



## Cases presented with teleradiology and telepathology by the local team

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oncology), C. Colpaert (pathology)

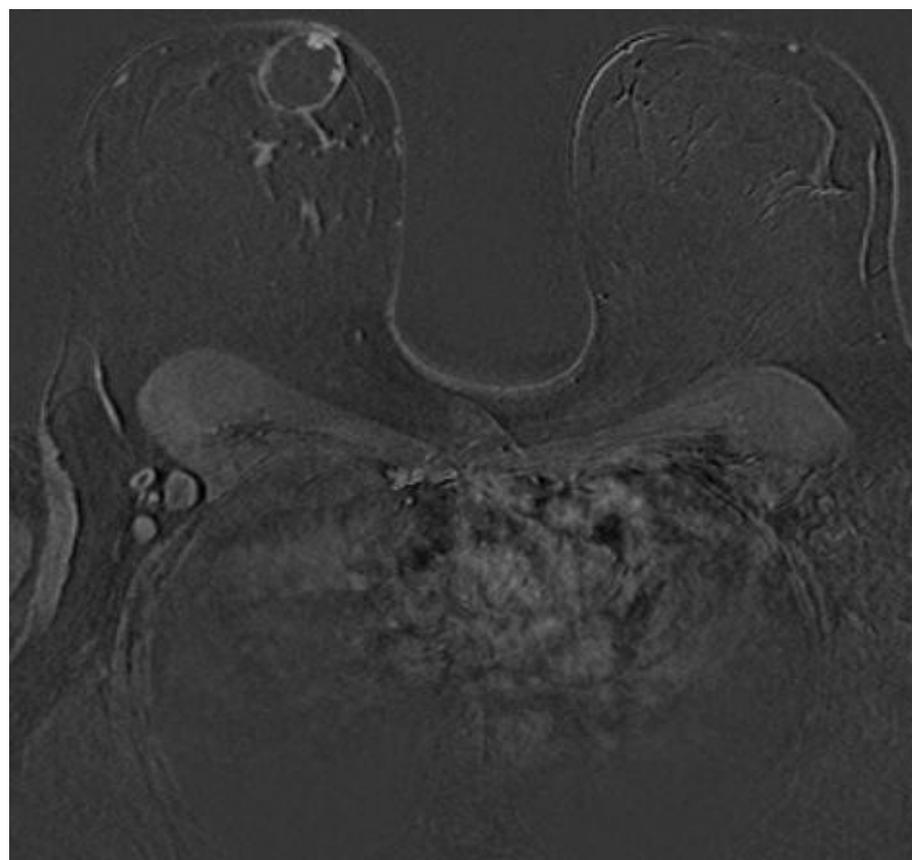
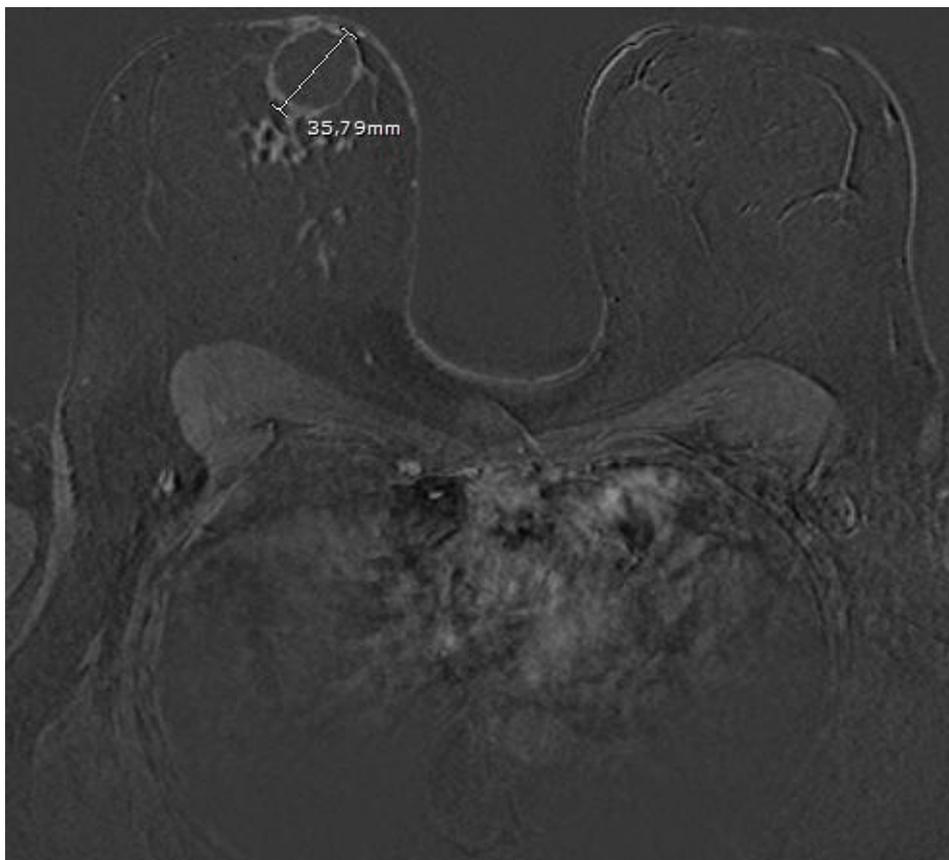
## Case 1: JA °12/3/1968 (46 years)

- Medical History
  - Mother (32y) and grandmother (50y) breast cancer
  - Hemangioma liver
- Oncologic history
  - Spring 2009: investigation “sensation of swelling” of the right breast
  - Clinical examination: no mass

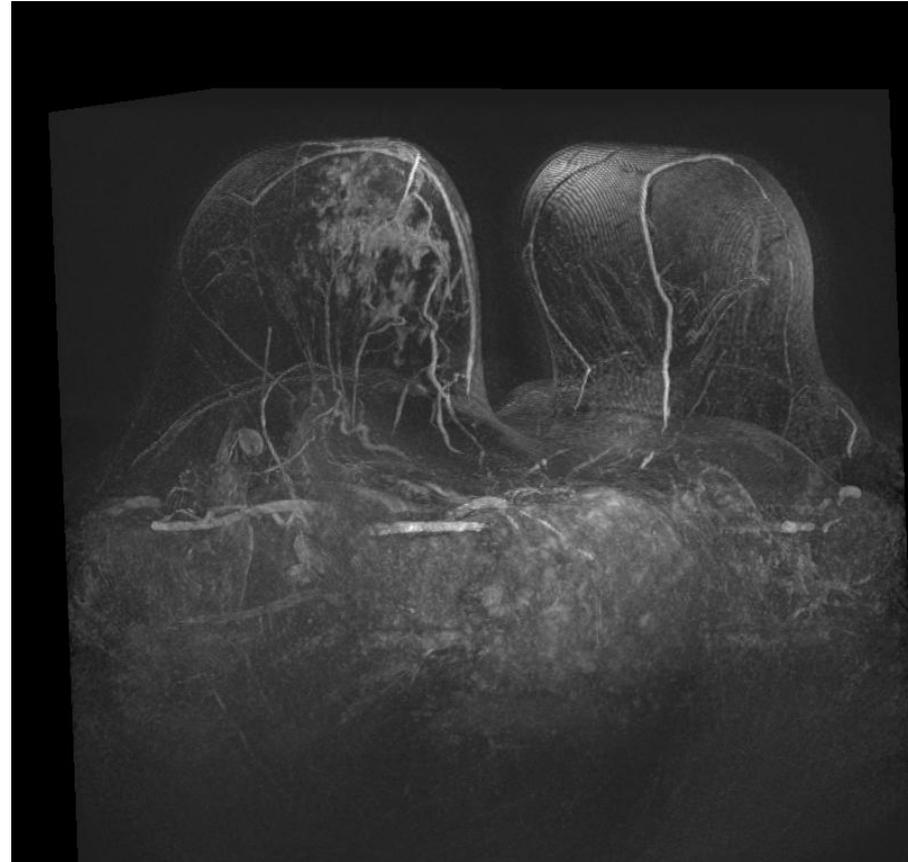
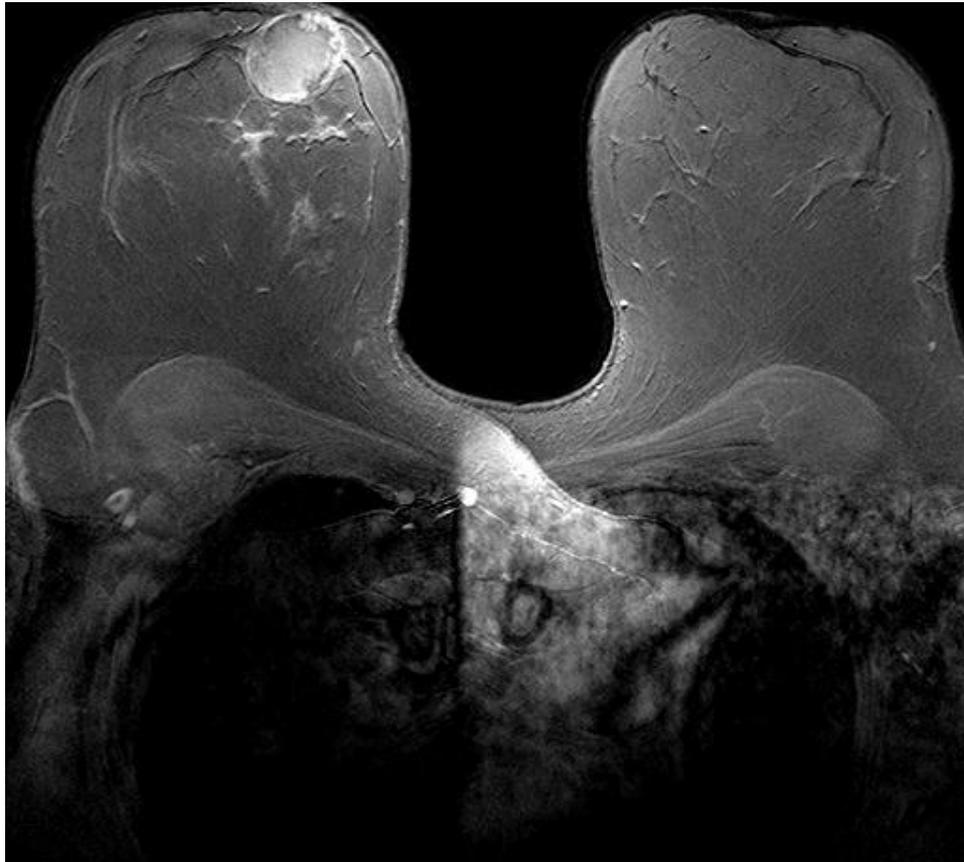
## Investigation/Staging

- MX US (other hospital)
- MRI breast
- Core biopsy

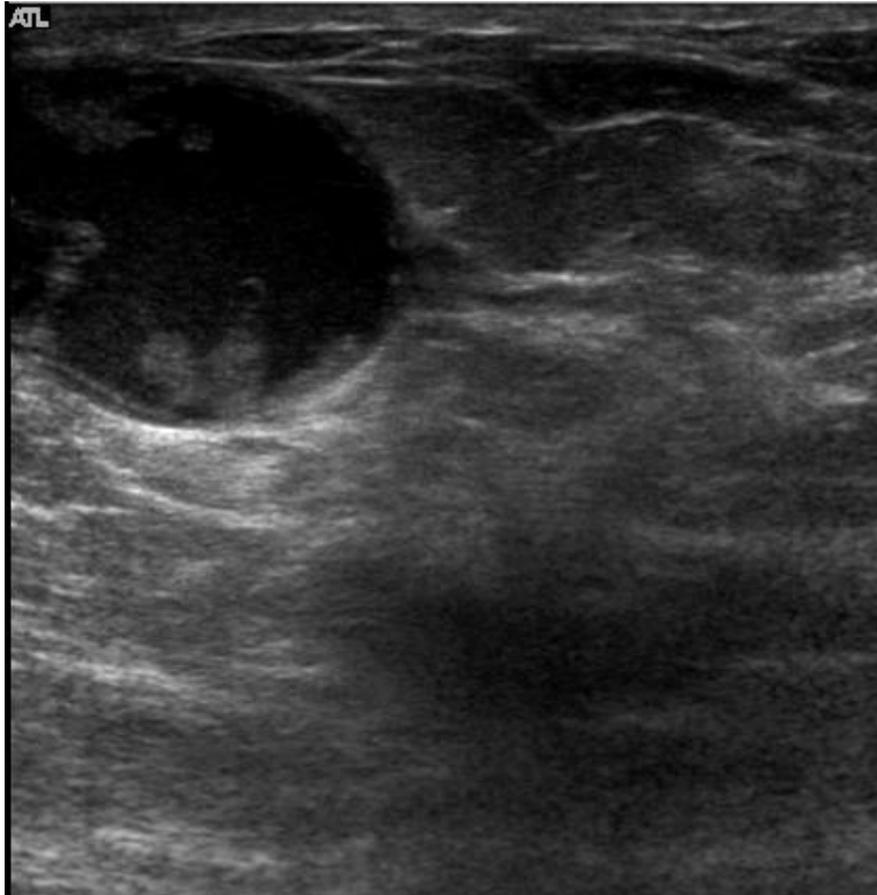
# MRI



MRI



## TRU CUT mass



- April 2009 : tumorectomy right breast+Sn procedure:  
pT1apN0M0, extensive DCIS with 3 invasive foci IDA G2  
(2, 3 and 5 mm), margins involved, ER 2/8 PR 2/8  
HER2 0
- Sn: 0/6
- BRCA : -

## What would you do?

- Mastectomy
- Radiotherapy
- Chemotherapy
- Hormonal treatment
- Other



## Pathology

- Tumorectomy: extensive DCIS with 3 invasive foci IDA G2 ( 2, 3 and 5 mm)
- Mastectomy 19/5/2009

- Mastectomy (no residual tu) –ALND (0/12)
- 6 cycles CEF
- Tamoxifen

- **2/2014** : rising CA 15.3 : 77, nl liver tests
- Investigation
  - CT scan chest – liver
  - PET scan
  - MRI : liver lesion : right lobe

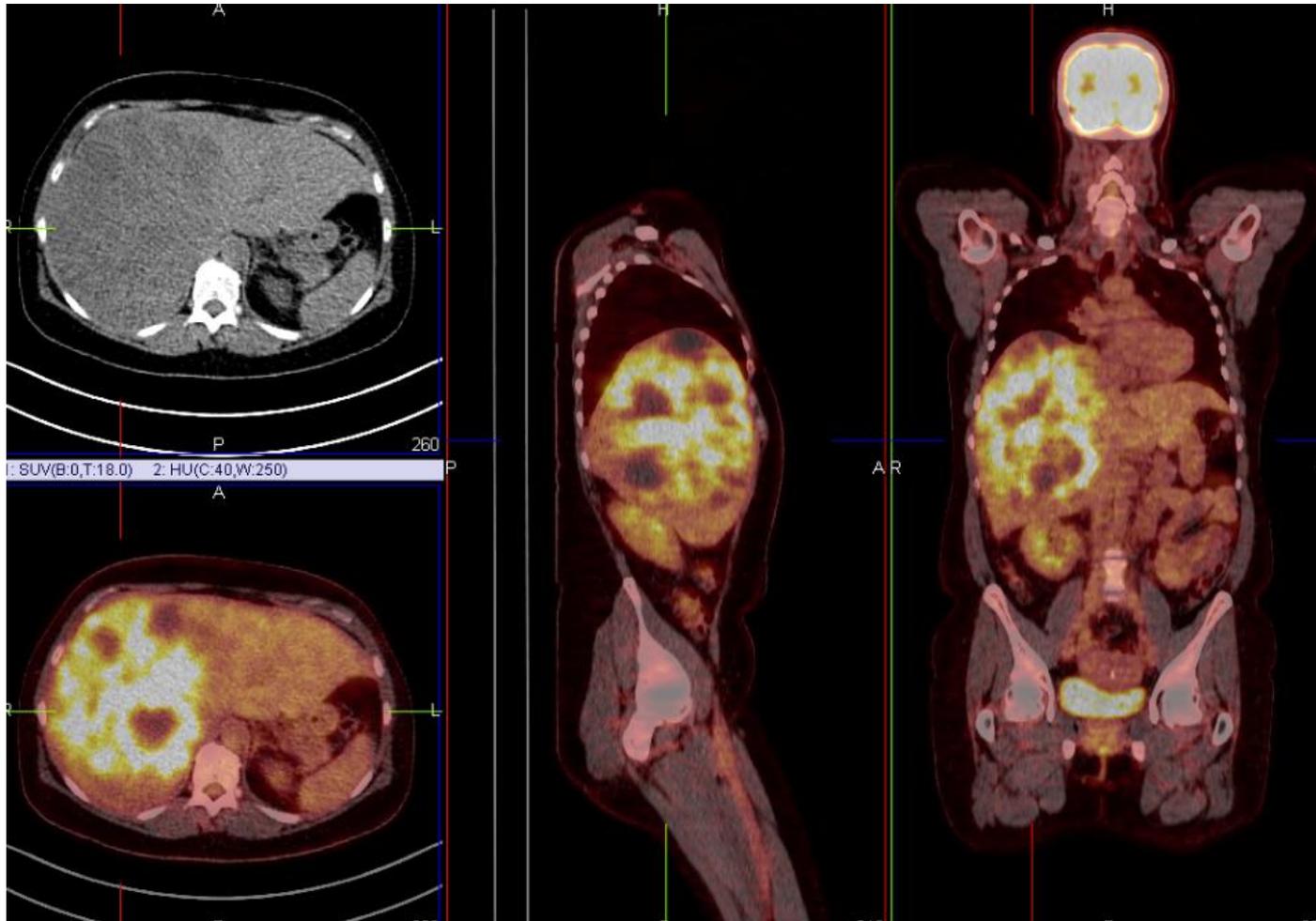
## Imaging : MRI liver

- 24/3/2014 (CT scan)
- 29/10/2014

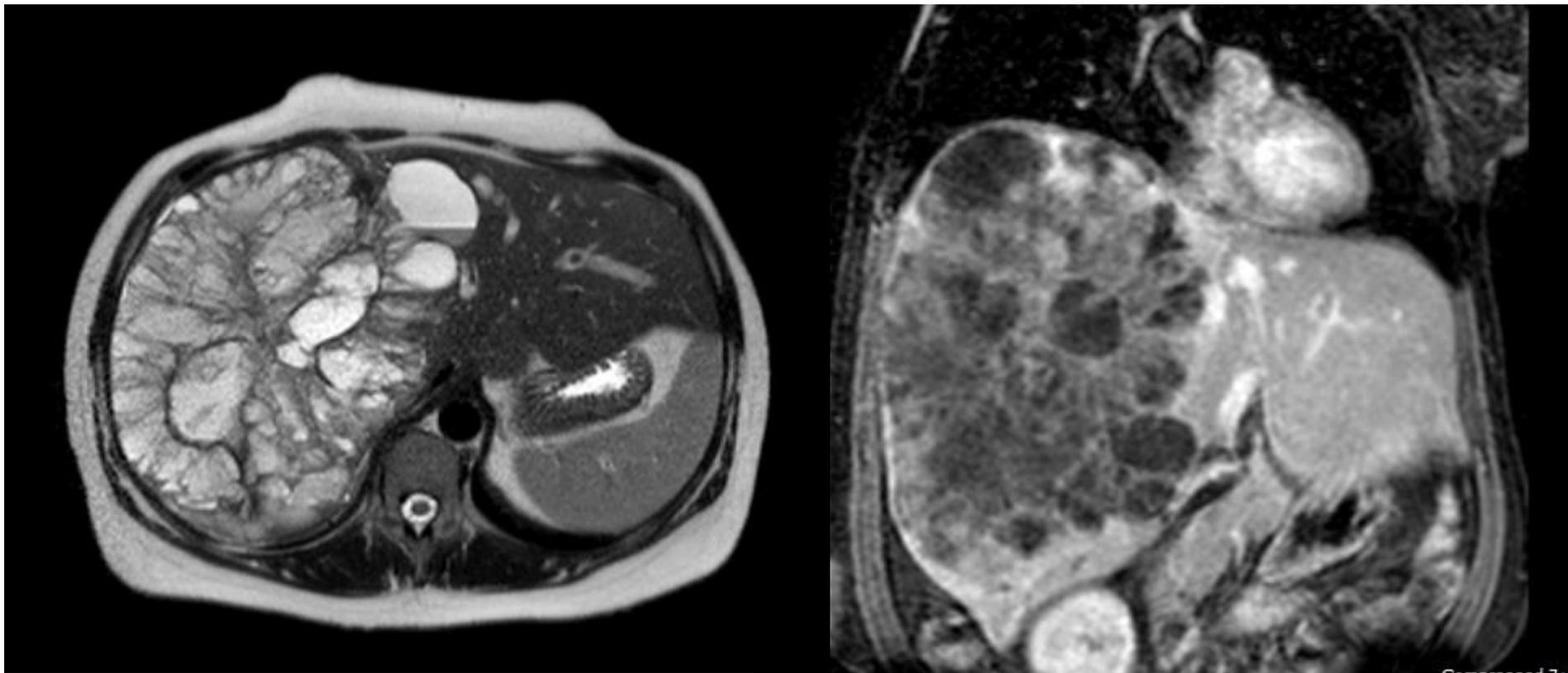
CT



# PET-CT



## MRI liver



## Pathology liver

- Second opinion (UZ Gent):
  - Liver metastasis from breast cancer: GATA3+, ER+,
  - 3 liver specific antigens -

## What would you do

- Chemotherapy / systemic treatment
- Resection
- Chemo and resection
- Other



- Evaluation after 12 weeks Paclitaxel
  - Stable disease
  
- Evaluation after 3 cycles Carboplatinum-Vinorelbine
  - Stable disease

- Resection was performed:
  - Right hemi hepatectomy: metastatic breast cancer, ER+; PR-, Her2neu negative, margins are free
- What to do next week?

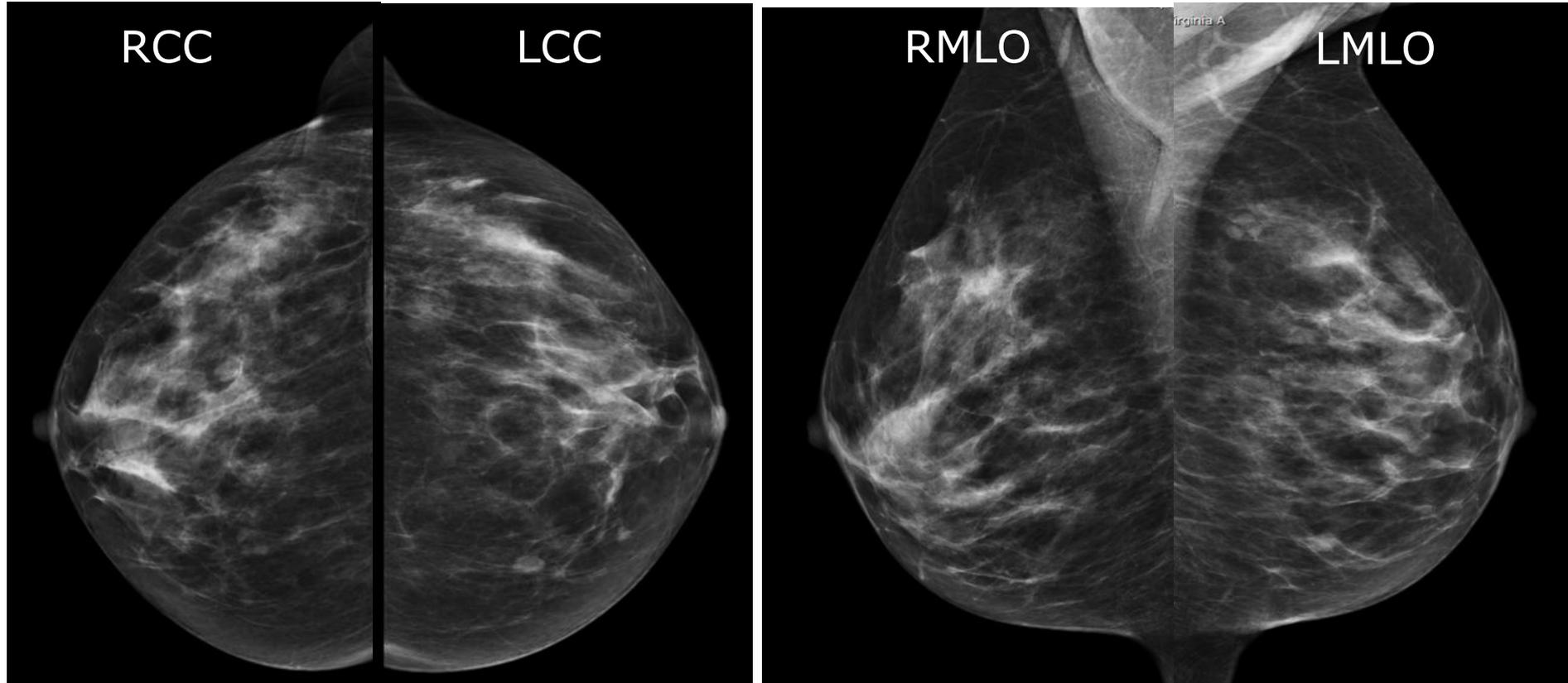
## Case 2: SVH (°02/06/1961).

