كلية الطب البشري

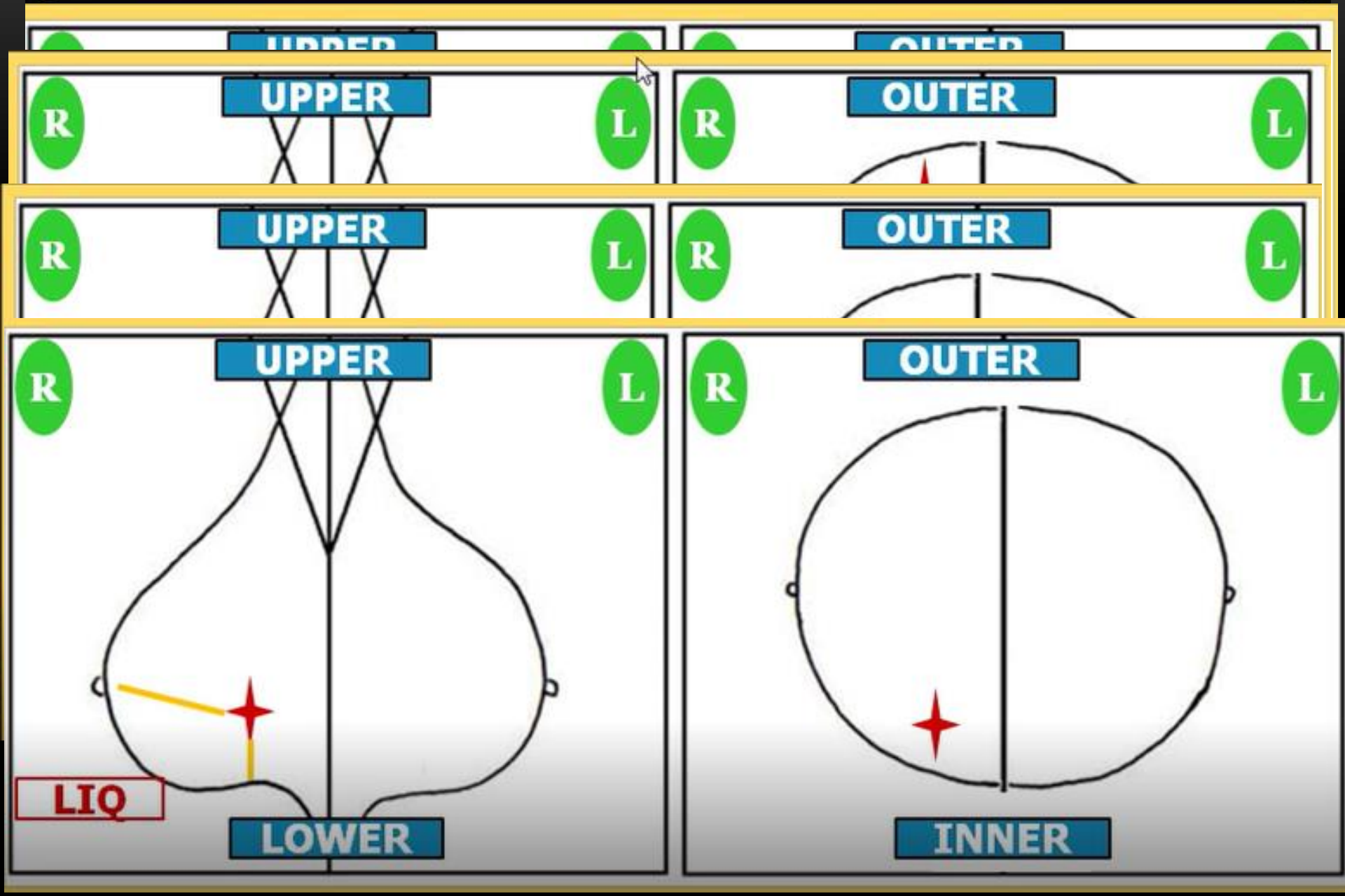
BREAST IMAGING

د. رفيف تركاوي

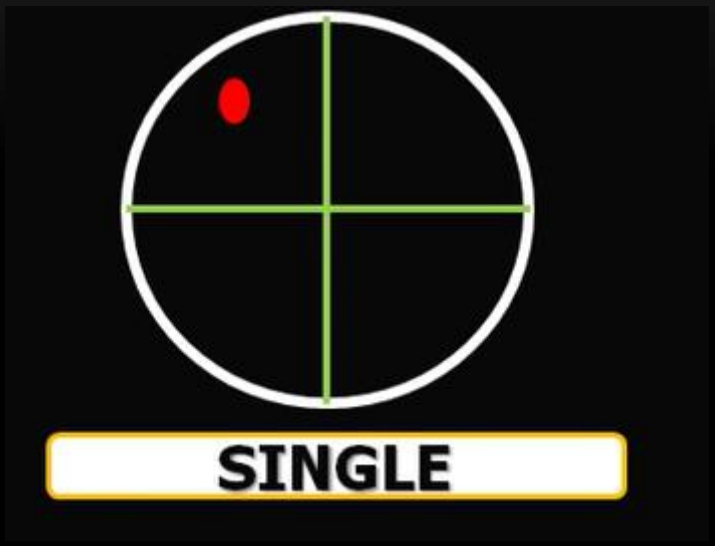

سرطان الثدي..
الكشف المبكر يُحدث
فرقا!!
اكتوبر شهر التوعية بسرطان الثدي - الفحص المبكر يحدث فرق

مقاربة الماموغرافي
APPROACH TO MAMMOGRAM

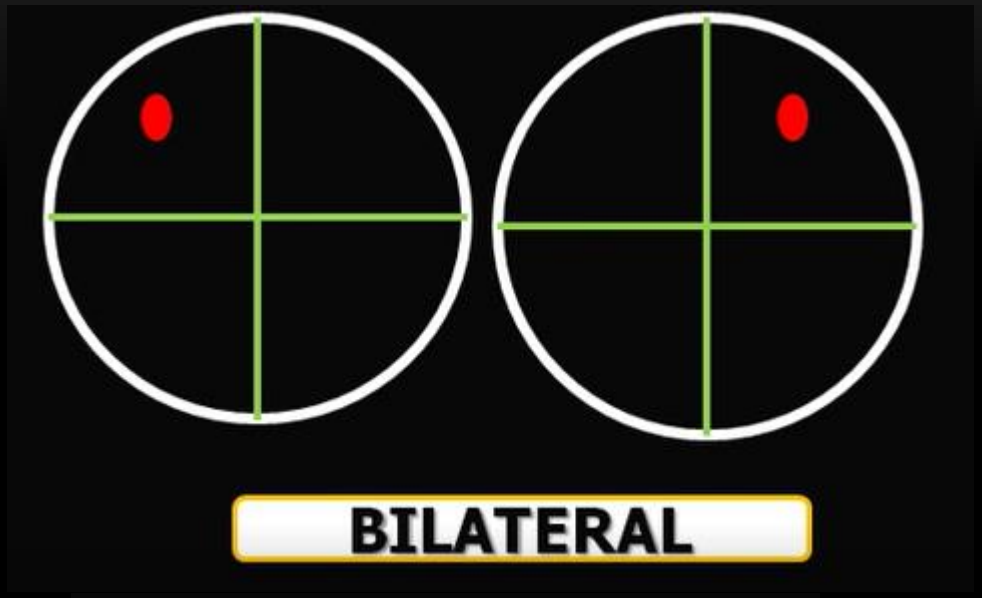
Specify the exact location of breast lesions



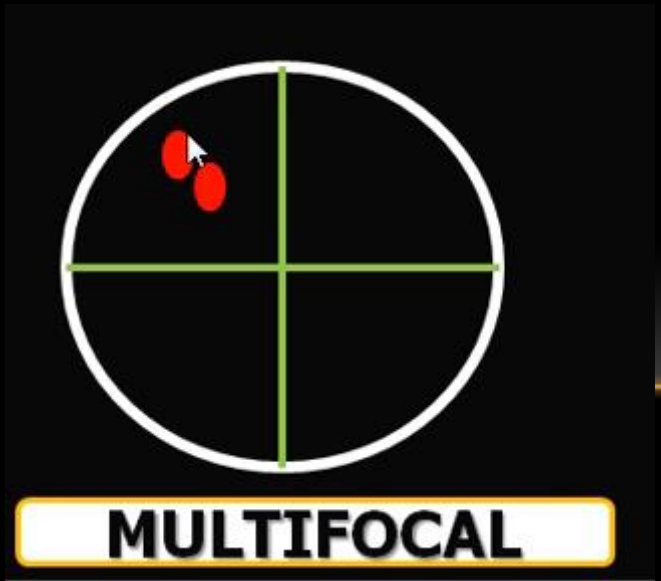
NUMBER OF LESIONS



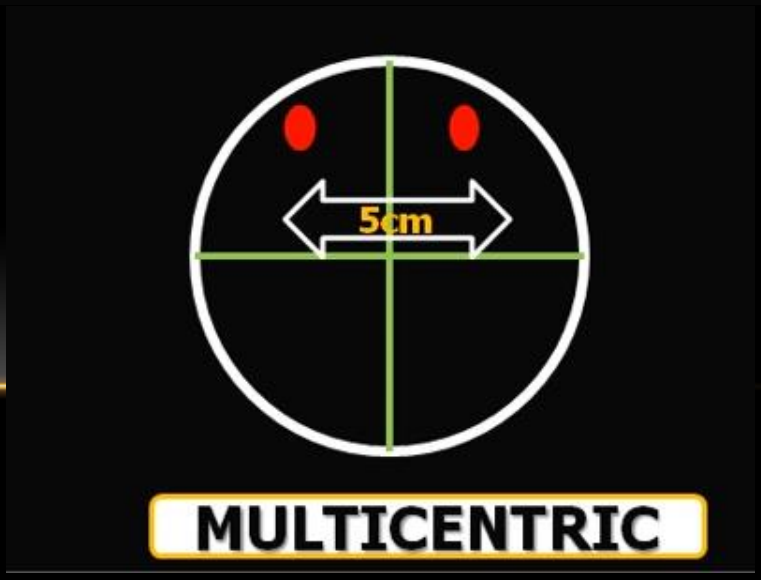
SINGLE



BILATERAL



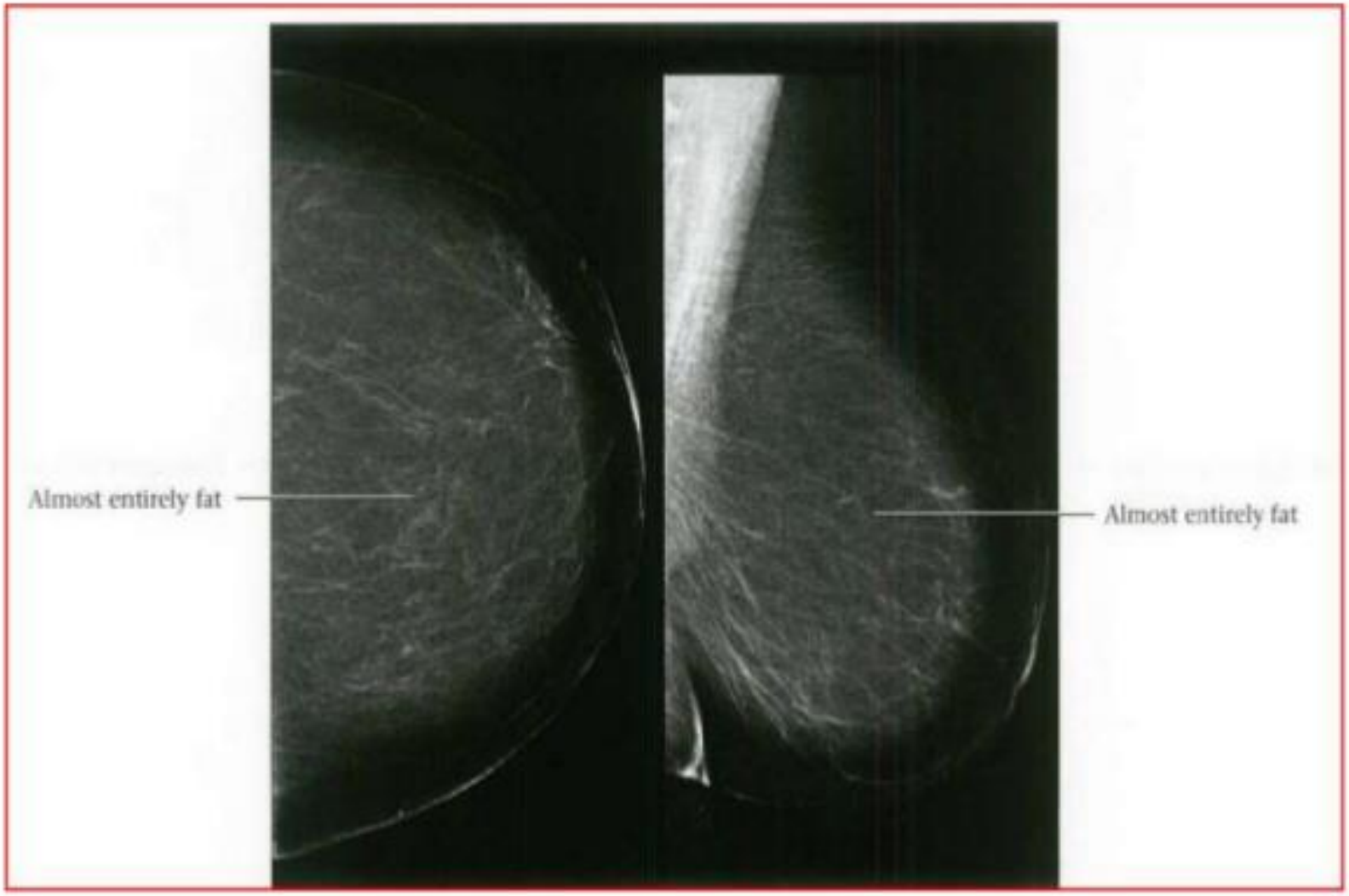
MULTIFOCAL



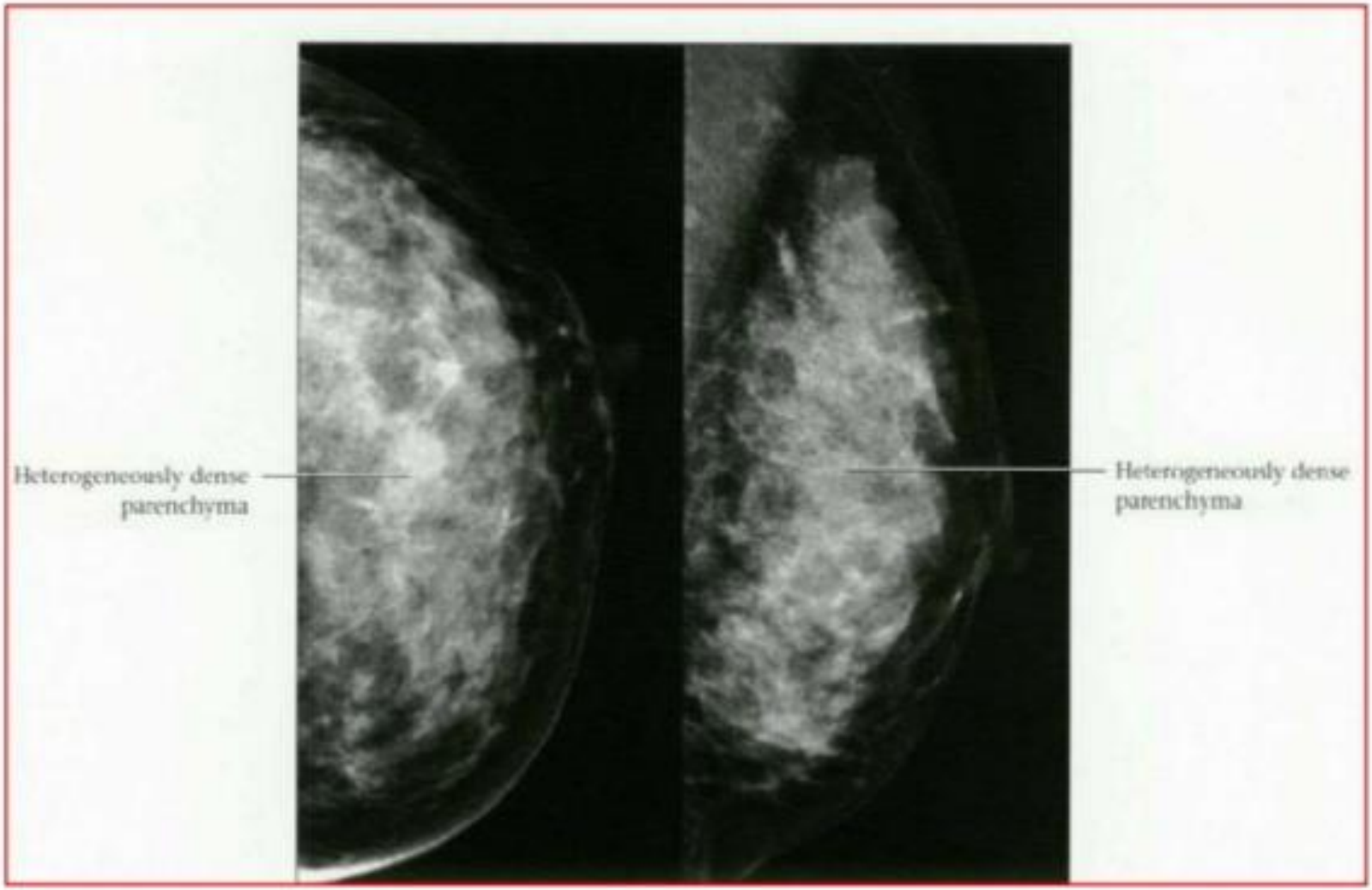
MULTICENTRIC

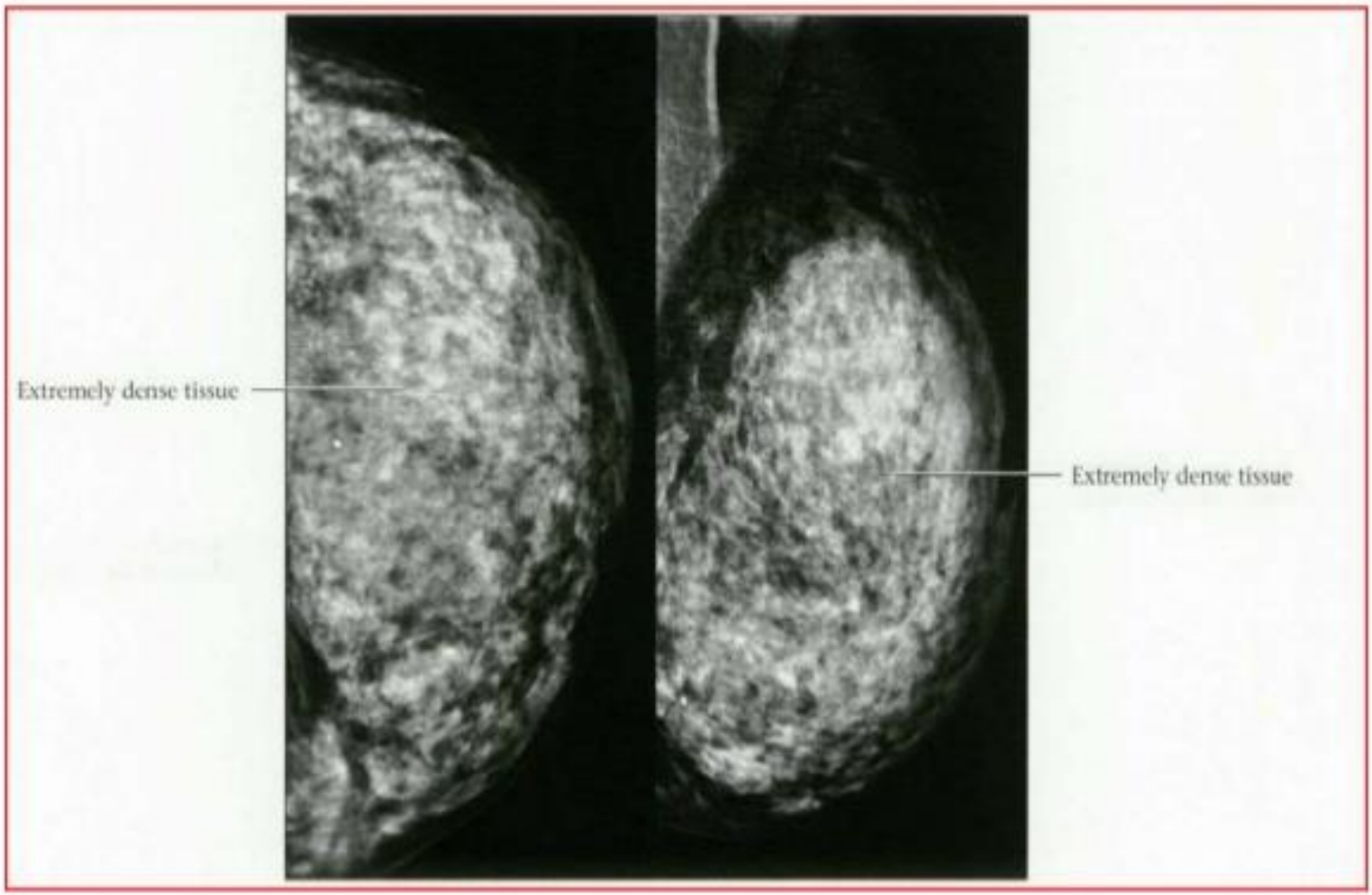
BI-RADS BREAST COMPOSITION

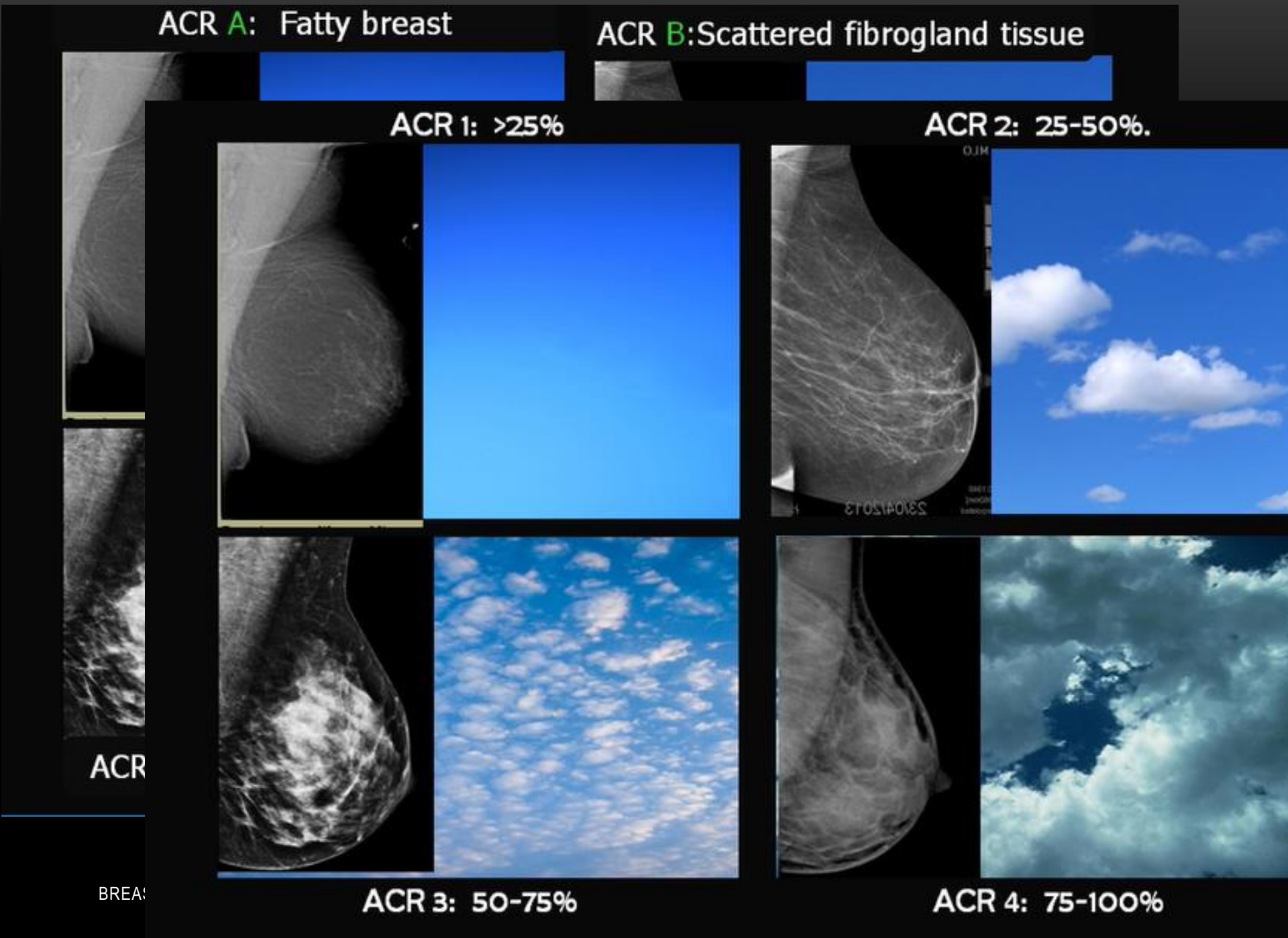
- The American College of Radiology Breast Imaging and Reporting Database System (BI-RADS)divides breast composition into four categories:
- 1) almost entirely fat,
- 2) scattered fibroglandular densities (approximately 25-50% glandular),
- 3) heterogeneously dense (51-75% glandular),
- 4) extremely dense (greater than 75% glandular).


Almost entirely fat
Almost entirely fat


Scattered
fibroglandular densities
Scattered
fibroglandular densities


Heterogeneously dense parenchyma
Heterogeneously dense parenchyma


Extremely dense tissue
Extremely dense tissue


ACR A: Fatty breast
ACR B:Scattered fibrogland tissue
ACR 1: >25%
ACR 2: 25-50%.
ACR 3: 50-75%
ACR 4: 75-100%

Mammography ACR Breast Imaging Reporting and Data System (BI-RADS) Lexicon Interpretation

Breast Imaging Reporting and Data System (BI-RADS) Lexicon Interpretation

- The descriptors in the BI-RADS lexicon were selected on the basis of their ability to discriminate between **benign** and **malignant** findings.

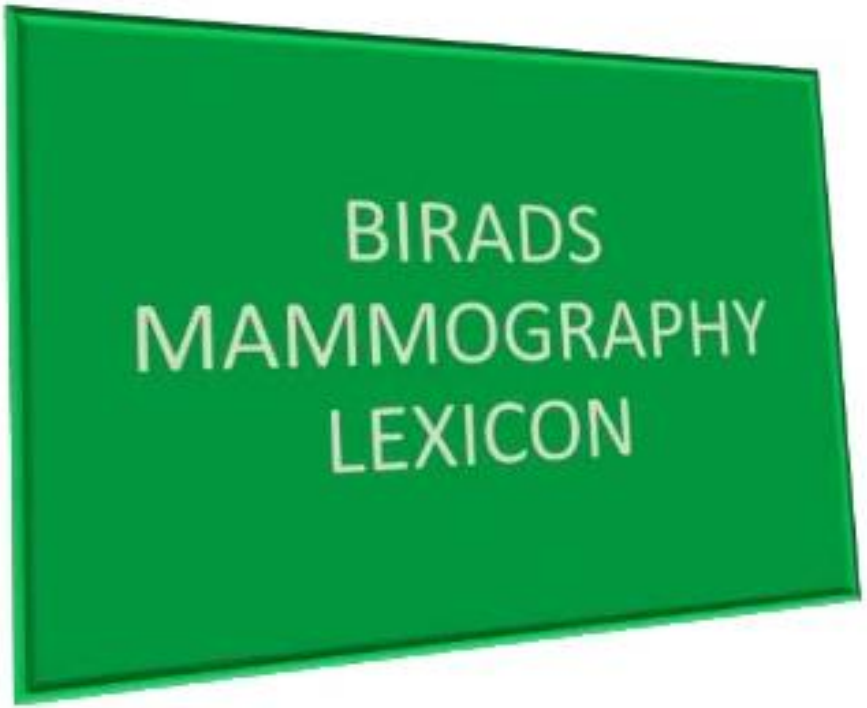

BIRADS
CATEGORIES

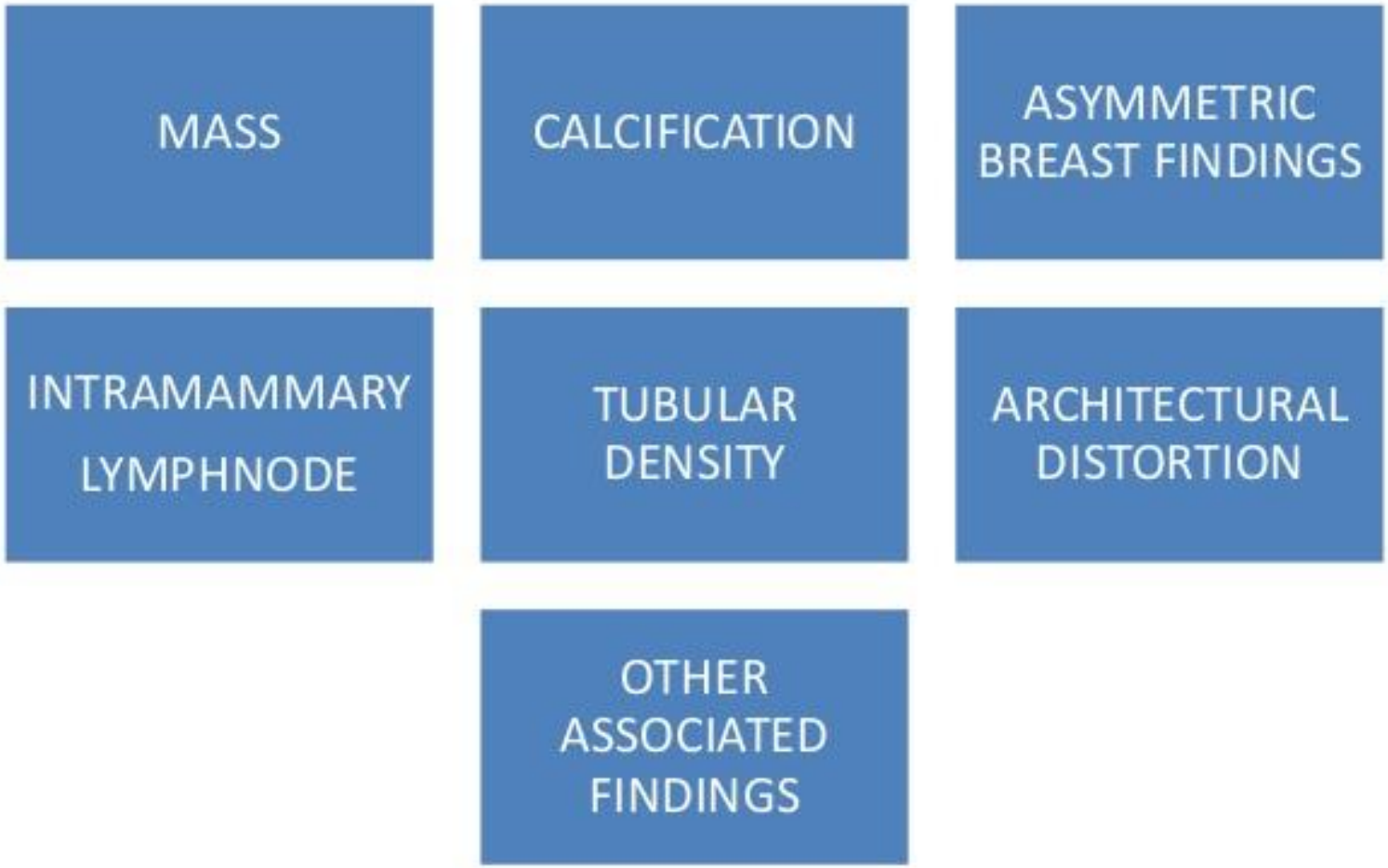
BIRADS	INFERENCE	RISK OF MALIG.	TYPICAL EXAMPLES
0	Needs additional imaging evaluation		
1	Negative/ Normal		
2	Benign Findings. No further evaluation needed		•Fat containing. •Benign Intramammary LN •Benign Calcifications
3	Probably Benign. Short term Follow up is suggested	=< 2 %	Round, oval or lobulated lesion with circumscribed margins.

4	Suspicious Abnormality. Biopsy should be considered	3 – 94 %	
5	Highly suggestive of malignancy Appropriate intervention to be taken	> 95%	Irregular shaped, spiculated margins.
6	Biopsy proven Malignancy		

BIRADS 0	**Incomplete** — Need additional imaging evaluation or Comparison with previous films
BIRADS 1	**Normal examination** – Nothing to comment on – Routine mammography screening is recommended
BIRADS 2	**Benign findings** Routine mammography screening is recommended
BIRADS 3	**Probably benign** <2% malignancy Short interval follow-up is suggested
BIRADS 4 **4A** **4B** **4C**	**Suspicious** >2 but <95% - Biopsy should be considered **Low suspicion of malignancy:** 2-20% **Mod suspicion of malignancy:** 10-50% **High suspicion of malignancy:** 50-90%
BIRADS 5	**Highly Suspicious of malignancy** >95% Appropriate action should be taken
BIRADS 6	**Known** – biopsy proven malignancy Surgical excision when clinically appropriate

قاموس الماموغرافي




MASS
CALCIFICATION
ASYMMETRIC BREAST FINDINGS
INTRAMAMMARY LYMPHNODE
TUBULAR DENSITY
ARCHITECTURAL DISTORTION
OTHER ASSOCIATED FINDINGS

MASS

CALCIFICATION

ASYMMETRIC BREAST FINDINGS

INTRAMAMMARY LYMPHNODE

TUBULAR DENSITY

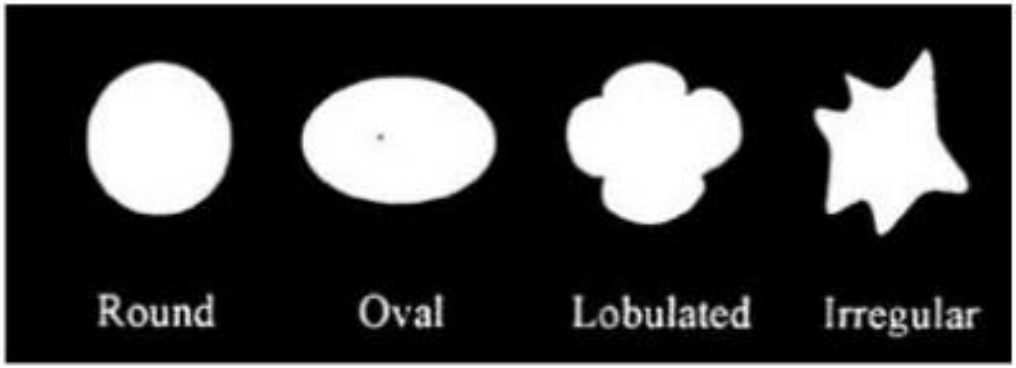
ARCHITECTURAL DISTORTION

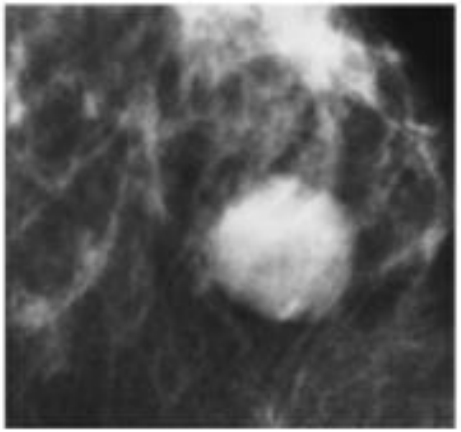
OTHER ASSOCIATED FINDINGS

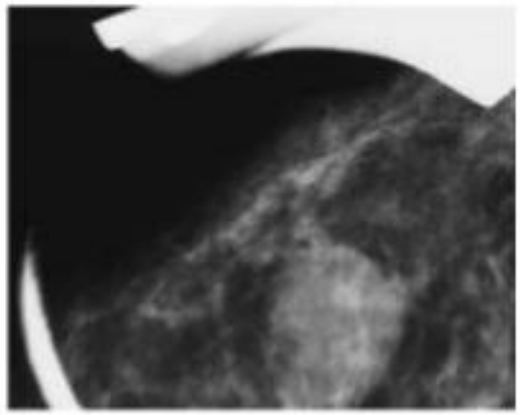
SOL seen in two different projections and have convex borders.

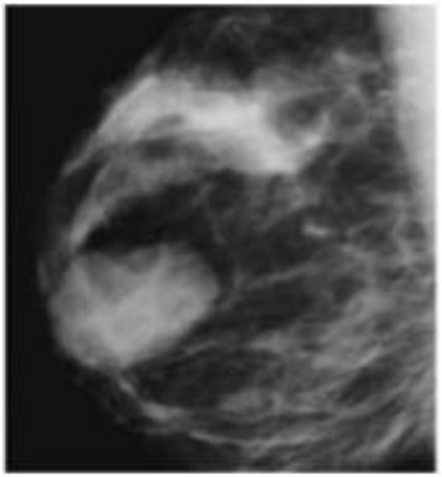
1. SIZE
2. SHAPE
3. MARGINS
4. DENSITY
5. CALCIFICATION

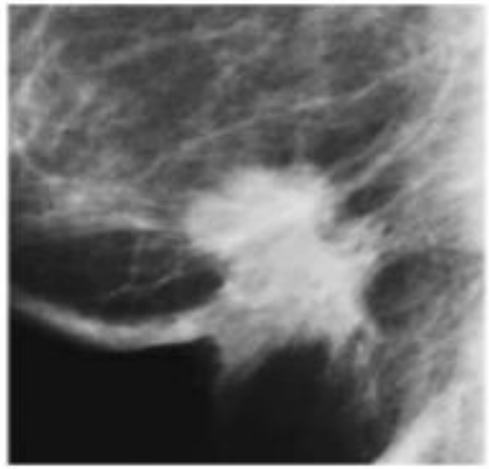
SHAPE



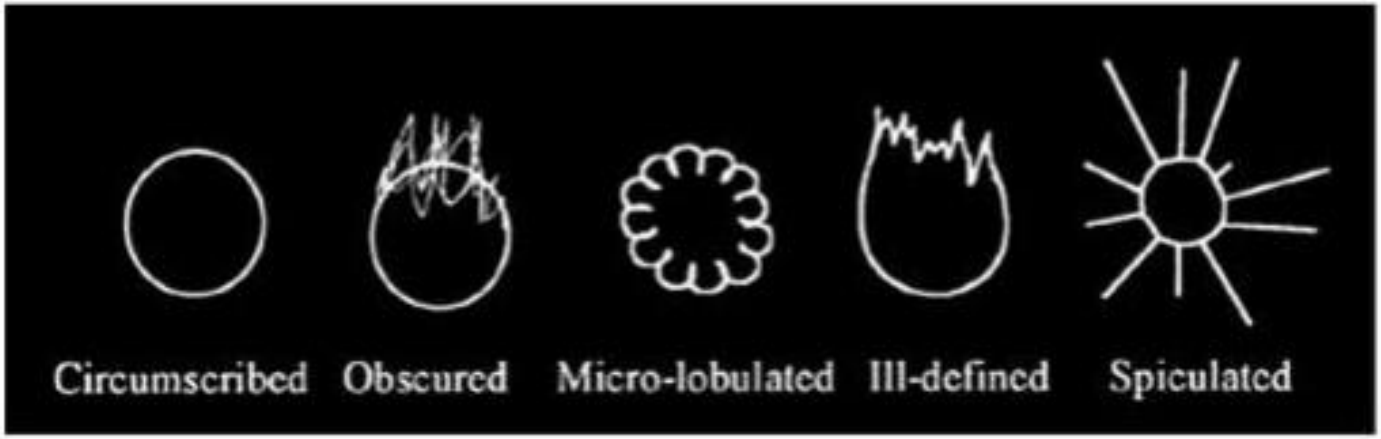


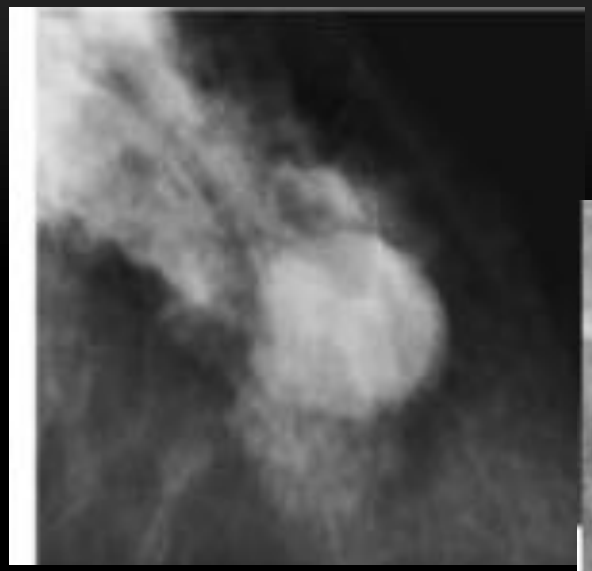


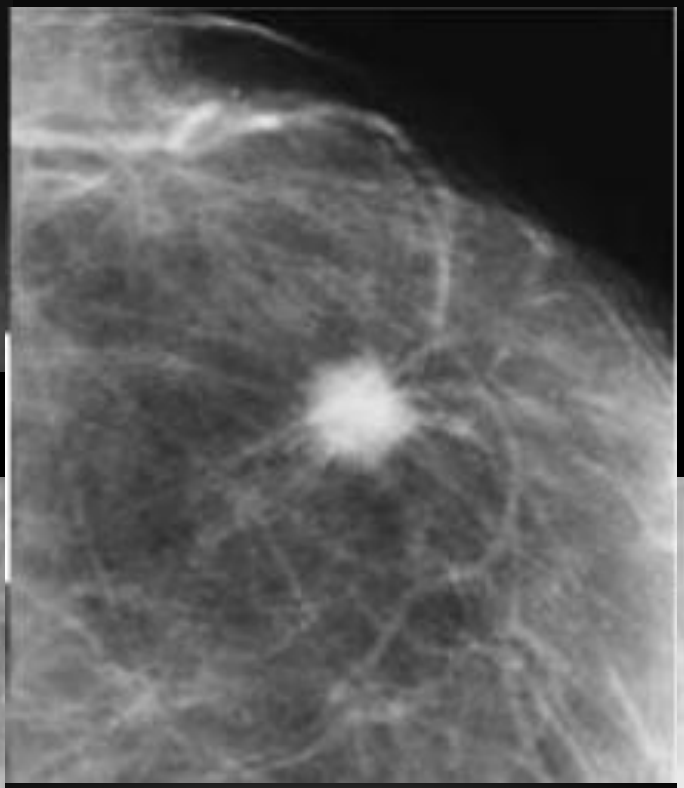


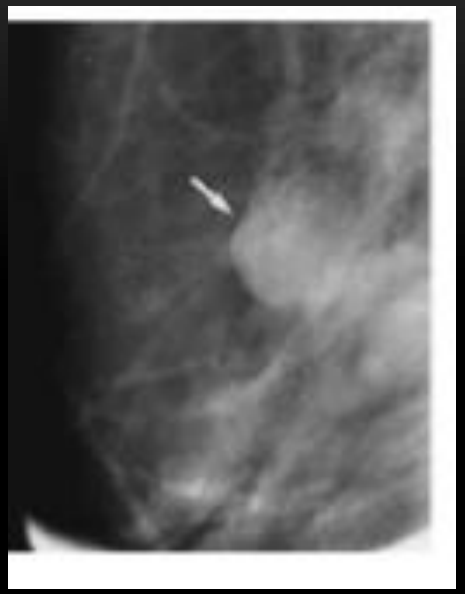


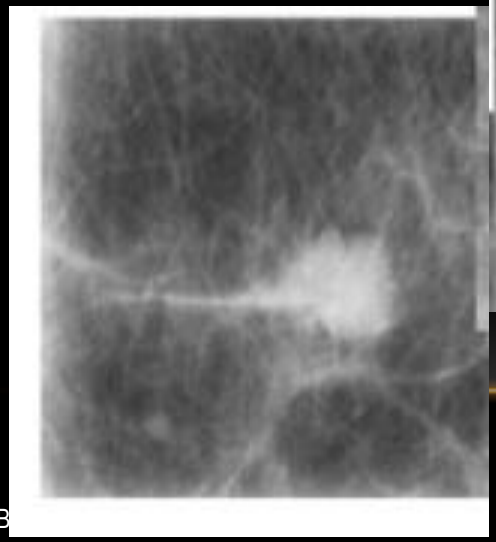
MARGINS

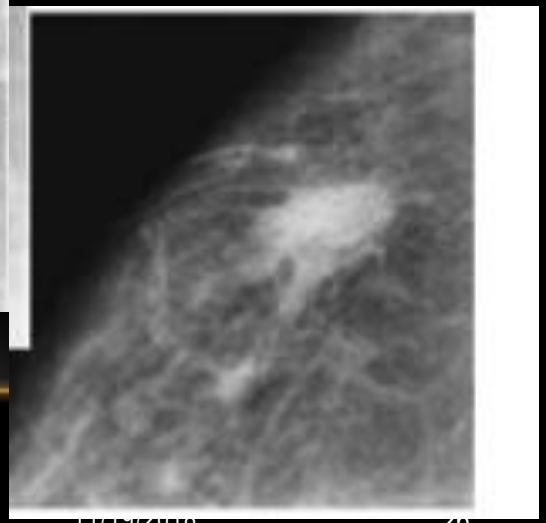

Circumscribed
Obscured
Micro-lobulated
Ill-defined
Spiculated





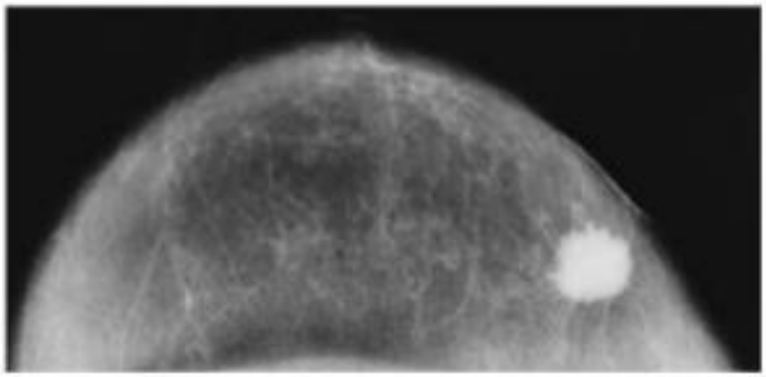


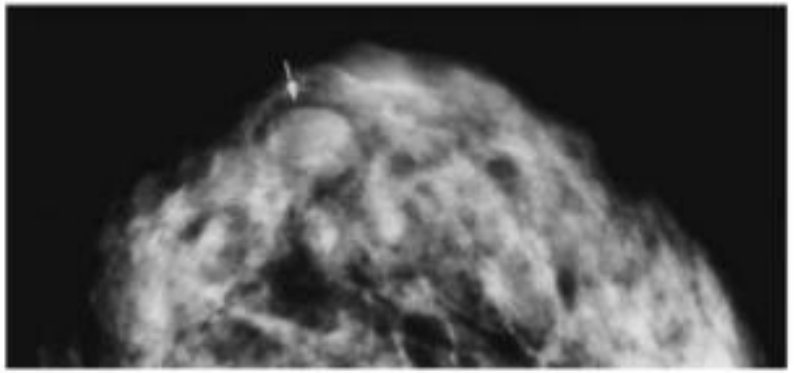


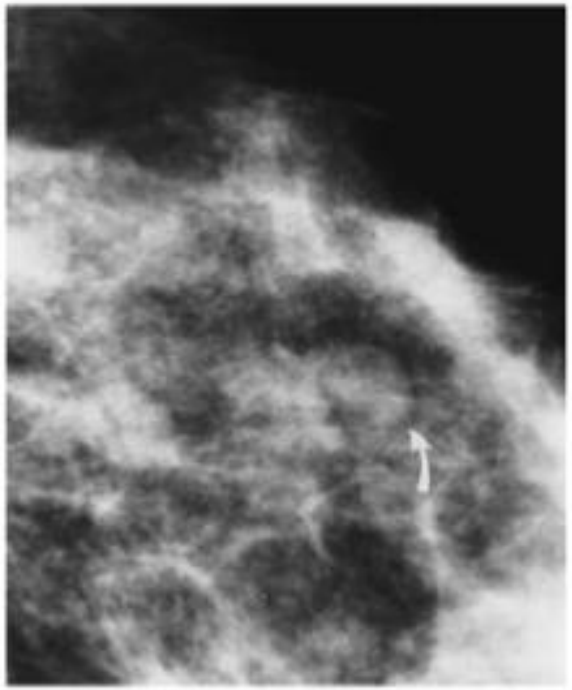


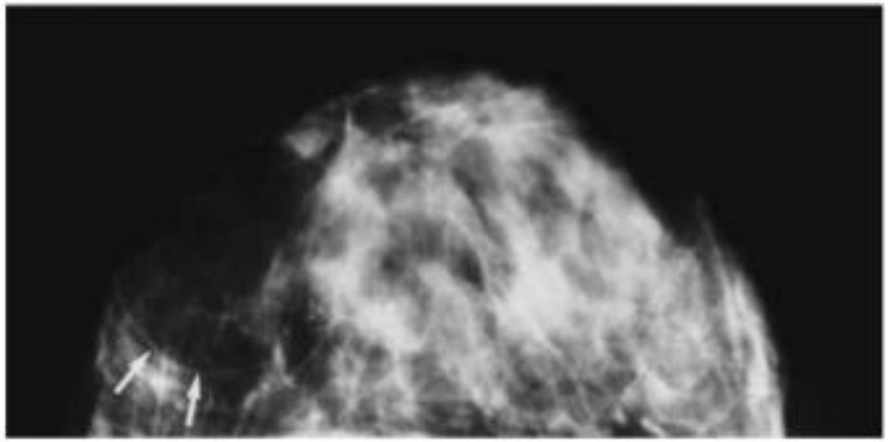
DENSITY

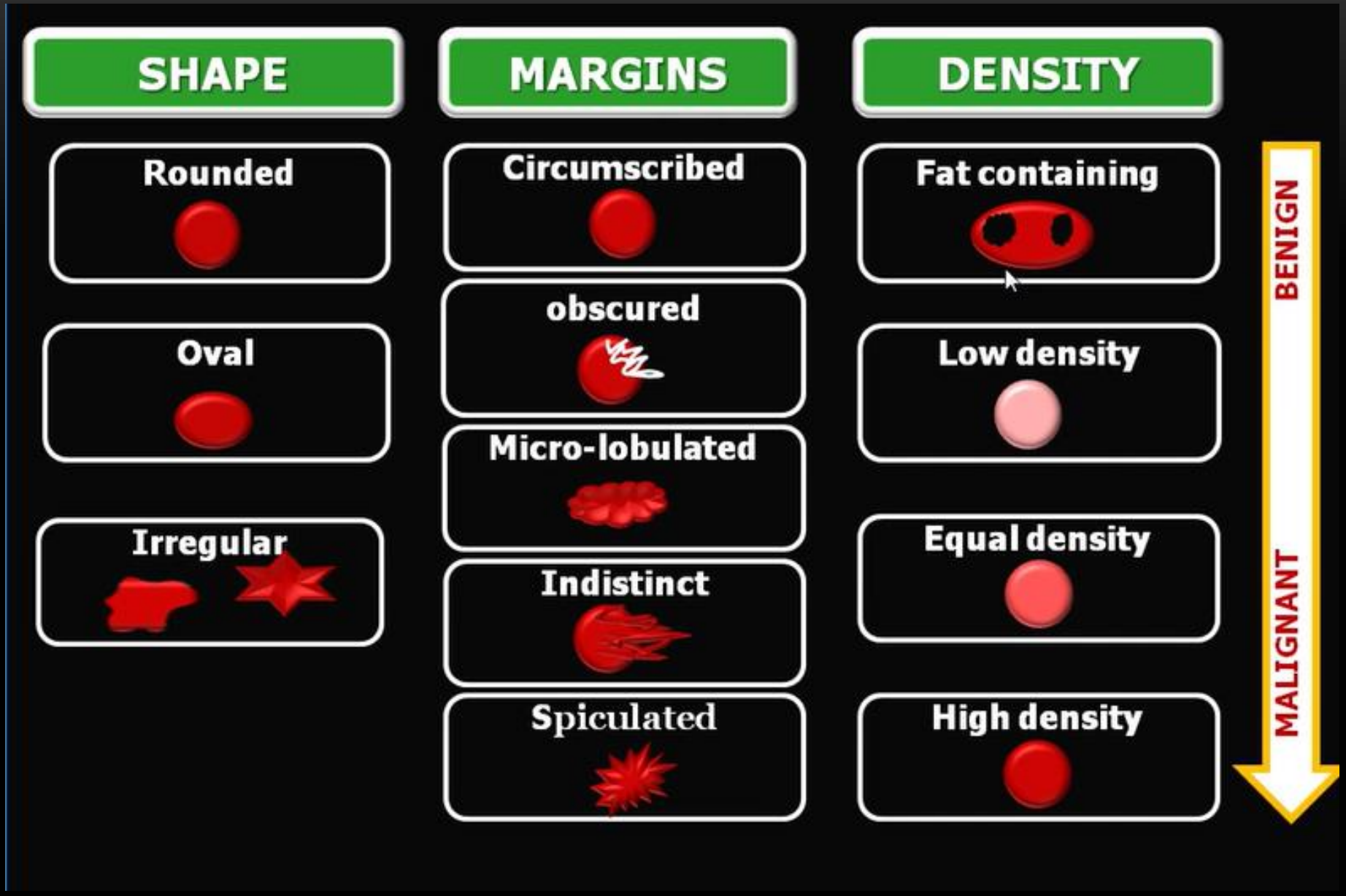
- High
- Iso
- Low (not fat)
- Fat containing
  - Oil cysts
  - Lipoma
  - Galactocele
  - Hamartomas
  - Fibroadenolipomas

