Benign, Reactive and Inflammatory Lesions of the Breast

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• No conflict of interest
Objectives

• Discuss the most common benign reactive/inflammatory lesions of the breast
• Discuss some of the most common benign tumors of the breast
• Discuss the pathology of mammary calcifications
Background

- As breast cancer screening has become more common, the number of diagnostic breast biopsies has also increased.
- Final diagnosis rests on the pathologic evaluation.
- **70 to 80% of breast biopsies are benign.**
- Studies indicate that pathologists are very good at determining when invasive cancer is present, but less skilled at making the right diagnosis with less serious conditions or when biopsied tissue is normal.
Background

• The American College of Radiology developed the BI-RADS classification system to categorize breast screening results
• Each BI-RADS category reflects an increased suspicion in the interpretation for the likelihood of breast cancer

BI-RADS: Breast Imaging Reporting and Data System
Case #1

• A 32 year old female presents with an 5 cm, round breast mass (BI-RADS 4A). Core needle biopsy was performed
Galactocele

- Most occur in adult women during pregnancy/ lactation
- It is a “retention cyst resulting from the obstruction of a lactiferous duct”
- Could be associated with galactorrhea
- Characteristic appearance on mammogram
- Inspissated secretion as soft caseous material
Case # 2

- A 50 year-old, smoker female present with intermittent watery nipple discharge and an indurated subareolar mass (BI-RADS 4A)
Breast lesions presenting with breast “inflammation”

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Clinical clues for diagnosis</th>
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</thead>
<tbody>
<tr>
<td>Acute/puerperal mastitis</td>
<td>Seen in lactating patients. Rarely develops outside lactation</td>
</tr>
<tr>
<td>Granulomatous mastitis</td>
<td>Special studies and cultures necessary for confirmation. May mimic cancer clinically and radiologically.</td>
</tr>
<tr>
<td>Granulomatous lobular mastitis (idiopathic)</td>
<td>Diagnosis of exclusion when infectious etiologies have been ruled out. Seen in young parous women, outside lactation. Associated to oral contraceptive use.</td>
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<tr>
<td>Plasma cell mastitis</td>
<td>Strongly associated with pregnancy</td>
</tr>
<tr>
<td>Fat necrosis</td>
<td>Painless. Associated with trauma or previous surgery</td>
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<tr>
<td>Breast infarcts</td>
<td>Often during pregnancy or postpartum</td>
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<tr>
<td>Subareolar breast abscess</td>
<td>Non-lactating premenopausal women. Tend to recur. Subareolar location</td>
</tr>
<tr>
<td>Dermatitis</td>
<td>Pruritus and redness. Rule out Paget’s disease if do not resolve with treatment in a reasonable period of time (10–14 days)</td>
</tr>
<tr>
<td>Paget’s disease of the nipple</td>
<td>Scaly, itchy rash that affects one nipple and persists despite treatment with skin creams or antibiotics</td>
</tr>
<tr>
<td>Inflammatory carcinoma</td>
<td>Rapid breast enlargement, induration, redness and peau d’orange</td>
</tr>
</tbody>
</table>

Rosa M. Arch Gynecol Obstet. 2010 May;281(5):901-5
Case #3

• A female patient presents with a month history of a palpable tender mass in the upper quadrants of the right breast. A core biopsy was performed.
Case #3

What clinical information is useful to arrive to the correct diagnosis?

- Age
- Location
- Nipple discharge
- Skin involvement
- Other symptoms such as fever
- Pregnancy or lactation
- Use of oral contraceptives
- History of trauma or surgery
Case #4

- A 17 year-old female presents with several months history of a right breast mass and breast pain. On US the mass measured 6 cm and was categorized as BIRADS 4. A biopsy was followed by an excisional biopsy (lumpectomy).
Rosai-Dorfman disease
(Sinus histiocytosis with massive lymphadenopathy)

- Unknown etiology
- Firm painless, ill-defined irregular mass
- Lymphocytes, plasma cells, histiocytes and lymphoid follicles
- Large histiocytes show “emperipolesis”
- No mitosis, no necrosis, no granulomas
- Differential diagnosis:
  - Inflammatory conditions, fat necrosis
  - Diabetic mastopathy
  - Lymphoma
  - Histiocytosis
  - Rarely some types of carcinomas
- Markers:
  - Positive CD68, S100
  - Negative CD1a
Case #5

- A 45 year old female is found to have a 1 cm stellate mass on mammography. A fine needle aspiration biopsy was performed under US guidance.
Granular Cell Tumor

