ROLE OF IMAGING IN BREAST CONSERVING SURGERY

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6/3/2022

MRI IN PRE-OPERATIVE SETTING

- Demand for breast-conserving treatment needs pre operative staging of disease.
- Breast MRI is **<u>superior</u>** to MG, US and CBE in determining the size of the primary tumor& additional sites of otherwise occult malignancy.
- Delineation of the extent of disease is **<u>critical</u>** because staging will determine treatment choices and patient outcome.
- MRI in women with newly diagnosed breast cancer influence surgical management by **<u>more extensive primary tumor</u>**, such as the presence of an DCIS around the mass or IDC.
- Preoperative MRI is most useful in:
  - **Large tumors (stage T2 or T3)**
  - **Invasive lobular carcinoma**
  - **Mammographically dense breasts**

MRI IN PRE-OPERATIVE SETTING

- According to studies ,preoperative breast MRI **reduces the incidence of local recurrence** and **more local control.**

- Breast MRI has a high sensitivity for the detection of occult **multifocal**, **multicentric**, or **contralateral tumors**.
  - Multifocal ,multi-centeric (15–27%)
  - Contralateral(3–10%).

- **Extension of primary tumor or satellite lesions to the areola or chest wall (serratus anterior, intercostal muscle, and ribs).**

- **Surgical management should be planned only after tissue sampling and not be based solely on the MRI findings.**

MRI IN PRE-OPERATIVE SETTING

The findings detected on breast MRI and conventional imaging(MG&US) should be carefully discussed by a multidisciplinary team including the radiologist, pathologist, the surgeon, medical oncologist, and the radiation oncologist.

MRI IN PRE-OPERATIVE SETTING

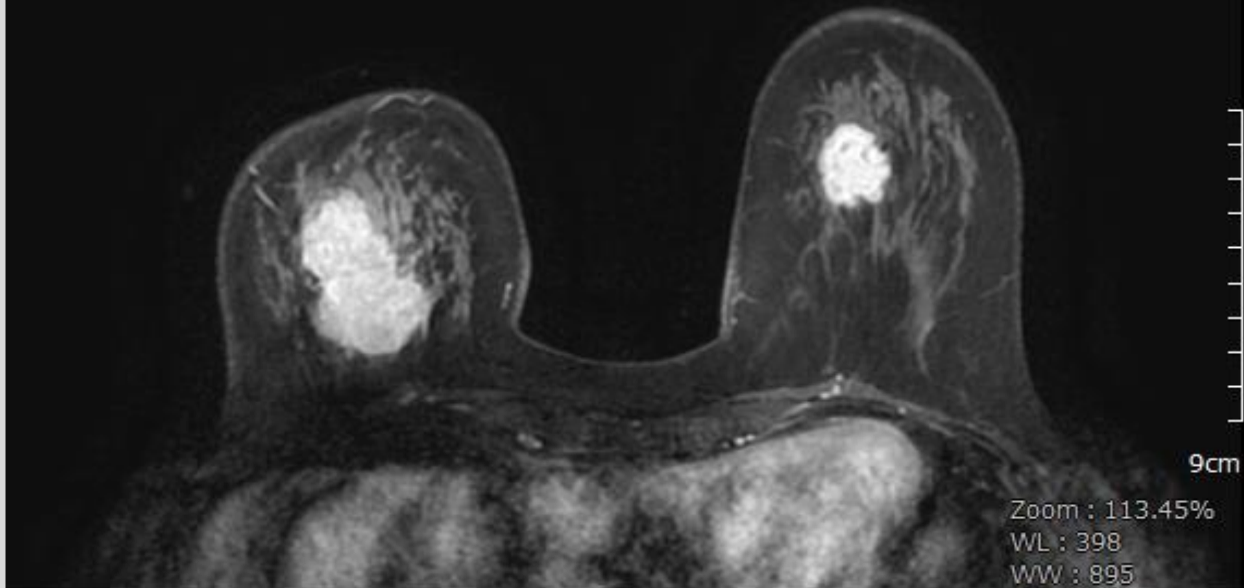
- **The MRI is not indicated:**

  - Change or developing scar in lumpectomy site on MG, : biopsy indicated regardless of the MRI findings.

  - Grouped microcalcifications: Whether suspicious requiring biopsy the decision should made solely on MG not MRI.

➢ Proven DCIS: MRI useful in showing full extent and determining the possible presence of underlying IDC.

