



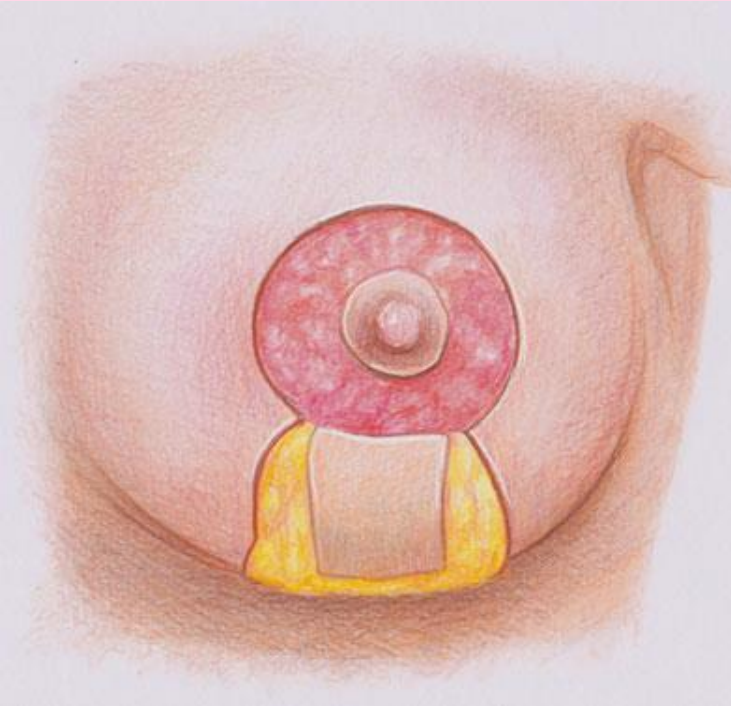
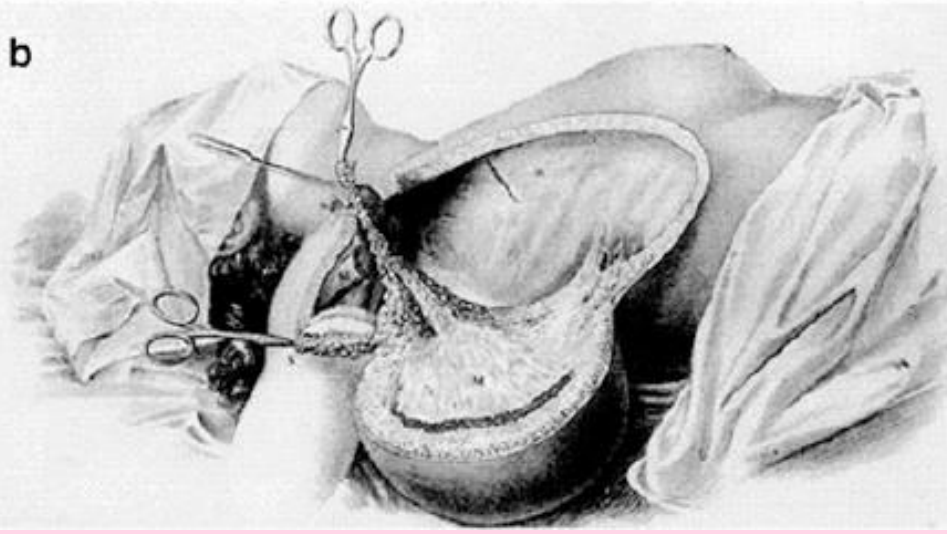
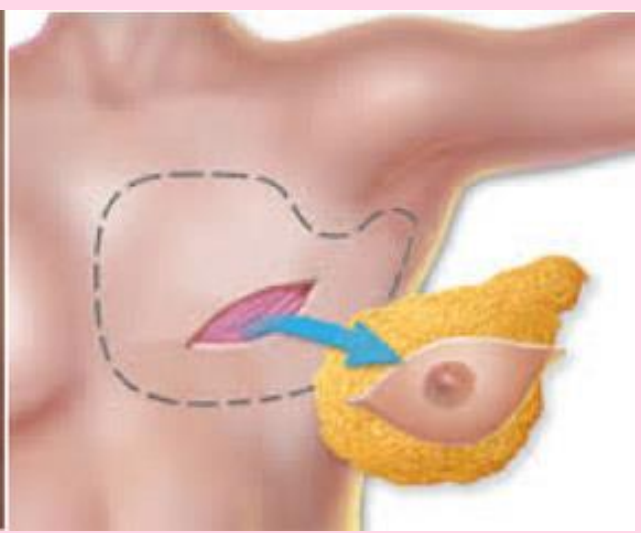
**ROLE OF BREAST IMAGING
IN
BREAST CONSERVING SURGERY**

Dr Ahmad Elahi

Fellowship of Breast Surgery

Breast Conserving Therapy



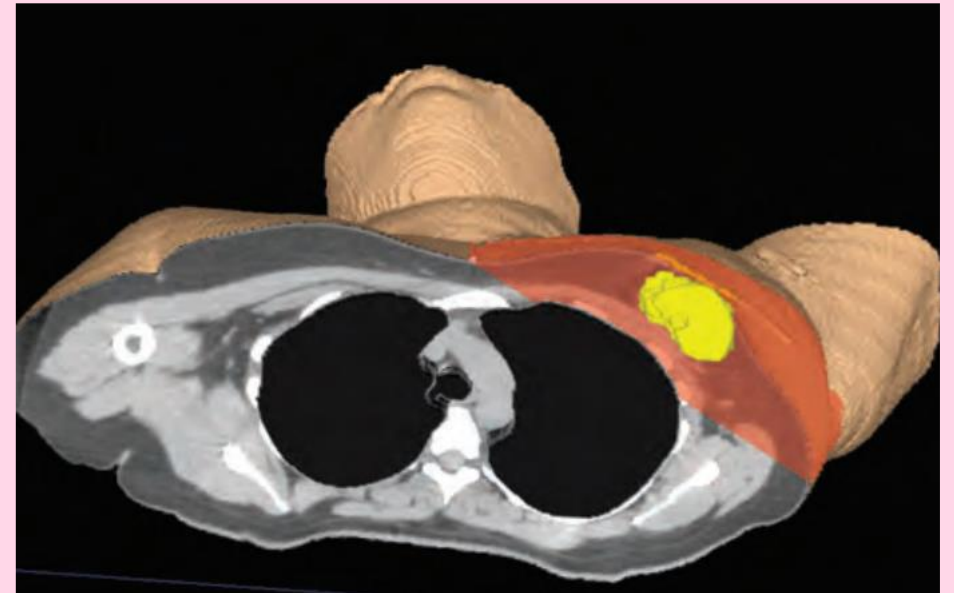
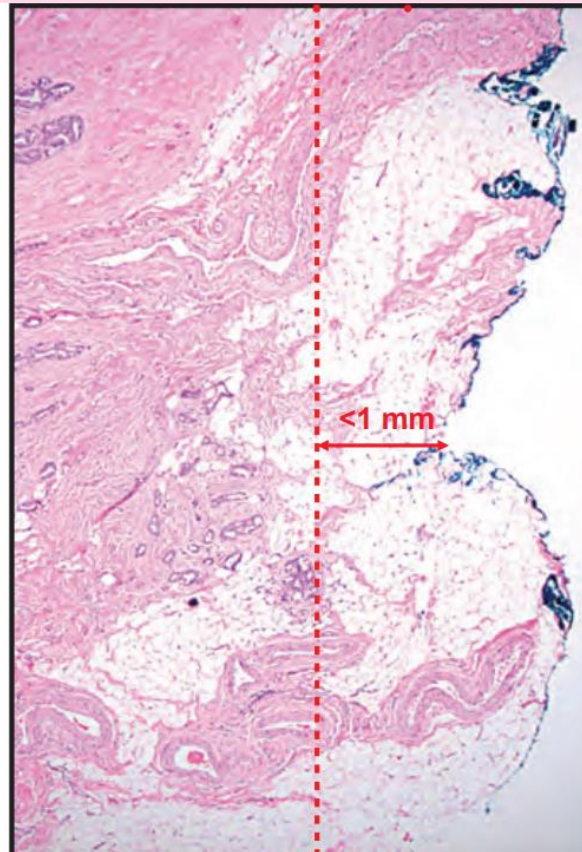
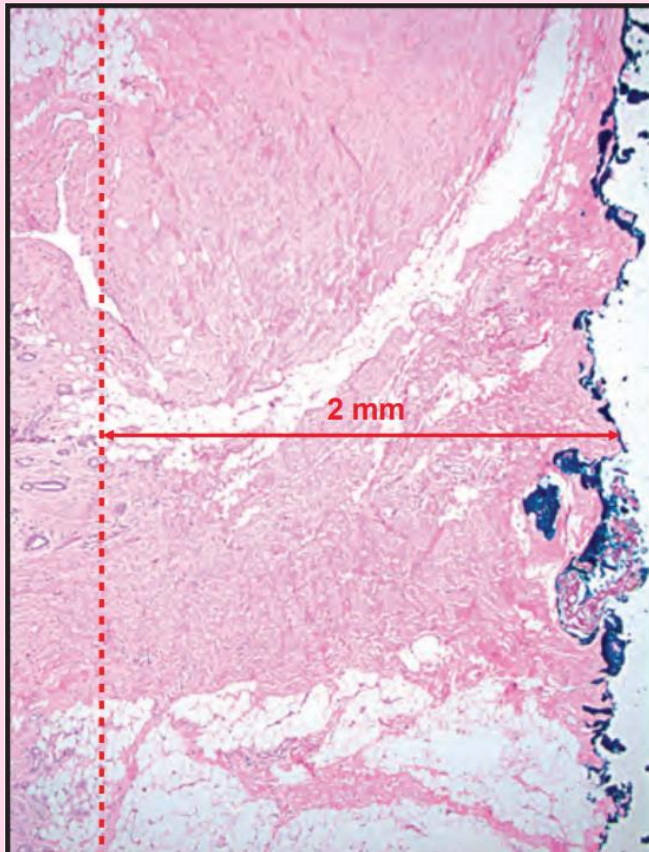


Definition of BCT:

- BCS + whole breast irradiation
- Standard of care for local-regional treatment for early-stage breast cancer
- BCT is generally reserved for patients with tumors smaller than 5 cm.
- However, more important than absolute tumor size is the relationship between tumor size and breast size.



Tumor margins

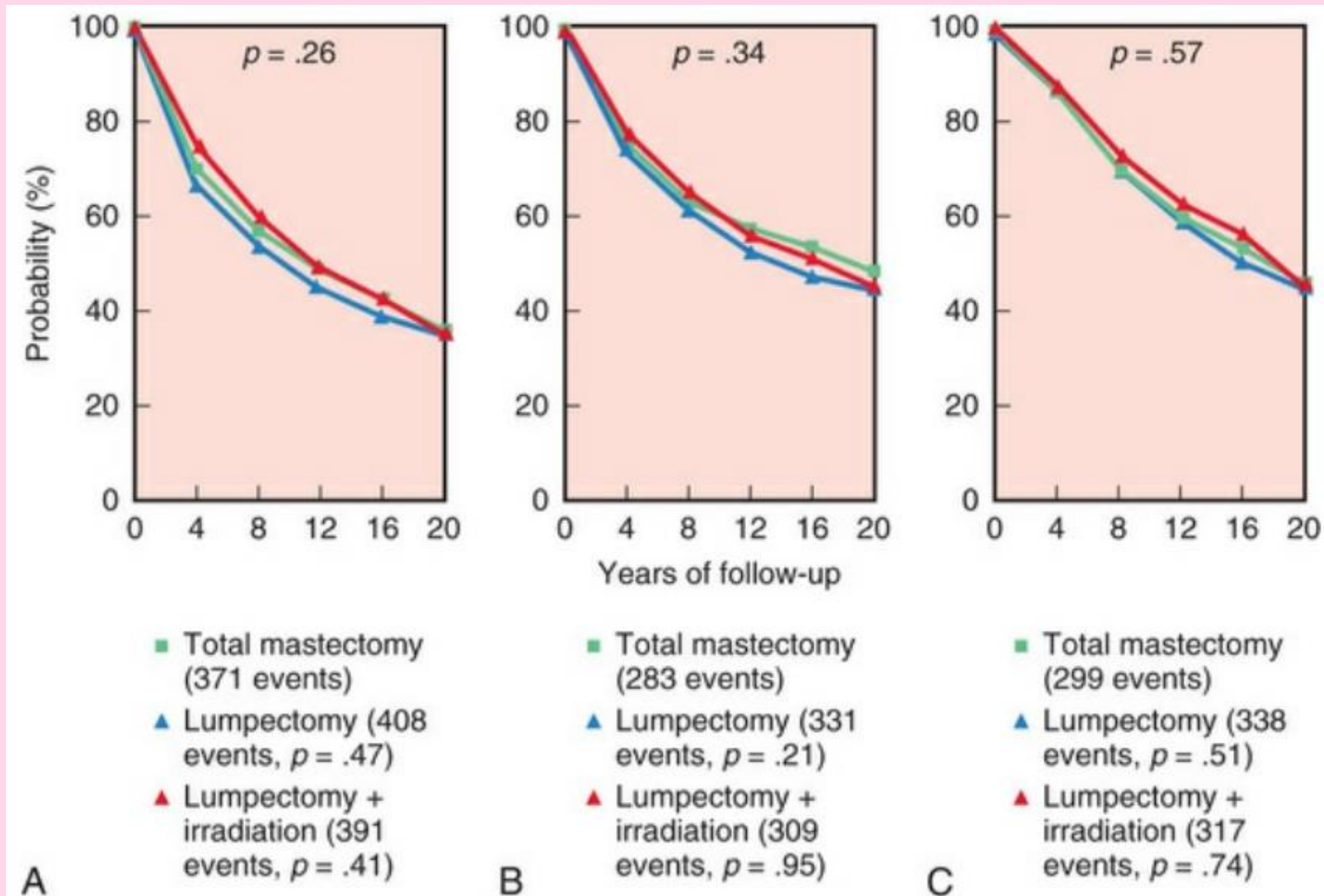


MST or BCT?

- The absence of a long-term survival difference between treatments
- The possibility and consequences of LR with both approaches
- Psychological adjustment (including the fear of cancer recurrence), cosmetic outcome, sexual adaptation, and functional competence



DISEASE-FREE SURVIVAL (A), DISTANT DISEASE FREE SURVIVAL (B), AND OVERALL SURVIVAL (C)



PATIENTS ASSIGNED TO BCS HAVE A BETTER SURVIVAL THAN PATIENTS ASSIGNED TO MASTECTOMY. (ACTA ONCOLOGICA 2018- DENMARK)

Breast conserving surgery versus mastectomy: overall and relative survival—a population based study by the Danish Breast Cancer Cooperative Group (DBCG)

Peer Christiansen^a, Stina Lyck Carstensen^b, Bent Ejlersen^c, Niels Kroman^d, Birgitte Offersen^e, Anne Bodilsen^f and Maj-Britt Jensen^b

^aBreast Unit, Aarhus University Hospital/Randers Regional Hospital, Aarhus, Denmark; ^bDanish Breast Cancer Cooperative Group Secretariat, Copenhagen University, Rigshospitalet, Copenhagen, Denmark; ^cDanish Breast Cancer Cooperative Group Secretariat, Department of Oncology, Copenhagen University, Rigshospitalet, Copenhagen, Denmark; ^dDepartment of Breast Surgery, Copenhagen University Hospital, Herlev, Denmark; ^eDepartment of Oncology, Aarhus University Hospital, Aarhus, Denmark; ^fDepartment of Surgery, Horsens Regional Hospital, Horsens, Denmark

ABSTRACT

Background: Observational studies have pointed at a better survival after breast conserving surgery (BCS) compared with mastectomy. The aim of the present study was to evaluate whether this remains true when more extensive tumor characteristics and treatment data were included.

Methods: The cohort included patients registered after primary surgery for early invasive breast cancer in the database of the Danish Breast Cancer Cooperative Group, in the period 1995–2012. The cohort was divided into three groups: (i) patients who primarily had a mastectomy, (ii) patients treated by BCS, and (iii) patients who primarily had BCS and then mastectomy [intention to treat (ITT) by BCS]. The association between overall mortality and standard mortality ratio (SMR) and risk factors was analyzed in univariate and multivariate Poisson regression models.

Results: A total of 58,331 patients were included: 27,143 in the mastectomy group, 26,958 in the BCS group, and 4230 in the BCS-ITT group. After adjusting for patient and treatment characteristics, the relative risk (RR) was 1.20 (95% CI: 1.15–1.25) after mastectomy and 1.08 (95% CI: 1.01–1.15) after BCS first and then mastectomy, as compared to BCS. Statistically significant interactions were not observed for age, period of treatment, and nodal status, but patients with Charlson's Comorbidity Index (CCI) score 2+ had no increased mortality after mastectomy, as opposed to patients with CCI 0–1. Locoregional radiation therapy (RT) in node positive patients did not reduce the increased risk associated with mastectomy [RR = 1.28 (95% CI 1.19–1.38)].

Conclusion: Patients assigned to BCS have a better survival than patients assigned to mastectomy. Residual confounding after adjustment for registered characteristics presumably explained the different outcomes, thus consistent with selection bias. Diversities in RT did not appear to explain the observed difference in survival after BCS and mastectomy.