- Age range 30-50 years
- Most are unilateral
- Infiltrative
- Differential diagnosis:
  - Histiocytic lesions
  - Fat necrosis
  - Granulomatous inflammation
  - Carcinoma (primary or metastatic)
- Markers:
  - Positive: S100, CEA, vimentin
  - Negative: Epithelial markers, ER, PR, GCDFP-15
Usually an incidental finding but may produce nodular lesions or have rapid growth.
Recommend to use this diagnosis sparingly in CNB.
Hamartoma
Well circumscribed, often encapsulated mass composed of all components of breast tissue
May have smooth muscle, adipose tissue, hyaline cartilage, PASH
Difficult to diagnose in CNB
Benign mixed tumor
• Identical in appearance to pleomorphic adenoma of the salivary glands
• Sharply circumscribed
• Mixture of epithelial, myoepithelial and chondromyxoid components
• No atypia or mitotic figures
Case #6

- A 57 year-old female with history of left breast invasive ductal carcinoma (9 years prior) s/p modified radical mastectomy followed by chest wall radiation, presents with a palpable mass in ipsilateral breast. Ultrasound showed an oval, elongated solid mass measuring 3.3 × 1.1 cm. A biopsy, followed by excision was performed.
Papillary endothelial hyperplasia

- Accounts for approx. 2% of the benign and malignant vascular tumors of the skin and subcutaneous tissues
- Can be confused with angiosarcoma
- The most helpful clue in making the correct diagnosis is the circumscribed nature of the lesion since it is an intravascular process
Core needle biopsy
Evaluation of Microcalcifications

• Microcalcifications are present in 50% of carcinomas versus 20% of benign breast disease

• Approx. 20-30% of radiologically suspicious microcalcifications are part of a malignant process
Core needle biopsy

Evaluation of Microcalcifications

• Radiological characteristics
  – Distribution
  – Appearance
  – Changes over time

• Types
  – Calcium phosphate:
    • Predominant
    • Basophilic, non-birefringent
  – Calcium oxalate:
    • Amber color
    • Seen under polarized light
    • Usually in benign lesions
Core needle biopsy

Evaluation of Microcalcifications

- **Diffuse or scattered distribution** is typically seen in benign entities.
- **Regional distribution** favor a non-ductal distribution (i.e. benignity).
- **Clustered calcifications** are seen in benign and malignant disease and are of intermediate concern.
- **Linear distribution** is typically seen when DCIS fills the entire duct and its branches with calcifications.
- **Segmental distribution** would favor a ductal distribution (i.e. malignancy).

Core needle biopsy
Evaluation of Microcalcifications

• **Benign Calcifications:** Don’t require histological verification

  • Skin Calcifications
  • Vascular calcifications
  • Coarse or 'Popcorn-like': involuting fibroadenomas
  • Large Rod-like: plasma cell mastitis
  • Round and punctuate calcification: fibrocystic changes
  • Lucent-Centered: fat necrosis
  • Eggshell or rim calcifications: cysts calcifications
  • Milk of calcium: calcified secretion inside cysts
  • Dystrophic calcifications: Fat necrosis, trauma, radiation
Core needle biopsy
Evaluation of Microcalcifications

• Suspicious Calcifications:
  – Amorphous calcifications (200 to 300 μm): without a clearly defined shape or form
  – Coarse Heterogeneous: irregular, conspicuous calcifications that are generally larger than 0.5 mm
Core needle biopsy

Evaluation of Microcalcifications

• **High Probability of Malignancy**: BIRADS 5
  – Fine Pleomorphic: Irregular, conspicuous calcifications
  – Fine Linear or Fine Linear Branching: thin, linear or curvilinear irregular calcifications
Evaluation of microcalcifications

What to do if calcifications are not identified in histologic sections?

How many deeper sections are enough?

Why there are instances where calcifications cannot be found?
Evaluation of microcalcifications

- Correlate with specimen radiograph/report
- Polarize the slides
- X-ray the tissue blocks before ordering deeper sections

If still microcalcifications are not found:
- They may have been lost during processing:
  - Fixation
  - Preparation of slides
- Calcium oxalate calcifications tend to fragment and dislodge from the tissue
• A 40 year-old female underwent her first screening mammogram. Coarse microcalcifications were identified and categorized as BI-RADS 4-A
Osseous metaplasia

- Associated with benign and malignant lesions
- Immature bone spicules, lacunae-containing osteocytes and occasionally osteoblasts
- Differential diagnosis:
  - Ossifying-type calcifications: surrounded by a bone-like matrix, do not contain osteocytes or osteoblasts
CONCLUSIONS

• The vast majority of breast lesions that undergo biopsy are benign

• Pathologists are accustomed to easily recognize proliferative and malignant lesions

• Benign breast conditions can be challenging to diagnose in histopathology

• They may have a wide variety of clinical presentations

• Correlation with clinical and radiological findings is necessary
References:

1- Rosa M. "Inflammatory" changes in breast: how to provide a better care to our patients. Arch Gynecol Obstet. 2010 May;281(5):901-5.
4- Chiniyama C. Benign Breast Diseases. Radiology-Pathology Assessment