

Breast MRI of Invasive Cancer



BC Surgery Oncology Breast Cancer Update

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Outline

- **Technique**
- **Indications**
- **Cases**
- **Pre-op Breast MRI**
- **Conclusion**

Outline

- Excluded
 - Screening
 - Post-op MRI
 - DCIS
 - Breast Implant integrity



Technique

Breast MRI Questionnaire

Name: _____

Date of Birth: _____

Referring Physician: _____

Reason for Exam:

_____ Implant Assessment _____ Enlarged lymph glands under arm
_____ Breast Lump (right / left) _____ Known breast cancer (R / L)
_____ Nipple Discharge (right / left) _____ Other:

Previous Mammogram

Where/When: _____

Previous Ultrasound:

Where/When: _____

Technique

Breast MRI Questionnaire

Previous Breast Surgery: (yes / no)

Where/When: _____ R/ L breast Benign / Malignant

Pre-menopausal (yes / no) First day of LMP: _____

Exam should be scheduled for Day 7-14 of cycle

Post-menopausal (yes / no) On HRT? _____

HRT should be stopped 3 months prior to exam—consult your physician

Do you have a family history of breast cancer (if yes, please indicate age of diagnosis)

Mother _____ Sister _____ Grandmother _____ Aunt _____

Daughter _____

Technique

Breast MRI Questionnaire

Have you had any of the following treatments
(If yes, please indicate where & when)

- Lumpectomy
- Chemotherapy
- Tamoxifen
- Needle biopsy

- Mastectomy
- Radiation
- HRT / BCP

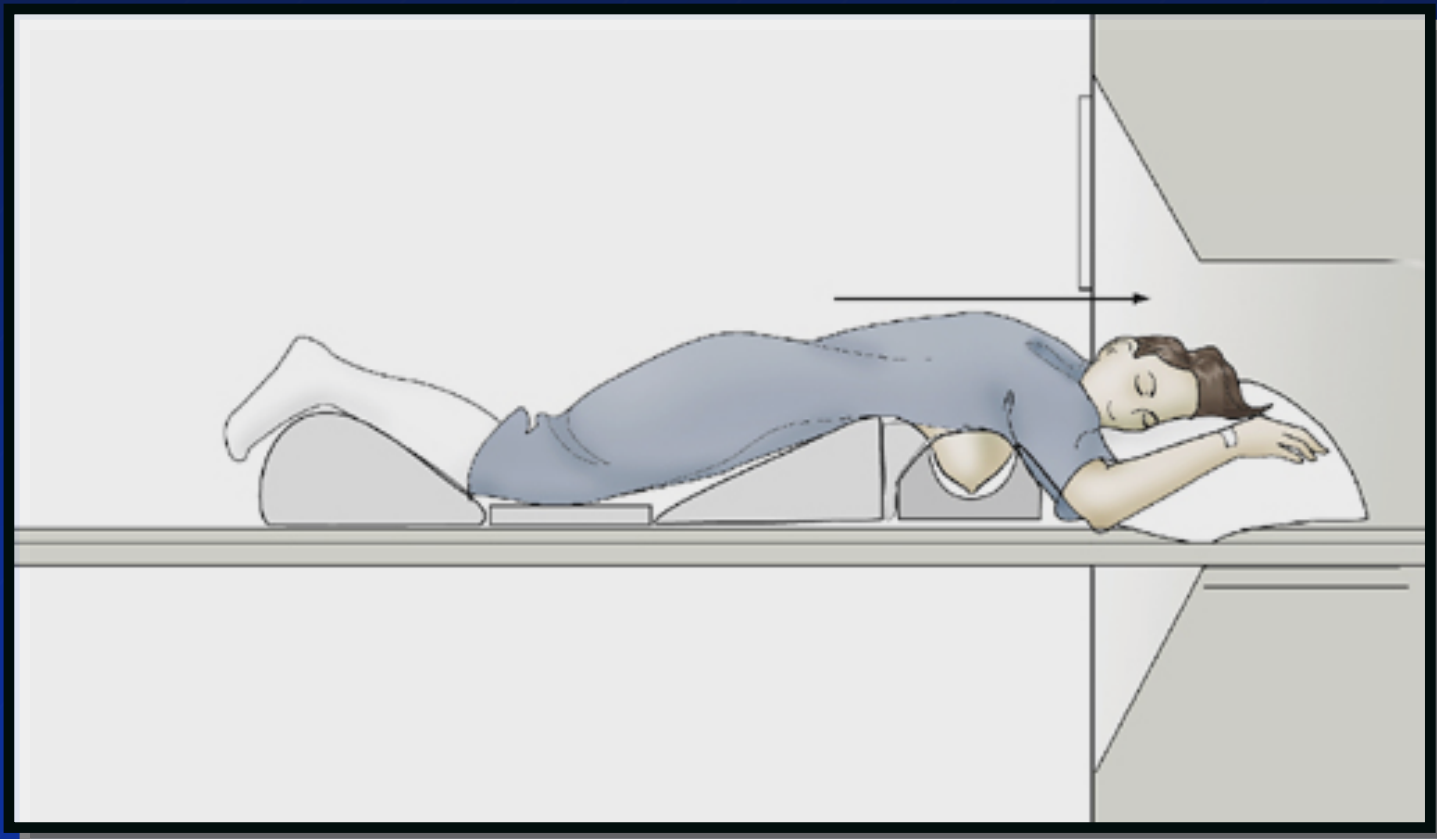
Patient Signature: _____
Date: _____

Technique

Breast Coil



Technique Positioning



Technique Sequences

- Coronal STIR
- Ax FSE T2 or STIR
- 3D VIBRANT with fat saturation-
precontrast, immediate post injection
and 3 more consecutive runs (scan
time <1.5 minutes)
- Post-processing-subtraction