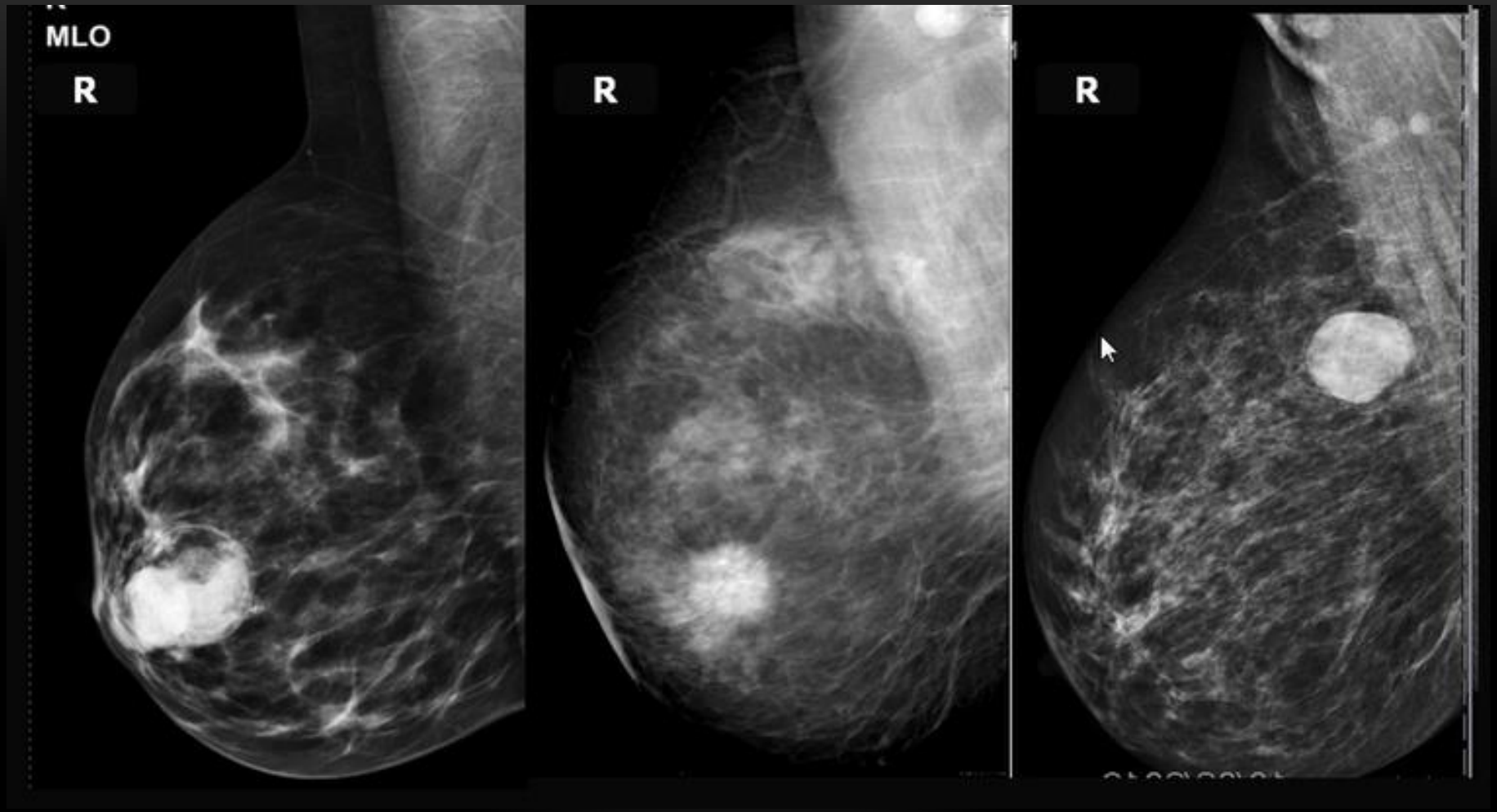


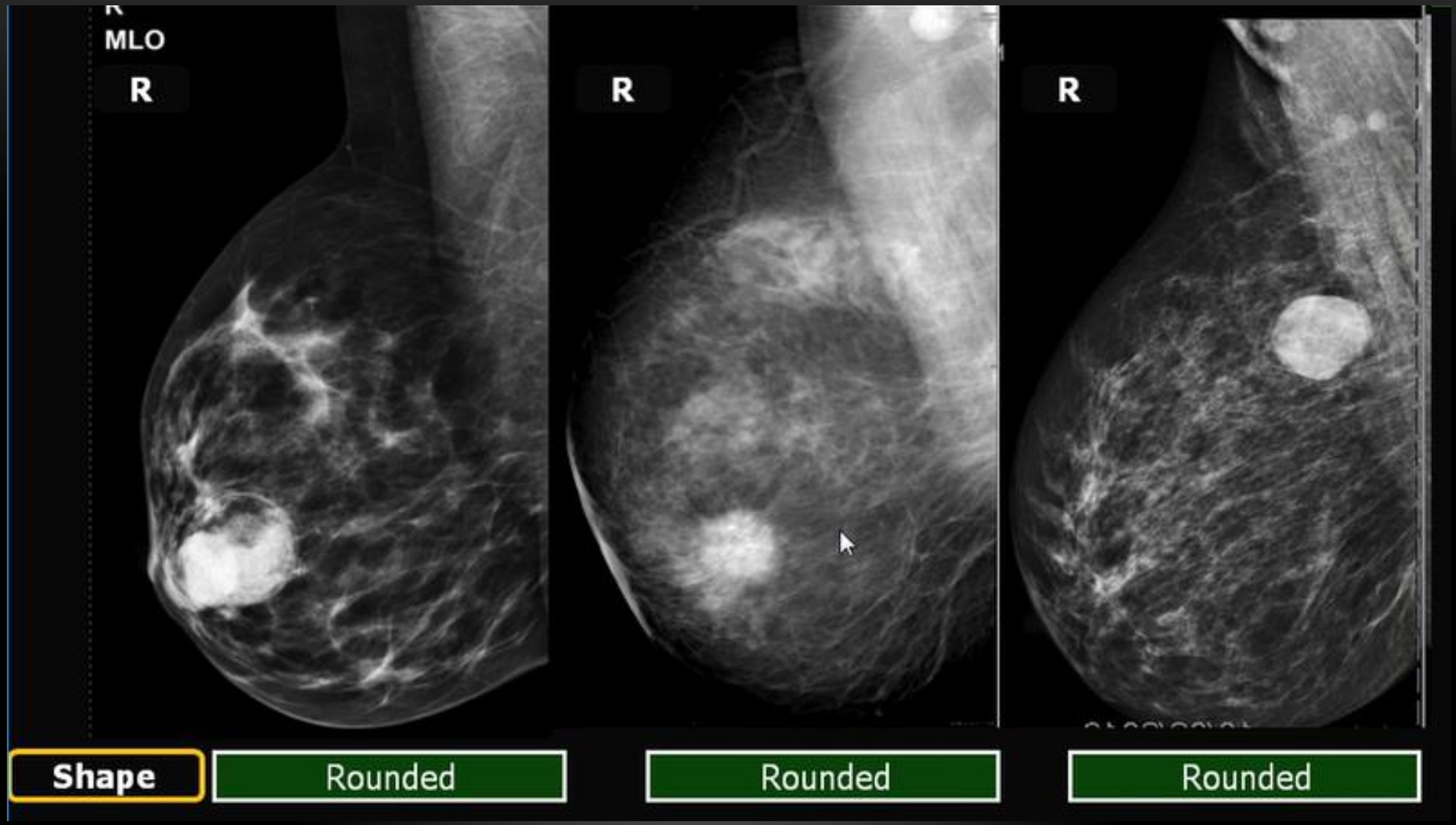


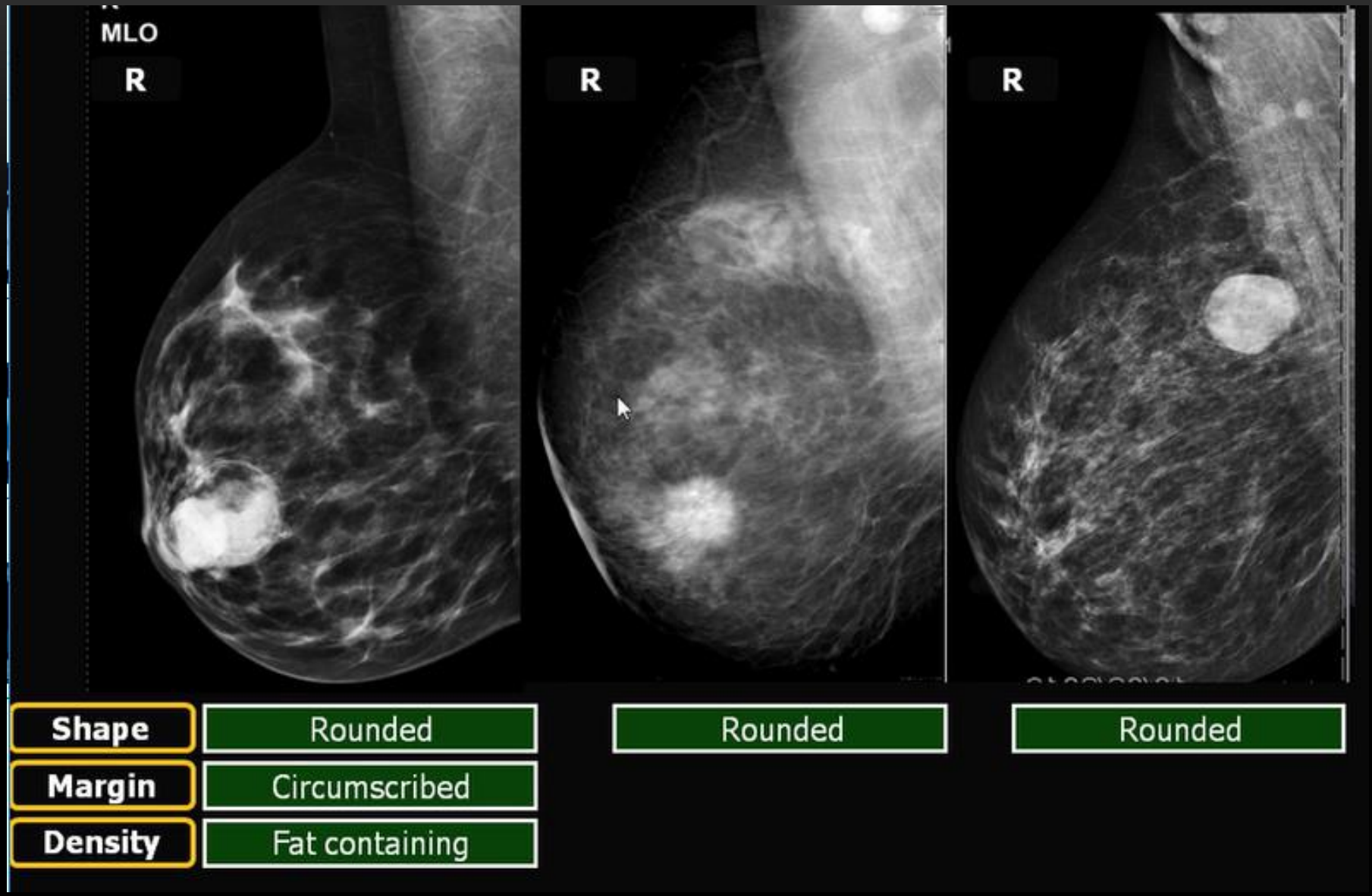


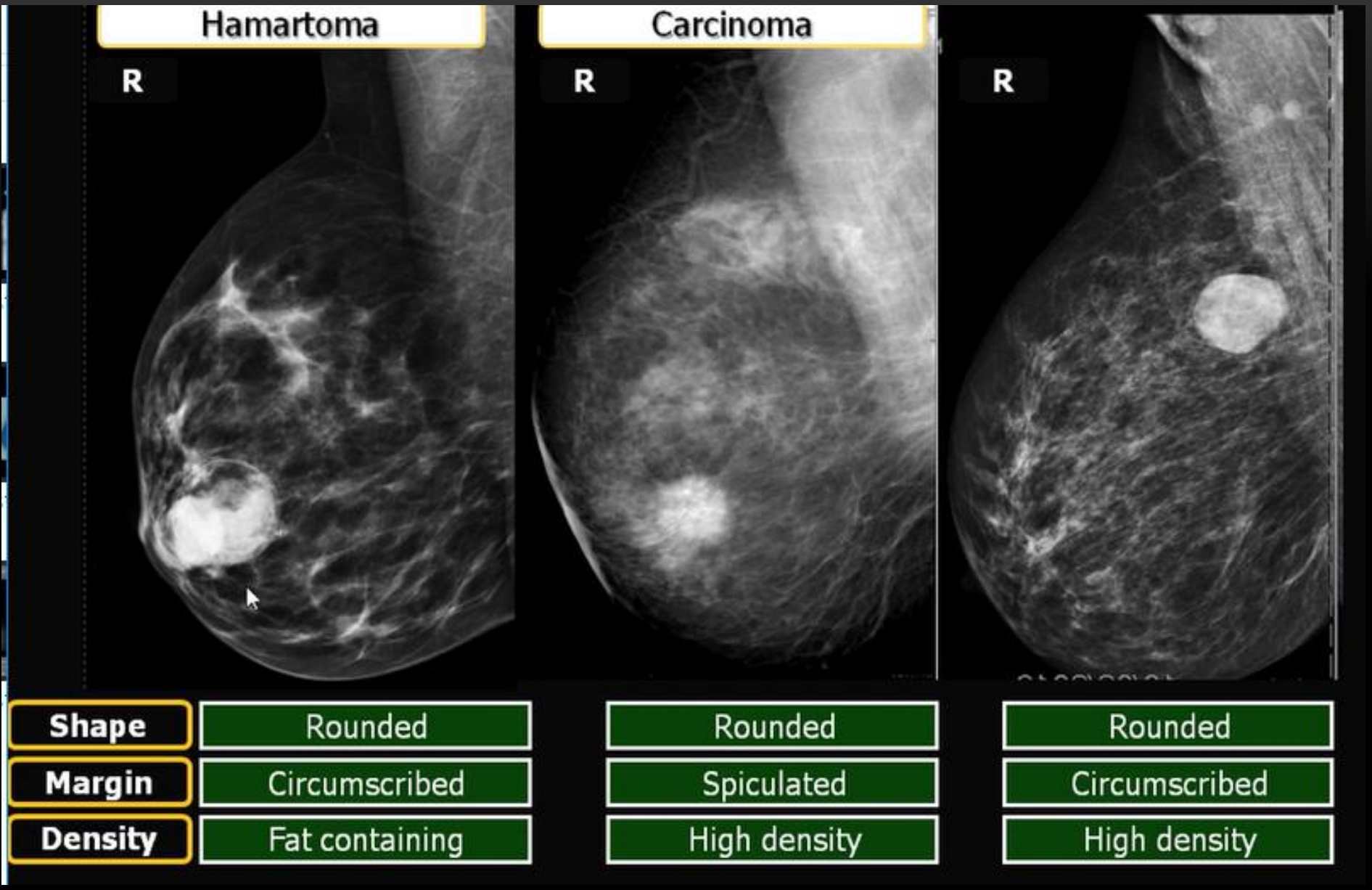


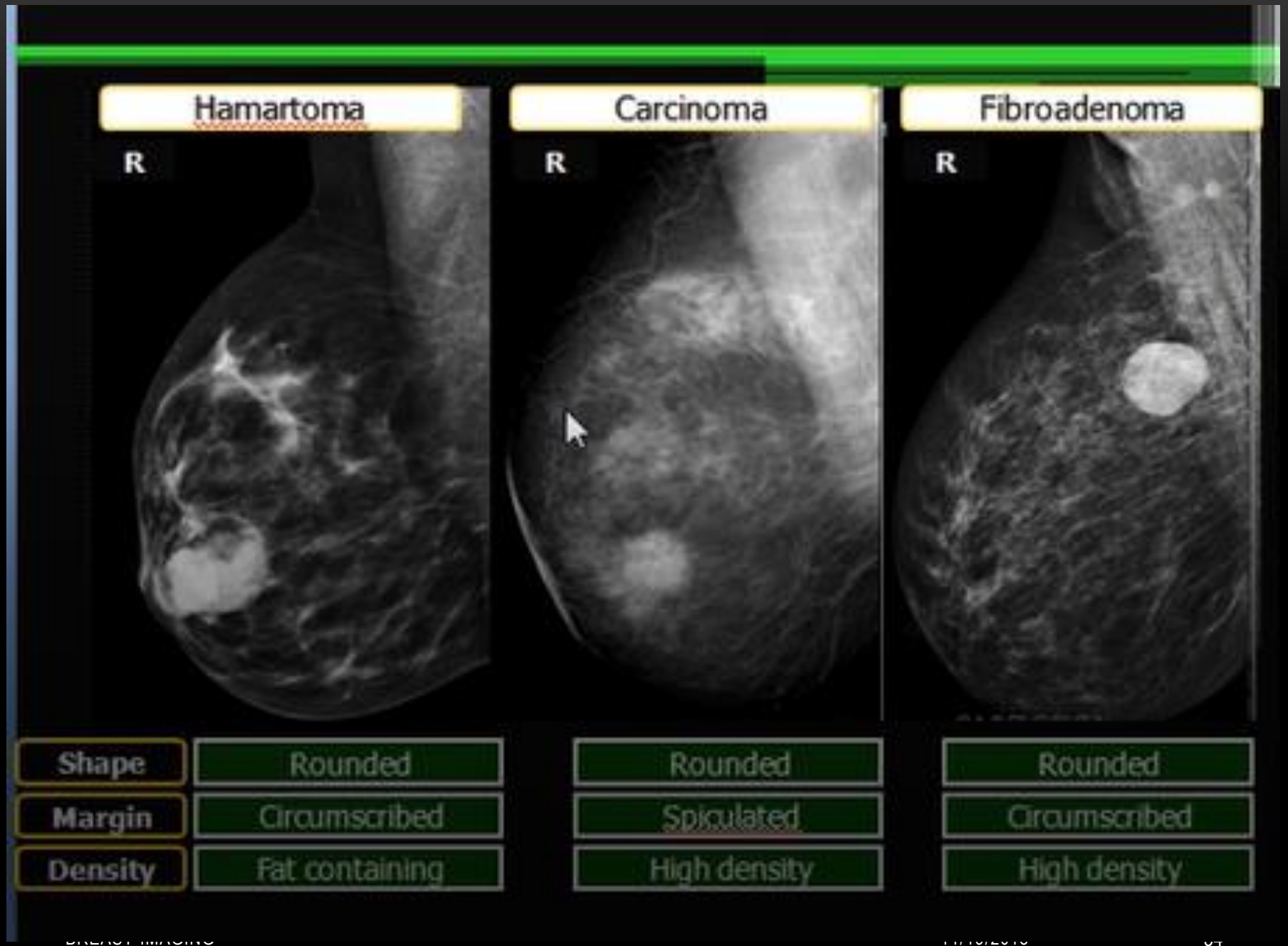

SHAPE
Rounded
Oval
Irregular
MARGINS
Circumscribed
obscured
Micro-lobulated
Indistinct
Spiculated
DENSITY
Fat containing
Low density
Equal density
High density
BENIGN
MALIGNANT

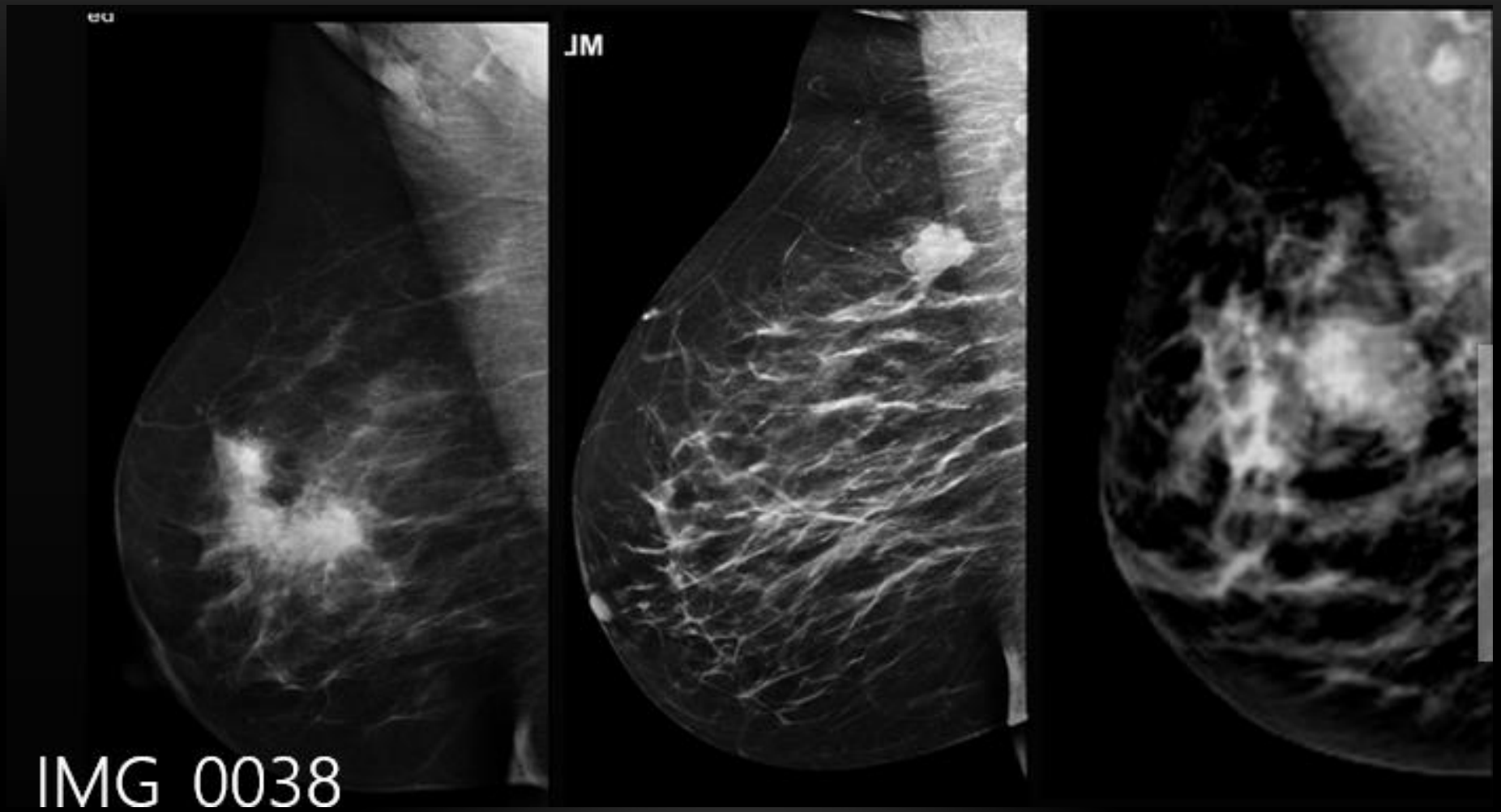

MLO
R
R
R

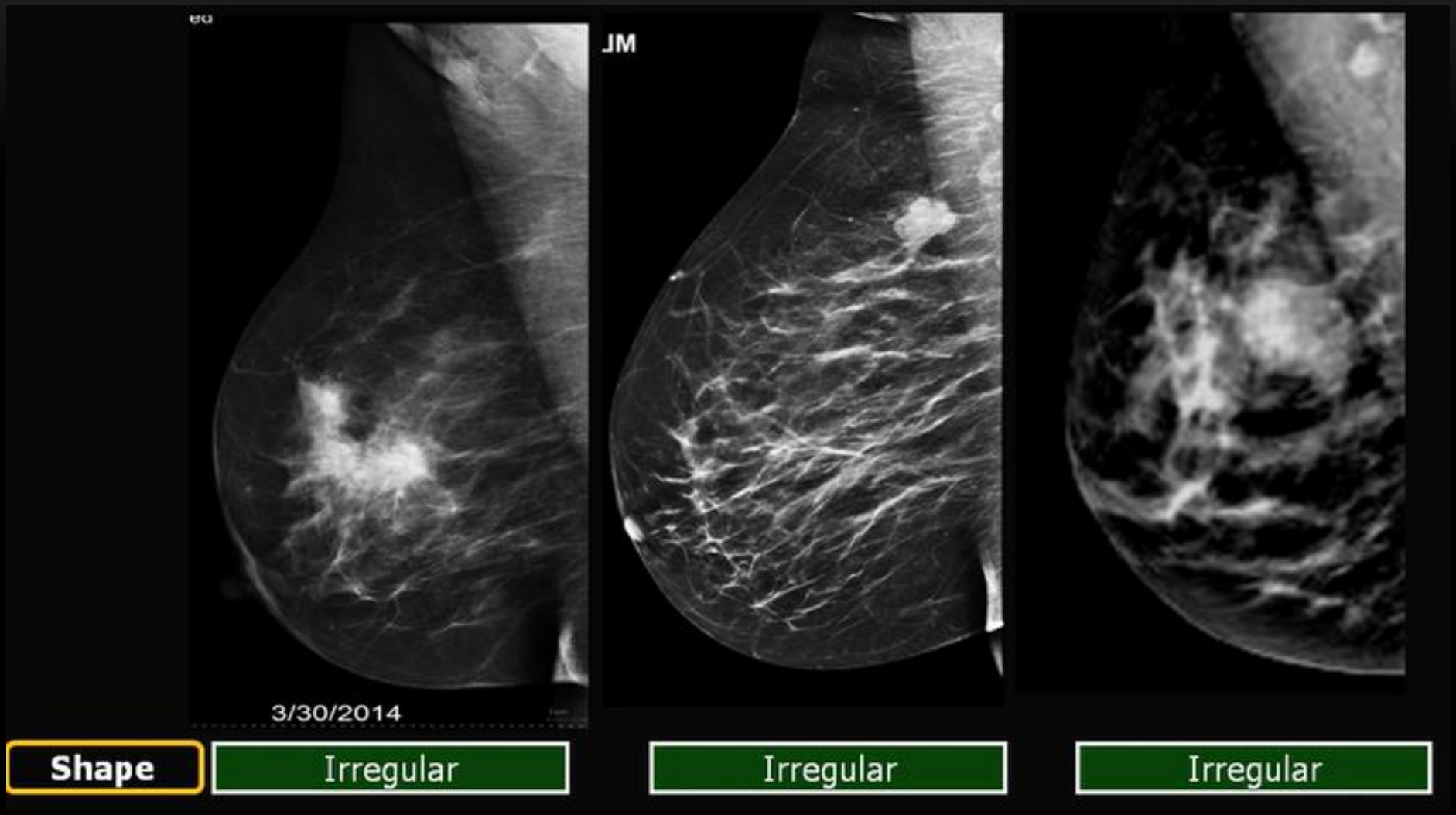

MLO
R
R
R
Shape
Rounded
Rounded
Rounded

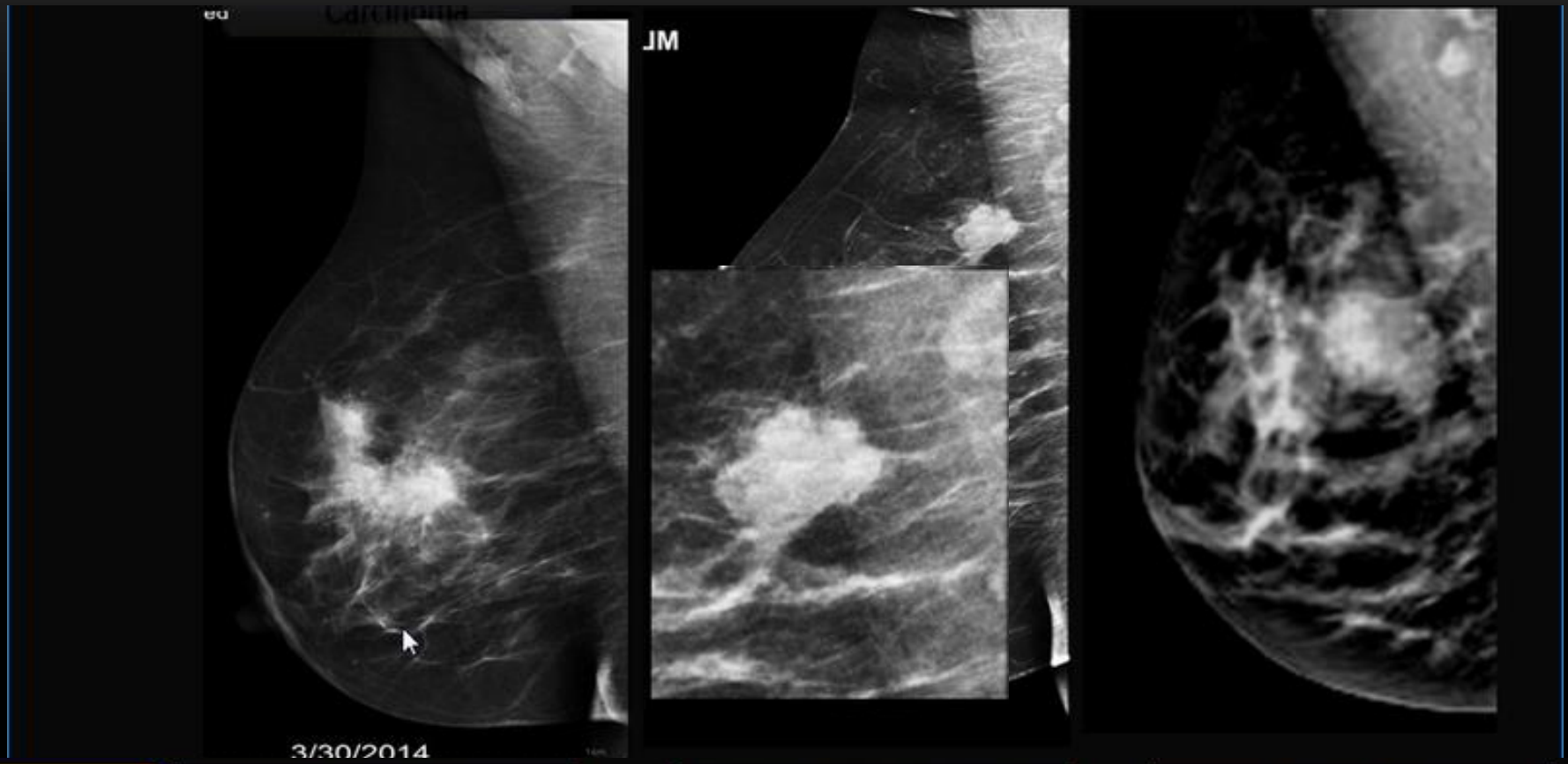

MLO
R
R
R
Shape
Rounded
Rounded
Rounded
Margin
Circumscribed
Density
Fat containing


Hamartoma
Carcinoma
R
R
R
Shape
Rounded
Rounded
Rounded
Margin
Circumscribed
Spiculated
Circumscribed
Density
Fat containing
High density
High density


Hamartoma
Carcinoma
Fibroadenoma
R
R
R
Shape
Rounded
Rounded
Rounded
Margin
Circumscribed
Spiculated
Circumscribed
Density
Fat containing
High density
High density

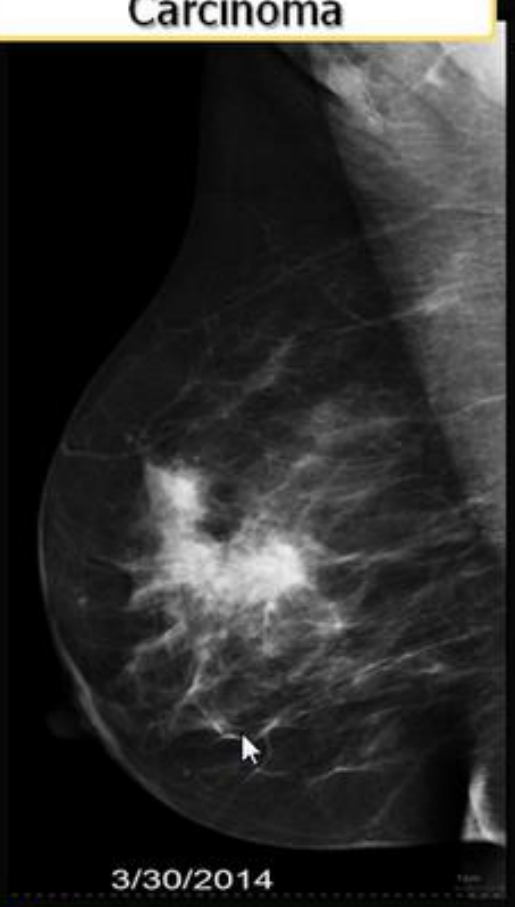

IMG 0038

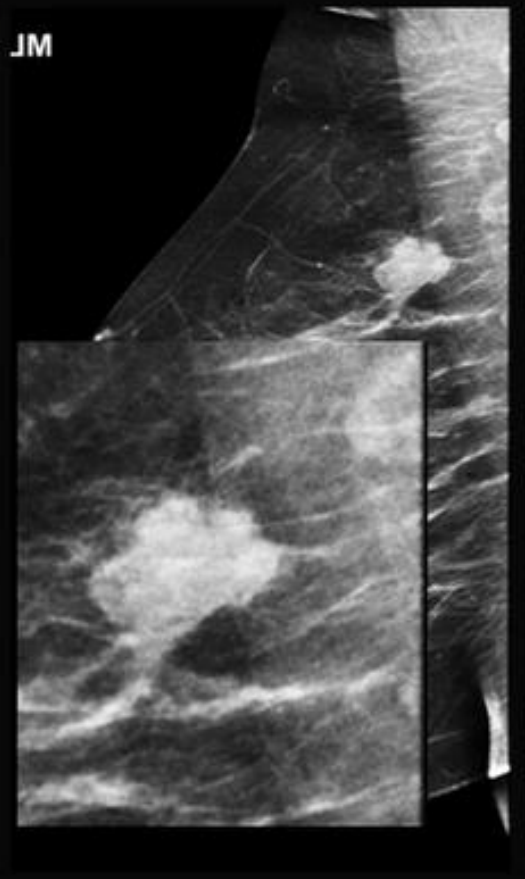

3/30/2014
Shape
Irregular
Irregular
Irregular

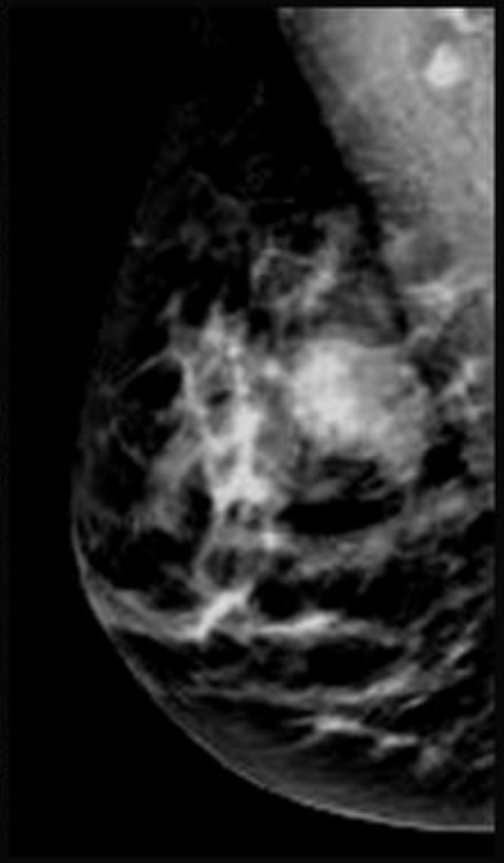


Shape	Irregular	Irregular	Irregular
Margin	Spiculated	Microlobulated	Obscured
Density	High density	High density	Equal density

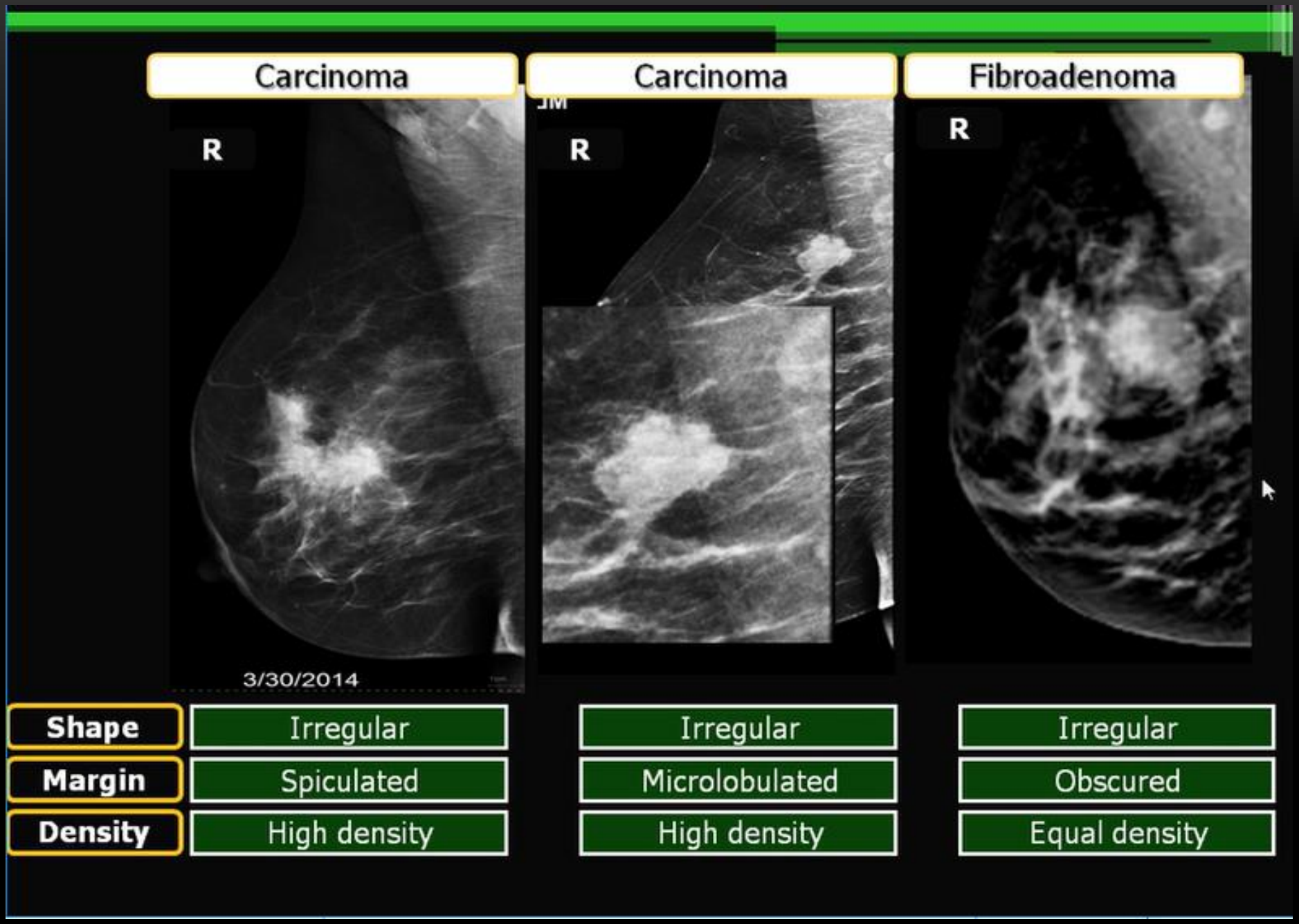
Carcinoma





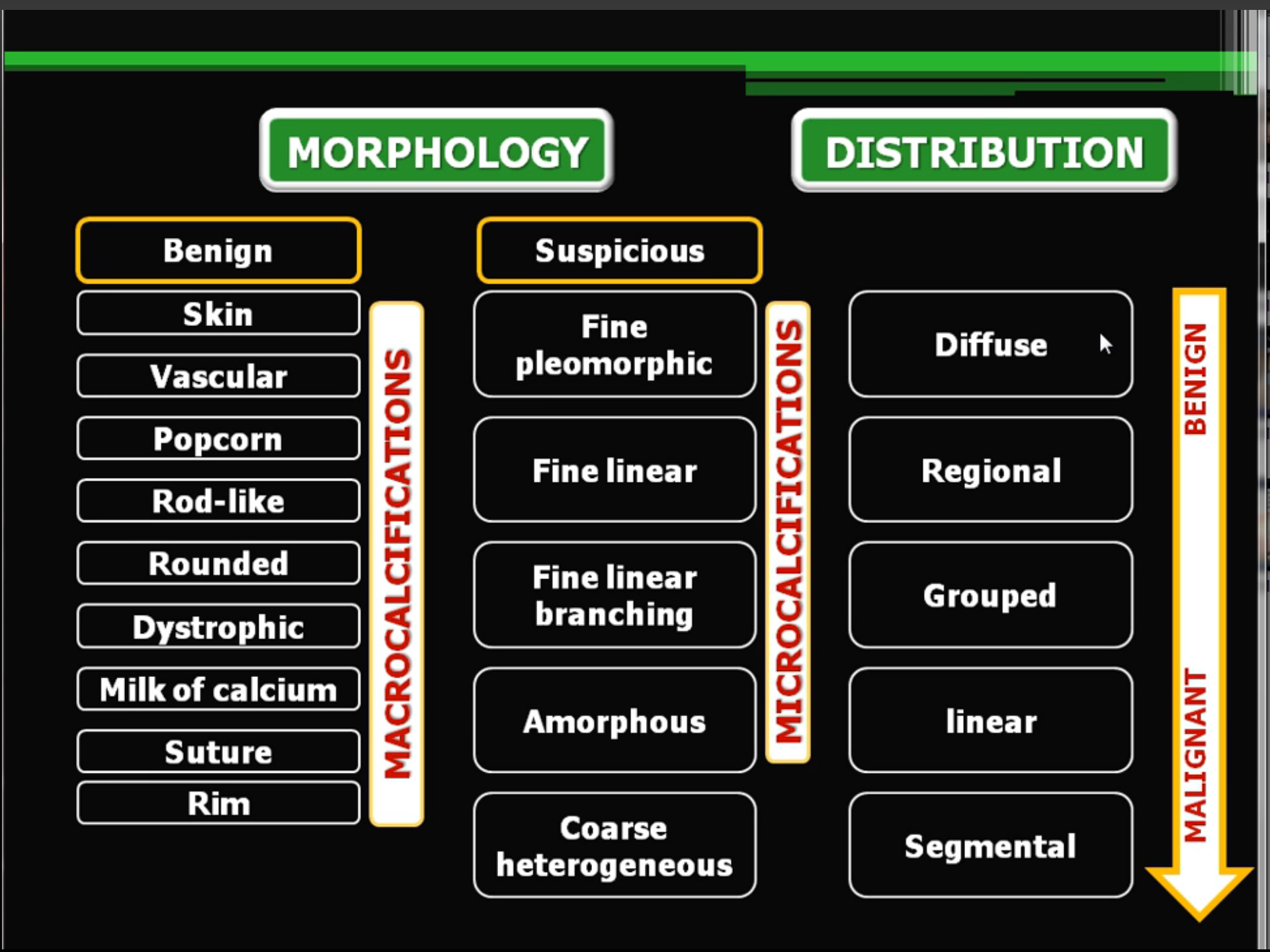


Shape	Irregular	Irregular	Irregular
Margin	Spiculated	Microlobulated	
Density	High density		

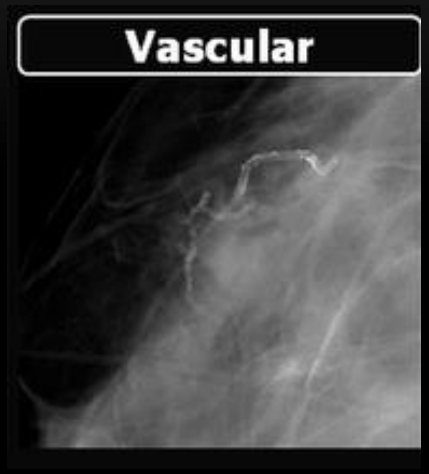

Carcinoma
Carcinoma
Fibroadenoma
R
R
R
3/30/2014
Shape
Irregular
Irregular
Irregular
Margin
Spiculated
Microlobulated
Obscured
Density
High density
High density
Equal density

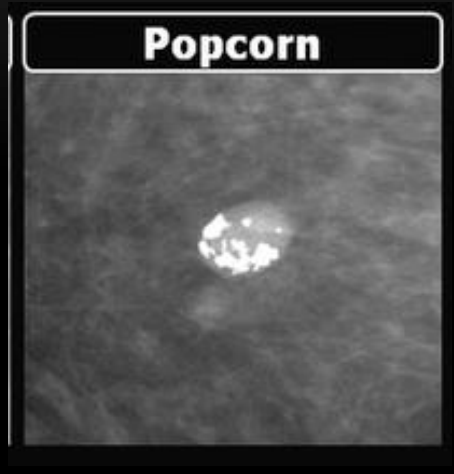

MASS
CALCIFICATION
ASYMMETRIC BREAST FINDINGS
INTRAMAMMARY LYMPH NODE
TUBULAR DENSITY
ARCHITECTURAL DISTORTION
OTHER ASSOCIATED FINDINGS

