

Asymmetries and Architectural Distortion

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Disclosures

Google- research grant
Hologic- consultant



Breast Tissue

- Absolute symmetry is rarely observed
- Variations in technique and positioning
- Changes in breast tissue due to trauma/surgery/biopsies/age
- Differences in vendor or modality

Asymmetries

Asymmetries- Definition

Areas of tissue that are different than the overall background either by:

- Density
- Location
- Non-mirror image in contralateral breast

Tend to have concave margins

Fat interspersed within the area

Can be a normal variant



Asymmetries- Types

Asymmetry

Focal asymmetry

Global asymmetry

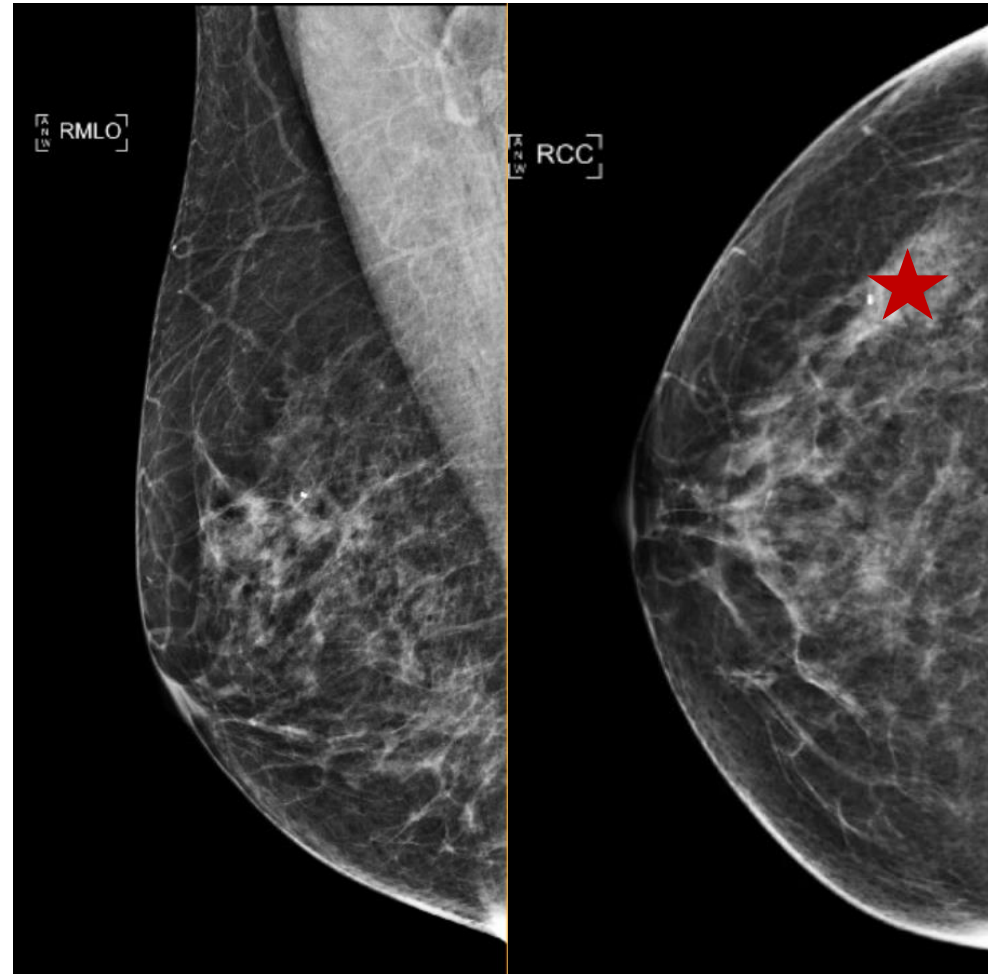
~~Developing asymmetry~~

- Removed in the 6th edition

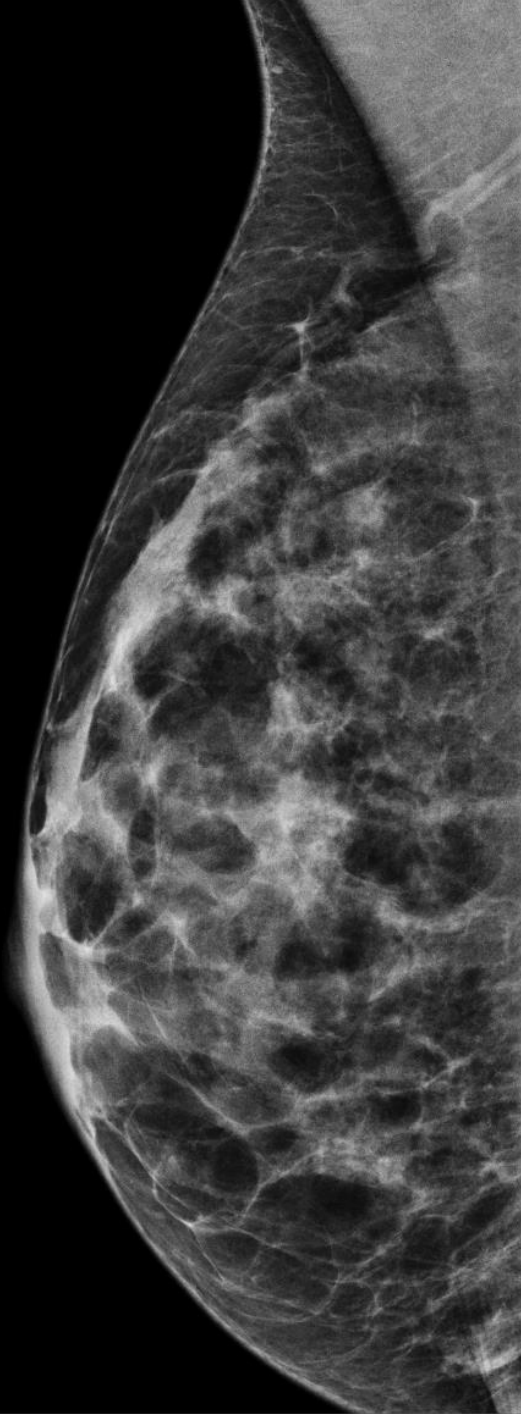


Asymmetry

Visible on only one
mammographic projection
80% of the time it is normal
superimposed tissue



[G] RMLO



[G] RCC

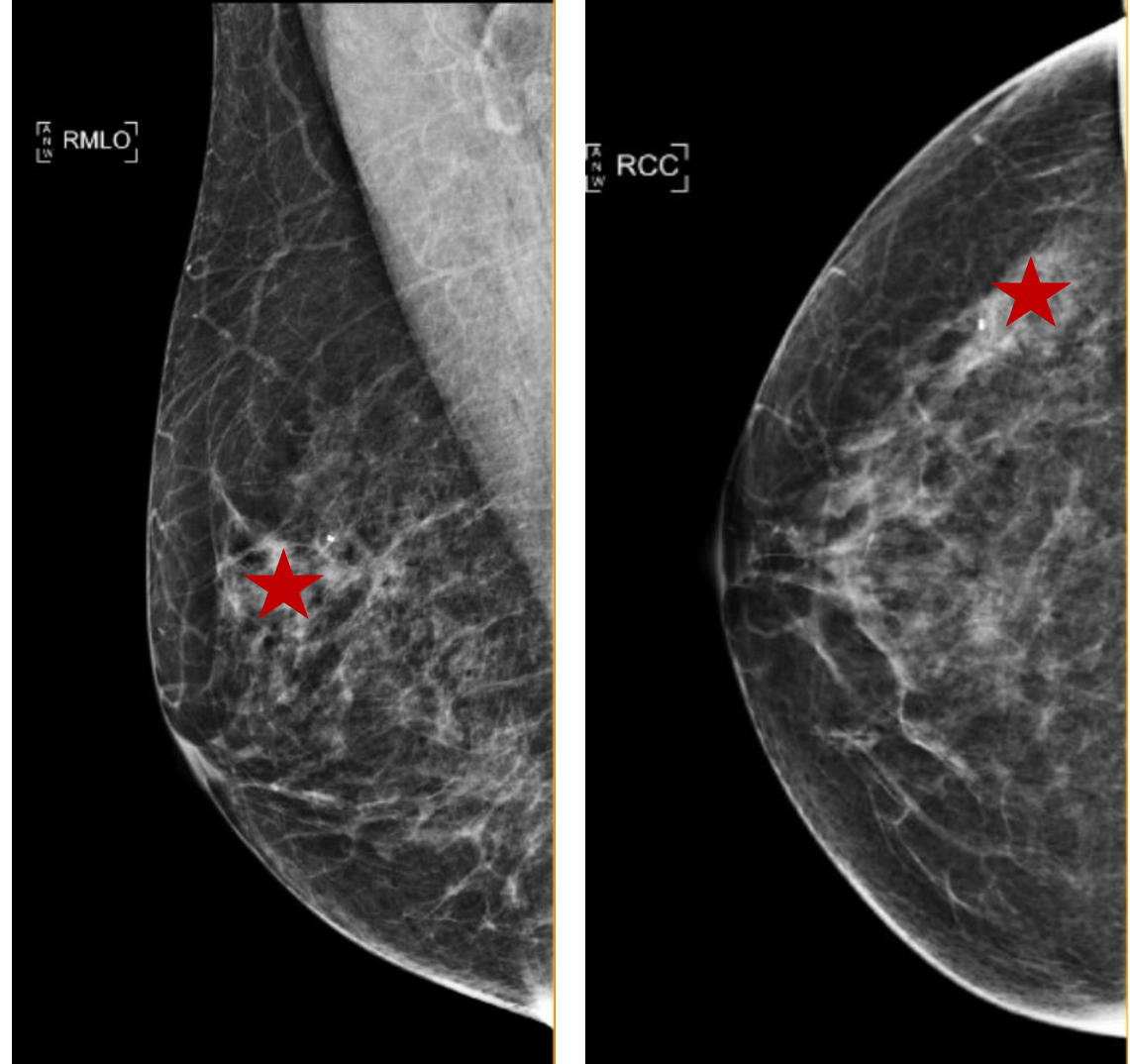


Focal Asymmetry

Visible on two mammographic projections

- Concave margins
- Often interspersed with fat

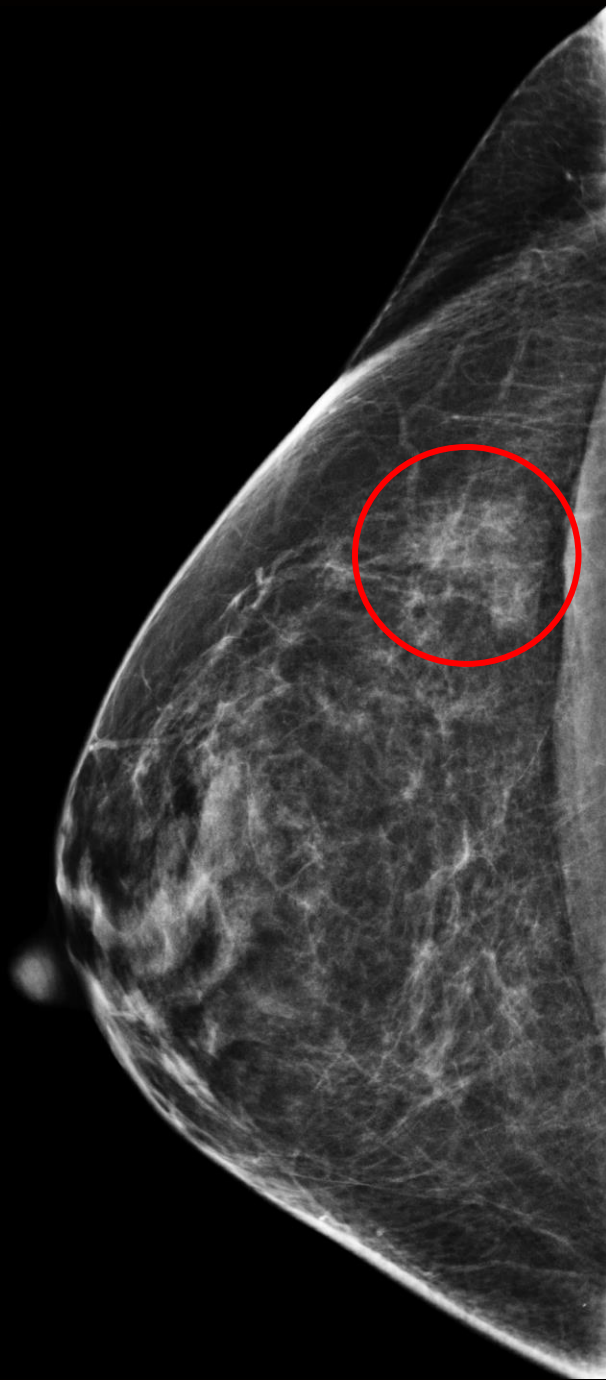
Similar size and appearance on both views



S
A
T
RMLO



S
A
T
RCC



[^H_D] RML



[^S_A] RCC

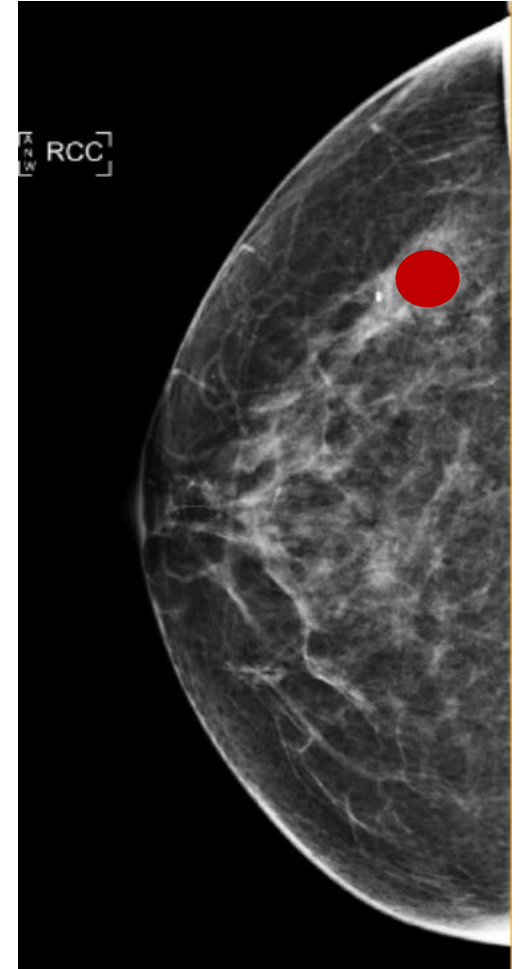


Focal Asymmetry vs. Mass

Does not fit criteria of a mass

A mass has...

- Convex margins
- Takes up a 3-dimensional space
- Is a definite finding and not superimposed tissue



BIRADS 5th vs. 6th Edition

5th Edition

- A mass must be on two views regardless if it appears as a mass on DBT

6th Edition

- A mass can be seen on only one view if well-established on DBT images as meeting the criteria of a mass
- Multiple slices qualify as multiple views

