

Unlocking the Power of Breast Ultrasound:

Mastering Techniques, Diagnosis and
Collaboration

Mammography Educators

June 10, 2025

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The Breast Center at CARTI

Disclosures



MYRIAD
GENETICS



HOLOGIC



SUPERSONIC



BEEKLEY



MAGVIEW



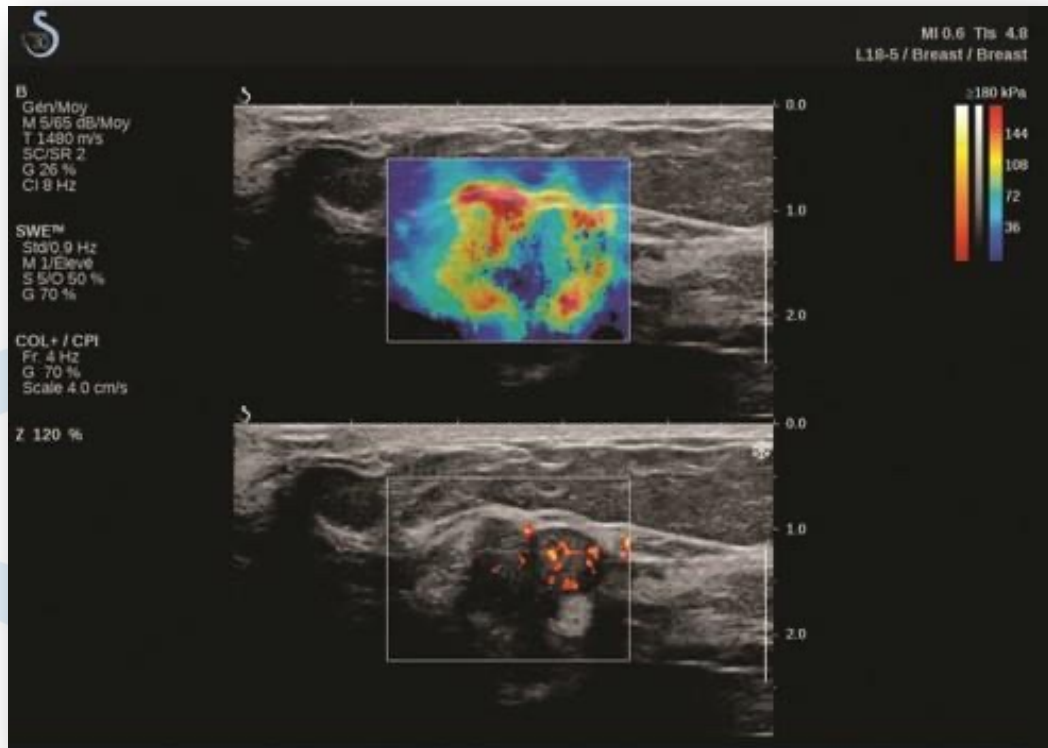
CARTI CANCER CENTER



RADIOLOGY

DO NOT ENTER

Breast Ultrasound Indications



Established diagnostic tool

- Characterization of mammographic lesions
- Further evaluate suspicious or equivocal mammographic findings

Widely used in the diagnosis of breast cancer

- Primary evaluation in young/pregnant patients
- Additional evaluation for MRI findings
- Ultrasound-guided biopsy of suspicious breast lesions
- Supplemental screening with dense breast tissue

Clinical Applications

- Further characterize architectural distortion seen on DBT
- 2nd look us for MRI, CT, PET CT findings
- Biopsy guidance
- Pre-operative assessment of breast cancer size and extent
 - evaluating the axilla
 - treatment planning
- Monitoring Response to treatment

Breast Ultrasound Challenges

Operator-
dependence

Quality
Assurance

High
Inter-observer
Variability

Underestimation
of tumor size

False Negatives

False Positives

Breast Imaging Top 10

- ✓ Do what Hurts the Most
- ✓ Thoroughness is next to godliness
- ✓ Communication is Key
- ✓ Strictly adhere to the BIRADS Lexicon
- ✓ Choose the Best Modality
- ✓ Put it on the Line
- ✓ Critically Determine Concordance
- ✓ Be a Sponge
- ✓ Special Cases: Trauma and Infection/Inflammation
- ✓ Provide Compassionate Care

Do what hurt's the most

- Review the order
- Call the referring provider for an order if necessary
- Talk to the patient
 - Listen to their concerns
- Examine the patient's area of concern
- Evaluate clinical symptoms with ultrasound
 - Palpable lumps
 - Focal pain
- Obtain and review prior imaging studies and reports
 - Developing findings have a higher index of suspicion
 - Prior needle and surgical biopsy pathology
- Recommendation for biopsy on most suspicious feature
- Participate in ongoing medical education and tumor boards

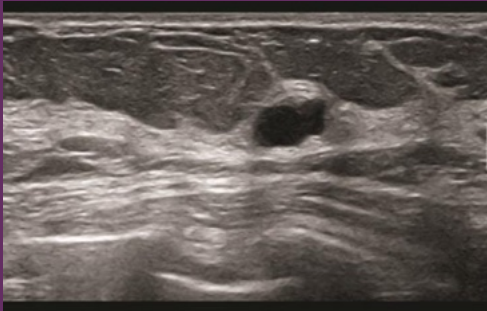
Thoroughness is Next To Godliness

- Review Prior Films and all available studies for correlation
 - Don't just read the report look at the images (mammo/MRI/CT/Pet CT)
 - Review with the radiologist
 - *a stable suspicious finding is still suspicious*
- Optimize technique for every static image on Ultrasound
 - Are the focal zones Optimized?
 - Gray Scale – Auto optimize
 - Show the Chest Wall
- Labeling
 - Laterality
 - O'clock and Distance from the Nipple
 - Area of Concern/Pain/Lump
- Measurements
 - Trans/Long; Radial/Anti-radial/Oblique
 - Longest dimension
- Doppler
- Advanced Tools like Elastography
- Document a single image for completely normal ultrasound
- Does it make sense
 - Size, shape, location, depth
- Did you scan widely enough?
- Does the finding contain Fat?



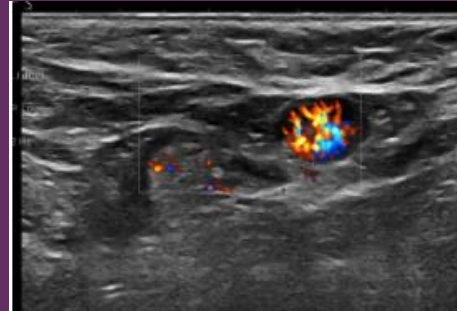
Characterization of Breast Lesions

Gray Scale B-Mode



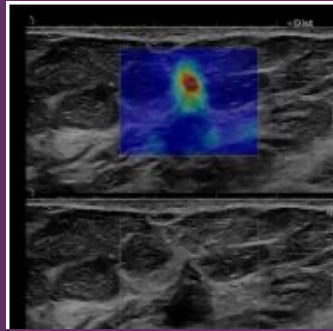
- Characterize cyst vs. solid lesion
- Margins
- Posterior features
- Superficial lesions

Color/Power Doppler US



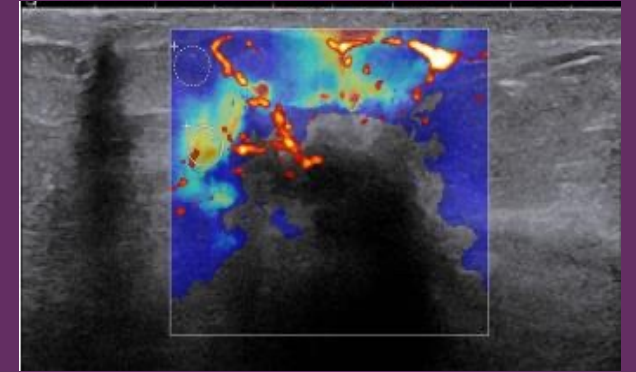
- Vascularity of the mass by visualizing the blood vessels angiogenesis (doppler measures flow)

SWE



- Increases specificity
- Quantifies the tissues elasticity

Combined Technology



- Showcases all three modes at once:
- B mode
 - Shear Wave
 - Microvascular Flow

Communication is Key

- Make sure you clearly communicate with the radiologist
 - Did you find the correlate?
- Communicate what you think it is
 - Cyst, Lymph Node, Fibroadenoma, Invasive Carcinoma
- Use standard BIRADS Lexicon Terms
- Correlate across modalities
- Is it what you expected to find
- Let the radiologist know if the patient is pregnant and or breast feeding or has a history of trauma or vaccination
- Discuss procedures with the radiologist
 - Approach/Modality/Core vs. VAB/Clip

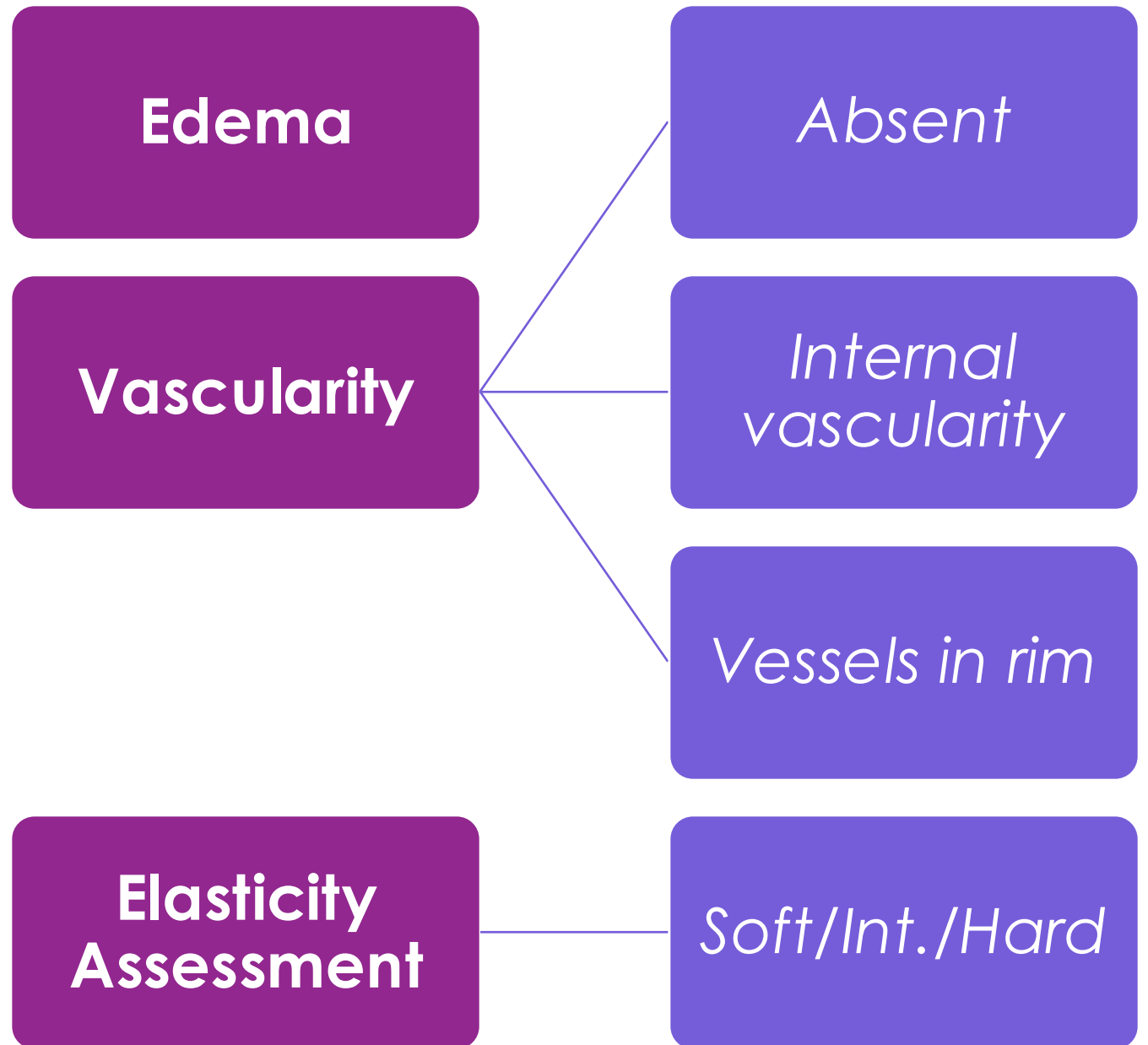


BIRADS™ Features

- **Shape**
 - *Oval / Round / Irregular*
- **Margins**
 - Circumscribed
 - Not Circumscribed
 - *Indistinct*
 - *Angular*
 - *Microlobulated*
 - *Spiculated*
- **Orientation**
 - *Parallel / Not Parallel*
- **Elasticity assessment**
 - Soft
 - Intermediate
 - Hard



BIRADS™ Features



Strictly Adhere to the BIRADS Lexicon

- Mass/Focal Asymmetry/Asymmetry/Architectural Distortion/Calcifications/Solitary Dilated Duct
- Document associated findings
 - Ductal extension/skin-nipple-chestwall involvement/adenopathy
- Architectural Distortion/Calcifications/Skin Retraction or Thickening
- Describe the location
 - Quadrant, O'clock, Distance, Depth
- Understand the likelihood of malignancy for different findings

BIRADS™ Features – Special Cases

Simple cyst

Clustered microcysts

Complicated cyst

Mass in or on skin

Foreign body including
implants

Lymph nodes –

- intramammary
- axillary

Post-Surgical
Collection

Fat Necrosis

Vascular abnormalities

- AVMs (arteriovenous malformations/
pseudoaneurysms)
- Mondor disease

Choose the Best Modality

- Perform the biopsy in the modality the finding is best visualized
 - Ultrasound
 - Stereotactic
 - Tomosynthesis
 - MRI
 - CEM
- Use Shortest Skin to Lesion Distance
- Discordant results
 - Additional Cost for the patient
 - Additional anxiety for the patient



Put it on the Line

- Communicate your level of suspicion to the radiologist
- Use the subcategories of BIRADS 4
 - A: 2-10% probability of malignancy
 - B: 10-50% probability of malignancy
 - C: 50-95% probability of malignancy
- Don't be afraid of using a BIRADS Category 5
- Communicate your best guess
- Be as specific as possible
- Incorporate the clinical history
- You will be pleasantly surprised that you are spot on a lot of the time

Critically Evaluate Concordance

- Before and After the biopsy
 - Location, distance from the nipple, depth, size, shape, and level of suspicion
 - Is the clip where it should be?
- Were calcifications identified?
 - Do a specimen radiograph to confirm
- Review the pathology with the radiologist
- Ask questions to gain a better understanding
- Be willing to speak up respectfully
- Listen to your gut/intuition



Potential Pitfalls

Factors that can be challenging with diagnostic breast ultrasound.

Lesion size

Depth

Breast
thickness

Isoechoic

Retroareolar

Be a Sponge

- Learn about the pathophysiology of breast cancer and benign breast disease
 - The imaging findings correlate with the pathologic subtypes
- Look up rare entities, you will eventually see everything
- Follow your patients from Screening to Diagnostic through biopsy and treatment
- Learn the NCCN Guidelines
 - Indications for Genetic testing and high-risk screening
 - Indications for chemo and radiation therapy
 - Indications for Surgical Referral
- Attend multi-disciplinary Conferences
 - Learn about methods of oncoplastic surgery and reconstruction

Never Underestimate Trauma or Abscess

- Fat Necrosis can look like almost anything
 - Hyperechogenic/Mass/Calcifications/Architectural Distortion
 - Oil Cysts can look suspicious on ultrasound
- Ask about history of surgery and trauma
- Unexplained discoloration/bruising
- Sudden development of a lump that is getting smaller
- Can evolve over years
 - Most Developing Findings require biopsy
- Clinical History is key with Abscesses
- Rapid onset, constitution symptoms, can be asymptomatic but is most frequently painful
 - Smoking and Piercings

Provide Compassionate Care

- Be a good listener
- Empathize
 - Remember the patient is someone's daughter, sister, girlfriend, wife, mother
 - Many Women are scared that they have breast cancer from the moment they feel the lump or receive the call/letter asking them to come back
- Be careful not to judge patients and let that cloud your interaction/exam
- You never know what is happening in someone else's life
- Denial is a powerful force
- Be Honest
 - It's OK to say you are not sure
- The stakes are high but the rewards are great
 - Patients are genuinely grateful for your time, expertise, and compassion



Case Review

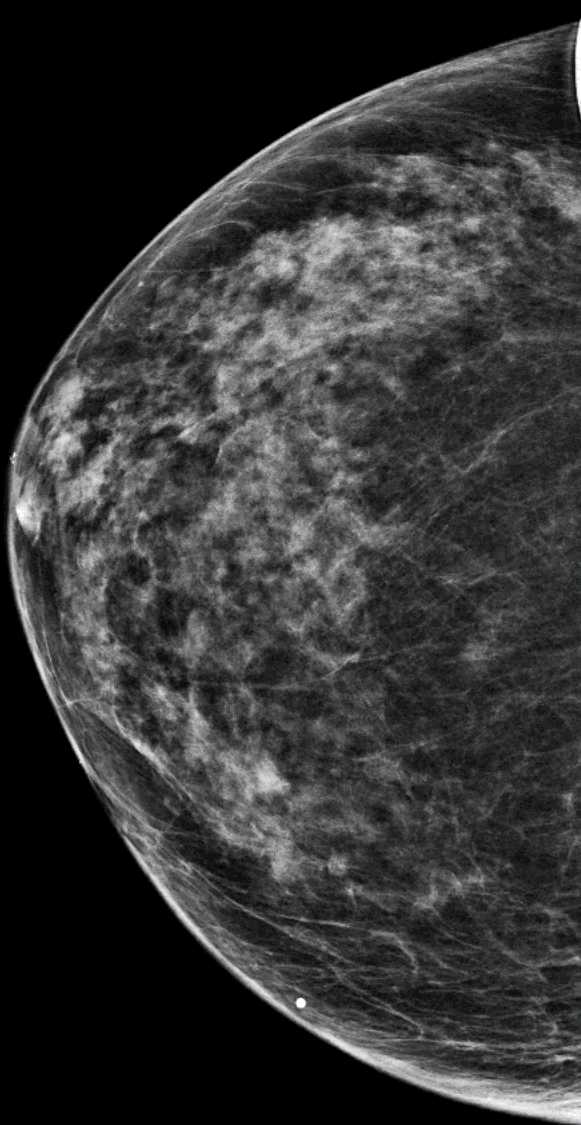


Case 1

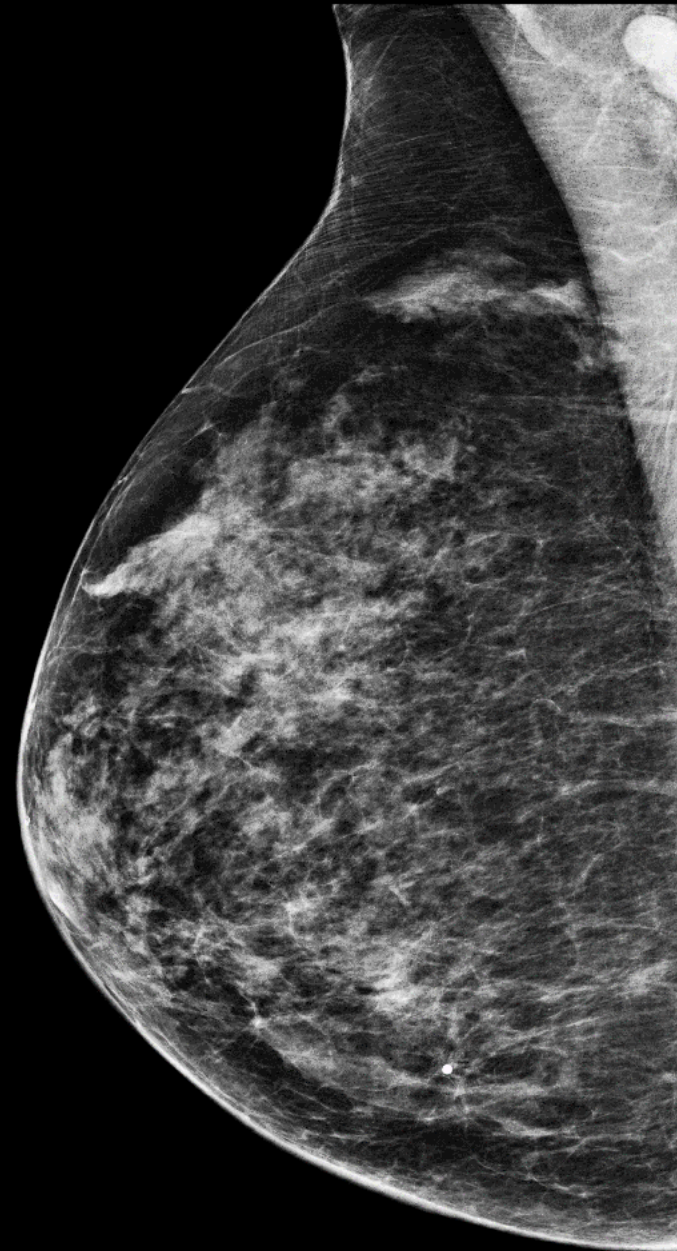
Axillary Mass

[V
H] RCC

tender area



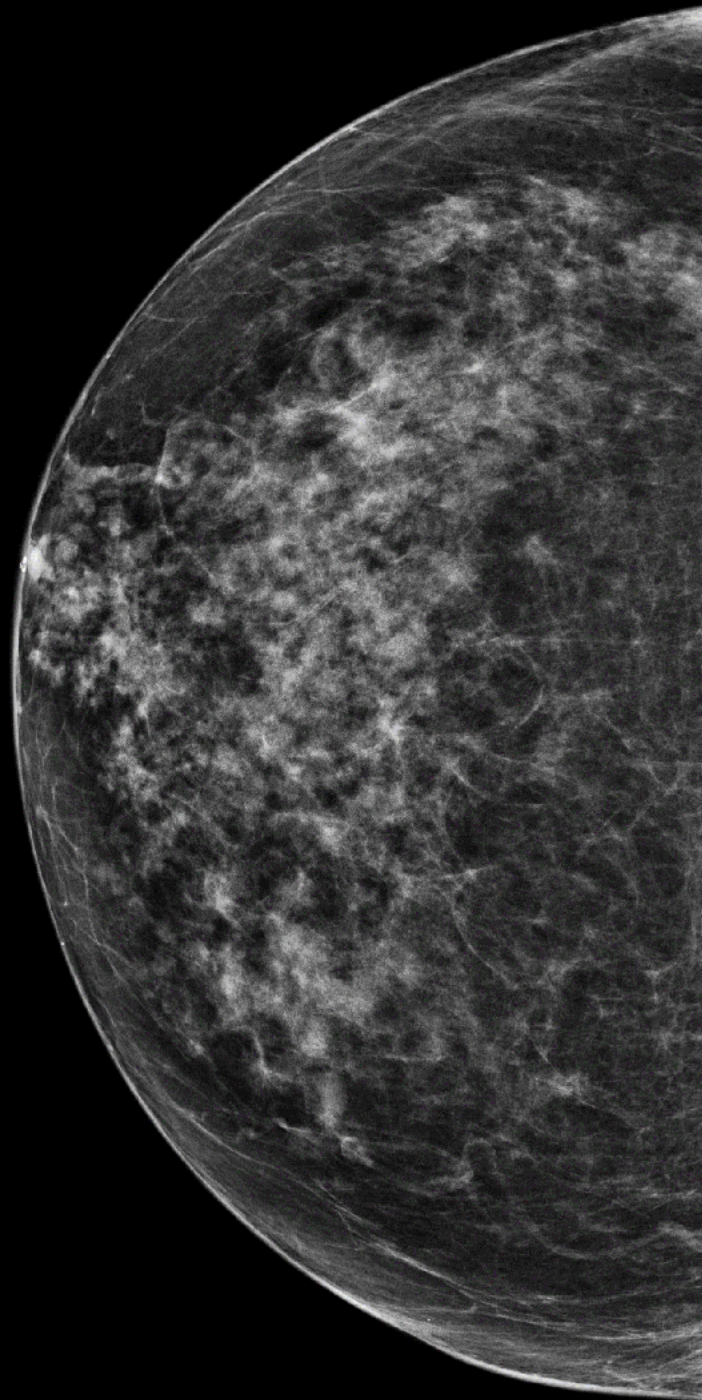
[C
H] RMLO



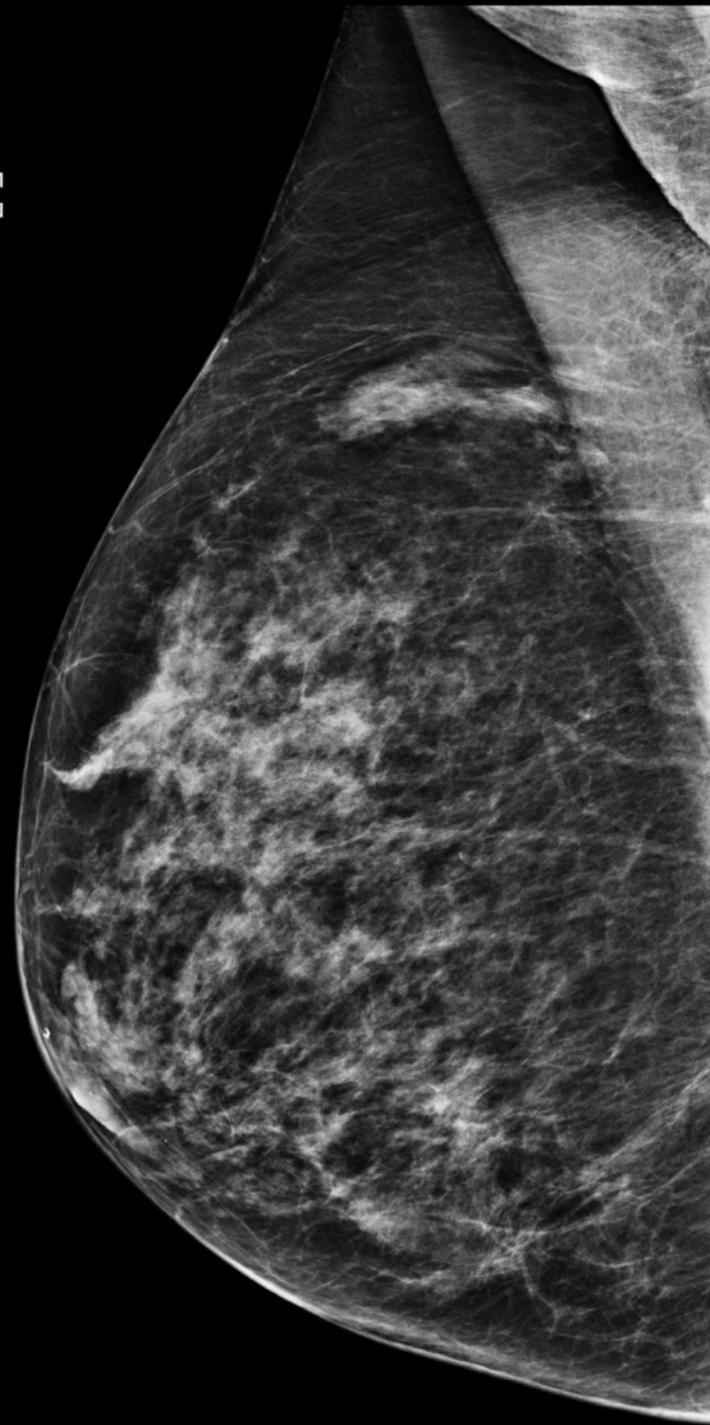
RMLO

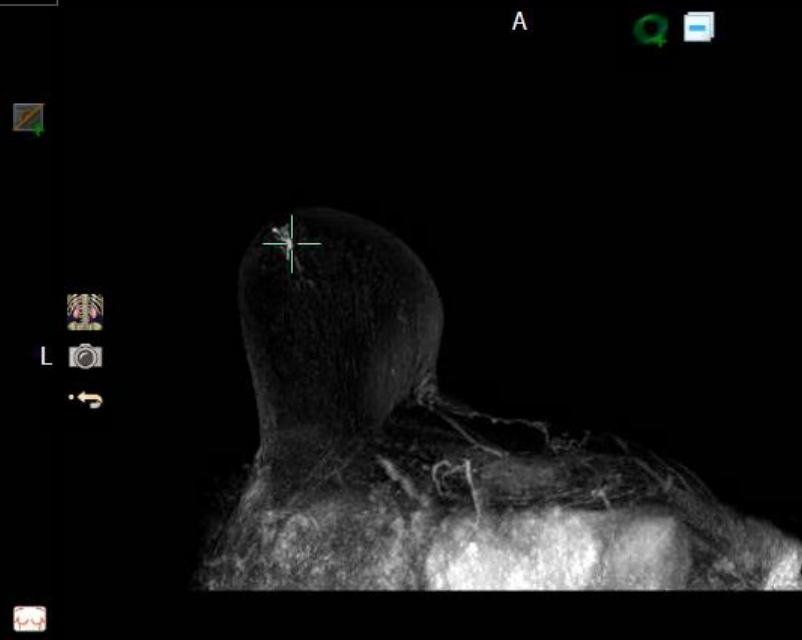
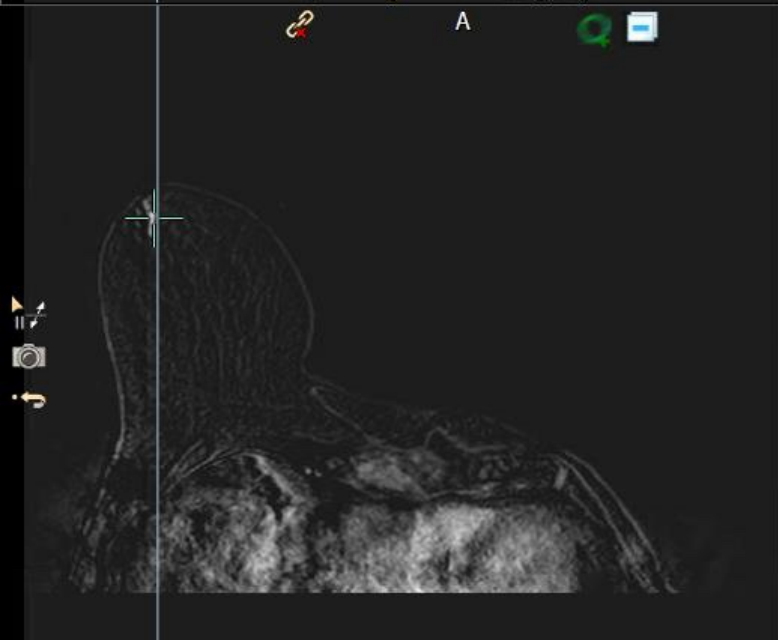
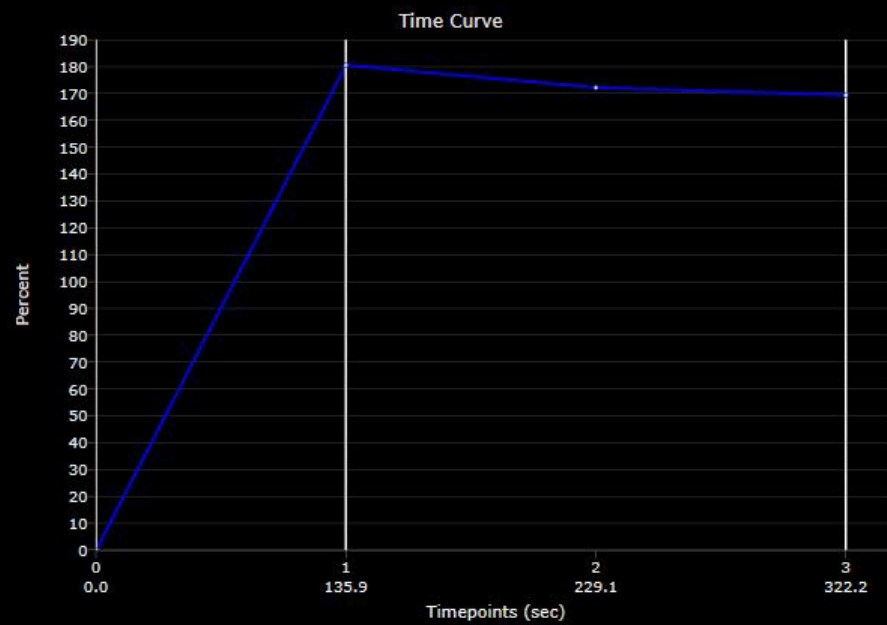
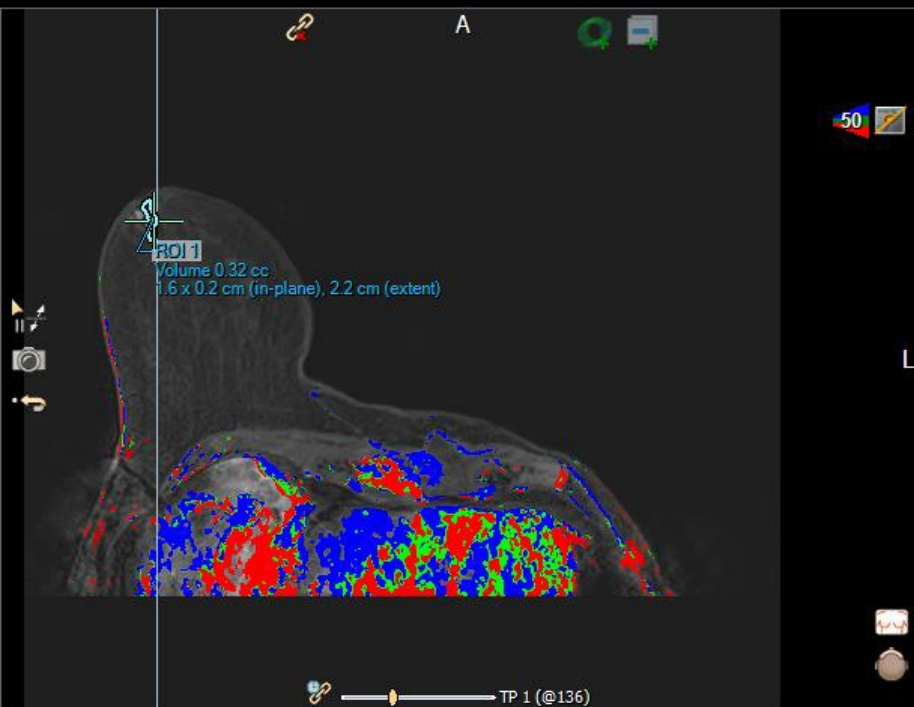


[₆₀ RCC]



[_S^K RMLO]



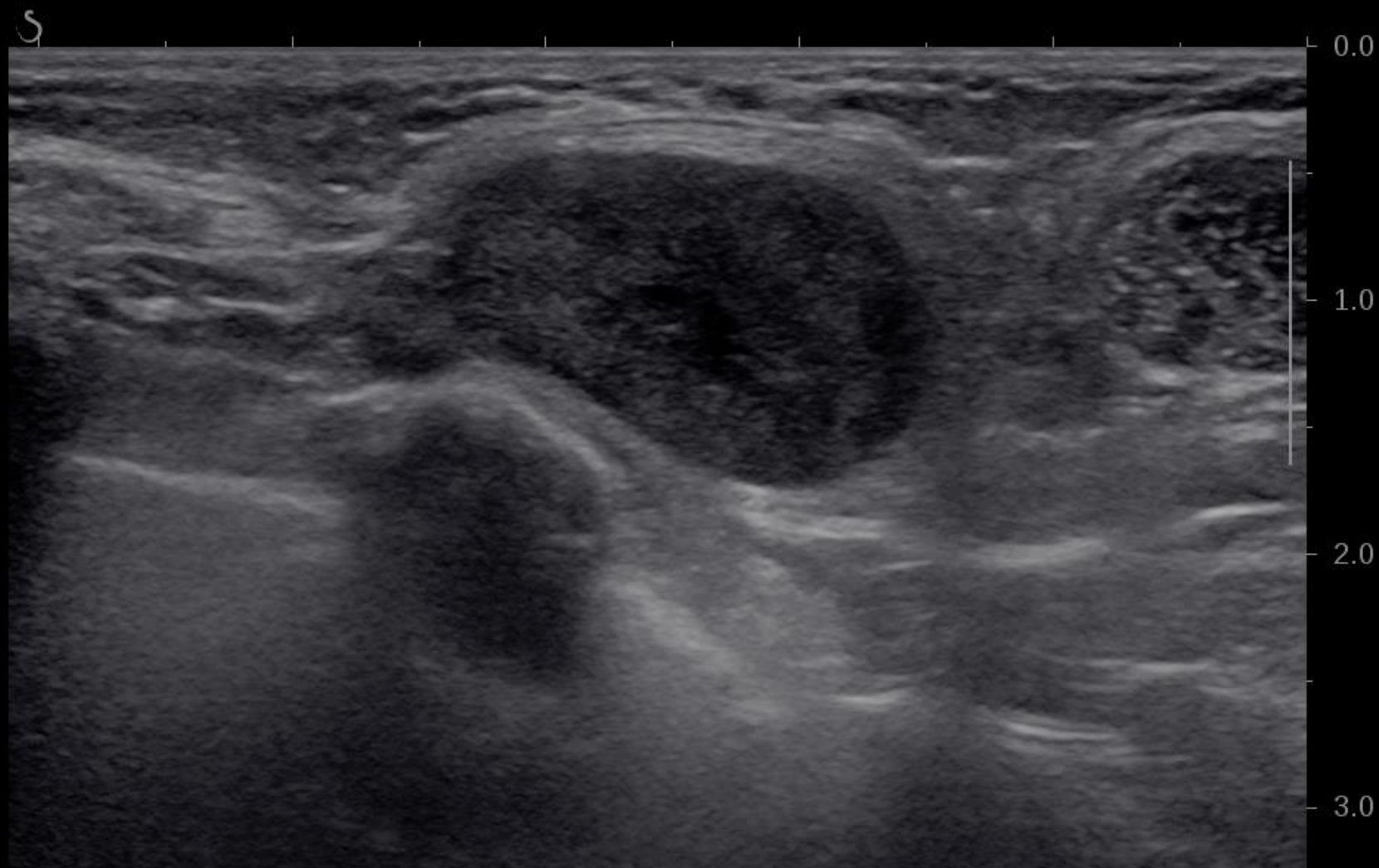




B

Res/H
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SC/SR 2
G 57 %
Fr. 53 Hz

Z 110 %

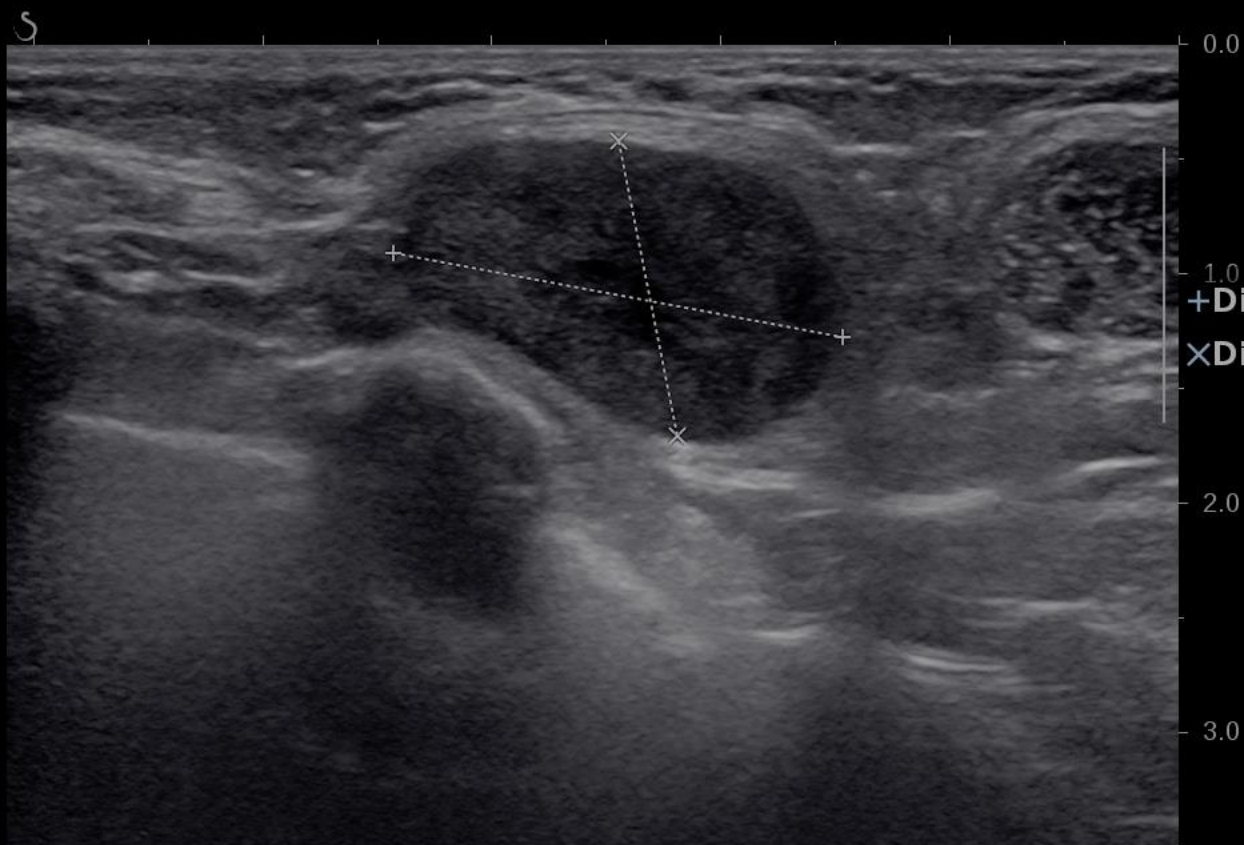




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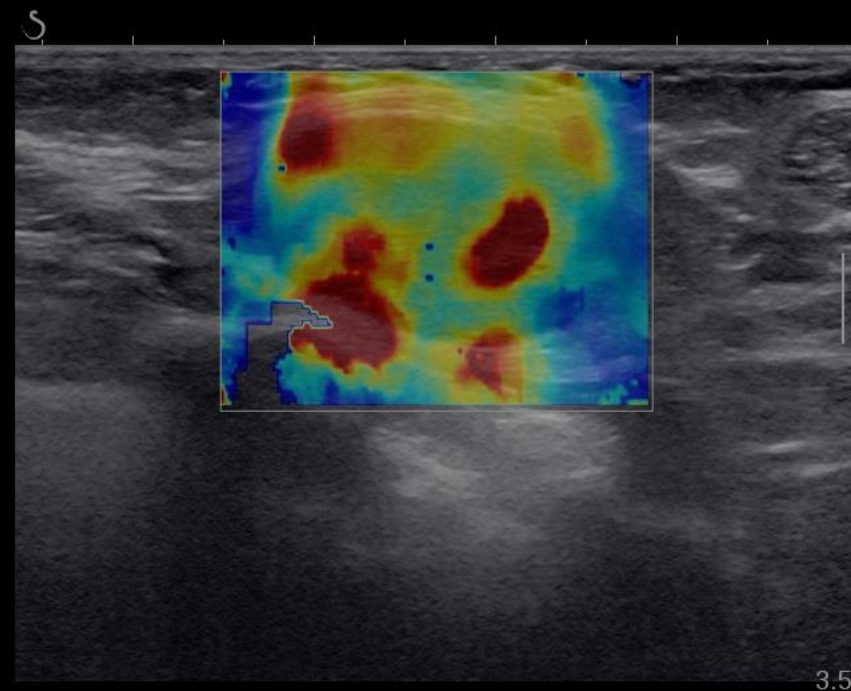
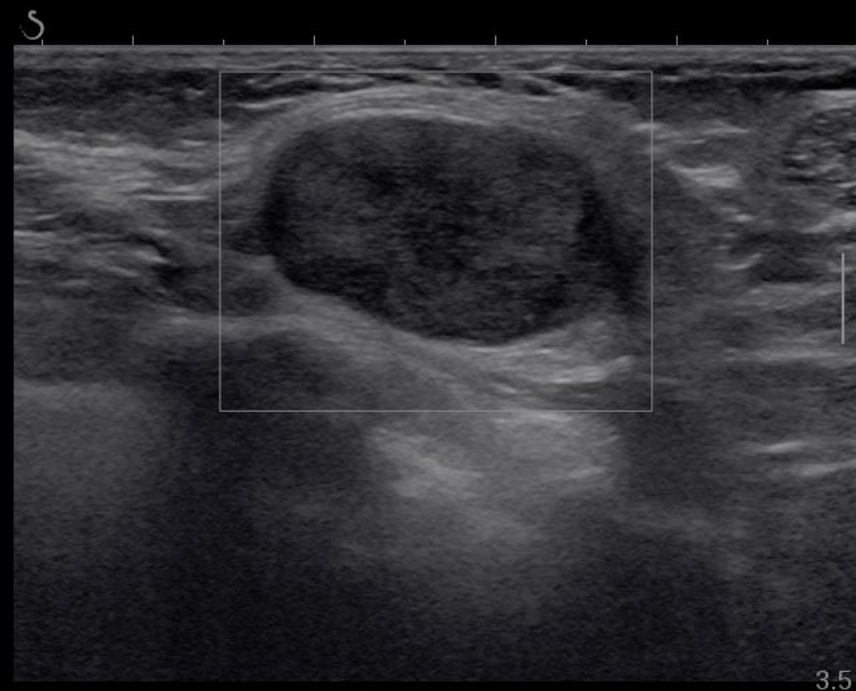
1.0
+Dist **2.00 cm**
XDist **1.31 cm**



RT AXILLA TRANS



≥180 kPa



RT AXILLA TRANS

Res/H
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T 1460 m/s/SC/SR 2
G 55 %/Fr. 19 Hz

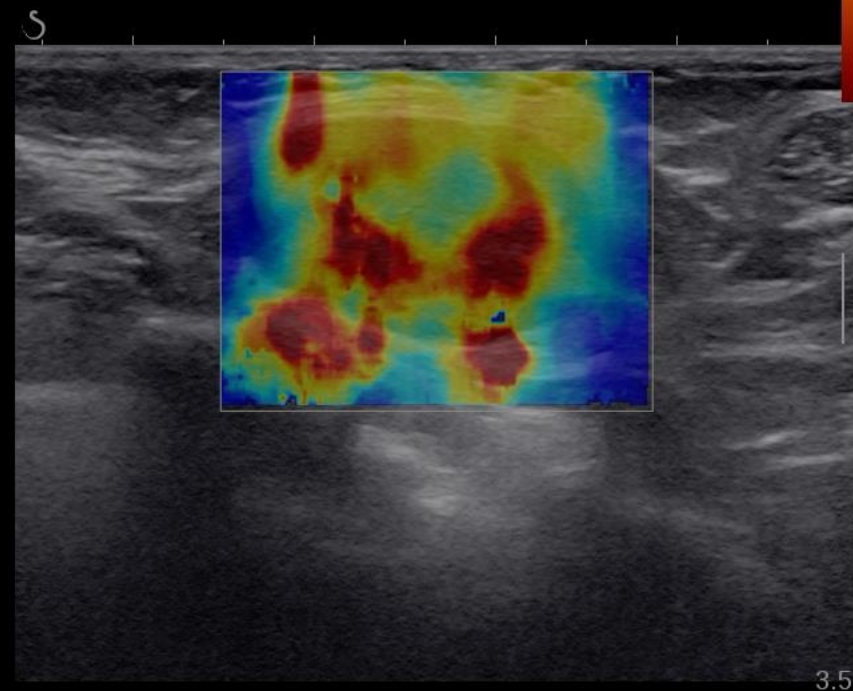
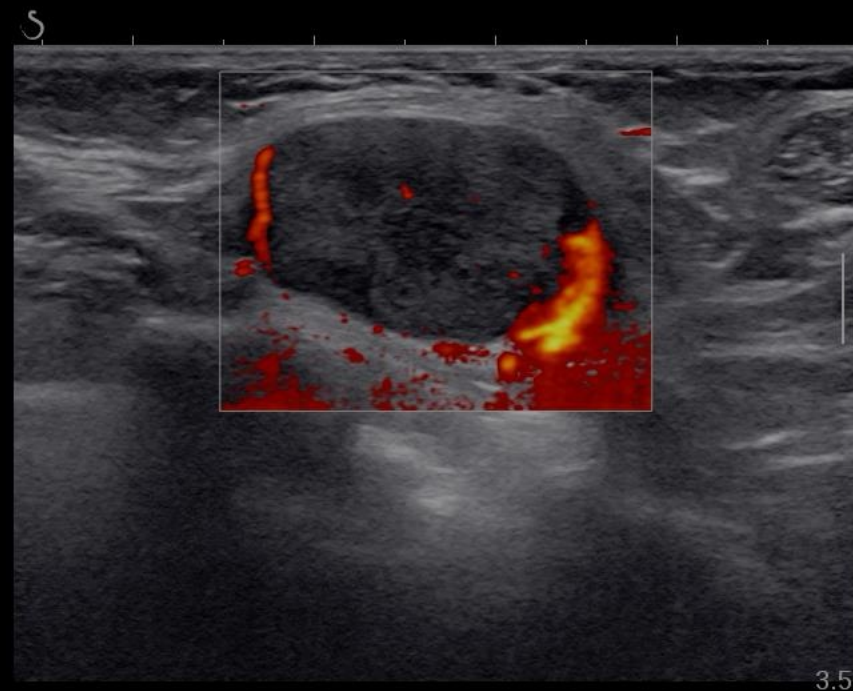
Z 110 %

