Modern Management of Acute Breast Pathology

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Breat Pathology for ACS Surgeons

- The two general pathologies that ACS surgeons encounter are mastitis and breast abscesses.
- Mastitis is inflammation of the breast tissue with or without an infectious component.
- Breast abscesses will develop from infective mastitis or cellulitis when treatment is delayed or in cases of bacterial resistance to antibiotics.
- Ultrasound is the most effective tool to differentiate mastitis from a breast abscess.

Mastitis

Demographics

- Lactational mastitis (LM) and nonlactation mastitis (NLM) have different characteristics.
- LM usually presents in the first three months of breast feeding. LM will become infective because of stagnation of breast milk flow and the presence of bacteria in the milk.
    - Infective LM is often caused by *Staphyloccus* infections. It is estimated to occur in 2 to 10% of breastfeeding women. The risk of LM is higher in women who have previously had LM.
- NLM incudes periductal mastitis and idiopathic granulomatous mastitis.
    - In periductal mastitis, the inflamation effects the subareolar ducts. It is most commonly seen in women who smoke. Periductal mastitis is associated with squamous metplasia and may be the result of inflammation from the disease process.
    - Idiopathic granulomatous mastitis is a benign inflammatory disease that may present with multiple peripheral breast infections. Skin inflammation with ulceration can also occur.

Clinical Presentation [i]

- LM presents as a red, tender, swollen breast with skin warmth. The engorgement of this tissue is from inadequate drainage of breast milk.

    - Infective LM has the above symptoms with fever > 38.30 C, myalgia, chills, malaise, and flu-like symptoms.
- NLM presents with periareolar inflammation and abscesses that spontaneously drain at the edge of the areola.
- Mastitis is considered Grade I on the AAST EGS grading scale for breast infections (*Table 1*).

Evaluation/Diagnostics/Imagining

- Diagnosis of mastitis is usually made on physical examination. Laboratory examination is not usually necessary.
- Ultrasound is used to look for drainable collections.

Role of Conservative Management

- All patients should receive supportive care (analgesia +/− warm compress).
- LM and NLM can be treated emperically. Oral medications are usually used in the outpatient setting. A**ntibiotics** effective against Staphylococcus aureus (e.g., dicloxacillin, cephalexin) are preferred. As methicillin-resistant S. aureus becomes more common, it is likely to be a more common cause of **mastitis**, and **antibiotics** that are effective against this organism may become preferred.
- First line would be amoxicillin-clavulanate 875 mg PO BID for 10-14 days.
- If symptoms fail to clear within 48-72 hours, ultrasound of the breast should be performed to rule out an abscess.

Breast Abscess

Demographics

- Breast abscesses will develop from infective mastitis or cellulitis when treatment is delayed, or in cases of bacterial resistance to antibiotics.
    - The incidence of abscess in the lactating female ranges from 0.4 to 11 percent.

    - The risk factors for abscess formation in lactating patients include age >30, first pregnancy, gestational age >41 weeks, and smoking.
    - Non-lactating absecesses were associated with African-American ethnicity, obesity, and smoking.
- Breast abscesses develop as a complication of mastitis in 5%–11% of cases, generally in the first 12 weeks after birth or at the time of weaning, and are referred to as puerperal or lactational abscesses.

Clinical Presentation

- LM abscesses present as a red, tender, swollen breast with localized induration. They may also have spontaneous drainage from the nipple.
- Patients can have systemic symptoms of fever, nausea, vomiting.
- A lactation history is helpful, these often occur when the patient is weaning or returning to work.
- In a study of 73 breast abscesses that manifested as a palpable mass, Leborgne and Leborgne reported that 80% of the masses were painful and 71% were associated with overlying skin redness; fever was documented in only 12% of women.[1]
- Breast abscess is considered Grade II or higher on the AAST EGS grading scale for breast infection (*Table 1*).

Evaluation/Diagnostics/Imagining

- **Ultrasound is the gold standard in evaluation.**
- Mammography is recommended to exclude malignancy in women presenting outside the peripartum period, but some authors recommend it in all women older than 30 years.
- Mammography should also be considered in breast-feeding women when the clinical course is prolonged.
- Whenever possible, it is suggested that mammography be delayed until after the acute episode due to patient comfort.

Pre-intervention Preparation for a Breast Abscess

- Treatment strategies for a breast abscess have been changing. Current options include antibiotics and aspiration (with or without ultrasound guidance).
    - Incision and drainage (with or without antibiotics) is often saved for second-line approach or in complicated cases.
- Traditional treatment with surgical incision and drainage is no longer recommended as a first-line approach.
- The best results with aspiration are achieved in abscesses that measure less than 3 cm, although a trial of US-guided drainage is recommended for abscesses of ALL sizes that do not have overlying skin necrosis.[1-3]
- This technique has overall better cosmesis and has been reported to be sucessful.

Operative technique/planning

- Aspiration should be done with 14G or 18G needle.
- In dwelling catheter can be considered for abscesses bigger than 3 cm but in general should be avoided, as the success rate of repeated drainage is as good as that of catheter drainage.
- Most published protocols describe irrigation with dilute local anesthethetic or saline within the abscess cavity to break up thick purulent material. There is no comparison data to confirm the effectiveness of this technique.
- Aspirated material should be sent for gram stain and culture.
- Authors have reported repeating aspirating abscesses up to 5 times before resorting to open drainage. The success rate vary accroring to the types of abscess but in general more than 50% will resolve with a single aspiration and 75% will resolve with a second aspiration.[1-3]
- In a study of patients who mostly (86%) had nonpuerperal abscesses, Imperiale et al reported a median of two aspirations (range, one to five) for collections less than 3 cm

and a median of 3.5 aspirations (range, one to seven) for those larger than 3 cm, with a 96% success rate.[4]

- Multiloculated and larger abscesses (the most common size cutoff is 3 cm) are more difficult to treat and associated with an approximately 50% rate of failure to cure with aspiration.
- Incision and drainage should be used if there is skin necrosis over the abscess or the patient has failed mutliple aspirations[3-5].