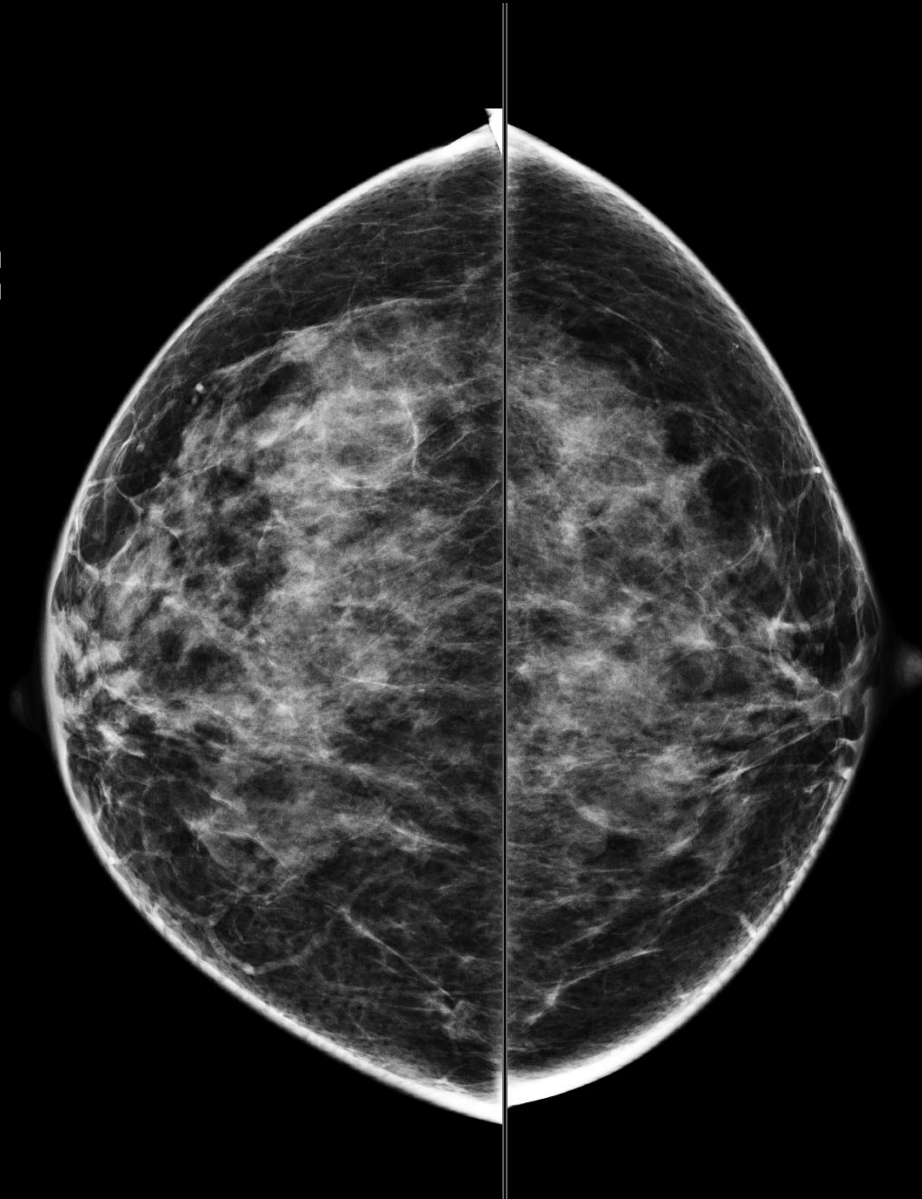


[A
G
Y] RMLO

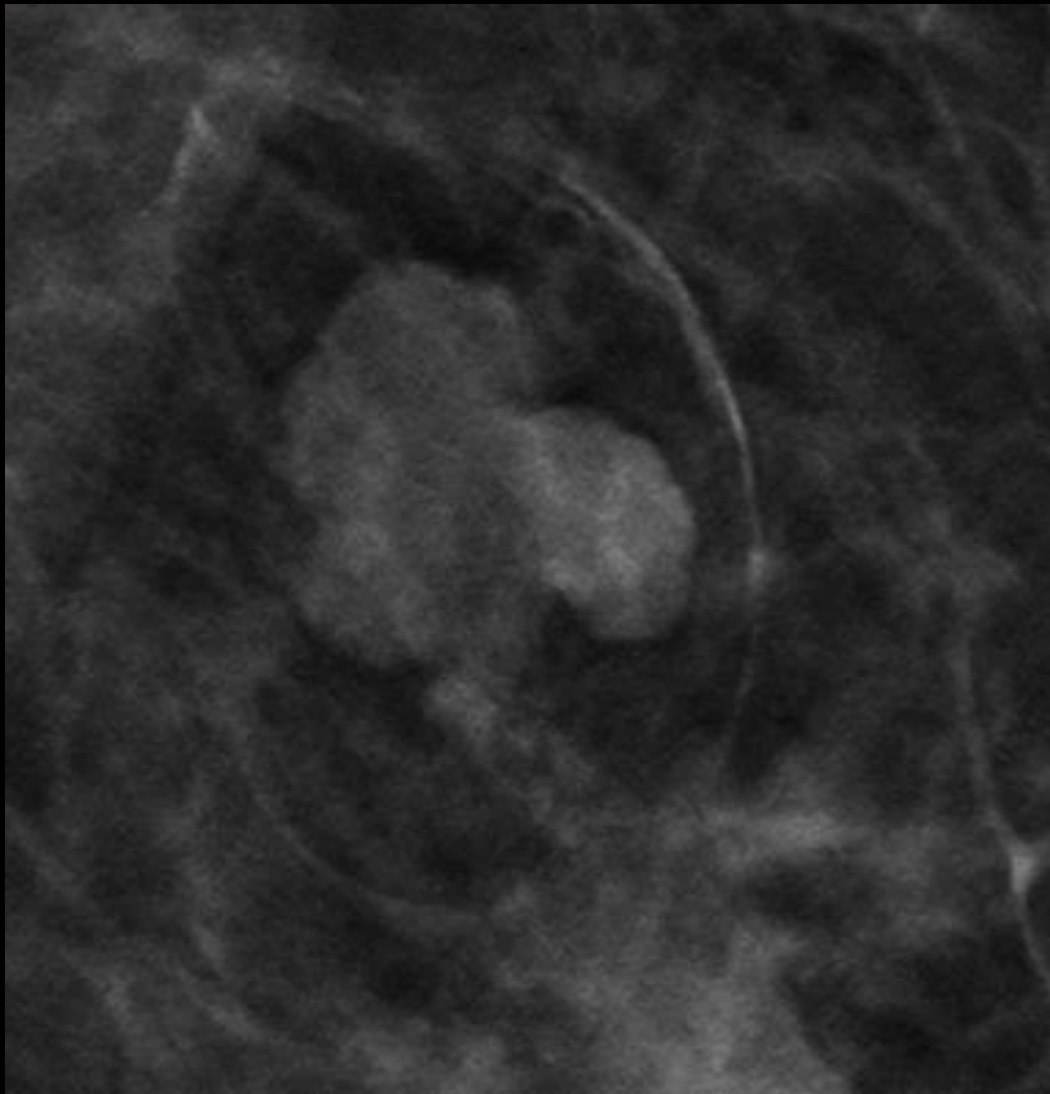
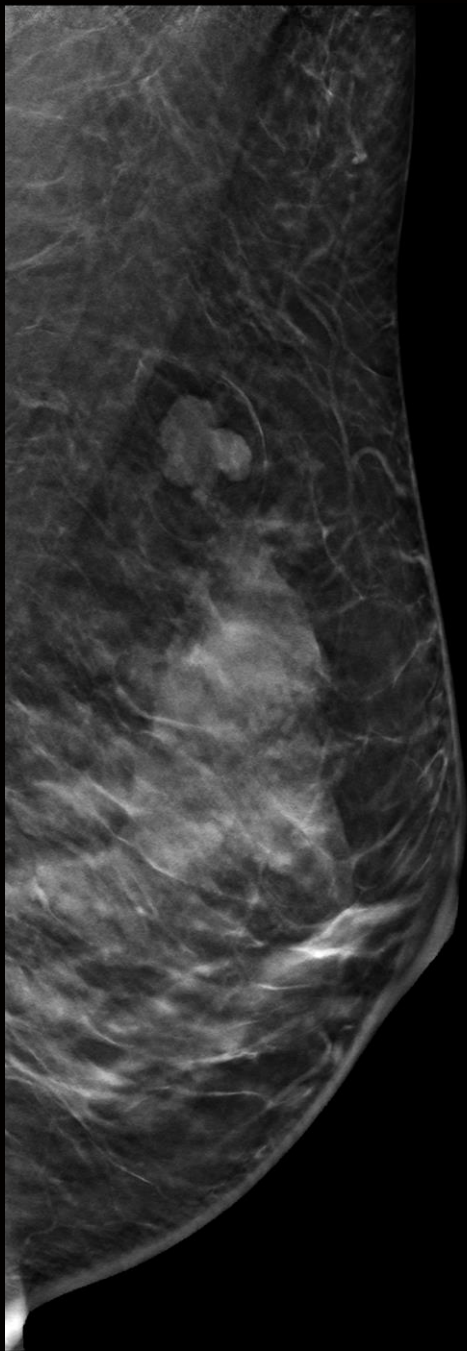


[A
G
Y] LMLO

[A
G
Y] RCC

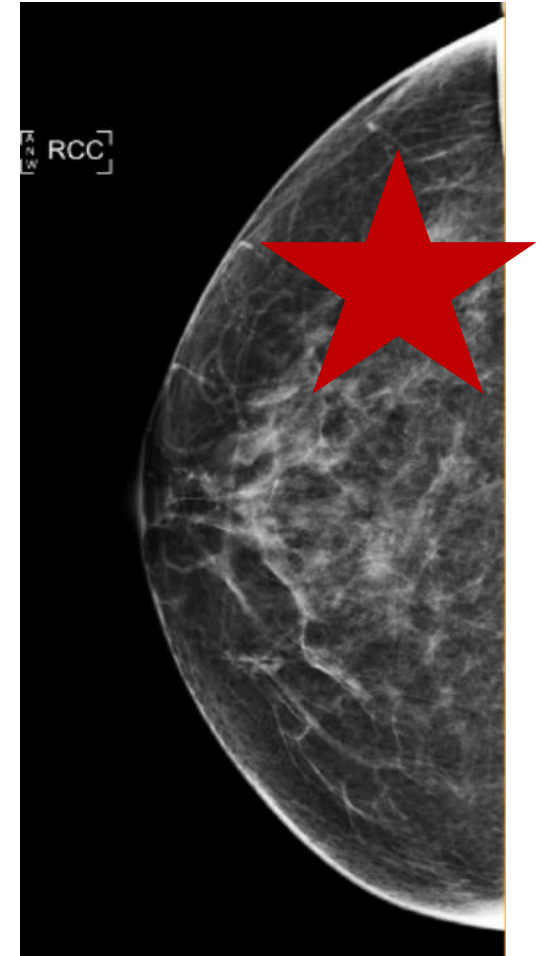


[A
G
Y] LCC

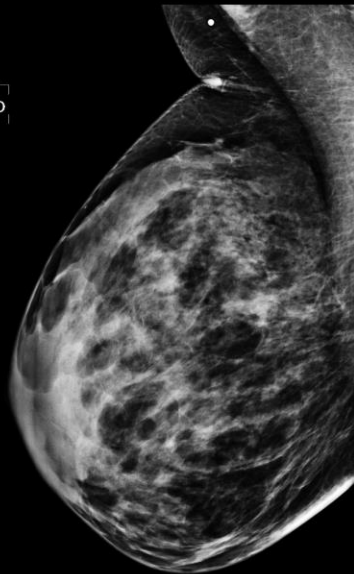


Global Asymmetry

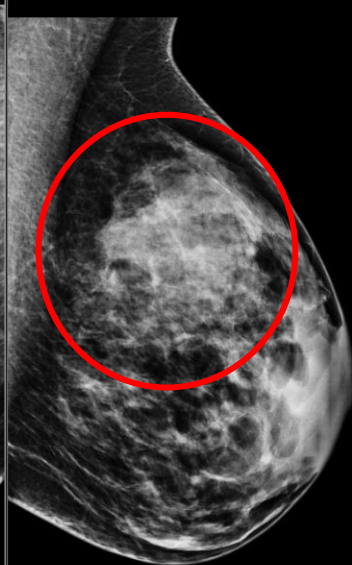
- Very large focal asymmetry
- Almost fills one quadrant or more
- No associated calcifications, masses or distortions
- Not palpable
- Almost always benign



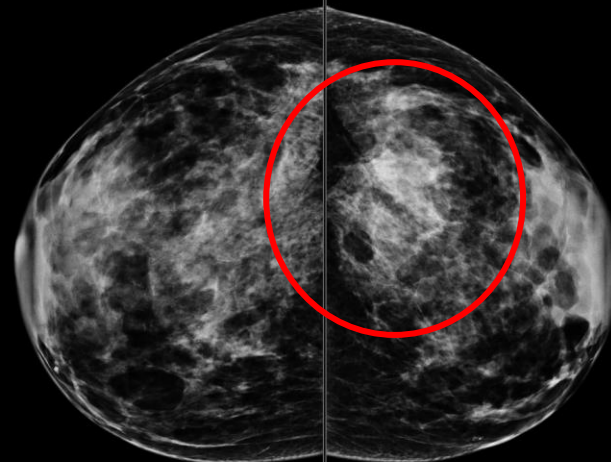
C
A
M
RMLO



C
A
M
LMLO



C
A
M
RCC



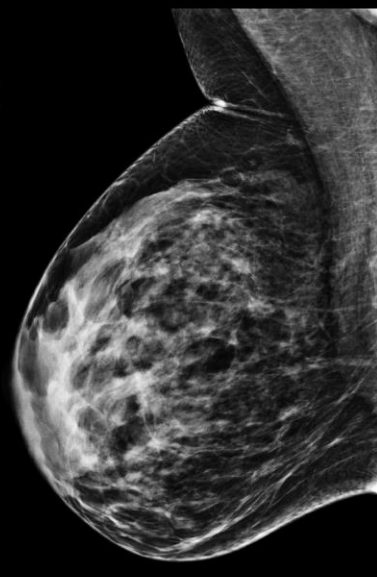
C
A
M
LCC



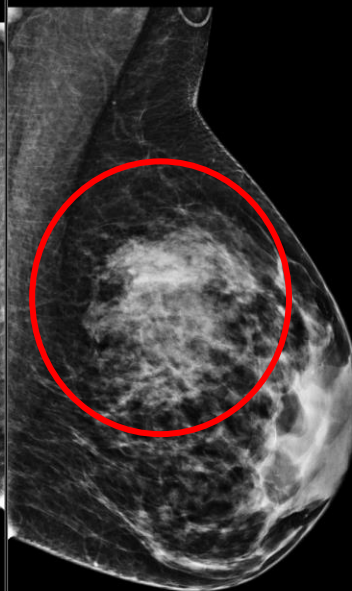
2017

C:2047 W:4096 2D n.a. 33% C:2047 W:4096 2D n.a. 33% C:2047 W:4096 2D n.a. 29% C:2047 W:4096 2D n.a. 29%

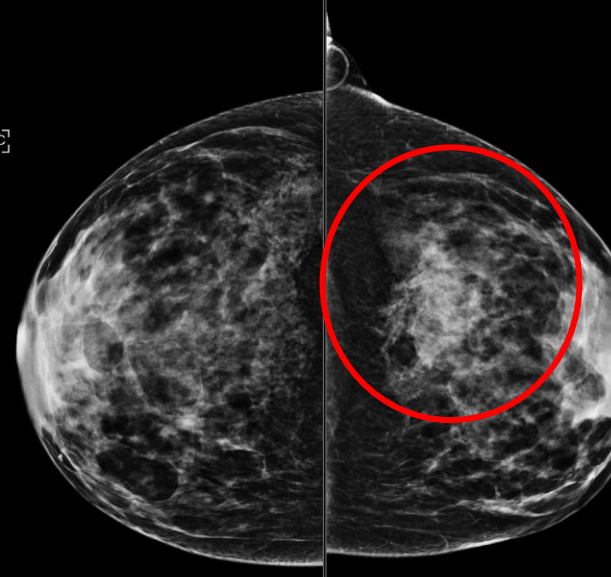
F
L
RMLO



F
L
LMLO



F
L
RCC



F
L
LCC

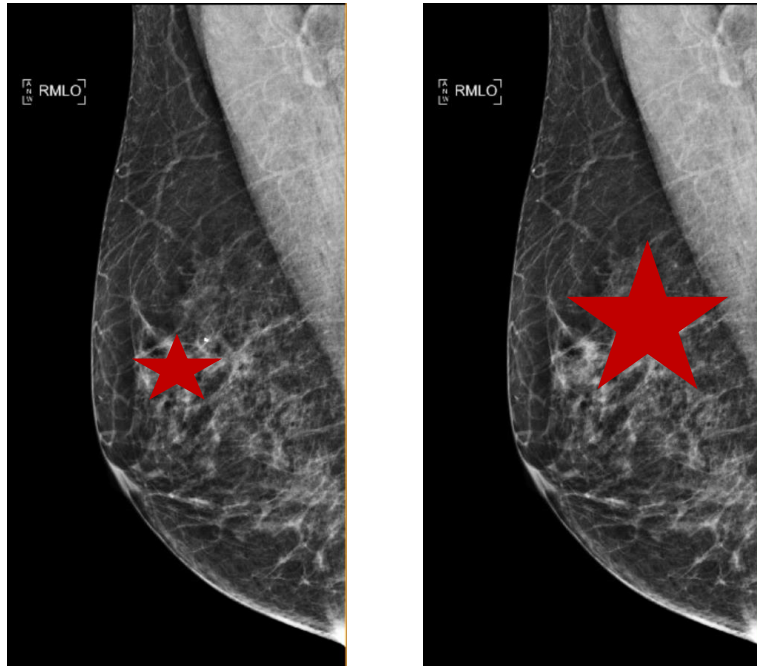


2024

Developing Asymmetry

A focal asymmetry that is new or increasing in size or conspicuity since the prior examination

Removed from BIRADS 6th edition



*You can say the focal asymmetry is new or more conspicuous or even developing, but its not its own different entity (but at our institution we don't comment on change unless new)

- We don't use "developing calcifications" or "developing masses" as a separate entity

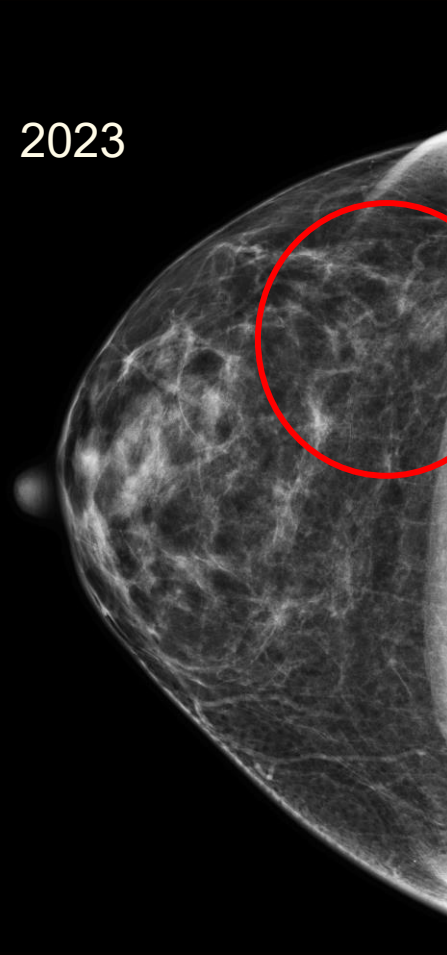
Developing asymmetry

RCC⁷

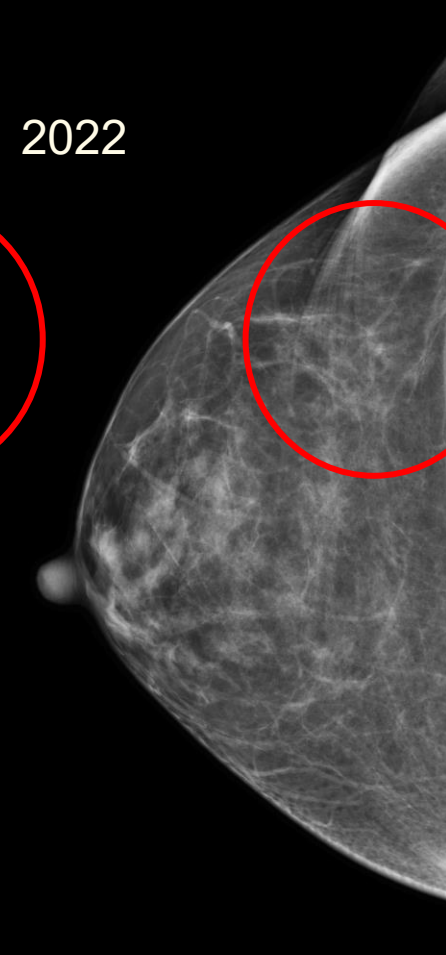
2024



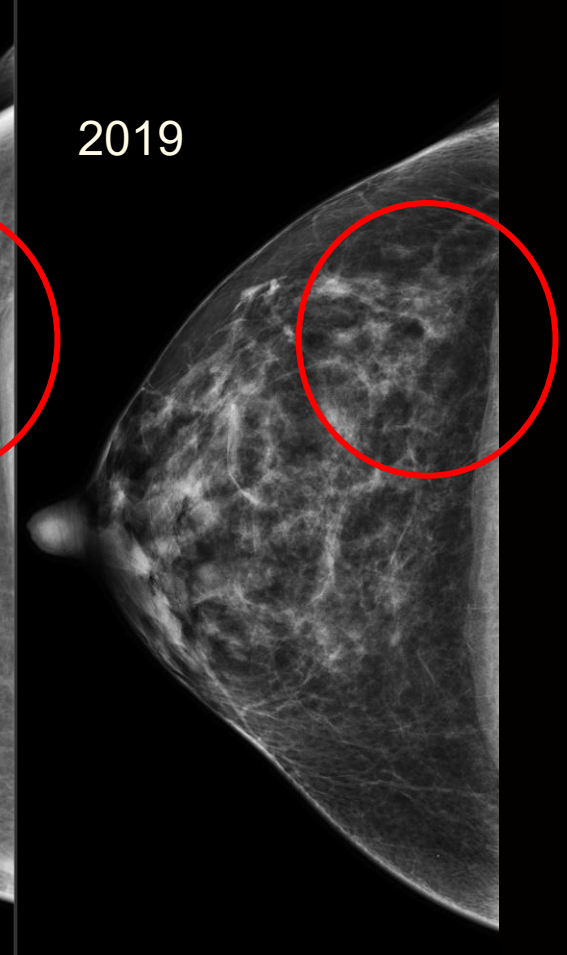
2023



2022



2019



Work up of Asymmetries

Now that I see an asymmetry/focal asymmetry, now what?

- Diagnostic imaging is warranted
- Spot compression views, rolled views and/or ultrasound



Asymmetry

Where is it on the other view?

- Is it obscured by other tissue?
- Is it not in the field of view?
- Try to find it based on the depth from the nipple

