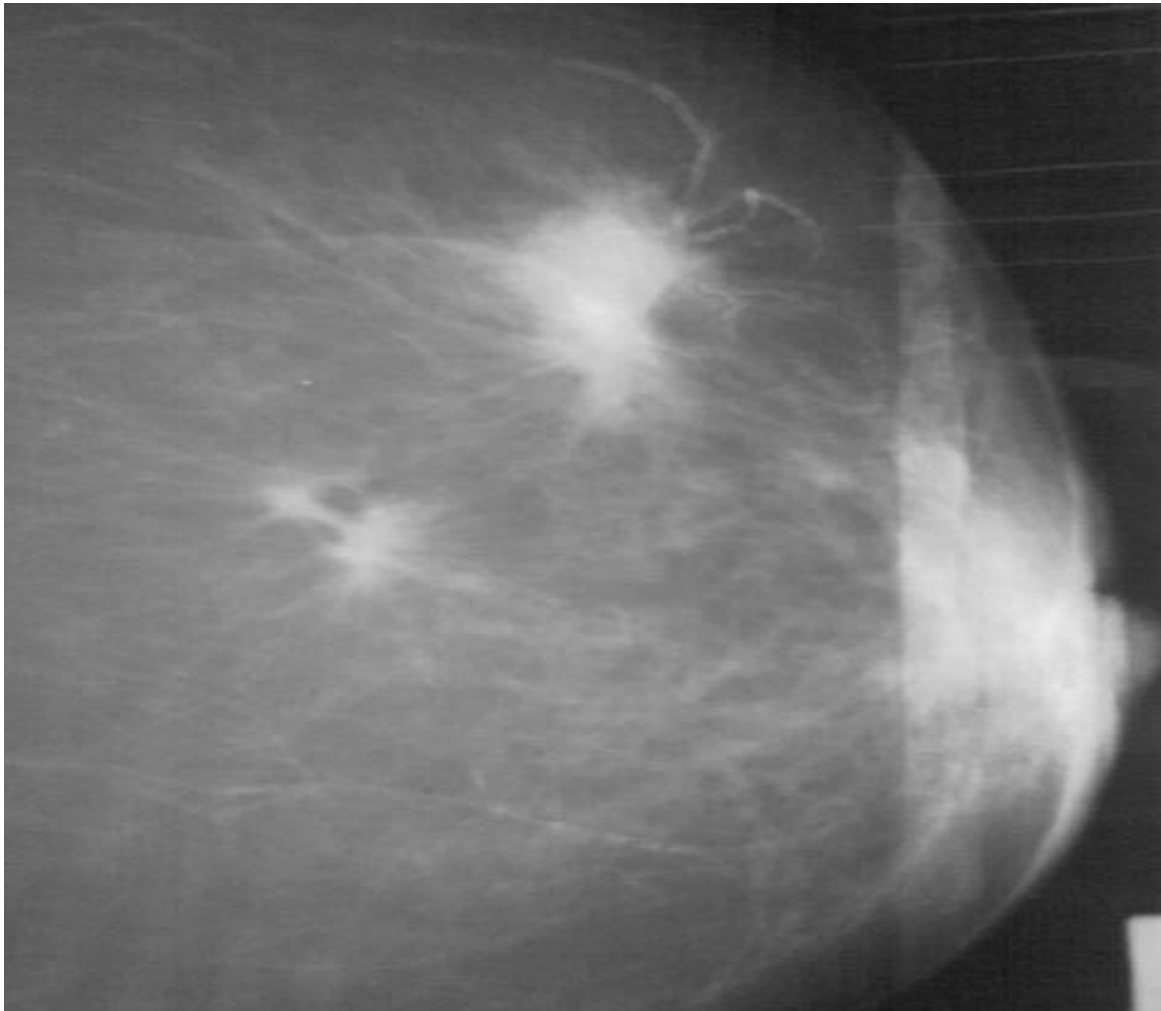


- ◉ *Mass Margin -Speculated*
- ◉ *lines radiating from margins of a mass*

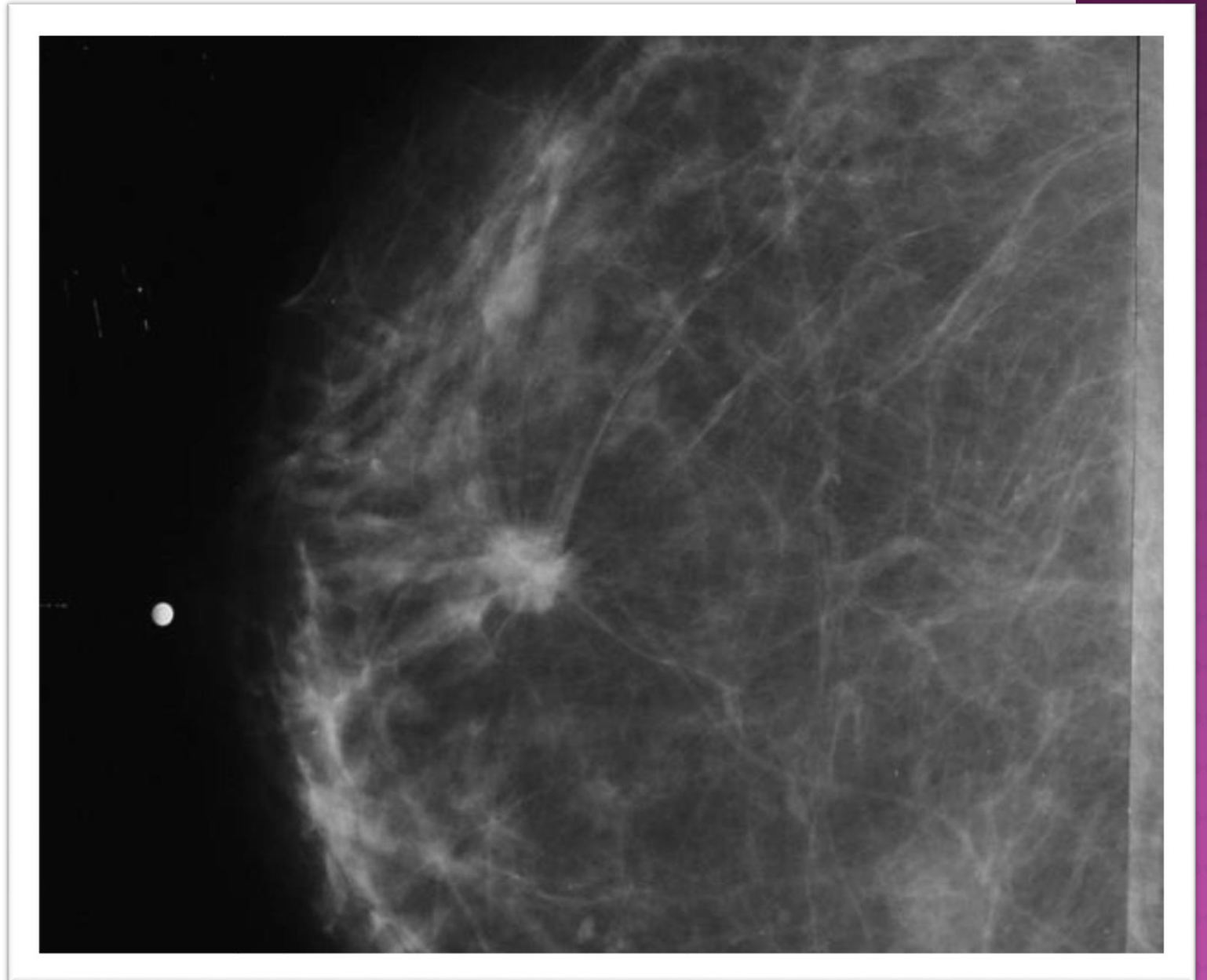


# DDX

- ⦿ *Breast CA. (tubular)*
- ⦿ *Radial scar*
- ⦿ *Post-op scar*

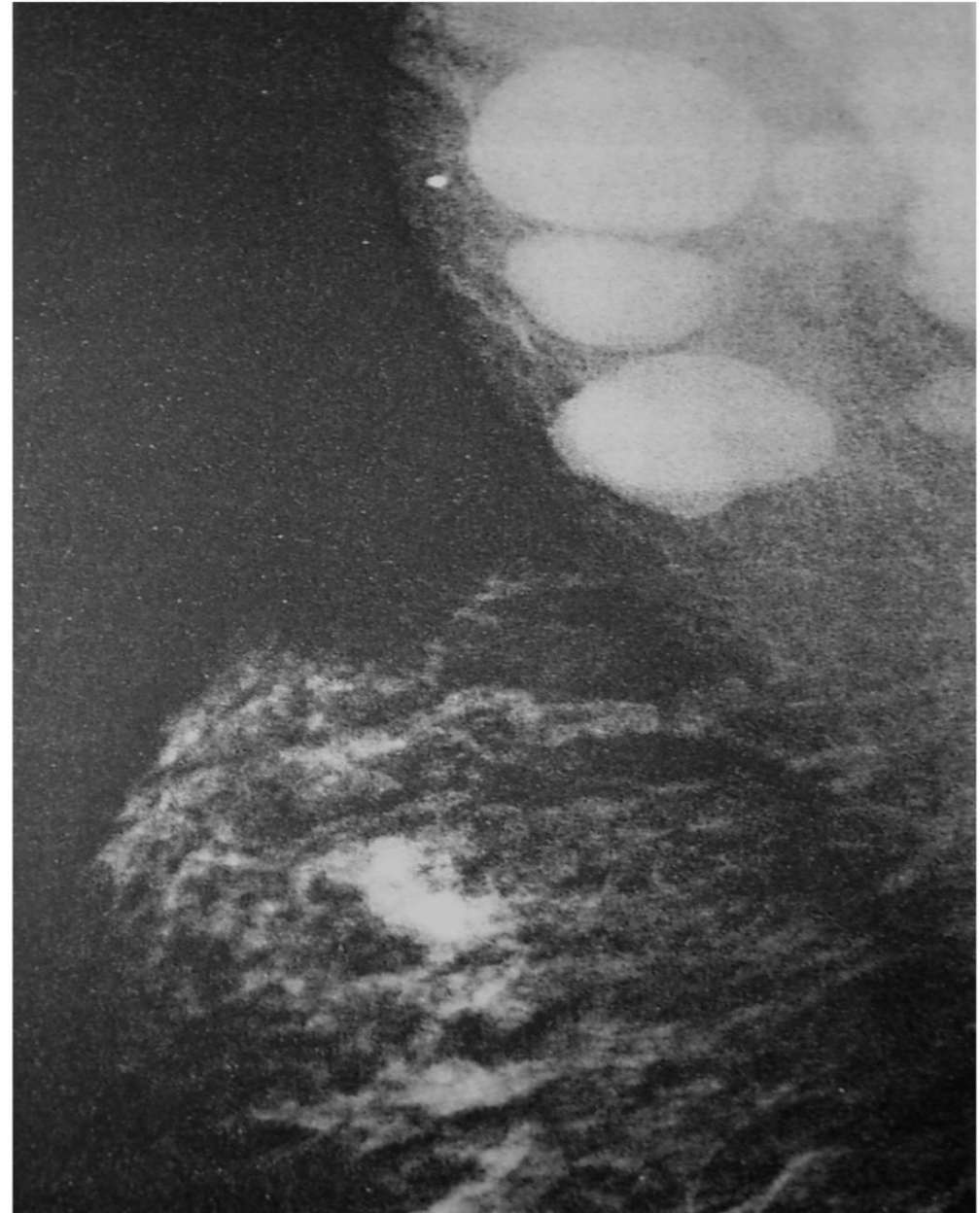


- ◉ ***Speculated margins***
- ◉ ***lines radiating from margins of a mass***
- ***Note: biopsy even if stable! (tubular CA?)***





# OTHER SIGNS

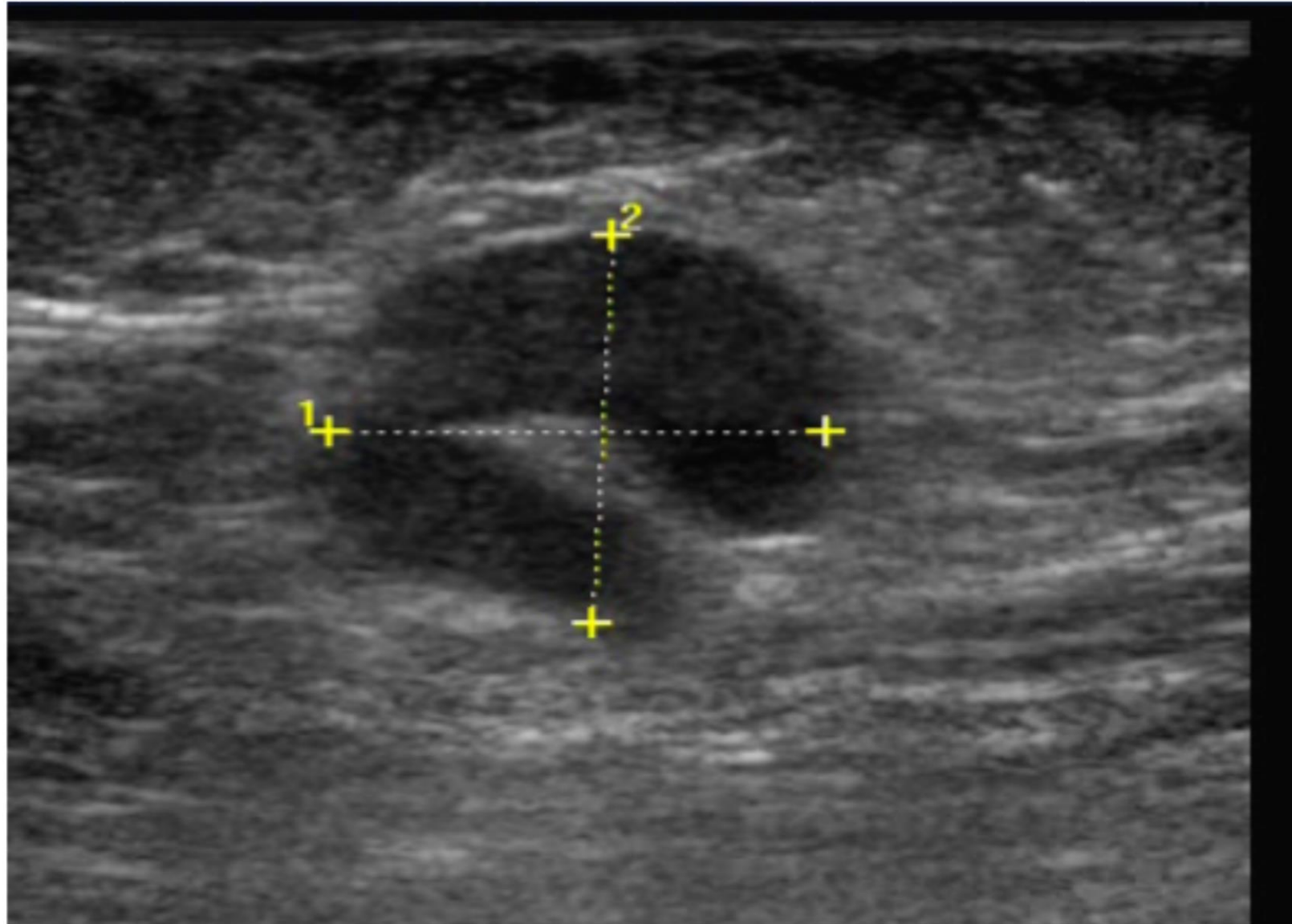




# AXILLARY ADENOPATHY

- ◉ *non-fatty replaced axillary lymph nodes*
- ◉ *mammographic assessment is unreliable*
- ◉ *bilateral: clinical correlation*
- ◉ *unilateral: clinical correlation and bx*
- ◉ *MRI of bx-proven occult malignancy*
- ◉ *DDx: :*
- ◉ *metastatic breast CA (unilateral)*
- ◉ *non -breast mets*
- ◉ *lymphoma*
- ◉ *infection, reactive LAN*
- ◉ *nonspecific LAN (often in HIV)*
- ◉ *connective tissue diseases*
- ◉ *Refer for clinical evaluation*