SWE™f [70 - 800] Hz
Pen/1.6 Hz/SWE Bias ⓘ
M 1/Med/Compression ⓘ
S 5/O 50 %/G 90 %

Fr: 162/162



≥180 kPa



RT AXILLA TRANS

Res/H
M 7/65 dB/High
T 1460 m/s/SC/SR 2
G 55 %/Fr. 11 Hz

COL+ / CPI
Fr. 12 Hz
G 80 %
Scale 4.0 cm/s

SWE™f [70 - 800] Hz
Pen/1.0 Hz/SWE Bias ⓘ
M 1/Med/Compression ⓘ
S 5/O 50 %/G 90 %

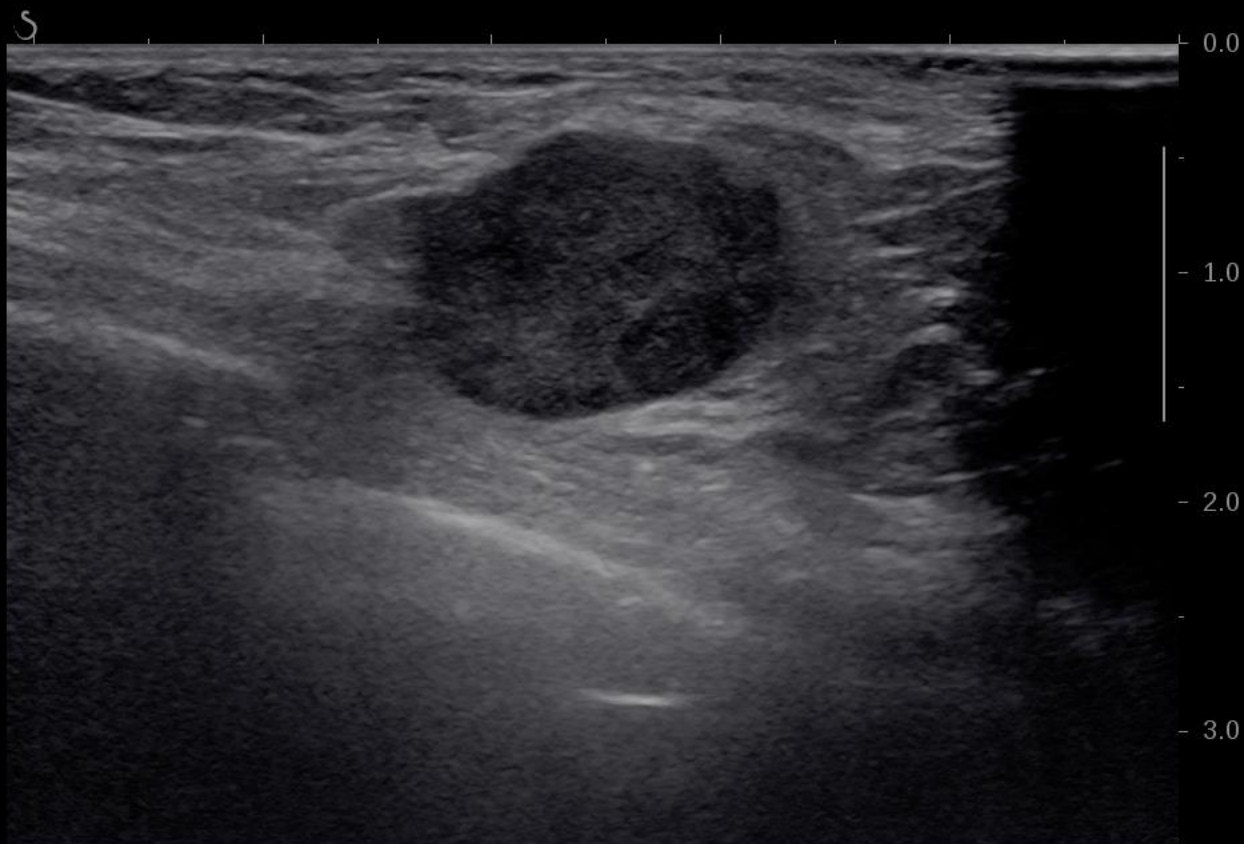
Fr: 63/63



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 55 %
Fr. 53 Hz

Z 110 %



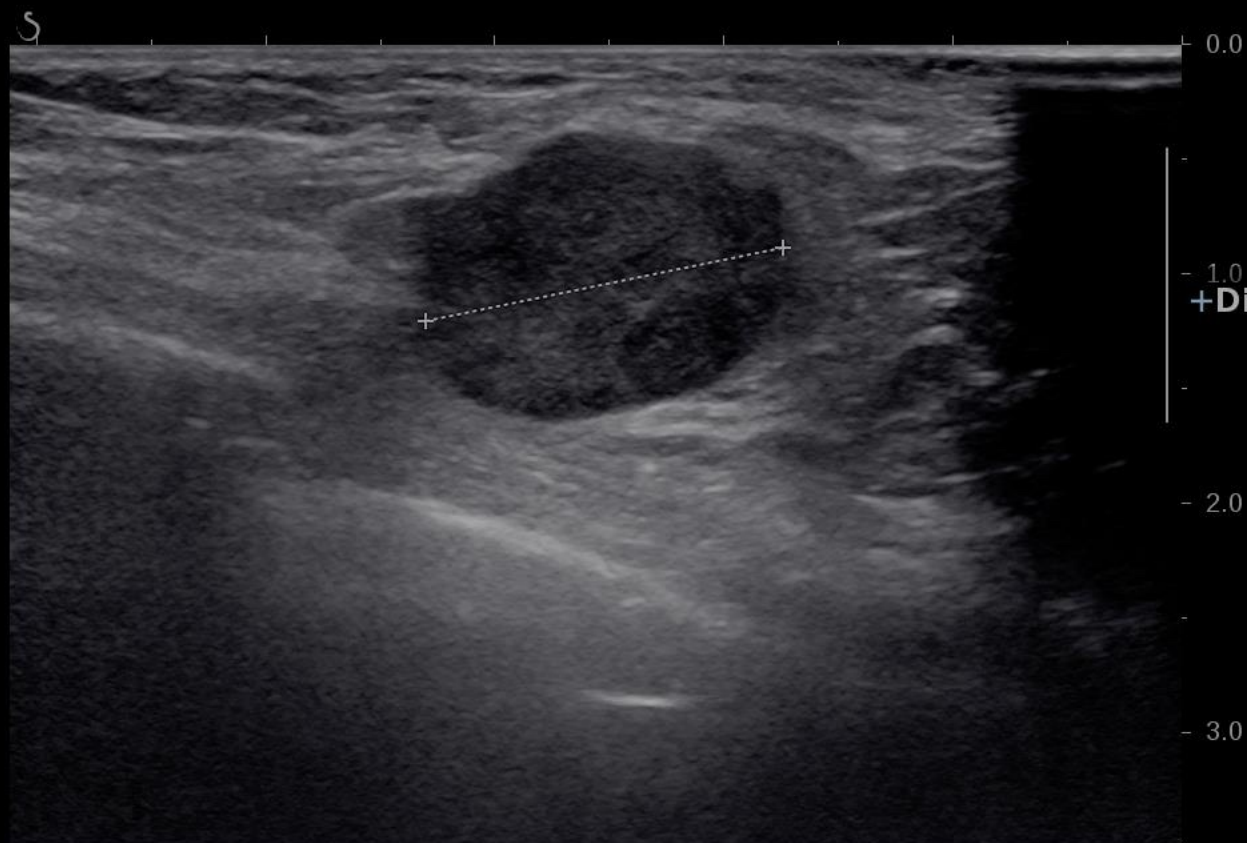
RT AXILLA LONG



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 55 %
Fr. 53 Hz

Z 110 %



+Dist 1.60 cm



RT AXILLA LONG



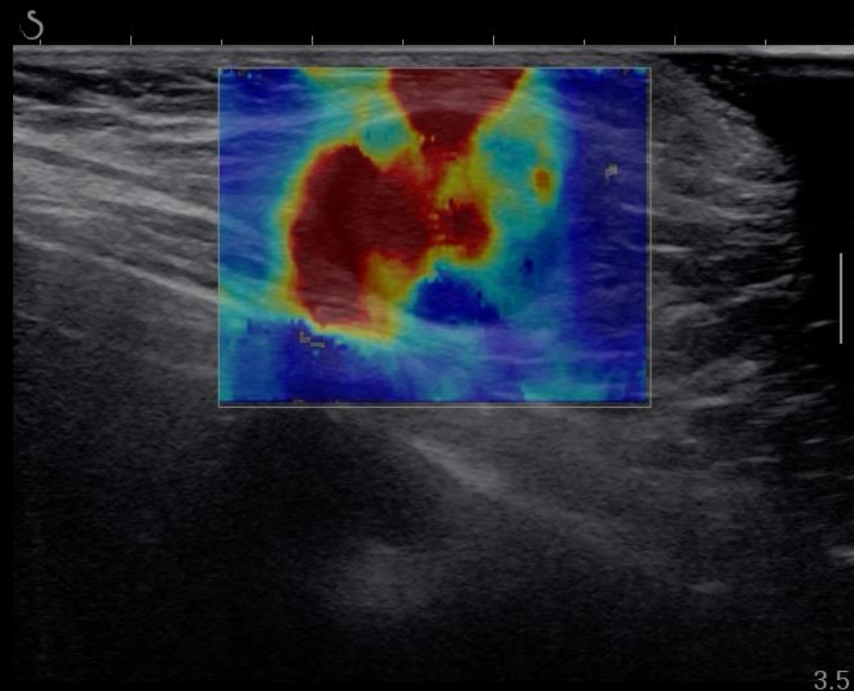
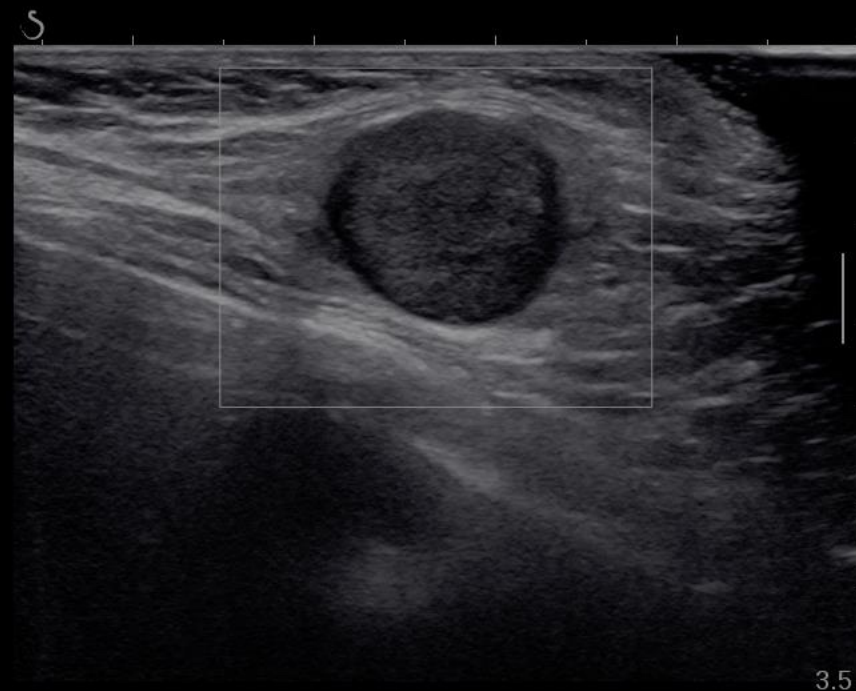
≥180 kPa

144

108

72

36



RT AXILLA LONG

Res/H
M 7/65 dB/High
T 1460 m/s/SC/SR 2
G 51 %/Fr. 19 Hz

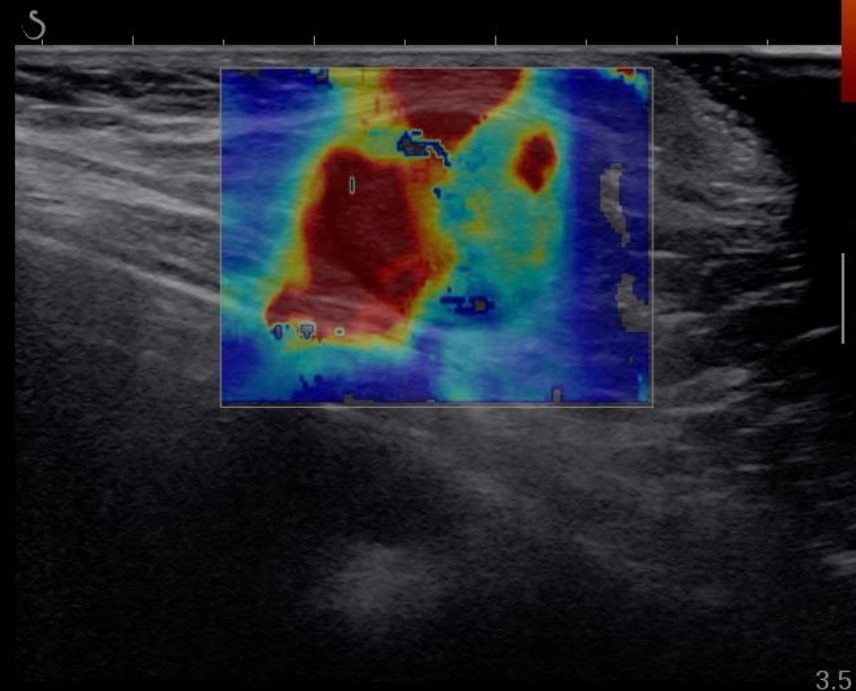
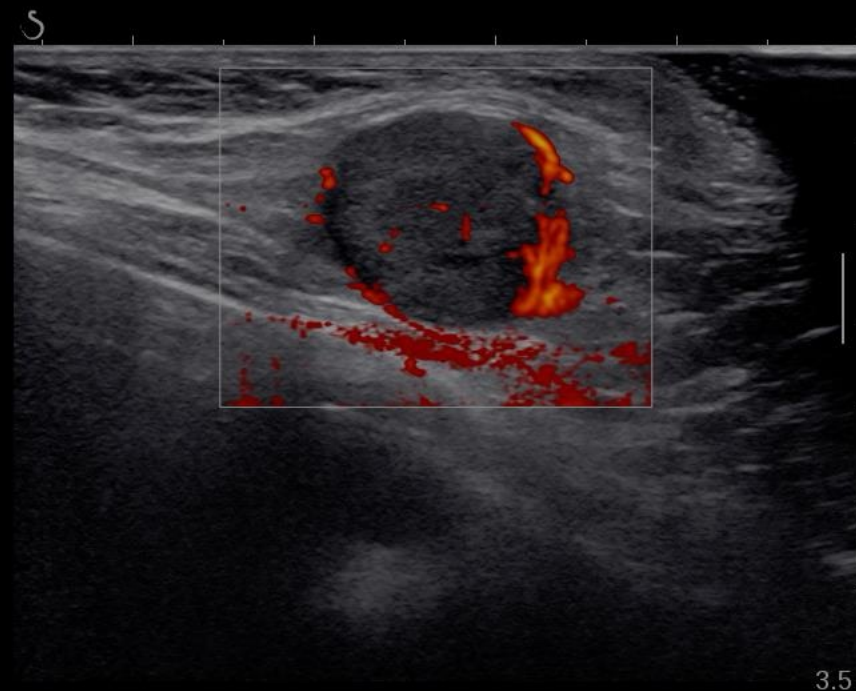
Z 110 %

SWE™f [70 - 800] Hz
Pen/1.6 Hz/SWE Bias ⓘ
M 1/Med/Compression ⓘ
S 5/O 50 %/G 90 %

Fr: 112/112





≥180 kPa



RT AXILLA LONG

Res/H
M 7/65 dB/High
T 1460 m/s/SC/SR 2
G 51 %/Fr. 11 Hz

COL+ / CPI
Fr. 12 Hz
G 80 %
Scale 4.0 cm/s

SWE™f [70 - 800] Hz
Pen/1.0 Hz/SWE Bias 
M 1/Med/Compression 
S 5/O 50 %/G 90 %

Fr: 54/54



B

Res/H
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T 1460 m/s
SC/SR 2
G 77 %
Fr. 45 Hz

Z 100 %

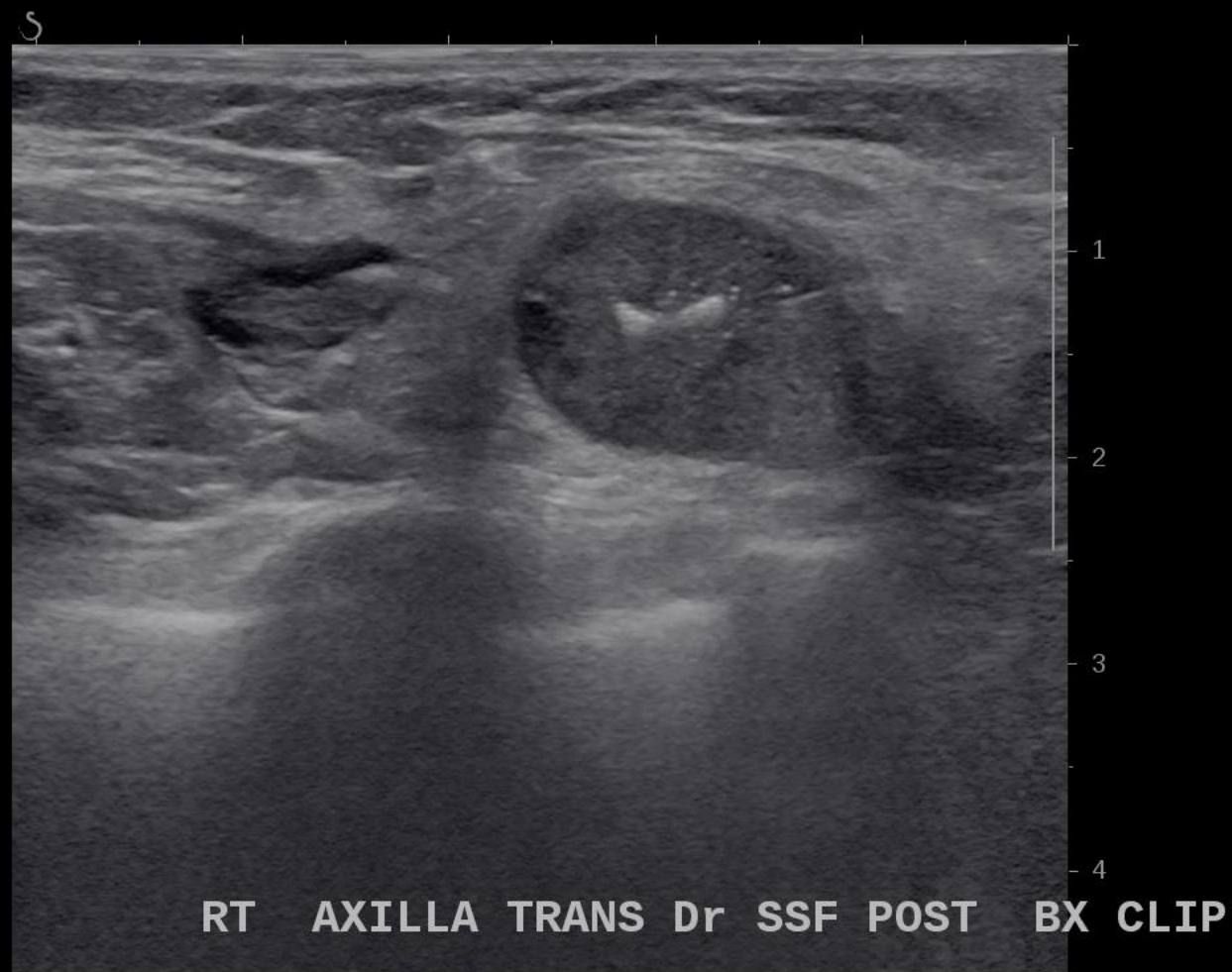




B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 77 %
Fr. 45 Hz

Z 100 %



CLINICAL INFORMATION

History: 87-year-old with history of left breast cancer now with right axillary adenopathy

Pre-op diagnosis: Axillary metastasis secondary to breast primary

Patient also with bone lesions, liver lesion

DIAGNOSIS:

Axillary lymph node, right, core biopsy: Involved by adenocarcinoma, moderately differentiated. See comment.

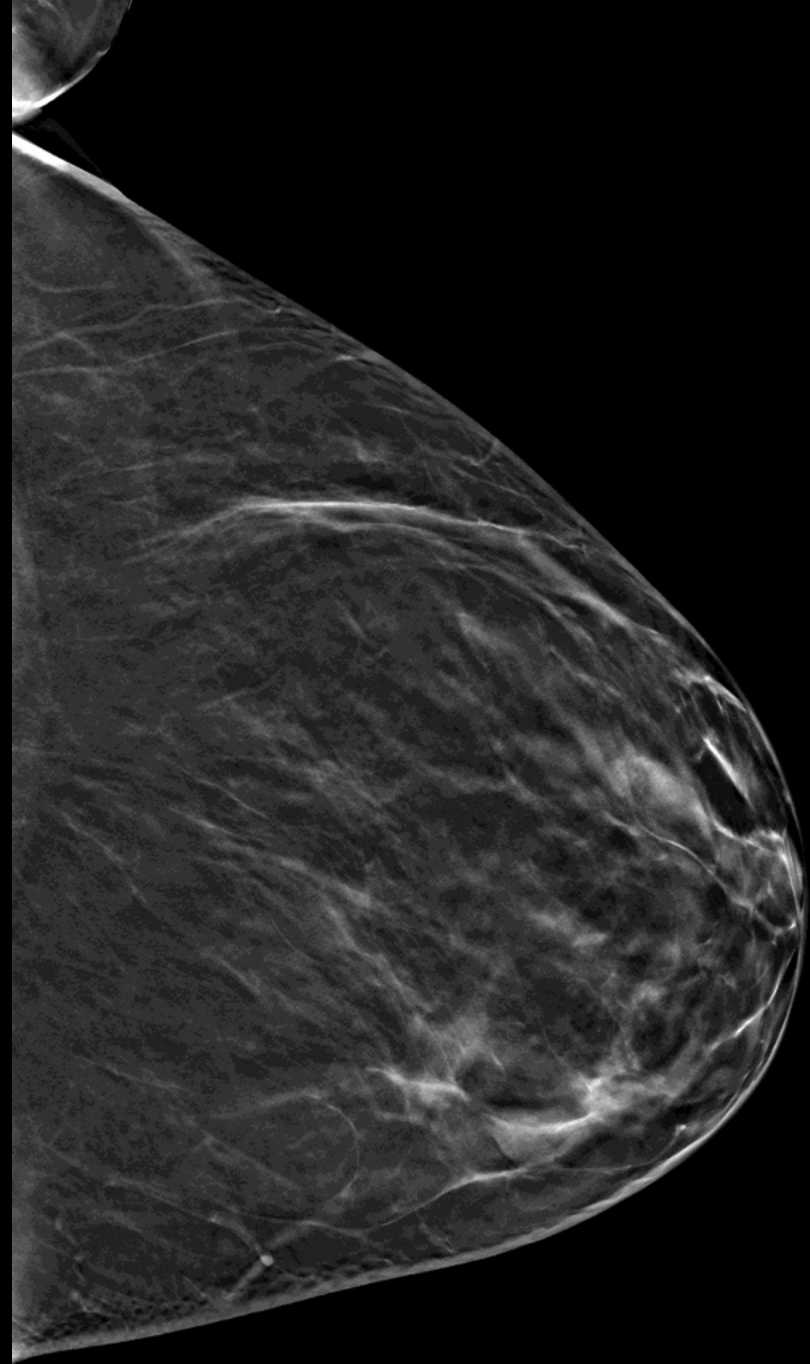
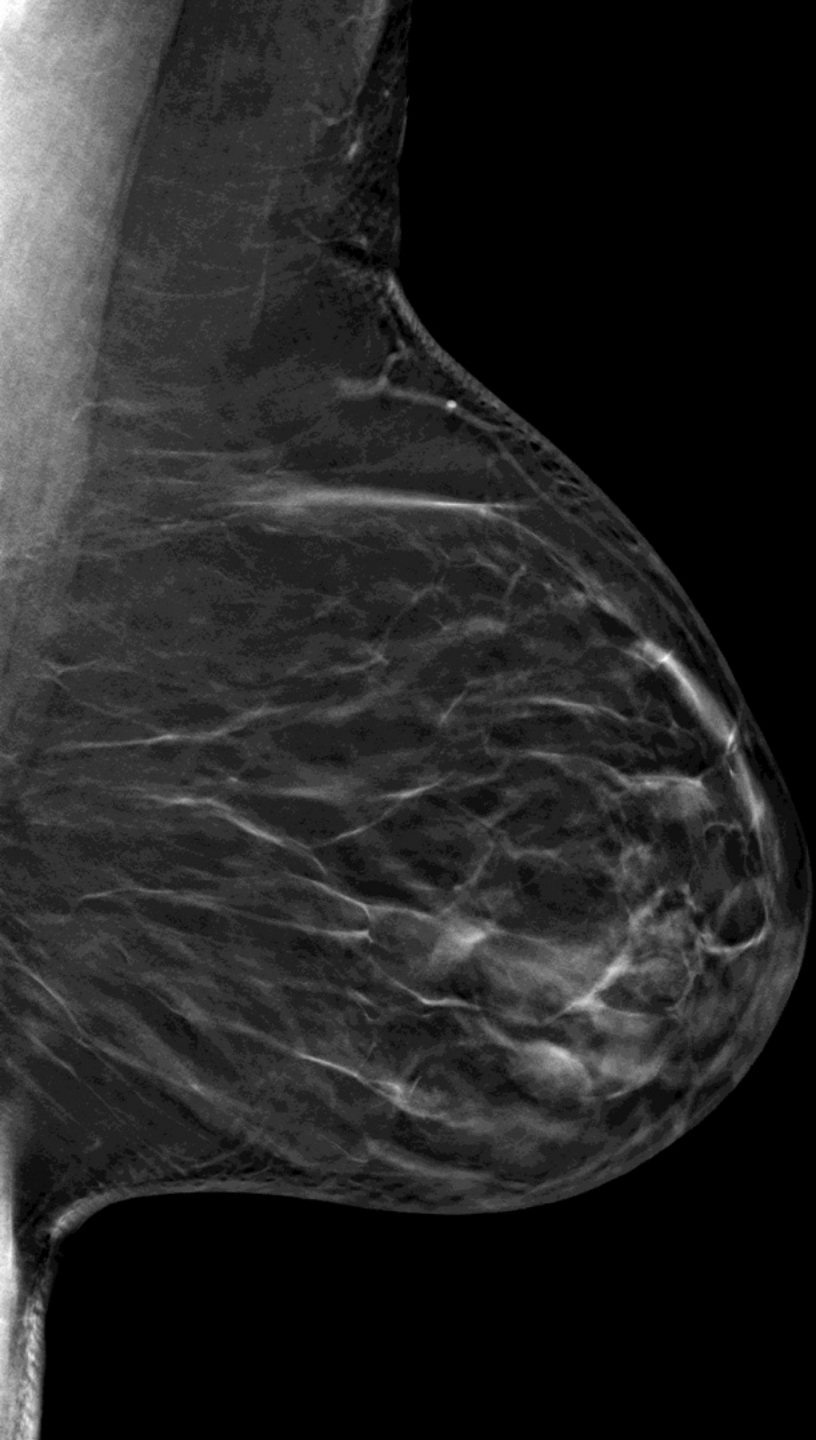
COMMENT:

The morphology of the tumor is unusual for a breast metastasis. No background lymph node tissue is present. This could represent an unusual-appearing breast metastasis, but a metastasis from another primary site is certainly possible. Particularly, the upper gastrointestinal tract and pancreaticobiliary tract should be considered. Immunohistochemical studies are not specific (see microscopic description).



Case 2

Oval Circumscribed Mass

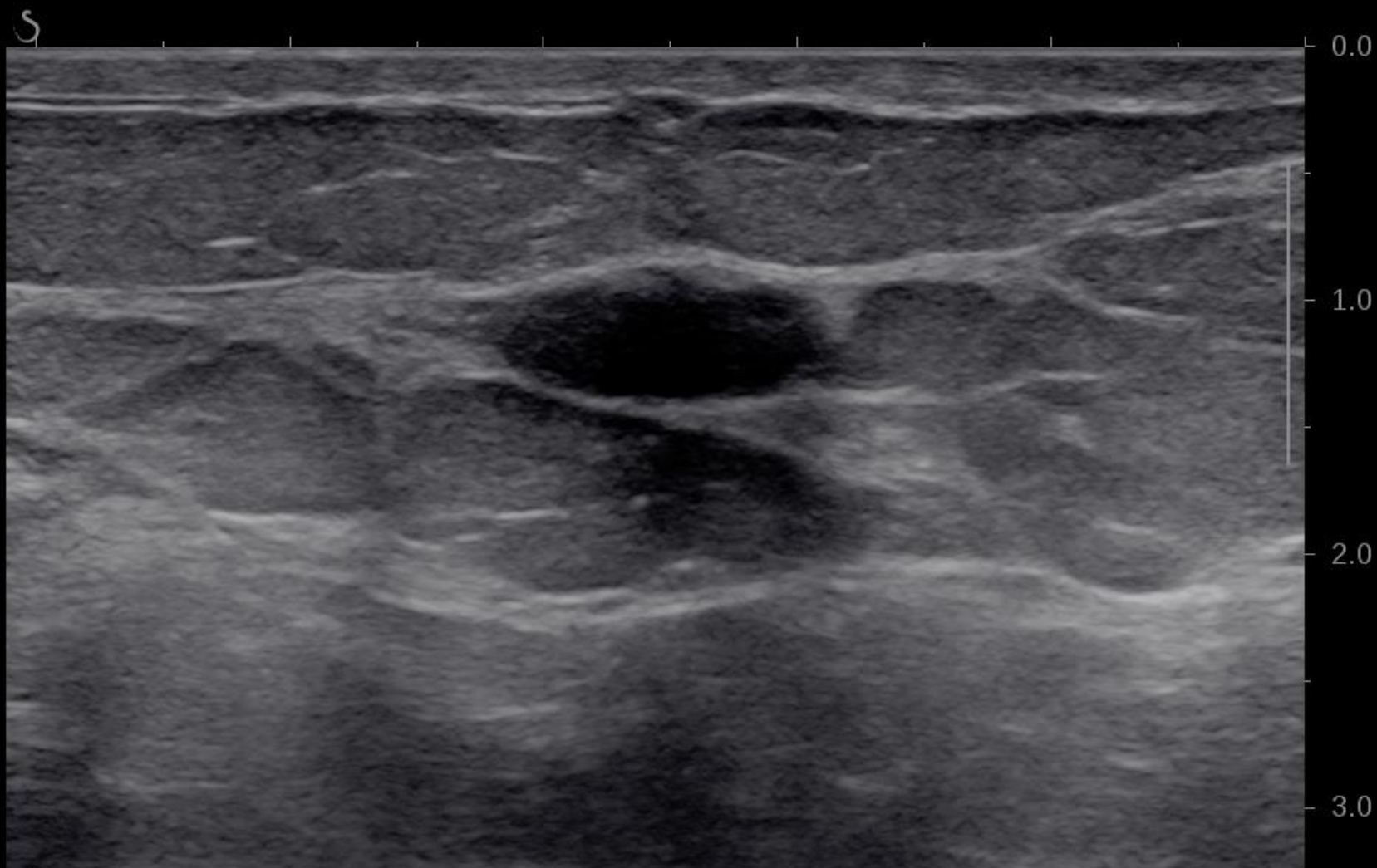




B

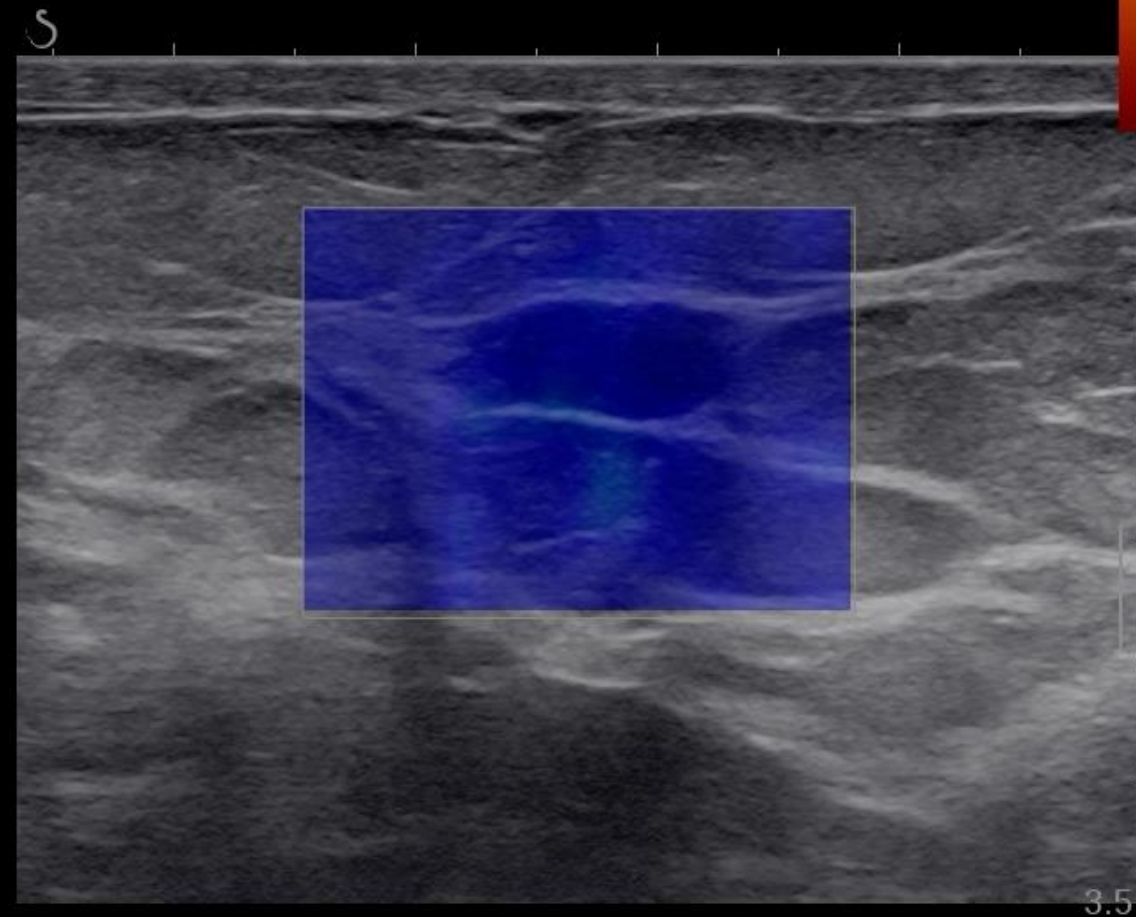
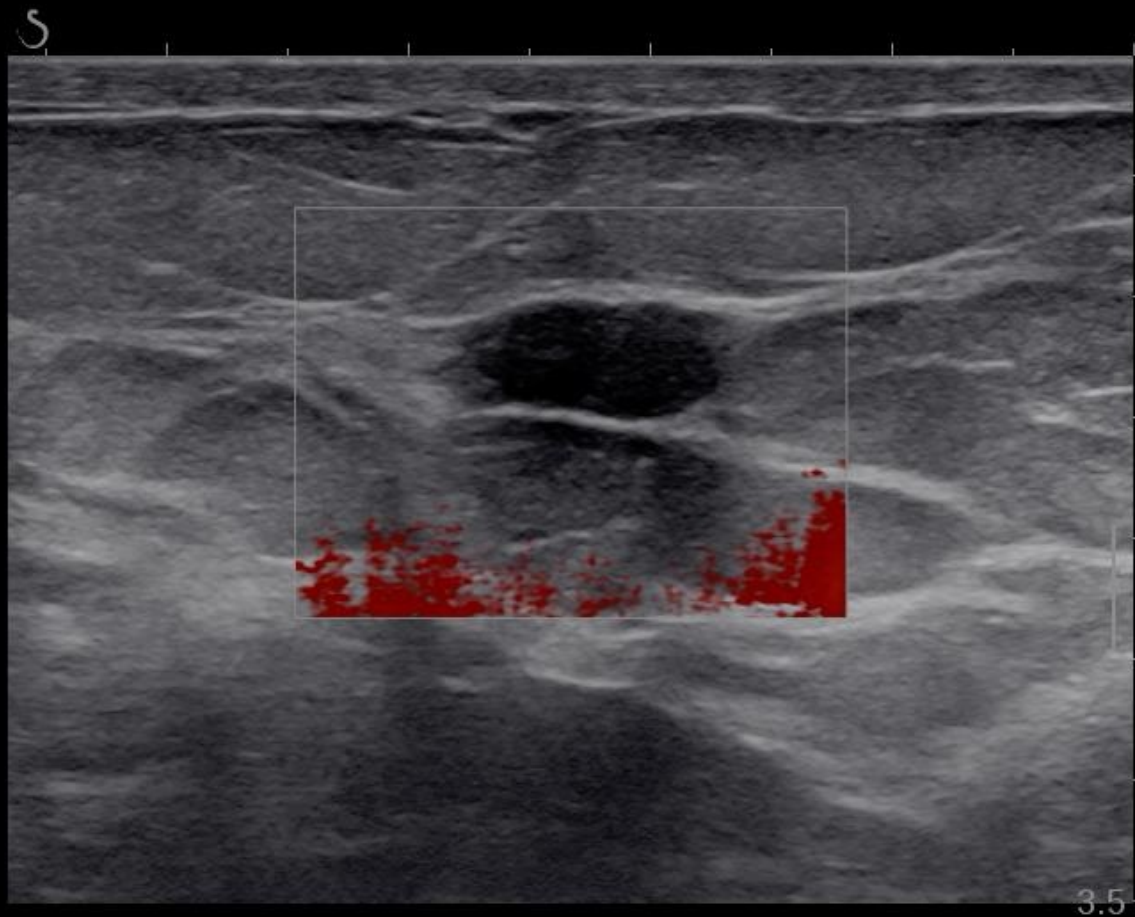
Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 59 %
Fr. 53 Hz

Z 110 %





≥180 kPa





B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 48 %
Fr. 58 Hz

Z 110 %



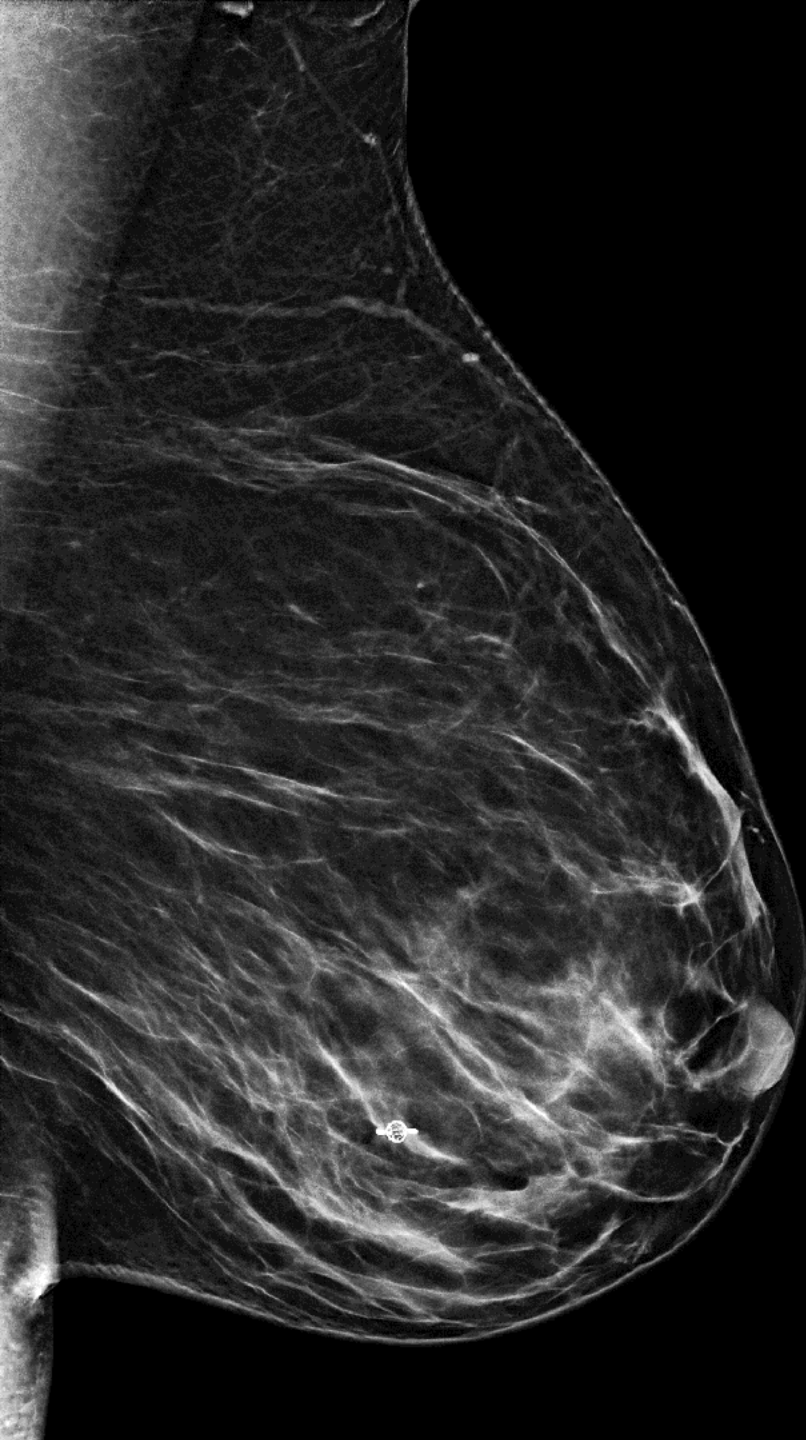


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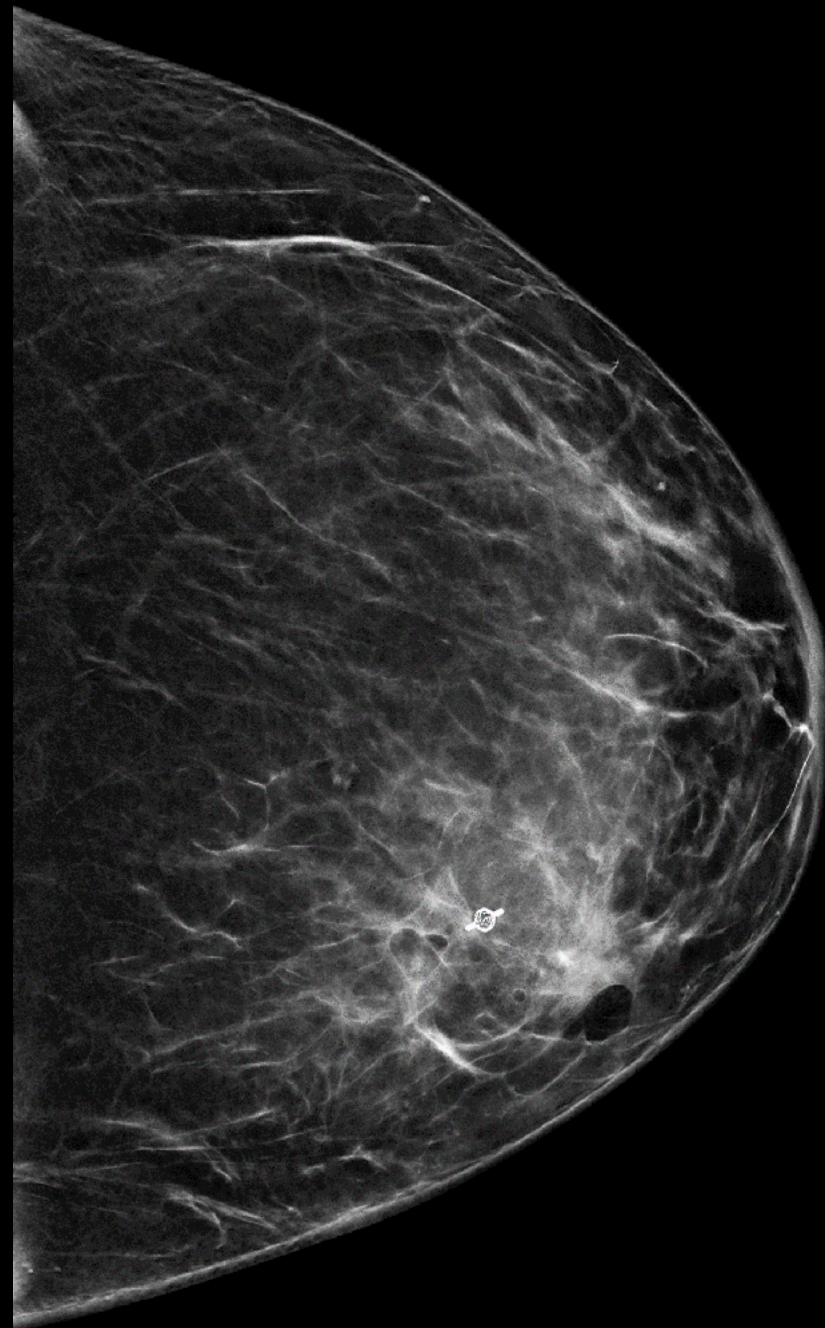
Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 48 %
Fr. 58 Hz

Z 110 %





M
A
L LML



M
A
L LCC

CLINICAL INFORMATION

34-year-old Caucasian female with BRCA 1 mutation.

Imaging impression: Fibroadenoma

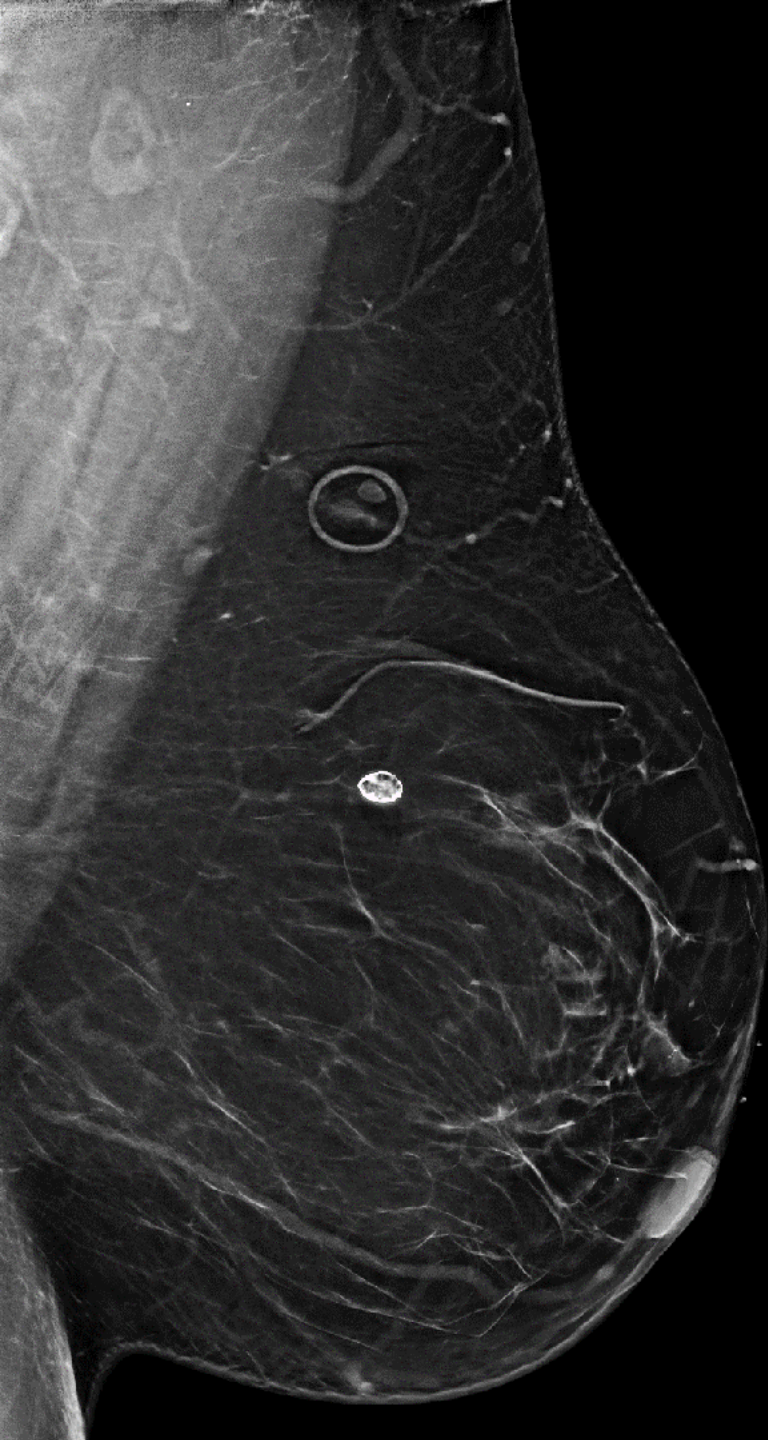
DIAGNOSIS:

Breast, left, 8 o'clock, 4 cm from nipple, ultrasound guided core biopsy: Fibroadenoma; negative for atypia and malignancy.