ARTICLE HISTORY

Received 27 September 2017

Accepted 3 November 2017



**BCS+RT YIELDED BETTER SURVIVAL THAN MST
IRRESPECTIVE OF RT (JAMA SURGERY 2021- SWED)**

JAMA Surgery | Original Investigation

**Survival After Breast Conservation vs Mastectomy
Adjusted for Comorbidity and Socioeconomic Status
A Swedish National 6-Year Follow-up of 48 986 Women**

Jana de Boniface, PhD; Robert Szulkin, PhD; Anna L. V. Johansson, PhD



CONTRAINDICATIONS:



National
Comprehensive
Cancer
Network®

NCCN Guidelines Version 3.2020 Invasive Breast Cancer

[NCCN Guidelines Index](#)
[Table of Contents](#)
[Discussion](#)

SPECIAL CONSIDERATIONS TO BREAST-CONSERVING THERAPY REQUIRING RADIATION THERAPY

Contraindications for breast-conserving therapy requiring RT include:

Absolute

- RT during pregnancy
- Diffuse suspicious or malignant-appearing microcalcifications
- Widespread disease that cannot be incorporated by local excision of a single region or segment of breast tissue that achieves negative margins with a satisfactory cosmetic result
- Diffusely positive pathologic margins^a
- Homozygous (biallelic inactivation) for *ATM* mutation (category 2B)

Relative

- Prior RT to the chest wall or breast; knowledge of doses and volumes prescribed is essential.
- Active connective tissue disease involving the skin (especially scleroderma and lupus)
- Positive pathologic margin^a
- Women with a known or suspected genetic predisposition to breast cancer:
 - ▶ May have an increased risk of ipsilateral breast recurrence or contralateral breast cancer with breast-conserving therapy
 - ▶ May be considered for prophylactic bilateral mastectomy for risk reduction
[\(See NCCN Guidelines for Genetic/Familial High-Risk Assessment: Breast, Ovarian, and Pancreatic\)](#)
 - ▶ May have known or suspected Li-Fraumeni syndrome (category 2B)

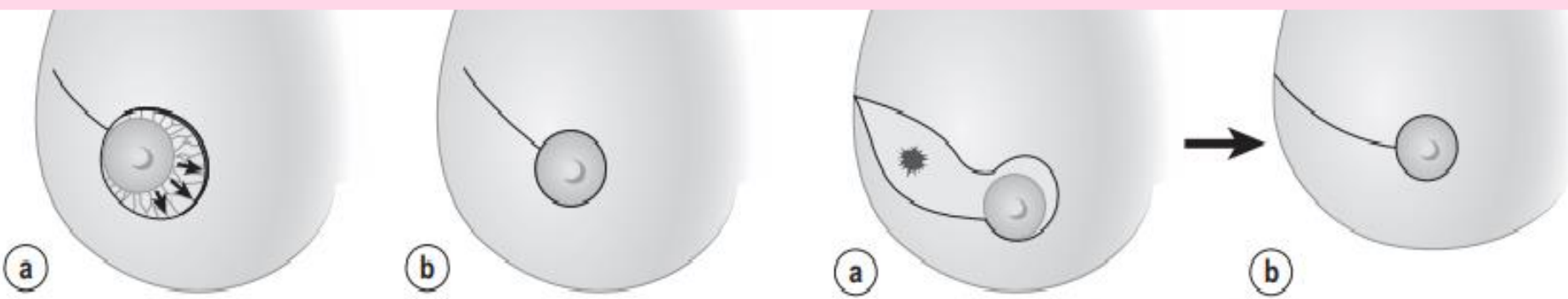


Figure 8.3 • Level I oncoplastic techniques (Clough). Centralisation of the NAC will offset some of the contraction towards the tumour cavity.

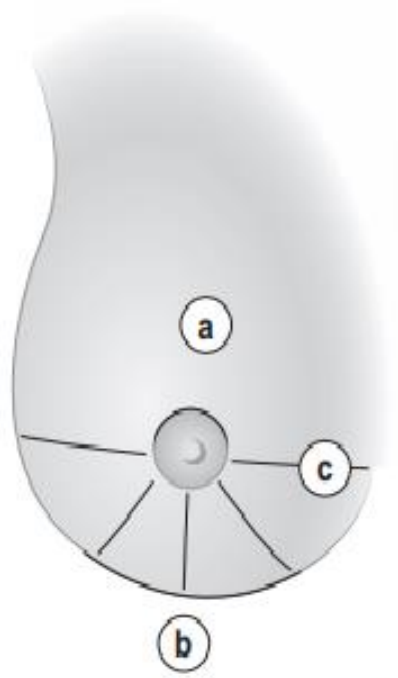
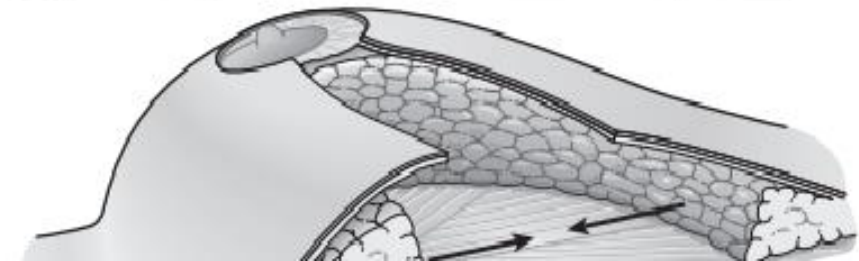
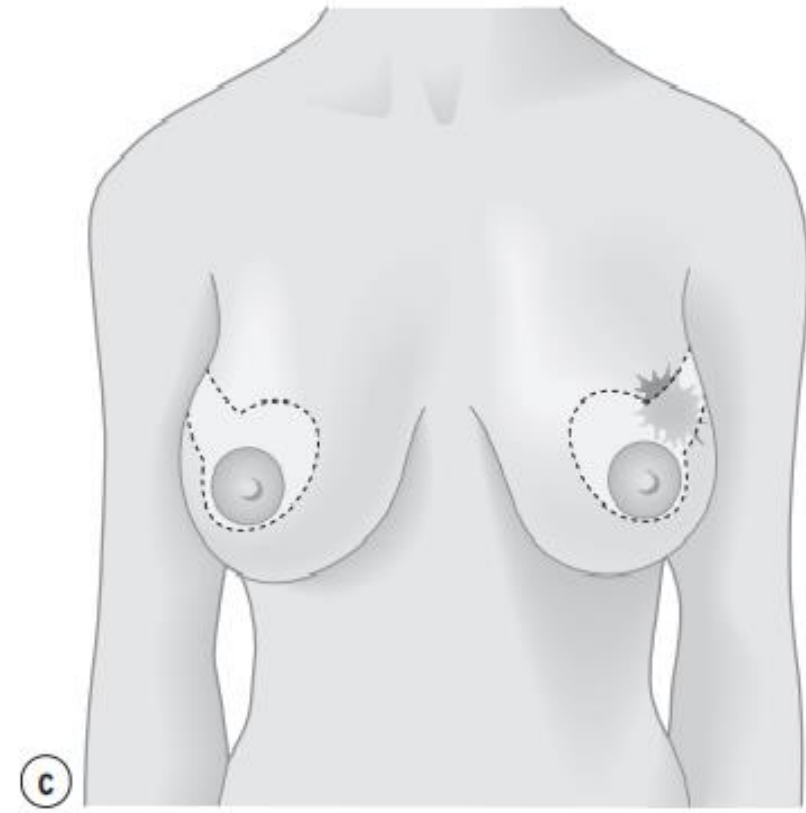


Figure 8.4 • Scars can be independent of the direction



Role of Breast Imaging

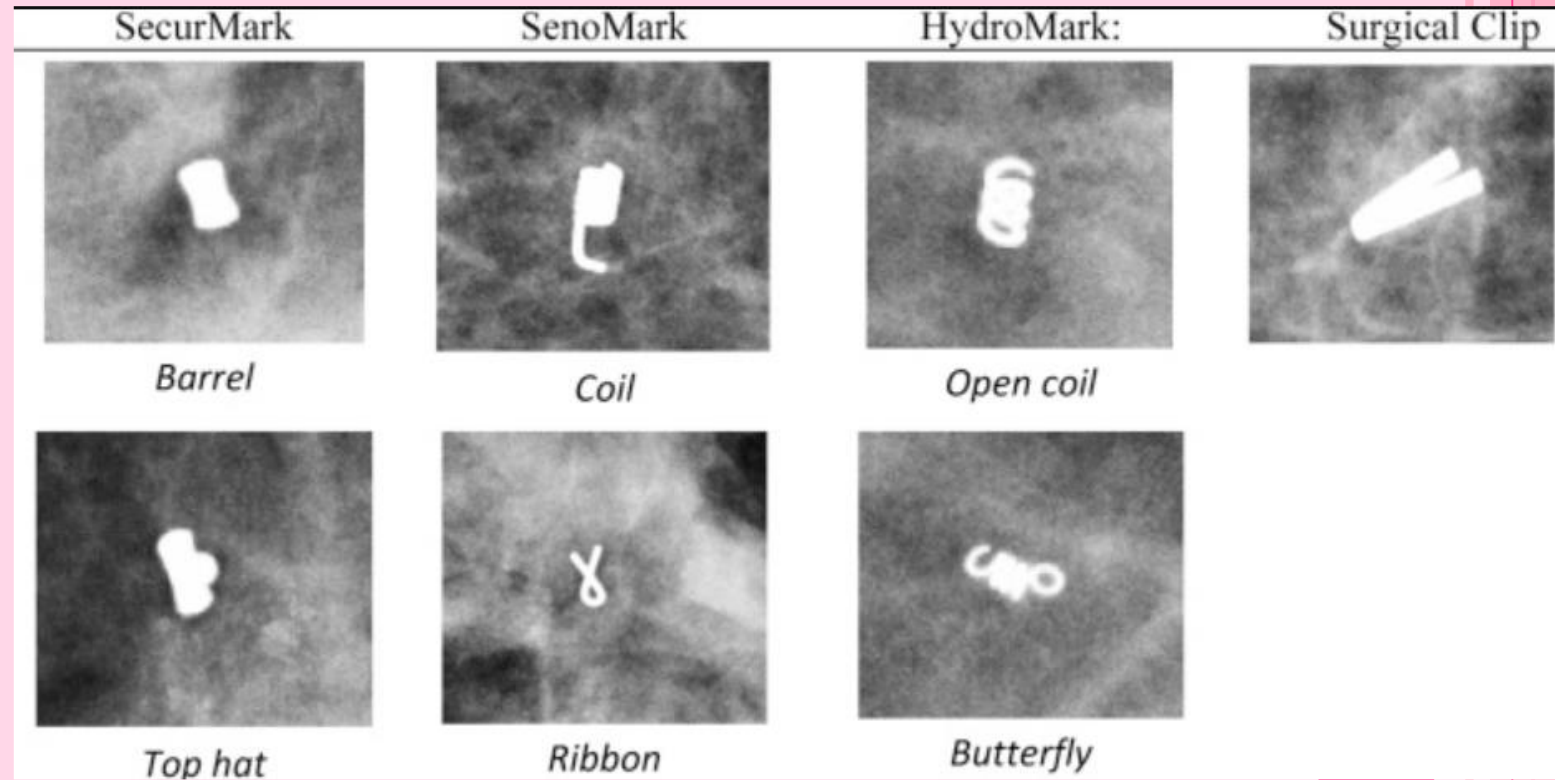


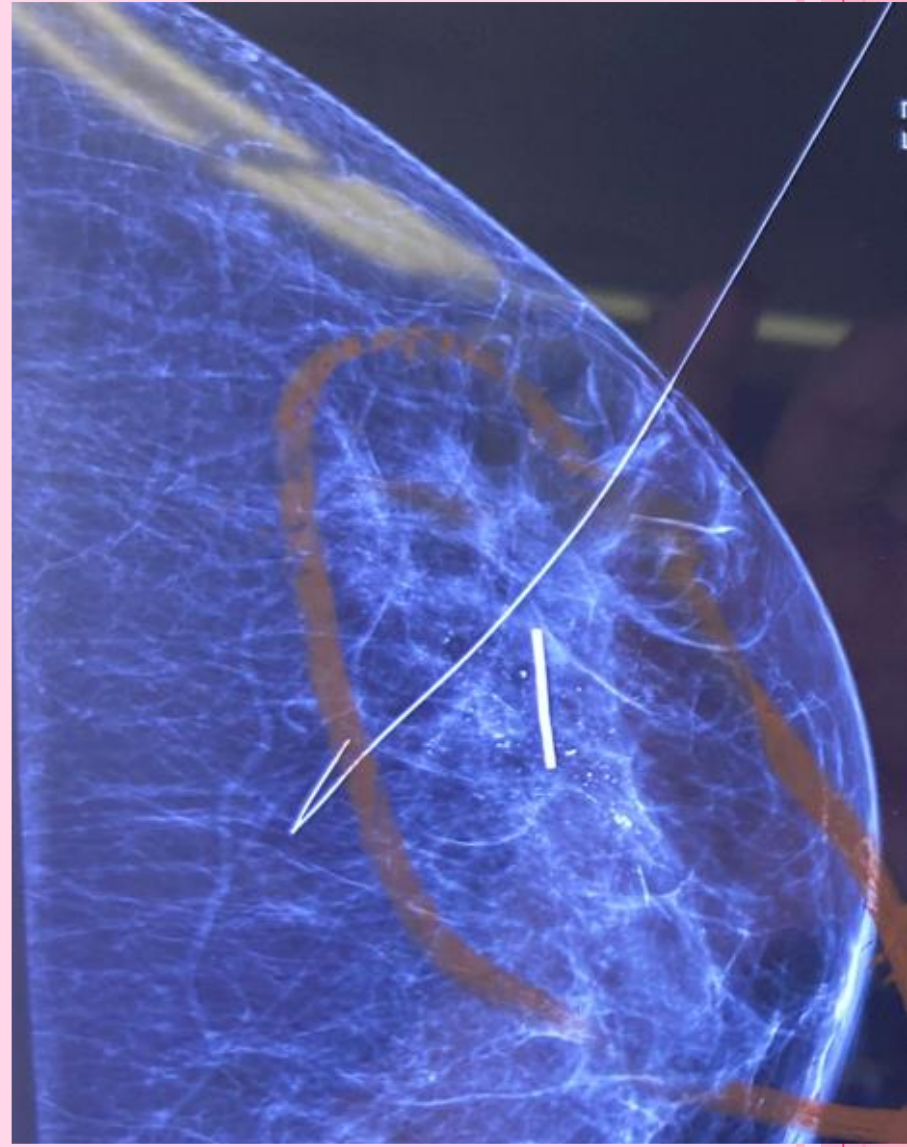
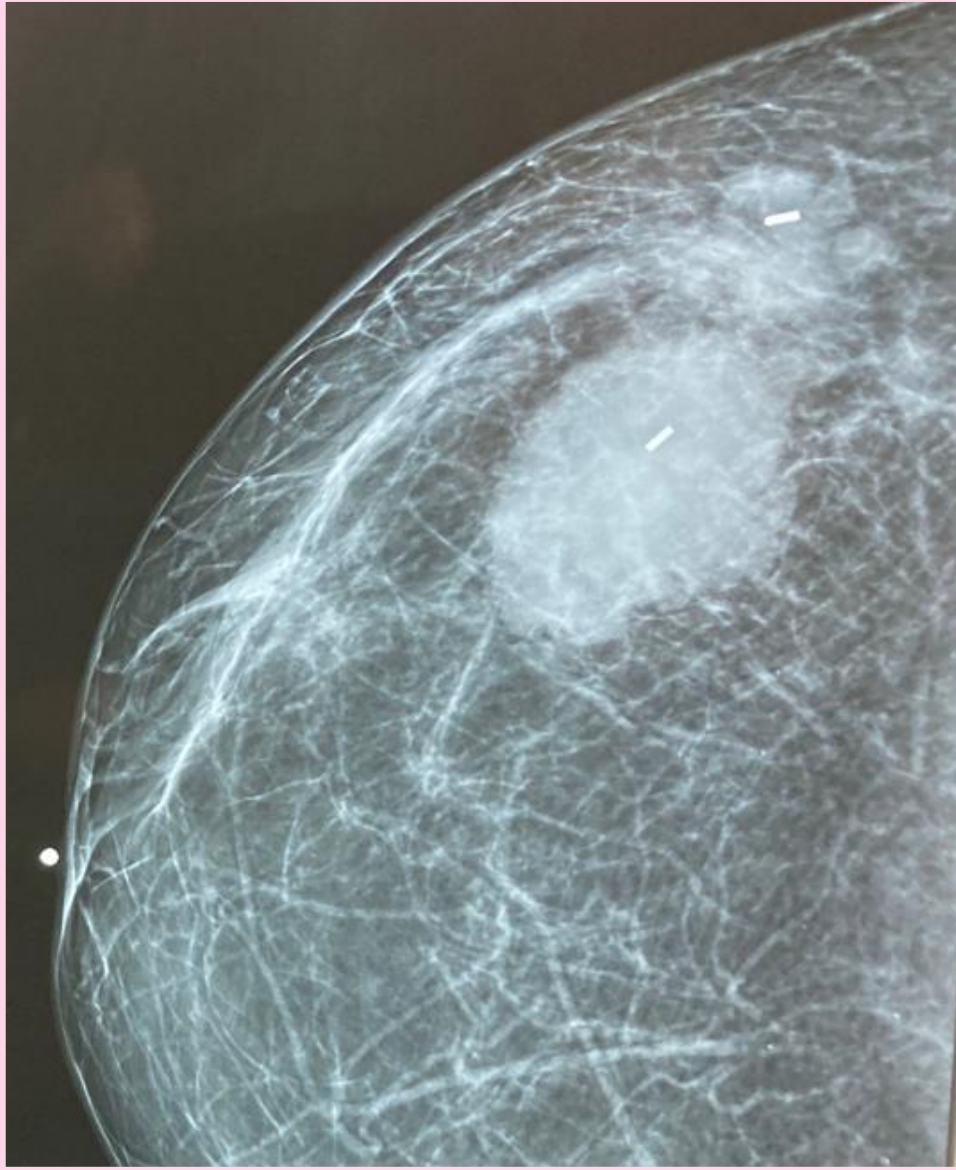
LOCALIZATION TECHNIQUE

- **Marker** clip insertion before NACT
- **Wire** localization before Surgery
- **Nonwire** Localization Techniques
- Intraoperative Ultrasonography