# OTHER SIGNS

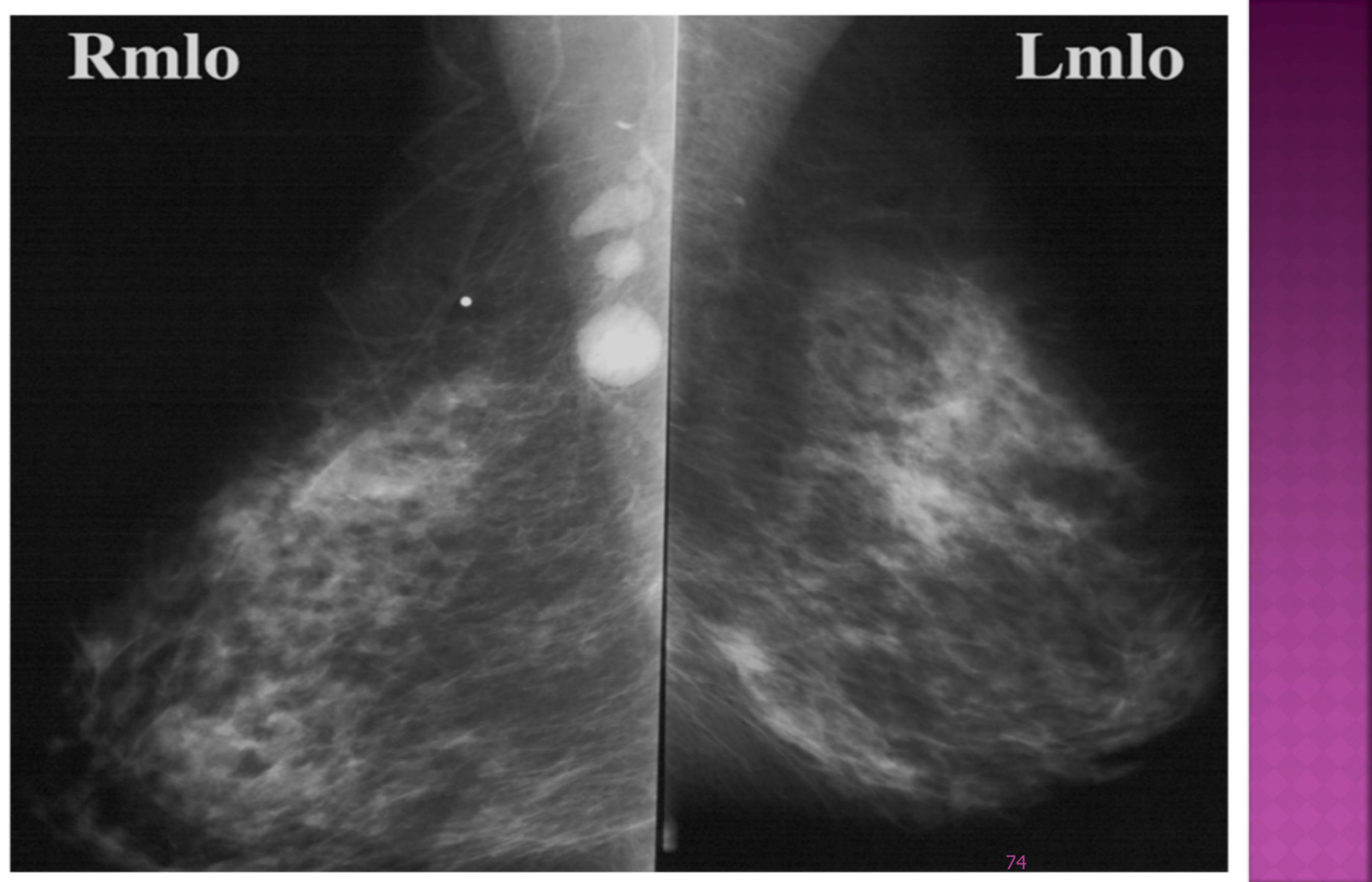






**Rmlo**

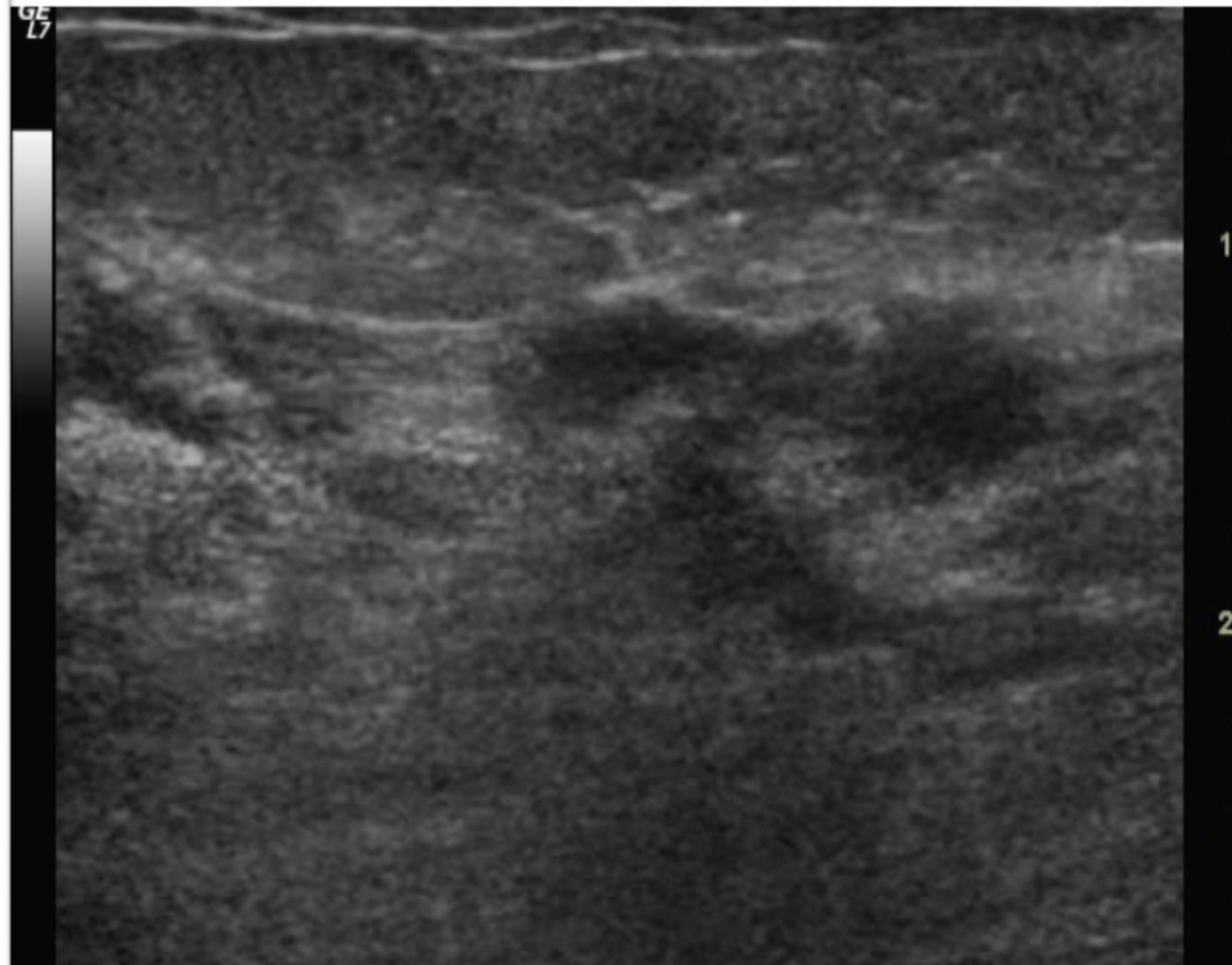
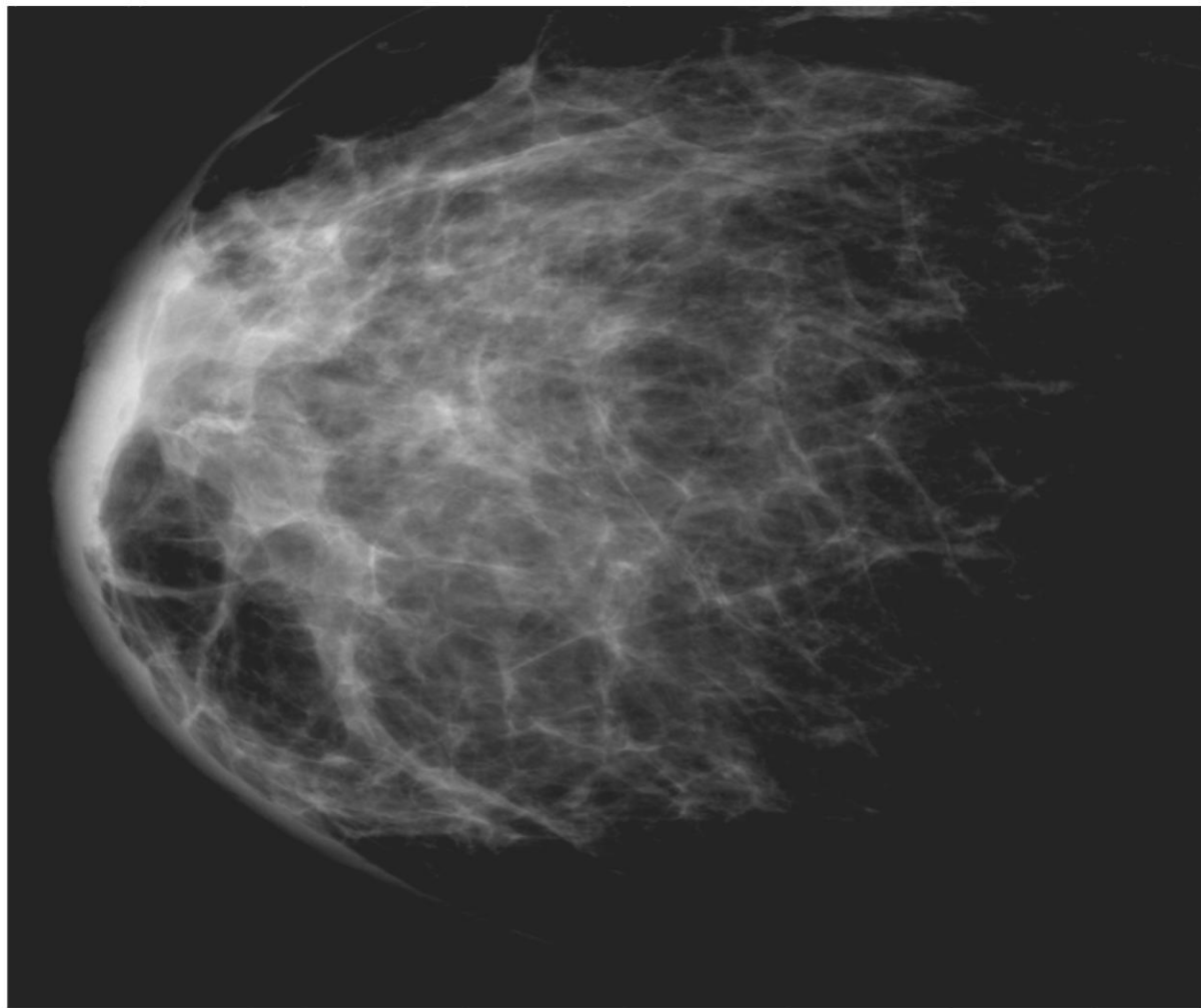
**Lmlo**





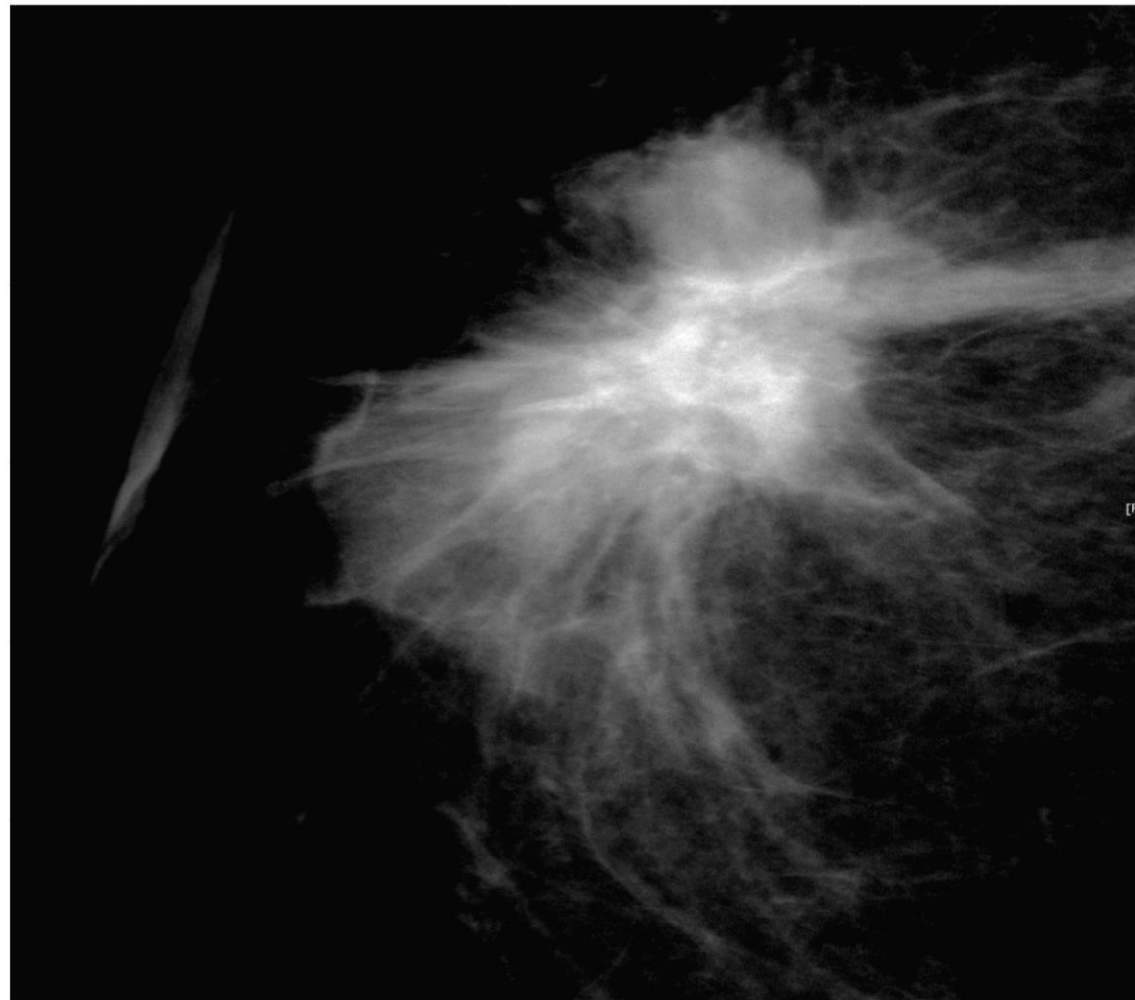
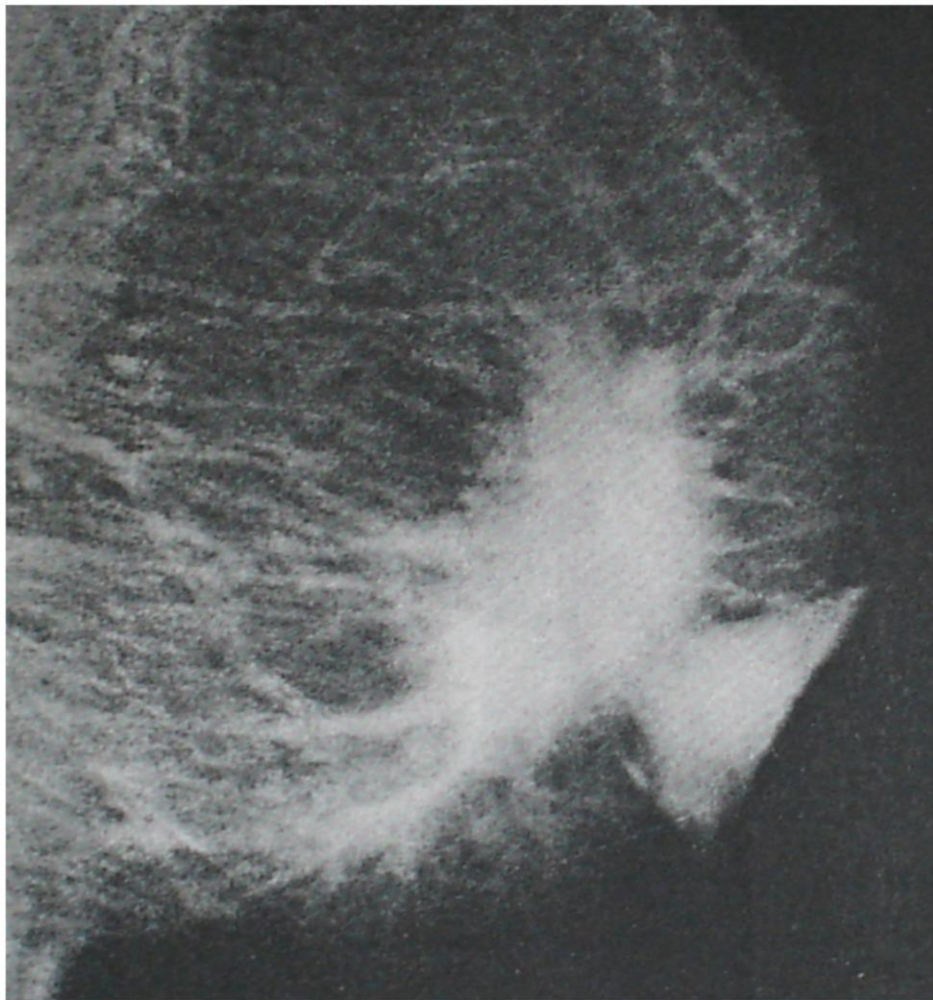
# SHOULD WE ALWAYS SEE A MASS

## ◉ *Skin Thickening*



# OTHER SIGNS

## SKIN AND NIPPLE RETRACTION

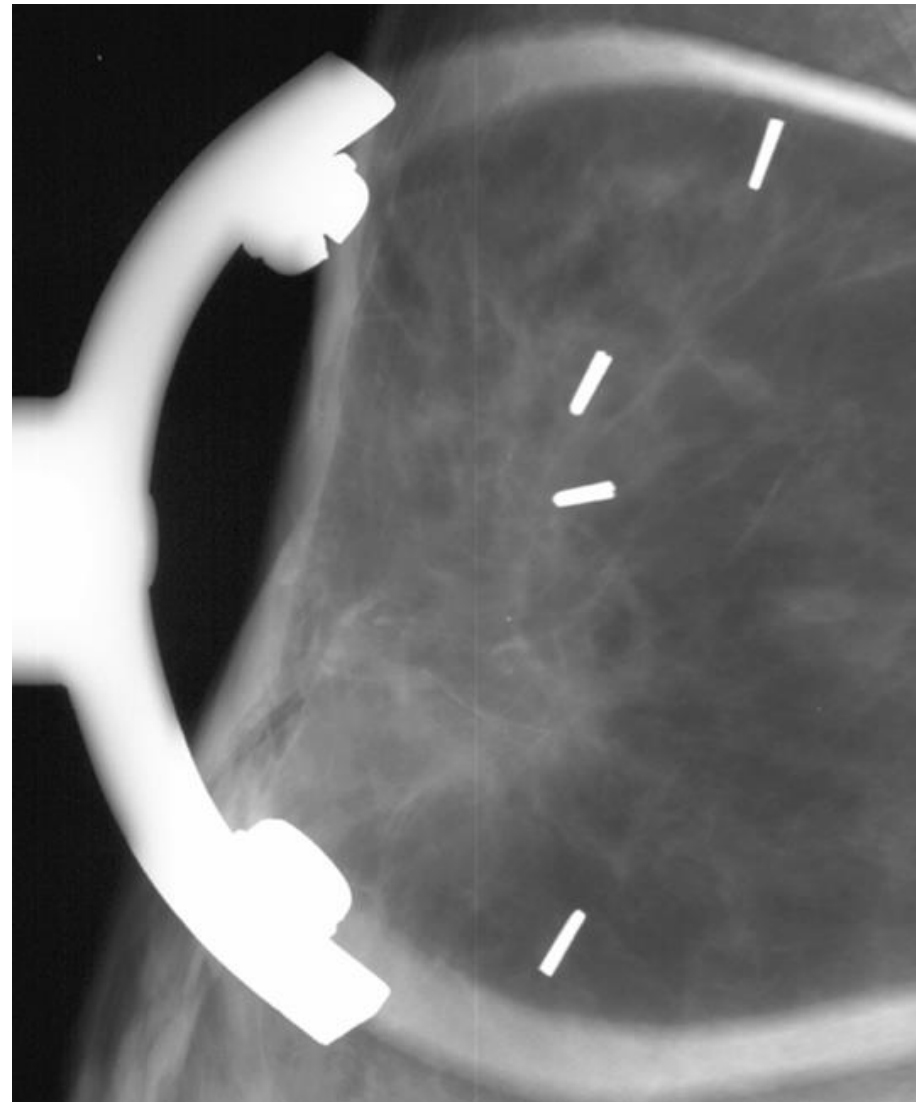


# SKIN THICKENING

normal 0.5 to 2 mm

- thicker at inframammary fold and peri-areolar

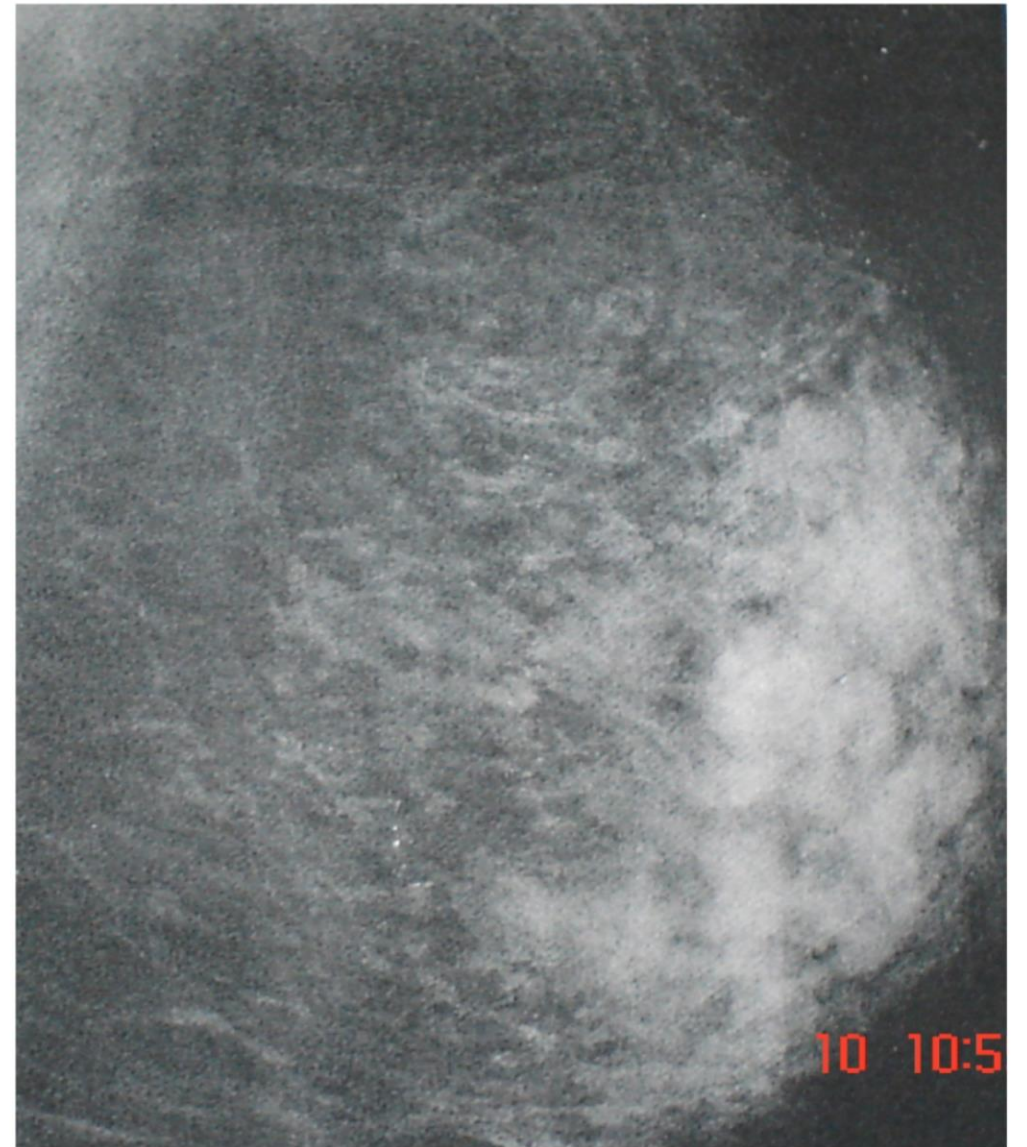
- DDx: Breast CA, radiation, lymphatic obstruction.





