Urgent and Emergent Breast Ultrasound

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Disclosure

- No real or apparent relationships to report

OBJECTIVES

Imaging features and management of various urgent/emergent breast findings

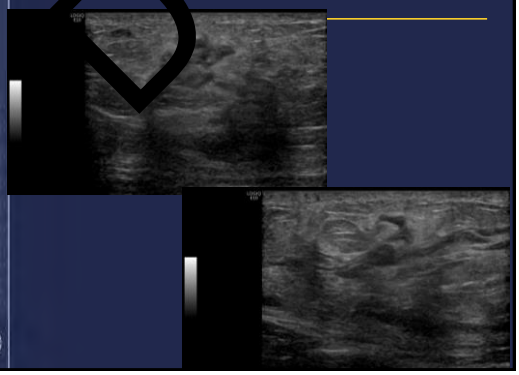
- **Mastitis and Abscess**
  - **Puerperal**
  - **Non-puerperal**
- **Inflammatory breast cancer mimicking mastitis**
- **Post biopsy complications**
  - **Hematoma**
  - **Pseudoaneurysm**
- **"Do not touch" lesion**

Mastitis

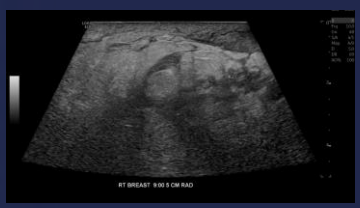
- Inflammation of the breast may be infectious or non-infectious
- S. aureus most frequent cause when infectious
- Local symptoms: unilateral pain, redness, warmth
- Systemic symptoms: flu-like symptoms including fever, chills, body ache
- US findings: dilated ducts, heterogeneous tissue from edema and no fluid collection

1. Spencer, J.P., *Management of mastitis in breastfeeding women.* Am Fam Physician, 2008. **78**(6): p. 727-31.
2. Trop, I., et al., *Breast abscesses: evidence-based algorithms for diagnosis, management, and follow-up.* Radiographics, 2011. **31**(6): p. 1683-99.

36-year-[illegible] woman [illegible] 4 da[illegible] of right breast pain and erythema



Different patient with diffuse edema and no fluid collection

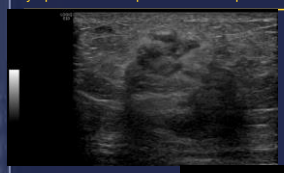


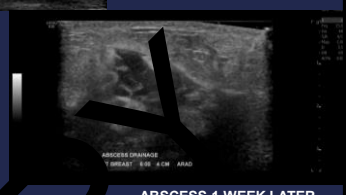
Puerperal/Lactational Infections

- Occur in lactating women within 3 months of childbirth
- Affect 1-9% of nursing mothers
- Retrograde travel of bacteria through cracked nipples
- Encourage nursing frequently
  - Lactation causes vasodilation improving BF
  - Milk flow flushes out infecting organisms

1. Cantlie, H.B., *Treatment of acute puerperal mastitis and breast abscess.* Can Fam Physician, 1988. **34**: p. 2221-6.
2. Mahoney, M.C. and A.D. Ingram, *Breast emergencies: types, imaging features, and management.* AJR Am J Roentgenol, 2014. **202**(4): p. W390-9.

36-year-old woman with history of mastitis returns with worsening of symptoms. 8 cc of purulent fluid aspirated and sent for gram stain, C & S

