SKIN

BRIEF ARTICLE

Atypical Breast Abscess in Pregnancy: A Case of *E. coli* and *E. faecalis* Co-Infection

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ABSTRACT

Introduction. Mastitis is a common type of breast tissue inflammation in women and is typically self-limited. In rare occurrences, it can progress to abscess formation involving *Staphylococcus aureus*, *Streptococcus* species, and anaerobes. This case presents an atypical progression of mastitis with abscess formation involving multidrug-resistant *Escherichia coli* and *Enterococcus faecalis*, highlighting a unique dermatologic presentation of a somewhat common soft tissue infection.
Case Presentation. A 36-year-old woman at 36 weeks gestation presented with unilateral localized tenderness, erythema, and induration. Initially diagnosed with mastitis at 10 weeks gestation, she was treated with cephalexin after culture confirmed *Staphylococcus aureus.* However, her lesion evolved to purulent nipple discharge associated with intense tenderness and diffuse erythema of the breast. Repeat cultures identified *Escherichia coli* and *Enterococcus faecalis*, with resistance to several first-line agents, posing a therapeutic challenge.
Discussion. Breast abscesses in pregnancy are rare, especially those involving gram-negative or enteric flora. The unusual resistance profile further complicates management. Though mastitis is commonly treated with antibiotics, abscesses often require drainage prior to complete resolution. This case highlights the importance of maintaining a broad differential in breast infections while utilizing culture-directed therapy in guiding treatment and preventing complications, particularly in pregnant patients where antibiotic options are limited.
Conclusion. This case illustrates the challenges associated with diagnosing and managing atypical breast abscesses. A broad differential diagnosis, paired with early culture and sensitivity testing, is critical for initiating targeted therapy and optimizing patient outcomes.

INTRODUCTION

Mastitis, defined as inflammation of the breast tissue, most commonly arises due to infection and is frequently encountered during the postpartum and breastfeeding periods. It typically results from milk stasis and nipple trauma, facilitating bacterial entry into the ducts and adjacent tissues. If left untreated, mastitis can progress to localized suppuration and abscess formation,

representing a more severe stage of infection.[1-4]

A breast abscess is a localized collection of pus within the breast tissue and can be categorized into three types: lactational, non-lactational, and the rare idiopathic granulomatous type. While more common in lactating women, breast abscesses are also observed in non-lactating women and, less frequently, in men. Clinically, patients present with warmth, redness, and/or pain in the affected breast, with occasional systemic symptoms such as fever, depending on the severity of infection.[1-4]

The development of abscesses differs between the two major types. In lactational abscesses, lactiferous ducts undergo epidermalization or squamous metaplasia during lactation, leading to keratin production and potential ductal obstruction. This creates a nidus for infection, and if prolonged, subsequent abscess formation. These abscesses are often precipitated by nipple trauma or milk stasis, such as during breast engorgement or duct ectasia. The bacterial etiology is most commonly attributed to *Staphylococcus aureus (S. aureus)* and *Streptococcus* species, with an increasing prevalence of methicillin-resistant *S. aureus.*[1-2]

In contrast, the etiology of non-lactational mastitis with subsequent abscess formation is less clearly defined. Chronic breast inflammation results in mammary duct dilation, plasma cell infiltration, and, in some cases, abscess development. While a bacterial infection may trigger these changes, many cases represent sterile inflammation driven by immune dysregulation, particularly via Th1 and Th17 Helper T-Cell pathways. Risk factors for non-lactational mastitis include smoking, diabetes mellitus, obesity and nipple piercing. When bacterial growth is present, mixed flora involving *S. aureus*, *Streptococcus* species, and anaerobes are commonly identified.[2,4-7]

We present a rare case of non-lactational, pregnancy-associated mastitis with subsequent breast abscess complicated by *Escherichia coli (E. coli)* and *Enterococcus faecalis (E. faecalis)* co-infection. This case highlights the need for careful clinical evaluation, microbiological assessment, and tailored management strategies in patients with refractory breast infections.

CASE PRESENTATION

A 36-year-old female, Gravida 3, Para 0, Aborta 2, presented at 36 weeks and 4 days gestation with a chief complaint of left-sided nipple discharge. Her symptoms first began at approximately 10 weeks gestation, with mild drainage from a pinpoint lesion located over the left subareolar region, slightly inferior to the site of a recently removed nipple piercing. No notable complications occurred during or immediately after the removal of the piercing.

An initial diagnosis of mastitis was made, and the patient was prescribed oral cephalexin 500 mg every 6 hours for 5 days. Four weeks later, the lesion continued to exude purulent discharge and had developed localized pruritus, overlying erythema, and induration. A sample of the discharge confirmed heavy growth of *Staphylococcus aureus*, prompting an additional course of cephalexin.

Despite antibiotic therapy, the patient experienced persistent symptoms and was referred to a breast specialist. The specialist evaluated the pathology but deemed it inoperable at that time, with no indication for drainage. The patient subsequently noted improvement and remained asymptomatic

thereafter. At 36 weeks gestation, however, she presented with worsening symptoms, reporting white subareolar nipple discharge and diffuse swelling throughout the left breast.

The patient's past medical history was notable for advanced maternal age, asthma, morbid obesity (BMI 43), chronic hypertension, herpes simplex virus type II, and prior chlamydial infection. Surgical history included a dilation and curettage procedure and two induced abortions. She reported menarche at age 14, with regular menstrual cycles every 21-32 days lasting 2-7 days.