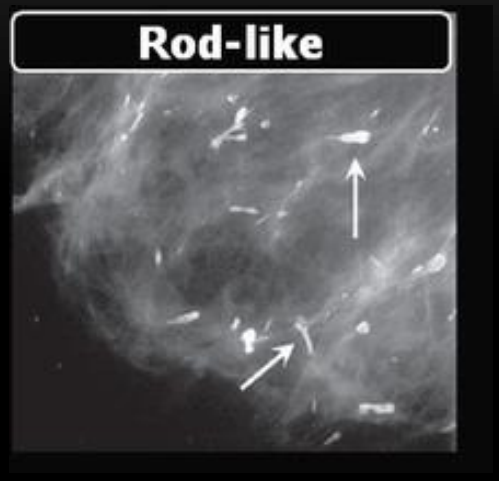
- Morphology
- Distribution
- Number
- Size


MORPHOLOGY
DISTRIBUTION
Benign
Skin
Vascular
Popcorn
Rod-like
Rounded
Dystrophic
Milk of calcium
Suture
Rim
MACROCALCIFICATIONS
Suspicious
Fine pleomorphic
Fine linear
Fine linear branching
Amorphous
Coarse heterogeneous
MICROCALCIFICATIONS
Diffuse
Regional
Grouped
linear
Segmental
BENIGN
MALIGNANT

Benign Calcifications



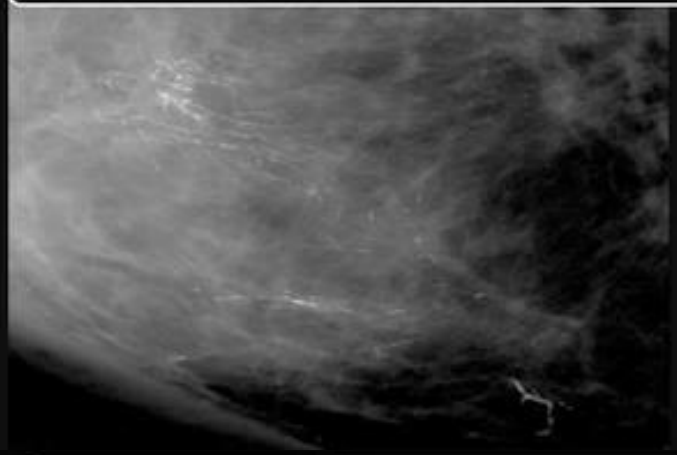




Suspicious Calcifications

Fine pleomorphic

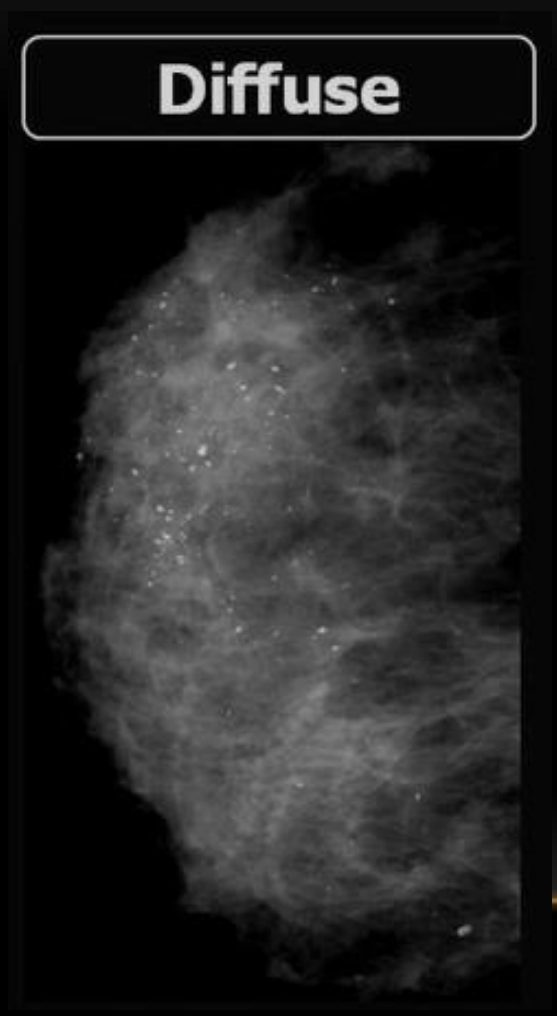
Fine linear branching

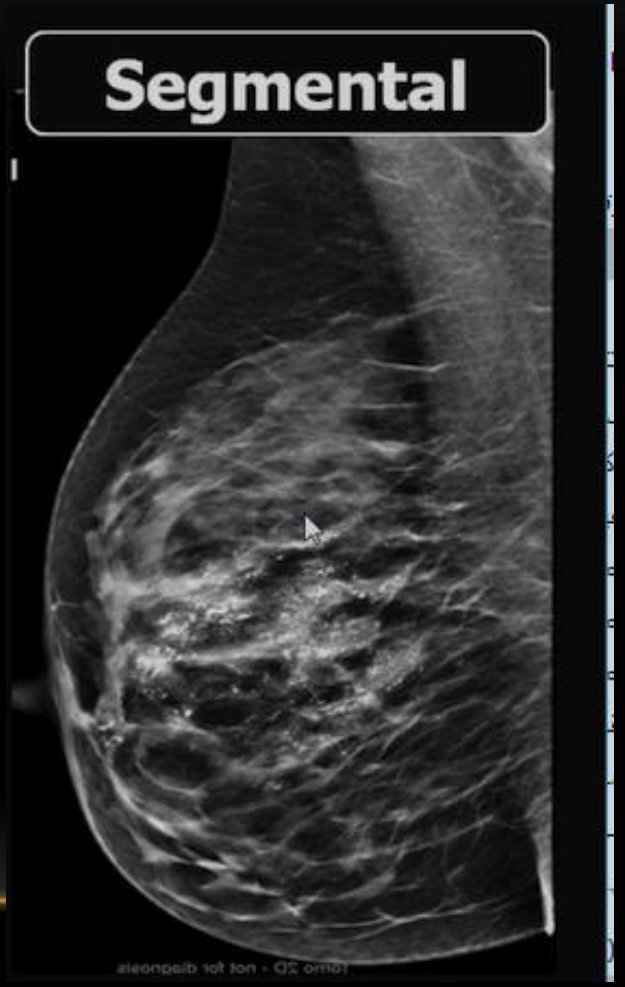


Amorphous

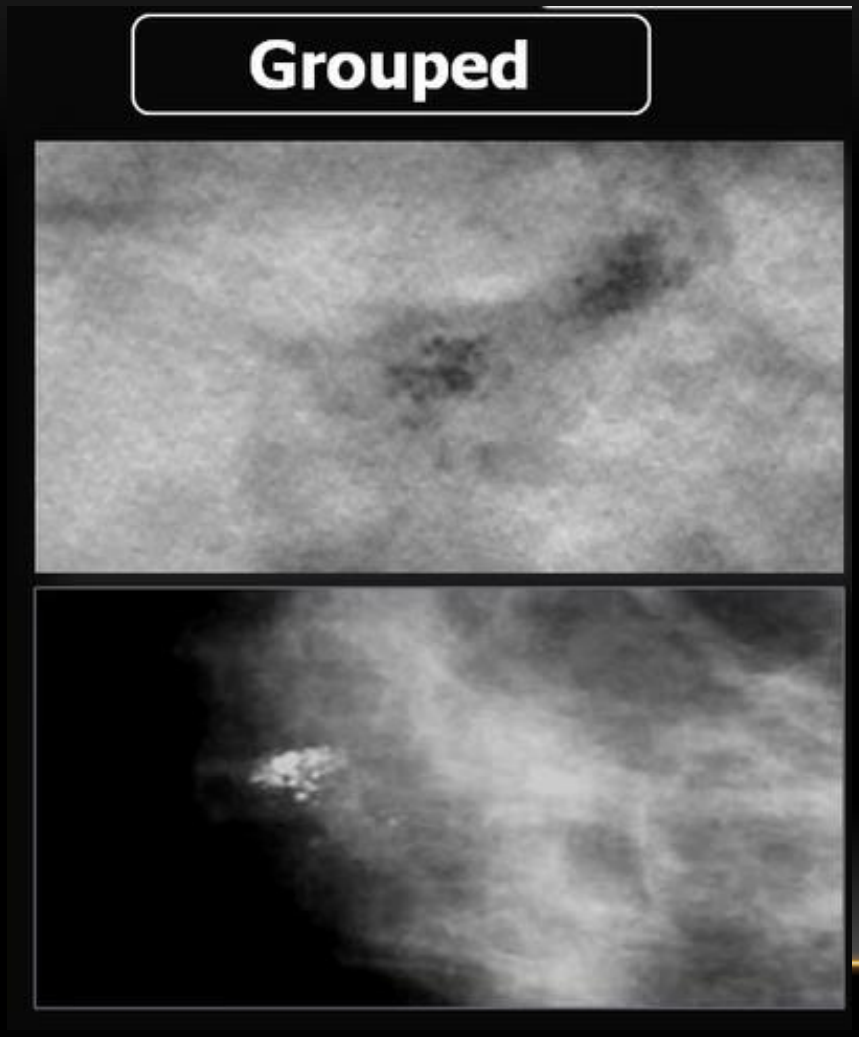
Coarse heterogeneous

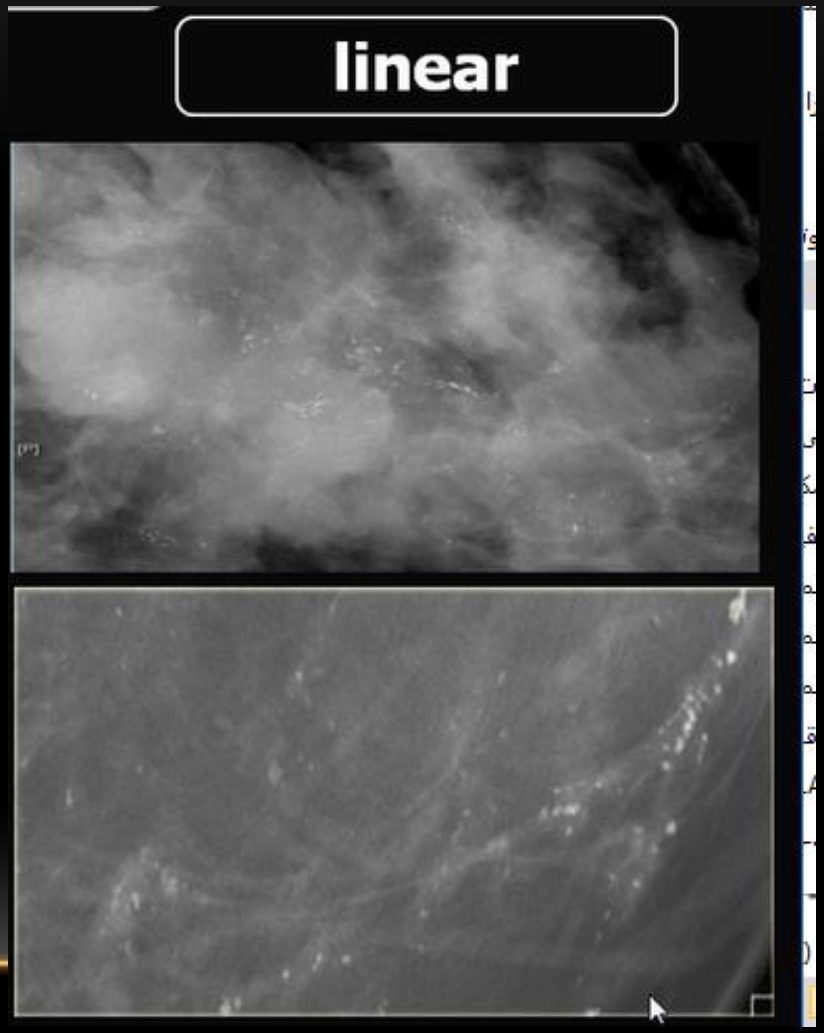
DISTRIBUTION





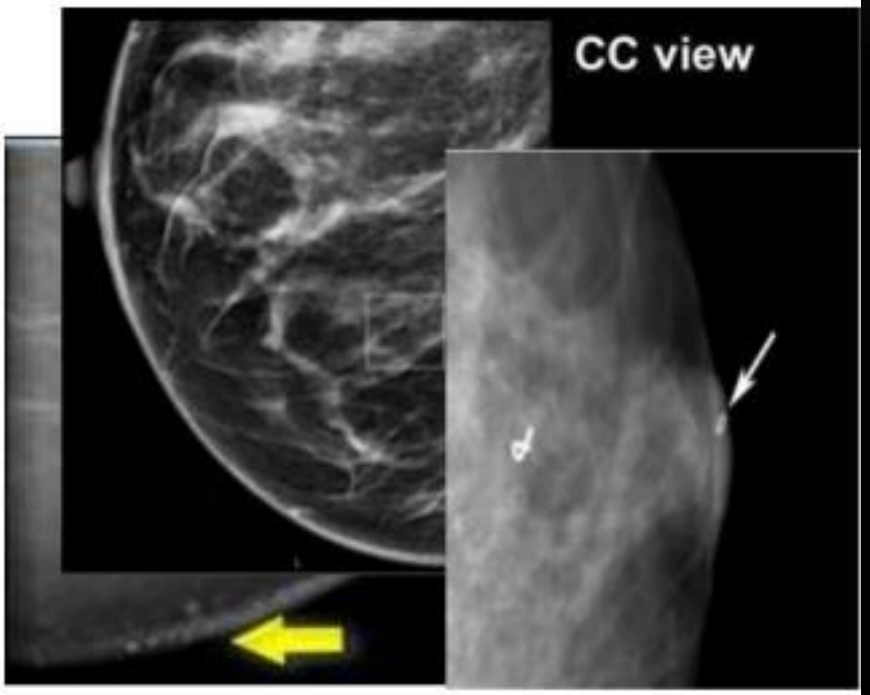
DISTRIBUTION





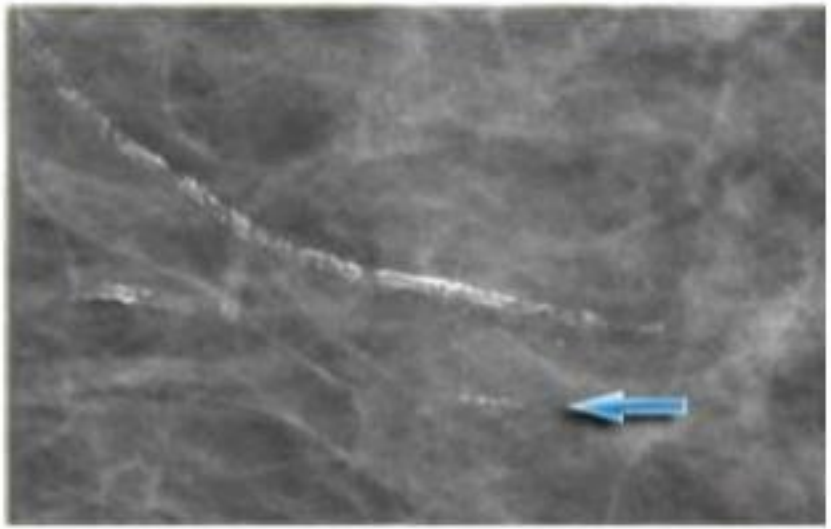
Skin Calcification

- Tattoo Sign
- Usually located along inframammary fold parasternally, axilla and areola.
- Can be seen in the skin which is enface



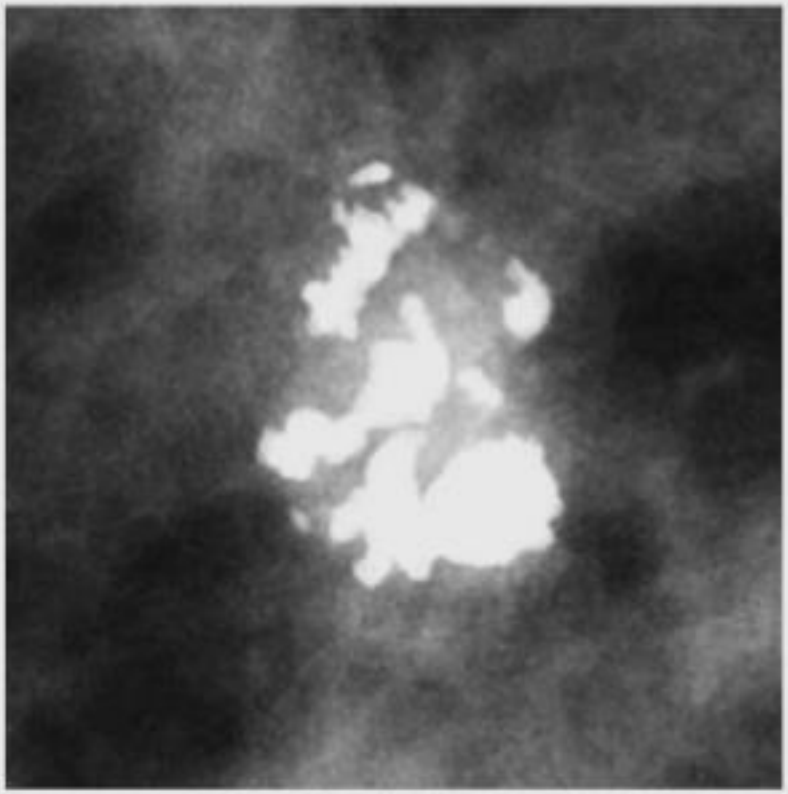
Vascular Calcification

- Linear or parallel tracks that are usually clearly associated with blood vessels.



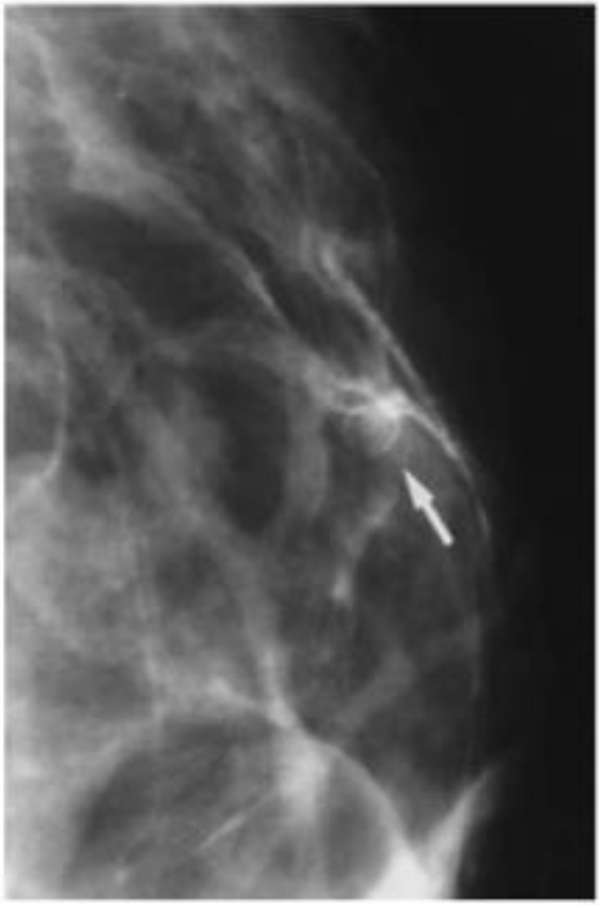
Popcorn Calcification

- Involuting Fibroadenoma



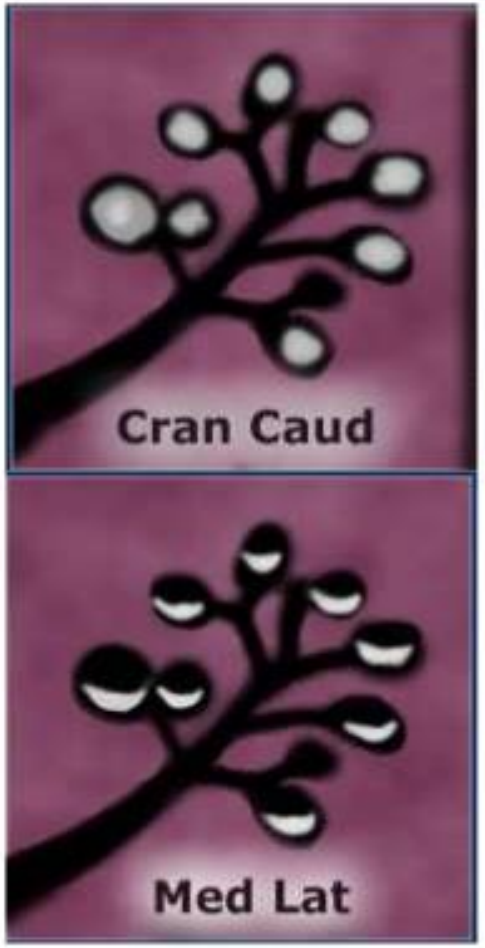
Eggshell or Rim Calcification

- **Wall of the Cyst.**
- Fat Necrosis.
- Periphery of Fibroadenoma



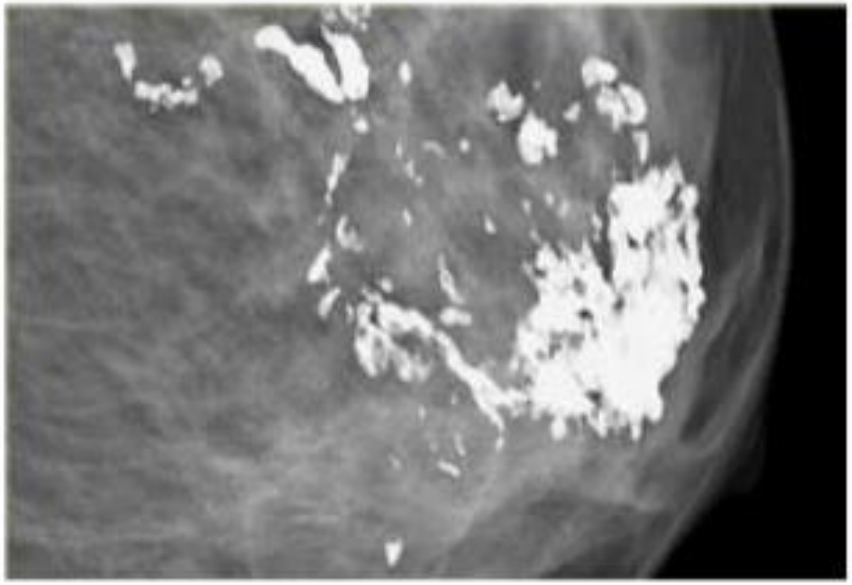
Milk of Calcium

- Are benign sedimented calcification in macro or micro cysts.
- Typical feature is apparent change in **shape** on different projections.



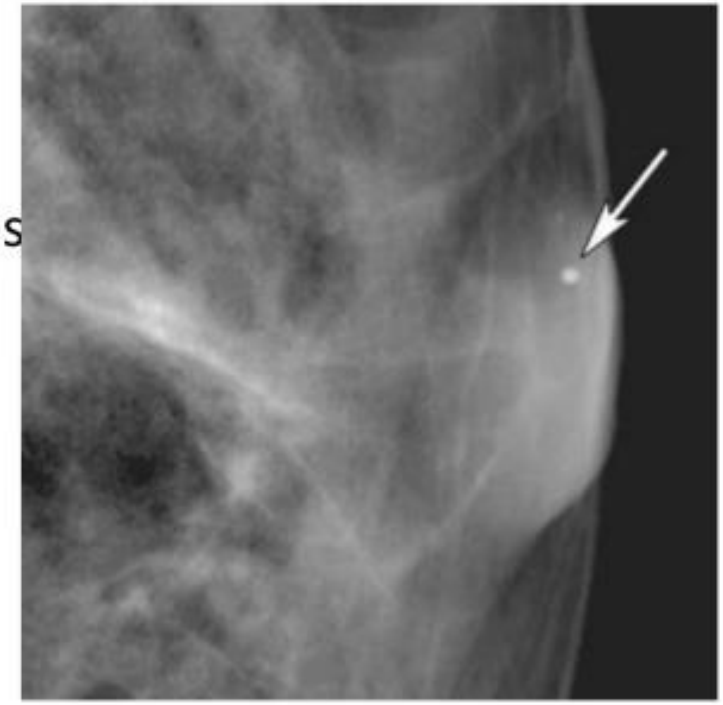
Dystrophic Calcification

- Coarse irregular lava shaped calcification.
- In irradiated breast or following trauma



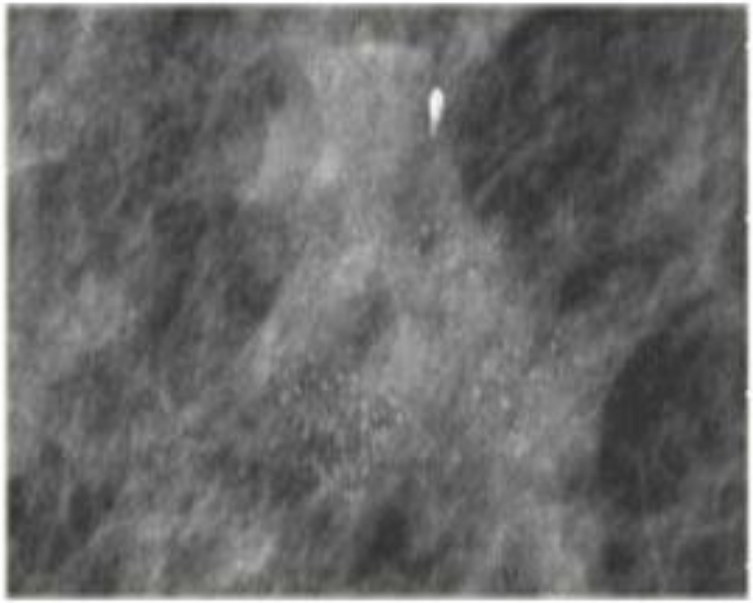
Round calcification

- >0.5 mm.
- In fibrocystic changes or adenosis or skin calcification.



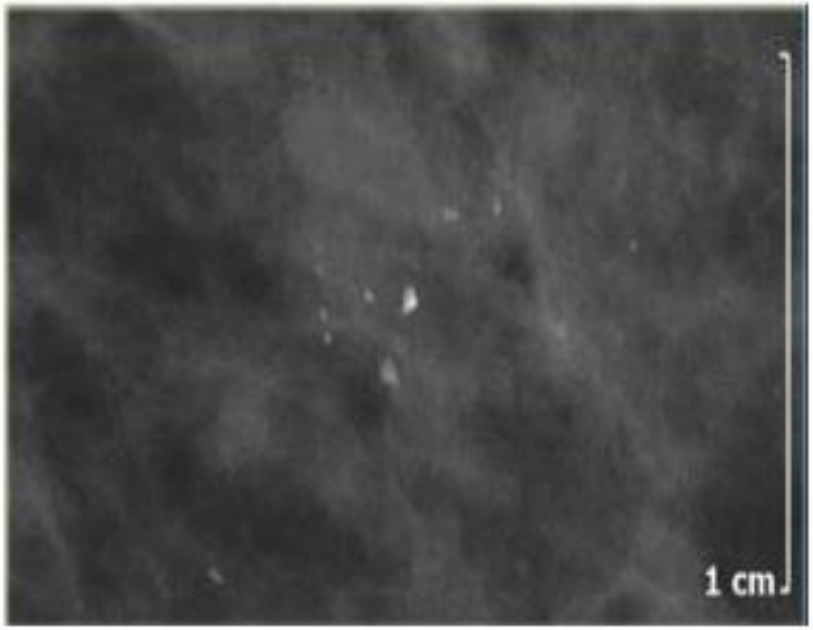
Amorphous or indistict calcification

- Calcification without a clearly defined shape or form. They are usually so small or hazy in appearance, that a more specific morphologic classification can not be determined.
- Present in many benign and malignant breast diseases. About 20% of amorphous calcifications turns out to be malignant.



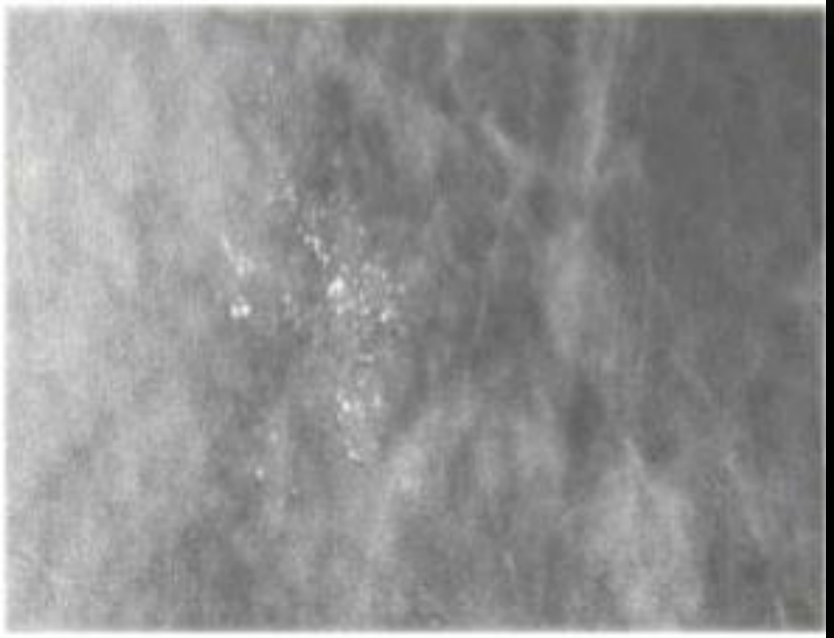
Coarse Heterogenous

- Irregular calcification that are usually larger than 0.5 mm but not the size of large heterogenous dystrophic calcifications.



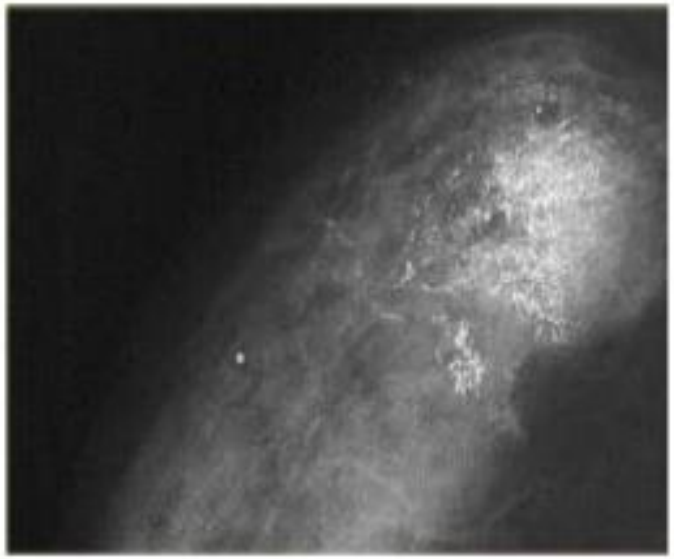
MORPHOLOGY: High Probability of Malignancy

- Fine Pleomorphic:
  - < 0.5 mm
  - Variable in size, density or form
  - 25 – 40% risk of malignancy



Fine Linear or Branching

- < 0.5mm in width.
- Linear or branching distribution



- As compared to Malignant Calcification, Benign Calcifications are:
  - Larger
  - Coarser
  - Round and smooth
  - Easily seen.


MASS
CALCIFICATION
ASYMMETRIC BREAST FINDINGS
INTRAMAMMARY LYMPHNODE
TUBULAR DENSITY
ARCHITECTURAL DISTORTION
OTHER ASSOCIATED FINDINGS

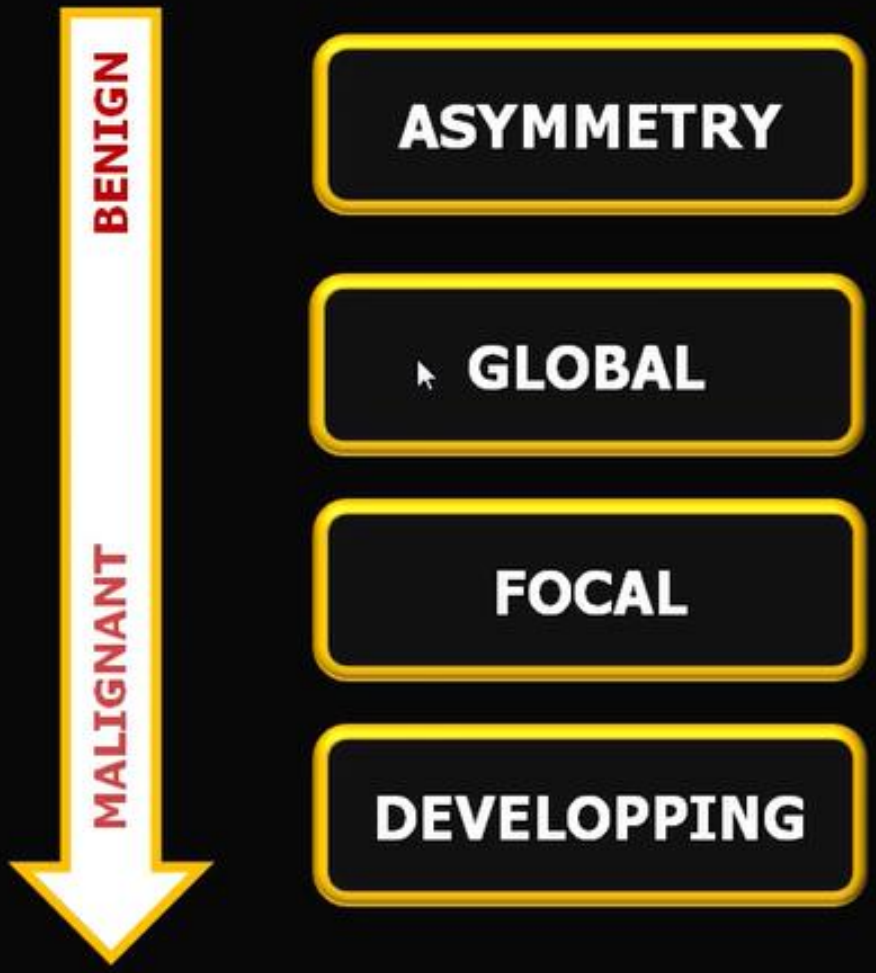
ASYMMETRY MORPHOLOGY DESCRIPTORS

HOW DO BREAST ASYMMETRIES LOOK LIKE?

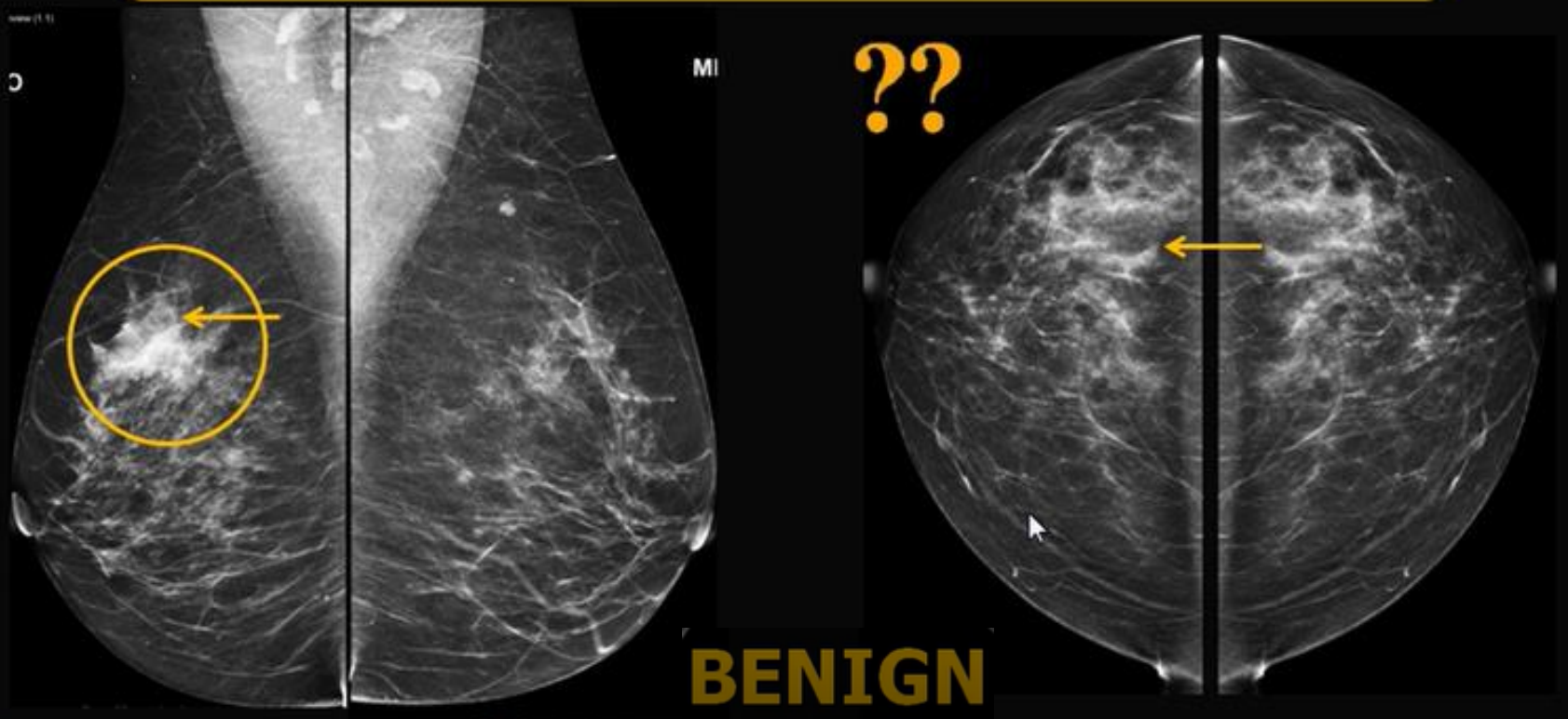
They look like nothing!!!

- They **lack the convex borders** of masses and are often interspersed with fat .
- They also **lack the radiating lines or tissue retraction** of architectural distortion
- They **lack the tubular branching appearance** of a dilated duct.

TYPES OF BREAST ASYMMETRIES



ASYMMETRY (Single view asymmetry)



- It is seen in only a single view.
- They usually contain interspersed fat.
- They are usually caused by the superimposition of normal fibroglandular breast tissue.

GLOBAL ASYMMETRY

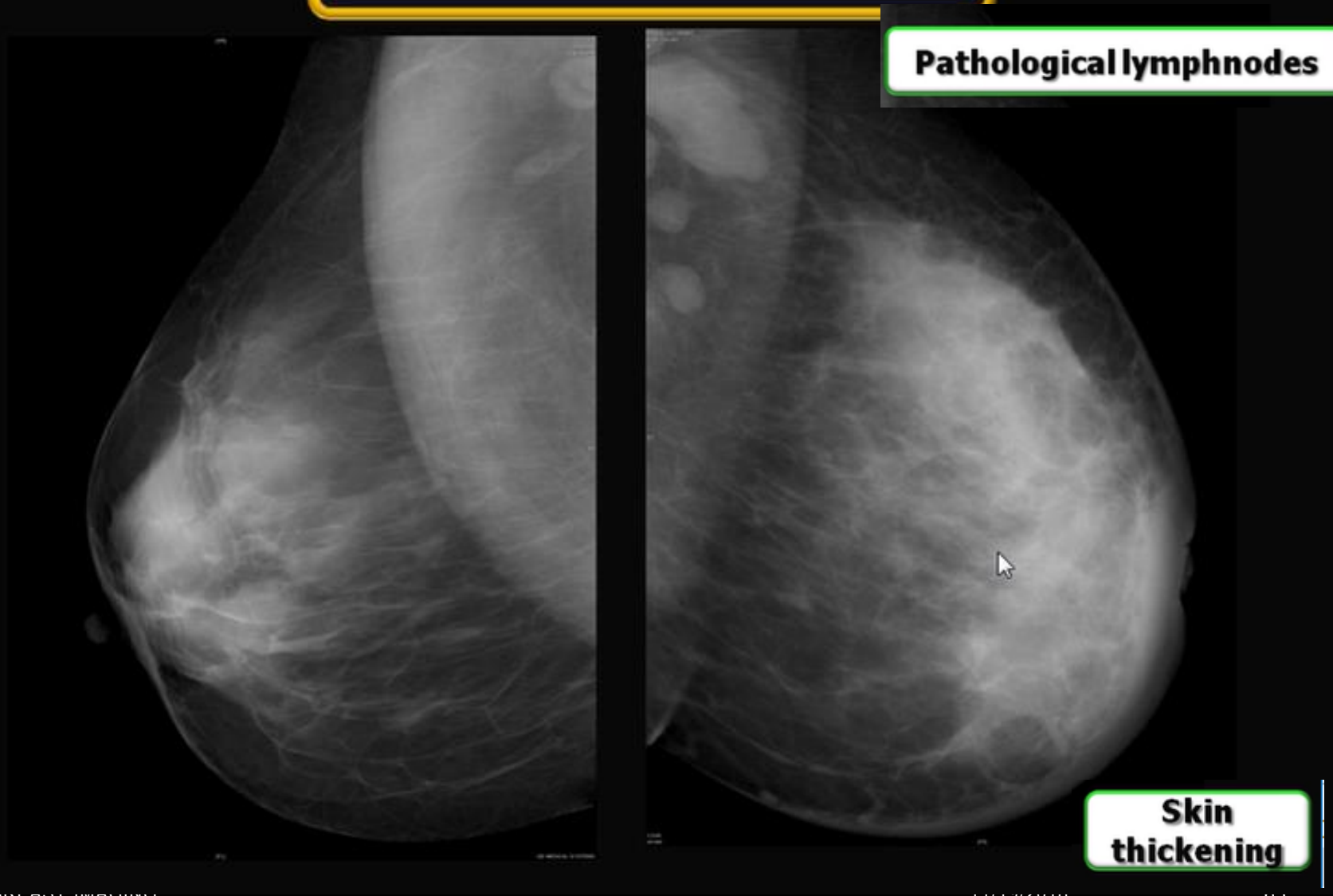
- It occupies more than 25% of the breast or at least one segment
- Seen in 2 views.
- It usually requires recall for further assessment.
- No microcalcation, distortion or mass lesions.

Benign

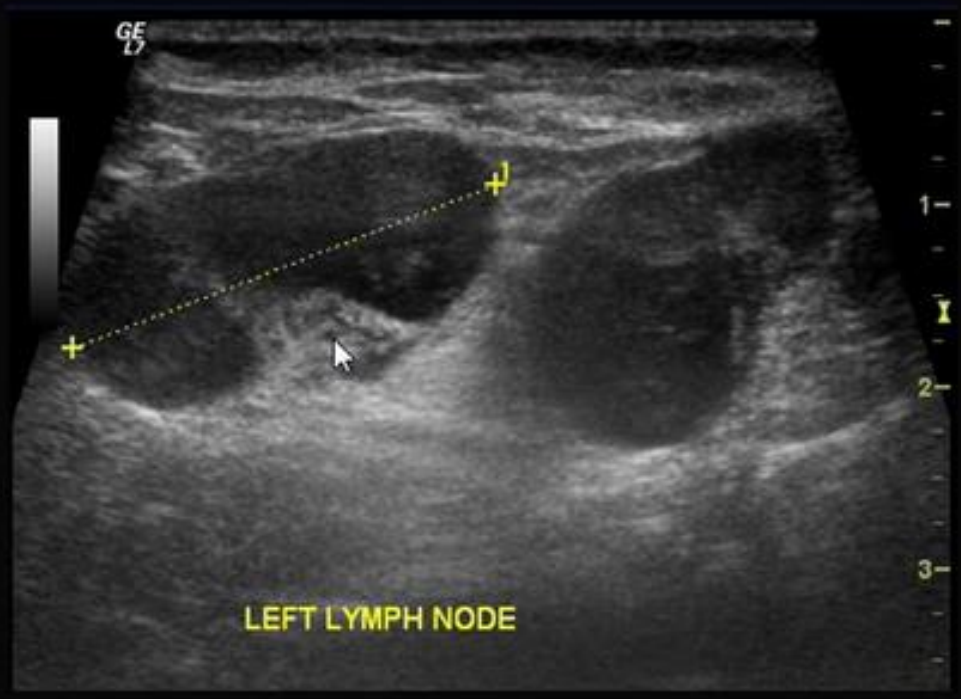
Malignant

- Palpable
- Associated breast erythema or edema
- Associated calcifications or distortion

GLOBAL ASYMMETRY



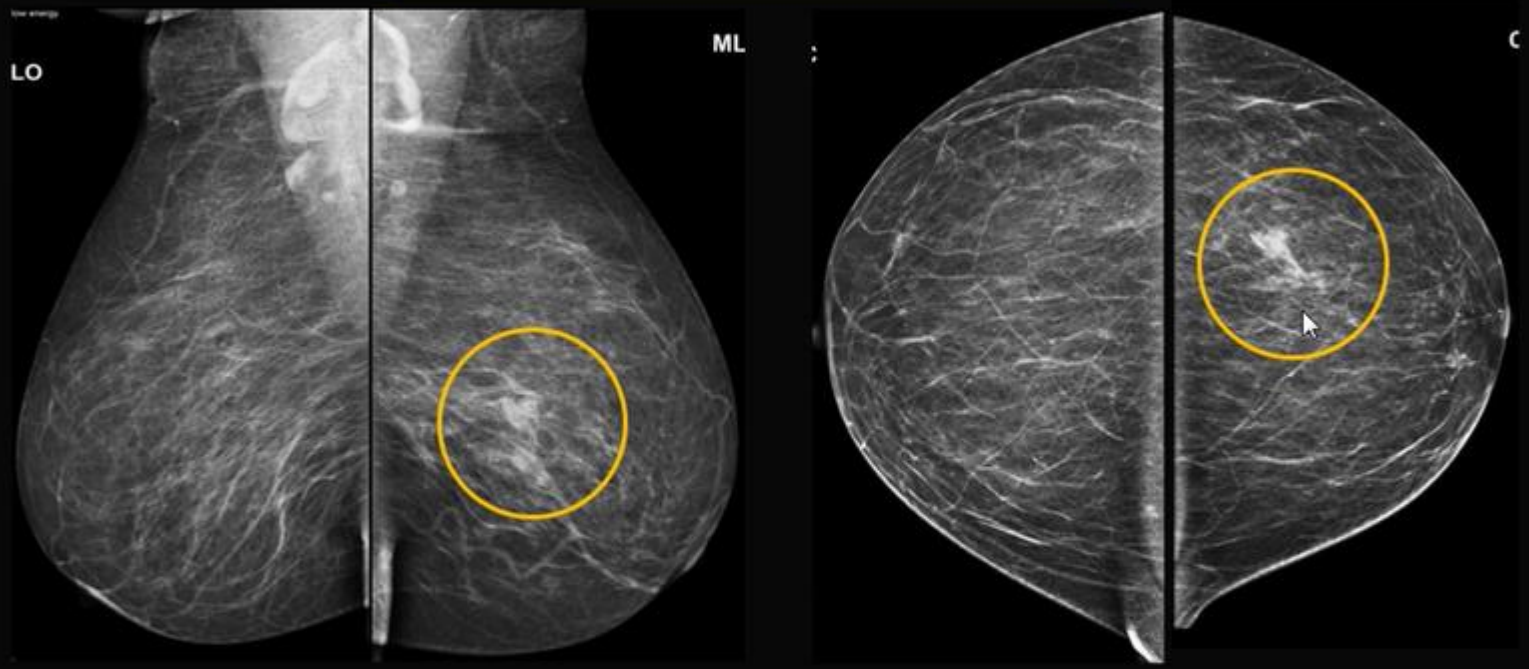
WE HAVE TO PROCEED TO ANOTHER IMAGING MODALITY



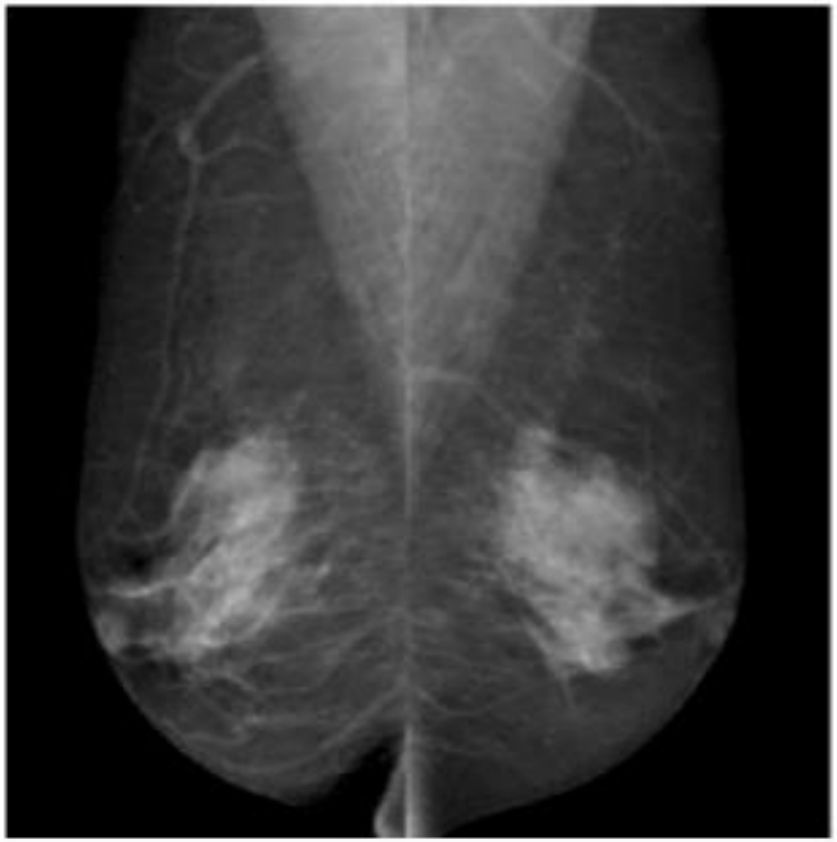
Inflammatory Breast Carcinoma

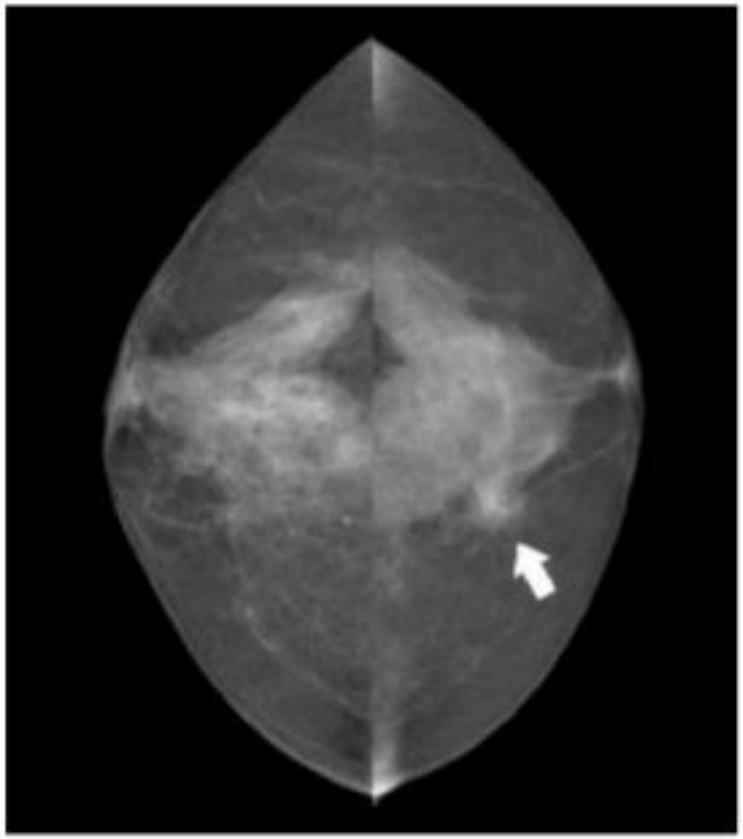
FOCAL ASYMMETRY

FOCAL ASYMMETRY

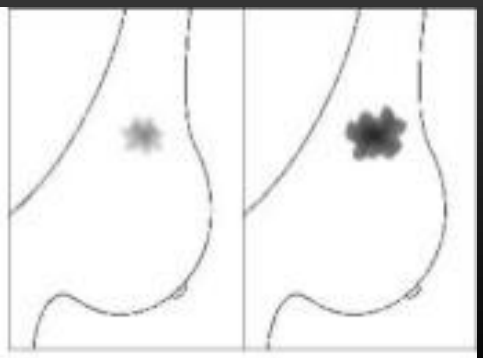


- It occupies less than 25% of the breast.
- Seen in 2 views.
- May be benign or malignant.