- **Suspicious finding in US or MG warrant biopsy**: negative MRI findings should not alter decision for biopsy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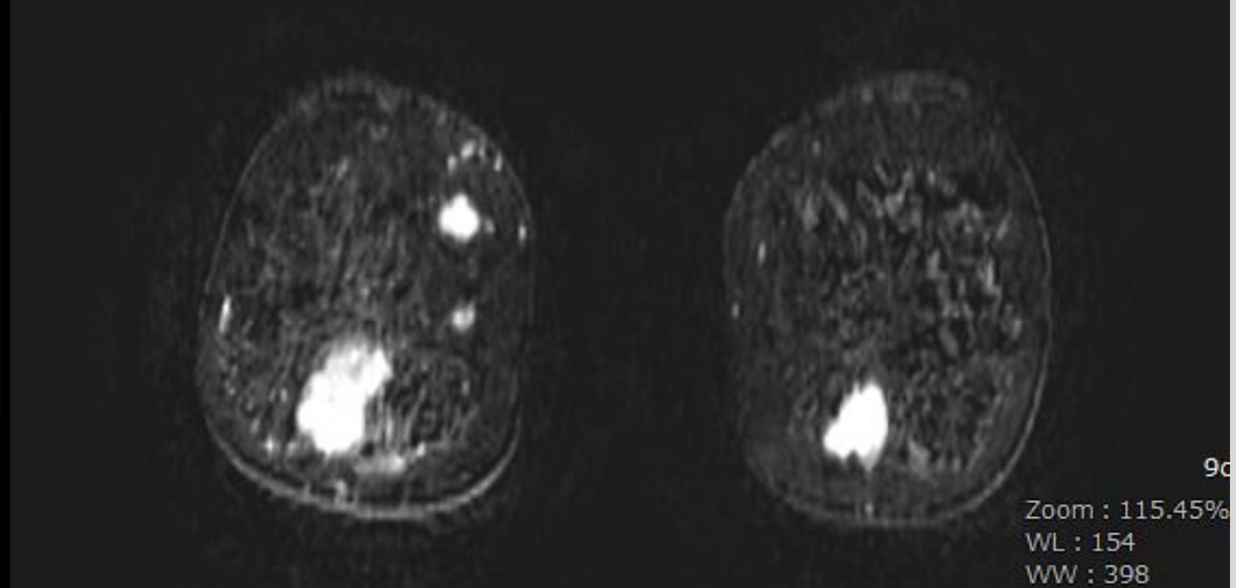
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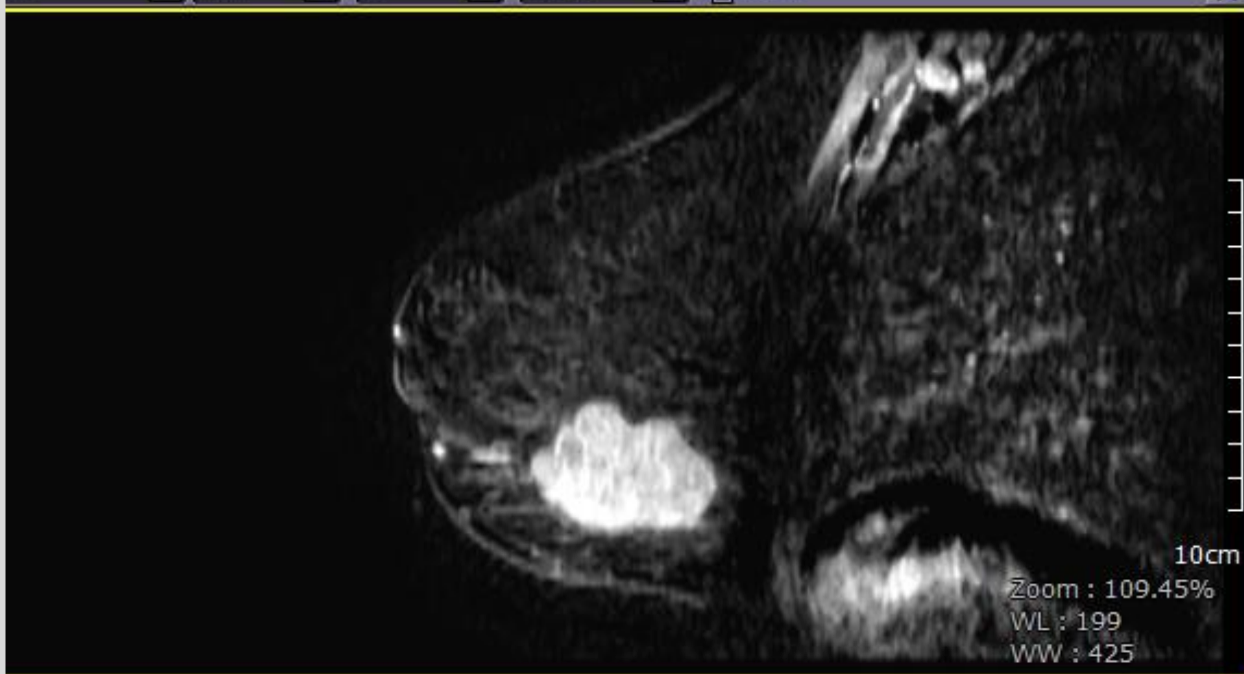
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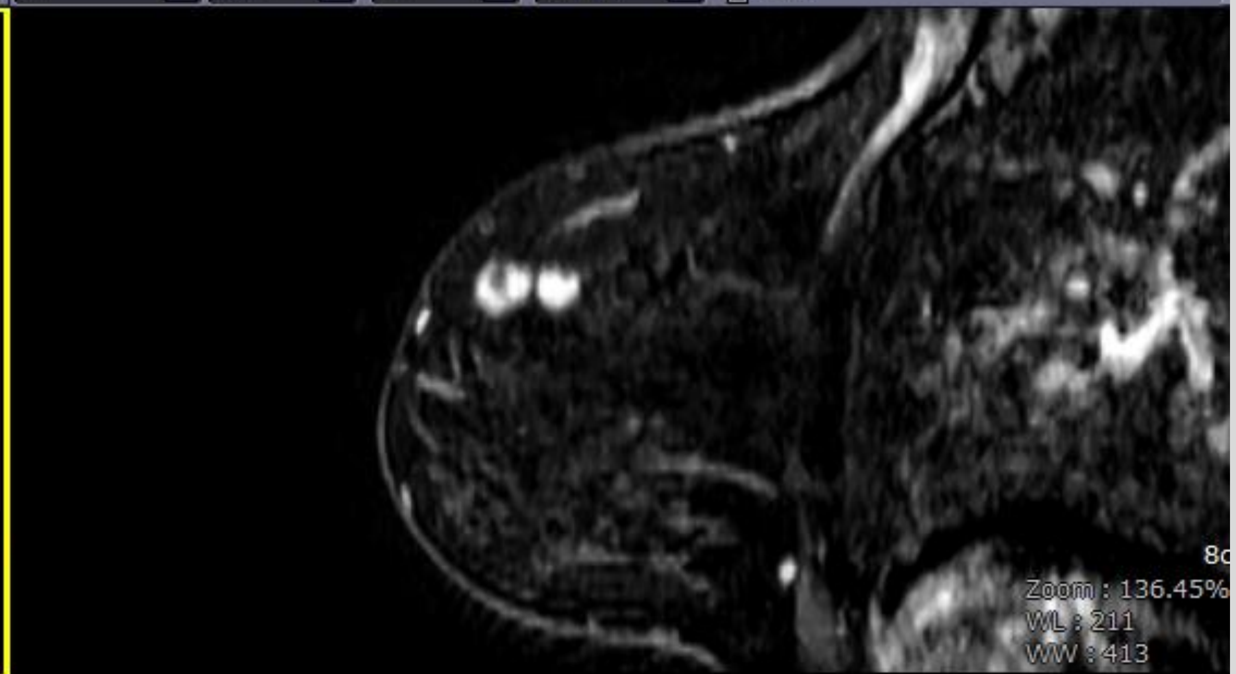
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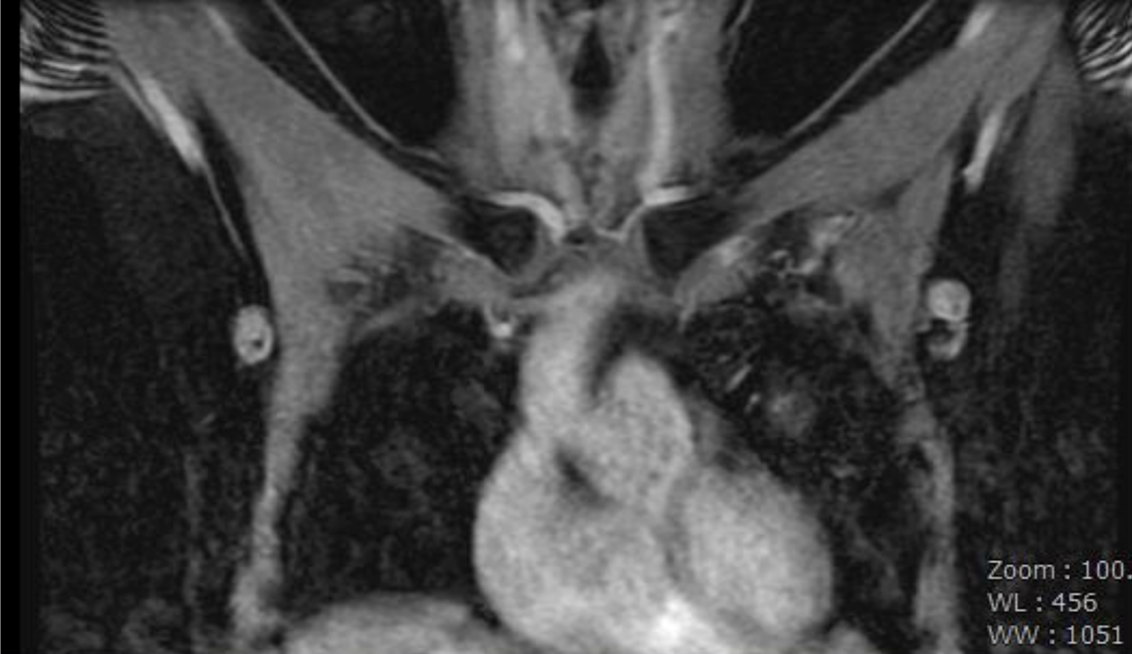
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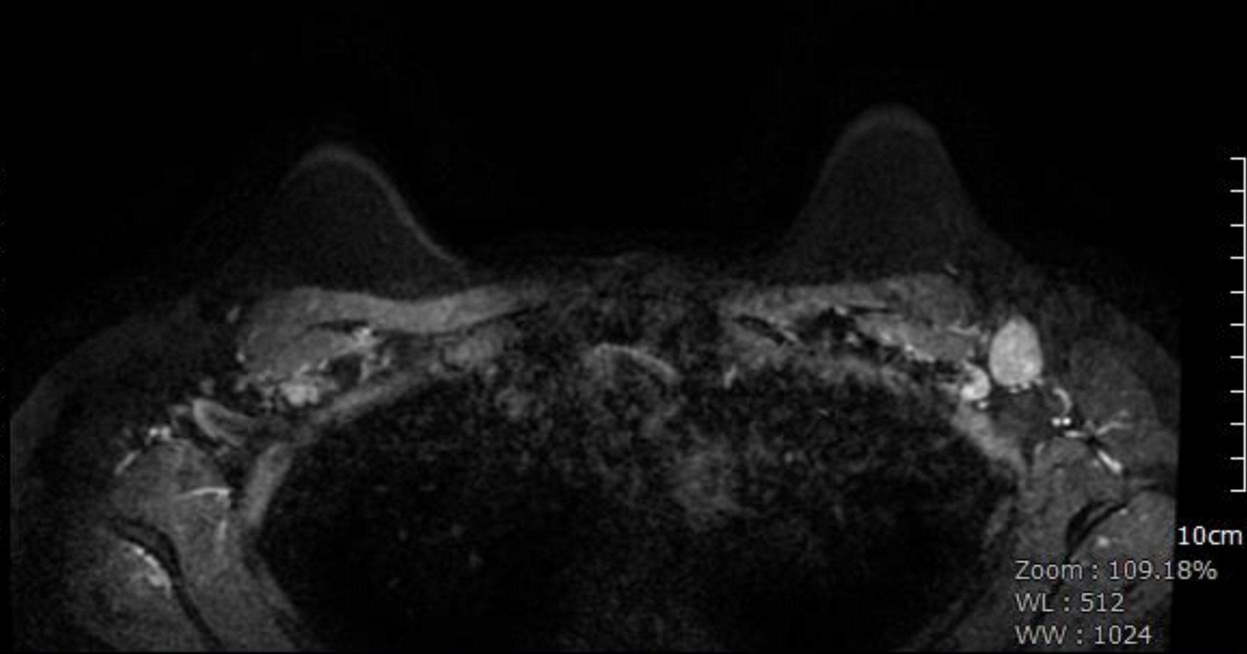
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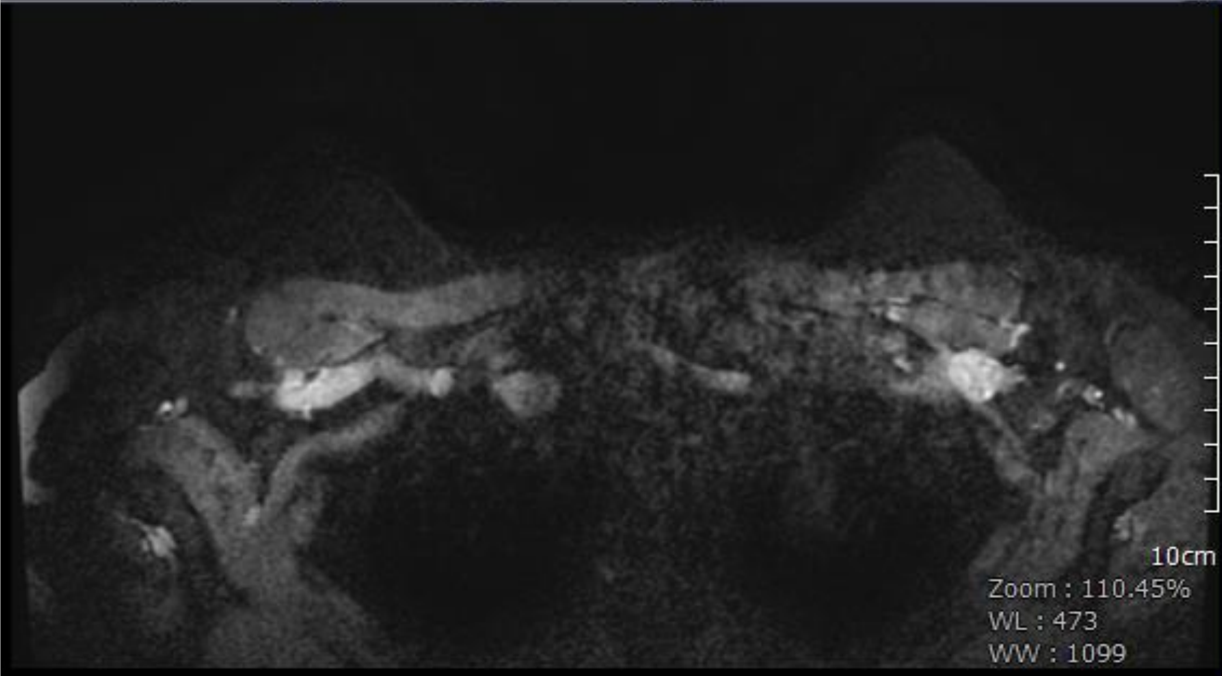
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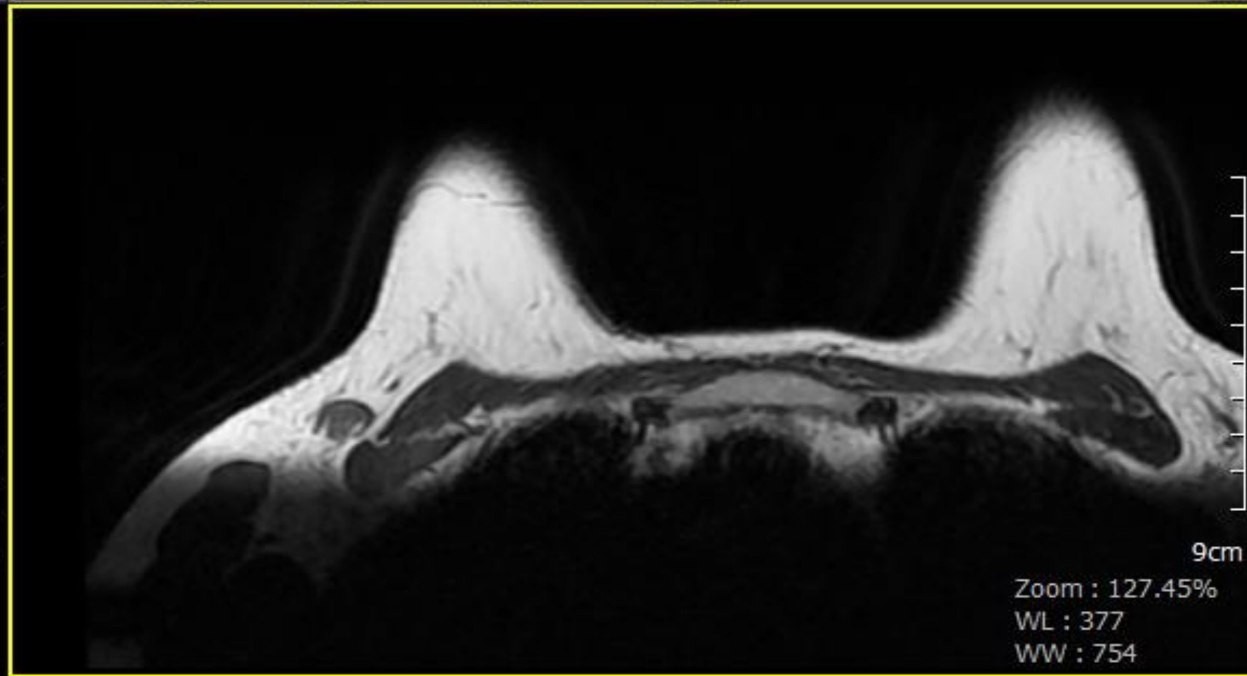
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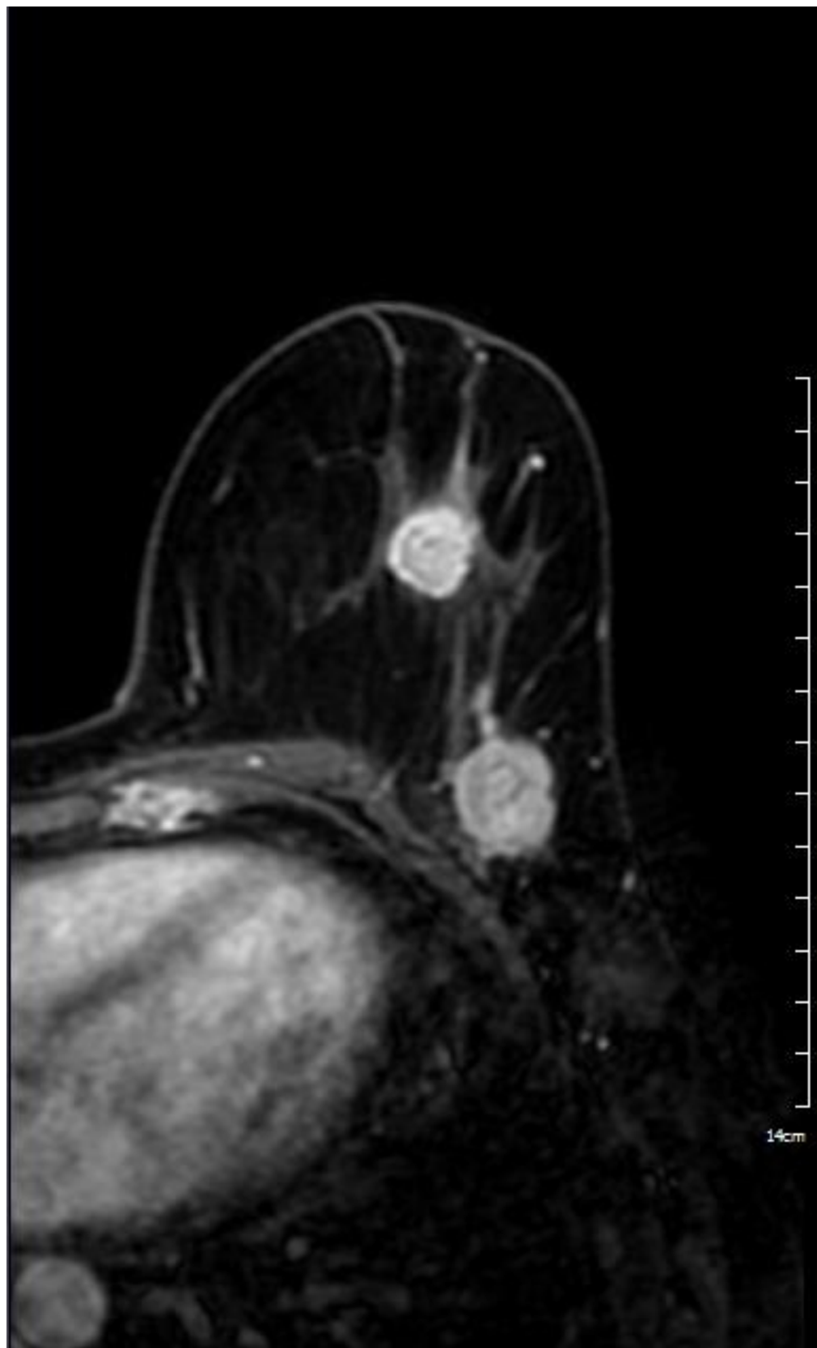
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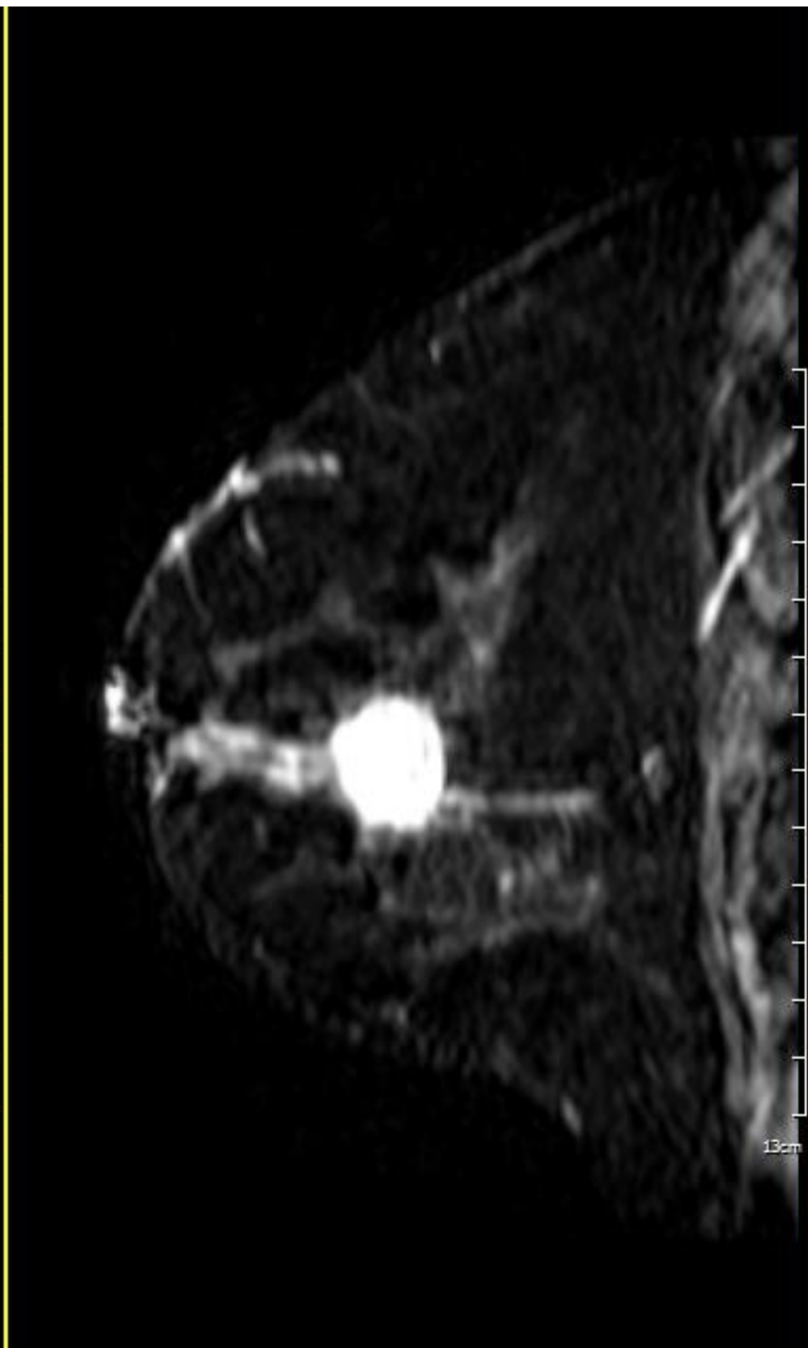
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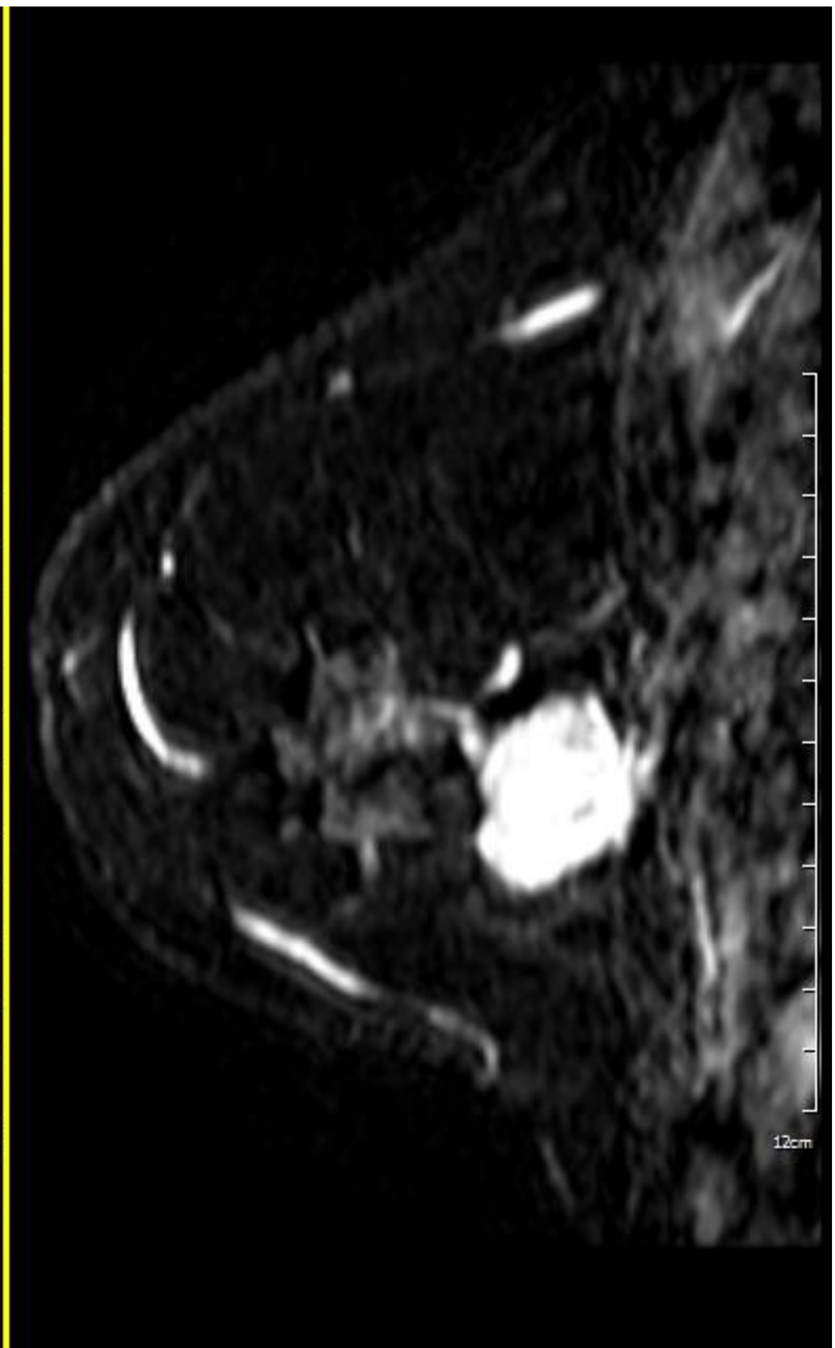
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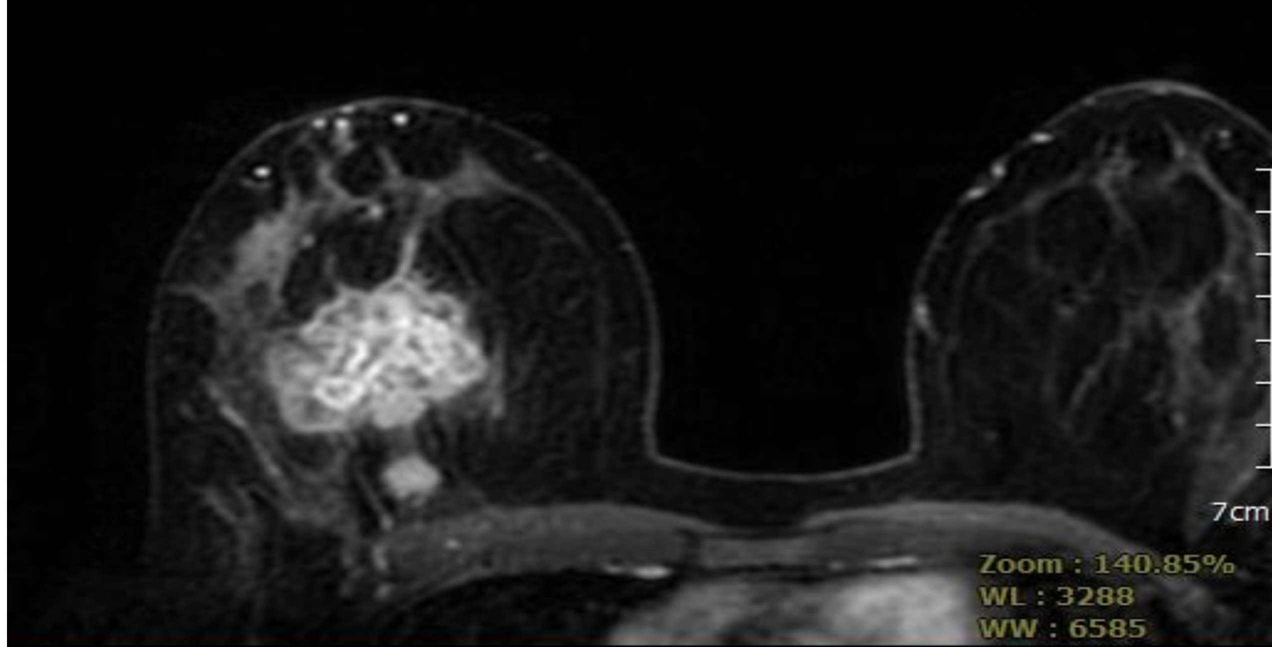