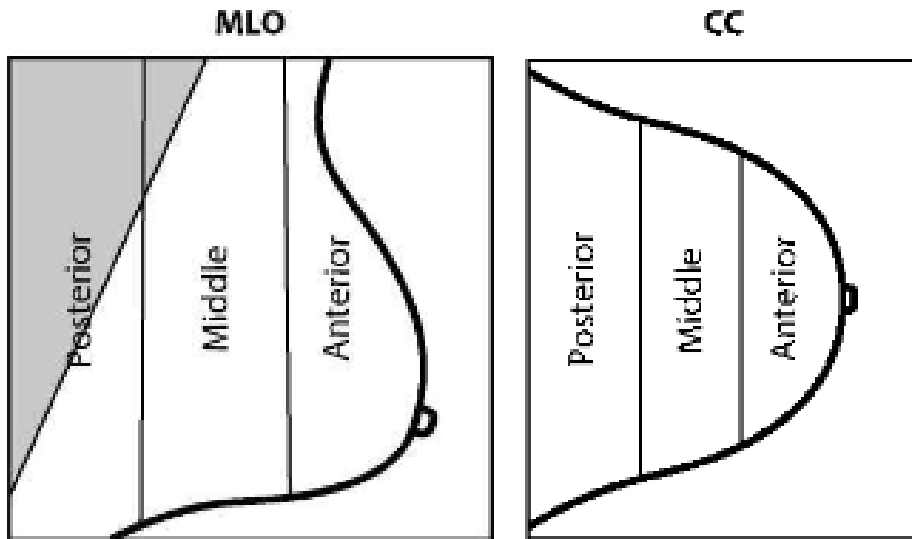


Figure 148 - Depth Diagrams

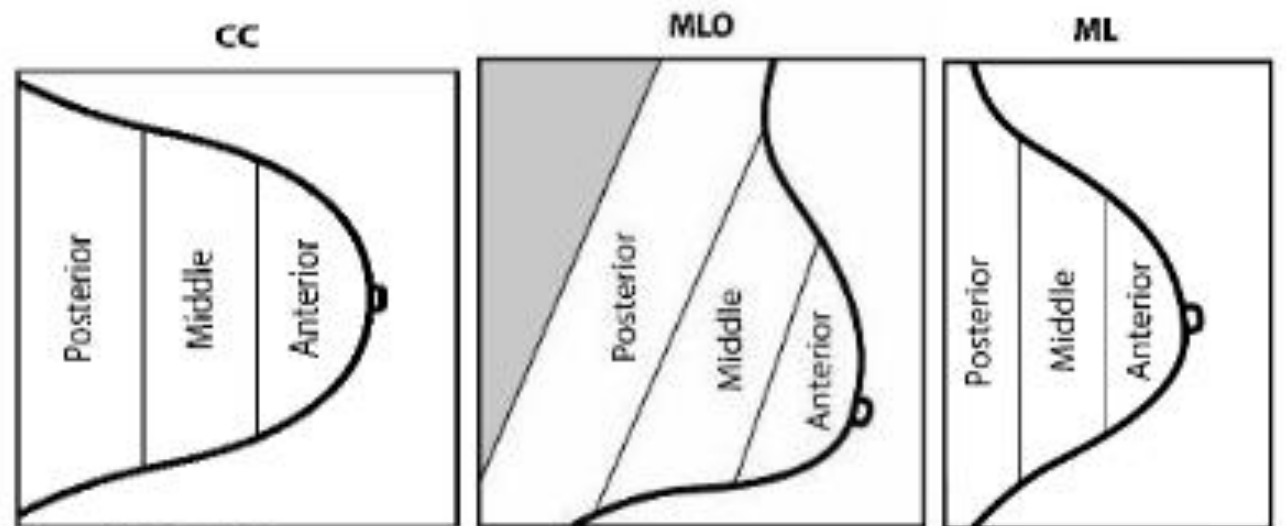


Figure 1. Depth Diagrams



5th Edition

6th Edition

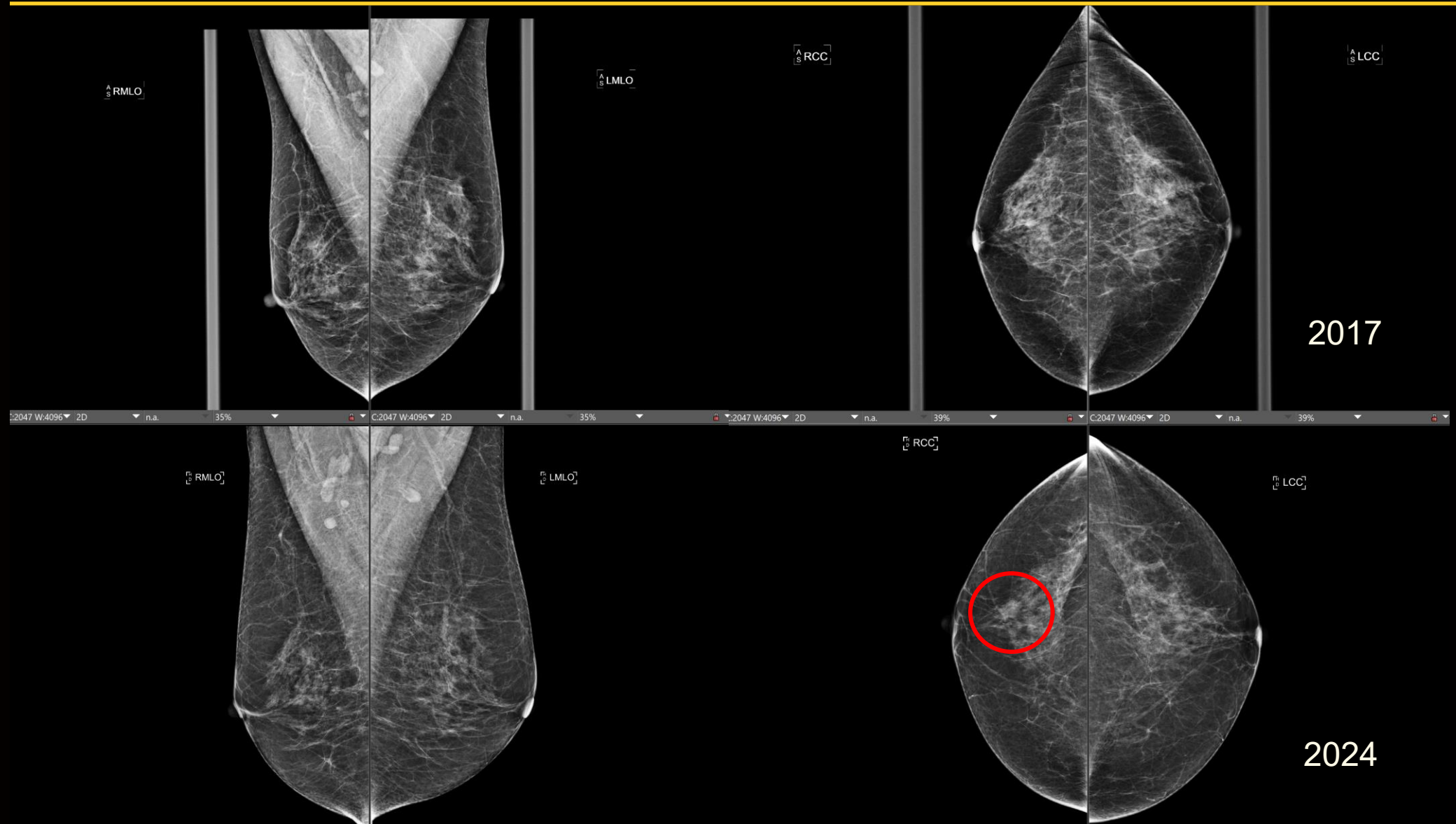
Asymmetry: Diagnostic Mammographic Work-Up

- Repeat the view of the one view asymmetry
 - About 50% of the time it will be gone*- decreases pre-test probability
- Do a lateral view
 - If the finding is still there on this view, more likely real
- Spot compression of the asymmetry
 - Be careful of asymmetries completely going away on spot views... this is the least reliable view if negative



*anecdotal

Work up of an asymmetry



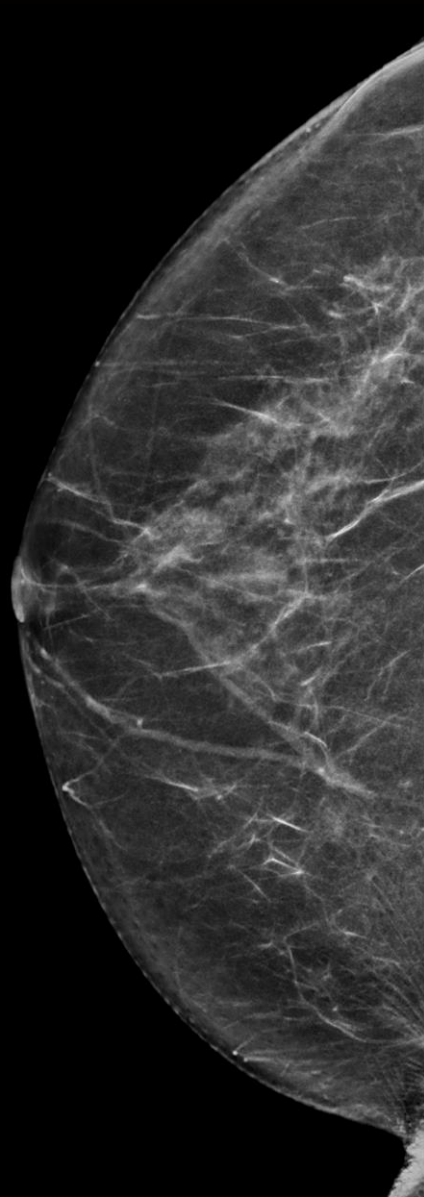
[R] RMLO



[R] RCC

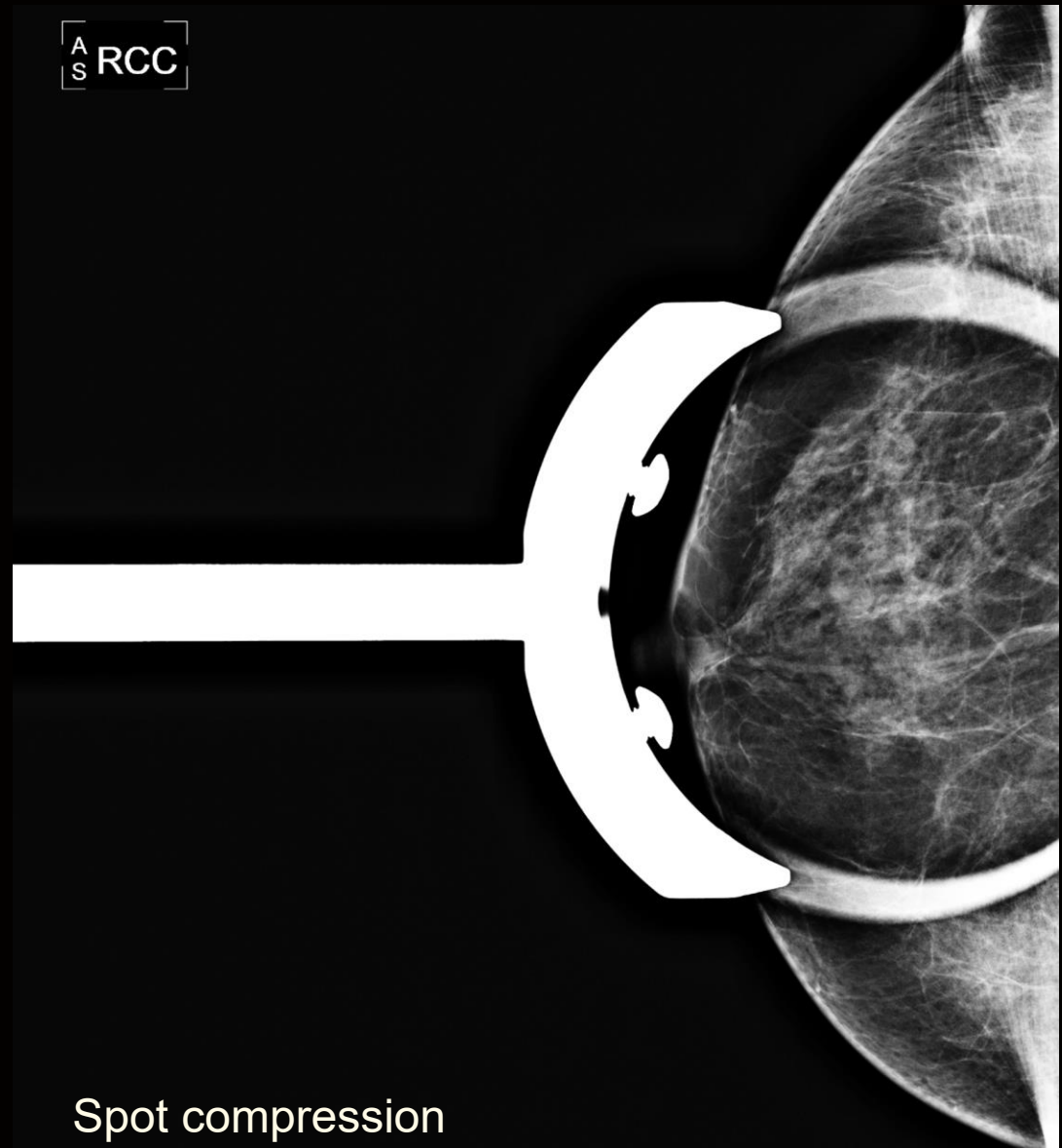


[R] RCC



Repeat view!

[A
S] RCC



Spot compression

Asymmetry: Diagnostic Sonographic Work Up

- Scan the entire hemisphere (upper breast, lower breast, inner breast, outer breast)
- If not present on any of the mammographic or sonographic views, then consider it superimposed tissue





Negative US

Focal Asymmetry

- Is the finding a true abnormality or is it an island of normal breast tissue?
- Is the density of the focal asymmetry more than the surrounding tissue and is localized centrally?
- Is this a new finding?
- Is this palpable?



Focal Asymmetry: Diagnostic Mammographic Work Up

- Spot compression in both views
 - If it persists in both views, then it is likely real
- True lateral view
 - Helps localize the finding for ultrasound
 - Also helps determine if the finding is real





[^H_D] RML



[^S_A] RCC

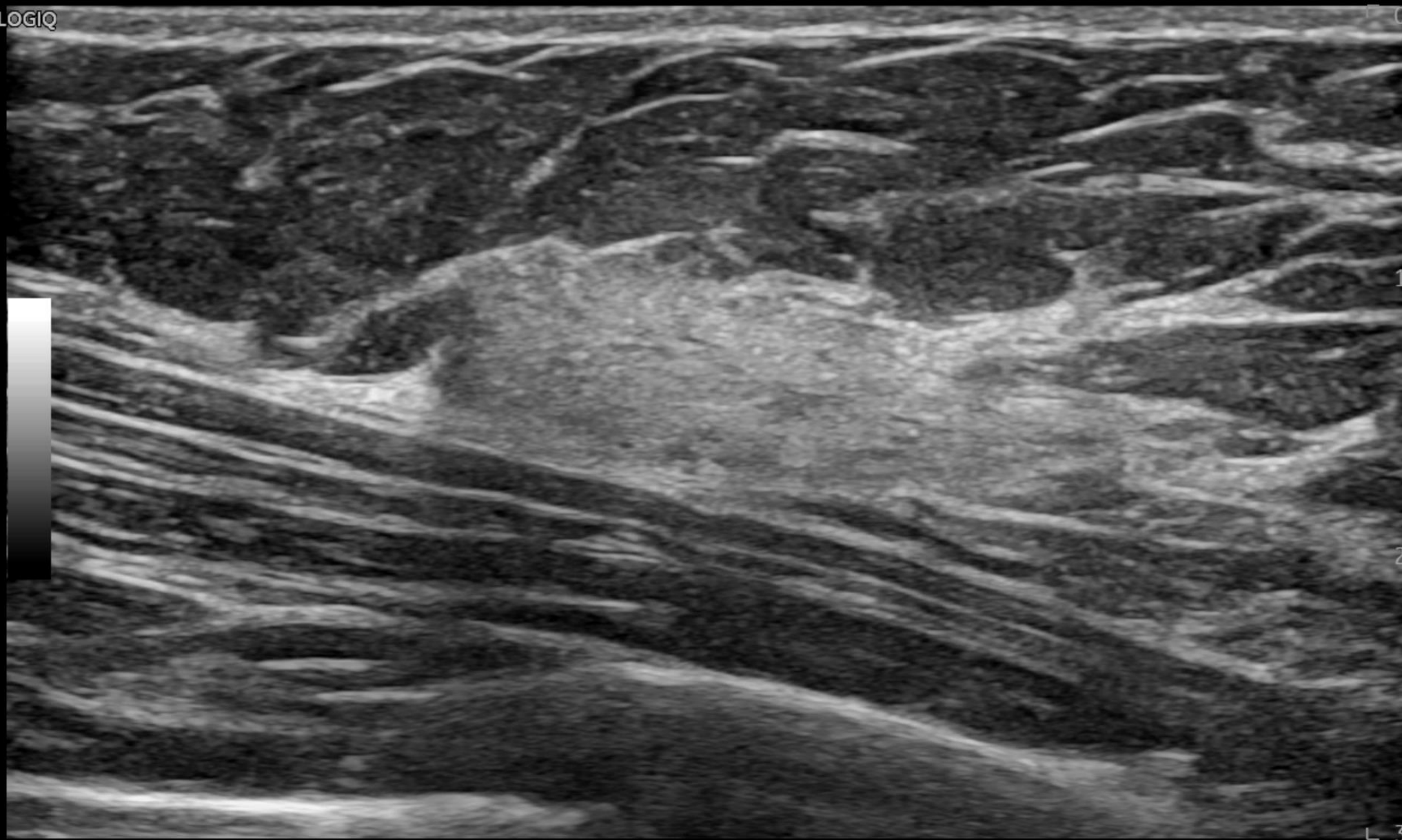


Focal Asymmetry: Diagnostic Sonographic Work Up

- Scan the quadrant where the focal asymmetry is located
- If the mammogram findings persist but the ultrasound is negative, a tomo/stereo biopsy is warranted