DEVELOPING ASYMMETRY



- This is a focal asymmetry that is new, larger, or denser at current examination than at previous examinations.

MASS

CALCIFICATION

ASYMMETRIC BREAST FINDINGS

INTRAMAMMARY LYMPHNODE

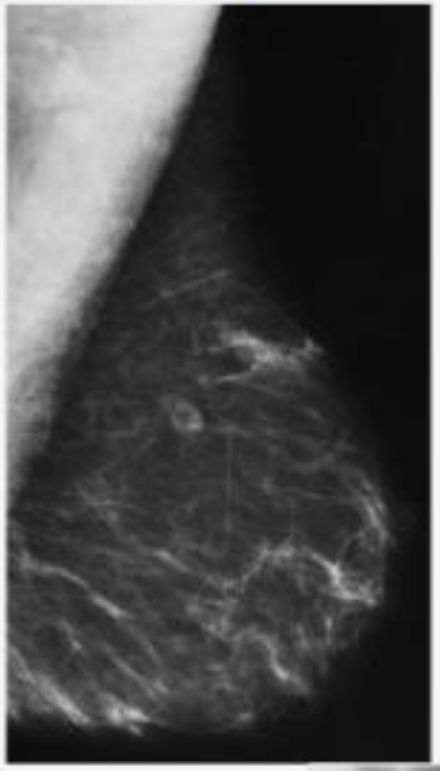
TUBULAR DENSITY

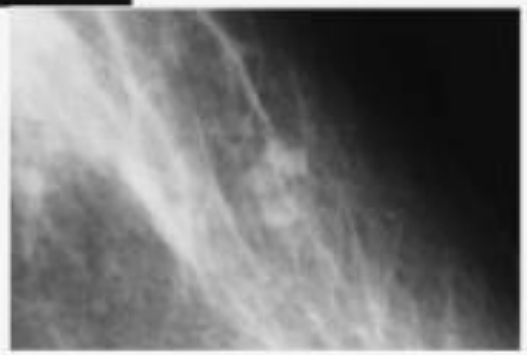
ARCHITECTURAL DISTORTION

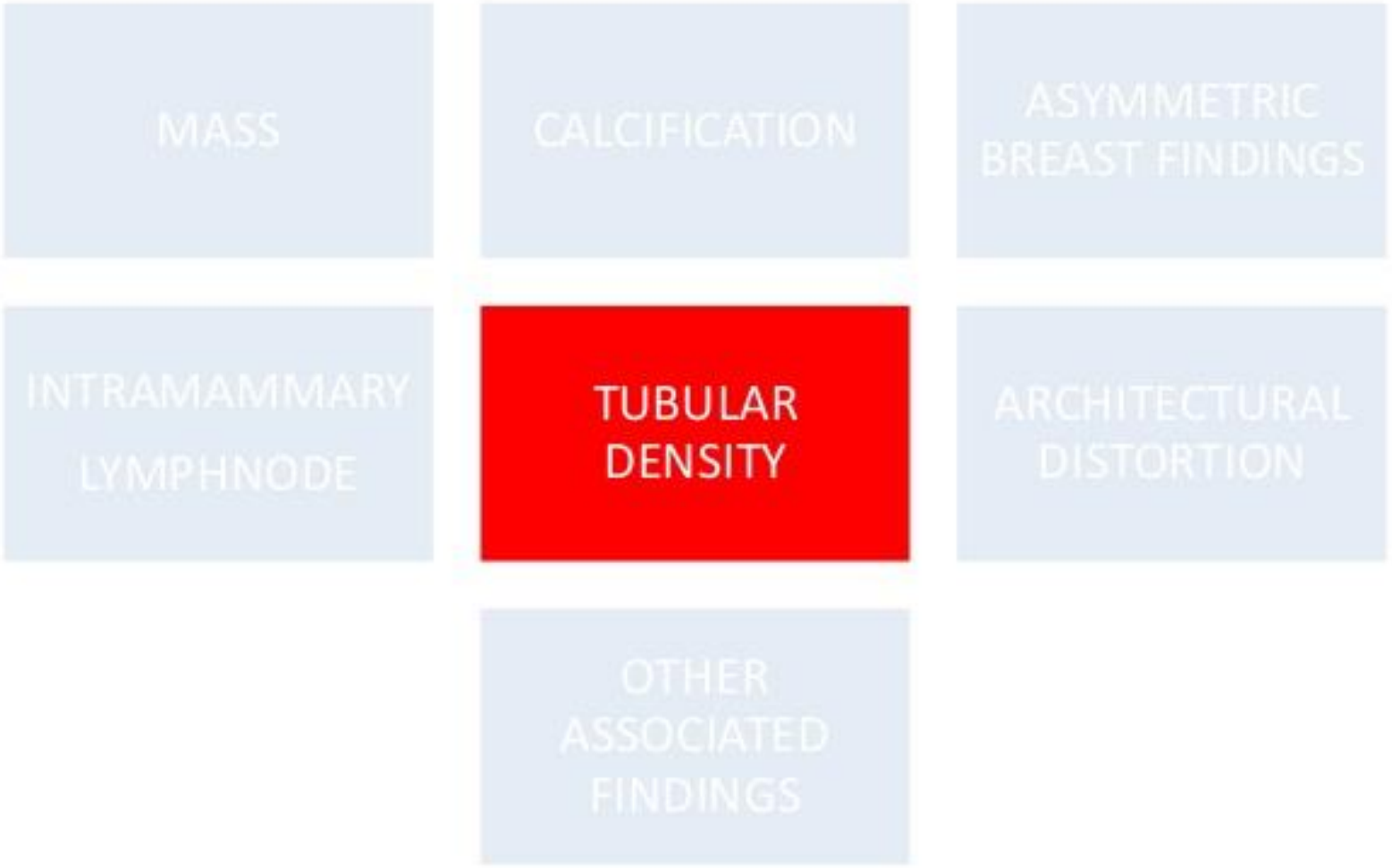
OTHER ASSOCIATED FINDINGS

BENIGN INTRAMAMMARY LYMPH NODE

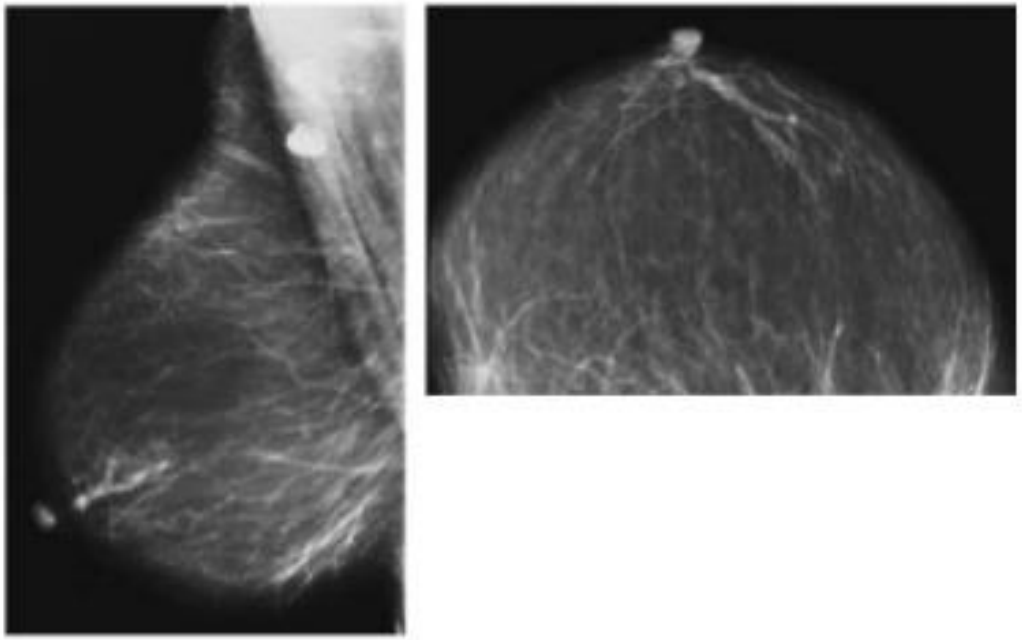
- Well circumscribed.
- < 1cm
- UPPER AND OUTER QUADRANT
- Lucent and invaginated fatty hilum
- May appear as 3 or more round densities in horse shoe arrangement.





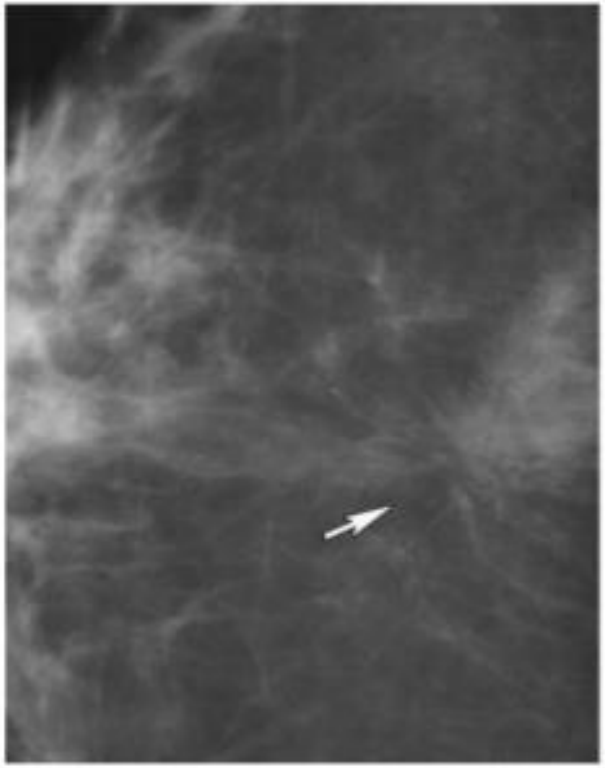

MASS
CALCIFICATION
ASYMMETRIC BREAST FINDINGS
INTRAMAMMARY LYMPHNODE
TUBULAR DENSITY
ARCHITECTURAL DISTORTION
OTHER ASSOCIATED FINDINGS

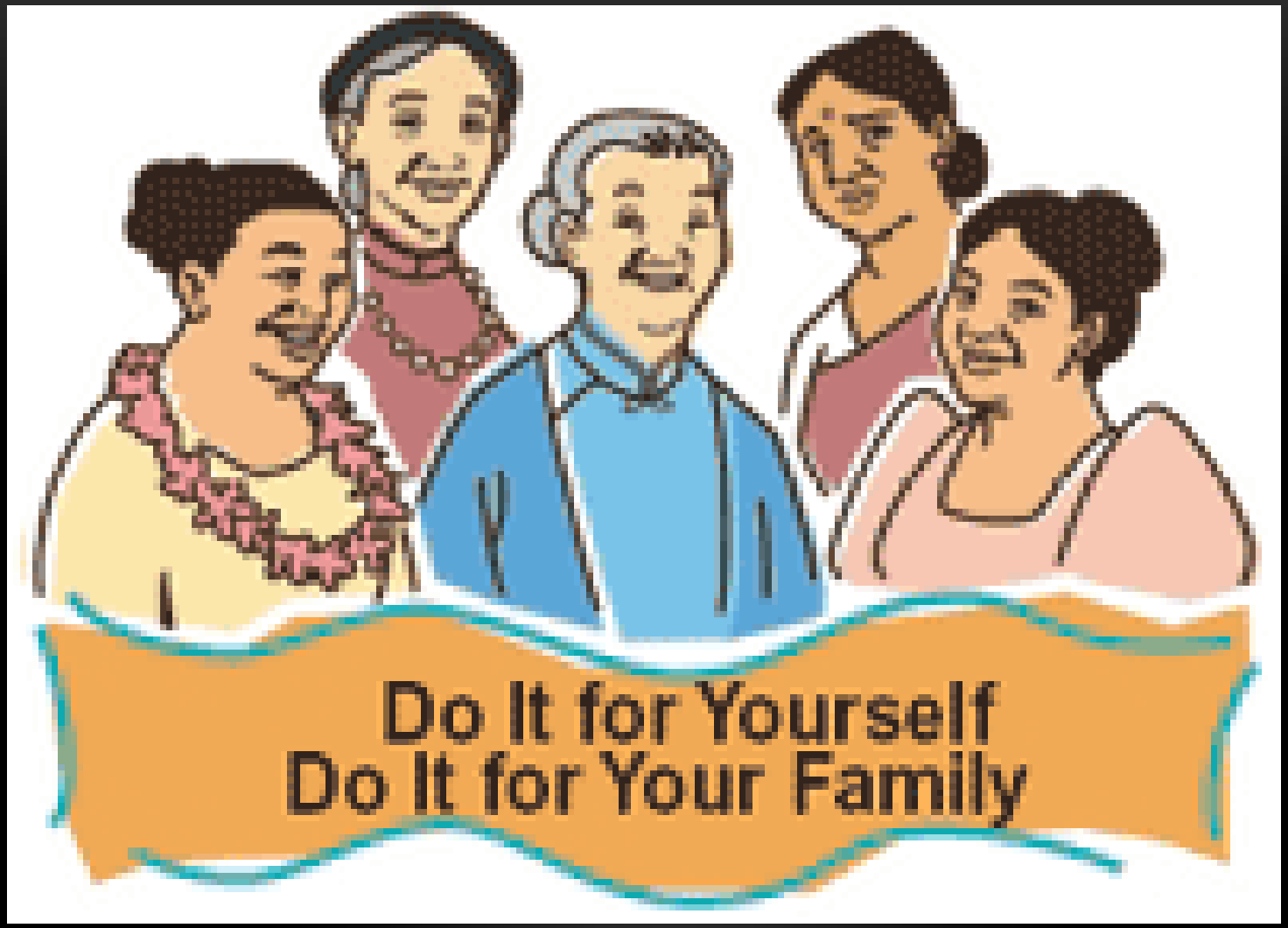
- Tubular or branching structure representing dilated duct.
- Usually of minor significance.
- BIRADS III




MASS
CALCIFICATION
ASYMMETRIC BREAST FINDINGS
INTRAMAMMARY LYMPHNODE
TUBULAR DENSITY
ARCHITECTURAL DISTORTION
OTHER ASSOCIATED FINDINGS

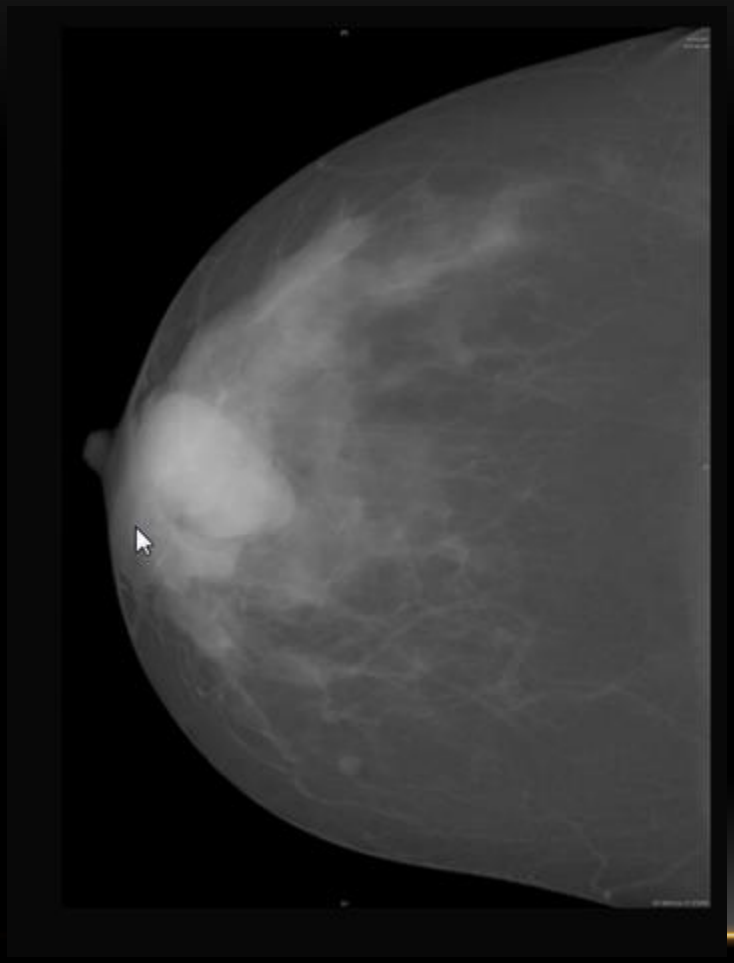
- Spiculations radiating from a point without any identifiable mass.
- The only architectural distortion that does not require further evaluation is that caused by prior surgery or trauma.
- BIRADS IV

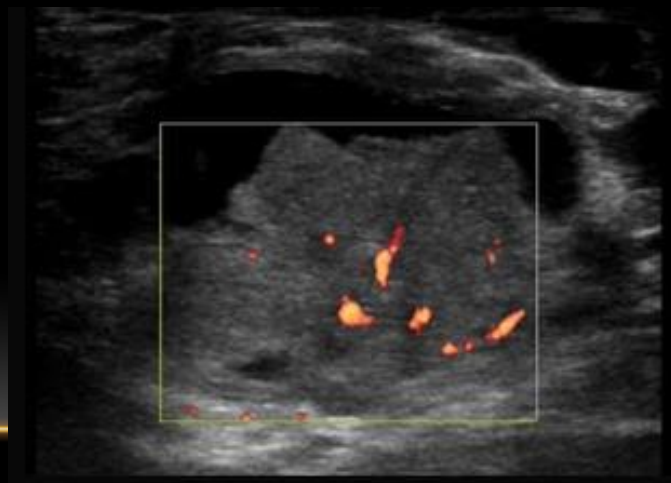



Do It for Yourself
Do It for Your Family

SPECIAL CASES

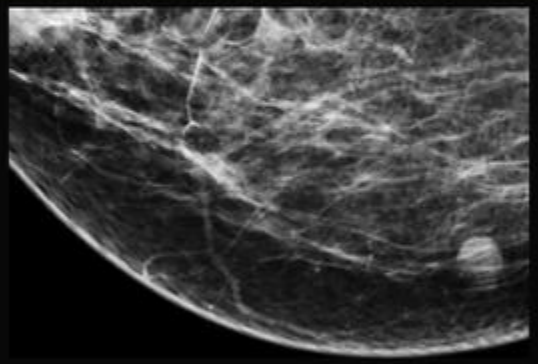
SINGLE DILATED DUCTS



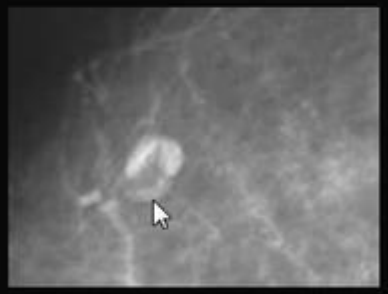


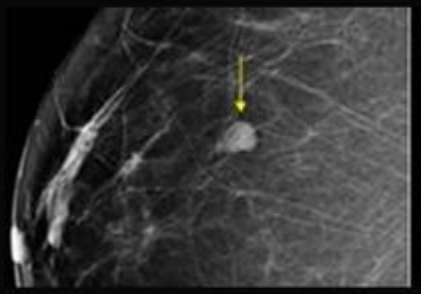
Intra ductal papillary carcinoma

SKIN LESIONS

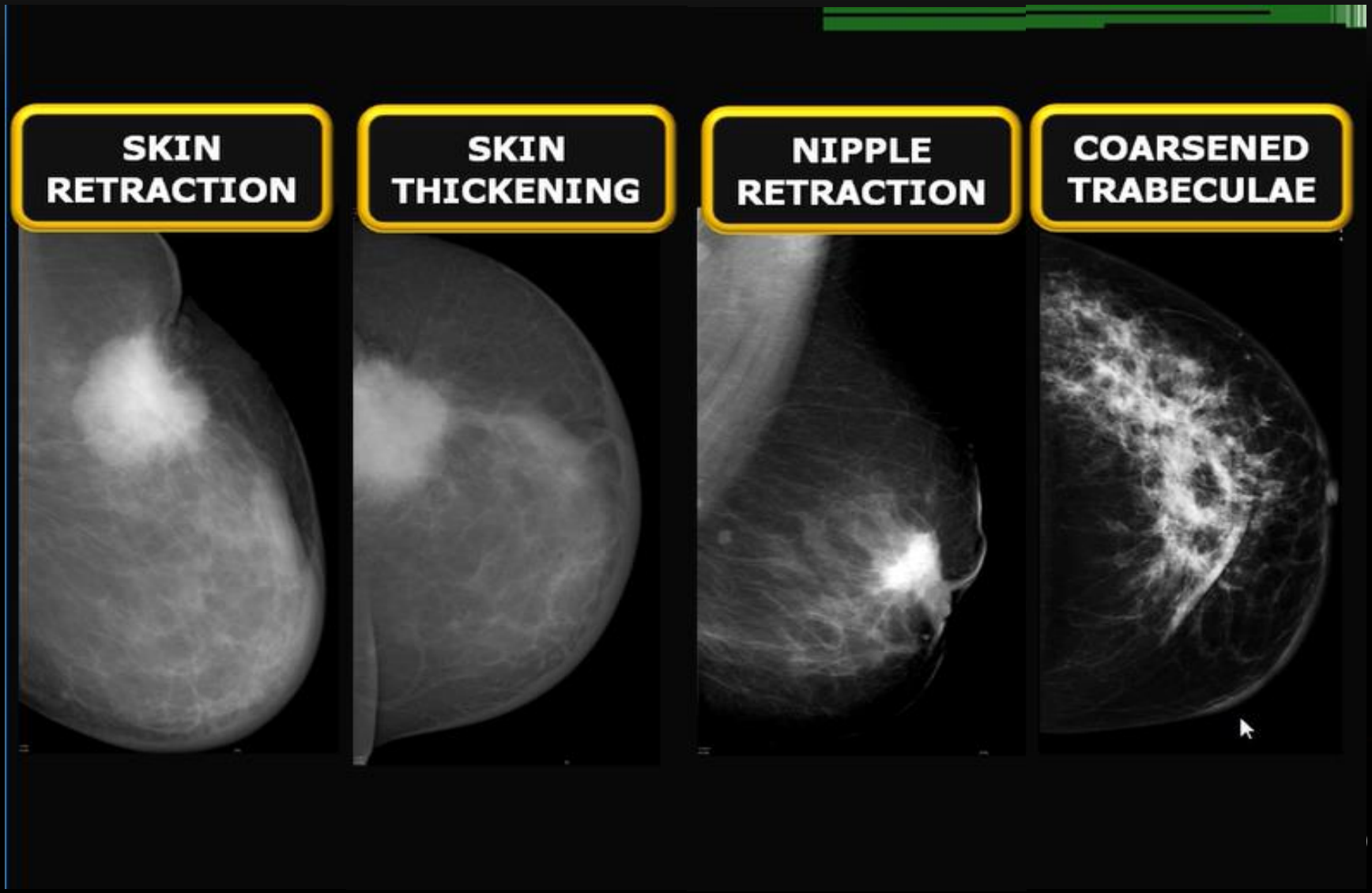


INTRA MAMMARY LN





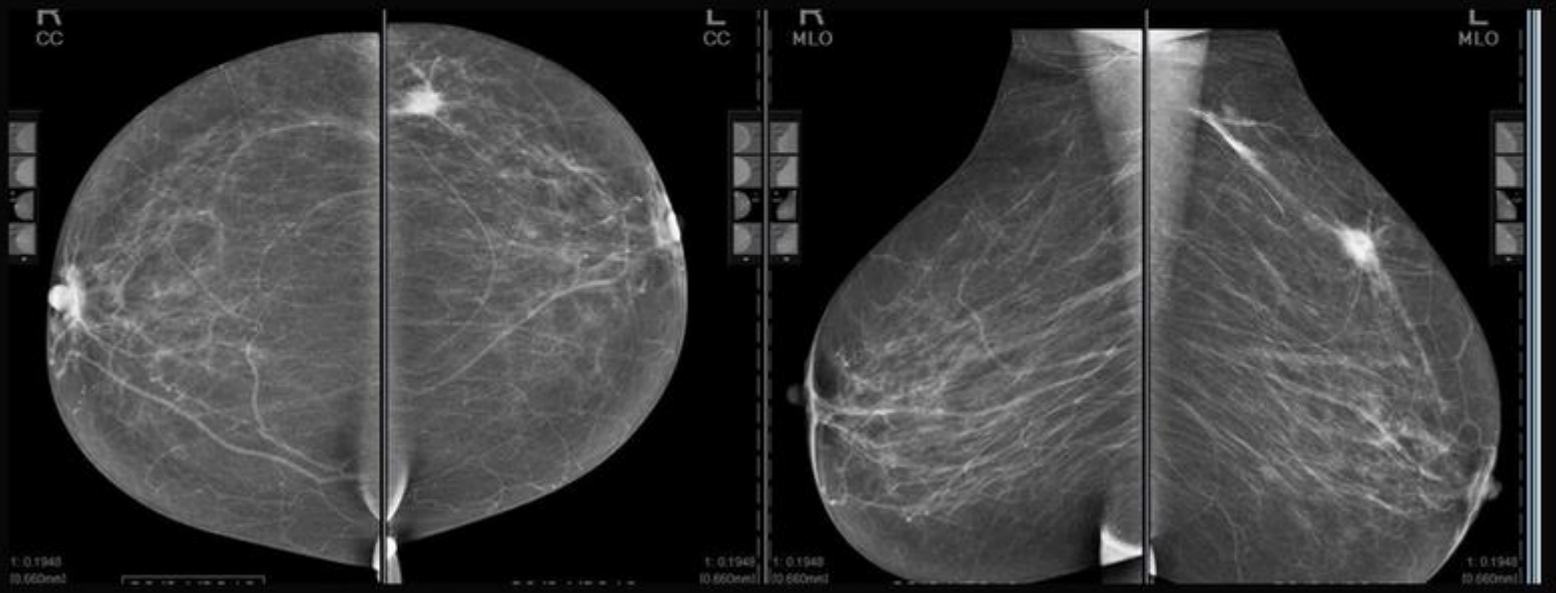
ASSOCIATED FINDINGS



1. Lexicon of morphology descriptors

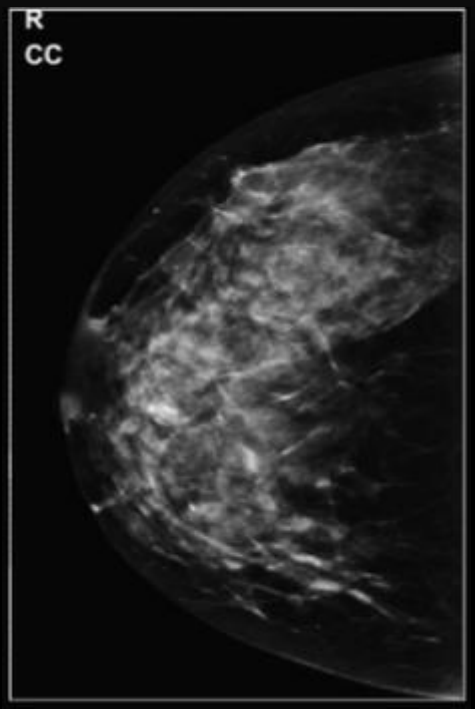
2. Reporting structure with final assessment categories

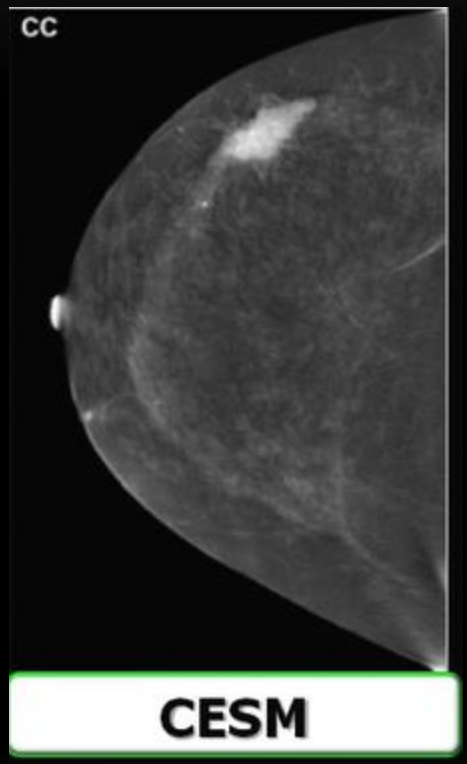
Lesions are easily detected and diagnosed in fatty breasts



IDC grade 2

Lesions can be easily missed in a dense breast parenchyma





CESM

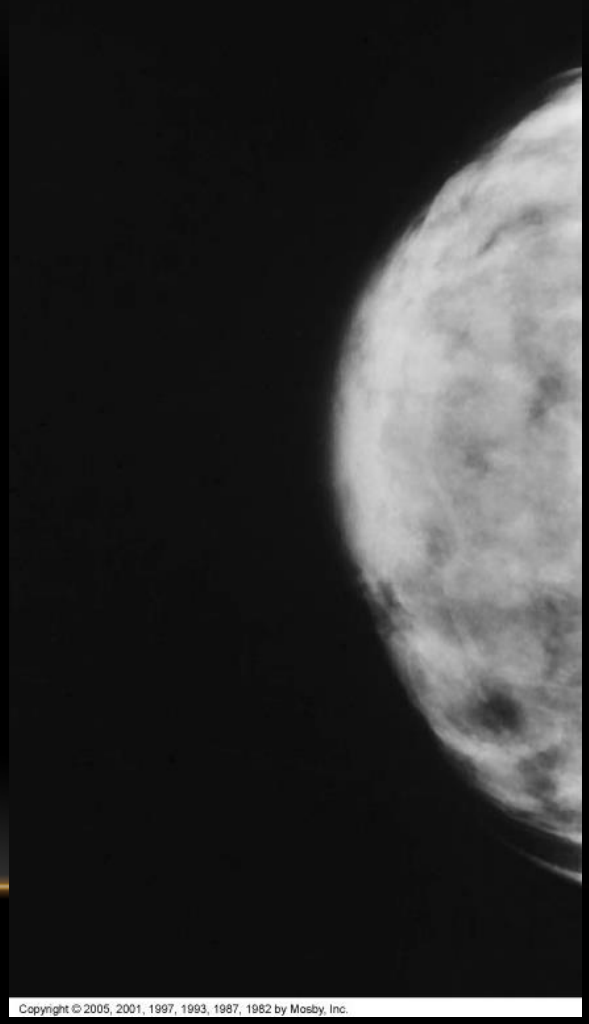
US

IDC grade 2


سرطان الثدي
الفحص المبكر هو الحل...

FIBRO-GLANDULAR BREAST

- Fibro-glandular
  - Dense with very little fat
  - Females 15-30 years of age
    - Or 30 years or older without children
  - Pregnant or lactating

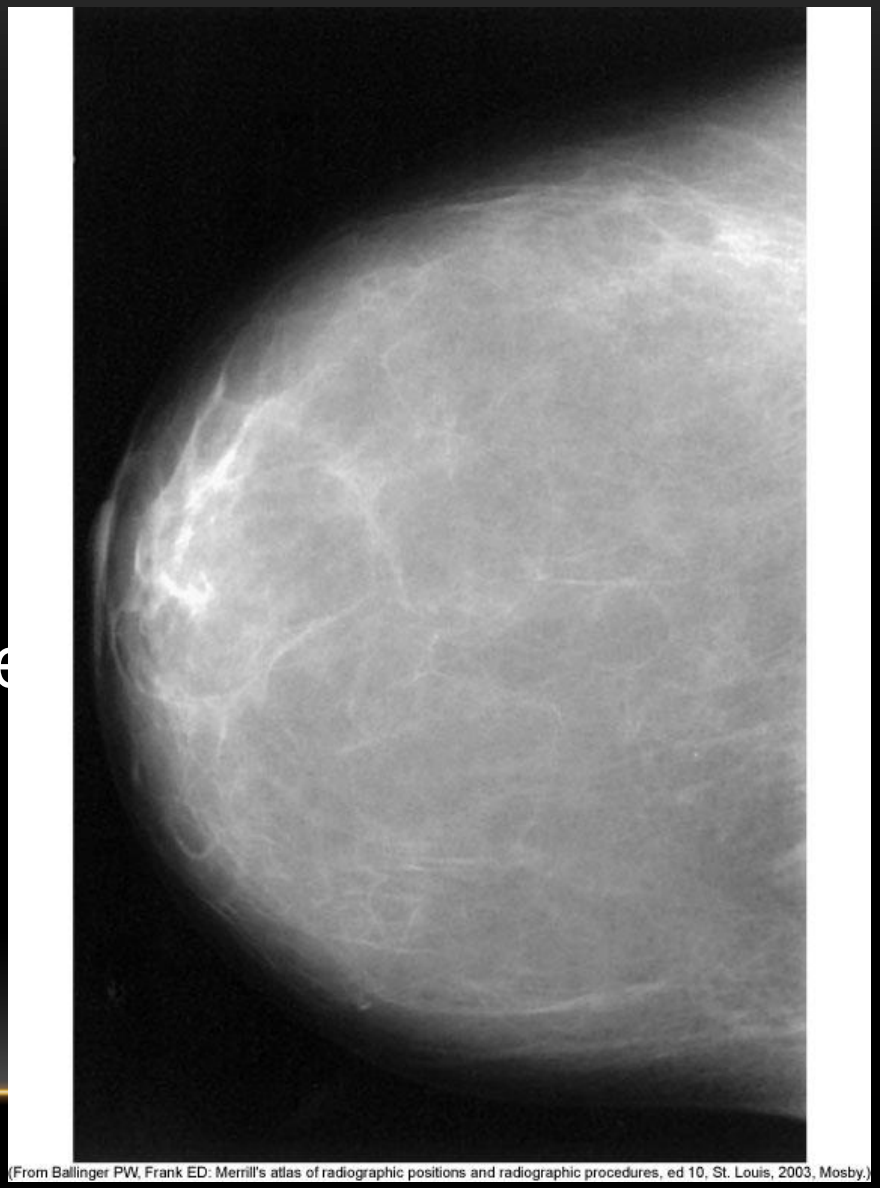


FIBRO-FATTY BREAST

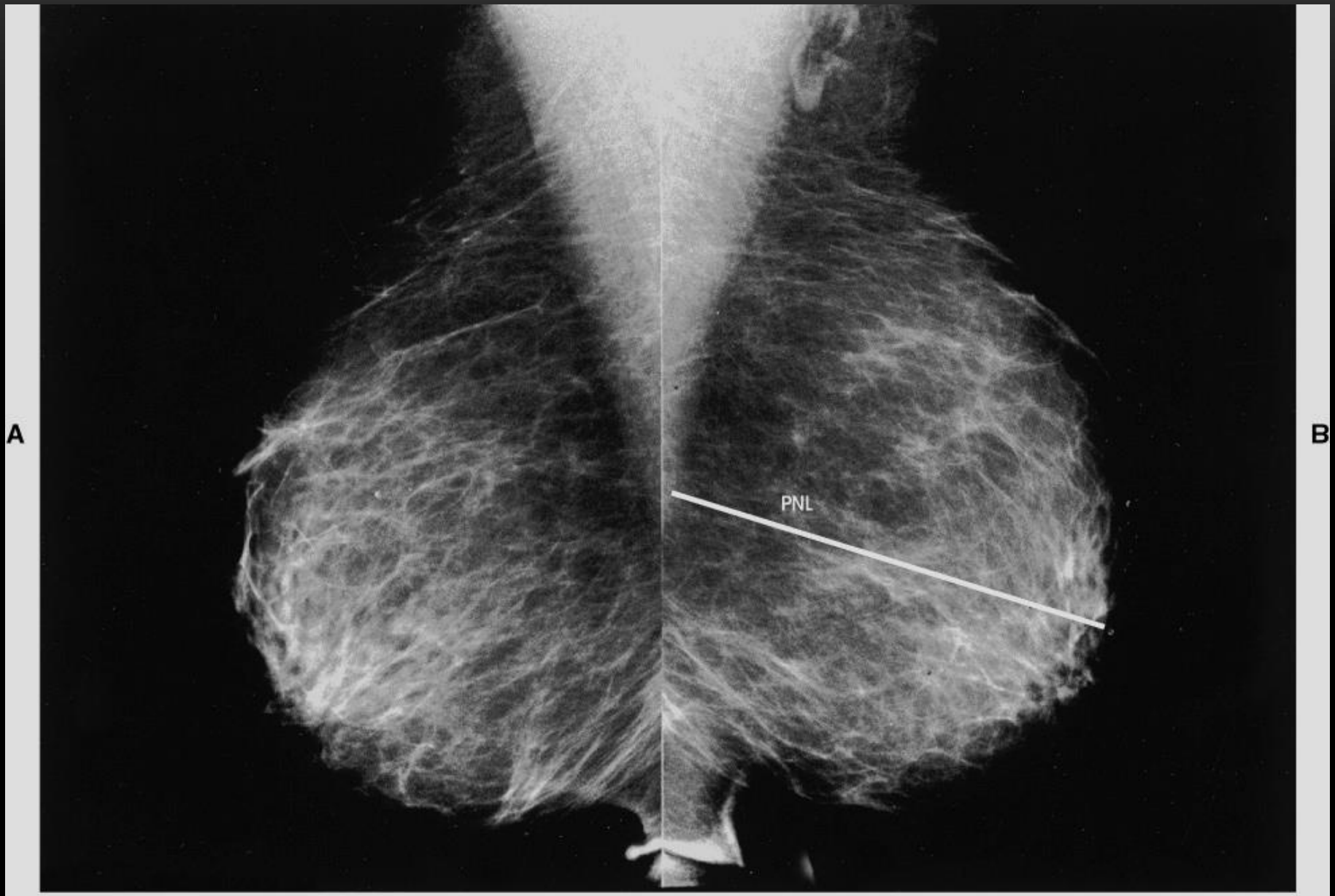
- Fibro-fatty
  - Average density
    - 50% fat & 50% fibro-glandular
    - Women 30-50 years of age
      - Or women with 3 or more children

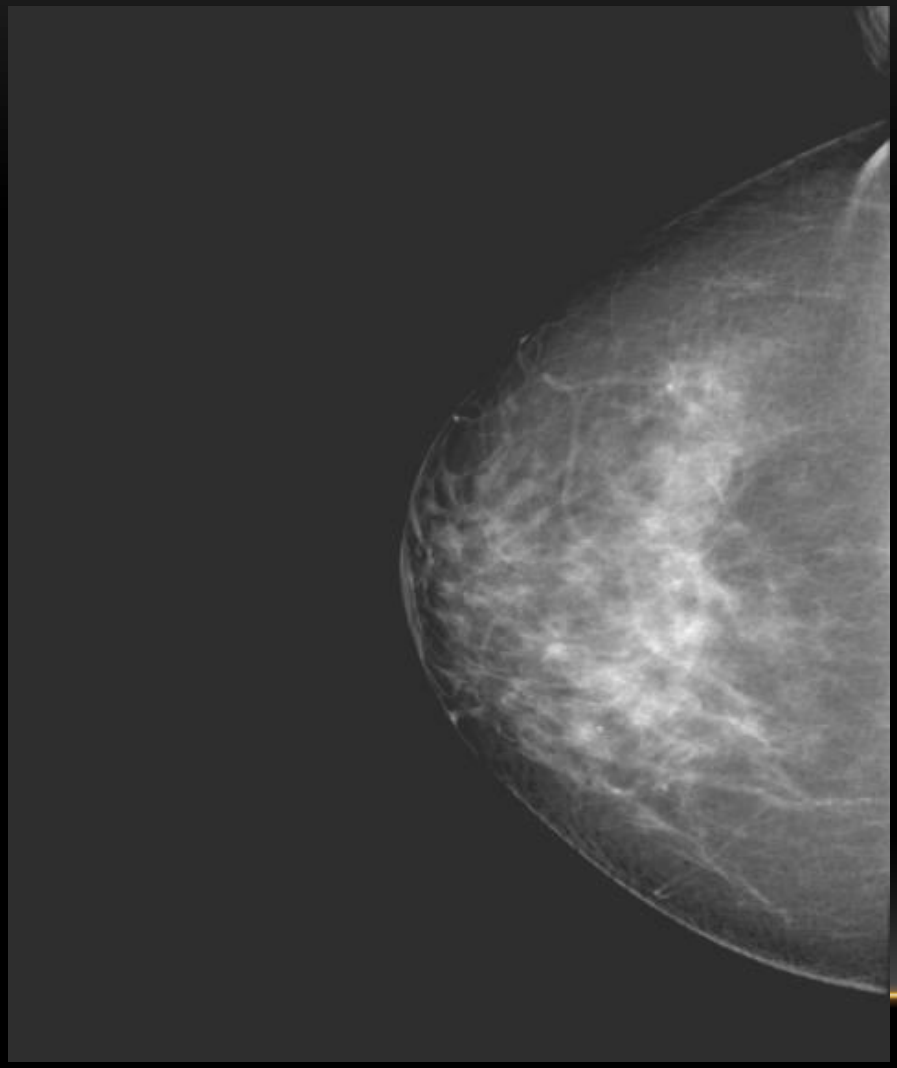
FATTY BREAST

- Fatty
  - Minimal density
  - Women 50 and olde (postmenopausal), men and children

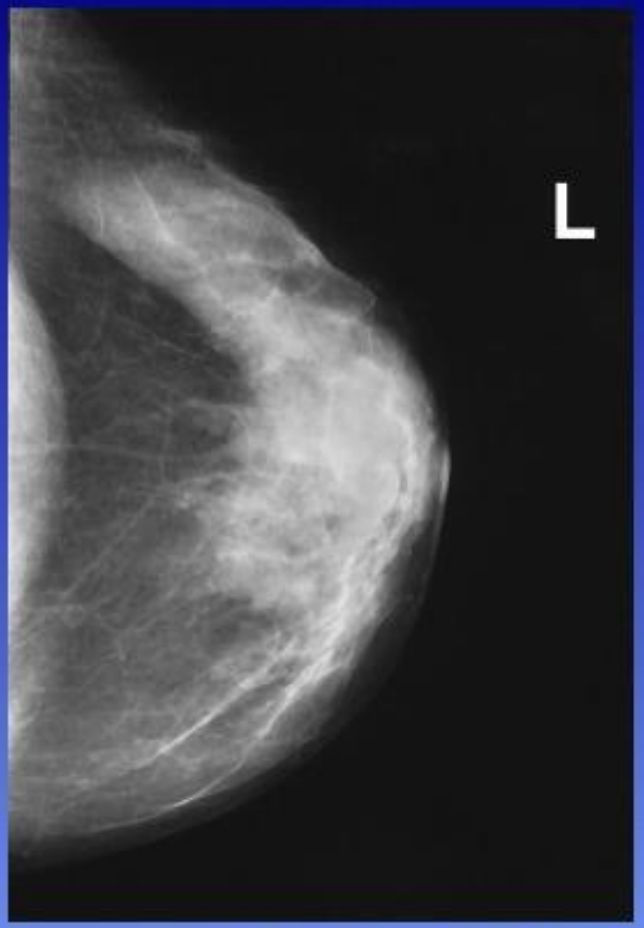


(From Ballinger PW, Frank ED: Merrill's atlas of radiographic positions and radiographic procedures, ed 10, St. Louis, 2003, Mosby.)

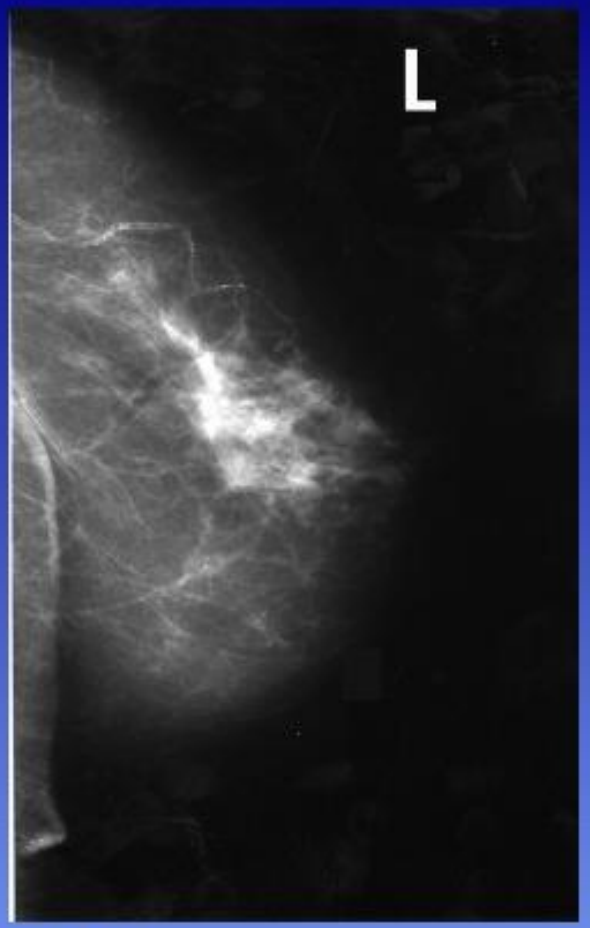




BREAST IMAGING



A



B

- Which projections are these?
- Which demonstrates a repeatable error?
- What is the error?


تحتاري
فحصك الآن ...
يعني الأمان

Ultrasound ACR Breast Imaging Reporting and Data System (BI-RADS) Lexicon Interpretation

PHYSICS

ELECTRIC SIGNAL

↓

PROBE CRYSTAL ⇄ ULTRASOUND WAVE

↓

U/S IMAGE

REFLECTION

- Difference in acoustic impedence
- Smooth interface

SCATTER

- Difference in acoustic impedence
- Very small or rough interface

TRANSMISSION

- No difference in acoustic impedence

ATTENUATION

- The deeper it goes the weaker it becomes

Ultrasound Image

- Electrical signals produce dots on the screen.
- Brightness of the dot depends on strength of reflected echoes.
- Location of the dot is determined by travel time.

