AMSER Rad Path Case of the Month:

42 year old female with a breast mass

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Patient Presentation

- Patient is a 42 year old female who presented with a left palpable breast mass that has been increasing in size, with associated pain, first noticed and evaluated over a year ago. She has known history of breast cysts.

Pertinent History and Physical Exam

- G0P0. Onset of menses at age 12. Menses is regular. Takes daily OCP.
- No family history of breast cancer.
- No surgical history.
- Former smoker and drinks alcohol occasionally
- Physical exam: Bilateral breasts are symmetrical in size, approx. 2 cm mass present at approximately the 1 o'clock position. No evidence of ecchymosis or hematoma. No nipple discharge. No palpable axillary lymph nodes.

ACR Appropriateness Criteria

Variant 1: **Adult female, 40 years of age or older. Palpable breast mass. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Digital breast tomosynthesis diagnostic	Usually Appropriate	☢☢
Mammography diagnostic	Usually Appropriate	☢☢
US breast	May Be Appropriate	O
Digital breast tomosynthesis screening	Usually Not Appropriate	☢☢
Mammography screening	Usually Not Appropriate	☢☢
Image-guided core biopsy breast	Usually Not Appropriate	Varies
Image-guided fine needle aspiration breast	Usually Not Appropriate	Varies
MRI breast without and with IV contrast	Usually Not Appropriate	O
MRI breast without IV contrast	Usually Not Appropriate	O
Sestamibi MBI	Usually Not Appropriate	☢☢☢
FDG-PET breast dedicated	Usually Not Appropriate	☢☢☢

BI-RADS Criteria

Final Assessment Categories			
Category		Management	Likelihood of cancer
0	Need additional imaging or prior examinations	Recall for additional imaging and/or await prior examinations	n/a
1	Negative	Routine screening	Essentially 0%
2	Benign	Routine screening	Essentially 0%
3	Probably Benign	Short interval-follow-up (6 month) or continued	>0 % but ≤ 2%
4	Suspicious	Tissue diagnosis	4a. low suspicion for malignancy (>2% to ≤ 10%) 4b. moderate suspicion for malignancy (>10% to ≤ 50%) 4c. high suspicion for malignancy (>50% to <95%)
5	Highly suggestive of malignancy	Tissue diagnosis	≥95%
6	Known biopsy-proven	Surgical excision when clinical appropriate	n/a

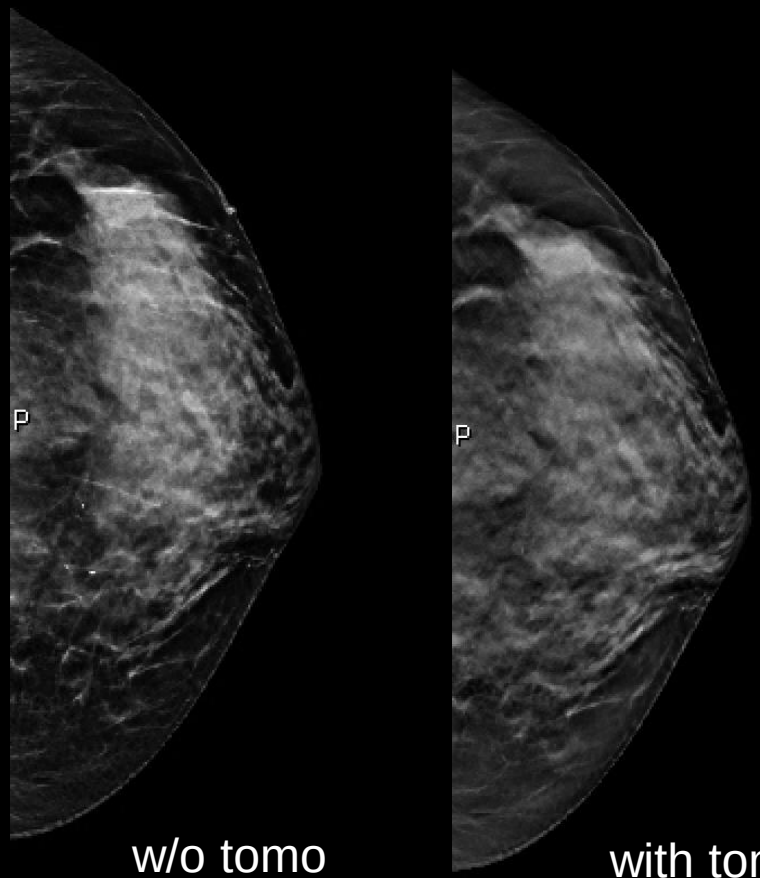
Initial evaluation

- Patient had performed a diagnostic mammogram with digital breast tomosynthesis (DBT) and breast ultrasound at initial presentation 1 year ago, which identified a 3mm superficial anechoic cyst without evidence of malignancy. BI-RADS 2.
- Routine screening mammogram without further intervention was recommended at that time.

- Due to the increasing size of the breast mass, the patient sought reevaluation. She underwent a repeat diagnostic mammogram with DBT and breast ultrasound.