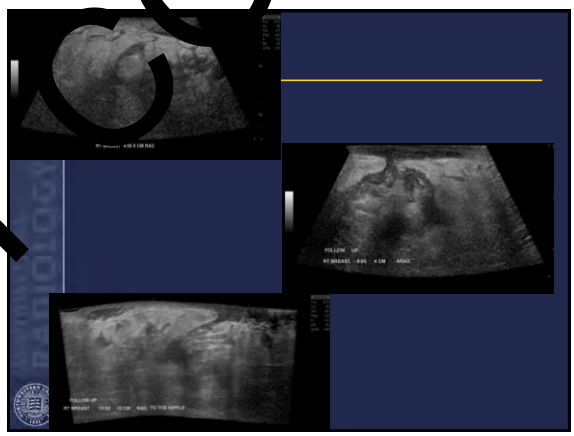




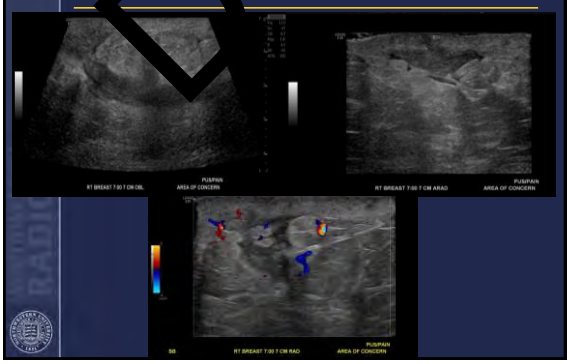
Non-Puerperal Infections

- May be mastitis or abscess
- Location: subareolar or peripheral
- Associated with DM, smoking, obesity
- Difficult to treat, with recurrences in 25-40% of women
- Cutaneous fistulas in 1/3 of women

1.Bharat, A., et al., *Predictors of primary breast abscesses and recurr… …2-6.
2.Trop, I., et al., *Breast abscesses: evidence-based algorithms for diagn… …raphics, 2011. **31**(6): p. 1683-99.



52 y/o w… a palpable mass

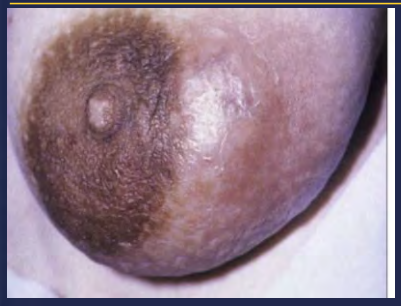


Abscess

- Complication of mastitis
  - Infected area of the breast is walled off
- Collection of infected fluid or pus
- Not related to breast cysts
- Same symptoms as mastitis + palpable mass
- Treatment: percutaneous drainage and antibiotics

1.Cantlie, H.B., *Treatment of acute puerperal mastitis and breast abscess.* Can Fam Physician, 1988. **34**: p. 2221-6.
2.Trop, I., et al., *Breast abscesses: evidence-based algorithms for diagnosis, management, and follow-up.* Radiographics, 2011. **31**(6): p. 1683-99.

Abscess



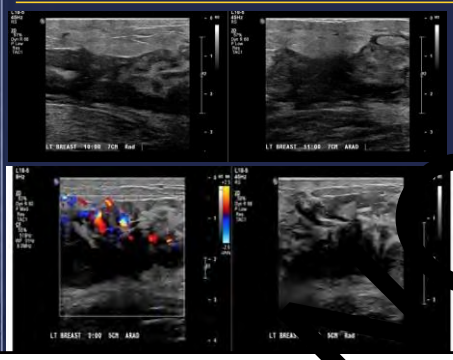
Mansel RE, Webster DJT, Sweetland HM, Hughes, Mansell, & Webster's Benign Breast Disorders, London, 3rd ed.WB Saunders (Elsevier), 2009

Abscess: Imaging Features

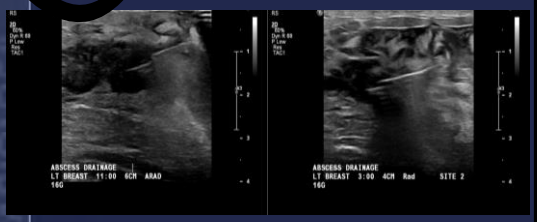
- Hypoechoic collection
- May have mobile internal debris, some acoustic enhancement
- Often multiloculated
- No internal color doppler flow
- Periphery is usually thick, echogenic and hypervascular

1.Mahoney, M.C. and A.D. Ingram, *Breast emerge... imaging features, ...nagement.* AJR Am J Roentgenol, 2014. **202**(4): p. W390-9.
2.Trop, I., et al., *Breast abscesses: evidence... algorithm... diagnosis, management, and follow-up.* Radiographics, 2011. **31**(6): p. 1683-98.
3.Ulitzsch, D., M.K. Nyman, and R.A. ... *Breast absce... lactating women: US-guided treatment.* Radiology, 2004. **232**(3): p. 904-9.