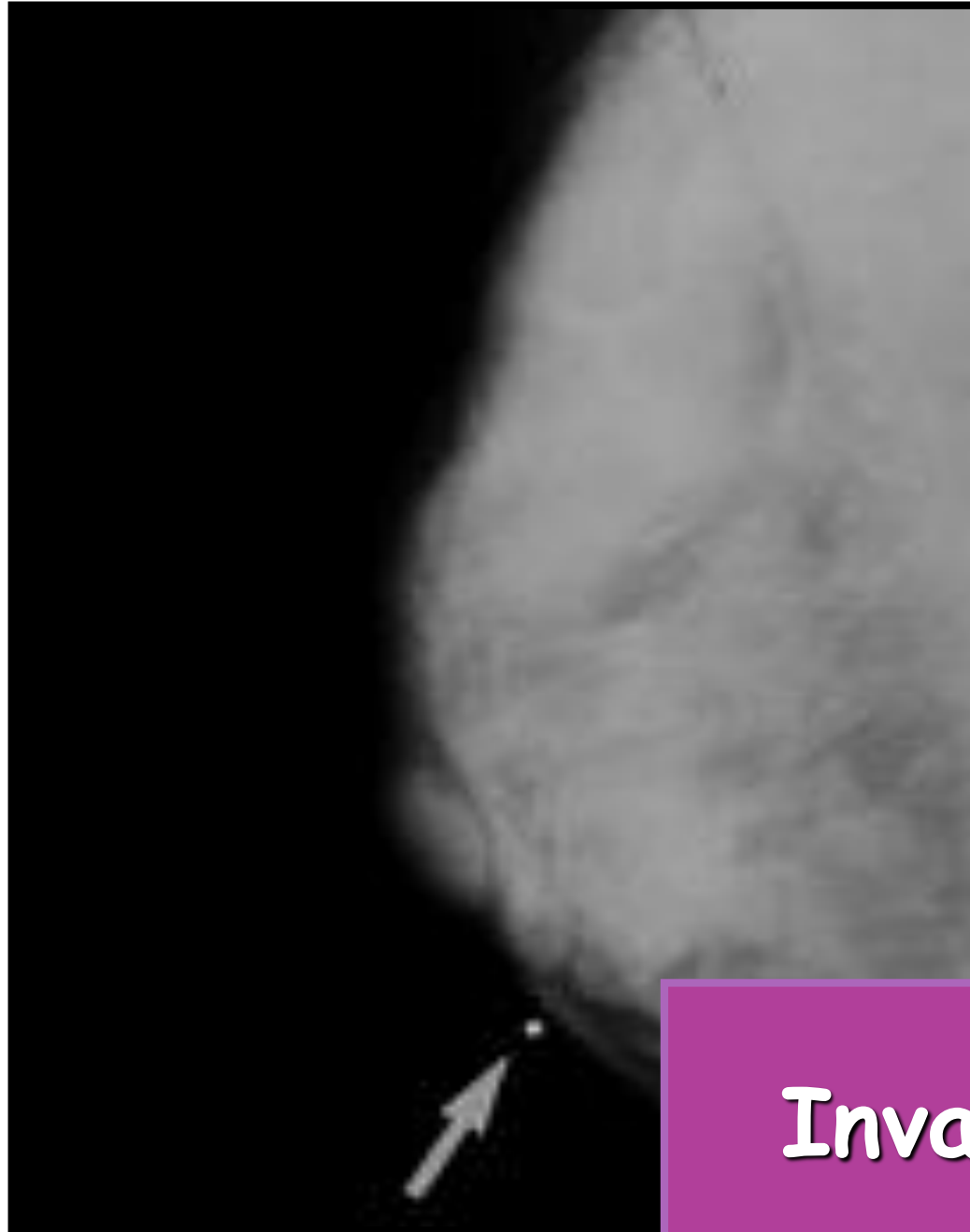
# OTHER SIGNS

**SKIN THICKENING &  
INCREASED TRABECULATION**

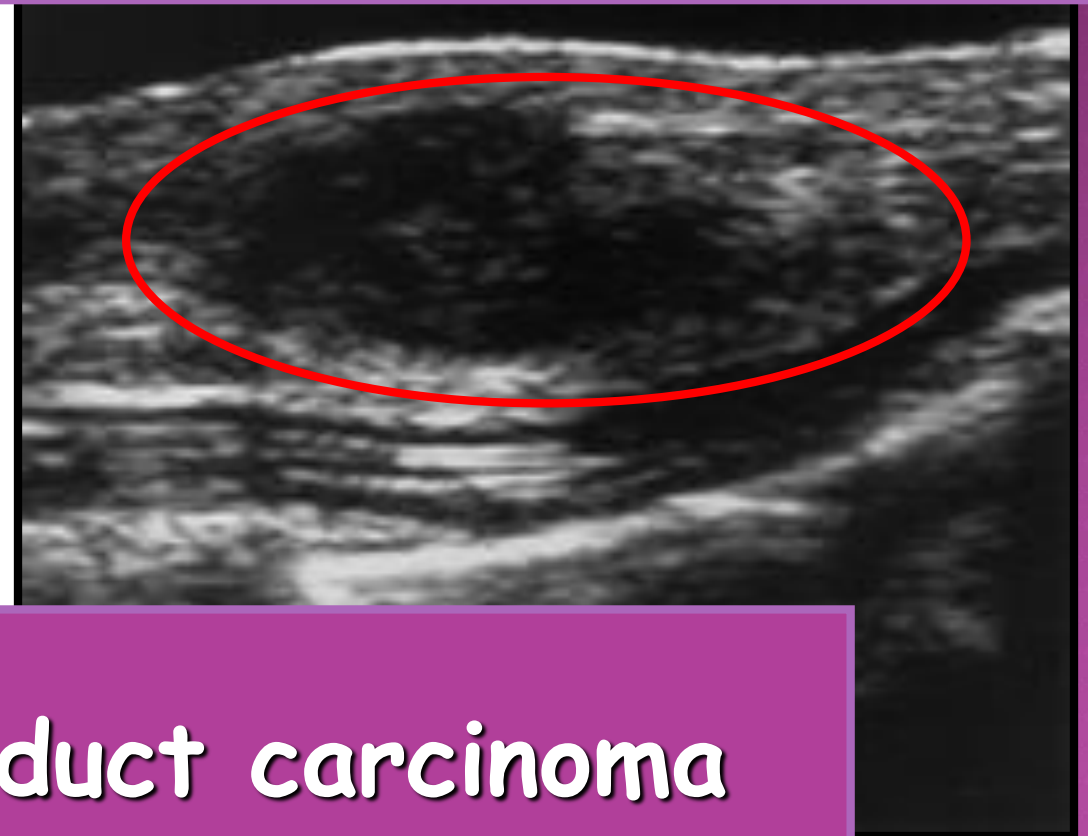




# DENSE BREAST= ULTRASOUND



A 36-year-old woman with dense breasts and a palpable mass



Invasive duct carcinoma

# CALCIFICATION

MORPHOLOGY

NUMBER

SIZE

DISTRIBUTION

# MORPHOLOGY OF CALCIFICATION

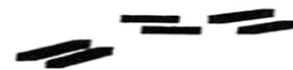
- ◎ Calcifications are categorized morphologically as to the likelihood of associated malignancy. The **BI-RADS lexicon** describes three groups:
- ◎ 1. Typically benign calcifications
- ◎ 2. Calcifications with intermediate concern of malignancy
- ◎ 3. Calcifications with a high probability of malignancy

# TYPICALLY BENIGN

Skin



Vascular



Coarse



Large,  
rod-like



Round



Eggshell



Milk of  
calcium





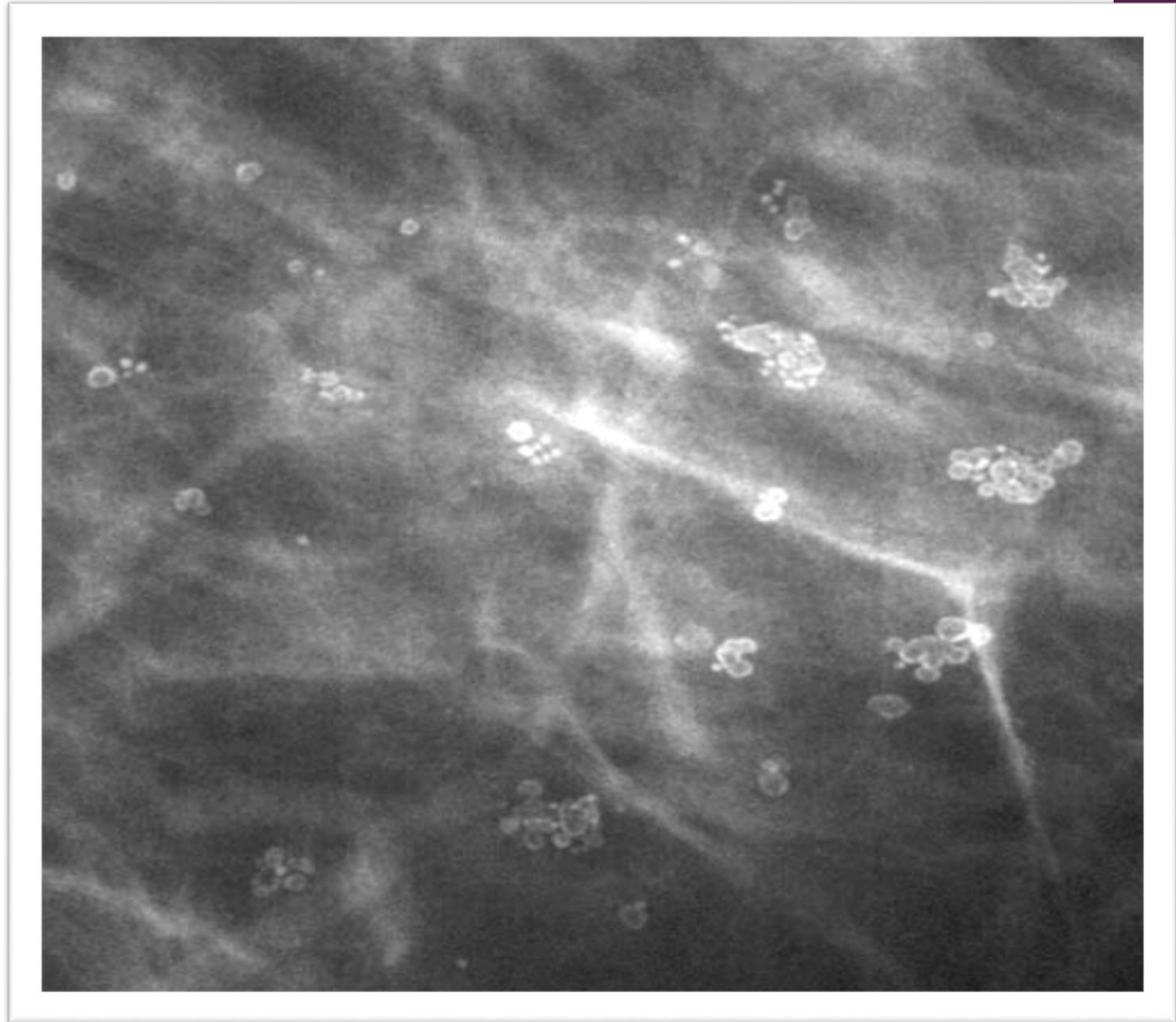
# TYPICALLY BENIGN CALCIFICATIONS

- Skin Calcifications
- Vascular Calcifications
- Coarse/Popcorn Calcifications
- Large Rod-Like Calcifications
- Round Calcifications
  
- Lucent-centered Calcifications
- Rim Calcifications
- Milk of Calcium
- Suture Calcifications
- Dystrophic Calcifications



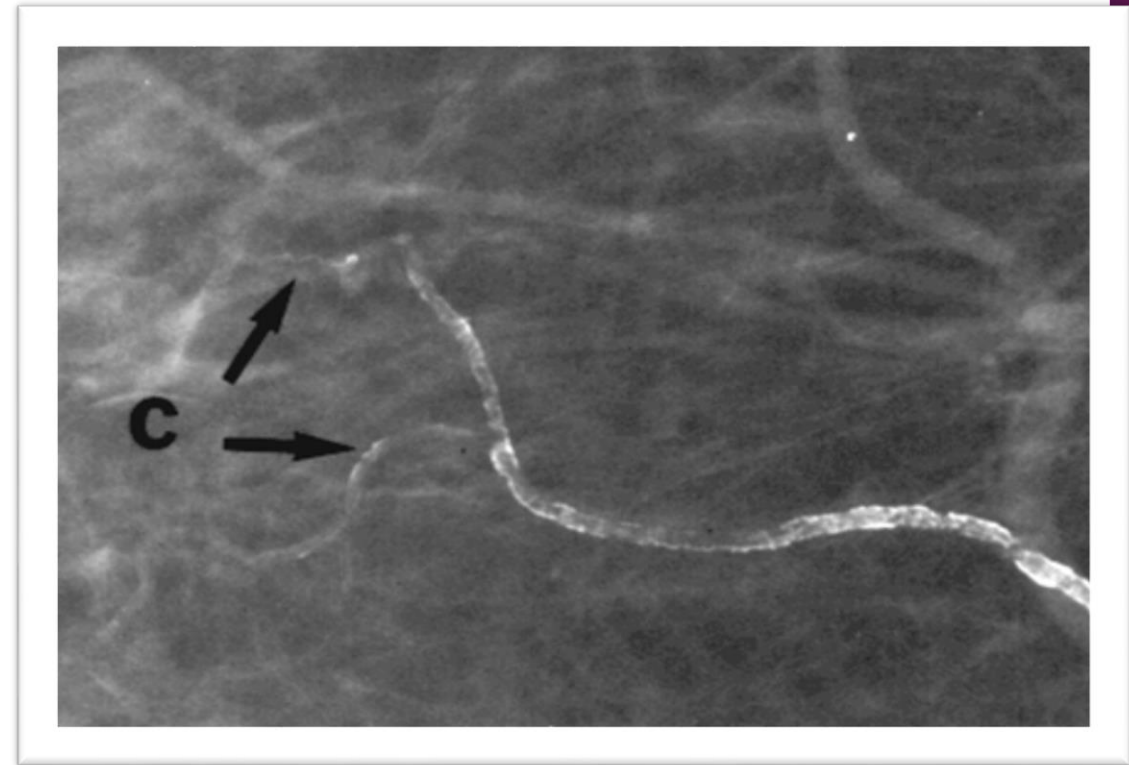
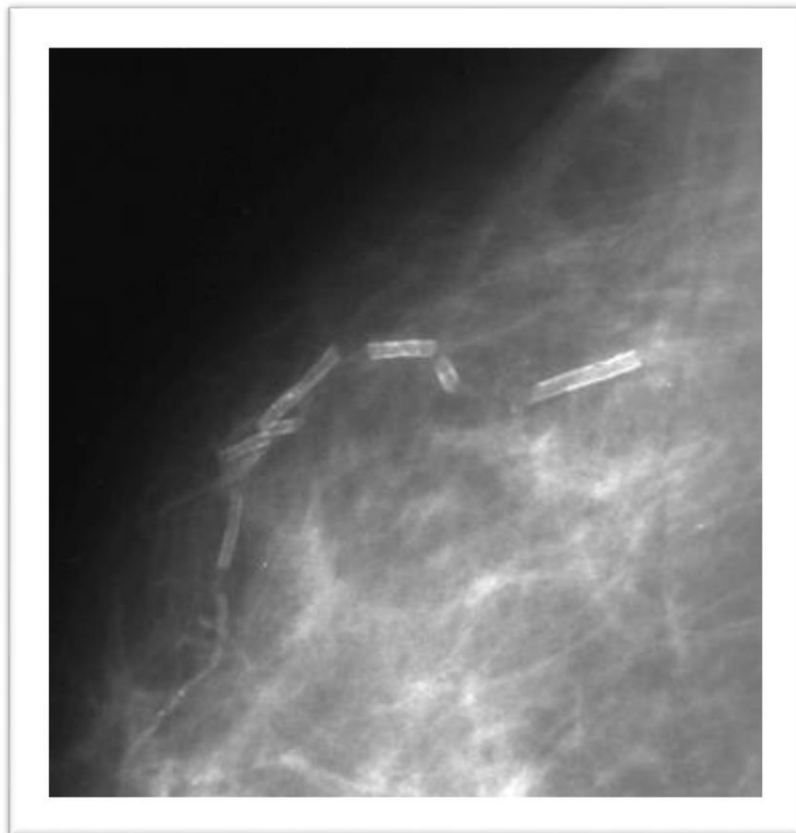
# ***SKIN CALCIFICATION***