Repeat Diagnostic Mammogram

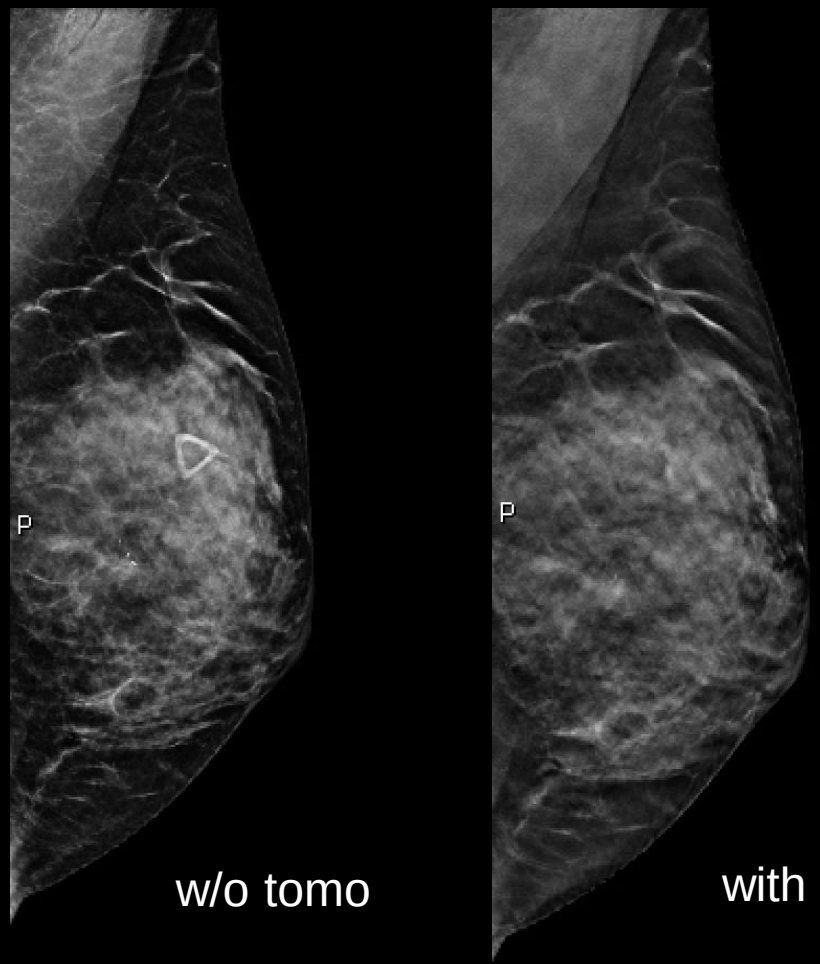
Left breast – CC view



w/o tomo

with tomo

Left breast – MLO view



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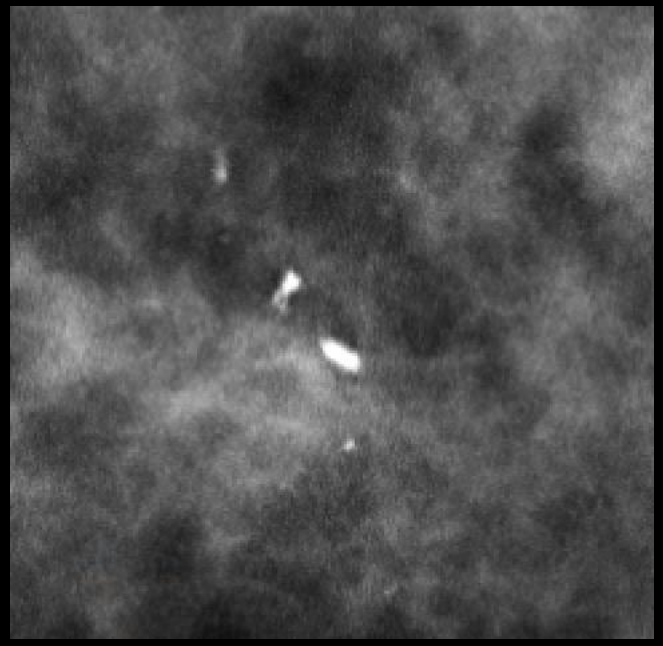
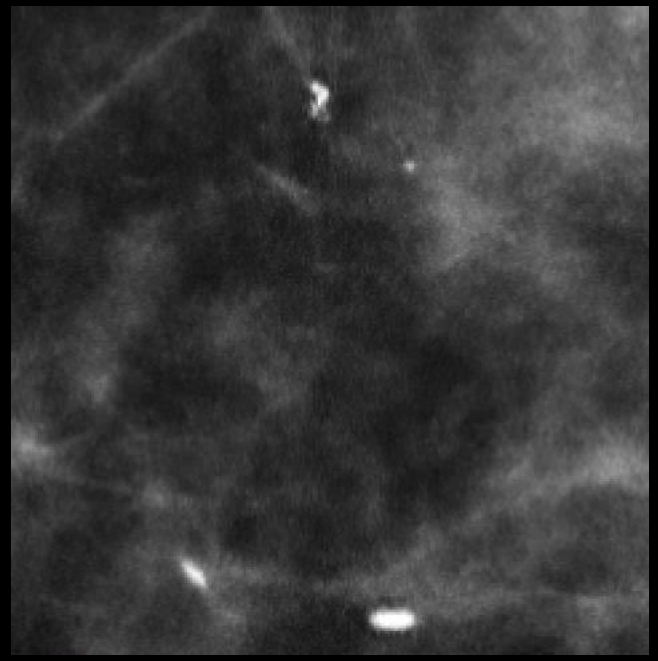
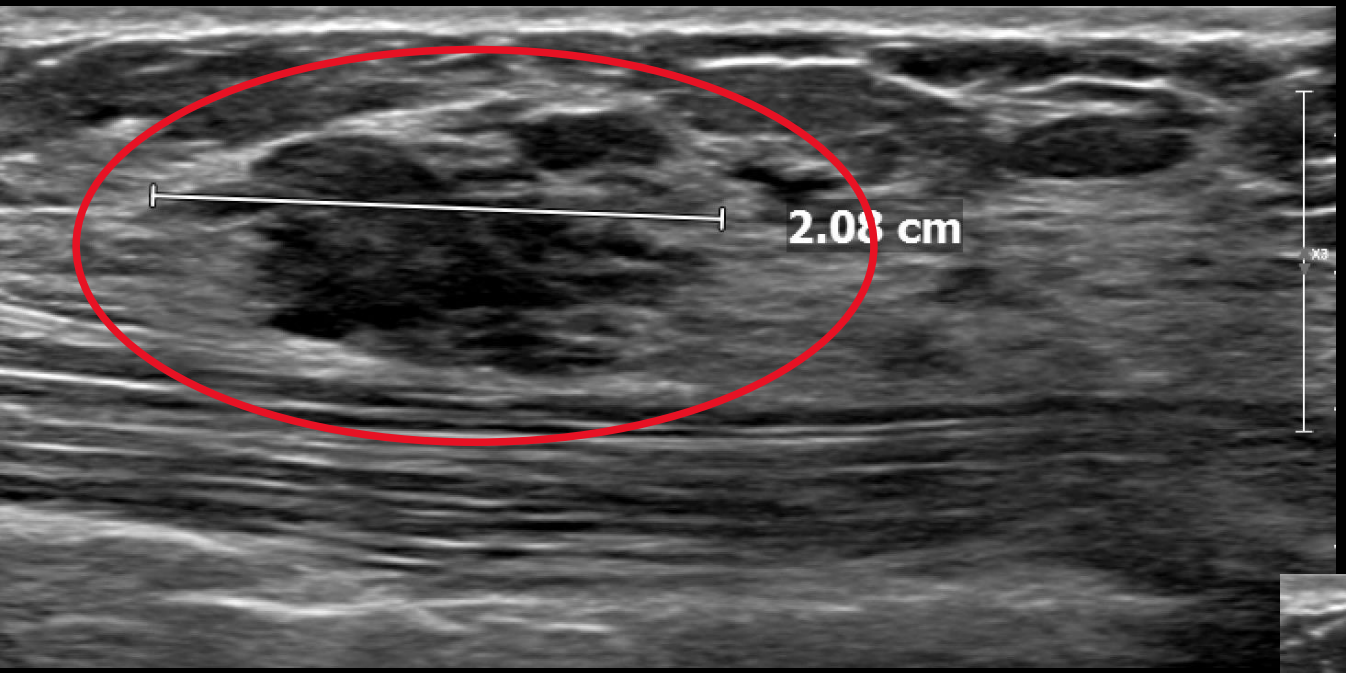
Findings: Asymmetry in the upper-outer left breast. No discrete underlying mass or architectural distortion.