○ Breast Marker Clip Insertion

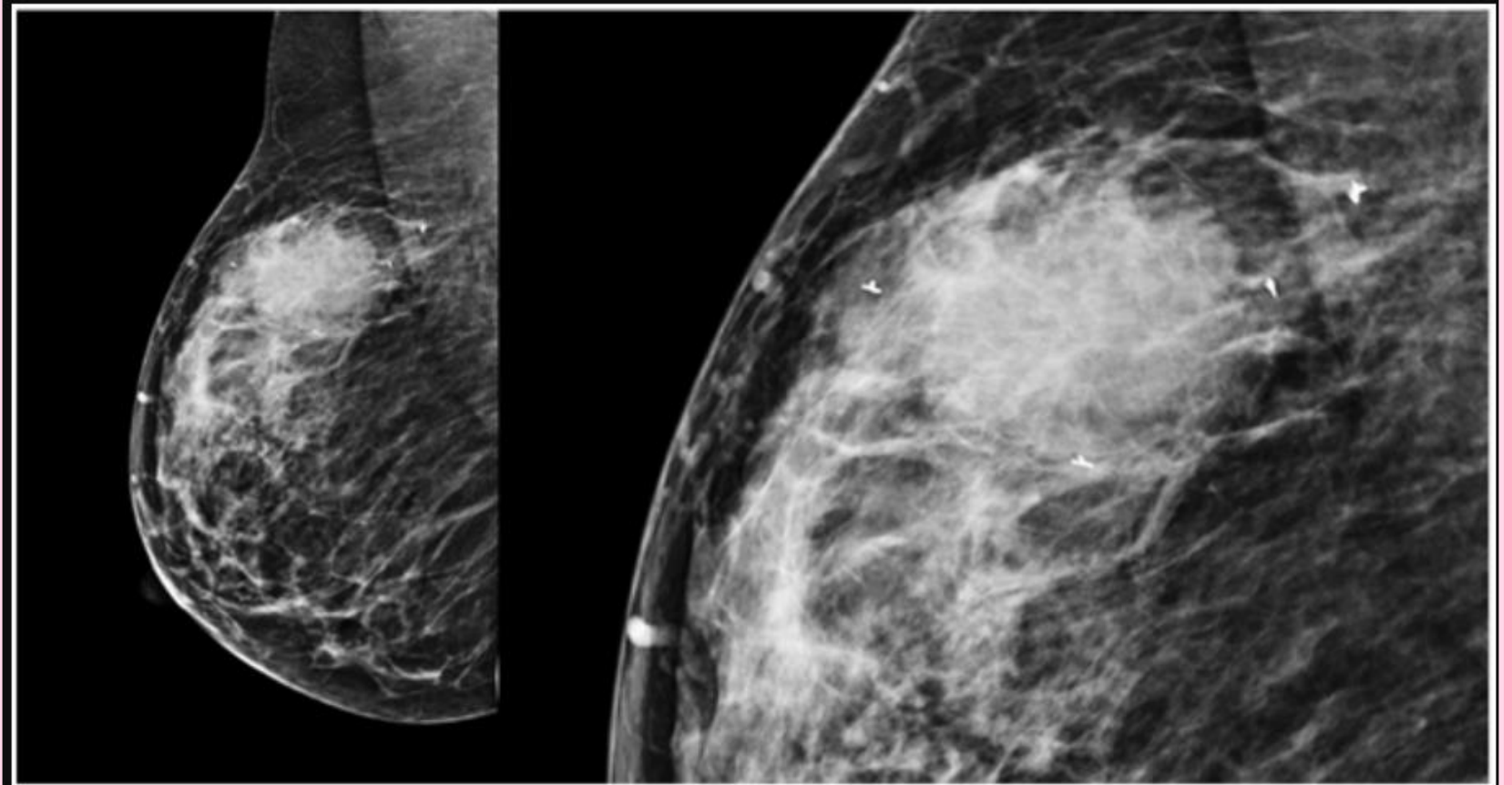




MARKING OF TUMOR BEFORE CHEMOTHERAPY

- placement of a metallic marker in the tumor under US or mammographic guidance either at:
 - initiation of therapy,
 - when the tumor has shrunk to less than 2 cm in size
- Placement of two or more markers should be considered for multifocal disease
- If the marker(s) is placed before the initiation of NACT, the tumor may shrink eccentrically, leaving the marker on the edge of the residual tumor, rather than in the epicenter





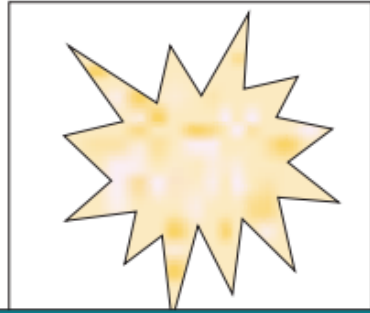
POST NACT LOCALIZATION



- The goal is:
 - to remove any residual lesion with 1 cm of clear margins
 - if there is no detectable residual lesion, a 2-cm specimen with the metal coil in the center



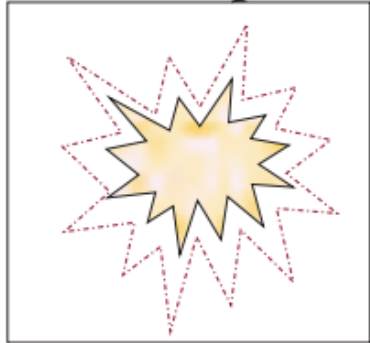
Extent of response to neoadjuvant therapy

Pretreatment invasive carcinoma

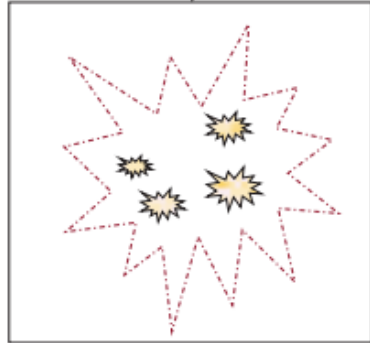


Invasive carcinoma = 
Tumor bed = 

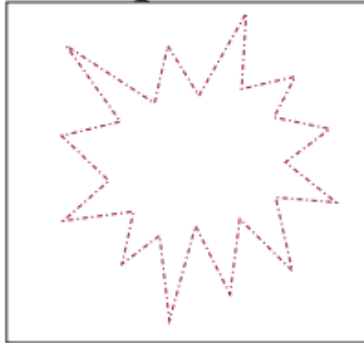
Neoadjuvant Treatment



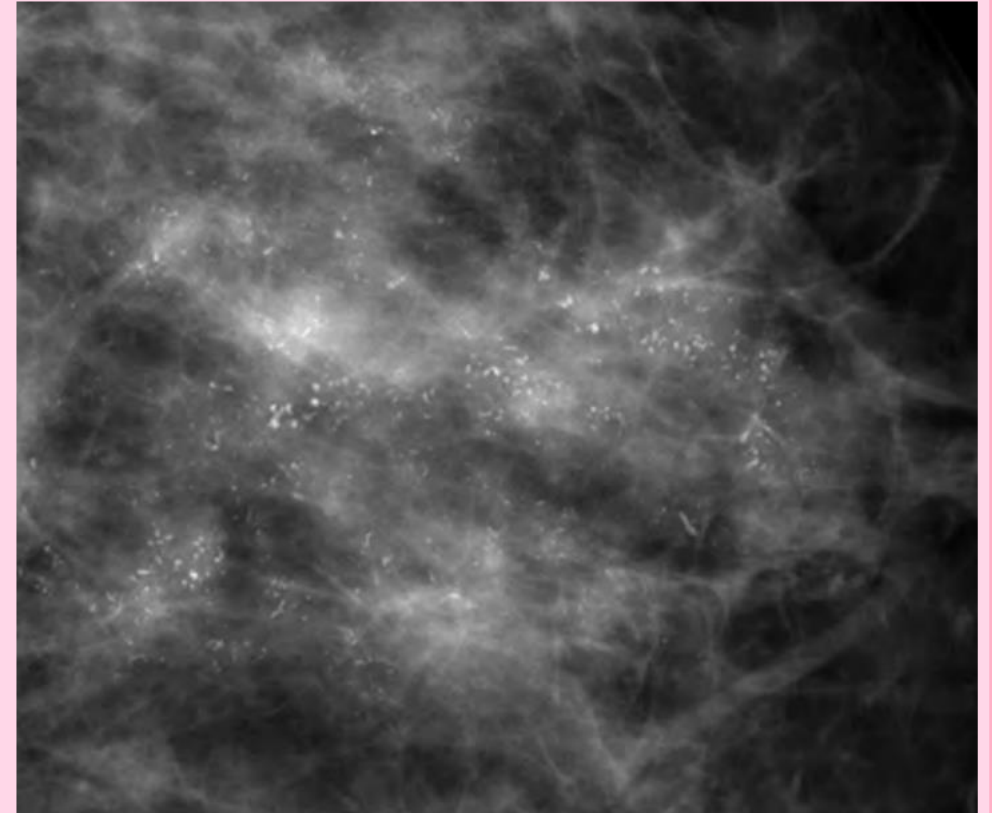
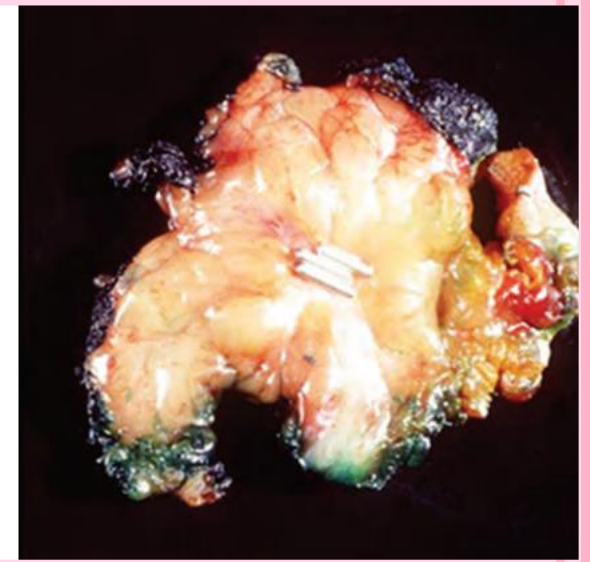
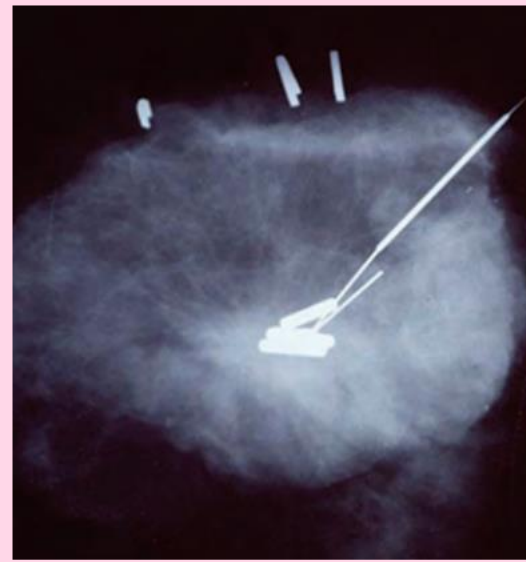
A. Minimal response - Single focus of invasion, slightly smaller after treatment

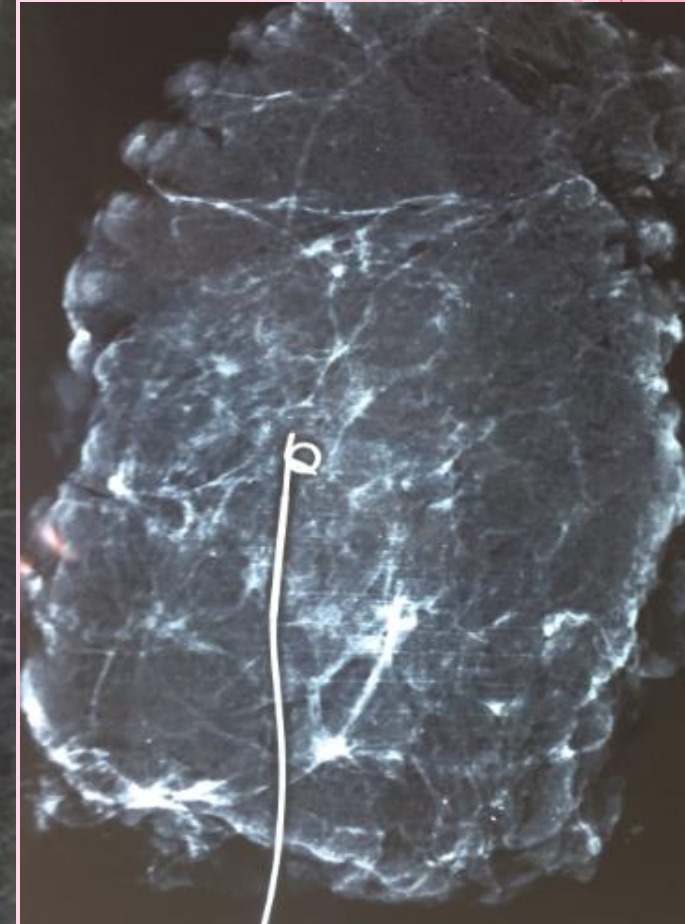
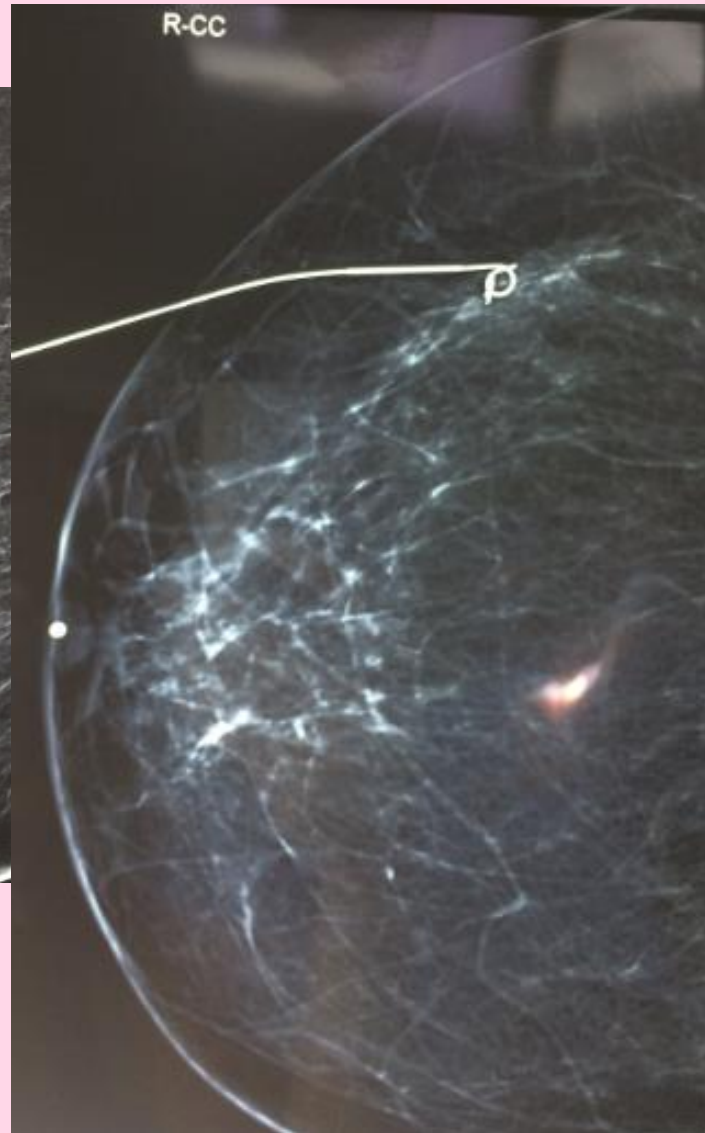
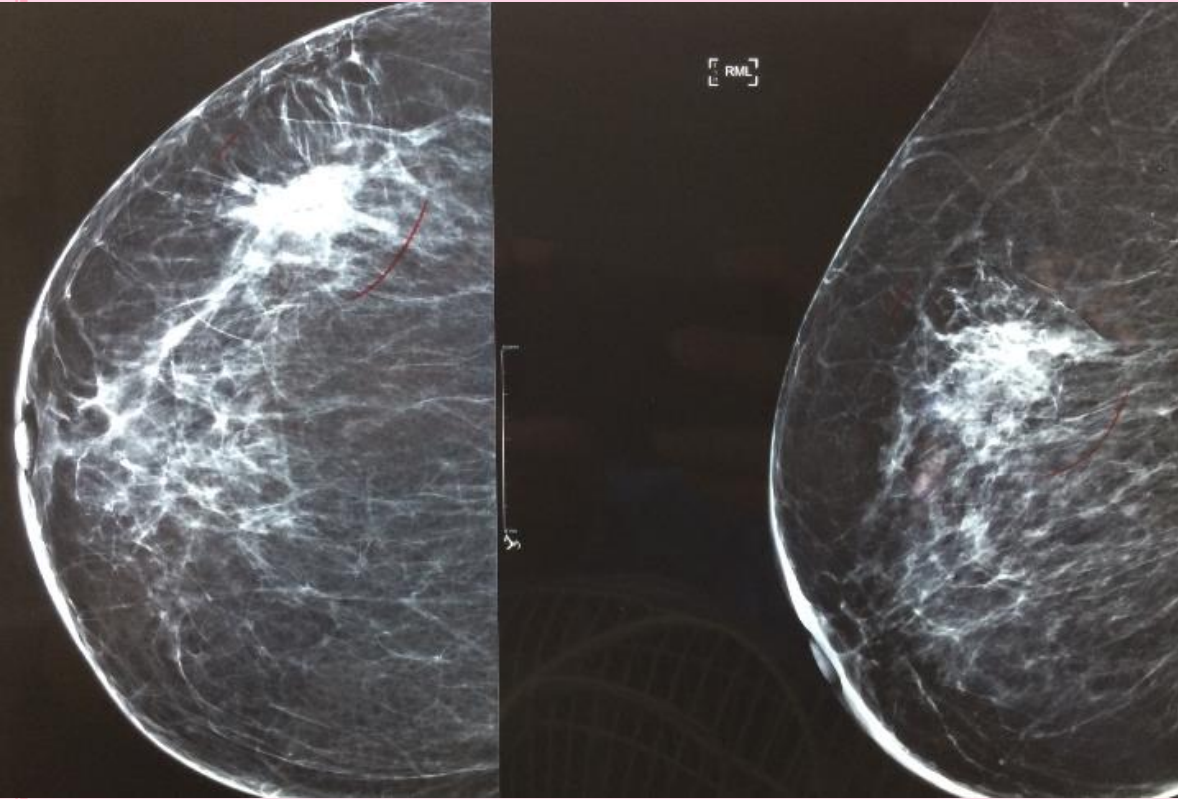