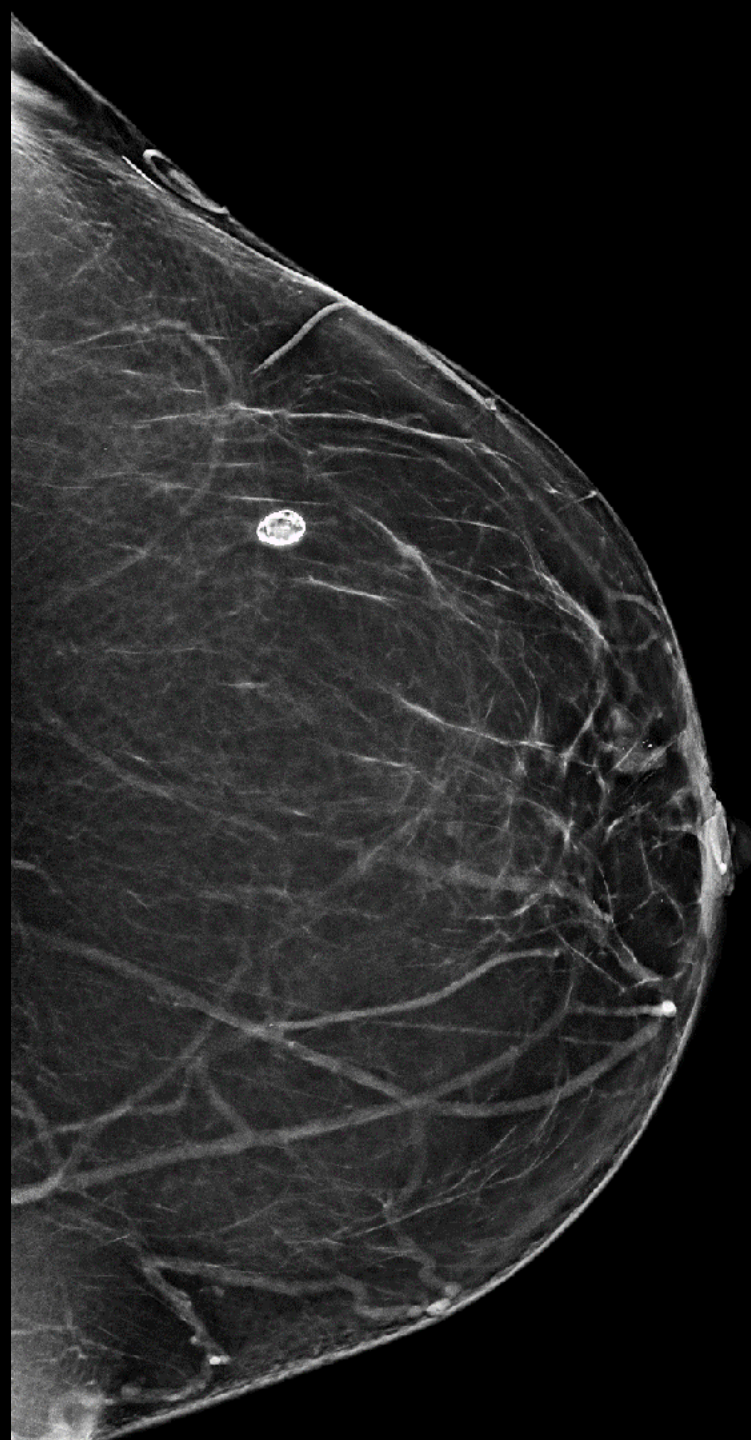


Case 3

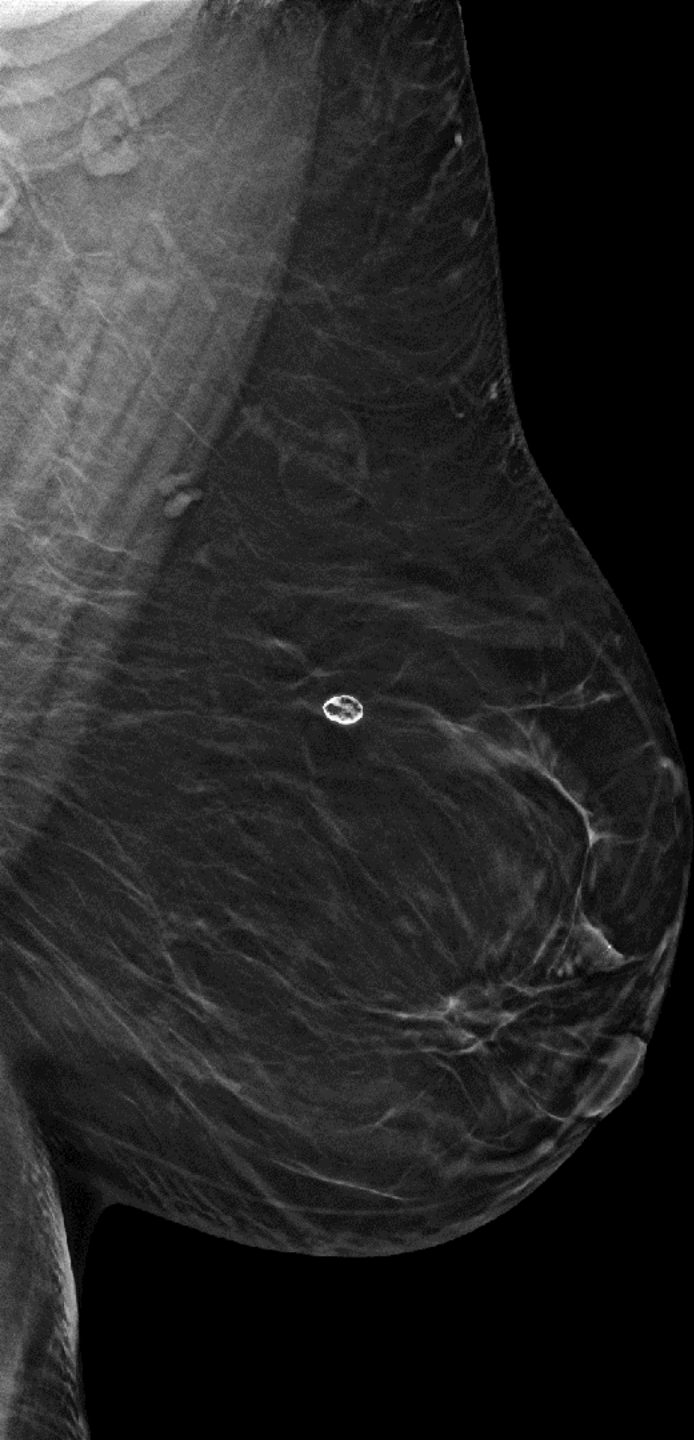
Oval Circumscribed
Mass



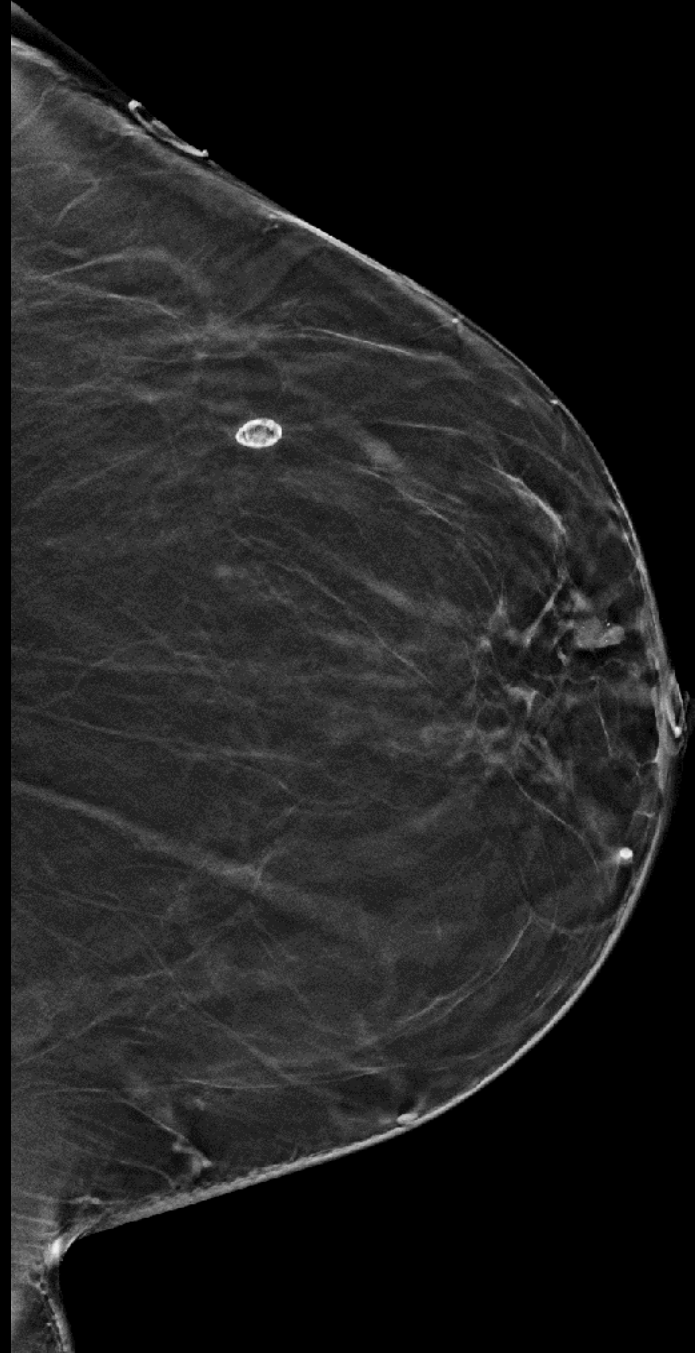
[x] LMLO



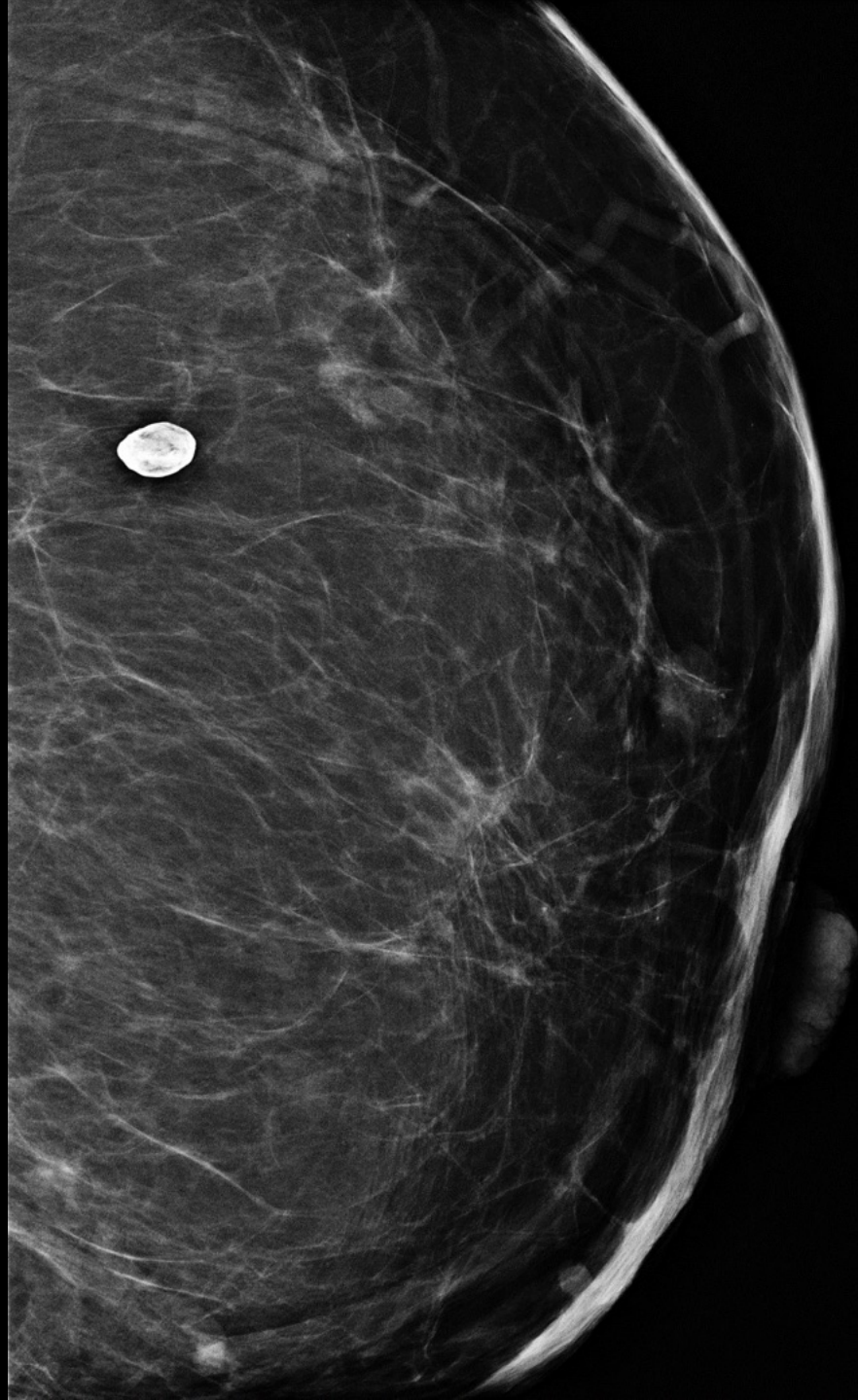
[x] LCC



Quorum



Quorum



[N
C] LMML



[N
C] LMCC



B

Res/H

M 7/65 dB/High

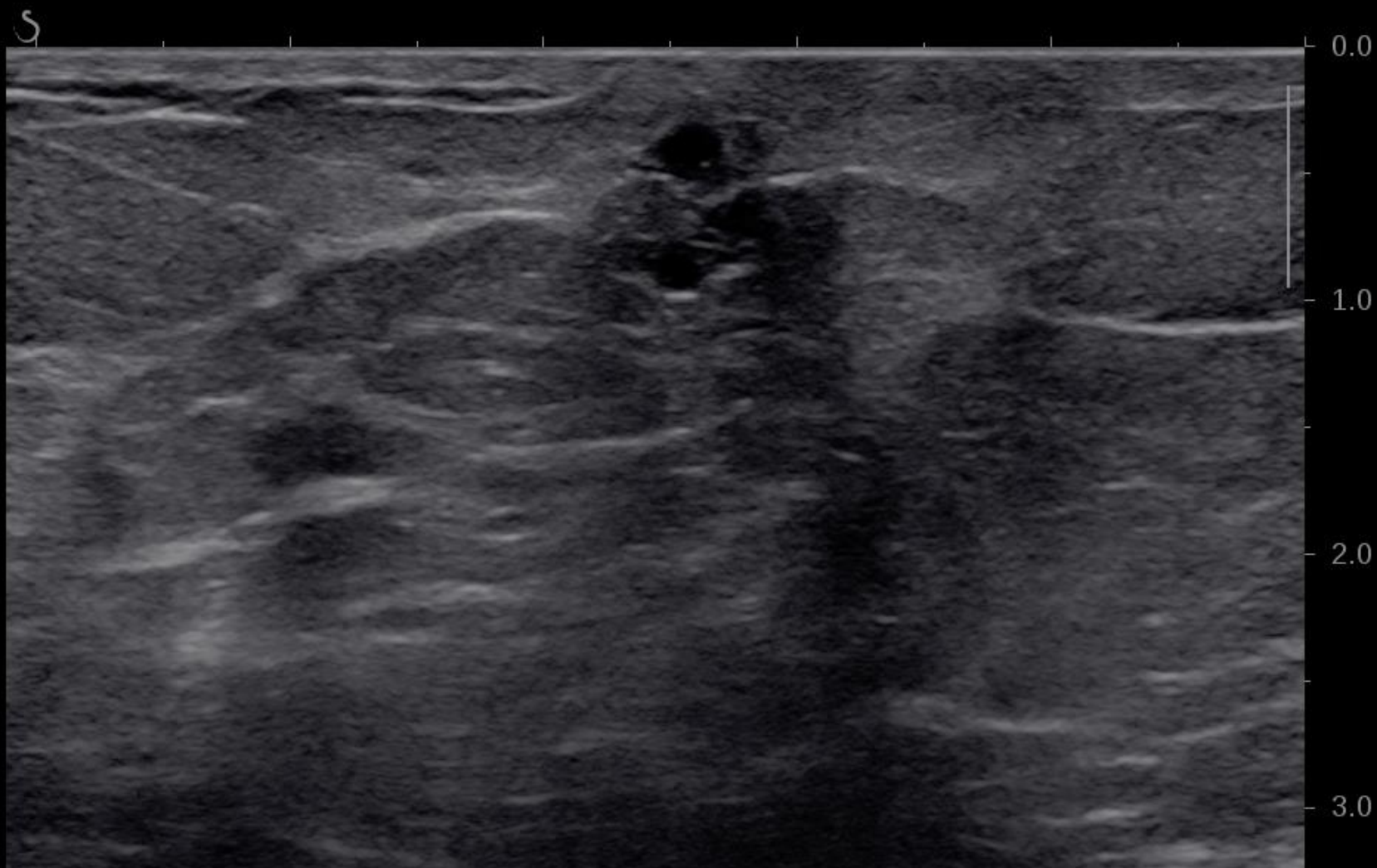
T 1460 m/s

SC/SR 2

G 58 %

Fr. 53 Hz

Z 110 %





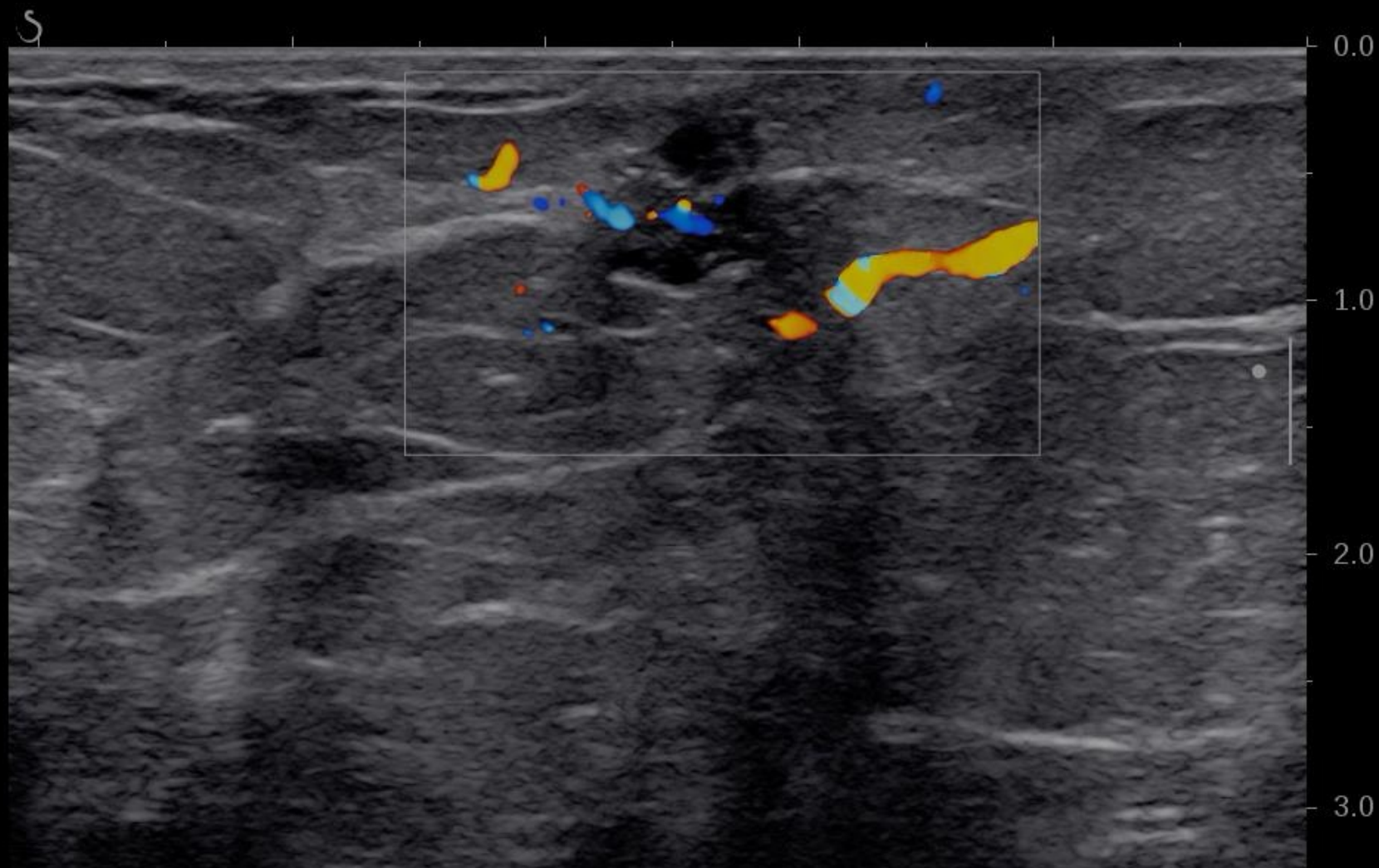
B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 52 %
Fr. 17 Hz

CFI

Gen/Med
Off/WF Med
M 5/P. Med
Scale 4 cm/s
S 3
G 70 %

Z 110 %

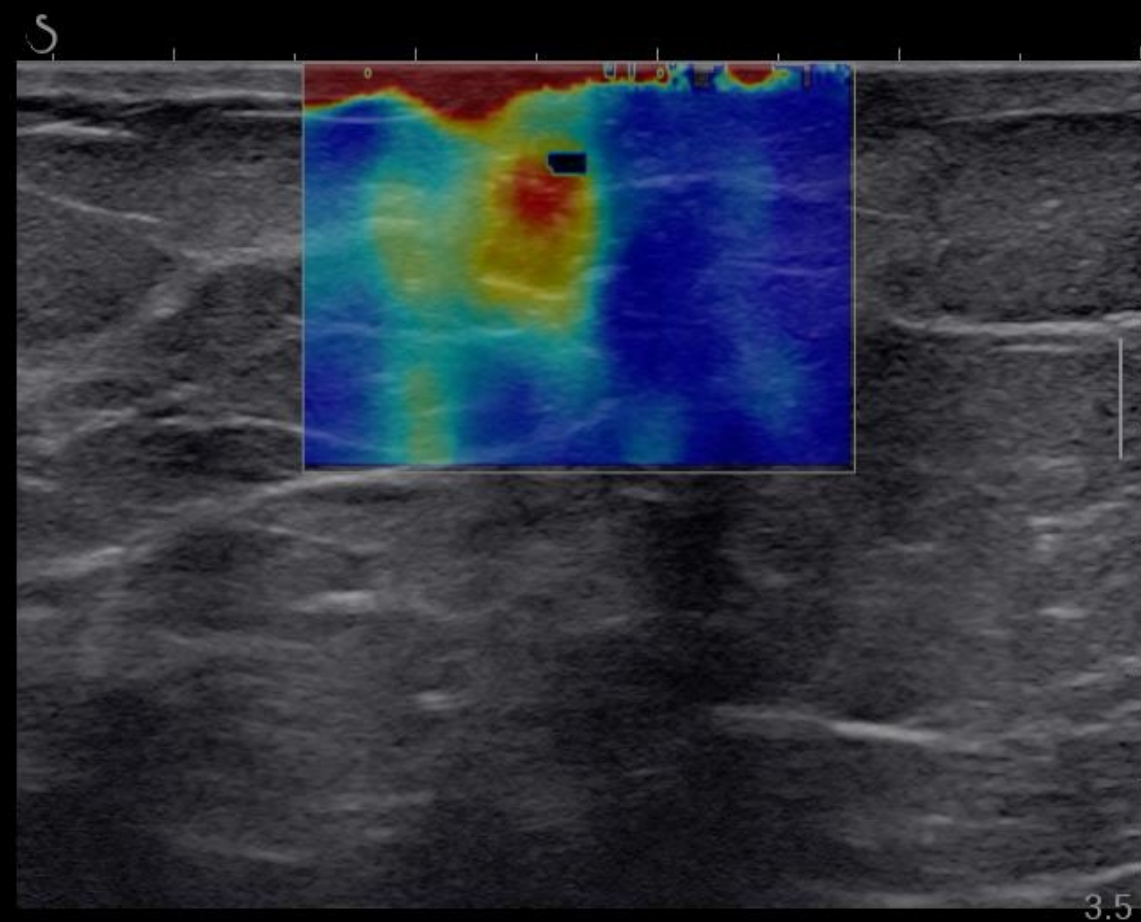
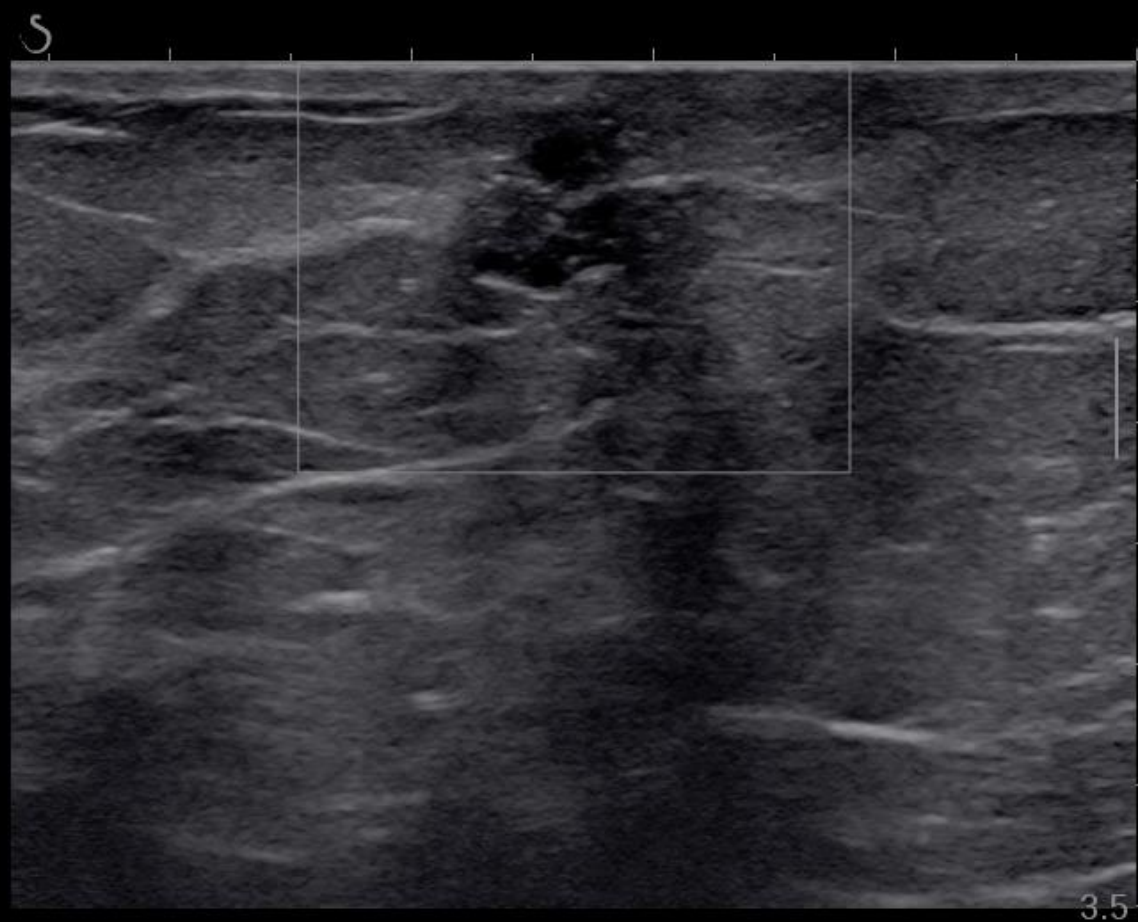


4.0

-4.0
cm/s

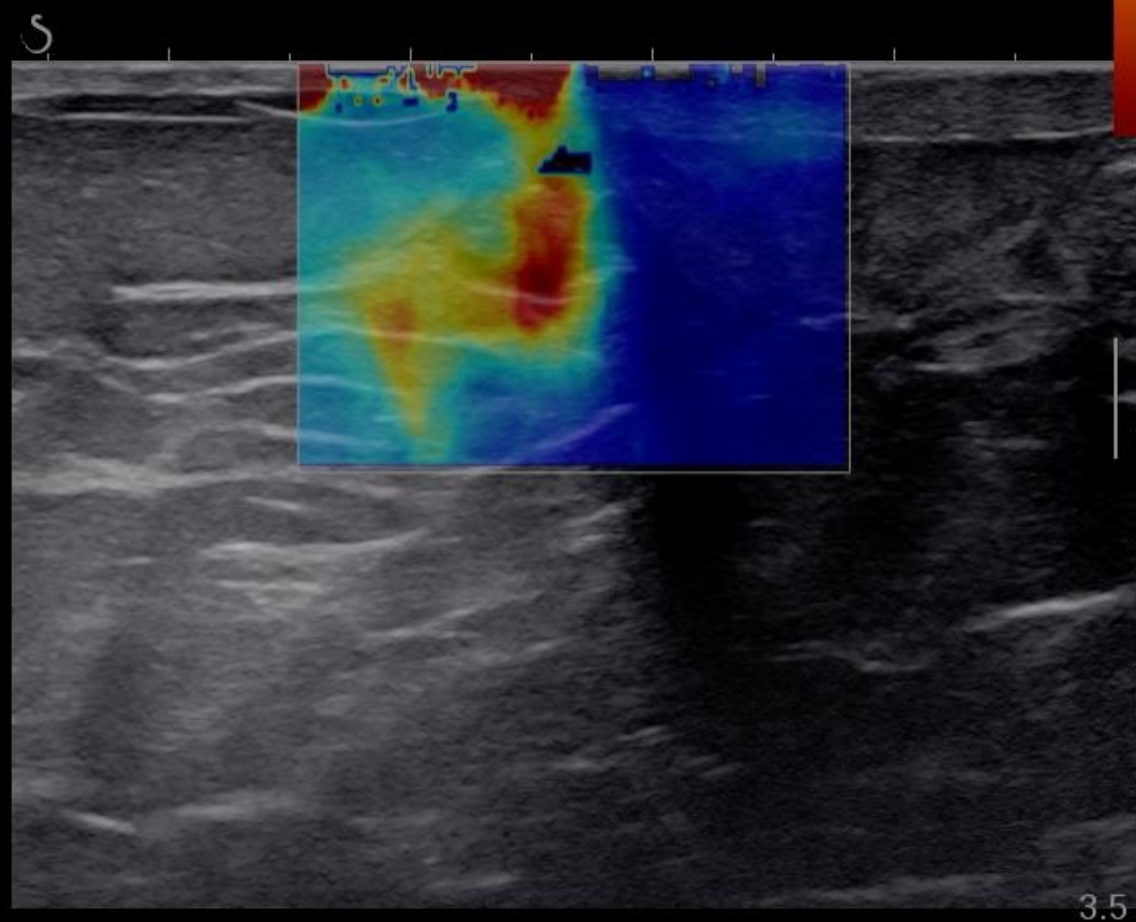
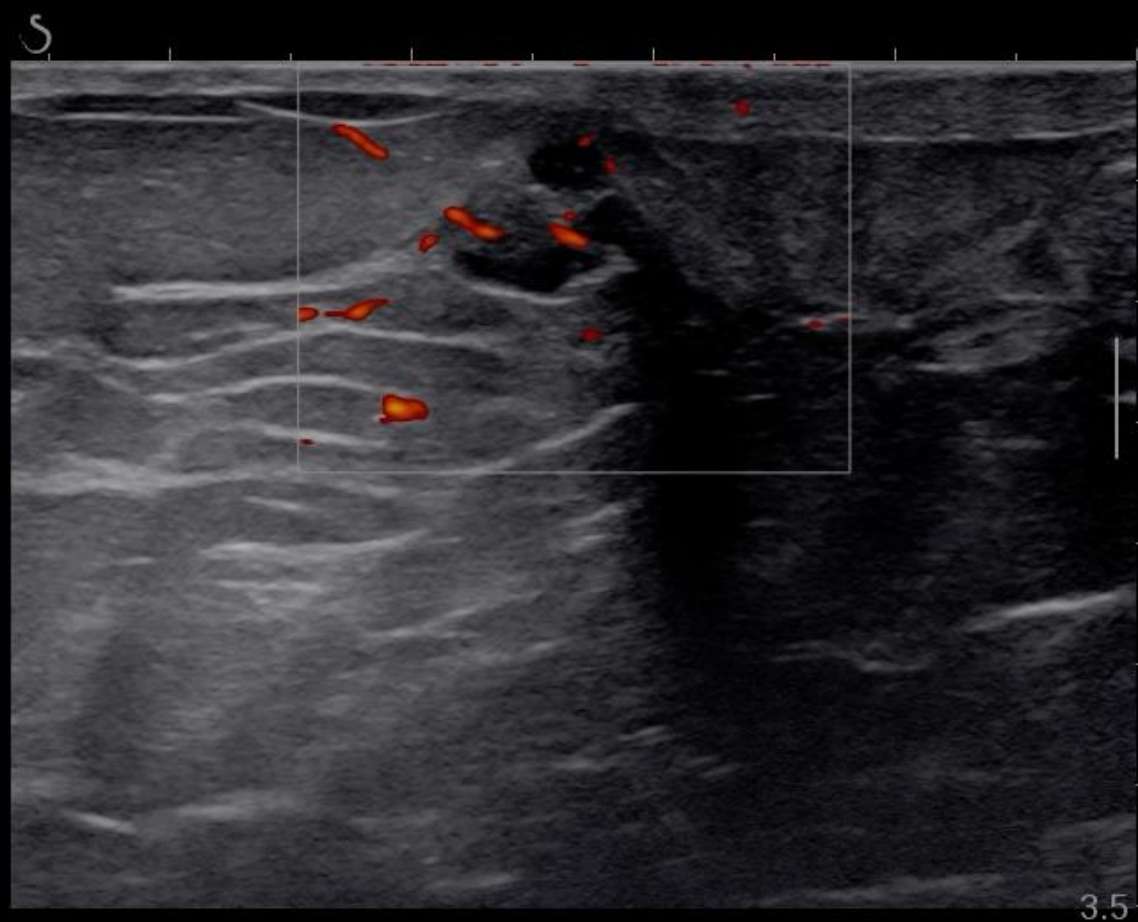


≥180 kPa





≥180 kPa

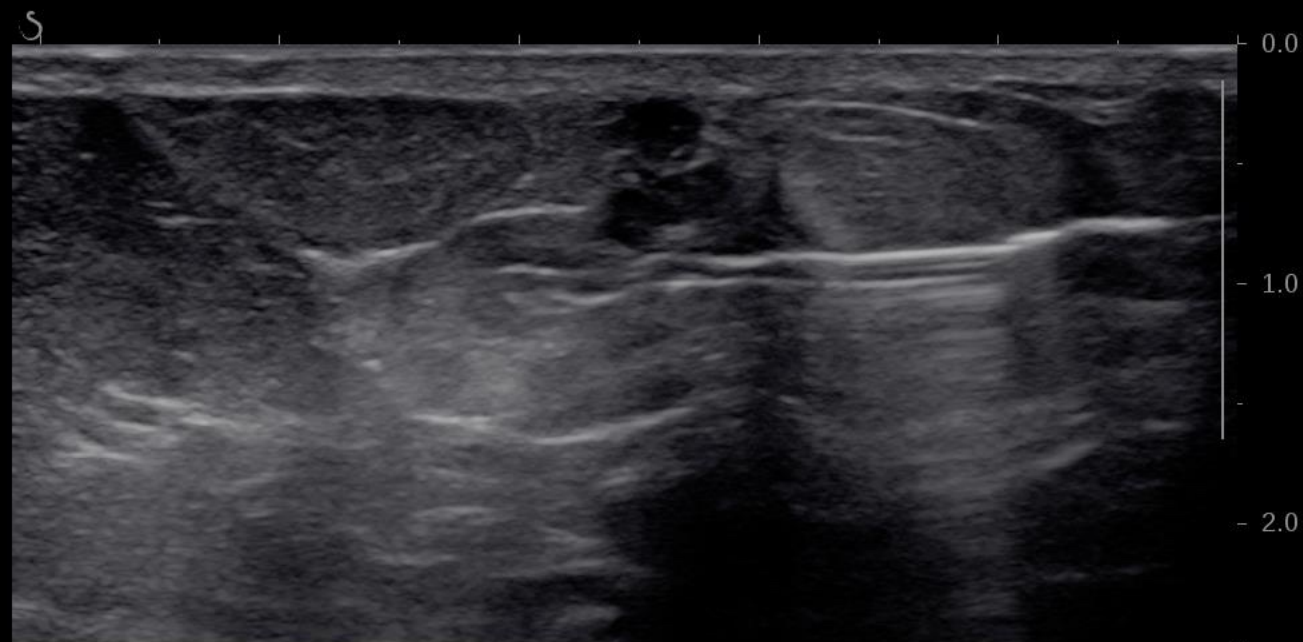




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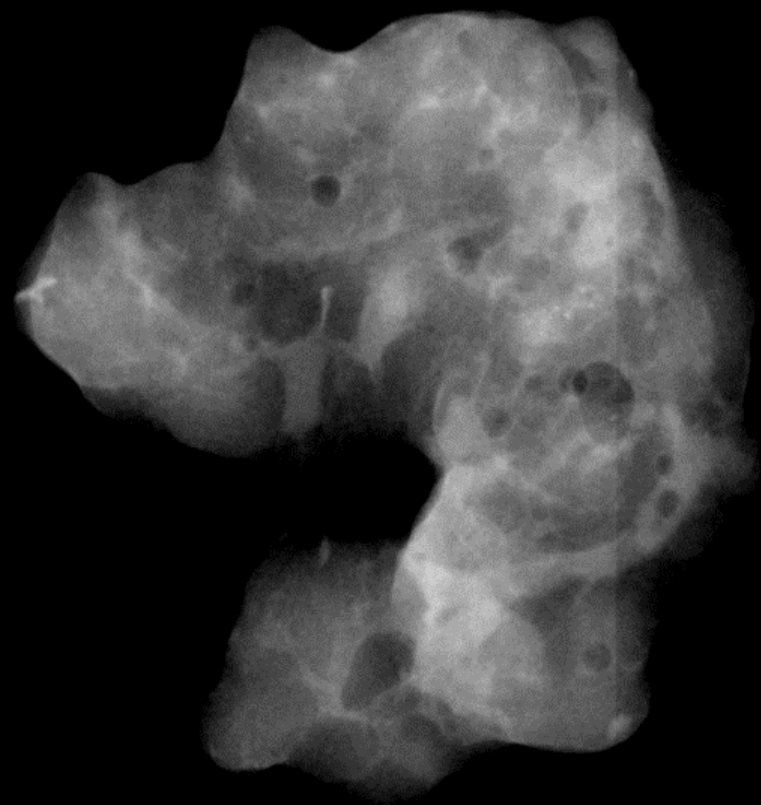
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G 32 %
Fr. 65 Hz

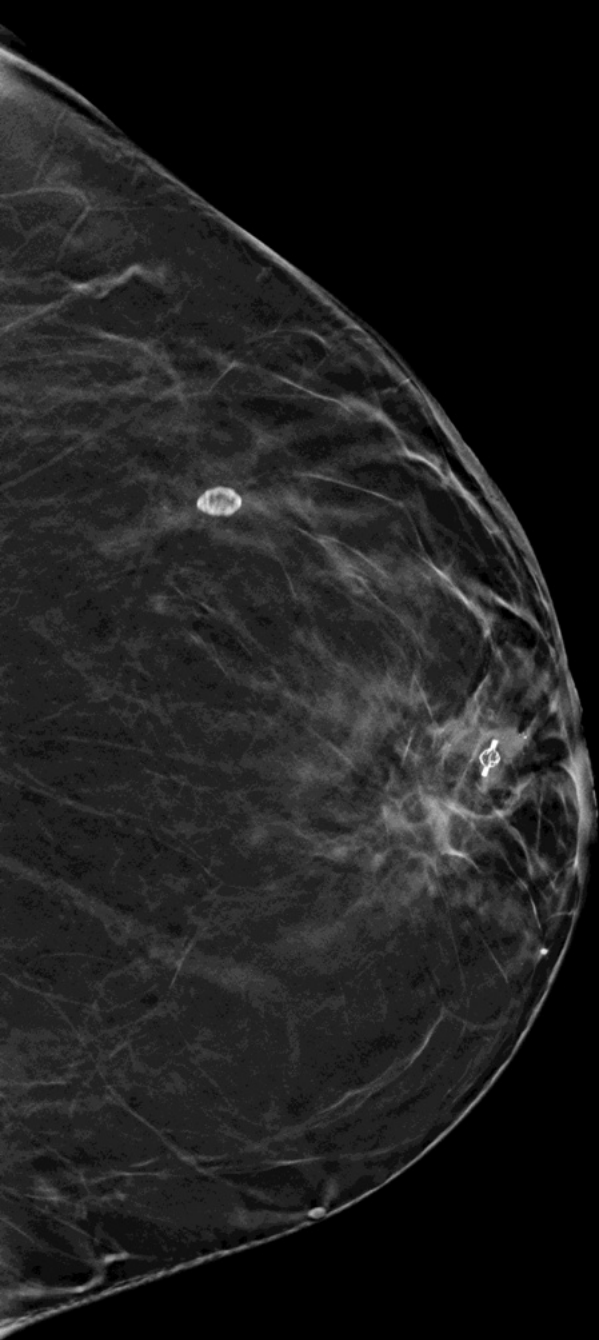
Z 115 %



LT BREAST 1:00 1 CMFN TRANS CLIP BX







olum



LCC

Intelligent
III 2D

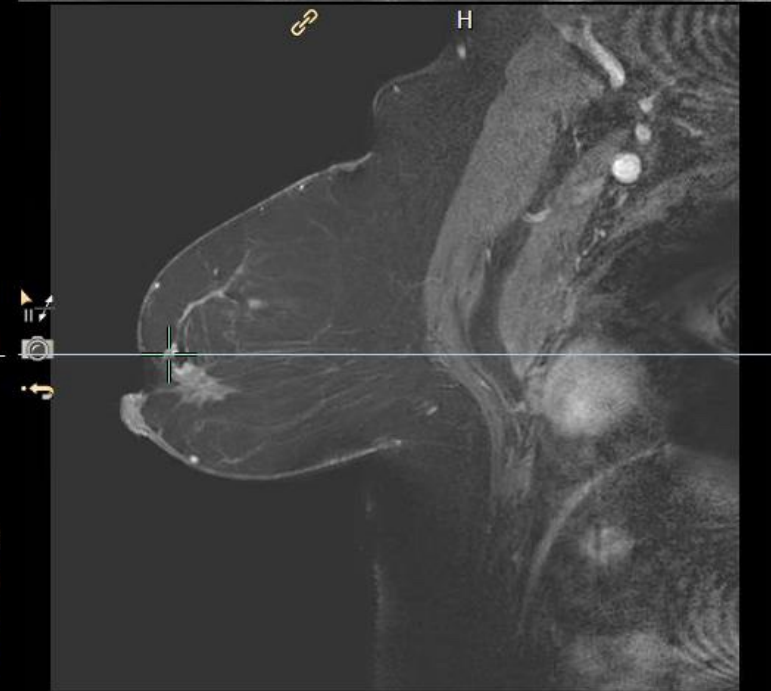
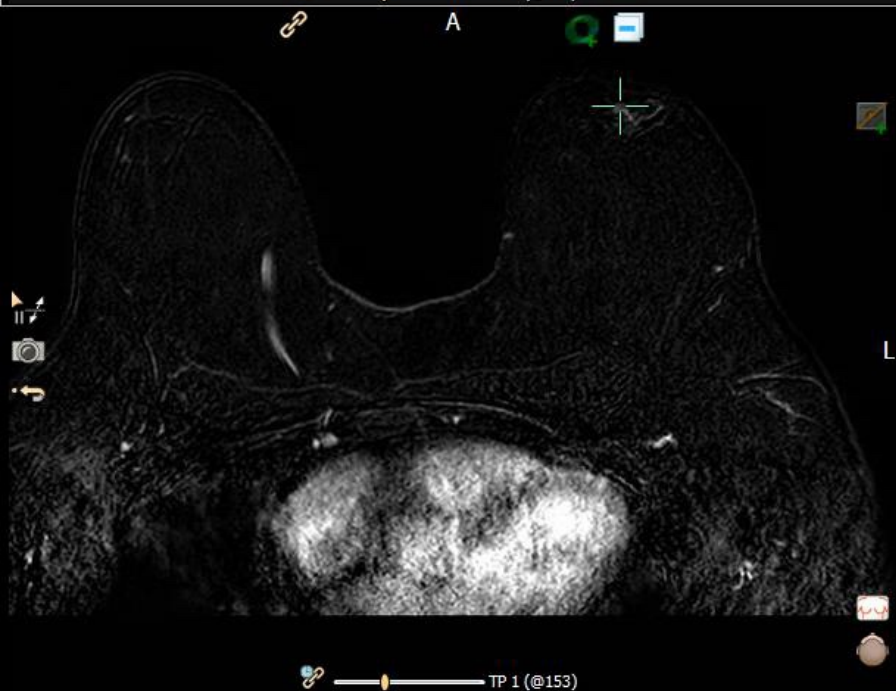
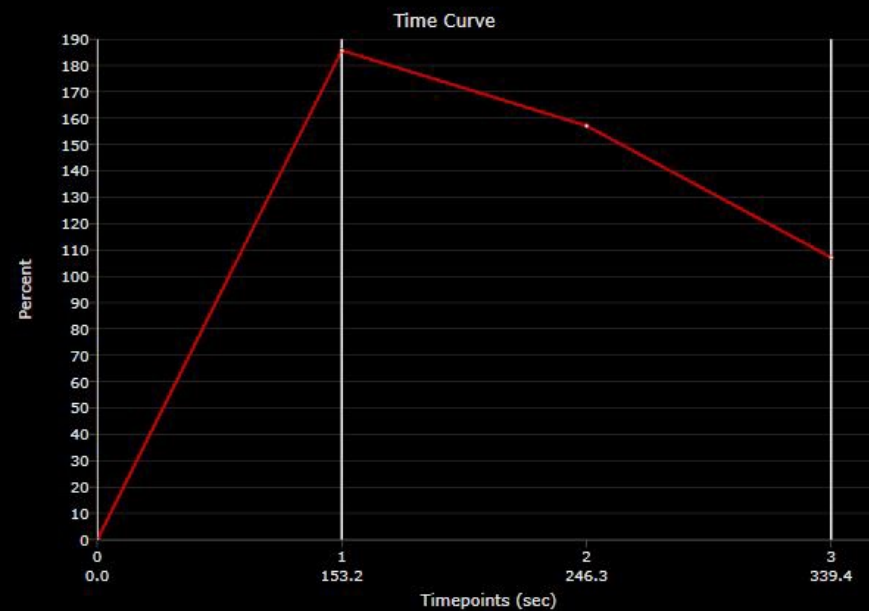
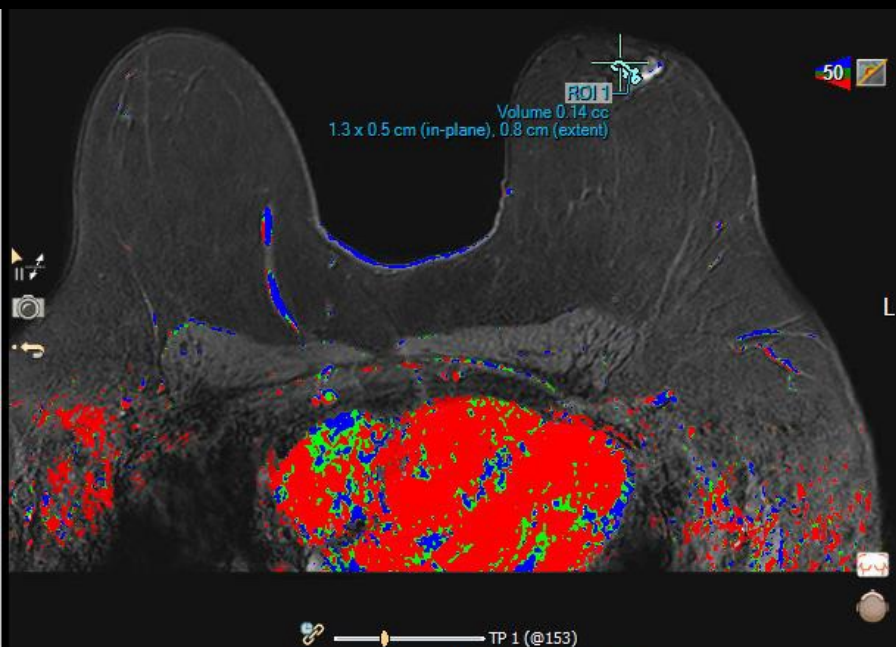
CLINICAL INFORMATION

Clinical history: 58-year-old female with an 11 mm mixed solid and cystic mass with associated calcifications, left breast 1:00, 1 cm from the nipple
Pre-op diagnosis: Fibrocystic change with benign calcs and apocrine metaplasia, rule out papillary lesion and DCIS

DIAGNOSIS:

Left breast, mass at 1:00, 1 cm from nipple, USCNB:
Invasive ductal carcinoma, grade 2;
small component of DCIS, grade 1–2.