Benign-appearing round and punctate calcifications





Repeat Breast Ultrasound



Above: 2 cm area of dense breast tissue that correlates with the palpable area confirmed with the patient

Below: 0.4 cm anechoic lesion compatible with simple cyst. This was likely the same cyst seen in the initial breast ultrasound

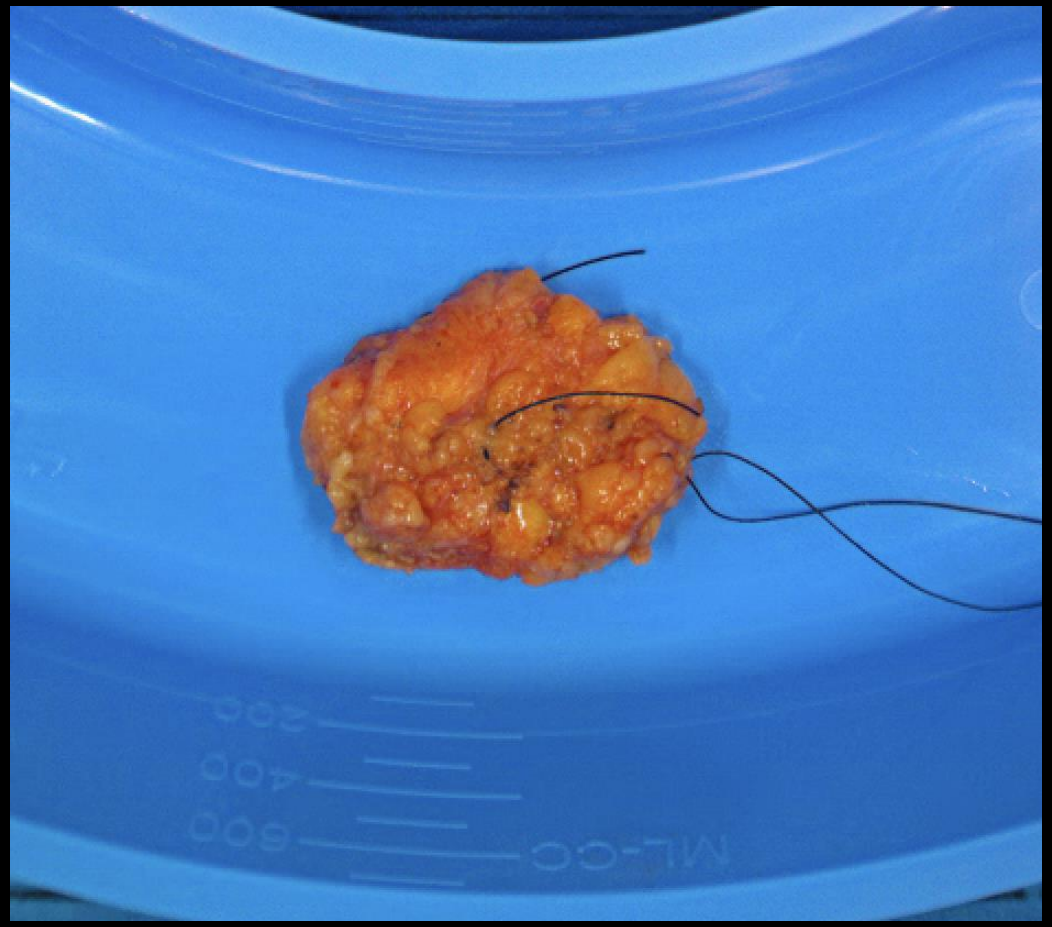
Repeat Imaging Results Impression

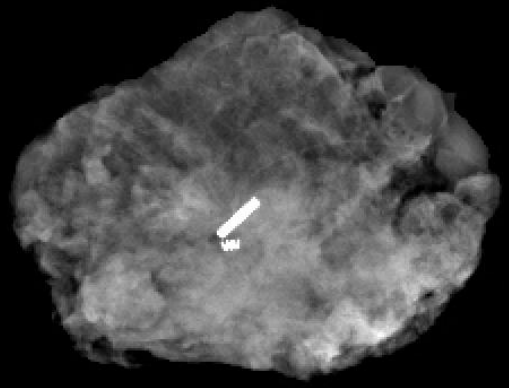
- There is an area of dense breast tissue at the 1 o'clock position 4 cm from the nipple that correlates with the palpable area confirmed with the patient.
- Given the subjective increase in size observed by the patient, ultrasound guided-biopsy is recommended.
- Normal left axillary lymph nodes
- Final Assessment: BI-RADS 4A – low suspicion for malignancy

Ultrasound-guided core needle biopsy

- Biopsy Pathology Result: Complex Sclerosing Lesion (CSL) / Radial Scar, Focal Usual Ductal Hyperplasia
- Although the lesion was biopsy-proven to be benign, surgical resection of the mass was recommended based on guidelines from the American Society of Breast Surgeons (ASBrS) due to its large size