- ◉ Dermal Calcifications
- ◉ lucent-centered
- ◉ polygonal



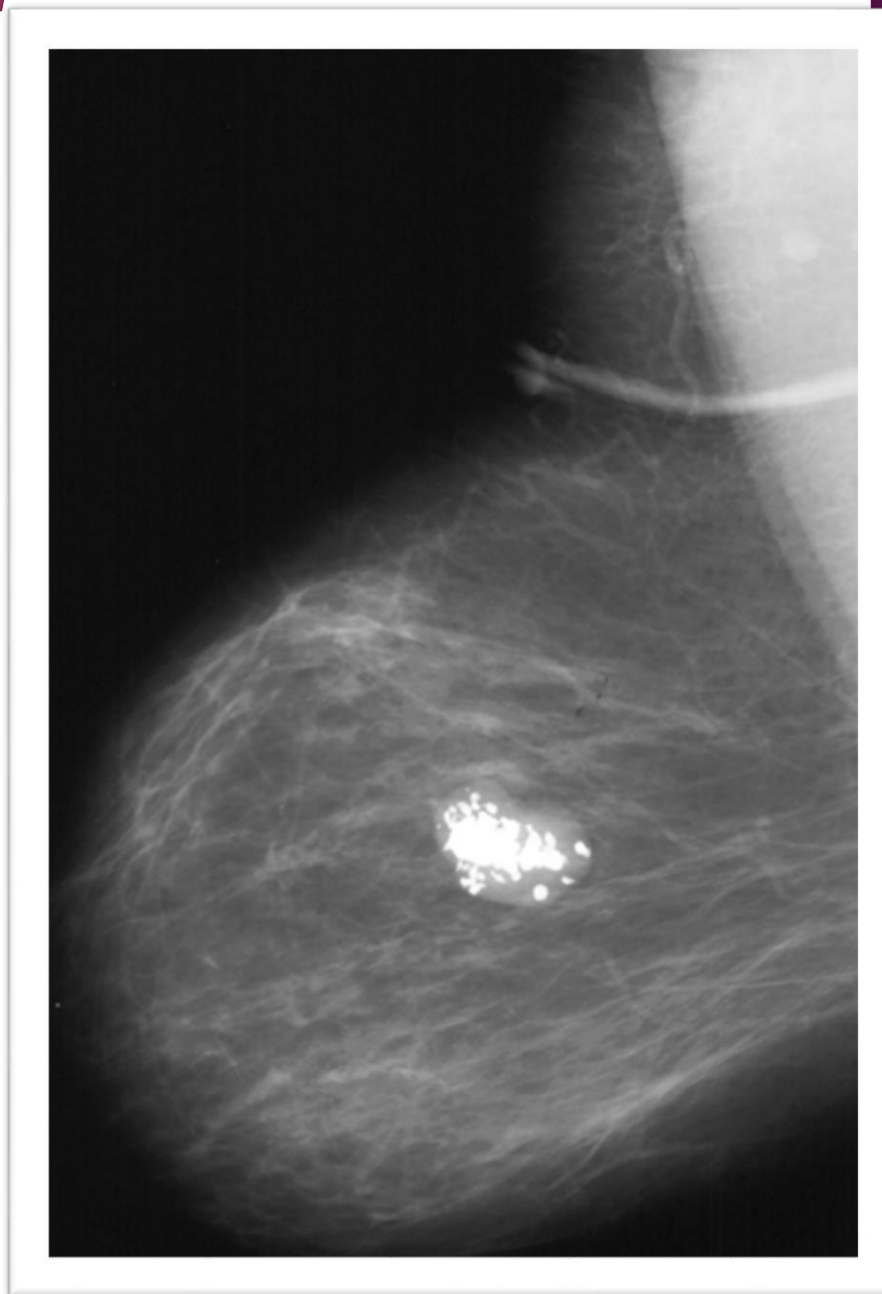
# VASCULAR CALCIFICATION

- parallel tracks
- linear tubular calcifications
- blood vessel evident



# ***COARSE/POPCORN CALCIFICATION***

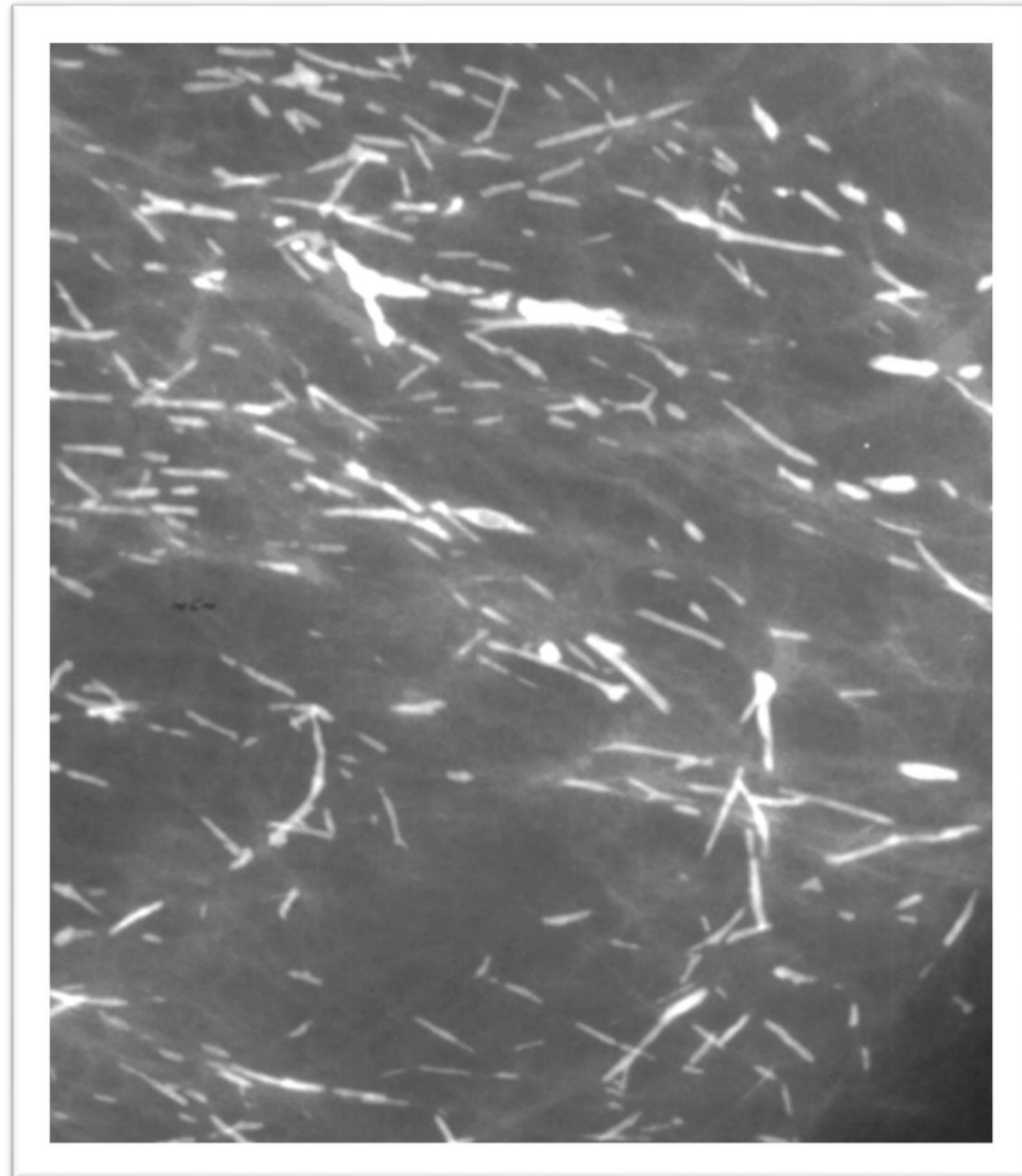
Involuting  
fibroadenoma





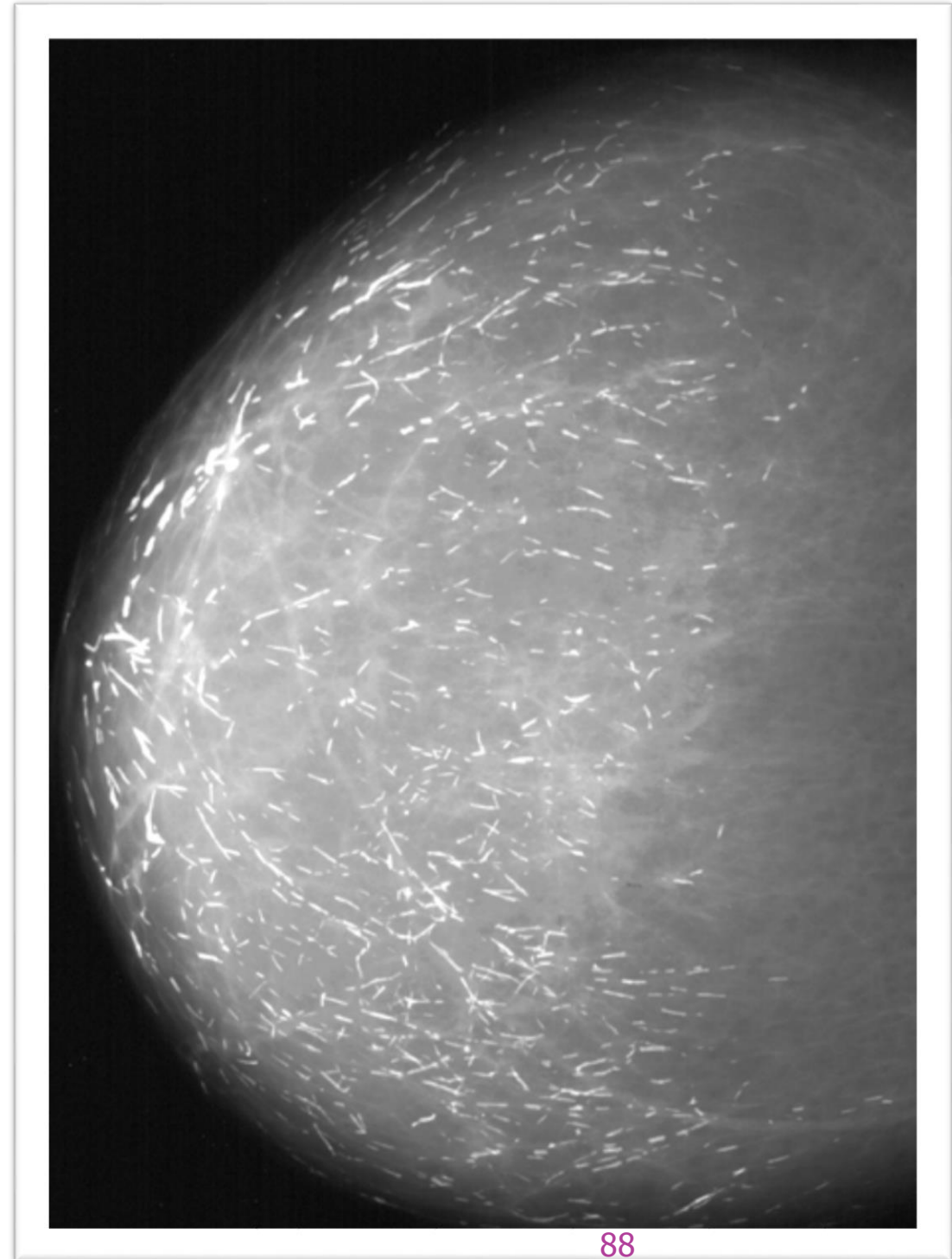
# ***LARGE ROD--LIKE CALCIFICATION***

- continuous rods
- may branch
- >1 mm diameter
- lucent center if calcification surrounds duct



## *LARGE ROD--LIKE CALCIFICATION*

- .secretory calcifications
- “plasma cell mastitis”
- .duct ectasia



## ***ROUND CALCIFICATION***

### Round & Punctate

- “punctate” if  $< 0.5$  mm
- frequently form in acini of lobules



## *LUCENT CENTERED CALCIFICATION*

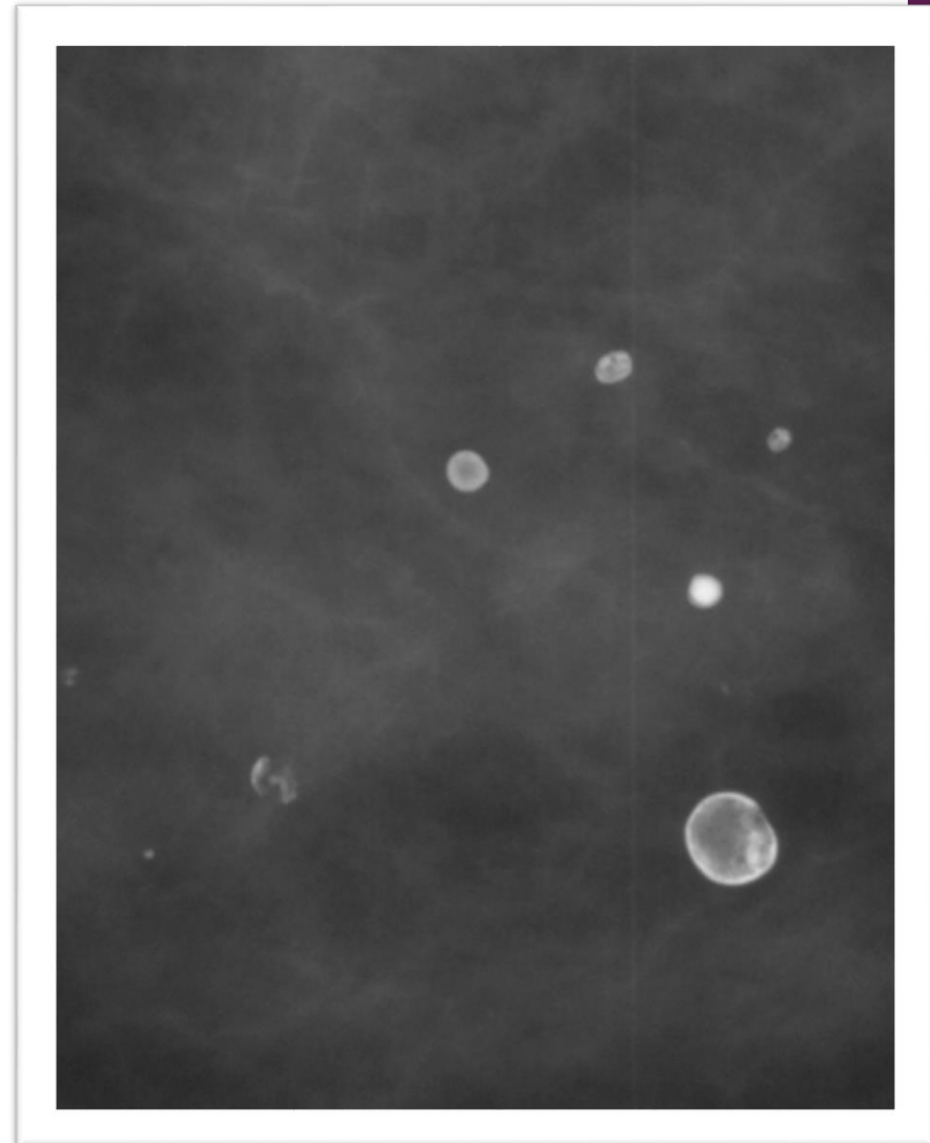
size: < 1 mm to > 1 cm

- round or oval, smooth surface
- lucent center
- wall thick “rim” or “eggshell” calcifications

DDX: -fat necrosis

-calcified debris in ducts

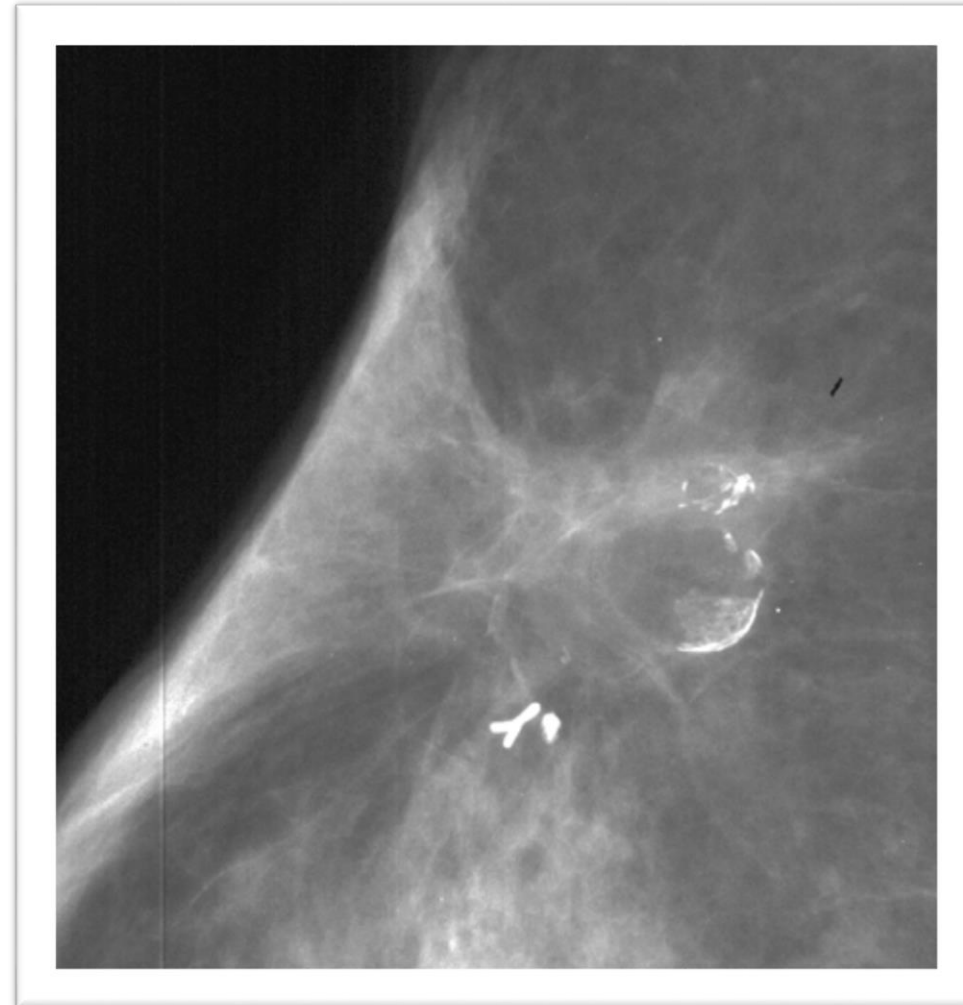
-occasional fibroadenomas??



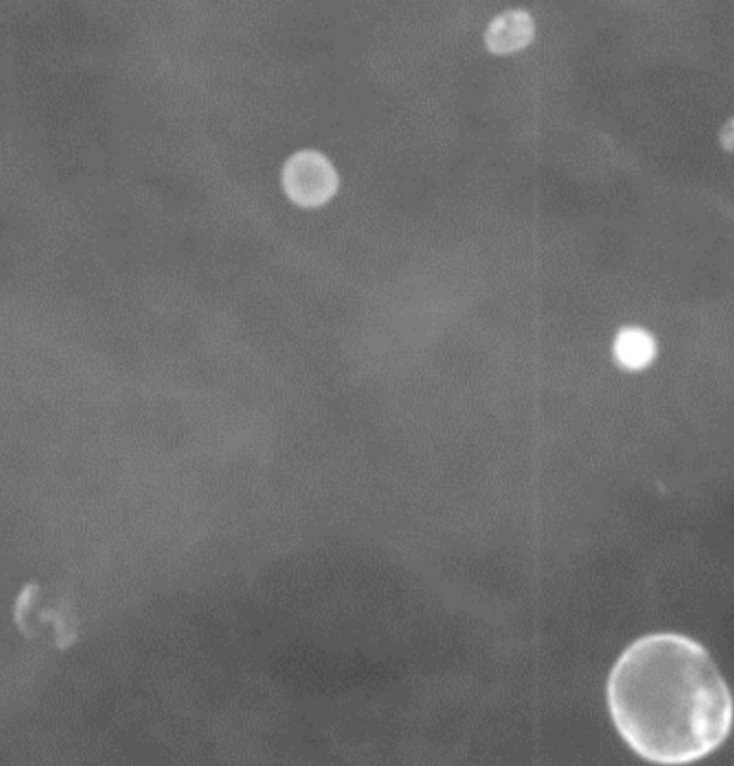


# **“EGGSHELL” RIM CALCIFICATION**

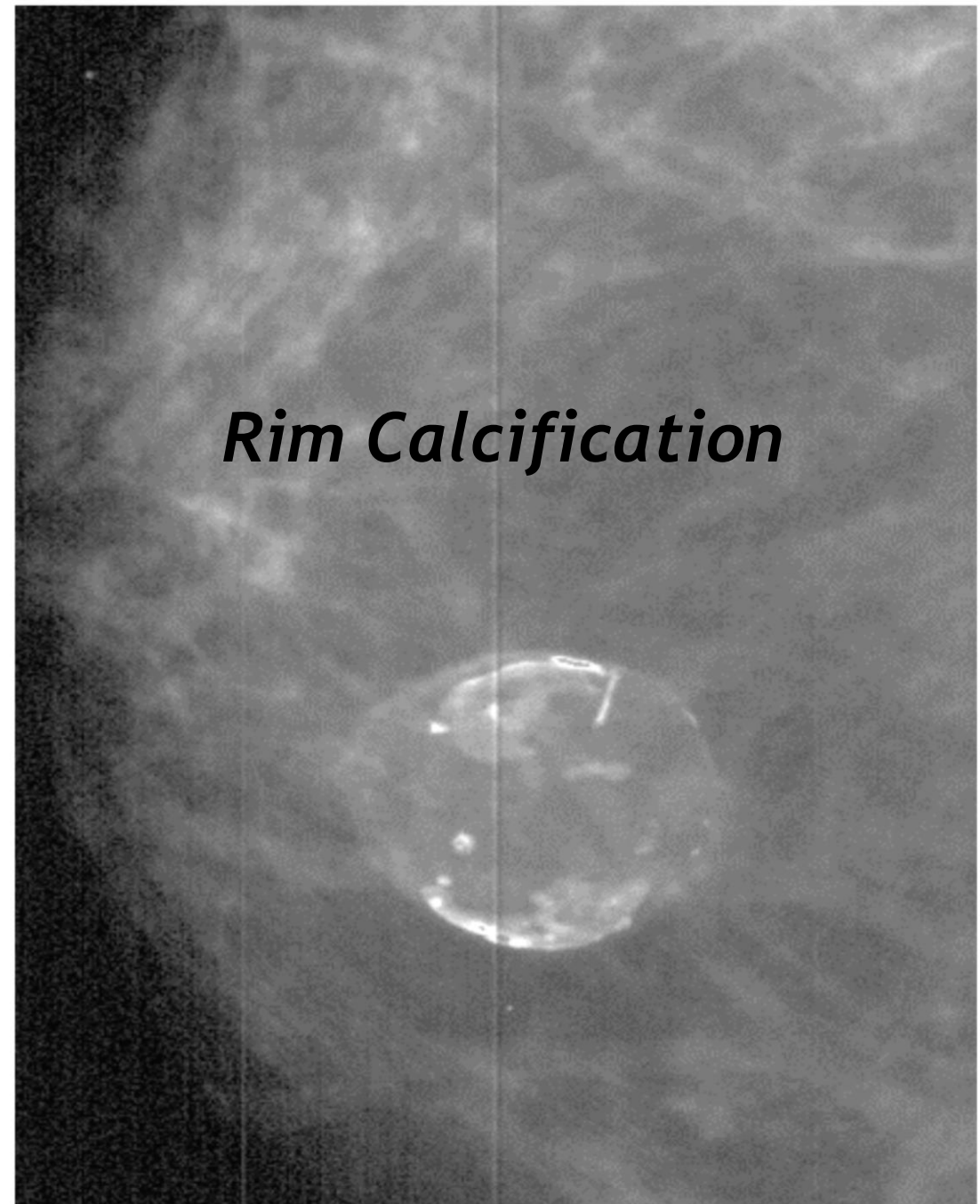
- ◉ *calcium deposited on surface of sphere*
- ◉ *< 1 mm thick deposits*
- ◉ *DDX: calcified wall of cyst vs fat necrosis.*



## ***Lucent-Centered Calcification***



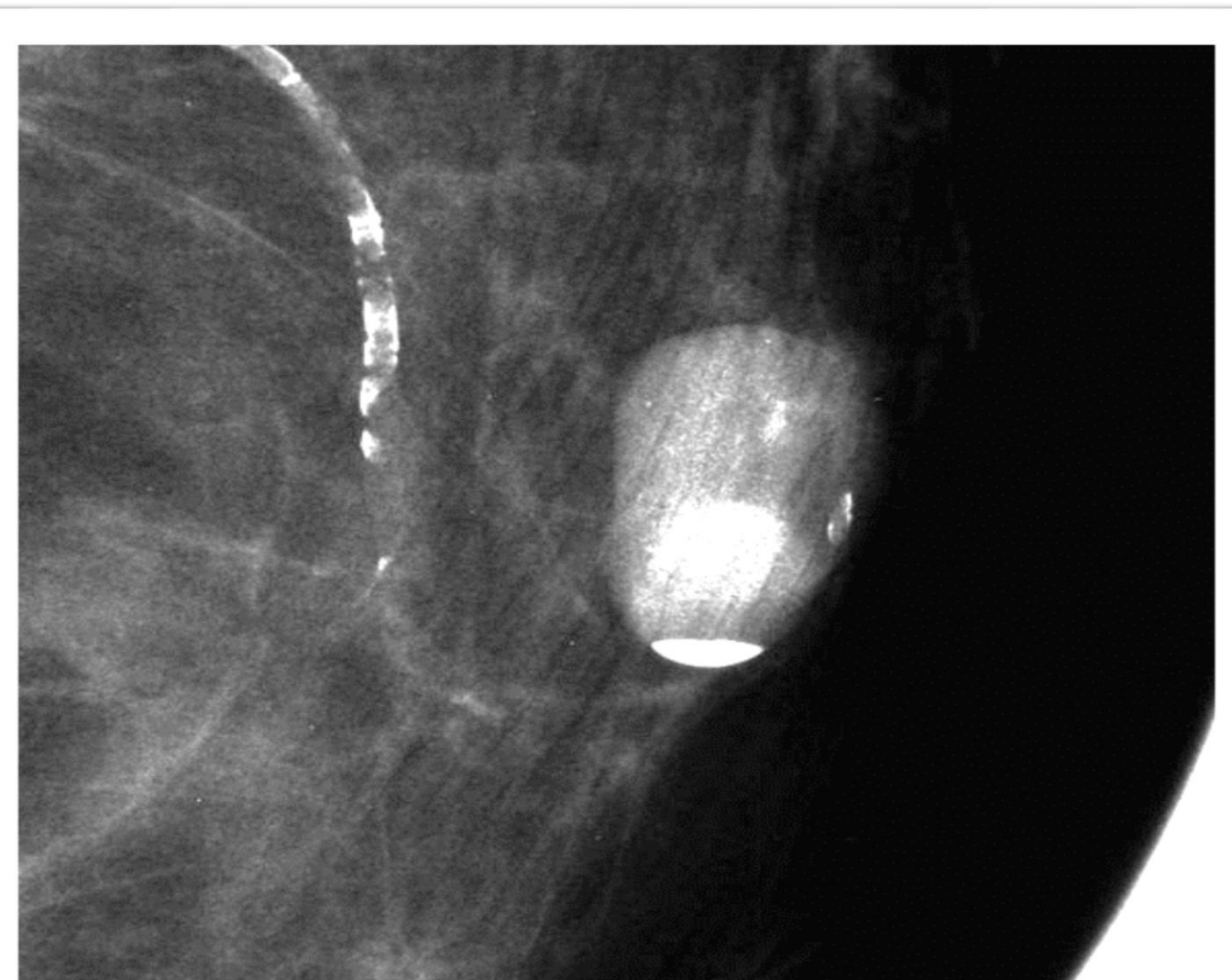
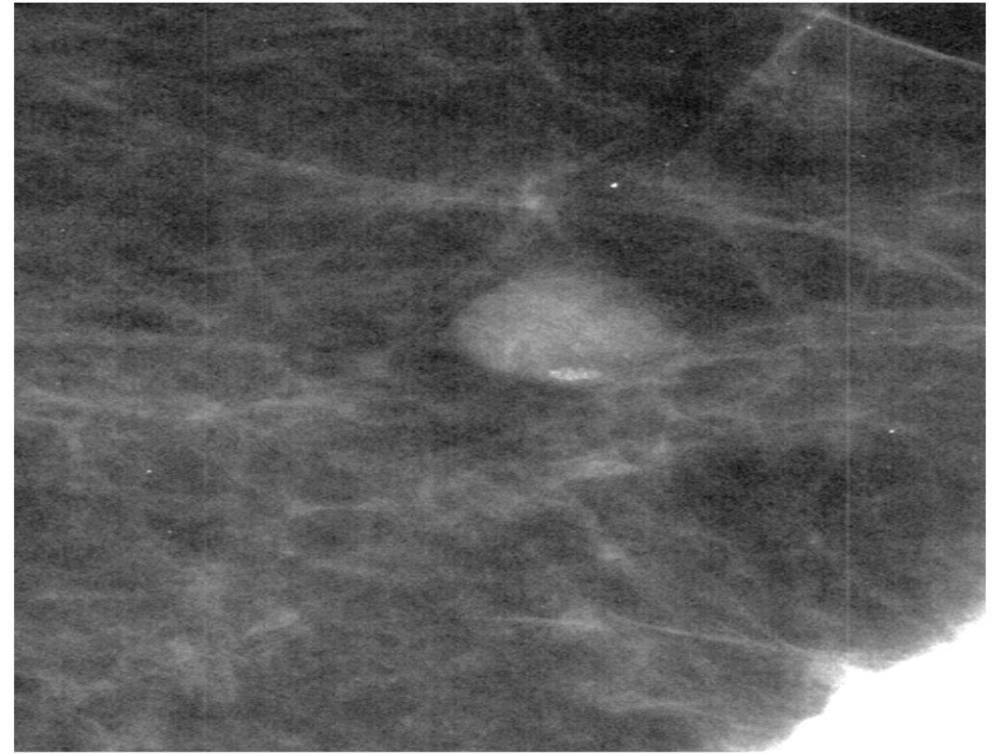
## ***Rim Calcification***