Breast Abscess



Confirmed abscess, resolved on follow up



US-guided Abscess Aspiration

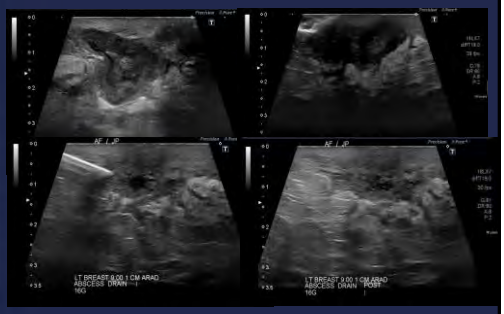
- First line treatment for an abscess, along with antibiotics
- Local anesthesia 1-2% lidocaine
- Aspirate with 18, 16, or 14G needle
- If pus very thick, liquefy with saline or lidocaine
- Send for microbiology (gram stain, culture and sensitivity) to help direct antibiotic therapy
- Indwelling catheters not favored

Hook GW, Ikeda DM. Treatment of breast abscesses with US-guided percutaneous needle drainage without indwelling catheter placement. **Radiology** 1999; 213(2):579–582.

Aspiration vs Surgical drainage

- Efficient
- Less invasive
- Less costly
- <1% complication rate
- Faster recovery time
- Minimal to no scarring
- No interruption of breast feeding
- Reserved for multiple failed aspirations, multiloculated collections or fistulas

Breast edema surrounding an irregular fluid collection with posterior enhancement characteristic of a retroareolar abscess.

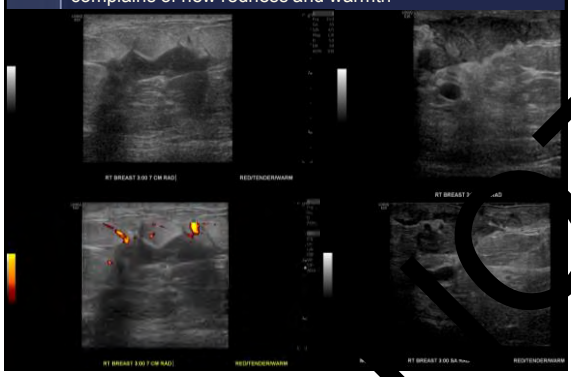


Chronic Granulomatous Mastitis

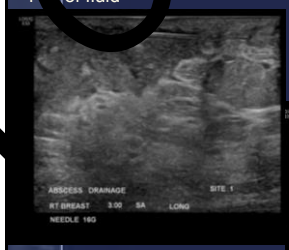
- Non-infectious inflammatory process affecting parous women of child-bearing age with history of lactation
- Usually presents as a tender, palpable, unilateral breast mass
- Sterile abscesses and sinus tracts common
- Non-necrotizing granulomas on core needle biopsy
- Oral corticosteroids first line of therapy

Pluguez-Turull, C.W., et al., *Idiopathic Granulomatous Mastitis: Manifestations at Multimodality Imaging and Pitfalls.* Radiographics, 2018. **38**(2): p. 330-356.