Test Name	Interpretation	Analysis Average	Intensity	Internal Controls
ER (Roche Clone SP1))	FAVORABLE	97%	Strong	Adequate
PR (DAKO Clone PgR636)	FAVORABLE	34%	Strong	Adequate
Ki67 (Roche 30-9)	EQUIVOCAL	12%	N/A	N/A
	Stain Intensity (0 – 3+)		Interpretation	
HER2 IHC (Roche Clone 4B5)	2+		Equivocal (Reflexed to ISH)	



DIAGNOSIS:

1. Lymph node, left sentinel, biopsy: Four lymph nodes negative for malignancy (0/4).
2. Breast, left, simple mastectomy:
 - Residual invasive ductal carcinoma, Nottingham grade 1.
 - Associated ductal carcinoma in situ, intermediate grade.
 - Margins are negative for carcinoma.
 - No lymphovascular invasion identified.
 - Benign compound melanocytic nevus.

Recurrence Score®
(RS) Result

19

Distant Recurrence
Risk at 9 Years

With AI or TAM Alone

6%

95% CI (5%, 7%)

TAILORx

Group Average Absolute
Chemotherapy (CT)
Benefit*

RS 11-25 All Ages

<1%

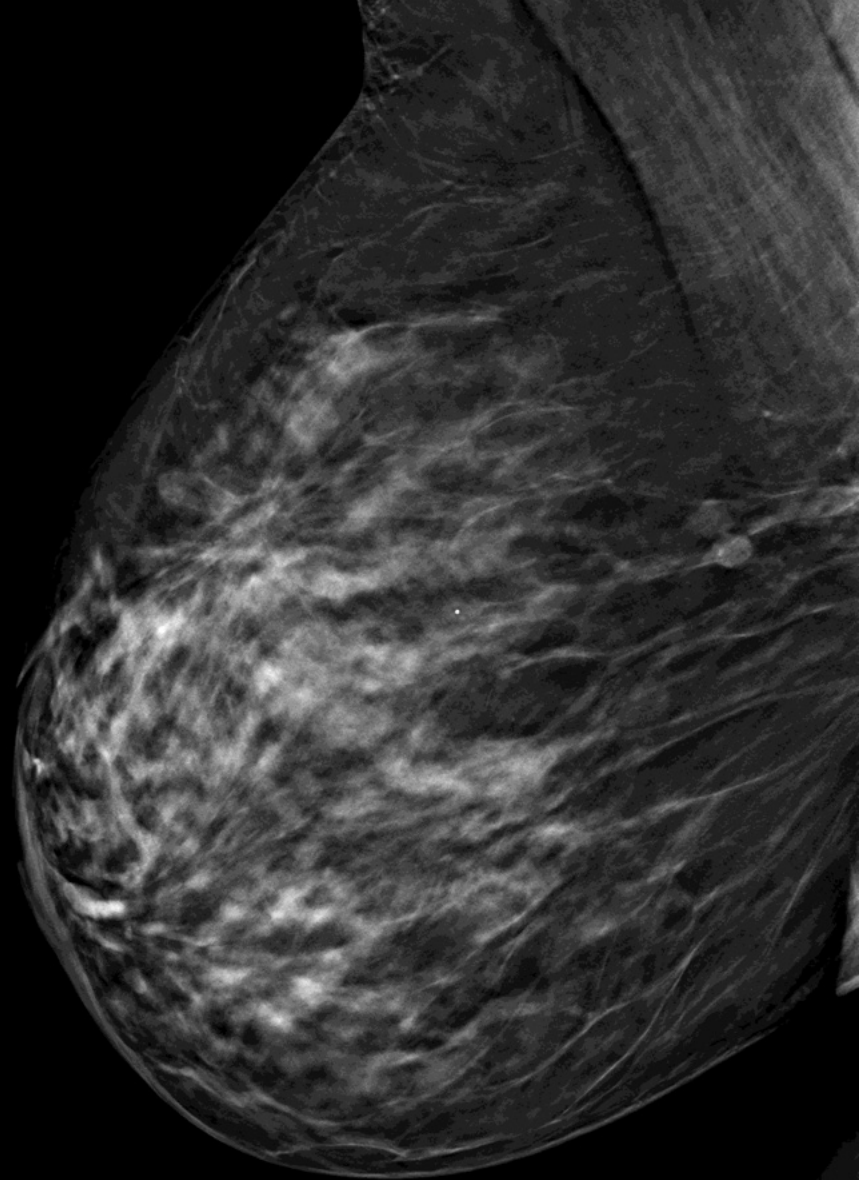
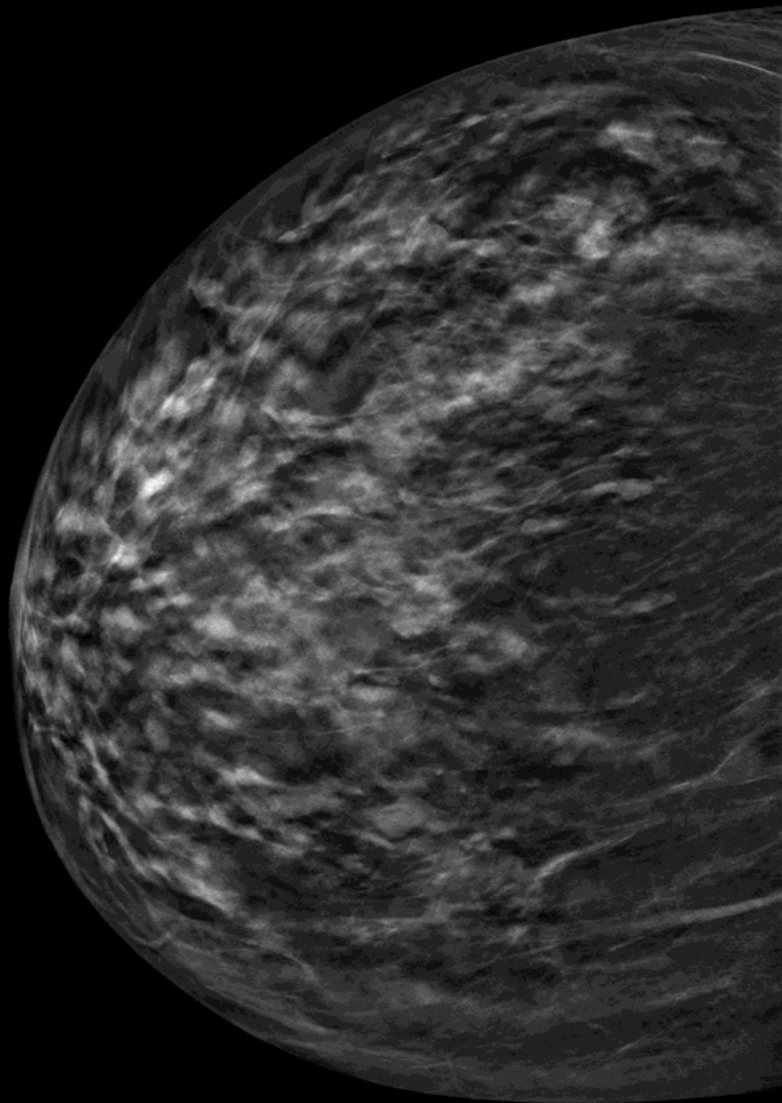
95% CI (-1%, 2%)

TAILORx

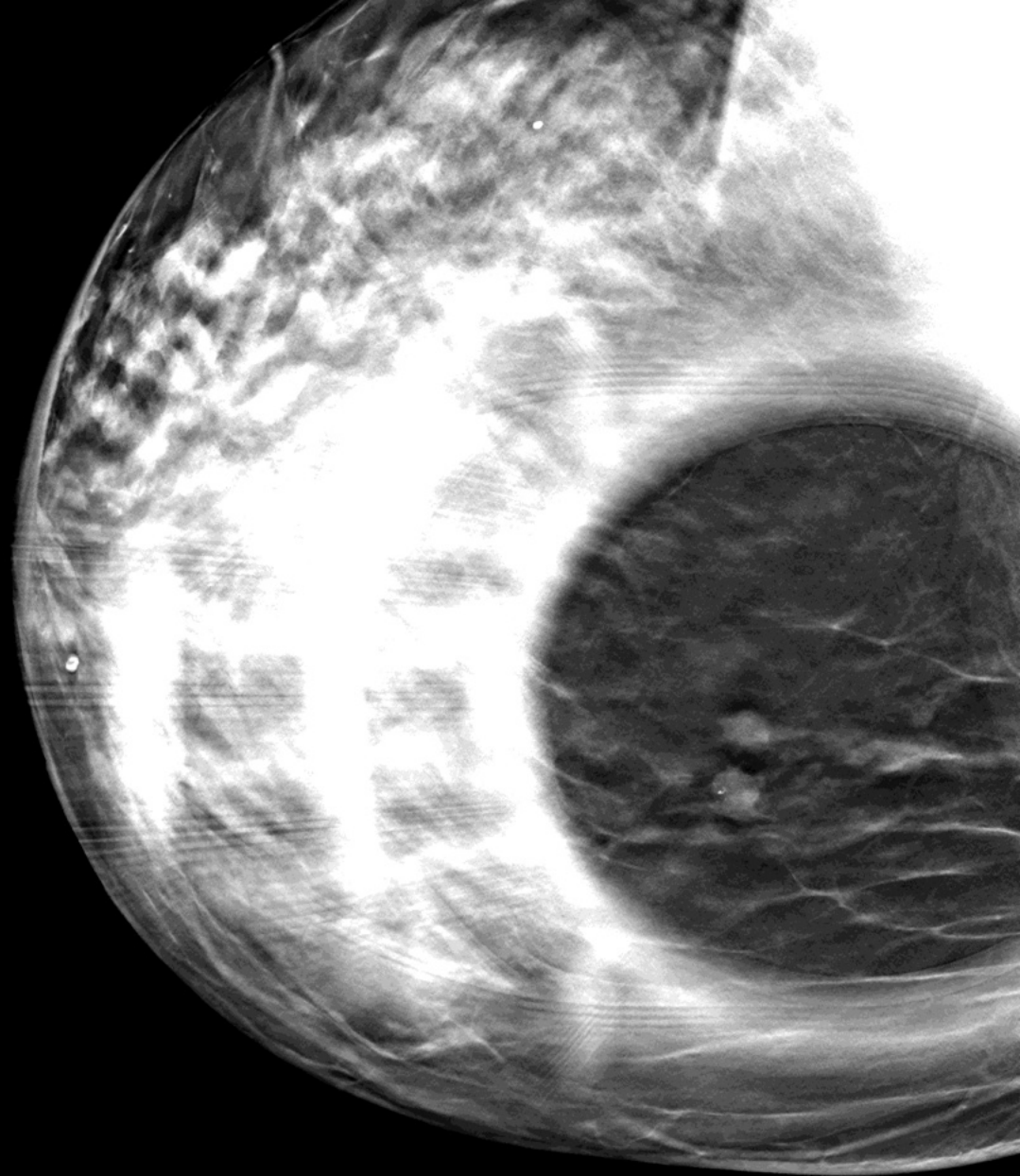
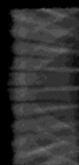
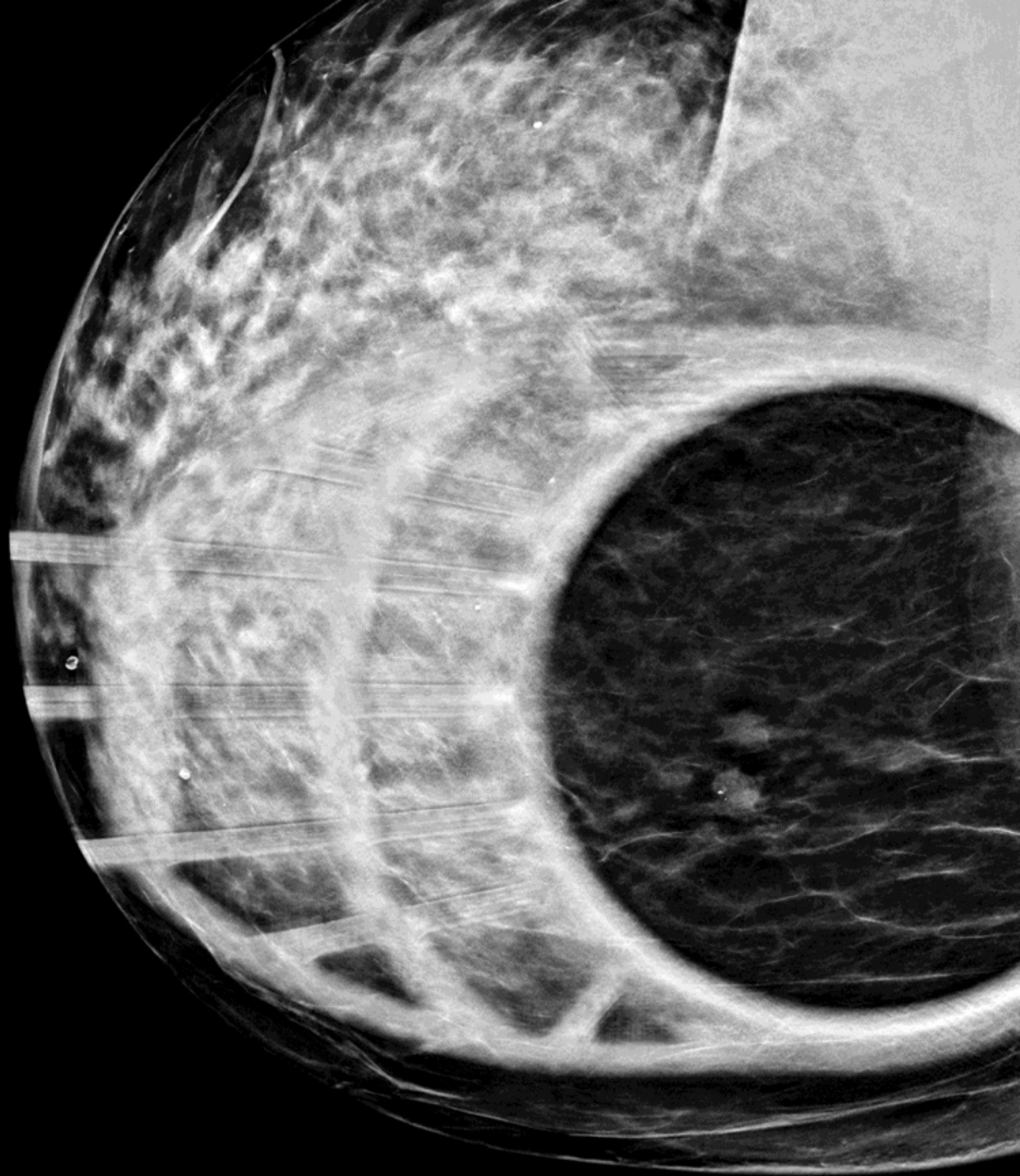


Case 4

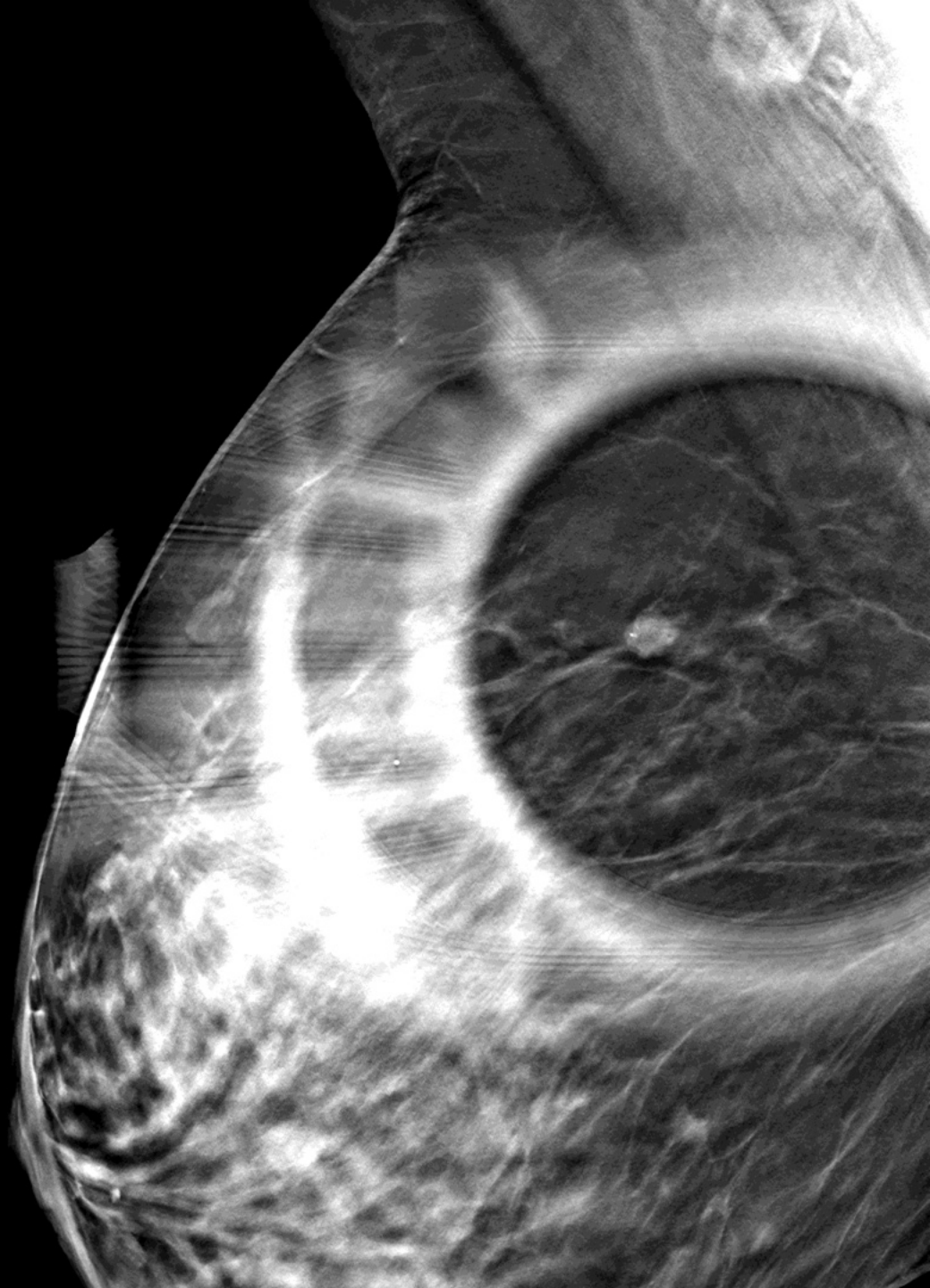
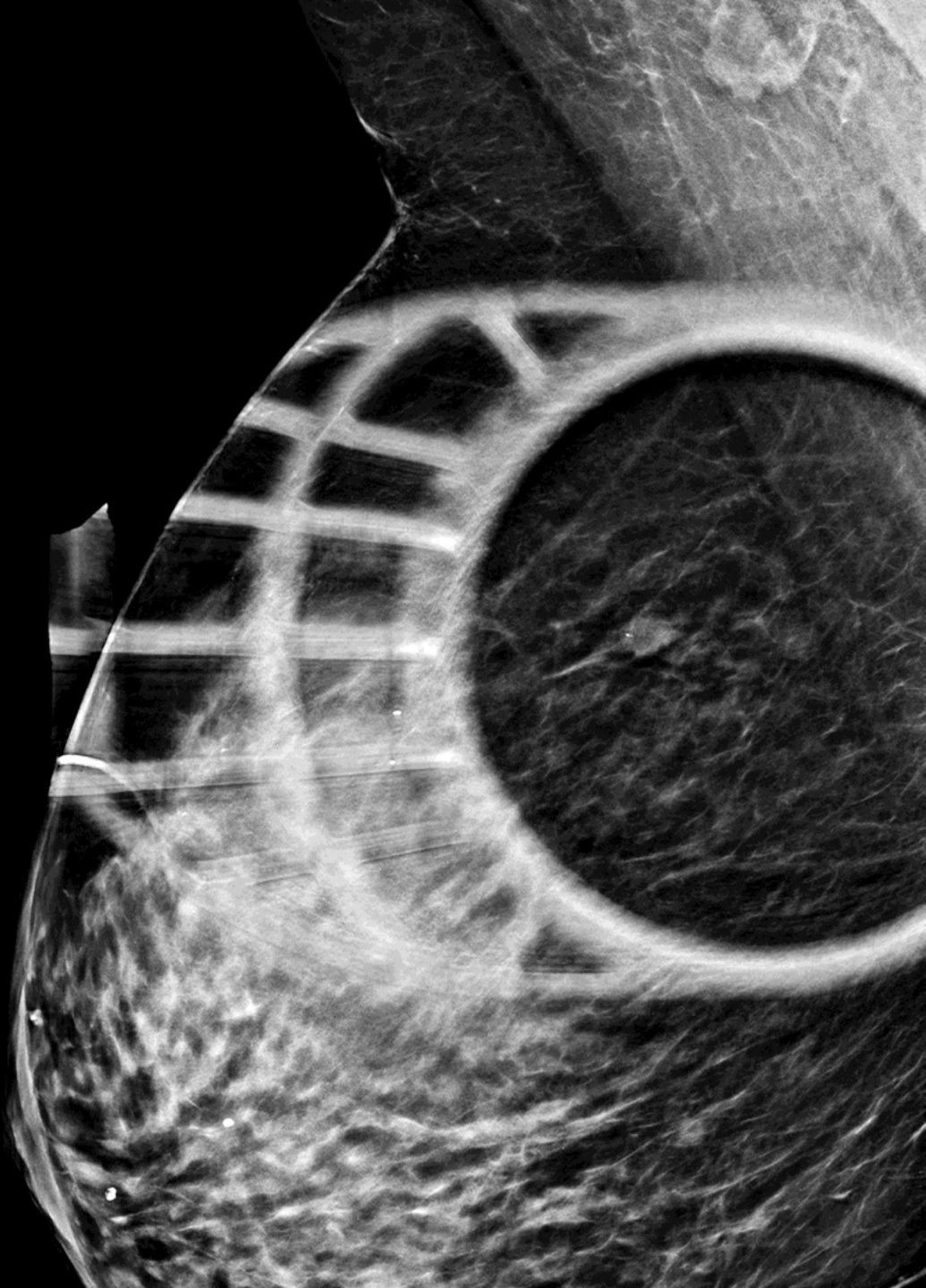
Oval Circumscribed
Mass



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B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 50 %
Fr. 49 Hz

Z 113 %

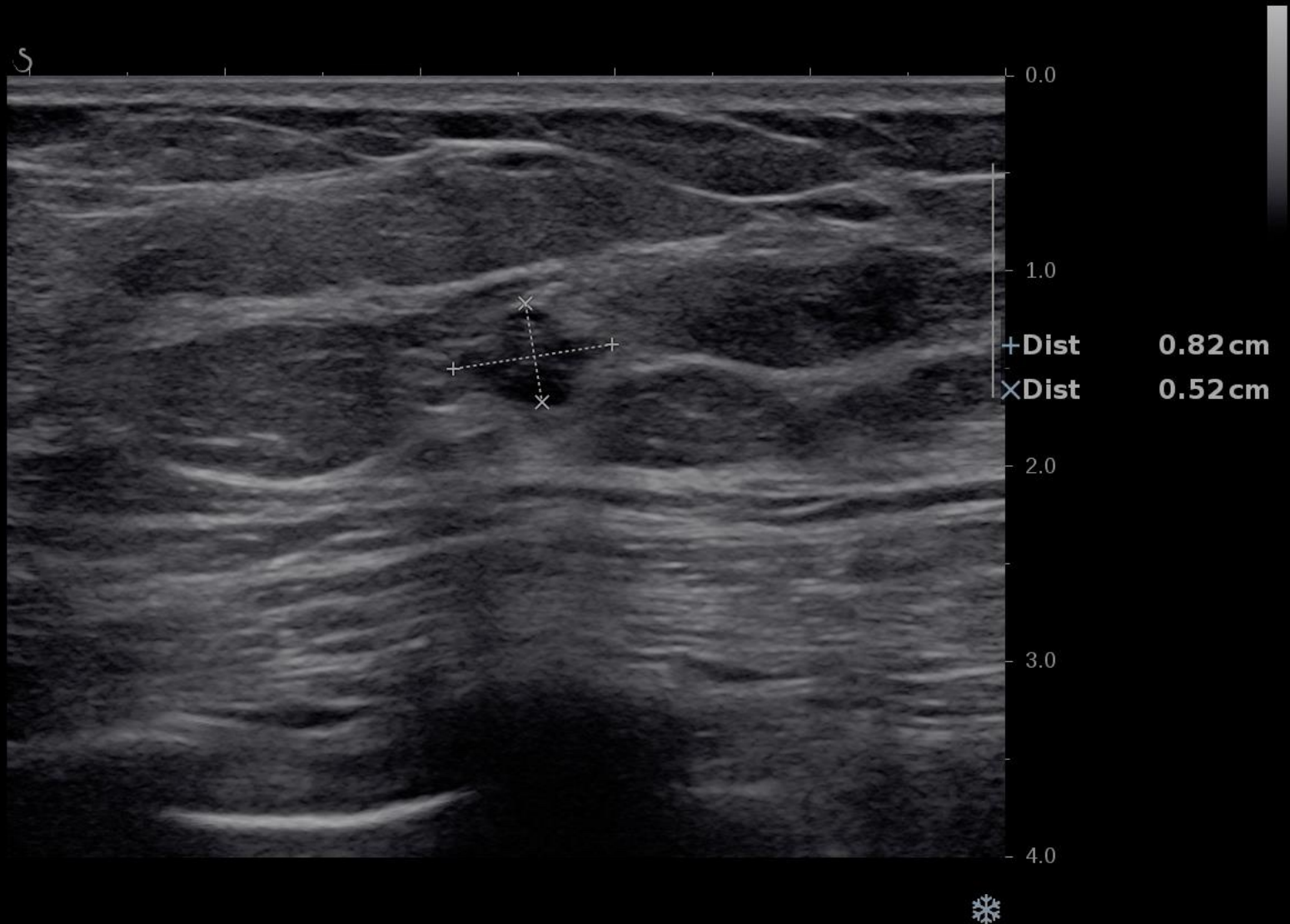




B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 50 %
Fr. 49 Hz

Z 113 %



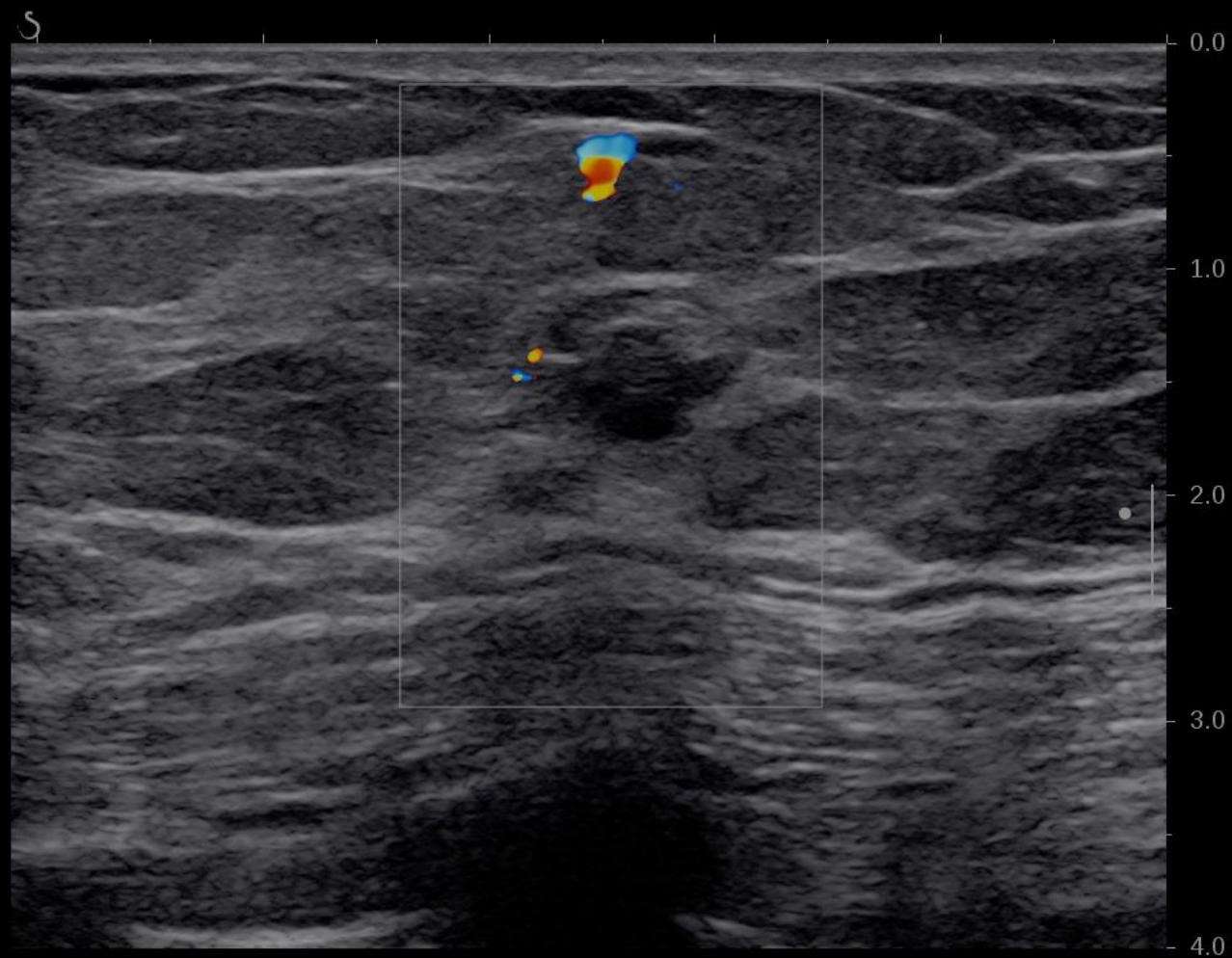
B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 46 %
Fr. 16 Hz

CFI

Gen/Med
Off/WF Med
M 5/P. Med
Scale 4 cm/s
S 3
G 63 %

Z 113 %

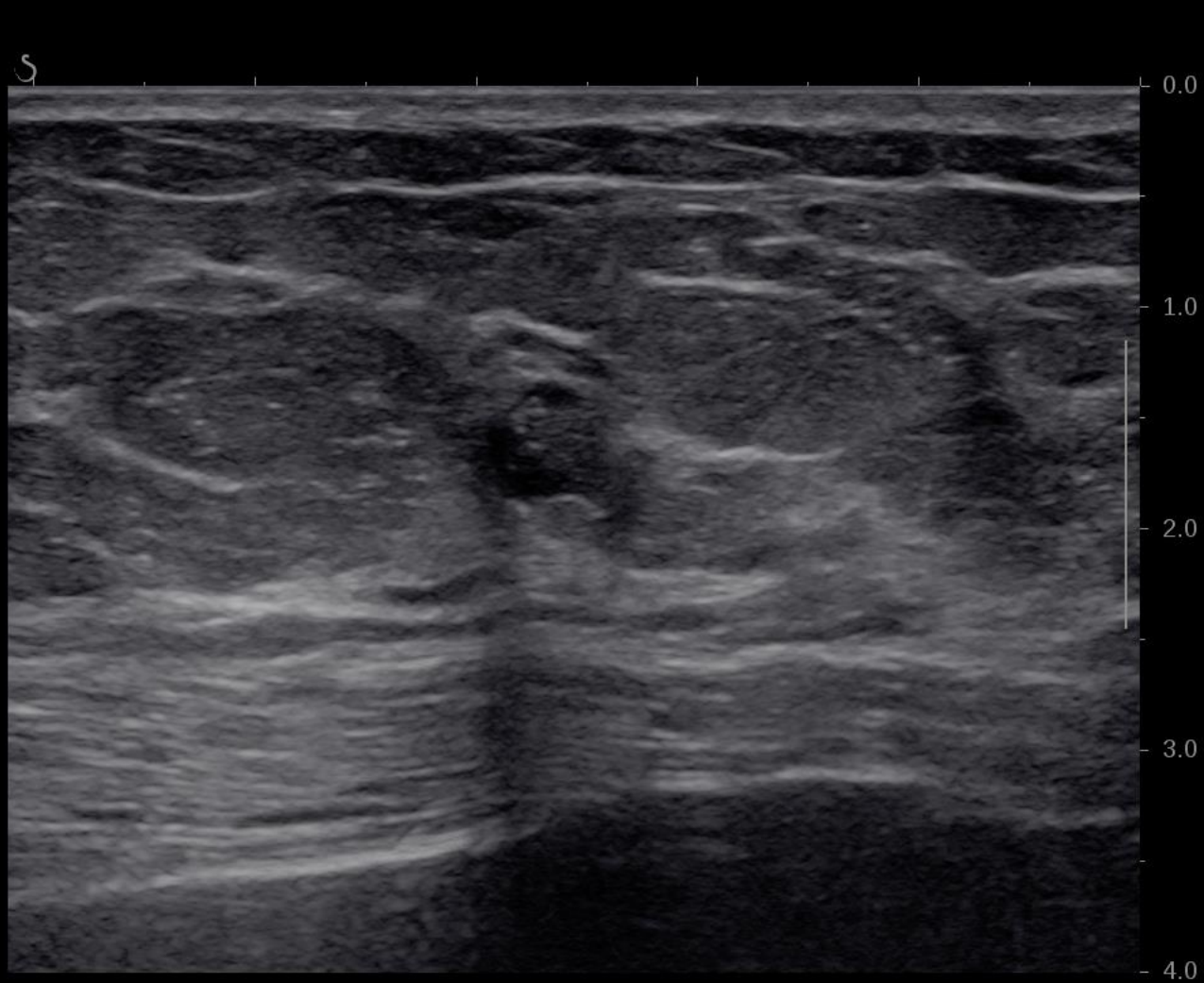




B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 48 %
Fr. 49 Hz

Z 113 %





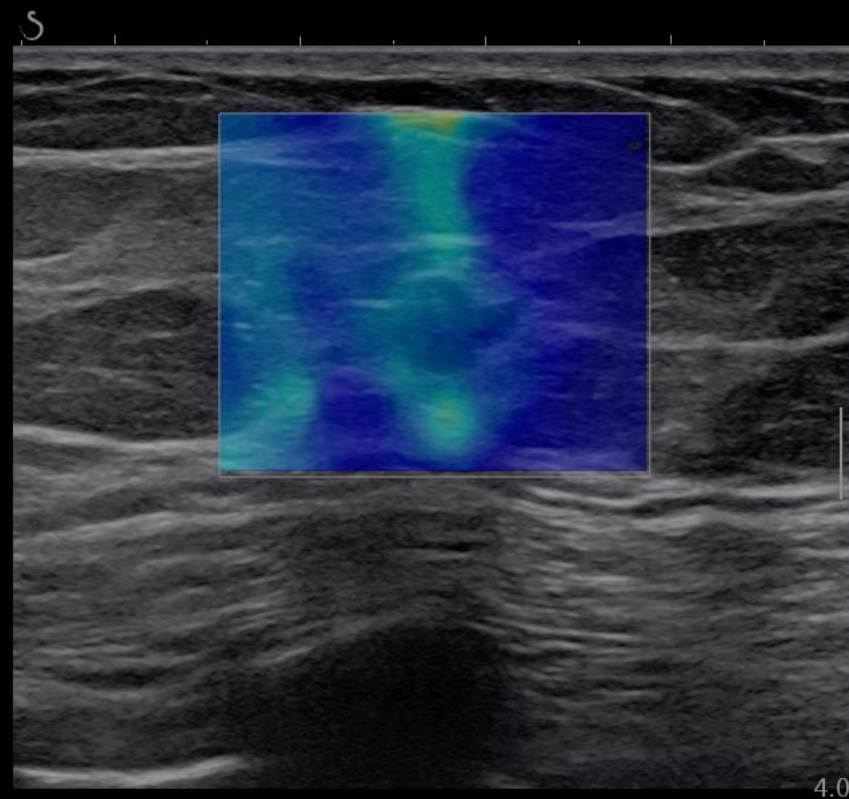
≥180 kPa

144

108

72

36



Fr: 93/93

B
Res/H
MI 1.7 Tib 1.7
T 1460 m/s/SC/SR 2
G 46 %/Fr. 19 Hz
RT BREAST 1:00 5 CM FN LONG

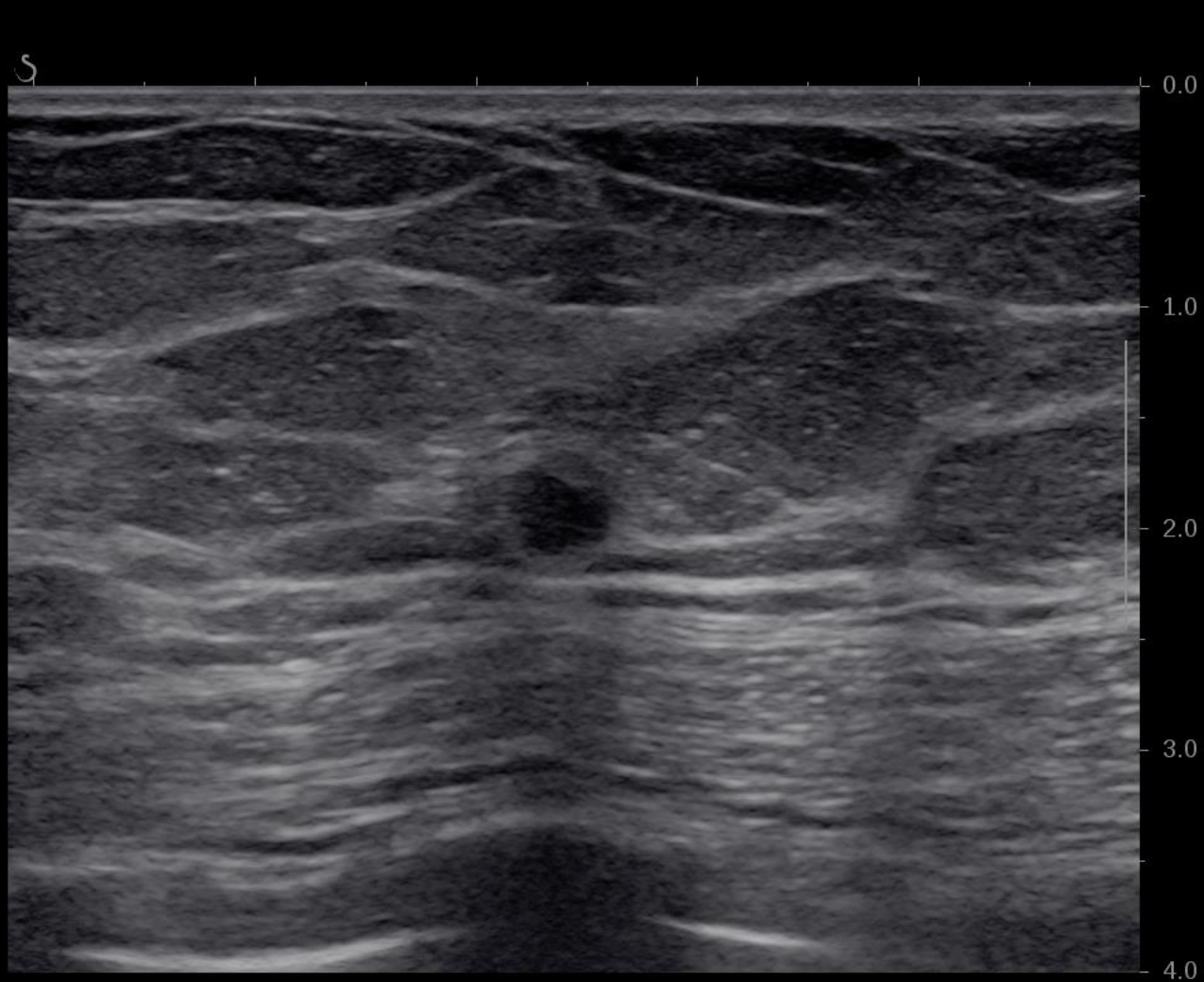
SWE™f [70 - 800] Hz
Pen/1.4 Hz/SWE Bias
M 1/Med/Compression
S 5/O 50 %/G 90 %



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 48 %
Fr. 49 Hz

Z 113 %





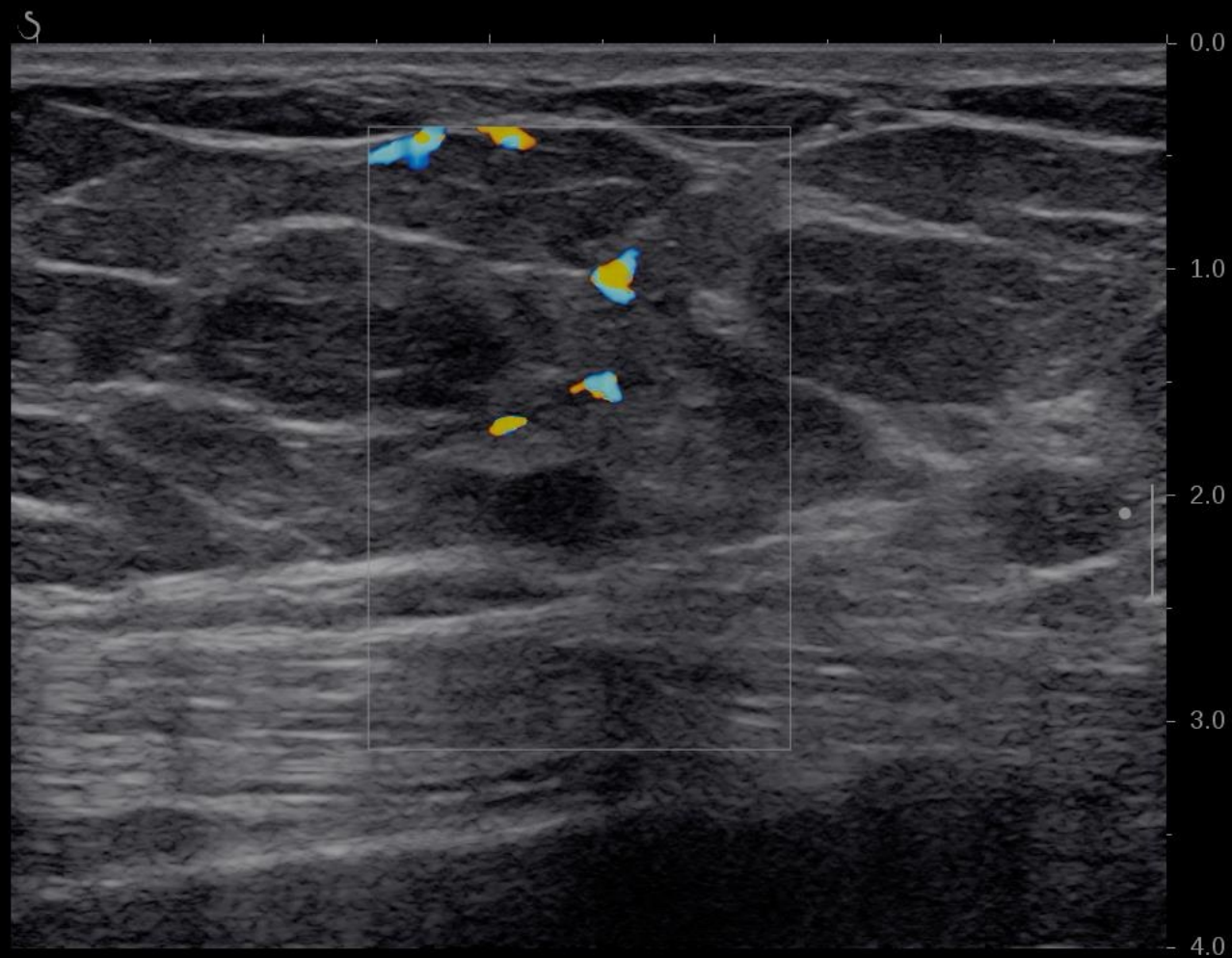
B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 48 %
Fr. 16 Hz