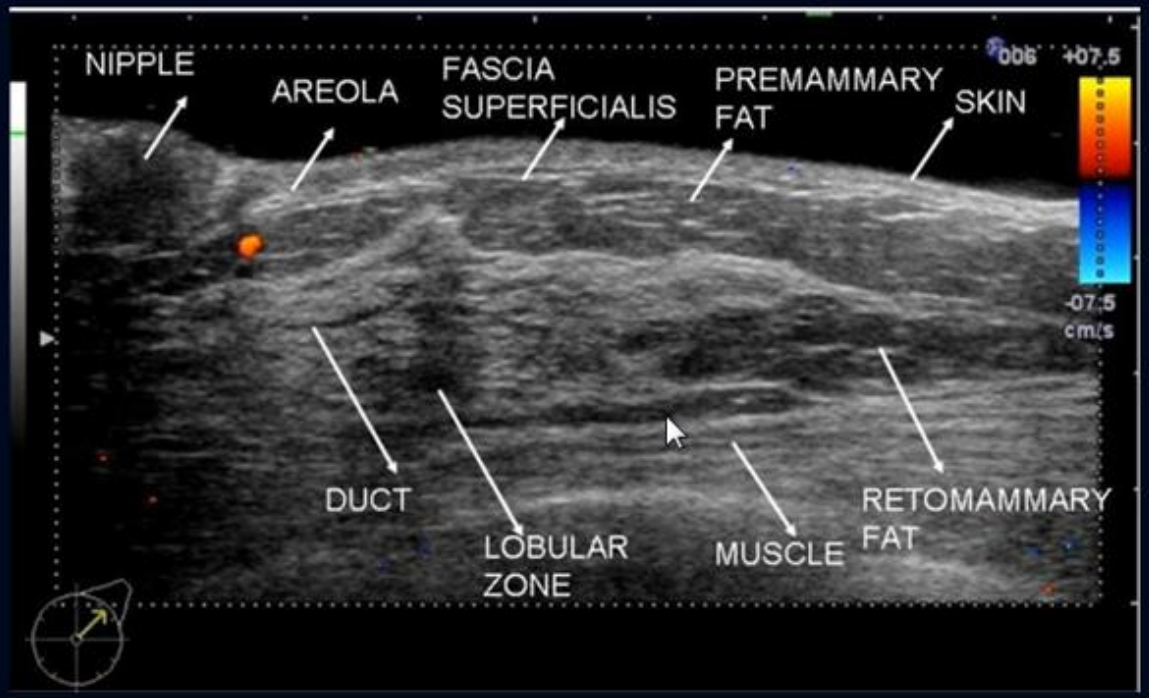
Ultrasound Image

Strong reflections = white dots
calcifications, breast parenchyma, skin

Weaker reflections = grey dots
fat lobules, muscles

No reflections = black dots
ducts

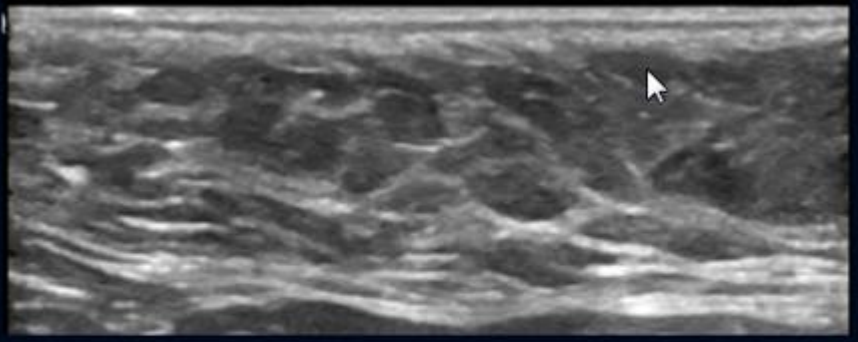
ULTRASOUND ANATOMY



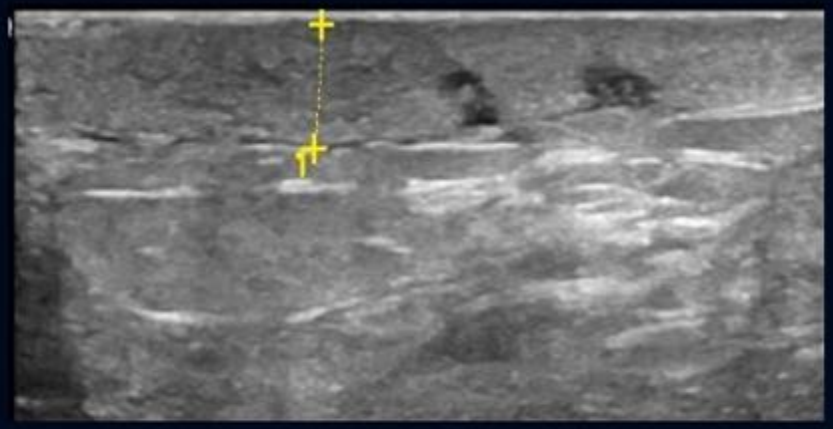
- Nipple (Hyperechoic)
- Skin : 2mm (triple linned)
- Parenchyma: (hyperechoic)
- RetroareolarD:3mm(anoechoic)
- Subcutan. fat: (hypoechoic)
- Retromam. Fat: (hypoechoic)
- Pectoral muscle

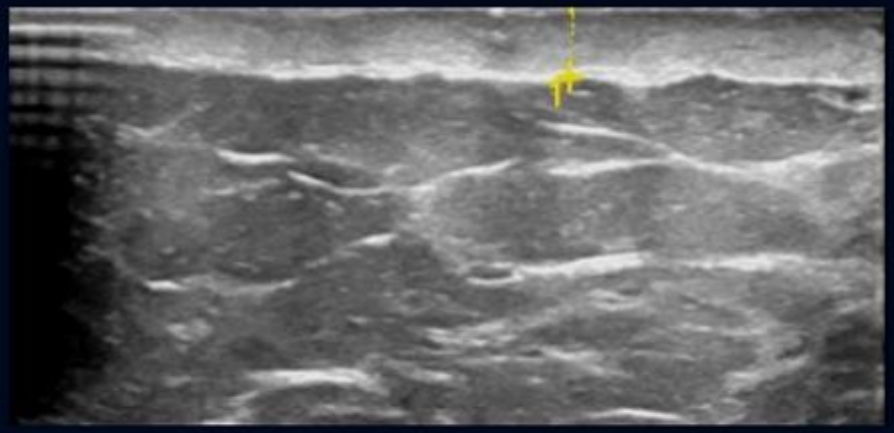
http://dx.doi.org/10.1594/ecr2012/C-0167

ULTRASOUND ANATOMY: skin



NORMAL SKIN
Triple line – 2mm





THICKENED SKIN
LOSS OF Triple line > 2mm

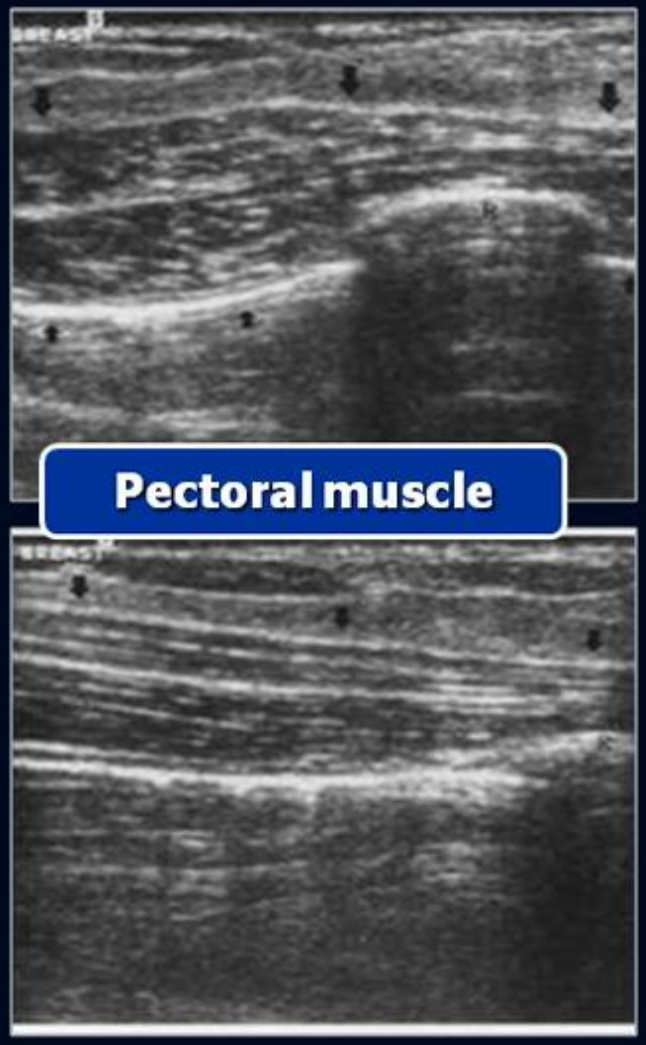
ULTRASOUND ANATOMY: nipple areola complex

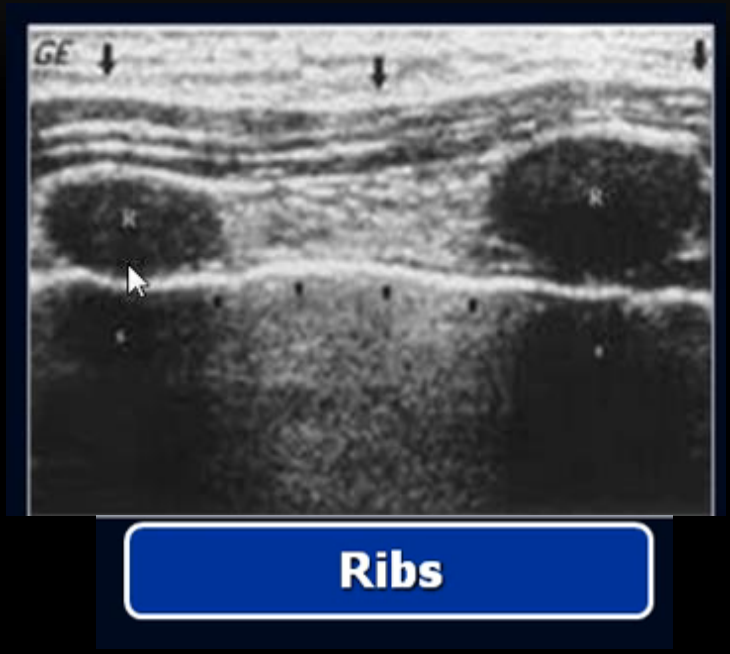
NIPPLE

IMPROPER

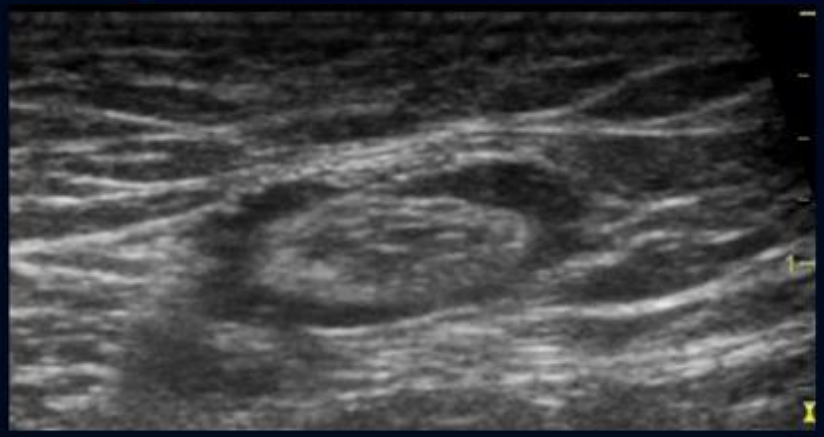
PROPER

ULTRASOUND ANATOMY: pectoral muscle and ribs

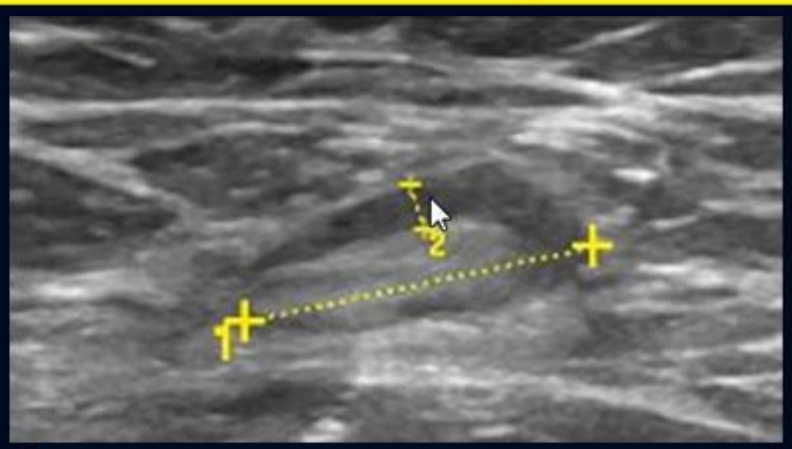




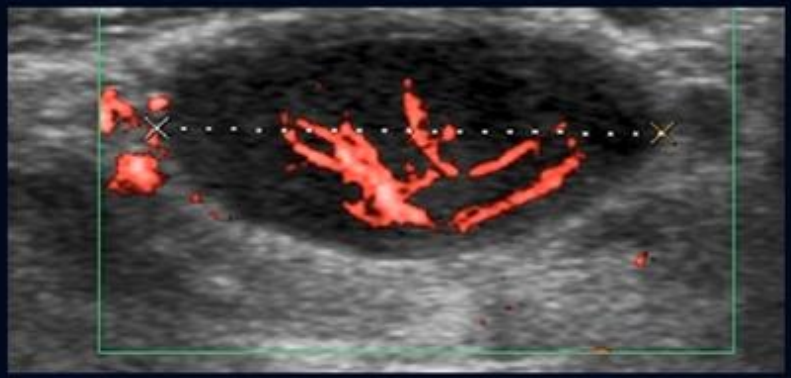
ULTRASOUND ANATOMY: lymphnodes



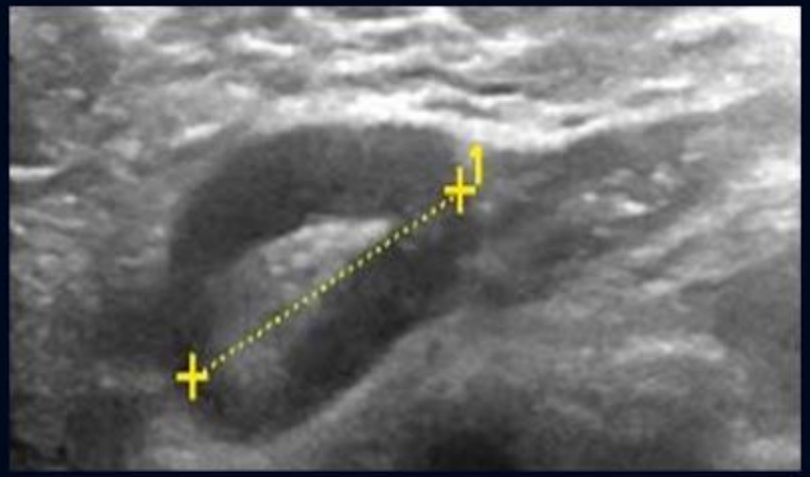
Kidney shaped preserved hilum

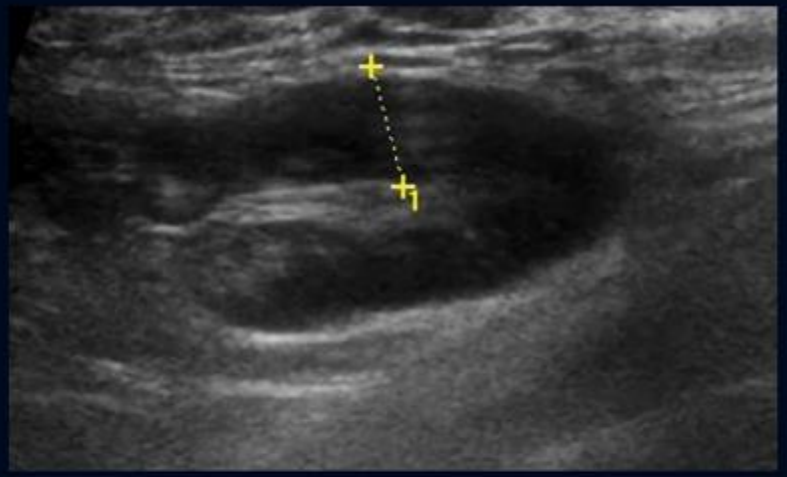


Thin cortex < 3mm

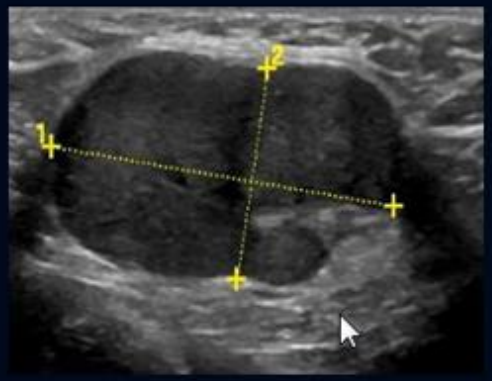


Hilar vascularity

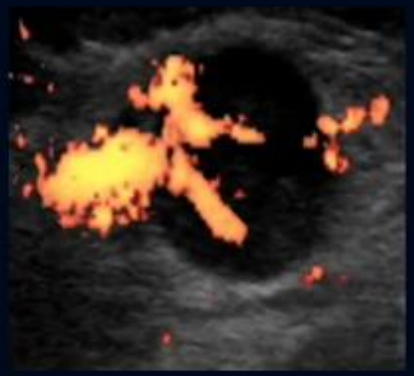


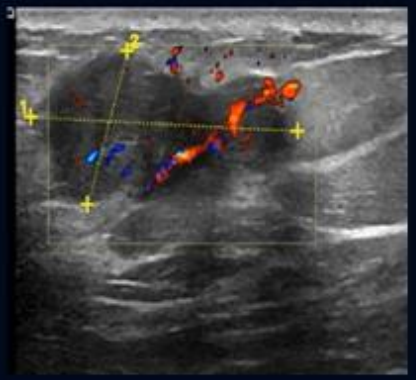


Reactionary nodes: preserved shape and fatty hilum but thick cortex



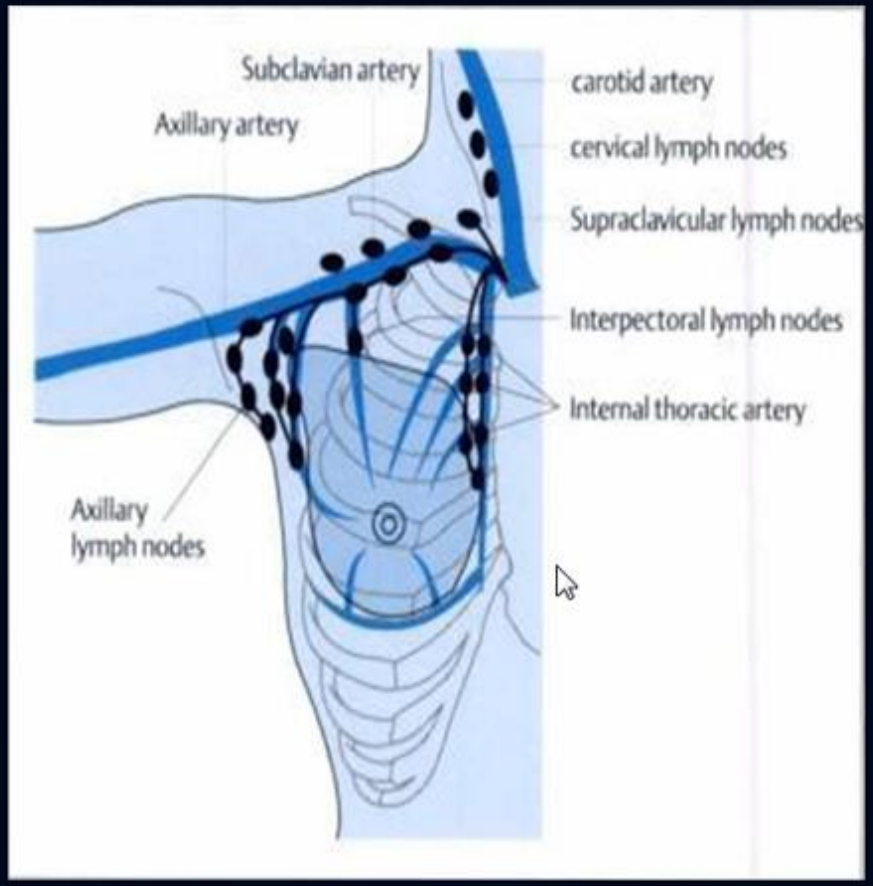
Globular shaped with muffled hilum

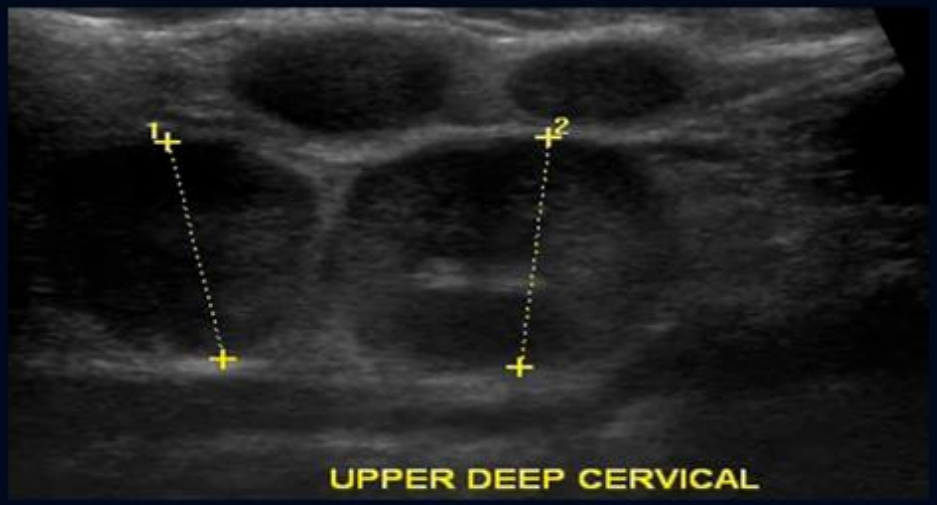




Increased vascularity

ULTRASOUND ANATOMY: lymphnodes





REPORT

1. Indication for examination.
2. Technique of breast US examination.
3. Overall breast composition.
4. Clear description of any important findings.
5. Comparison to previous examination and correlation with clinical, mammography, or MRI findings.
6. Composite reports.
7. BIRADS Assessment category and recommendation of management

1. INDICATION OF ULTRASOUND EXAMINATION

(according to 2014 ACR practice guidelines for performance of ultrasound examination)

- Evaluation of abnormalities detected on **other imaging studies**.
- **Complementary** to mammography screening.
- **Initial imaging evaluation in women under 30** years of age and in lactating and pregnant women.
- Evaluation of **breast implants** .
- Evaluation of breasts with microcalcifications in a setting of **dense fibro-glandular tissue**, for detecting an underlying mass.
- Guidance of **interventional procedures** .
- **Treatment planning** for radiation therapy .

REPORT

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2. TECHNIQUE OF ULTRASOUND EXAMINATION

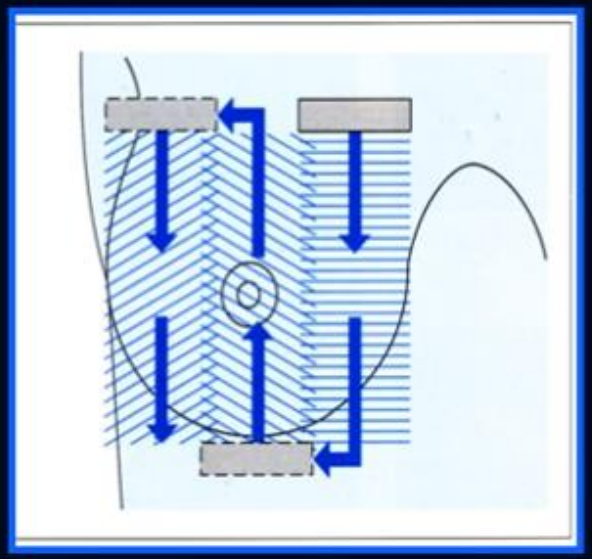
In the ultrasound report we should specify:

- Targeted or whole breast.
- Primary examination or complementary to other studies.
- Whether Doppler or elastography were applied.

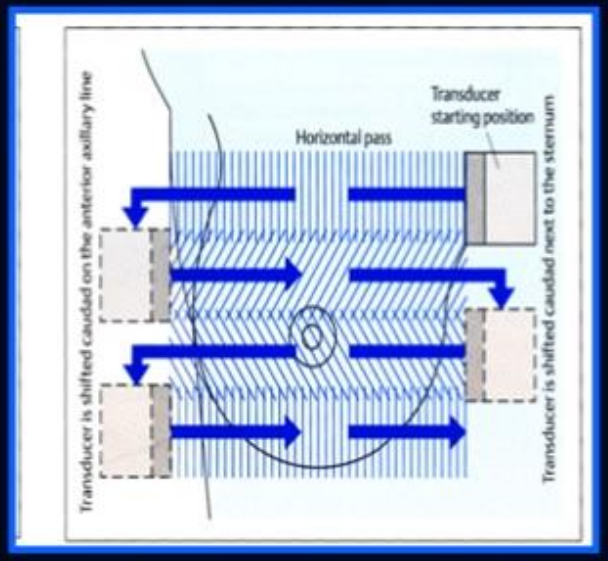
WHICH PROBE SHOULD WE USE??

HIGH FREQUENCY	LOW FREQUENCY
7-12 MHz scan head	3-5 MHz scan head
Poor penetration	Excellent penetration
Excellent resolution	Poor resolution

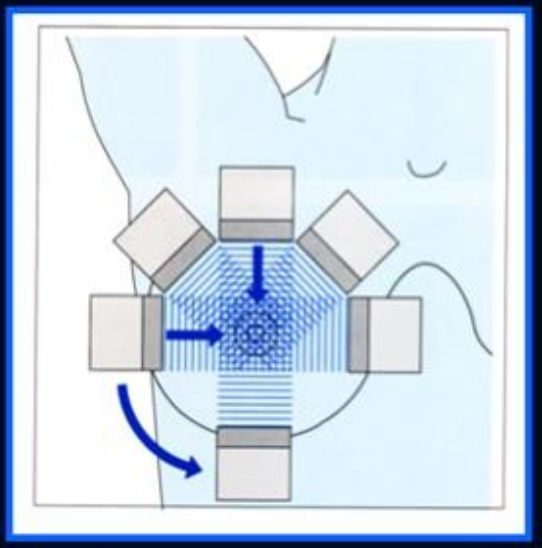
SCANNING PLANES



VERTICAL



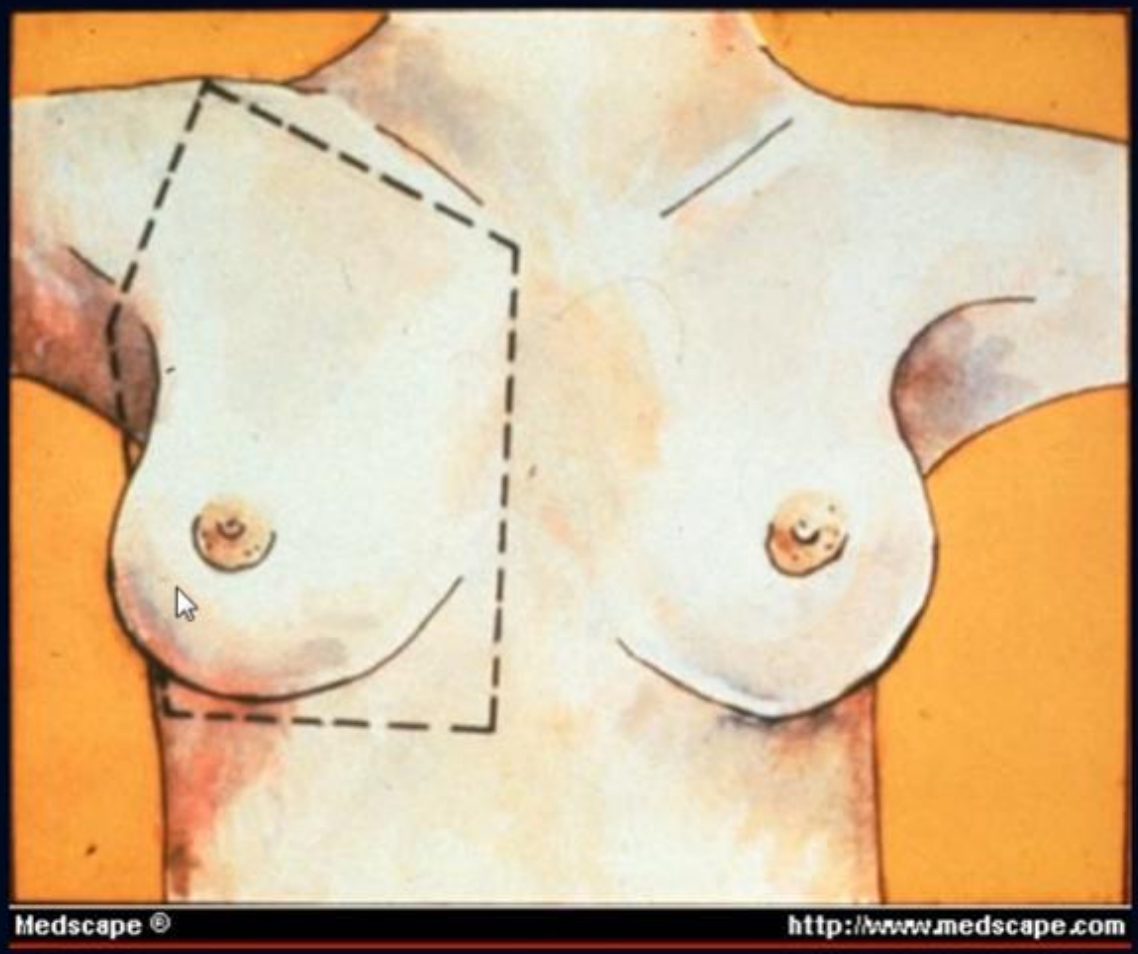
HORIZONTAL



RADIAL

Which ever way you choose make sure that you

SCAN THE WHOLE BREAST



REPORT

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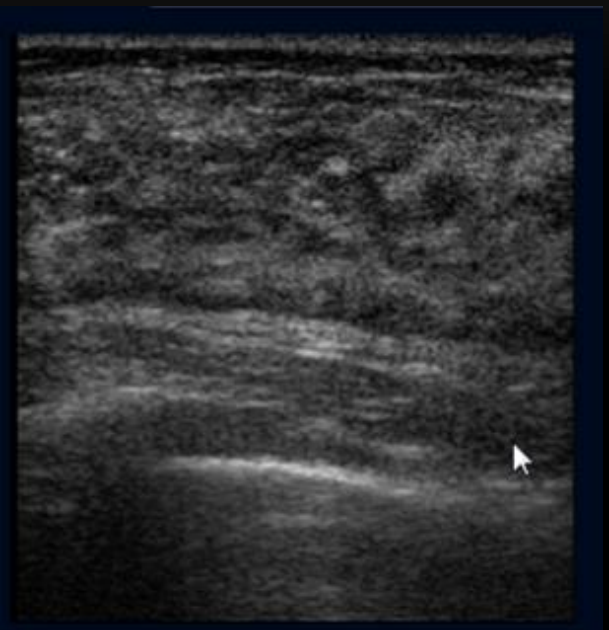
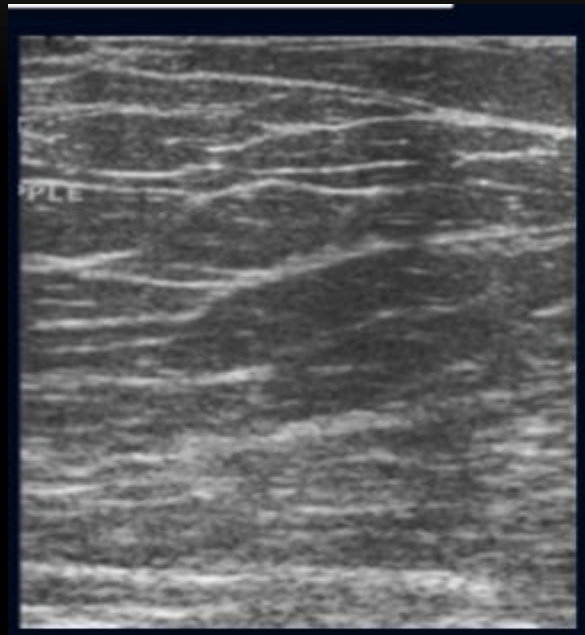
3. OVERALL BREAST COMPOSITION

(mainly in screening/automated whole breast ultrasound)



Homogeneous background echotexture **(fibro-glandular)**

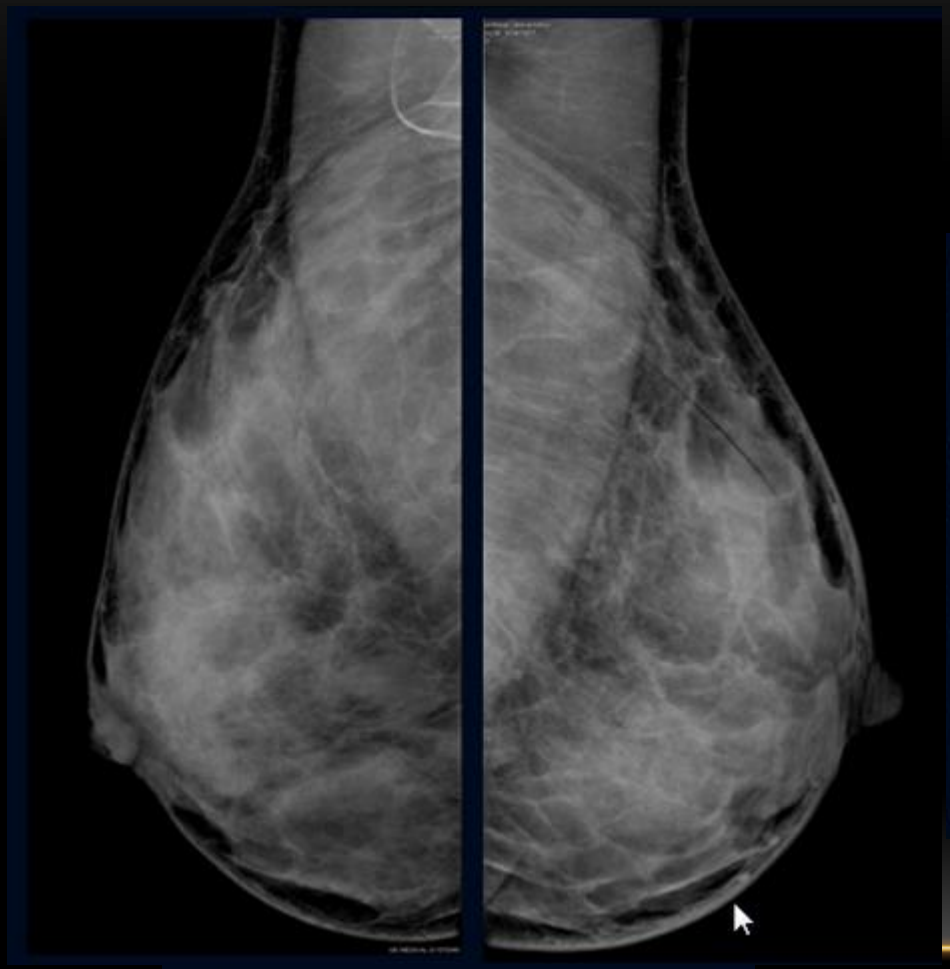
Heterogeneous background echotexture **(fat and fibro-glandular)**

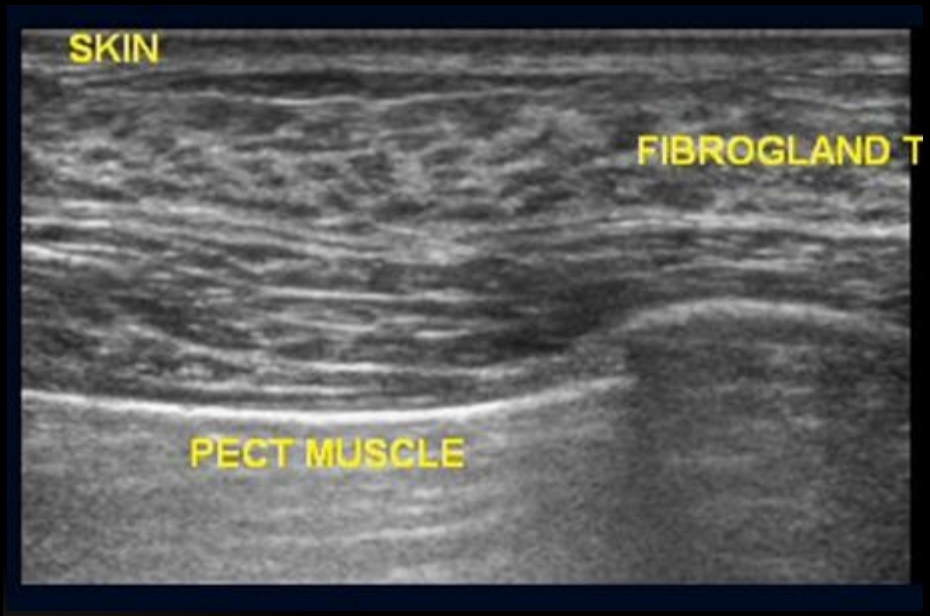


Homogeneous background echotexture **(fat)**

YOUNGER ⟵ ⟶ OLDER

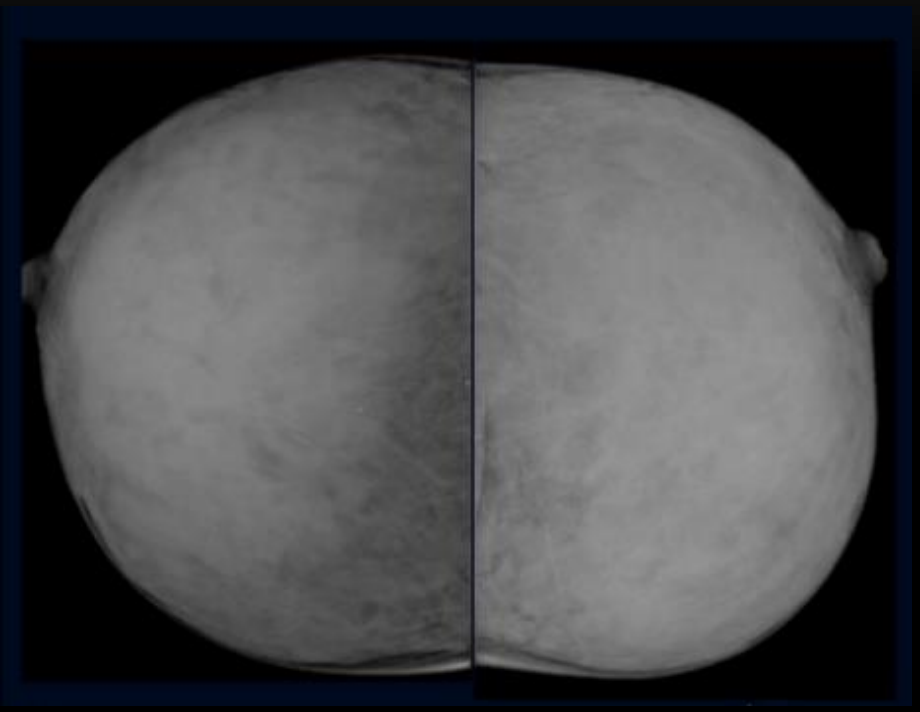
Homogeneous background echotexture
(fibro-glandular)

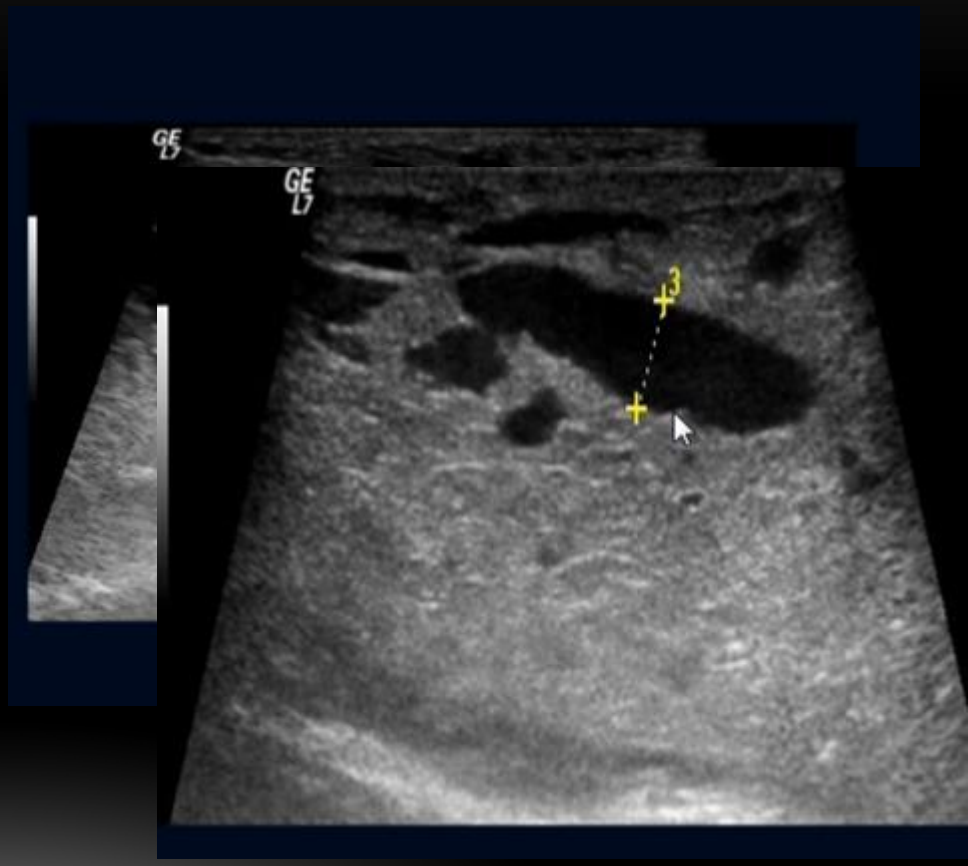




ACR 'D'

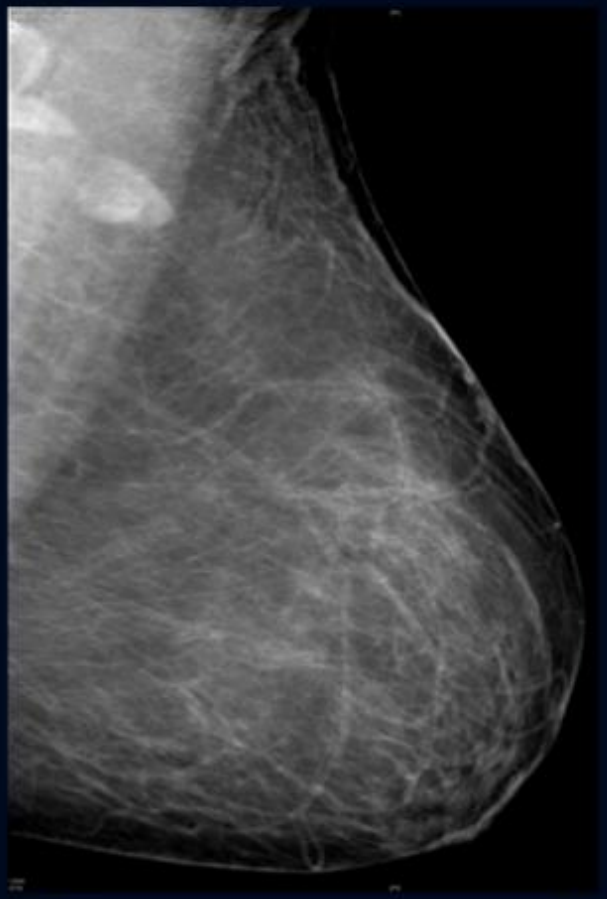
Homogeneous background echotexture
(fibro-glandular)

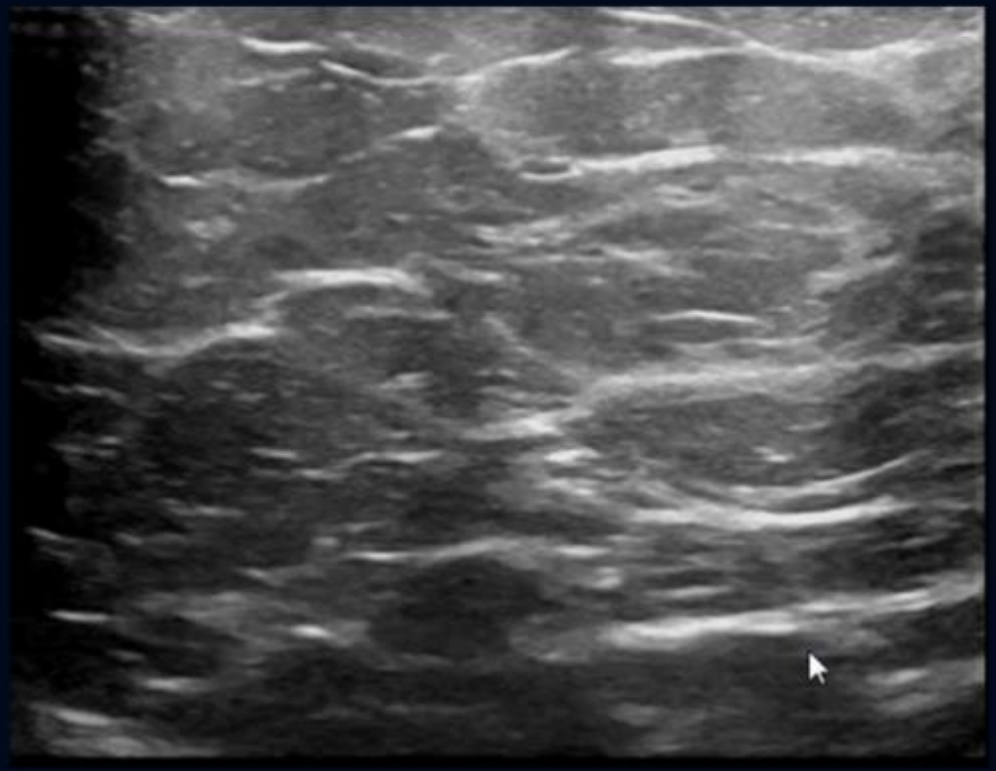




LACTATING BREAST – ACR 'D'

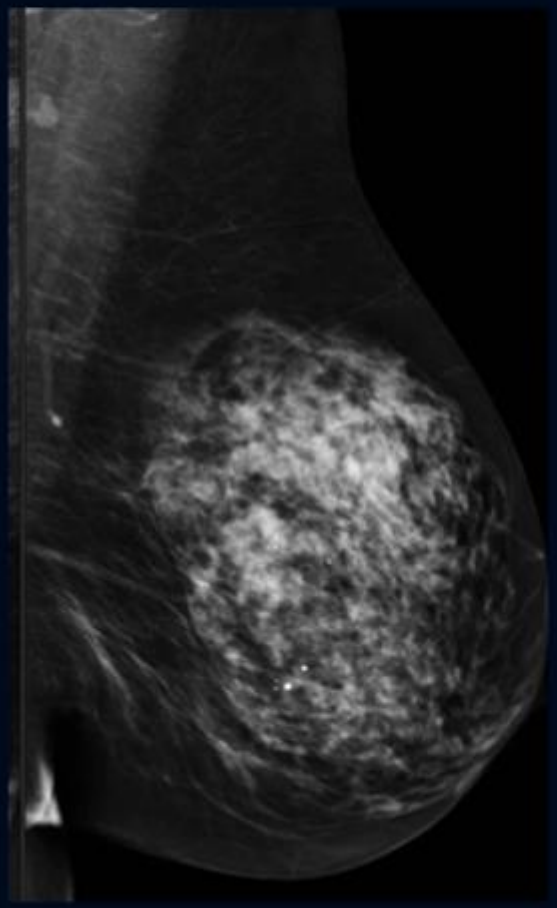
Homogeneous background echotexture
(fat)

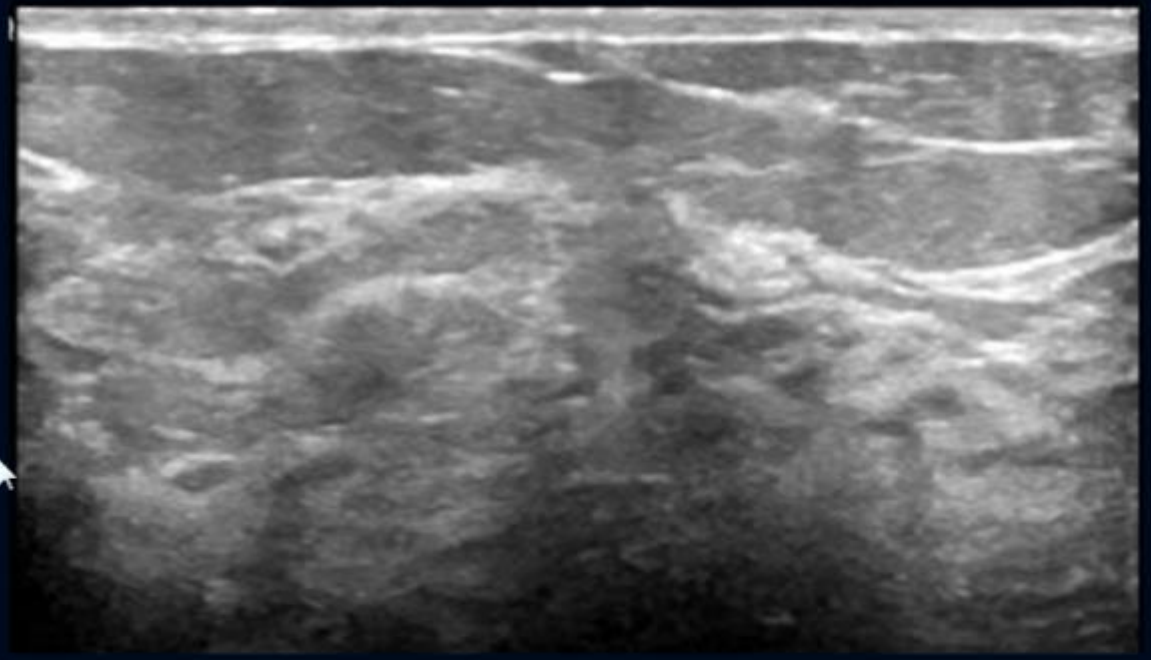




ACR 'A'

Heterogeneous background echotexture
(fat and fibro-glandular)





Heterogeneous ACR 'D'

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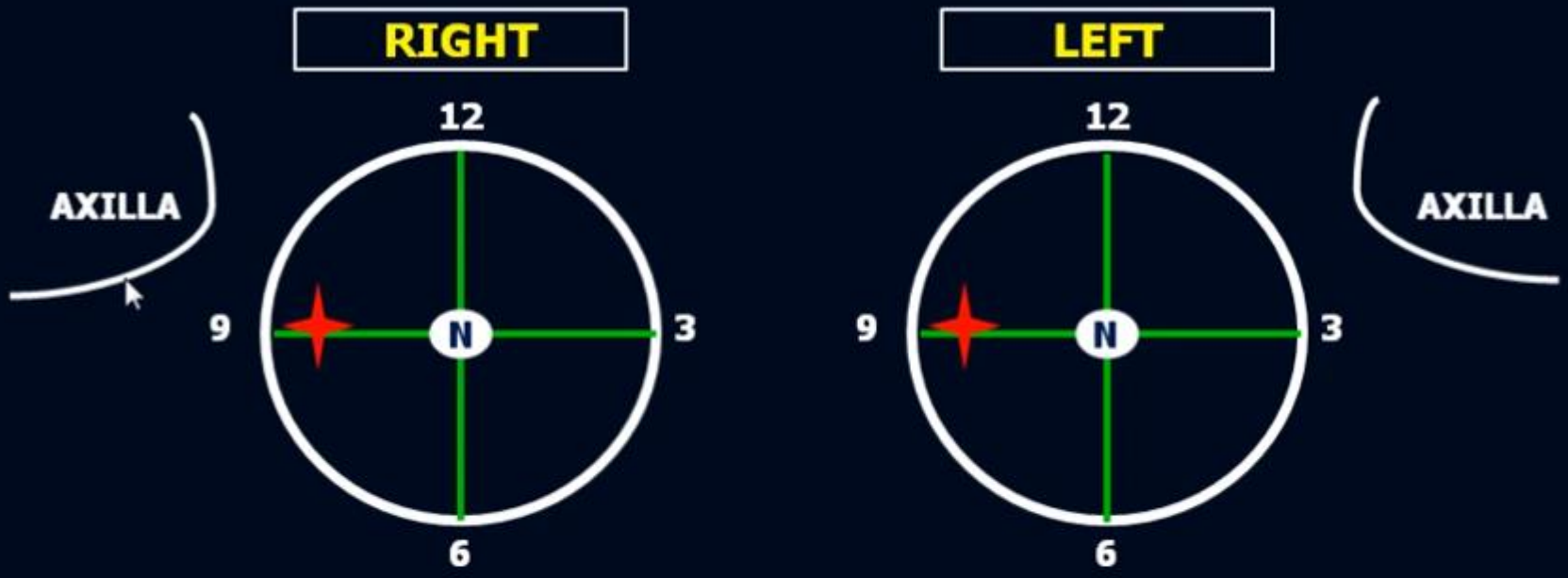
BI-RADS Lexicon of Ultrasound Morphology Descriptors

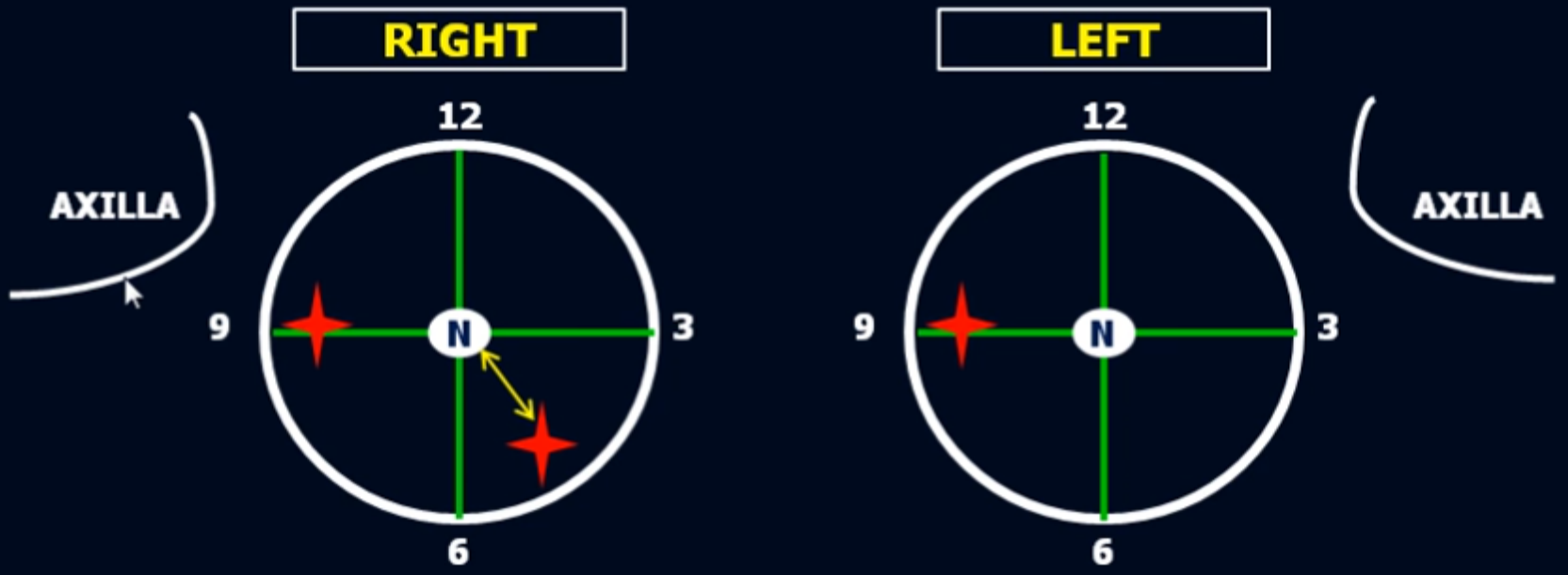
- The descriptors in the BI-RADS lexicon were selected on the basis of their ability to discriminate between benign and malignant findings.