- Relevant patient history:
  - Family: paternal aunt with breast cancer at 60 yrs.
  - Medical: hypertension.
  - Surgical: -
  - A0P0G0.
  - Medication: Nobiten.
  - Allergy: -
  - Smoking: -

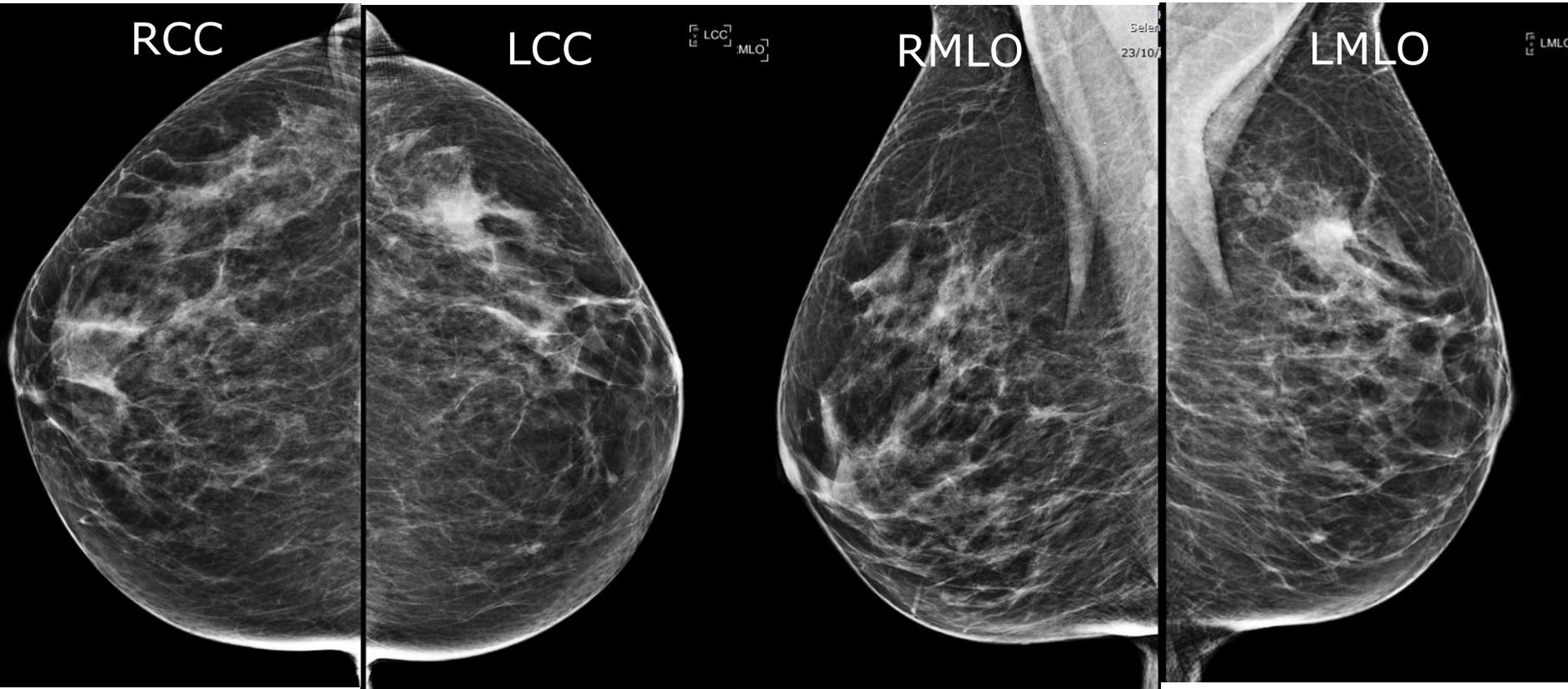
## Case 2: SVH (°02/06/1961).

- Investigations:
  - Clinical examination: palpable, mobile nodule in left breast at 2h (2.0 x 2.0 cm), no skin retraction, cN0.
  - MX US (23/10/2014): tumor (20 mm) peripherally at 2h in the left breast with a little satellite nodule of 7 mm. cN0.
  - MRI (24/10/2014): solitary tumor in the upper, outer quadrant of the left breast with maximal diameter of 1.9 cm. No other lesions. No adenopathy.
  - US abdomen (30/10/2014): normal.
  - Chest X-ray (30/10/2014): normal.
  - Bone scan (29/10/2014): normal.

## Screening MX 2 years before



MX



23/10/2014

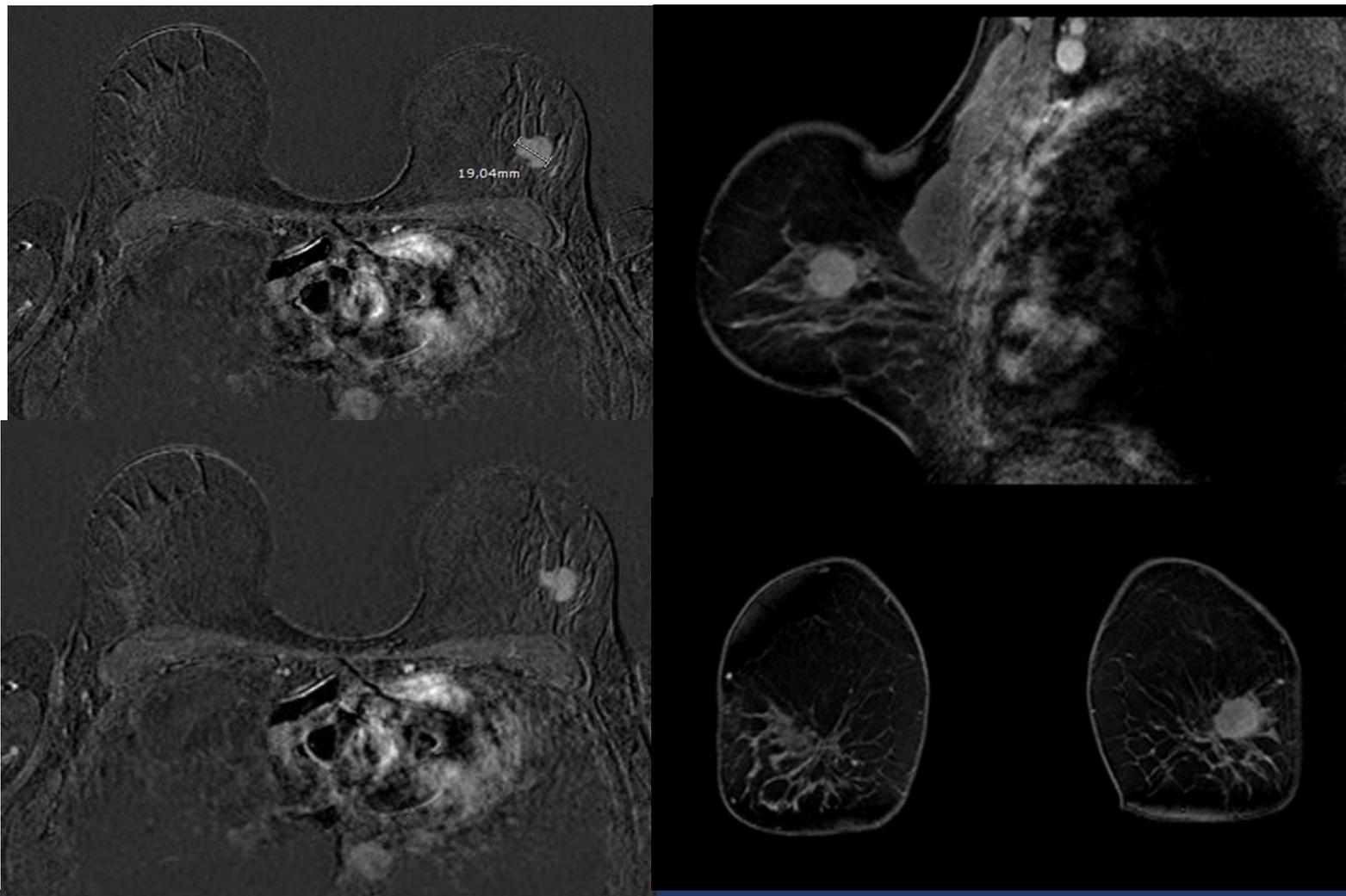
US



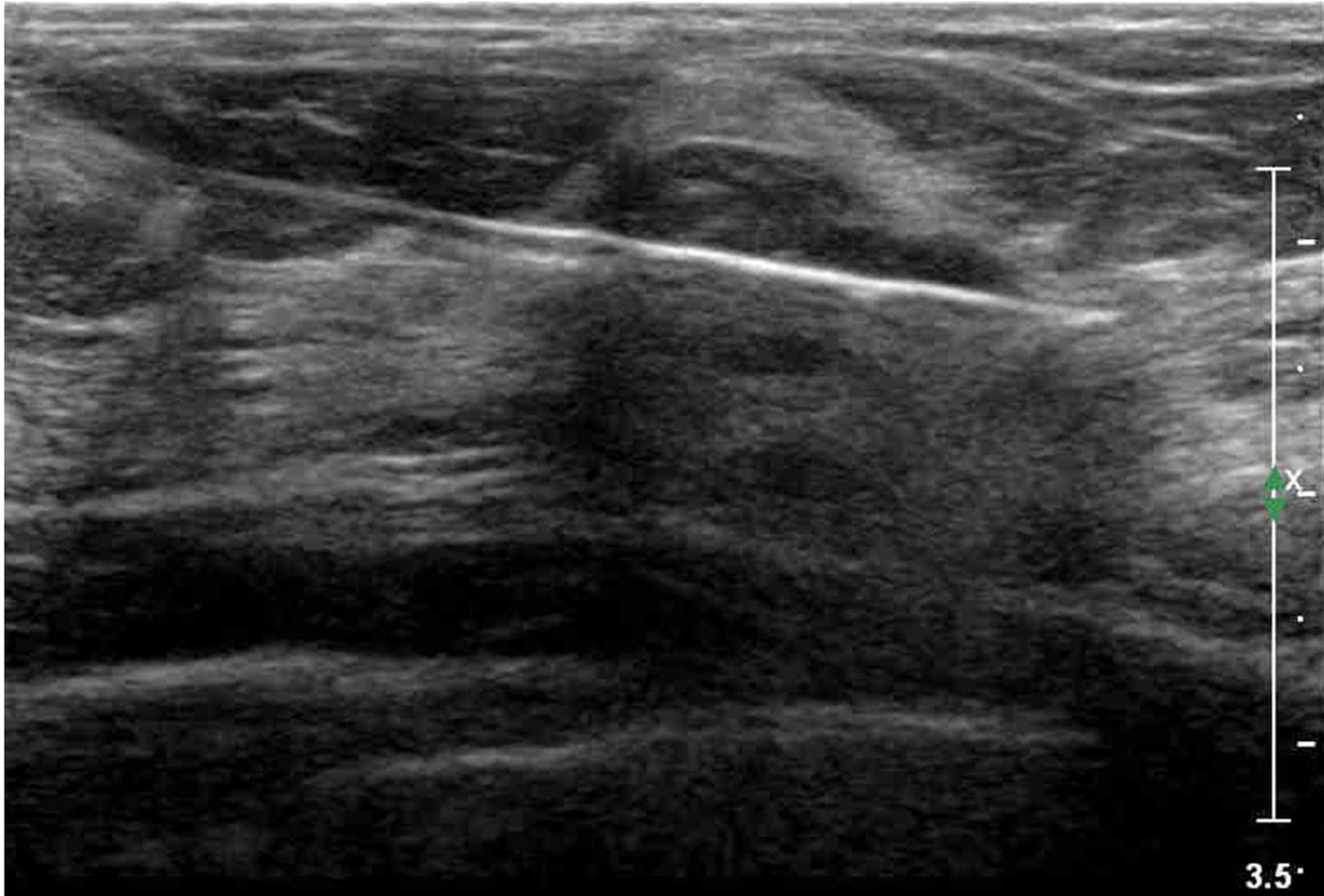
US



# MRI



# CORE BIOPSY



## Pre-operative staging: conclusion.

- IDA grade 2, ER 8/8, PR 8/8, HER-2 2+ but SISH negative.
- **cT1c cN0 cM0.**

## BCS + SLND on 04/11/2014.

- IDA grade 2, maximal diameter 1.8 cm.
- LVI+.
- ER 8/8, PR 8/8, HER-2 2+ but SISH negative.
- One of two SLNs positive with macroM+ of 3.5 mm.
- **pT1c pN1a(sn)**.

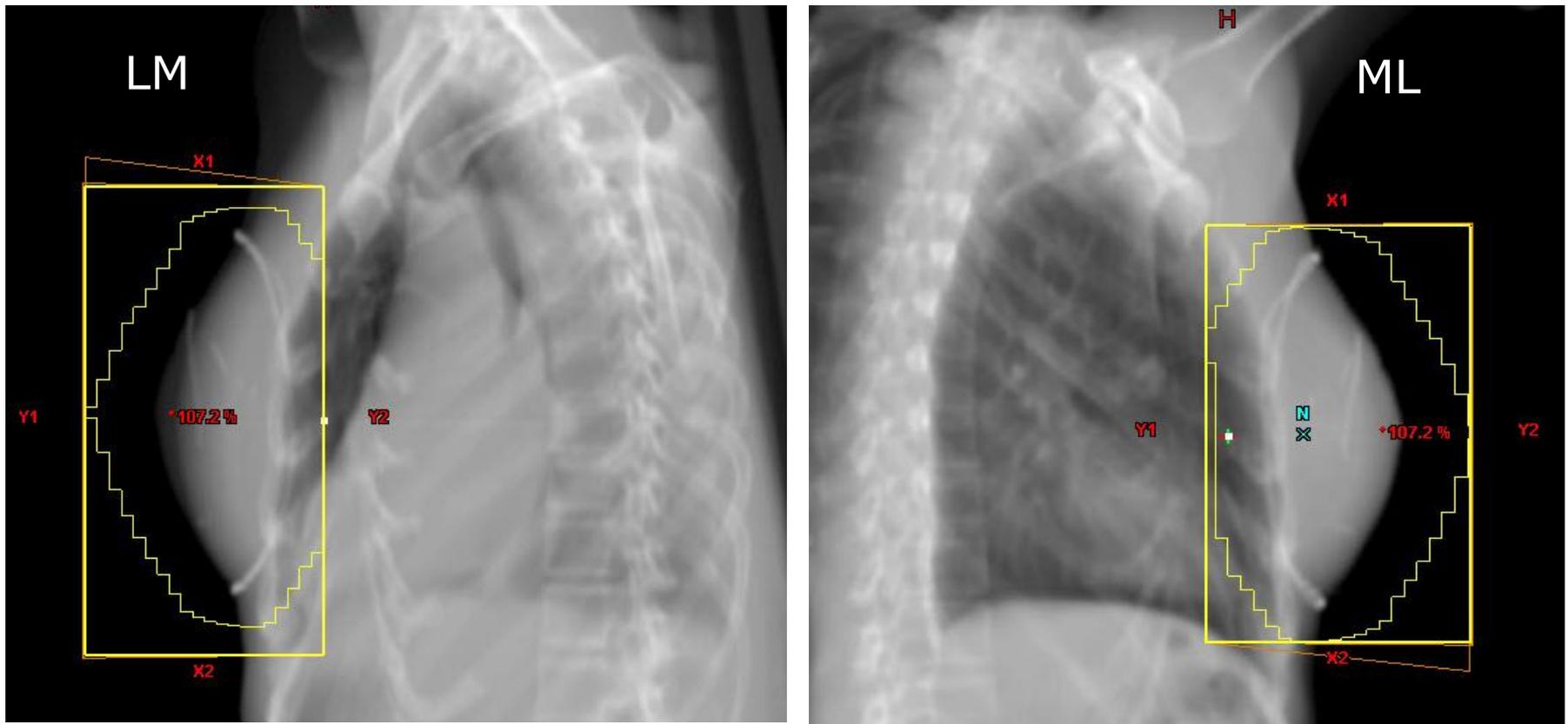
## What now?

- Further ALND or not?
- Adjuvant chemotherapy or not?
- Radiotherapy:
  - Whole-breast radiotherapy alone.
  - Whole-breast + IM-MS radiotherapy.
  - Whole-breast + axillary radiotherapy.
  - Whole-breast + IM-MS + axillary radiotherapy.
- Hormonal therapy.

## Multidisciplinary discussion.

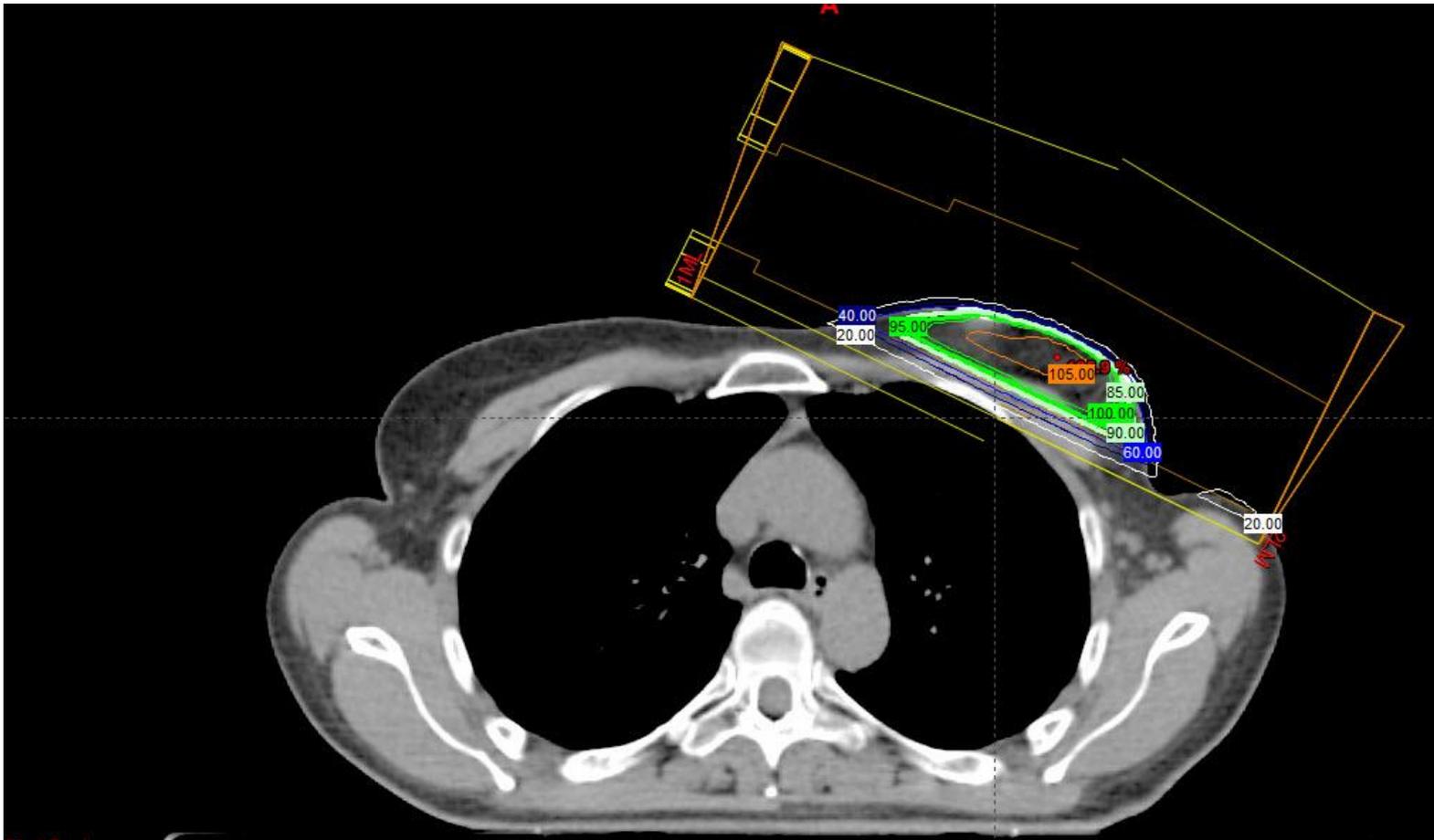
- No further ALND.
- No adjuvant chemotherapy.
- Whole-breast radiotherapy alone, without explicit nodal irradiation. Not even what is called “high tangents”.
- Hormonal treatment: 5 yrs AI + 5 yrs Tam.

## RT fields (1).



High targets = cranial border  $\leq$  2 cm from the humeral head.<sup>ref</sup>

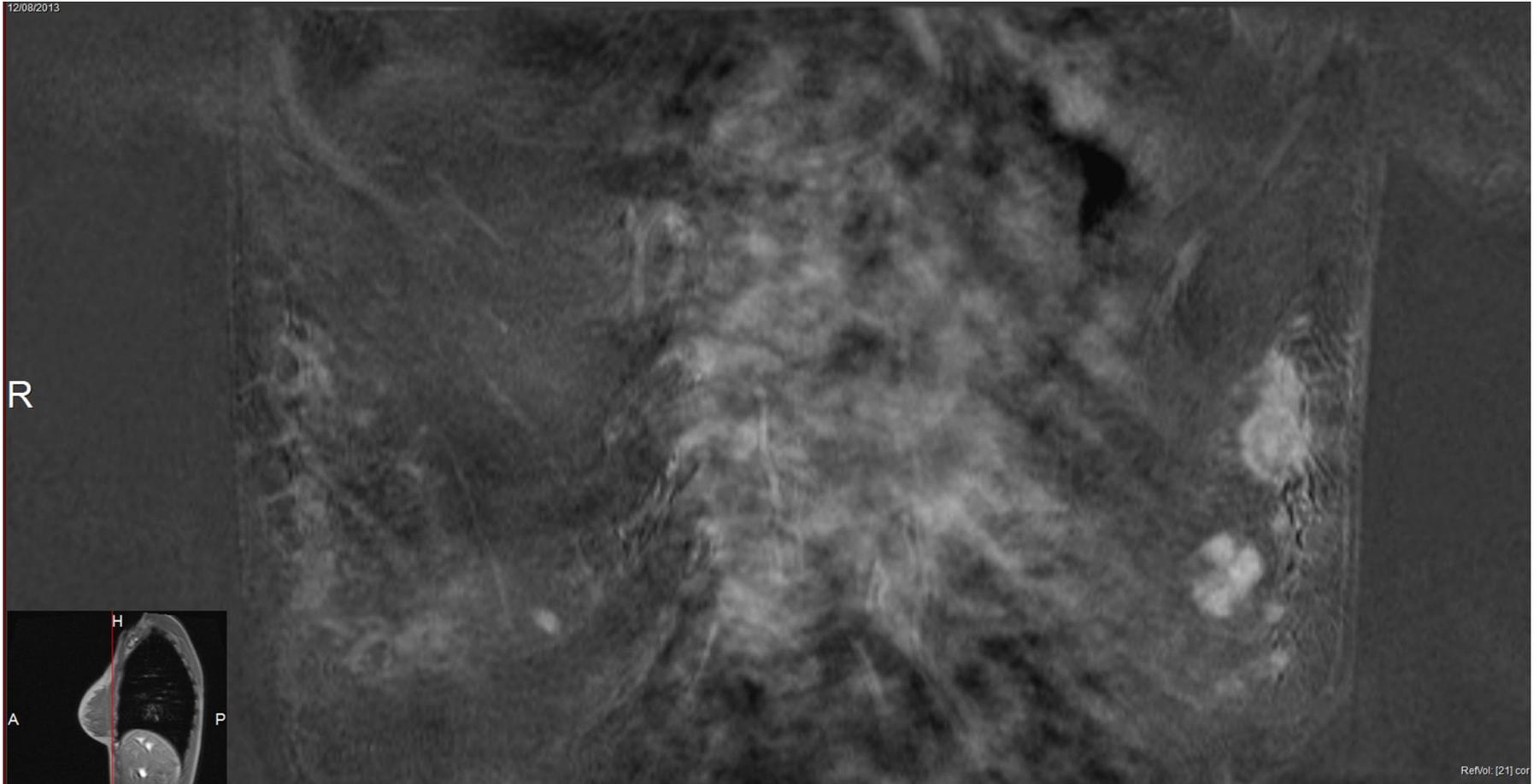
## RT fields (2).



