

An Overview of Breast Emergencies and Guide to Management by Interventional Radiologists

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A review of breast and emergencies may seem mutually exclusive of one another, but breast interventions beyond pathologic diagnosis are encountered and may be urgent. Acute breast situations that can potentially require interventional techniques to resolve include abscess or complications from percutaneous biopsy or trauma such as hemorrhage or pseudoaneurysm. Acute breast interventions are not commonly seen, but a working knowledge of the various treatment approaches and management is important. These entities can be similar to other areas of the body, but there are some specifics to the breast that can allow for optimal treatment and management.
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Abscess

Overview

One of the more common emergent breast pathologies encountered by the interventionalist is breast abscess. A breast abscess is usually a complication of infectious mastitis.¹ Mastitis is an inflammation of the breast, most commonly caused by *Staphylococcus aureus*.^{1,2} As mastitis progresses to an abscess, a defined collection of infected fluid or pus forms. Mastitis and abscess are broadly categorized as either lactating or nonlactating. Lactating mastitis or abscess usually occurs in younger patients, within 3 months of childbirth, whereas nonlactating mastitis or abscess is usually seen in older patients.¹ Abscesses are also encountered in the recently postoperative patient population, whether from mastectomy, lumpectomy, or reconstruction. Yet another group is those with posttraumatic hematoma that later becomes superinfected.

Clinical Evaluation

The initial clinical presentation for both mastitis and abscess is focal inflammation, including pain, warmth, and erythema. More generalized symptoms include fever, headache, fatigue, and body aches.² A clinically palpable

mass can occur with both mastitis and abscess but is suggestive of abscess.¹ The location of the infection can suggest the etiology and also gives clues as to the potential effectiveness of different types of treatment. Inflammation or abscess at or near the site of a surgery is usually a postsurgical complication. A site of known trauma that demonstrates progressive worsening is suggestive of superinfection. Subareolar location is associated with duct ectasia and chronic ductal obstruction. Subareolar infections have a reputation for being difficult to treat, with a high failure rate requiring multiple interventions and not uncommonly surgical excision for complete resolution.¹

Imaging

Imaging evaluation of an abscess is primarily by ultrasound. Ultrasound characteristics of an abscess include a focal collection of variable shape and size, often with posterior acoustic enhancement. The collection is usually hypoechoic, but hyperechoic mobile debris, internal septations, and air with dirty shadowing can be seen in the collection (Fig. 1). The associated inflammation can lead to a thick echogenic rim and increased vascularity surrounding the collection on color flow imaging, but there is no internal vascularity.^{1,3-5} Alternatively, findings of tissue heterogeneity and dilated ducts without a focal fluid collection are consistent with mastitis rather than abscess. A breast abscess can also be identified by computed tomographic (CT) or magnetic resonance imaging (MRI) as a rim-enhancing fluid collection. Although neither modality would be first line, an abscess could incidentally

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Figure 1 Ultrasound image of a hypoechoic abscess with layering mobile debris in the right breast.

be identified on an emergent CT or as a postbiopsy or implant complication on MRI. Regardless, a sonographic correlate should be identified, as image-guided treatment is typically guided by ultrasound. Mammography should also be pursued in any case that does not resolve after adequate treatment, to exclude underlying malignancy. Histologic diagnosis should be performed if suspicious findings such as microcalcifications are identified or if symptoms do not resolve despite treatment.^{1,6}

Treatment

Oral antibiotics should be included in the treatment of any abscess. Antibiotics should be tailored based on cultures of abscess aspirate material but are often begun empirically.¹ Some empiric choices include dicloxacillin 500 mg orally 4 times daily or cephalexin 500 mg orally 3 times daily. For patients with a penicillin allergy, options include clindamycin 300-450 mg orally 4 times daily, doxycycline 100 mg orally twice daily, or trimethoprim-sulfamethoxazole 160/800 mg orally twice daily. However, doxycycline should not be given if the patient is breast-feeding, and trimethoprim-sulfamethoxazole should not be taken if the breast-fed infant is younger than 2 months.

Aspiration

Ultrasound-directed aspiration is the first-line interventional treatment for breast abscess. Abscesses less than 3 cm in size have the highest success rate, but aspiration should be attempted with all sizes.^{1,4} Equipment includes a high-frequency ultrasound probe (7.5-12 MHz), local anesthetic, 18- or 16-gauge needles or both, syringe, and saline flushes. Standard size needles usually suffice, but longer spinal needles may be necessary in a larger breast with a deeper collection. Depending on the size of the collection, a stopcock and tubing may also be beneficial. For abscesses larger than 3 cm, direct instillation of an injectable antibiotic suspension into the abscess cavity can be beneficial. Ice pack and positioning wedge can aid in patient comfort and optimal positioning.

The patient is positioned supine and a positioning wedge cushion can add obliquity that will allow an optimal approach to the abscess. The nipple and areola should be avoided. Breast abscesses are usually very tender. An ice pack can be applied before any intervention for pain relief and numbing. A local anesthetic such as lidocaine should be administered before aspiration with generous anesthetic applied to the abscess capsule. An 18-gauge needle is advanced into the collection with ultrasound guidance utilizing an oblique tract to reduce fistula formation.⁴ The fluid is completely aspirated. A larger gauge needle may be needed for thicker more purulent collections to completely drain the cavity.^{4,5} If the collection is large, the aspirate can be siphoned away with a stopcock and tubing without having to lose initial access to the collection. The aspirate should always be sent for microbiological analysis to help direct antibiotic therapy.^{1,3-5} The cavity is flushed with saline until the aspirate is clear. Antibiotics can be directly instilled into the cavity, which has shown a higher success rate, particularly in patients with abscesses larger than 3 cm.¹ Some examples include cephadrine 1 g or gentamicin 40-160 mg, depending on the size of the collection.¹ Intracavitary infusion of antibiotics can also be done if follow-up aspiration is needed, using culture results to guide antibiotic choice.⁴

Clinical and ultrasound follow-up is performed at intervals of 7-14 days with continued oral antibiotics until symptoms resolve. Given the high success rate for lactating abscesses, clinical follow-up alone can be done with ultrasound only if symptoms recur or worsen.¹ Aspiration can be repeated several times if the abscess persists on follow-up examinations, with some researchers suggesting up to 5 repetitions before pursuing alternative treatment.^{1,4,5} Success rates for percutaneous aspiration ranges from 54%-100%.¹

Catheter Placement

When aspiration fails, or in the setting of larger abscesses, another treatment option is the placement of an indwelling catheter. Necessary equipment is similar to that required for aspiration, with the addition of a no. 11 blade, 5-8-F catheter with introducer of choice, and a retention device. There are a variety of catheter and introducers to choose from, including a peel-away sheath needle with catheter; the trocar technique with catheter, cannula, and needle combined; and the more traditional Seldinger technique with needle access followed by wires, dilators, and catheter placement. Given the generally superficial location of a breast abscess, the peel-away sheath needle and catheter, or trocar technique usually suffice and reduce the multiple steps and equipment needs of the Seldinger technique.

Positioning, ice pack, and local anesthesia are similar to the aspiration technique. The nipple and areola, as well as the infected area, should be avoided for entry of the catheter. Final position of the external drainage catheter may dictate the approach, but a longer path to the abscess can potentially transect more ducts. This is of particular concern in a lactating female in whom a milk fistula would ultimately lead to cessation of breast-feeding. This possibility should be included in the informed consent process.

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