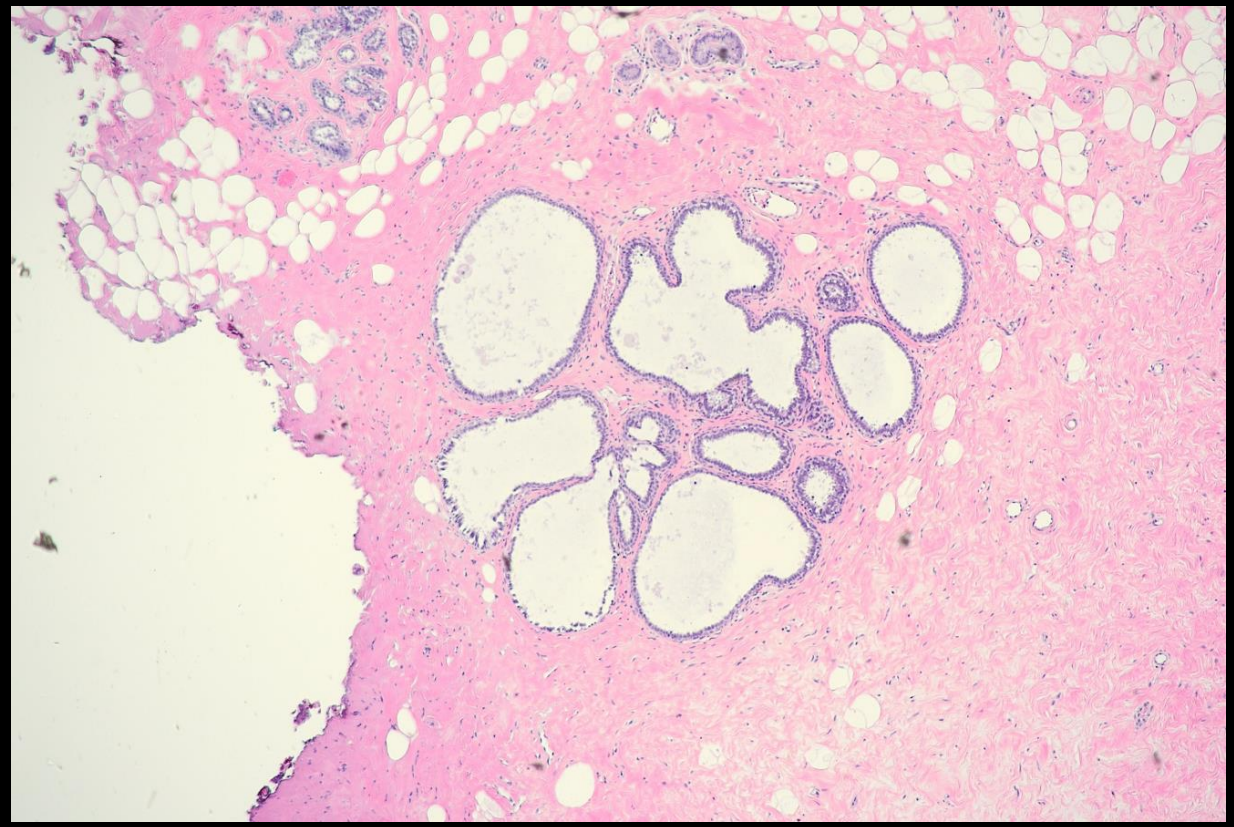
Surgical Excision – Gross image

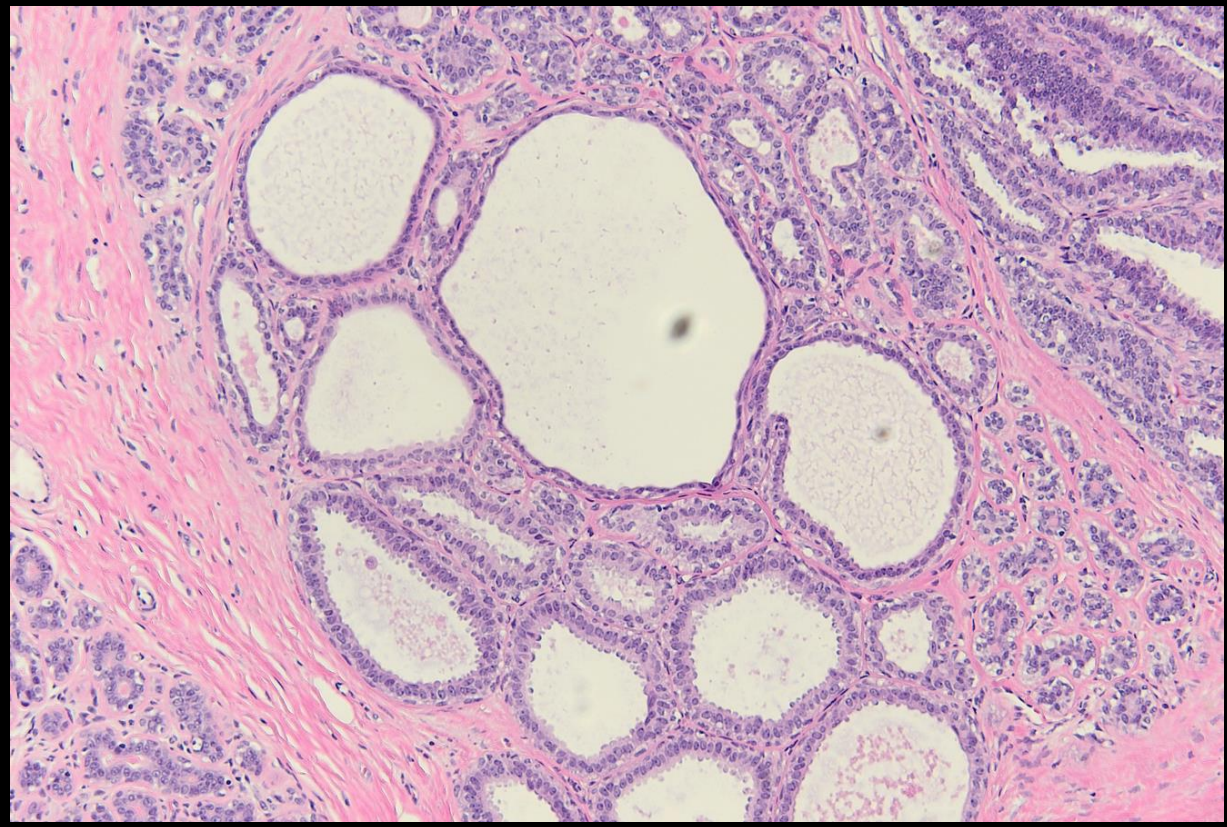




Specimen radiograph with