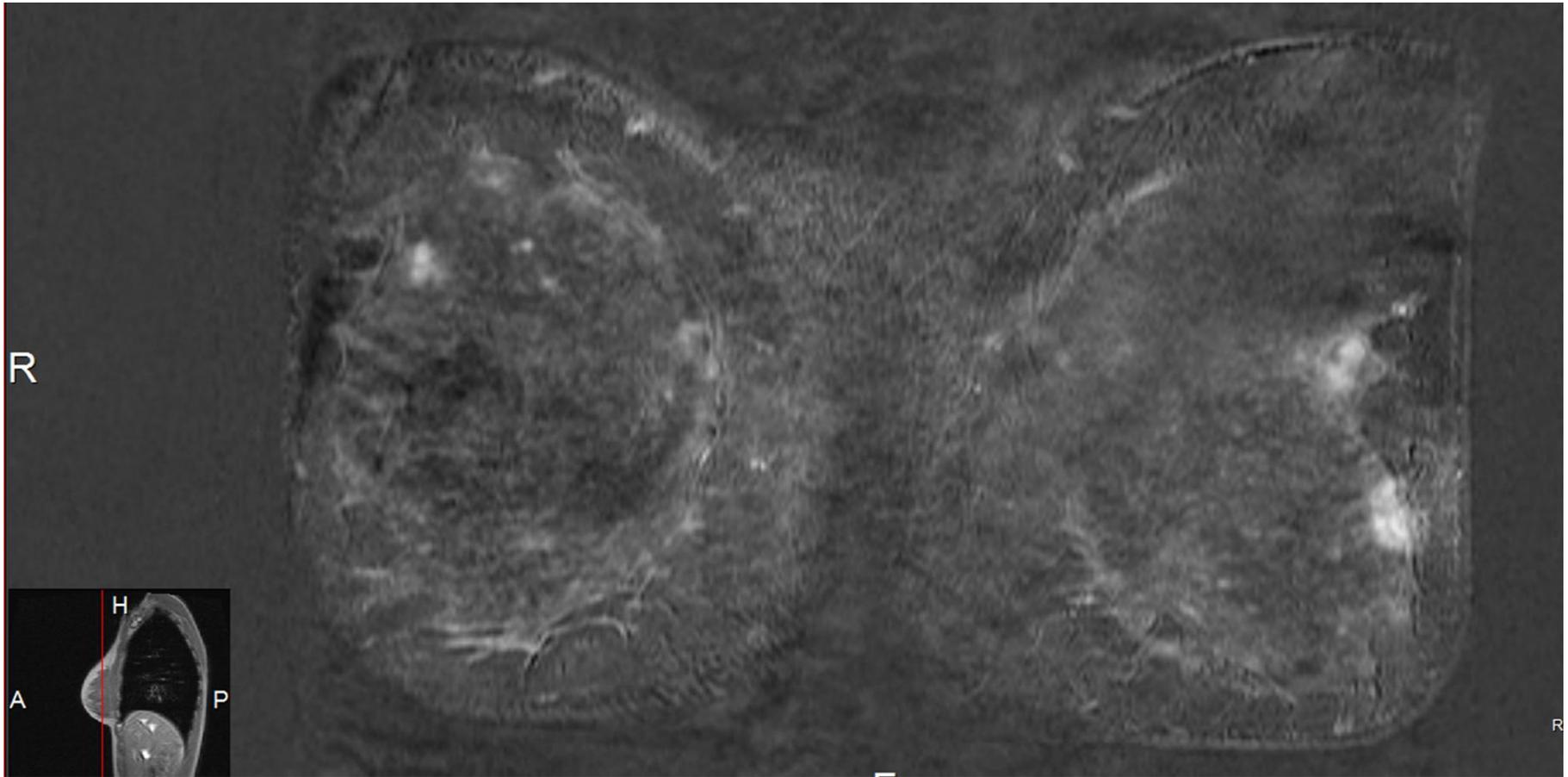
## Case 3: HW °28/04/1980

- **Previous oncological history:** nil
- **Medical history:** G0P0A0
- **Familial history:** nil
- **Current problem:** palpates mass in left breast, referred because diagnosis IDC
- **Physical examination 2/8/2013:**
  - Normal palpation of the right breast and no lymphadeneopathy
  - Mass 3 cm superolateral in the left breast, suspicious left axillary nodes
  - T2N1Mx
- **Imaging:**
  - MX US (other hospital): lesion SL left breast and suspicious lymph node 9 mm left axilla
  - MRI 12/8/2013: lesion 50 mm lateral part left breast

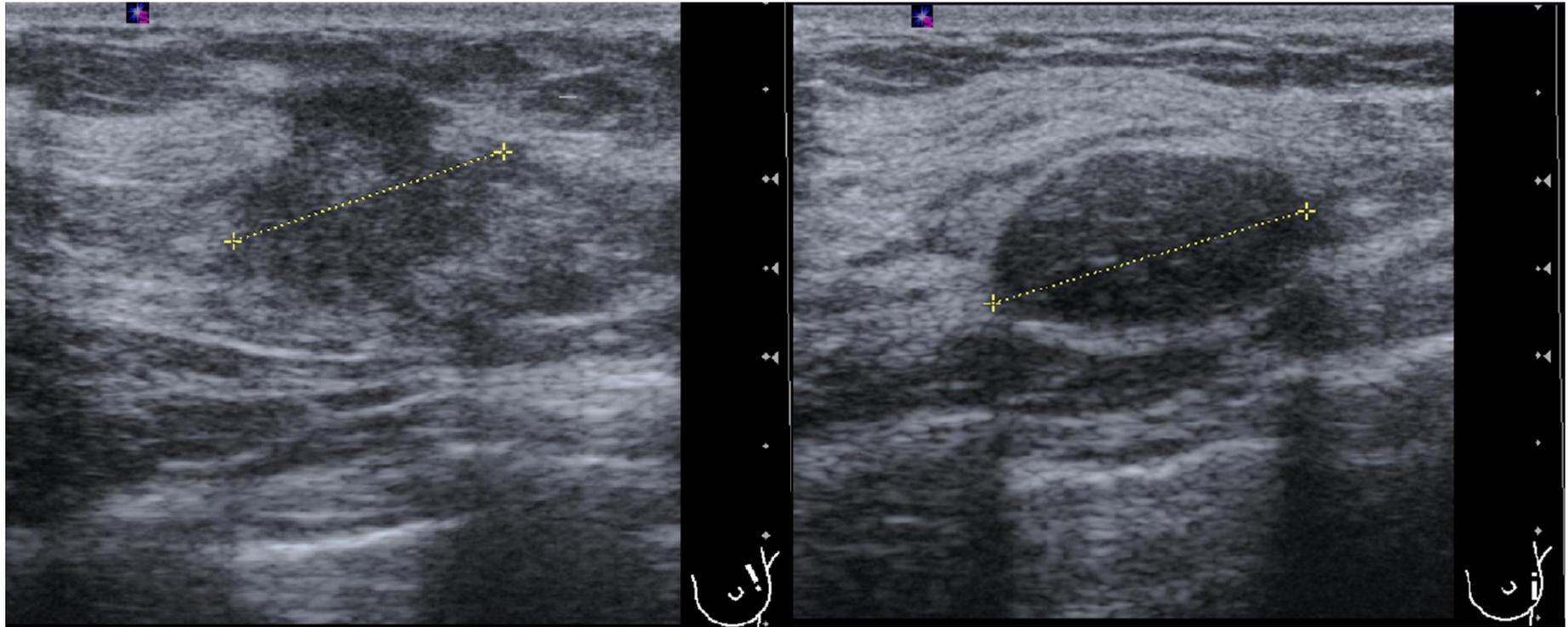
**MRI 12-8-2013**



**MRI 12-8-2013**



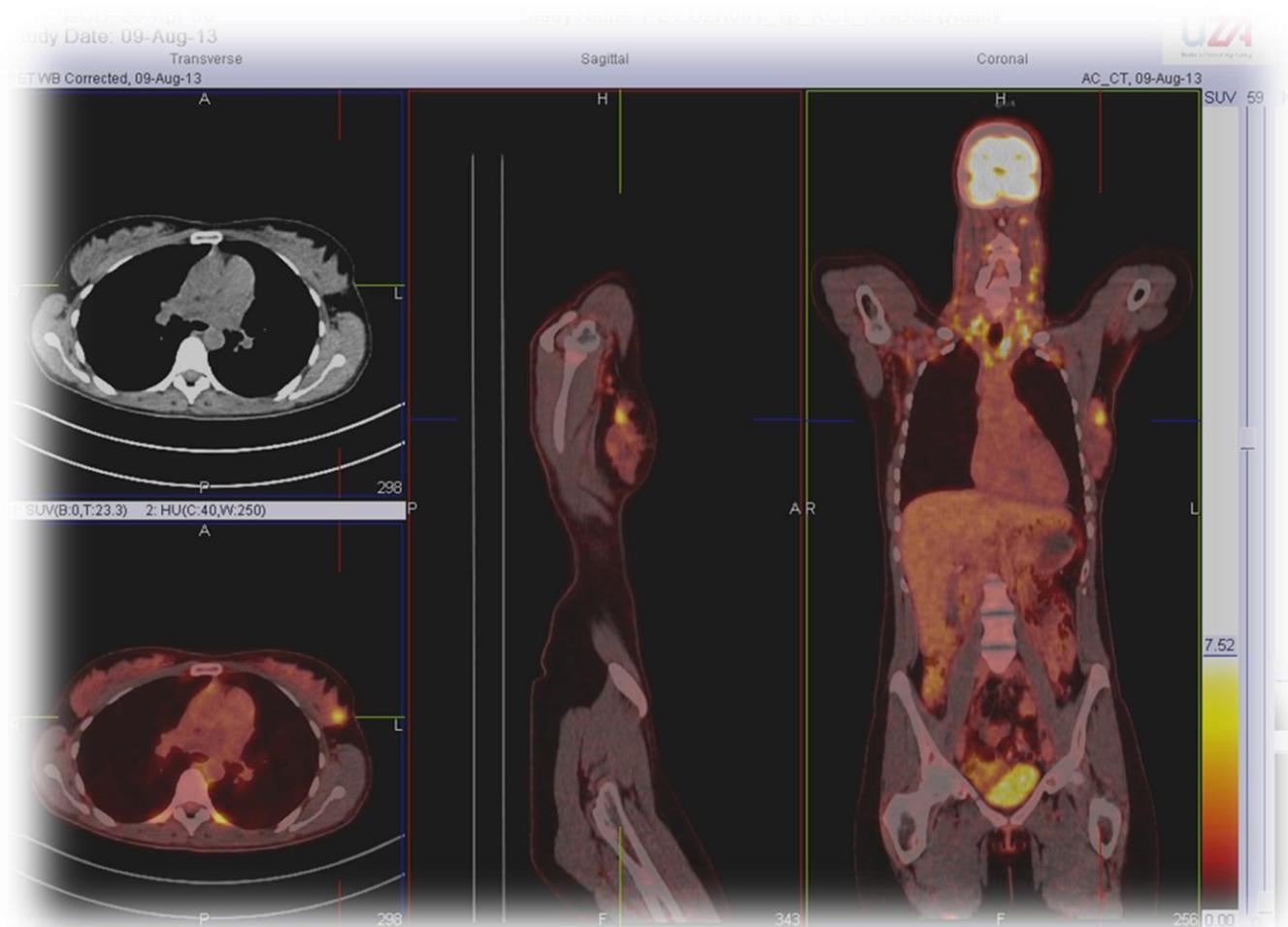
- **CORE BIOPSY: mass left +, LN +, right breast: FA**



## Case 3: HW °28/04/1980

- **Ultrasound guided core biopsy:**
  - Grade III IDC, ER 50%, and PR 10%, Her-2 1+, Ki67 > 80%
  - FNAC axillary lymph node: metastatic cells
  
- **Staging:**
  - **PET-CT 12/8/2013:** suspicious mass in the left breast, dsuspicious FDG captation of 3 left axillary lymph nodes, no distant metastasis
  - Boscintigraphy 13/8/2013, chest Xray 7/8/2013 and ultrasound liver normal

# PET-CT 12-8-2013



## Case 3: HW °28/04/1980

### – What would you do ?

- Primary BCS with sentinel node biopsy procedure
- Primary BCS with sentinel node biopsy and complete axillary clearance
- Primary mastectomy with sentinel node biopsy procedure
- Primary mastectomy and complete axillary clearance
- Neoadjuvant chemotherapy

Is there a need for genetic testing ?

## Case 3: HW °28/04/1980

### – What would you do ?

- Primary BCS with sentinel node biopsy procedure
- Primary BCS with sentinel node biopsy and complete axillary clearance
- Primary mastectomy with sentinel node biopsy procedure
- Primary mastectomy and complete axillary clearance
- Neoadjuvant chemotherapy

Is there a need for genetic testing ?

## Case 3: HW °28/04/1980

**27/8/2013:** Start dose dense AC 4x followed by docetaxel with Neulasta support

**1/10/2013 PETCT:** partial respons

**20/10/13 MRI breasts:** partial respons

**5/11/2013:** switch to taxol weekly (9 cycles) because of grade III hand-foot syndrome

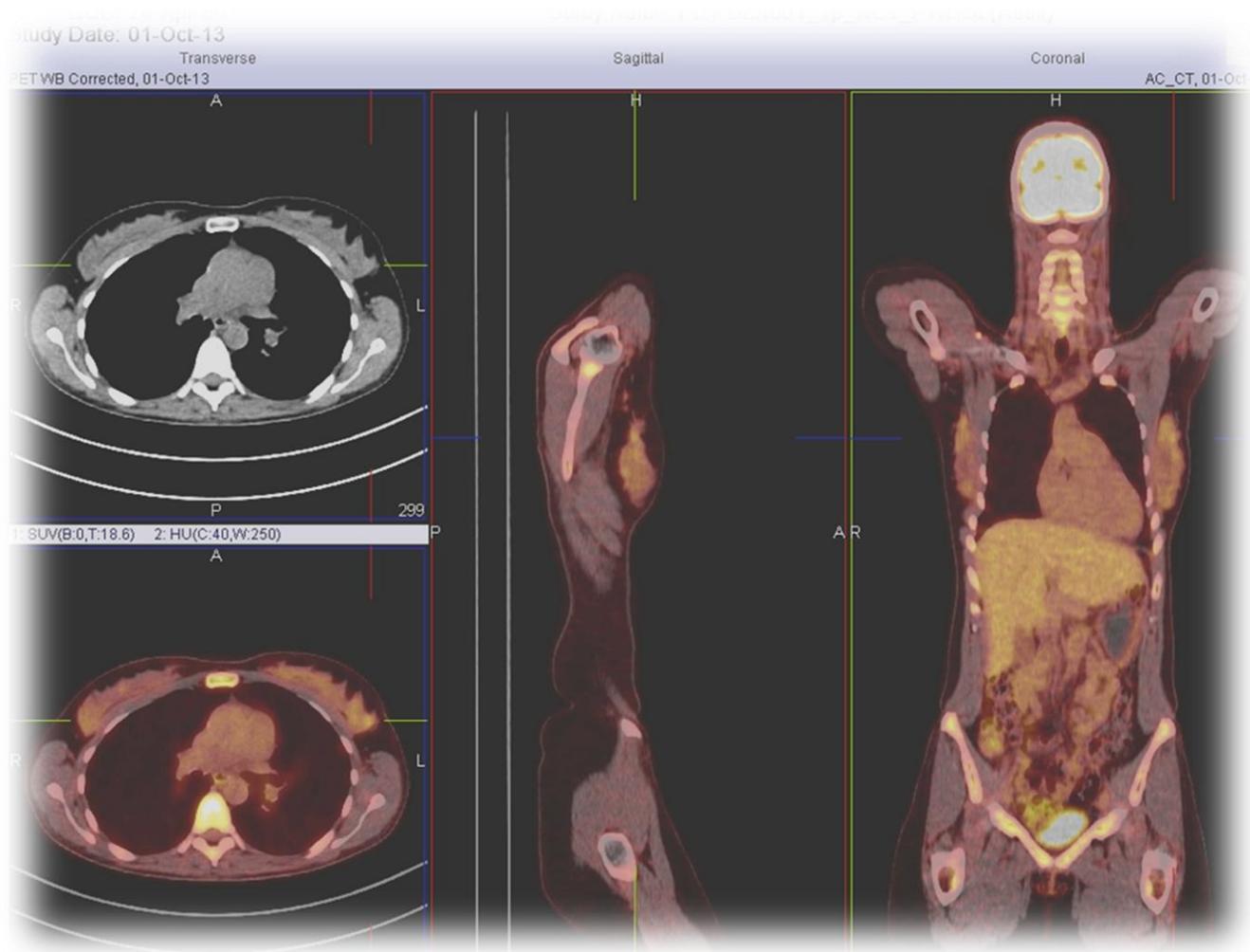
**7/1/2014 MRI breasts:** further respons

**23/1/2014:** wide local excision after guide wire localisation, sentinel node biopsy and axillary clearence level I-II

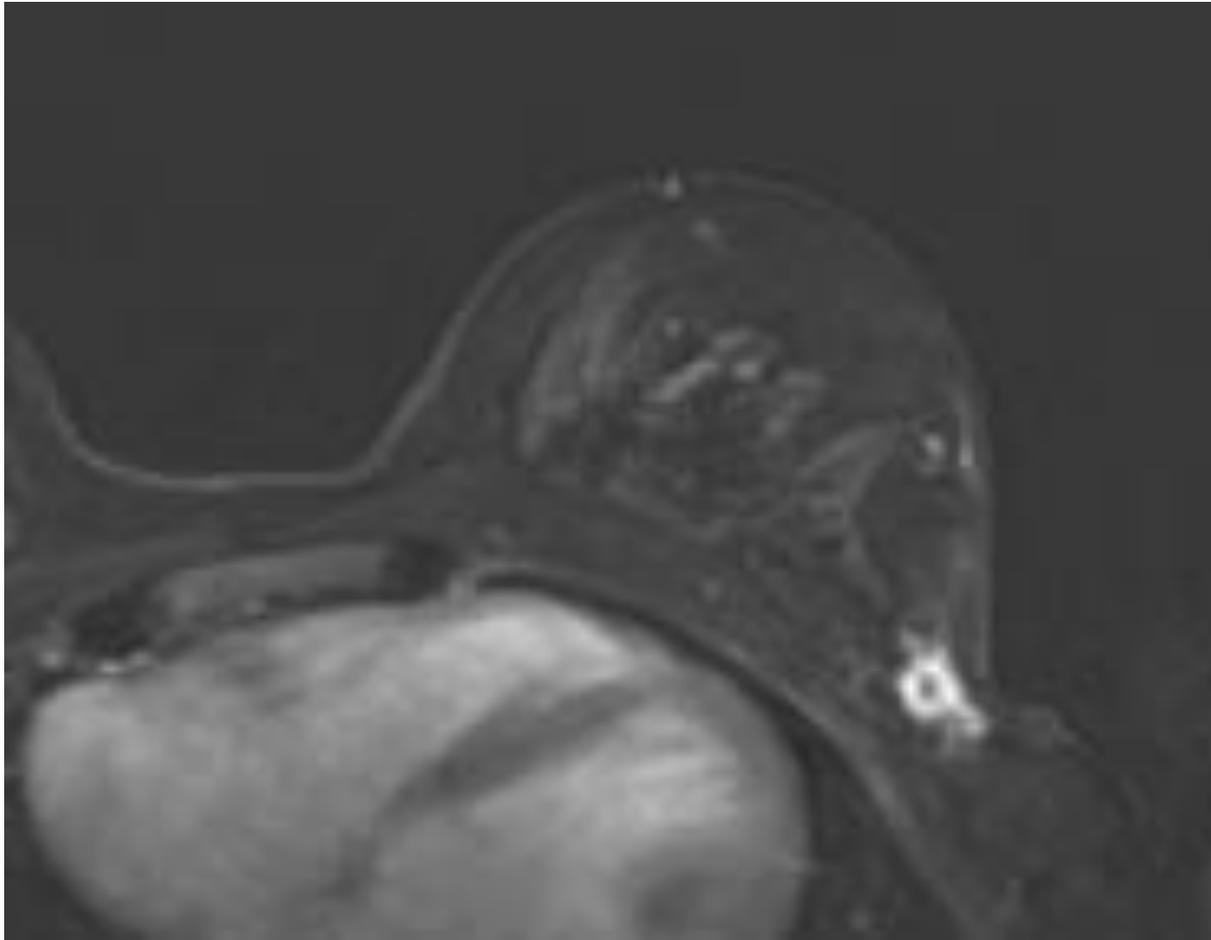
### **Pathology result:**

Focus 2 mm DCIS completely excised, fibrous tissue tumor bed.  
Sentinel node and 7 further nodes negative : yPTisPN0M0

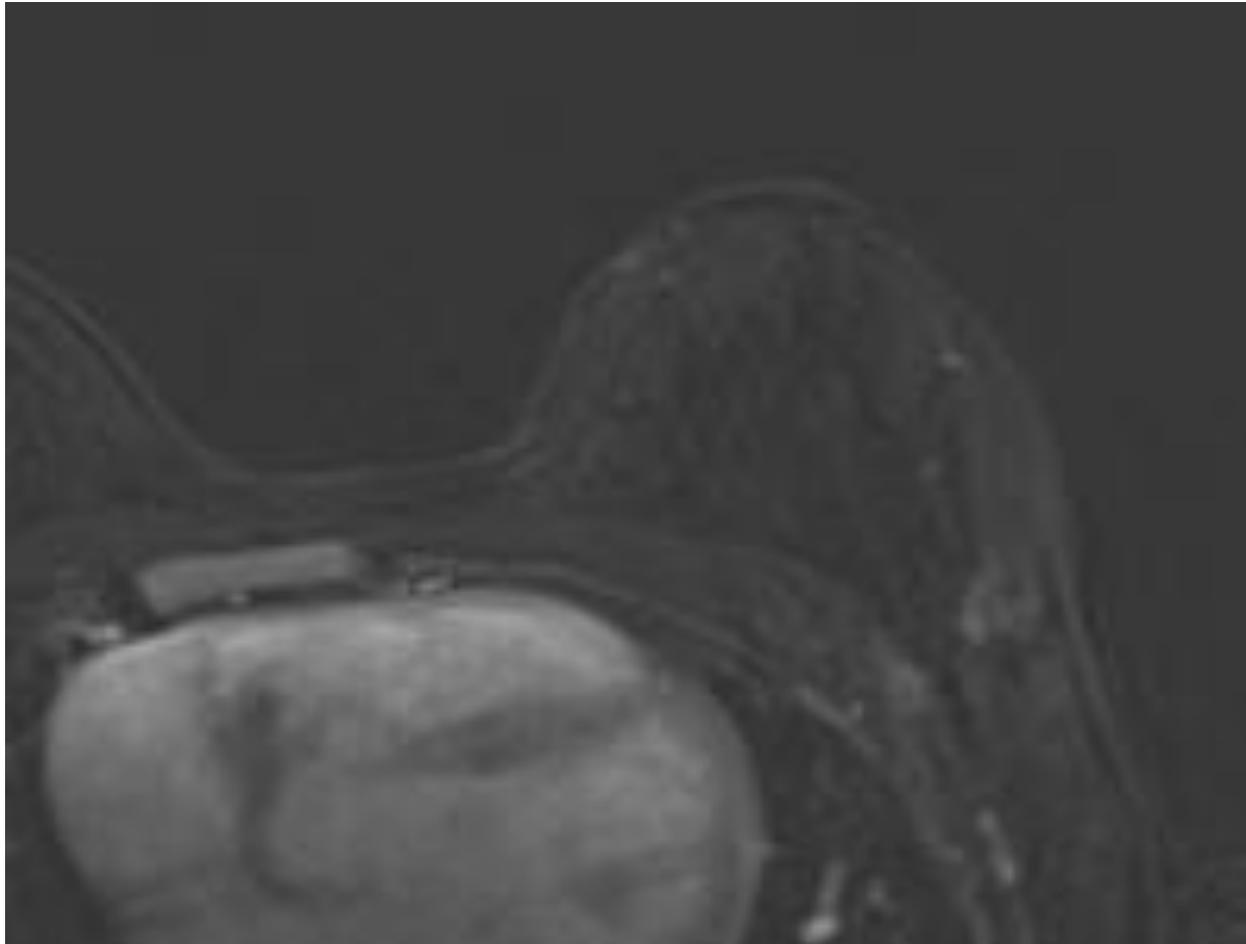
# PET-CT 1-10-2013 partial respons



## MRI after 4x AC



## MRI after TAXOL



## Case 3: HW °28/04/1980

### **Pathology result:**

Focus 2 mm DCIS completely excised, fibrous tissue tumor bed.  
Sentinel node and 7 further nodes negative : ypTisPN0M0