Incision and drainage techniques

- Langer's lines should be considered when planning the incision site.
- The excision of tissue should be limited to only the necrotic portions.
- Once the incision is made and a specimen for gram stain and culture has been sent, the wound should be thoroughly irrigated and inspected to ensure that no loculations were left undisturbed.
- Most authors suggest sending a specimen for pathological evaluation to rule out cancer.
- There is considerable variation in practice as to packing the wound, leaving a small drain, or even some advocating closing the incision.

Postoperative Management

- In lactating patients, breast feeding should continue to prevent engorgement of tissue in patients treated by aspiration or incision and drainage.
- Cessation of breast-feeding is necessary only when treatment with an antibiotic contraindicated for the newborn is prescribed (eg, tetracycline, ciprofloxacin, or chloramphenicol) or if surgical drainage is performed.
- Follow up in 2 week intyervals for repeat ultrasound until normalized
- Repeat aspiration is the standard for recurrnet collections.

Antibiotic Coverage

- *Staphylococcus aureus* is by far the main pathogen, other microorganisms can be encountered.

- Treatment with antibiotics should always be offered in addition to percutaneous drainage. Good first-line antibiotic options include 500 mg of cloxacillin administered orally four times daily for 7–10 days. Alternatives are 300 mg of clindamycin administered four times daily, 500 mg of erythromycin administered three times daily, or 500 mg of cefazolin administered four times daily. Some authors suggest adding 500 mg of metronidazole administered three times daily from the onset in the treatment of nonpuerperal abscesses.
- The length of treatment with repeated aspiration varies vastly in the literature. Most authors would recommend 7-14 days.
- There is insufficent data to determine if antibiotics should be added when incision and drainage is pursued. This decision should be made on a case-by-case basis.

Complications

- Central nonpuerperal abscesses are the most difficult to treat, with a chronic clinical course. Recurrences occur in 25%–40% of women, with formation of cutaneous fistulas in one-third of women.
- Risk factors for recurrent infection are nonlactational abscess, diabetes, and smoking.
- Galactoceles, or milk retention cysts, can for after lactation mastitis.

Neoplastic Consideration

- When a patient presents with erythema and swelling but no abscess is identified at US, inflammatory carcinoma should be considered, particularly in older and nonlactating women. Some physicians suggest an initial trial of antibiotics. Nevertheless, additional investigations including mammography and biopsy should be promptly performed to differentiate between infection and malignancy, depending on the clinical context (nonpuerperal setting, family history of breast cancer).

Noninfectious Inflammatory Processes

- Breast involvement by less common inflammatory processes must also be considered in the differential diagnosis of a breast abscess. Immunologic diseases—Churg-Strauss syndrome, amyloidosis, Wegener granulomatosis, sarcoidosis, and diabetic mastopathy—rarely involve the breast, but when they do, breast involvement is not the first manifestation of the disease.
- Inflammatory diseases of unknown origin may also affect the breast, but again rarely in an isolated fashion. For example, necrobiotic xanthogranulomatosis predominantly involves the subcutaneous fascia.

ACS Limitations/Indications for Referral

- Literature would say that >85% of abscesses should resolve with 3 aspirations.[1-4] Patients exceeding that number should be referred to a breast surgeon before proceeding with open drainage.
- Patients with nonpeureral abscess and residual hypoechoic areas should be refrred to a breast surgeon for core biospy.
- Patient with microcalcificatiosn on mammogram in the evalaution of non-resolving mastitis should be refrred to a breast surgeon for further evalaution.

Table 1. AAST EGS Grading Scale for Breast Infection:

AAST Grade	Description	Clinical Criteria	Imaging Criteria (U/S or CT)	Operative Criteria	Pathological Criteria
I	Breast cellulitis	Erythema, induration, edema, pain, tenderness	Inflammation without fluid collection	N/A	N/A
II	Simple abscess	Single, small abscess without loculation; not involving the nipple/areolar complex	Single well-circumscribed fluid collection within breast tissue, not involving nipple/areola complex	Single, well-circumscribed fluid collection within breast tissue, not involving nipple/areola complex	Acute inflammation limited to breast tissue
III	Complex abscess	Large abscess with multiple loculations, multiple abscesses, or abscess involving nipple/areolar complex; lymphadenopathy	Multiple separate fluid collections or single large collection with multiple loculations within breast tissue or involvement of nipple/areolar complex	Multiple separate fluid collections or single large collection with multiple loculations within breast tissue or involvement of nipple/areolar complex; enlarged lymph nodes	Acute inflammation limited to breast tissue with cultures positive for organism if available
IV	Breast abscess with axillary extension	Breast abscess with ipsilateral lymphadenopathy, thrombophlebitis, lymphangitis	Fascial plane thickening with enhancement; evidence of lymphadenopathy on US or CT	Above, plus axillary fluid collections, extension of inflammatory changes well beyond the abscesses	Acute inflammation limited to breast tissue with cultures positive for organism
V	Breast abscess with chest wall involvement	Above, plus erosion into chest wall muscles or ribs or pleural space, or necrotizing fasciitis	Above, plus inflammatory changes in the chest wall muscles, ribs or pleural space	Above, plus erosion into chest wall muscles or ribs or pleural space, or necrotizing fasciitis	Acute inflammation involving chest wall fascia , muscle, or ribs with or without necrosis and cultures positive for organisms

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