clip and Magseed marker located centrally

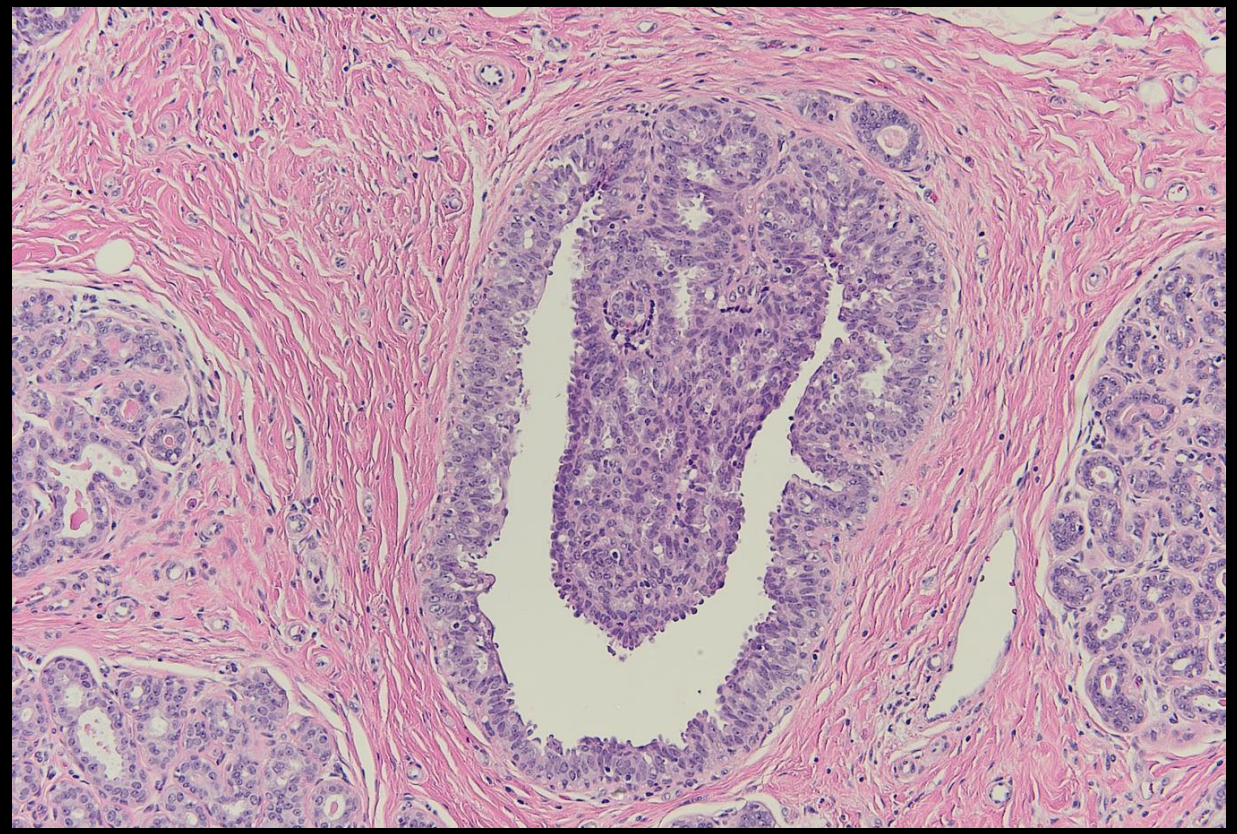
Surgical Excision - Micro Path

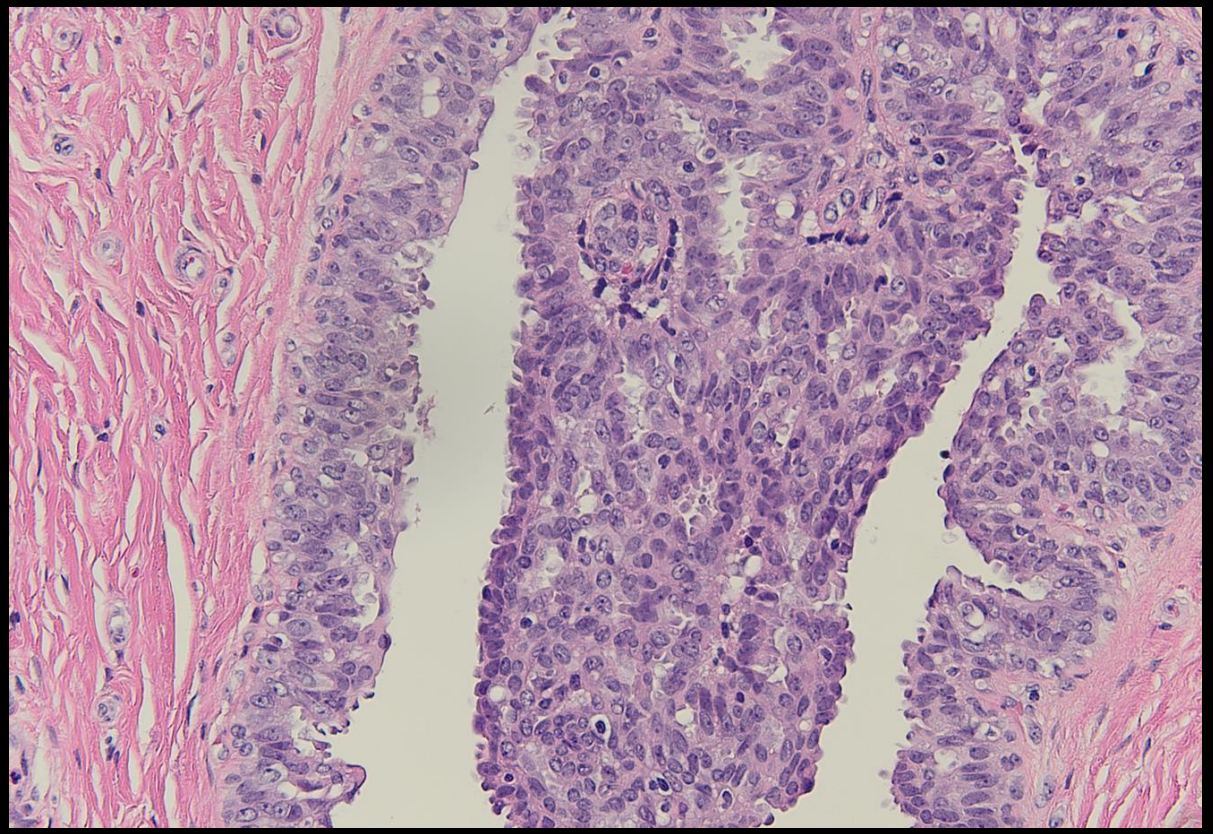