B. Moderate/marked response - Multiple small foci of invasive carcinoma within the tumor bed

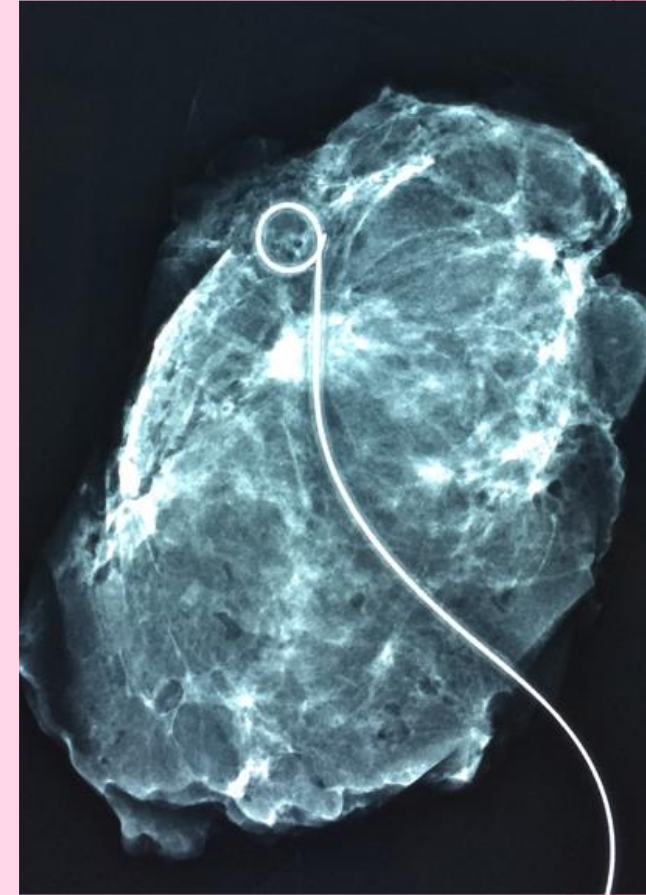
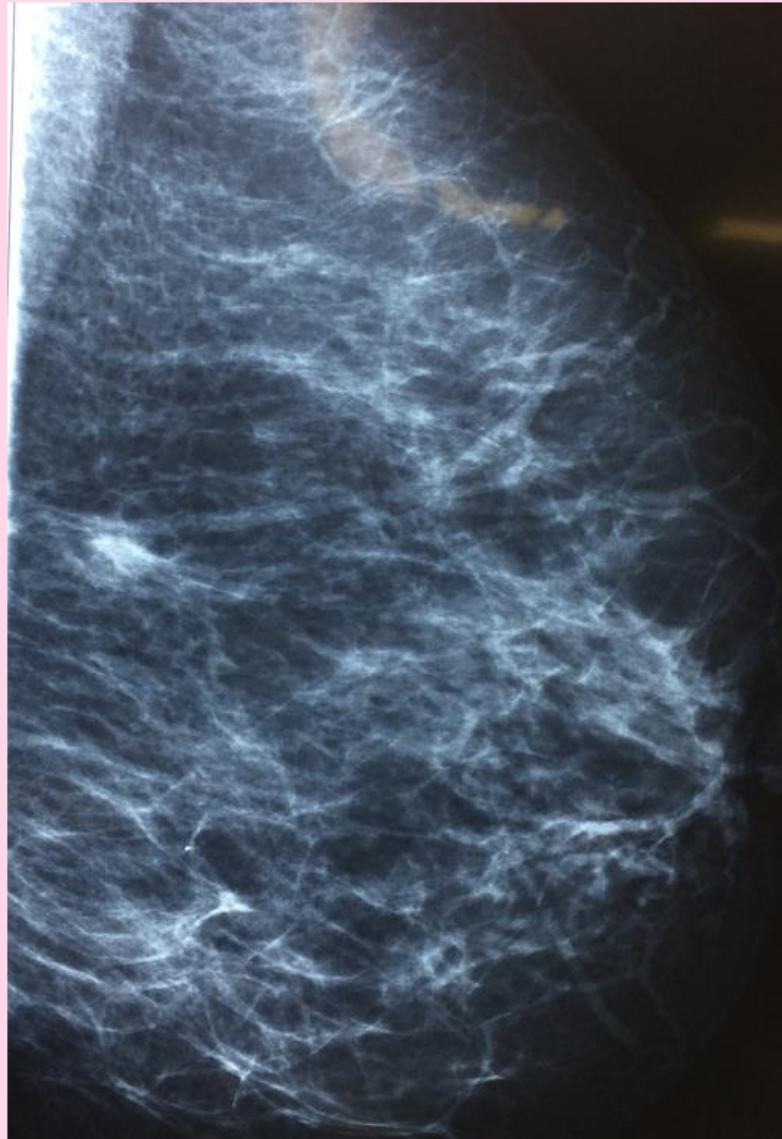
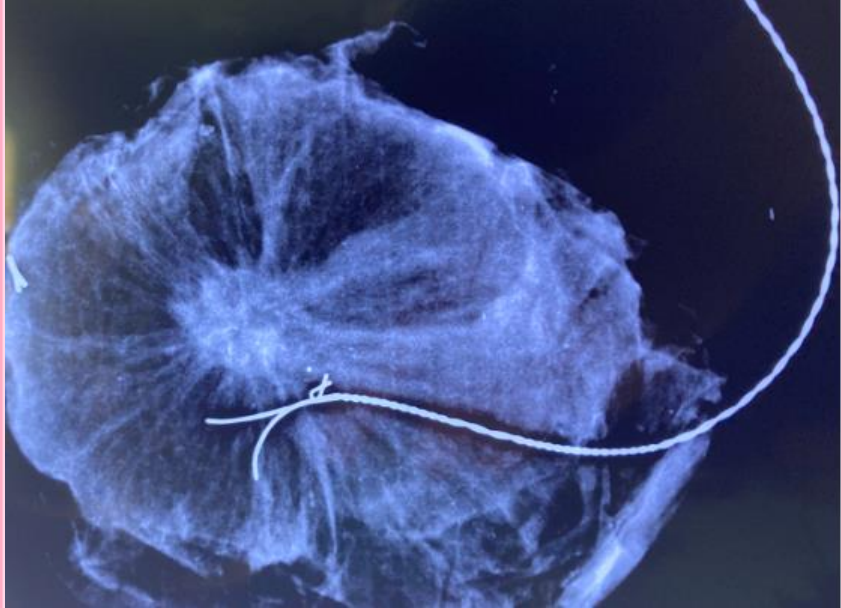


C. Complete response - No residual invasive carcinoma



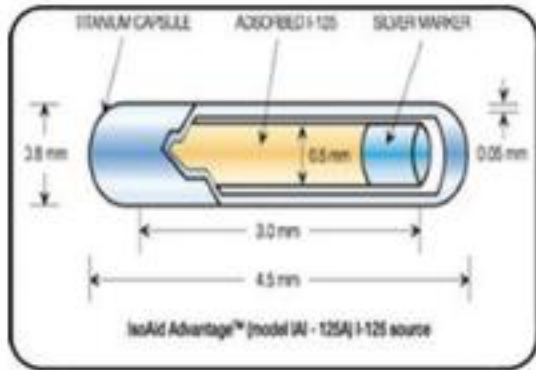


NONPALPABLE MASS LOCALIZATION



NONWIRE LOCALIZATION TECHNIQUES

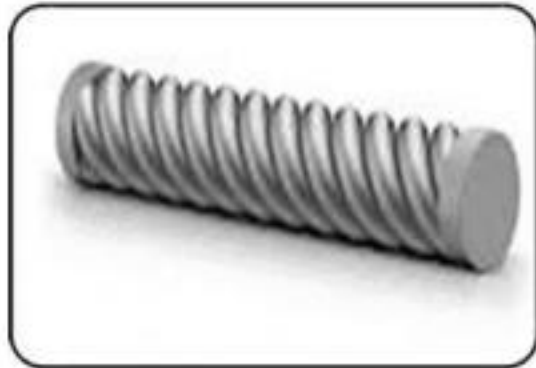
Examples of NWL Systems



I-125 Seed



Radar Reflector

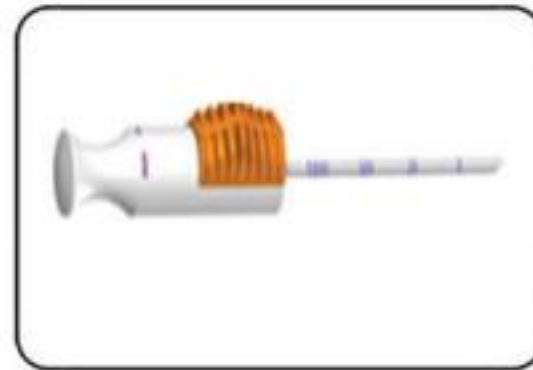


Magnetic Seed



RFID Tag

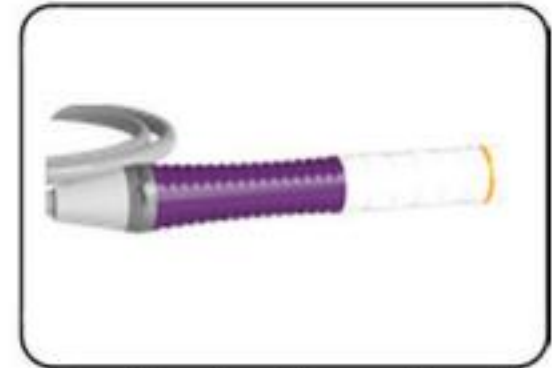
NWL Systems Typically Have 3 Components



Single-use
sterilized device
preloaded into a
needle introducer



Reusable small
console



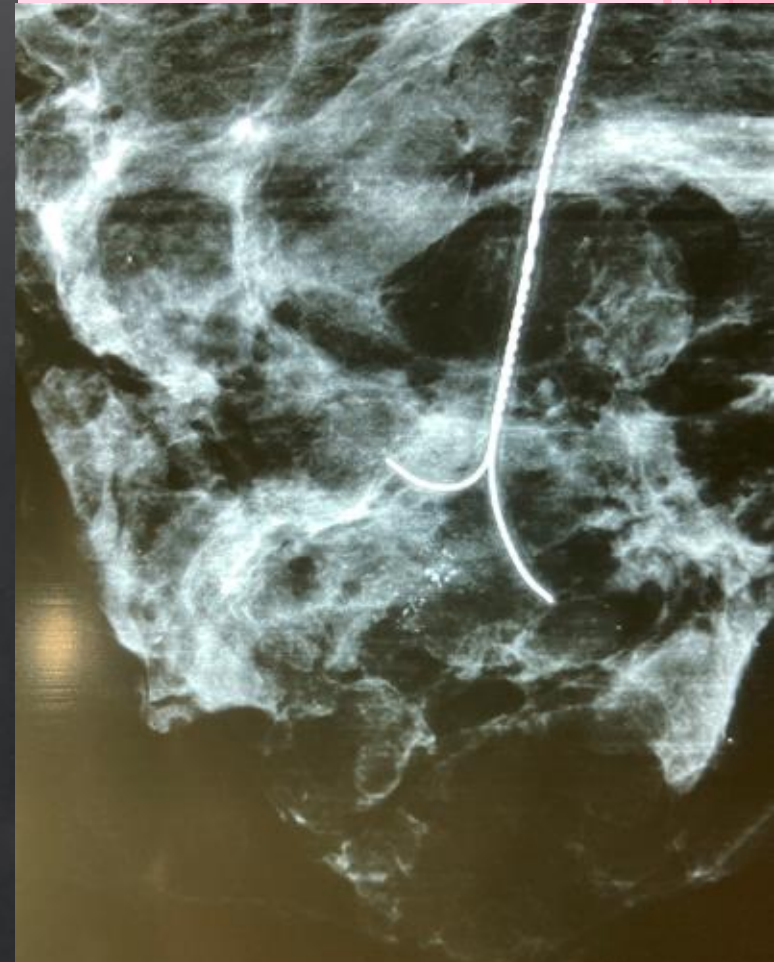
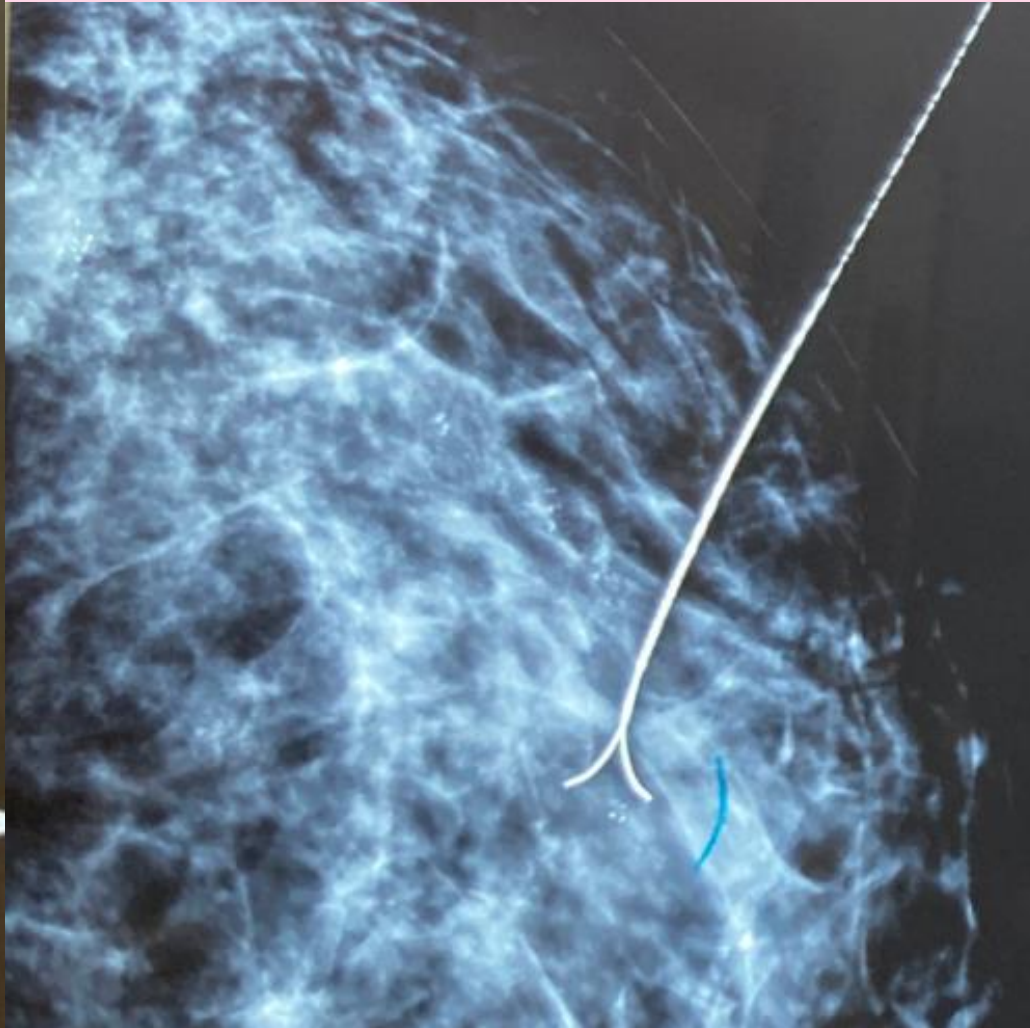
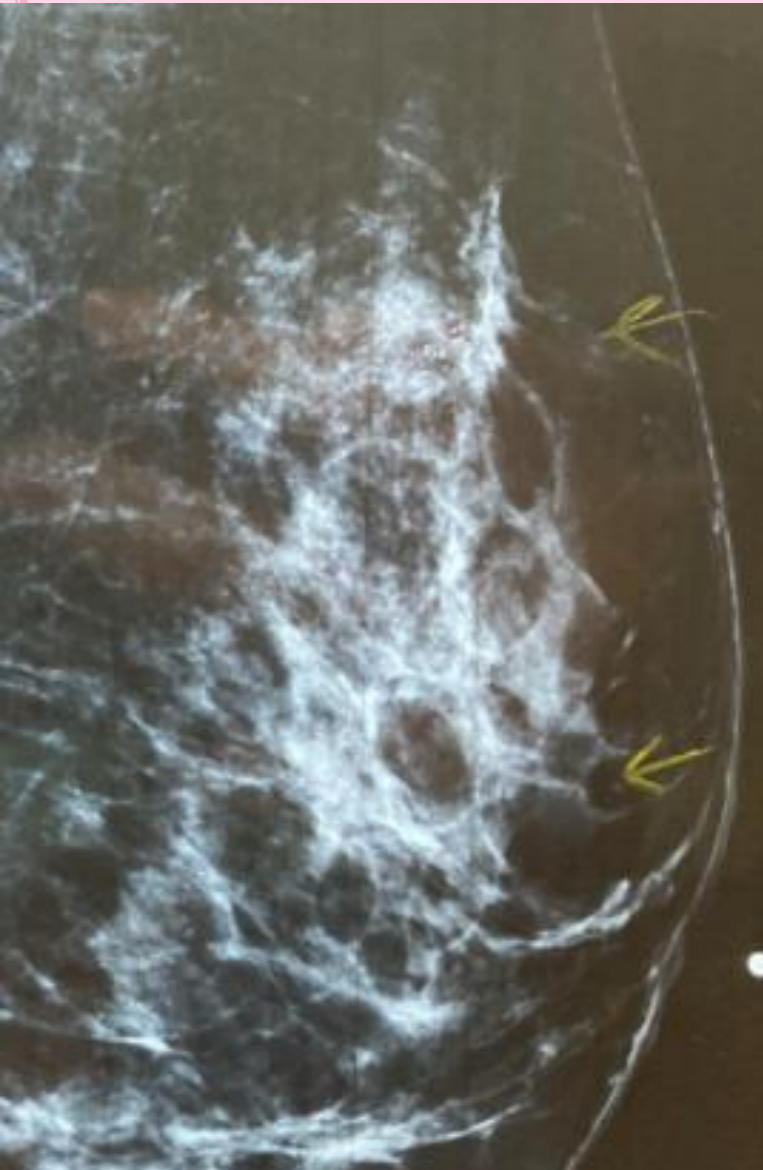
Dedicated handheld
intraoperative probe