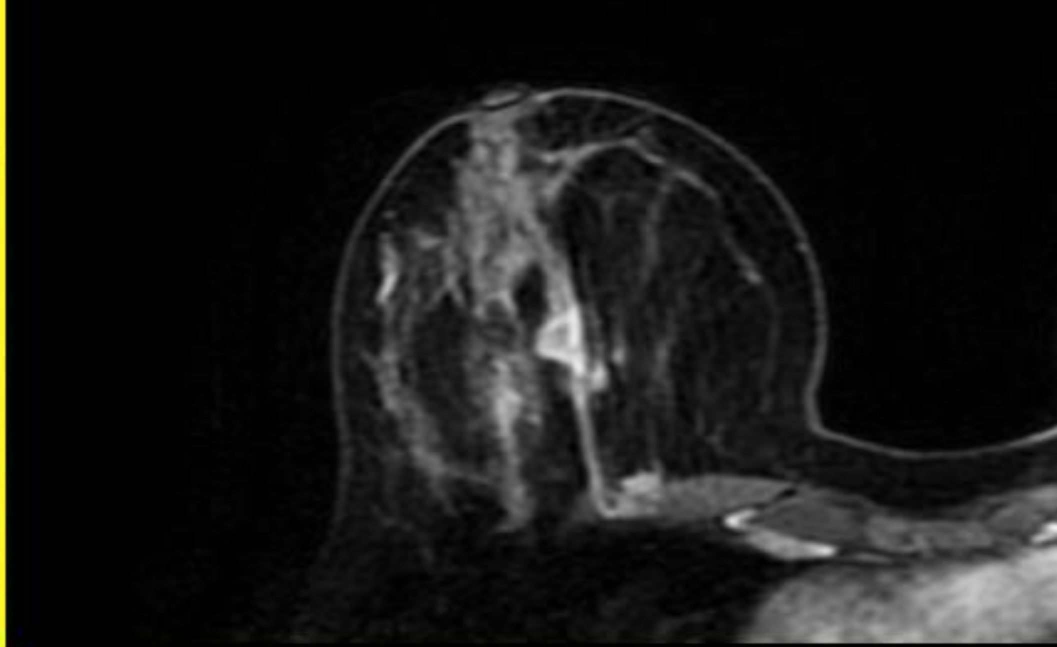

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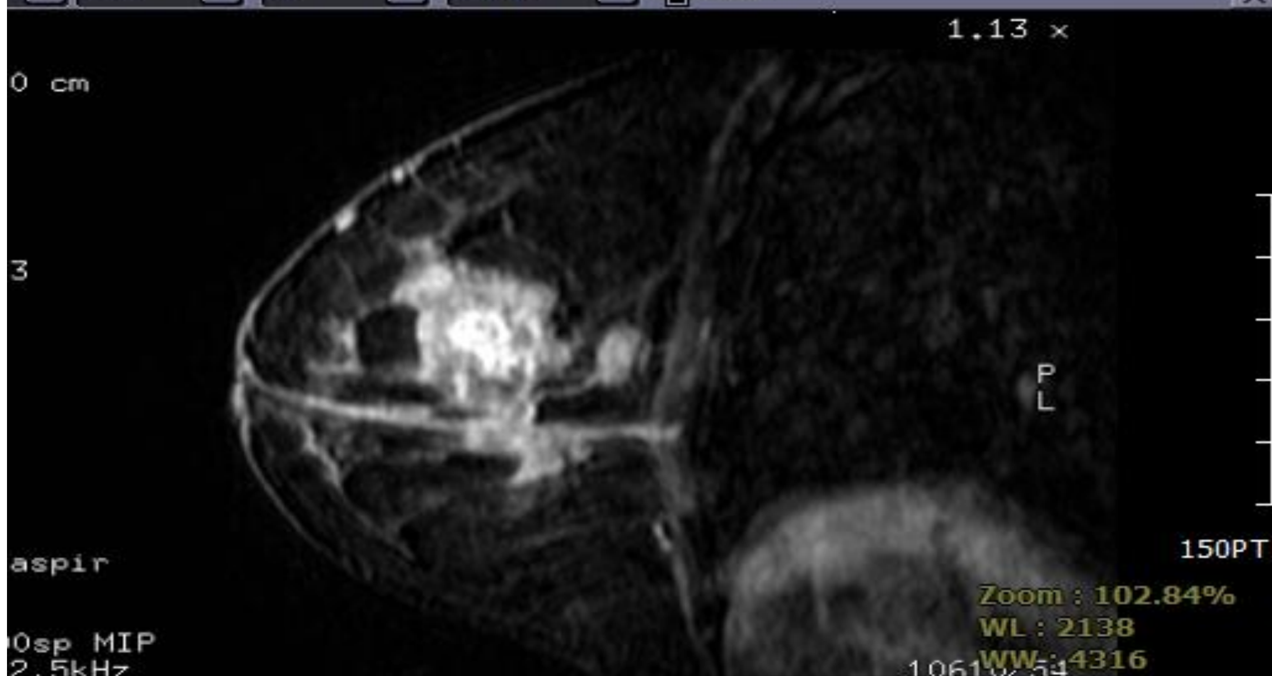

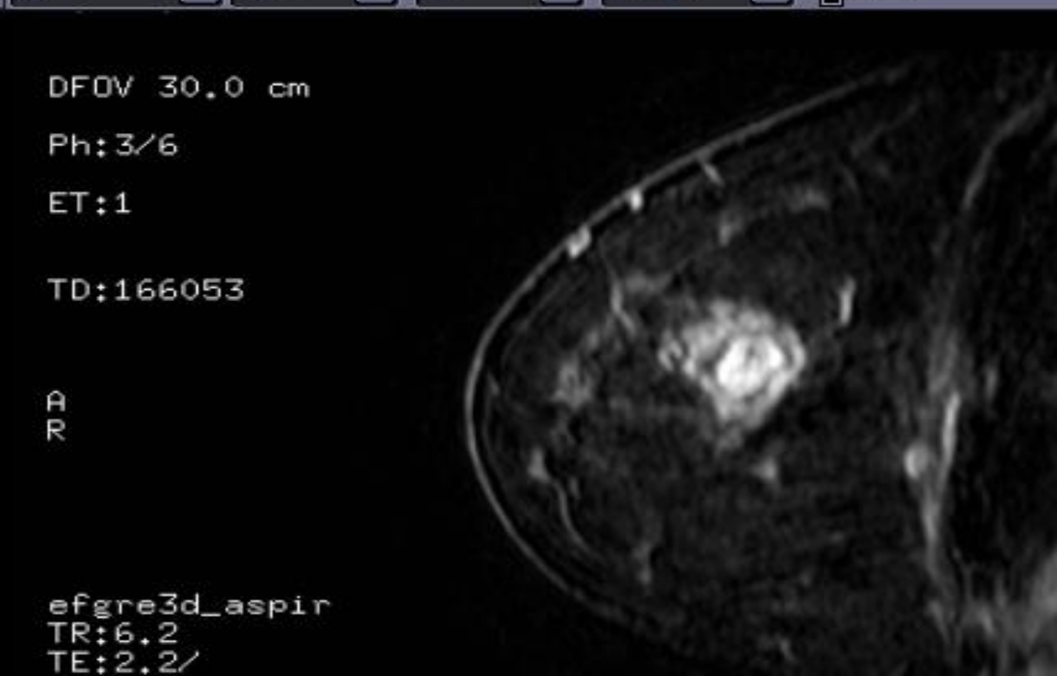

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10cm

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WW : 4096

8cm

Zoom : 20.00%
WL : 2048
WW : 4096

Zoom
WL :
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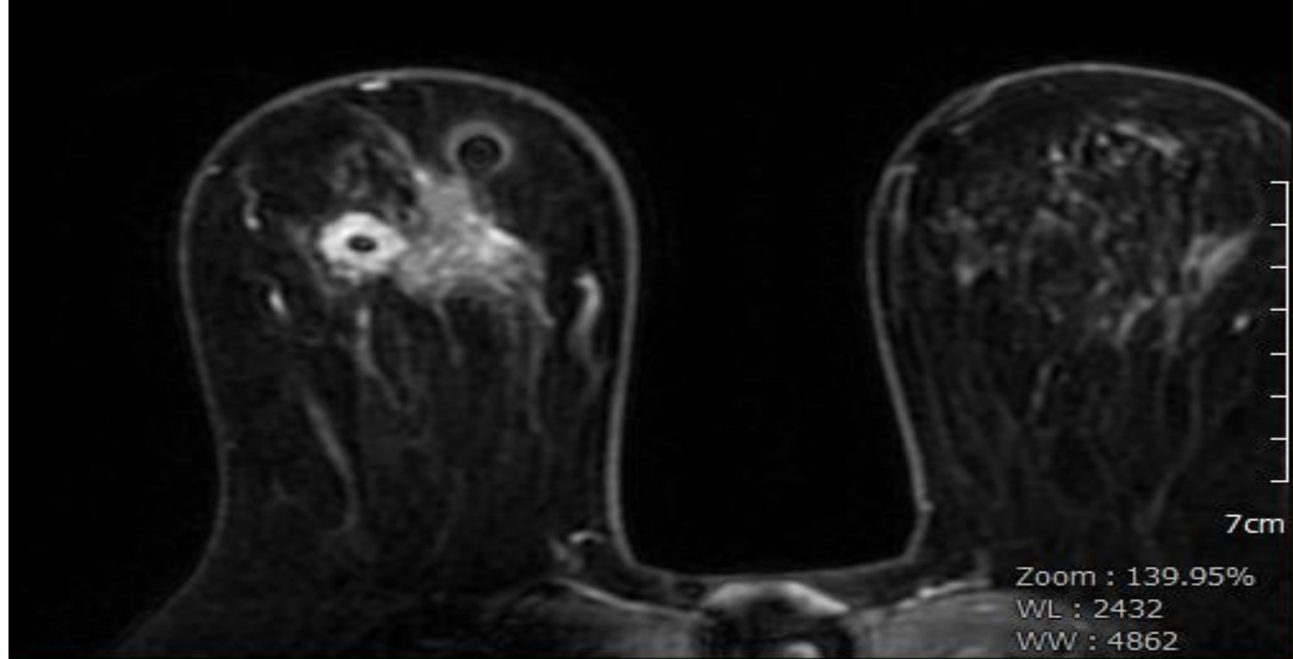

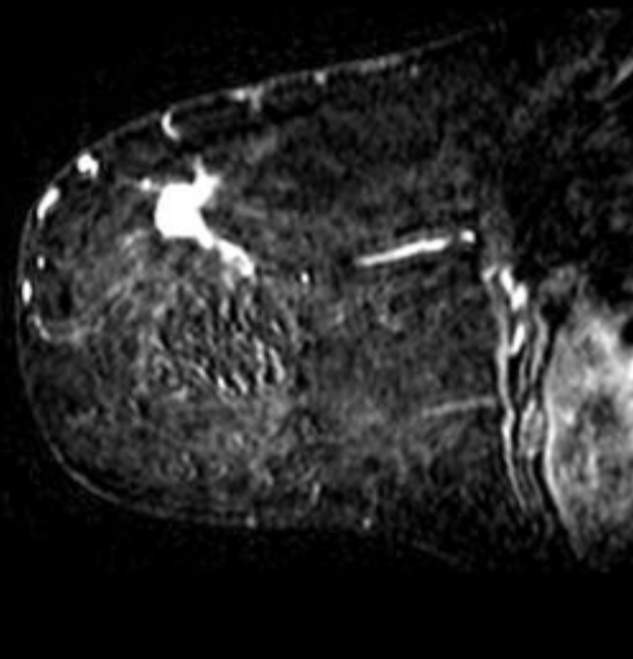

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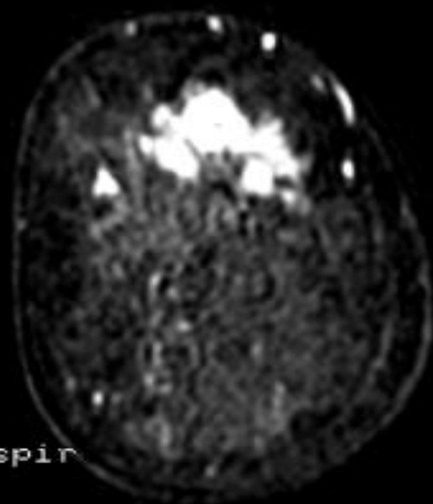

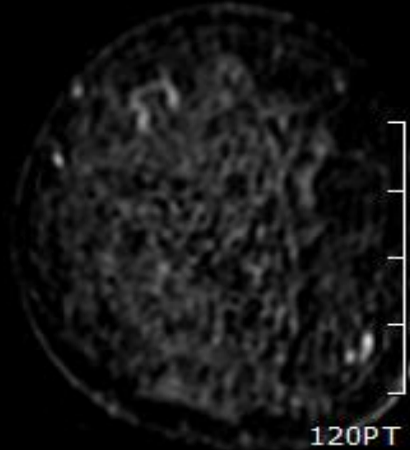

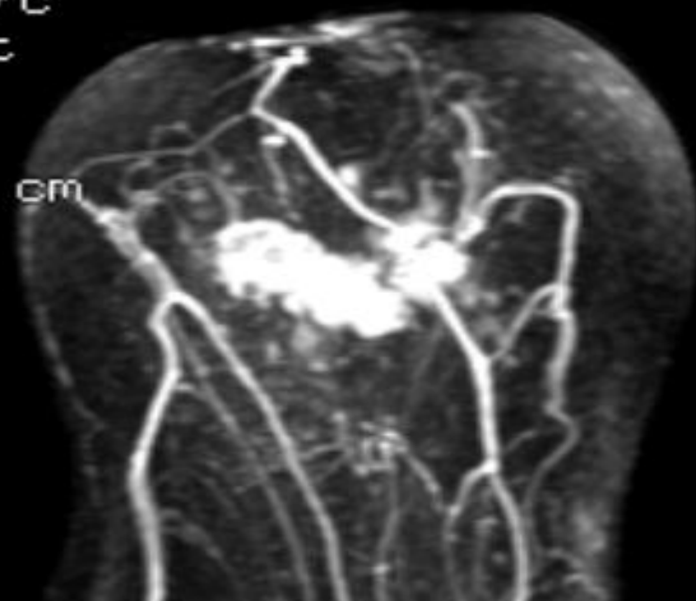

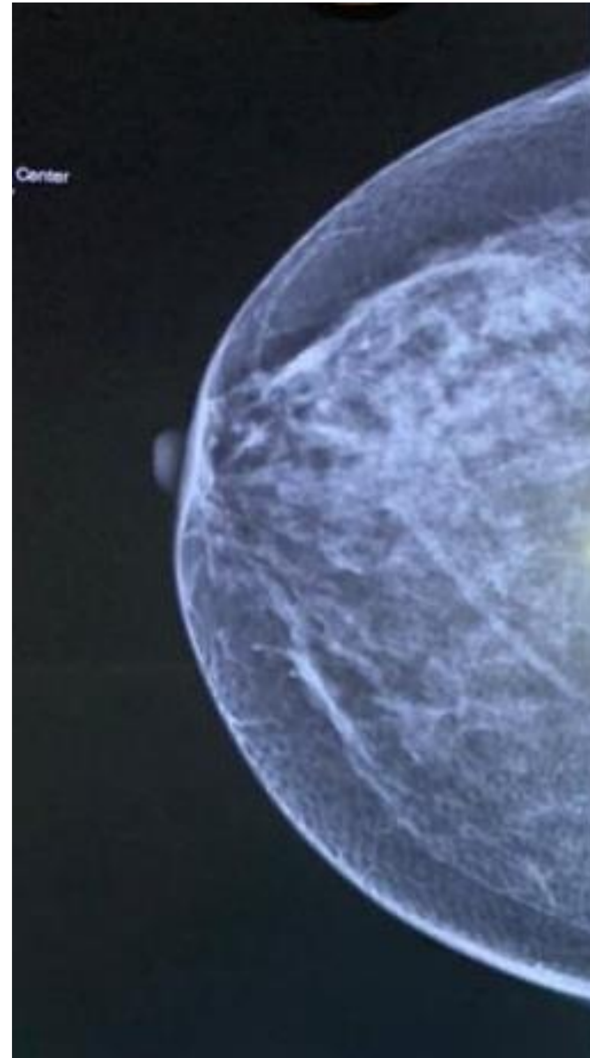
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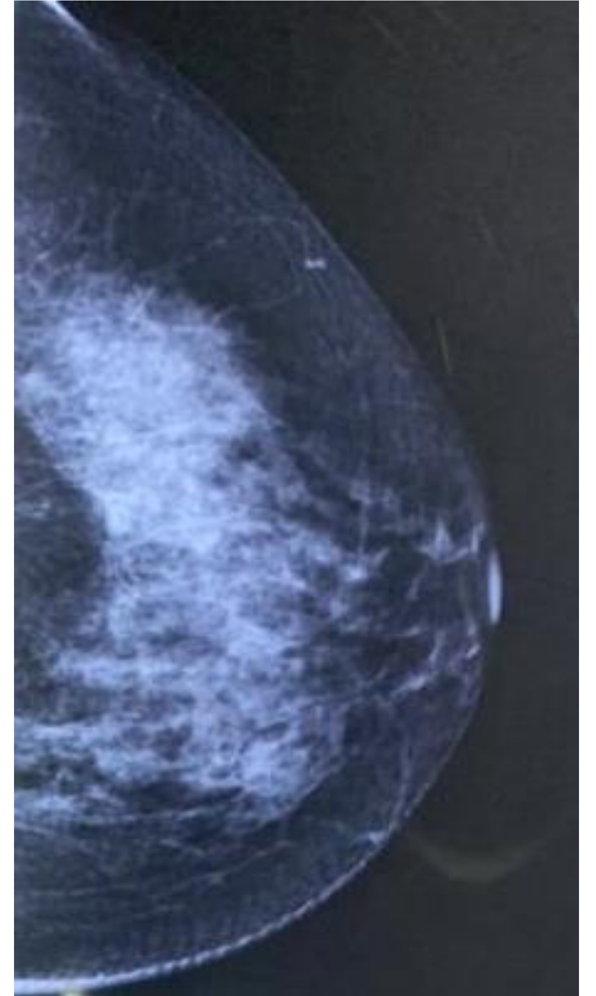
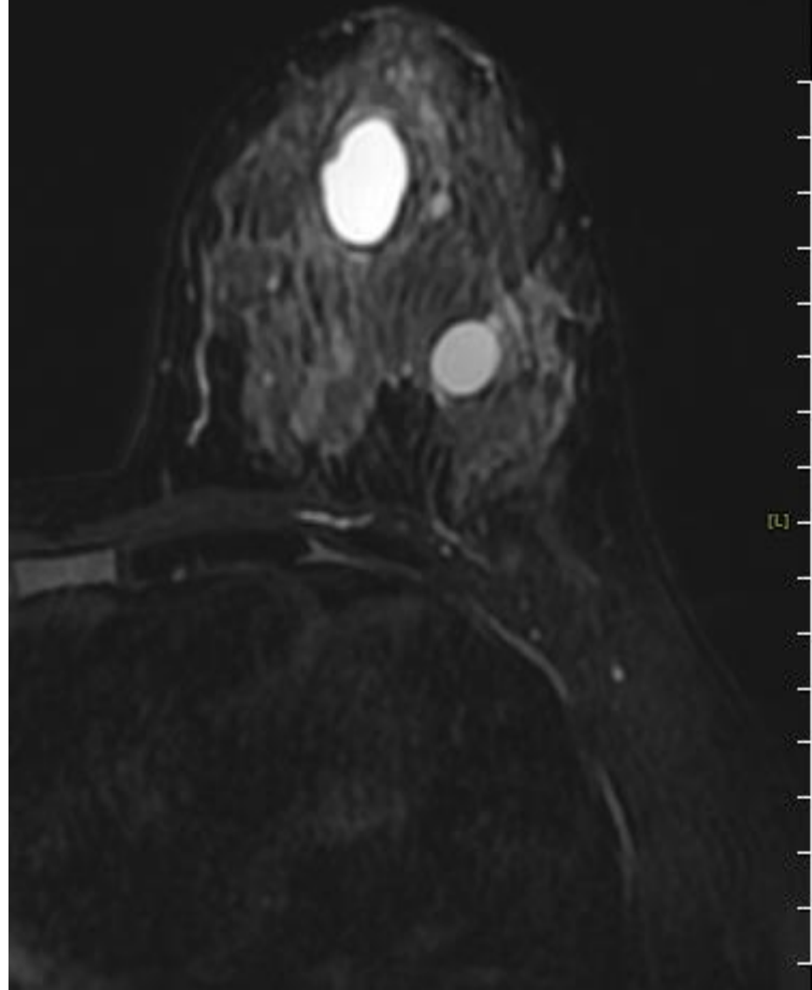