2/2013 and 3/2014: external beam radiotherapy on breast and  
tributary nodal areas (50 Gy in 25 sessions, boost tumor bed  
10 Gy in 10 sessions)

BRCA and check-2 analysis negative

MOC advice: Zoladex and tamoxifen

## Case 3: HW °28/04/1980

**Patient refuses hormonal treatment because she wants to get pregnant !!!**

**What would you advice ?**

- \* do not become pregnant during the first 5 y, then it can be considered if no metastasis
- \* agree with pregnancy and no hormonal therapy
- \* never become pregnant later in life (pregnancy life-long contraindicated)

## Case 3: HW °28/04/1980

**23/11/2014:** at follow up visit increasing back- and hip pain.

**23/11/14:** Physical examination tender lumbar vertebrae.  
Palpation breasts and axillae normal

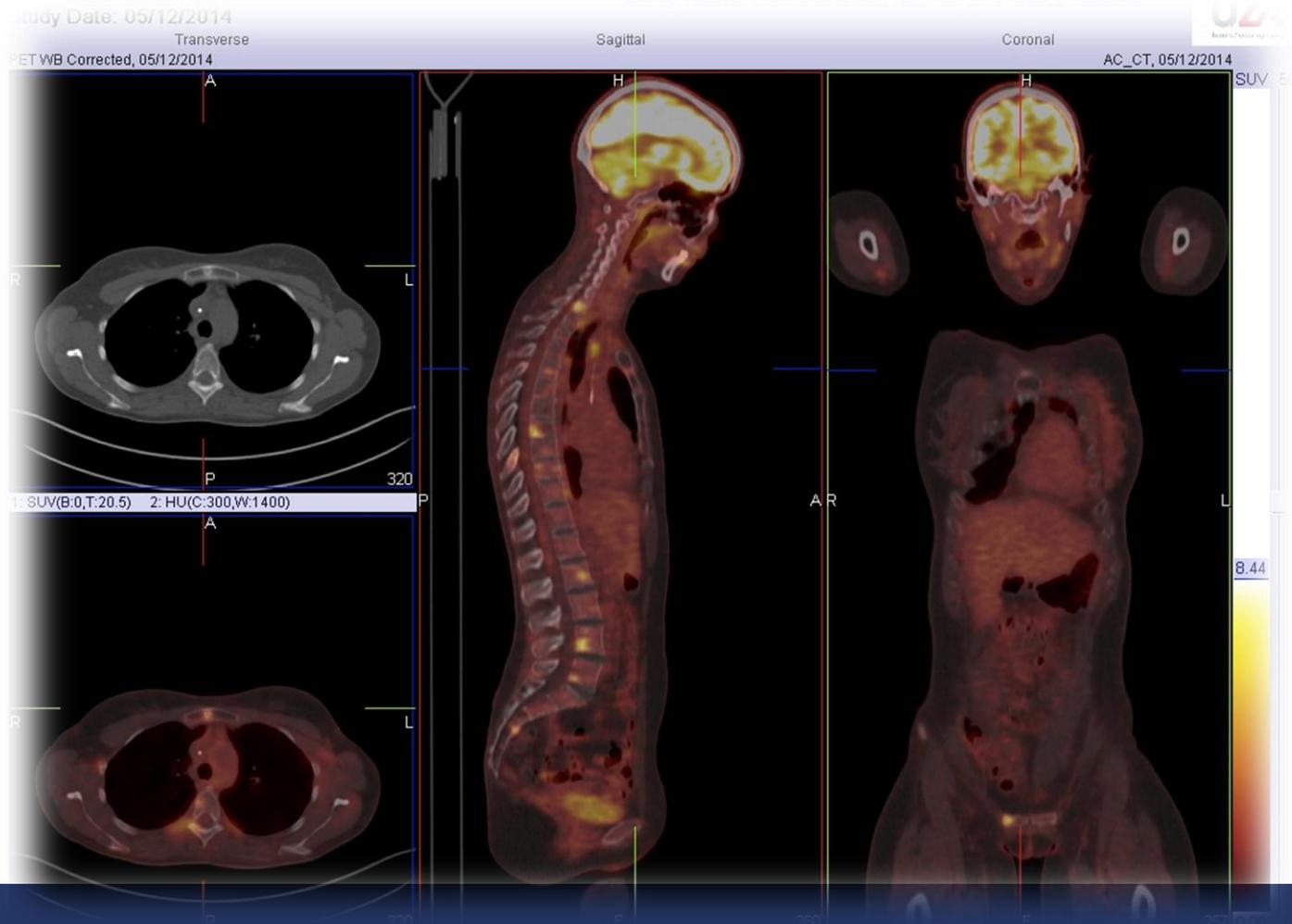
**21/11/14 CA15.3:** 6.7 (has always been normal)

**5/12/14 PET CT:** diffuse bone metastases

**17/12/14 bonescintigraphy:** bone metastases

**MOC advice:** bone biopsy, X-geva, castration, JPBL study  
(Faslodex with or without CDK4/6 inhibitor)

# PET-CT 5-12-2014 (almost year after surgery)



## Case 4: MvL °8/8/1967 (47 years)

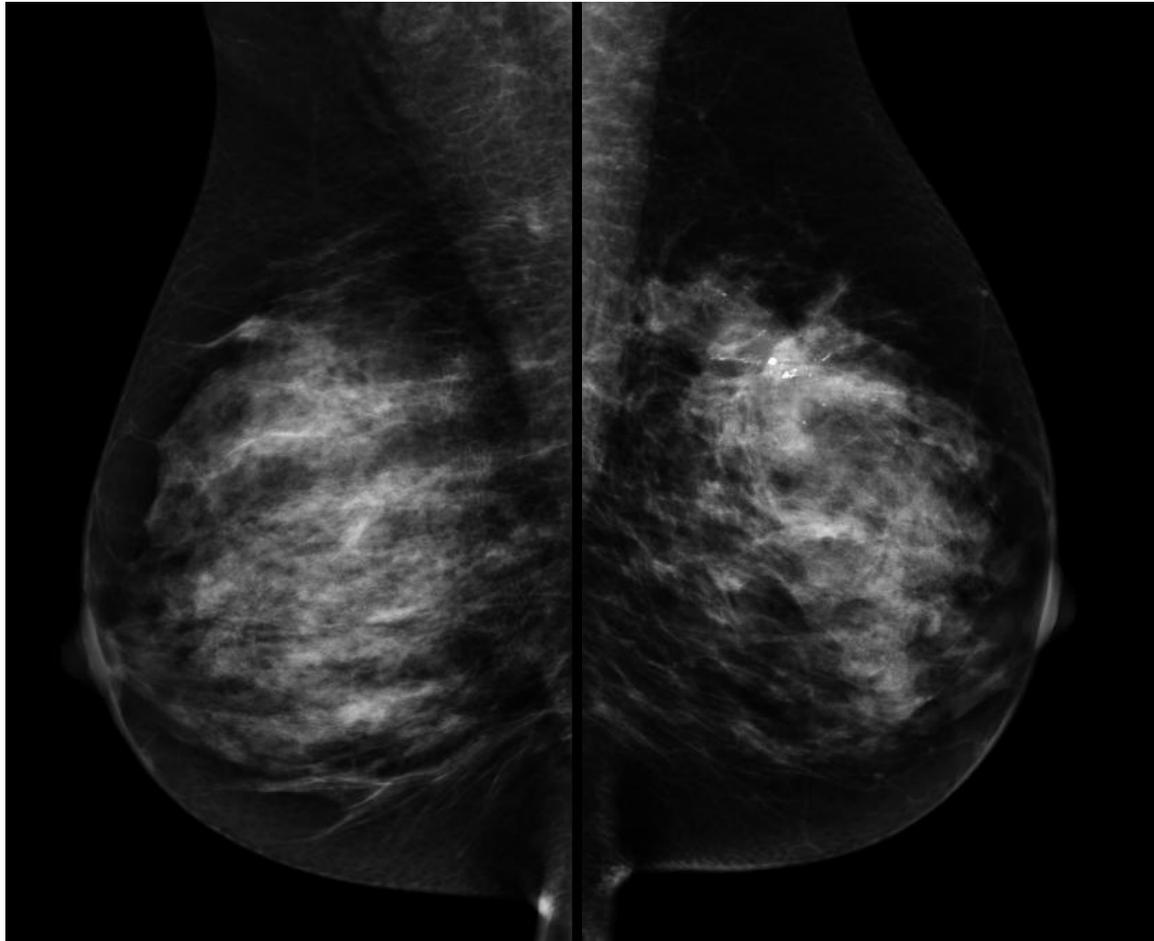
- Medical History: Insulin dependent DM – premenopausal patient
- Familial history: 0
- Nov 2013 : presented at the breast clinic: tumor in the left breast +/- 4 cm
- Clinical examination: cT2N0 tumor of the left breast

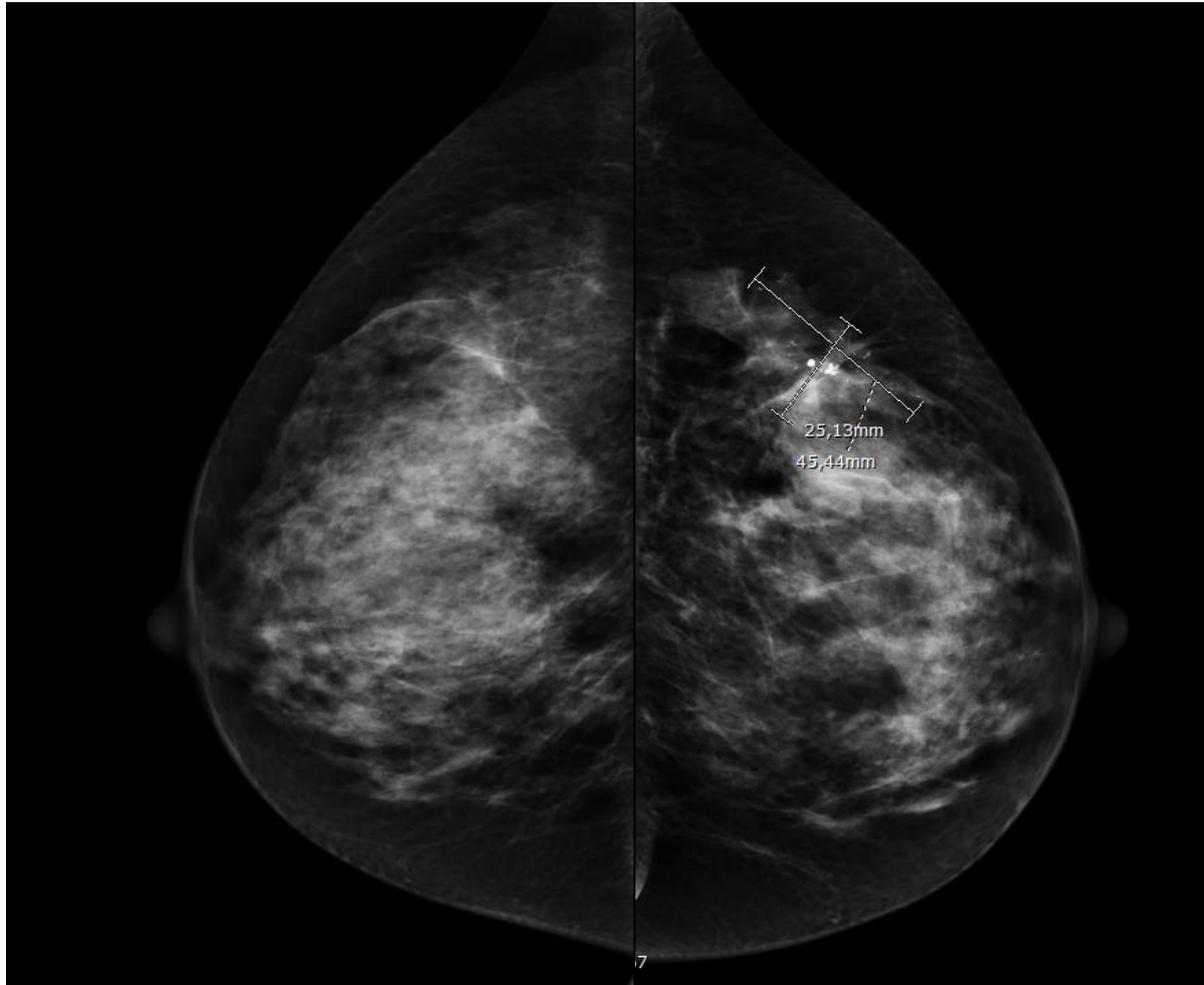
## Staging

- MX US
- MRI
- CT chest – liver
- Core biopsy



**MX**

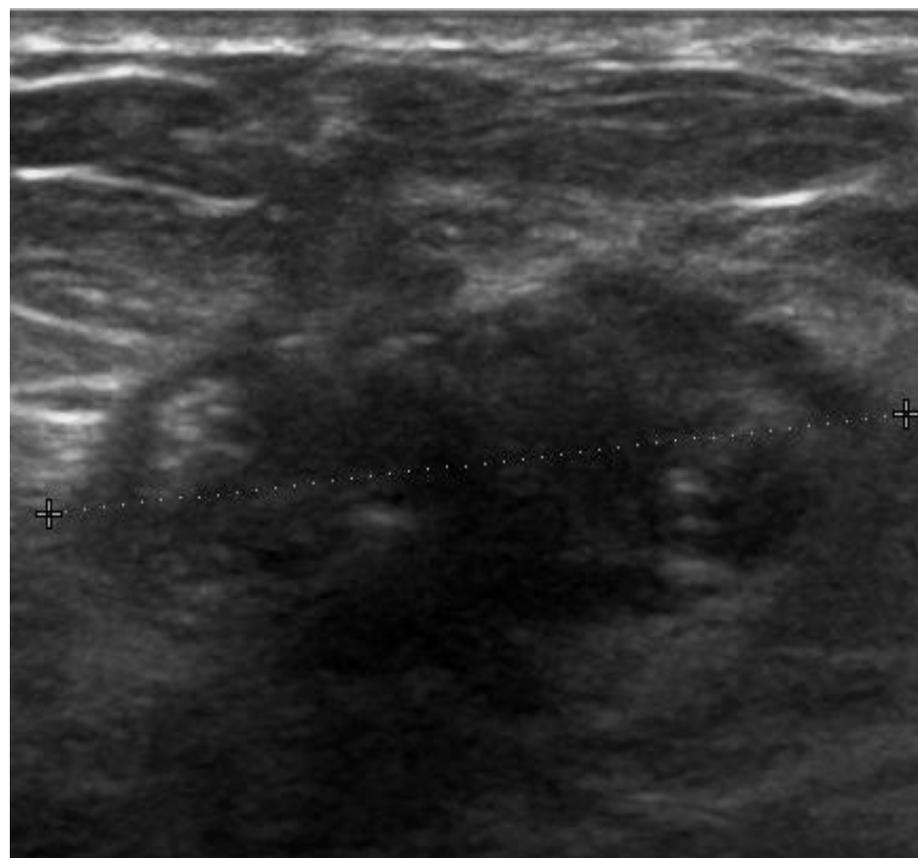






US

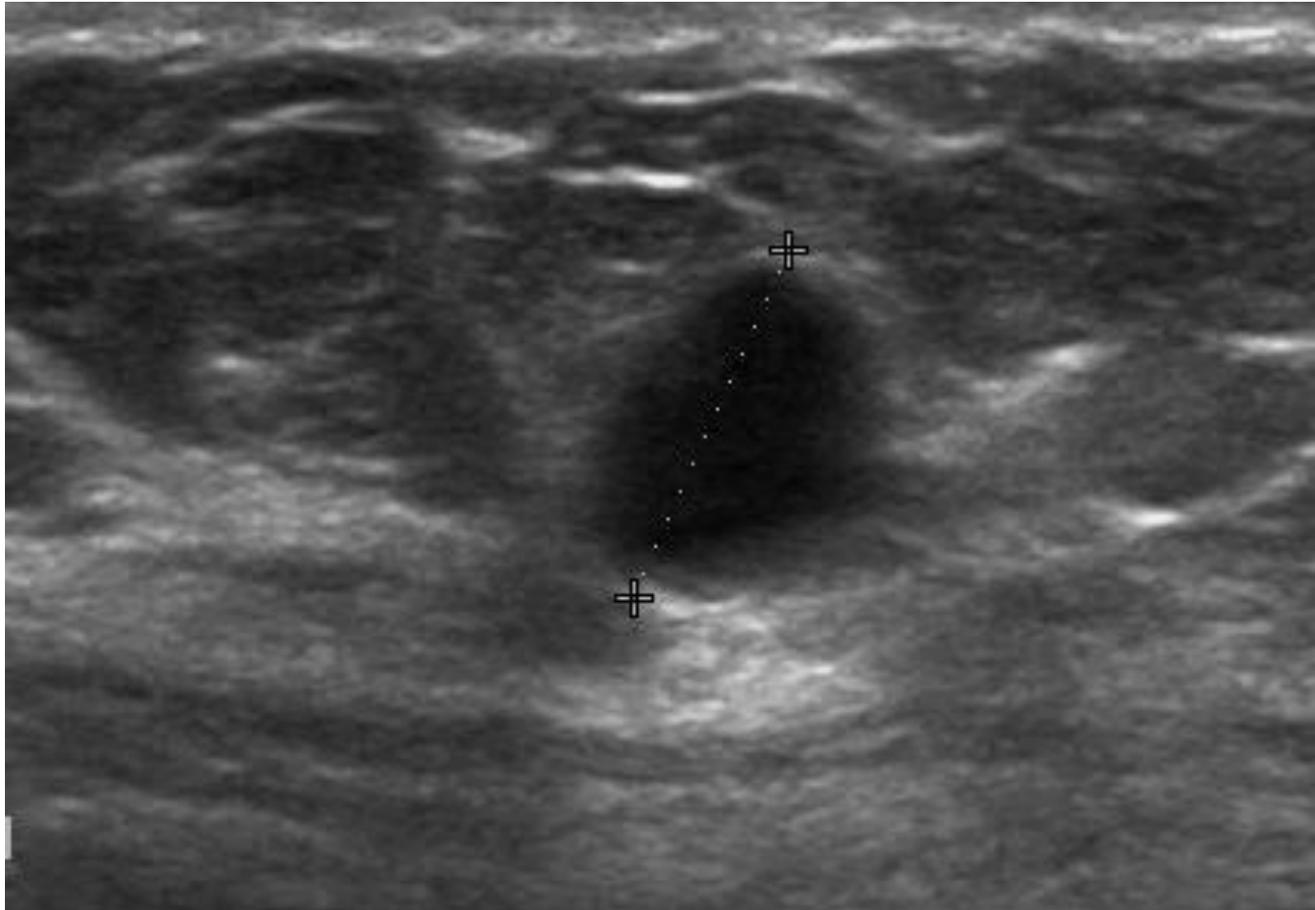
iridium  
kankernetwerk



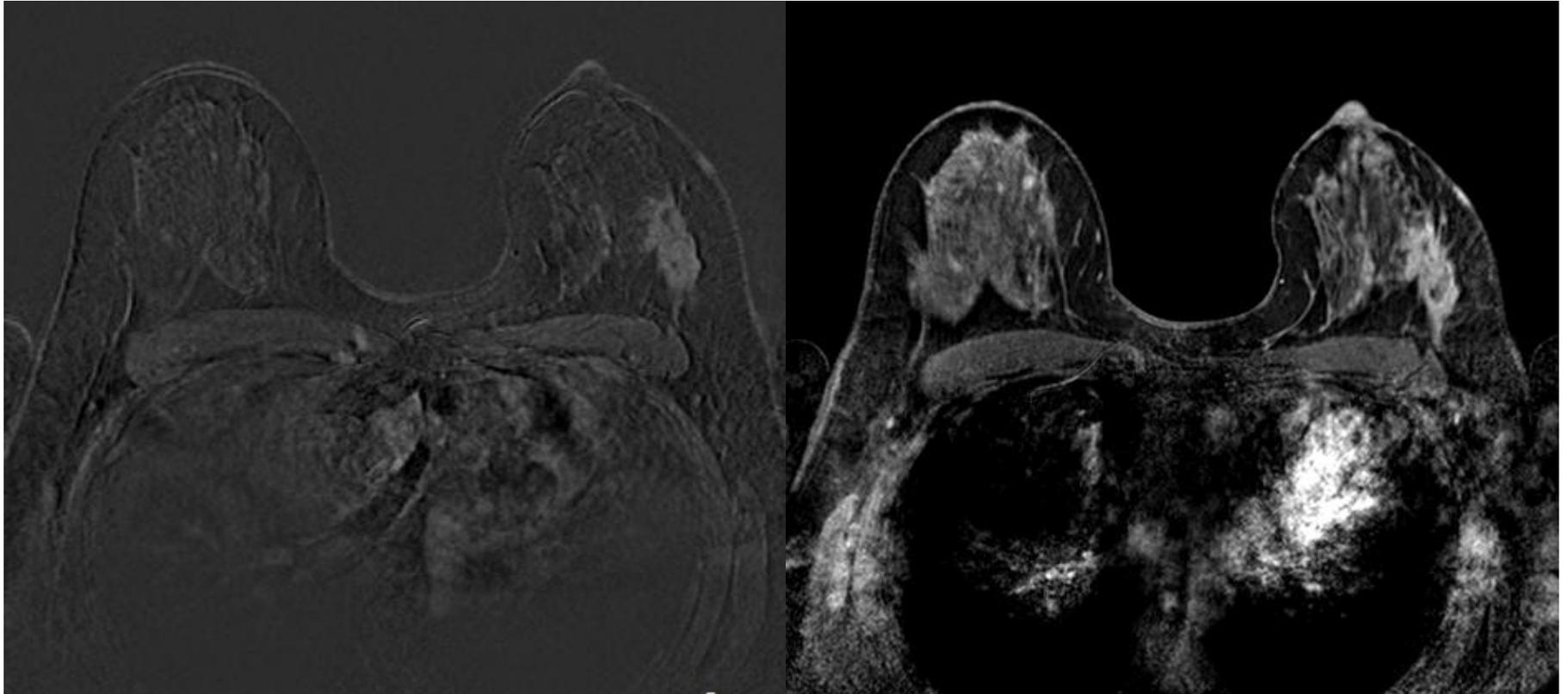


US

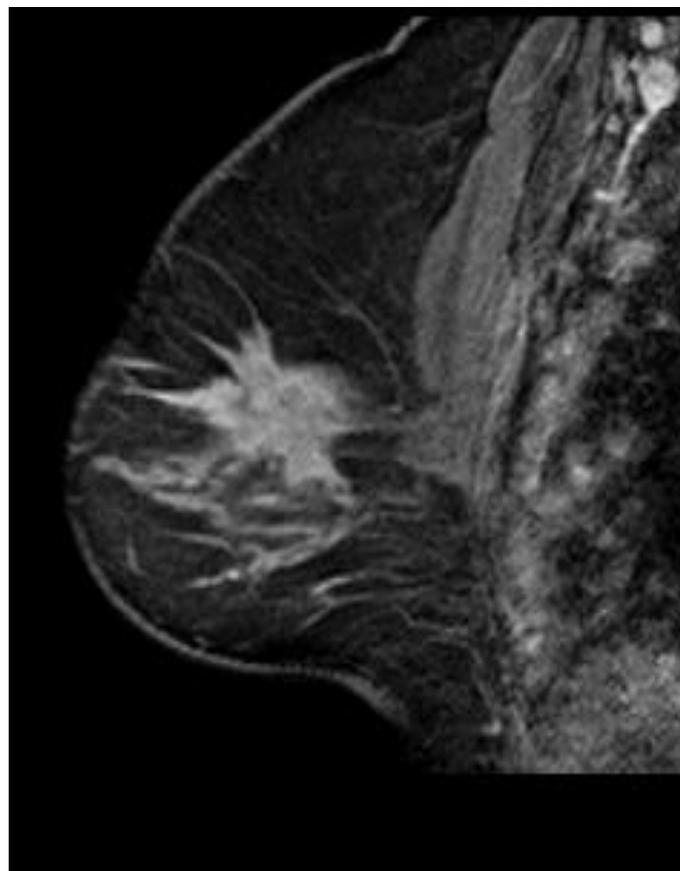
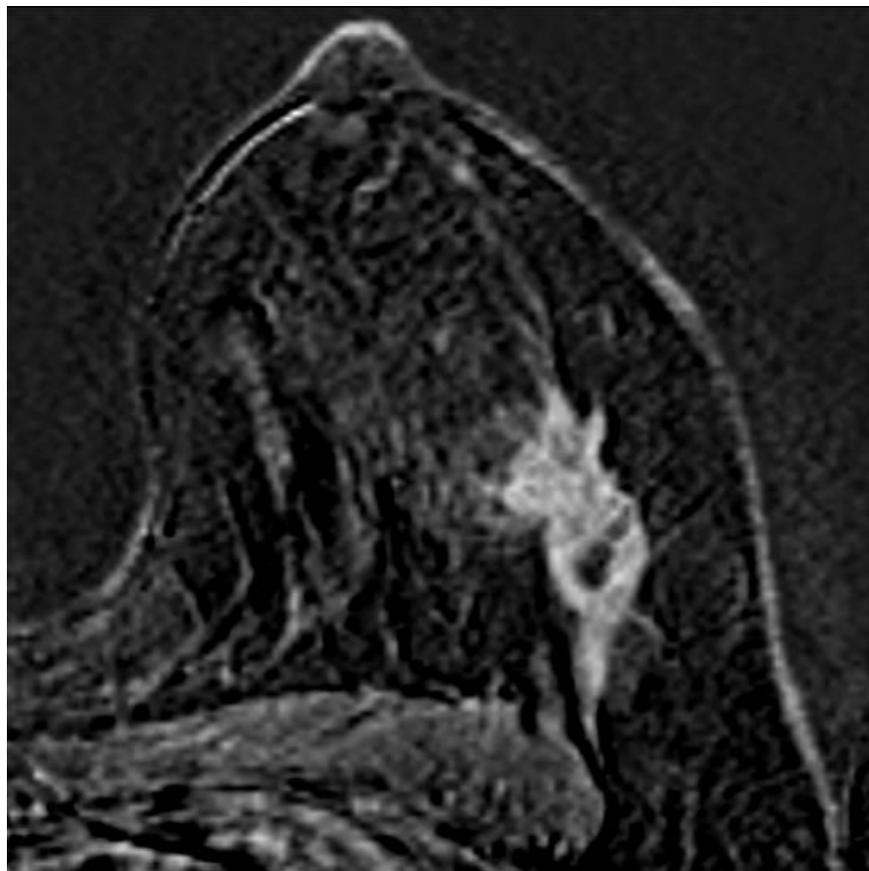
iridium  
kankernetwerk