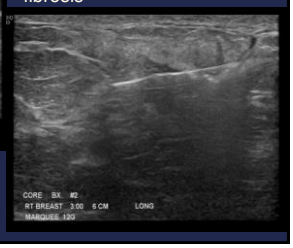
32 yo with an intermittently palpable mass for 4 months complains of new redness and warmth



Aspiration yielded only 1 cc of fluid



Core needle biopsy yielded breast tissue with granulomas, histiocytic reaction, acute and chronic inflammation, and fibrosis

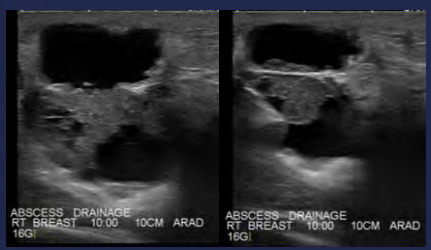


Mimicker- Inflammatory breast cancer

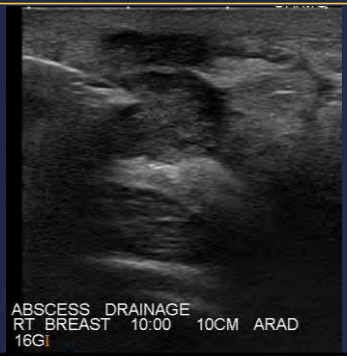
- Differential diagnosis includes IBC
- Can be difficult to differentiate on PE and imaging
- IBC generally less painful than mastitis
- Skin changes usually more focal in mastitis and generalized in IBC
- Follow-up after initial trial of antibiotics
- If persistent, consider mammography and core needle biopsy

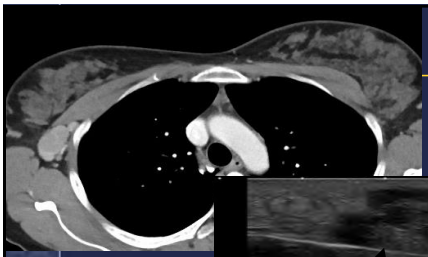
Apple SK, Bassett LW, Poon CM. Invasive ductal carcinomas. In: Bassett LW, Mahoney MC, Apple SK, D'Orsi CJ, eds. Breast imaging. Expert Radiology Series. Phil
Trop, I., et al., *Breast abscesses: evidence-based algorithms for diagnosis, management, and follow-up.* Radiographics, 2011. **31**(6): p. 1683-99.

35 yo with redness for 1 week



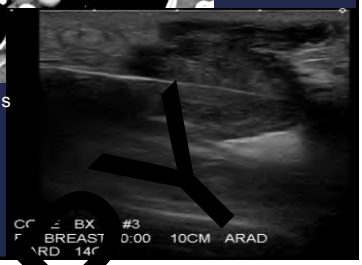
1-2 cc of fluid aspirated and follow up was recommended