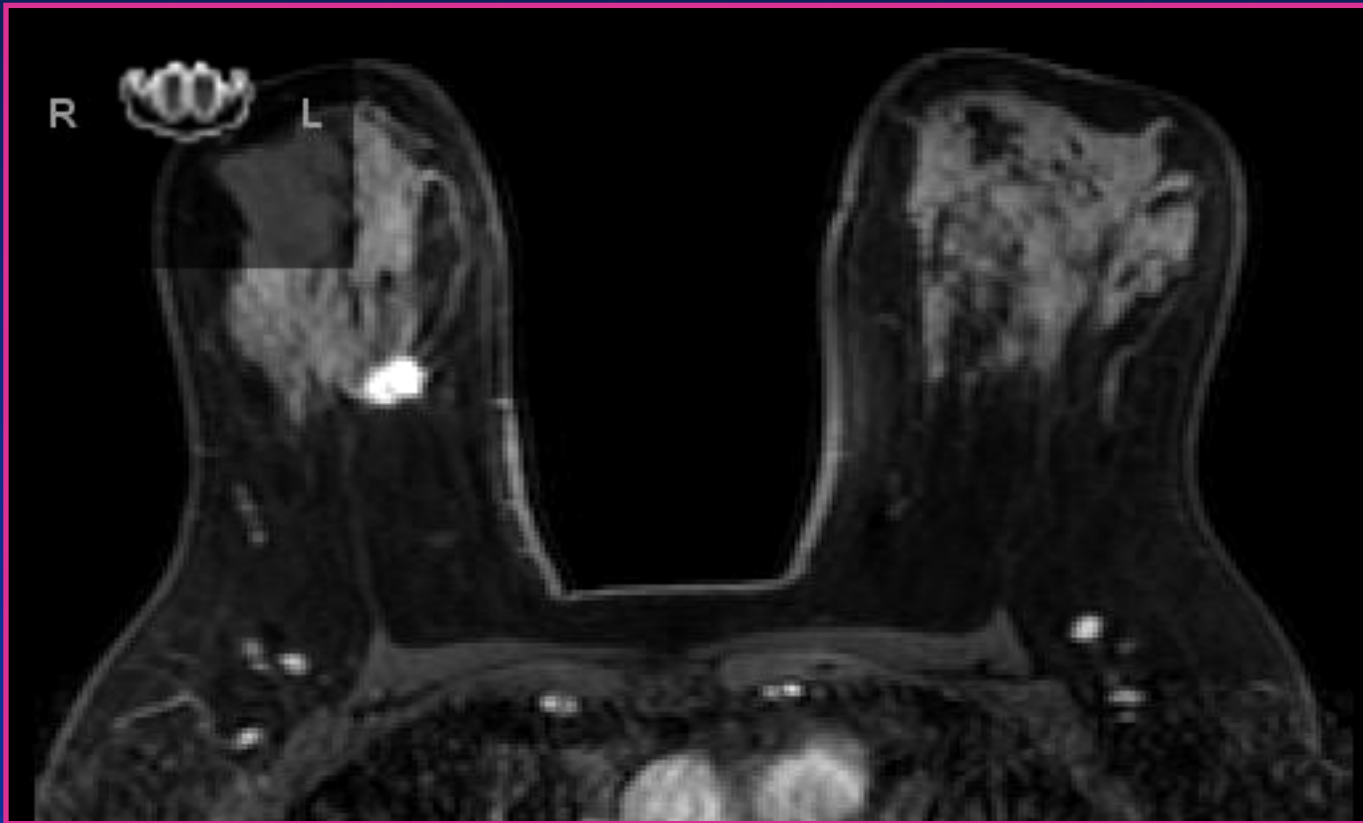
Breast MRI

BI-RADS Lexicon

- **Lesion Morphology**
 - **Mass (3D)**
 - **Area of non-mass-like enhancement**
 - **Focus (<5mm)**
- **Enhancement Kinetics**

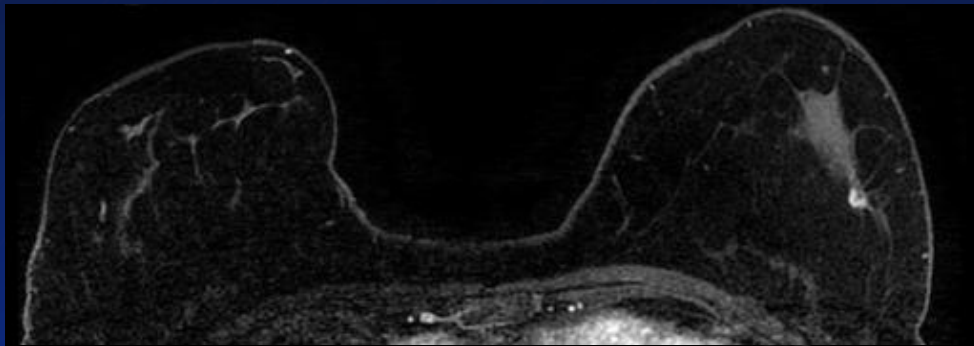
MRI BI-RADS Lexicon

Mass-Irregular shape

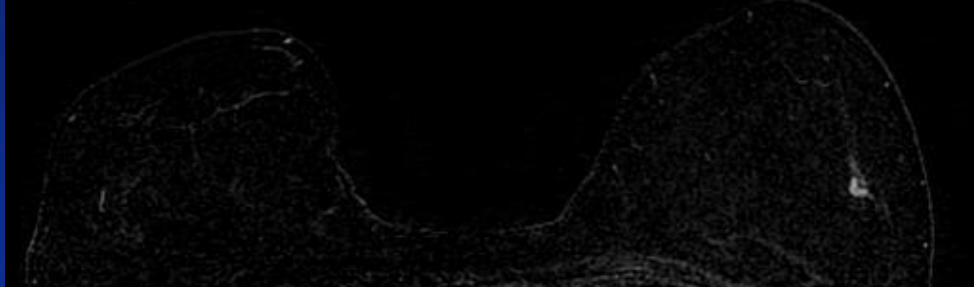
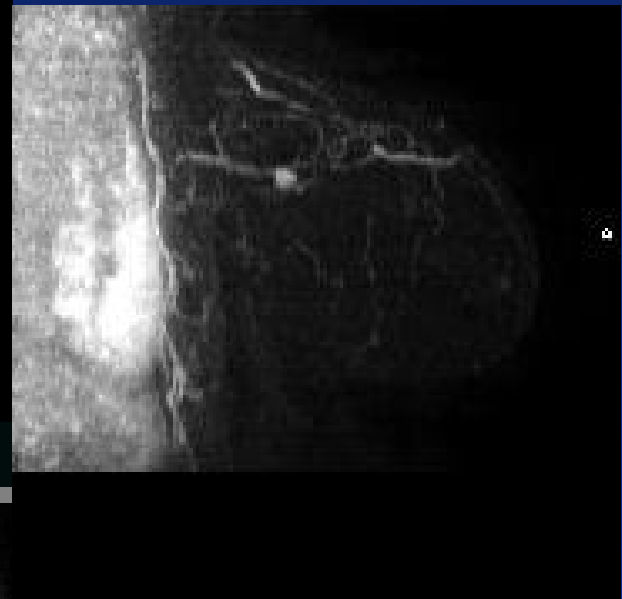