Features of Wire and Nonwire Localization Techniques

Feature	Localization Device				
	Wire	¹²⁵ I Radioactive Seed	Radar Reflector	Magnetic Seed	RFID Tag
Needle gauge	20–21	18	16	18	12
Needle length (cm)	3–15	5, 7, 12	5, 7.5, 10	7, 12	5, 7, 10
Device length (mm)	...	5	12	5	9
Device cost (\$)	20–25	5–100	400–500	400	274
Additional equipment requirements	None	OR gamma probe and console Geiger counter	OR detector probe and console Radiology suite probe and console	OR detector probe and console Nonferromagnetic surgical instruments	OR console and single-use surgical probe
Depth limit for detectability (cm)	None	None	6	4	3–6
Maximal duration of implantation (d)	0	5	>30	>30	>30
MRI safety	MRI-compatible wires are available from multiple vendors	MRI conditional	MRI conditional	MRI conditional	MRI conditional



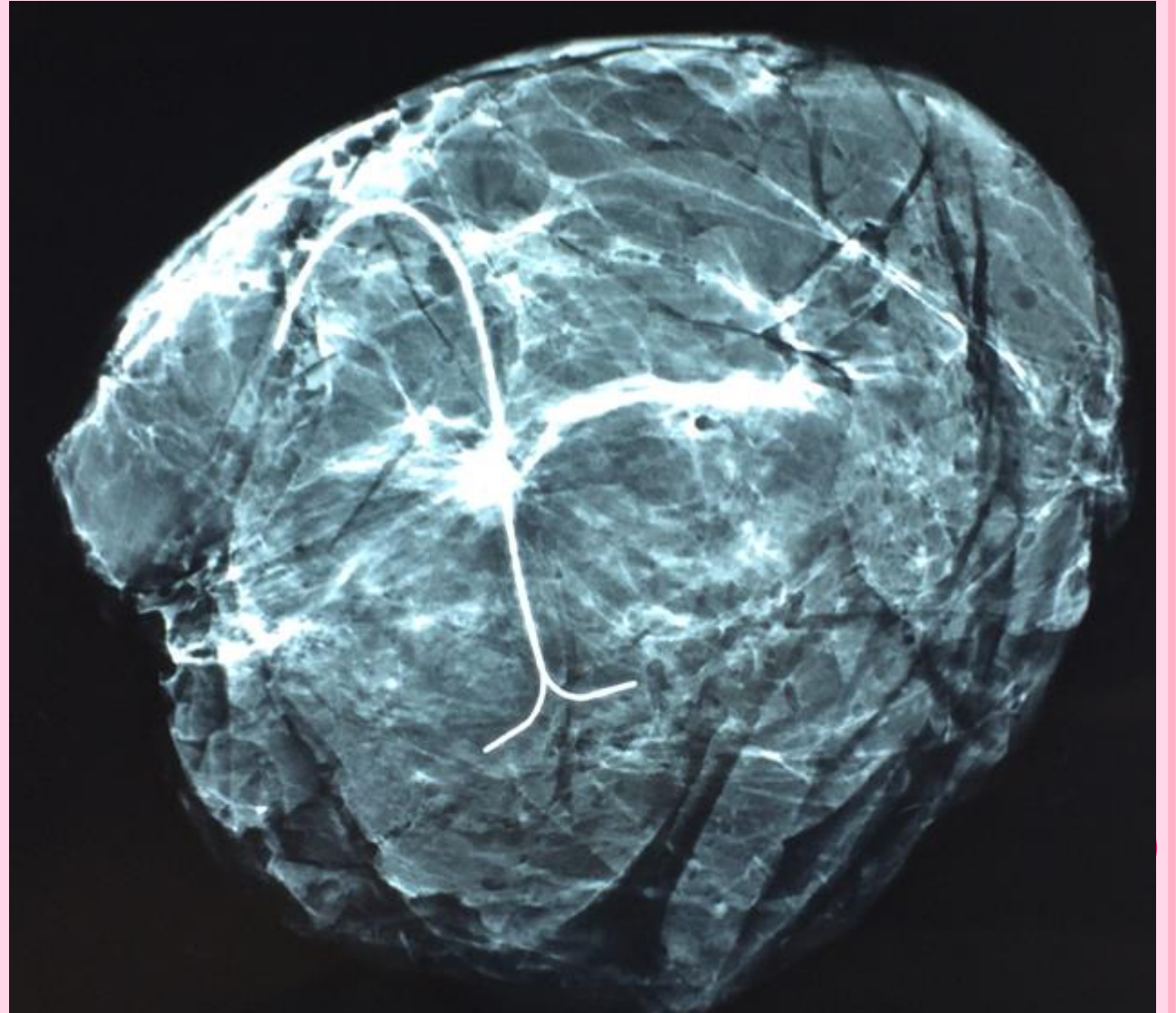
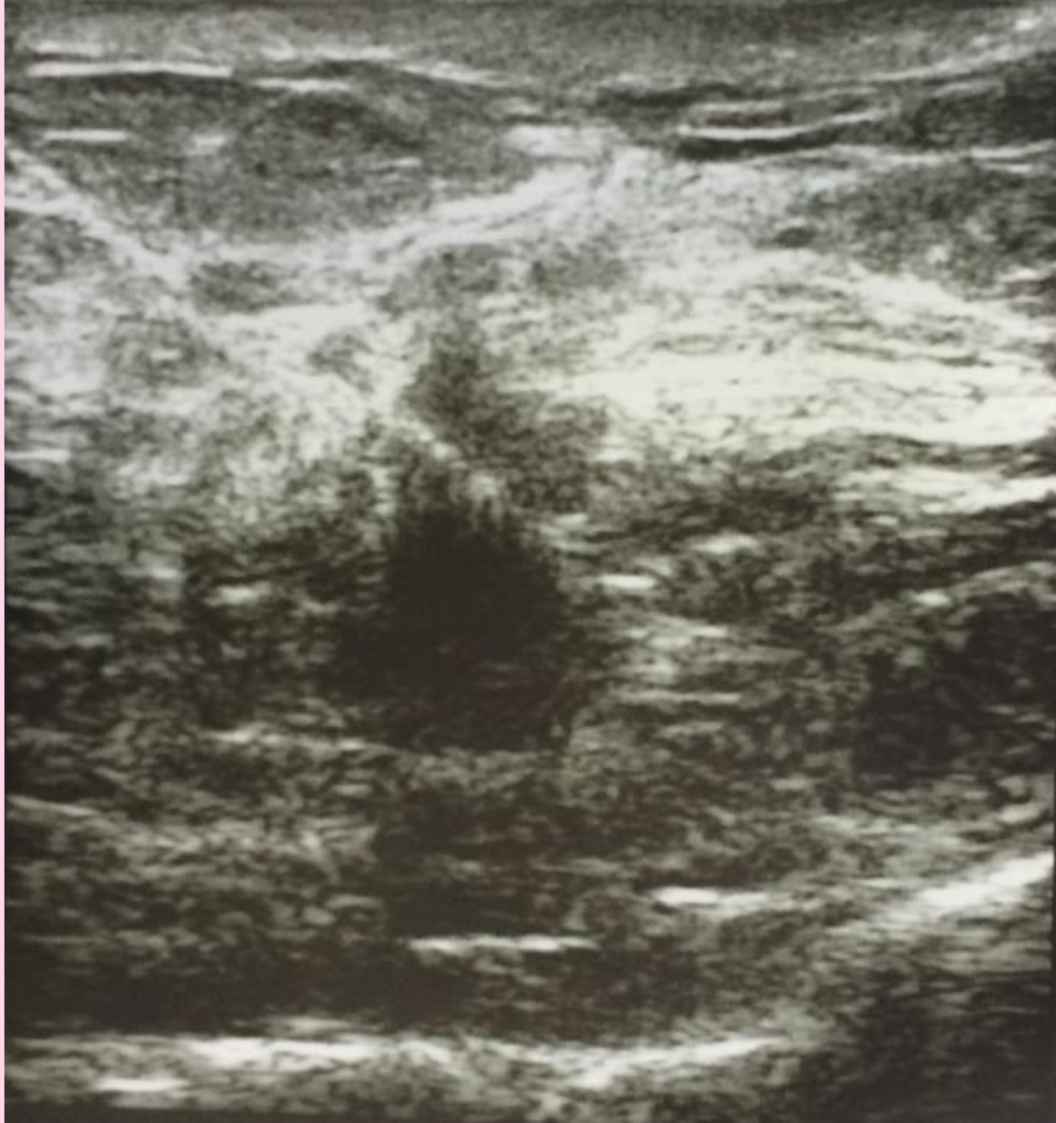
WIRING OF GROUP MICROCALCIFICATION

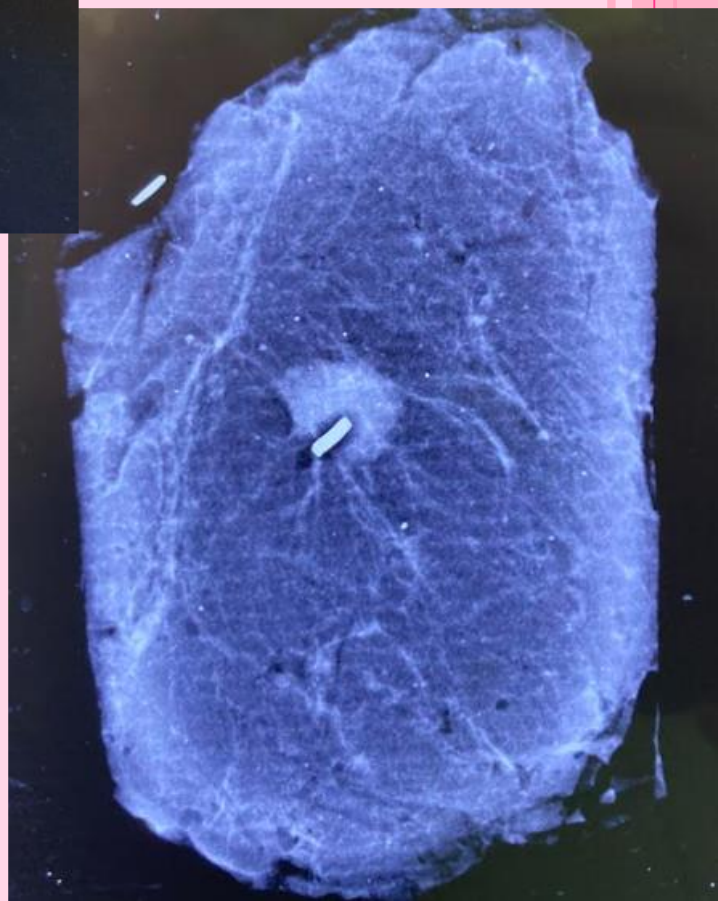
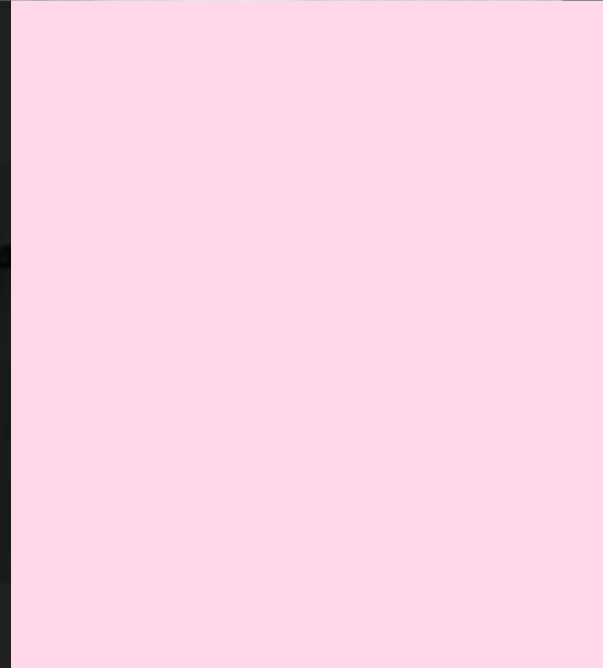
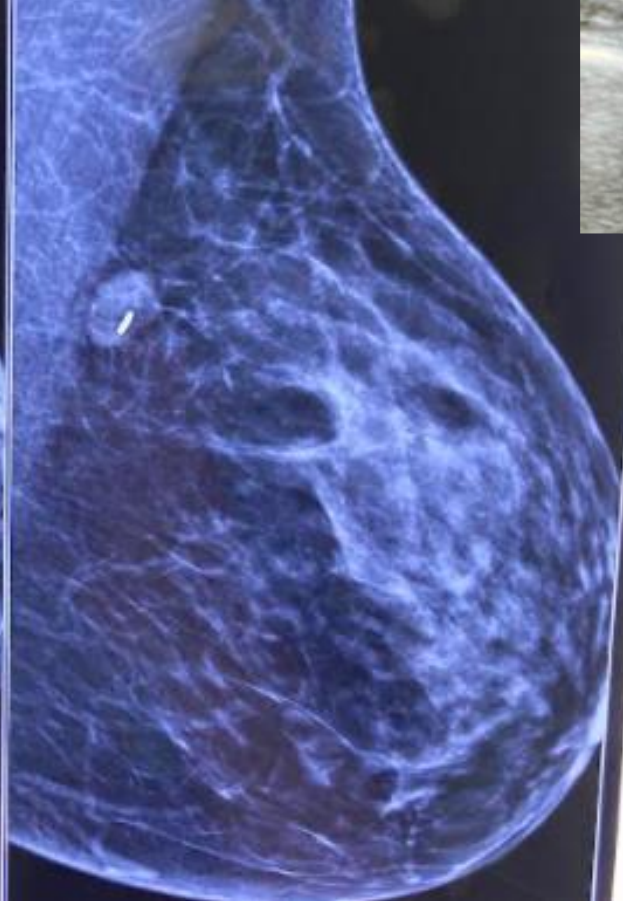
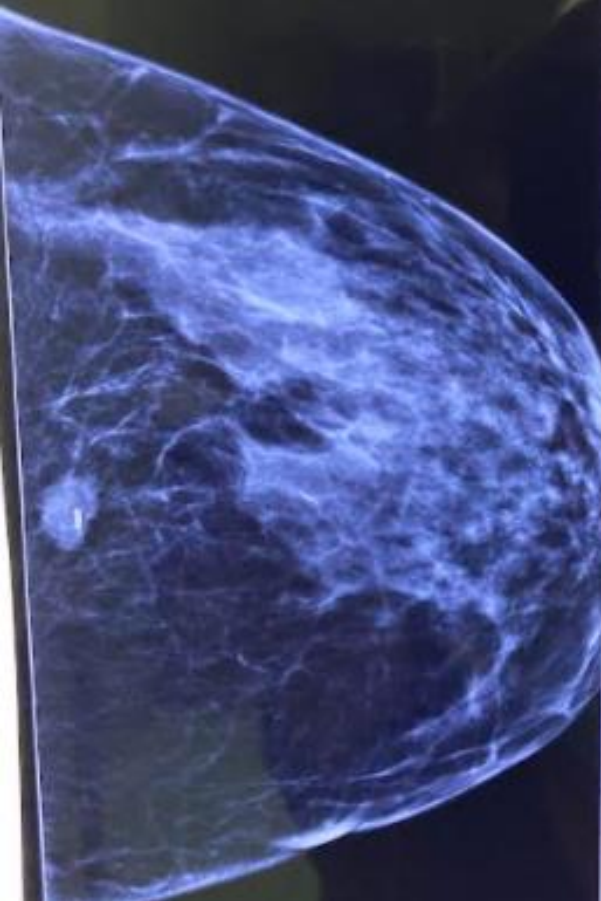
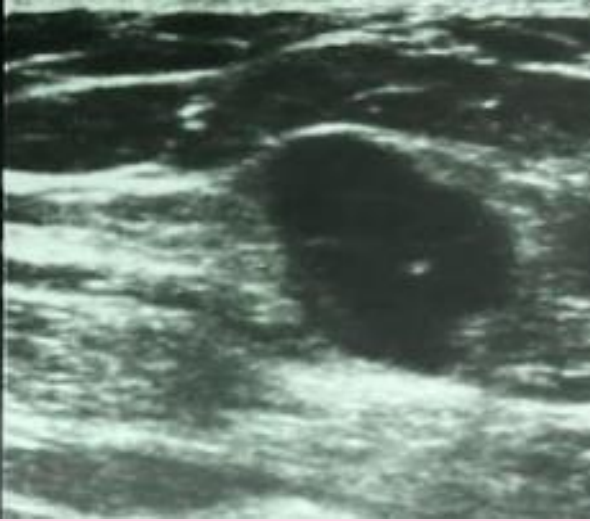