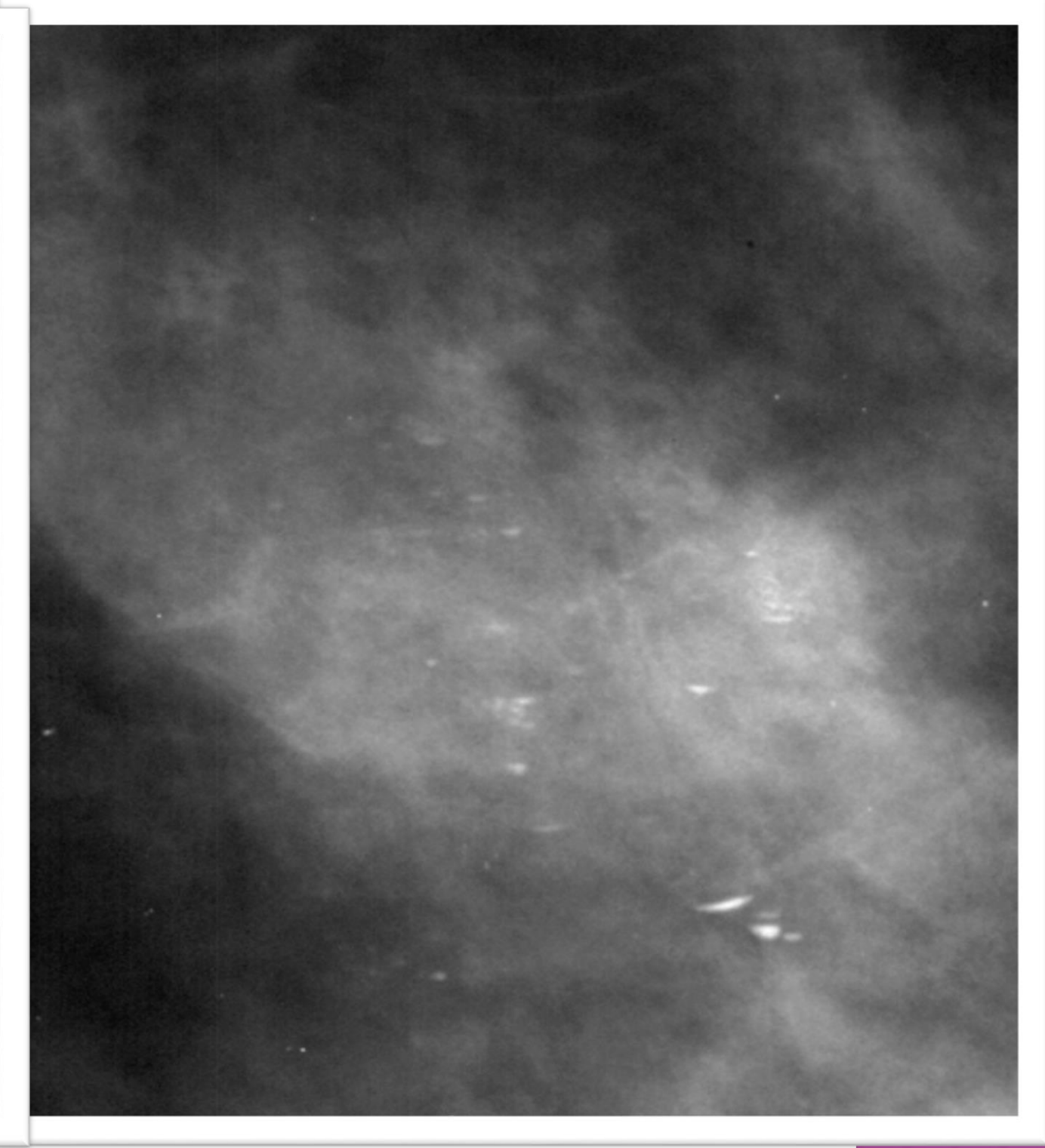
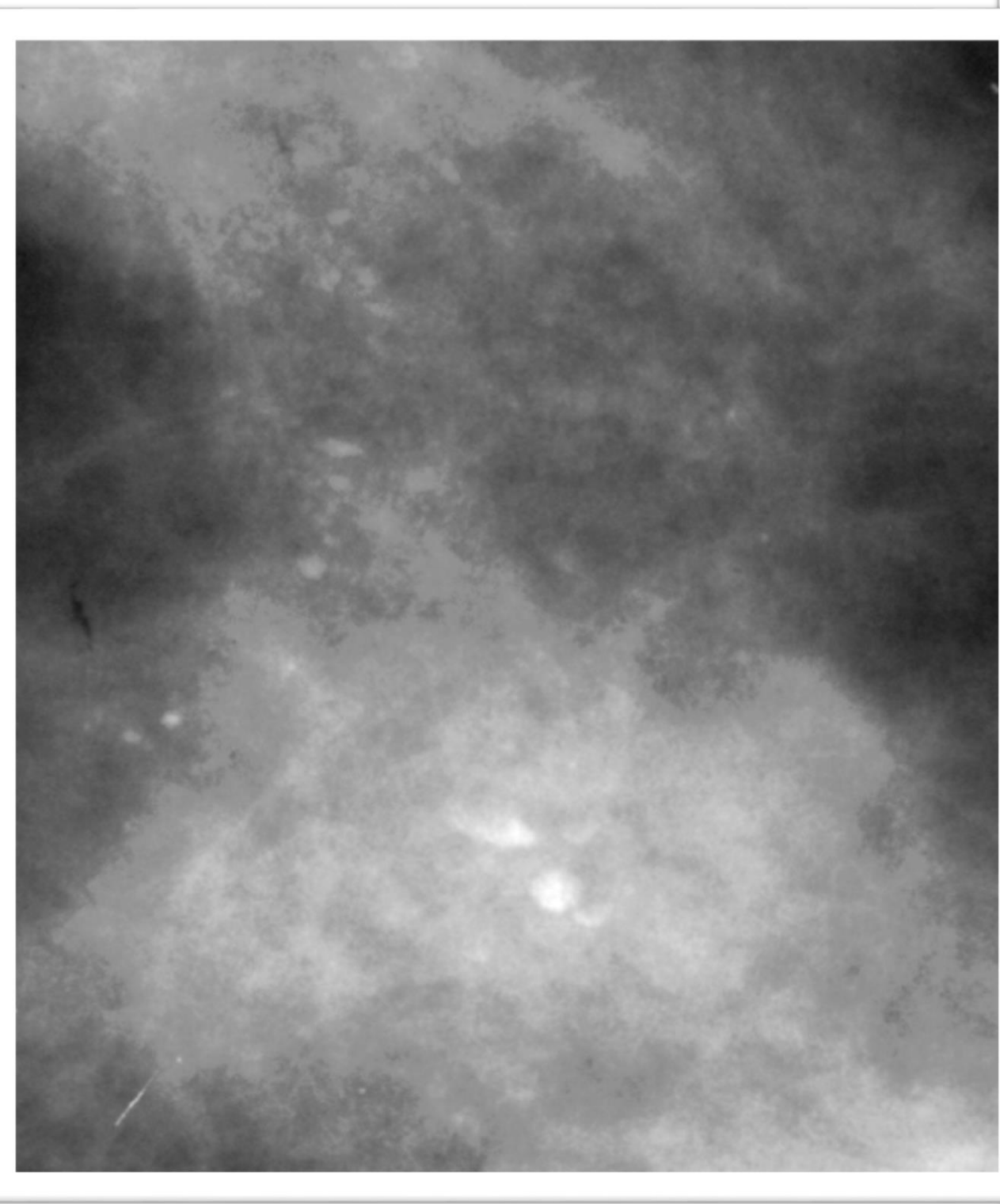




## ***MILK OF CALCIUM CALCIFICATION***

- calcium sediment in cysts

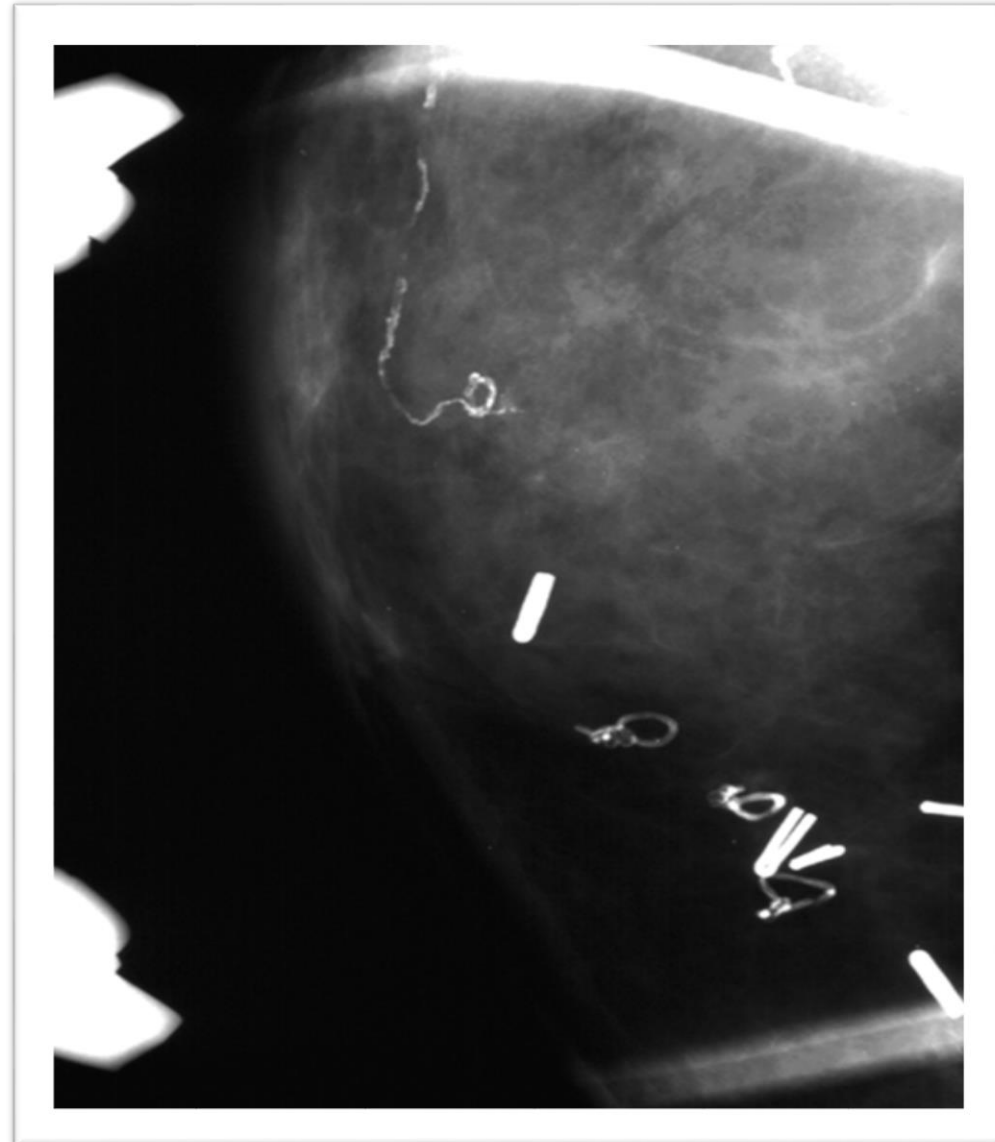






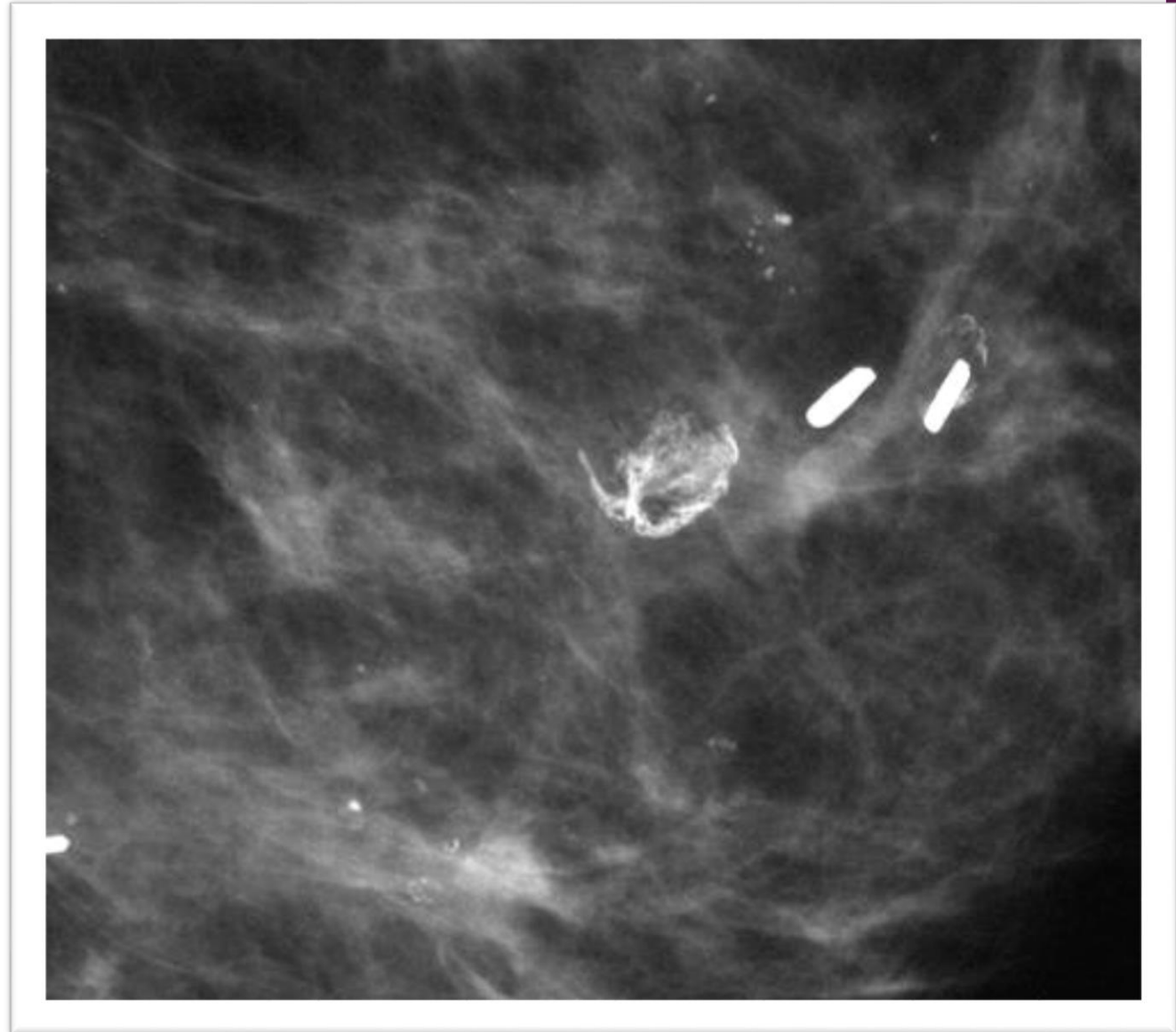
# ***SUTURE CALCIFICATION***

- *calcium deposited on suture material*
- *linear or tubular, ±knots*



## ***DYSTROPHIC CALCIFICATION***

- usually irradiated breast or s/p trauma
- irregular shape > 0.5 mm
- often lucent centers



