Granulomatous Mastitis in a Transgender Patient

Kenny Q Sam¹*, Frederick J Severs¹, Lilian O Ebuoma¹, Nagi S Chandandeep², Emily L Sedgwick¹

¹. Department of Diagnostic and Interventional Radiology, Baylor College of Medicine, Houston, USA

². Department of Pathology and Immunology, Baylor College of Medicine, Houston, USA

* Correspondence: Kenny Sam, D.O., One Baylor Plaza, Houston, TX 77030, USA (Kenny.sam2@bcm.edu)

ABSTRACT

Granulomatous mastitis is a rare and benign inflammatory condition of the breast most commonly affecting women of child-bearing age as well as patients on oral contraceptives. This condition is important to identify due to its diagnostic mimicry of malicious entities such as breast carcinoma. Clinical and radiological findings are nonspecific and may overlap with breast carcinomas, thus pathologic confirmation is often necessary for definitive diagnosis. Although cases of granulomatous mastitis have been described in cisgender females, there have been no reported cases in the transgender patient, a growing patient population with few imaging guidelines. Transgender patients are at risk of developing this breast entity due to the use of long-term hormone treatments or presence of residual breast tissue. A trial of antibiotics or steroids may be administered. However, surgical treatment is often necessary in recurrent or refractory cases.

CASE REPORT

A 36 year old male-to-female (MtF) transgender patient with a history of long term hormonal treatment presented with bilateral palpable breast masses for two months. The patient had been receiving estrogen therapy for six of the past seven years in addition to an anti-androgen, spironolactone, for the past two years. There was no personal or family history of breast carcinoma, and the patient had no prior breast imaging.

A diagnostic mammogram was performed which showed a 5 mm equal density oval mass with circumscribed margins in the right breast at 11 o’clock anterior depth [Figure 1] which correlated with a palpable mass on pre-imaging clinical exam. There was no mammographic or sonographic correlate to the left breast palpable concern. Sonographic evaluation of the palpable abnormality in the right breast demonstrated a non-parallel irregular hypoechoic mass with posterior acoustic shadowing measuring 0.5 x 0.3 x 0.4 cm [Figure 2].

Histopathological examination of this mass revealed acute and chronic inflammation and histiocyte inflammation arranged in poorly formed granulomata [Figure 3]. The mass stained negative for occult epithelial cells (pankeratin immunohistochemical stain), acid-fast bacilli (AFB stain) and fungal organisms (Grocott-Gomori methenamine silver (GMS) stain). No malignancy was seen.

These findings established the diagnosis of granulomatous mastitis. The patient was seen by the breast surgeon, deferred any further treatment, and was subsequent lost to follow up.

DISCUSSION

Etiology & Demographics:

Granulomatous mastitis (GM) most commonly presents in women of child-bearing age, with a mean age of presentation of 33-38 years old, and represents 1.8% of benign breast diseases [1-8]. Although the exact etiology is uncertain, an autoimmune etiology is favored with additional associations to...
Breast Imaging: 
Granulomatous Mastitis in a Transgender Patient
Sam et al.

pregnancy and lactation [3-4, 8]. The hypothesis proposes prolonged breast-feeding results in long term distention of acini and ducts, which increases the risk of injury and rupture of these structures and causes a granulomatous response [8]. GM has also been associated with patients taking oral contraceptives [8-9], although the association with long term hormonal therapy for gender reassignment, such as in our patient, has not yet been elucidated.

Clinical & Imaging Findings:

Granulomatous mastitis has similar physical exam findings as breast carcinoma, making the clinical distinction difficult. GM most commonly present as a palpable breast mass (78-89% of cases), and less commonly with pain or tenderness (11-41%), erythema, skin thickening, sinus formation or axillary adenopathy [2, 4, 8, 10]. Symptoms frequently persist despite various treatment regimens, and may necessitate further diagnostic testing [5, 7]. GM usually occurs unilaterally without side or site predilection, although tends to spare subareolar region [4, 7-8, 11].

Many cases of granulomatous mastitis will need histopathologic confirmation following diagnostic imaging to distinguish this entity from malignancy. Core biopsy is diagnostic in 96% of women, whereas fine needle aspiration is only diagnostic in 21% [5]. Histologically, GM demonstrates nonnecrotizing noncaseating granulomas mixed with epithelioid histiocytes, multinucleated giant cells of the foreign body and of the Langerhans types confined to breast lobules [4-6, 8]. Inflammation often extends into adjacent periblobular and interlobular tissue with frequent microabscess formation and fat necrosis [5, 11]. The predominance of neutrophilic infiltrate in the background and absence of necrosis favor a diagnosis of granulomatous mastitis [4]. Cytologic examination may be unable to differentiate GM from carcinoma or other granulomatous diseases of the breast, subsequently requiring a wide breast tissue sample for differentiation [8].