Cyst formation: Dilated glands lined by flat cuboidal or columnar cells

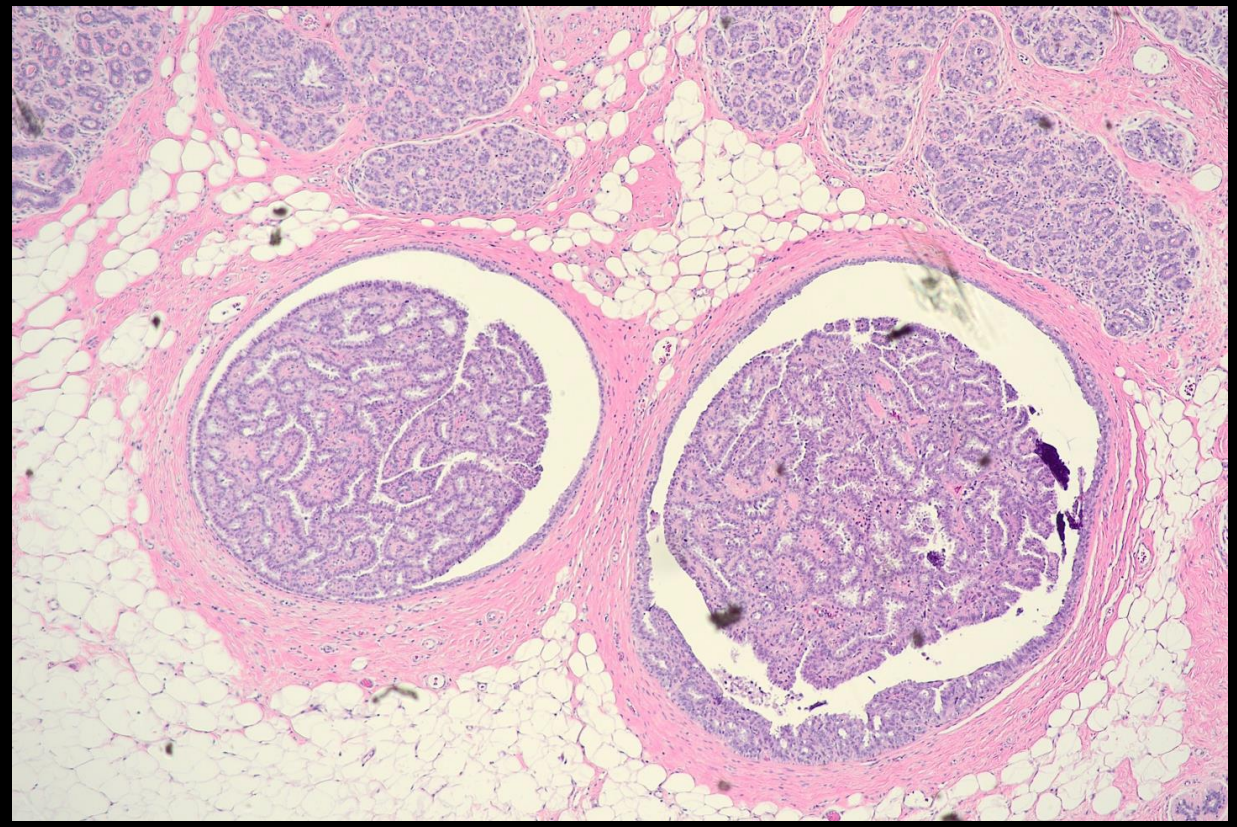
Micro Path