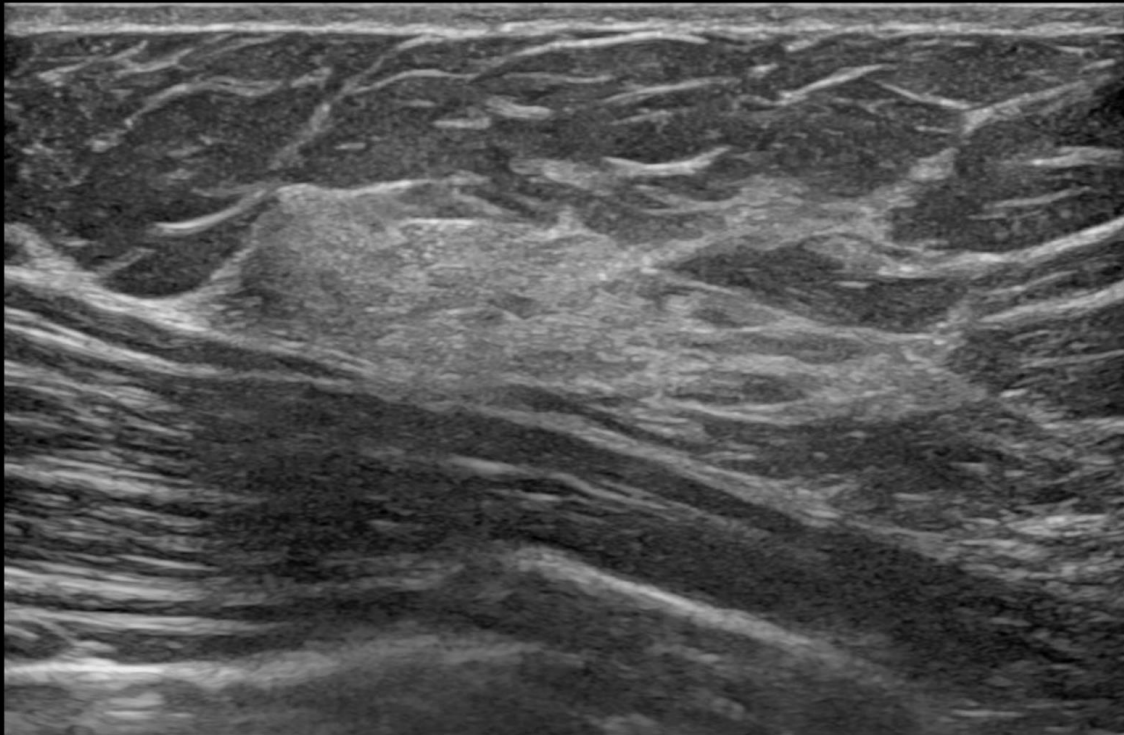
LOGIQ



SMF

RT BREAST 10:00 7 CM RAD

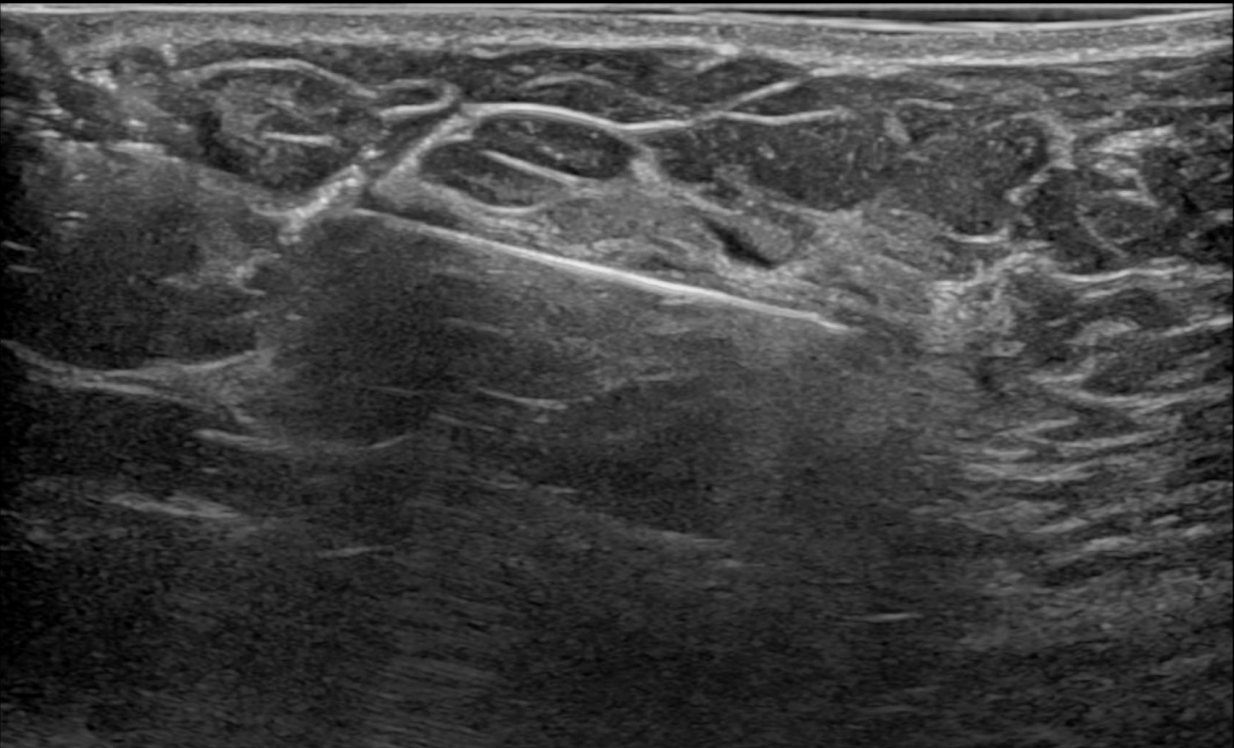
LOGIQ



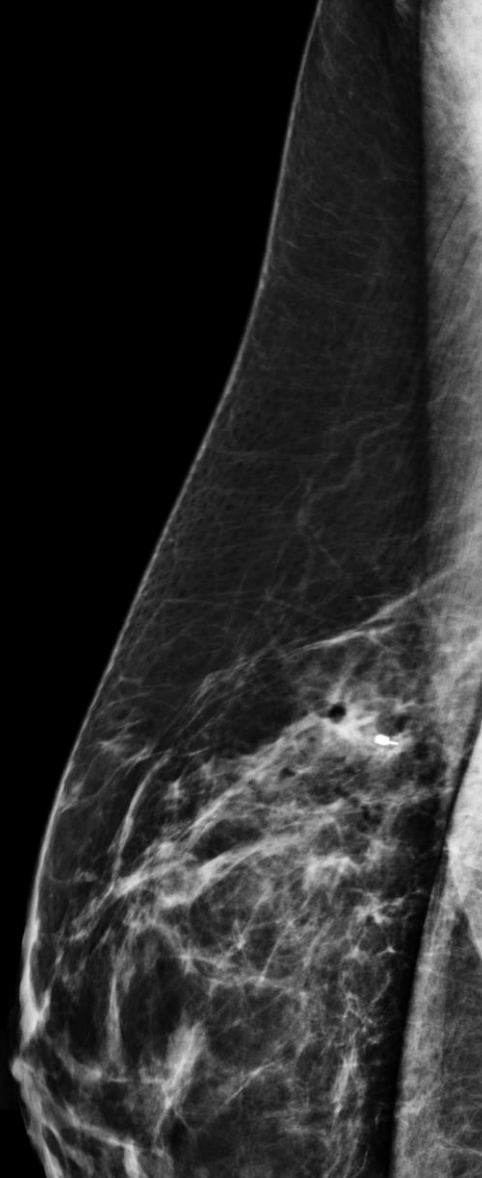
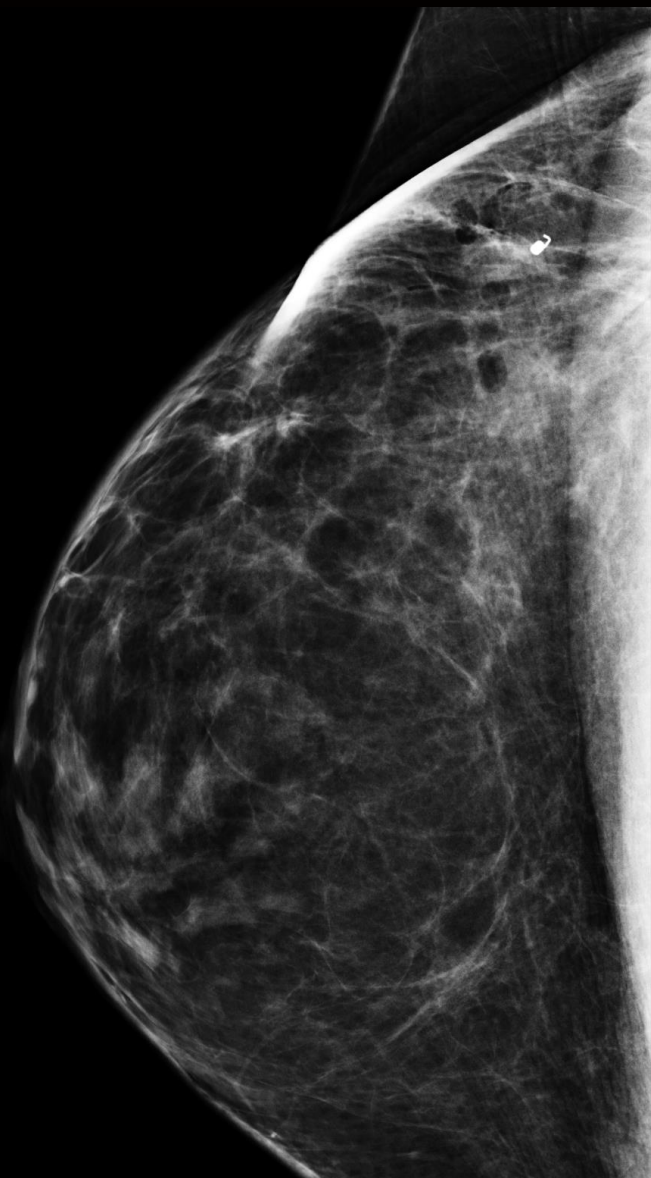
RT BREAST 10:00 7 CMFN RAD
SCOUT BX

LOGIQ

SB



RT BREAST 10:00 7 CMFN ARAD
ELEVATION
CORE BX SITE 1



Final Diagnosis

A. Right breast, mass at 10 o'clock and 7 cm from nipple, ultrasound core needle biopsy (BI-RADS 4A):

- Breast tissue with stromal fibrosis (up to 0.6 cm), apocrine metaplasia, usual ductal hyperplasia, columnar cell change, and microcysts

Global Asymmetry

- Mostly identified on a baseline examination
- If not palpable, then this is most likely a benign finding
- Cannot have associated distortion, calcifications or masses
- Same work up as a focal asymmetry if uncertain
- Generally doesn't need a diagnostic work up



Developing Asymmetry

- Anything new or more conspicuous is inherently suspicious
- Doesn't need its own category
- Optional to describe the change from the prior examination
- Differential diagnosis: HRT, PASH, malignancy
- $\frac{1}{4}$ of developing asymmetries were malignant in the diagnostic setting*
 $\frac{1}{4}$ of them don't have a sonographic correlate



Leung JW, Sickles EA. Developing asymmetry identified on mammography: correlation with imaging outcome and pathologic findings. AJR Am J Roentgenol. 2007 Mar;188(3):667-75.

Architectural Distortion

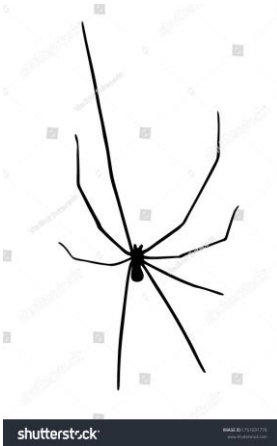
Architectural Distortion

Thin dense or lucent lines radiating from a point

Lines can be straight or curved slightly

Tissue looks like:

- Fireworks
- Spider-like
- Crumpled tissue paper



Architectural Distortion

- Appears more conspicuous on DBT
- Likelihood of malignancy is lower with DBT
- Radiating lines can be bright or dark
- Does not need to have a central mass
- DBT can help you determine if it is superimposed normal linear structures in the breast
 - Coopers ligaments
 - Vessels
 - Ducts



Architectural Distortion

Differential Diagnosis

- Invasive ductal or lobular carcinoma
- Radial scar
- Fibrosis
- PASH
- Fibrocystic change

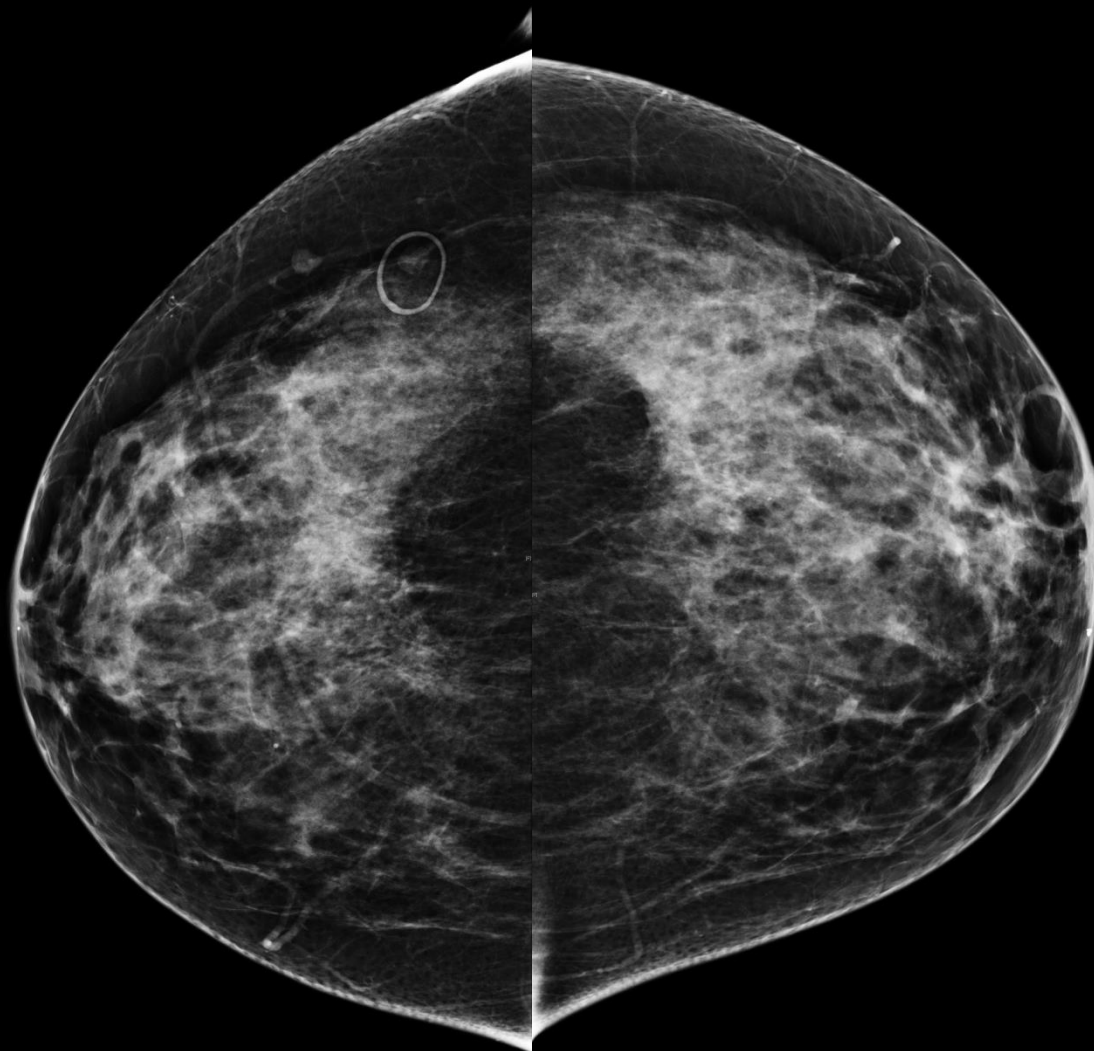
Make sure you do proper rad path correlation!



Case 1

49 year old woman who presents for a screening mammogram

[1.2.3] RCC

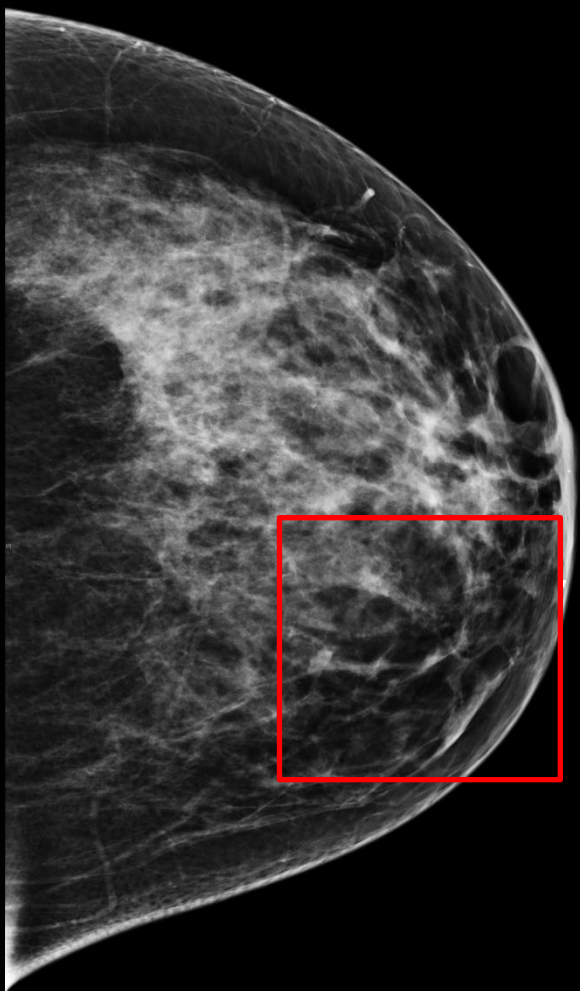


[1.2.3] LCC

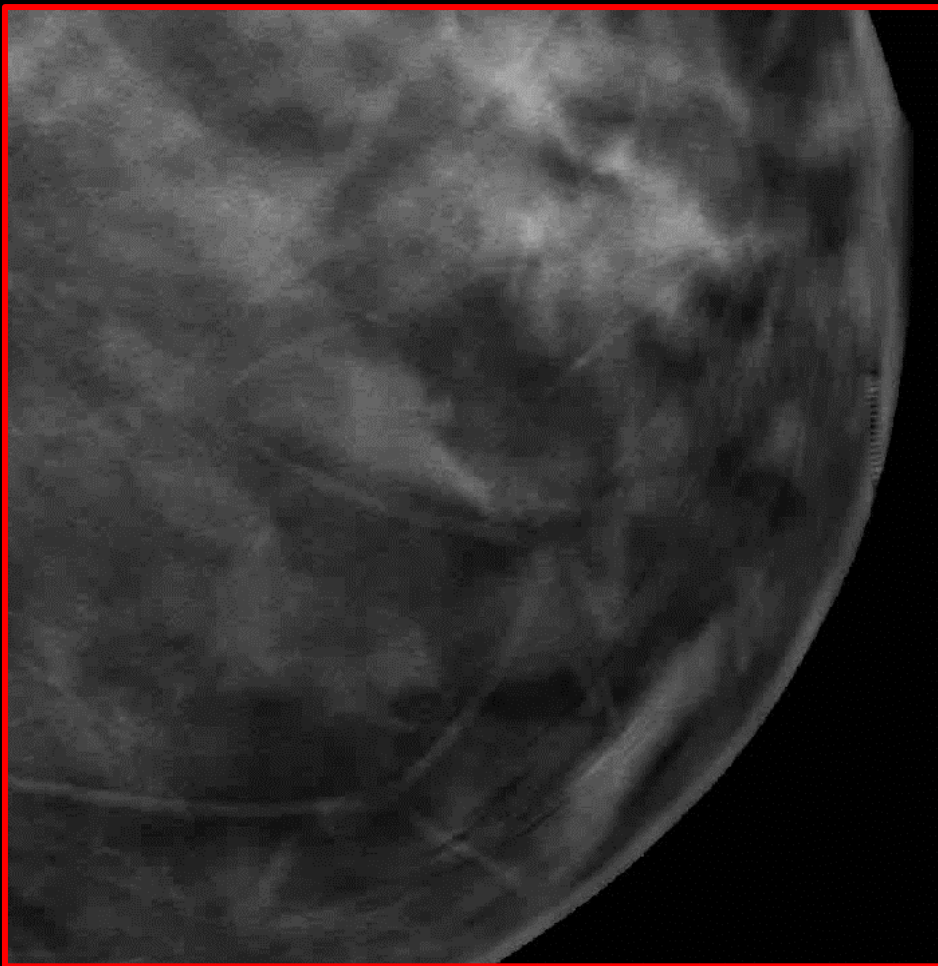
RMLO

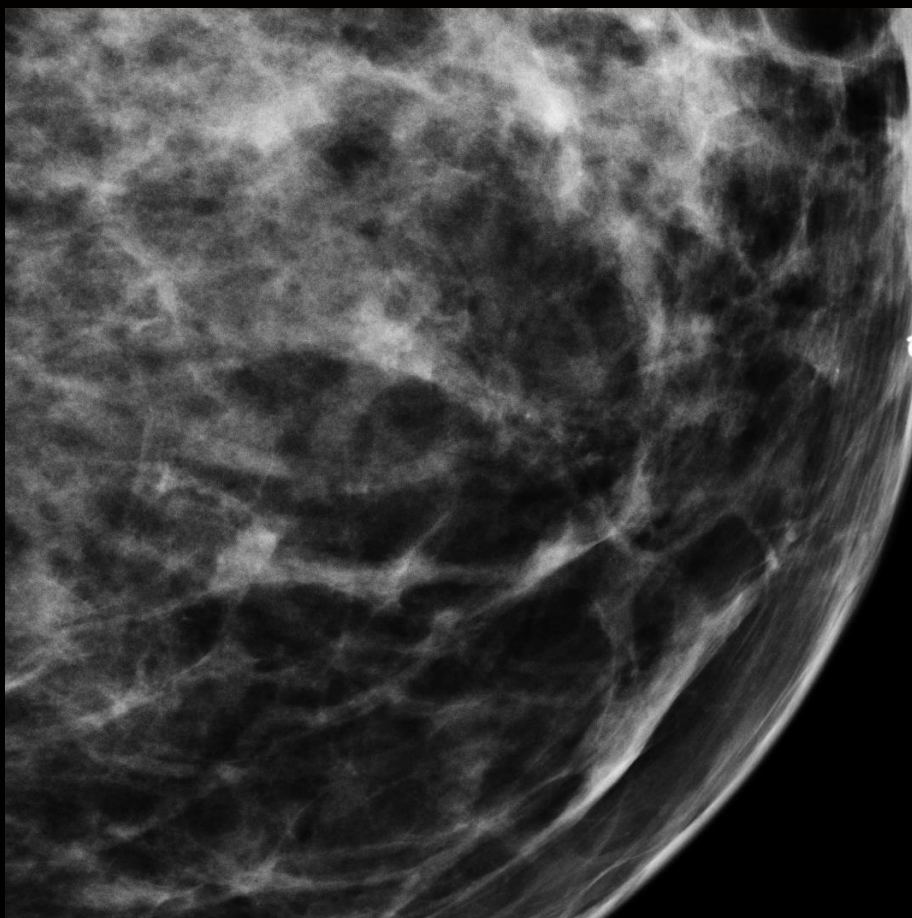


LMLO

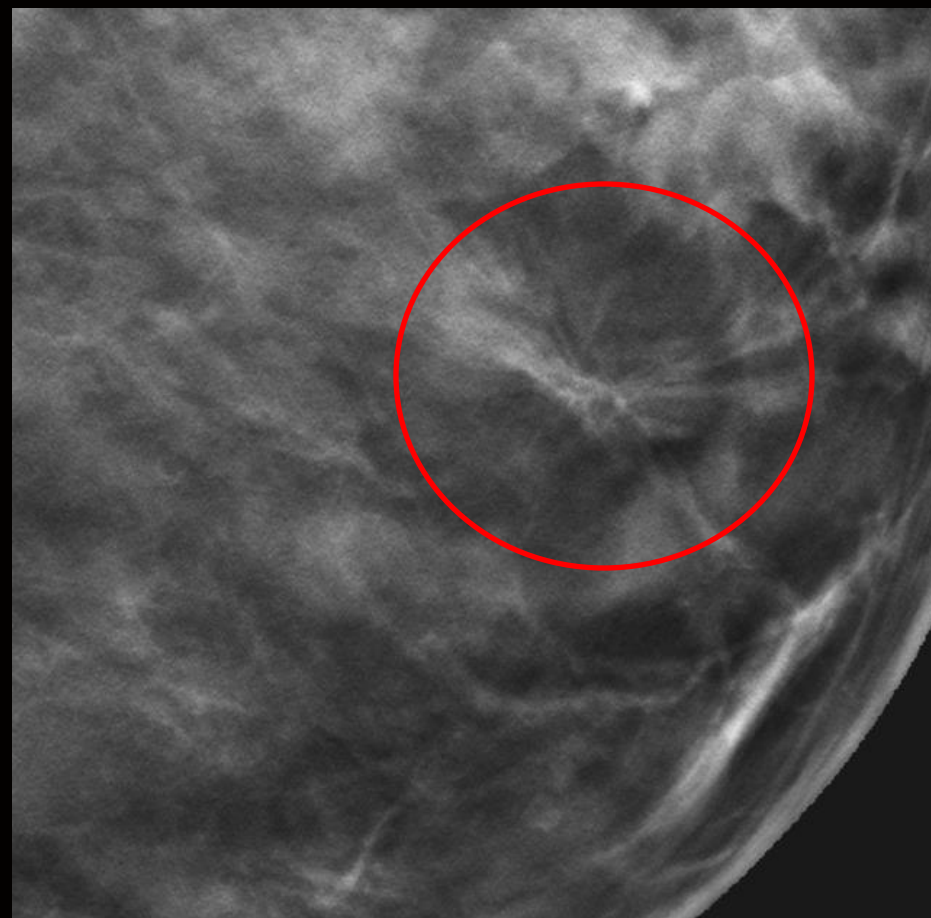


[LCC]