MRI BI-RADS Lexicon

Mass-Irregular shape



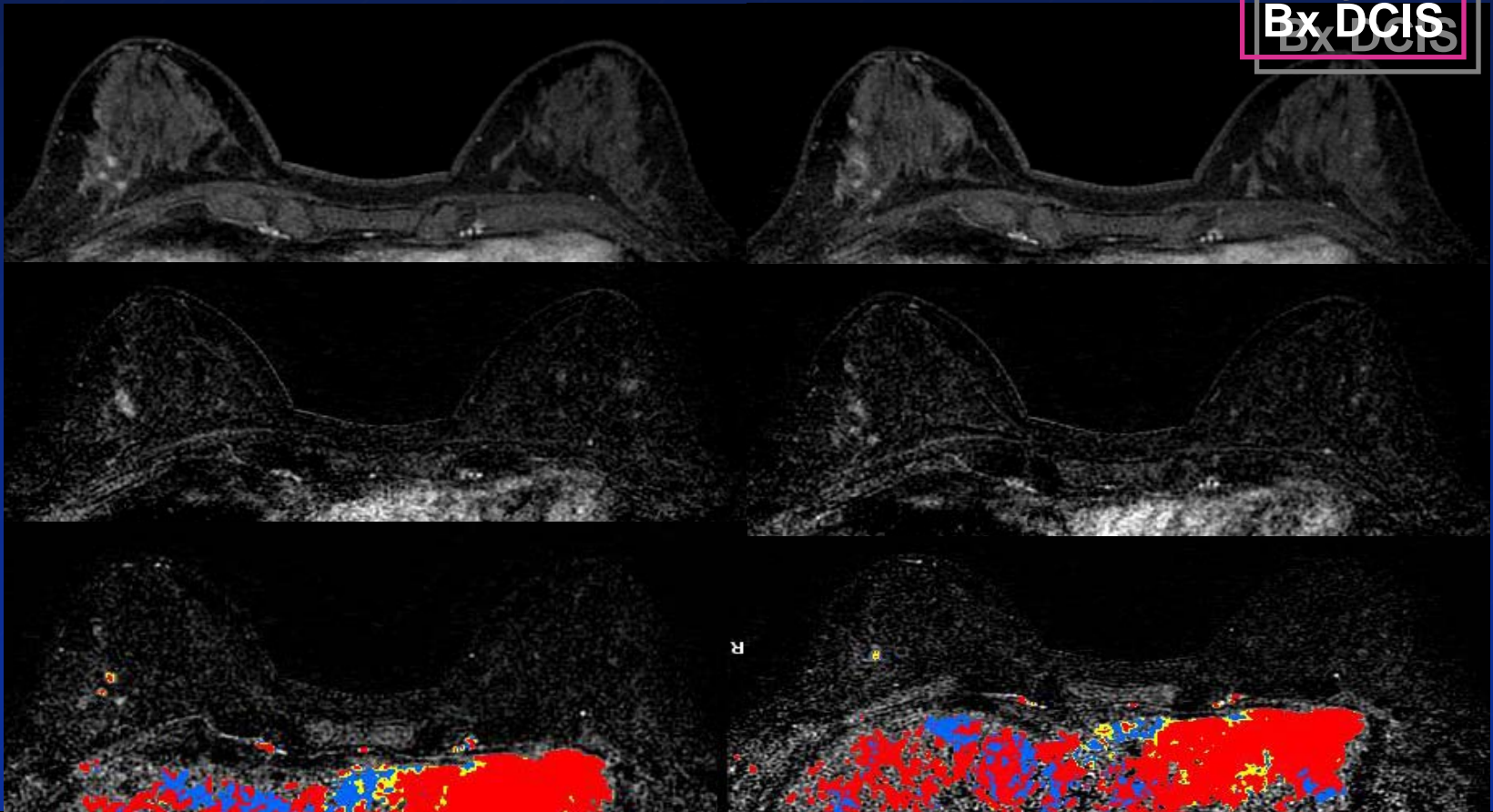
57yo
Mammo +, US Bx



MRI BI-RADS Lexicon

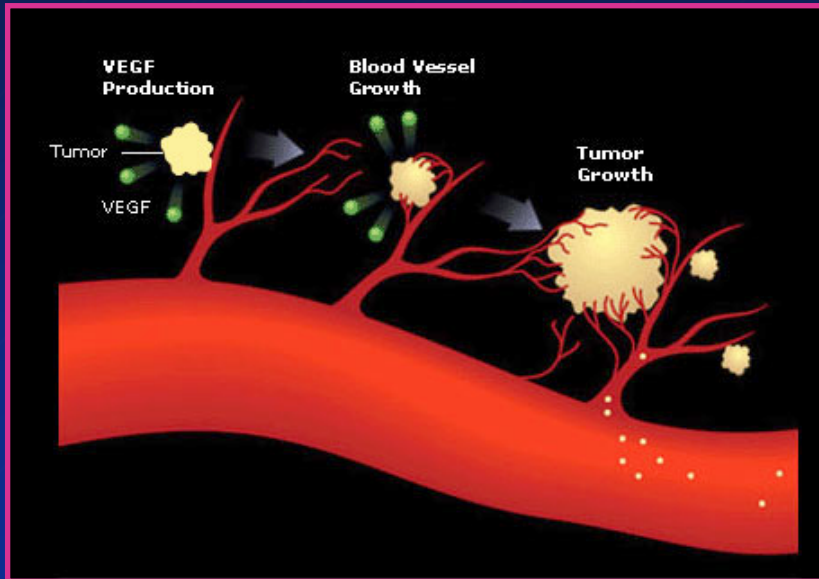
Asymmetric Enhancement

45 yo
Bx DCIS



Breast MRI

Enhancement Kinetics

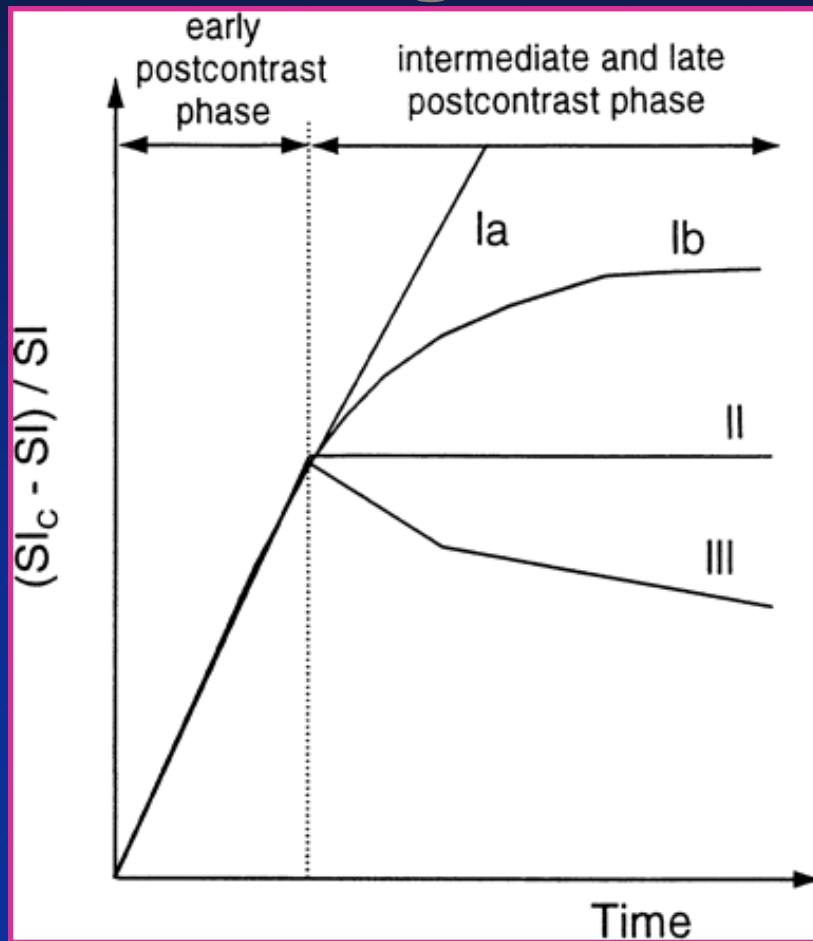


angiogenesis



Breast MRI

Time-signal intensity curve



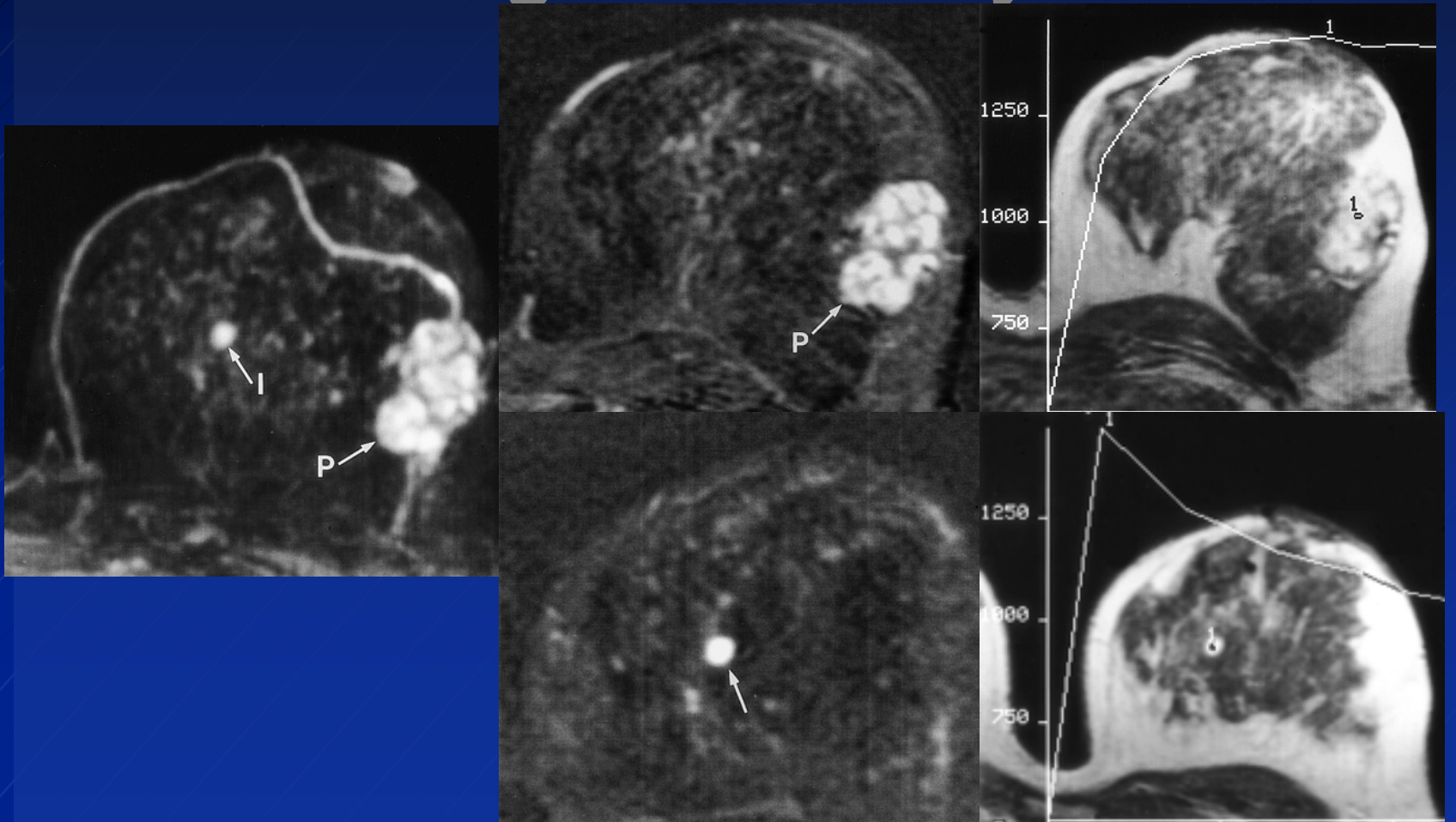
94% Benign

64% Malignant

87% Malignant

Breast MRI

Time-signal intensity curve



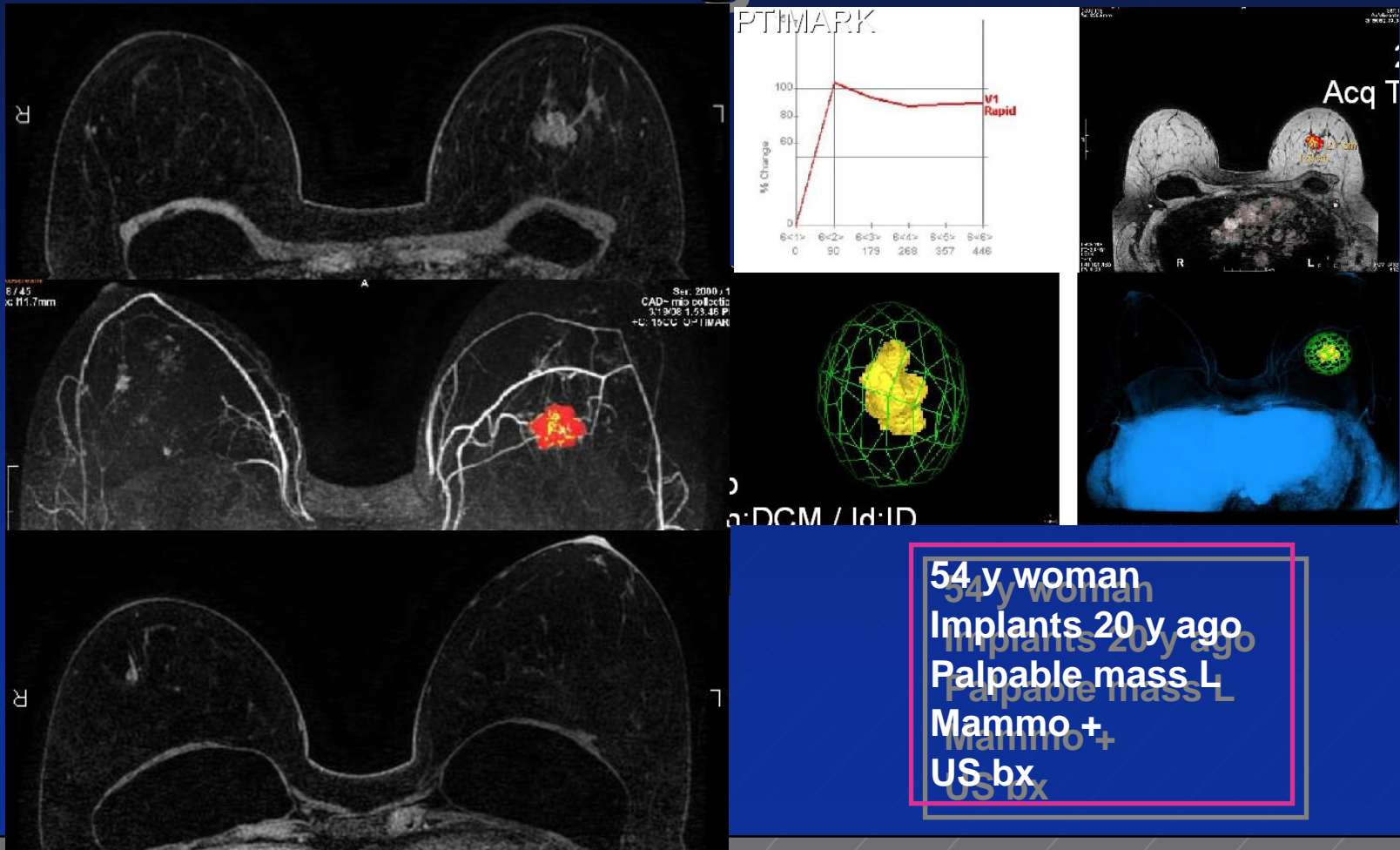
Indications

ACR practice guidelines (2008)

- **Screening**
 - **High risk patients**
 - **Contralateral breast (3-5% occult malignancy)**
 - **Breast Augmentation**

Indications

Breast Augmentation



Indications

ACR practice guidelines (2008)