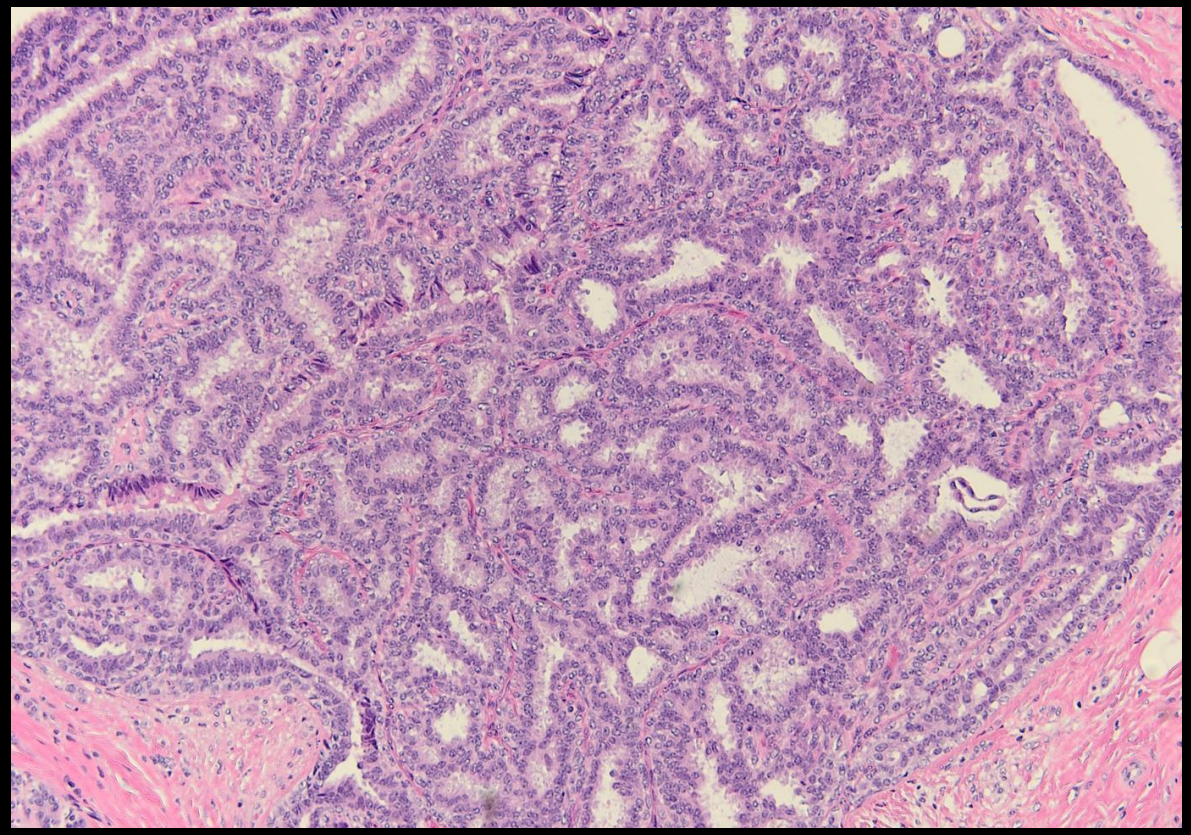




Usual ductal hyperplasia: Proliferation of ductal epithelial cell in a jigsaw puzzle pattern