Imaging characteristics of granulomatous mastitis are often nonspecific. Mammographic evaluation demonstrates variable breast density, with a 56% incidence of heterogeneously dense or extremely dense parenchymal pattern [3, 5, 7-8]. An asymmetry (44%) or irregular mass(es) (16-34%) may also be present, as well as skin thickening (7%) or axillary adenopathy (18%) [2, 5]. Calcifications are rare [7].

Sonographically, GM commonly appears as an irregular hypoechoic mass with a reported mean diameter ranging from 0.8 to 6 cm [5]. These masses may present with or, less commonly, without hypoechoic tubular extensions leading away from the mass [2-3, 5, 11], and often with posterior acoustic enhancement [8]. Perilesional echogenicity may be present, which corresponds to fibrous walls of confluent granulomas [6]. Doppler ultrasound shows increased vascularity of the lesions and surrounding tissues [7]. Yildiz et al. reported fistulae in up to 50% of patients [3].

Magnetic resonance (MR) imaging will demonstrate heterogeneous segmental T1 hypointense and T2 hyperintense signal [12]. These areas correspond to heterogeneous nonmasslike enhancement on postcontrast dynamic T1-weighted sequences with heterogeneously enhancing irregular lesions. The enhancing lesions most often demonstrate gradual enhancement and either progressive (Type 1) kinetics (50%) or plateau (Type 2) kinetics (50%) [8, 12]. Additional MR findings may also include overlying skin thickening or nipple retraction [12].

Treatment & Prognosis:

The optimal management for GM has not been established. Some studies report 50-75% complete remission in patients who did not receive any treatment [11, 13]. Often the clinical presentation is similar to that of a breast infection and abscess, and thus many suspected cases are empirically treated with antibiotics. Surgery can be therapeutic as well as diagnostic. Surgical options include local excision and abscess drainage or wide surgical excision, often dictated by the disease extent [8]. Wide surgical excision is more efficacious than local excision or incision and drainage (I&D) [5, 10], and often times, I&D may ultimately lead to a second operation after confirmation of GM is made. The efficacy of I&D is improved with post surgical steroids [5]. Complications of excisional surgery include chronic sinus formation, poor wound healing, and cosmetic disfigurement [11]. Recurrence rates for surgical excision range from 8-50% [13-14].

Nonsurgical treatments include antibiotic therapy or corticosteroids [2, 5-6, 8]. Due to the similar clinical presentation to breast infection and abscess, antibiotics are typically given as an empiric treatment, despite a 5% efficacy rate [5]. VanHouweling et al. was the first to recommend steroid therapy for the treatment of granulomatous mastitis [15]. Steroid treatments have been shown to be effective either without or with surgical excision, especially in recurrent or resistant cases [2, 8], although there is currently no consensus on the duration and dose of the corticosteroid administration. Infectious etiologies must be excluded before initiating steroids, however, due to possible exacerbating effects of steroids on infection [2, 4]. Refractory or steroid resistant cases may respond to methotrexate, hydroxychloroquine, azathioprine, and/or colchicines [2, 4, 9, 14, 16].

There are relatively few standard recommendations for breast and chest examinations in the transgender population. Mastectomy and chest contouring as part of sex reassignment may leave residual breast tissue, particularly in the axillary region [17], resulting in the possibility of developing breast pathologies in these areas. Additionally, transgender patients will receive cross-sex hormone treatments such as testosterone in the female-to-male population or estrogen and androgens in the male-to-female population, which can theoretically increase the risk of inducing hormone-sensitive cancers such as breast cancer [17-19]. In the transgender patient with prior or current history of hormone use, current guidelines advocate annual mammography beginning at 50 years old if there are additional risk factors which include...
estrogen or progestin use for >5 years, body mass index >35, and a family history of breast cancer. Clinical breast examinations are not recommended for formal cancer screening. Routine screening mammography is not recommended in transgender patients with no hormone use unless there are other risk factors, such as Klinefelter syndrome [20]. Although there are studies in the literature documenting the incidence and risks of breast cancer in the transgender population, to our knowledge, our case was the first of granulomatous mastitis in this population to be evaluated and published. Additional research on the non-malignant entities of the transgender breast should be performed to improve standard of care for this growing population.

**Differential Diagnoses:**

**Acute infectious mastitis or breast abscess**
Infectious mastitis generally occurs in younger women, often arising from secondary Staphylococcus aureus infection from skin contamination, and may develop an abscess. Risk factors include primiparity, breast feeding, obesity, smoking, and diabetes. Symptoms include skin redness, pain, and heat, and may be associated with a palpable mass. Mammography can demonstrate an asymmetry, mass or architectural distortion with overlying skin thickening, however calcifications are rare. Ultrasound evaluation of infectious mastitis shows nonspecific areas of increased echogenicity correlating with inflamed glandular and fat tissue, occasionally with prominent inflamed axillary lymph nodes. Breast abscesses may appear as multiloculated, hypoechoic collections with peripheral increased echogenicity. Treatment is often percutaneous drainage with concurrent antibiotics. Patients with granulomatous mastitis are often initially unsuccessfully treated for acute infectious mastitis [21].