# Microcalcifications: Concerning

## Indeterminate

Amorphous,  
indistinct



## Higher Probability of Malignancy

Pleomorphic,  
heterogeneous

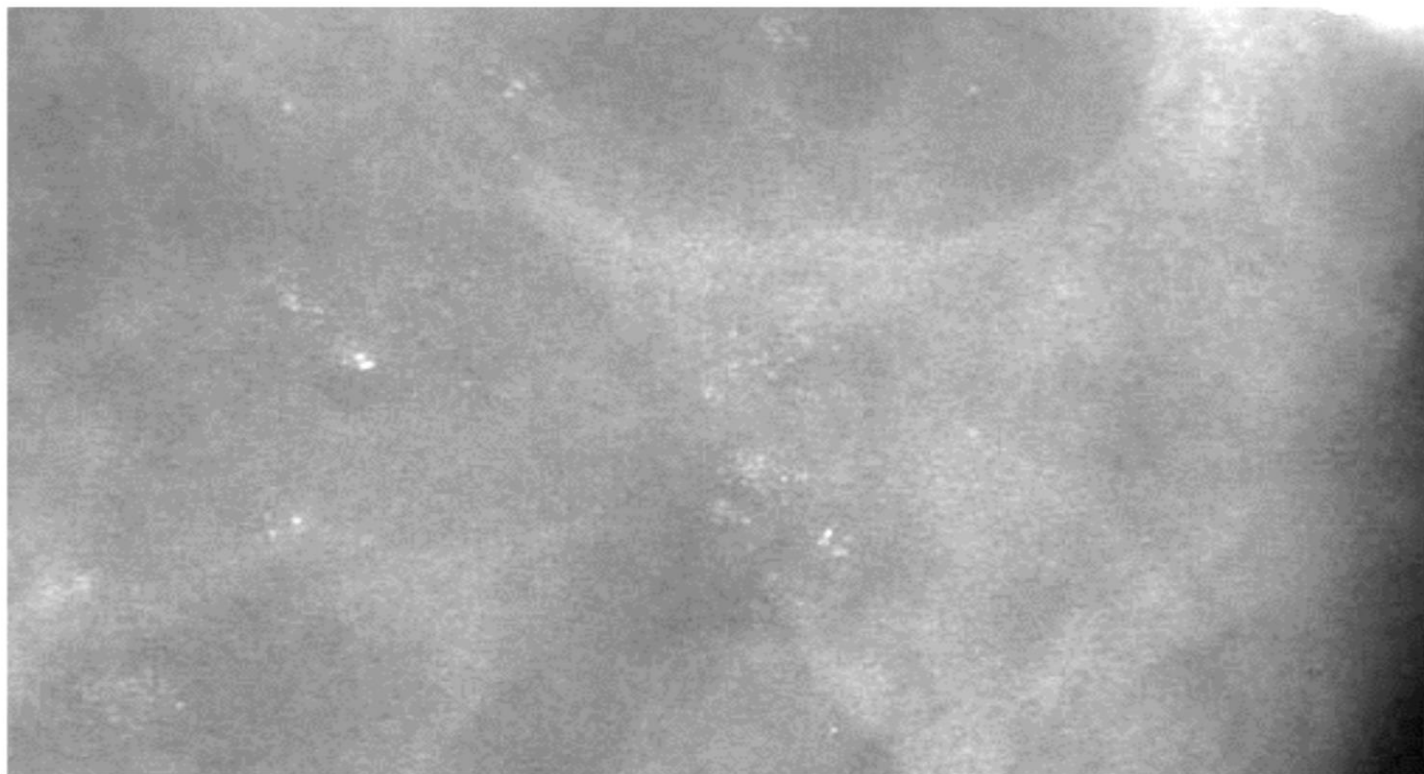
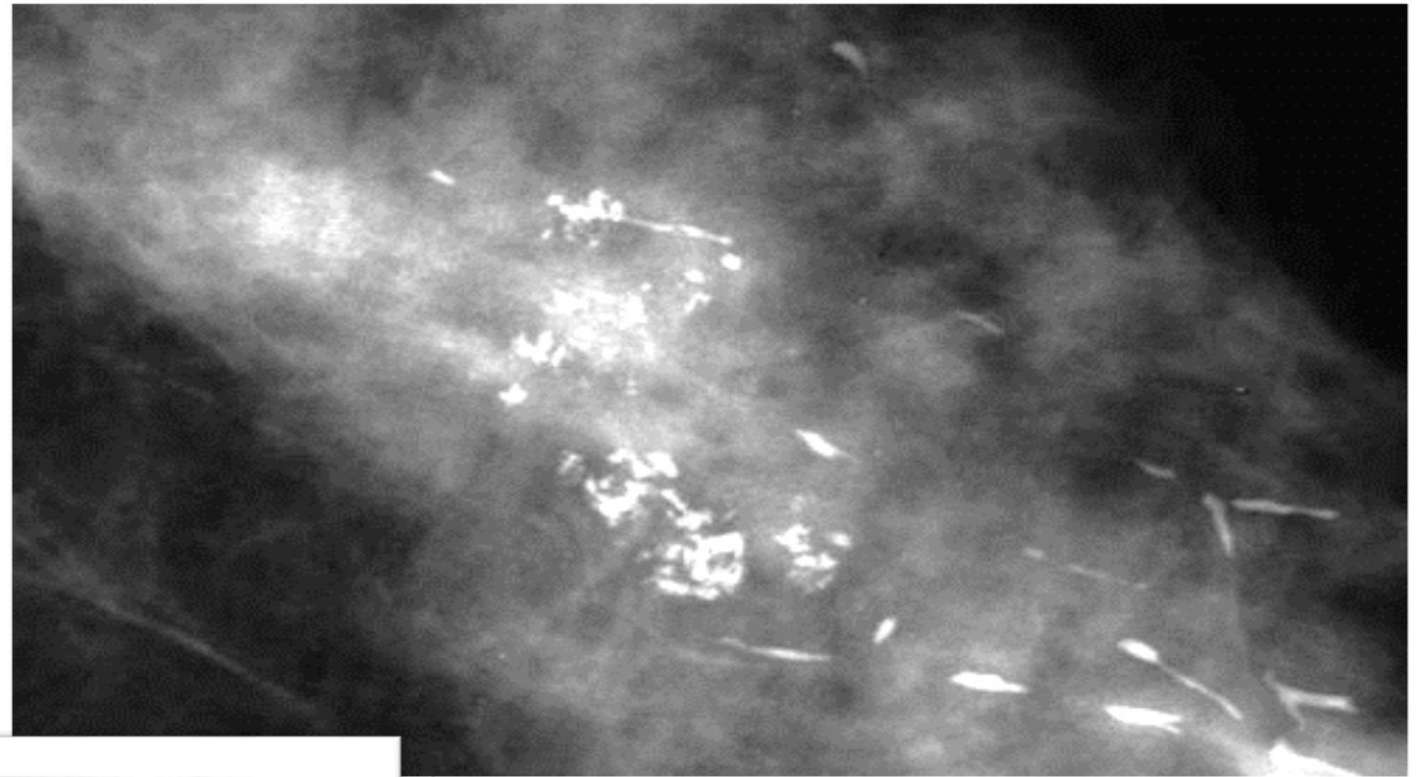


Fine, linear  
and/or  
branching



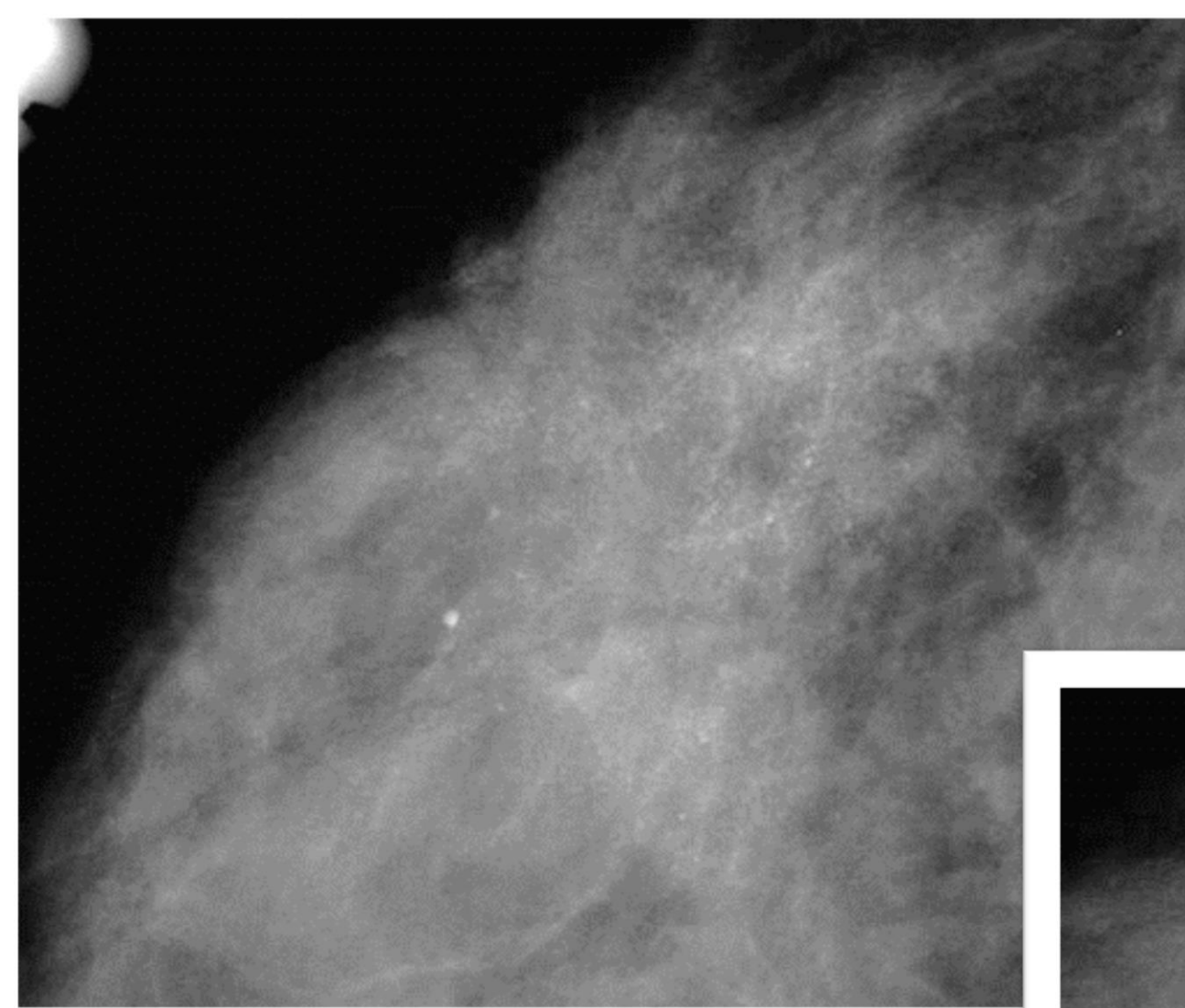
## INTERMEDIATE CONCERN

- Amorphous or Indistinct Calcifications
- Coarse Heterogeneous



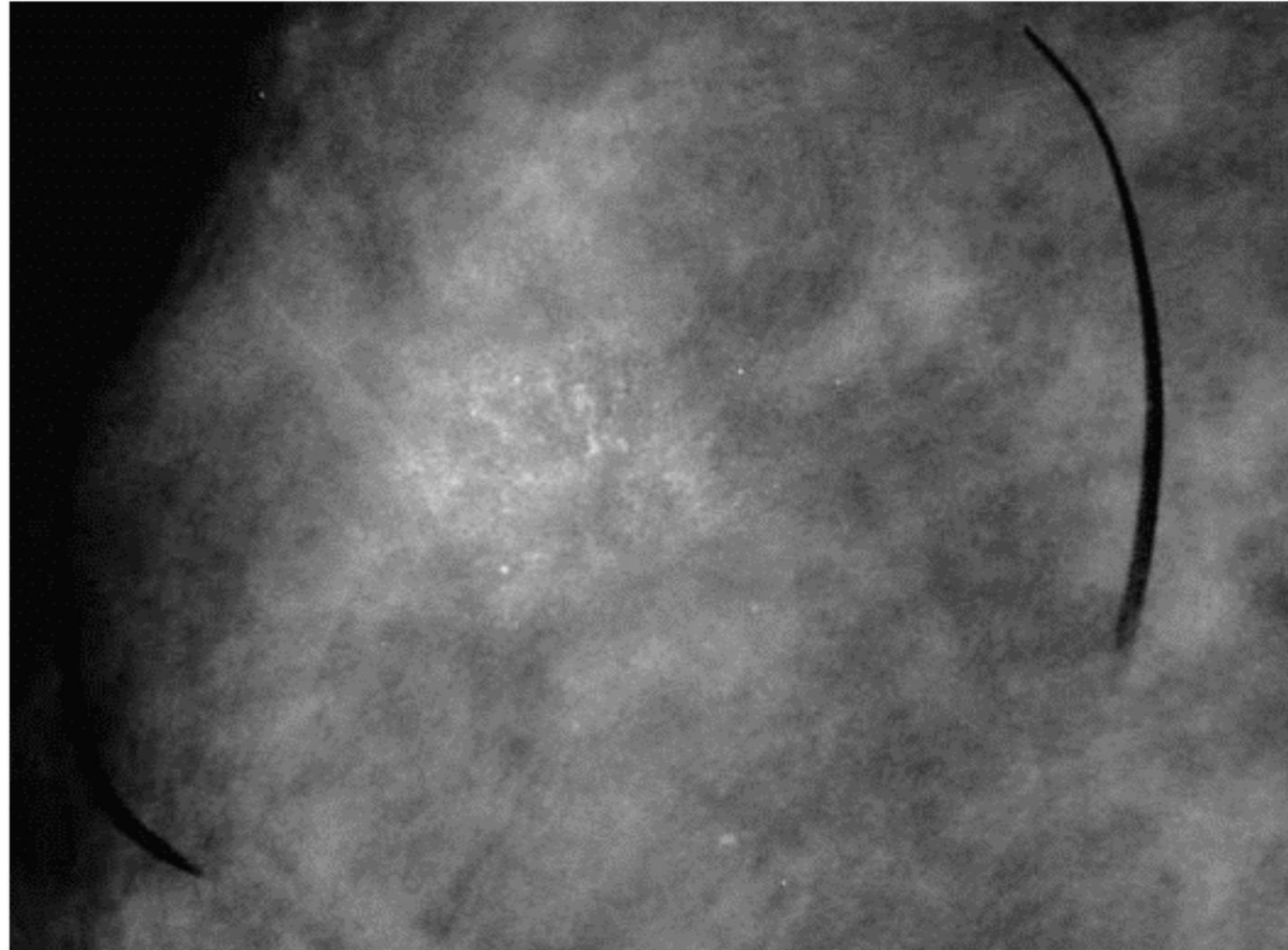
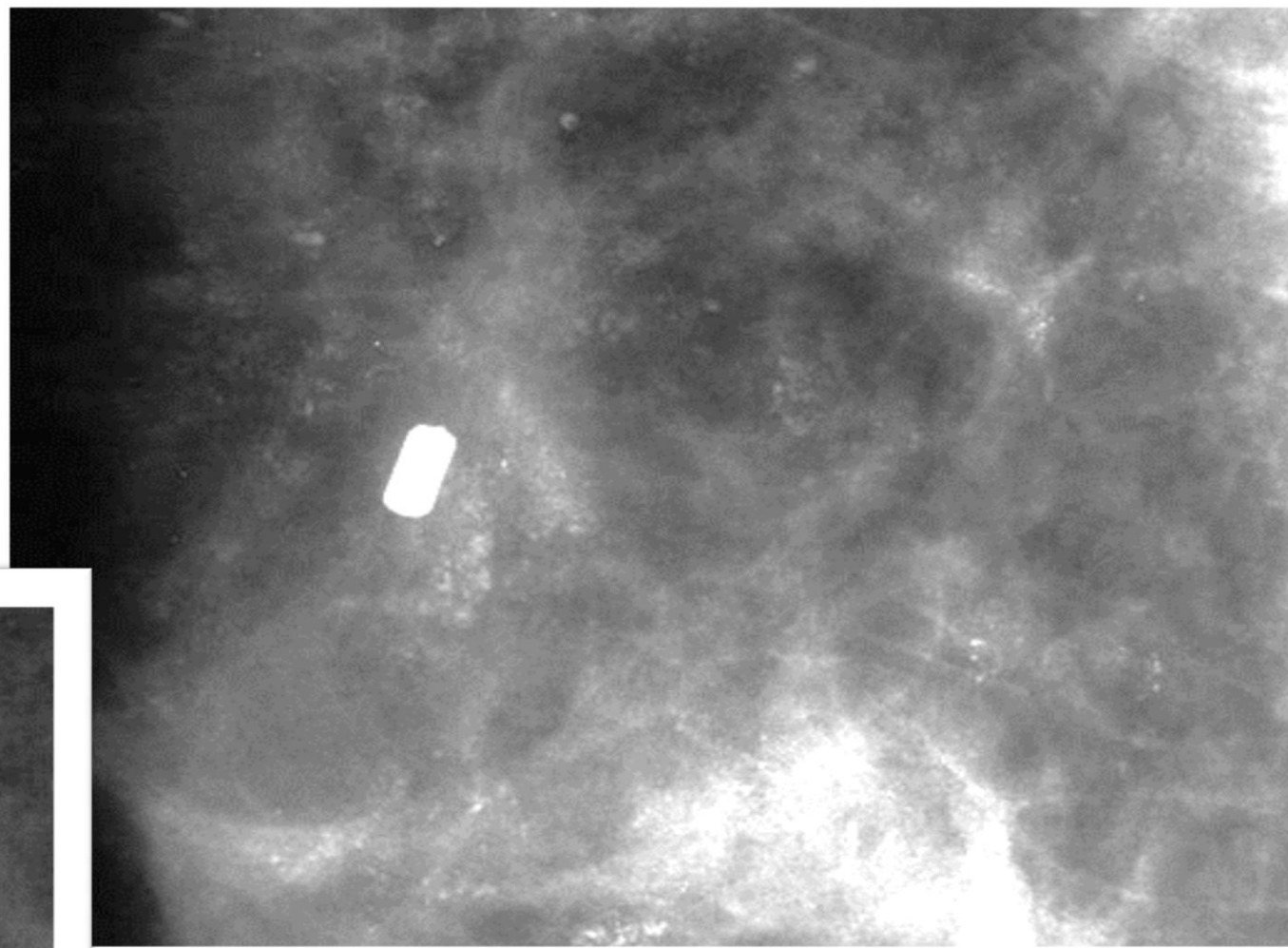


# Amorphous or Indistinct



## ***AMORPHOUS/ INDISTINCT CALCIFICATION***

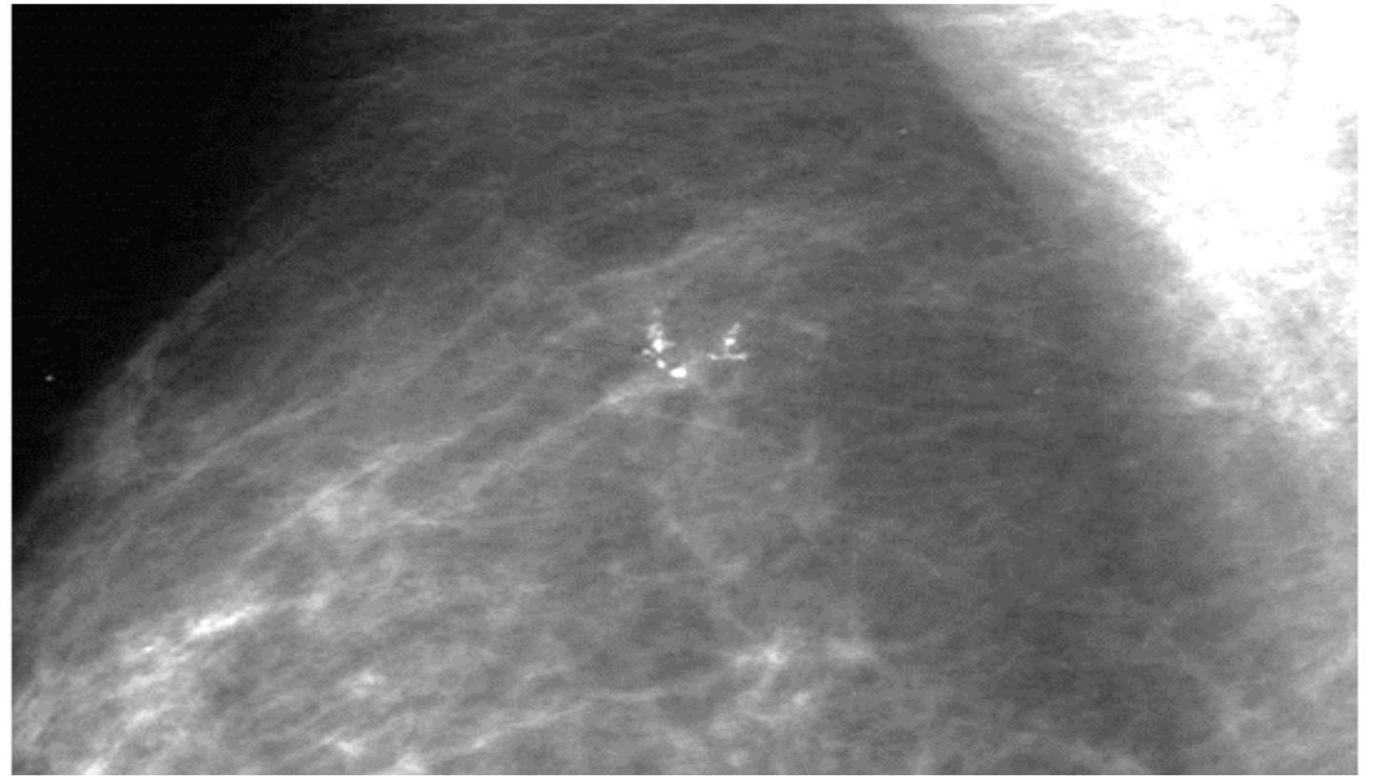
- flake-shaped, “hazy”
- cannot apply more specific classification



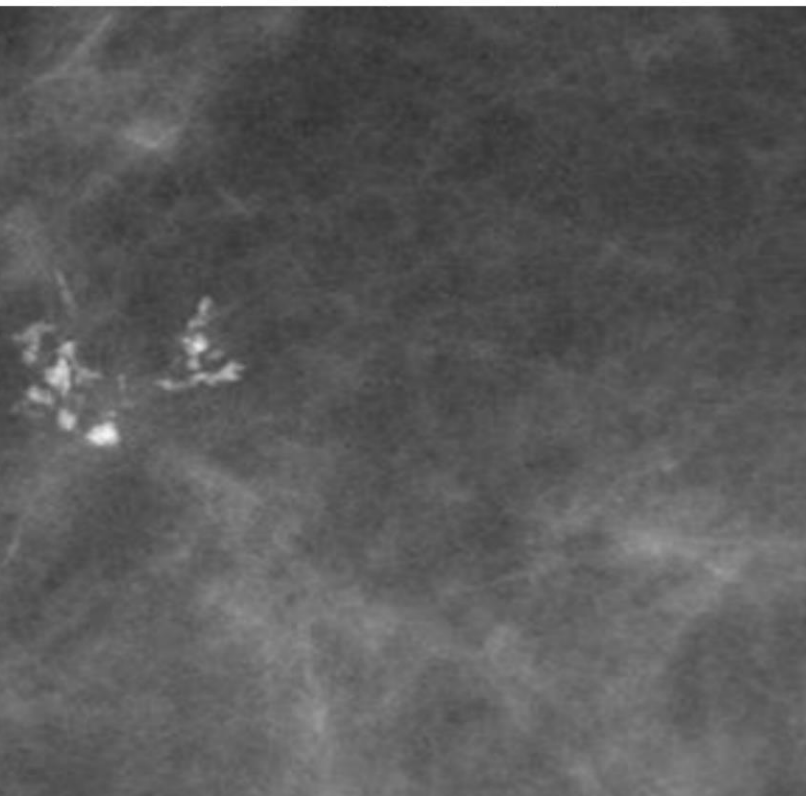


## ***COARSE HETEROGENEOUS CALCIFICATION***

- . Irregular, conspicuous, >0.5 mm
- DDx: breast CA, fibroadenomas, fibrosis.
- Less worrisome if multiple bilat'l groups
- “Bx unless distribution suggests BENIGN