- **Extent of disease**
 - **Multifocality and Multicentricity**
 - **Invasion deep to fascia**
 - **Postlumpectomy + margins**
 - **Neoadjuvant chemotherapy**

Indications

ACR practice guidelines (2008)

- **Additional evaluation of clinical/imaging findings**
 - **Recurrence**
 - **Occult Breast Cancer**
 - **Lesion characterization**
 - **PO tissue reconstruction**
 - **MRI-guided biopsy**

Breast MRI Indications

Pre-operative Evaluation

- Tumour size and location
- Multifocality & Multicentricity (occult disease 15-37%)
- Chest wall or pectoralis muscle invasion, nipple or skin invasion
- Axillary or internal mammary LN
- Metastasis

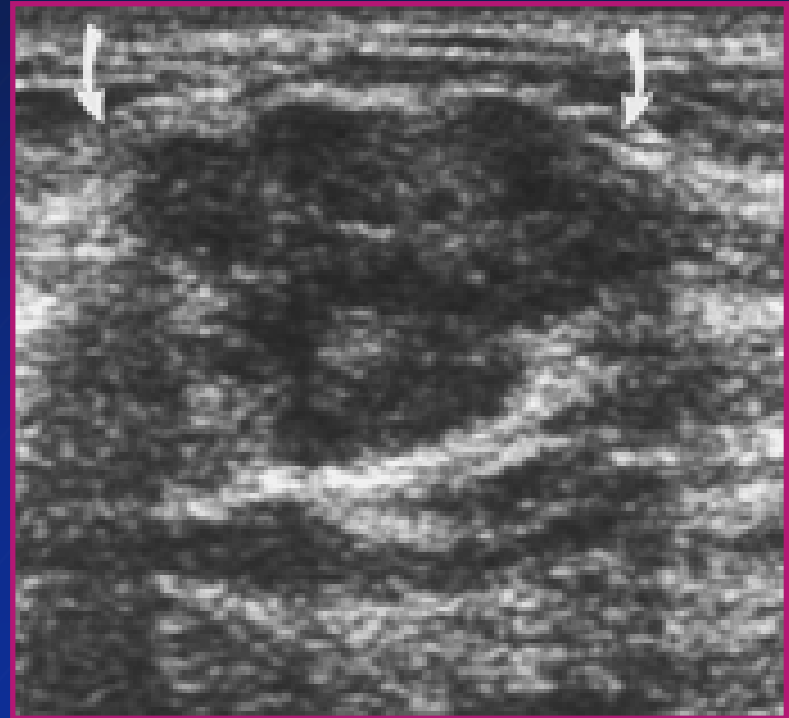
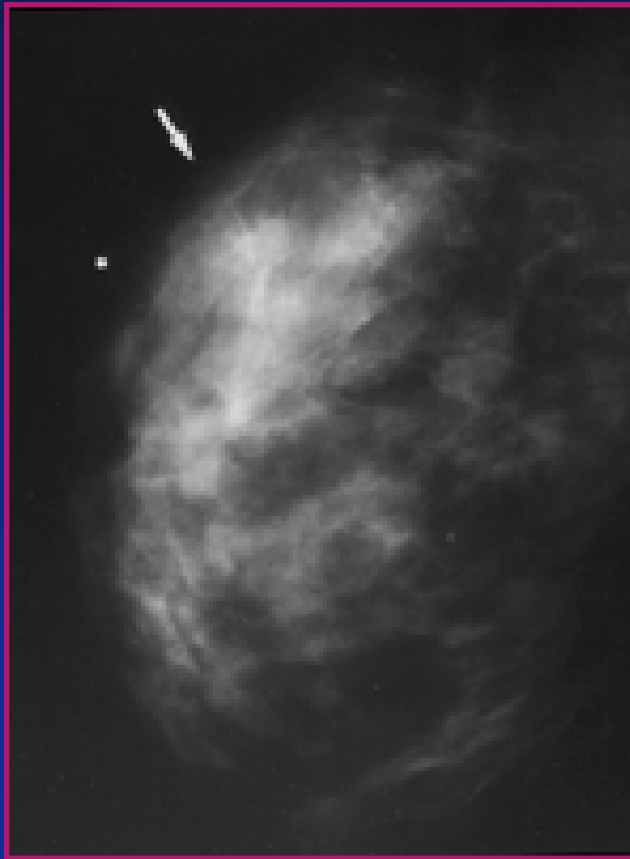
Breast MRI Indications