Family history was notable for a paternal grandmother who died of breast cancer (unknown age at diagnosis). She was sexually active with one partner, used condoms for contraception, and had ceased alcohol consumption upon learning of her pregnancy. Despite counseling, she continued to smoke 6-10 cigarettes daily. She denied illicit drug or marijuana use.

On physical examination, the left breast was tender with circumferential erythema extending approximately 3 cm from the subareolar region. A prominent punctum with watery, white purulent secretion and a fluctuant base was observed. Diffuse swelling was present throughout the breast. The patient was febrile (38.2°C, 100.8°F) but all other vitals were within normal limits. She was alert and oriented to person, place, and time. Cardiovascular examination revealed a regular rate and rhythm without murmurs. Pulmonary and abdominal examinations were also unremarkable.

A culture of the nipple discharge grew heavy colonies of *E. coli* and *E. faecalis*. The *E. coli* isolate was resistant to ampicillin/sulbactam, gentamicin, and trimethoprim/sulfamethoxazole, amoxicillin/clavulanate, but sensitive to cefepime, ceftriaxone, ciprofloxacin, and imipenem. *E. faecalis* was susceptible to ampicillin and vancomycin, though extensive sensitivities were omitted from laboratory analysis. Her white blood cell count was within normal limits.

The patient was treated with oral cephalexin 500 mg every 6 hours for 10 days. She was also re-evaluated by the specialist, but no intervention was performed as ultrasound imaging did not reveal a drainable abscess. Complete resolution of symptoms was reported after completing the extended course of antibiotics. The patient subsequently delivered a healthy infant vaginally at term and successfully breastfed for five months, including the previously affected left breast. Approximately one year after the initial presentation, she reported recurrence of similar symptoms within the left breast.

DISCUSSION

Mastitis, an inflammation of the breast tissue, is predominantly infectious in etiology. Breast infections most commonly occur during the postnatal period in association with breastfeeding. The underlying pathophysiology typically involves milk stasis and nipple trauma, facilitating bacterial entry into the adjacent breast tissues.[8]

Periductal mastitis, in particular, affects non-lactating women and is especially relevant to the present case. It is thought to originate from squamous metaplasia of the ductal epithelium, leading to keratin plug formation, ductal narrowing, and subsequent upstream ductal congestion.[2] Squamous metaplasia has been associated with chronic smoking, a

significant risk factor in our patient.[9]

Abscess formation occurs when bacterial invasion isolates within the breast tissue, circumventing immune processes. The predominant organism identified in breast abscesses is *S. aureus*, which is commonly found on the skin surface of healthy individuals and contributes to pus formation. While *S. aureus* remains the most frequent pathogen, less common organisms such as *Mycobacterium fortuitum*[10] and *Neisseria gonorrhoeae*[11] have also been reported, albeit rarely in clinical practice.

Notably, a history of nipple piercings, as observed in our patient, has been recognized as a risk factor for infection with atypical organisms. Studies suggest that removal of a nipple piercing can alter normal ductal anatomy and introduce localized scar tissue, creating a nidus for bacterial entry.[9-11] In contrast to the common pathogens mentioned, our patient's culture revealed heavy growth of both *E. coli* and *E. faecalis*, highlighting the diverse spectrum of potential microorganisms involved in breast abscess formation.

Management of mastitis and breast abscesses encompasses both conservative and invasive approaches. Conservative treatment begins with the elimination of modifiable risk factors such as smoking.[9] Direct evidence linking smoking cessation to decreased disease incidence is limited once squamous metaplasia and keratin plugging have already occurred. However, cessation may lower the risk of recurrent abscess formation with the additional systemic benefits outside of the breast.[9]

Obesity also appears to play a role, as chronic low-grade inflammation and impaired immune responses seen in obese individuals may predispose to infection and impaired healing. Given our patient's morbid obesity, it is plausible that this contributed to her disease progression and recurrence risk.[7]

Antibiotic therapy remains the cornerstone of treatment. For clinically stable patients presenting with suspected breast abscess, first-line antibiotic therapy includes oral amoxicillin/clavulanic acid 625 mg three times daily for 10-14 days.[2] In cases of non-lactational mastitis, or in patients with penicillin allergies, oral clindamycin 300 mg four times daily for 10-14 days is recommended.[2,9]

When antibiotic therapy alone fails to resolve the infection, invasive measures such as ultrasound-guided needle aspiration may be employed. Aspiration allows for both diagnostic sampling and therapeutic drainage.[12-13] Compared to incision and drainage, aspiration is associated with better cosmetic outcomes and fewer complications.[14-15] However, incision and drainage may still be required for large, multiloculated, or refractory abscesses.[14] If these interventions prove ineffective, surgical excision of keratin-plugged ducts may be necessary.[9]

CONCLUSION

This case highlights the diagnostic challenges clinicians may face when evaluating non-lactational breast mastitis and/or abscess, particularly during pregnancy. The presence of atypical pathogens such as *E. coli* and *E. faecalis* highlights the importance of obtaining timely cultures and maintaining a broad differential diagnosis in patients who fail to respond to standard therapy. Given the presence of risk factors including nipple piercings, smoking, and obesity, early culture-directed treatment and individualized care strategies are

essential to optimizing outcomes, preventing future occurrences and minimizing complications.

Conflict of Interest Disclosures: None

Funding: None

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