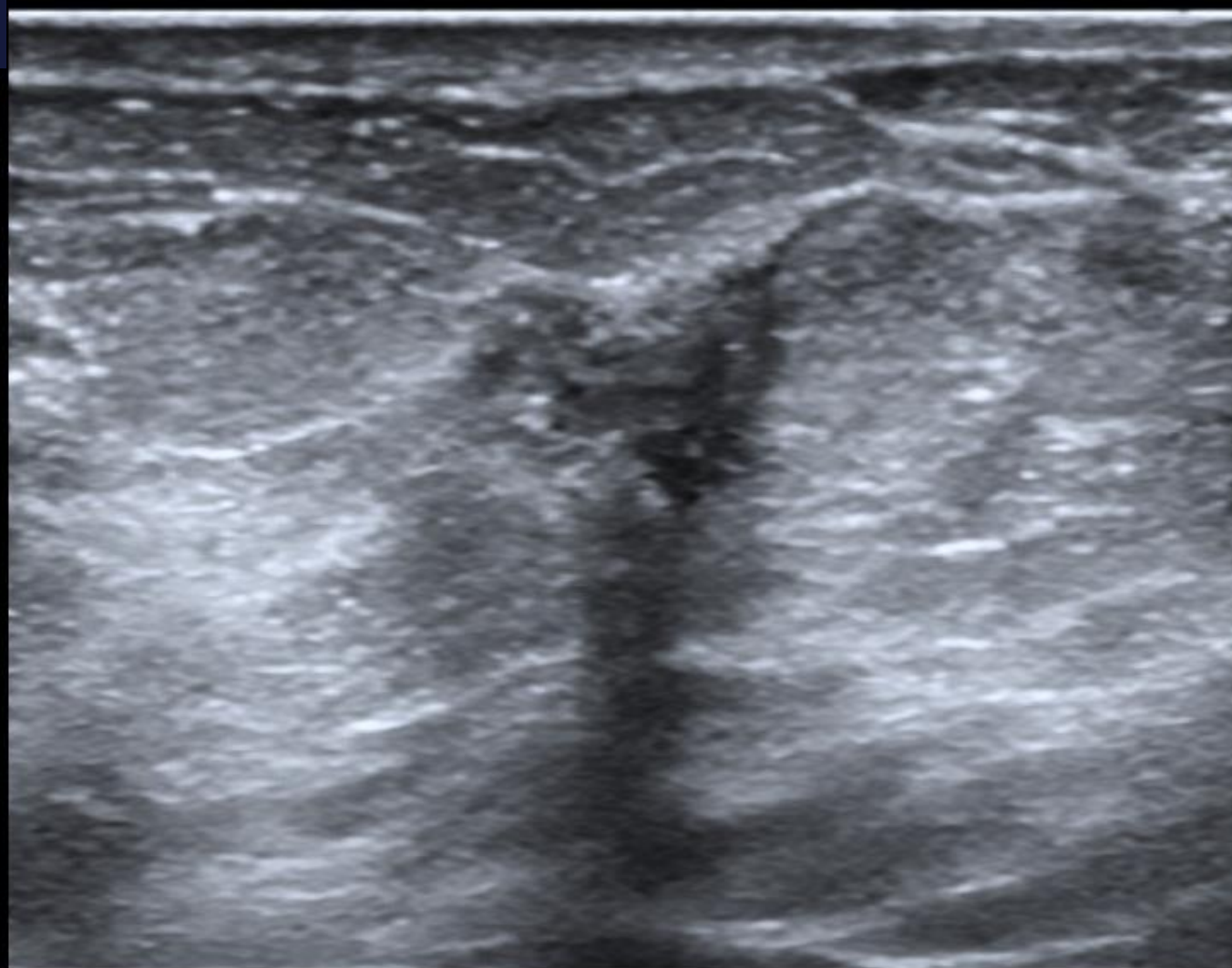




2D mammogram, left breast



Tomosynthesis slice



- B CHI
Frq 10.0 MHz
- Gn 60
S/A 1/1
- Map H/0/0
D 3.0 cm
DR 66
- FR 16 Hz
⚡ AO 100 %

1-

-

⚡

-

2-

⚡

-

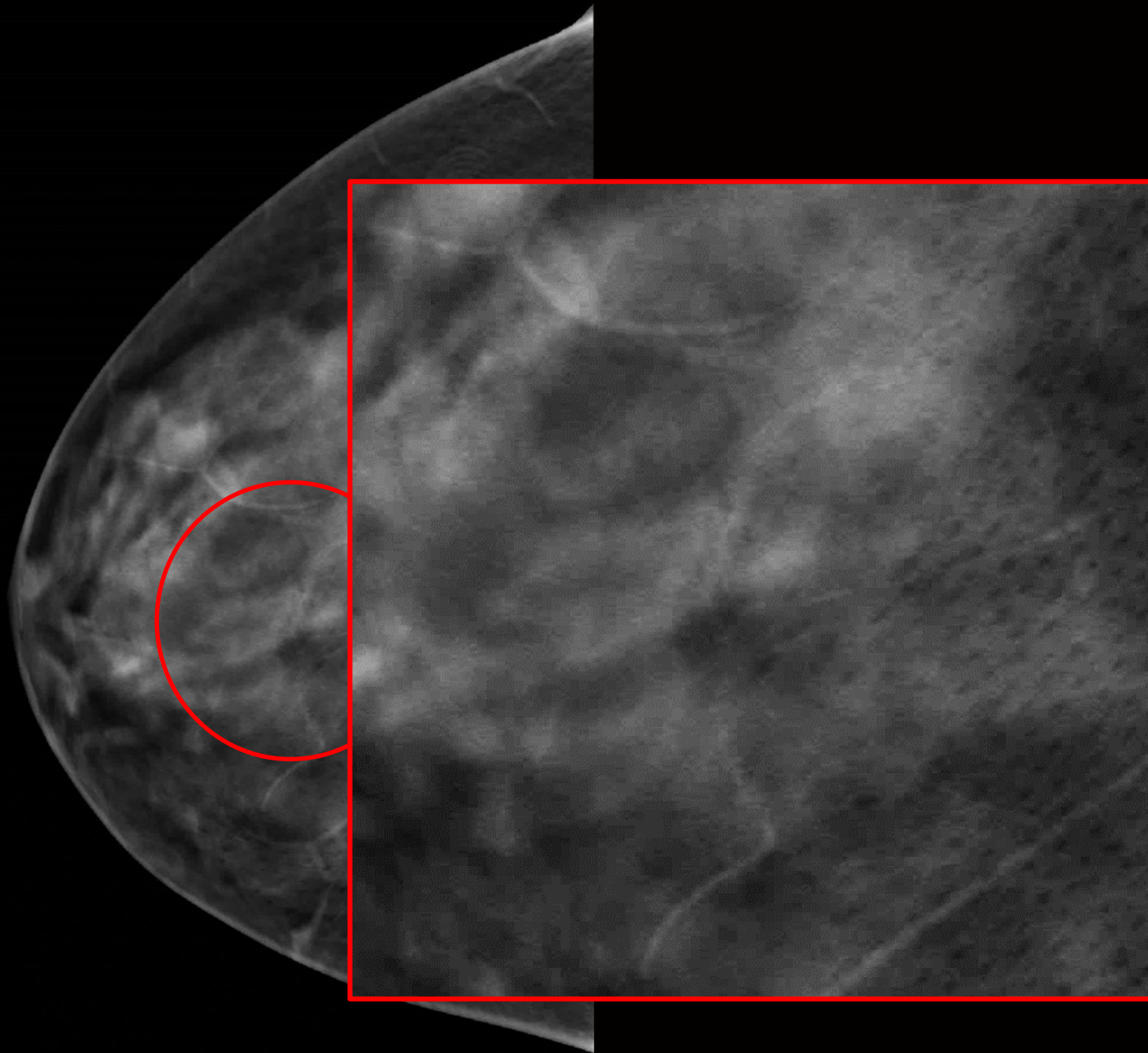
-

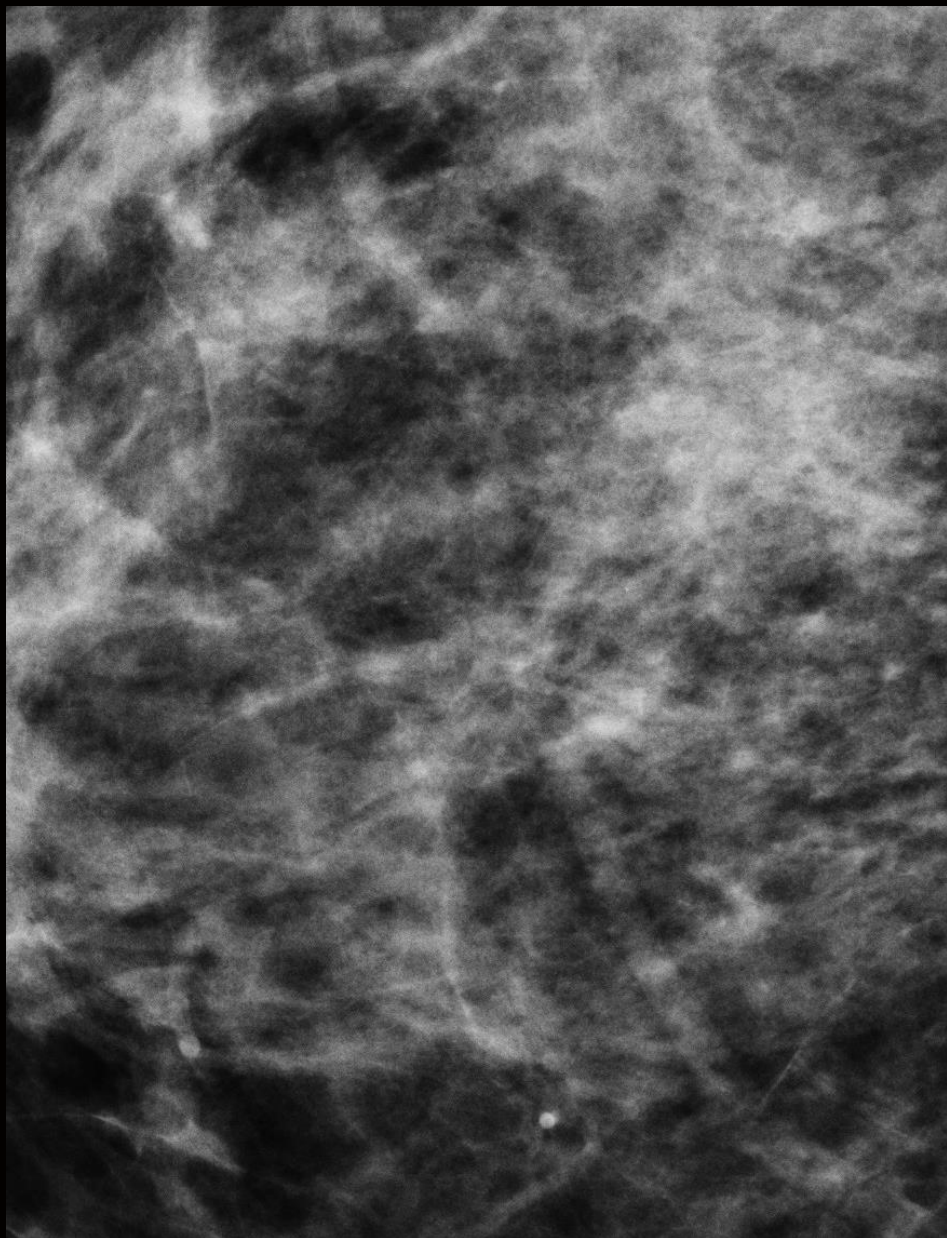
-

3-

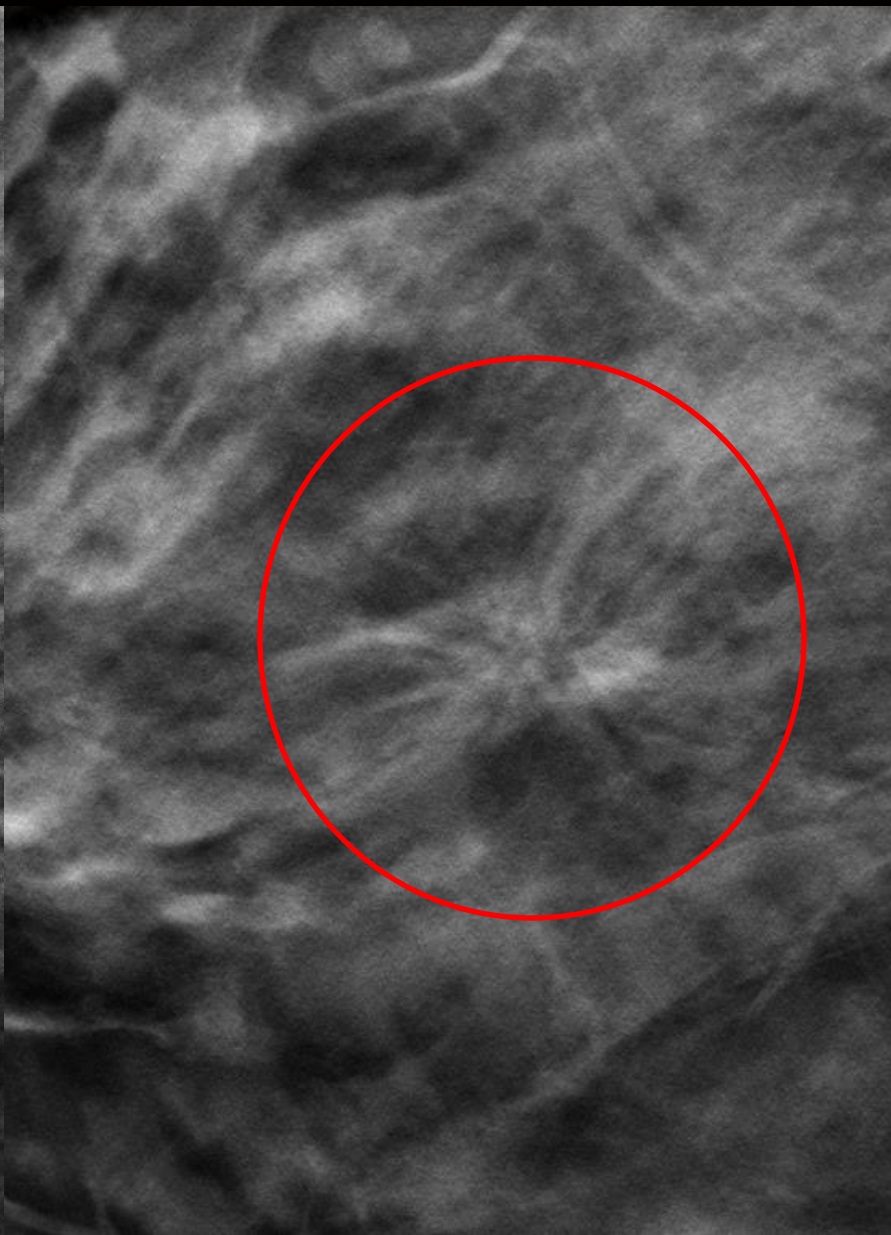
LEFT BREAST LONG
8 O'CLOCK 3 CM FN

NS

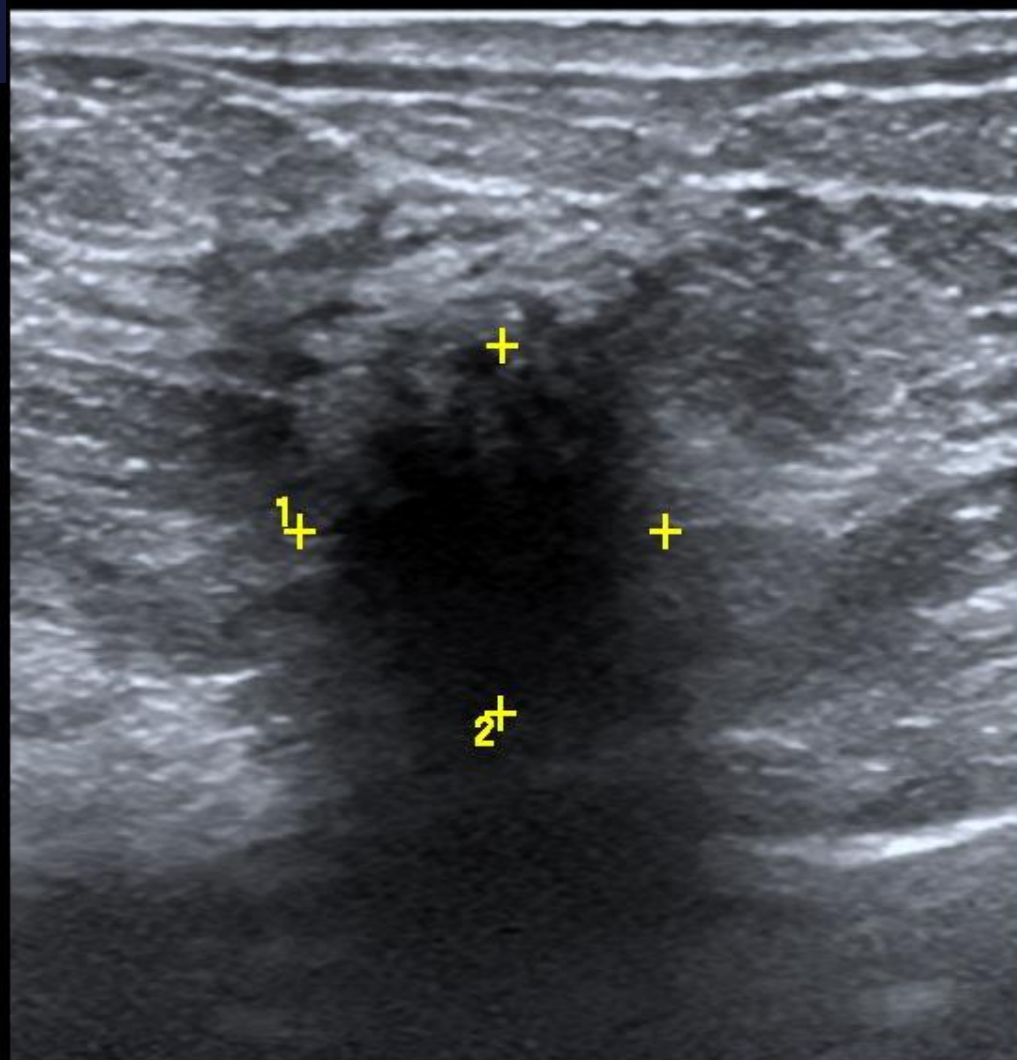




2D mammogram, right breast



Tomosynthesis slice



- B CHI
- Frq 10.0 MHz
- Gn 60
- S/A 1/1
- Map H/0/0
- D 4.0 cm
- DR 66
- 1- FR 11 Hz
- AO 100 %



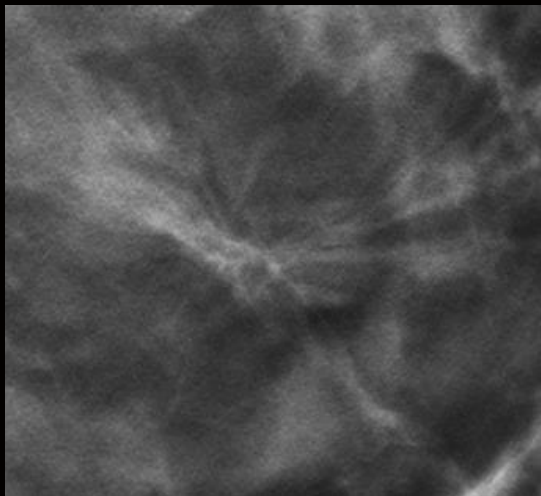
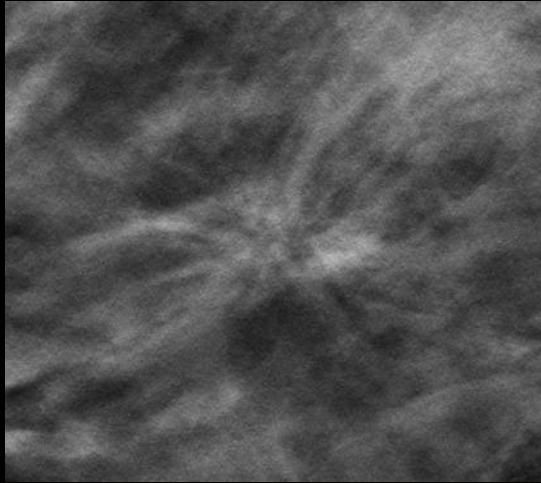
3-