11cm

14cm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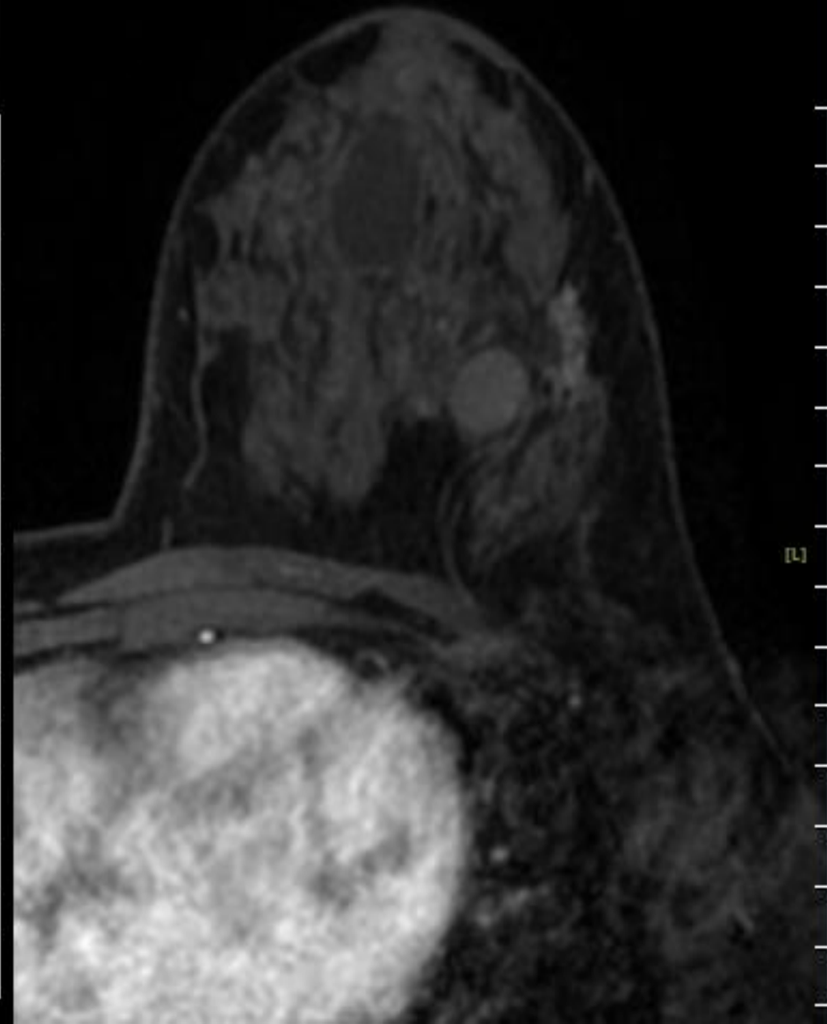
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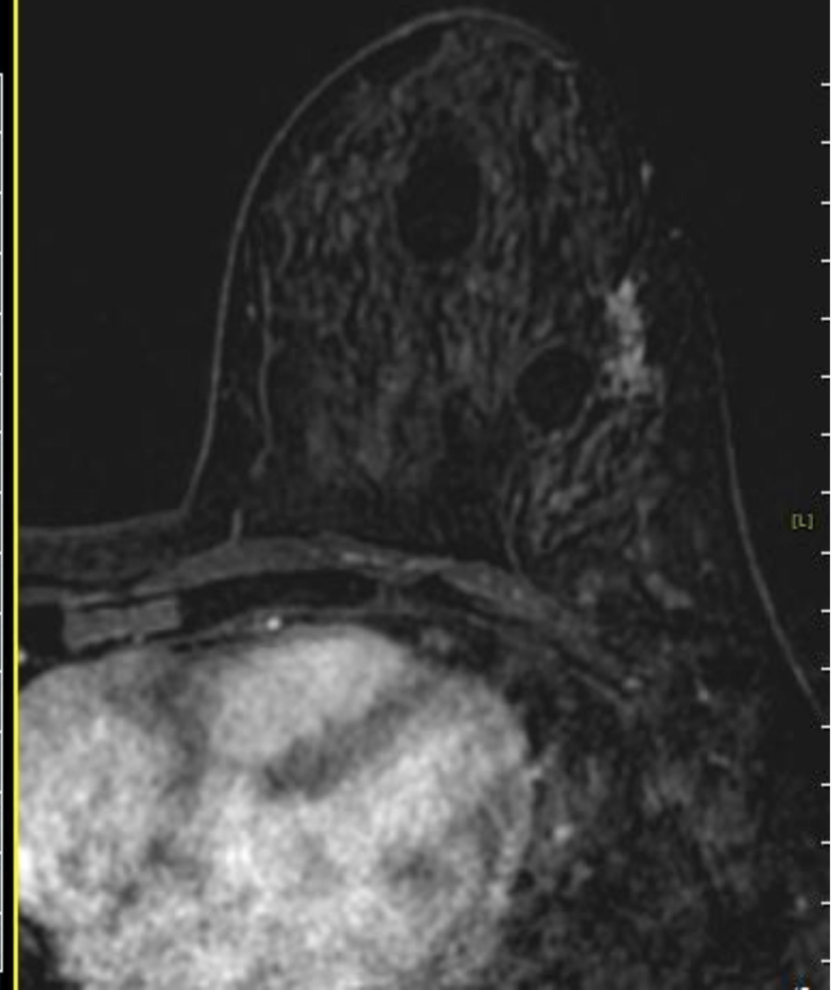
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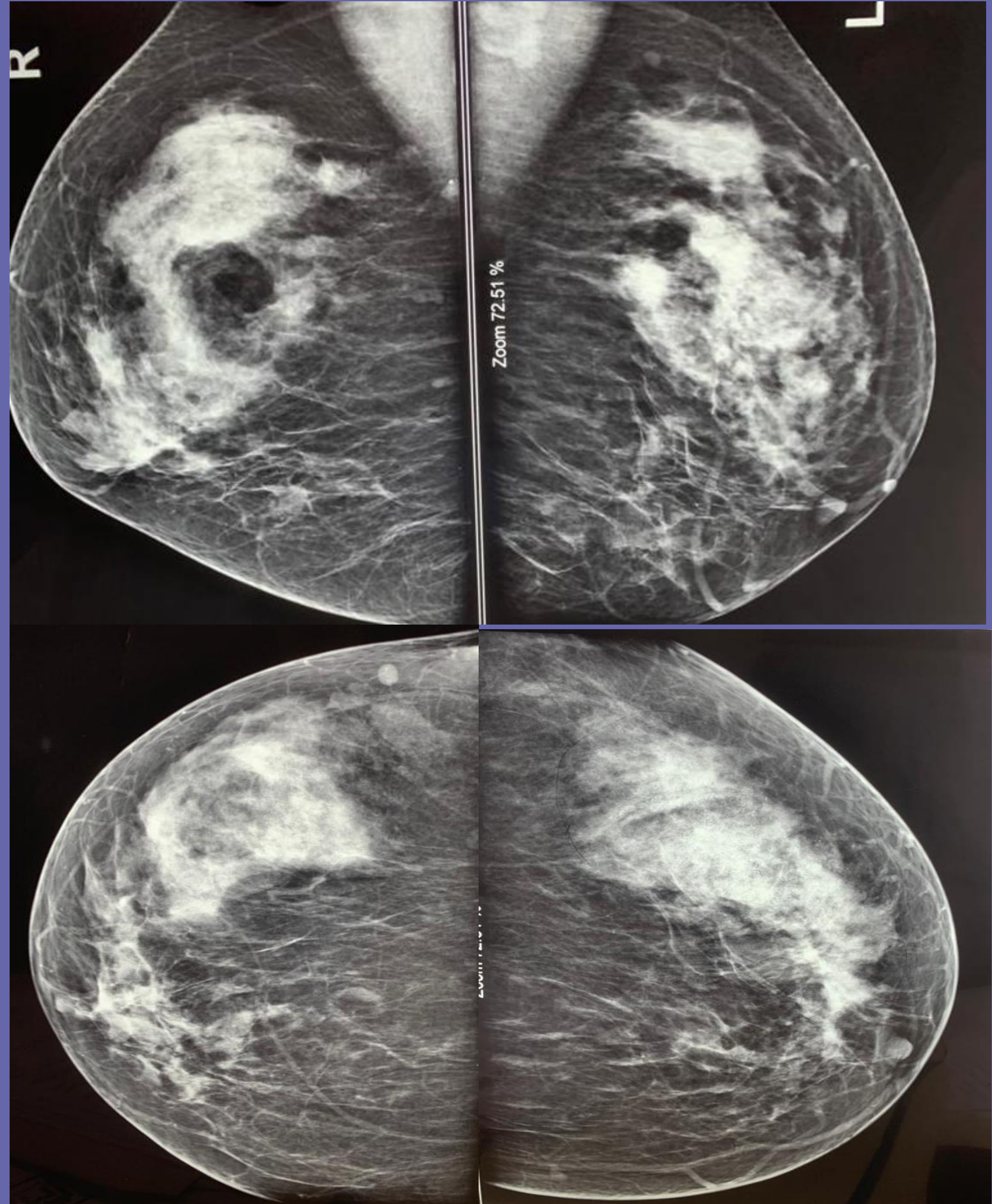
11cm

CASE 1

MG

A 43 years-old-female with mass palpation at UOQ of Left breast



MG & US

با عرض سلام و ارادت

در بررسی سونولوژیک انجام شده از پستانها :

از نظر کامپوزیشن هتروژن مشاهده شد. (FCD)
architectural distorsion با حدود نامنظم در ساعت 1-2 پستان چپ
به ابعاد 16x14mm مشاهده شد. بررسی تکمیلی و ماموگرافی
توصیه می شود (بیوپسی).
ضخامت پوست نرمال است.
غدد لنفاوی با نمای راکتیو در اگزیلای دوطرف حداکثر به ابعاد
15×8mm در اگزیلای چپ مشاهده شد.

Medical Report

- در بررسی ماموگرافی های تهیه شده از پستانها و زیر بغل شامل نماهای CC ، MLO
- (Low dose Full digital Philips mamo)

ترکیب بافت پستانها از نوع C مي باشد .

ضایعه ای در پوست ، نیپل ، چربی زیر جلدی ،بافتهای فیبرو گلندولر و
لیگمانهای کوپر در طرف راست مشهود نیست .
تغییرات در پوست و Architecture پستان راست مشهود نیست .
توده ، دنسیتی غیر طبیعی ، اسپیکولاسیون و میکرو کلسیفیکاسیون در طرف راست دیده نمی شود .

Micro calcification با توزیع سگمنتال در قسمت خارجي - فوقاني پستان چپ و
چند لنف نود با کورتکس ضخیم روي پکتورالیس چپ دیده شد .

.. تحت هدایت سونو گرافی CNB از توده حاوي Micro calcification با حدود نامنظم
در ساعت ۱ - ۲ پستان چپ و FNA لنف ادنوپاتی اگزیلای چپ انجام شد .
تصاویر پیوست محل قرار گیری سوزن در توده و لنف آدنوپاتی را نشان می دهند .

BI.RADS: 4C :ن

CNB

- Invasive ductal carcinoma
- ER+
- PR+
- Ki67 15%
- HER 2+++

تاریخ گزارش :1400/08/05 نام پزشک :جناب آقای دکتر ناصر قائمیان شماره پذیرش:S00-2871

تاریخ پذیرش: 1400/07/28

موضع نمونه برداری :بیوپسی سوزنی توده پستان چپ تحت گاید سونوگرافی(BIRADS:5)

شماره پاتولوژی:S00-2871,i00-773,C00-1510

Macroscopy:

Received specimen consists of 4 needle shape creamy yellow soft tissue each one measuring 1.5 cm in length and 0.2 cm in diameter. TS/2

Microscopy:

Microscopic sections from breast tissue show malignant tumoral lesion composed of infiltrating nests (T:3/3) of atypical cells with hyperchromatic and pleomorphic nuclei (P:3/3) associated with some mitotic figures (M:2/3) and desmoplastic stroma. Extensive ductal carcinoma in situ (comedo and solid types) are also seen.

Final Diagnosis:

Left breast mass,sonoguided core needle biopsy:

-Invasive ductal carcinoma.

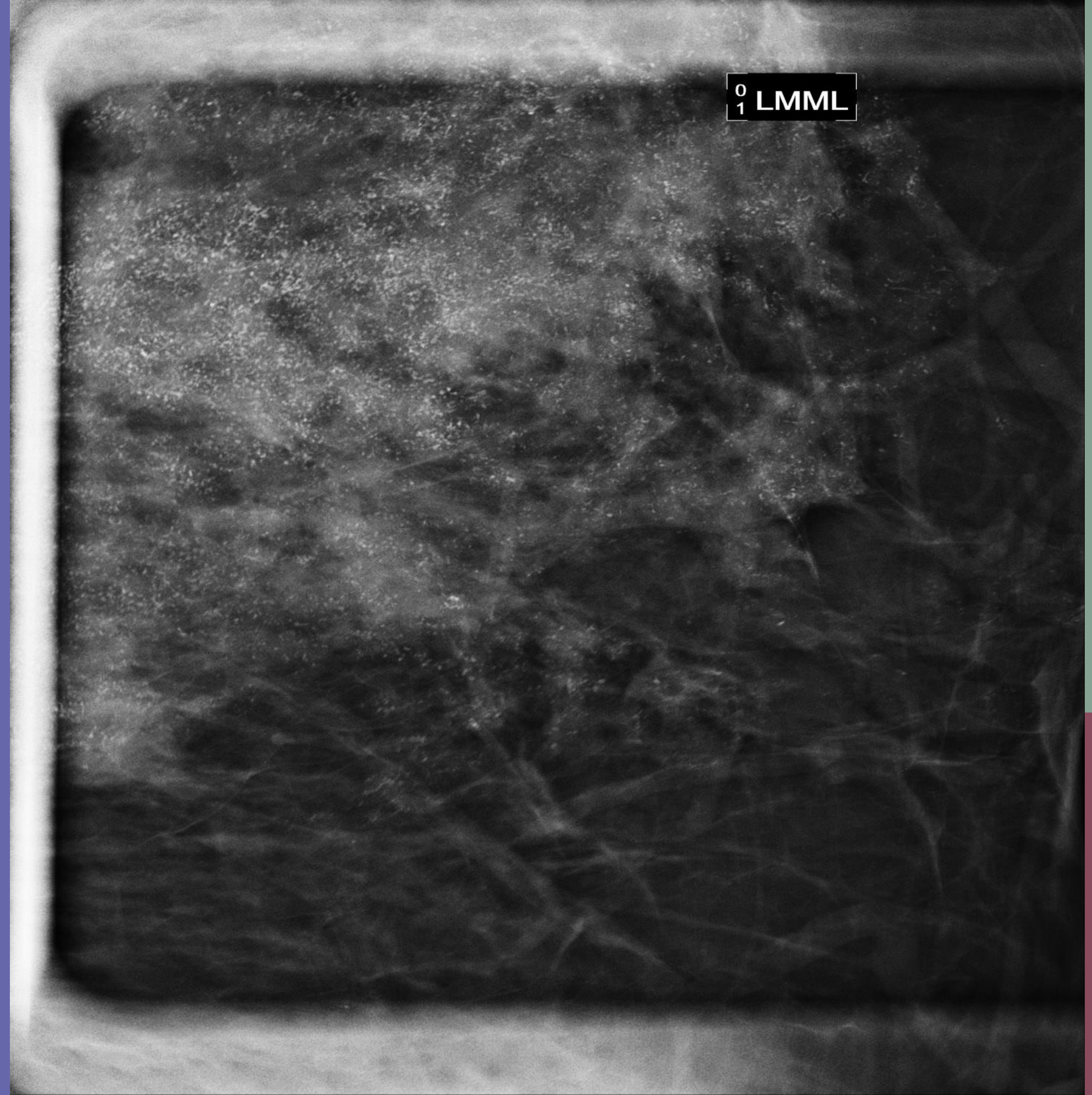
-Histologic Nottingham grading: III (total score: 8/9)

-Presence of lymphovascular invasion

ICD-O Code: M-8500/3 C50.9

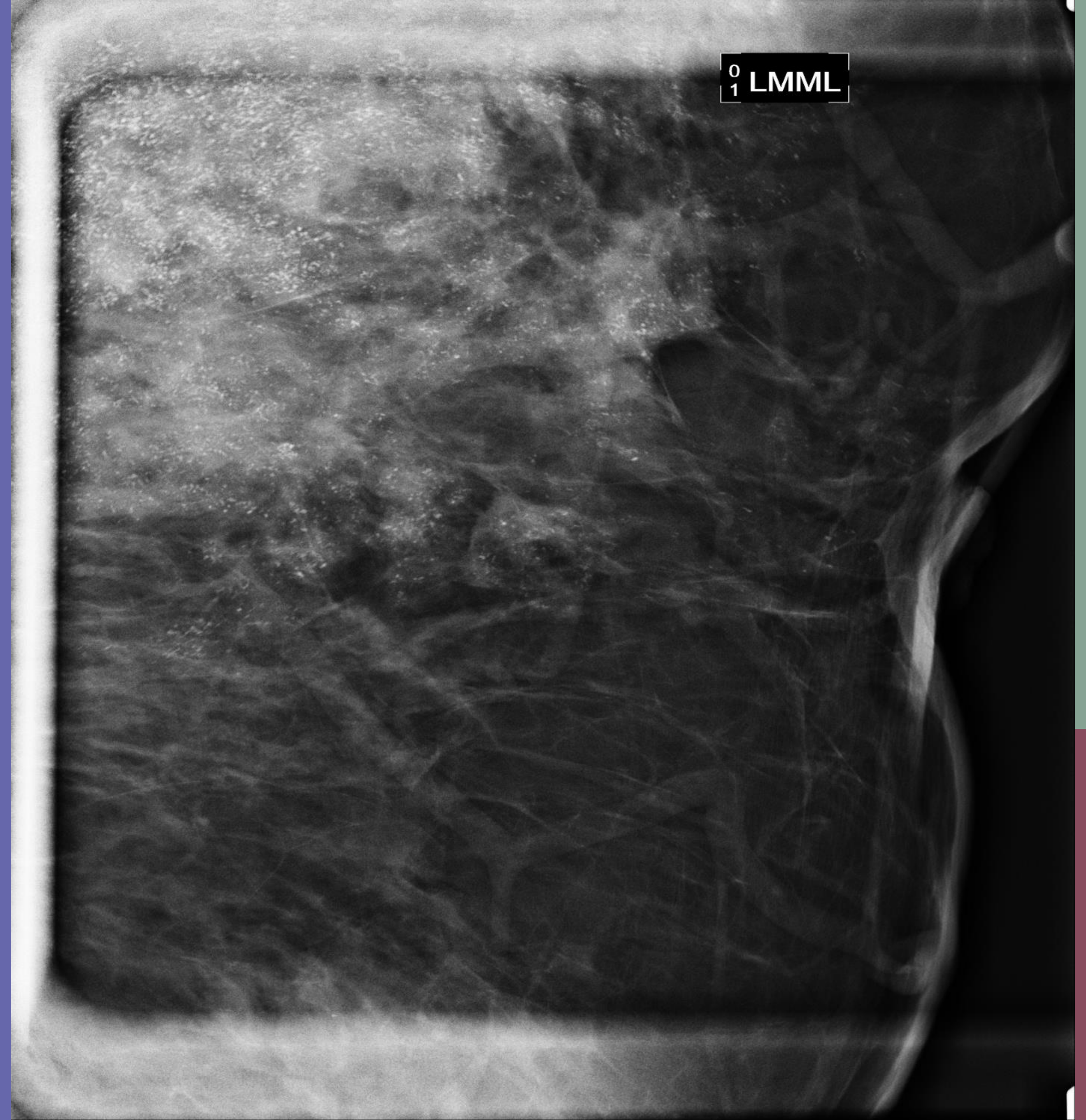
MAG ON TL VIEW

- She referred to Radiology ward for Tissue marker in the mass.
- We re-evaluate the MG as our routine.
- Extensive MCs are noticed
- on magnification views.