- They are used to describe ultrasound identified lesions including:
  - Mass lesions
  - Calcifications
  - Associated features
  - Special cases
  - Lesion location
  - Lesion size

Specify the exact location of breast lesions



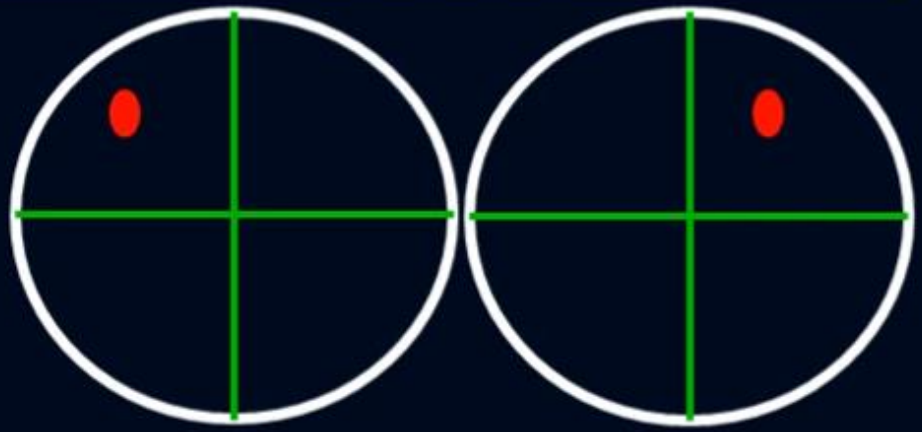
- Laterality
- Clock wise orientation



- Laterality
- Clock wise orientation
- Distance from nipple and depth from skin

NUMBER OF LESIONS

SINGLE

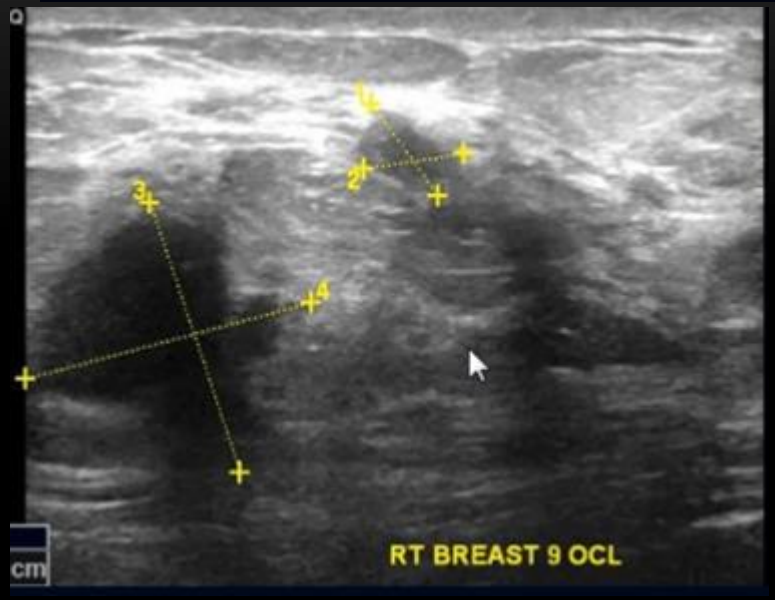


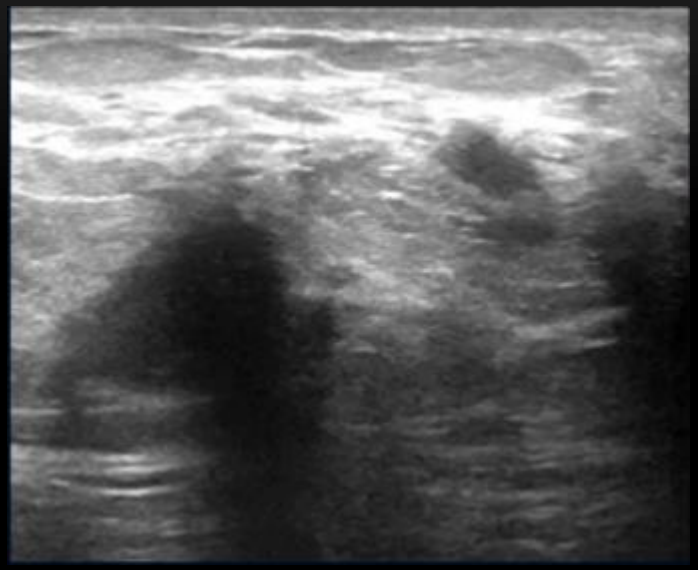
BILATERAL

MULTIFOCAL

MULTICENTRIC

SIZE OF LESIONS





MULTIFOCAL CARCINOMA

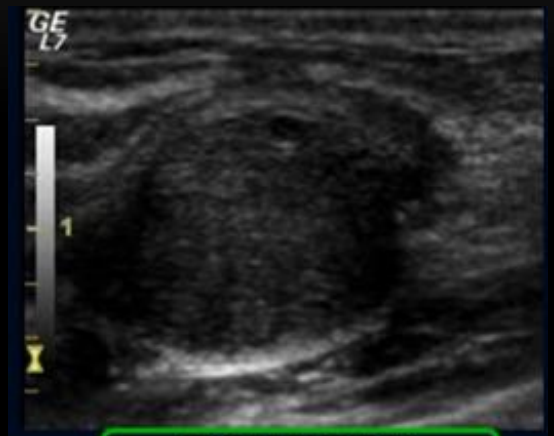
- Lesion size should be measured in at least two dimensions
- Images should be recorded with and without calipers.
- It is not necessary to report the measurements of every small simple cyst; location and measurements of the largest cyst in each breast will suffice.

- Multiple lesions should be written **in a list** by location within the breast, and by size.
- Bilateral lesions should be described separately.

MASS LESIONS MORPHOLOGY DESCRIPTORS

TO CHARACTERIZE MASS LESIONS

SHAPE

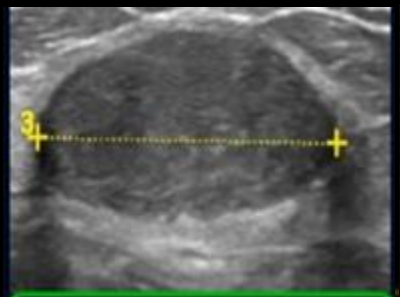


ROUNDED

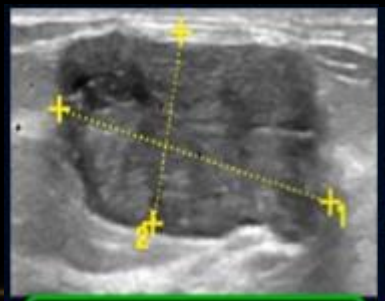
OVAL

IRREGULAR

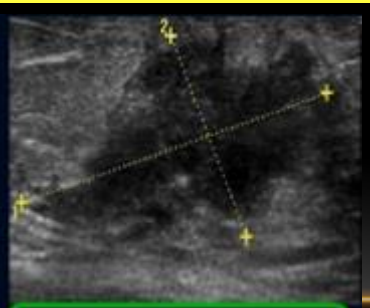
MARGINS



CIRCUMSCRIBED

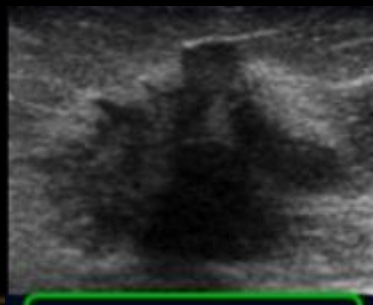


LOBULATED



ANGULATED

INDISTINCT



SSPICULATED

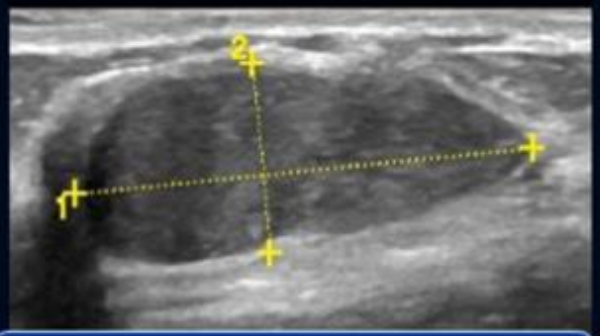
BENIGN

MALIGNANT

TO CHARACTERIZE MASS LESIONS

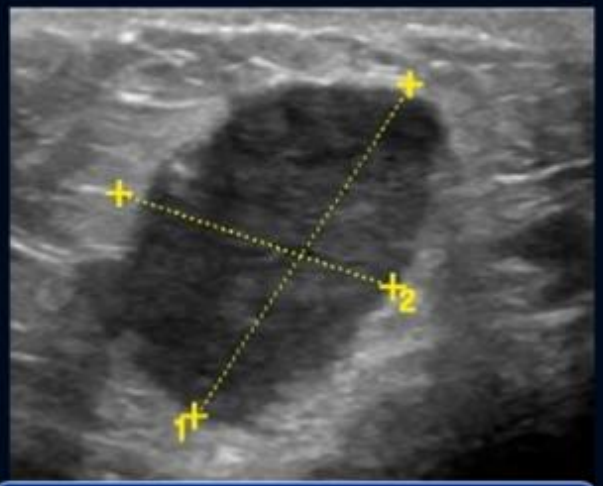
ORIENTATION

Wider than tall
Parallel to skin
and fat lobules



FIBROADENOMA

Taller than
wide
Not
parallel
to skin and
fat lobules

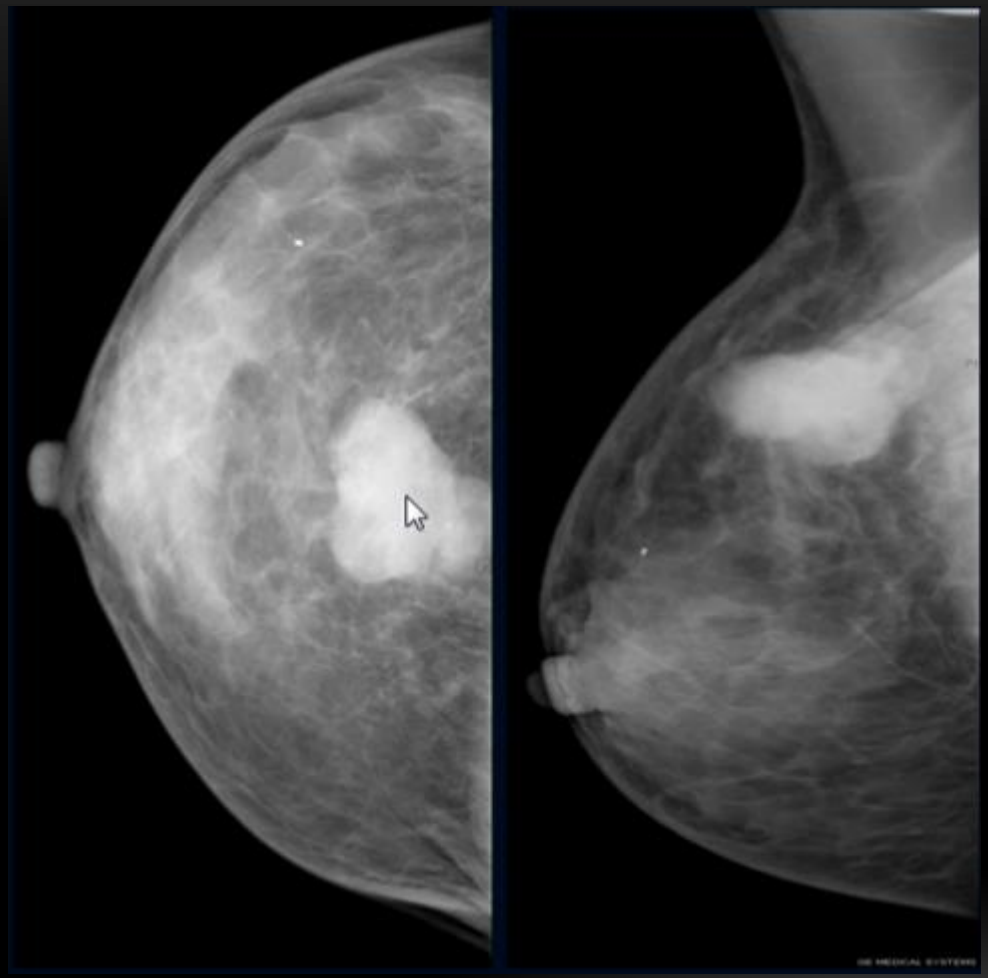


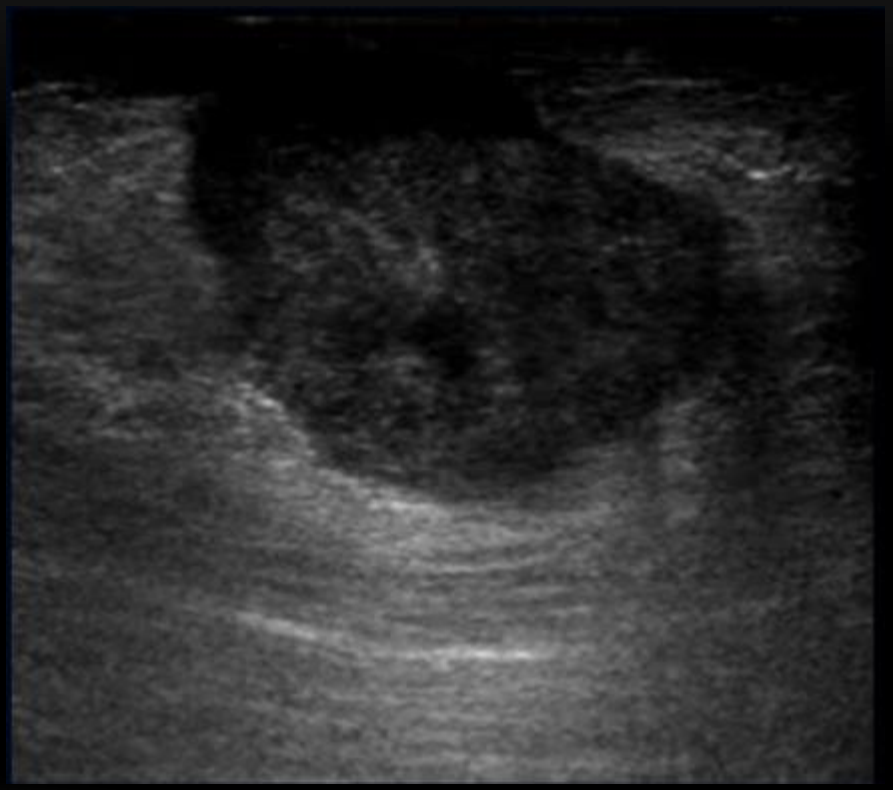
IDC

BENIGN

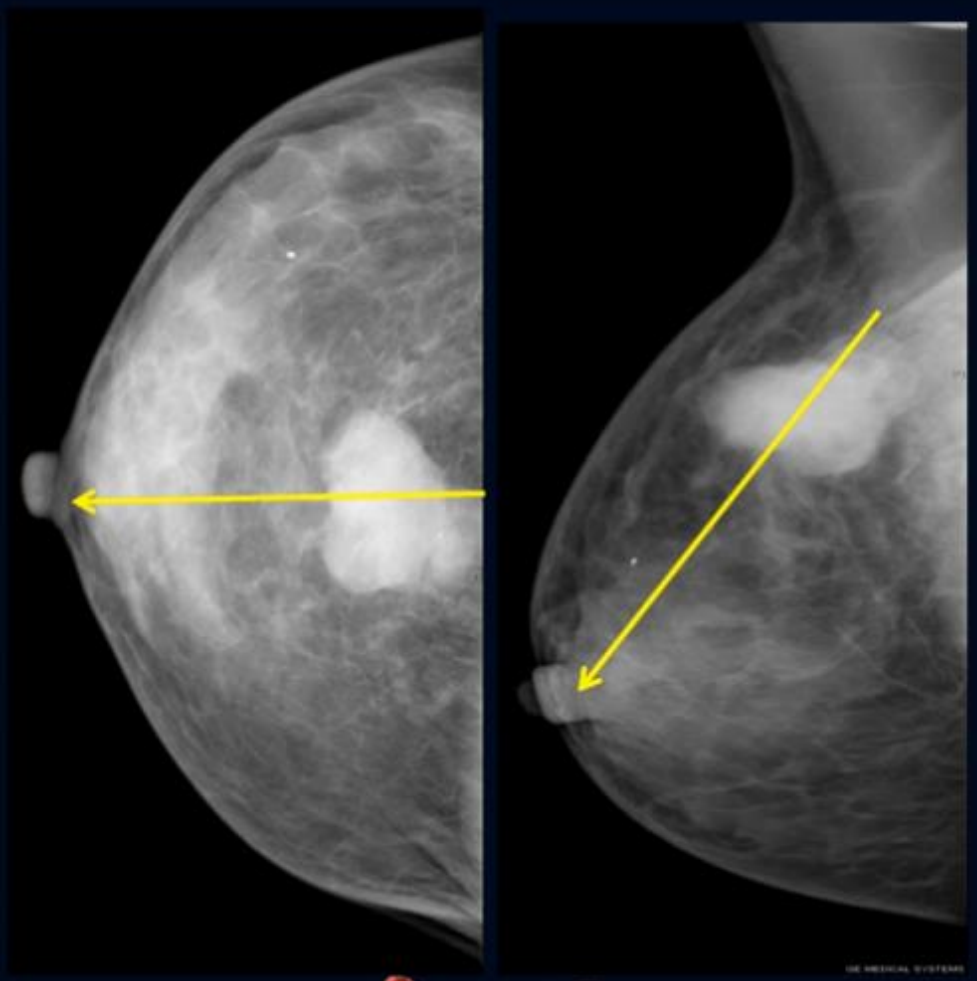
MALIGNANT

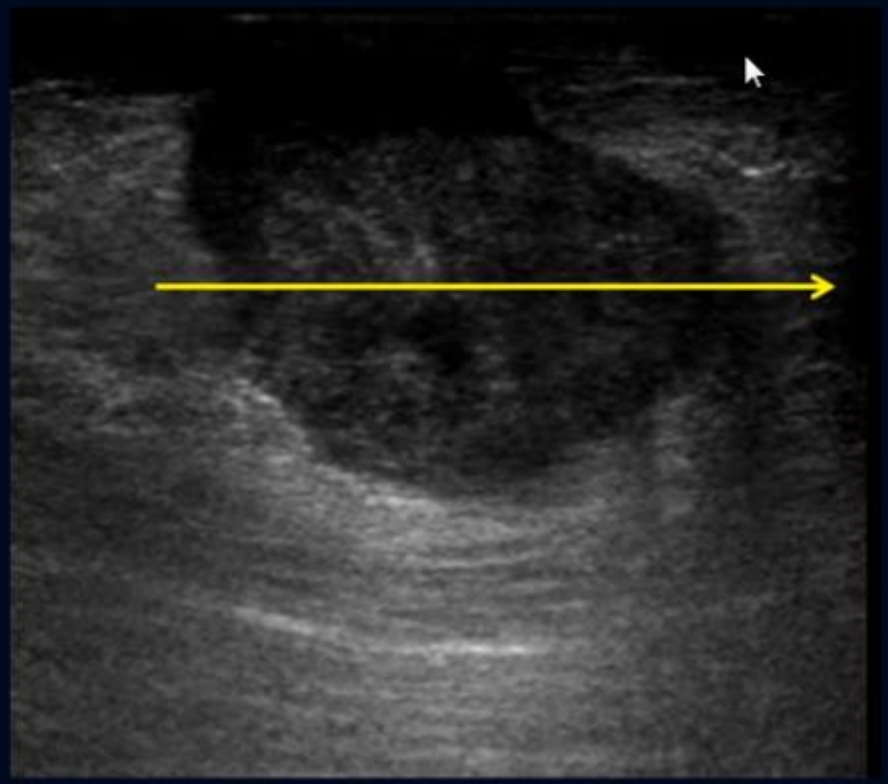
ORIENTATION





FIBR ADENOMA



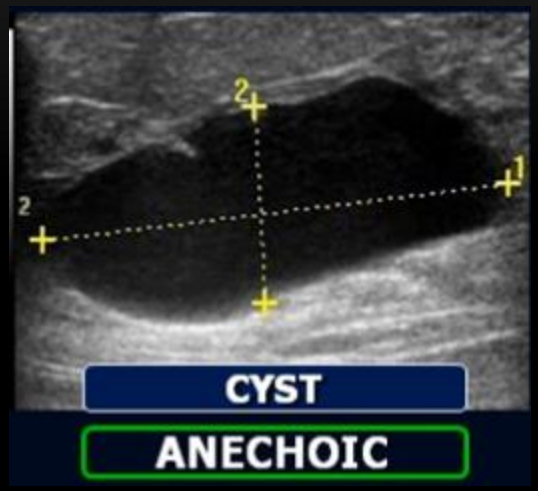


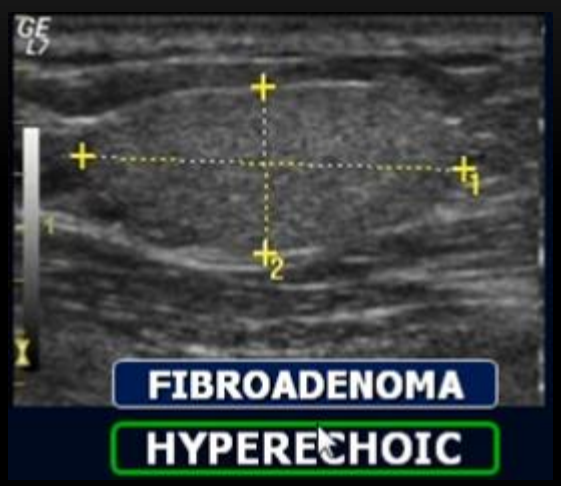
FIBR ADENOMA

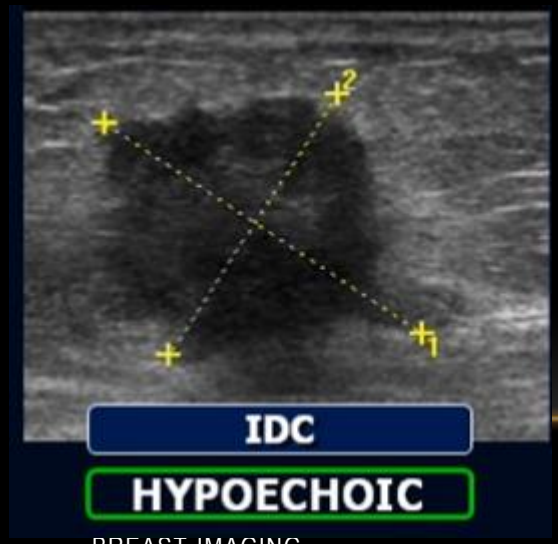
IDC

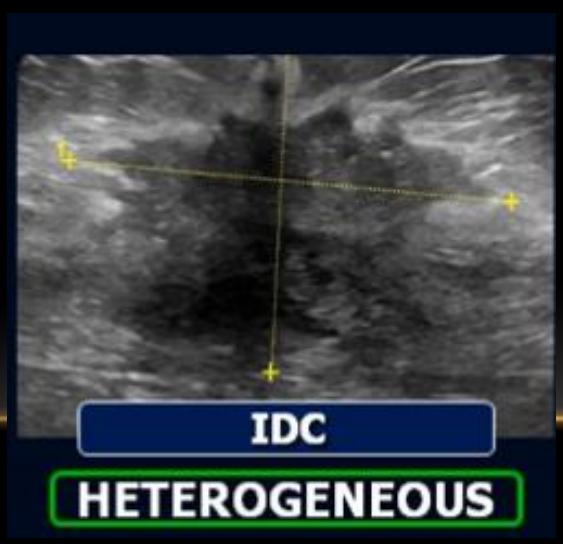
TO CHARACTERIZE MASS LESIONS

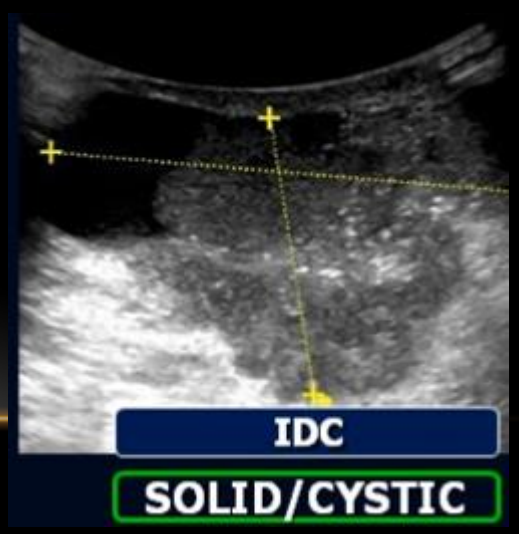
ECHOGENICITY











BENIGN

MALIGNANT

TO CHARACTERIZE MASS LESIONS

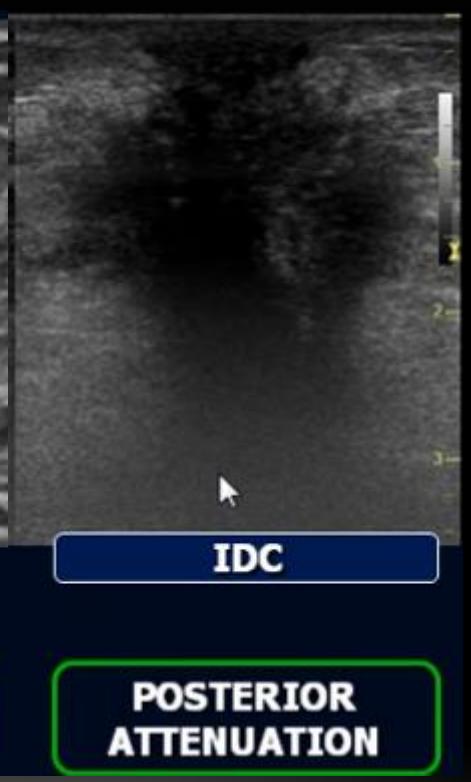
POSTERIOR FEATURES

CYST

POSTERIOR ENHANCEMENT

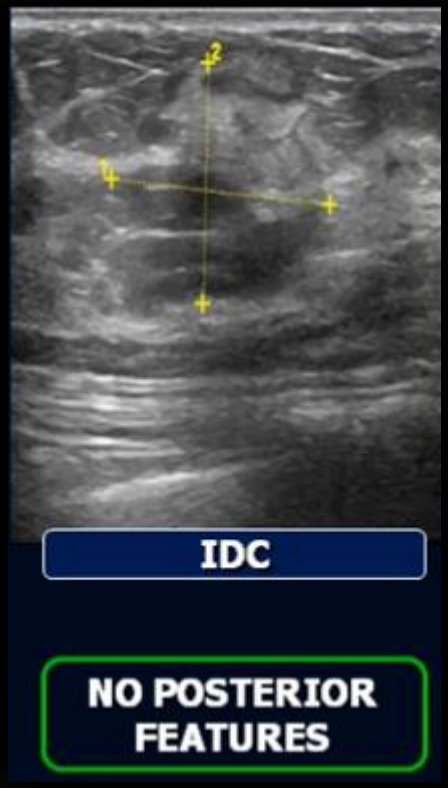
HAMARTOMA

MIXED ATTENUATION



IDC

POSTERIOR ATTENUATION



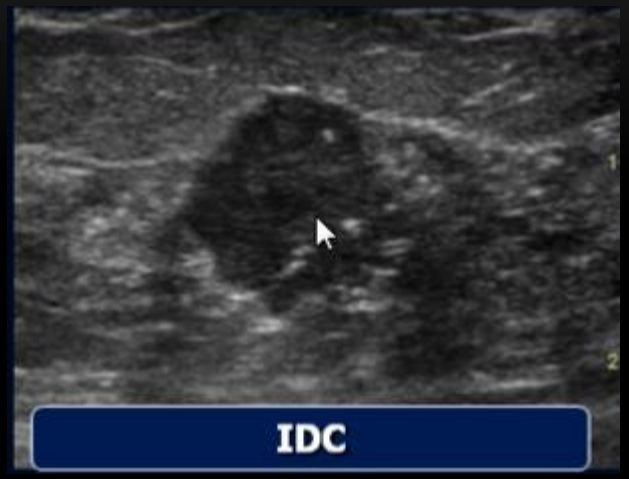
IDC

NO POSTERIOR FEATURES

BENIGN ⟷ MALIGNANT

CALCIFICATIONS MORPHOLOGY DESCRIPTORS

CALCIFICATIONS DESCRIPTORS



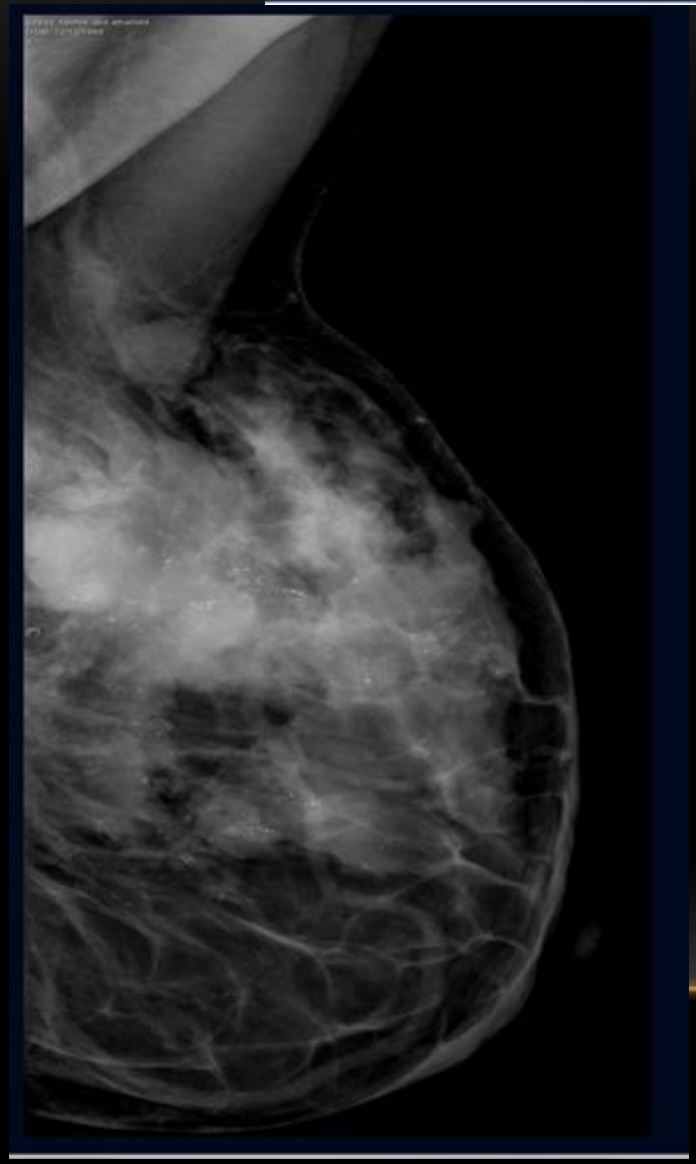
INSIDE &OUTSIDE A MASS

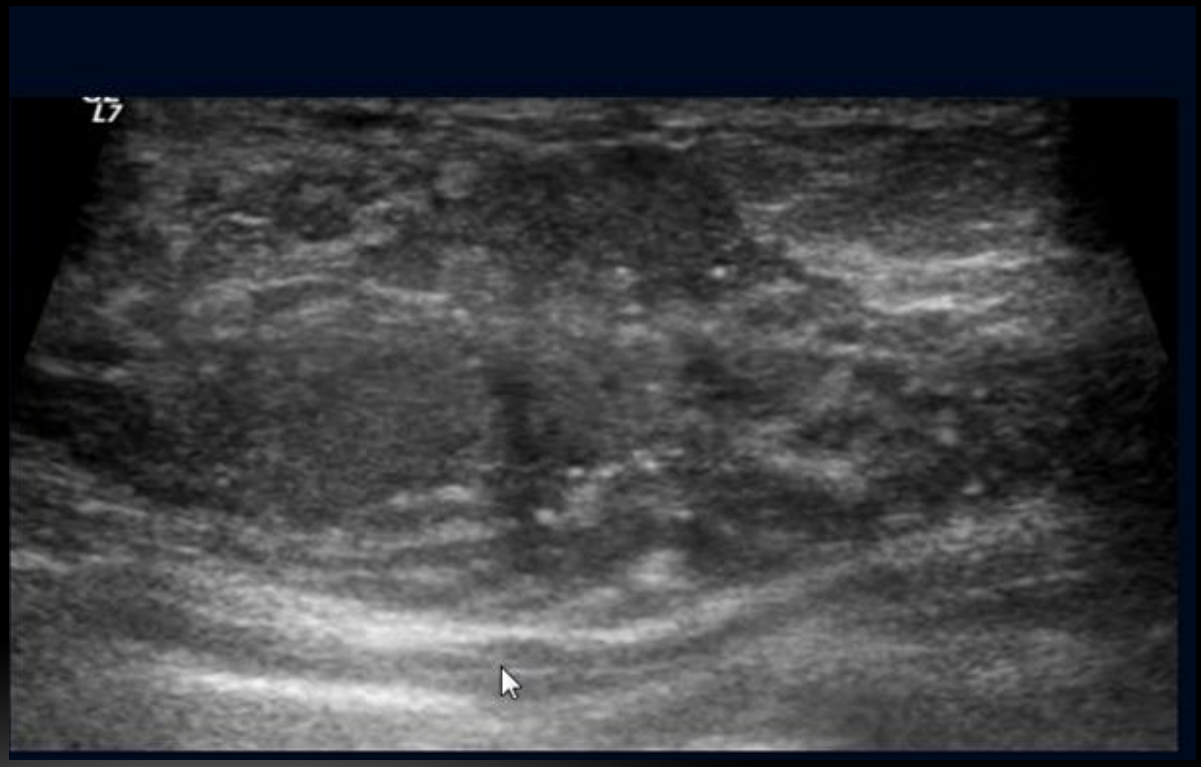
IN A MASS

OUTSIDE A MASS

INTRADUCTAL

MICROCALCIFICATIONS





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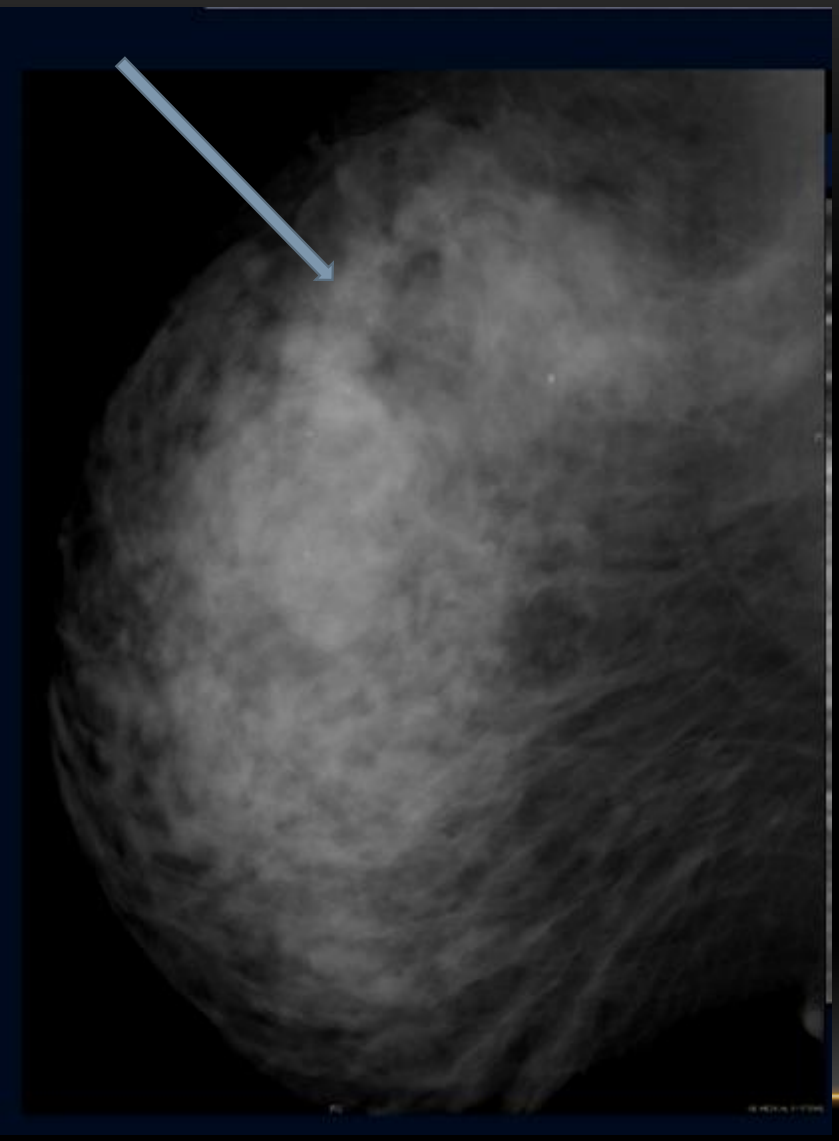
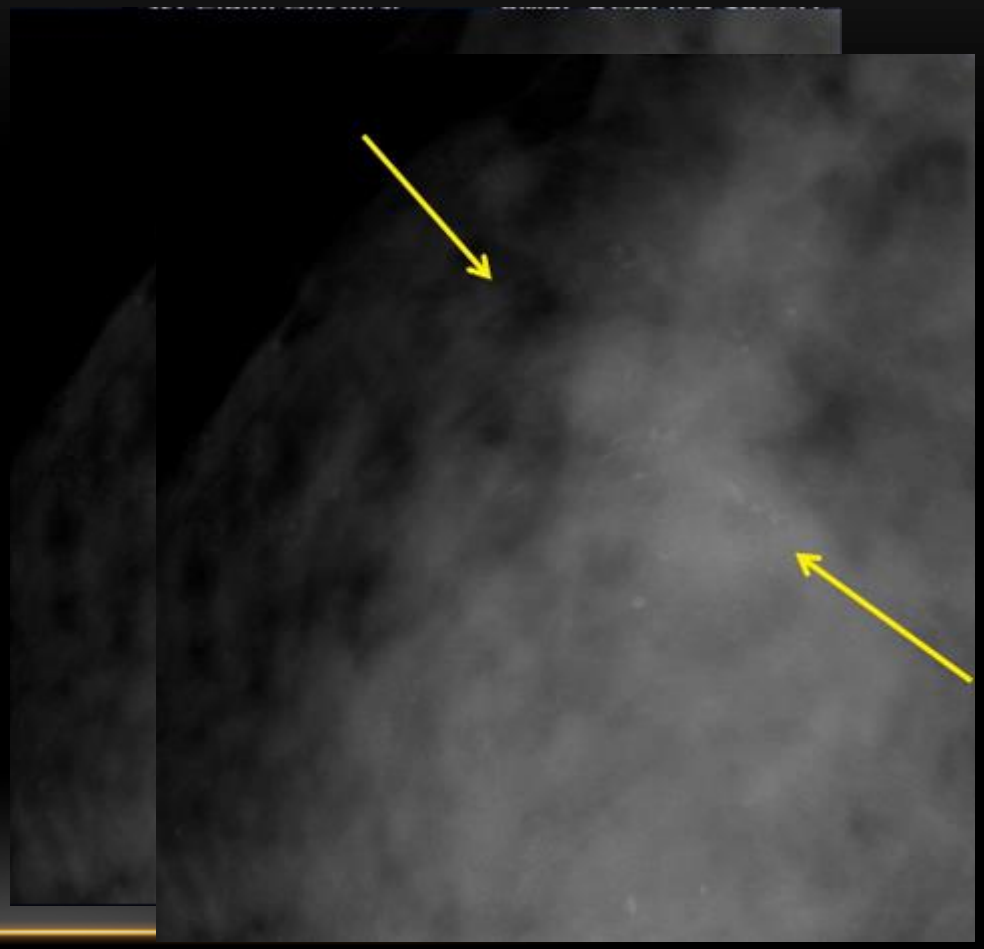
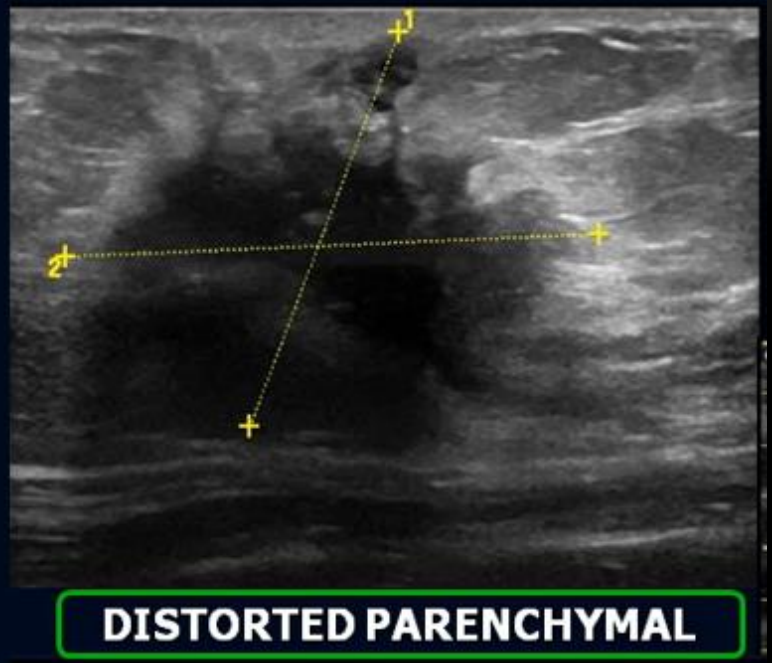