INTRA-OP US



INTRAOPERATIVE US



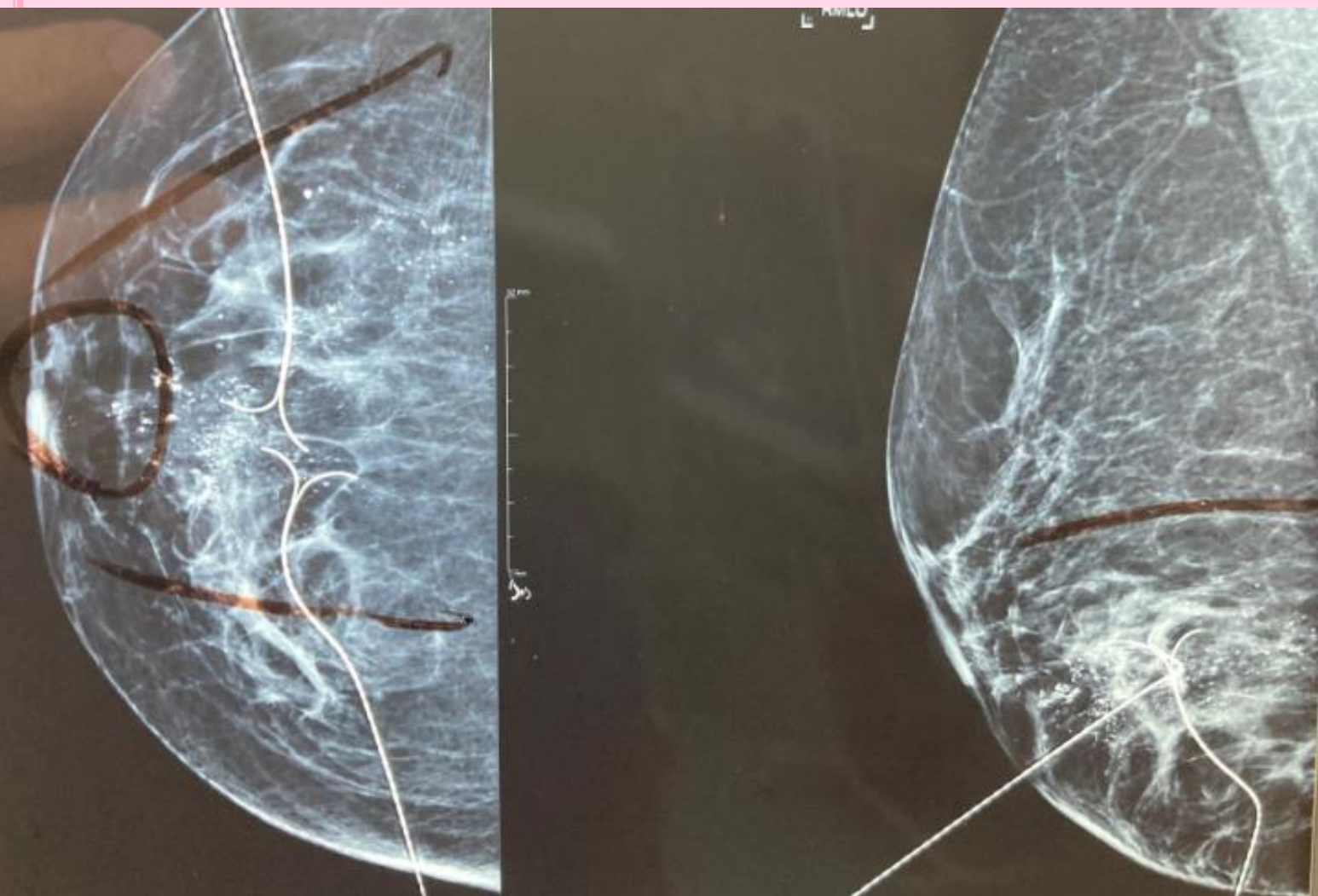


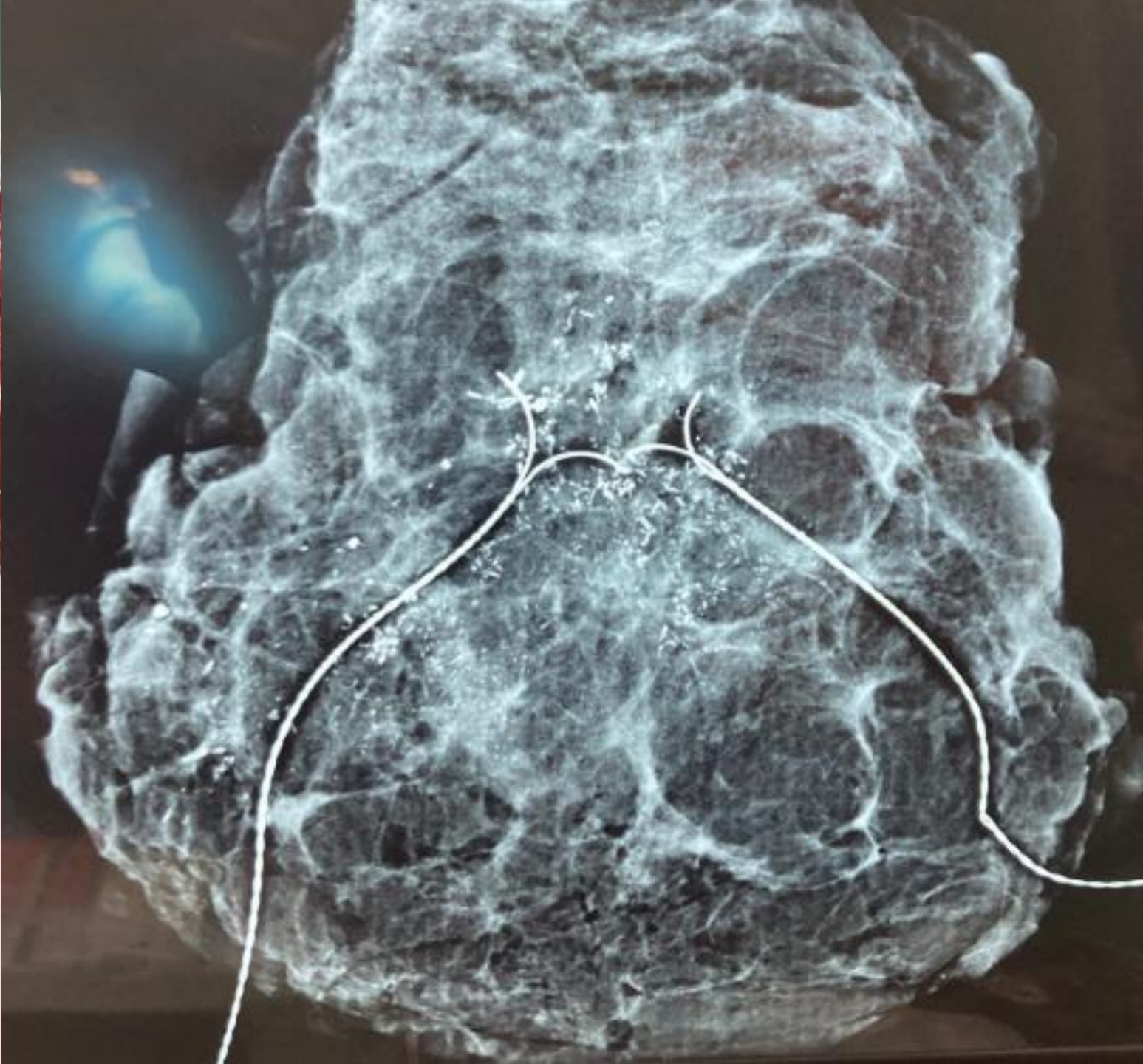
WIRE BRACKETING

Bracketing with two or more guidewires is used for patients with:

- **Multifocal disease**
- **Distribution of microcalcification**







MULTIPLE MASS LOCALIZATION



Royal College
of Surgeons
ADVANCING SURGICAL CARE

BREAST SURGERY

Ann R Coll Surg Engl 2020; **102**: 62–66
doi 10.1308/rcsann.2019.0109

Multifocal and multicentric breast cancer, is it time to think again?

YA Masannat^{1,2}, A Agrawal⁵, L Maraqa⁴, M Fuller^{1,2}, SK Down^{5,6}, SSK Tang⁷,
D Pang¹, M Kontos⁸, L Romics⁹, SD Heys^{1,2}

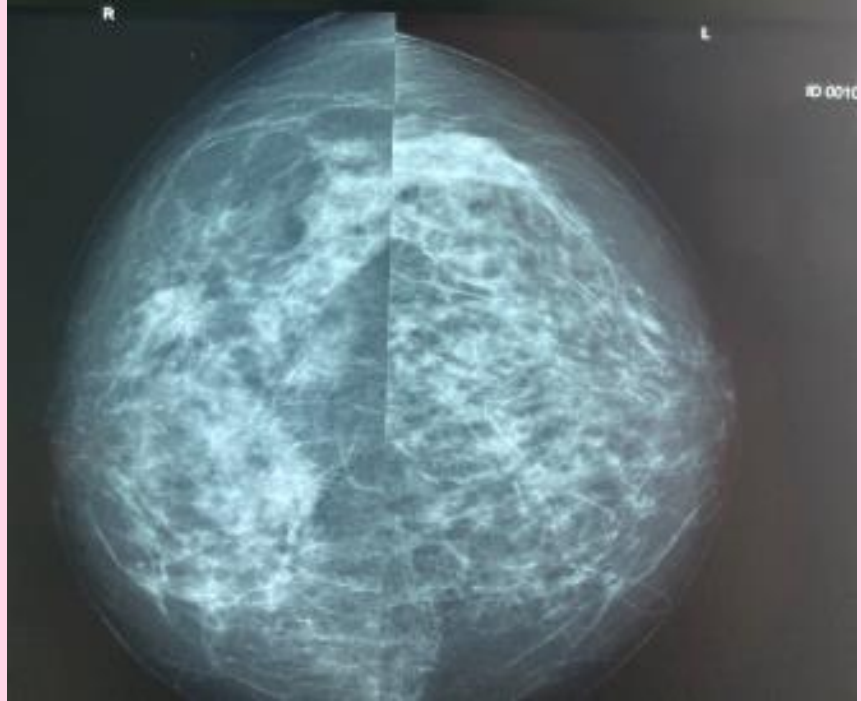
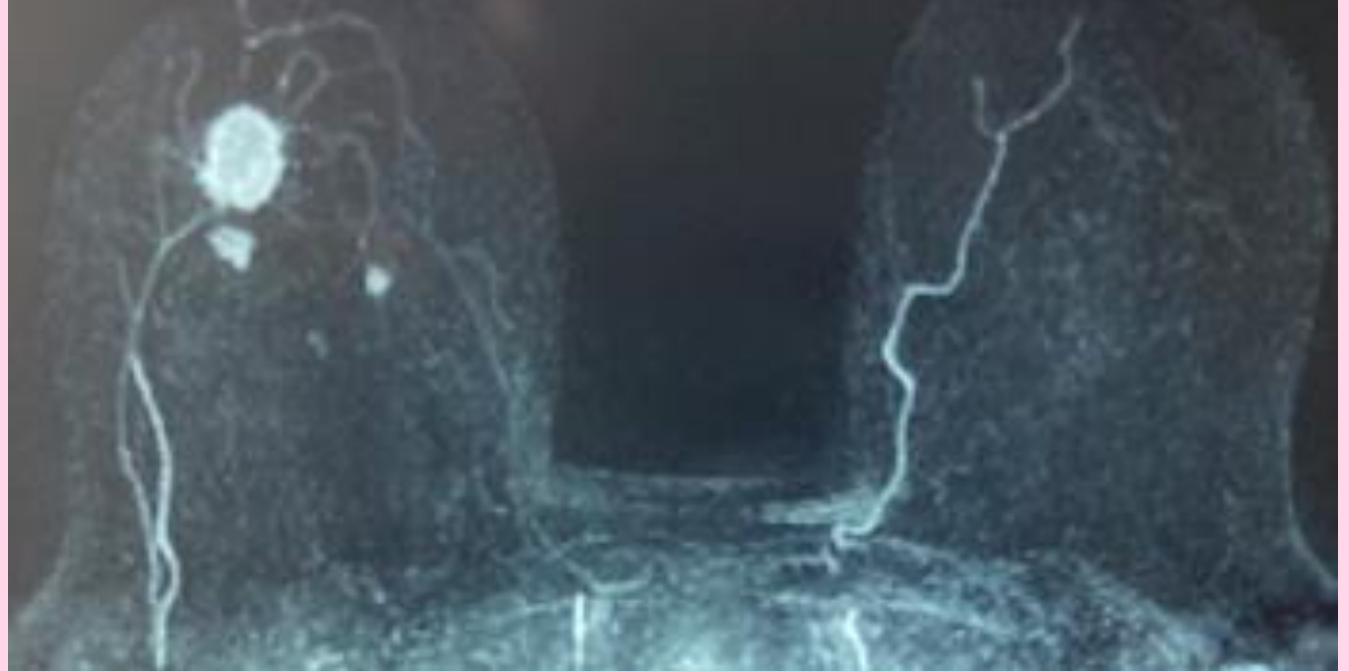


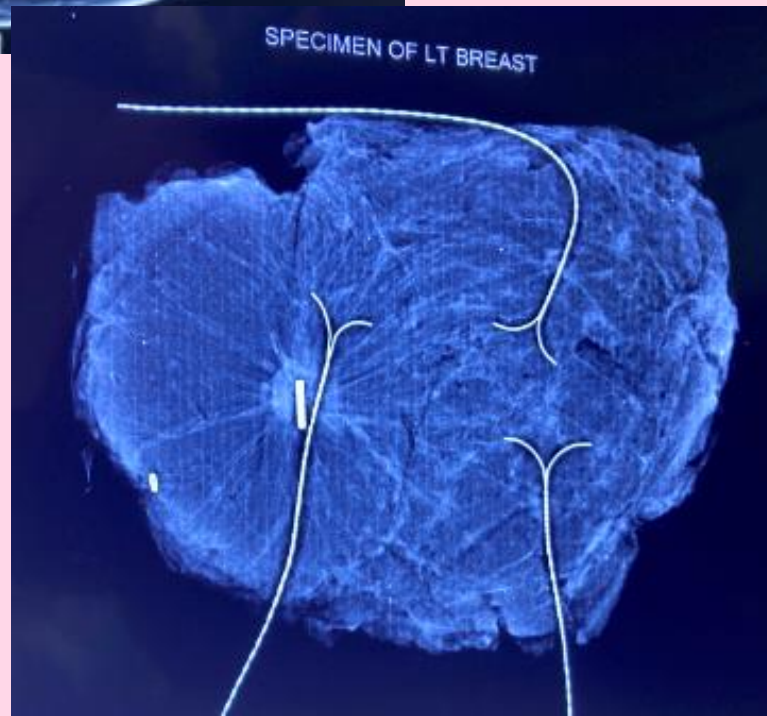
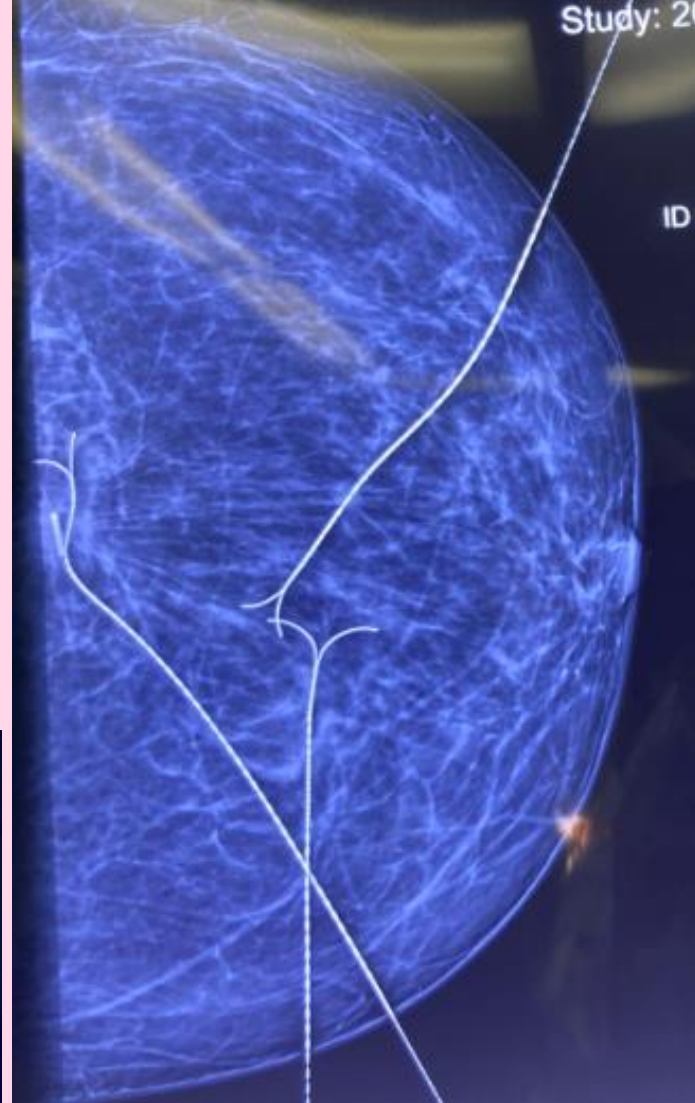
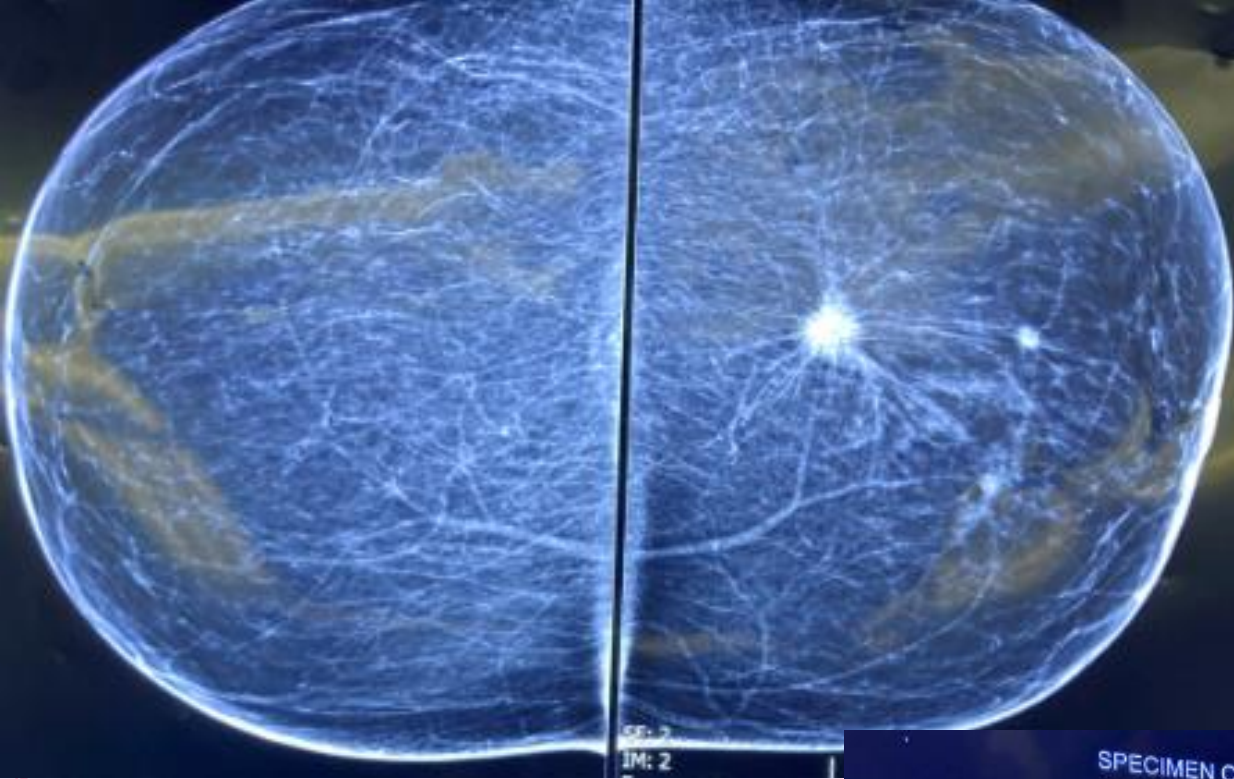
BREAST CONSERVING SURGERY IN MULTIFOCAL MULTICENTRIC BREAST CANCER HAS NO SIGNIFICANT DIFFERENCE IN THE RECURRENCE OR SURVIVAL RATES

Table 2 Papers examining the outcomes of breast conserving surgery in multifocal multicentric breast cancer.