MAG ON TL VIEW

- Extensive calcification determined from 11-5 o'clock with extension to Nipple-Areolar-Complex.
- Breast MRI & Bracketing with Tissue marker is planned



Pre-NACT MRI

Left

- Rim enhancing mass (18X15mm) at 2-3 o'clock.
- Extensive NME confirmed from 11-5 o'clock corresponding with MCs on MG
- Multiple LAP at level I,II

Right

- Enhancing foci with washout at 9 o'clock without corresponding finding at MRI Targeted US exam.

مرکز تصویربرداری ۱۴۰۰/۰۸/۳۰ ۱۰:۴۲

تاریخ پذیرش: ۱۴۰۰/۰۸/۲۳

بیمار:

خدمت: پستان دو طرفه با و بدون ماده حاجب

آدرس: شماره پذیرش: ۱۱۶۱۸۲۷۰

موبایل: سن: ۴۳ جنسیت: مونث

همکار گرامی: خانم / آقا دکتر

A 43 years old woman with segmental microcalcification and breast cancer in UOQ of left breast (pathology is not available).

Breast MRI with and without contrast :

Tech Examination made by 3 tesla machine , 16 channel coil and hanging technique, different sequence including T1 , T2 with and without contrast (dynamic) , DW , ADC and subtraction 3D images.

Heterogeneous fibro glandular tissue is seen on pre contrast images.

After contrast administration minimal background parenchymal enhancement is seen.

A few oval well defined hyper T2 signal non enhancing lesions are seen in both breasts suggestive of cysts.

Extensive NME extended from LIQ, UOQ to upper central of left breast (11 to 5 o'clock) with ring enhancement and extension to nipple and alveolar region & suggestive of multicentric left breast cancer. (Left breast BIR = 6). No skin or chest wall involvement is seen.

Ductal ectasia in retro aleolar of left breast is seen.

There is enhancing foci about 5mm in centrolateral portion of right breast with rapid washout (BIR = 4a). Second targeted sonography is recommended.

Thick cortical lymph nodes in level I, II of left axillary is seen.

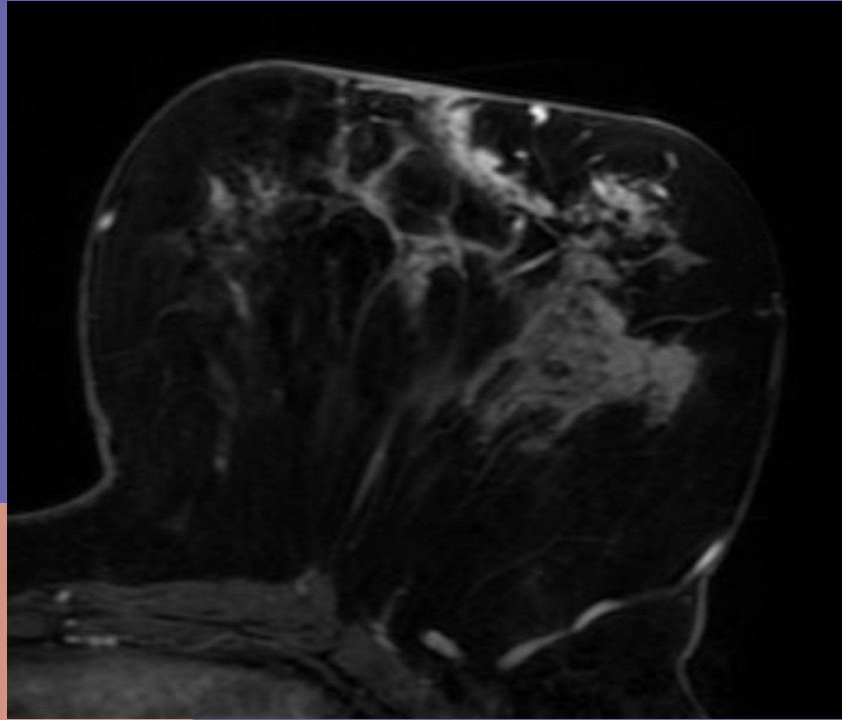
Some reactive lymph nodes in intramammary and right axillary tail is seen. /s

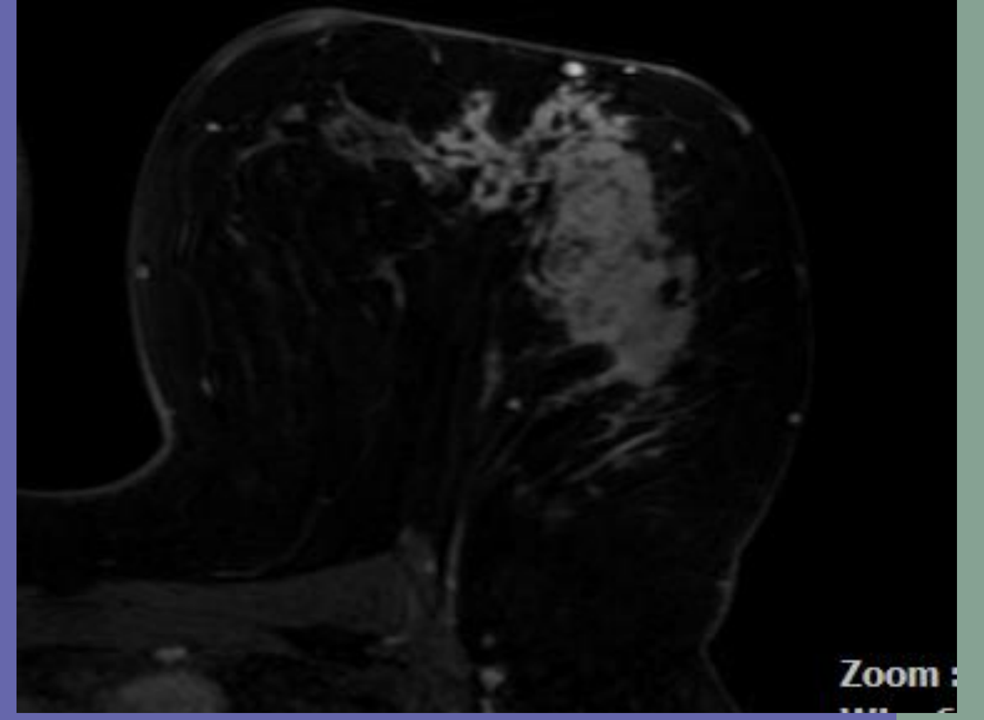
Left Breast BIRADS = 6

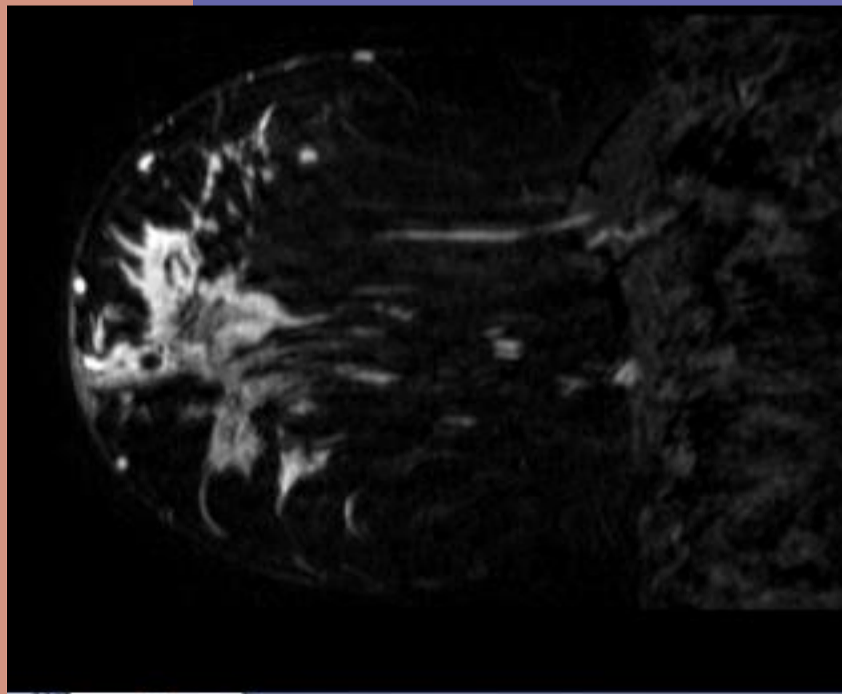
Right Breast BIRADS = 4a

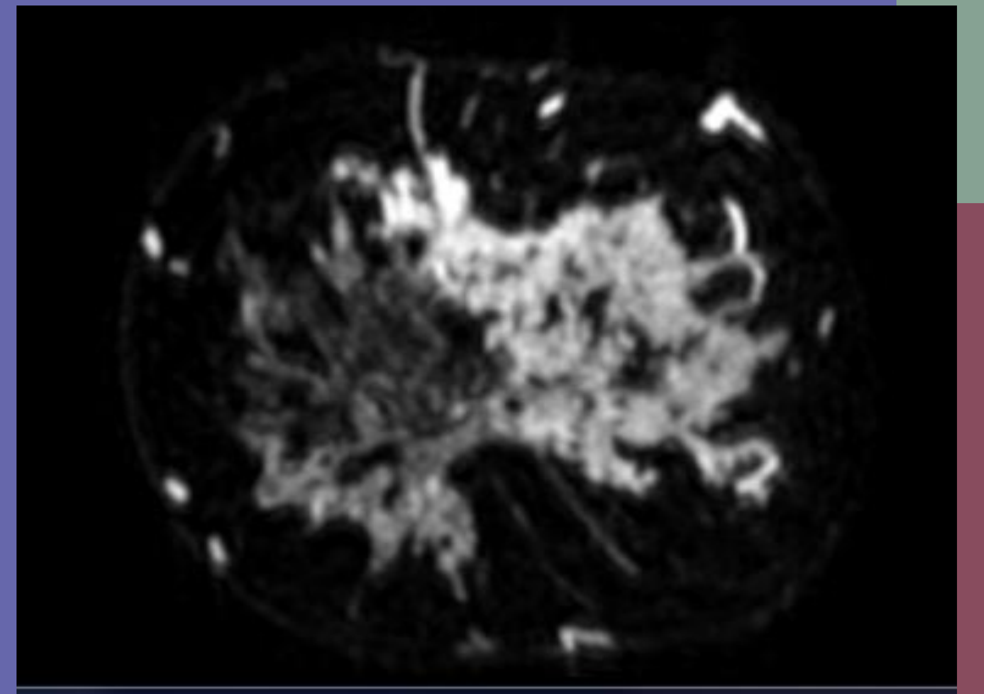
Dr. Ahmadinezhad

Pre NACT MRI









1

2

3

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3

Mid cycle MRI

Left

- Mild non significant decrease of enhancement in comparison with pre-NACT MRI

Right

- Enhancing foci with washout at 9 o'clock of Right breast ,still visible but with persistent kinetic curve.

تاریخ پذیرش: ۱۴۰۰/۰۹/۲۱

خدمت: پستان دو طرفه با و بدون ماده حاجب

آدرس:

موبایل: سن: ۴۳ جنسیت: مونث شماره پذیرش: ۱۱۶۹۵۱

همکار گرامی : خانم / آقا دکتر

A 43 year old woman , known of left breast cancer referred after chemotherapy for early post treatment follow up and also for evaluation of previous right enhancing Focus.

Breast MRI with and without contrast :

Tech Examination made by 3 tesla machine , 16 channel coil and hanging technique, different sequence including T1 , T2 with and without contrast (dynamic) , DW , ADC and subtraction 3D images.

Heterogeneous fibro glandular tissue is seen on pre contrast images.

After contrast administration minimal background parenchymal enhancement is seen.

Extensive non mass enhancement at all quarant of left breast is noted infavor of multicentric malignancy which shows mild decrease in enhancement , however no significant size reduction (less than 30%) is noted suggestive of no significant response.

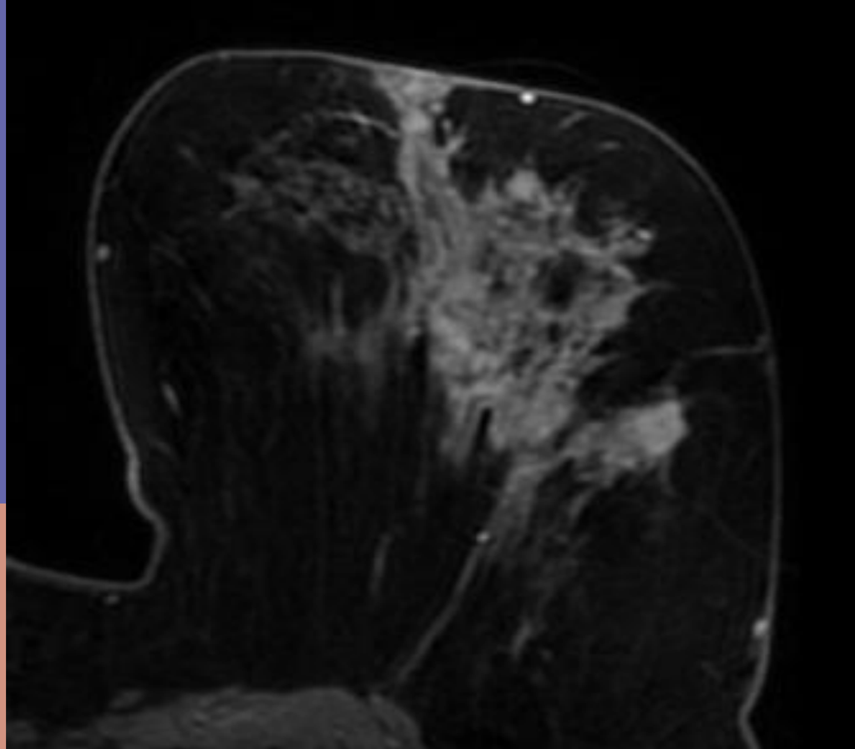
Mentioned 5mm enhancing focus which shows rapid washout at previous breast MRI (1400/8/23) at recent MRI is stable in size but there is no sign of washout .6 month follow up with MRI and U/S exam is recommended.

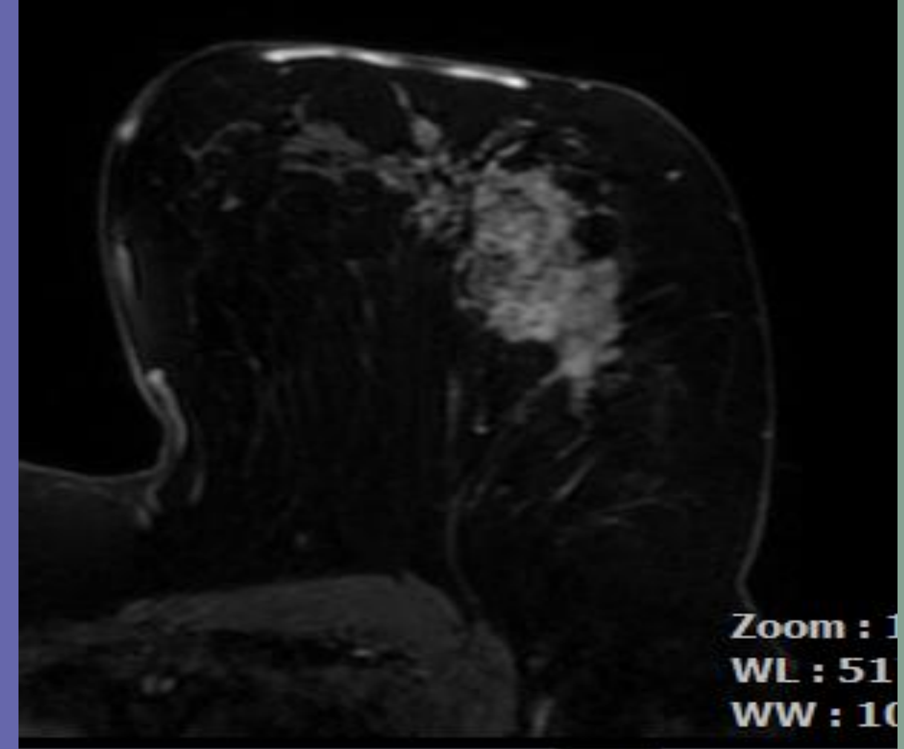
The left axillary lymphnode reported at previous MRI are stable at recent MRI.

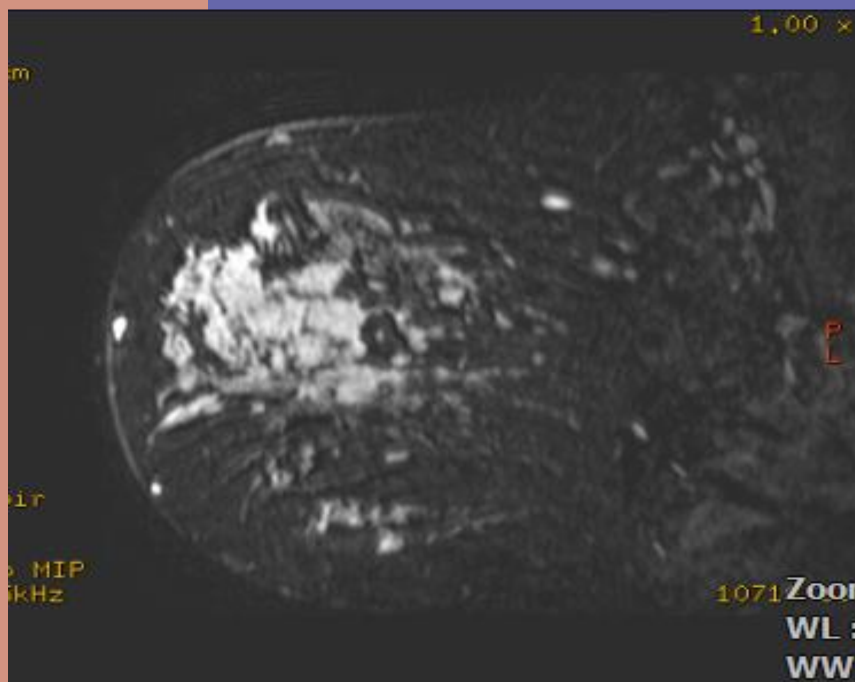
BIRADS 3:probably benign findings in right breast

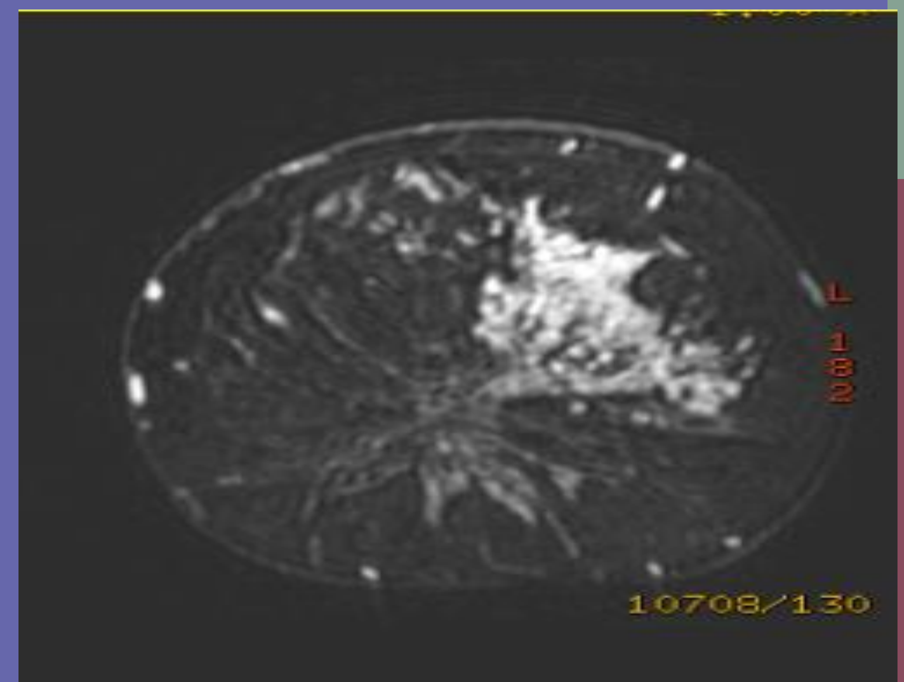
BIRADS 6: Known breast cancer in left breast./p

MRI after 2 course of chempotherapy









POST NACT MRI

Left

- Mild non significant decrease of Mass and NME(1-4 o'clock) in comparison with pre-NACT MRI

Right

- Enhancing foci with washout at 9 o'clock of Right breast ,still visible but with persistent kinetic curve (BIII)

خدمت: پستان دو طرفه با و بدون ماده حاجب

آدرس:

موبایل ۰۹۱۲۴۳۷۷۳۸۵ سن: ۴۳ جنسیت: مونث شماره پذیرش: ۱۱۸۵۵۱۵۹

همکار گرامی: خانم / آقا دکتر

A 42 years old woman with history of left breast IDC and history of chemotherapy

Breast MRI with and without contrast :

Tech Examination made by 3 tesla machine , 16 channel coil and hanging technique, different sequence including T1 , T2 with and without contrast (dynamic) , DW , ADC and subtraction 3D images.