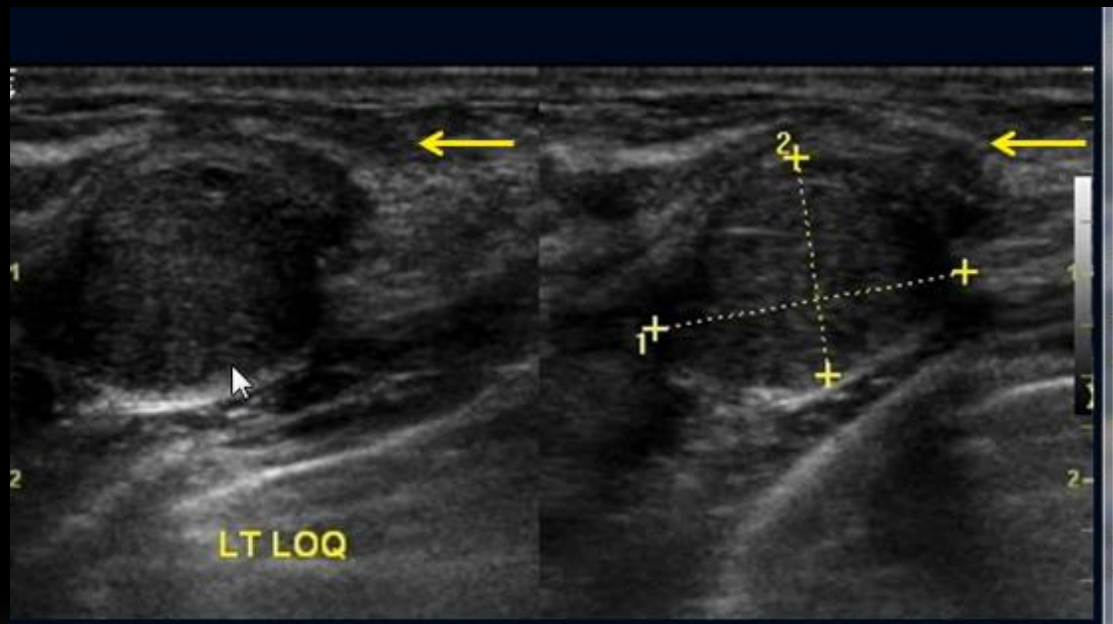
ASSOCIATED FEATURES

- ARCHITECTURAL DISTORTION
- DUCT CHANGES
- SKIN CHANGES
- EDEMA
- VASCULARITY
- ELASTICITY

ARCHITECTURAL DISTORTION



DISTORTED PARENCHYMAL

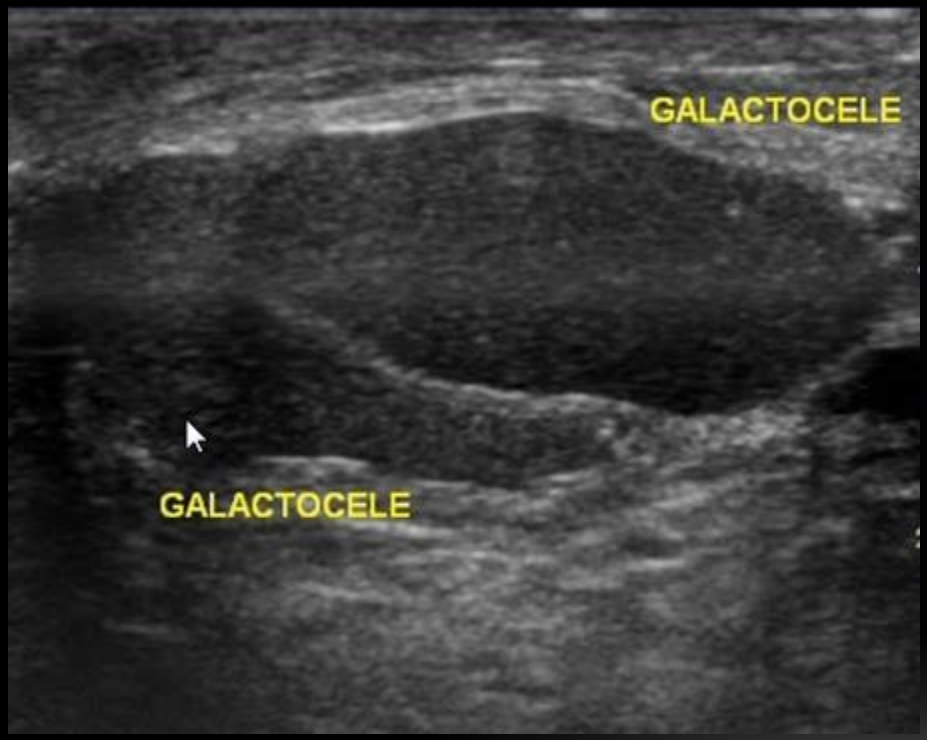


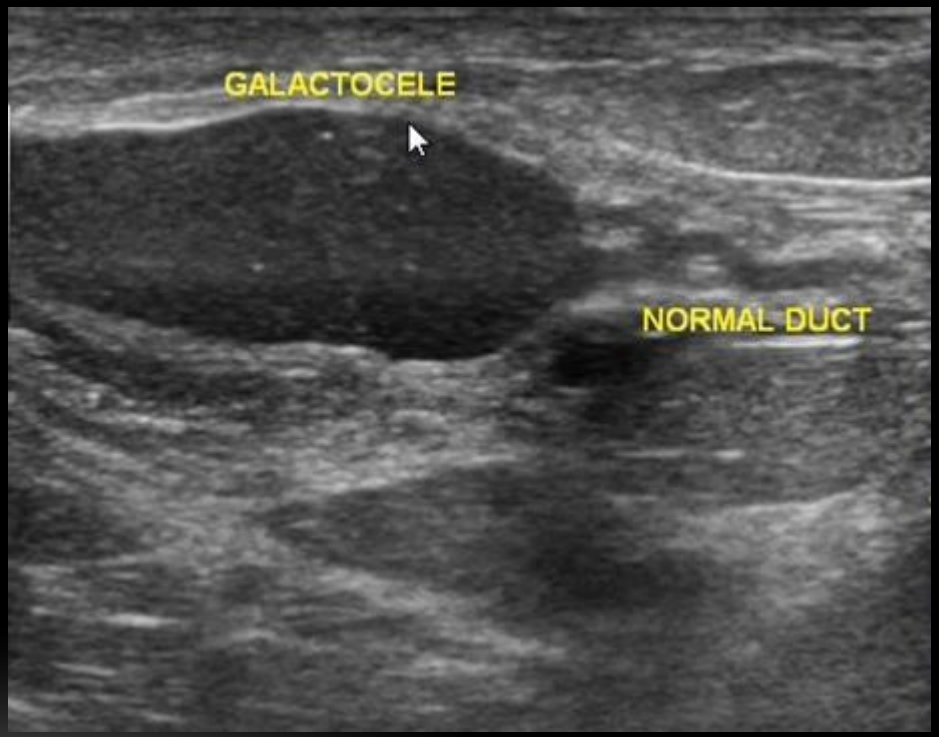
DISPLACED PARENCHYMA

DUCT ECTASIA

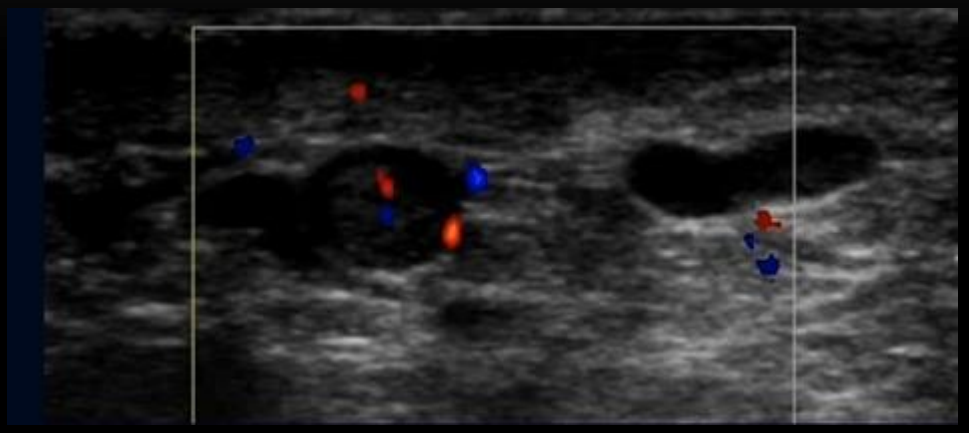
PERIDUCTAL MASTITIS COMPLICATING DUCT ECTASIA

GALACTOCELE

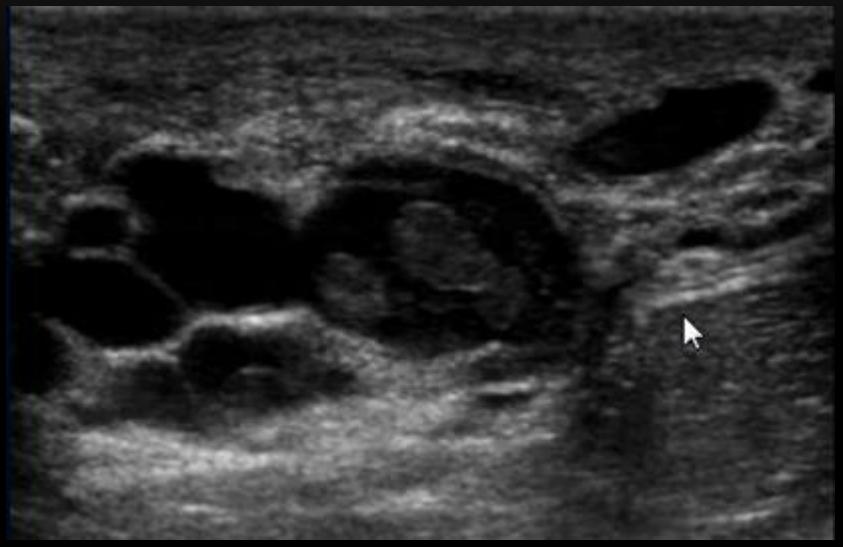


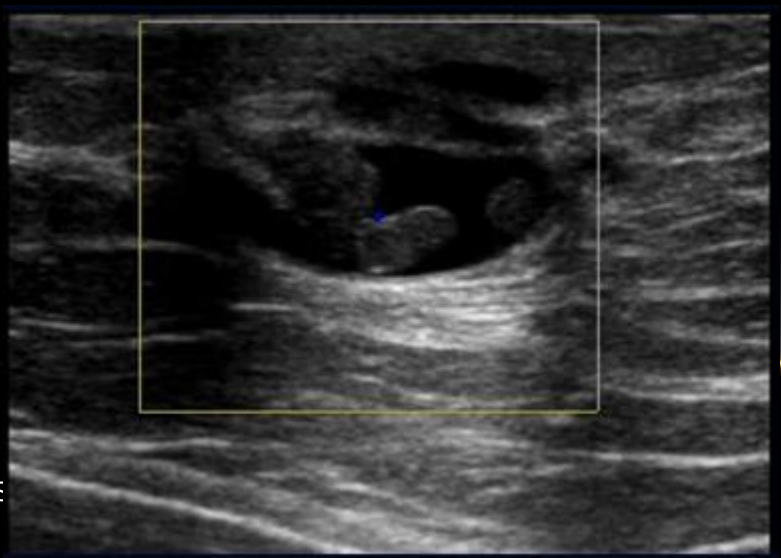


INTRADUCTAL PAPPILOMA

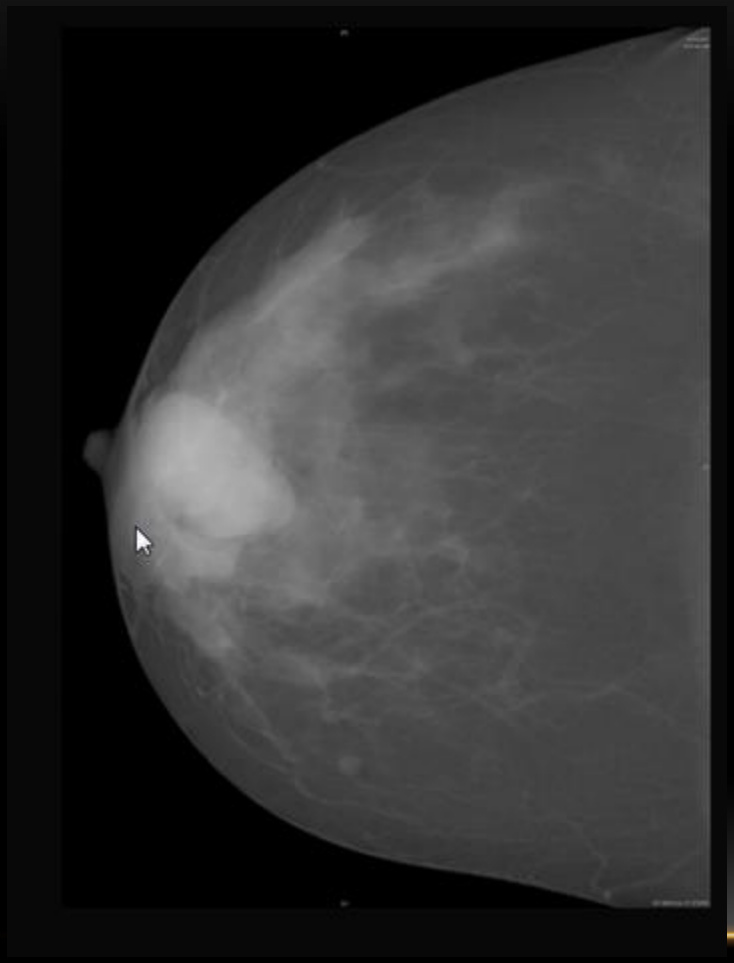


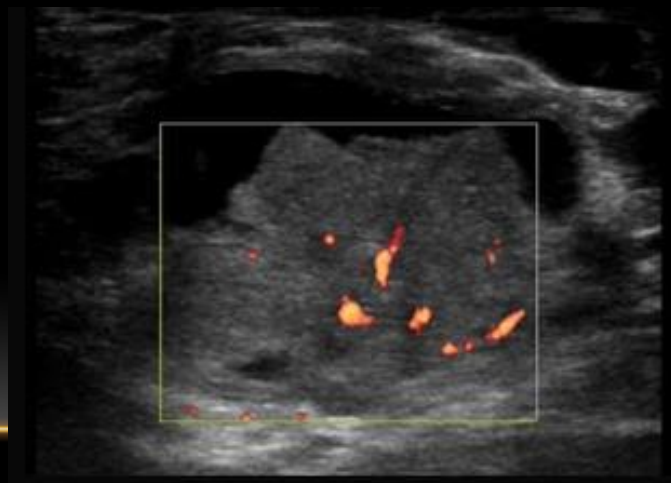
INTRADUCTAL INSPISSATED SECRETIONS





SINGLE DILATED DUCTS



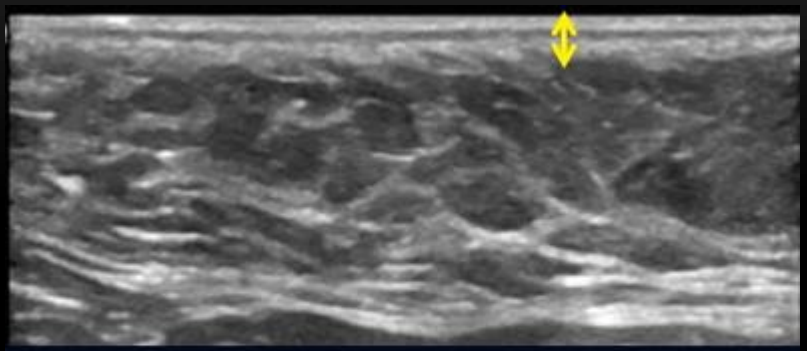


Intra ductal papillary carcinoma

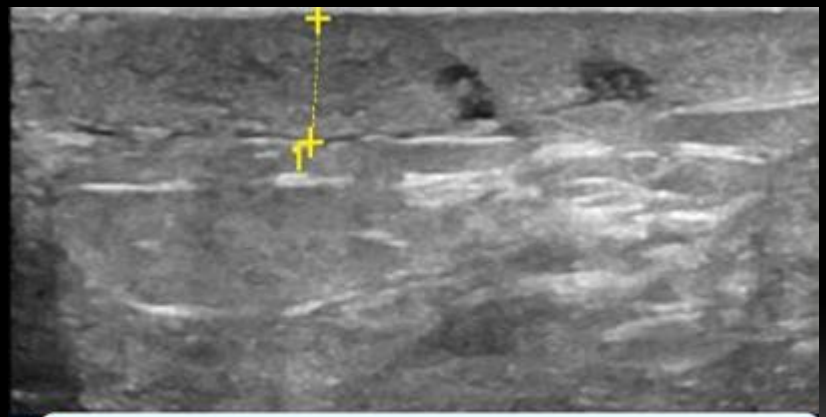
ASSOCIATED FEATURES

SKIN CHANGES

SKIN CHANGES



NORMAL SKIN
Triple line – 2mm



THICKENED SKIN
LOSS OF Triple line > 2mm

SKIN RETRACTION

ASSOCIATED FEATURES

BREAST EDEMA

BREAST EDEMA

- **Breast edema can accompany many breast diseases starting from:**

  - Simple mastitis
  - Simple mastitis complicated with abscess formation
  - lymph edema associating malignant breast lesions
  - Inflammatory breast carcinoma

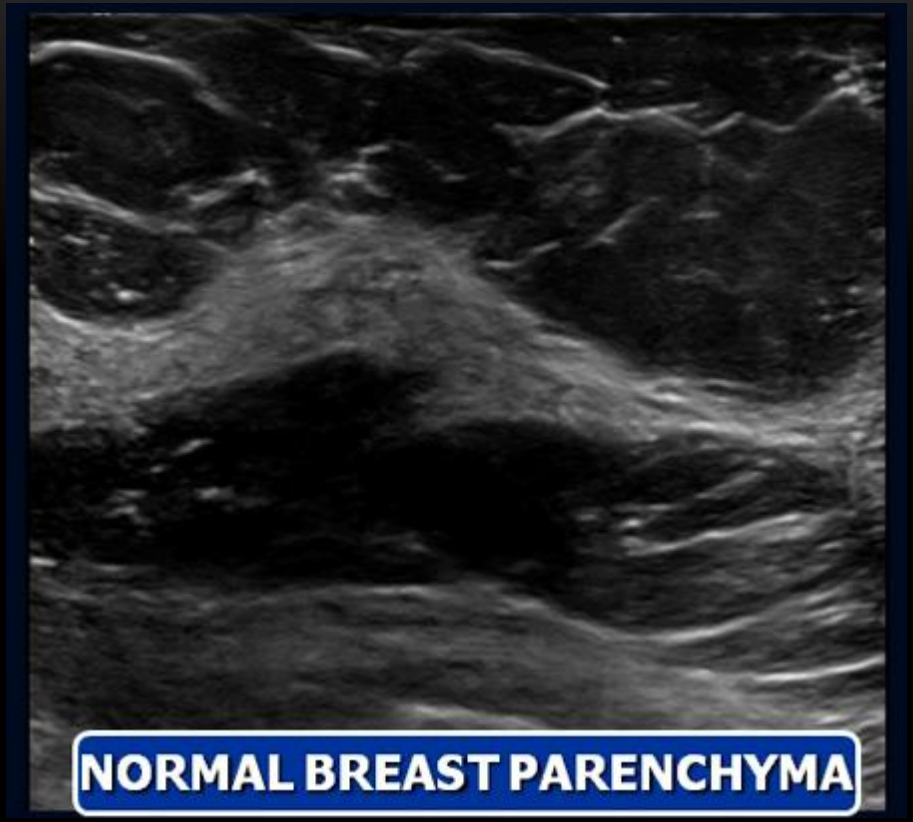
Whenever you see breast edema…

LOOK FOR ASSOCIATED MASS LESIONS AND ABSCESS CAVITIES

LOOK AT THE AXILLARY LYMPHNODES

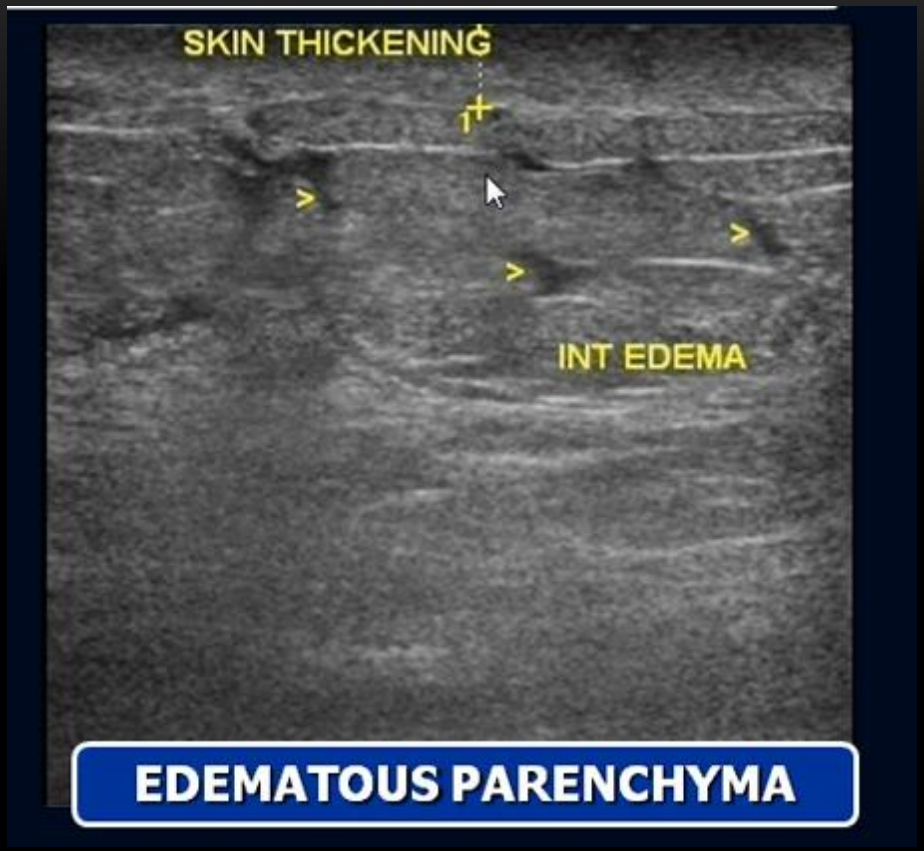
FOLLOW UP YOUR PATIENT

BREAST EDEMA



NORMAL BREAST PARENCHYMA

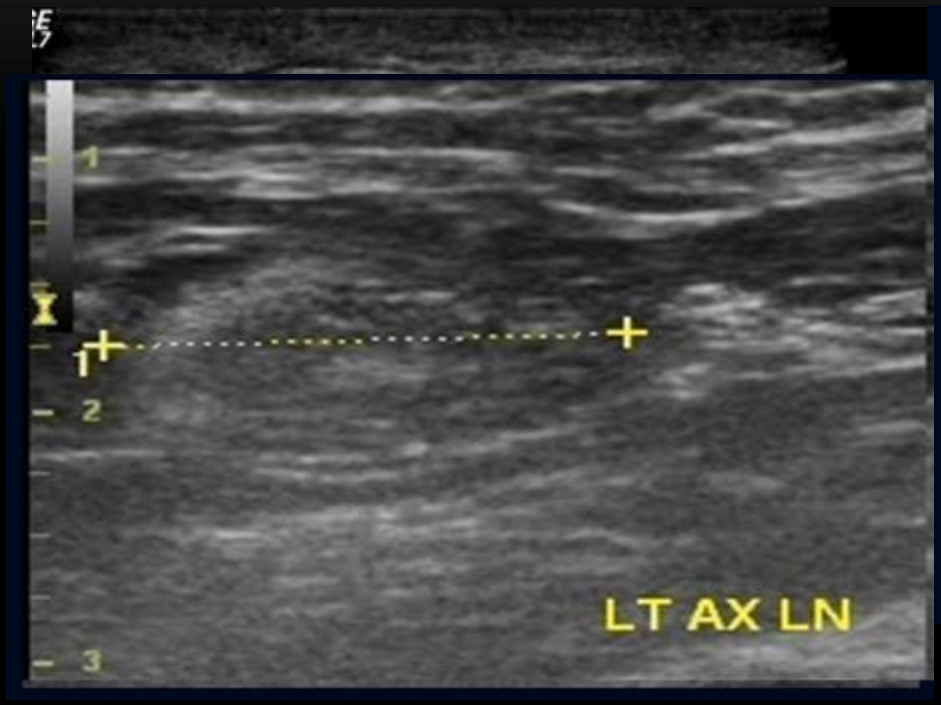
- Fat is slender and hypo echoic
- Intervening parenchyma is hyper echoic
- Normal overlying skin

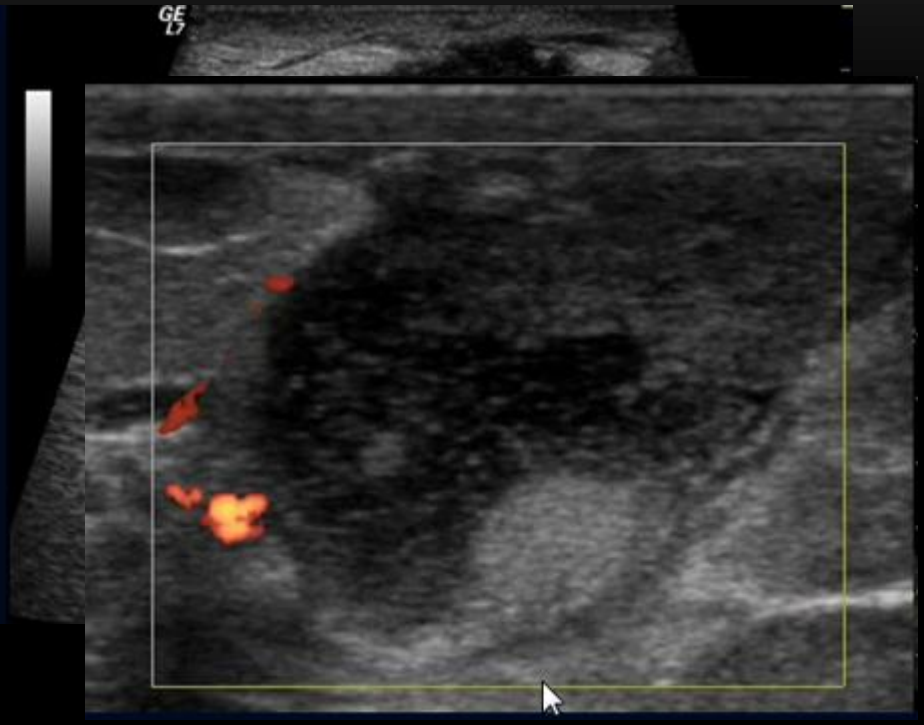


EDEMATOUS PARENCHYMA

- Fat is edematous and echogenic
- Hypoechoic interstial edema lines delineating the fat lobules.
- Overlying skin thickening

BREAST EDEMA: Inflammatory

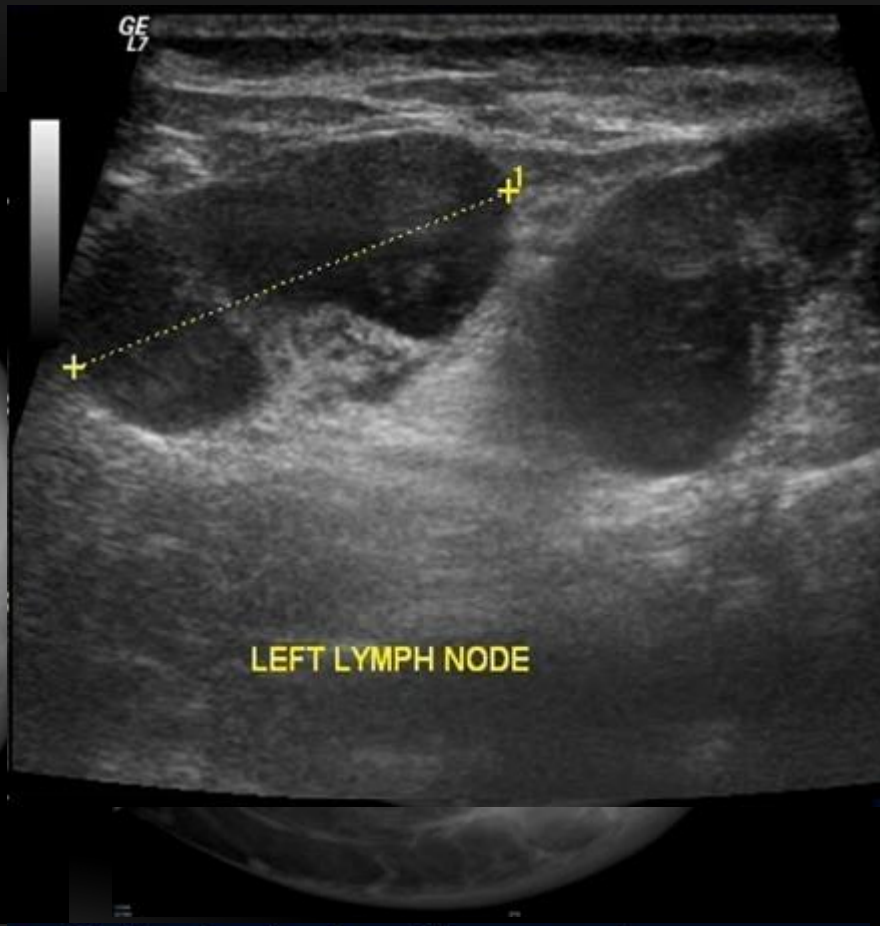




- Ill defined collections or phlegmons
- Normal axillary nodes

- Abscess cavity formation
- Only peripheral vascularity is seen.

BREAST EDEMA: Inflammatory Carcinoma



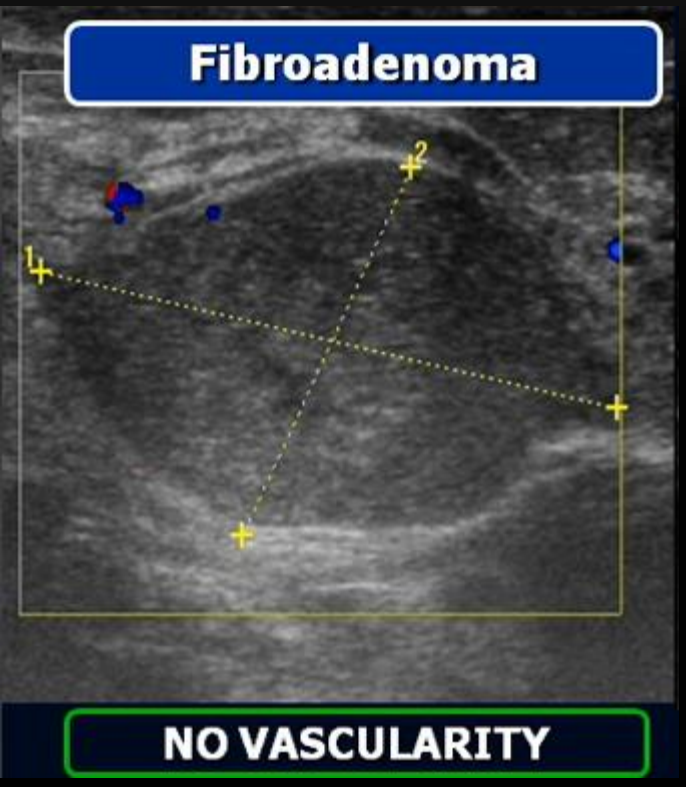
- Diffuse edema pattern
- Breast edema
- No abscess cavities and no mass lesions

- Pathological axillary nodes
- Globular shaped with a thickened cortex and muffled hila.

ASSOCIATED FEATURES

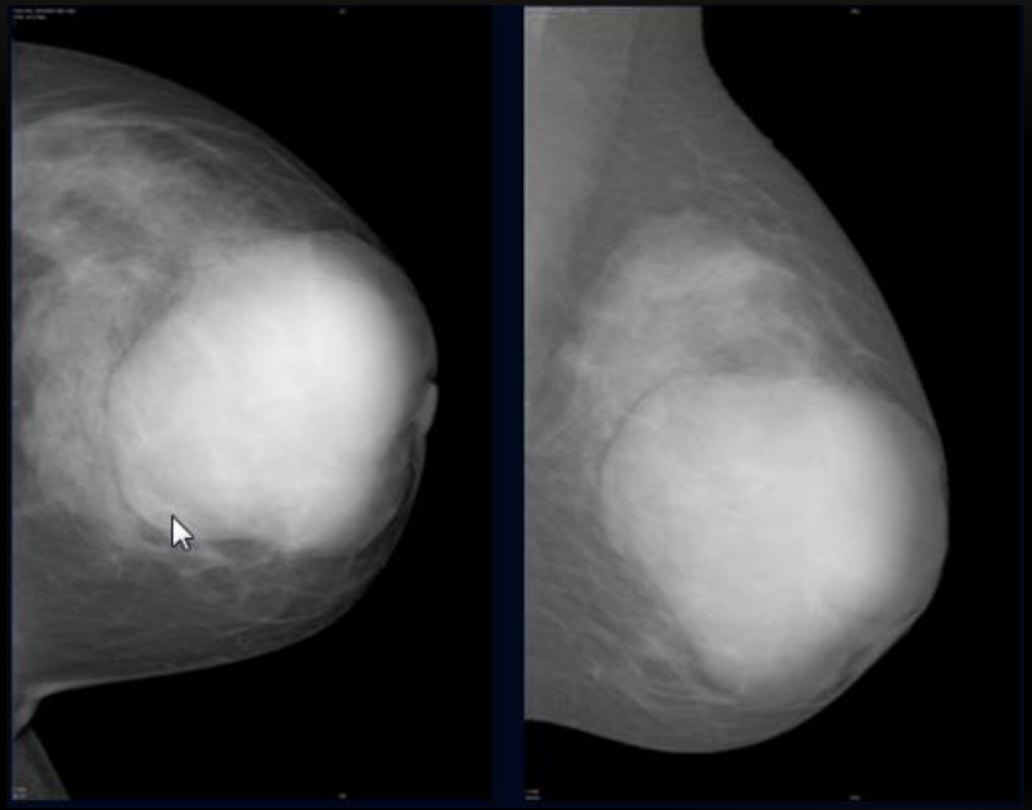
LESION VASCULARITY

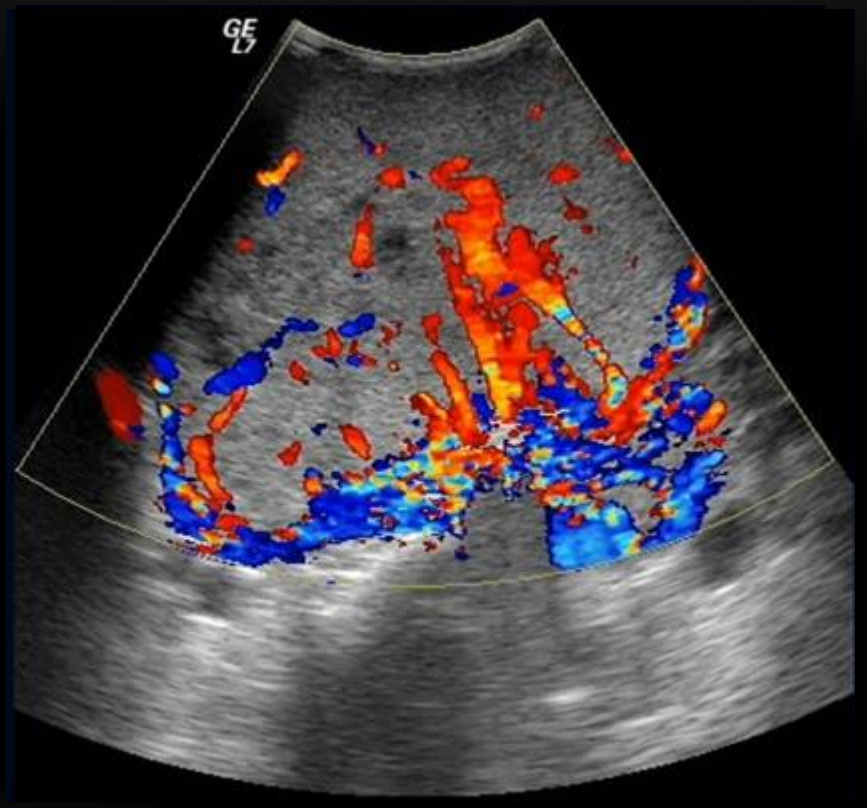
VASCULARITY



BENIGN ⟷ MALIGNANT

VASCULARITY



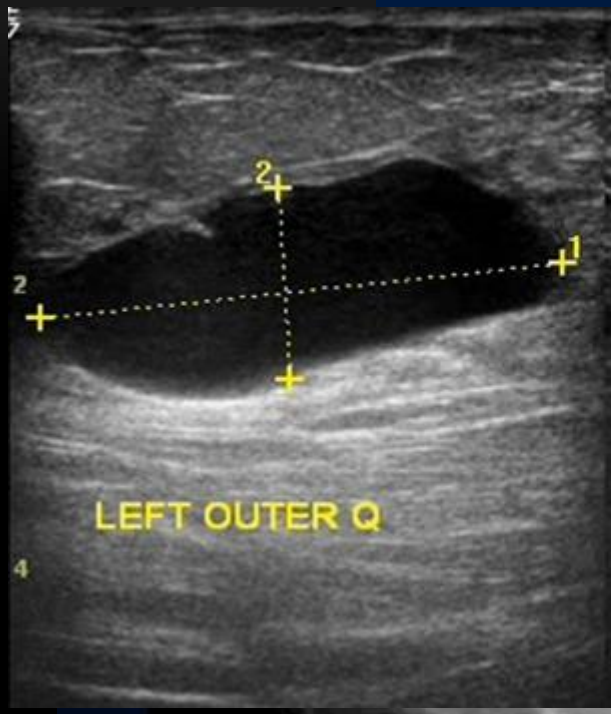


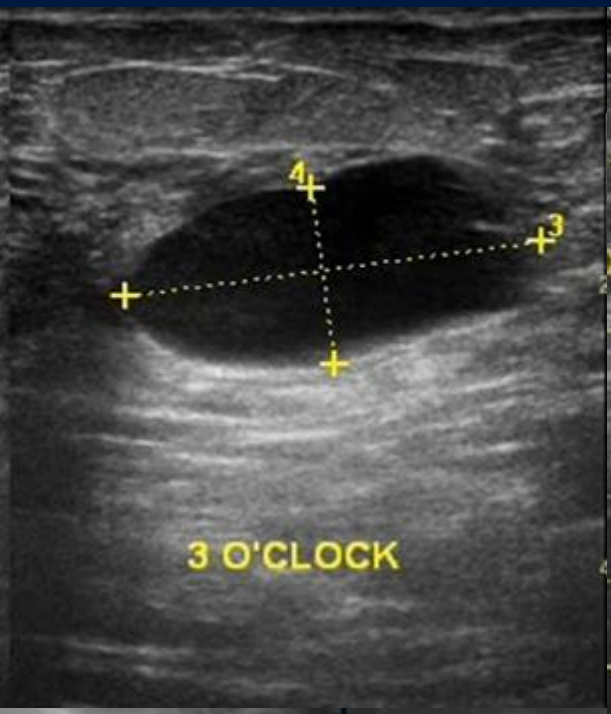
PHYLLOIDES

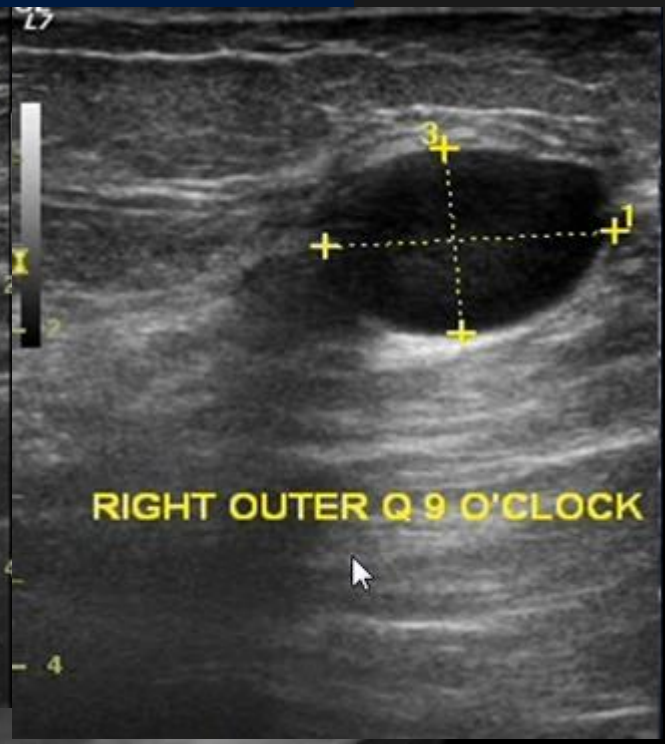
SPECIAL CASES

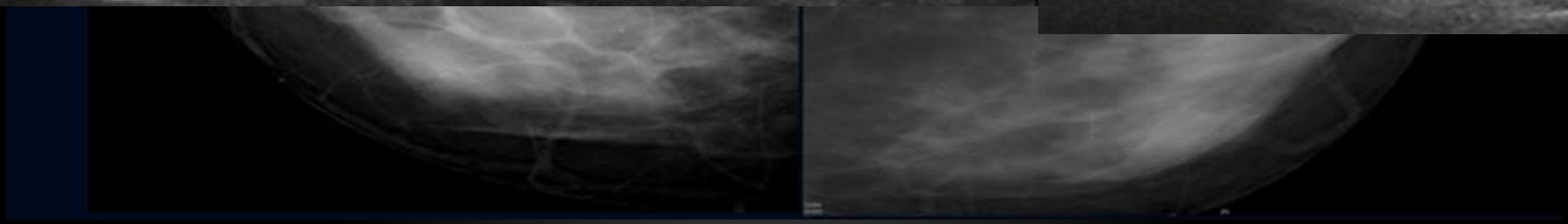
- CYSTIC LESIONS
- SKIN LESIONS
- FOREIGN BODIES AND IMPLANTS
- LYMPHNODES
- VASCULAR ABNORMALITIES
- POST SURGICAL LESIONS