4-

RIGHT BREAST LONG
7 O'CLOCK 4 CM FN

NS

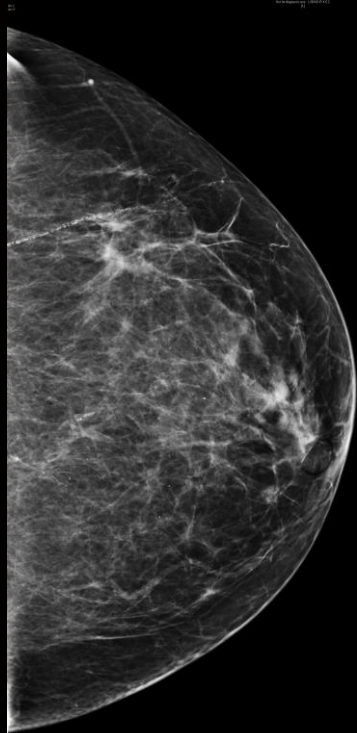
●	100%
1	L 1.38 cm
2	L 1.39 cm



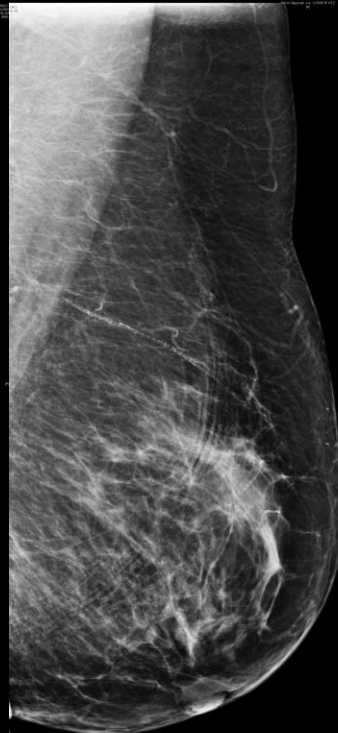
- Bilateral
- Mammographically occult
- Dense breasts
- Tomosynthesis visible
- Invasive ductal carcinoma

Case 2

63 year old women who presents for a screening mammogram

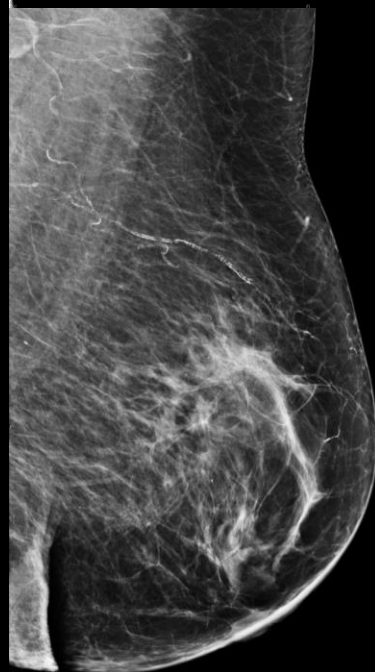
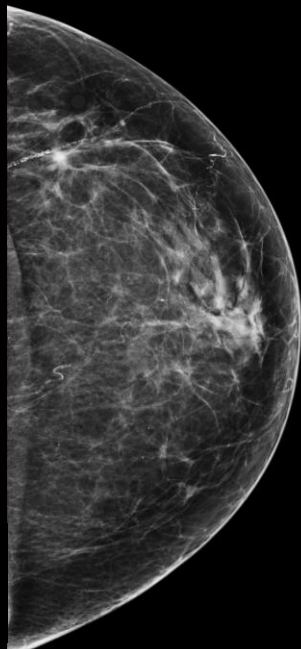


LCC



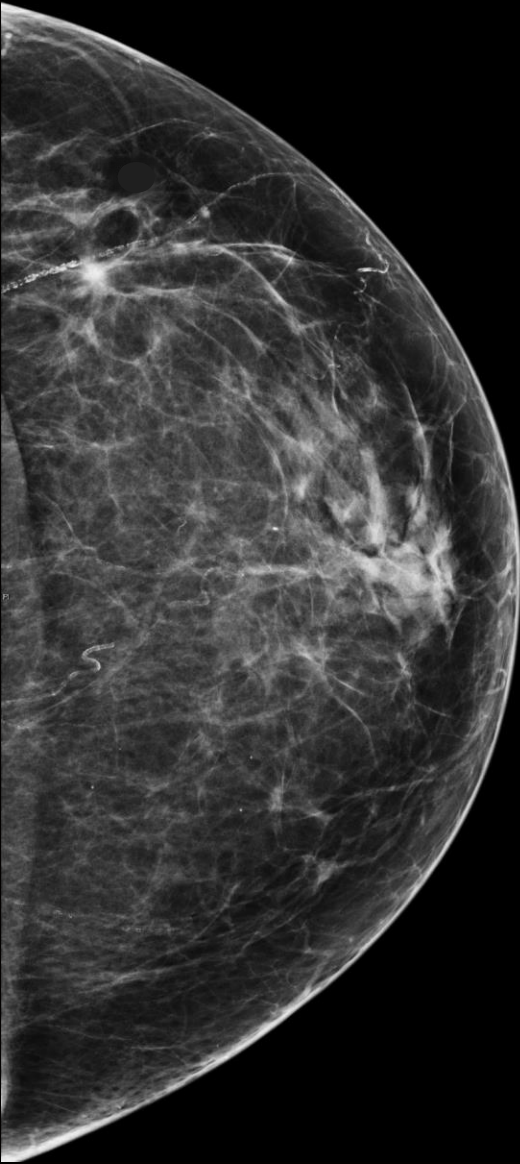
LMLO

2009



LMLO

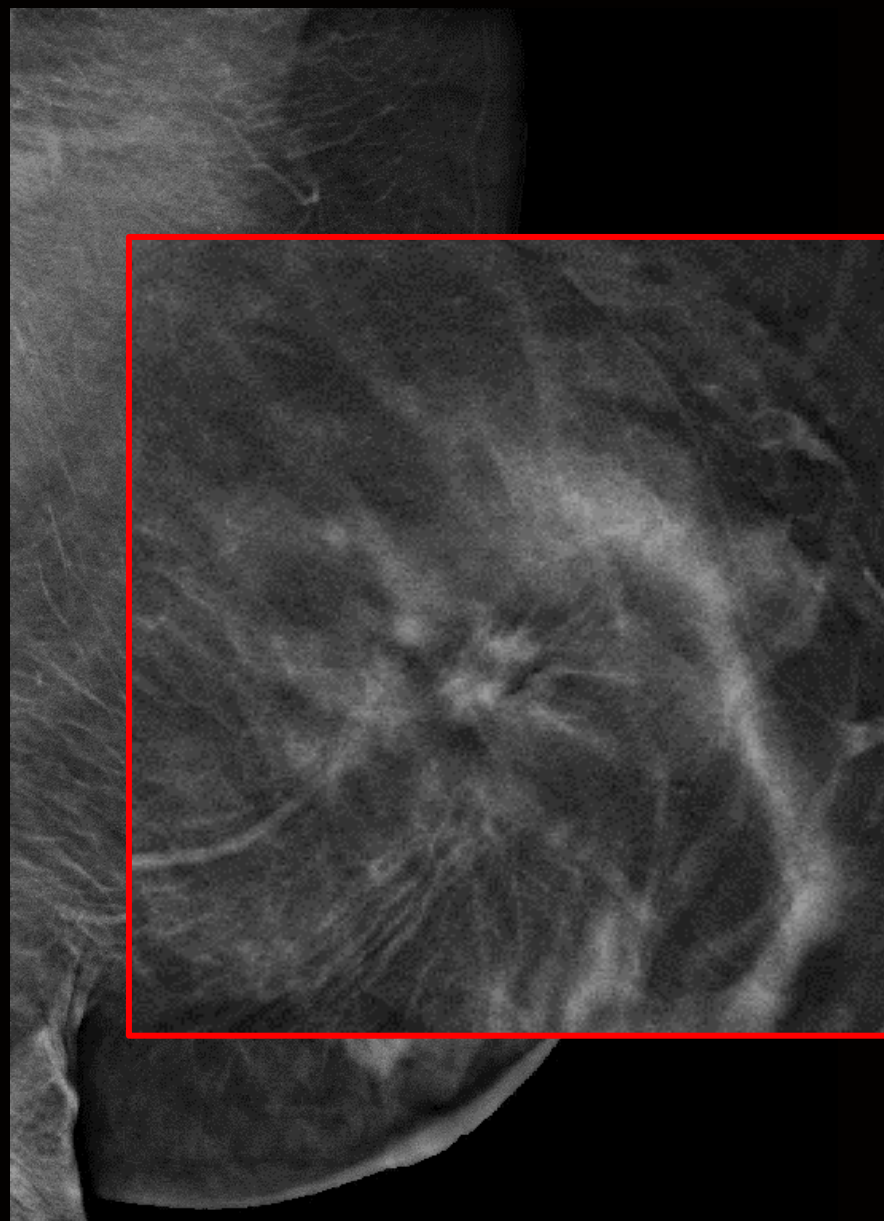
2011

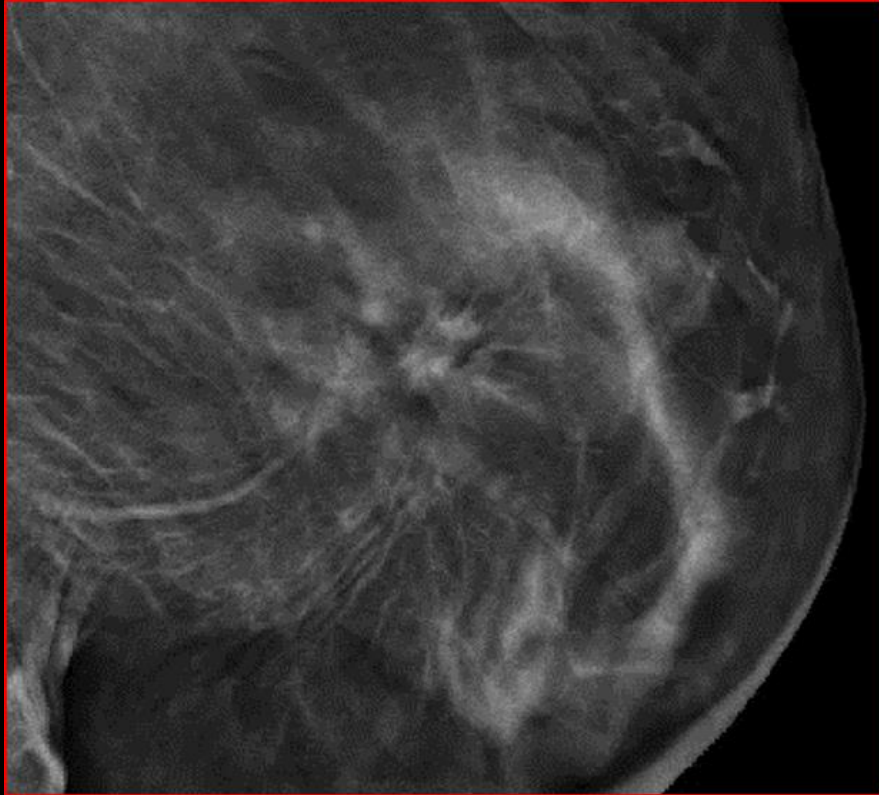


S
M
L
LCC



S
M
L
LMLO



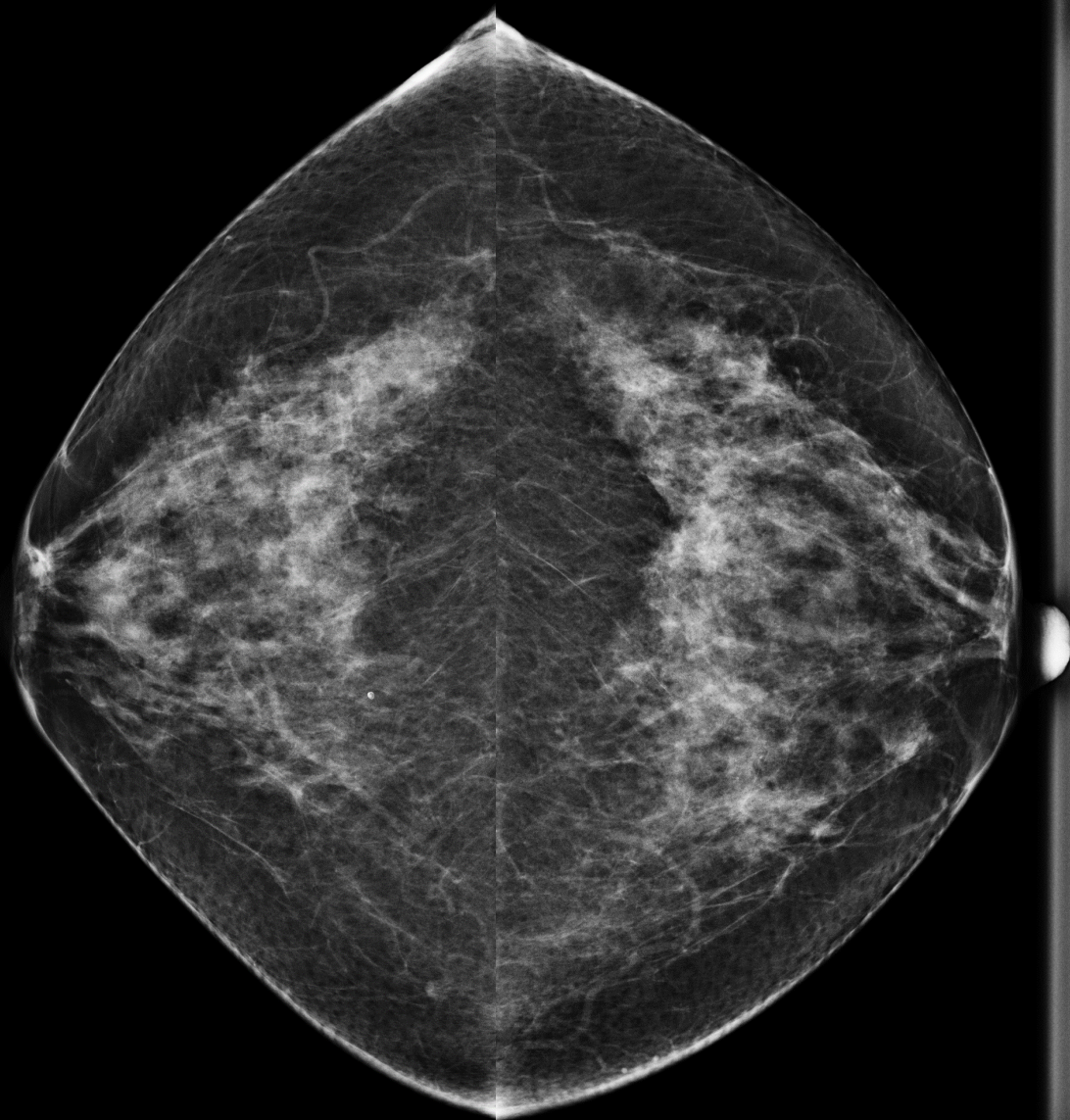


- Heterogeneous
- Mammographically occult
- Tomosynthesis visible
- Invasive ductal carcinoma

Case 3

61 year old women who presents for a screening mammogram

[^A_S RCC]



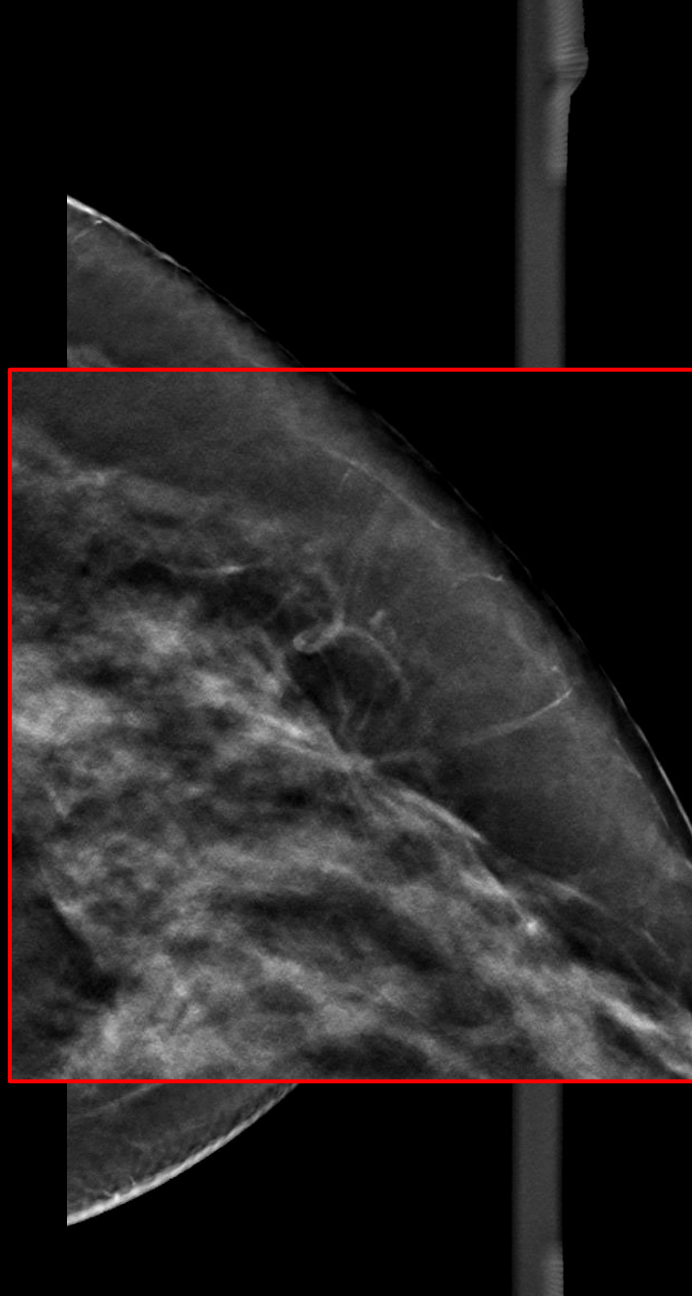
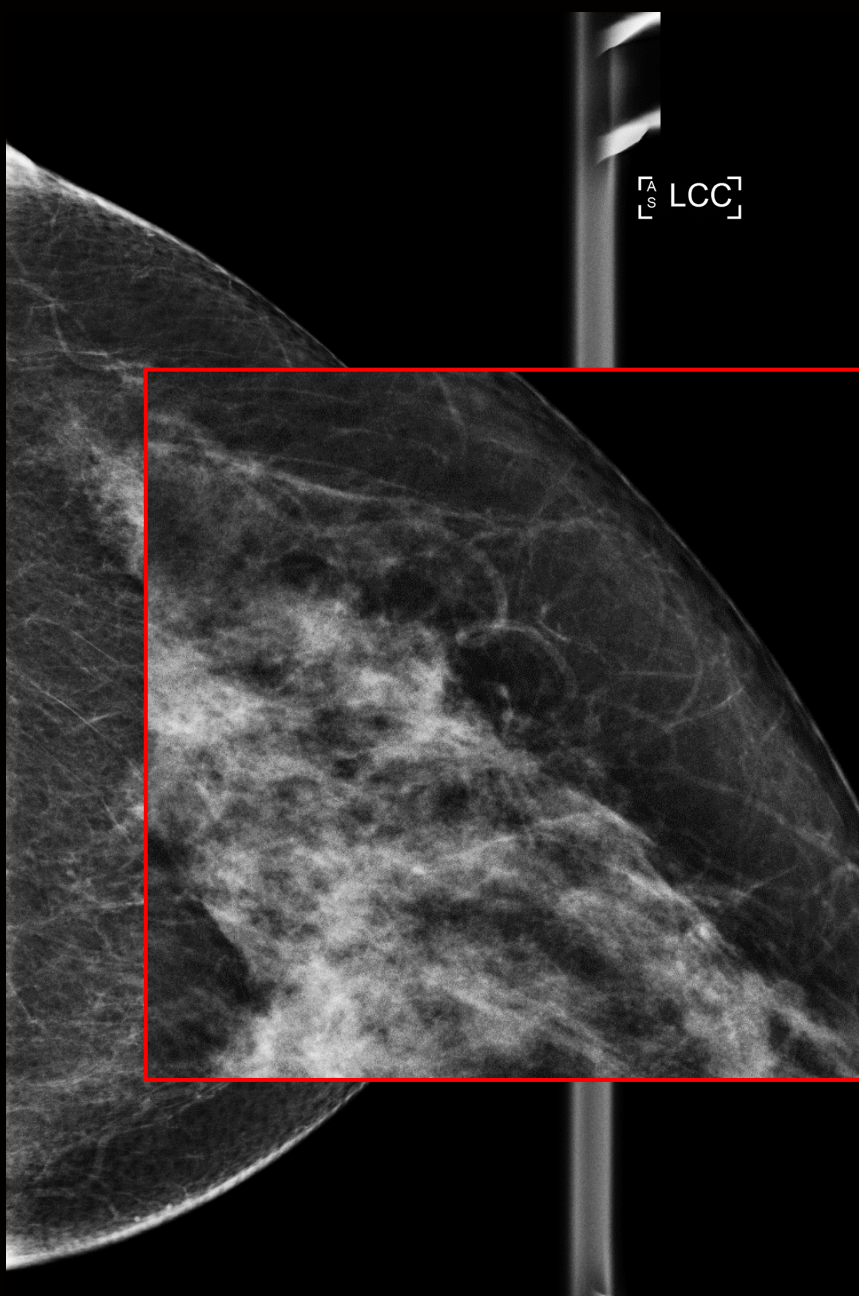
[^A_S LCC]