Pre-operative Evaluation

- Ipsilateral cancer was found on MRI in 19/70 (27%)
 - 20% same quadrant
 - 4% different quadrant
 - 3% same and different
- Strong family Hx or infiltrating lobular histology

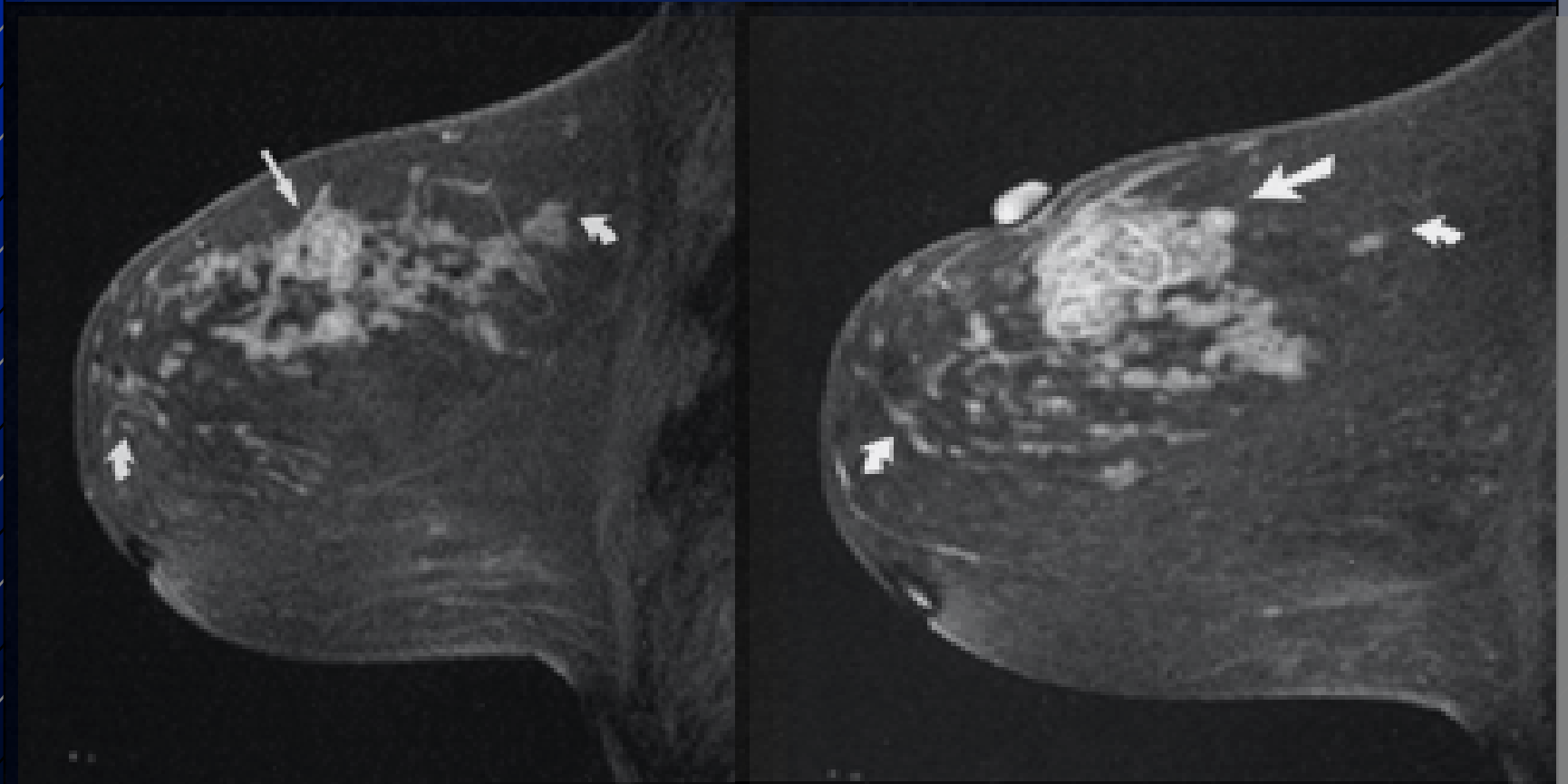
Breast MRI Indications

Pre-operative Evaluation



Breast MRI Indications

Pre-operative Evaluation



Breast MRI Indications

Pre-operative Evaluation

50 yo woman

77 yo mother dx metastatic breast