Heterogeneous fibro glandular tissue is seen on pre contrast images.

After contrast administration mild background parenchymal enhancement is seen.

There is heterogeneous rim enhancing mas measuring 14*11mm at 3 o'clock of left breast.

Also heterogeneous enhancing mass(washout pattern) measuring 14*13mm at 1 o'clock of left breast is seen.

There are clump NME at 1-4 o'clock of left breast.

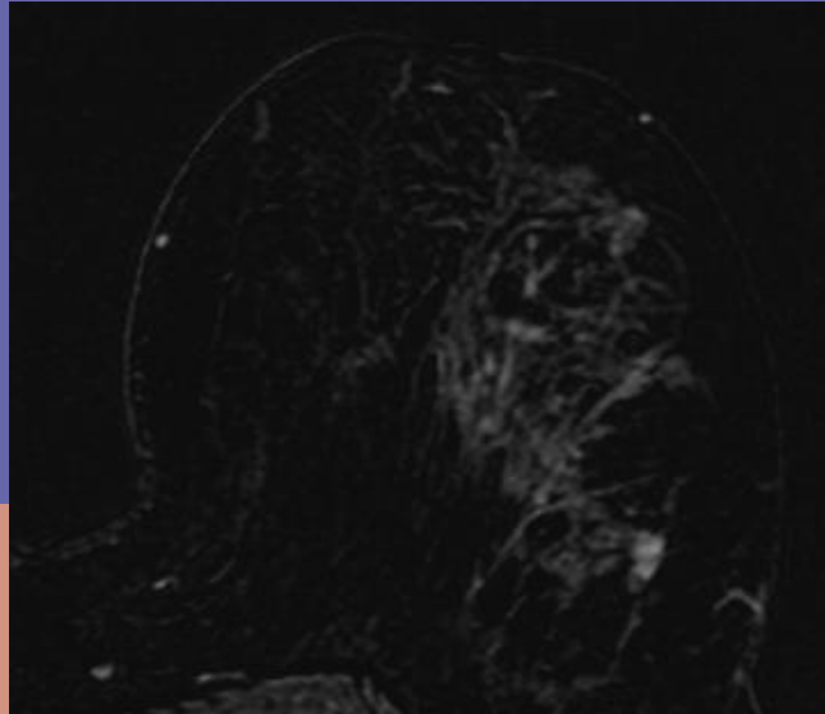
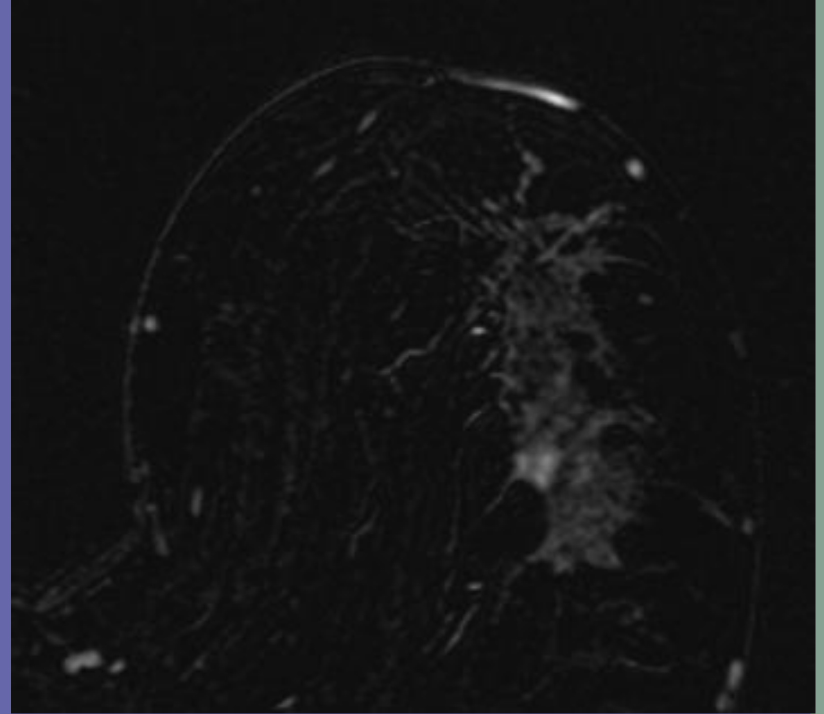
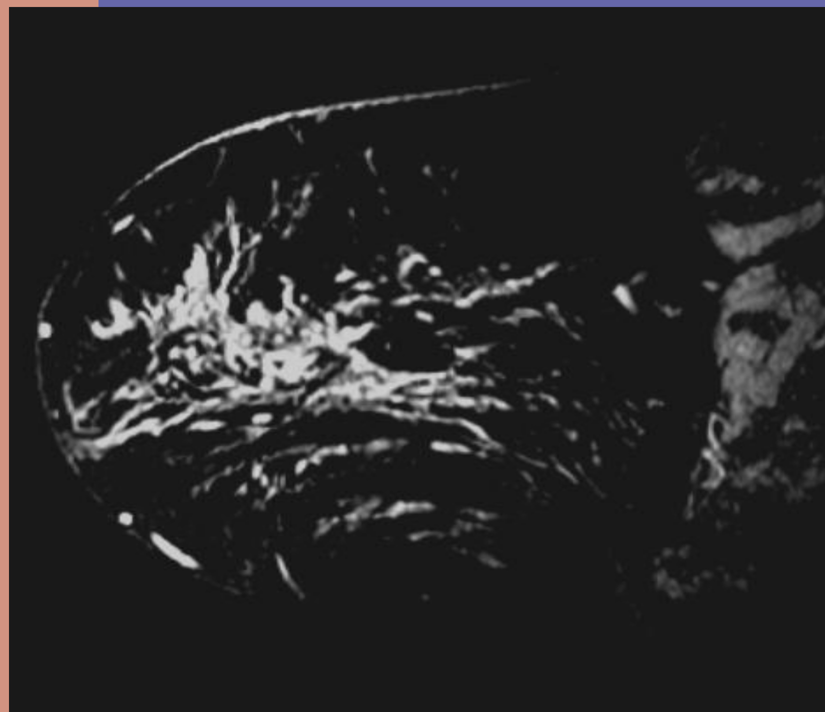
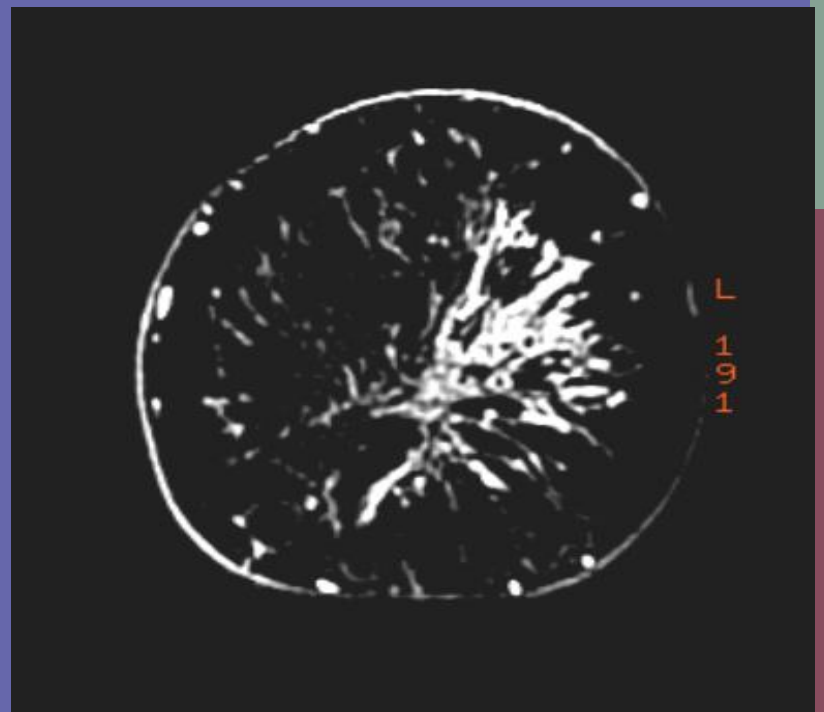
Also stable small persistent enhancing focus 5mm in LOQ of right breast is seen (B :2)

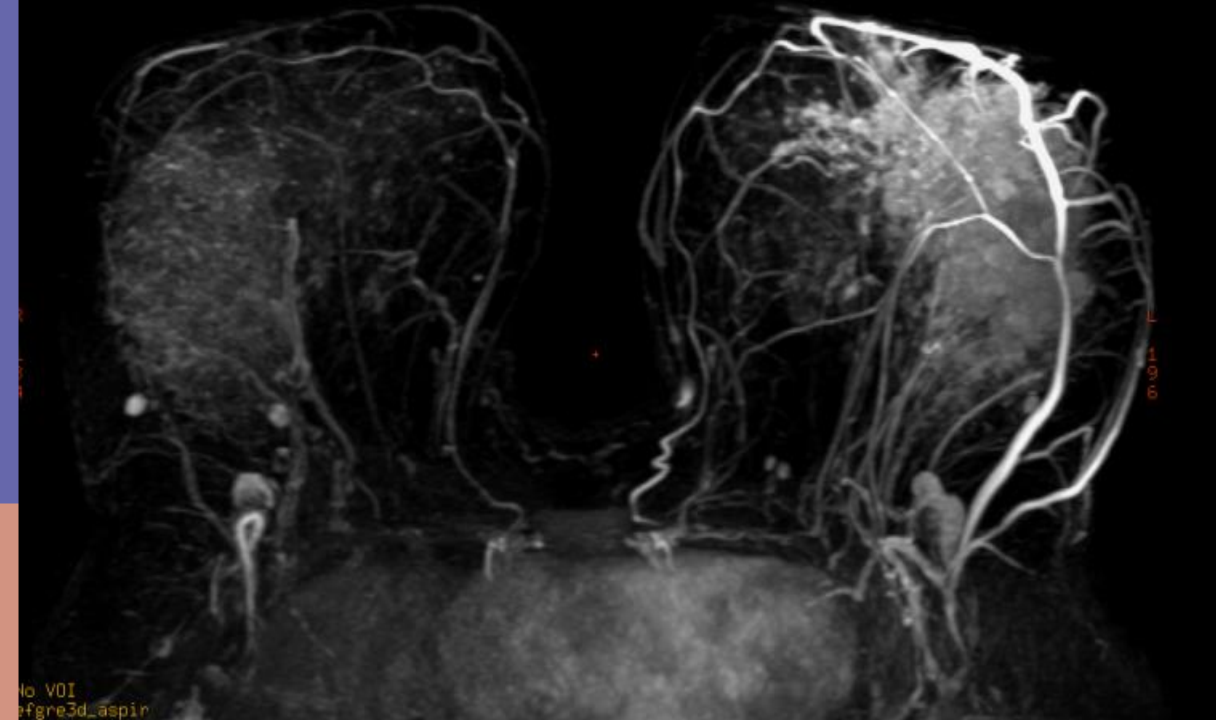
BIRADS 6: Known breast cancer (partial response to neoadjuvant therapy)