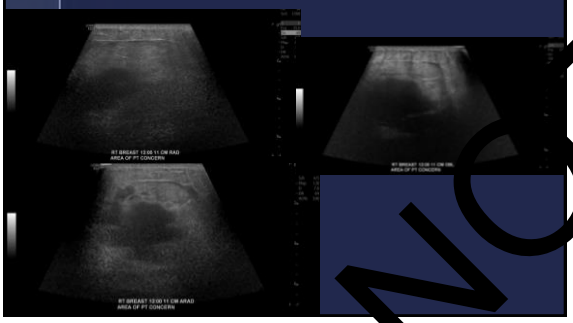


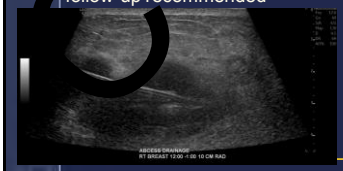
5 months later

Core biopsy yields Invasive Ductal Carcinoma

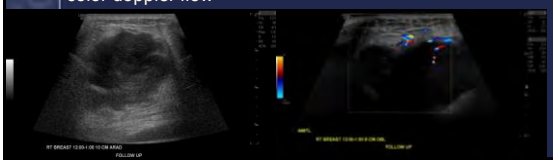


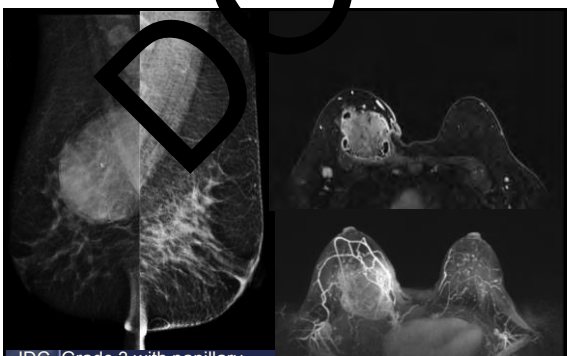
40-year-old female with a 6-day history of pain and redness in the right breast. On Augmentin for 2 days.





Follow-up US demonstrates a persistent mass with internal color doppler flow





IDC, Grade 3 with papillary features and necrosis

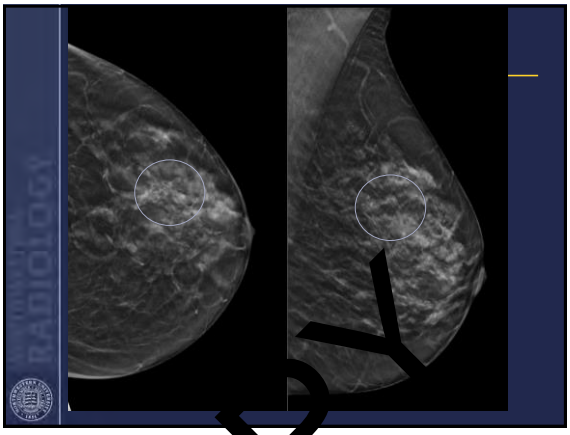
Post-biopsy Hematoma

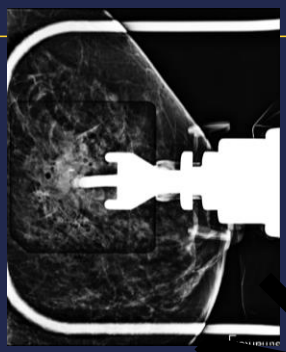
- Hemostasis usually achieved after 5-10 min of compression at the biopsy site
- Excessive bleeding can occur if hemostasis not achieved in this time
- Mammography: New focal asymmetry at the biopsy site
- US: Hematoma may appear as a hypoechoic fluid collection or complex mass

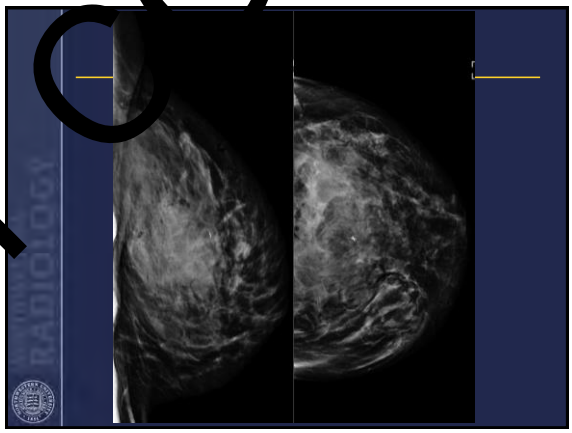
Post-Biopsy Hematoma

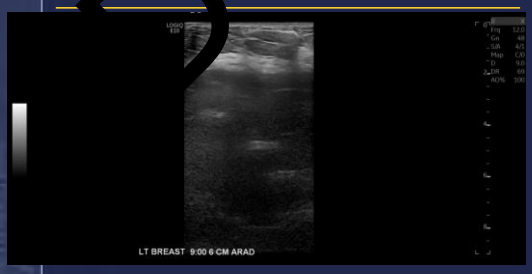
- Incidence of post biopsy hematoma is less than 1%
- NOT affected by coagulation status
- While anti-coagulants associated with bruising, no sig diff in clinically significant hematoma formation
- Consider risk/benefit of discontinuing anti-coagulation esp in patients with a-fib, mechanical valve, recent thromboembolic event or stent placement