Ca

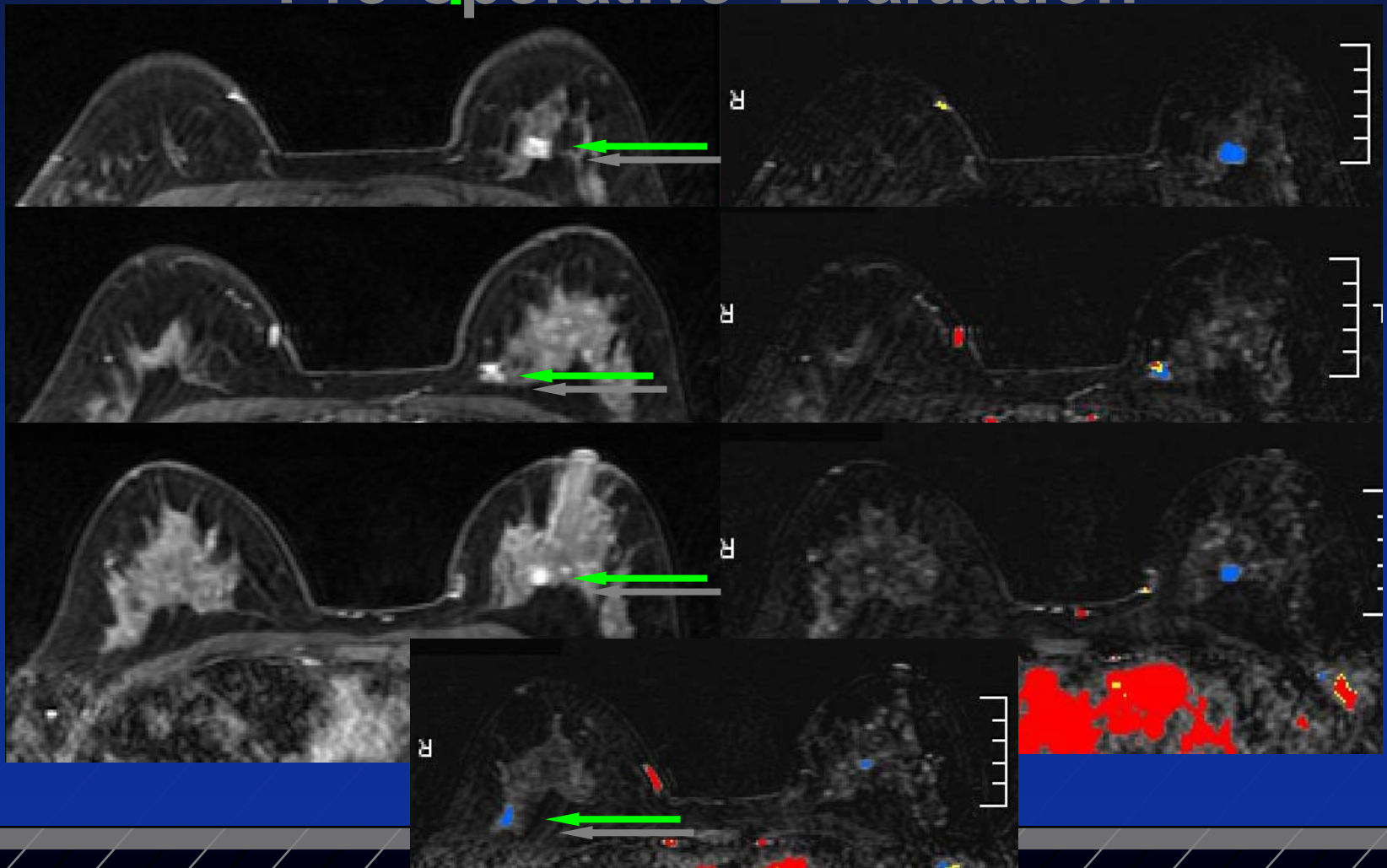
Thickening L UOQ

Mammo -, US - in area but lesion
in L UIQ

US Bx → infiltrating lobular Ca

Breast MRI Indications

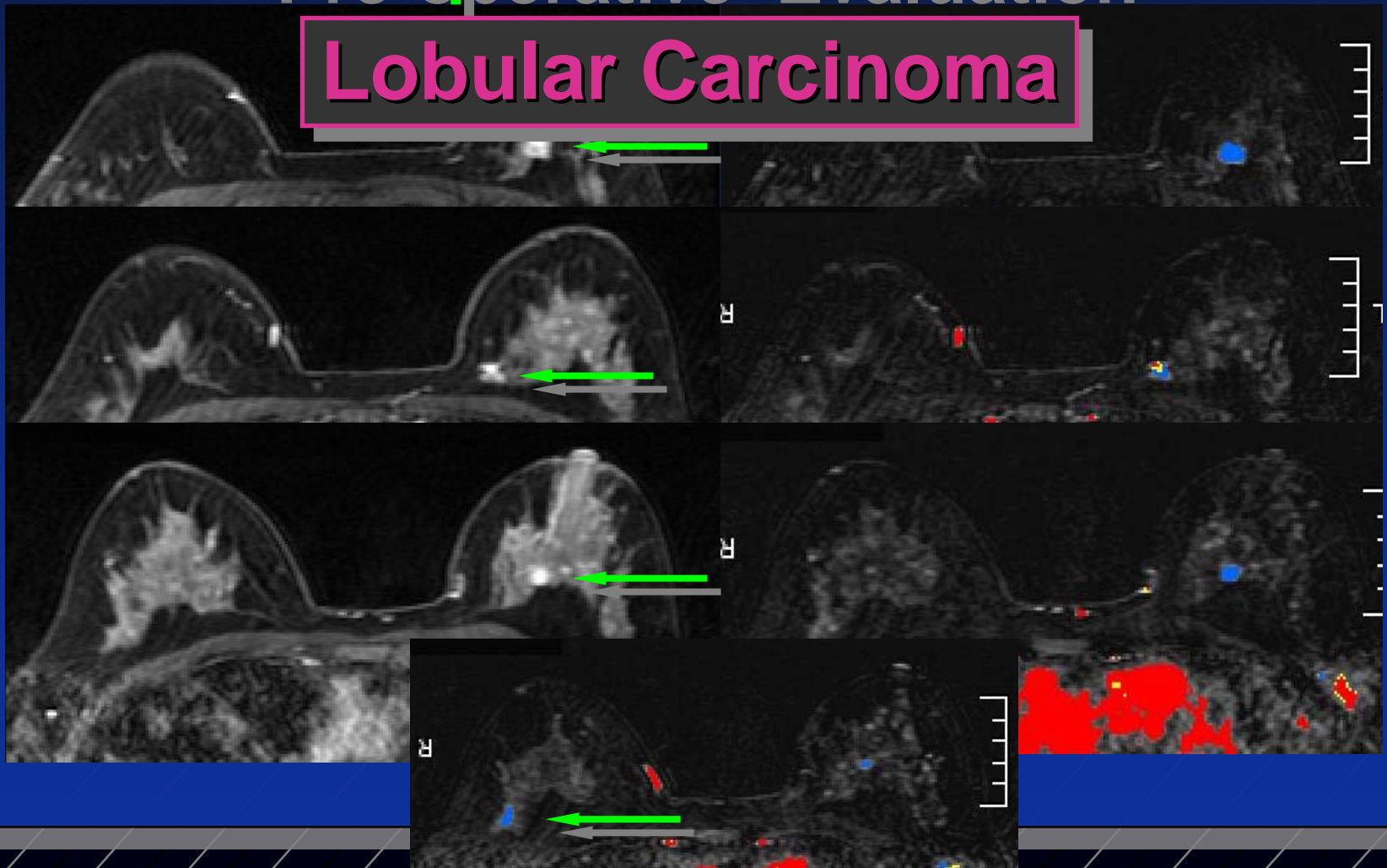
Pre-operative Evaluation



Breast MRI Indications

Pre-operative Evaluation

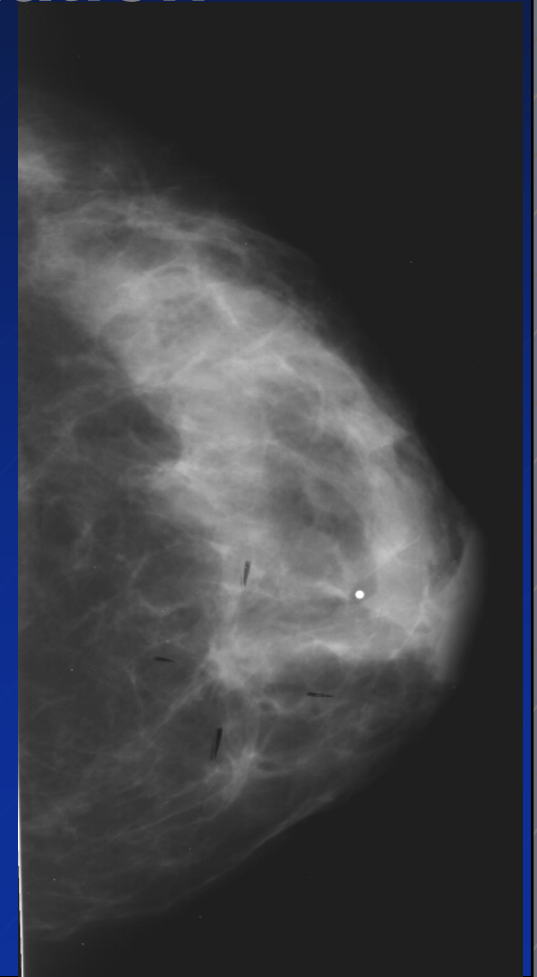
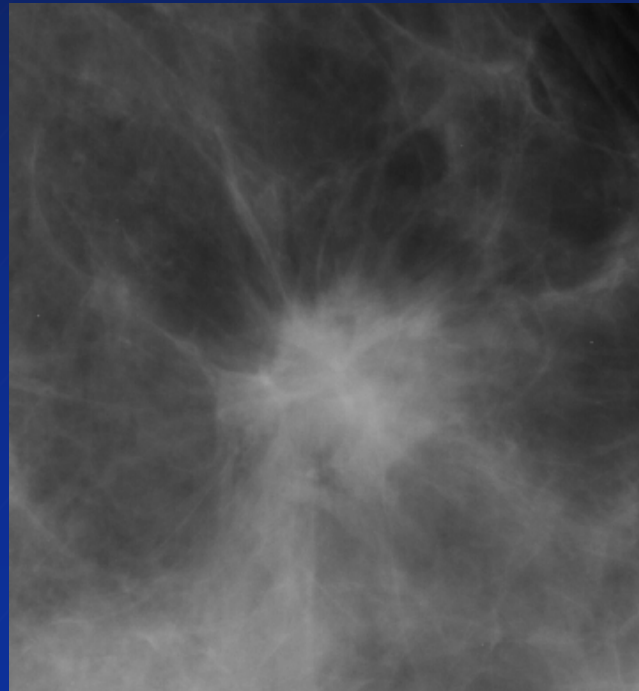
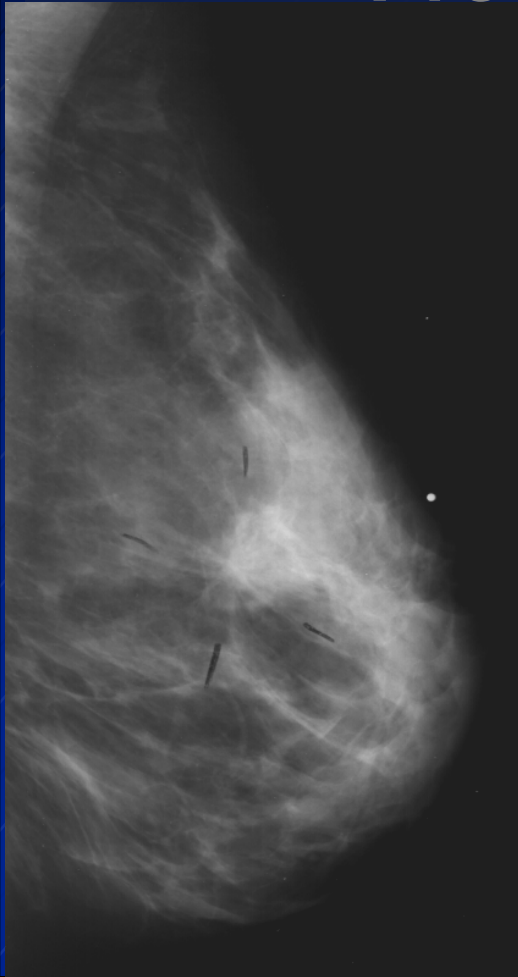
Lobular Carcinoma