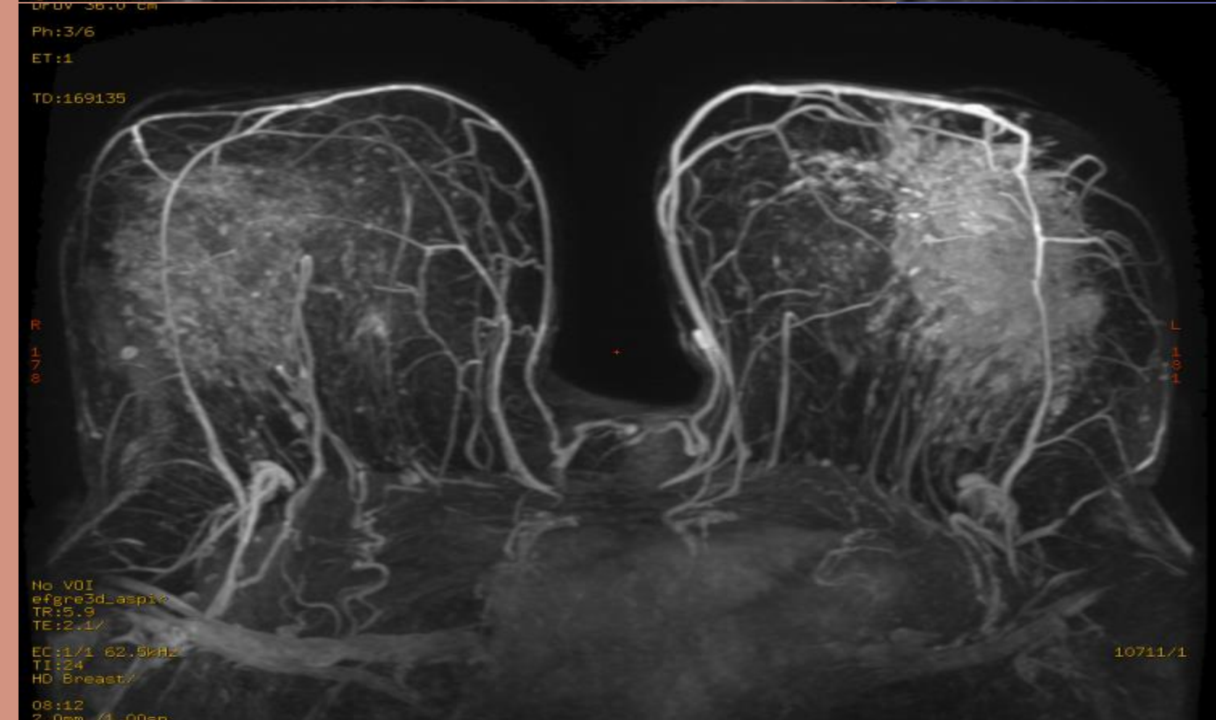
DR. Ariyan

Dr. ghadriyan

Post NACT MRI





Ex:Feb 09 2022

L
190

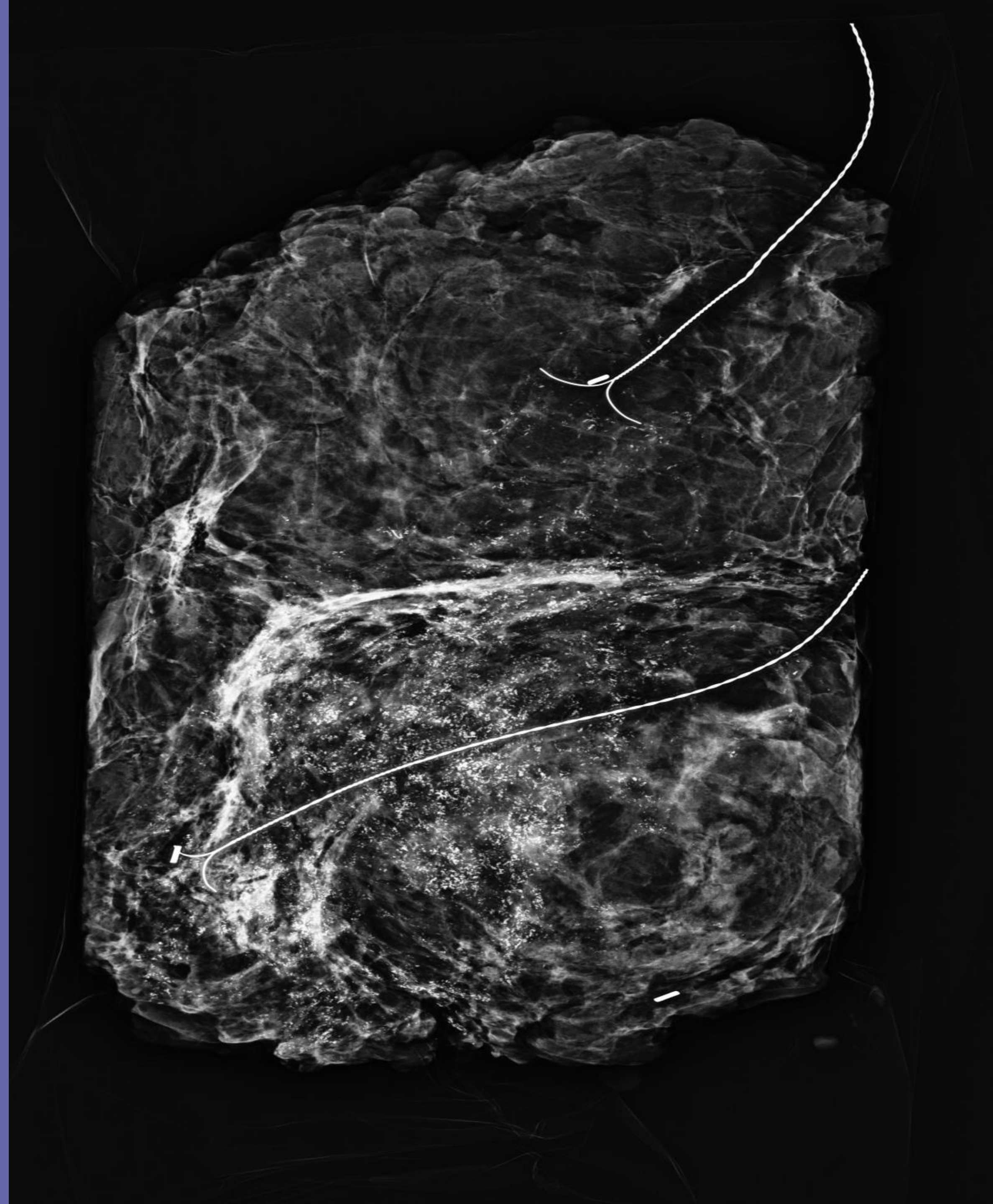
LCC

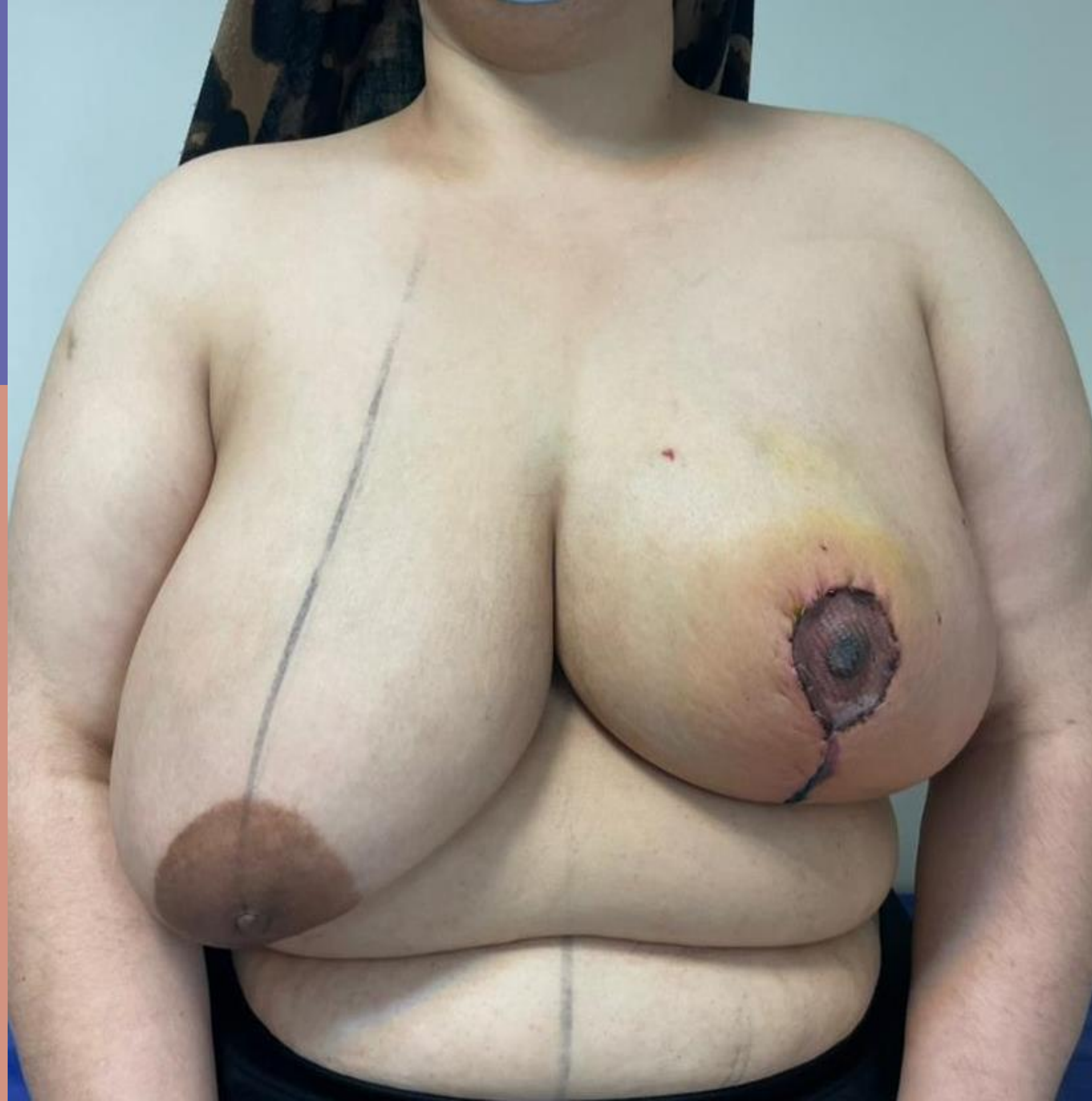
LLM

SPECIMEN MG

Post op pathology:

- Margin free

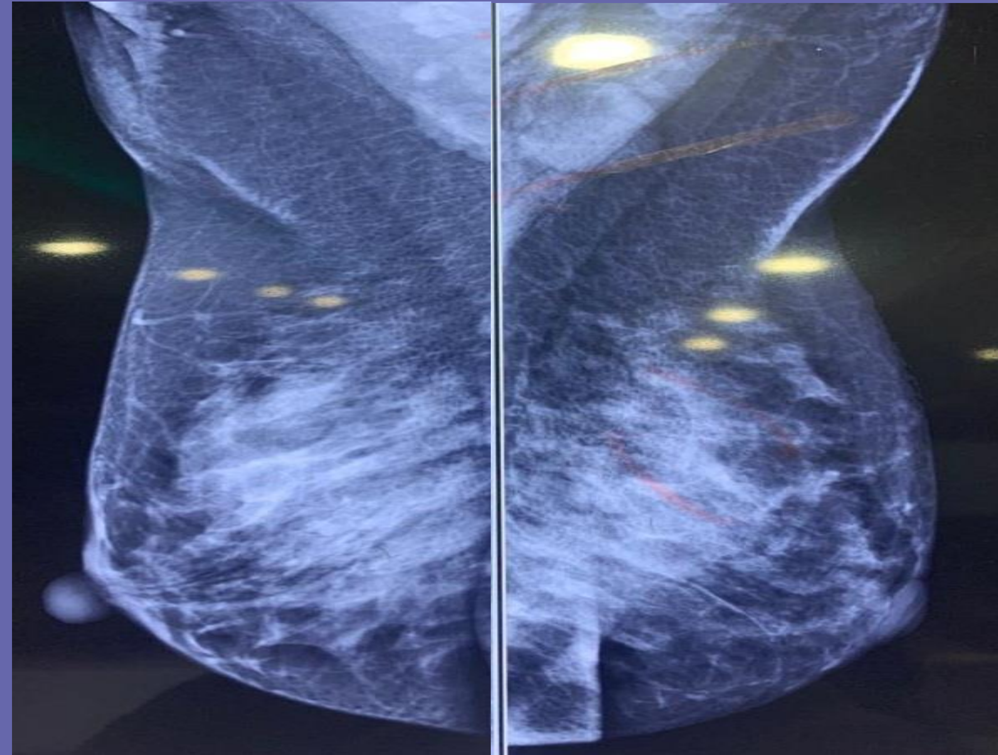


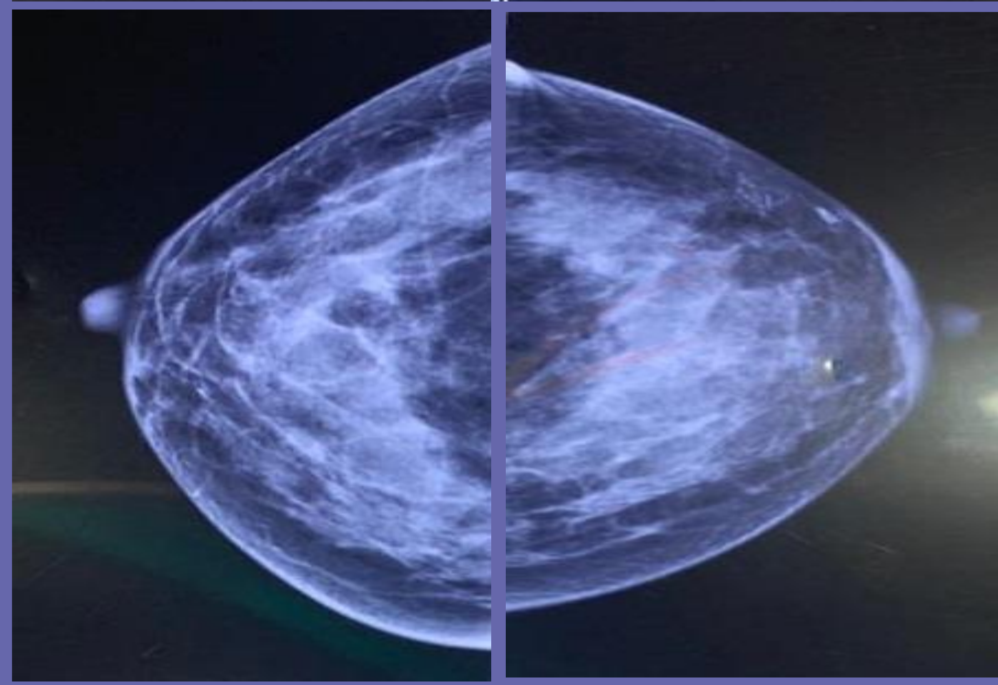


CASE 2

MG

A 37 years-old female with thickening sensation in left breast





MG&US

سونوگرافی پستان ها و آگزیلای دوطرف:

این سونو گرافی در تطابق با ماموگرافی مورخ 1400/05/11 (BIRADS0) انجام شده است.

بیمار خانم 37ساله بدون سابقه فامیلیال کانسر برست و بدون سابقه شخصی کانسر برست و با شکایت از stiffness برست چپ جهت ارزیابی یافته ماموگرافیک مراجعه کرده است.

بیمار در تاریخ 1400/05/18 سابقه CNB توده برست چپ (ساعت 12)را داشته است .

(multiple foci of Lobular carcinoma in situ)

Breast composition: بافت فیبرو گلاندولار هتروژن و fat

در هردو برست تعدادی کیست با جدار ظریف بعضا حاوی سپتای ظریف یا دبری بدون جزء سالید و بدون واسکولاریته به سایز کمتراز 7mm به صورت پراکنده دیده میشود.(BIRADS II)

:Right Breast

•در ساعت12 در مارژین آرئول و به فاصله ی 11mm از سطح پوست دو tubular cyst با جدار ظریف در مجاورت یکدیگر بدون سپتا بدون واسکولاریته حاوی دبری به سایز 7x3mm و8x2mm دیده میشود.(BIRADSII)

***در ساعت7-6 در مارژین آرئول و به فاصله ی 8mm از سطح پوست یک micro cystic cluster حاوی سپتا و جدار ظریف بدون واسکولاریته به سایز8.5x3.5mm دیده میشود.(BIRADSII) سونو گرافی فالوآپ شش ماه بعد توصیه میشود.**

:Left Breast

•در ساعت11 در مارژین آرئول و به فاصله ی 5.5mm از سطح پوست یک cyst با جدار ظریف بدون سپتا بدون واسکولاریته حاوی کانون های میکروکلسیفیه dependent به سایز 8x4mm دیده میشود.(BIRADSII)

در ساعت 12 در فاصله near zone تا رتروآرئول در محل stiffness یک کانون نامنظم و elongated از ضخامت peri ductal حاوی کانون های میکروکلسیفیه fine و واسکولاریته internal و پری فرال با گسترش به

با سلام و احترام

duct مجاور به طول 16mm و ضخامت 7mm دیده می شود که مطابق با یافته ماموگرافیک آسیمتری فوکال حاوی کانون میکروکلسیفیه در UOQ و central می باشد با توجه به سیتولوژی ضایعه فوق moderate to high suspicious بوده و excision آن توصیه می شود. (BIRADS IVc)نمای stiffness و ضایعه پری داکتال کاراکتریستیک برای LCIS می باشد.

در تشخیص افتراقی کمتر ضایعاتی نظیر تغییرات فیبروکیستیک فوکال شدید مطرح می گردد.

•در بررسی آگزیلای چپ یک لنف نود دارای افزایش ضخامت کورتیکال فوکال (4mm)مشاهده می شود(BIRADSIV)

شواهدی از داکتال اکتازی مشاهده نمیشود.

ضایعه فضاگیر solid مشخصی در پستان راست رویت نمیگردد.

شواهدی ازretraction در پوست هردو برست و نیپل هردو سمت دیده نمیشود.

در بررسی پوست ، چربی زیر پوستی و خلف پستان پاتولوژی مشخصی مشهود نیست.

در نواحی آگزیلری آدنوپاتی دیده نشد.

س/

Left breast: BIRADS IV c
Right breast: BIRADS II

Dear colleague, Dr.

Bilateral CC & MLO view full field digital mammography:

*** This is diagnostic mammography. (due to stiffness in Lt. breast – upper part) ***

- *The breasts are extremely dense, which lowers the sensitivity of mammography (breasts composition: type d).*
- ***Generalized breast trabecular thickening & NAC thickening are seen in Lt. breast (Breast edema). Also a group of microcalcifications is seen in this breast – UCQ. Focal compression magnification view on CC & M.L.O projection and U.S. exam are recommended.***
  - ***A large dense (suspicious?) lymph node is projecting on Lt. axillary region.***
- *Considering this type of breast composition, there is no evidence of suspicious mass, architectural distortion, clustered microcalcifications or any definite sign of malignancy in Rt. breast.*

Conclusion& Comment :

Rt. breast: BIRADS 1: (Negative for malignancy)

Lt. breast: BIRADS 0 : Assessment incomplete, needs focal compression magnification view on CC & M.L.O projection and U.S. exam.

Also because of extremely dense breasts, high resolution U.S. exam is recommended to exclude any hidden mass.

CNB

- Multiple foci of LCIS

-I.G.M

MACROSCOPY: SRIF and consists of multiple creamy tissue cores 9 cm. in length and 0.1 cm. in thickness.

BLOCK SUMMARY: Totally submitted in 2 blocks

M ICROSCOPY:

Sections reveal breast tissue . There are multiple foci of dilated lobules filled by relatively uniform mild to moderately pleomorphic epithelial cells . The I.H.C shows positive cytoplasmic staining for P-120 in most of these cells. There are also some expanded duct - like lumina filled by epithelial cells which show membraneous staining for E-cadherin and absence of cytoplasmic staing for P-120. No invasive component identified.

Diagnosis: Core – needle biopsy of the left breast mass(12 o`clock position):

Multiple foci of lobular carcinoma in situ , see note

INCISIONAL BX

- Extensive ductal & loular carcinoma insitu
- ER +
- PR +
- HER2 –
- Ki67 <5 %

Lymph node :Negative

Gross description:
Received specimen in formalin labeled as "left breast mass", consists of an unoriented piece of irregular fibrofatty tissue measuring 5x4x2.5cm. On sectioning, firm granular area are seen all over the tissue.
Totally submitted in 18 blocks:1-18

Diagnosis:
"Left breast mass", incisional biopsy:
-Extensive ductal and lobular carcinoma in situ
 * Architectural pattern: Cribriform, solid and comedo
 * Nuclear grade: 2-3
 * Necrosis: Present, (central expansive " comedo" necrosis)
-Lobular carcinoma in situ (LCIS): Present, classic type
-Microcalcifications: Present in DCIS

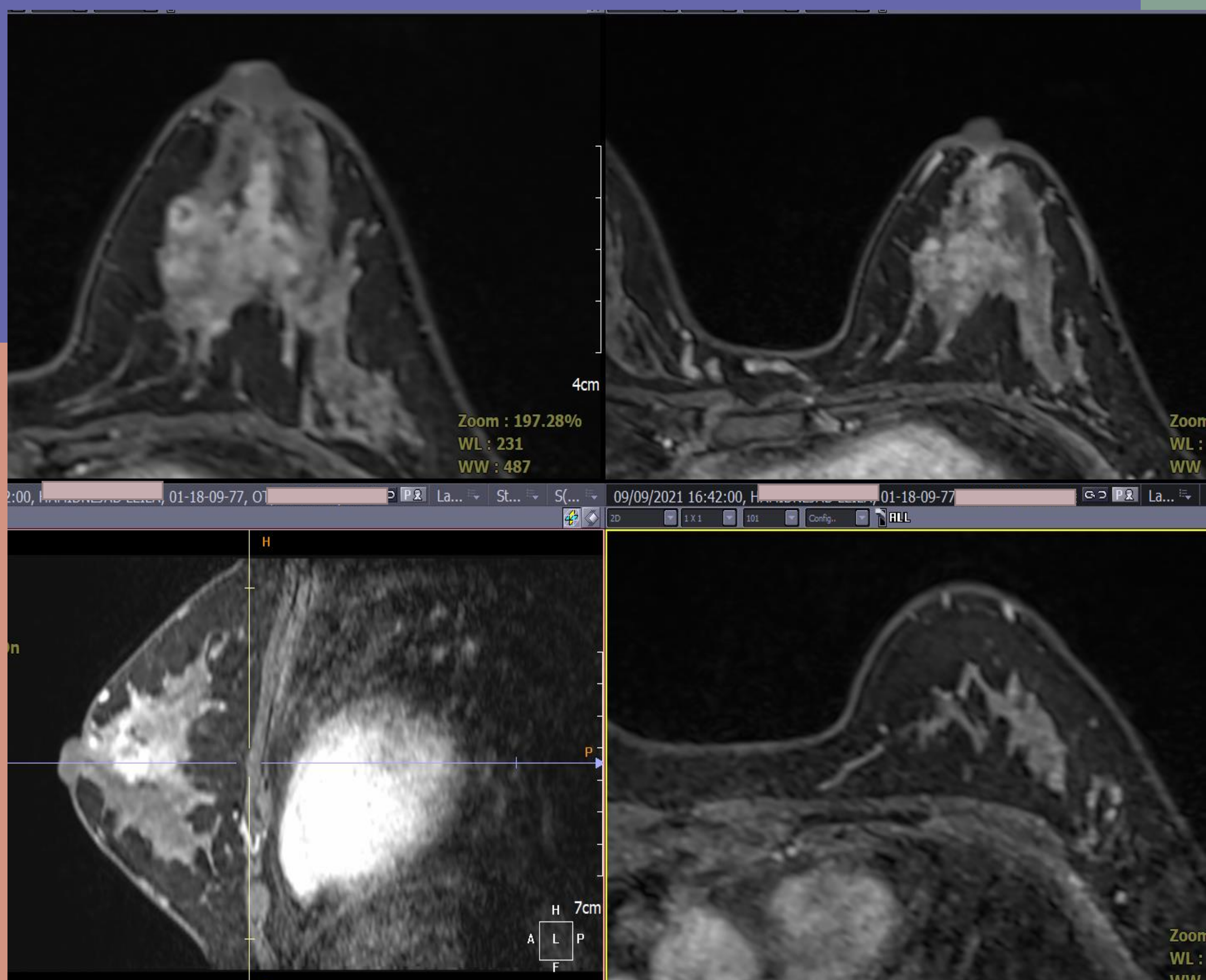
Macroscopy
Received specimen in neutral buffered formalin consists of five bar-shaped cream-brown soft tissue fragments totally measuring 5×0.1cm; ET/1

Microscopy
Histopathologic evaluation denotes the following diagnosis.