CFI

Gen/Med
Off/WF Med
M 5/P. Med
Scale 4 cm/s
S 3
G 63 %

Z 113 %



4.0
-4.0
cm/s



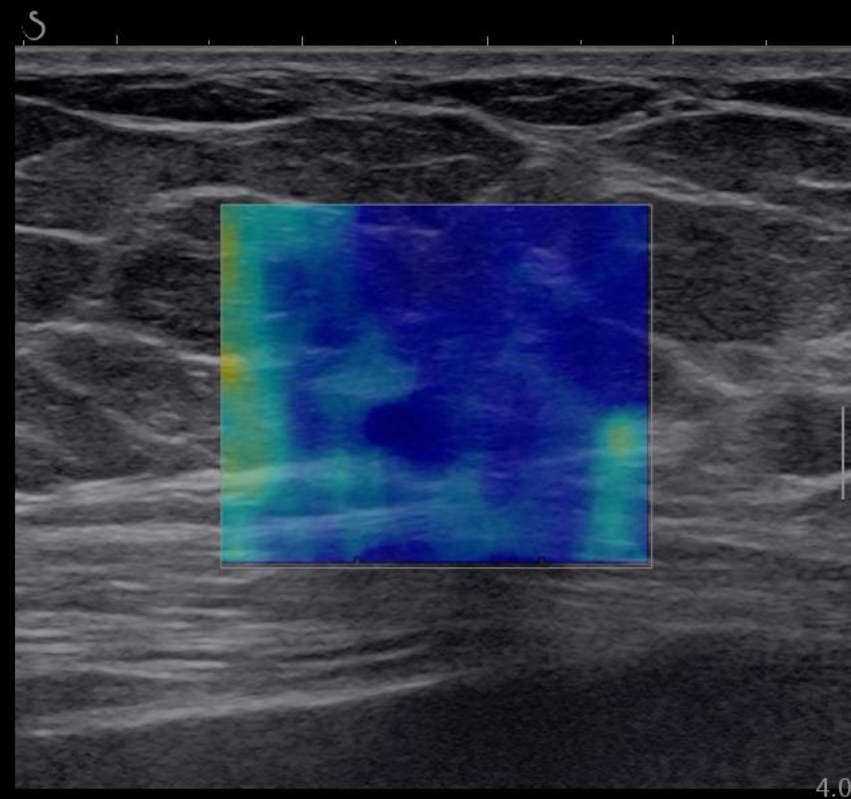
≥180 kPa

144

108

72

36



B

Res/H

M 1/05 d/1/1/1/1

T 1460 m/s/SC/SR 2

G 48 %/Fr. 19 Hz

RT BREAST 1:00 5 CMFN TRANS

SWE™f [70 - 800] Hz

Pen/0.9 Hz/SWE Bias

M 1/Med/Compression

S 5/O 50 %/G 90 %

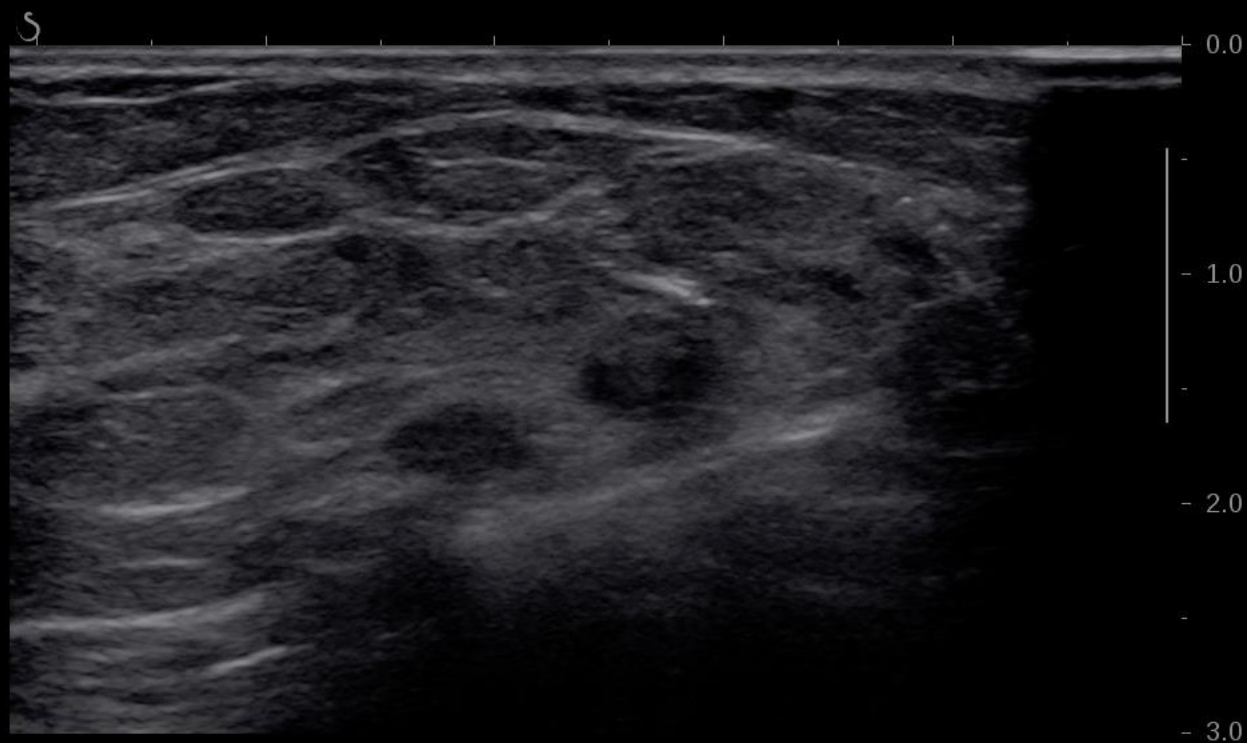
Fr: 27/27



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 32 %
Fr. 58 Hz

Z 110 %



RT BREAST 1:00 5 CMFN OBLIQUE BX

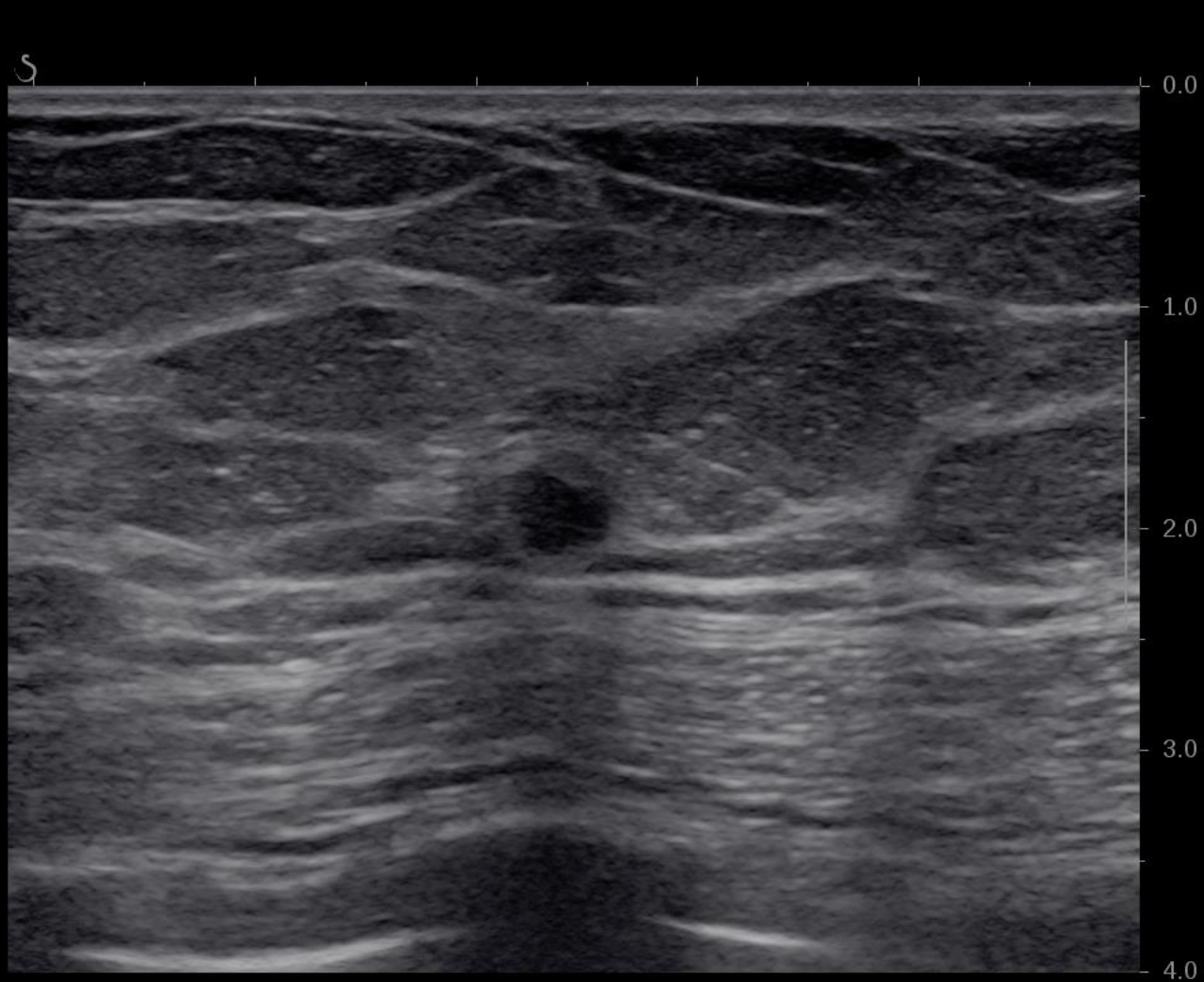




B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 48 %
Fr. 49 Hz

Z 113 %

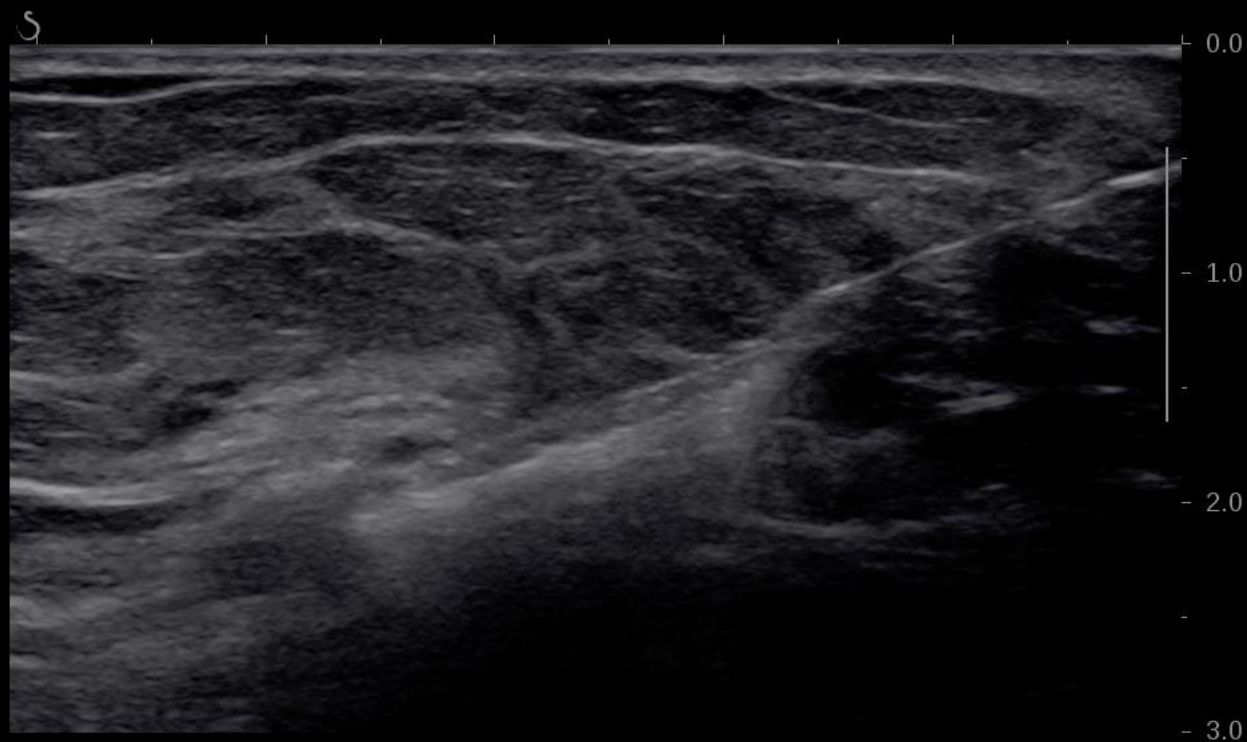




B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 32 %
Fr. 58 Hz

Z 110 %



RT BREAST 1:00 5 CMFN OBLIQUE BX





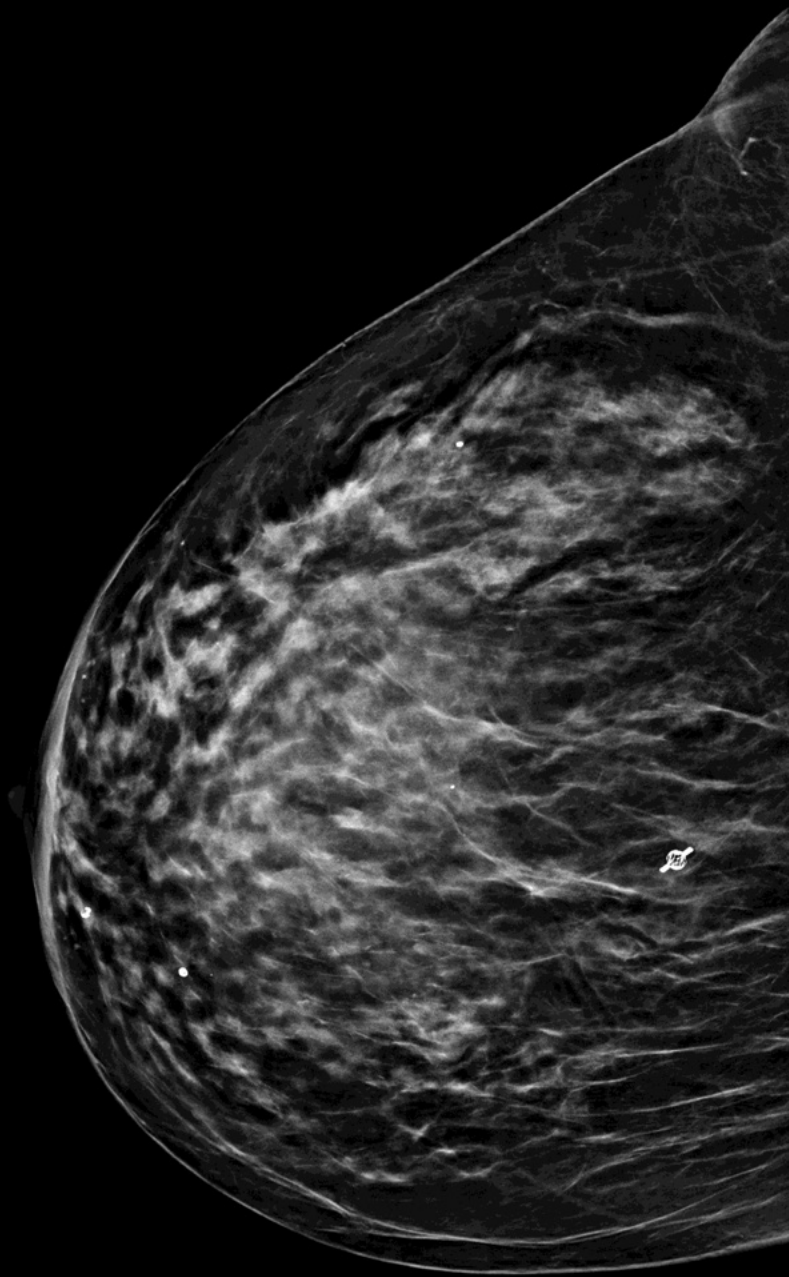
B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 25 %
Fr. 58 Hz

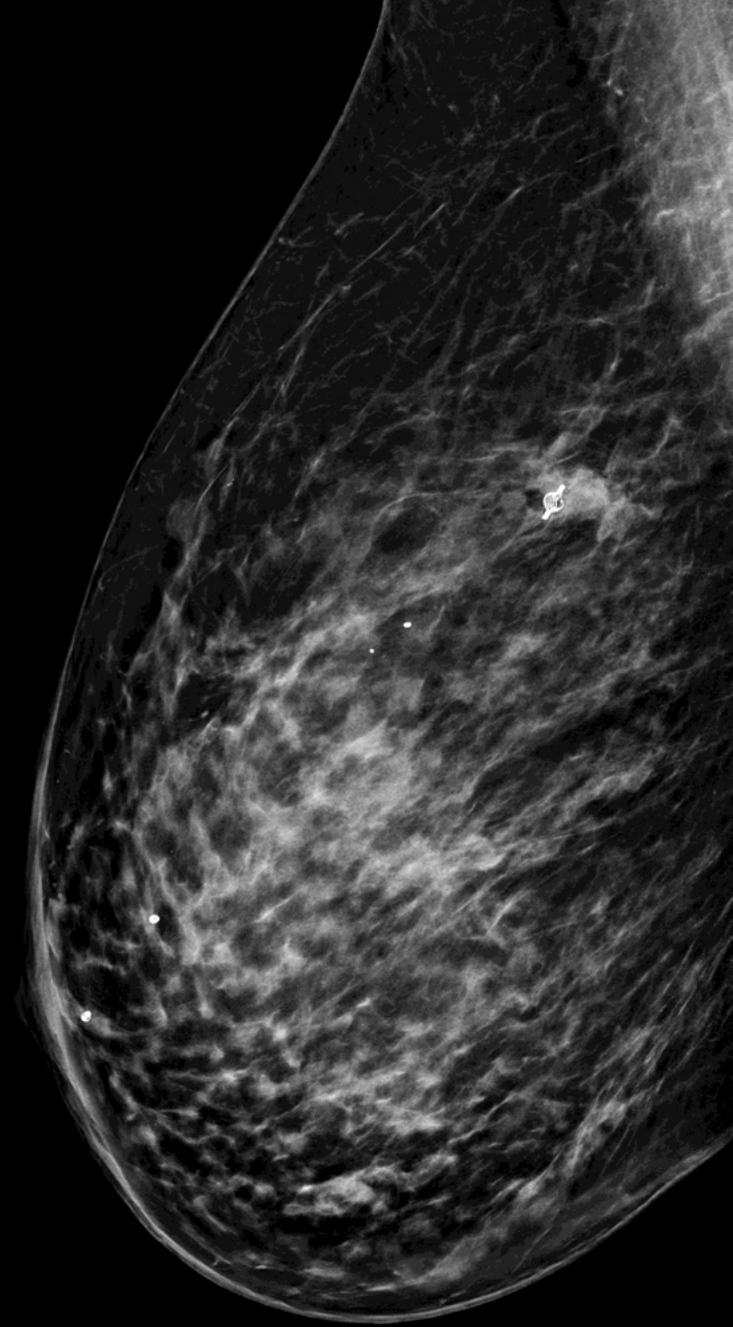
Z 110 %



Intelligent
||| 2D



Intelligent
||| 2D

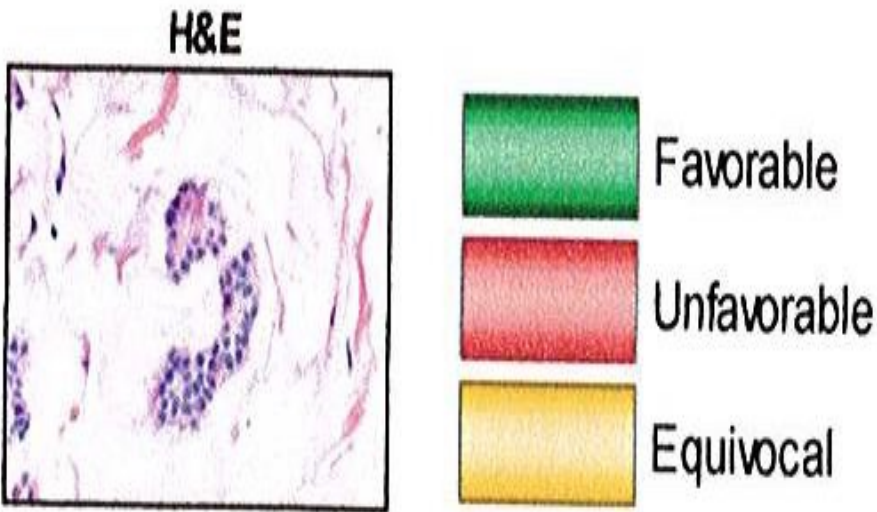


CLINICAL INFORMATION

74-year-old Caucasian female with two adjacent indeterminate solid-appearing masses in the right breast at 1:00, 5 cm from nipple.
Imaging impression: Sclerosing adenosis versus fibrocystic change. Rule out malignancy together the 2 masses span 12 mm. The individual masses measure 8 and 5 mm, respectively).

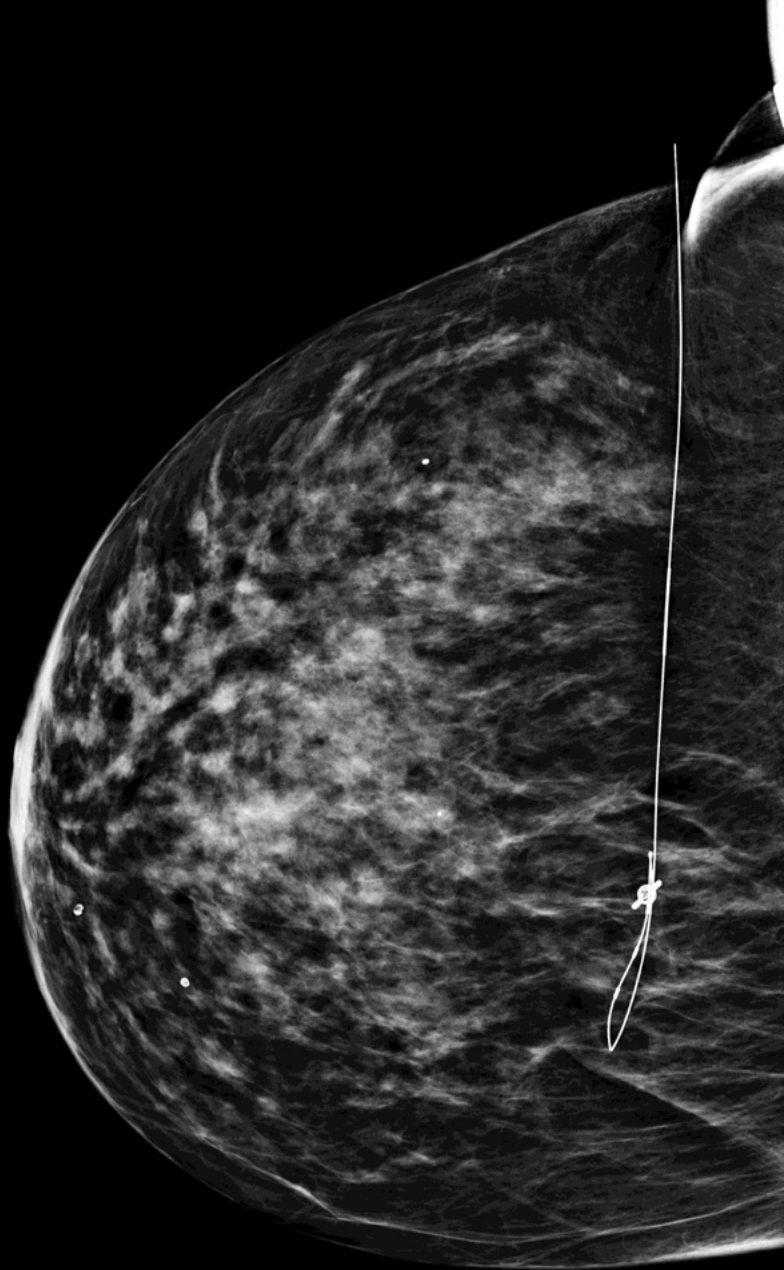
DIAGNOSIS:

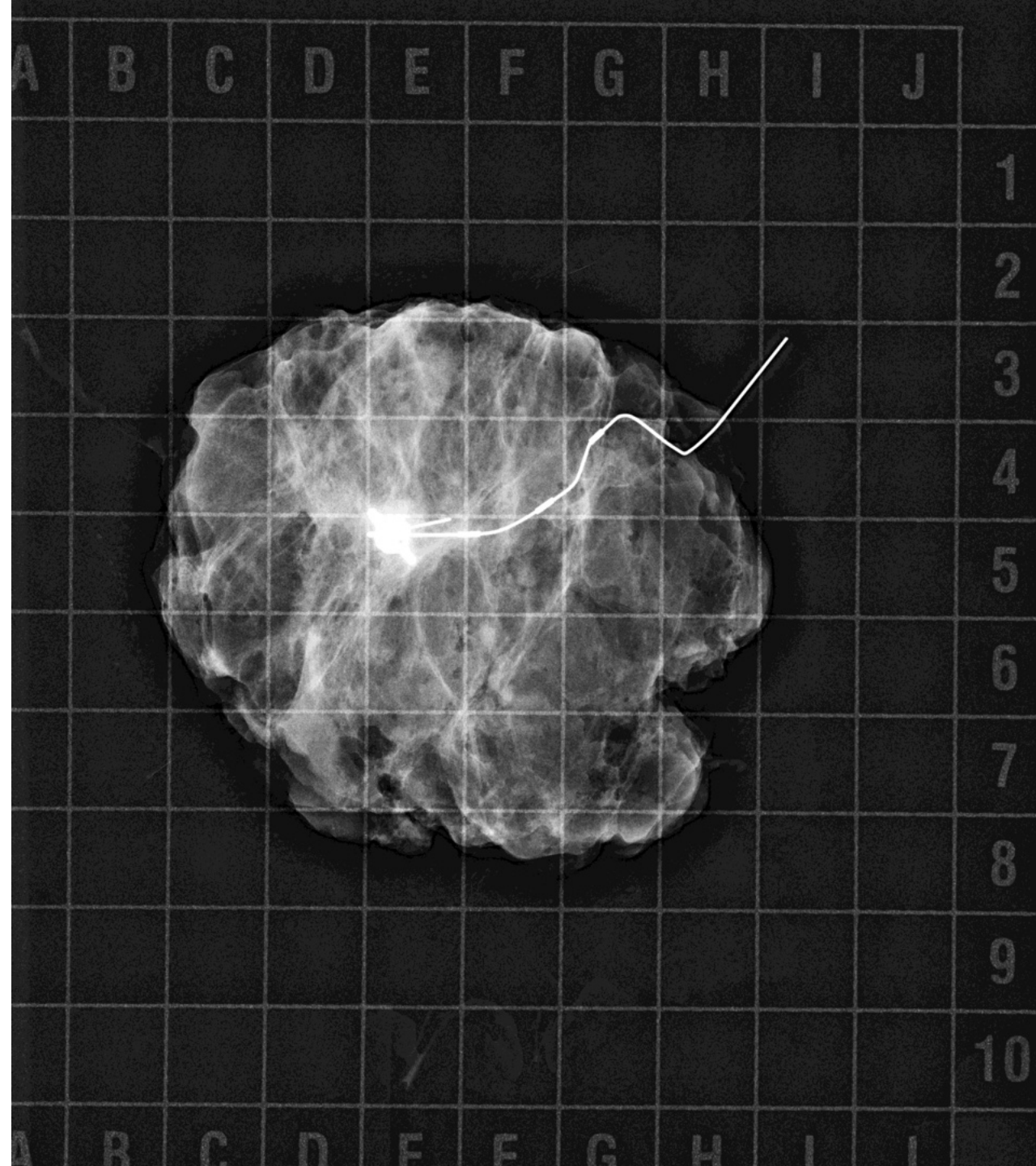
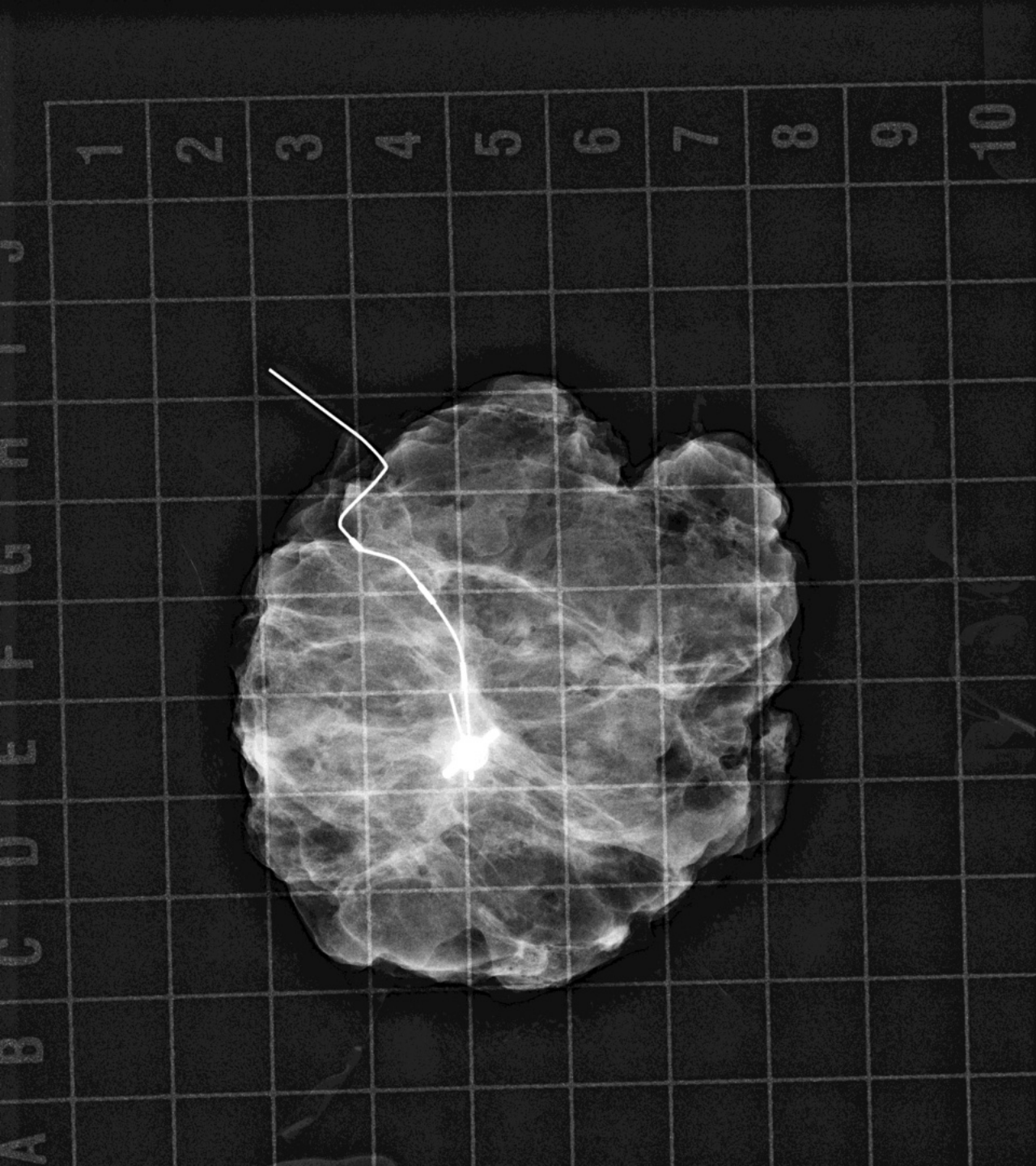
Breast, right, 1 o'clock, 5 cm from nipple, ultrasound guided core biopsy: Infiltrating mammary carcinoma, probably pure mucinous/colloid type, low combined histologic grade, with no significant in-situ component; no peritumoral lymphovascular invasion seen. See comment.



ASSAY RESULTS

Test Name Assay Type	Analysis Average		Interpretation
ER	Percent Positive:	97.3479%	POSITIVE
PR	Percent Positive:	63.3516%	POSITIVE
Her2/neu	Stain Intensity:	1+	NEGATIVE
Ki-67	Percent Positive:	19%	BORDERLINE





DIAGNOSIS:

Right breast tissue, needle localized lumpectomy:

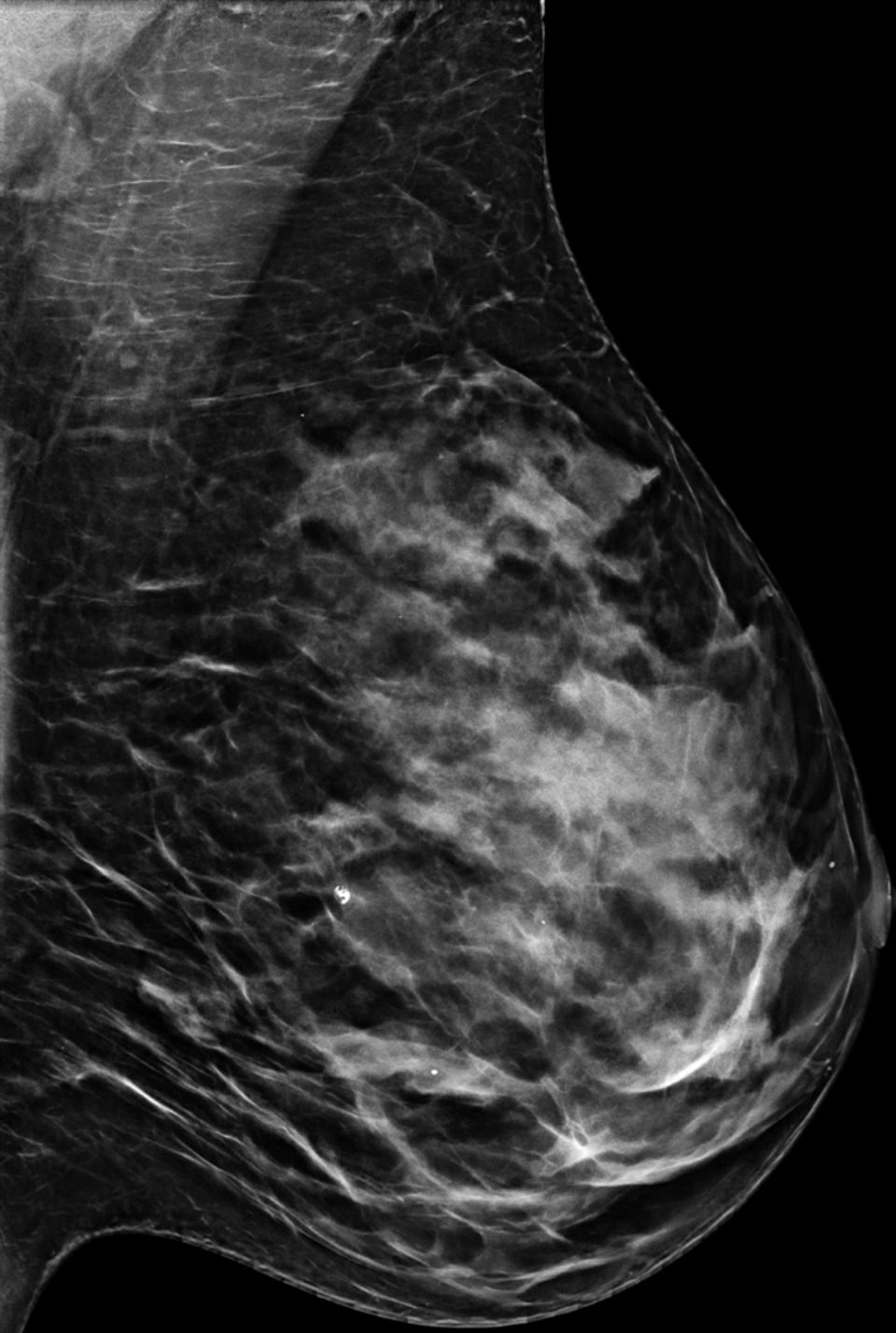
Mucinous carcinoma, margin negative.

Biopsy site excised.



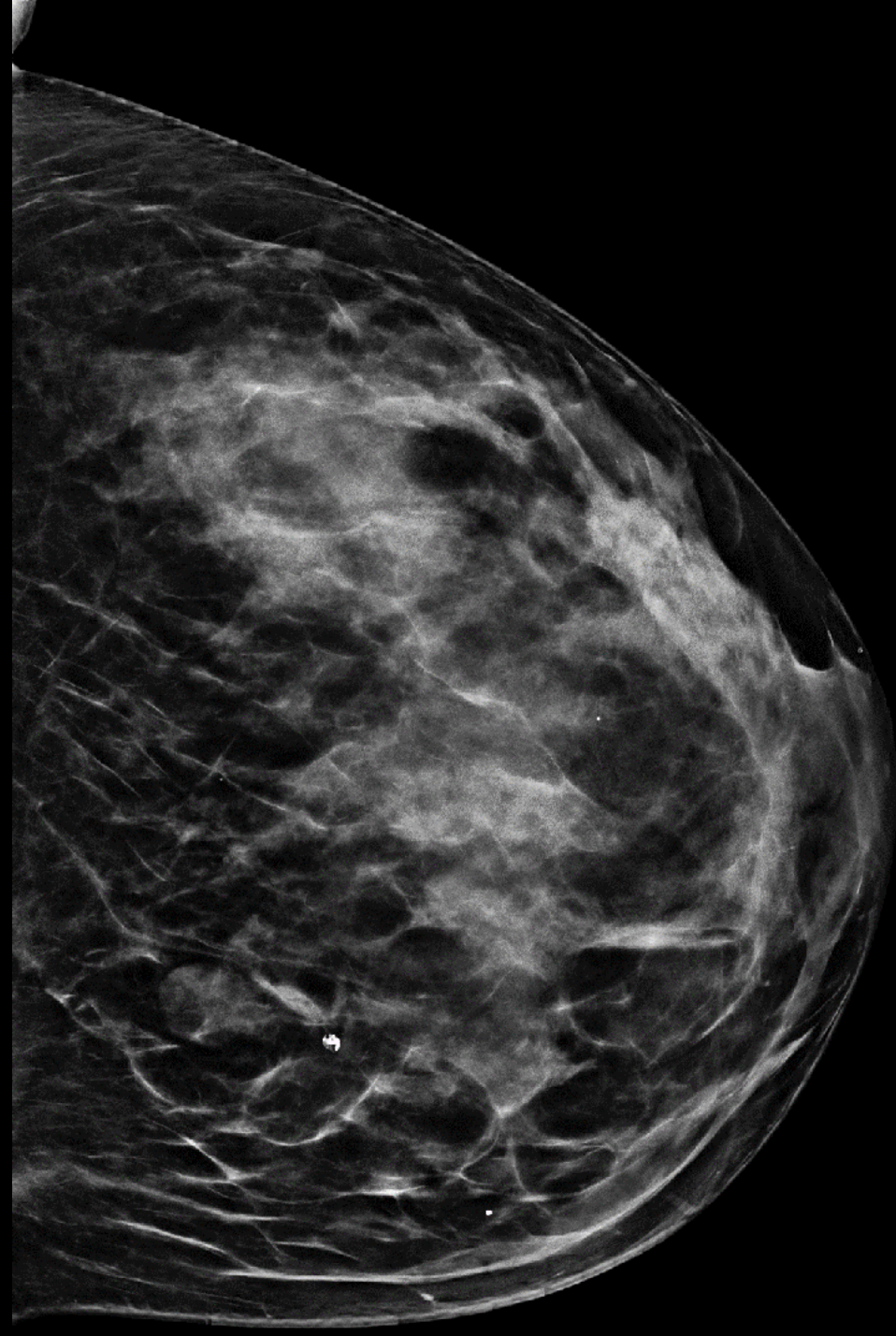
Case 5

Oval Circumscribed Mass



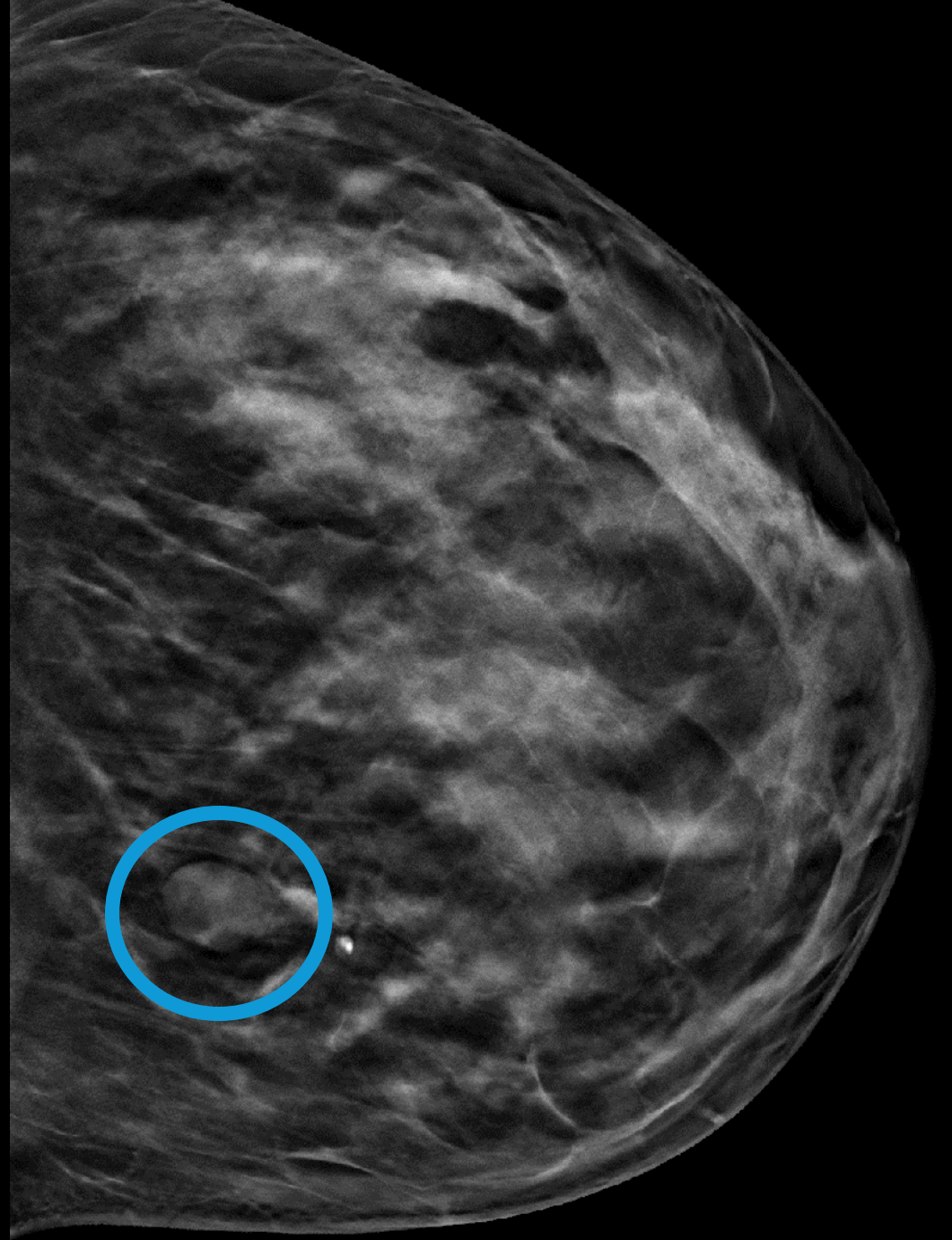
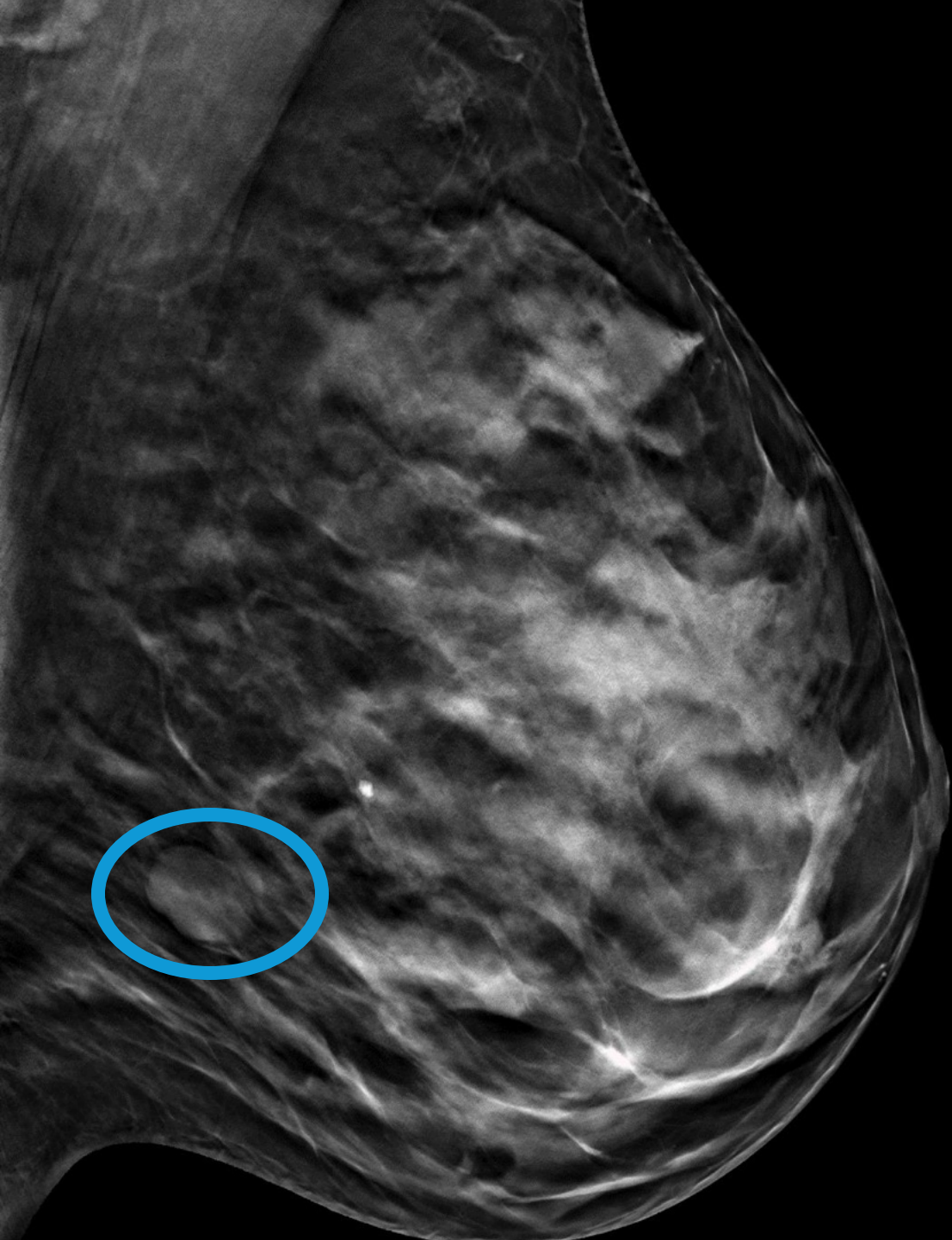
MA
L
LMLO

Intelligent
III 2D



MA
L
LCC

Intelligent
III 2D



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 52 %
Fr. 53 Hz

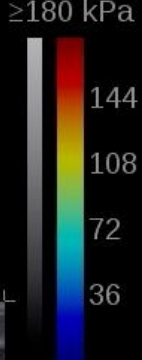
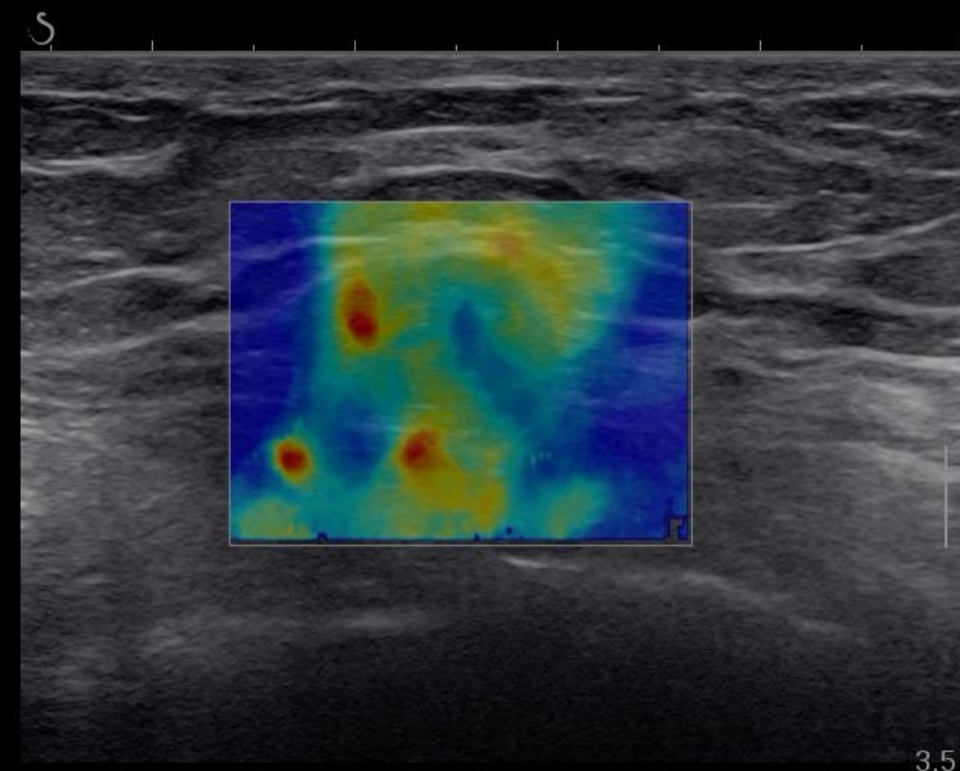
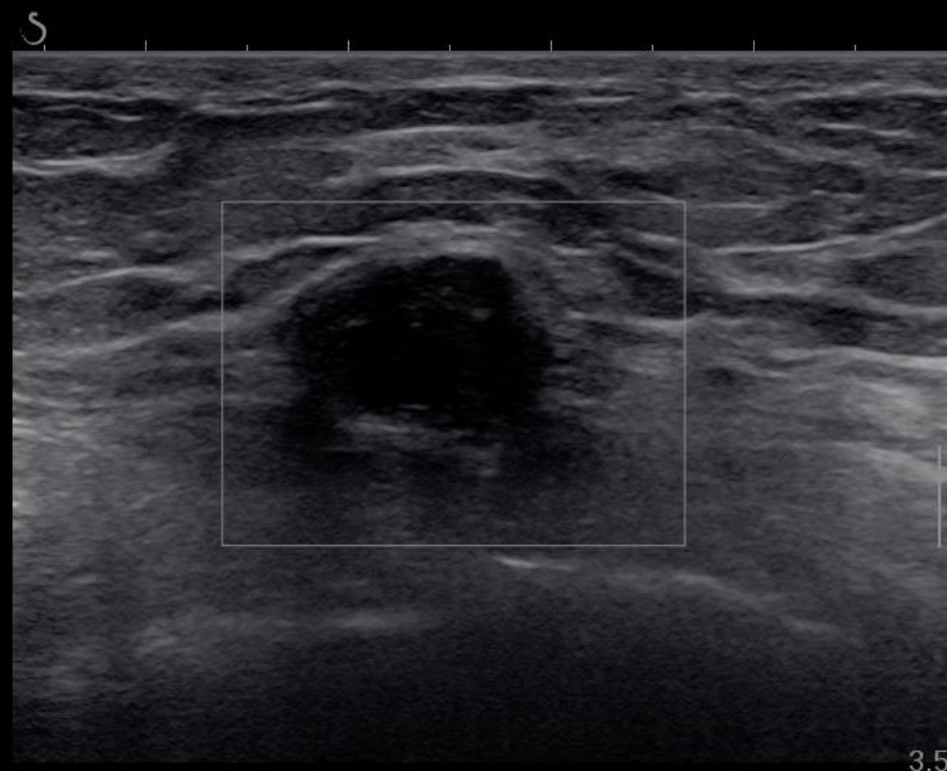
Z 110 %



LT BREAST 8:00 6 CMFN TRANS



Fr: 1450/1450



LT BREAST 8:00 6 CMFN TRANS



Fr: 135/135

B
Res/H
M 7/65 dB/High
T 1460 m/s/SC/SR 2
G 54 %/Fr. 19 Hz

Z 110 %

SWE™f [70 - 800] Hz
Pen/1.4 Hz/SWE Bias ⓘ
M 1/Med/Compression ⓘ
S 5/O 50 %/G 90 %