1. Somerville P, Seifert PJ, Destounis SV, Murphy PF, Young W. Anticoagulation and bleeding risk after core needle biopsy. AJR 2008; 191:1194–1197
2. Chetlen AL, Kasales C, Mack J, Schetter S, Zhu J. Hematoma formation during breast core needle biopsy in women taking antithrombotic therapy. AJR 2013; 201:215–222









Post-Biopsy Hematoma

- Injecting lidocaine with epi causes vasoconstriction and can slow bleeding
- If vacuum biopsy, aggressive vacuum suctioning can help slow bleeding
- Firm manual pressure for 15-20 minutes
- Pressure bandage such as an ace wrap
- Very rarely surgical consultation for ligation of a bleeding vessel or evacuation of a hematoma

Pseudoaneurysm

- PSA is a hematoma that communicates with the vessel lumen
- Contains the flowing blood but lacks the 3 layers of the arterial wall
- Most post-traumatic or post-biopsy
- Excessive bleeding/hematoma formation noted at time of biopsy
- Palpable pulsatile mass, often with bruising

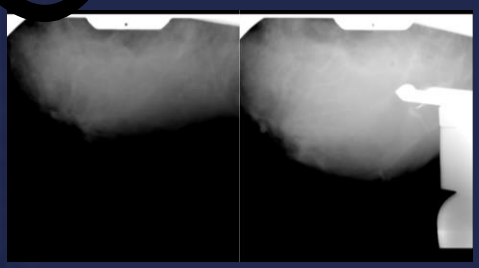
Pseudoaneurysm

- Mammography
  - Circumscribed mass adjacent to a blood vessel
- US
  - anechoic mass with an echog nic rim
  - neck of the PSA connects to a acent artery
  - Classic yin-yang pattern o flow

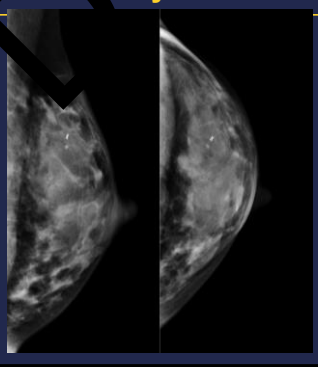
Pseudoaneurysm

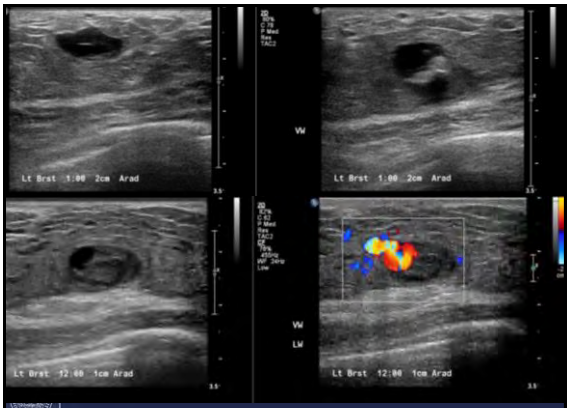
- Treatment
  - Manual compression at the neck of the PSA for 30-60 min
  - Assess resolution of flow on doppler imaging and ensure continued thrombosis with f/u in 2-7 days
  - If compression fails, injection of thrombin/alcohol or embolization

Pseudoaneurysm

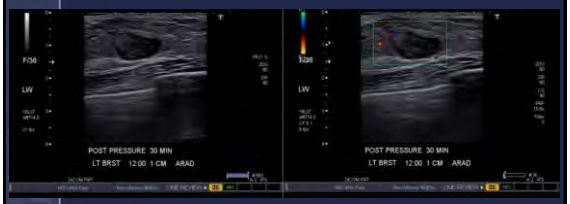


Pseudoaneurysm





Post-compression US



"Do not touch" lesions: epidermal inclusion cysts and sebaceous cysts

- Epidermal inclusion cysts (EIC) and sebaceous cysts are not readily distinguishable
- EIC arise from the uppermost portion of the hair follicle and contain keratinous material
- Sebaceous cysts arise from the outer root sheath of the hair follicle
- Usually circumscribed masses with a skin punctum