Breast MRI Indications

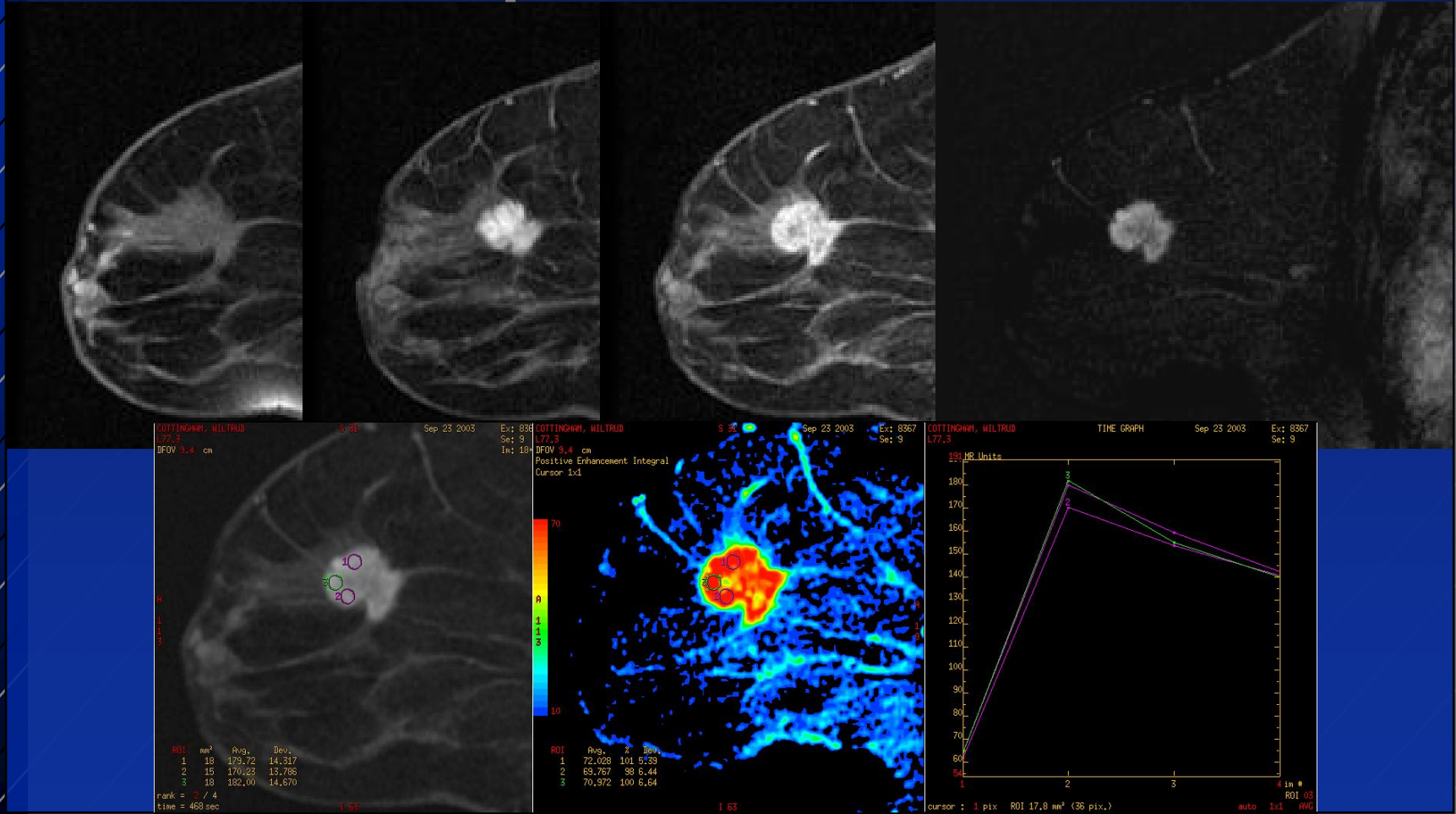
Pre-operative Evaluation

42 y woman
Palpable L breast
mass



Breast MRI Indications

Pre-operative Evaluation



Breast MRI Indications

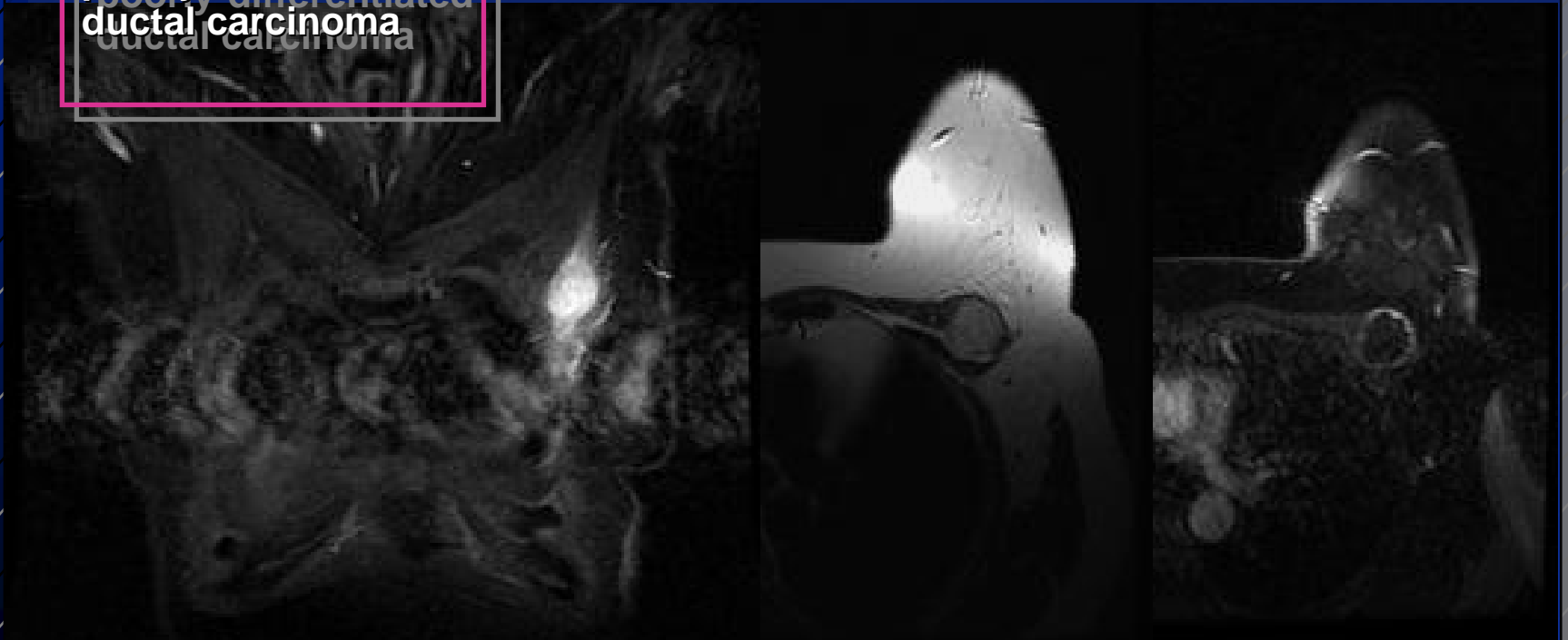
Pre-operative Evaluation



Pre-op Breast MRI

Chest Wall Invasion

41 y woman
Palpable L breast
mass UOQ
Bx infiltrating
poorly-differentiated
ductal carcinoma