B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 62 %
Fr. 53 Hz

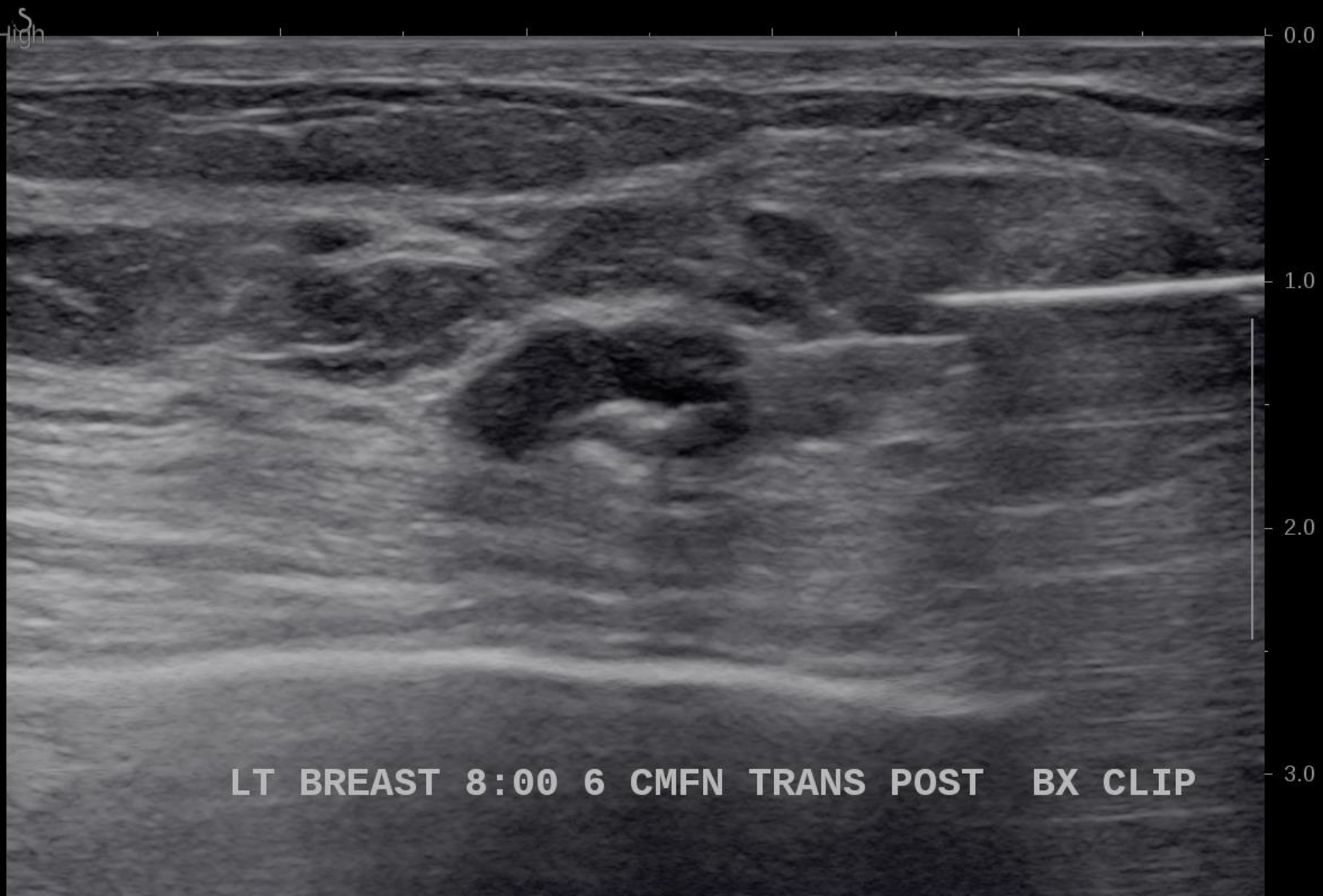
Z 140 %



B

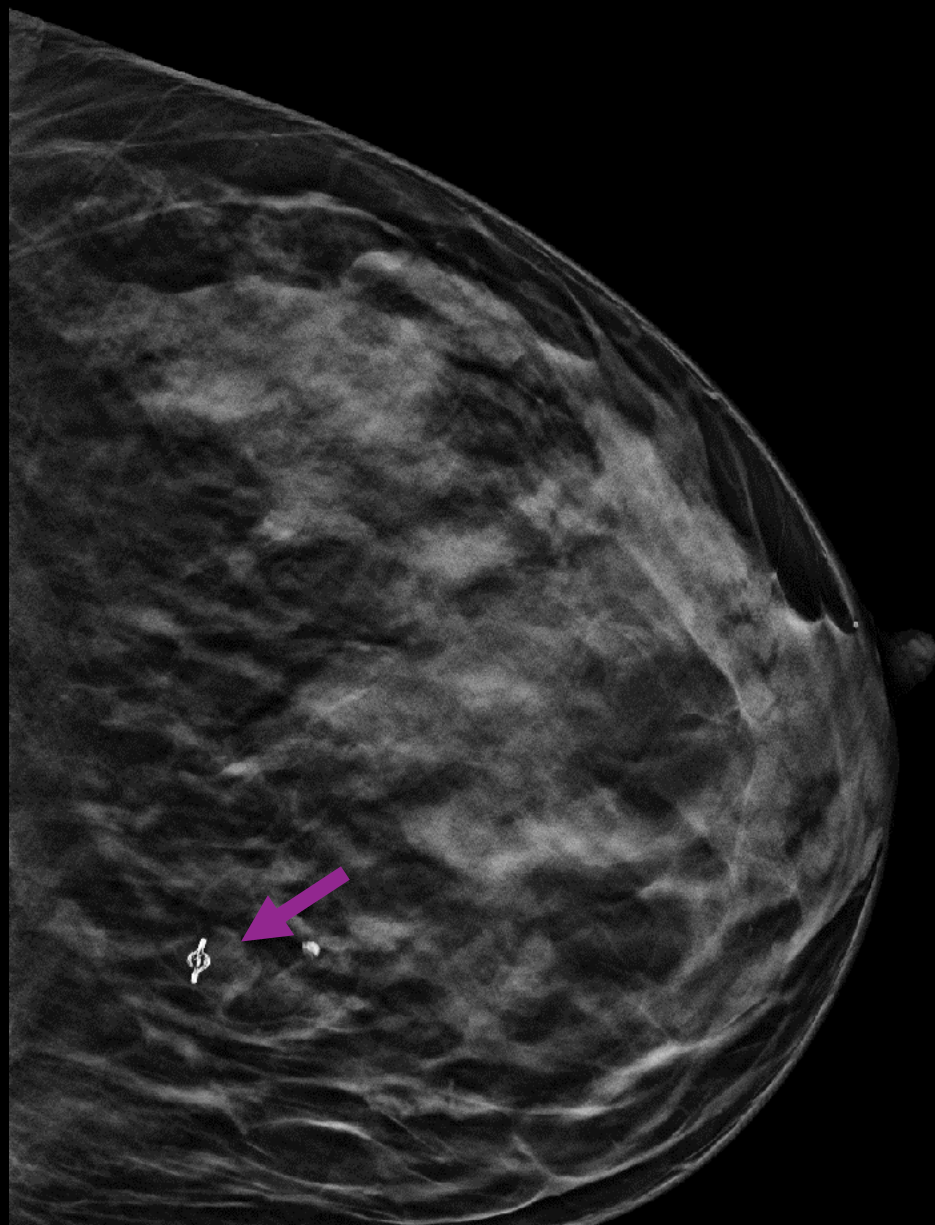
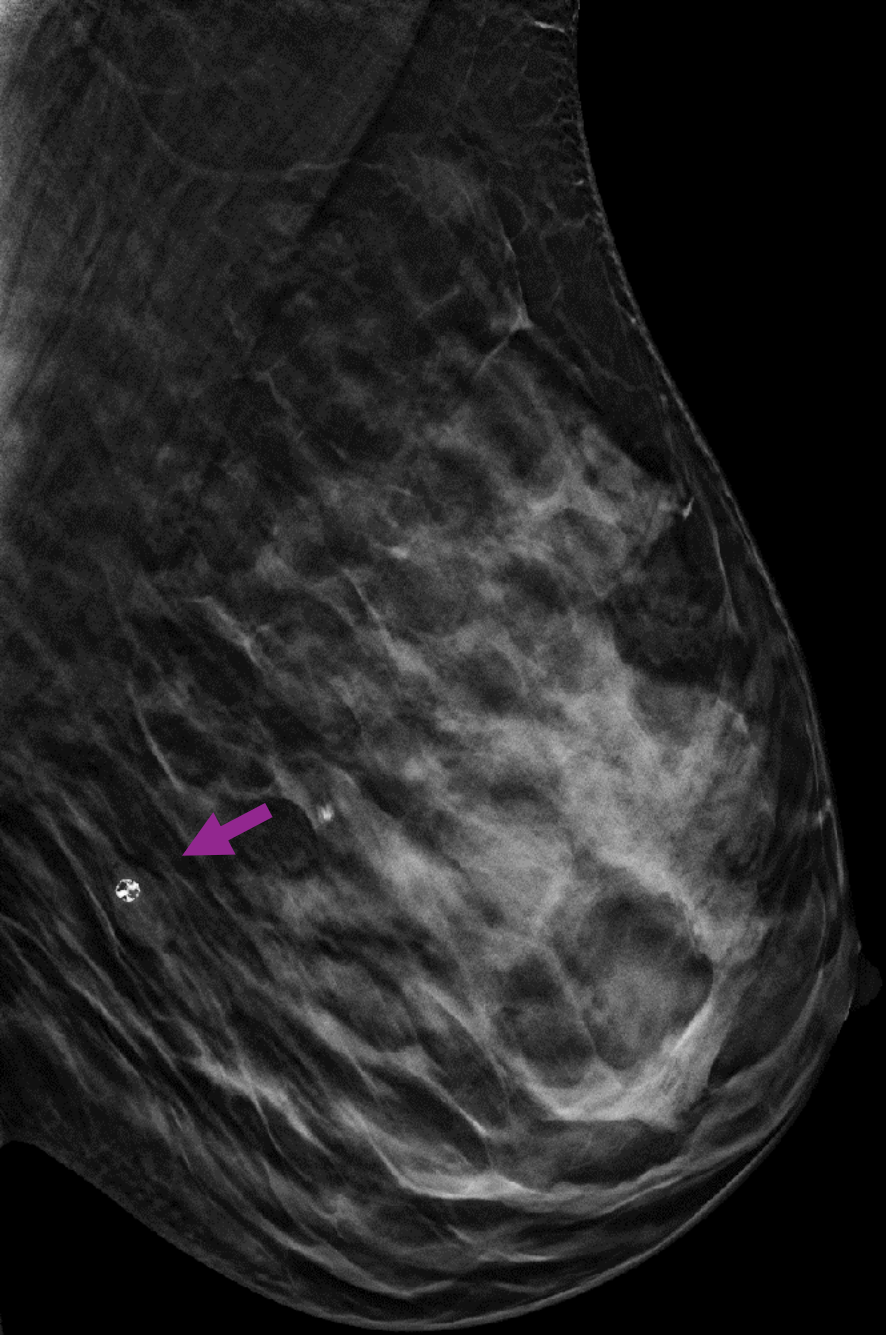
Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 62 %
Fr. 53 Hz

Z 140 %



LT BREAST 8:00 6 CMFN TRANS POST BX CLIP





CLINICAL INFORMATION

History: 38-year-old Caucasian female with PALB2 gene mutation

Pre-op diagnosis: 7 mm grouped calcifications right breast-sclerosing adenosis versus benign fibrocystic changes, 1.4 cm solid mass left breast 8:00-fibroadenoma rule out malignancy

DIAGNOSIS:

1. Right breast, calcifications at 12 o'clock, SCNB: Focal area of sclerosing adenosis with microcalcifications present; surrounding stromal changes of pseudoangiomatous stromal hyperplasia (PASH); no atypia.
2. Left breast, mass at 8 o'clock, USCNB: Fibroadenoma; no atypia.

***Electronically Signed by [Signature]



Case 6

Architectural Distortion

PROCEDURE: CT CHEST, ABDOMEN, AND PELVIS WITH CONTRAST

COMPARISON: 09/19/2018.

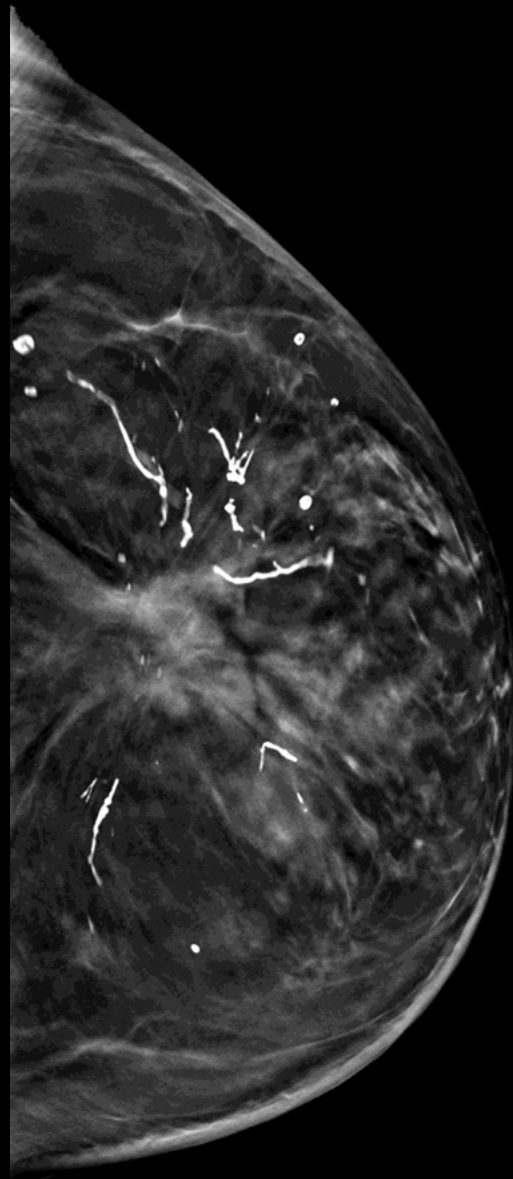
INDICATIONS: Breast cancer. Bladder cancer. Endometrial cancer.

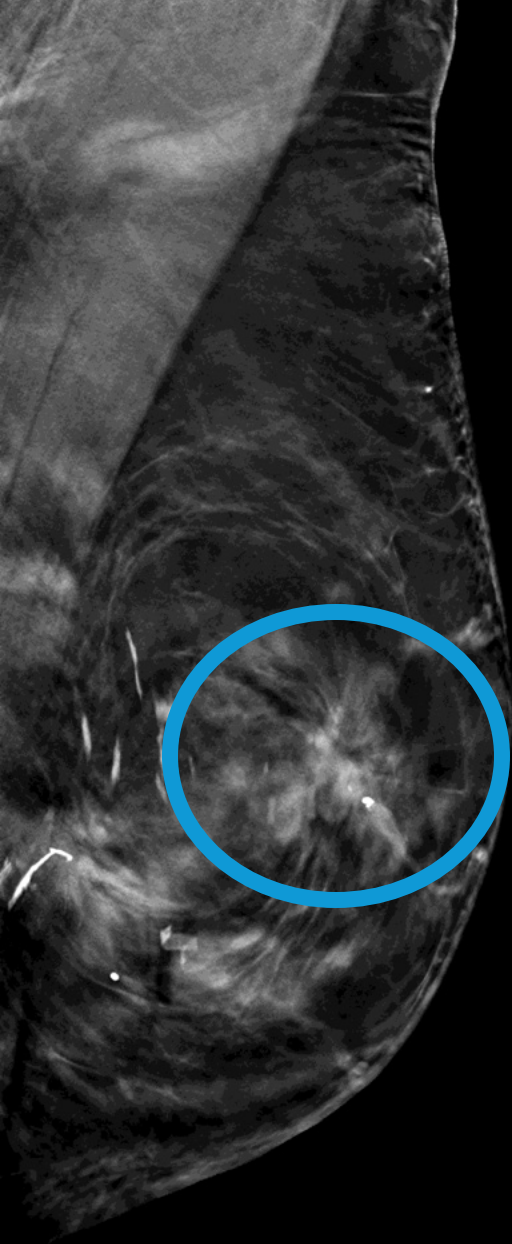
TECHNIQUE: Positive oral contrast was ingested prior to the procedure. Visipaque 320/80 cc was administered intravenously.

CHEST: The thyroid gland and thoracic inlet are normal. The nodule in the left breast has not significantly changed. There are stable postoperative changes in the more inferior left breast, with an enlarging 5 mm nodule seen adjacent to the operative defect. There is no thoracic lymphadenopathy. Emphysematous changes noted along with coronary artery disease. Interstitial changes along the anterior left chest wall are stable. Scattered areas of parenchymal scarring elsewhere are noted. No new infiltrate, consolidation, or effusion. No osseous lesion.

IMPRESSION:

1. There are stable postsurgical changes to the left breast. Adjacent to the surgical defect, there is a 5 mm enhancing nodule that is more conspicuous on today's exam. Mammographic correlation is recommended.
2. No evidence of metastatic disease elsewhere.



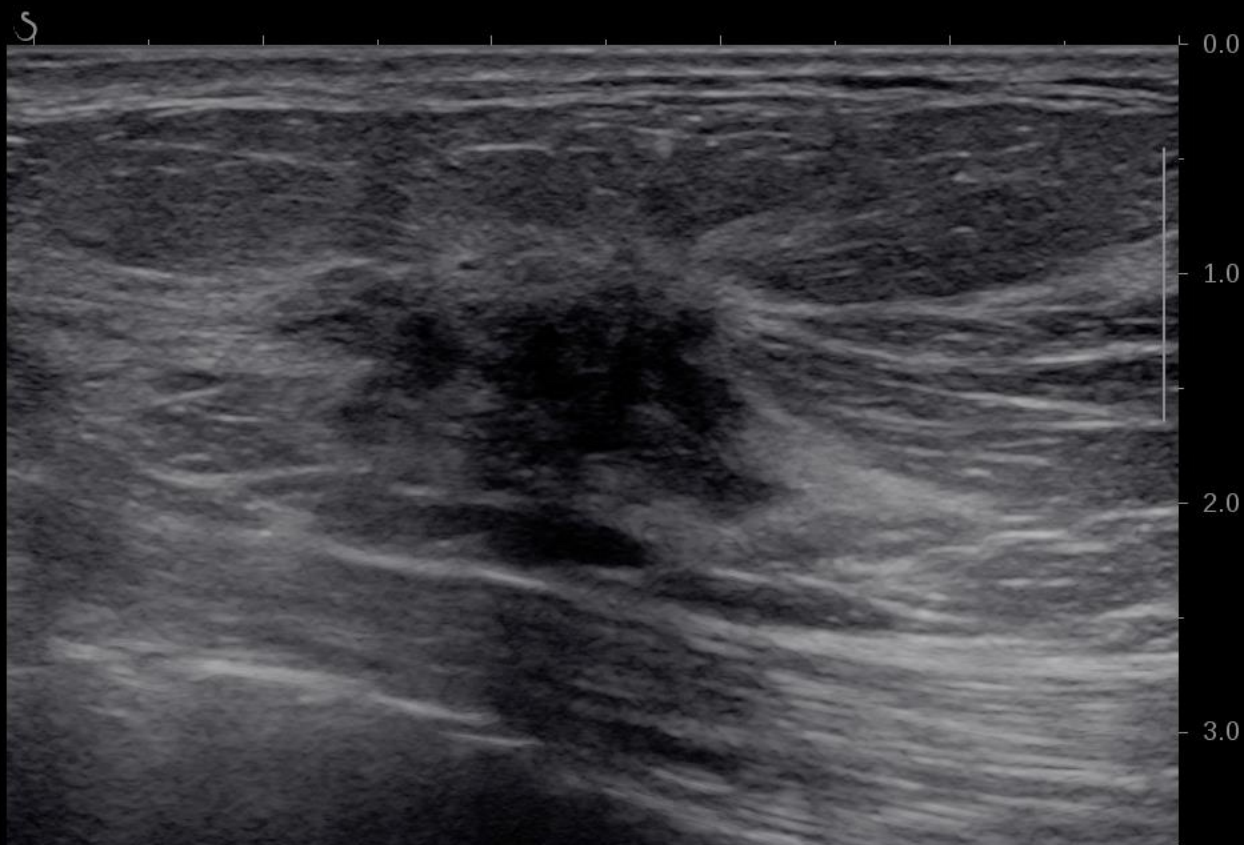




B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 53 %
Fr. 53 Hz

Z 110 %



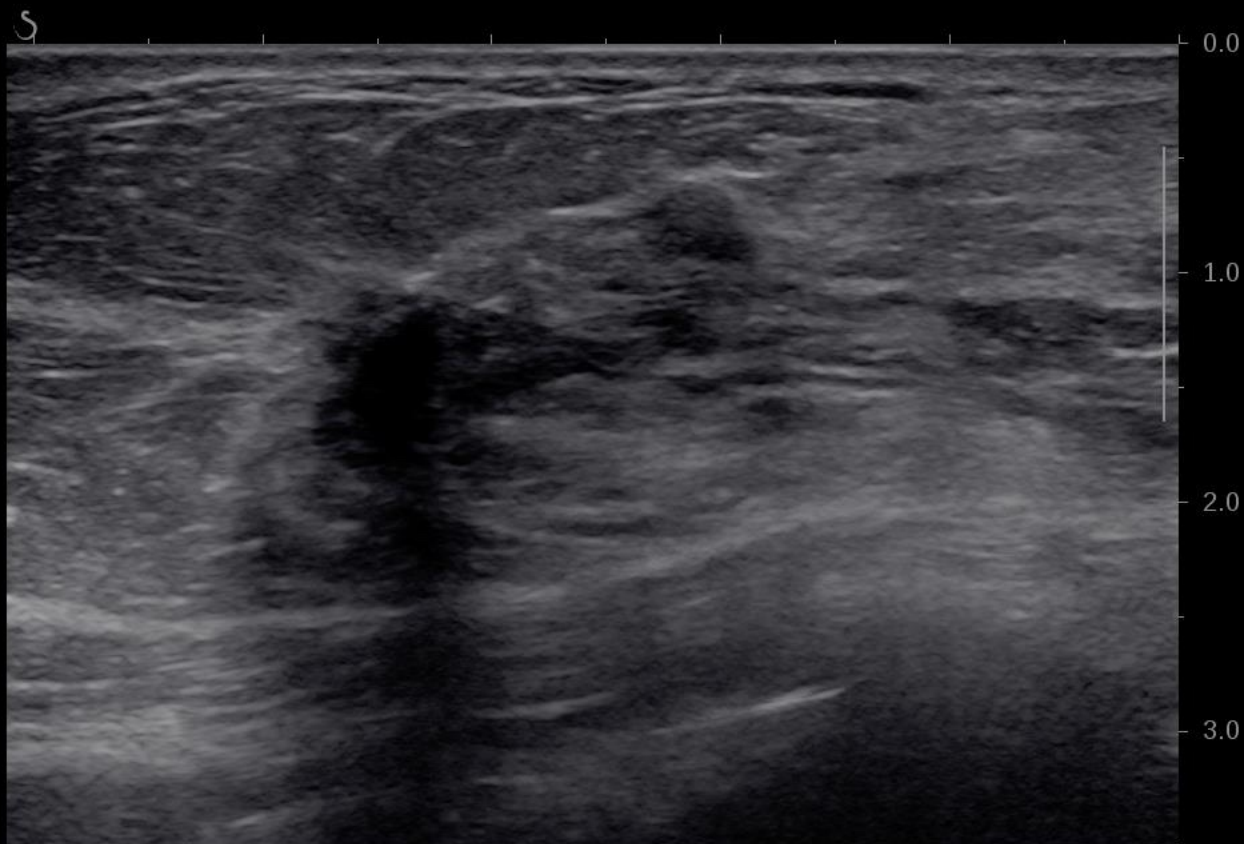
LT BREAST 11:00 5 CMFN TRANS AOC



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 53 %
Fr. 53 Hz

Z 110 %



LT BREAST 11:00 5 CMFN LONG AOC



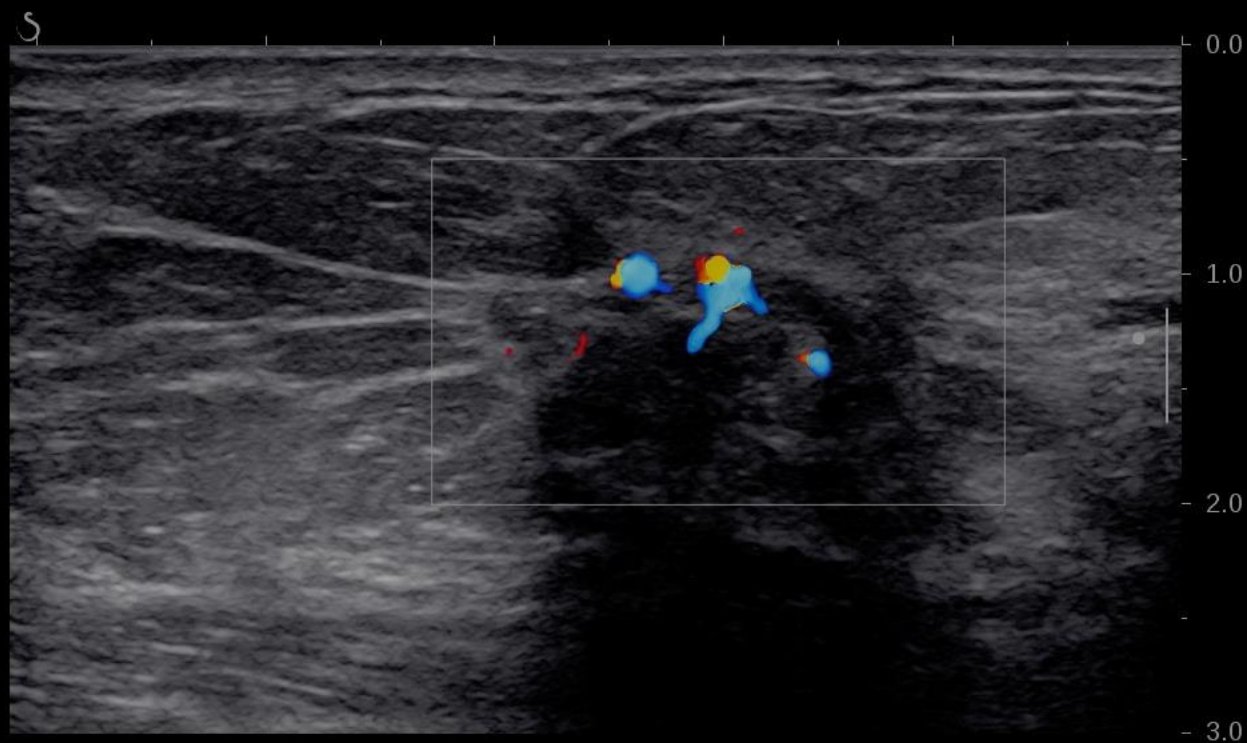
B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 37 %
Fr. 17 Hz

CFI

Gen/Med
Off/WF Med
M 5/P. Med
Scale 4 cm/s
S 3
G 70 %

Z 110 %

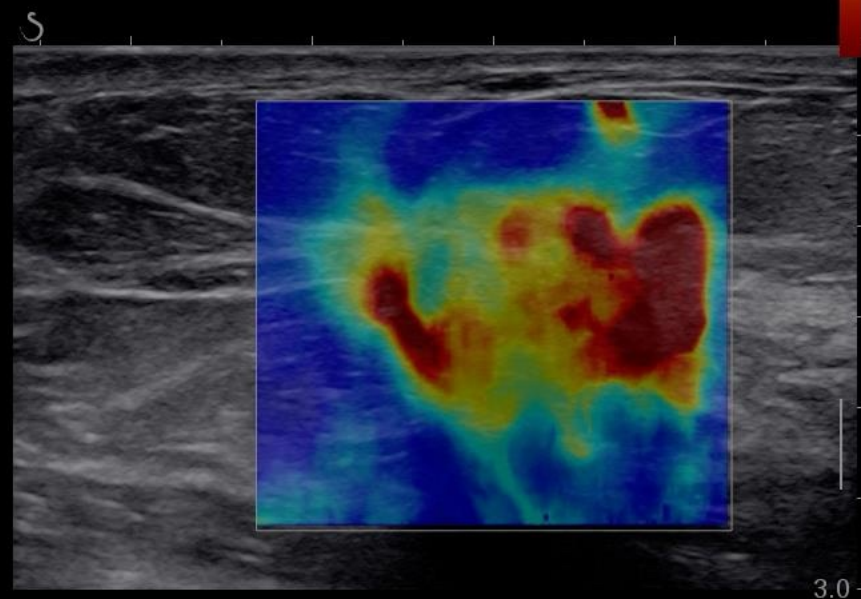
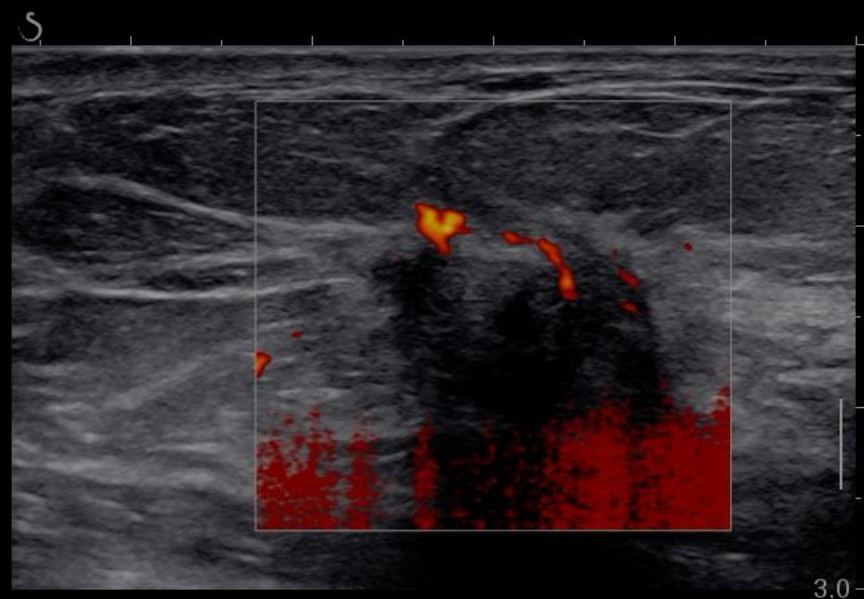
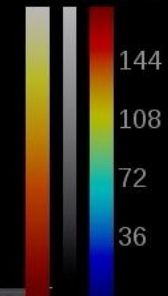


4.0
-4.0
cm/s

LT BREAST 11:00 5 CMFN TRANS Dr SSF



≥180 kPa



LT BREAST 11:00 5 CMEN TRANS Dr SSF

Res/H
M 7/65 dB/High
T 1460 m/s/SC/SR 2
G 35 %/Fr. 9 Hz

Fr. 10 Hz
G 80 %
Scale 4.0 cm/s

WE™ f [70 - 800] Hz
Pen/0.8 Hz/SWE Bias
M 1/Med/Compression
S 5/O 50 %/G 90 %

Fr: 55/55



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 25 %
Fr. 68 Hz

Z 115 %





B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 25 %
Fr. 58 Hz

Z 110 %



CLINICAL INFORMATION

86-year-old female with history of left breast cancer.

Imaging impression: 1.7 cm area of architectural distortion in left breast. fat necrosis/fibrosis, rule out cancer

DIAGNOSIS:

Left breast, area at 11 o'clock, 5 cm from nipple, USCNB: Invasive ductal carcinoma, Grade 2.

ASSAY RESULTS

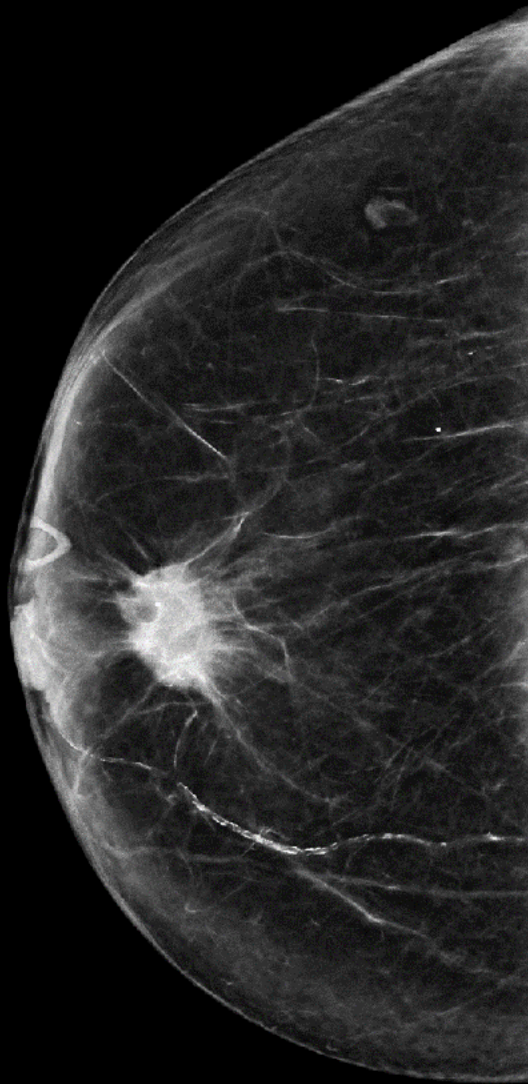
Test Name Assay Type	Analysis Average		Interpretation
ER	Percent Positive:	76.4788%	POSITIVE
PR	Percent Positive:	38.5475%	POSITIVE
Her2/neu	Stain Intensity:	1+	NEGATIVE
KI-67	Percent Positive:	18%	BORDERLINE



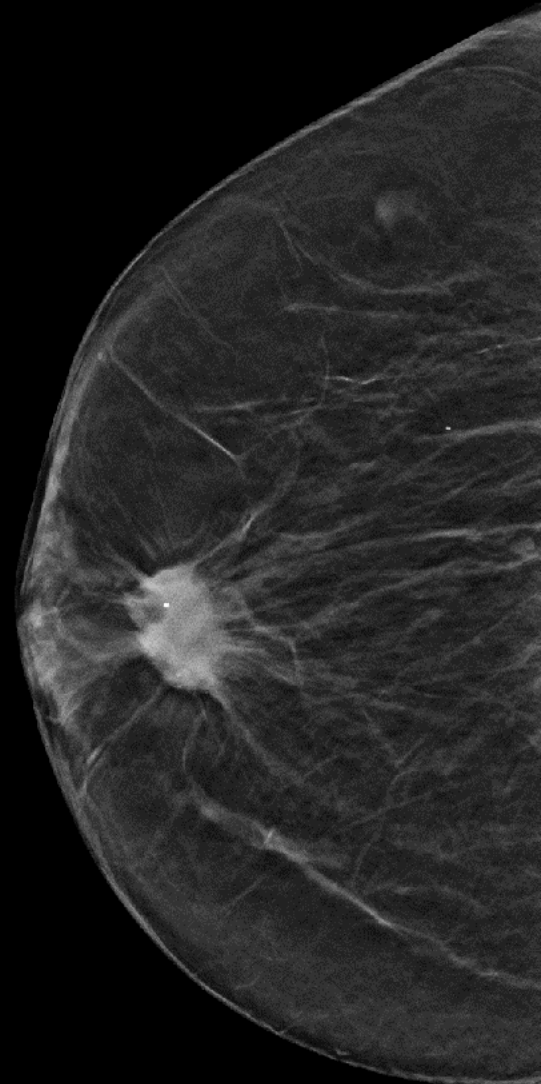
Case 7

Palpable Mass

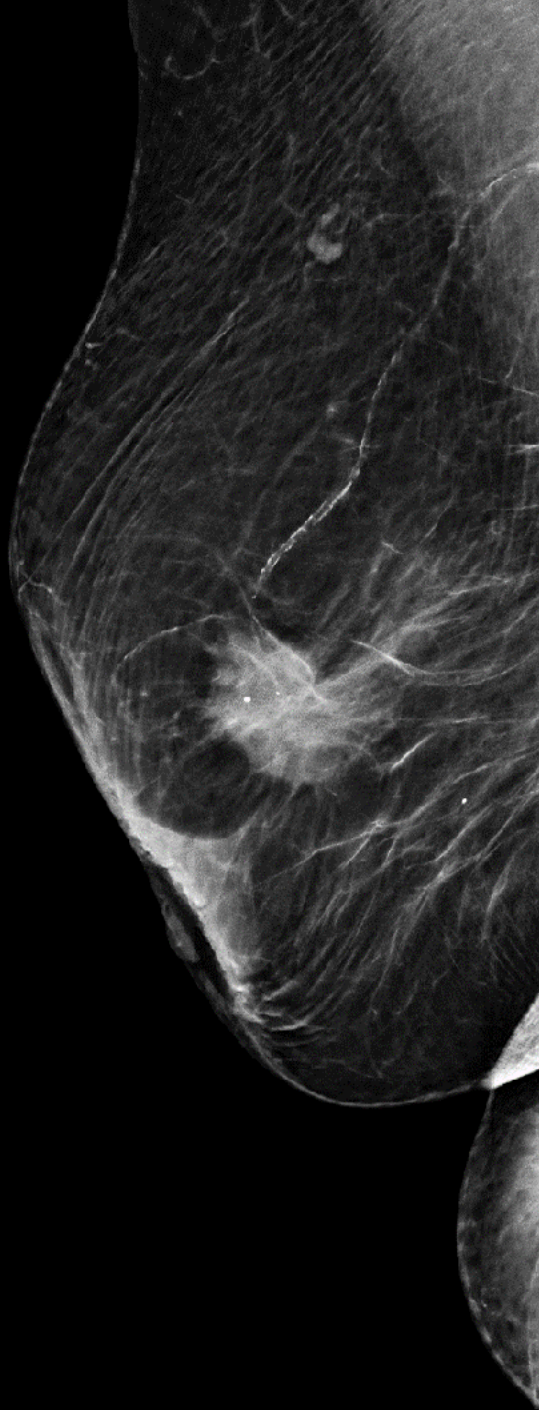
RA
L RCC



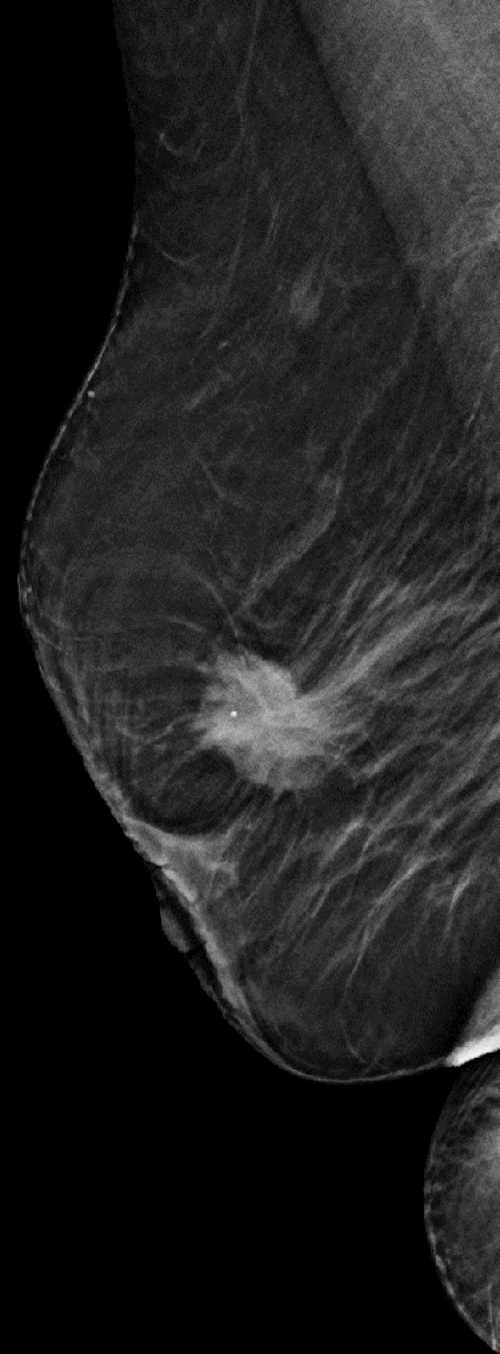
adrum



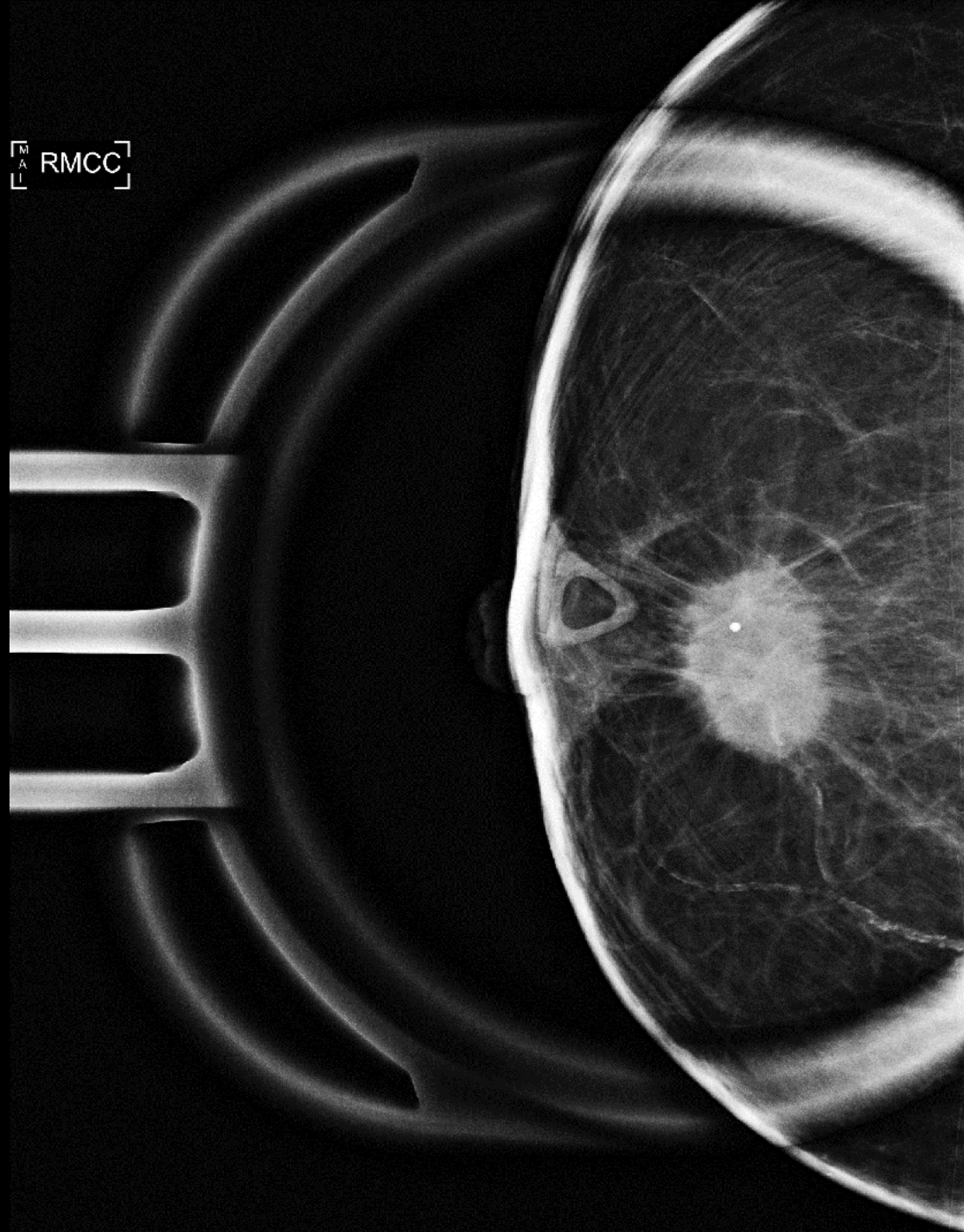
M
A
L RML



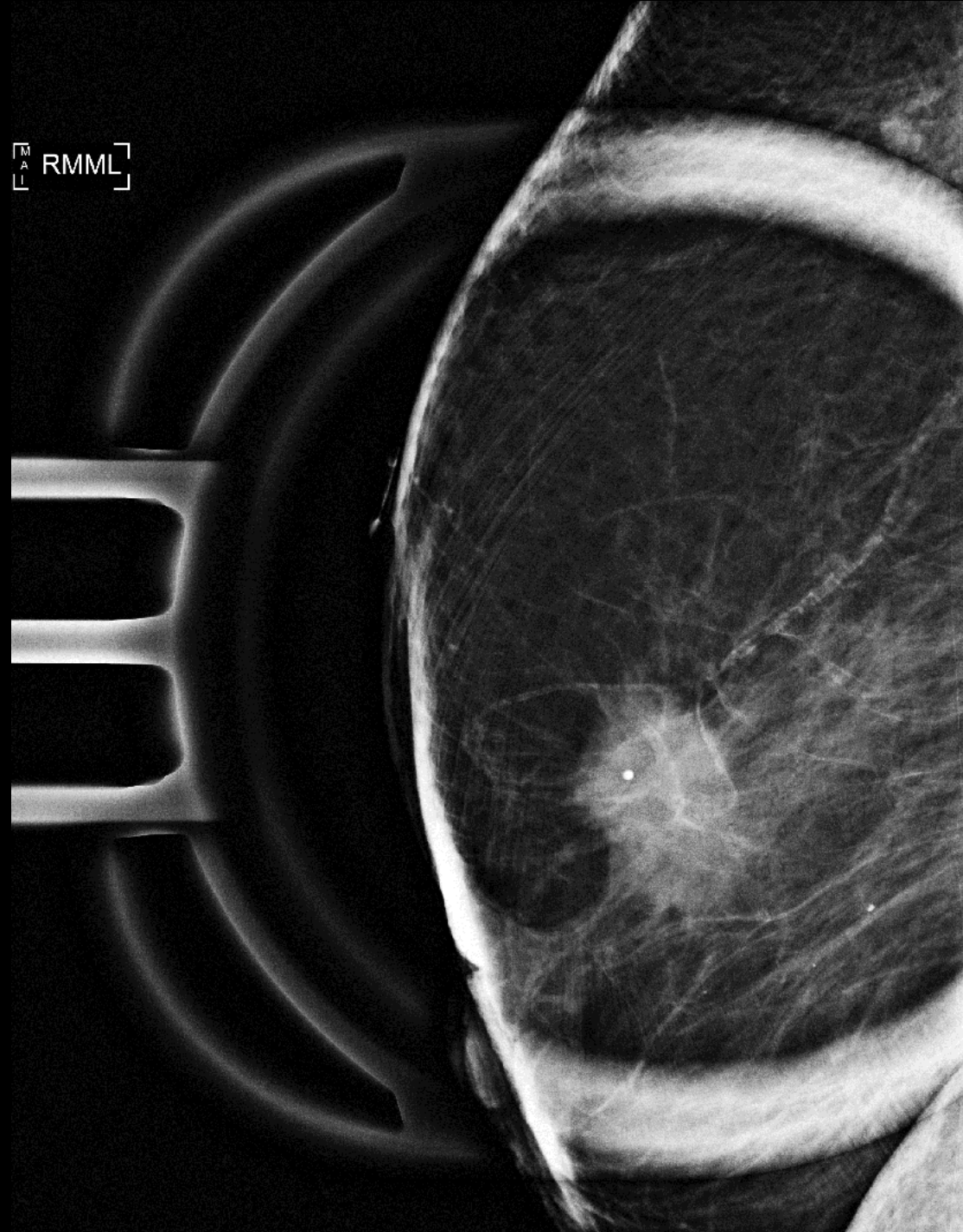
Quorum



RMCC

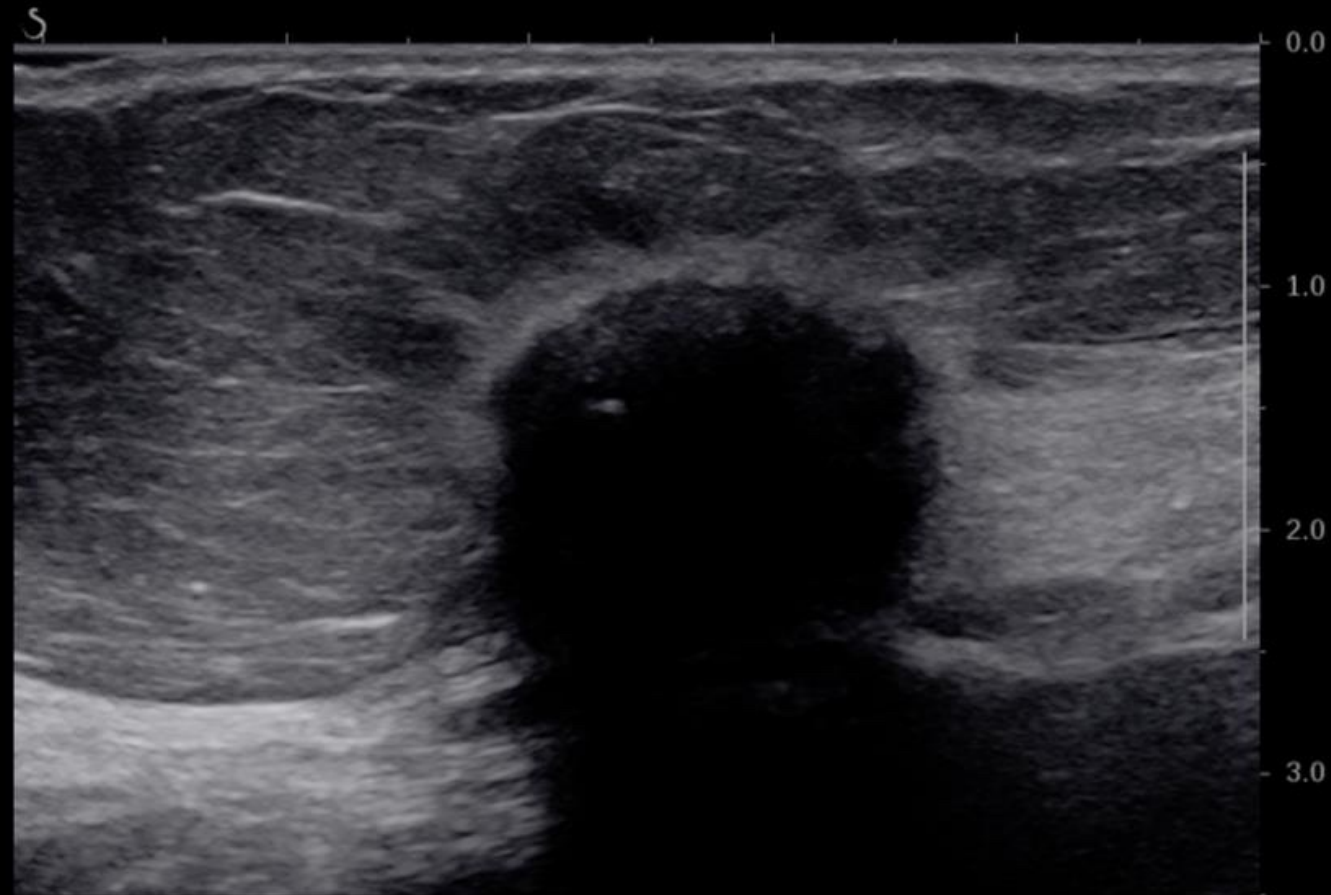


RMML



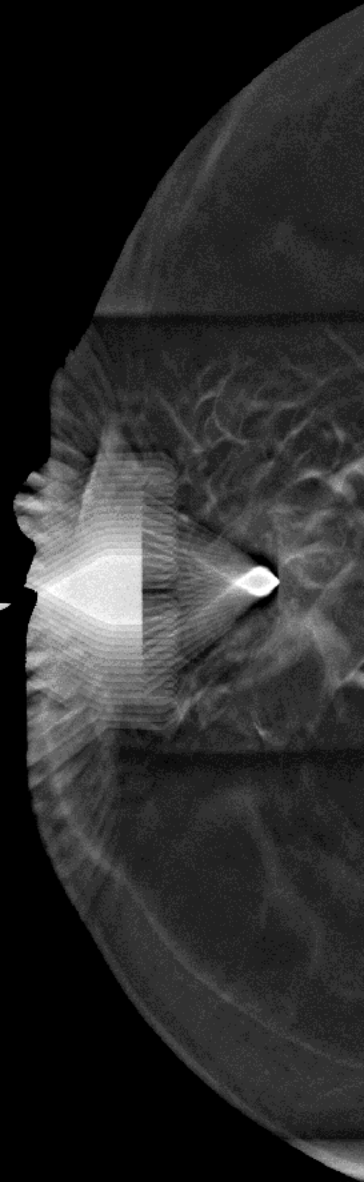
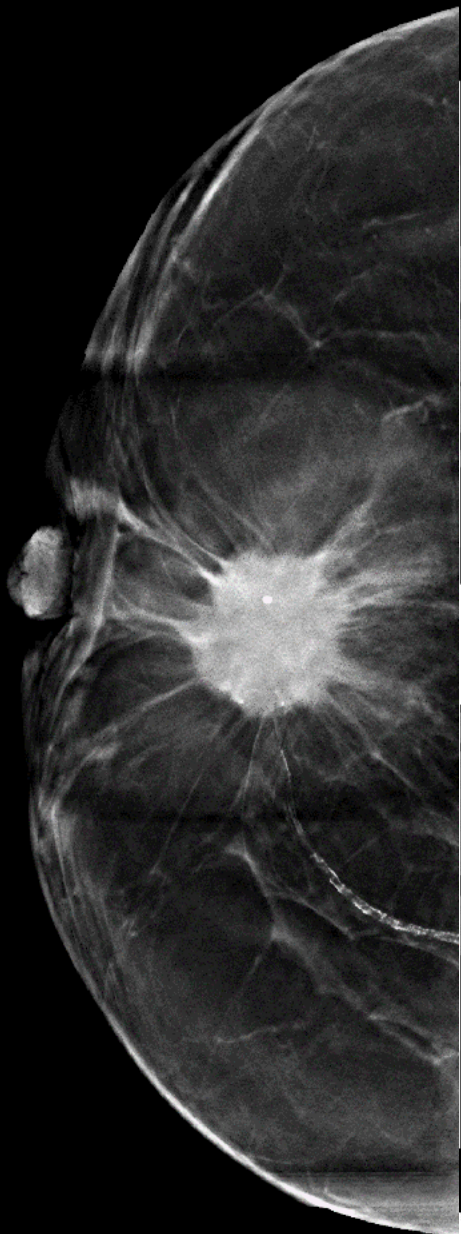
B
Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 39 %
Fr. 53 Hz