Dx: Left axillary lymph node, ultrasound-guided core needle biopsy:
- **Fragments of reactive lymph node tissue**

MRI

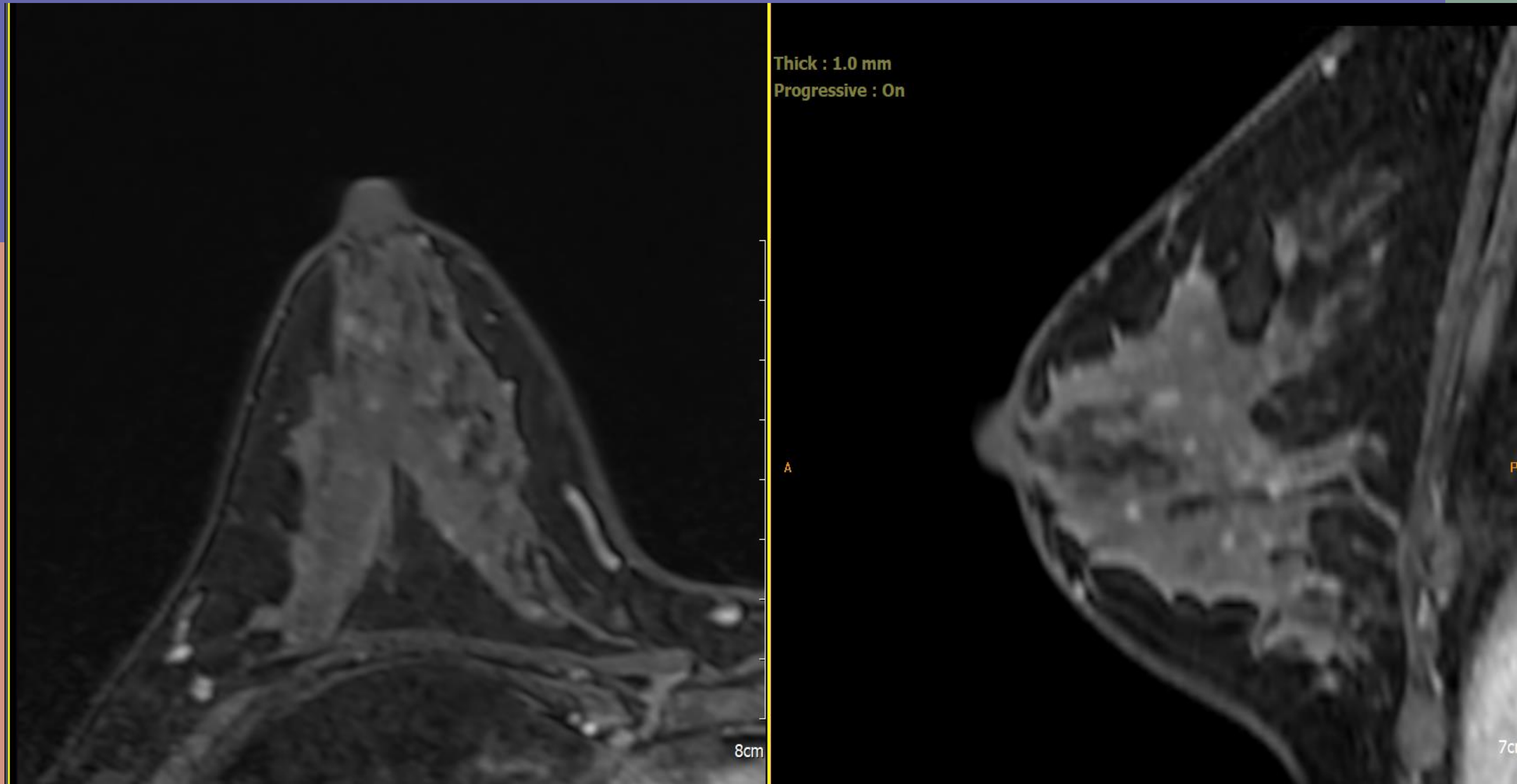
- 50x30x20 mm irregular avid enhancing areas in central and superior part
- Several scattered cysts



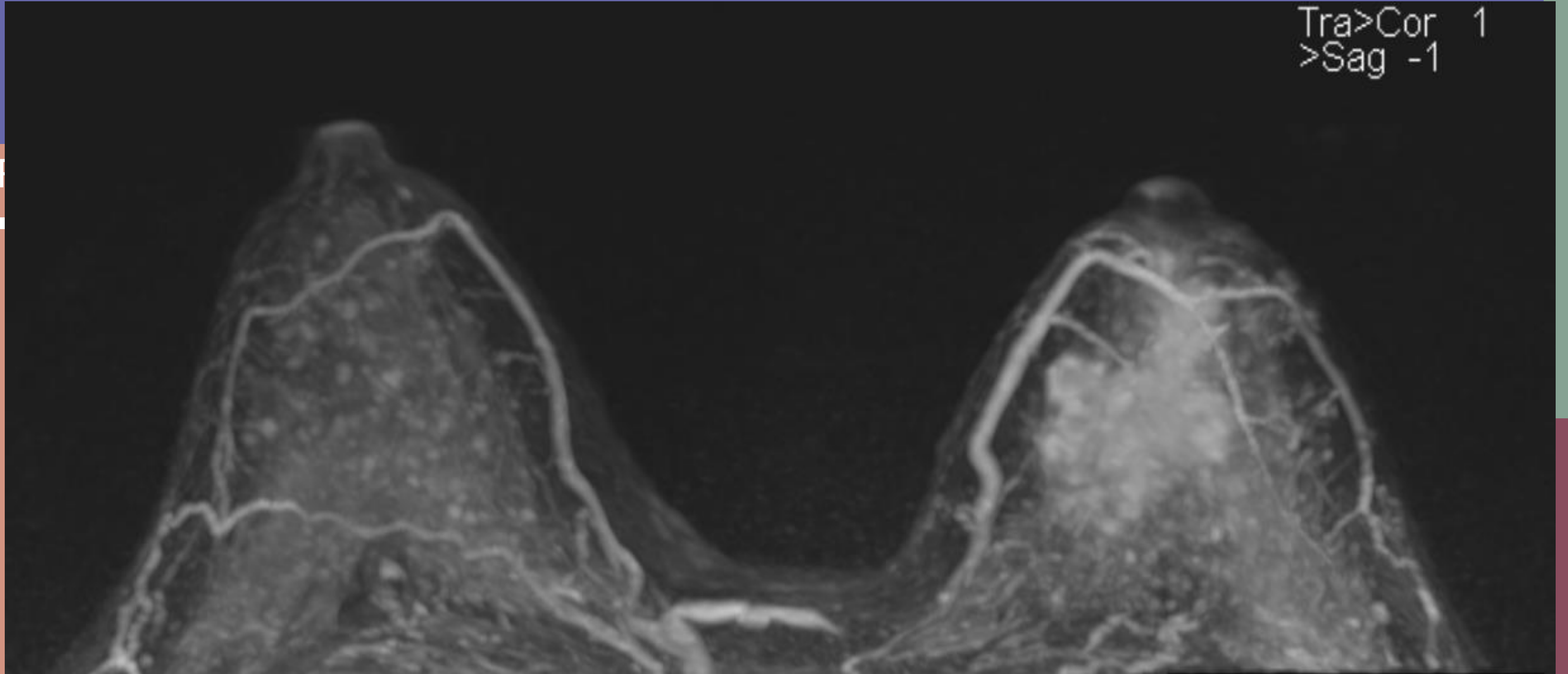
MRI

Right breast

- Multifocal enhancing foci (BIII)



MRI



SURGICAL PATHOLOGY

- Superior margin involved
- Inferior margin very closed
- Superficial margin very close
- Deep very close
- Medial margin 2mm distance
- Lateral margin not involved

B)"Left Breast lumpectomy":

-Invasive lobular carcinoma with greatest dimension of 3mm in area of extensive DCIS and LCIS spans 8x7.5 cm

-Overall Histologic Grade: 2/3 (score: 6/9)

*Glandular (Acinar)/Tubular Differentiation Score: 3

*Nuclear Pleomorphism Score: 2

*Mitotic Rate Score: 1

-Ductal Carcinoma In Situ (DCIS): Present, Positive for extensive intraductal component (EIC)

* Architectural pattern: Solid and cribriform
* Nuclear Grade: 2
* Necrosis: Not identified

-Lobular Carcinoma In Situ (LCIS): Present, classic type

-Skin: Unremarkable

-Nipple: No Paget's disease but large lactiferous ducts involved by LCIS

-Invasive carcinoma and DCIS margins:

*Superior margin: involved by invasive and in situ component, multifocal

*Superficial margin: at superior side very close, just not touch inked margin

*Inferior margin: very closed to DCIS, Just not touch inked margin

*Deep margin: very close to DCIS, just not touch inked margin

*Medial margin: free, distance to DCIS: 2 mm

*Lateral margin: More than 1cm distance

-Lymphovascular Invasion: Not seen

-Dermal Lymphovascular Invasion: Not seen

-Additional Pathologic Findings: Three intramammary lymph nodes without tumoral involvement

-Microcalcifications: Not identified

-Pathologic Stage Classification (pTNM, AJCC 8th Edition): pT1a pN0

Biomarkers:

ER: Strongly positive in 90-100% of tumor cells

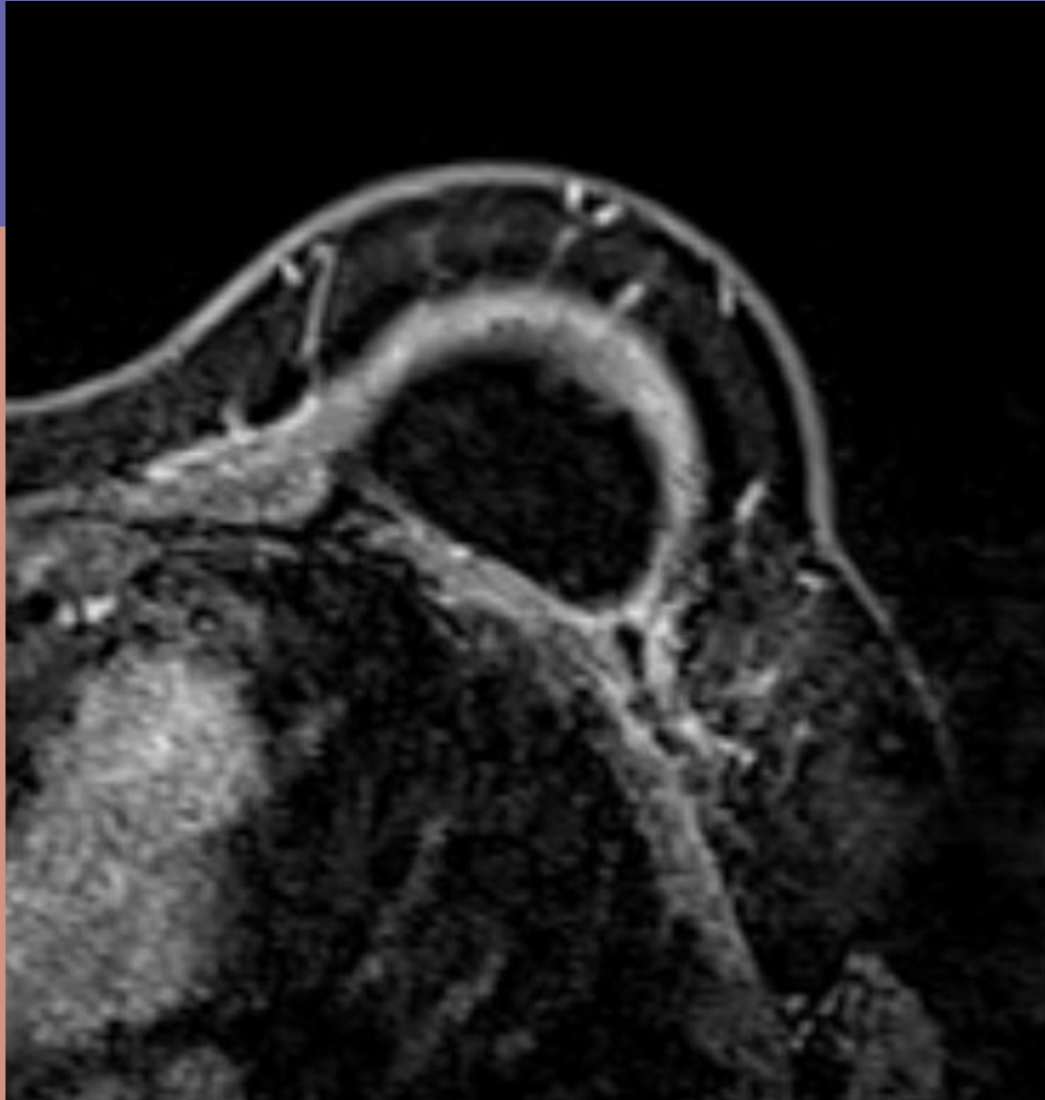
PR: Strongly positive in 90-100% of tumor cells

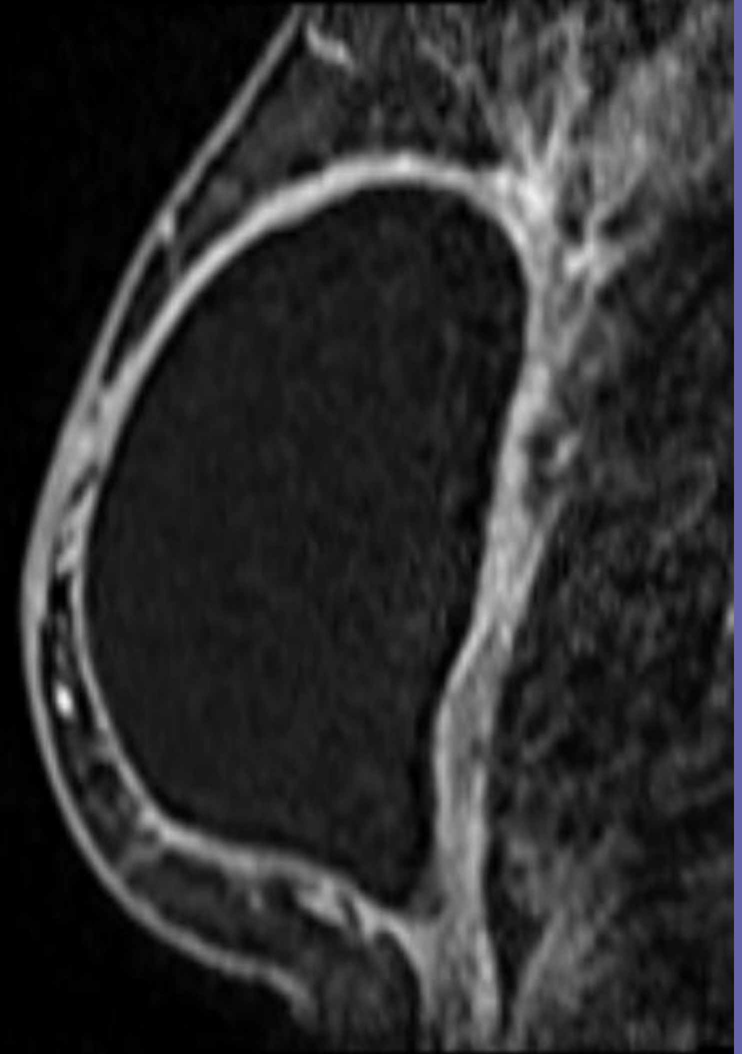
HER2: Negative (Score 0)

Ki67: Less than 5%

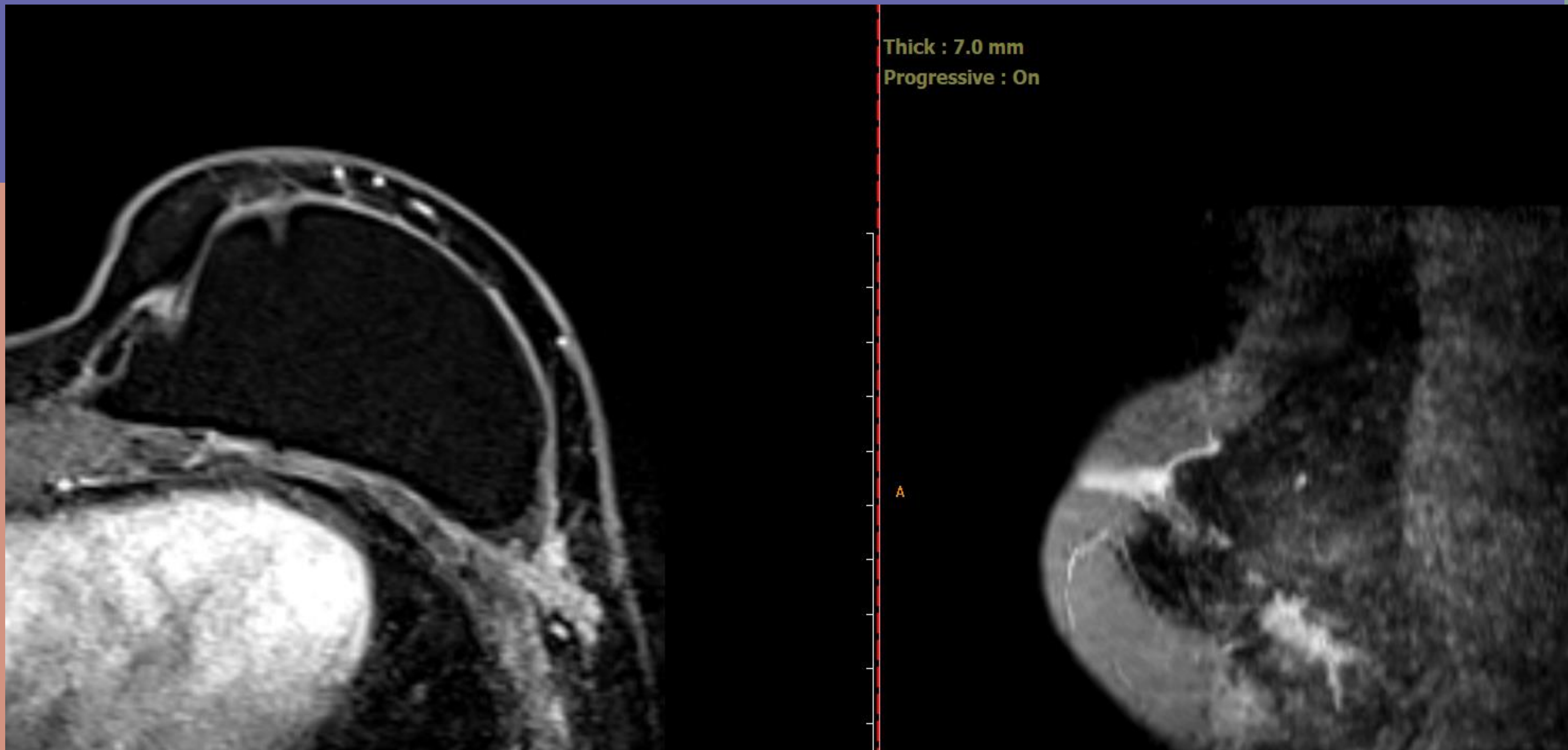
Bcatenin: Loss of membranous staining in lobular components

MRI





MRI



MRI in detection of post lumpectomy residual disease and recurrence

- Breast MRI is quite helpful in determining the extent of residual tumor after results from initial lumpectomy positive surgical margins.
- Breast MRI is most sensitive for the detection of residual disease **35–42 days after lumpectomy**.
- MRI can perform in the immediate postoperative period—**within the first week**—to assess for residual disease.
- Asymmetric enhancement in the tissue adjacent to the surgical cavity may be readily detected and may be suggestive of residual disease.

THANKS OF YOUR ATTENTION

ANY QUESTION?