Micro Path





Intraductal Papilloma: Circumscribed intraductal proliferation comprised of arborizing fibrovascular cores lined by outer layer of luminal cells and an inner layer of myoepithelial cells

Biopsy Dx:

Complex Sclerosing Lesion

Surgical Resection Final Dx:

Benign breast tissue with prominent stromal fibrosis and foci of sclerosing intraductal papillomatosis, cyst formation, and usual ductal hyperplasia

Case Discussion – Biopsy Findings:

Radial Scars, or Complex Sclerosing Lesions

Definition and Imaging Findings:

- Radial scars are defined by a central fibroelastotic stromal core with radiating ducts and lobules with varying degrees of proliferative and cystic changes arranged in a stellate configuration
- Complex sclerosing lesion (CSL) typically refers to radial scars >1 cm but is often used interchangeably.
- Can be detected incidentally during core needle biopsy (CNB) or appear as architectural distortion or spiculated masses on imaging.

Historical and Modern Malignancy Risk:

- Older studies reported up to a 25% malignancy rate upon surgical excision.
- More recent studies suggest a much lower upgrade rate.

Case Discussion – Biopsy Findings:

ASBrS Updated Surgical Management Recommendations of Radial Scars as of Feb 2025

CSLs Without Atypia:

- A 2019 meta-analysis of 49 studies (3163 CSLs):
  - 1% malignancy upgrade rate with vacuum-assisted biopsy.
  - 1–5% upgrade rate with 8–16 gauge CNB.
- No upgrades noted in:
  - Microscopic CSLs found incidentally.
  - Radiologic CSLs <5 mm.
- Short-term observational studies have not shown progression or missed malignancy.
- Surveillance is reasonable for pure CSLs with radiologic-pathologic concordance, depending on:
  - Imaging findings.
  - Lesion size.
  - Biopsy method.
- CSL without atypia, particularly when ≤1 cm in size, has <3% rate of upgrade to malignancy at surgery, allowing consideration of imaging follow-up in lieu of excision.

Case Discussion – Biopsy Findings:

ASBrS Updated Surgical Management Recommendations of Radial Scars as of Feb 2025

CSLs With Atypia:

- Malignancy upgrade rate as high as 35%.
- Routine surgical excision is recommended.

Conclusion

- Although our patient's biopsy demonstrated CSL without atypia, the lesion's large size of 2 cm prompted the decision to proceed with surgical excision
- Management guidelines traditionally recommended surgical excision for CSLs due to malignancy risk. However, for CSL without atypia, guidelines are shifting towards surveillance with follow-up imaging. Surgical excision remains as the management of choice for CSL with atypia.

Case Discussion – Surgical Resection Findings:
Intraductal Papilloma

- **Definition & General Characteristics**
  - Benign intraductal proliferation of epithelial cells with fibrovascular cores and underlying myoepithelial cells
- **Clinical Features**
  - Common benign breast lesion
  - Pathophysiology is poorly understood, however theorized that intraductal papillomas originate from bipotent progenitor cells that differentiate as luminal and myoepithelial cells
  - Central intraductal papilloma: arises from large lactiferous ducts, usually solitary
  - Peripheral intraductal papilloma: involves terminal duct lobular unit, usually multiple (papillomatosis)
  - Surgical excision recommended for intraductal papilloma with atypical epithelial proliferation

Radiology Findings

- **Mammography:**
  - Large, well-circumscribed central masses
  - Calcifications possible
  - Small peripheral lesions may not be visible
- **Ultrasonography:**
  - Solid mural nodule within a dilated duct
  - Vascular pedicle may be seen on Doppler
- **MRI:**
  - Well-circumscribed, round or ovoid intraductal mass with variable enhancement
  - May show ductal dilation

Case Discussion – Surgical Resection Findings:
Intraductal Papilloma

Gross Pathology

- **Central papilloma:** Well-circumscribed polypoid nodule in a cystically dilated duct
- **Peripheral papilloma:** Not easily grossly visible

Microscopic Features

- Arborizing fibrovascular cores lined by luminal and myoepithelial cells
- May show hyperplasia, apocrine metaplasia, and sclerosing changes
- Can be associated with atypical ductal hyperplasia, lobular carcinoma in situ, DCIS, or invasive carcinoma

Case Discussion – Surgical Resection Findings:

ASBrS Updated Surgical Management Recommendations of Papillary Lesions as of Feb 2025

Management of Intraductal Papilloma (IP) Without Atypia

- **Asymptomatic IPs**
  - Can undergo **active imaging surveillance** due to low upgrade rates.
  - Prospective study: **1.7% upgrade rate to DCIS** regardless of lesion size or patient age.
  - Retrospective studies: **1-5% upgrade rates** with excellent clinical, radiologic, and pathologic concordance.
  - **Higher upgrade risk factors** (not consistently across studies):
    - Lesion **>1 cm**
    - Age **>50 years** at diagnosis
    - **Multiplicity** of lesions
    - **Peripheral location**
    - **>50% of lesion remaining after CNB**
- **Symptomatic IPs** (palpable mass or nipple discharge)
  - **Higher risk** of upgrade to DCIS or invasive cancer.
  - **Surgical excision can be considered** to rule out malignancy and relieve symptoms.

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