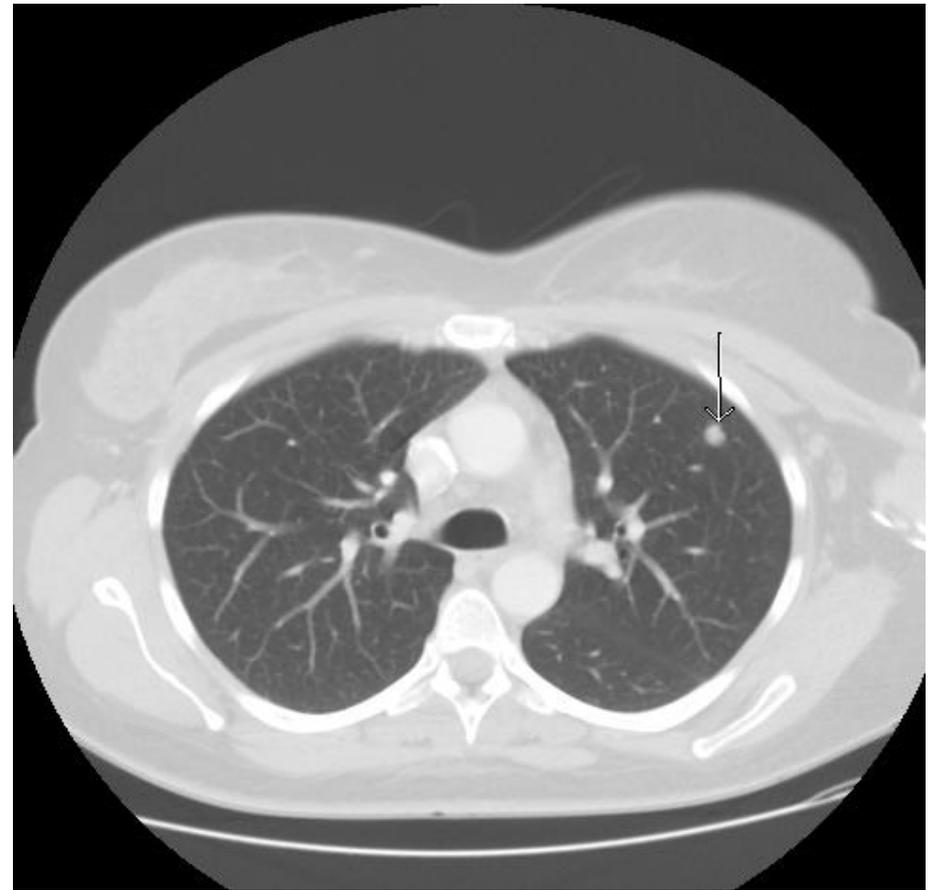
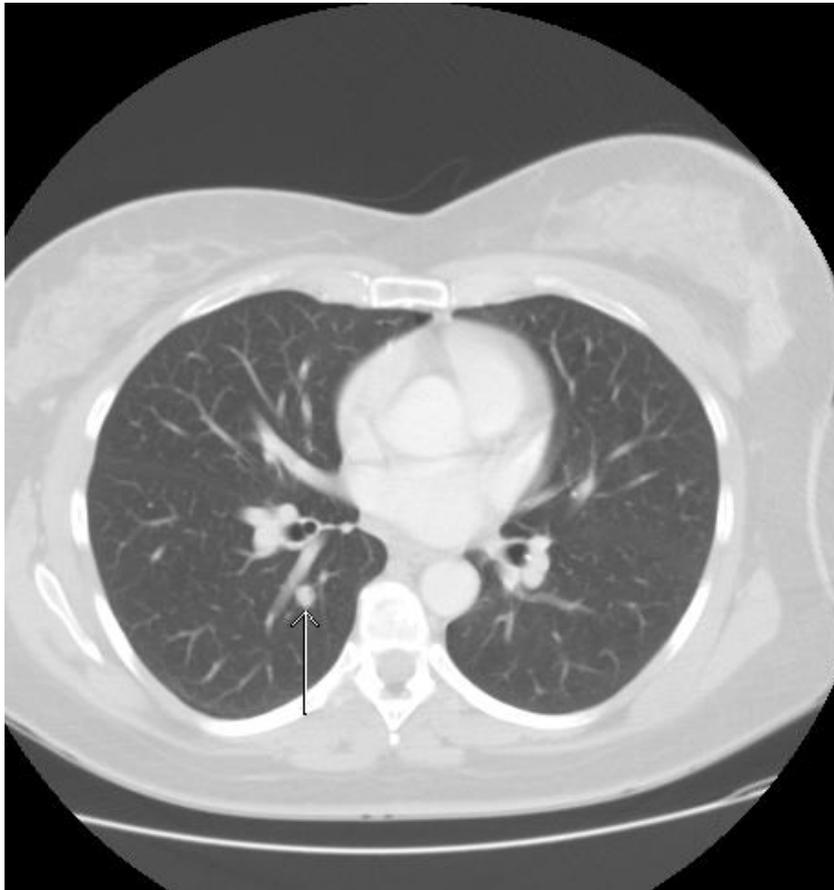
MRI



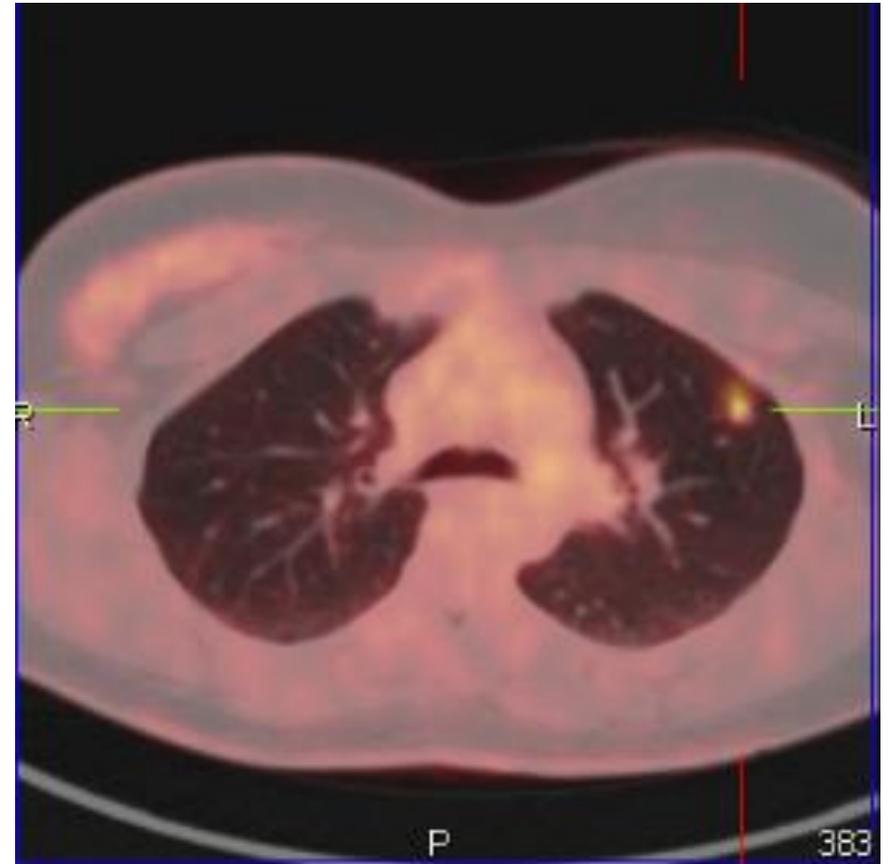
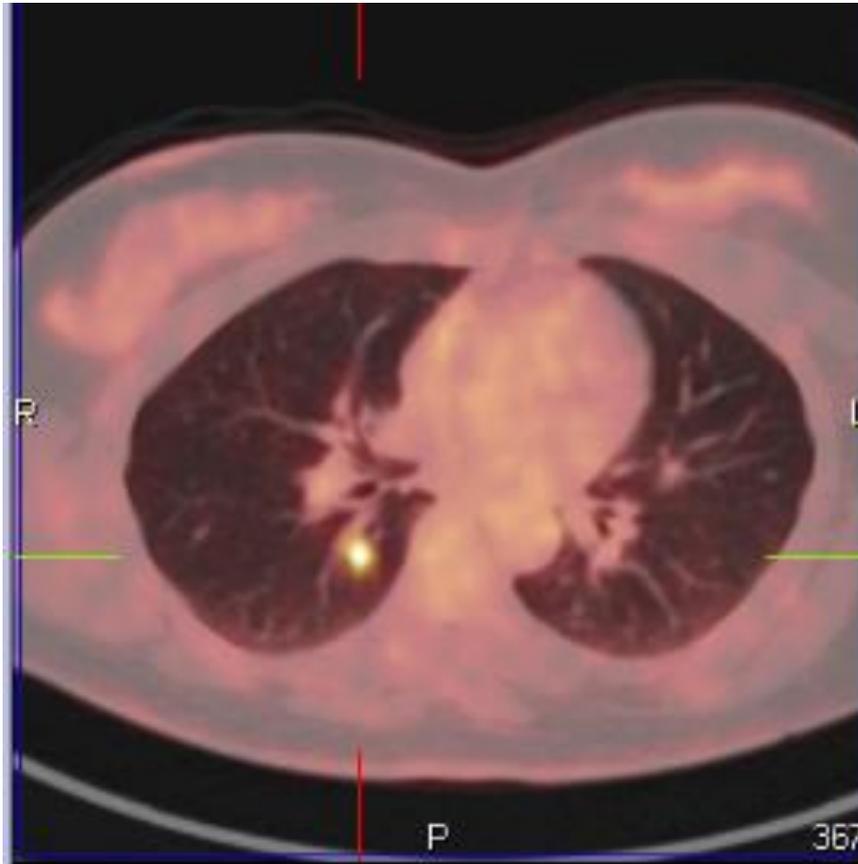
MRI



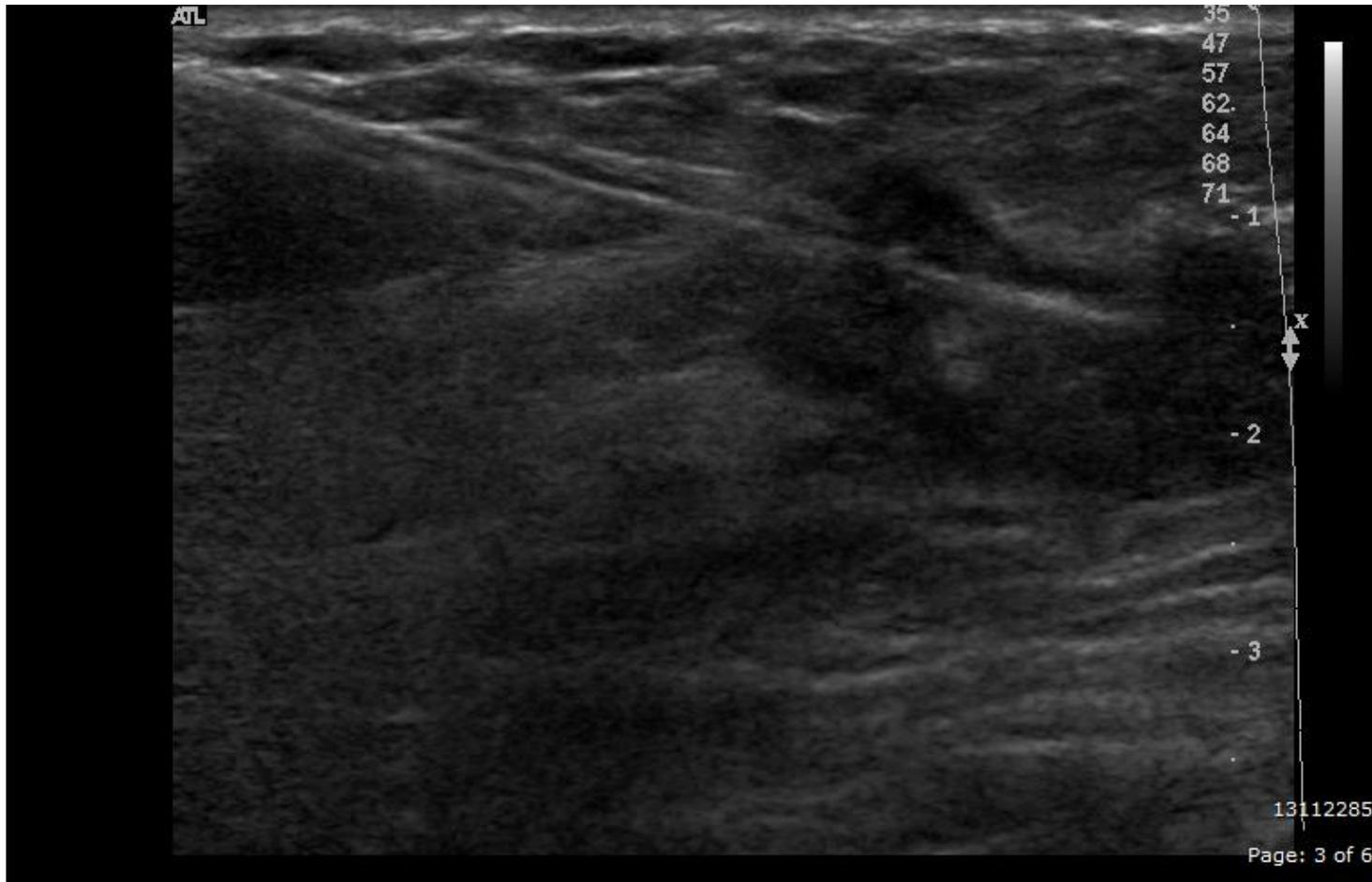
## CT CHEST – LIVER



# PET-CT



# CORE BIOPSY

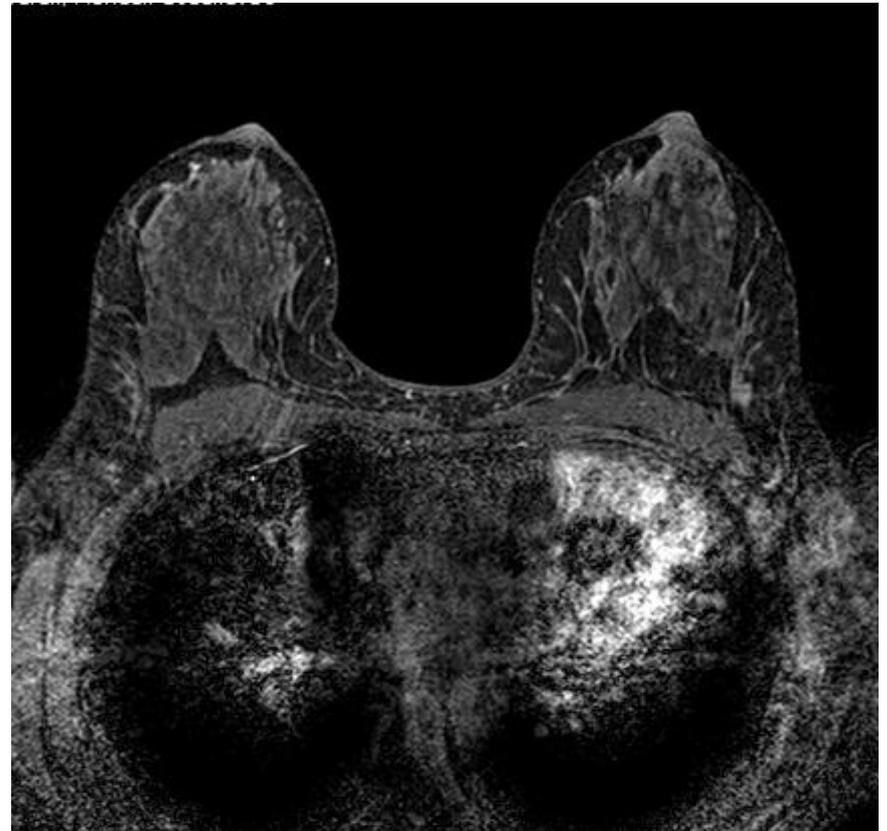
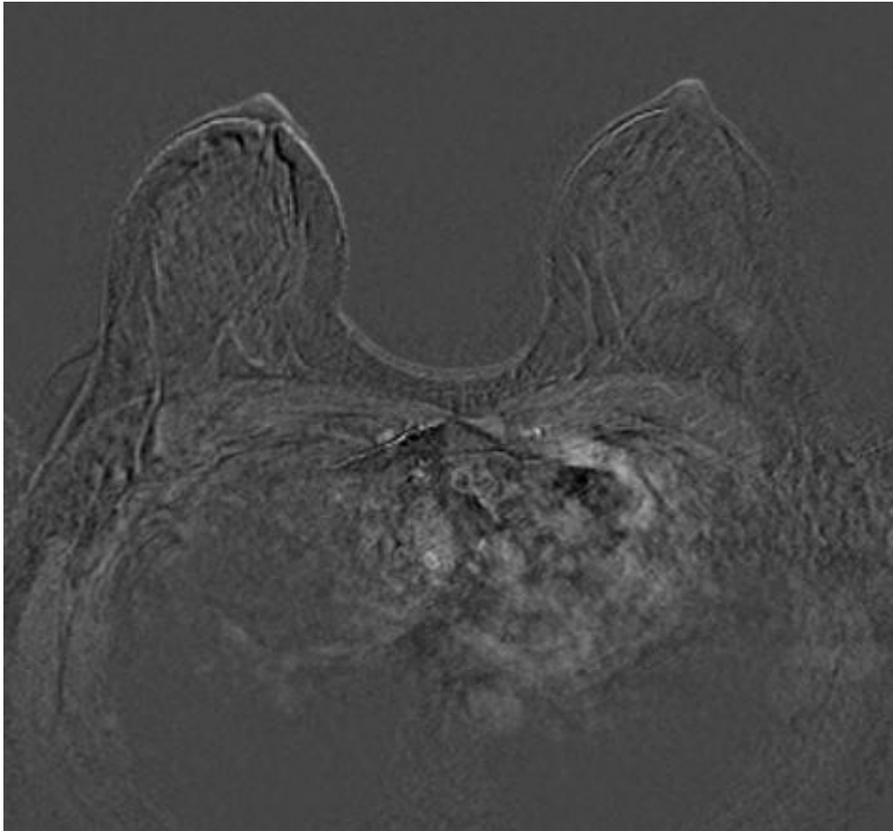


## After staging...

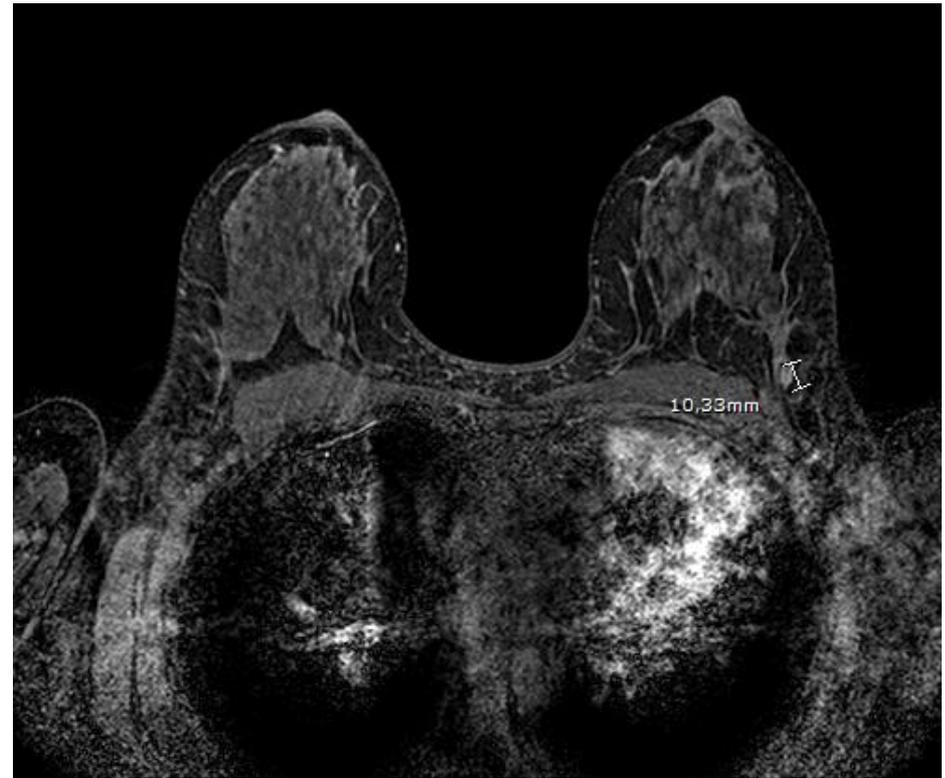
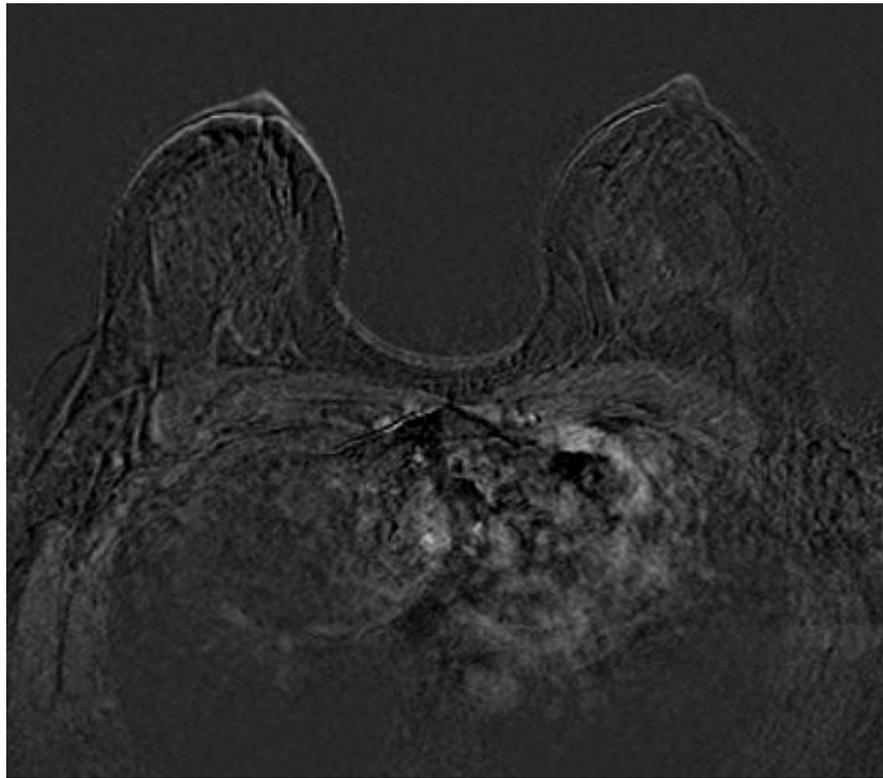
- cT2N1M1 (2 lung lesions)
- IDA G3, ER 0 PR 0 HER2 3+, SISH HER2 + , Ki 67: 75%
- PET/CT-scan: Breast tu left, axillary lymph nodes, 2 lung lesions
- **What would you do?**
  - Start palliative systemic therapy?
  - Surgery: ME-ALND?
  - Neoadjuvant systemic therapy?