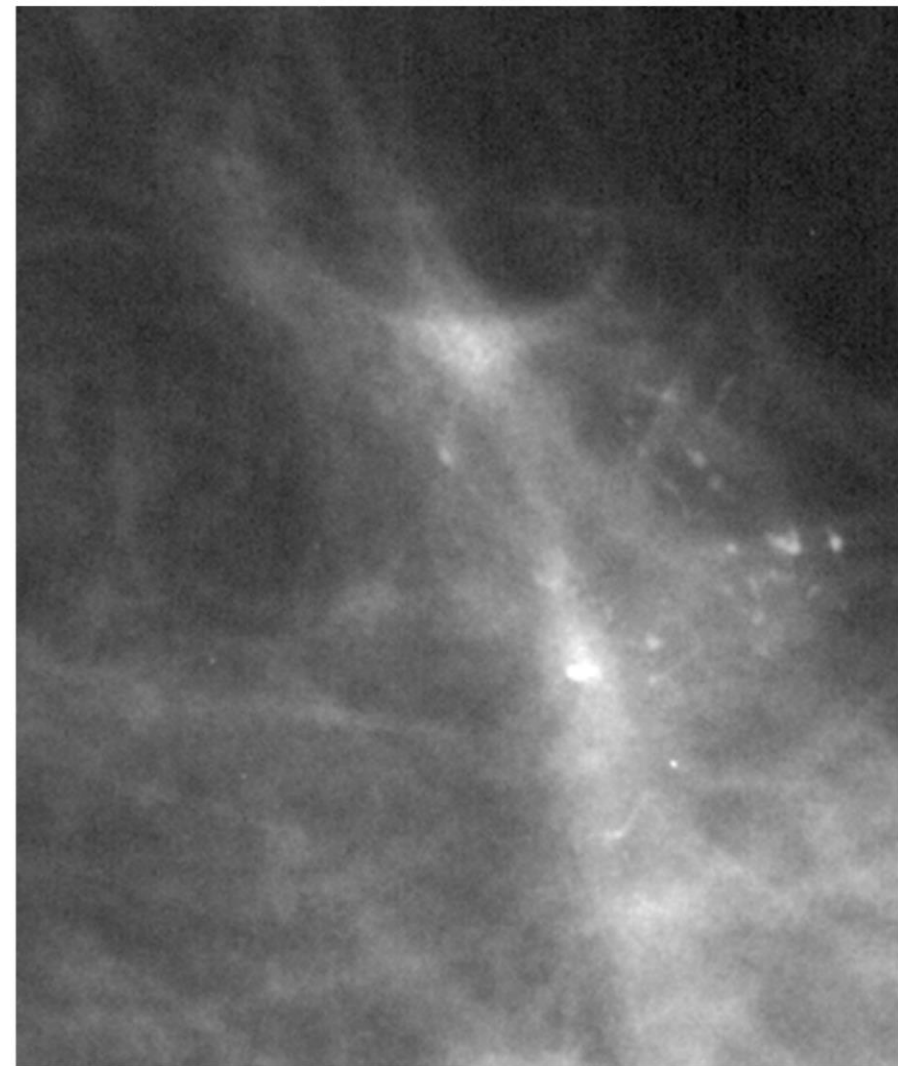
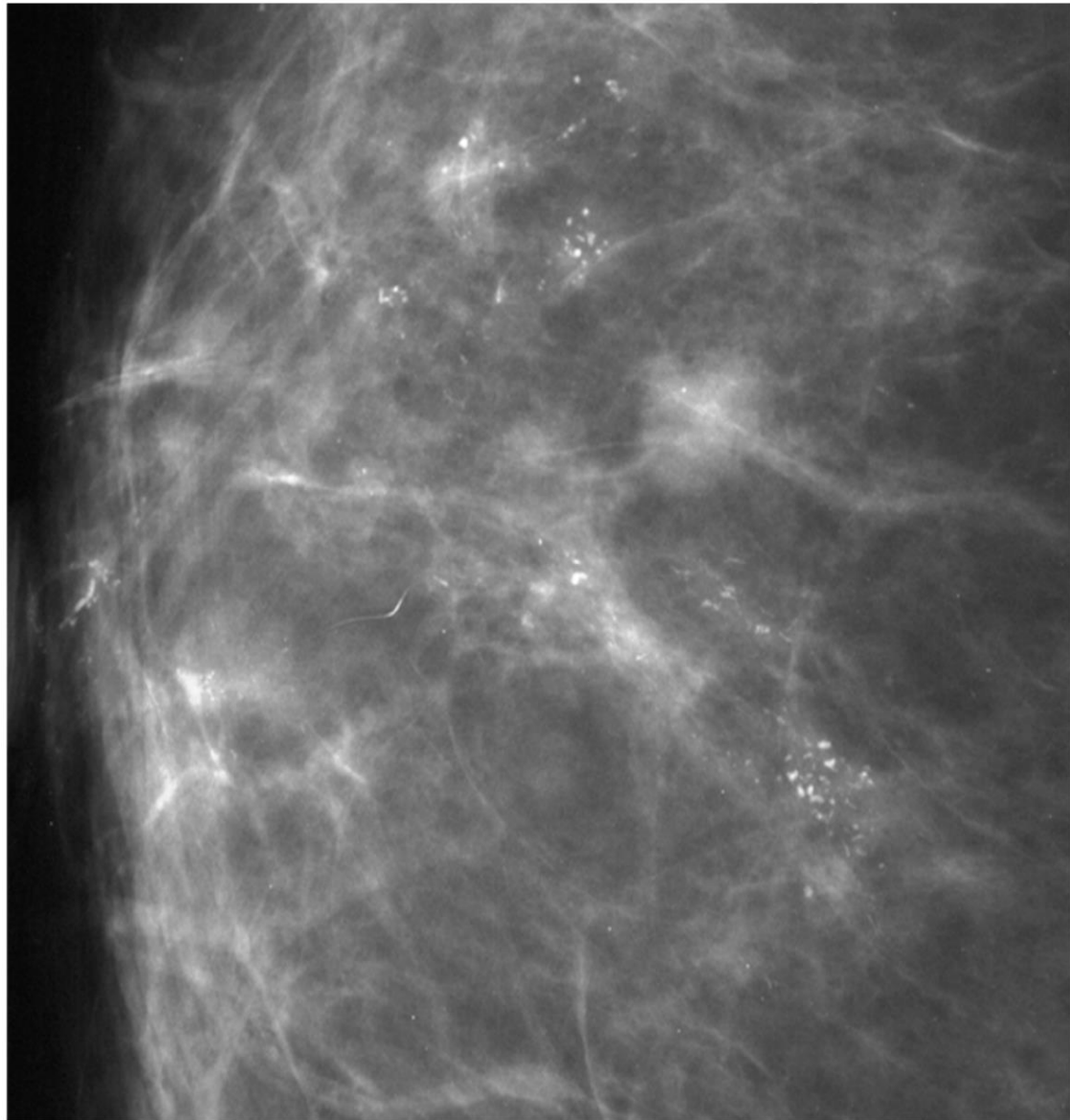
***DCIS***



# HIGHER PROBABILITY CALCIFICATIONS

*Note: biopsy even if stable!*

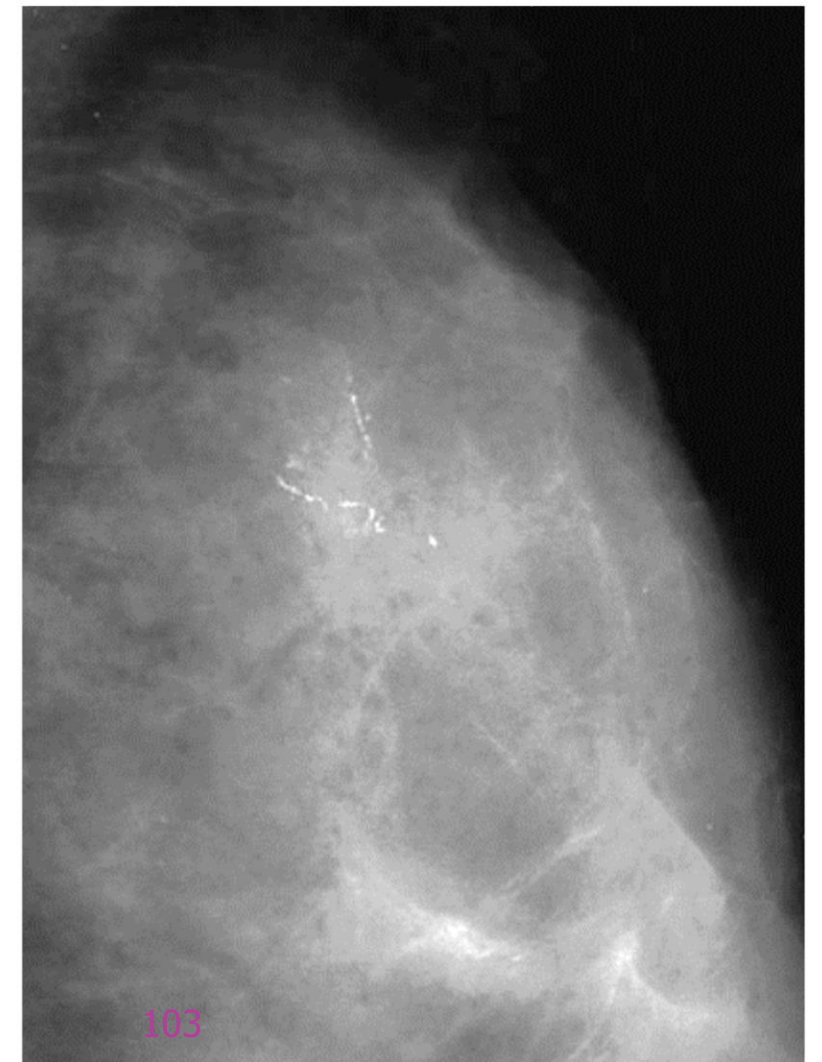
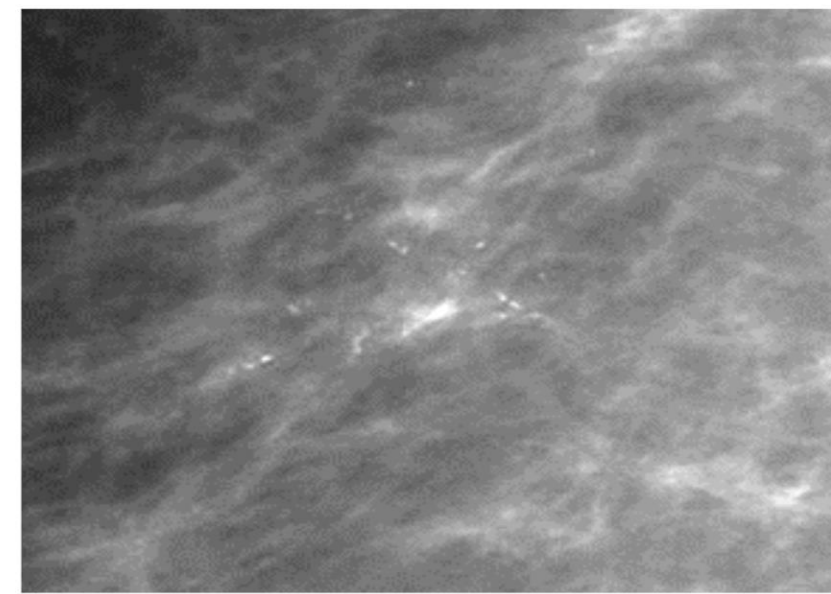
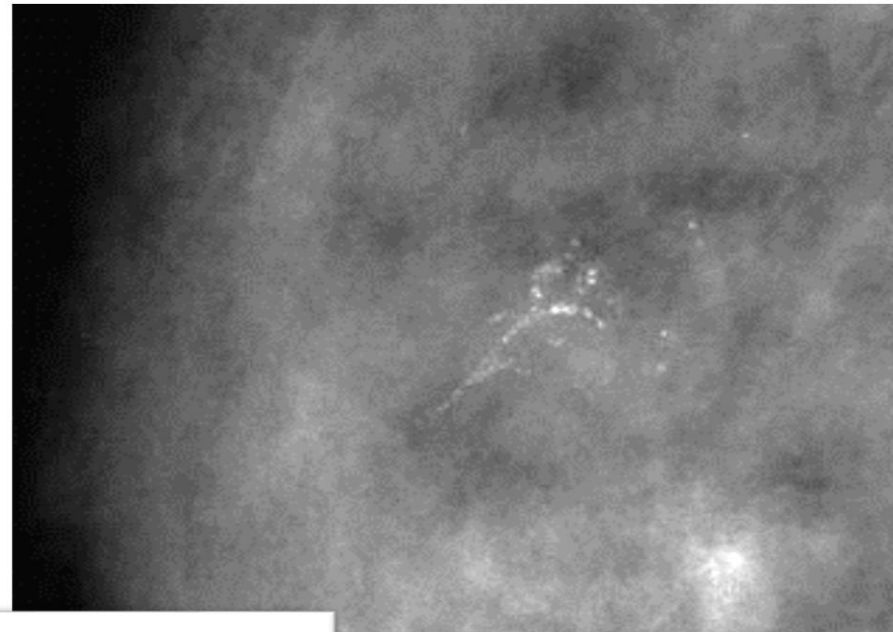
## 1•Fine Pleomorphic Calcifications



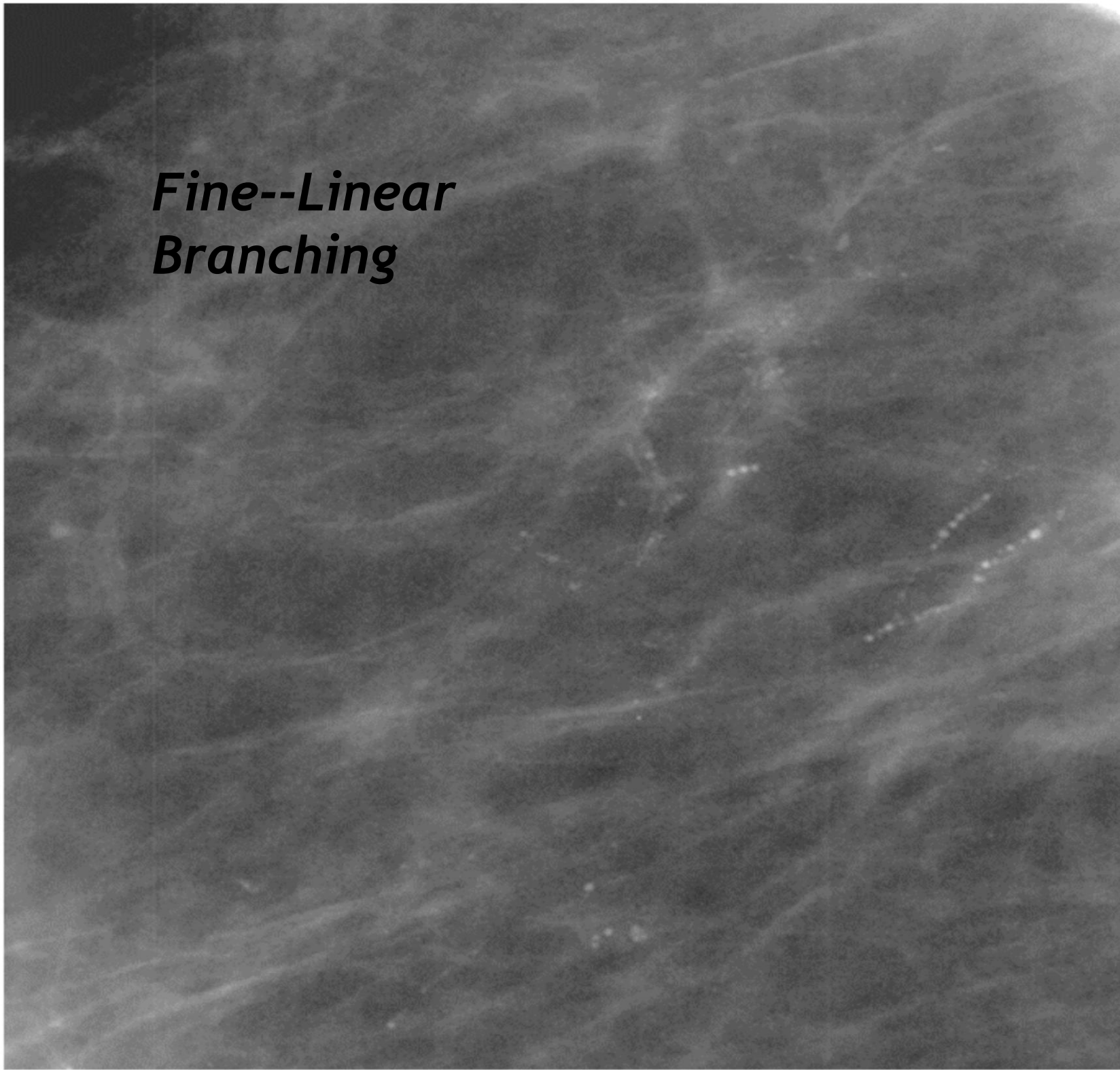


## 2• FINE LINEAR/BRANCHING CALCIFICATIONS

- *casting: fill lumen of duct*
- *discontinuous*
- *“dot-dash”*
- *thin, irregular, linear*

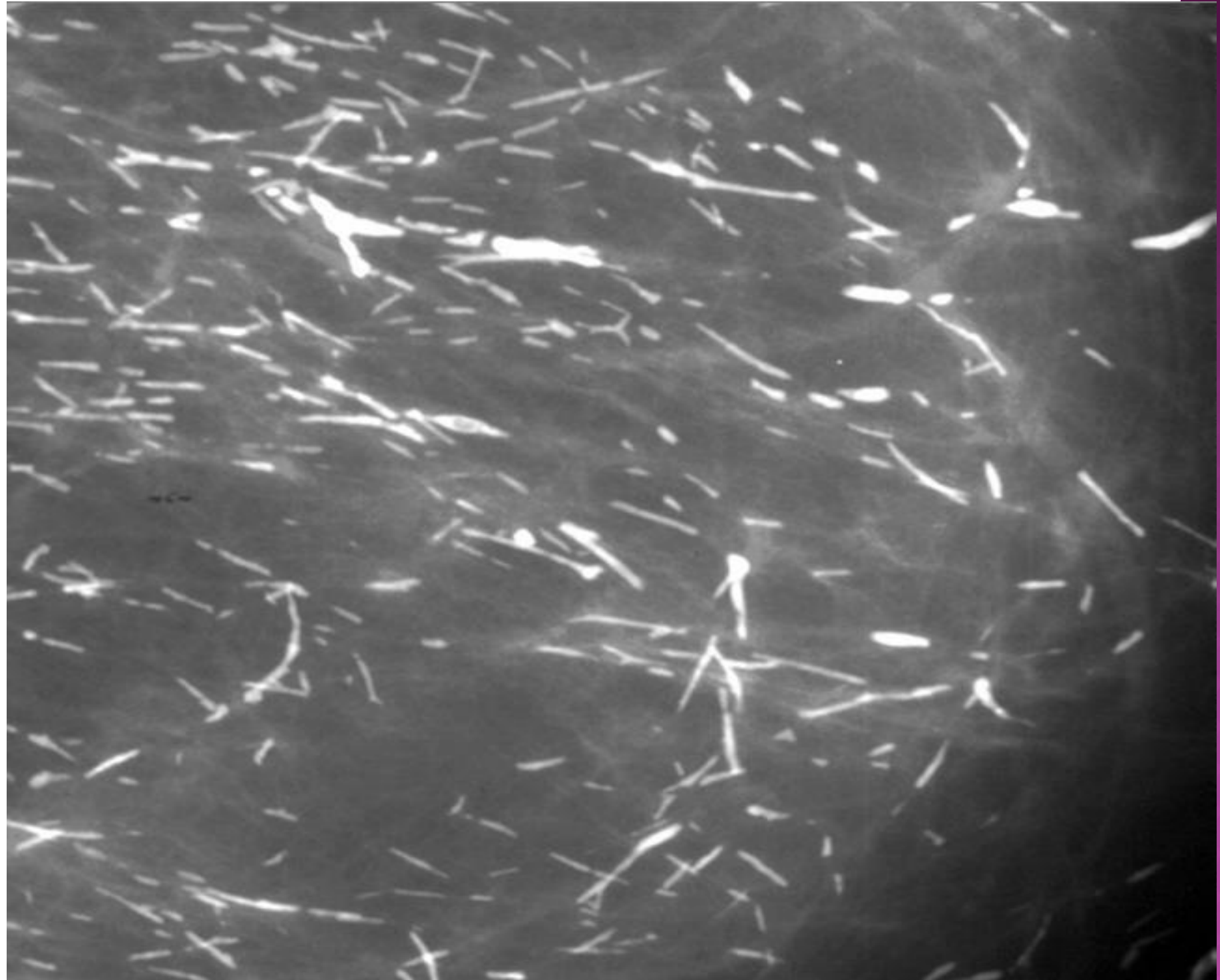


***Fine--Linear  
Branching***





***Rod-Like***



# NUMBER OF CALCIFICATIONS:

- o The probability of malignancy increases with the number of calcifications.
- o No exact threshold exists to categorize a cluster of calcifications as suspicious, although the risk is greater when **5 or more calcifications** are present within 1cm of tissue
- o Conversely, a cluster of more than 5 calcifications with characteristic benign features could be monitored mammographically.