CYSTIC LESIONS



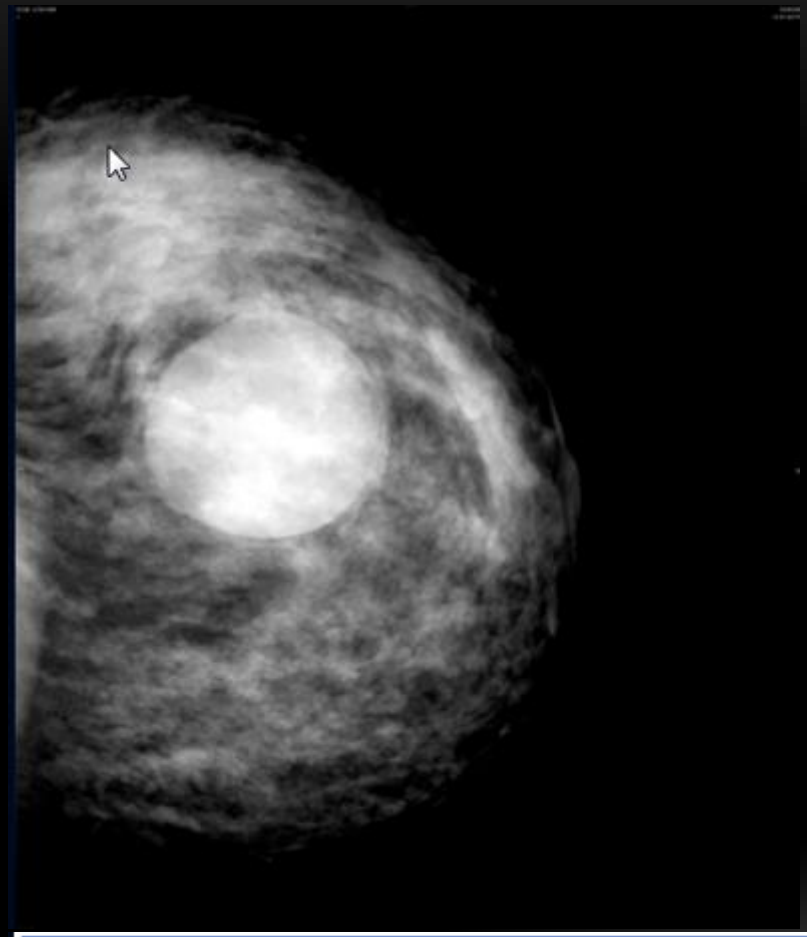


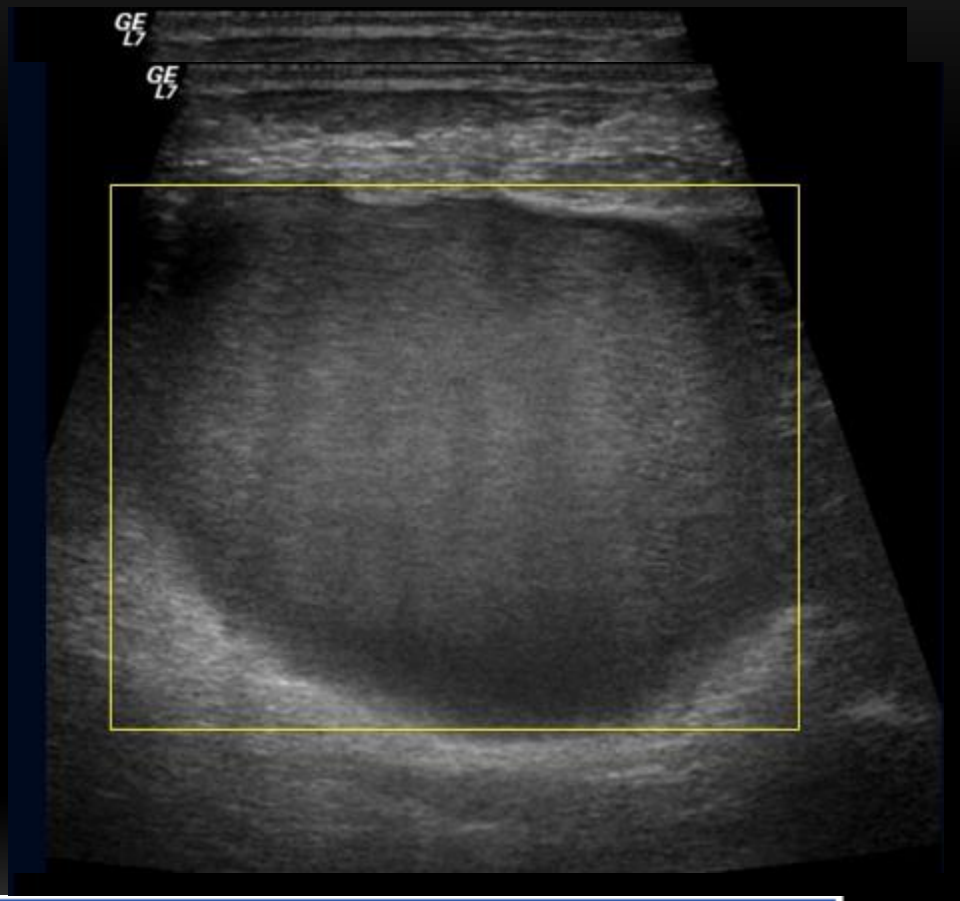




Fibrocystic mammary changes

CYSTIC LESIONS

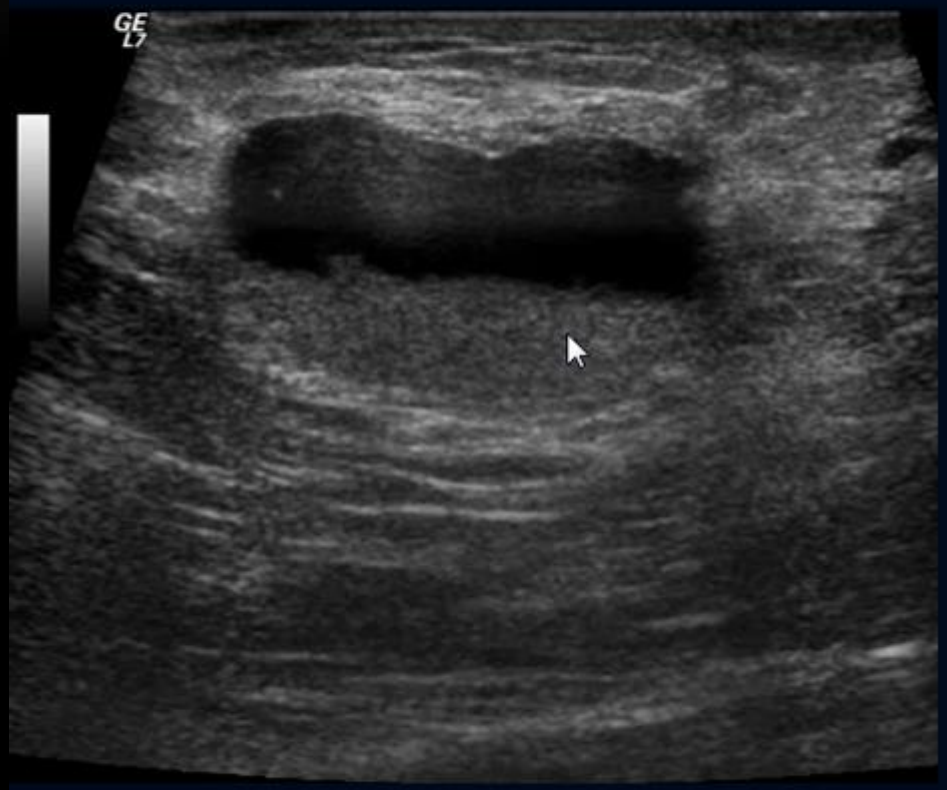


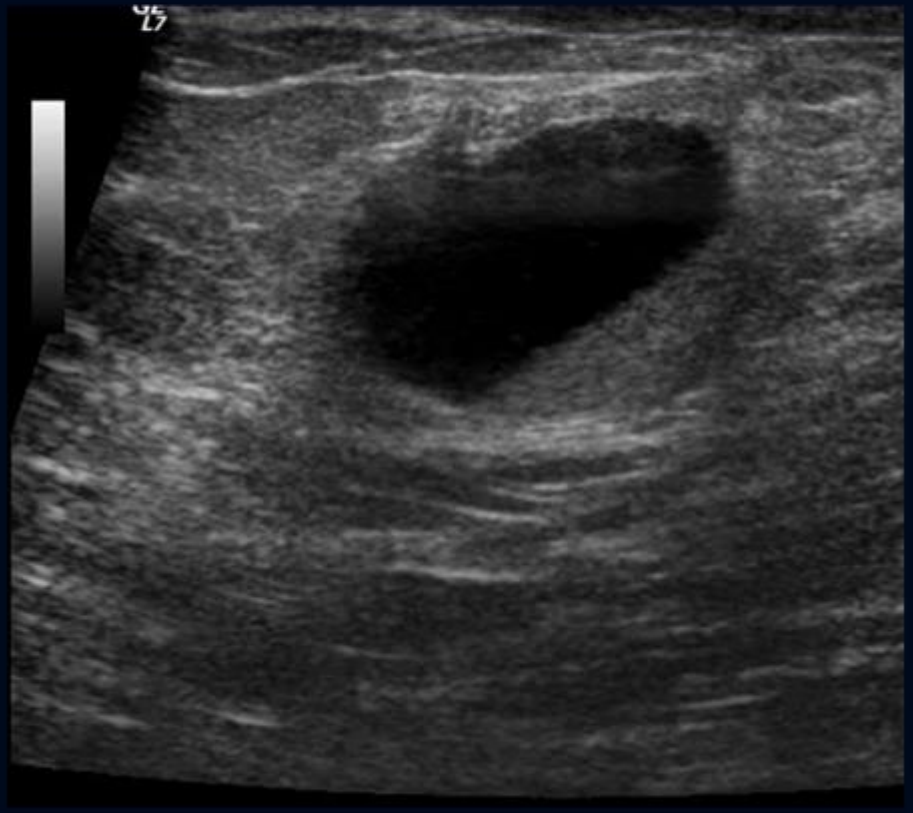


COMPLICATED CYST

No solid lesions + No vascularity + floating internal particles

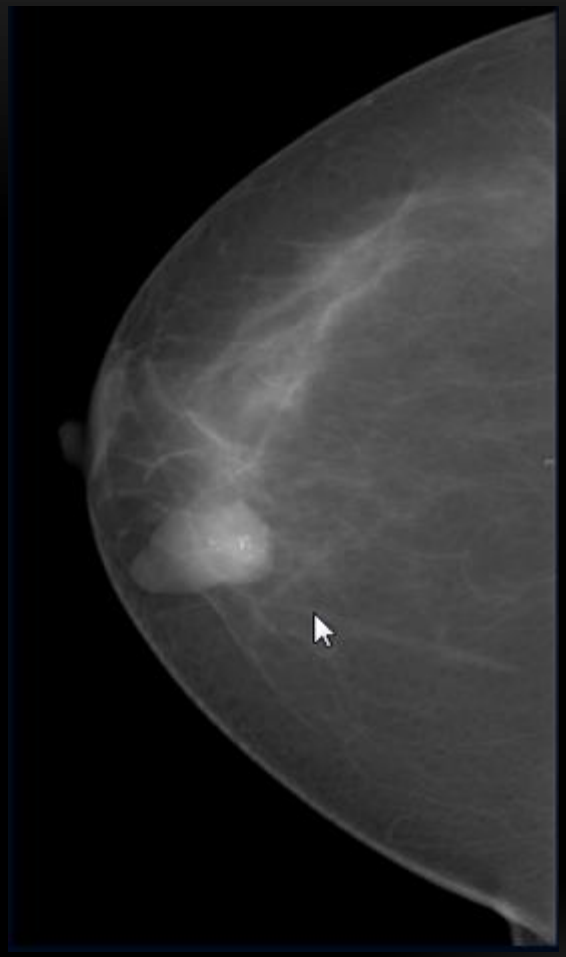
CYSTIC LESIONS

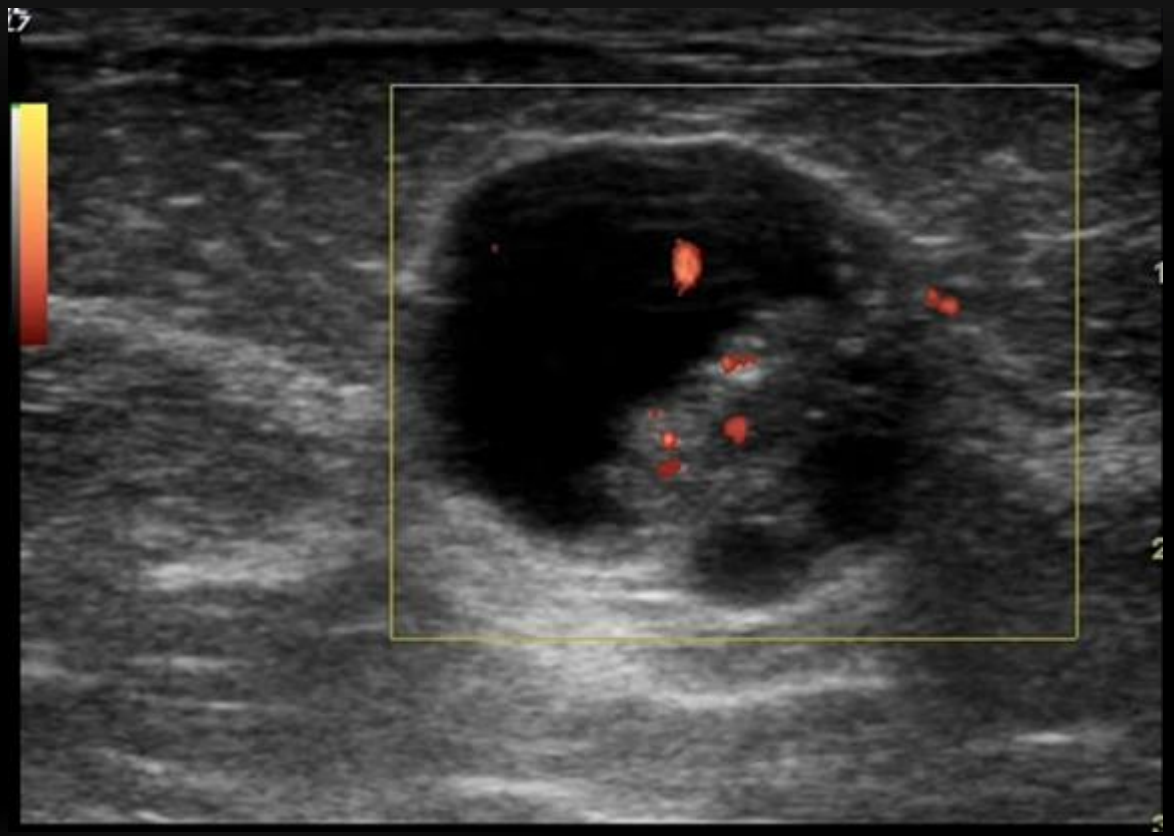




Complicated cyst

CYSTIC LESIONS

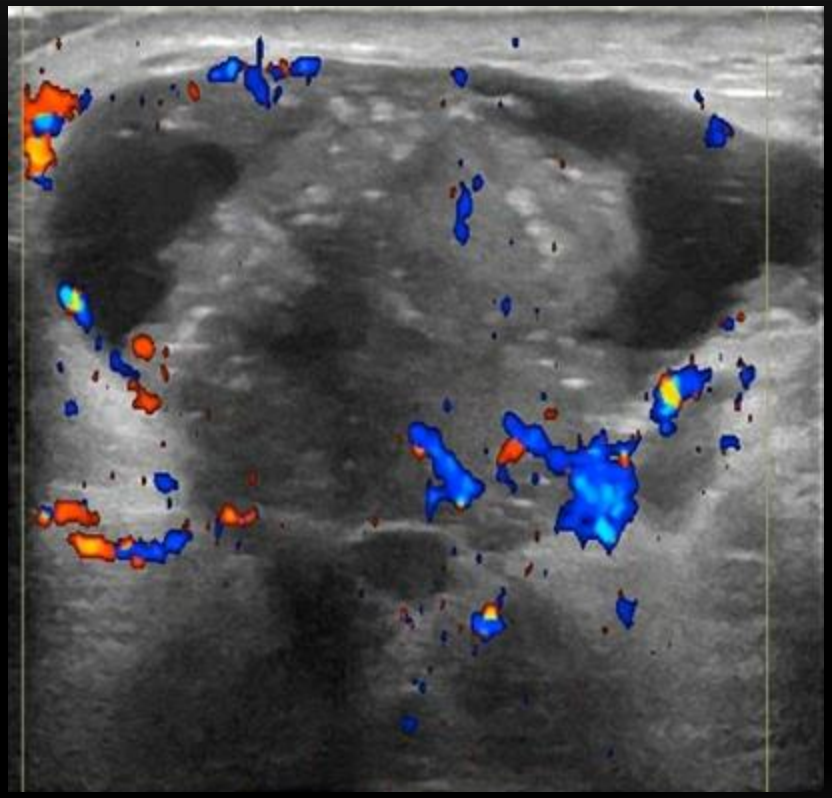


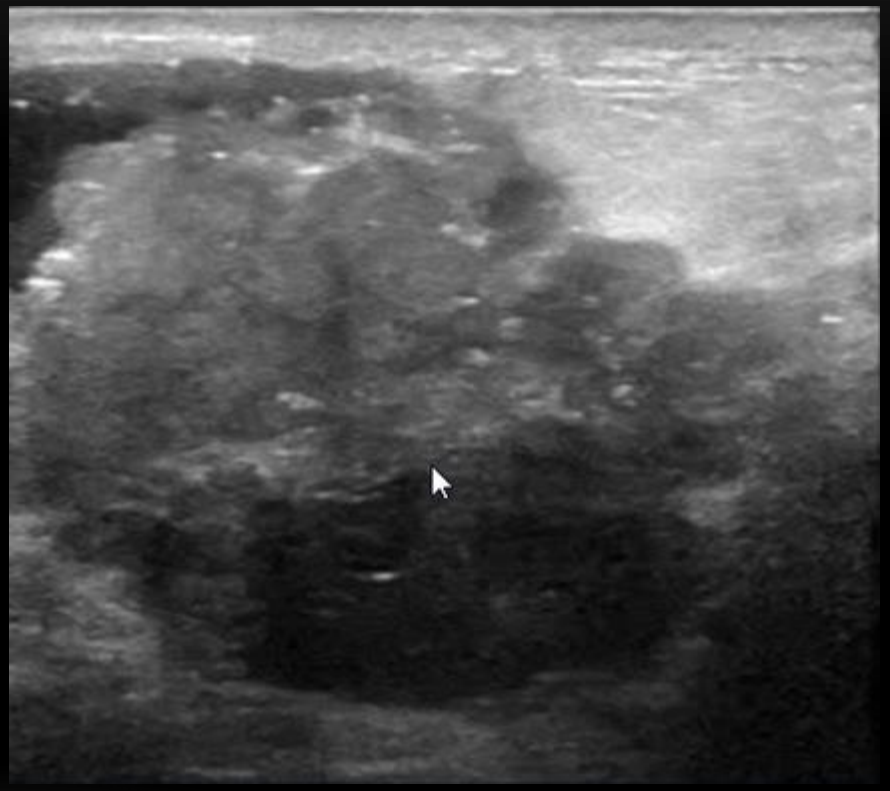


COMPLEX CYST

Solid component + vascularity

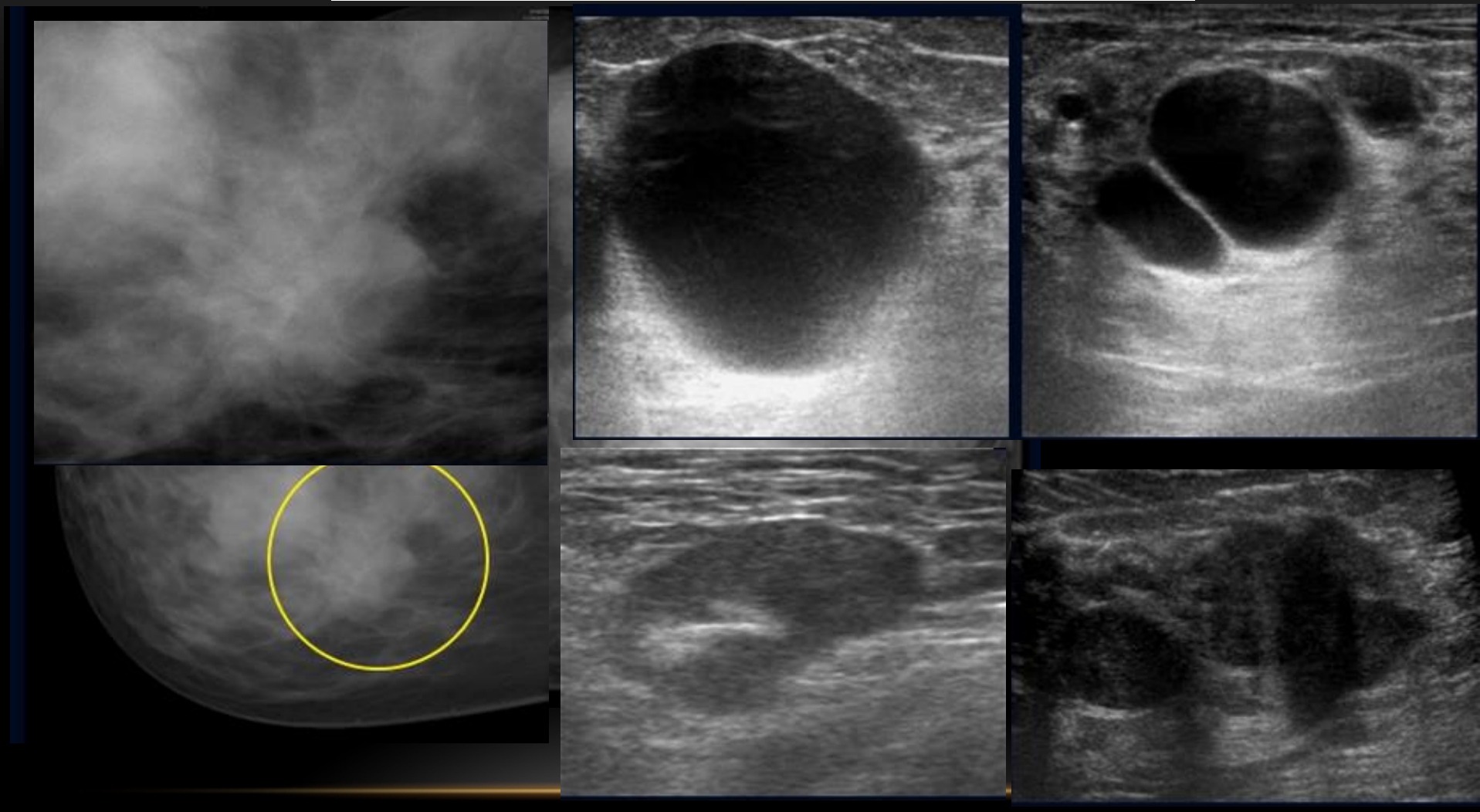
CYSTIC LESIONS





Complex solid

CYSTIC LESIONS

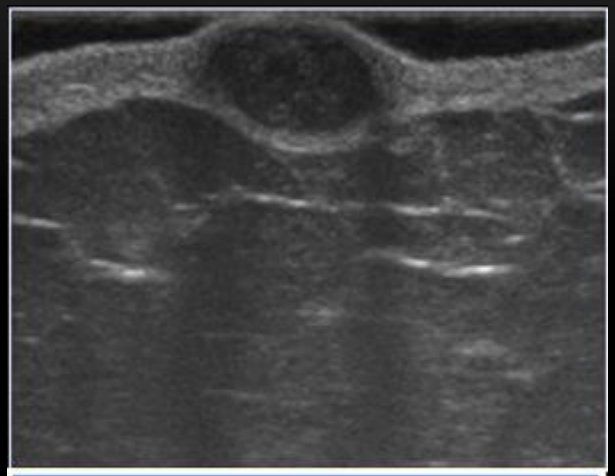


Fibrocystic and malignant lesion

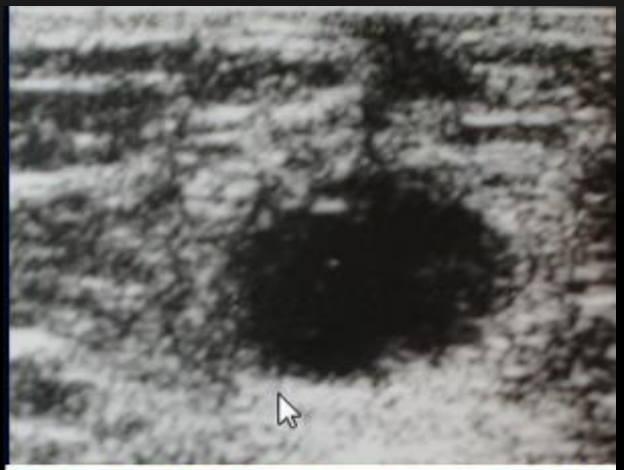
SPECIAL CASES

SKIN LESIONS

SKIN LESIONS



Sebaceous cyst



Infected sebaceous cyst

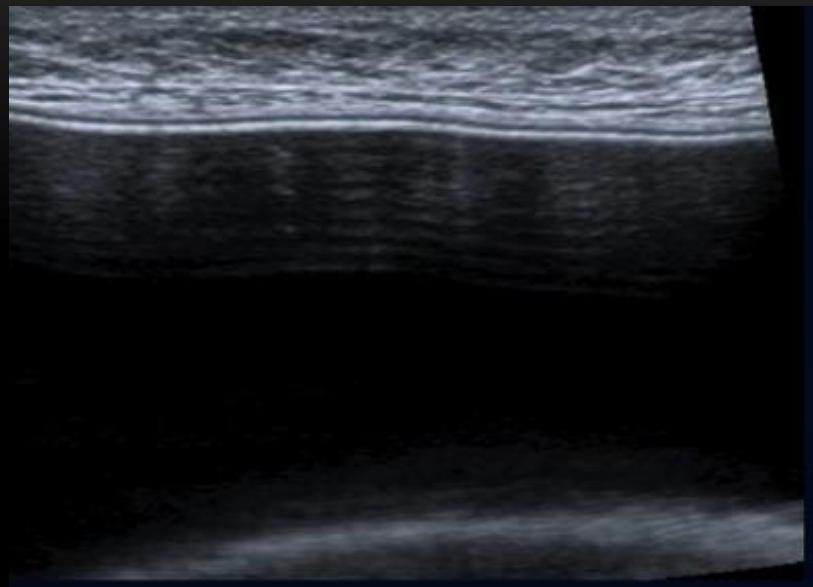
Ruptured Sebaceous cyst

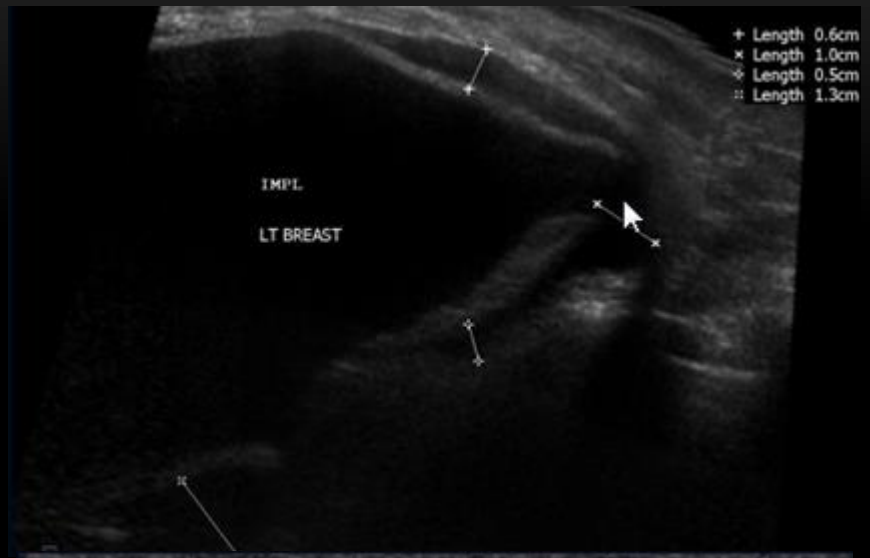
Mastitis with sinus tracts

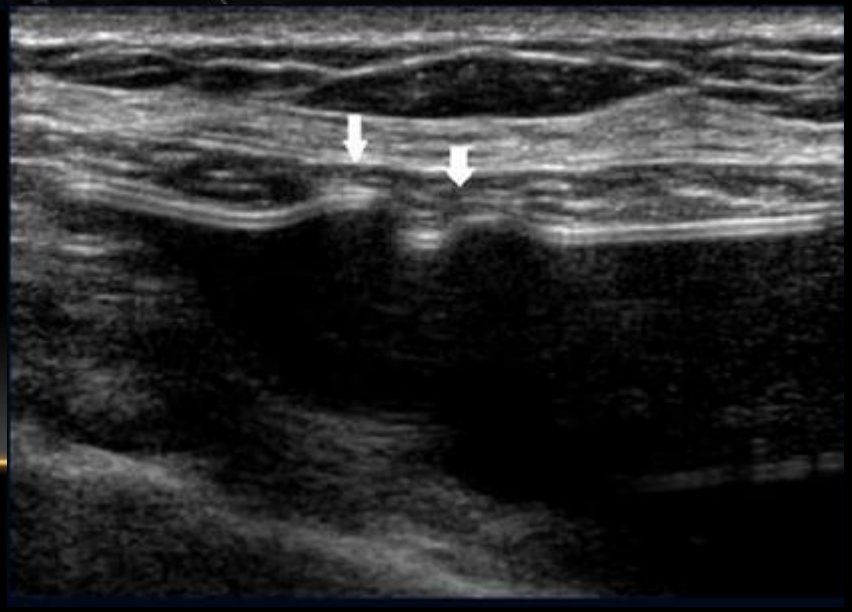
SPECIAL CASES

FOREIGN BODIES AND IMPLANTS

NORMAL IMPLANTS

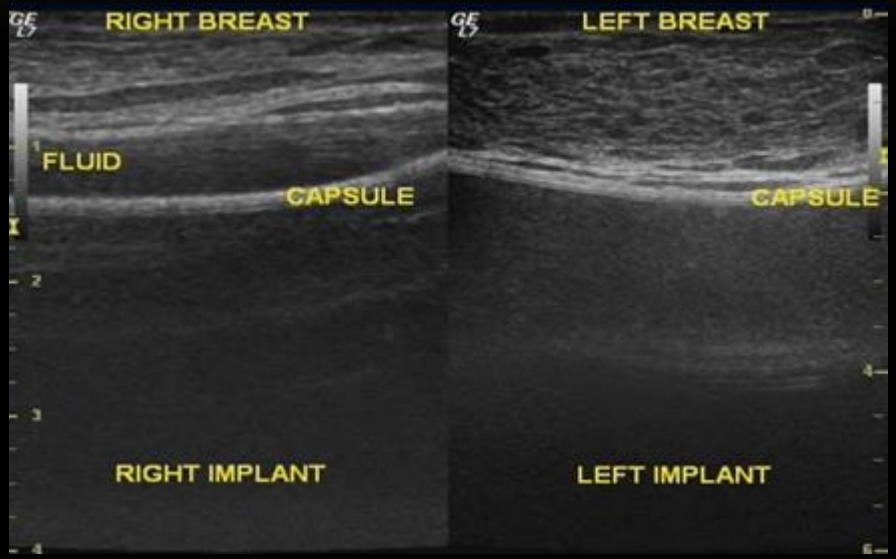


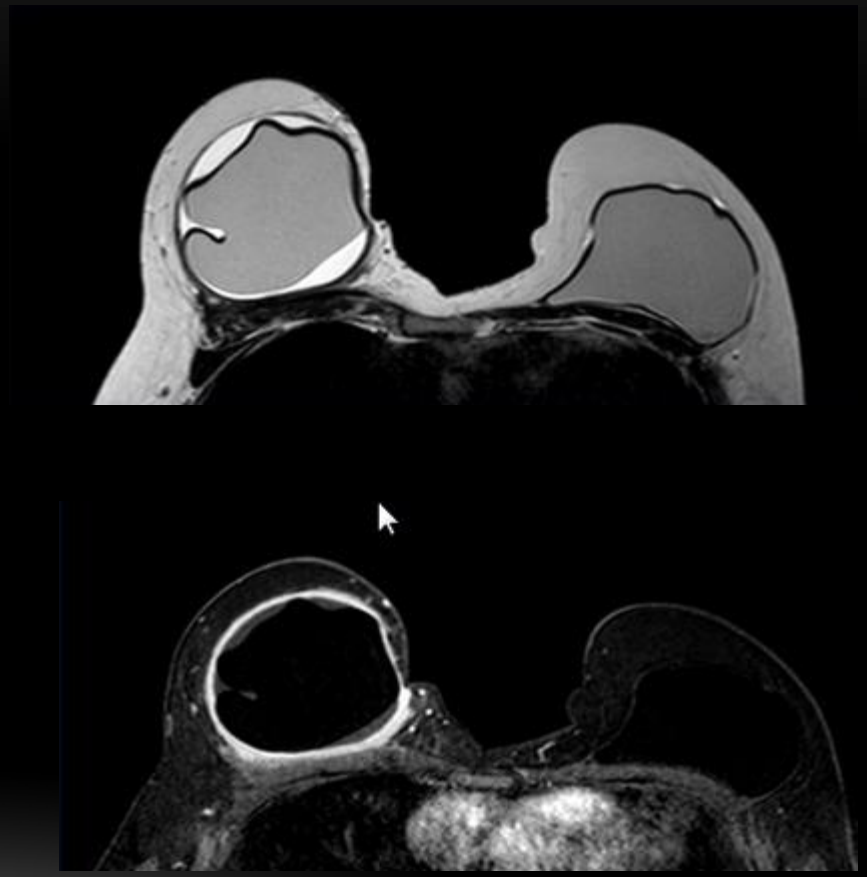




- Regular smooth outline (2 parallel lines)
- Homogeneous anechoic interior
- Linear internal echoes
- Some fluid may be present around the implant
- Radial folds possible

BREAST IMPLANTS

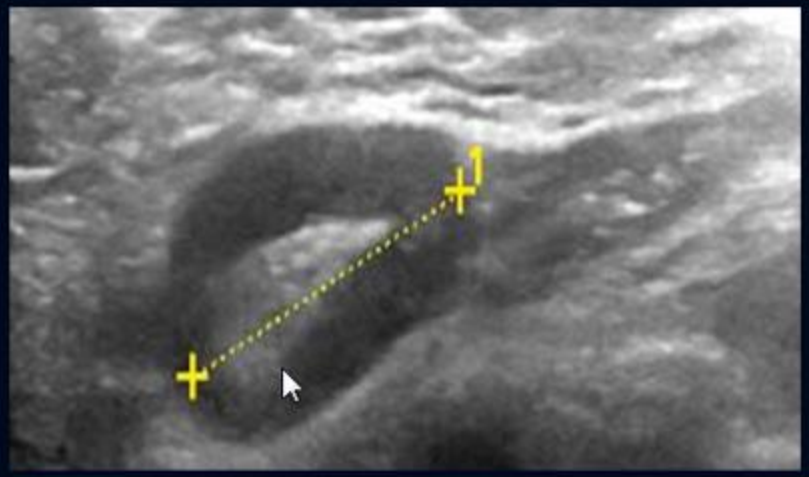


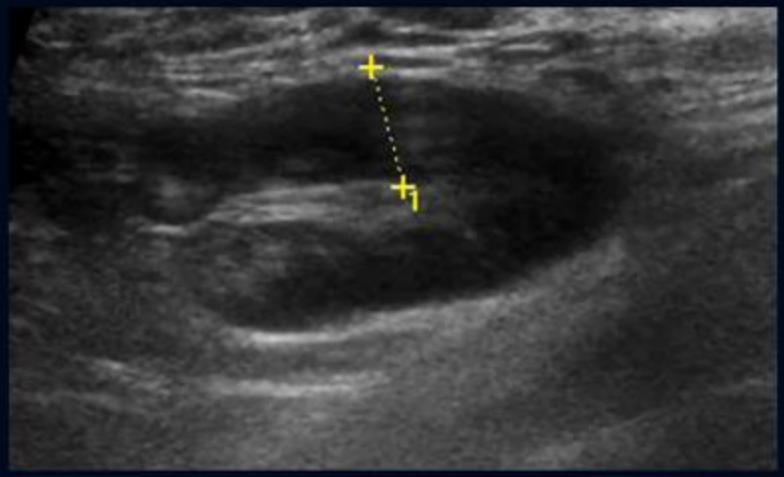


Infected right implant

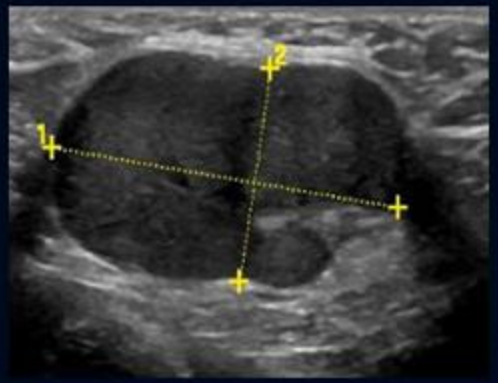
SPECIAL CASES

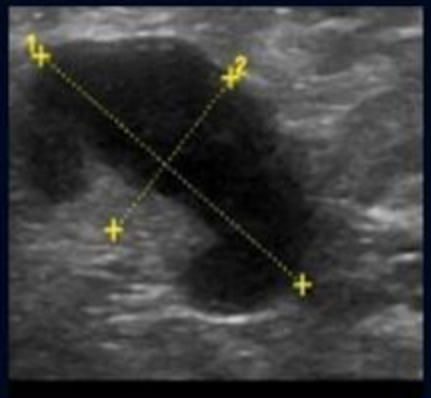
LYMPHNODES



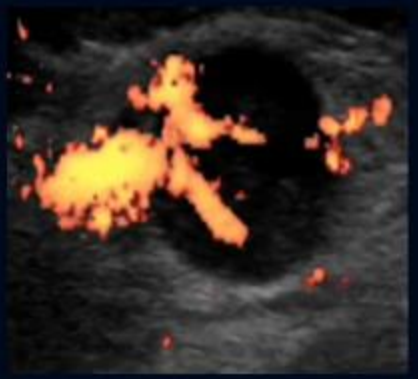


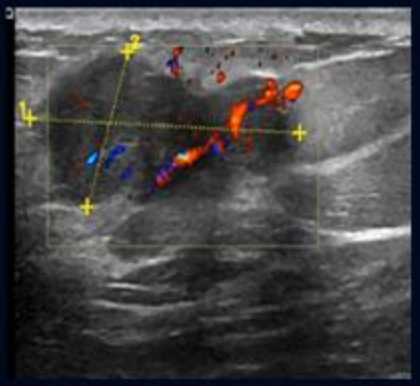
Reactionary nodes: preserved shape and fatty hilum but thick cortex





Globular shaped with muffled hilum



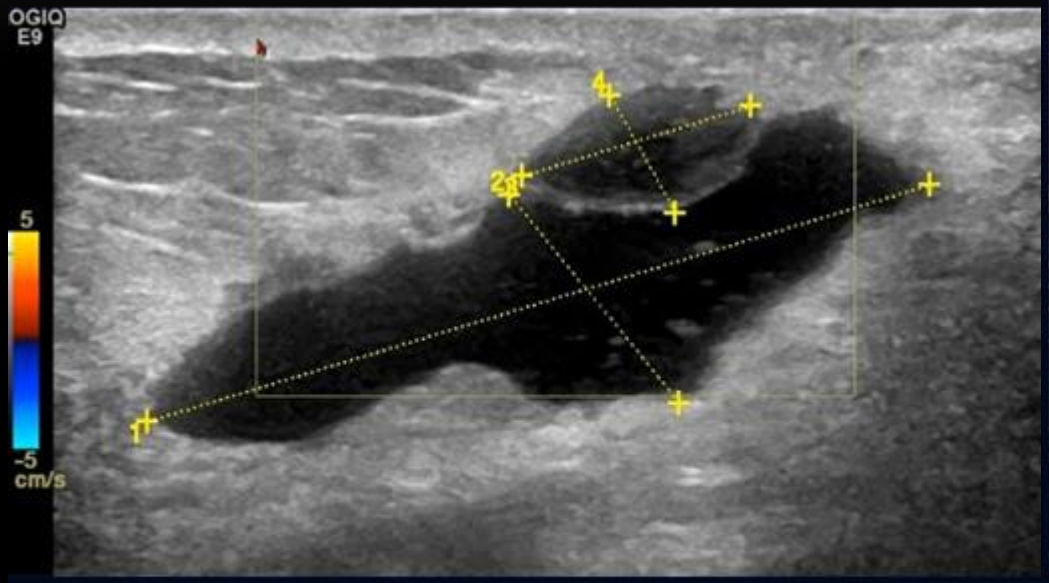


Increased vascularity

SPECIAL CASES

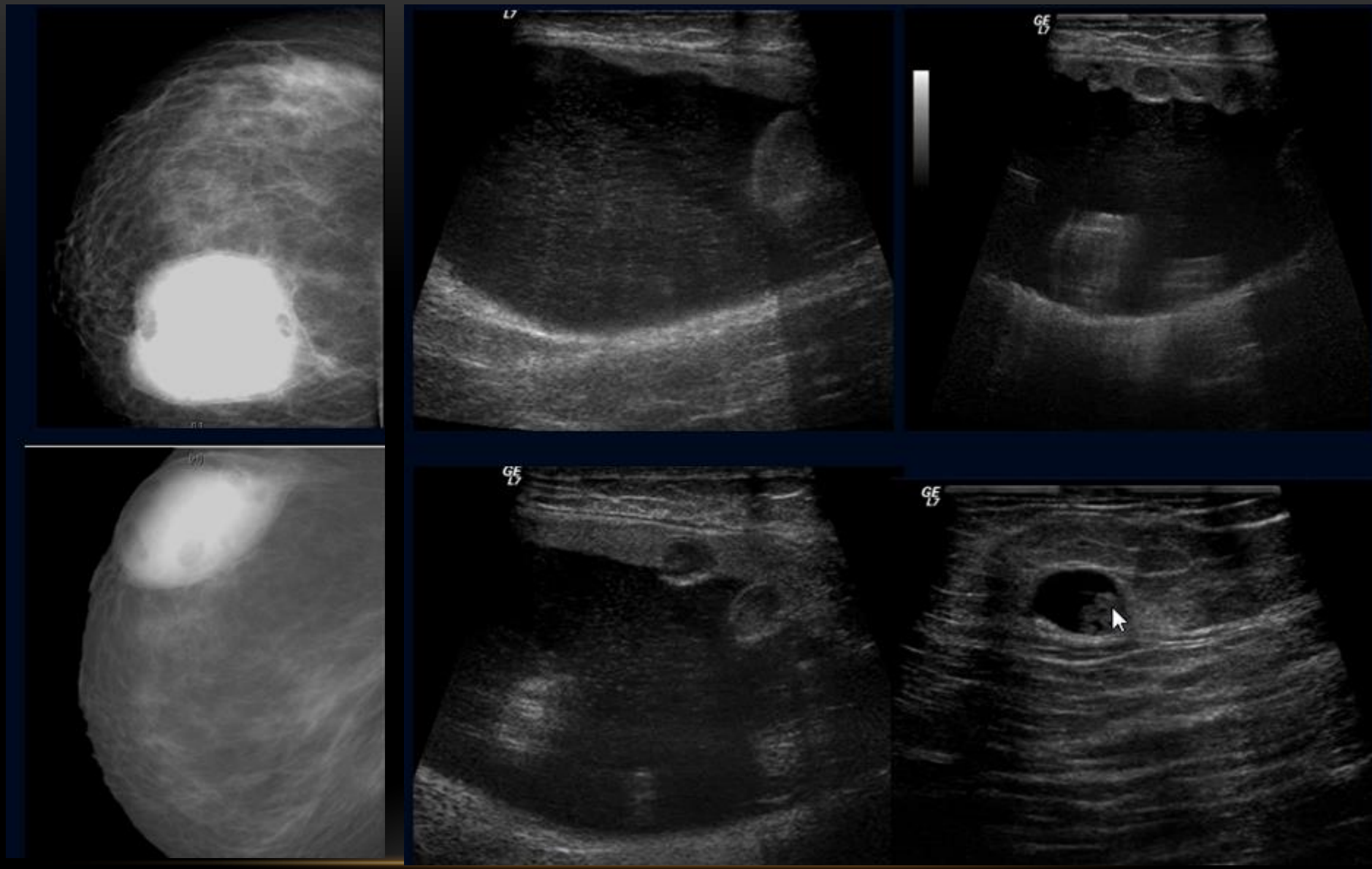
POST SURGICAL COMPLICATIONS

POST SURGICAL COMPLICATIONS



Operative bed seroma

Operative bed inflammatory changes



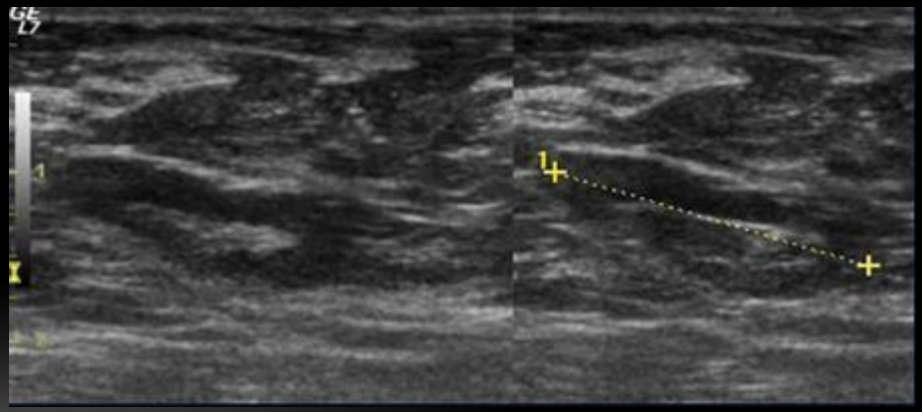
Operative bed fat necrosis

REPORT

1. Indication for examination.
2. Technique of breast US examination.
3. Overall breast composition.
4. Clear description of any important findings.
5. Comparison to previous examination and correlation with clinical, mammography, or MRI findings.
6. Composite reports.
7. BIRADS Assessment category and recommendation of management

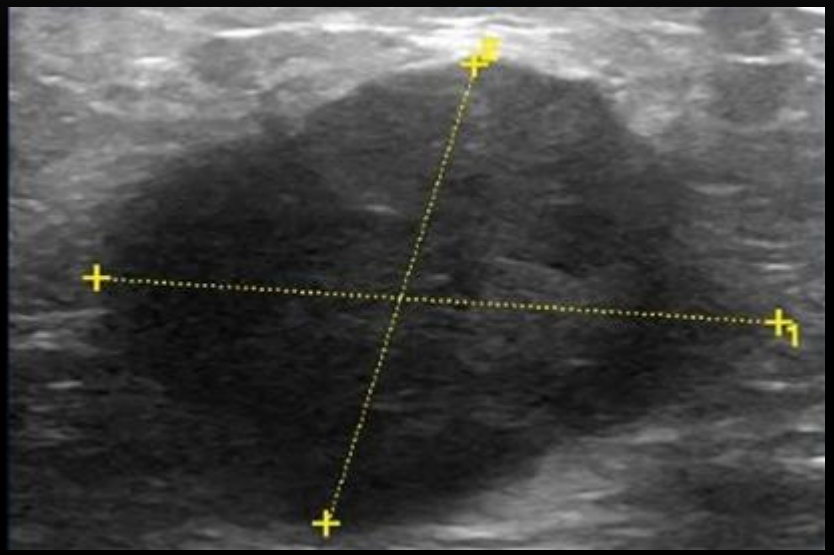
5. CLINICAL CORRELATION AND SHORT TERM FOLLOW UP

Young lactating female presenting with inflammatory signs of the right breast



Simple mastitis

CLINICAL CORRELATION AND SHORT TERM FOLLOW UP



- An increase of 20% or more in the longest dimension of a probably benign solid mass within 6 months may prompt biopsy.
- An increase of only 1–2 mm in lesion size may be related to differences in scanning technique or patient positioning.

REPORT

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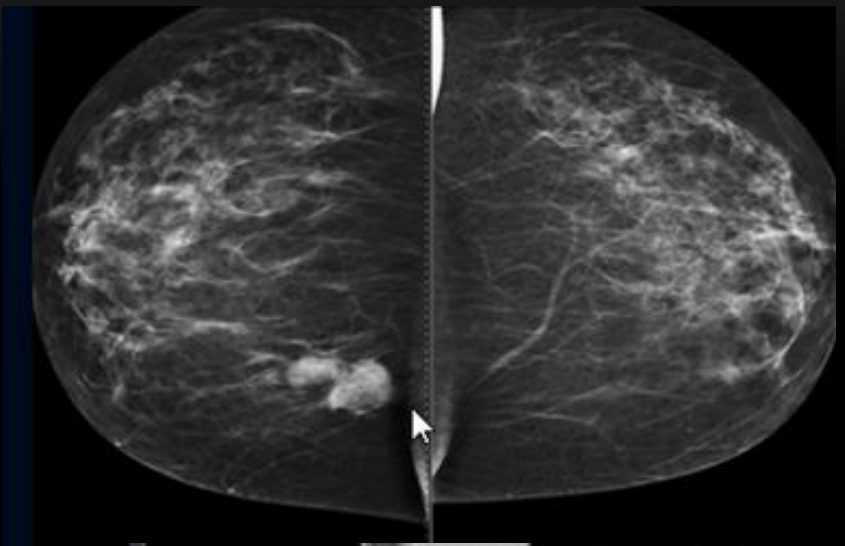
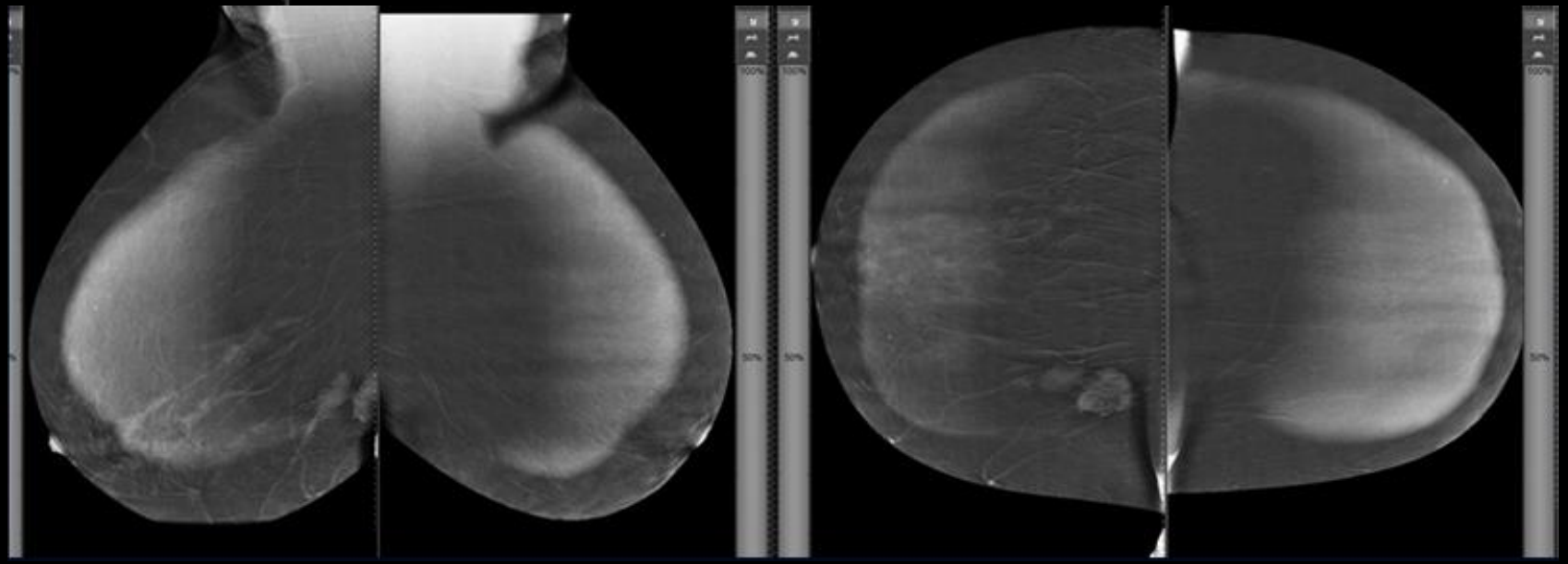
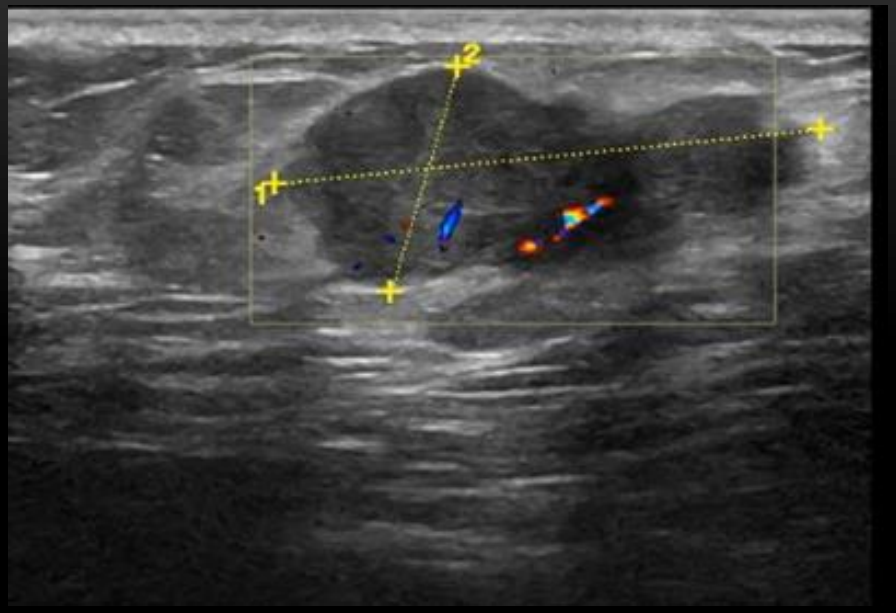
7. BIRADS Assessment category and recommendation of management

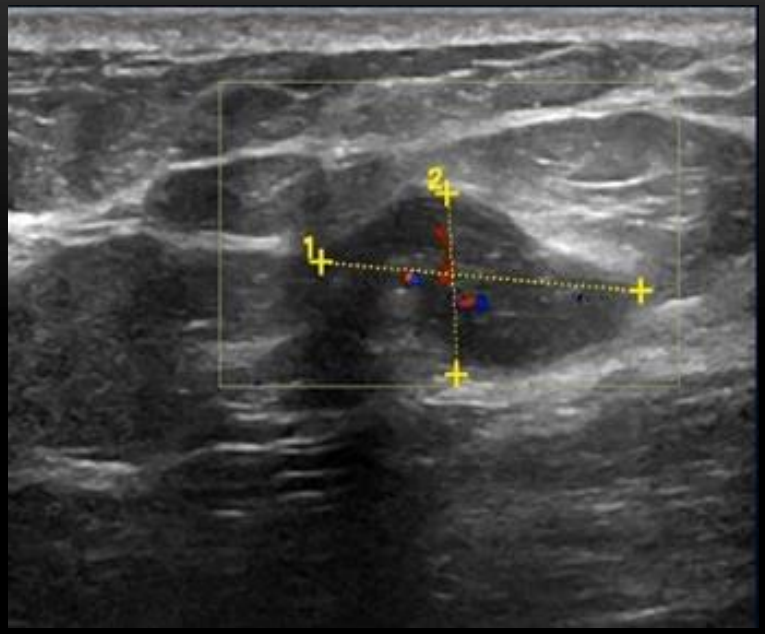
CORRELATION WITH MAMMOGRAPHY AND CESM FINDINGS

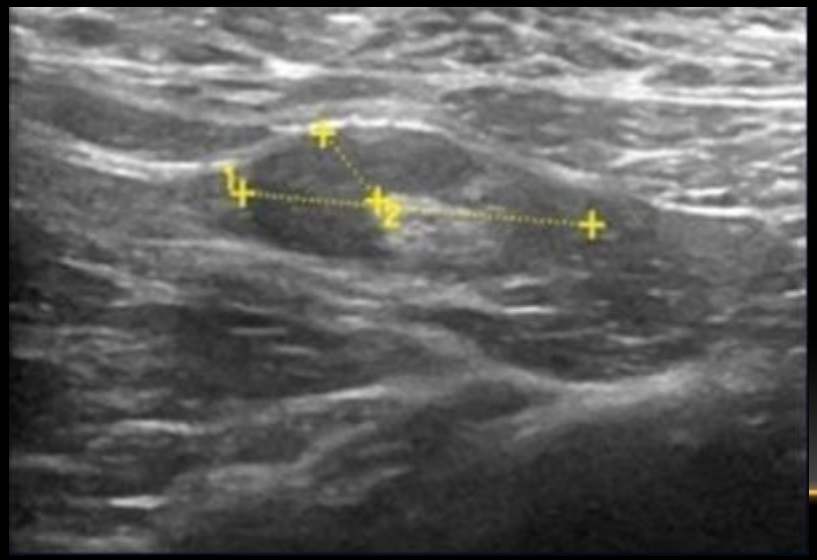


BIRADS 3









BIRADS 4c
IDC

REPORT

1. Indication for examination.
2. Technique of breast US examination.
3. Overall breast composition.
4. Clear description of any important findings.
5. Comparison to previous examination and correlation with clinical, mammography, or MRI findings.
6. Composite reports.
7. BIRADS Assessment category and recommendation of management

BIRADS 0	**Incomplete** — Need additional imaging evaluation or Comparison with previous films
BIRADS 1	**Normal examination** – Nothing to comment on – Routine mammography screening is recommended
BIRADS 2	**Benign findings** Routine mammography screening is recommended
BIRADS 3	**Probably benign** <2% malignancy Short interval follow-up is suggested
BIRADS 4 **4A** **4B** **4C**	**Suspicious** >2 but <95% - Biopsy should be considered **Low suspicion of malignancy:** 2-20% **Mod suspicion of malignancy:** 10-50% **High suspicion of malignancy:** 50-90%
BIRADS 5	**Highly Suspicious of malignancy** >95% Appropriate action should be taken
BIRADS 6	**Known** – biopsy proven malignancy Surgical excision when clinically appropriate

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