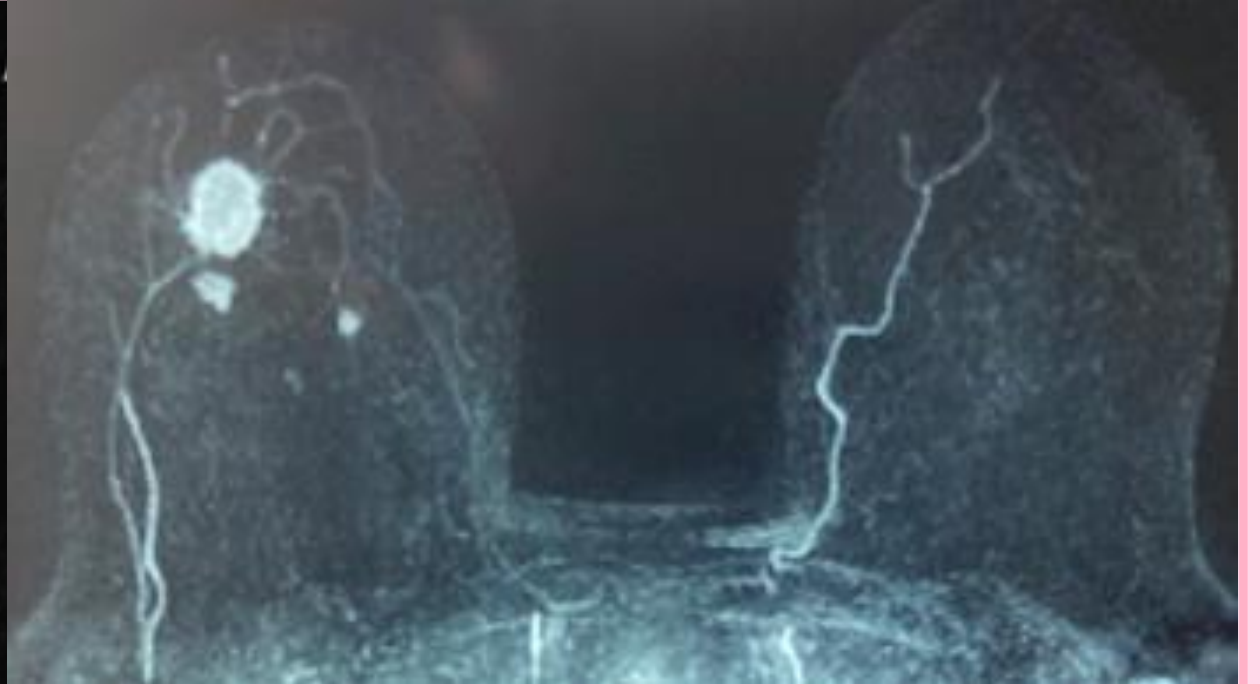
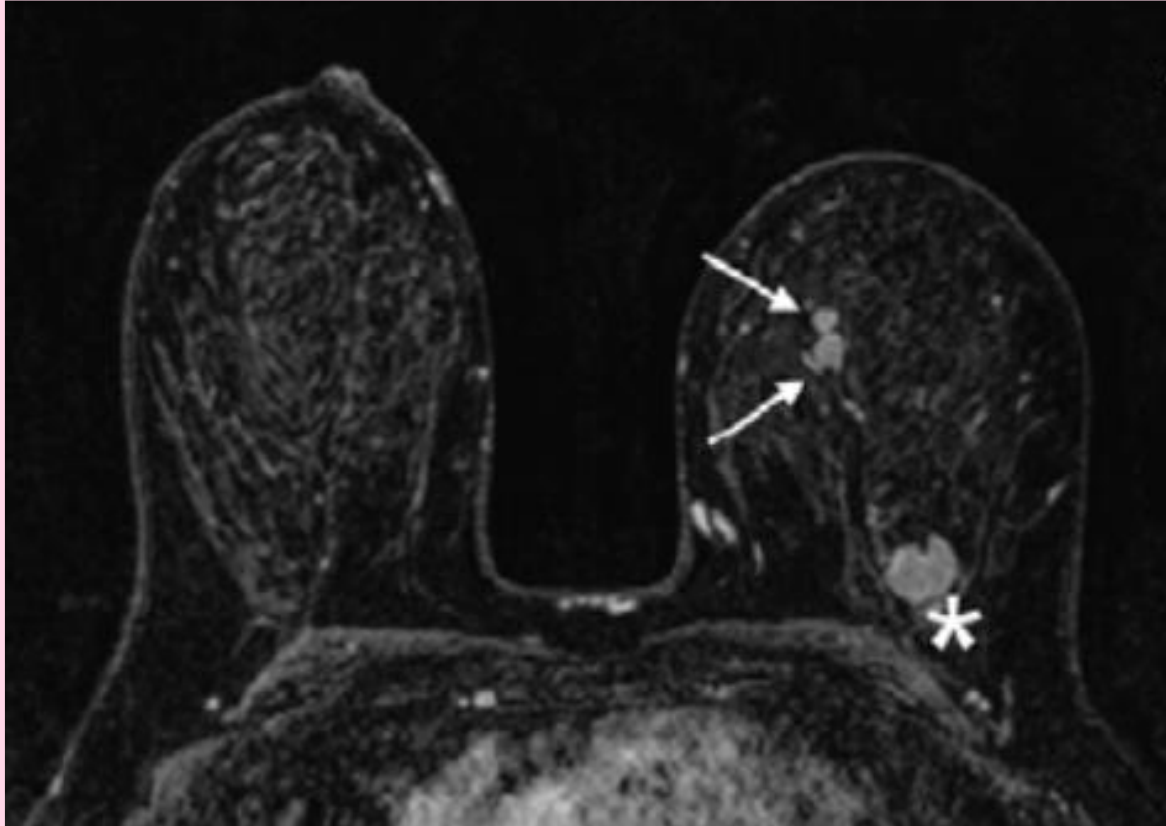
Study	Breast conserving surgery	Mastectomy	Conclusion
Nos <i>et al</i> (1999) ²³	56	132	No significant difference in the recurrence or survival rates
Kaplan <i>et al</i> (2003) ²⁴	36	19	Type of surgery had no impact on 5-year overall or disease-free survival
Oh <i>et al</i> (2006) ²⁶	20	27	No significant difference in disease-free or overall survival
Gentilini <i>et al</i> (2009) ²⁵	476	–	Local recurrence rate of 5.1% at 5 years
Lynch <i>et al</i> (2013) ²⁷	1757 UFBC	1059 UFBF	Breast conserving surgery is a safe option for MFBC
	256 MFBC	417 MFBC	All MCBC had mastectomy in this cohort
Wolters <i>et al</i> (2013) ¹⁴	623 MFBC	319 MFBC	No significant difference in disease-free or overall survival
	60 MCBC	40 MCBC	
Winters <i>et al</i> (2018) ²⁸	3537 MFMCBC	–	Breast conserving surgery and mastectomy had similar locoregional recurrence for MFMCBC. The conclusion was to support a future randomised trial

MCBC, multicentric breast cancer; MFBC, multifocal breast cancer; MFMCBC, multifocal multicentric breast cancer; UFBC, unifocal breast cancer.





ROLE OF MRI IN MULTIPLE MASS

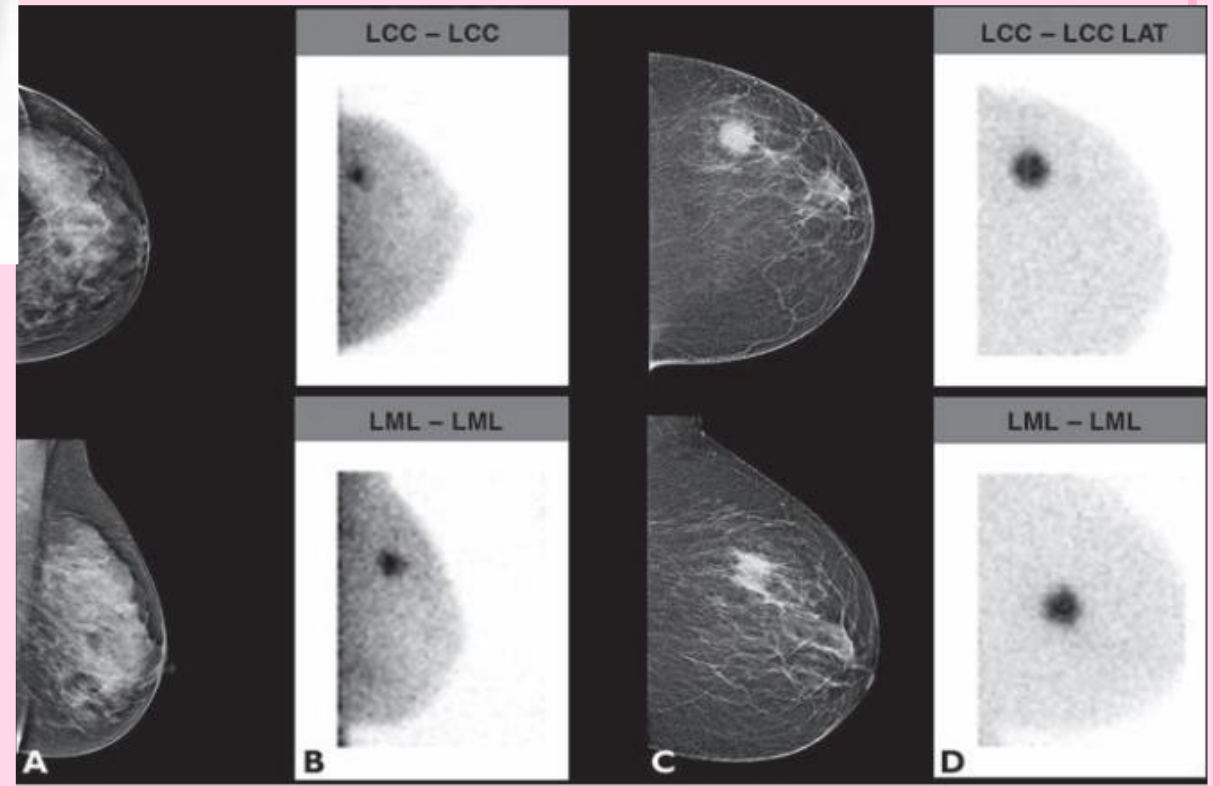
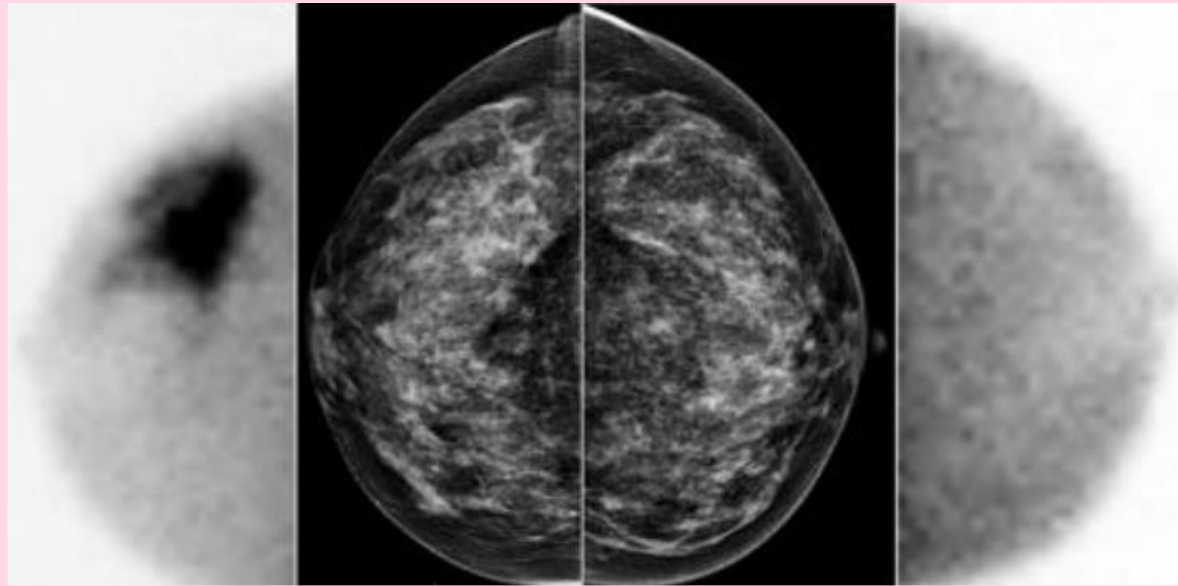