Breast MRI Indications

Contralateral breast screening pre-op

- 3-5% synchronous contralateral breast Ca on MRI only
 - 30/969 (3%) contralat breast Ca
 - 121/969 (12.5%) Bx
 - 30 + bx(24.8%)
 - 18 invasive Ca
 - 12 DCIS
 - All node negative

Breast MRI Indications

Contralateral breast screening pre-op

- Risk of occult Ca in contralateral breast 1 year post neg MRI 0.3%

Pre-op Breast MRI

Radiological Perspective

- **Additional breast tumour foci**
 - **15-37% ipsilateral breast**
 - **3-5% contralateral breast**
- **Alters clinical management 10-31%**
- **Biopsy of suspicious lesions before Δ surgical approach**

Pre-op Breast MRI

Surgical Perspective

- **Conflicting endorsement**
- **Cleveland clinic-fully promotes pre-op breast MRI without restriction**
- **327 patients-25% pts occult but suspicious lesions**
- **13% pts occult and separate tumours**
- **75% no additional suspicious foci**

Pre-op Breast MRI

Surgical Perspective

- 267 patients invasive Ca
- Surgical management Δ to wider/separate excision or mastectomy in 26% (69/267)
- Confirmed on path that necessary 71% (49/267)
- 46% lobular Ca altered management

Pre-op Breast MRI

Surgical Perspective

- Occult primary malignancy
- BRCA1/2/other genetic mutation
- Major discrepancy between mammo and US
- (ILC, very dense breasts)

Pre-op Breast MRI

Assumptions

Meta-analysis observational studies
(2610 women)

- Improved surgical planning
- Reduce re-excision surgery
- Reduce local recurrence

Not substantiated by trials

→ Additional foci tx with radiation & chemotherapy

Pre-op Breast MRI

Assumptions

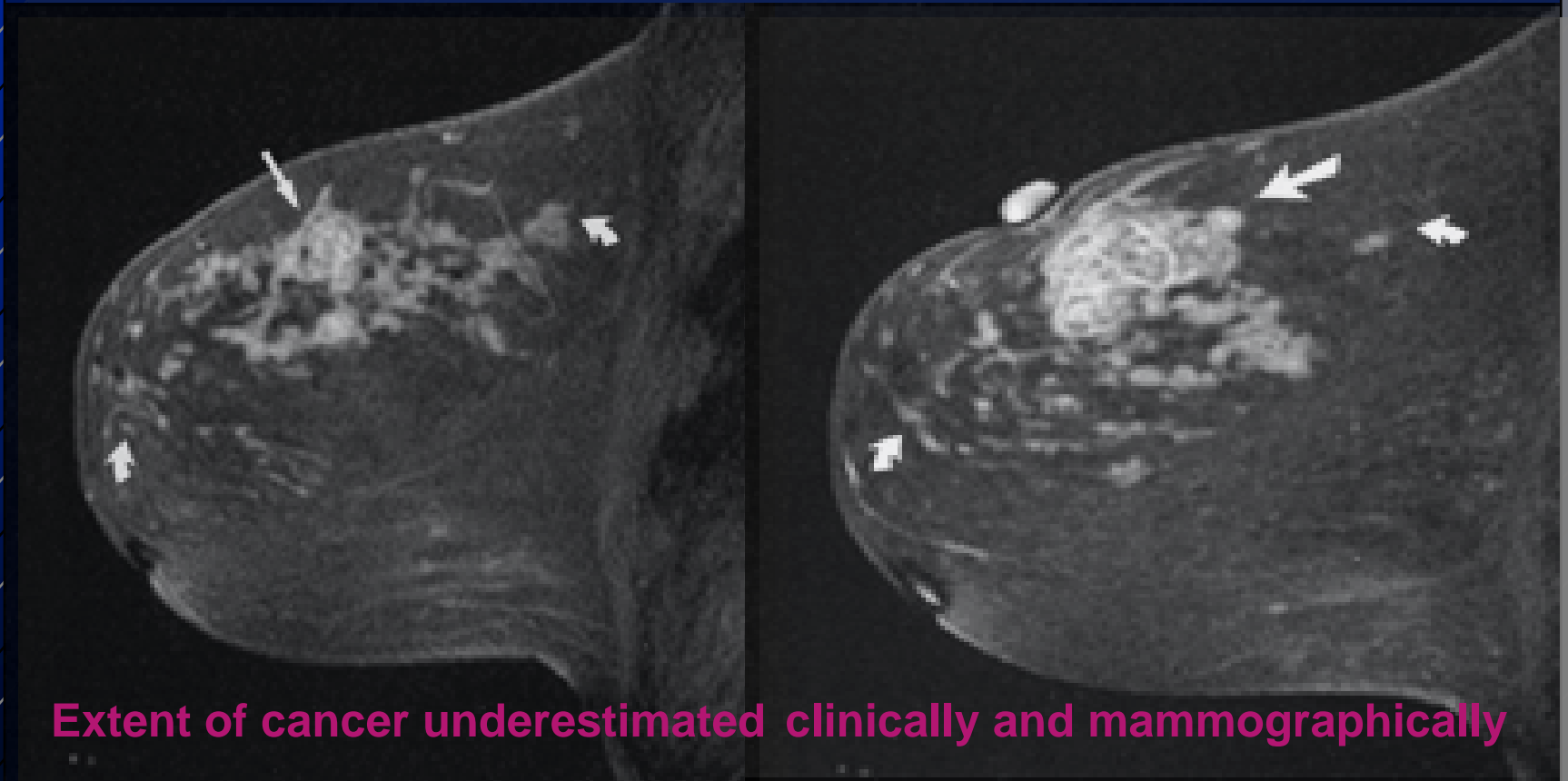
- 15/18 studies quoted in the meta-analysis ≤ 2004 back to 1995
- 3/18 > 2004
- Marked improvement in image quality

Increased risk of recurrence

- Involvement of surgical margins
- Extensive cancer ID clinically or mammographically
- Presence of locally advanced Ca

Breast MRI Indications

Pre-operative Evaluation



Pre-op Breast MRI

Pros

- Extent (MF vs MC)
- Screen CL breast
- Chest wall invasion
- Patient & Surgeon reassured

Cons

- Additional Imaging
- Further biopsy
- Delay in surgery
- More pt anxiety
- More extensive lumpectomy or conversion to mastectomy

Pre-op Breast MRI

Conclusion

- Pre-op Breast MRI will find otherwise occult ipsilateral and contralateral tumour foci
- Must bx MRI suspicious lesions
- Patient awareness that further bx and delay in surgery
- Negative MRI for MC/CL disease reassuring

Pre-op Breast MRI

Conclusion

- **Particularly helpful**
 - **Axillary nodes-occult primary**
 - **Genetic Ca**
 - **Lobular Carcinoma**
 - **Very dense breasts/young patients**

Pre-op Breast MRI

Conclusion

- More research (randomized, controlled prospective trials) needed to study longterm impact on local recurrence, morbidity and mortality

Thank You!