- R/ neoadjuvant chemo: 4 x CEF, 4 x Taxotere-Herceptin
- Evaluation after chemo NMR/PET scan: PR
- PET scan: no residual activity in the lung lesions

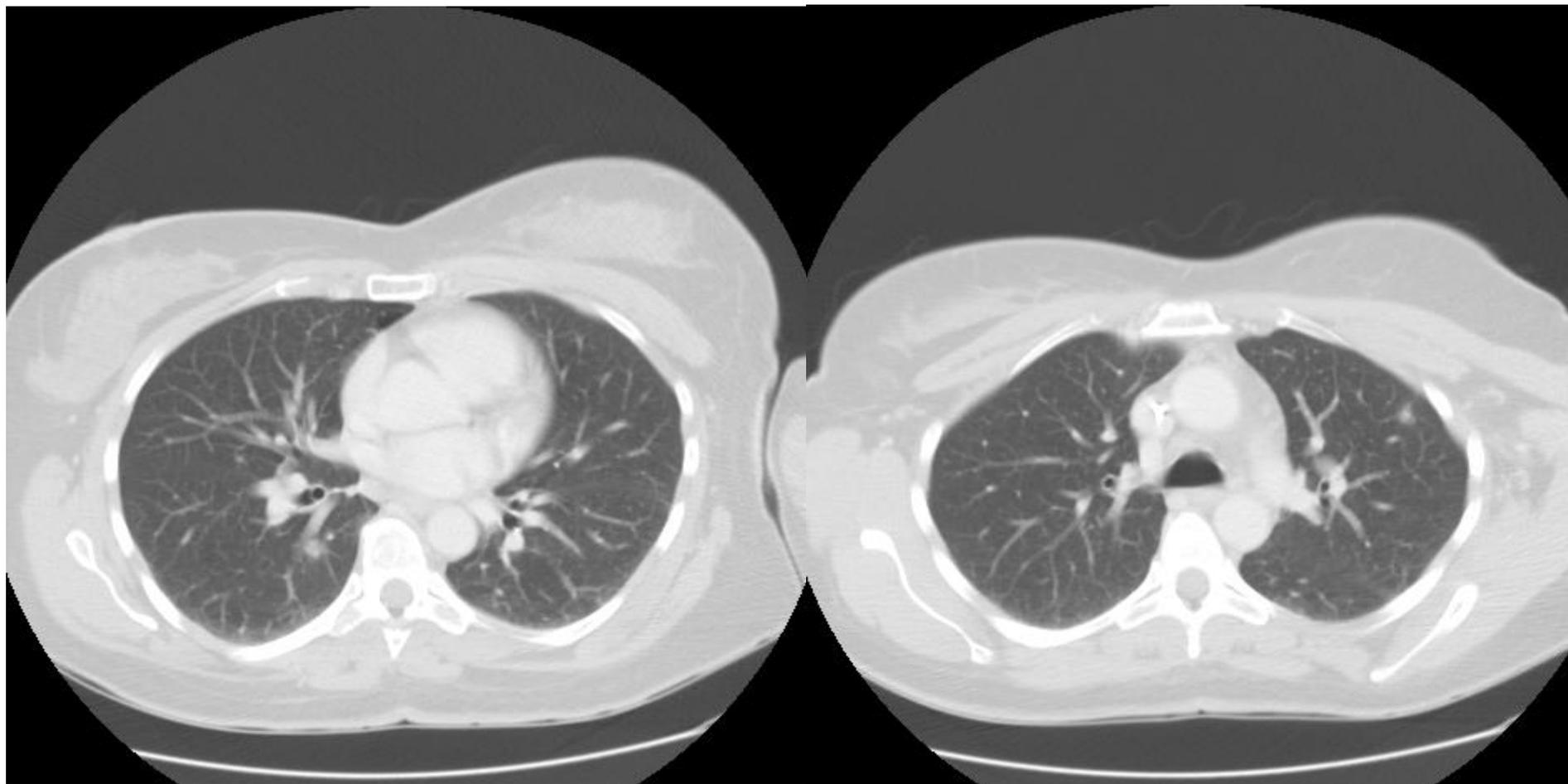
## MRI after chemotherapy



## MRI after chemotherapy



# CT THORAX after chemotherapy



## PET-CT after chemotherapy



## Multidisciplinary discussion

- Mastectomy and LN dissection ?
- Radiotherapy ?
- Herceptin 18 x
- Herceptin until progression
- Other



## Evolution

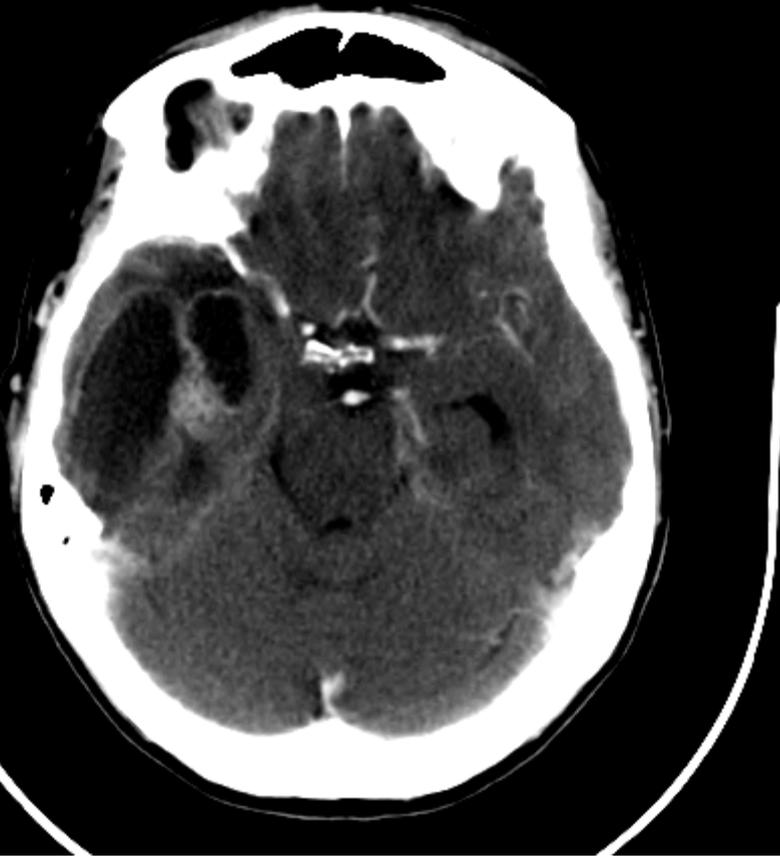
April 2014:

- Mastectomy and axillary clearance ypT0N0

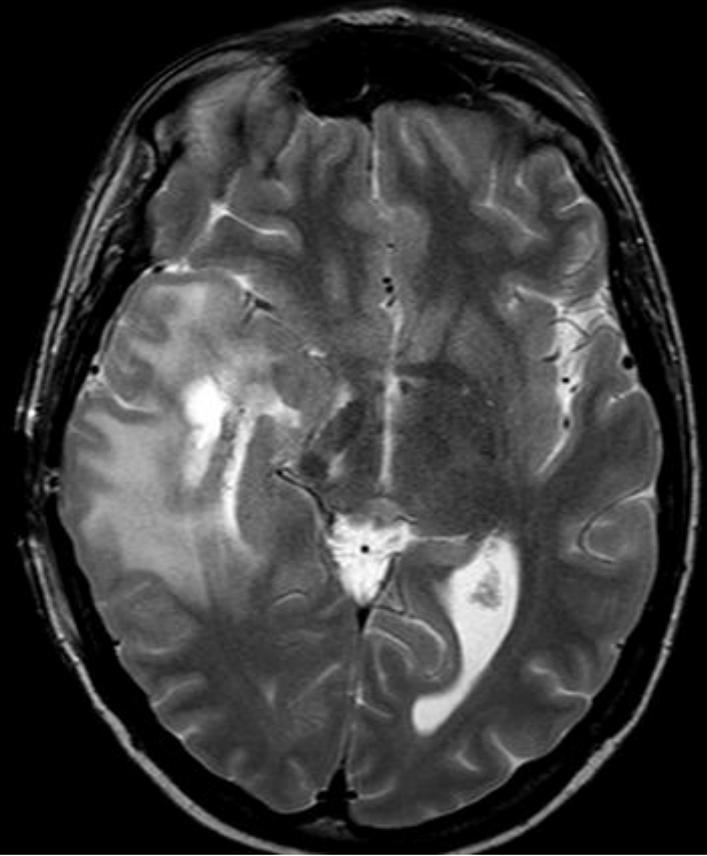
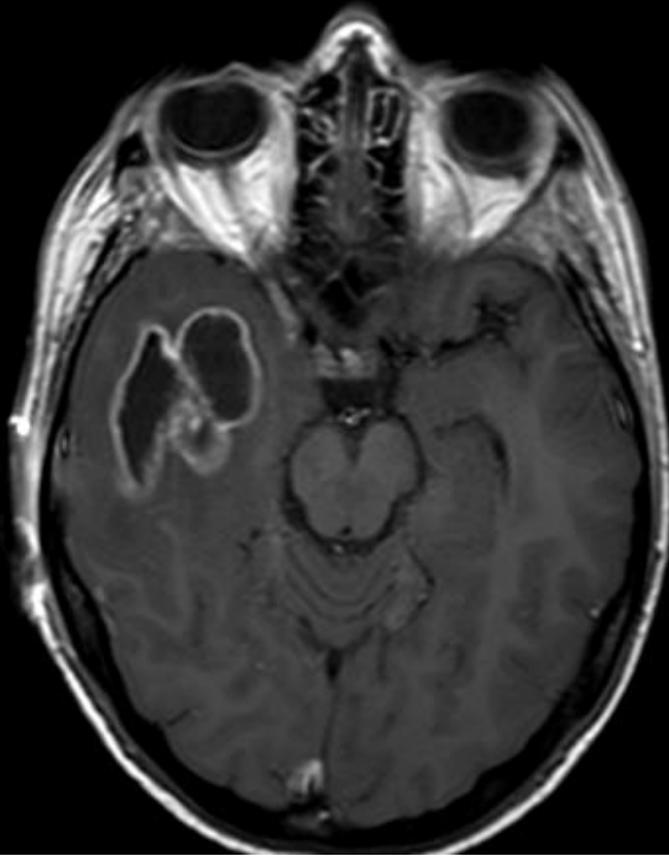
August 2014:

- Headache
- CT and NMR
- Bone scan and CT chest – liver: OK

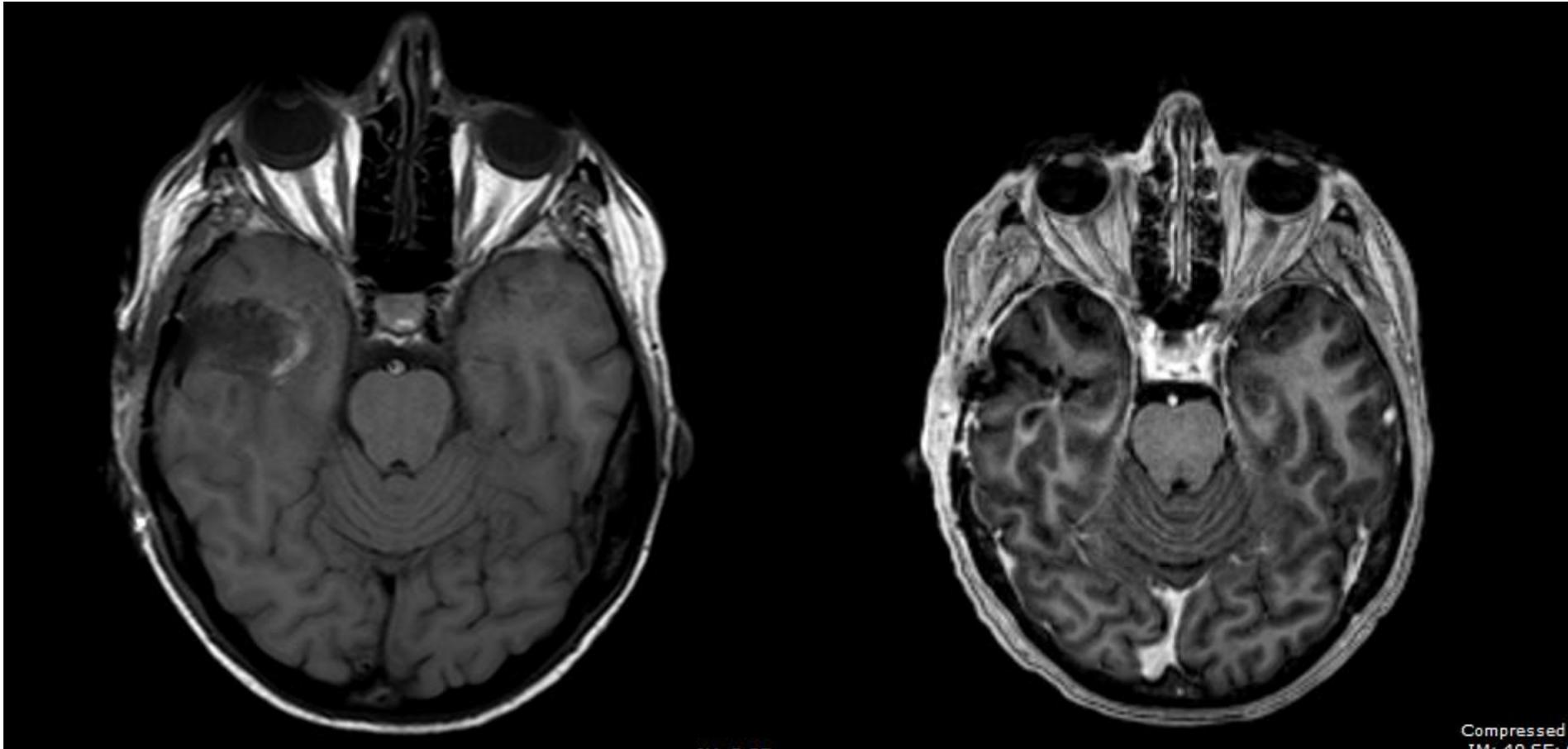
## Brain CT aug 2014



## Brain MRI aug 2014



- **Brain MRI after resection  
aug 2014 and nov 2014**



## Pathologic evaluation after resection

- M+ Breast cancer; Her2neu+++

## Multidisciplinary discussion

- Radiotherapy?
- Systemic treatment
  - Herceptin mono
  - Combination with Lapatinib
  - Chemotherapy ?
  - .....?

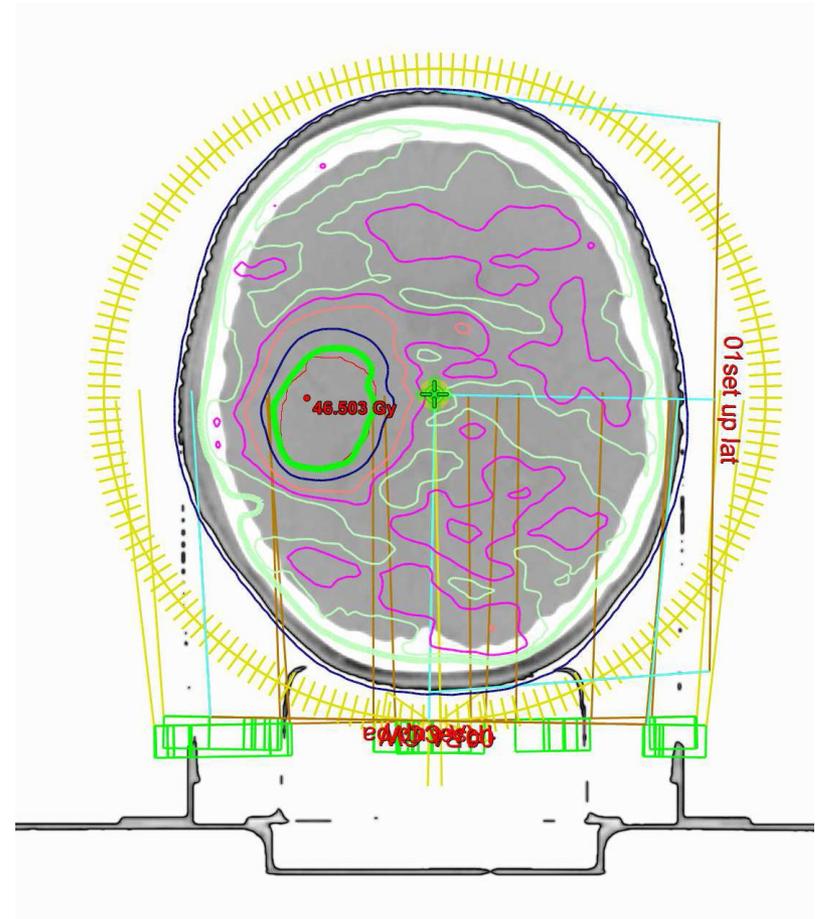


# Radiotherapy

## Radiotherapy:

- From 16/09/2014 to 06/10/2014, patient was irradiated in 15 fractions of 2,4/3,2 Gy on the entire brain/residual disease, respectively (simultaneously intergrated boost (SIB) technique with RapidArc VMAT)

Trastuzumab until progression



## Case 5: CM °14/11/1964

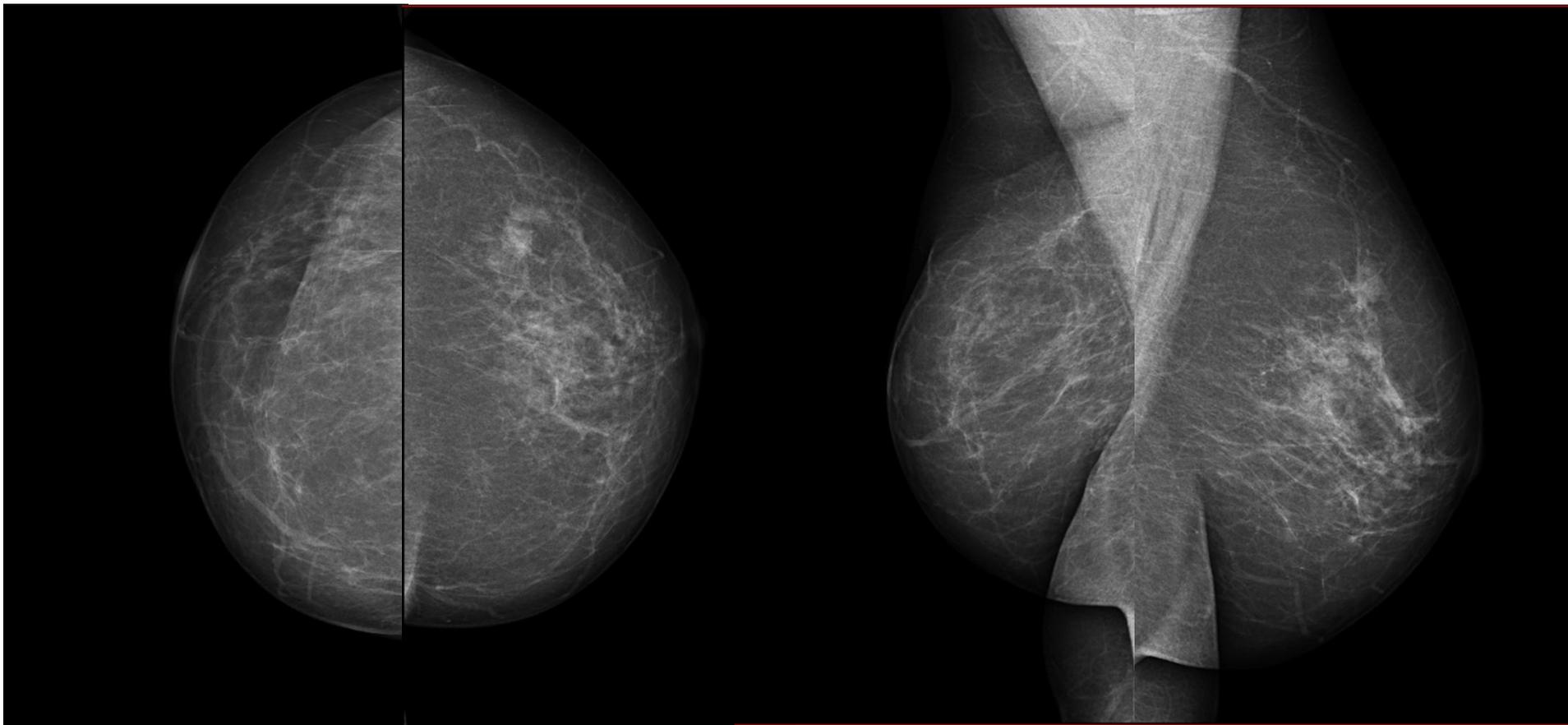
- **Previous oncological history:** (elsewhere)
  - 2/2008: mass right breast: IDC, ER and PR negative, Her-2 negative, MAI > 50
  - Neoadjuvant chemotherapy: 4xCEF, 4x taxotere
  - 4/2009: wide local excision and axillary lymphadenectomy
  - 7/5/2009 till 19/6/2009: external beam radiotherapy 60 Gy in 30 sessions on right breast and 45 Gy in 25 sessions on axilla, supracalvicular and mediastinal lymph nodes
- **Medical history:** G0P0A0
- **Familial history:** father lungcancer 55y, grandmother (M) oesophageal cancer

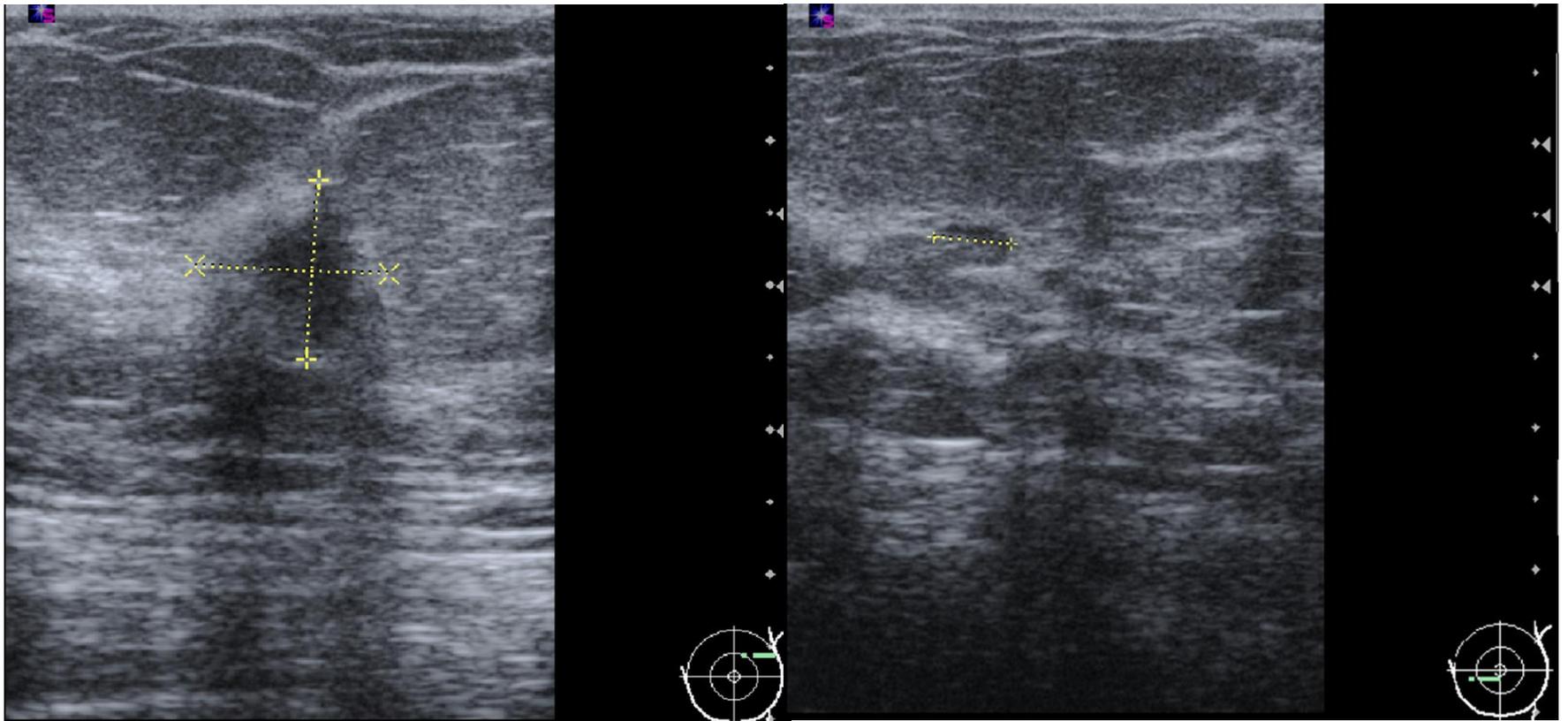
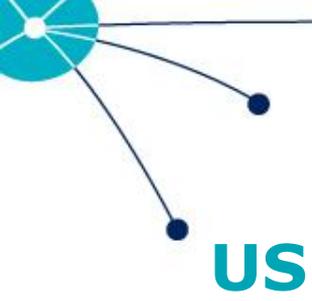
## Case 5: CM °14/11/1964