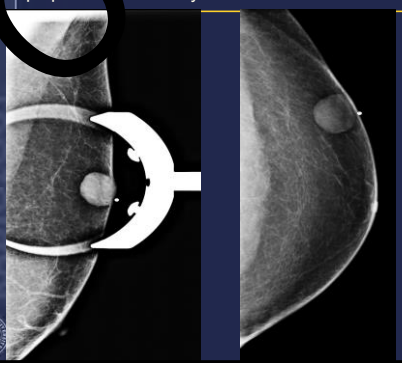
Giess, C.S., S. Raza, and R.L. Birdwell, *Distinguishing breast skin lesions from superficial breast parenchymal lesions: diagnostic criteria, imaging characteristics, and pitfalls.* Radiographics, 2011. **31**(7): p. 1959-72.

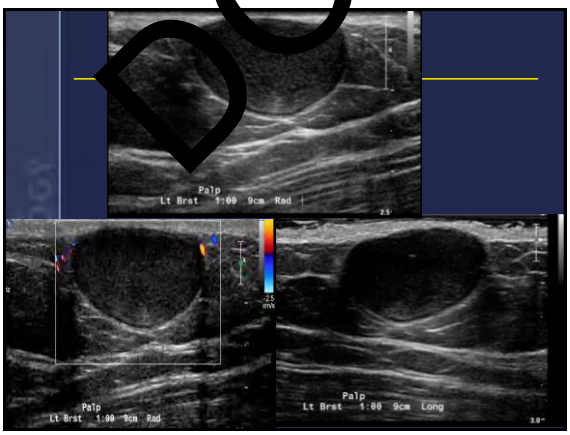
"Do not touch" lesions: epidermal inclusion cysts and sebaceous cysts

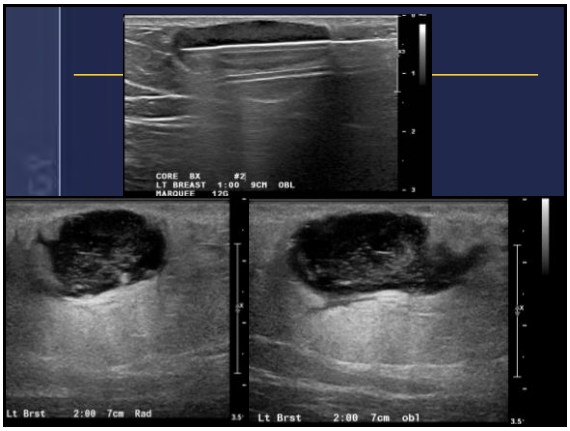
- Inflamed EIC and sebaceous cysts may be ill-defined with surrounding vascularity
- Needle biopsy should be avoided as rupture may cause inflammatory reaction
- If inflammation suspected, recommend clinical and imaging follow-up
- If indeterminate, refer to surgery or dermatology for excisional biopsy

Giess, C.S., S. Raza, and R.L. Birdwell, *Distinguishing breast skin lesions from superficial breast parenchymal lesions: diagnostic criteria, imaging characteristics, and pitfalls.* Radiographics, 2011. **31**(7): p. 1959-72.

35-year-old female patient with a superficial palpable abnormality in the left breast







Summary

- Symptomatic lactating patients should be seen urgently and evaluated with US
- If mastitis, treat with antibiotics and recommend follow-up ultrasound in 1-2 weeks
- If abscess, aspirate and send for gram stain, C & S
- Beware of inflammatory breast cancer mimicking mastitis
- Hematomas and pseudoaneursyms may be post-procedure complications
- Avoid needle biopsies in suspected epidermal inclusions cyst or sebaceous cysts