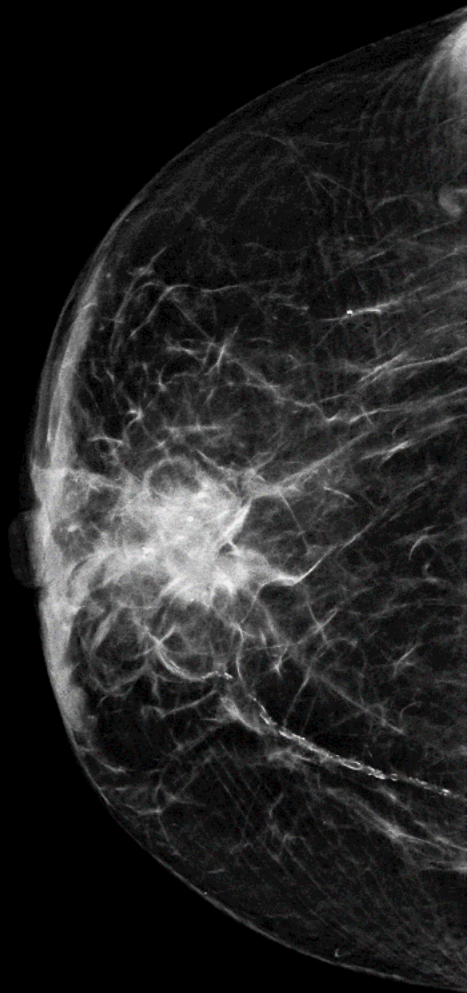
Z 110 %



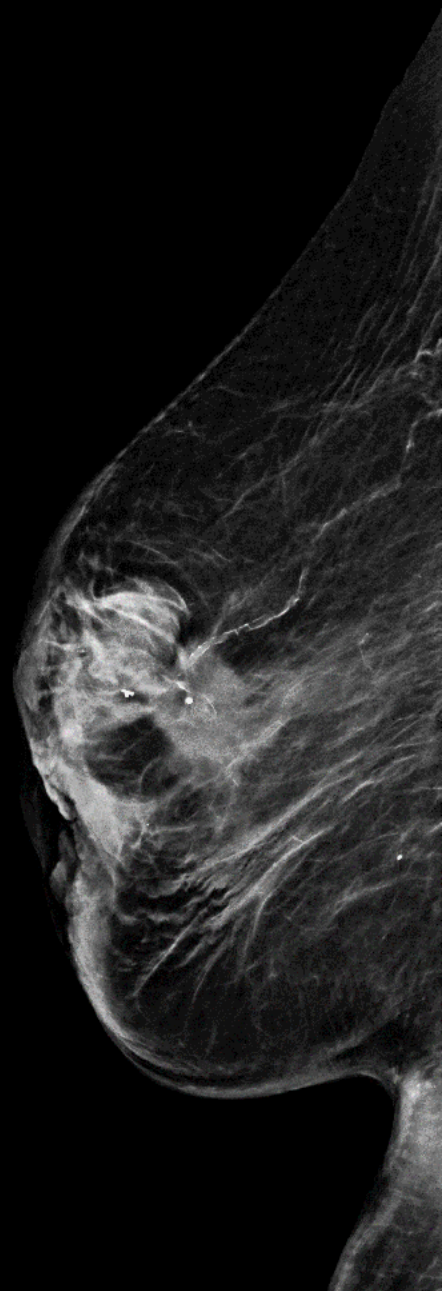
RT BREAST 12:00 4 CMFN TRANS PALPABLE ❄ AREA

Fr: 352/352





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III 2D™



CLINICAL INFORMATION

92-year-old Caucasian female with 1.8 cm spiculated mass, right breast, 12:00, 4 cm from nipple.

Imaging impression: Invasive ductal cancer

DIAGNOSIS:

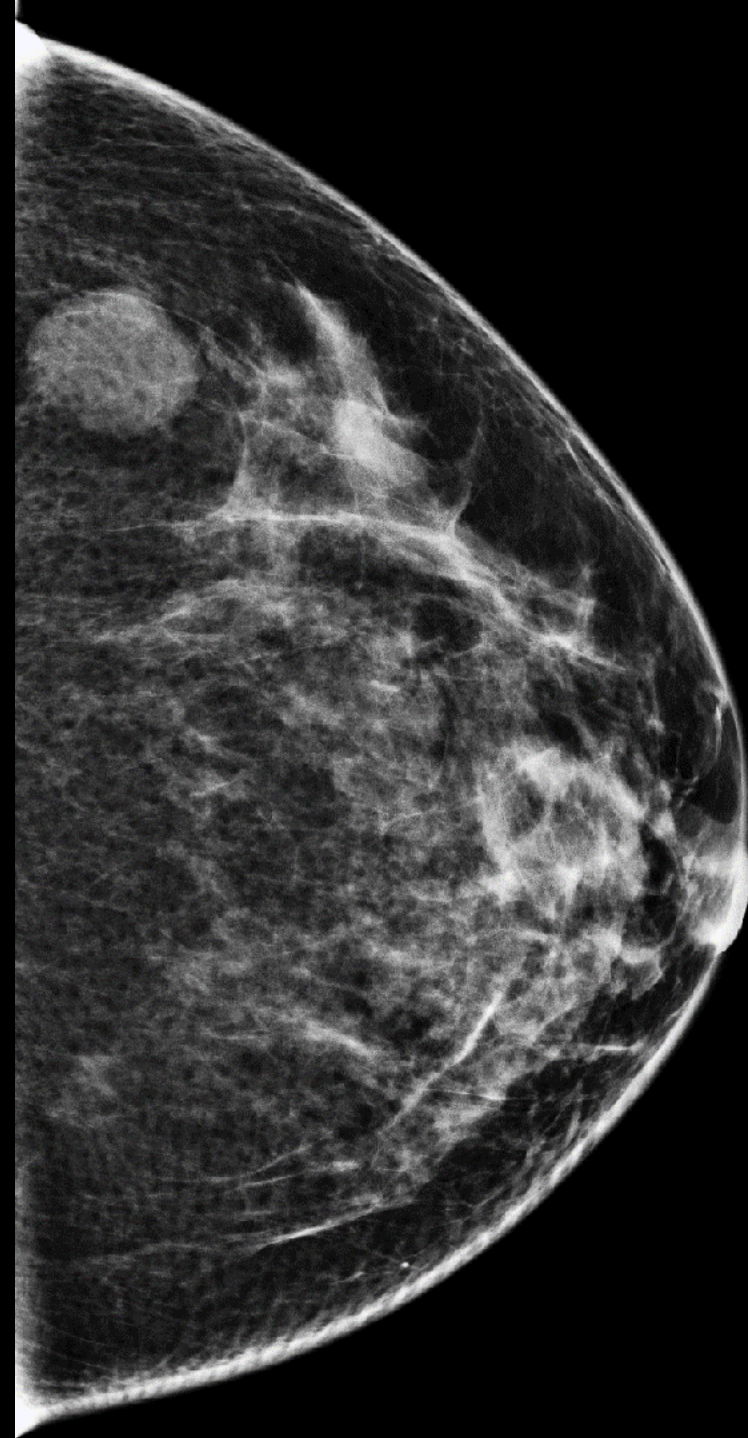
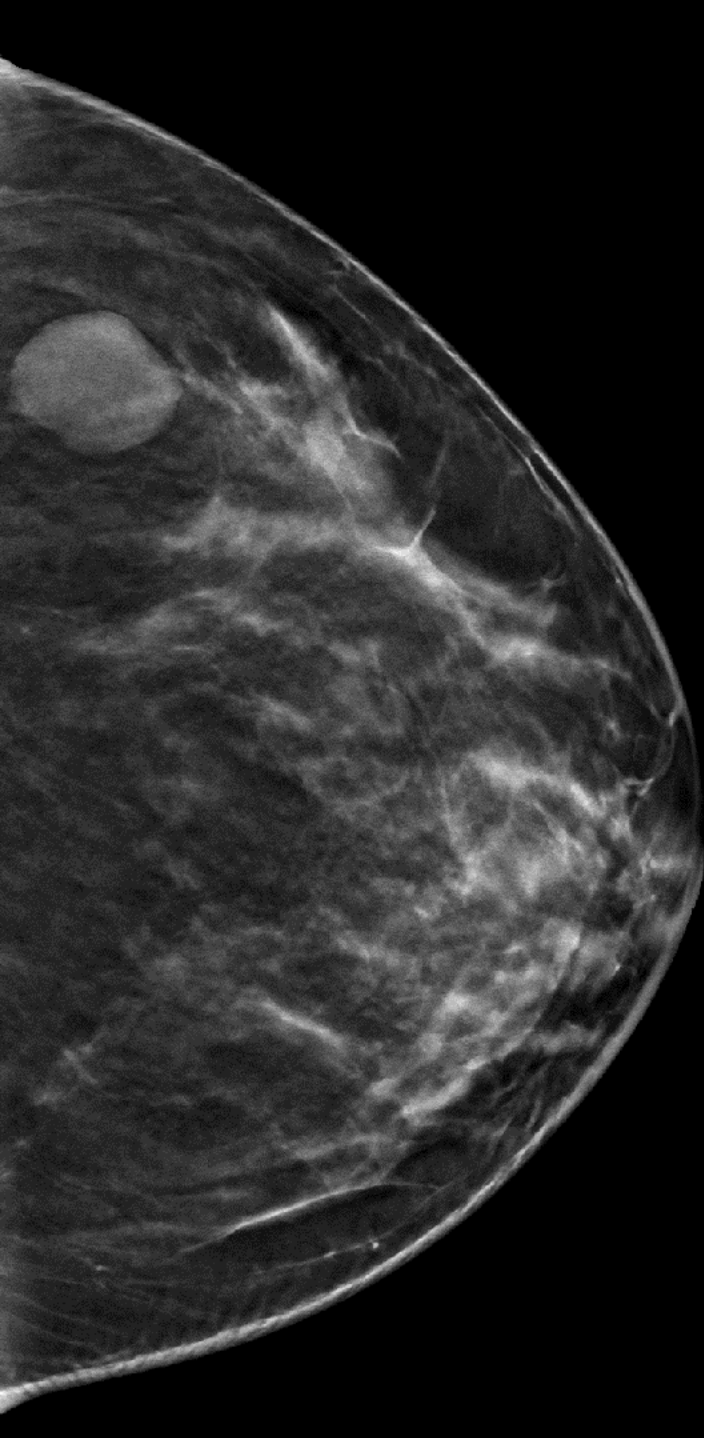
Breast, right, 12:00, stereotactic core biopsy: Infiltrating mammary carcinoma, no special type (ductal, NOS), low combined histologic grade, with no in-situ component; no peritumoral lymphovascular invasion seen. See comment.

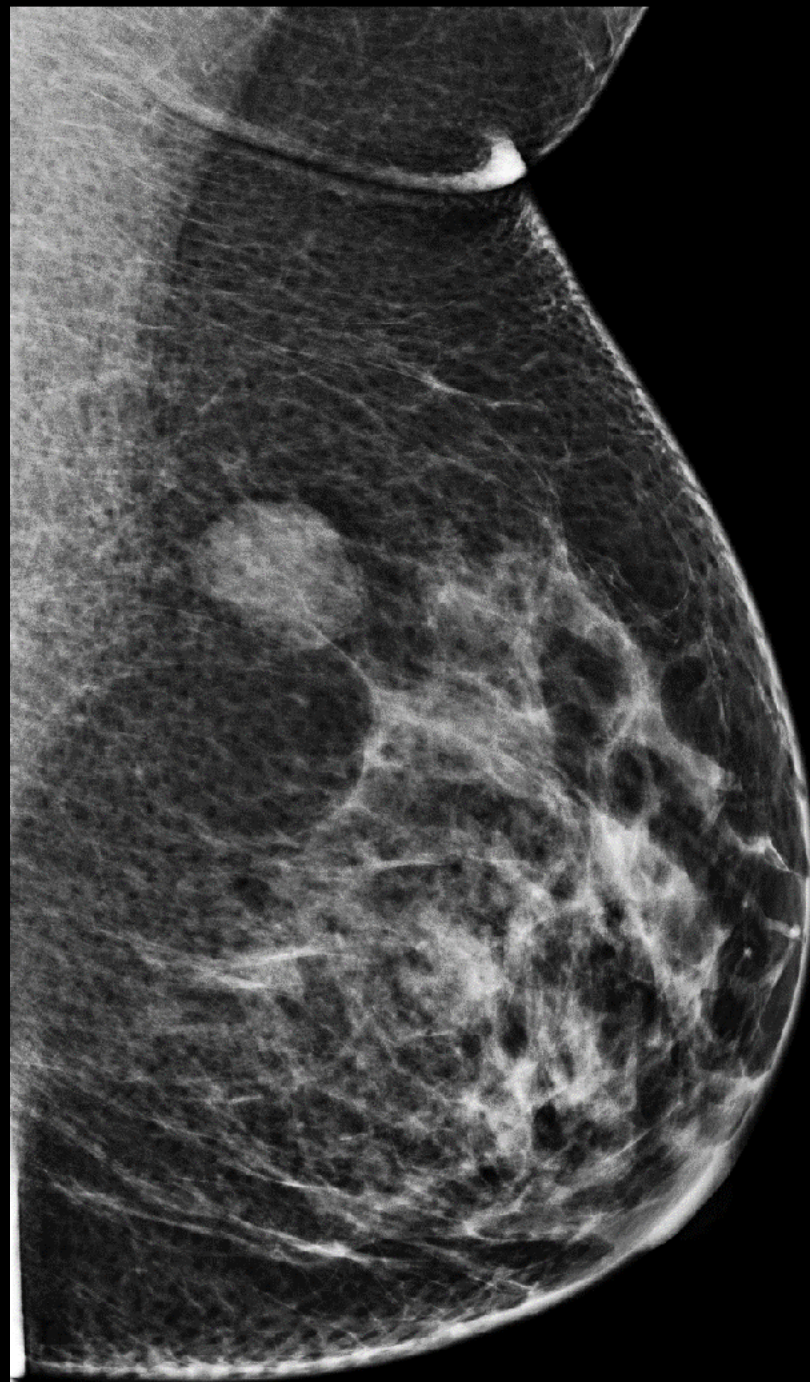
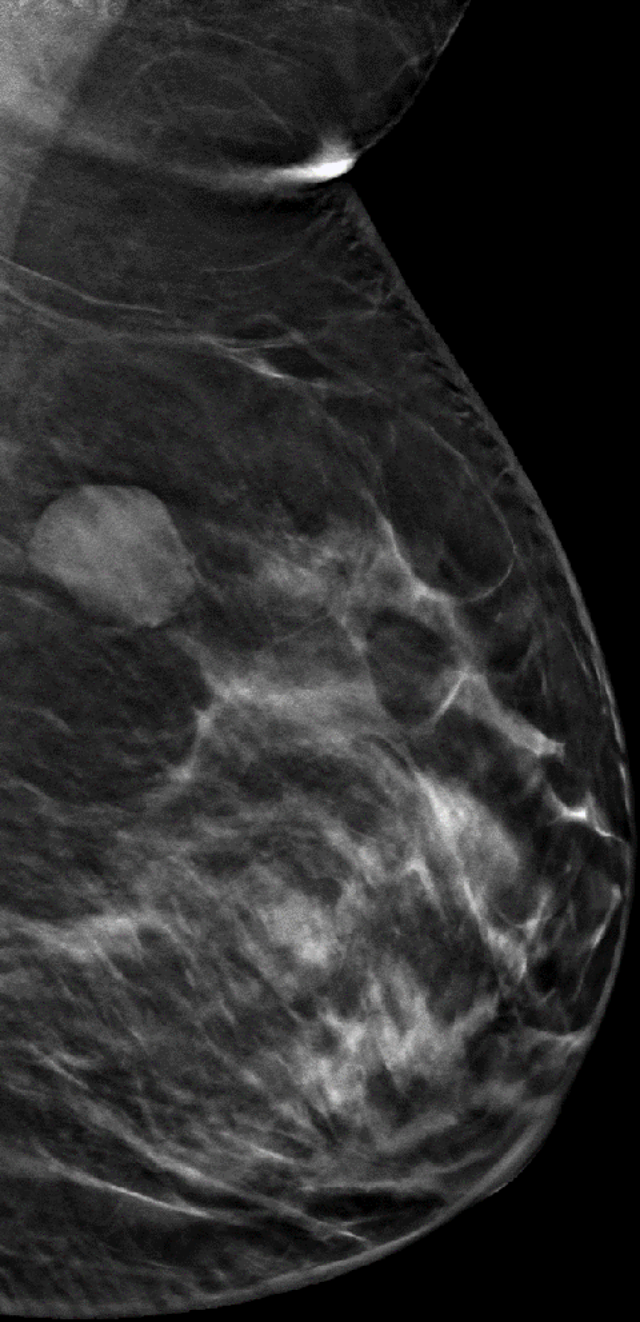
Test Name	Interpretation	Analysis Average	Intensity	Internal Controls
ER (Roche Clone SP1))	FAVORABLE	94%	Strong	Adequate
PR (Roche Clone 1E2)	FAVORABLE	73%	Moderate	Adequate
Ki67 (Roche 30-9)	FAVORABLE	7%	N/A	N/A
	Interpretation		Stain Intensity (0 – 3+)	
HER2 IHC (Roche Clone 4B5)	Equivocal (Reflexed to ISH)		2+	



Case 8

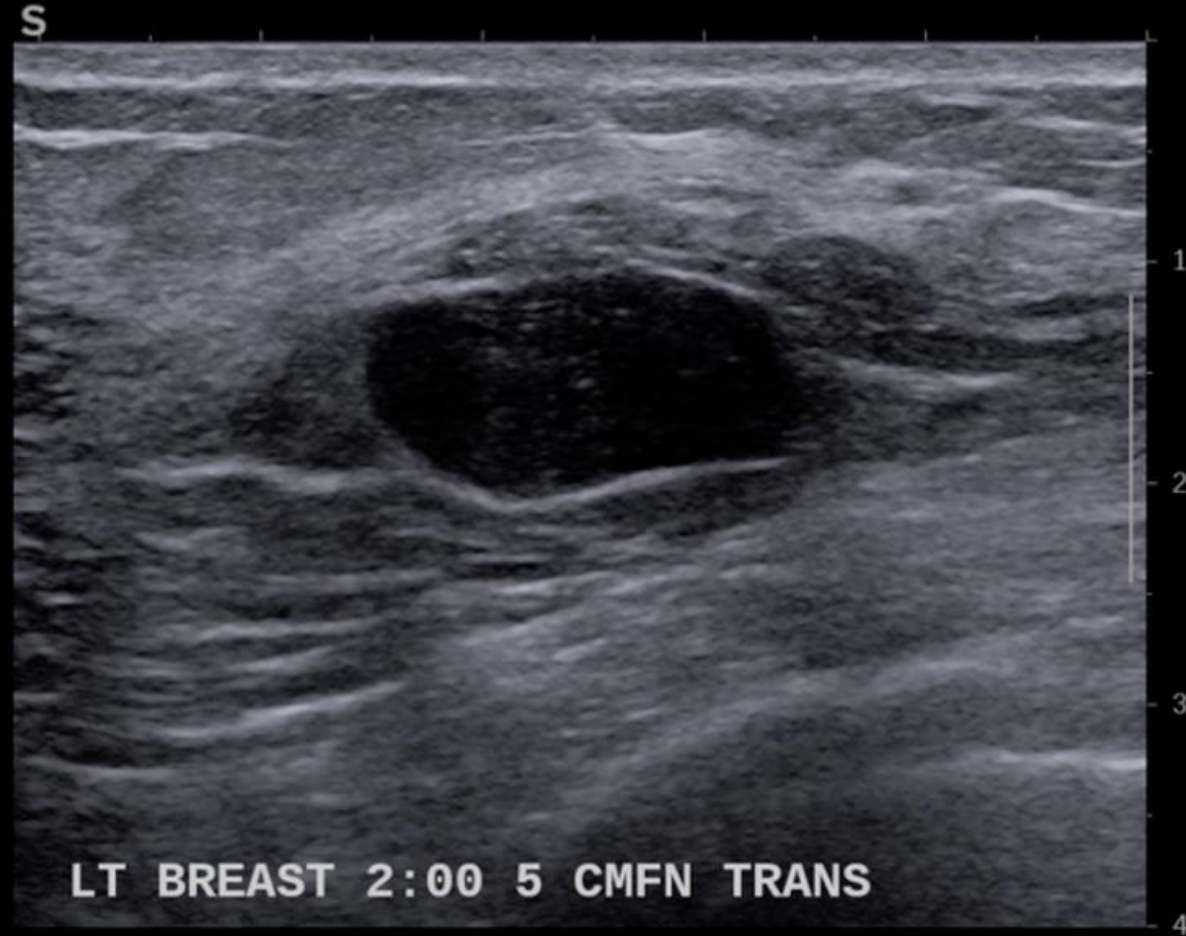
Oval Mass





B
Gen
M 4/70 dB/High
T 1460 m/s
SC/SR 2
G 54 %
Fr. 54 Hz

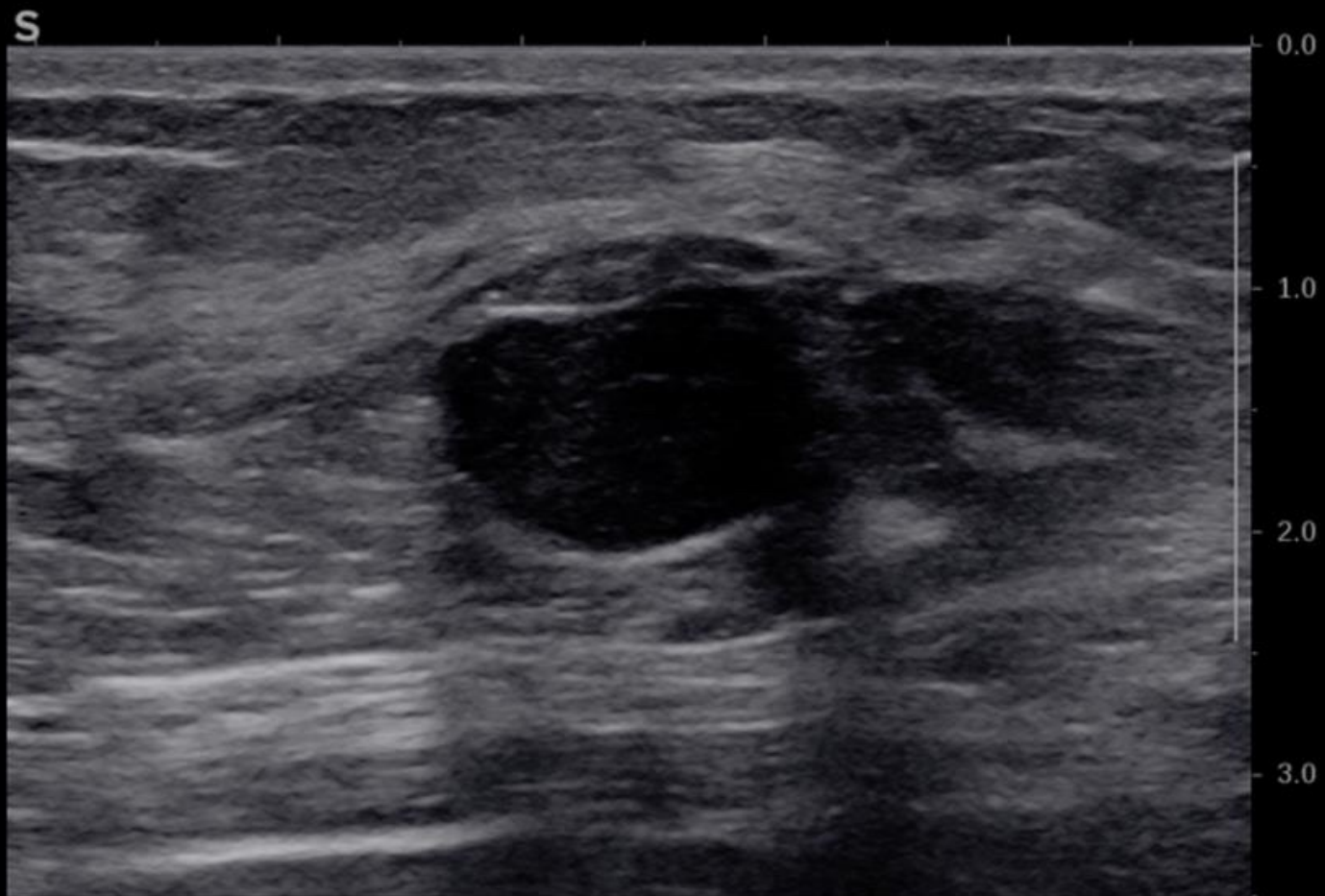
Z 100 %



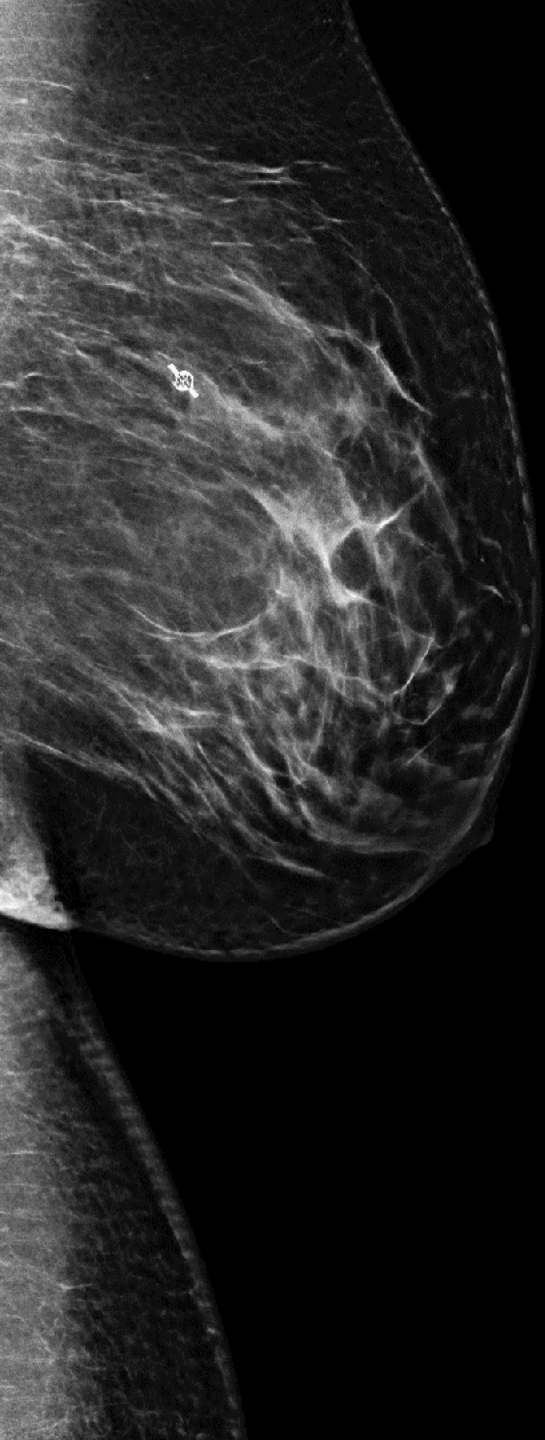
Fr: 306/306

B
Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 50 %
Fr. 52 Hz

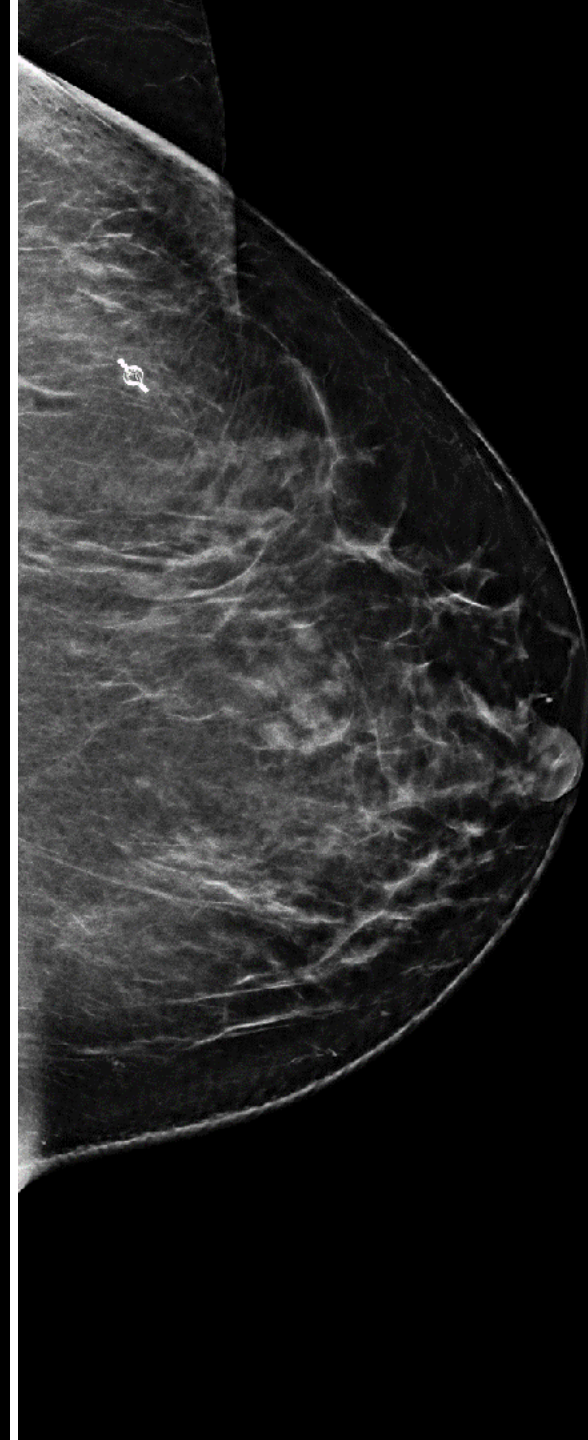
Z 110 %



LT BREAST 2:00 5 CMFN TRANS PRE BX ❄



Intelligent
||| 2D

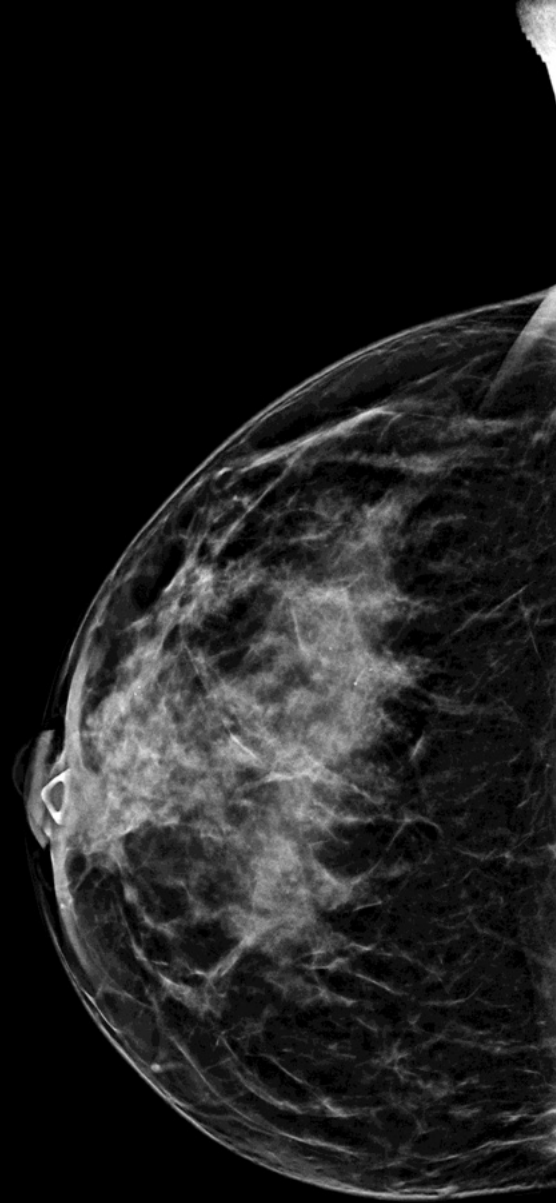




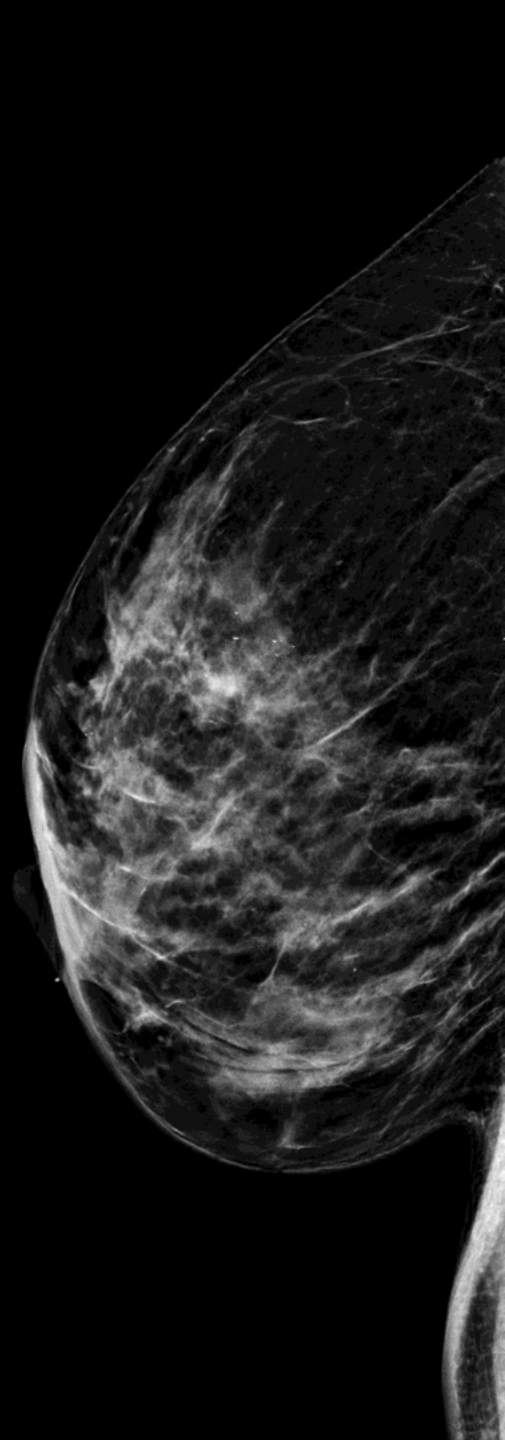
Case 9

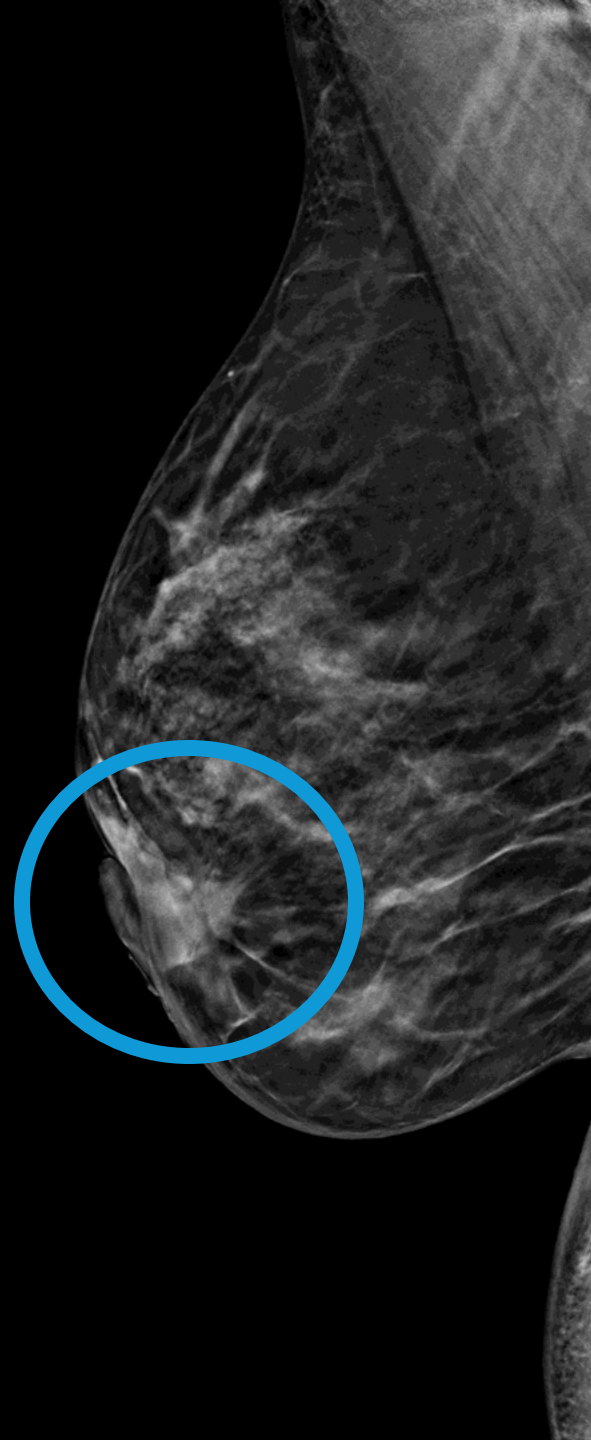
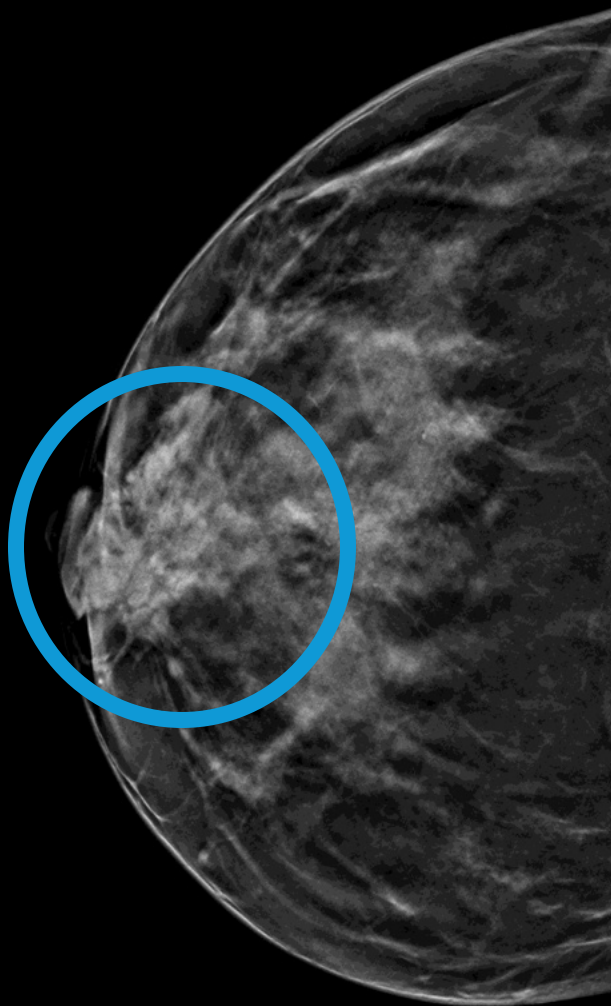
Retroareolar Mass

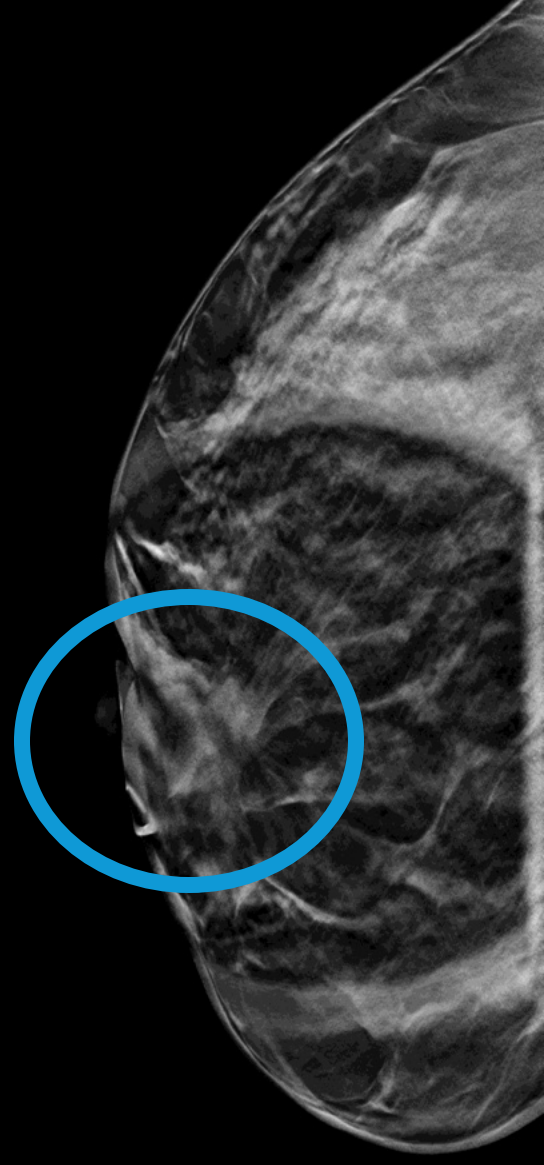
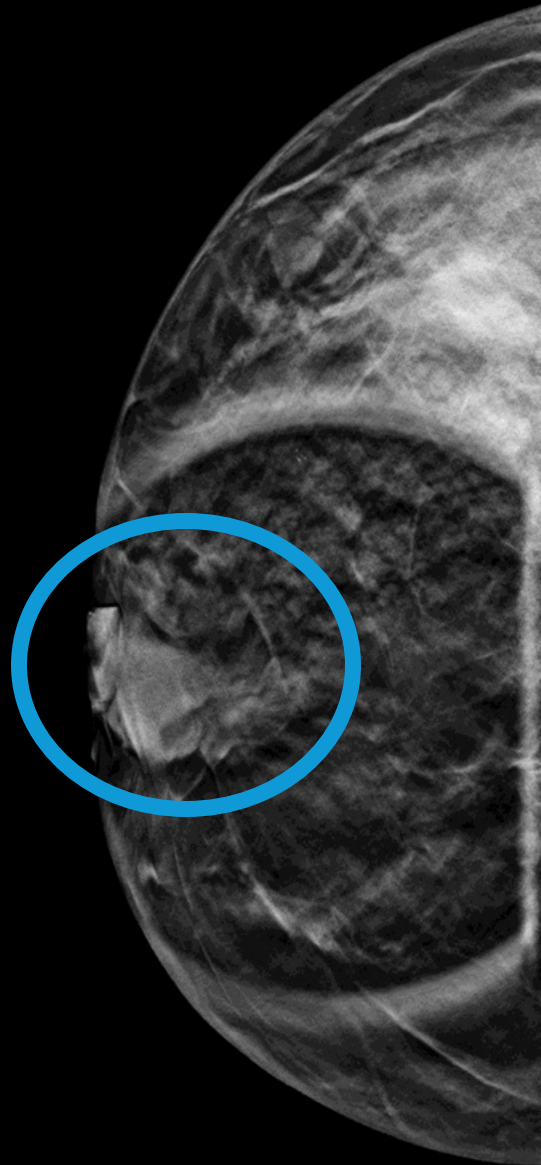
Intelligent
||| 2D™