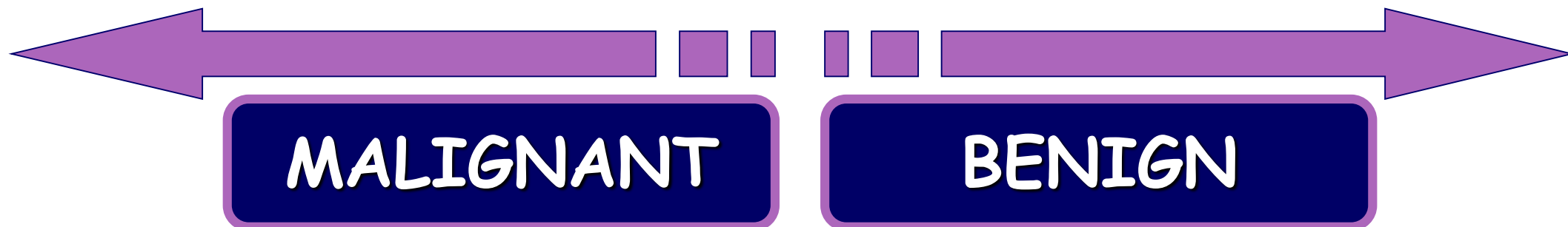
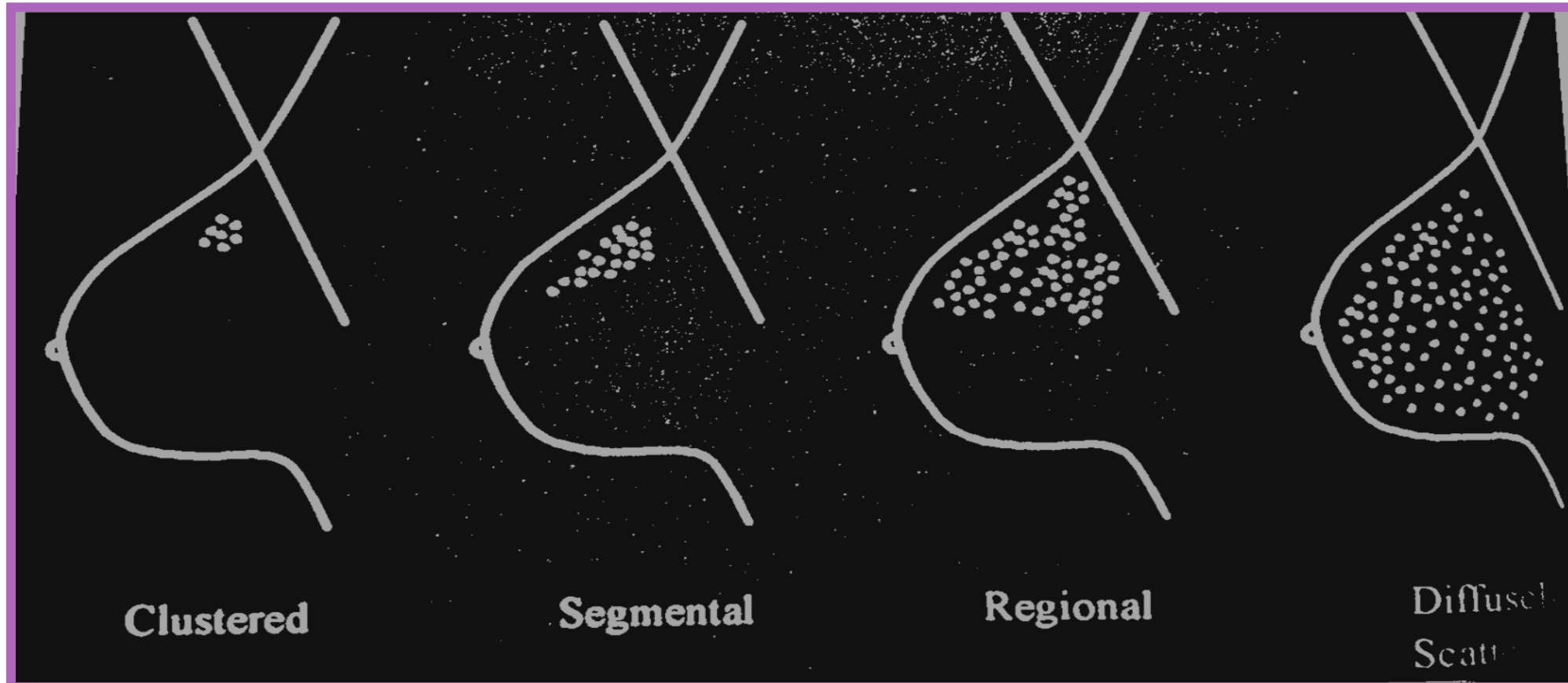
# SIZE OF CALCIFICATION

- ◉ Calcifications as small as 0.2 to 0.3mm are visible mammographically.
- ◉ In general, smaller calcifications are more suspicious for malignancy.
- ◉ Breast carcinomas usually produce calcifications less than 0.5mm in diameter

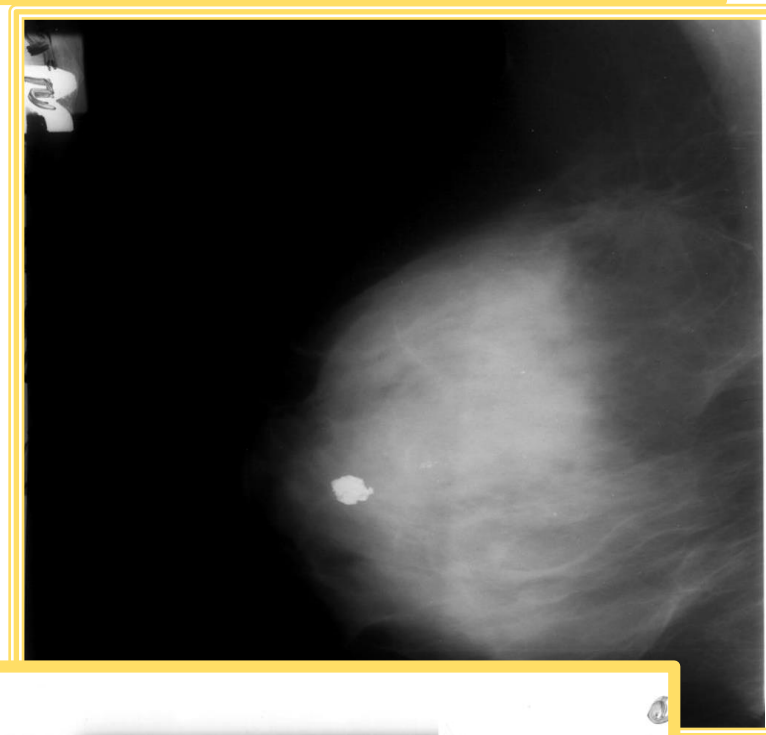
# DISTRIBUTION MODIFIERS

- **Diffuse/Scattered**
- **Regional**
- **Grouped or Clustered**
- **Linear**
- **Segmental**

# DISTRIBUTION



# FIBROADENOMA





# Calcifications Morphology

## Benign

Skin  
Vascular  
popcorn  
plasmacell mastitis  
fat necrosis  
milk of calcium  
dystrophic  
eggshell  
suture

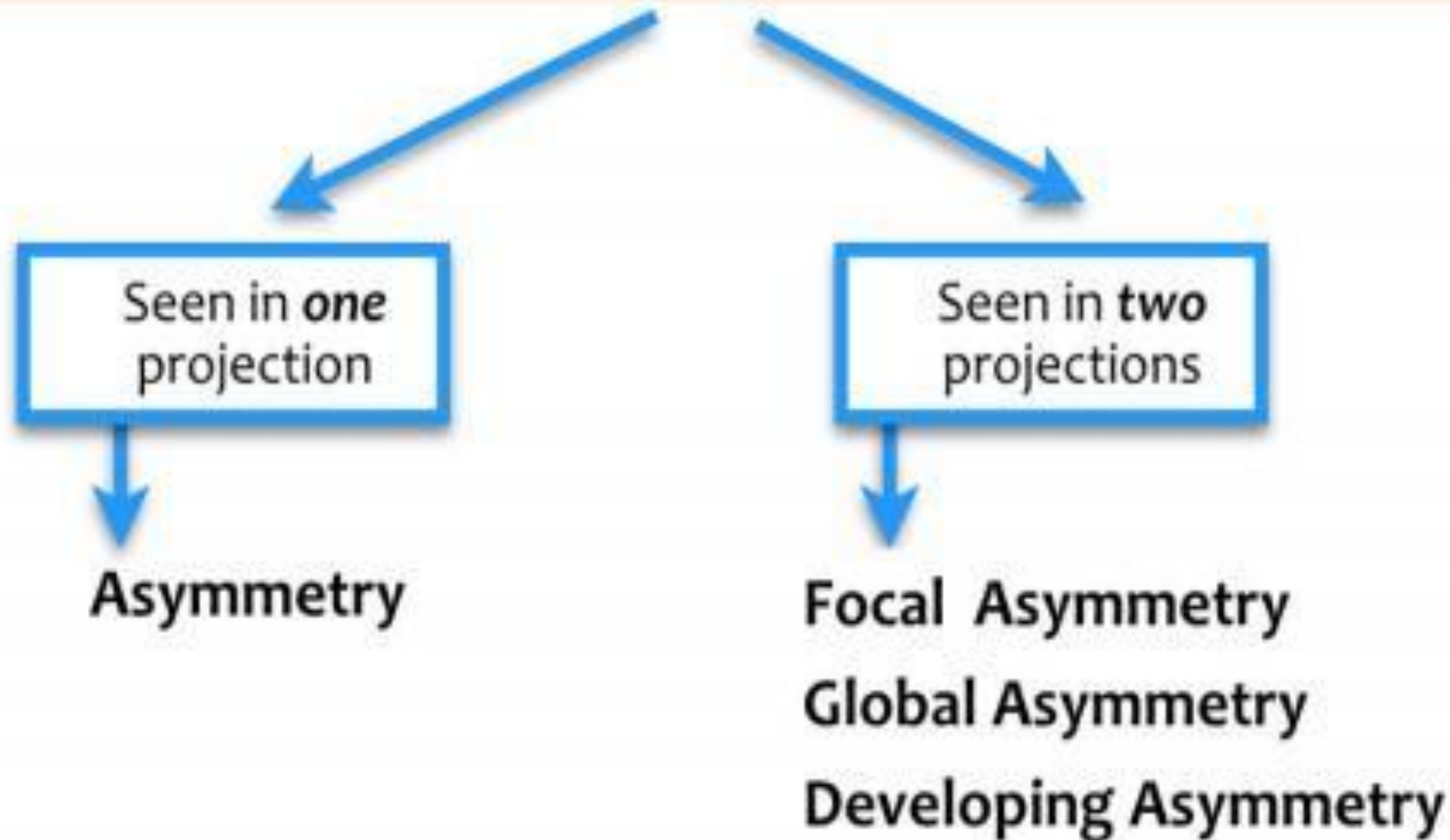
## Malignant

fine linear  
branching  
pleomorphic

## Intermediate Concern

Amorphous  
Coarse heterogenous

# Asymmetries

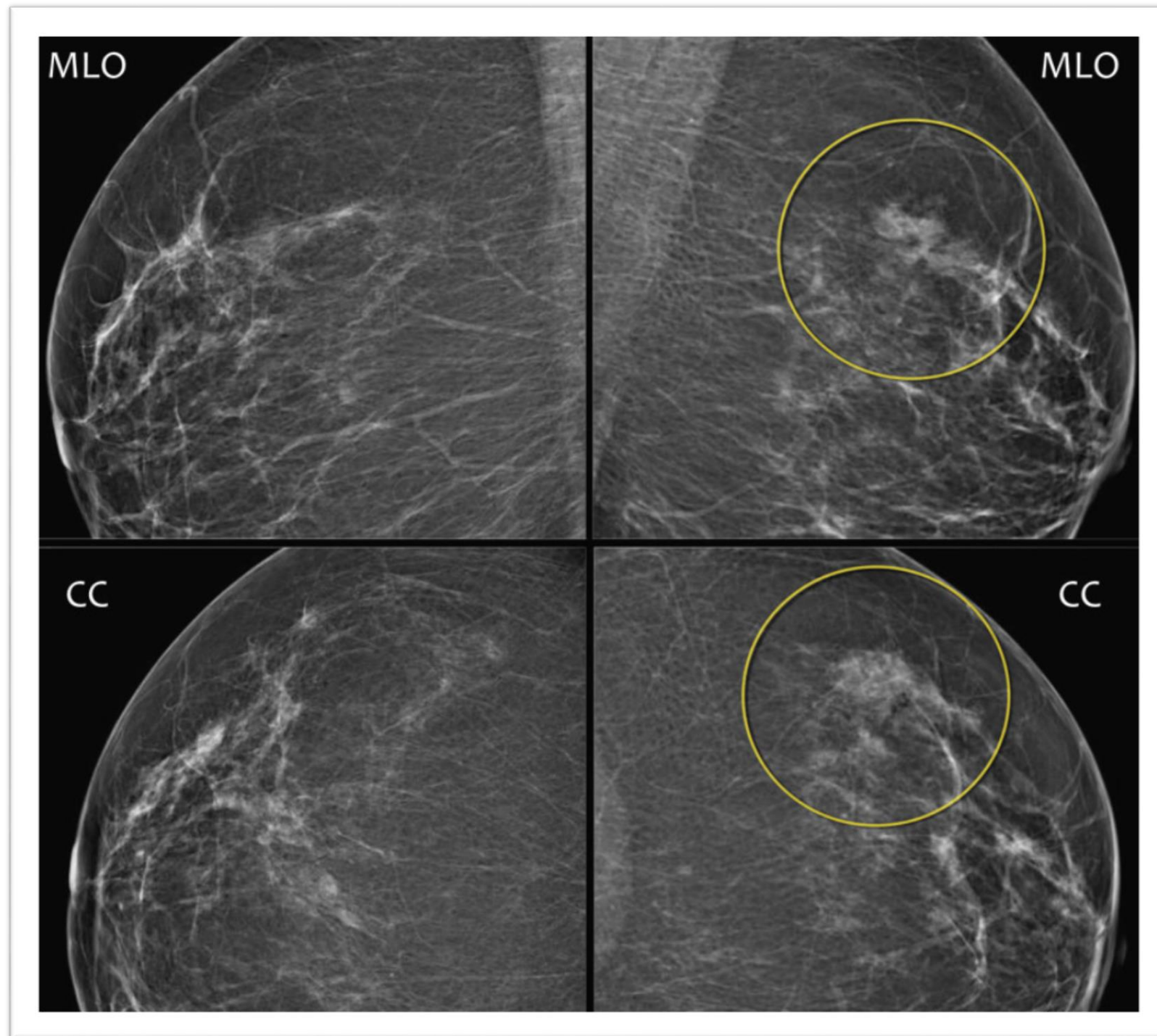


# ASYMMETRY

- Findings that represent unilateral deposits of fibroglandular tissue not conforming to the definition of a mass.
- **Asymmetry** as an area of fibroglandular tissue visible on only *one* mammographic projection, mostly caused by superimposition of normal breast tissue.
- **Focal asymmetry** visible on two projections, hence a real finding rather than superposition.  
This has to be differentiated from a mass.
- **Global asymmetry** consisting of an asymmetry over at least one quarter of the breast and is usually a normal variant.
- **Developing asymmetry** new, larger and more conspicuous than on a previous examination.

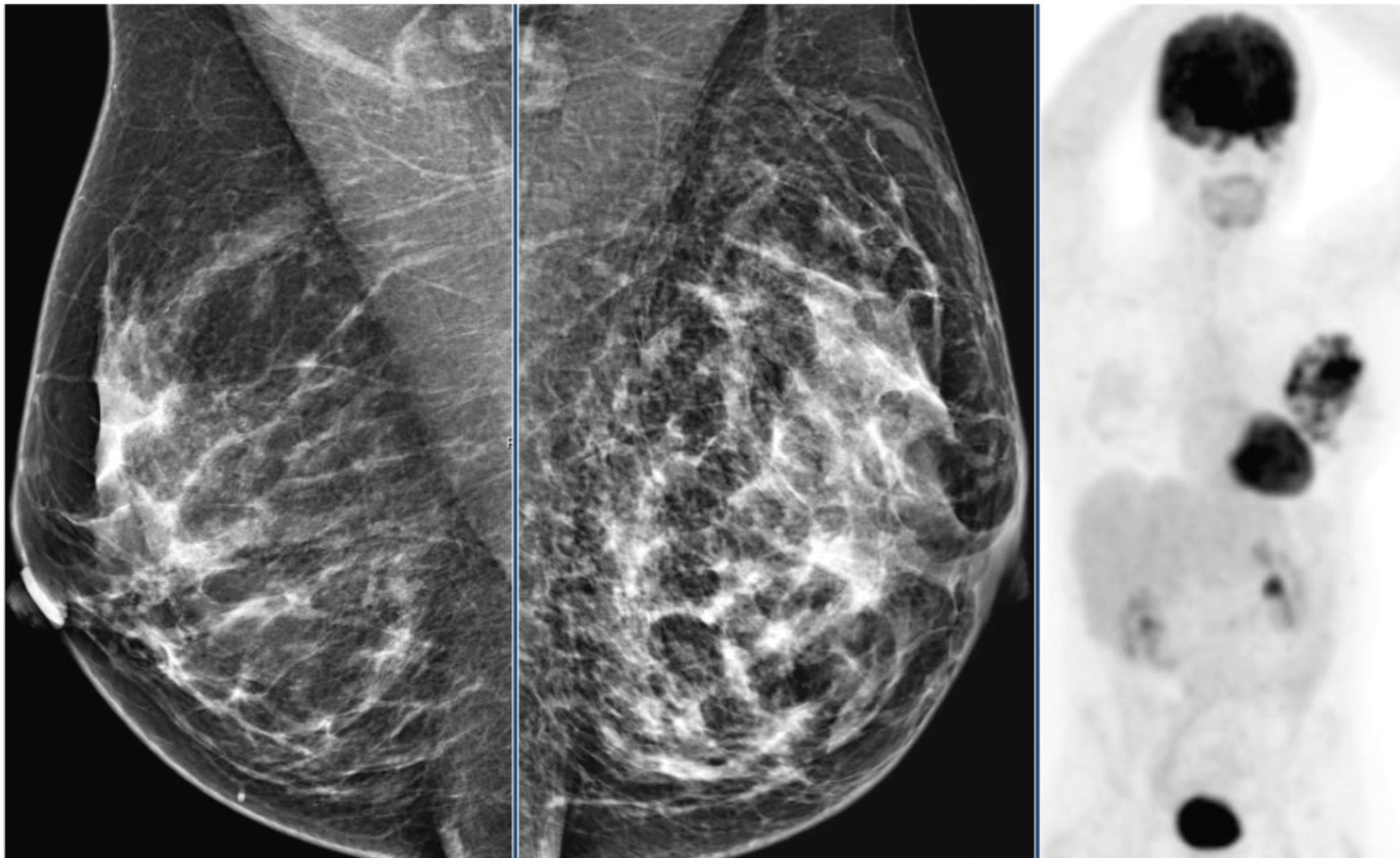


# FOCAL ASYMMETRY





# GLOBAL ASYMMETRY





Mammography Lexicon			Ultrasound Lexicon		
Breast composition	A. entirely fatty		Breast composition	a. homogeneous - fat	
	B. scattered areas of fibroglandular density			b. homogeneous - fibroglandular	
Mass	shape	oval - round - irregular	Mass	shape	oval - round - irregular
	margin	circumscribed - obscured - microlobulated - indistinct - spiculated		margin	Circumscribed <b>or</b> Not-circumscribed: indistinct, angular, microlobulated, spiculated
	density	fat - low - equal - high		orientation	parallel - not parallel
Asymmetry		asymmetry - global - focal - developing		echo pattern	anechoic - hyperechoic - complex cystic/solid hypoechoic - isoechoic - heterogeneous
Architectural distortion		distorted parenchyma with no visible mass		posterior features	no features - enhancement - shadowing - combined pattern
Calcifications	morphology	typically benign	Calcifications	Associated features	in mass - outside mass - intraductal
		suspicious			
Associated features	distribution	diffuse - regional - grouped - linear - segmental	Special cases <i>(cases with a unique diagnosis)</i>		simple cyst - clustered microcysts - complicated cyst - mass in or on skin - foreign body (including implants) - intramammary lymph node - AVM - Mondor disease - postsurgical fluid collection - fat necrosis
	skin retraction - nipple retraction - skin thickening - trabecular thickening - axillary adenopathy - architectural distortion - calcifications				



## Final Assessment Categories

Category		Management	Likelihood of cancer
0	Need additional imaging or prior examinations	Recall for additional imaging and/or await prior examinations	n/a
1	Negative	Routine screening	Essentially 0%
2	Benign	Routine screening	Essentially 0%
3	Probably Benign	Short interval-follow-up (6 month) or continued	>0 % but ≤ 2%
4	Suspicious	Tissue diagnosis	4a. low suspicion for malignancy (>2% to ≤ 10%) 4b. moderate suspicion for malignancy (>10% to ≤ 50%) 4c. high suspicion for malignancy (>50% to <95%)
5	Highly suggestive of malignancy	Tissue diagnosis	≥95%
6	Known biopsy-proven	Surgical excision when clinical appropriate	n/a





***Thank you and good luck***