- **Current problem:** 25/4/2014: routine follow-up: feels excellent
- **Physical examination:**
  - Normal palpation of the right breast and no lymphadeneopathy
  - Vague dense area (2cm diameter) superolateral in the left breast
- **Imaging:**
  - MX US: lesion 16x13 mm SL and a small lesion 5 mm left breast
  - MRI

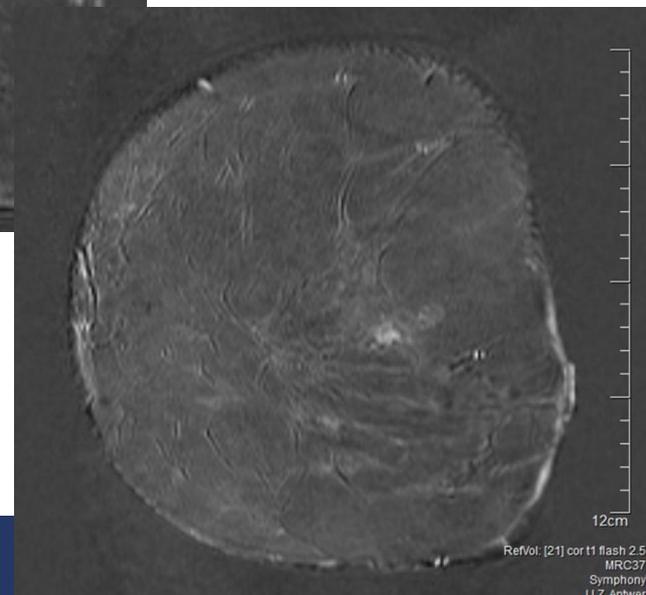
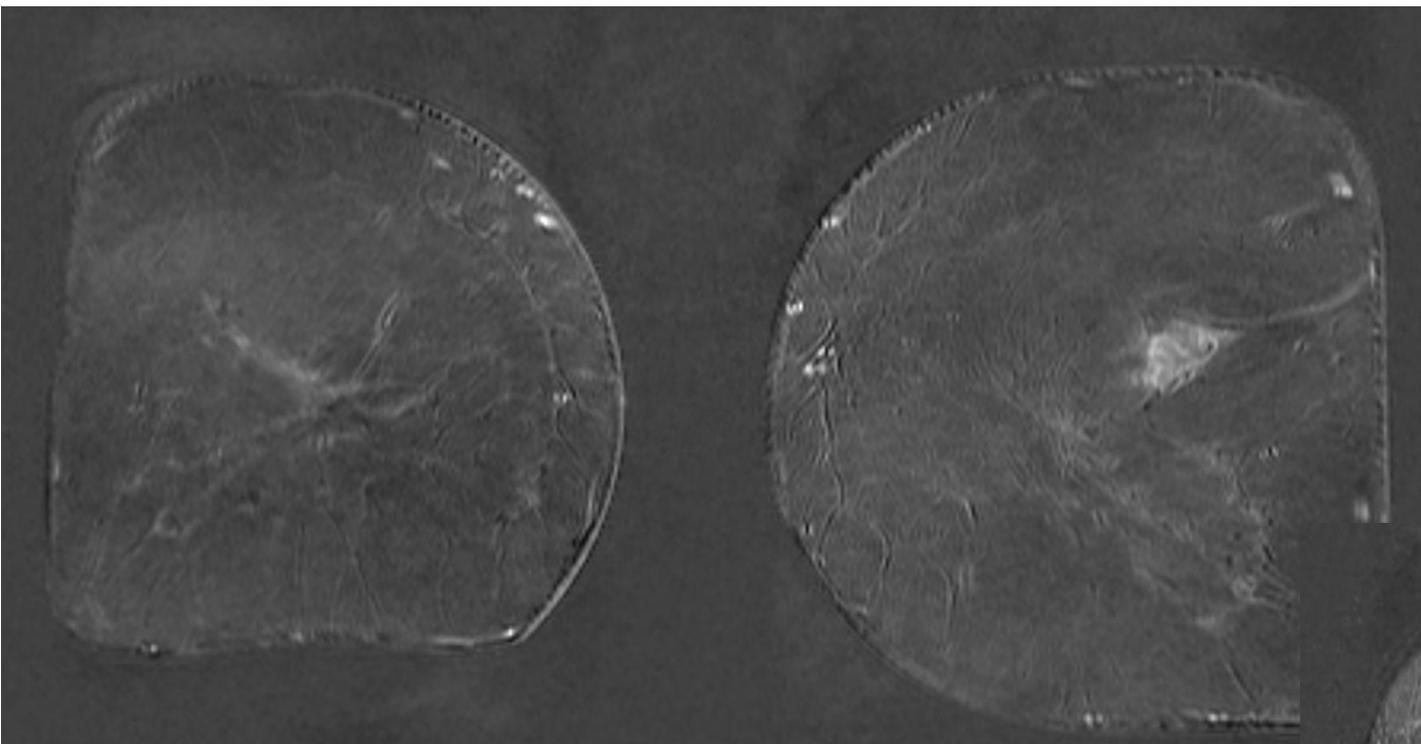


MX

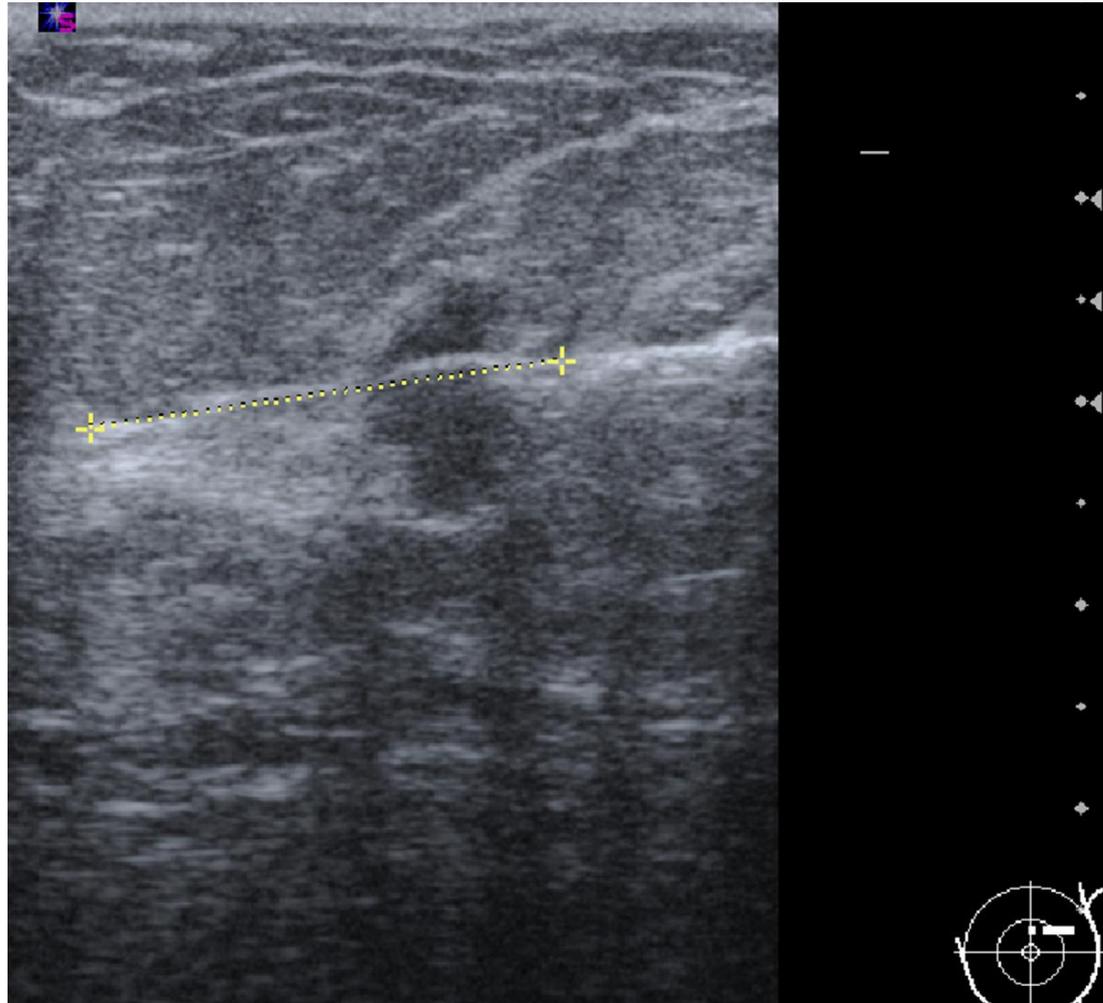




MRI



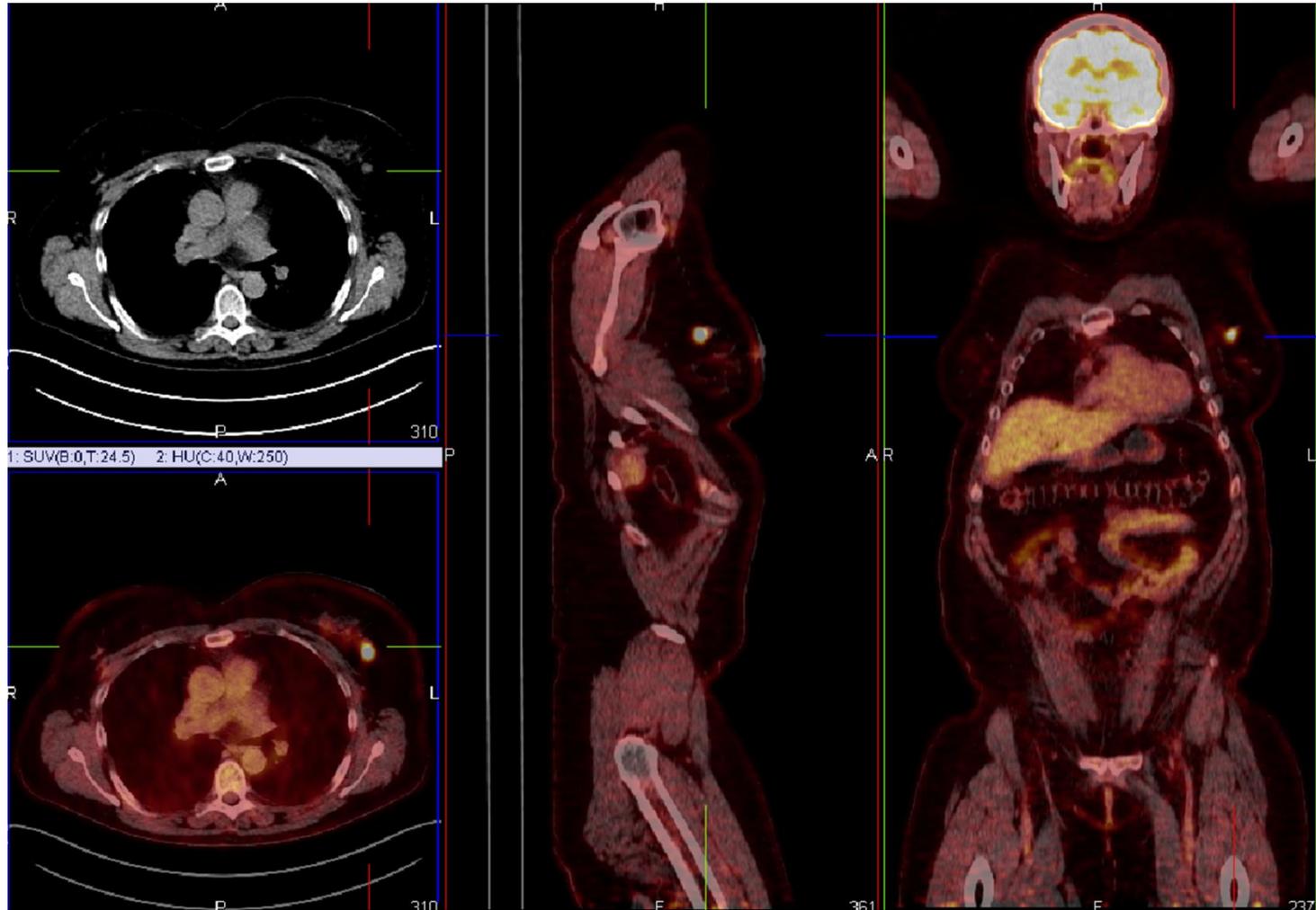
# CORE BIOPSY



## Case 5: CM °14/11/1964

- **US guided core biopsy 25/4/2014:**
  - Grade III IDC, ER and PR negative, Her-2 negative, Ki67 > 80%
- **Staging:**
  - **PET-CT 9/5/2014:** suspicious mass in the left breast, borderline FDG captation of a left axillary lymph node

# PET-CT



## Case 5: CM °14/11/1964

- **What would you do ?**
  - Primary BCS with sentinel node biopsy procedure
  - Primary BCS with sentinel node biopsy and complete axillary clearance
  - Primary mastectomy with sentinel node biopsy procedure
  - Primary mastectomy and complete axillary clearance
  - Neoadjuvant chemotherapy
- Is there a need for genetic testing ?

## Case 5: CM °14/11/1964

- **Is there a role for genetic testing ?**
  - Will the result influence your surgical approach ?
  - Will the result influence your systemic treatment ?

## Case 5: CM °14/11/1964

26/05/2014: start weekly neoadjuvant carbo AUC 2/taxol 80 mg/m

9/7/2014 PETCT: excellent respons with normalisation of the FDG captation in the left breast and axilla

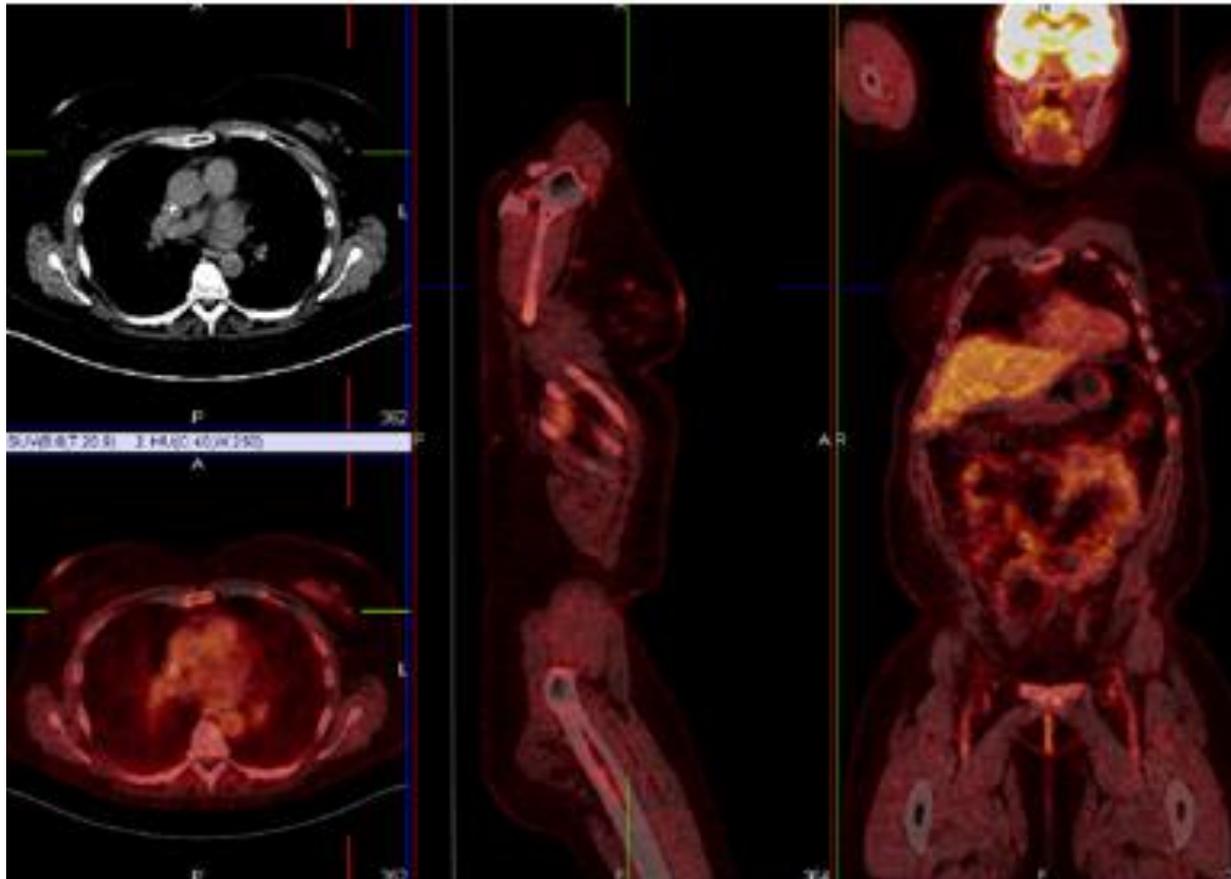
25/8/2014 MRI scan breast: excellent respons, remaining suspicious area 6 mm

19/9/2014 mastectomy with sentinel node procedure (DEP Prep negative )and level 1 axillary lymphadenectomy

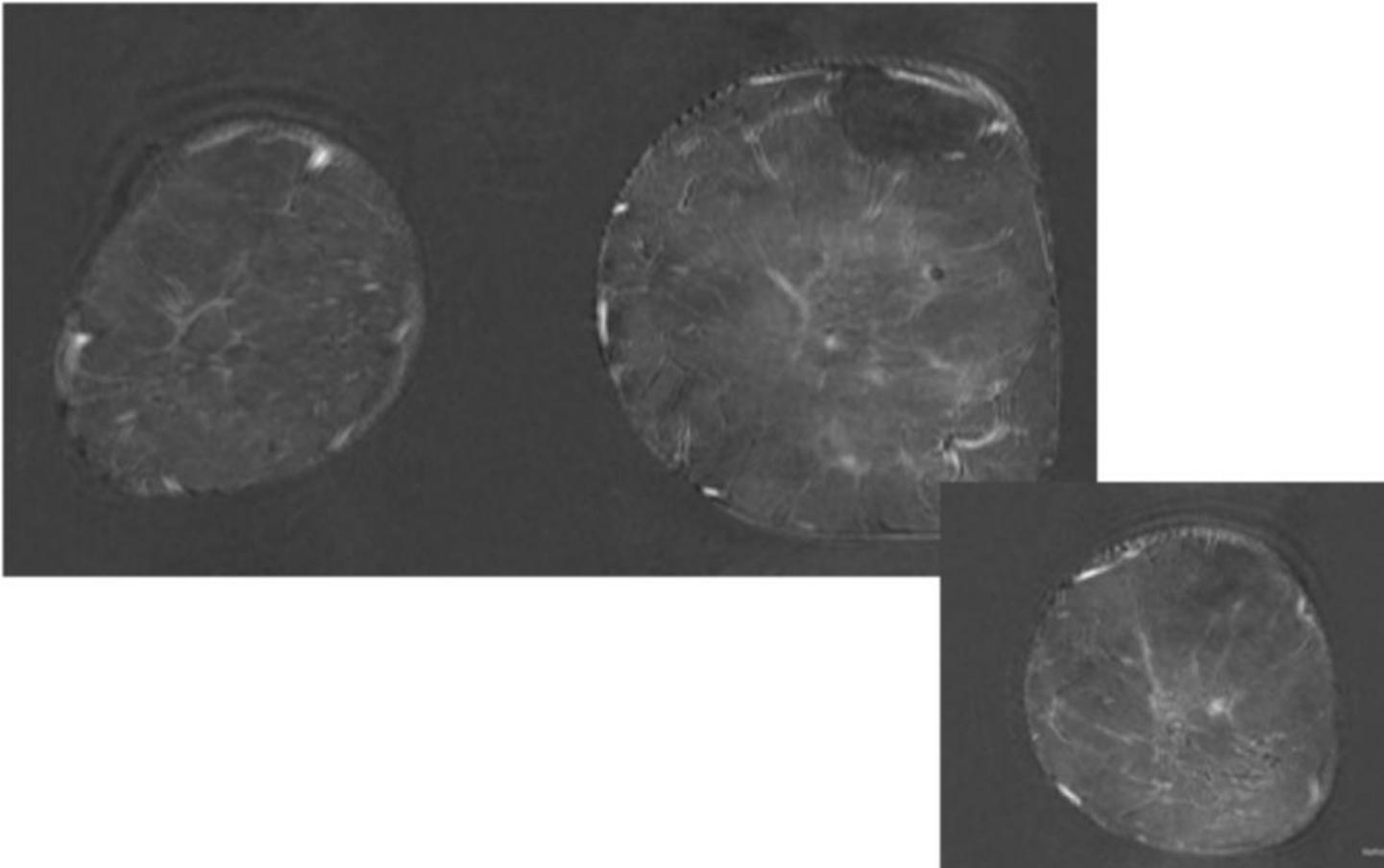
29/9/2014 **final pathology:** tumor bed without malignant cells, 2 sentinel nodes and 5 additional nodes normal ypT0N0M0

13/11/2014 till 5/12/2014 chest wall radiotherapy (40 Gy in 15 sessions)

## PET-CT after chemotherapy



## MRI after chemotherapy



## Case 5: CM °14/11/1964

10/2014 BRCA mutation analysis: BRCA1 positive

15/1/2014: laparoscopic salpingoophorectomy

A contralateral prophylactic mastectomy with bilateral DIEP flap reconstruction is planned in the winter 2014-2015



## Case 3: SVH (°02/06/1961).

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Radiation Oncology  
Iridium Kankernetwerk

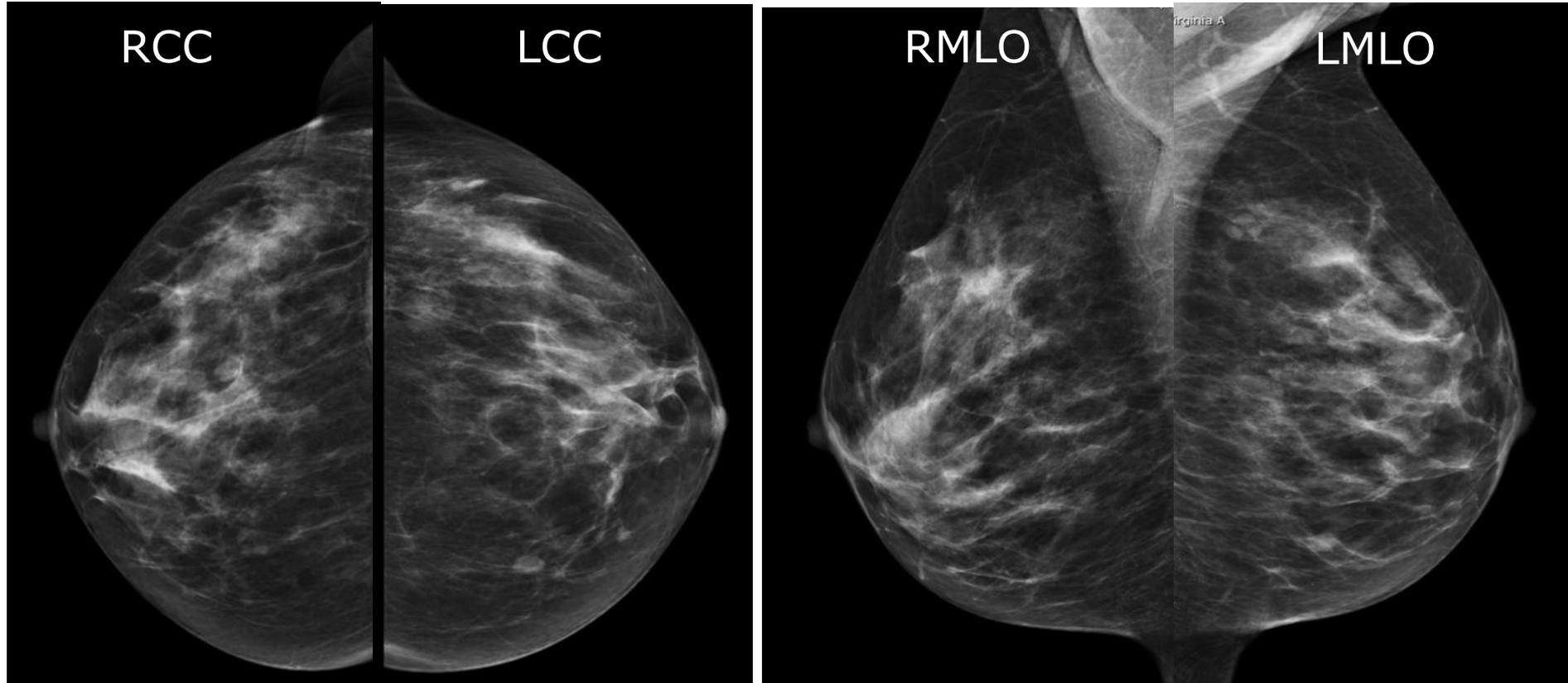
## Case 3: SVH (°02/06/1961).