Intelligent
||| 2D™









B

Res/H

M 7/65 dB/High

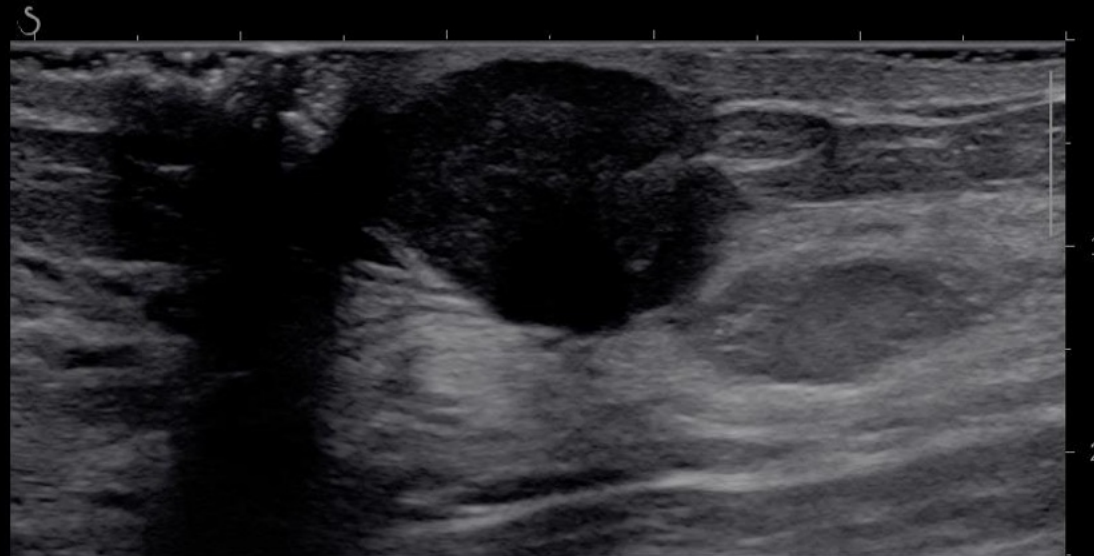
T 1460 m/s

SC/SR 2

G 51 %

Fr. 68 Hz

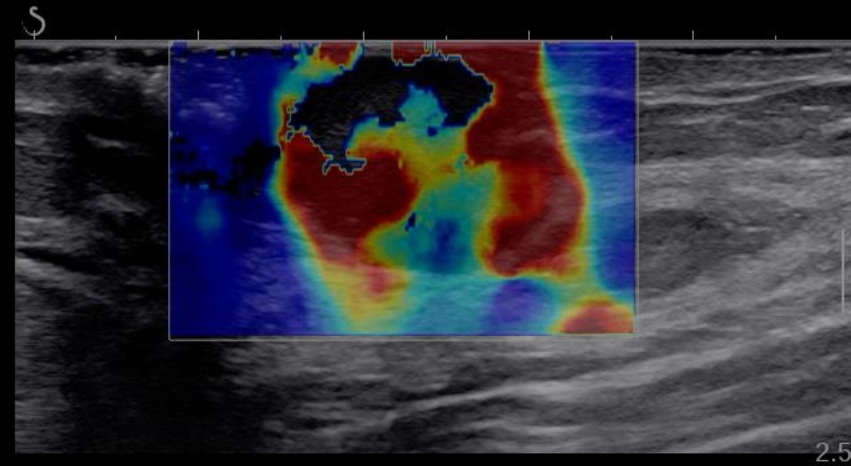
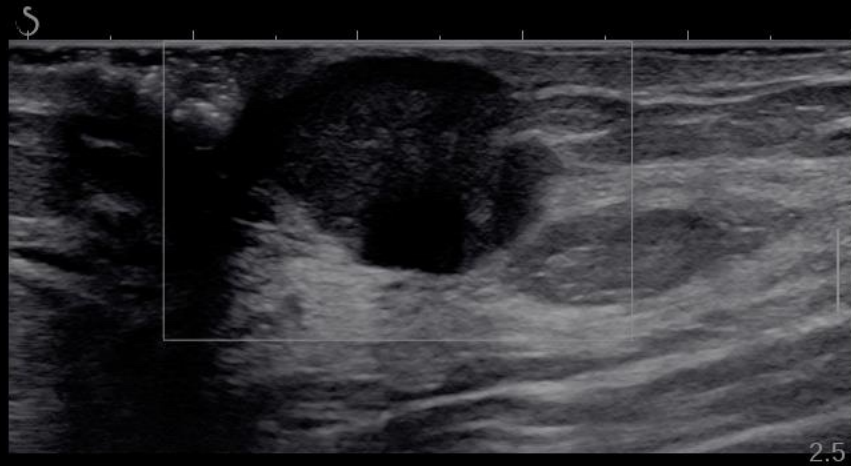
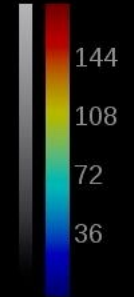
Z 100 %



RT BREAST SA TRANS PALPABLE AREA



≥180 kPa



RT BREAST

SA TRANS PALPABLE

AREA

B

Res/H

M 7/65 dB/High

T 1460 m/s/SC/SR 2

G 46 %/Fr. 19 Hz

Z 100 %

SWE™f [70 - 800] Hz

Pen/1.3 Hz/SWE Bias ⓘ

M 1/Med/Compression ⓘ

S 5/O 50 %/G 90 %

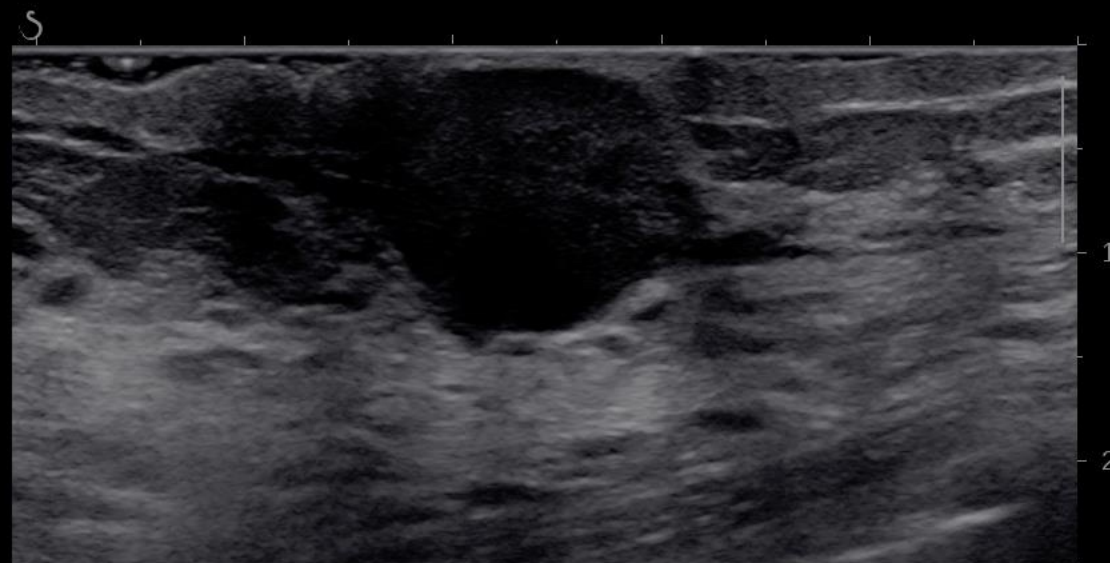
Fr: 39/39



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 49 %
Fr. 68 Hz

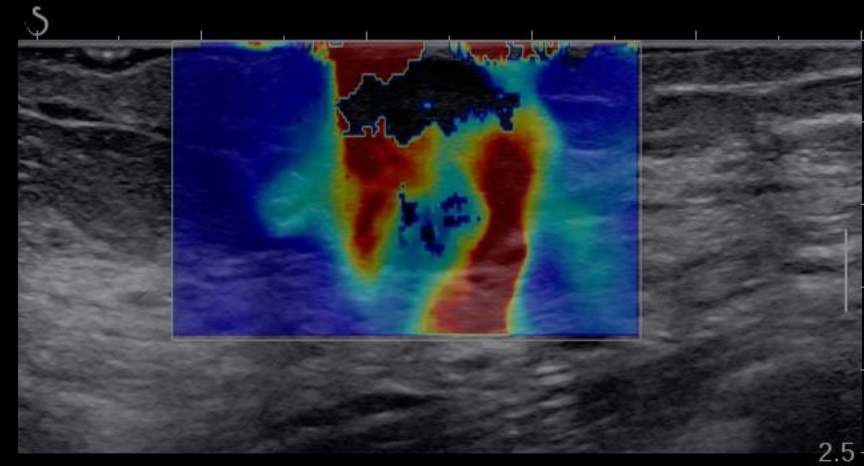
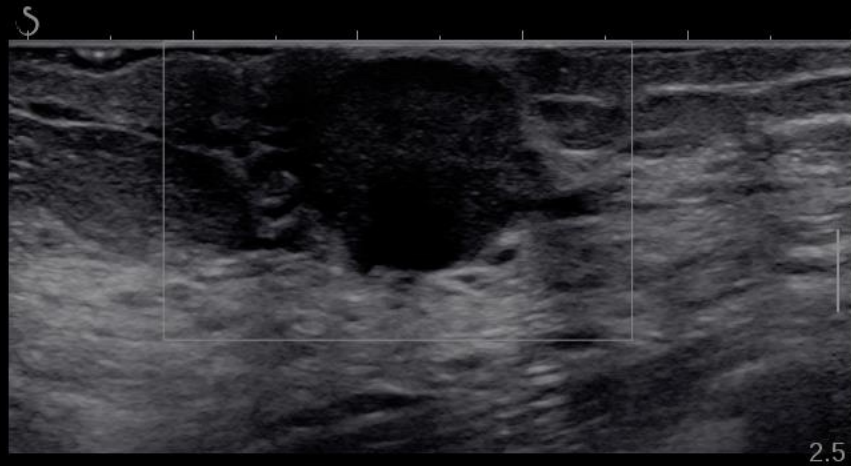
Z 100 %



RT BREAST SA LONG PALPABLE AREA



≥180 kPa



RT BREAST SA LONG PALPABLE AREA

Fr: 102/102

B
Res/H
M 7/65 dB/High
T 1460 m/s/SC/SR 2
G 44 %/Fr. 19 Hz

Z 100 %

SWE™f [70 - 800] Hz
Pen/1.3 Hz/SWE Bias ⓘ
M 1/Med/Compression ⓘ
S 5/O 50 %/G 90 %



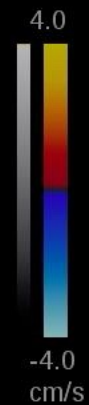
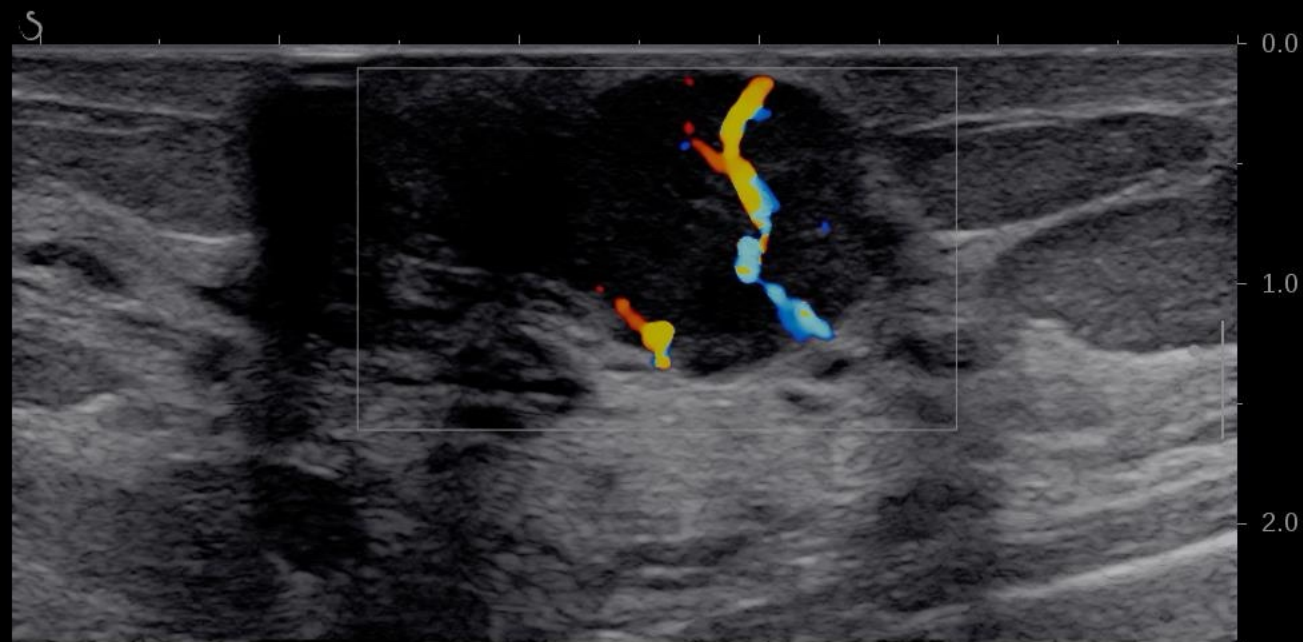
B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 44 %
Fr. 18 Hz

CFI

Gen/Med
Off/WF Med
M 5/P. Med
Scale 4 cm/s
S 3
G 70 %

Z 115 %



RT BREAST SA OBLIQUE Dr SSF



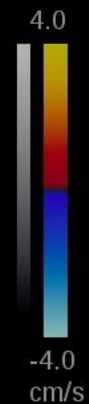
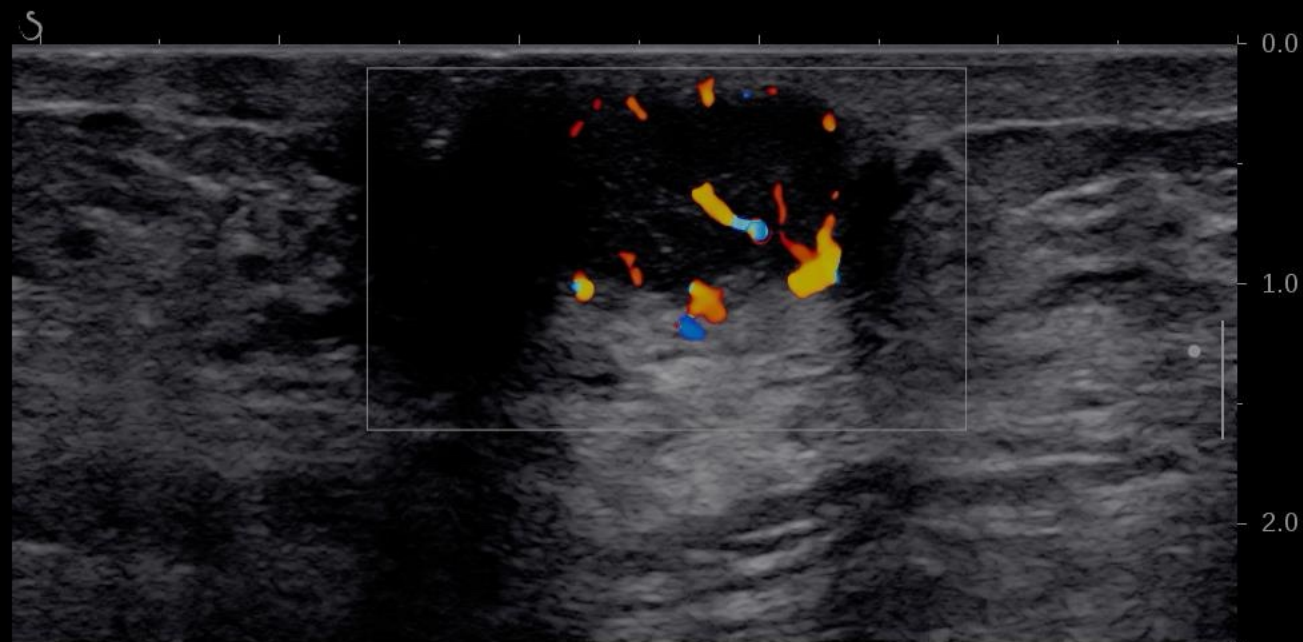
B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 44 %
Fr. 18 Hz

CFI

Gen/Med
Off/WF Med
M 5/P. Med
Scale 4 cm/s
S 3
G 70 %

Z 115 %

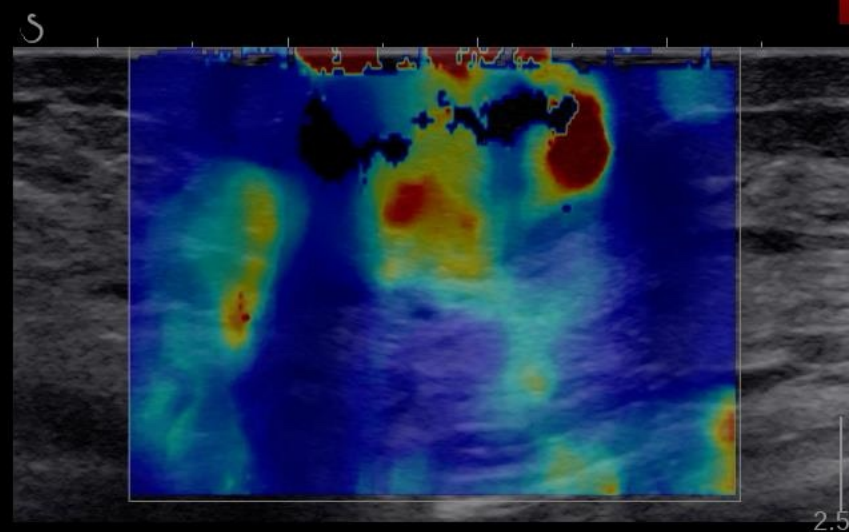
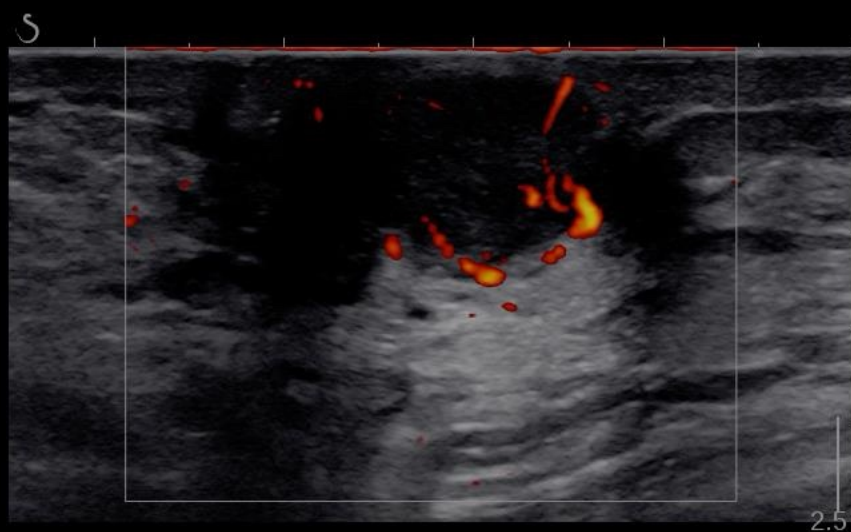
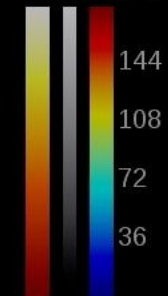


RT BREAST SA LONG

Dr SSF



≥180 kPa



Fr: 25/32

RT BREAST SA LONG

Res/H
M 7/65 dB/High
T 1460 m/s/SC/SR 2
G 43 %/Fr. 7 Hz

Dr SSF

COH/CM
Fr. 8 Hz
G 80 %
Scale 4.0 cm/s

SWE™f [70 - 800] Hz
Pen/0.7 Hz/SWE Bias **i**
M 1/Med/Compression **i**
S 5/O 50 %/G 90 %

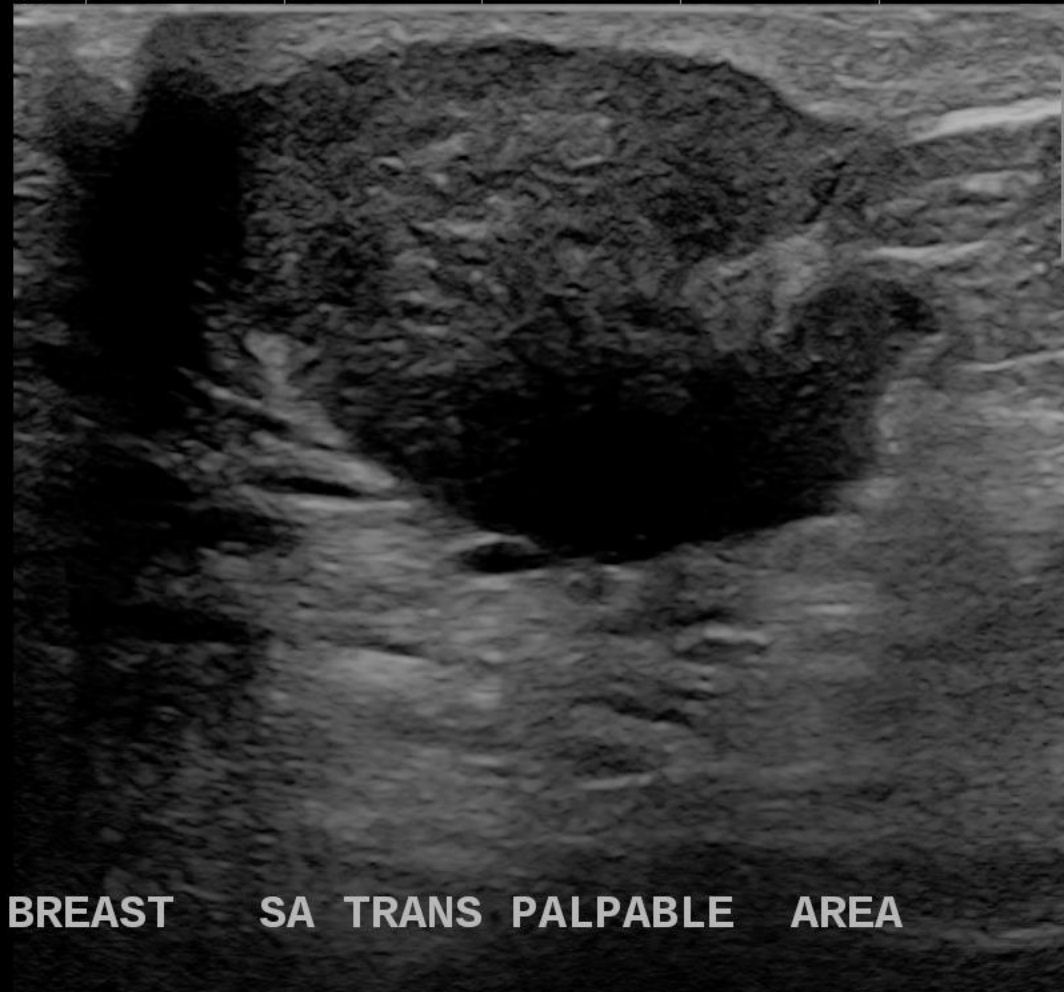


B

Res
M 10/63 dB/Low
T 1480 m/s
SC/SR 4
G 67 %
Fr. 59 Hz

Z 100 %

S



RT BREAST SA TRANS PALPABLE AREA

1

2





B

Res

M 10/63 dB/Low

T 1480 m/s

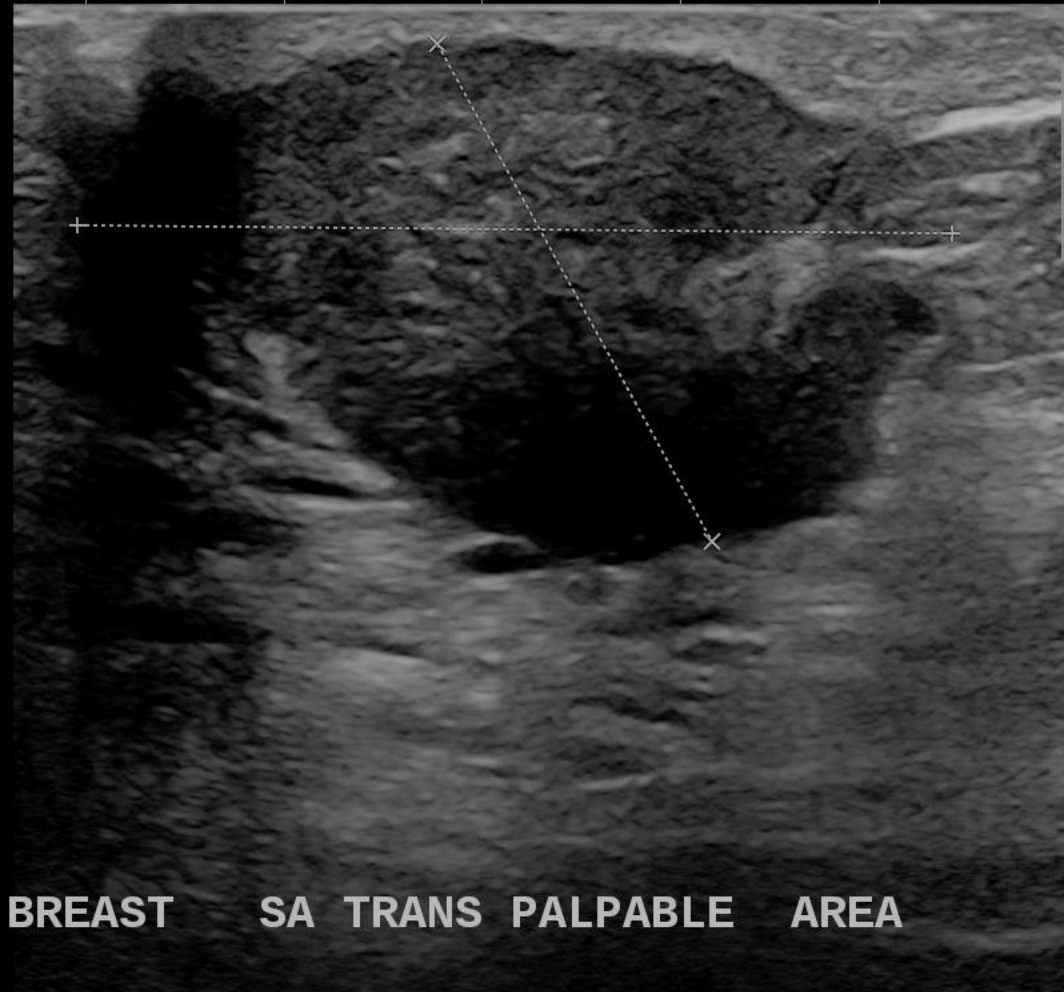
SC/SR 4

G 67 %

Fr. 59 Hz

Z 100 %

S



+Dist 2.21 cm

1 XDist 1.43 cm

2

RT BREAST SA TRANS PALPABLE AREA





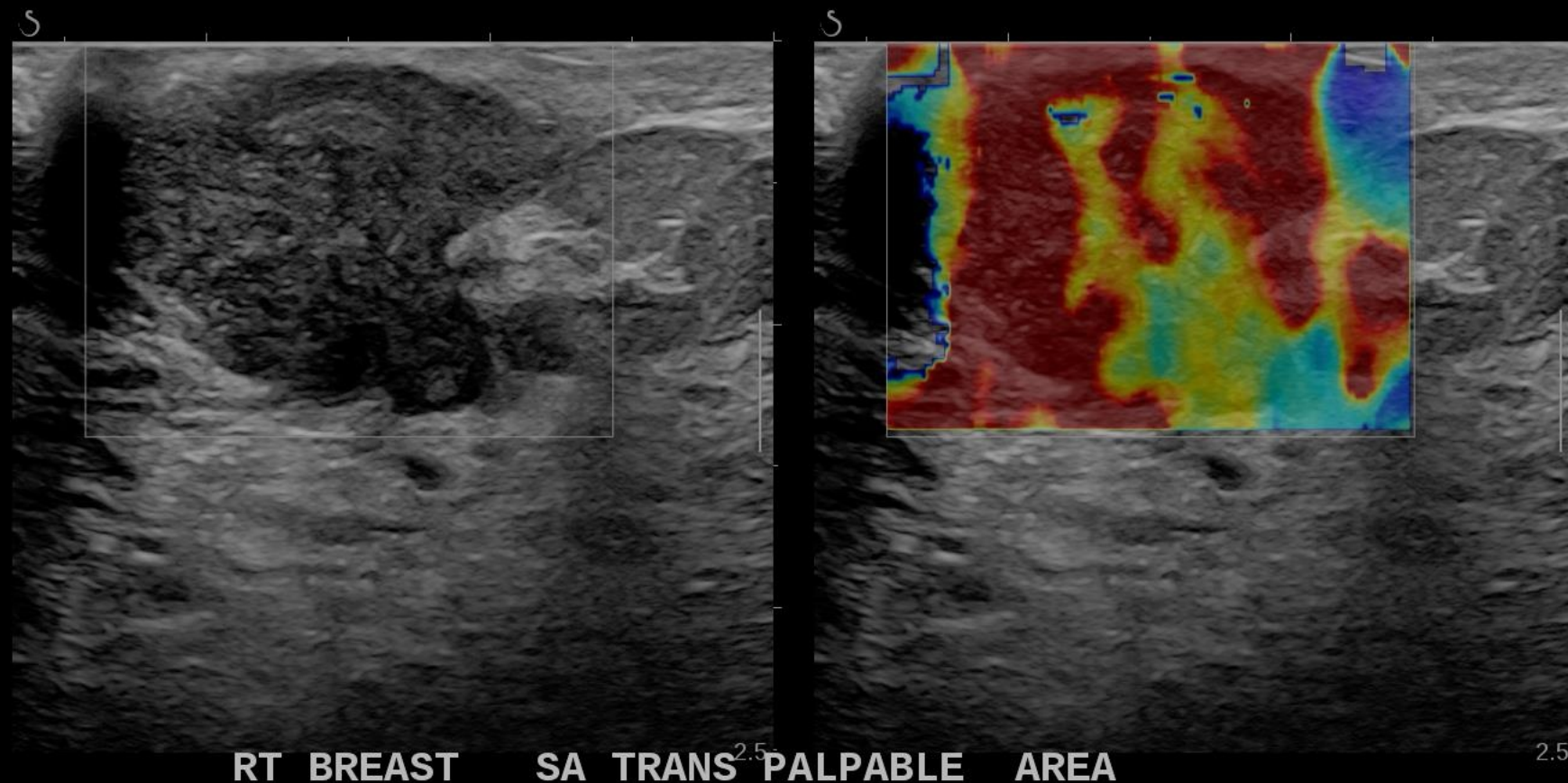
≥180 kPa

144

108

72

36



B

Res

M 10/63 dB/Low

T 1480 m/s/SC/SR 4

G 60 %/Fr. 19 Hz

Z 100 %

SWE™f [70 - 800] Hz

Pen/2.0 Hz/SWE Bias *i*

M 1/Med/Compression *i*

S 5/O 50 %/G 90 %

Fr: 423/423



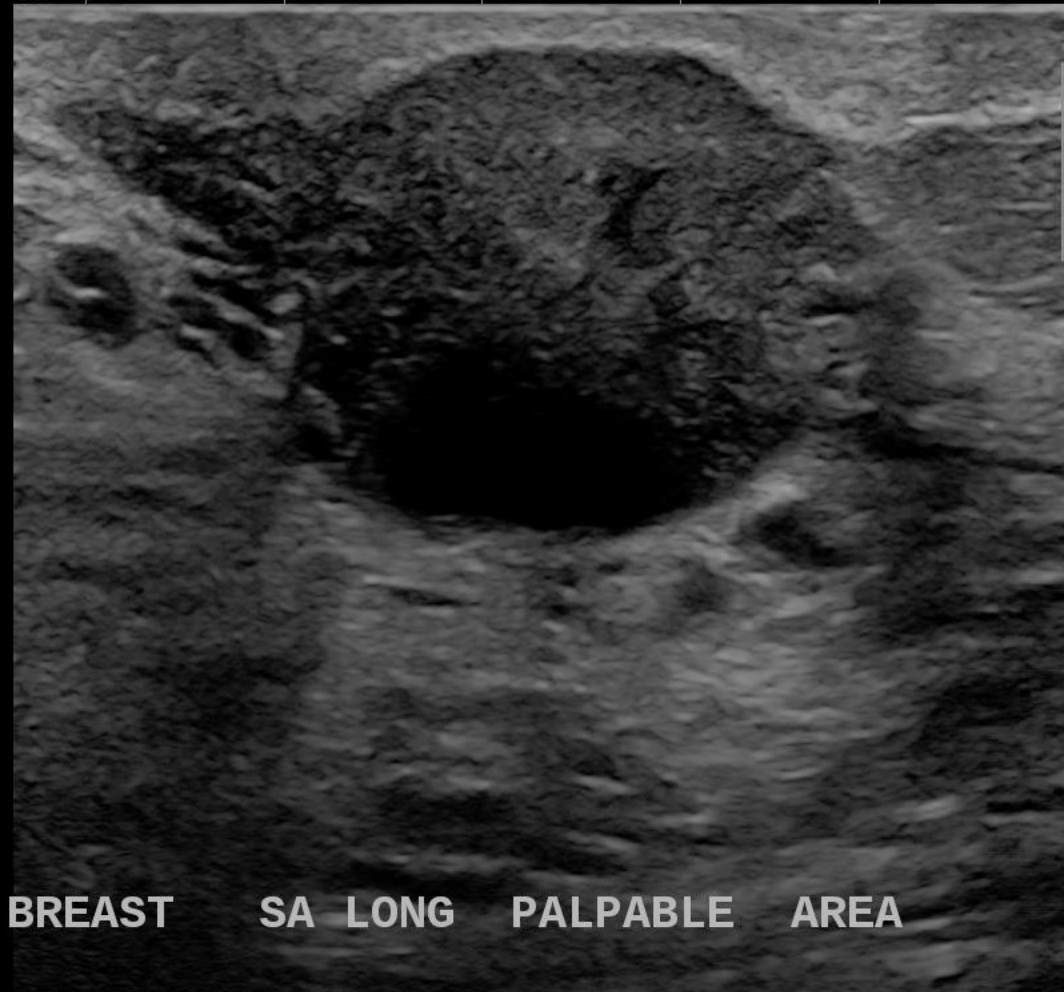


B

Res
M 10/63 dB/Low
T 1480 m/s
SC/SR 4
G 66 %
Fr. 59 Hz

Z 100 %

S



RT BREAST SA LONG PALPABLE AREA





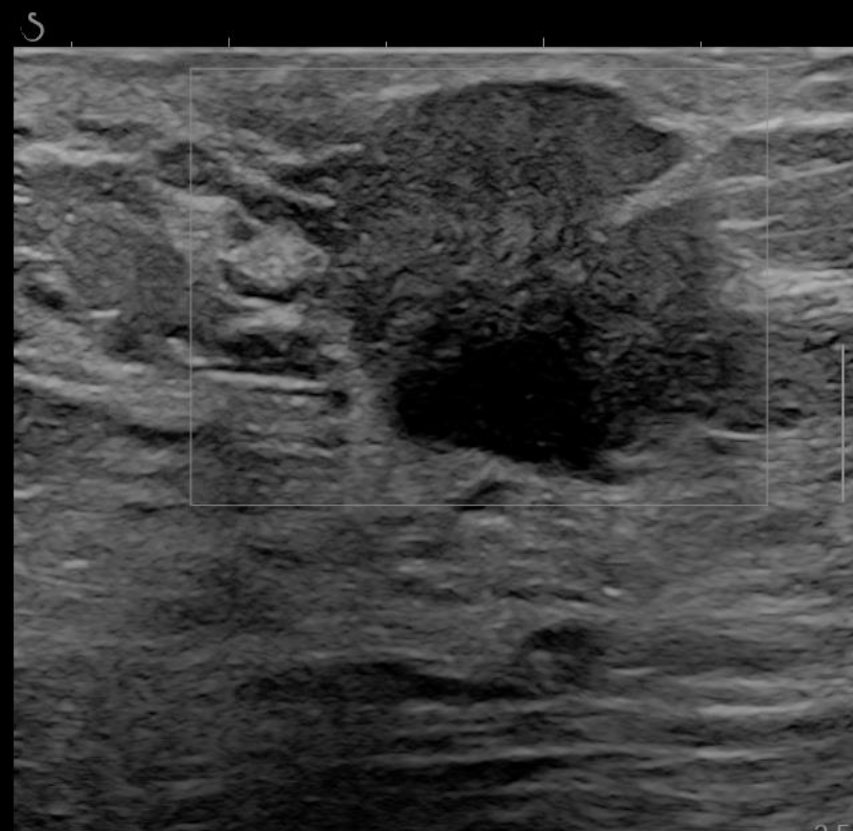
≥180 kPa

144

108

72

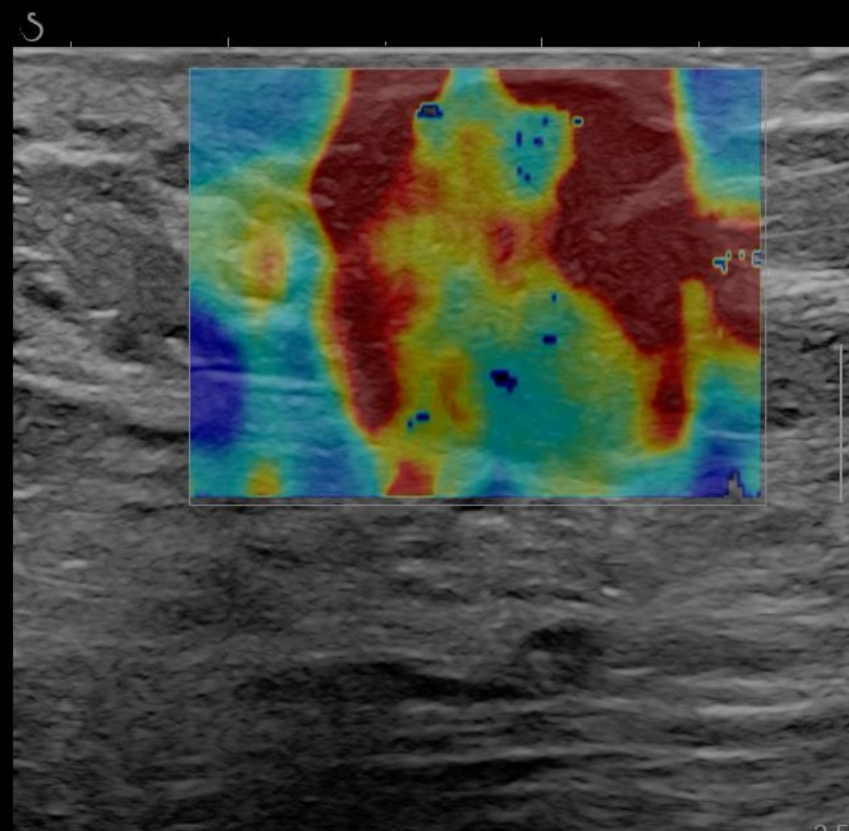
36



RT BREAST

SA LONG

2.5



PALPABLE

AREA

2.5



Fr: 118/118

B

Res

M 10/63 dB/Low

T 1480 m/s/SC/SR 4

G 59 %/Fr. 19 Hz

Z 100 %

SWE™f [70 - 800] Hz

Pen/2.0 Hz/SWE Bias *i*

M 1/Med/Compression *i*

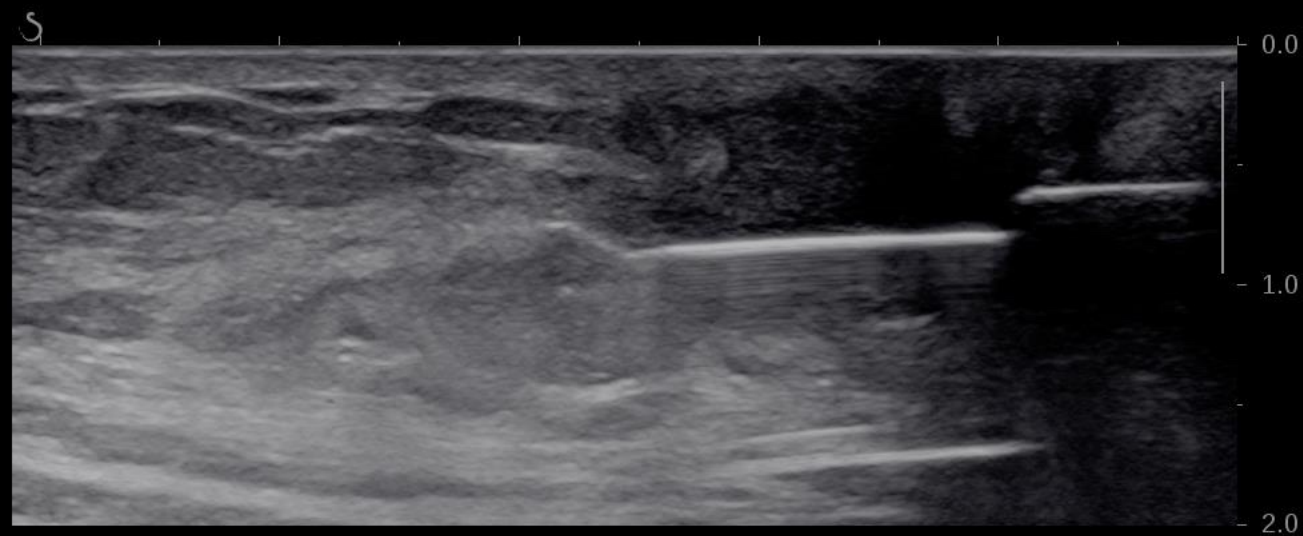
S 5/O 50 %/G 90 %



B

Res/H
M 7/65 dB/High
T 1460 m/s
SC/SR 2
G 52 %
Fr. 68 Hz

Z 115 %



RT BREAST SA TRANS Dr SSF BX



B

Res/H

M 7/65 dB/High

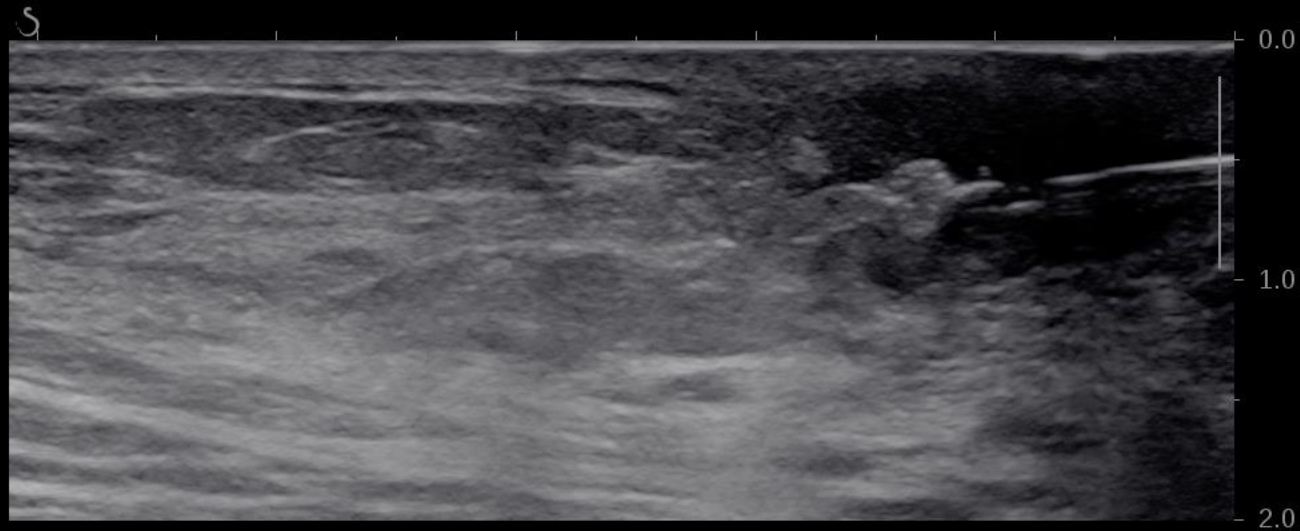
T 1460 m/s

SC/SR 2

G 52 %

Fr. 68 Hz

Z 115 %



RT BREAST SA TRANS Dr SSF POST BX CLIP



CLINICAL INFORMATION

45 year-old female with 2 cm solid mass, right breast, subareolar region.

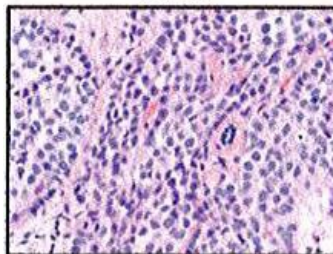
Imaging impression: Infiltrating mammary carcinoma versus papilloma.

DIAGNOSIS:

Right breast mass, subareolar, ultrasound guided core needle biopsy:

Invasive mammary carcinoma, moderately differentiated (grade 2 of 3).

H&E



Favorable



Unfavorable

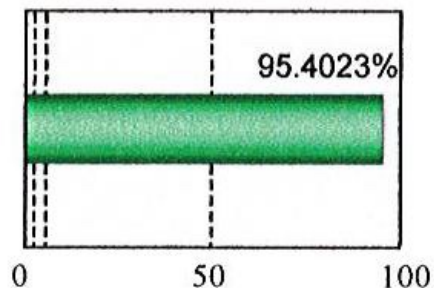
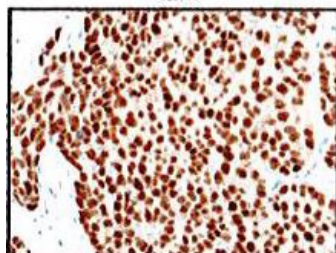


Equivocal

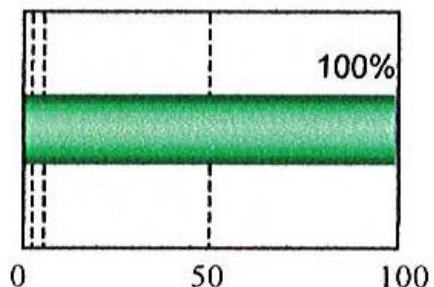
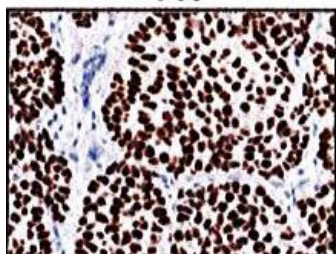
ASSAY RESULTS

Test Name Assay Type	Analysis Average		Interpretation
ER	Percent Positive:	95.4023%	POSITIVE
PR	Percent Positive:	100%	POSITIVE
Her2/neu	Stain Intensity:	2+	BORDERLINE
Ki-67	Percent Positive:	58%	POSITIVE

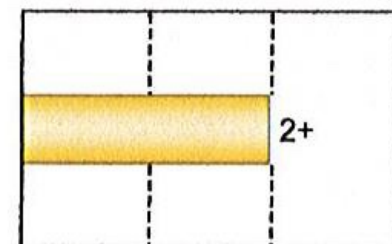
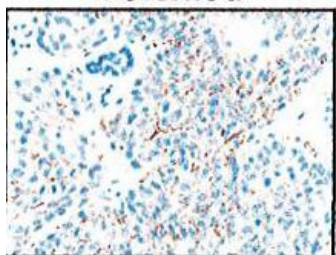
ER



PR



Her2/neu



Reference Ranges

Test Name	Favorable	Equivocal	Unfavorable
ER	≥ 1.0%		< 1.0%
PR	≥ 1.0%		< 1.0%
Her2/neu*	0+, 1+	2+	3+
Ki-67	≤ 10%	> 10 - ≤ 20%	> 20%

*Her2/neu cases scored 2+ will be reflexed to FISH.

Comments

Received is one paraffin block labeled with the patient's name.
PQRS: 3394F

Total Nottingham Score: 7/9 (Grade II / III)

Nodal Status: N/A

Tumor Diameter: 0.9 cm

HER2 FISH RESULTS: NEGATIVE (see attached report)

ER Intensity: Strong

PR Intensity: Strong

Internal Controls: Adequate

Fixative : Formalin

Duration of fixation >6 and <72 hours?: YES

Estrogen (Roche Clone SP1), Progesterone (DAKO Clone PgR636), HER2 (Roche Clone 4B5)



Thank you



Questions?

Thoroughness is Next To Godliness

- Review the order, prior report and old images
- Make sure your Images are Technically Adequate
 - Is the patient positioned correctly? – use a wedge, raise the arm
 - Have you scanned a large enough area – don't scan a postage stamp
- Optimize technique
 - Focal Zones
 - Depth – show the skin to the chest wall
 - Then zoom in on area of interest
 - Adjust Gray Scale
 - Apply Doppler and other advanced tools
 - Measure in 3 dimensions
 - Label image
 - Number findings