MOLECULAR IMAGING APPROACHES IN THE DIAGNOSIS OF BREAST CANCER

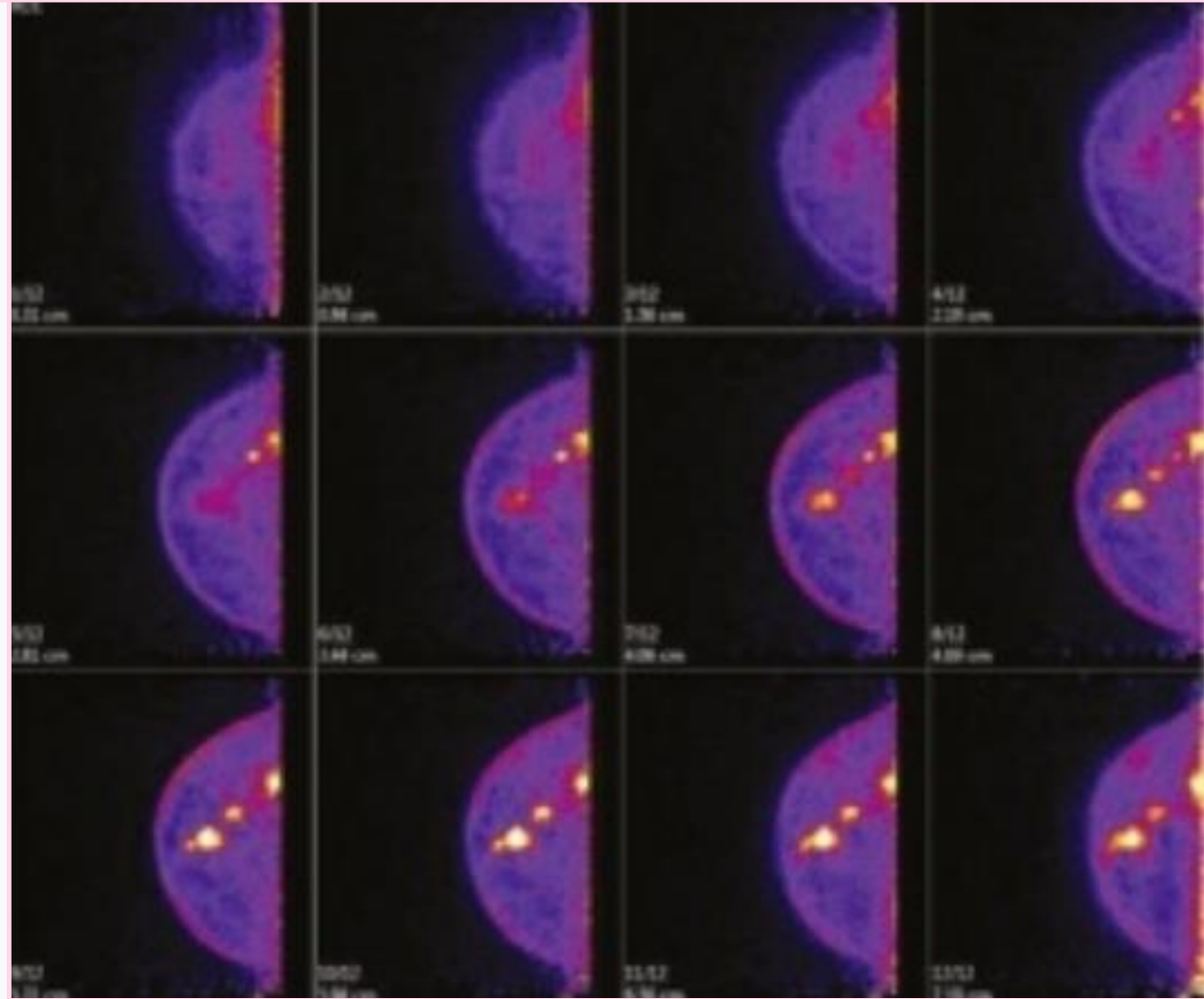
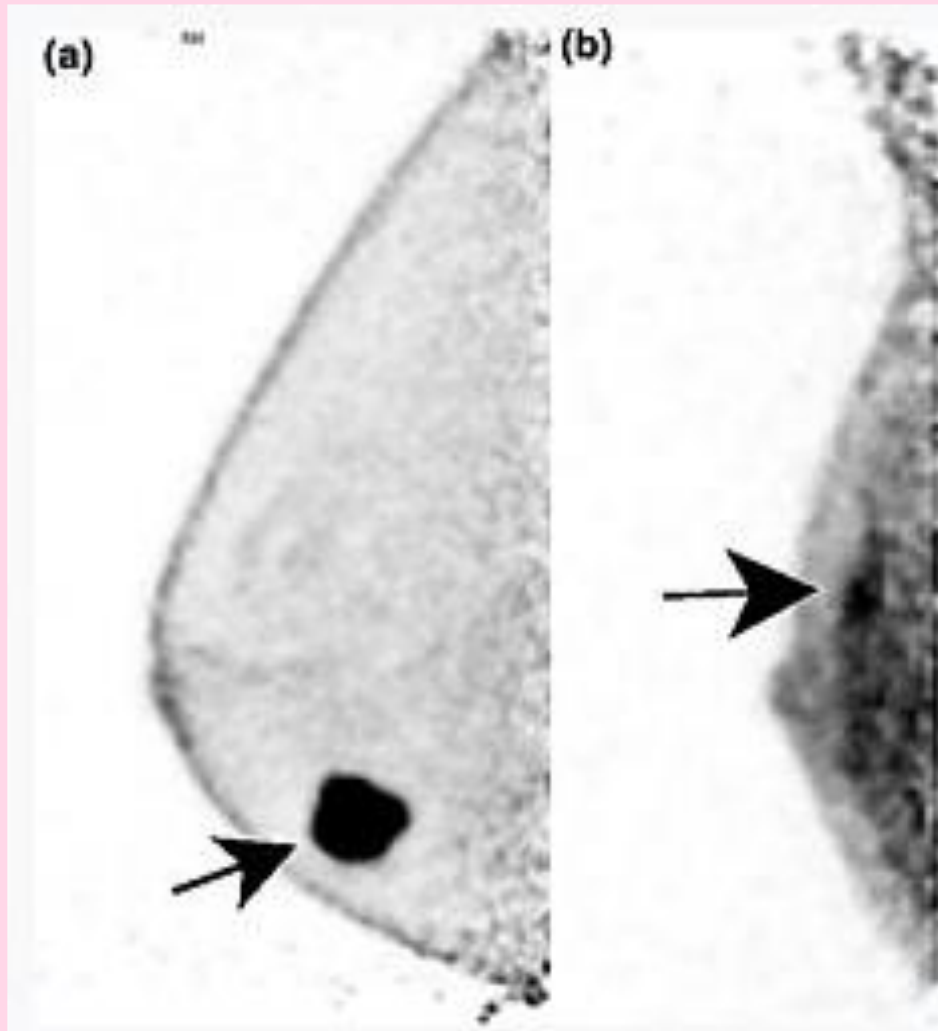
- Breast specific-gamma imaging (BSGI)
 - ^{99m}Tc -MIBI
- Positron emission mammography (PEM)
 - ^{18}F -FDG



BREAST-SPECIFIC GAMMA IMAGING (BSGI)



POSITRON EMISSION MAMMOGRAPHY (PEM)

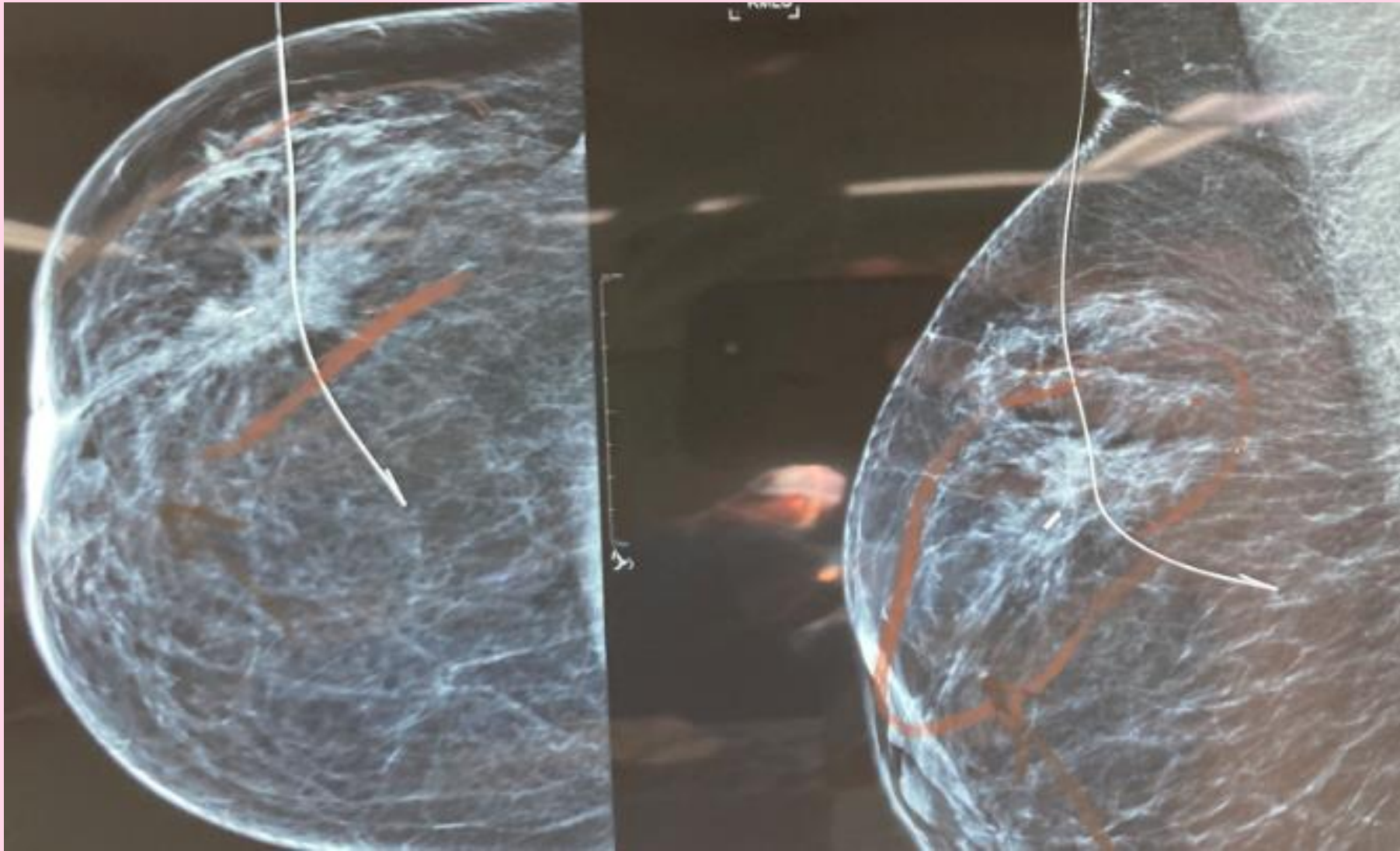


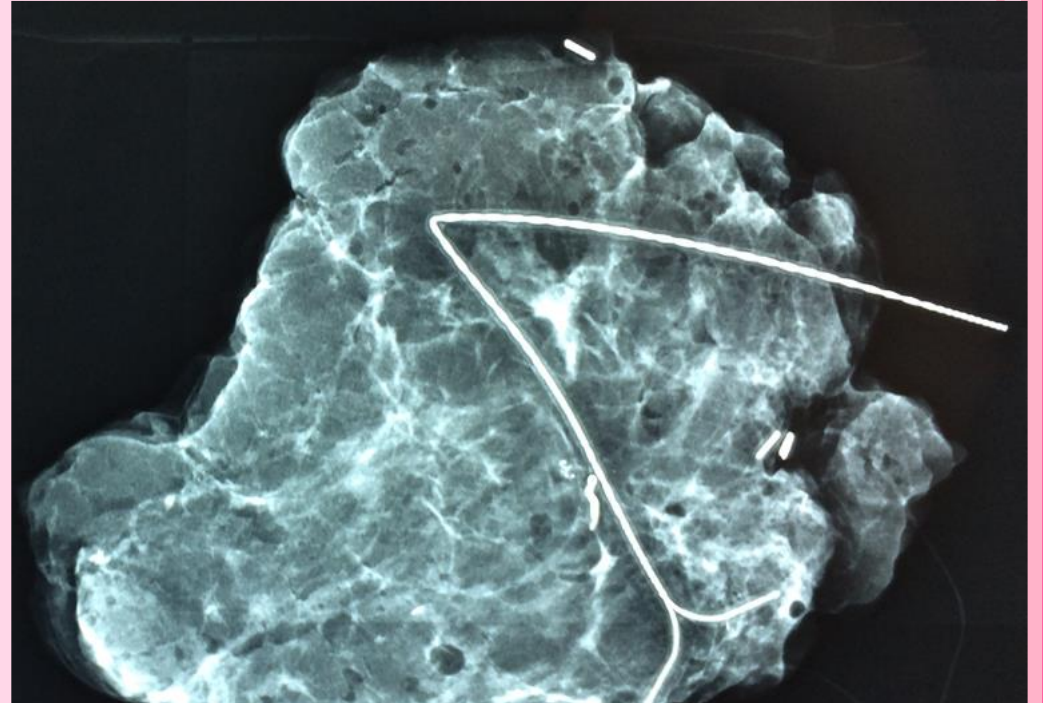
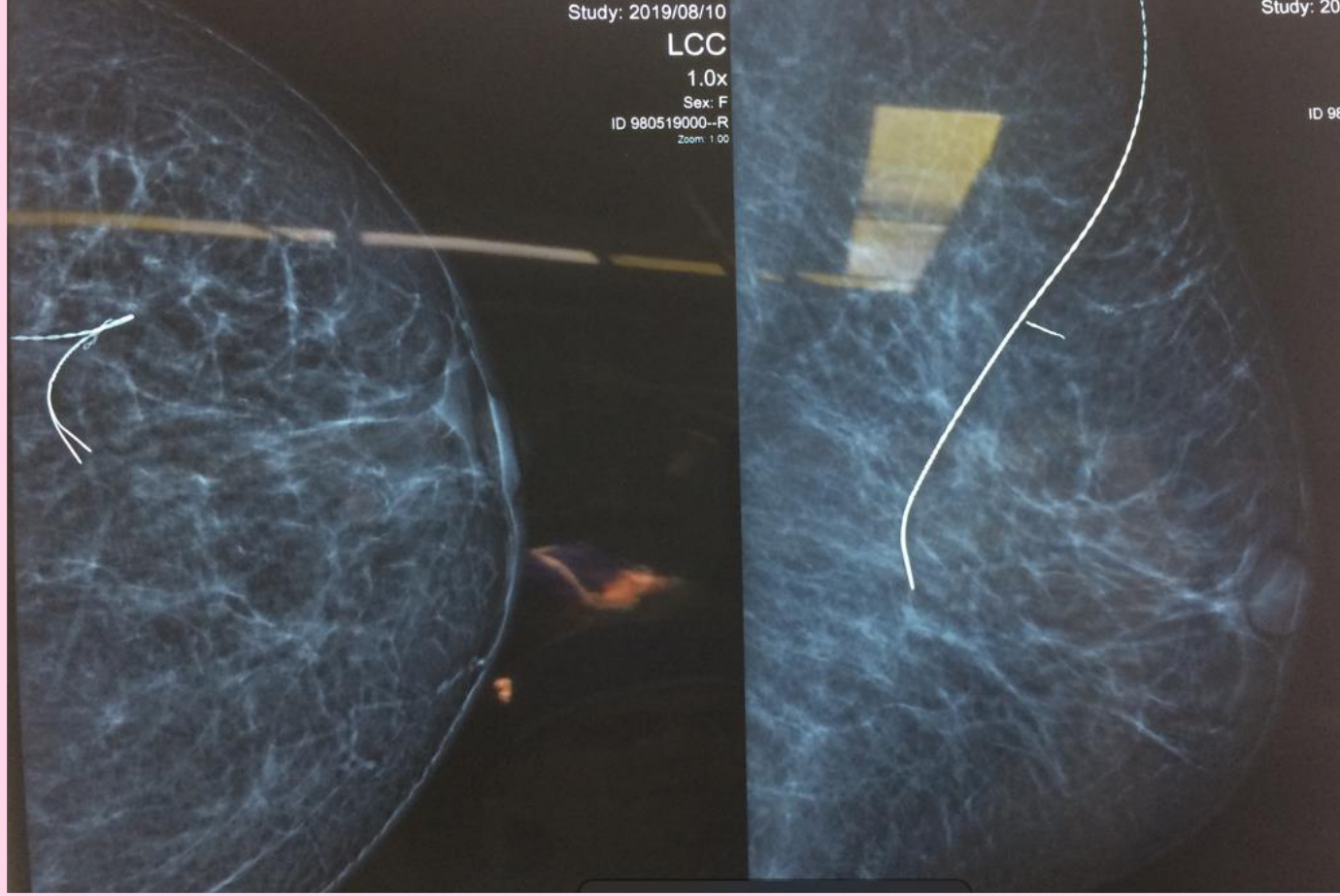
COMPLICATED CASES

- Wire migration
- Overprogression of wire
- Wire transection and retained wire fragment
- False wire localization
- Crossing through the breast
- Hematoma
- Infection
- Pneumothorax

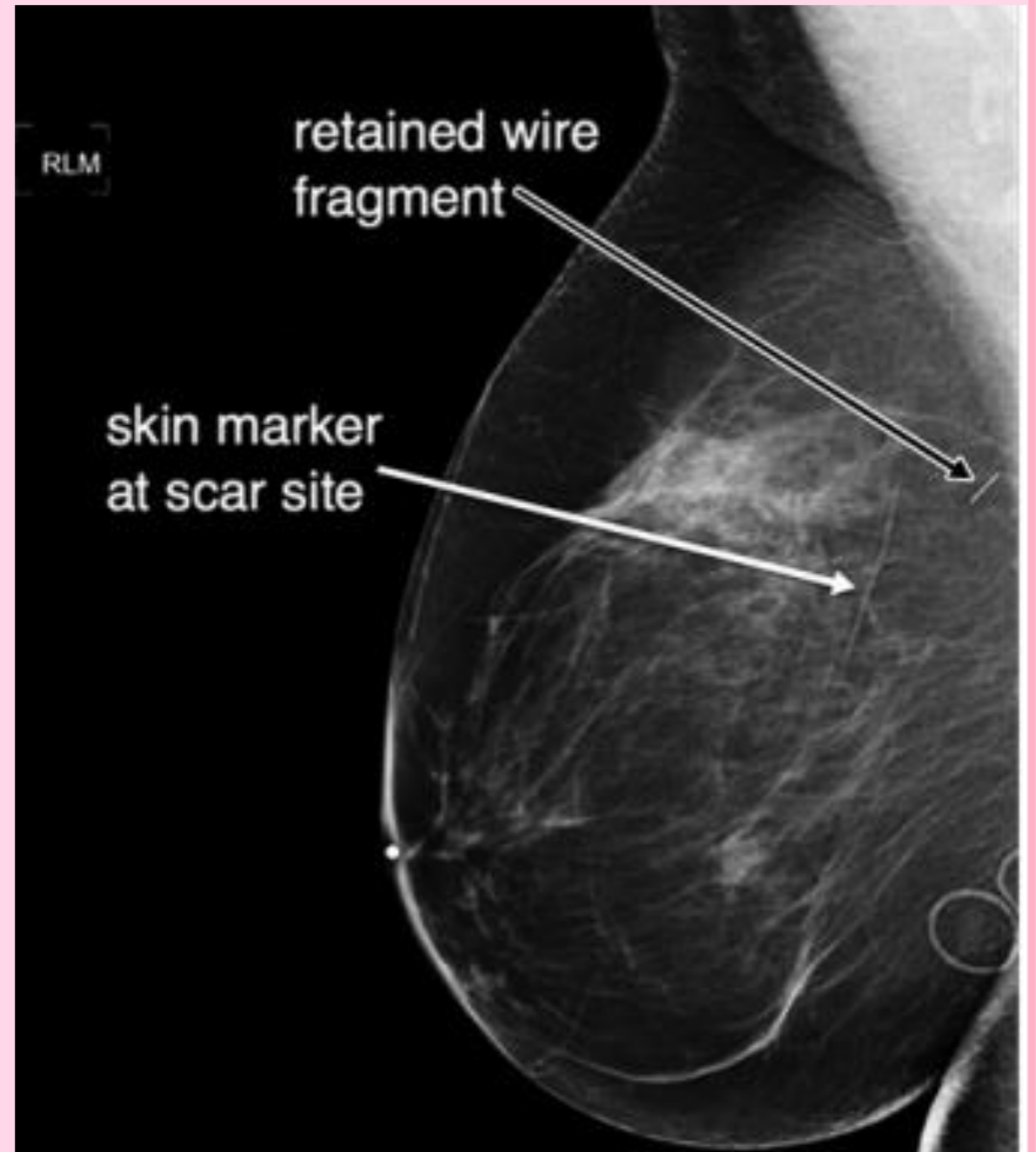


OVERPROGRESSION OF WIRE





RATAINED WIRE FRAGMENT





سپاس از توجه شما