RMLO

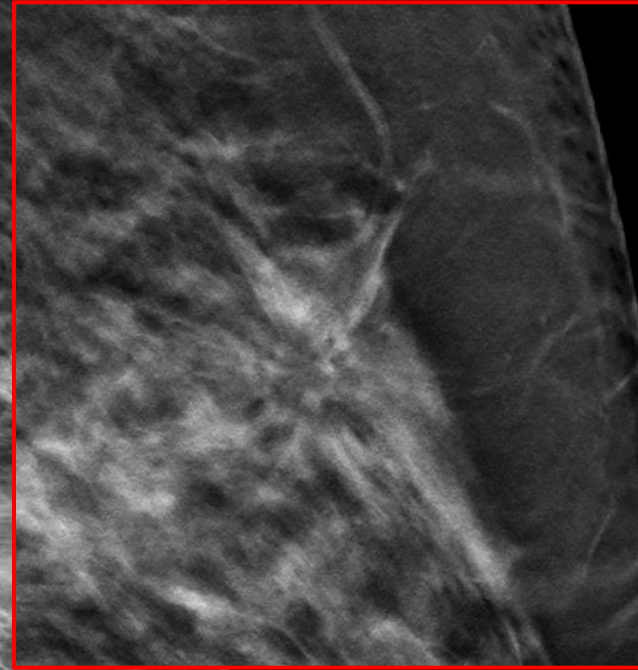
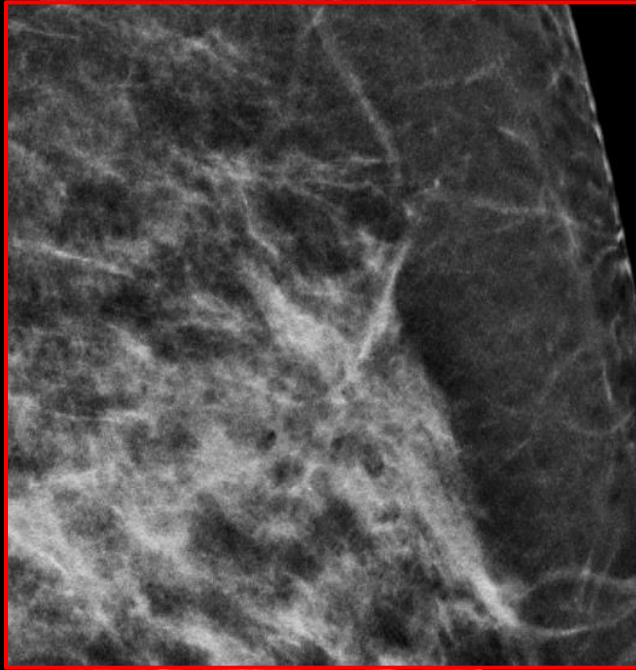
LMLO



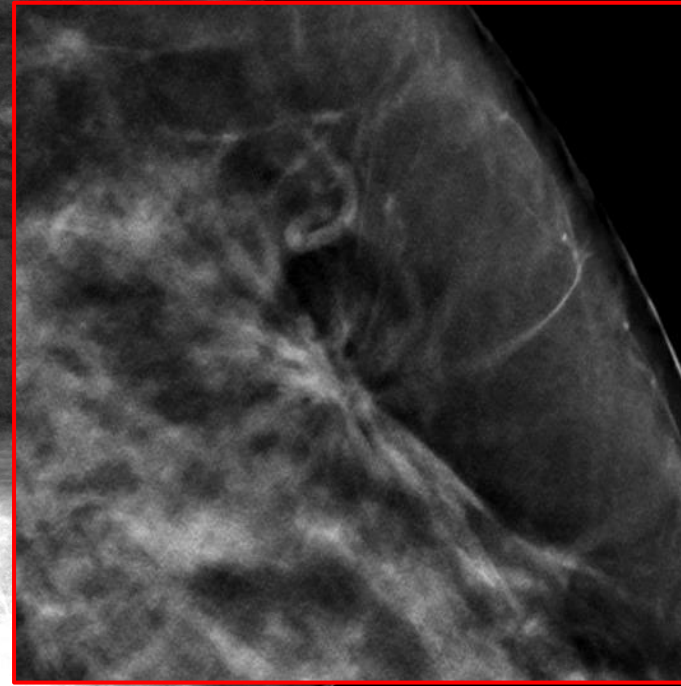
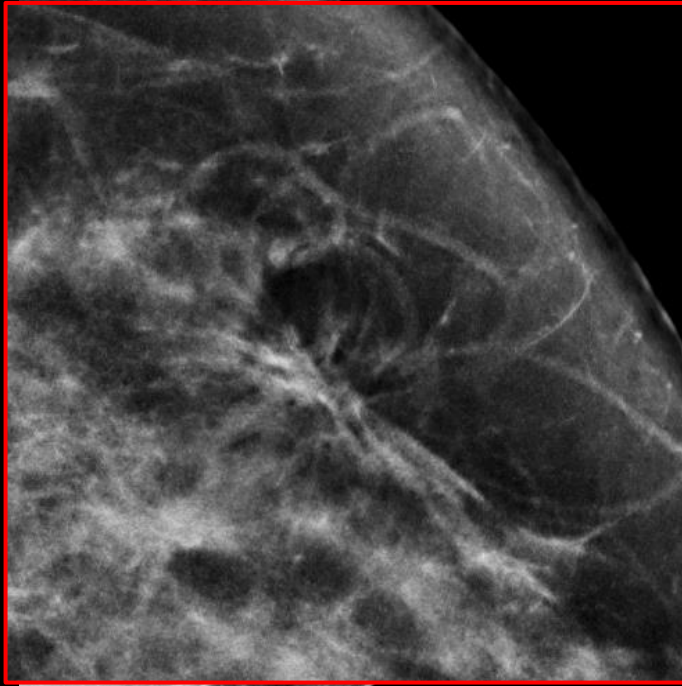




C-View



C-View



GE
L9



11
1-

11

21
11

11

3-

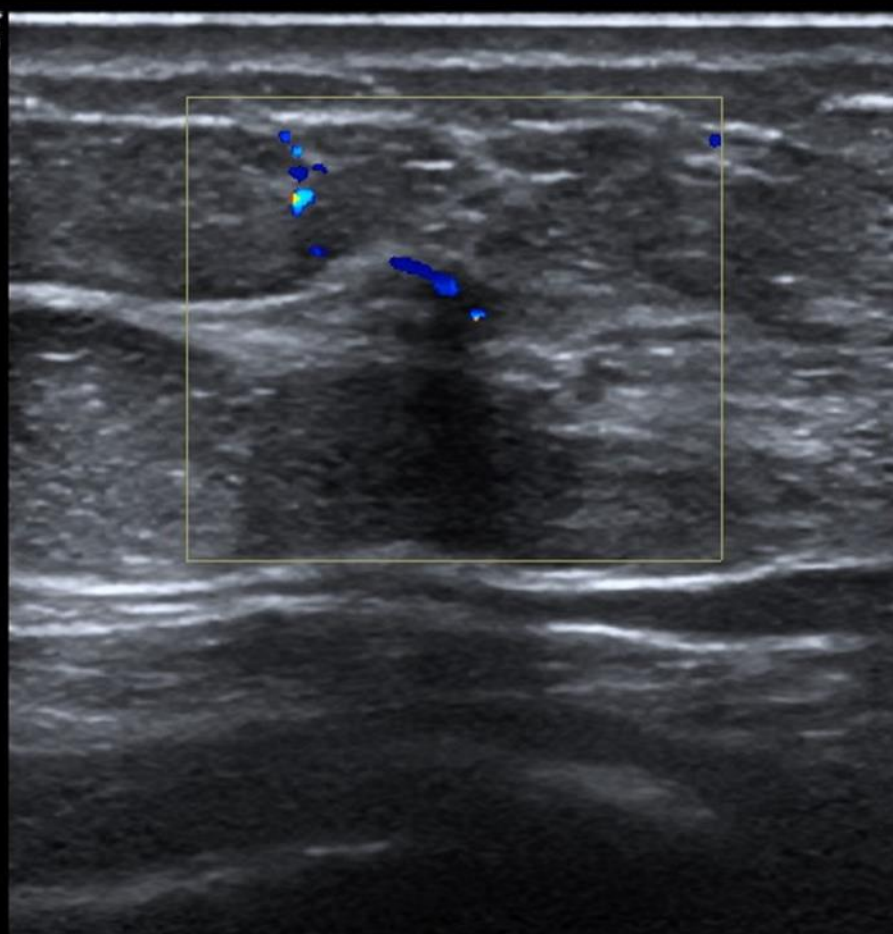
4-

LEFT BREAST TRANS
12 OC 7 CM FN

DP

GE
L9

2
-2
cm/s



IX

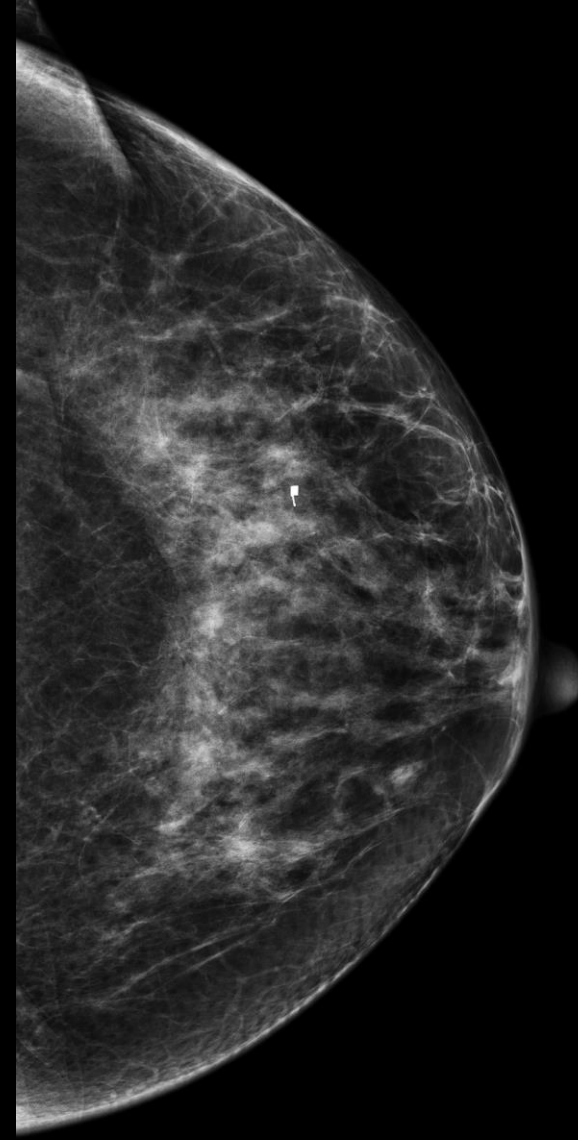
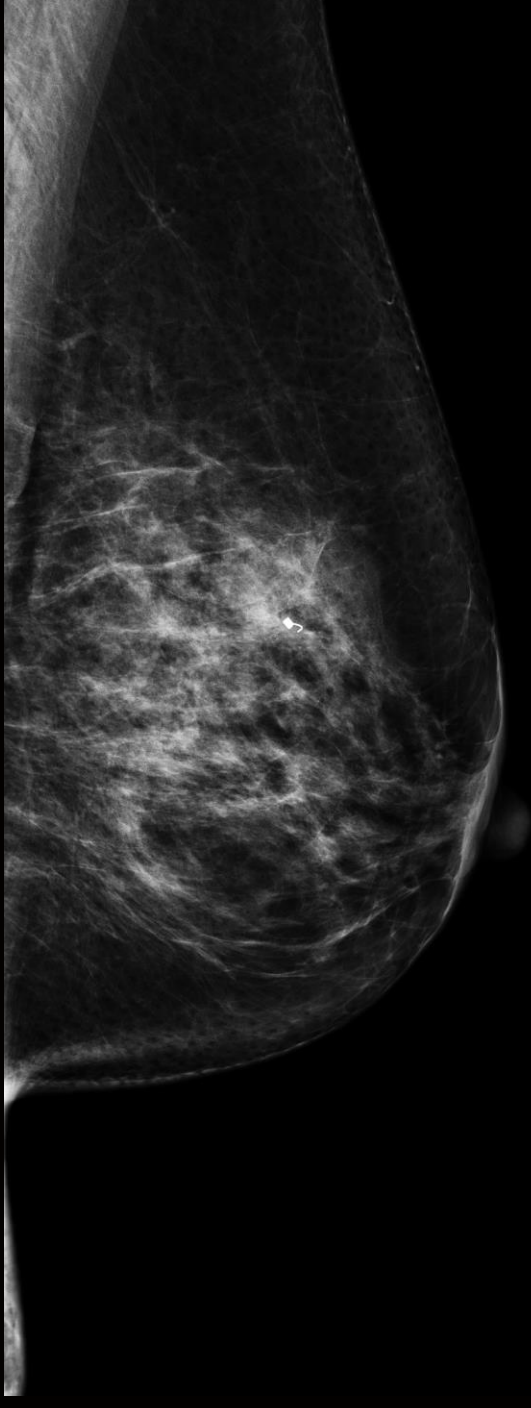
2-

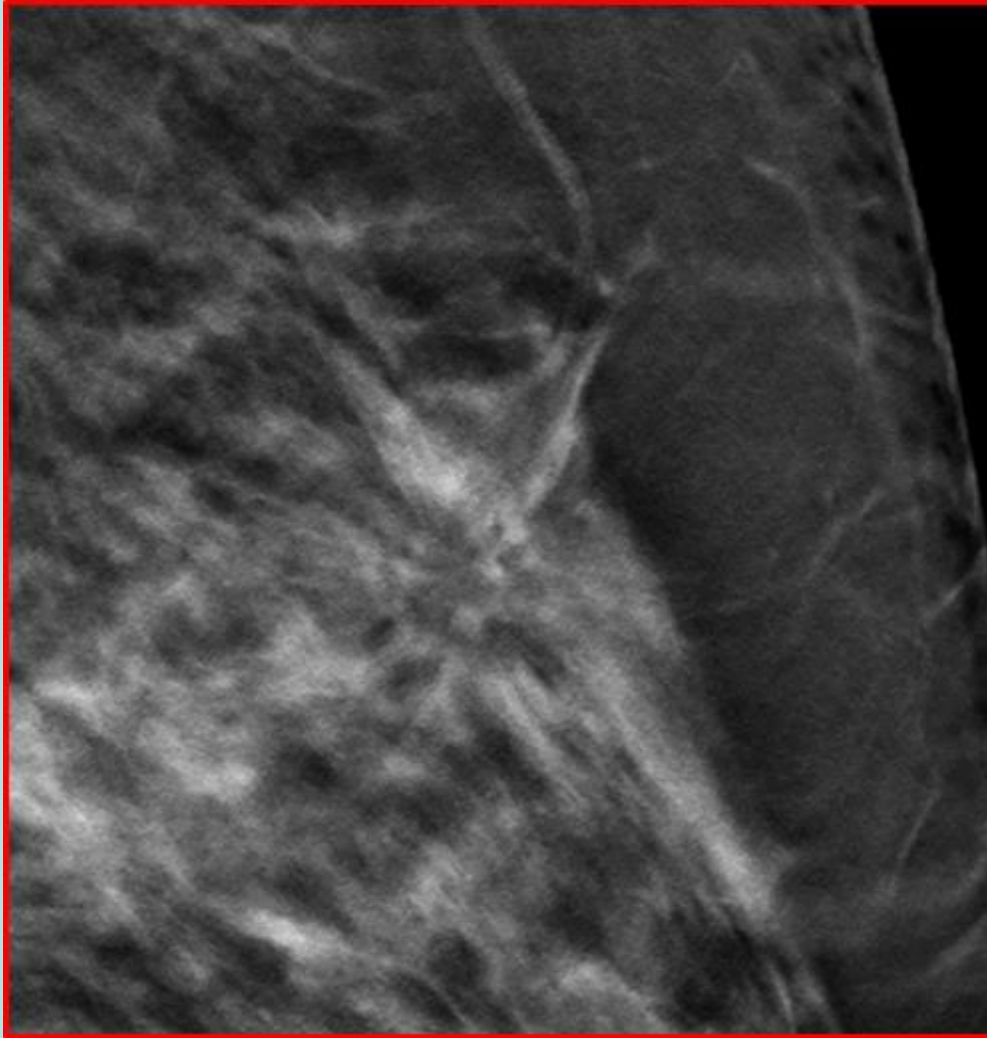
3-

4-

LEFT BREAST TRANS
12 OC 7 CM FN

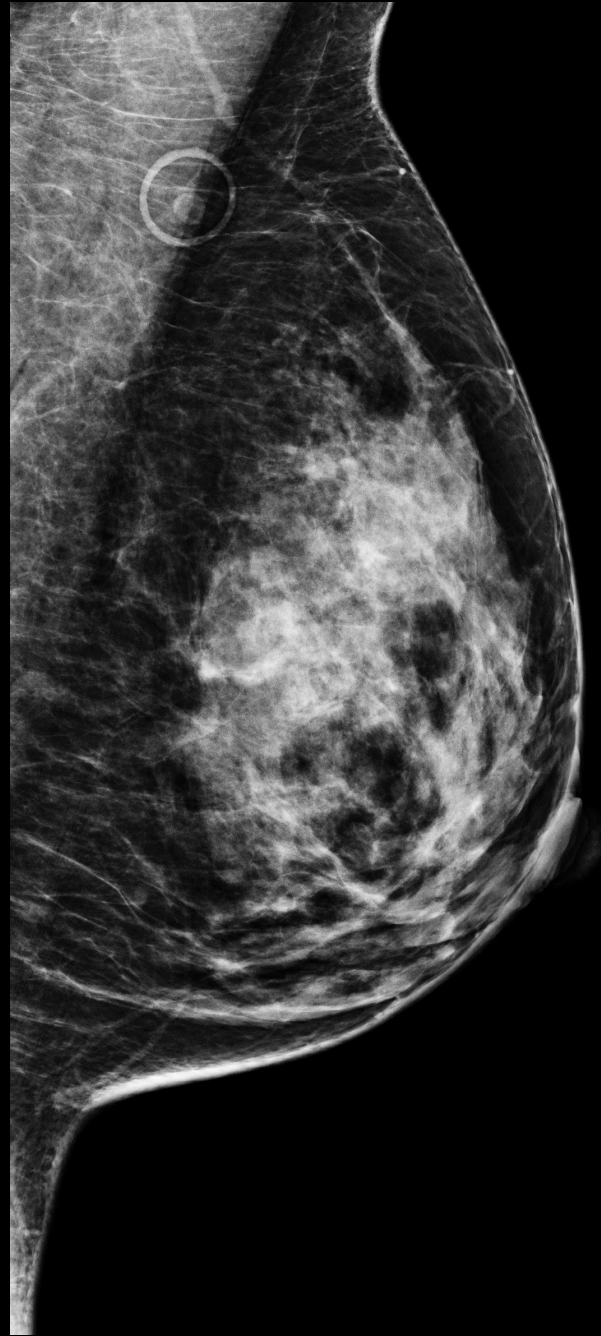
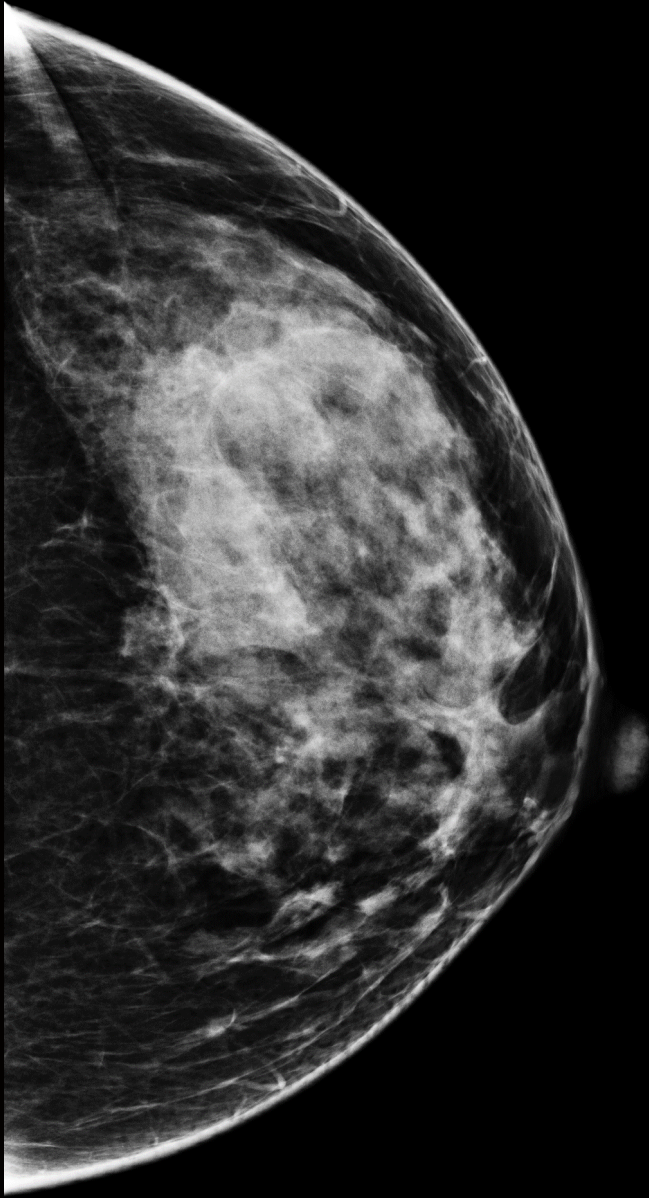
DP