- Relevant patient history:
  - Family: paternal aunt with breast cancer at 60 yrs.
  - Medical: hypertension.
  - Surgical: -
  - A0P0G0.
  - Medication: Nobiten.
  - Allergy: -
  - Smoking: -

## Case 3: SVH (°02/06/1961).

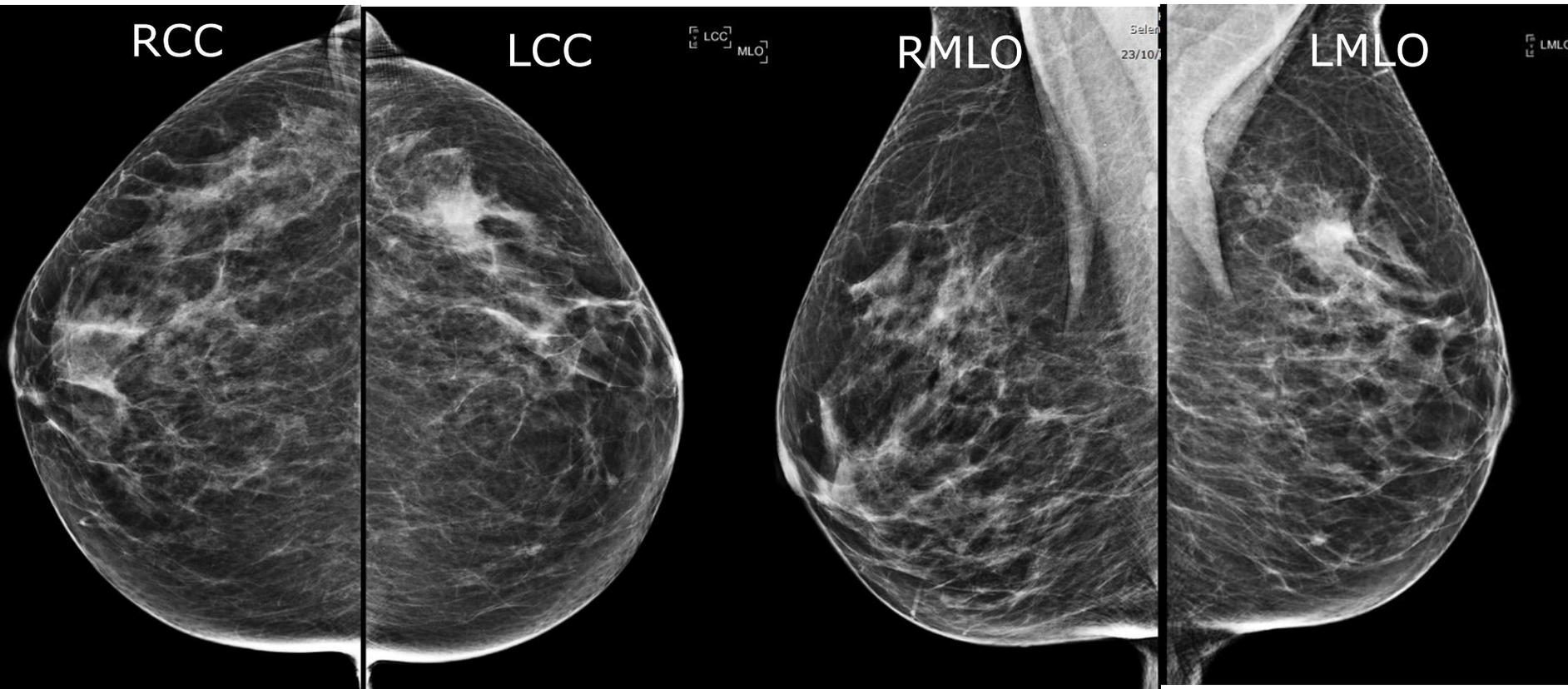
- Technical investigations:
  - Clinical examination: palpable, mobile nodule in left breast at 2h (2.0 x 2.0 cm), no skin retraction, cN0.
  - Mammo-US (23/10/2014): tumour (20 mm) peripherally at 2h in the left breast with a little satellite nodule of 7 mm. cN0.
  - MRI (24/10/2014): solitary tumour in the upper, outer quadrant of the left breast with maximal diameter of 1.9 cm. No other lesions. No adenopathy.
  - US abdomen (30/10/2014): normal.
  - Chest X-ray (30/10/2014): normal.
  - Bone scan (29/10/2014): normal.

# Imaging: earlier screening mammography.



19/05/2011

# Imaging: diagnostic mammography.

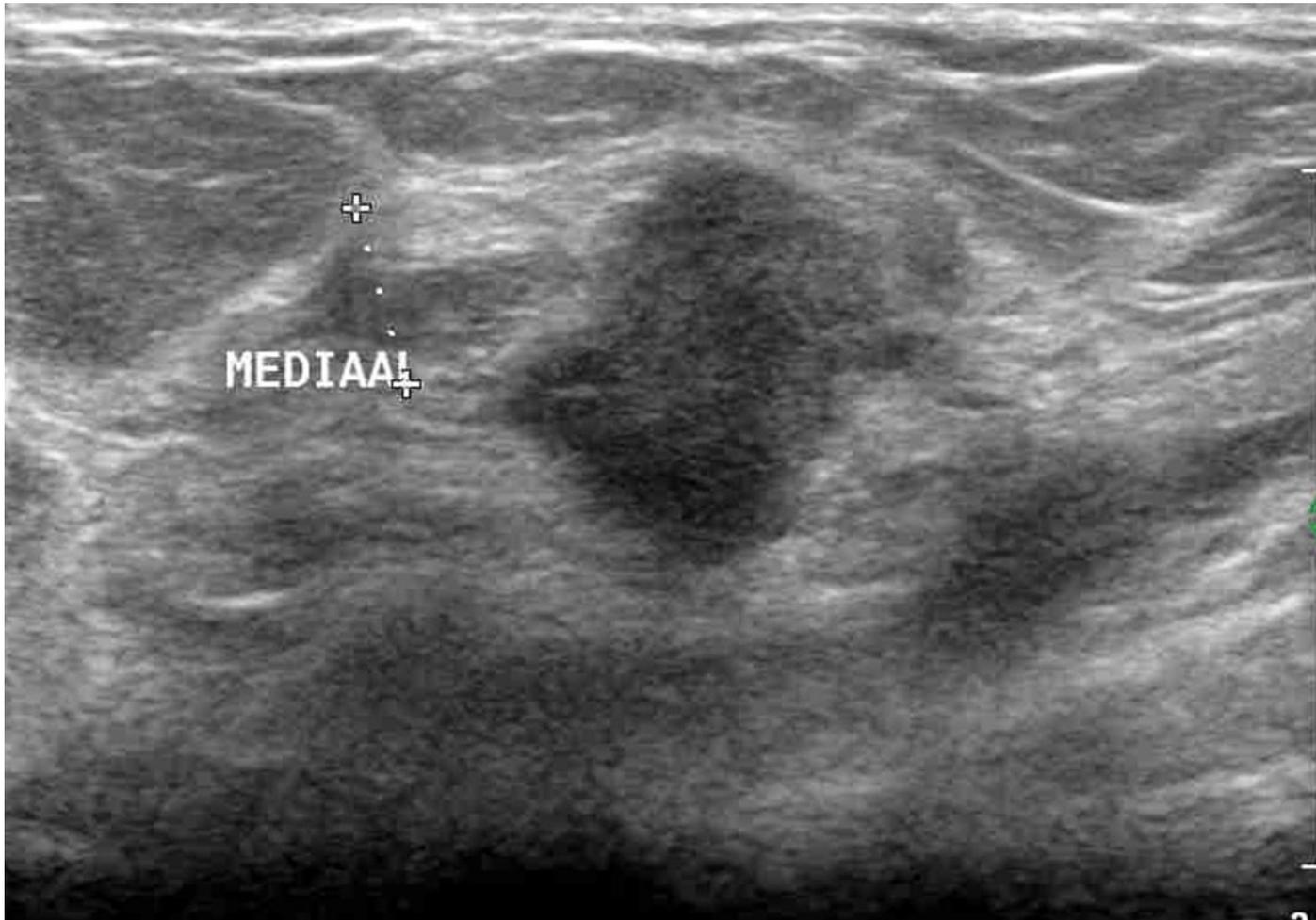


23/10/2014

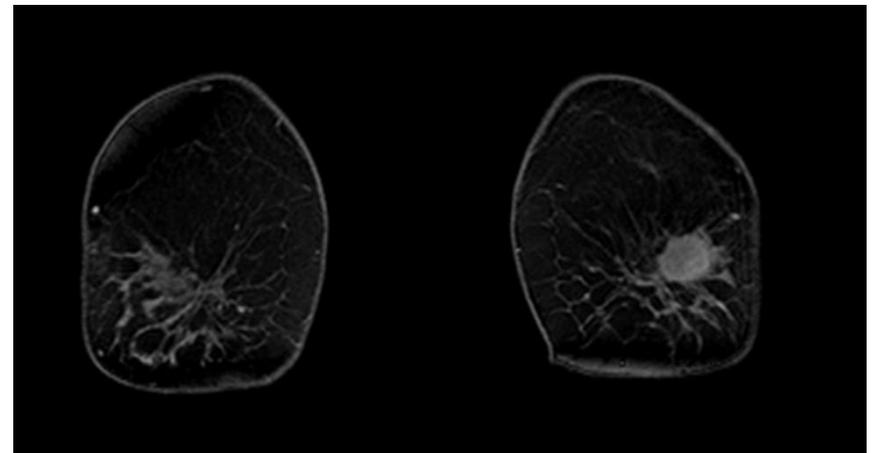
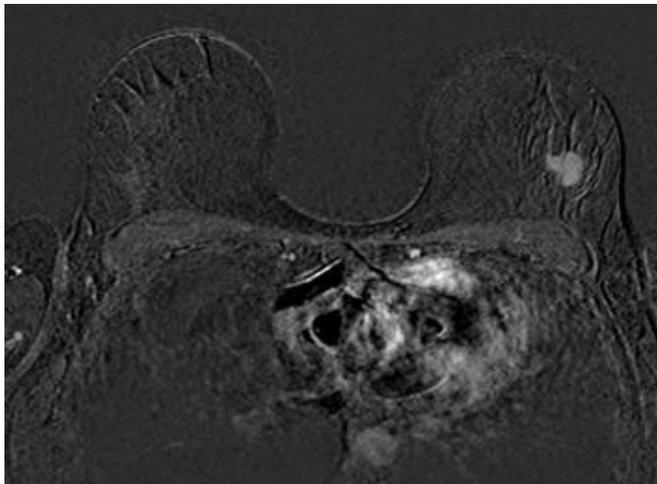
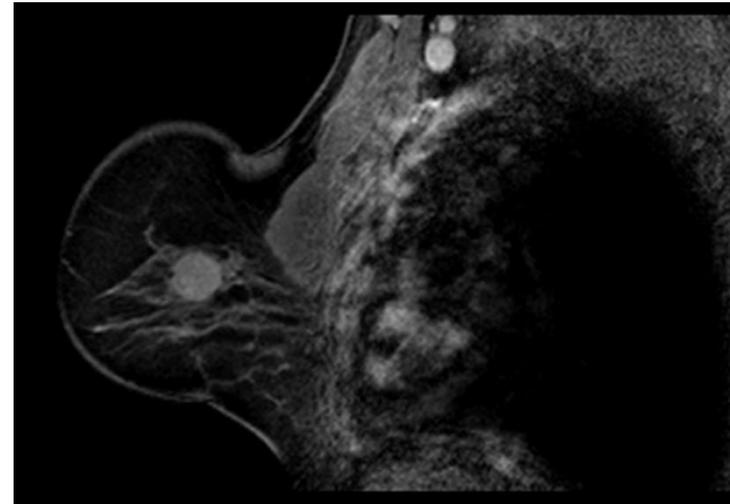
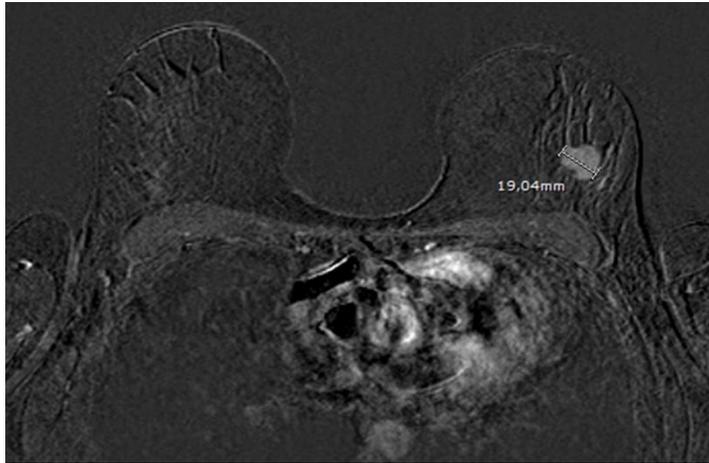
# Imaging: diagnostic US (1).



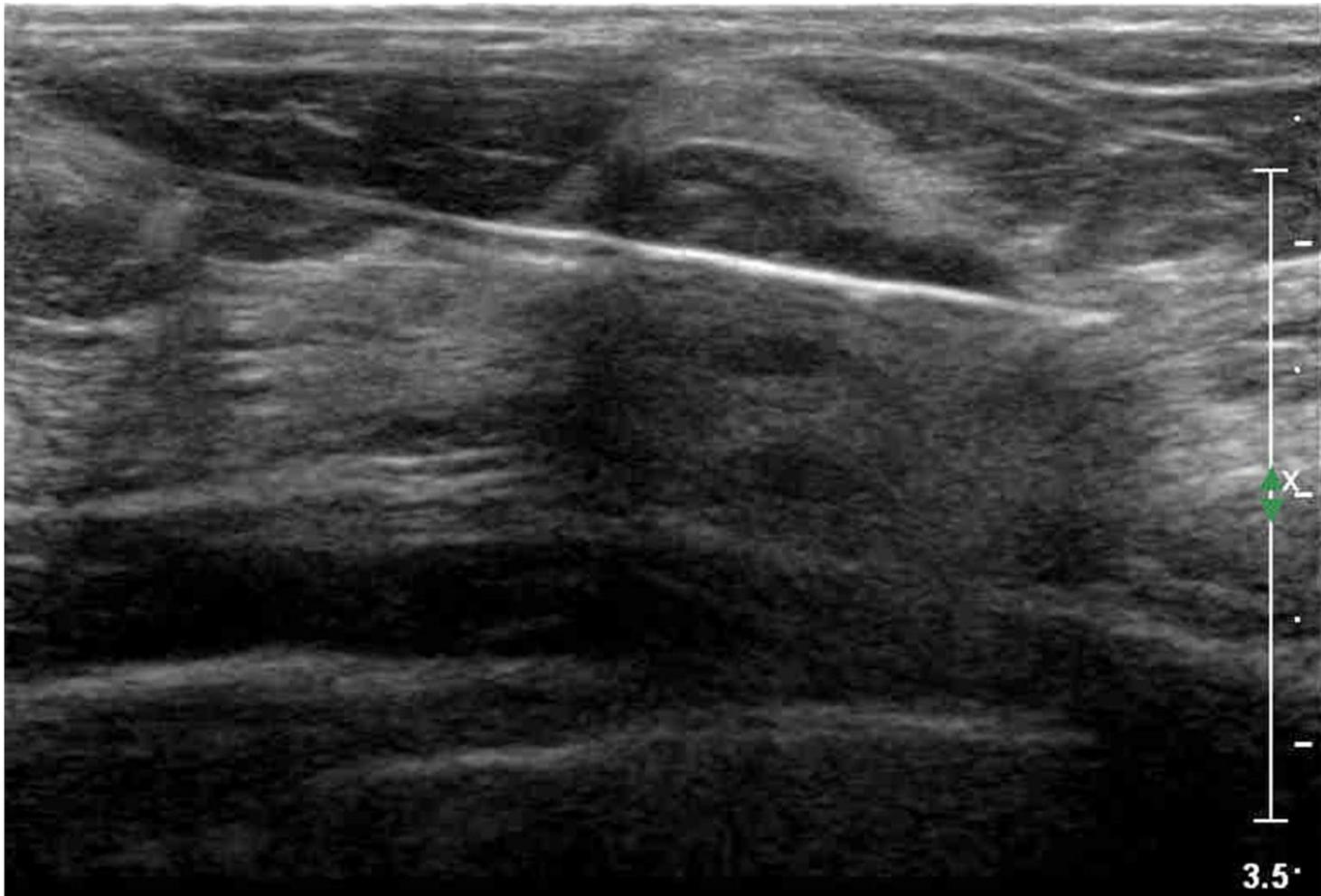
## Imaging: diagnostic US (2).



## Imaging: diagnostic MRI.



## Imaging: US punctation.



## Pre-operative staging: conclusion.

- IDA grade 2, ER 8/8, PR 8/8, HER-2 2+ but SISH negative.
- **cT1c cN0 cM0.**

## BCS + SLND on 04/11/2014.

- IDA grade 2, maximal diameter 1.8 cm.
- LVI+.
- ER 8/8, PR 8/8, HER-2 2+ but SISH negative.
- One of two SLNs positive with macroM+ of 3.5 mm.
- **pT1c pN1a(sn)**.

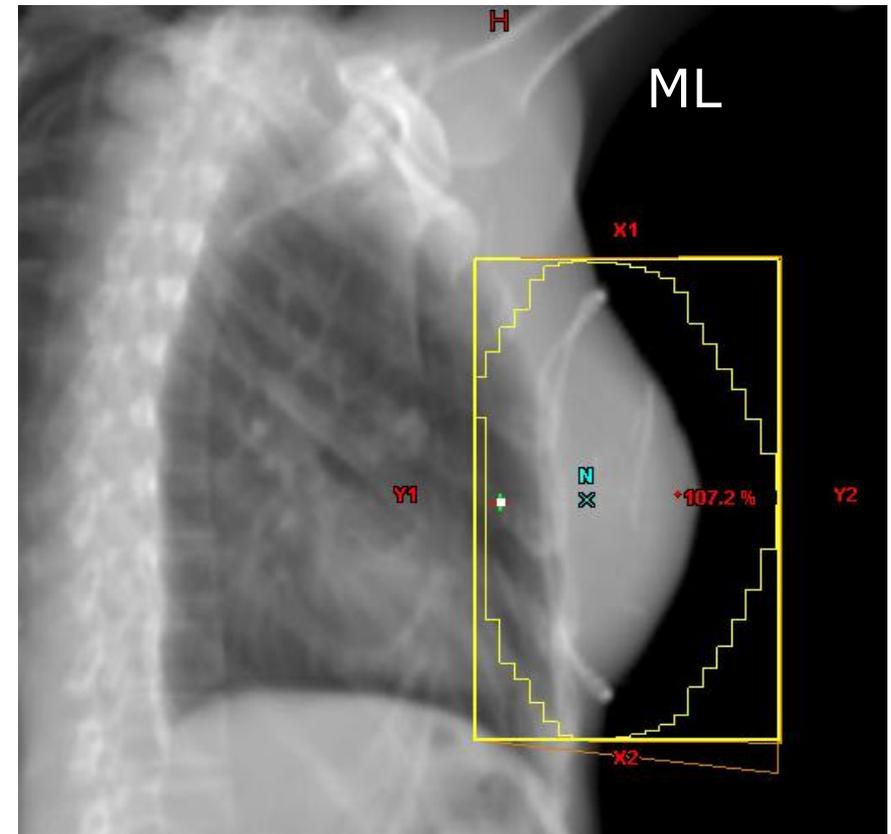
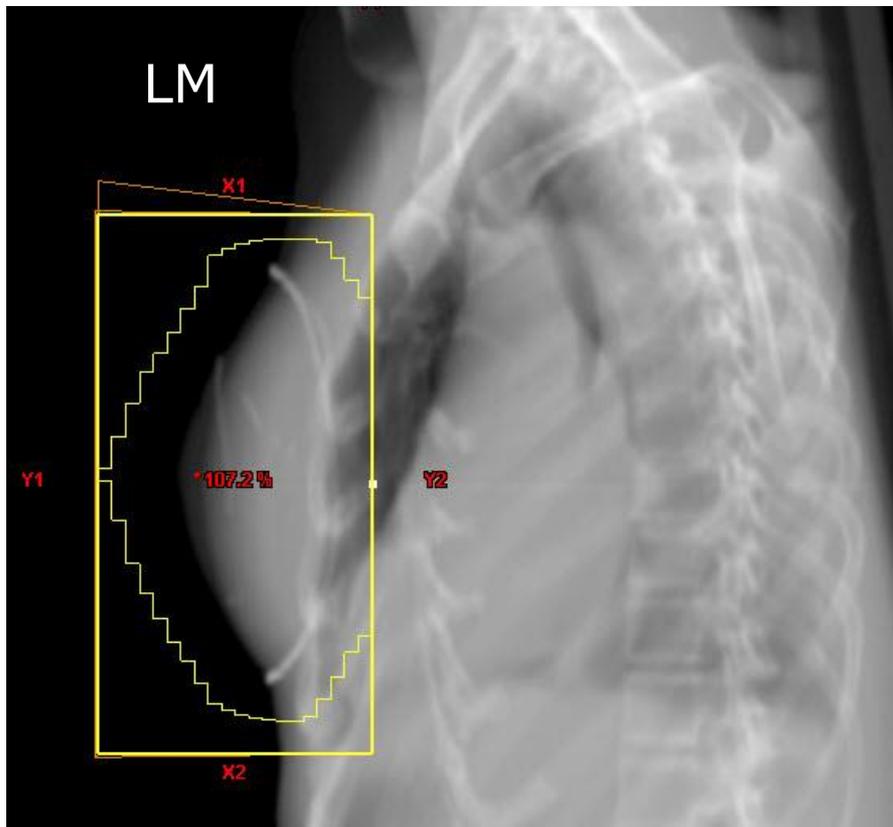
## What now?

- Further ALND or not?
- Adjuvant chemotherapy or not?
- Radiotherapy:
  - Whole-breast radiotherapy alone.
  - Whole-breast + IM-MS radiotherapy.
  - Whole-breast + axillary radiotherapy.
  - Whole-breast + IM-MS + axillary radiotherapy.
- Hormonal therapy.

## Multidisciplinary discussion.

- No further ALND.
- No adjuvant chemotherapy.
- Whole-breast radiotherapy alone, without explicit nodal irradiation. Not even what is called “high tangents”.
- Hormonal treatment: 5 yrs AI + 5 yrs Tam.

## RT fields (1).



High targets = cranial border  $\leq$  2 cm from the humeral head.<sup>ref</sup>

## RT fields (2).