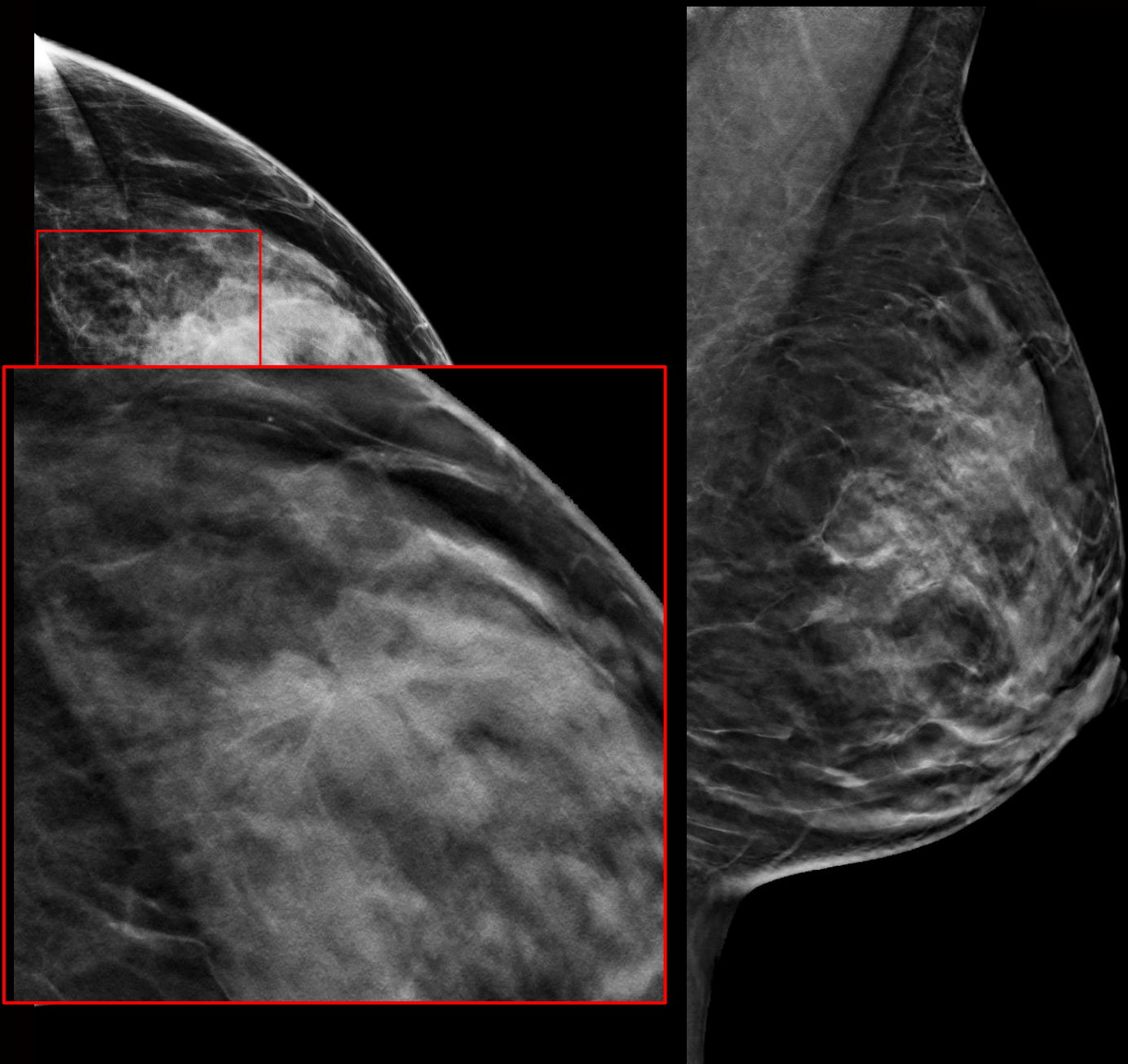




- Architectural distortion
- Tomo only finding
- Radial Scar

Case 4





Mass vs Distortion

Can overlap in appearance

Mass

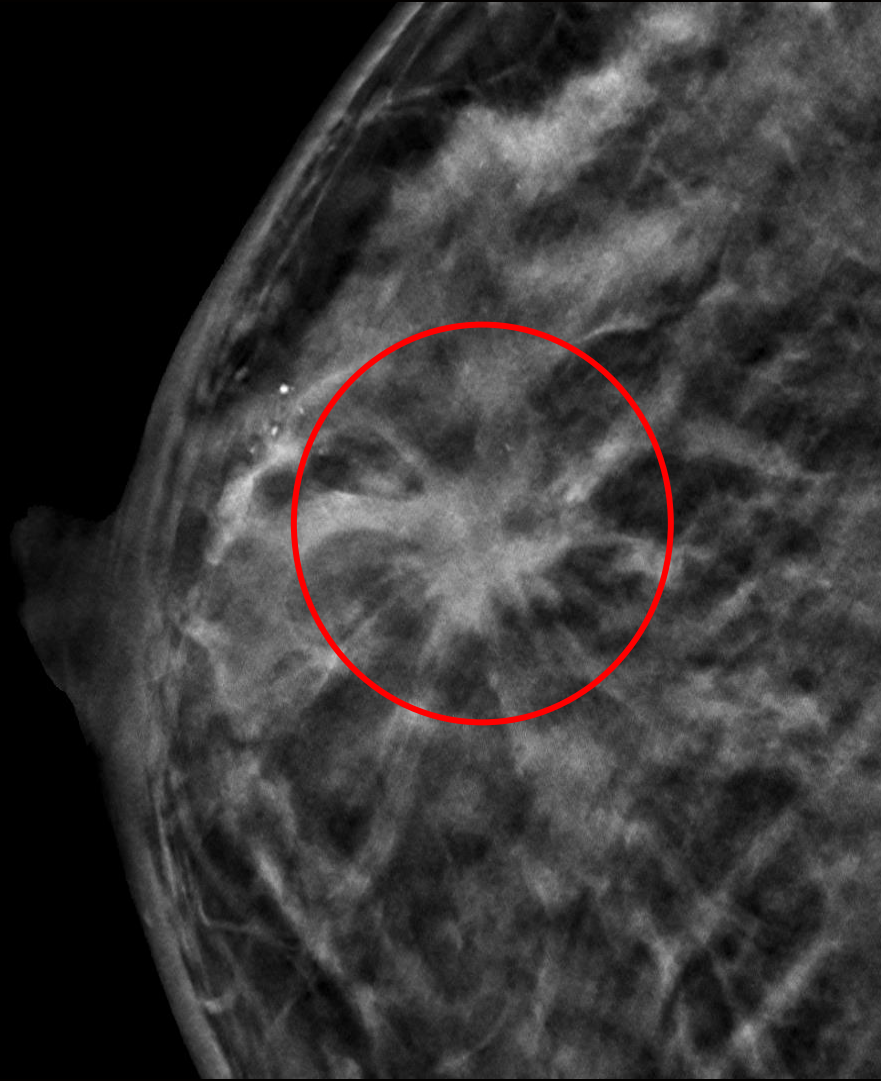
- Solid appearing with central density

Architectural distortion

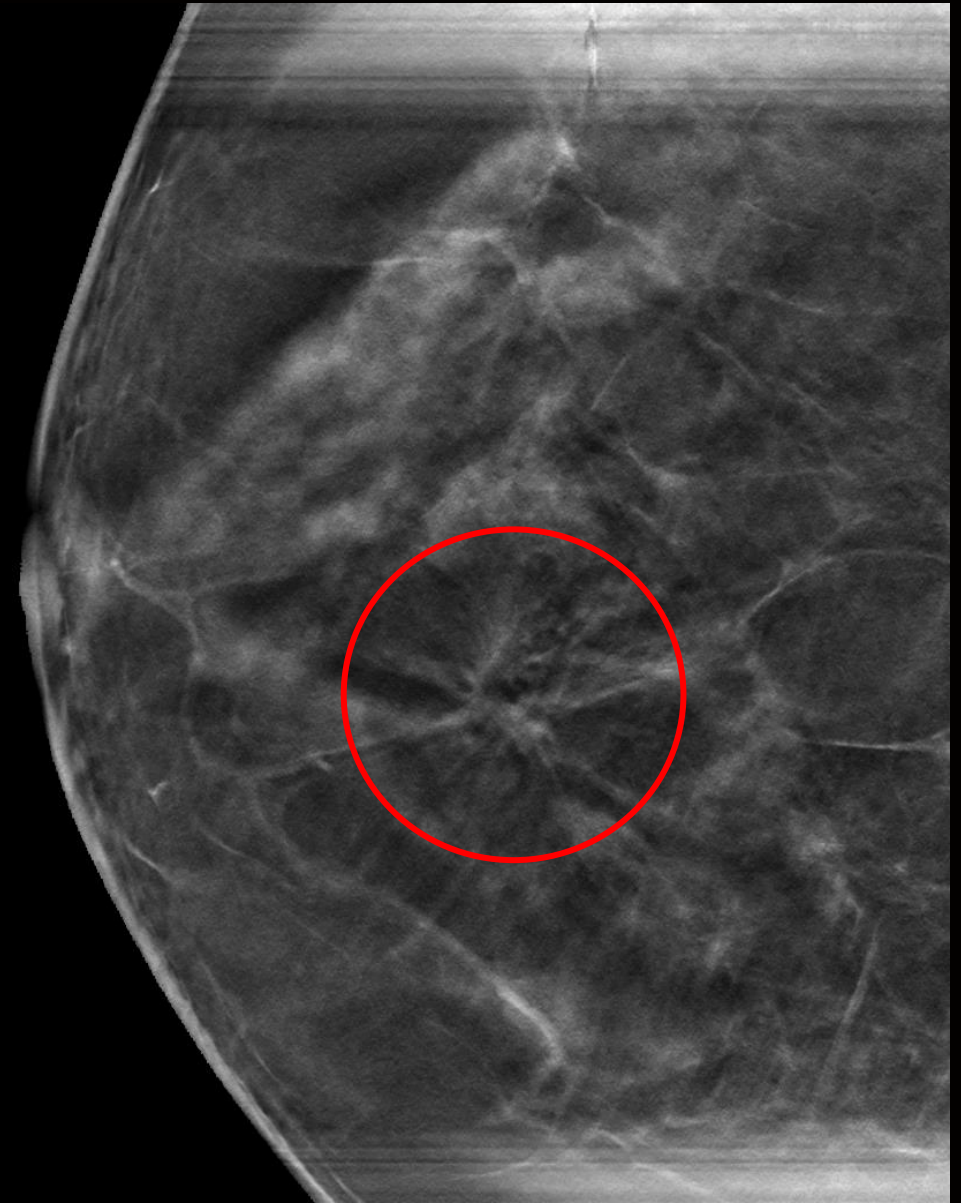
- Central component is missing, but tissue being drawn in



Mass vs Distortion

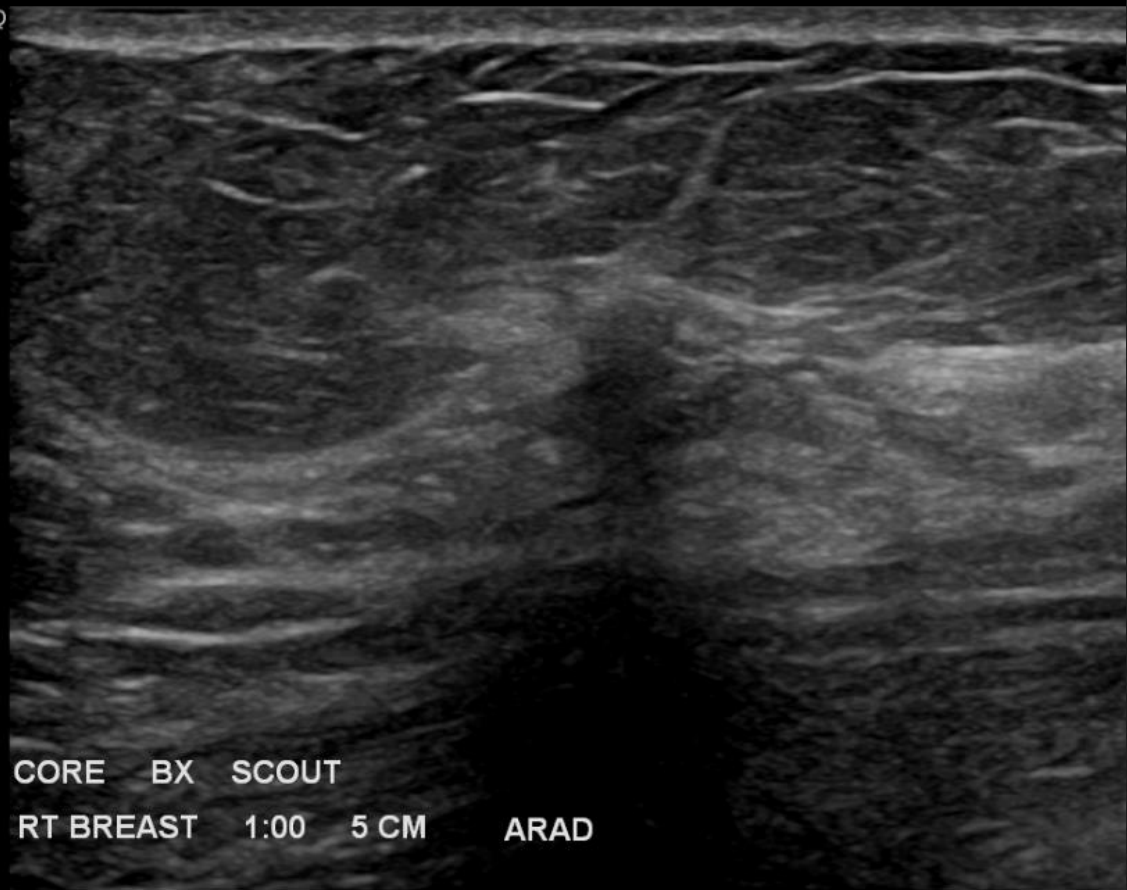


Mass with spiculated margins



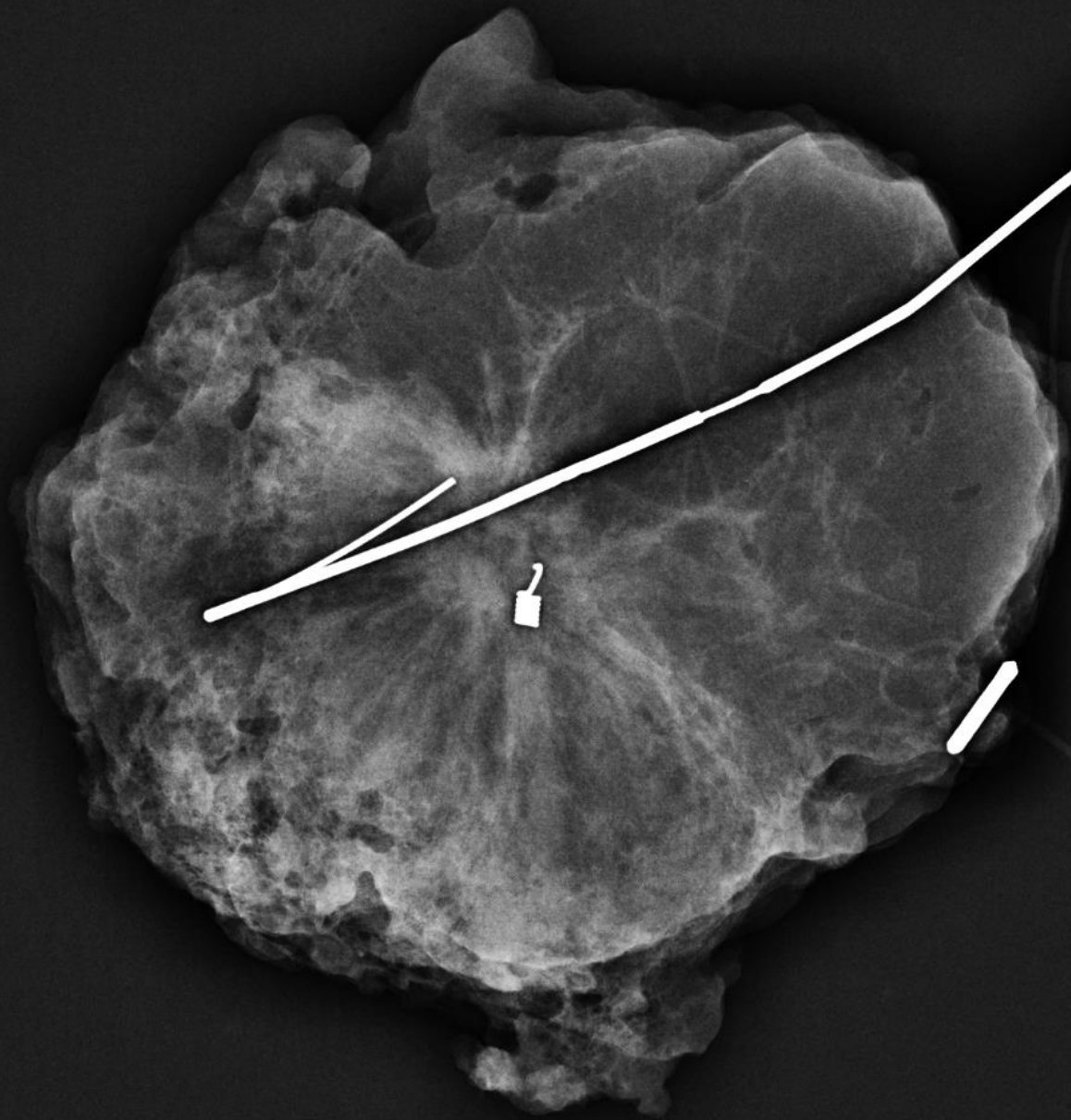
Architectural distortion

LOGIQ
E10



CORE BX SCOUT
RT BREAST 1:00 5 CM ARAD

Architectural distortion which on US
appears like a mass



Summary:

3 types of asymmetries:

- Asymmetry
- Focal Asymmetry
- Global Asymmetry

Anything new or more conspicuous is suspicious

Anything palpable or with associated features is suspicious

Architectural distortion can be benign or malignant, but accurate rad path correlation is KEY!



Thank You

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