**Inflammatory breast cancer**
Inflammatory breast cancer (IBC) is a rare subtype of breast cancer with characteristic dermal-lymphatic invasion. Common clinical symptoms include a rapid onset of breast erythema and edema as well as the characteristic peau d’orange dimpling of the skin. Distinguishingly, IBC will rarely present with a palpable breast mass, which is the most common clinical presentation of granulomatous mastitis. Imaging findings include skin thickening, trabecular thickening, and enlarged lymph nodes with marked cortical thickening. However IBC will less commonly present as asymmetries or masses on mammography with associated radiating hypoechoic tubular extensions on sonogram.

**Invasive breast carcinoma**
Breast cancer is the second leading cause of cancer death in women in the United States and will develop in 1 in 1000 men. Most often arising from the terminal duct lobules, the most common subtype of invasive breast cancer has a ductal component. Clinically, symptomatic patients with invasive breast cancer will most often present with a palpable mass or nipple or skin changes. Mammography may show an irregular mass with spiculated or indistinct margins, and its sonographic correlate commonly appears as an irregular, hypoechoic vascular mass often with an echogenic rim. On MR imaging, invasive breast carcinomas often present as an irregular enhancing mass or segmental area of non-masslike enhancement, which demonstrates washout kinetics (Type 3). Treatment regimen includes surgery (breast conservation with adjuvant radiation therapy versus mastectomy) and adjuvant or neoadjuvant chemotherapy. Targeted receptor therapies are also utilized as treatment.

**TEACHING POINT**
Granulomatous mastitis is a rare and benign entity that is important to consider in the transgender patient due to the history of hormone use and the diagnostic mimicry of breast carcinoma. Imaging findings are nonspecific however, most often present as asymmetries or masses on mammography with associated radiating hypoechoic tubular extensions on sonogram.

**REFERENCES**


Figure 1: 36 year old male-to-female transgender patient with granulomatous mastitis.

FINDINGS: (A) Mammographic craniocaudal view and (B) mediolateral oblique view of the right breast shows a 5 mm equal density mass in the upper outer breast anterior depth [arrows] which correlates with the palpable marker.

TECHNIQUE: (a) Digital mammogram, craniocaudal view. Tungsten anode; rhodium filter; kVp: 31; mAs: 208. (b) Digital mammogram, mediolateral oblique view. Tungsten anode; rhodium filter; kVp: 31; mAs: 178.
Etiology | Unknown; favor autoimmune
--- | ---
Incidence | 0.025%-3% of surgically treated breast disease
Gender ratio | Almost exclusively women
Age predilection | Women of child-bearing age; mean age of presentation of 33-38 years old
Risk factors | Child bearing age, oral contraceptives, recent pregnancy, lactation
Treatment | No clear consensus; surgical wide excision, steroid therapy, methotrexate, colchicine, azathioprine, expectant management
Prognosis | Benign; high rate of recurrence (16-50%)
Findings on Imaging | Mammography – focal asymmetry or mass
Ultrasound – heterogeneous hypoechoic lesions often with tubular extensions

Table 1: Summary table of granulomatous mastitis.
Granulomatous Mastitis in a Transgender Patient

<table>
<thead>
<tr>
<th>XR</th>
<th>US</th>
<th>MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granulomatous mastitis</td>
<td>- Heterogeneous or extremely</td>
<td>- Heterogeneous segmental T1</td>
</tr>
<tr>
<td></td>
<td>dense parenchyma</td>
<td>hypointense, T2 hyperintense signal</td>
</tr>
<tr>
<td></td>
<td>- Asymmetry or irregular masses</td>
<td>- Non-masslike enhancement on postcontrast</td>
</tr>
<tr>
<td></td>
<td>- Skin thickening</td>
<td>T1-weighted</td>
</tr>
<tr>
<td></td>
<td>- Axillary adenopathy</td>
<td>- Heterogeneously enhancing irregular lesions with</td>
</tr>
<tr>
<td></td>
<td>- Calcifications are rare</td>
<td>gradual enhancement without washout</td>
</tr>
<tr>
<td></td>
<td>- Irregular hypoechoic mass</td>
<td>- Skin thickening and nipple retraction</td>
</tr>
<tr>
<td></td>
<td>usually with hypoechoic tubular</td>
<td></td>
</tr>
<tr>
<td></td>
<td>extensions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Perilesional echogenicity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Vascularity of surrounding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tissues</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fistula formation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Skin thickening</td>
<td></td>
</tr>
<tr>
<td>Acute Mastitis/Abscess</td>
<td>- Asymmetric density, mass, or</td>
<td>- Heterogeneous T2 signal correlating with parenchymal</td>
</tr>
<tr>
<td></td>
<td>distortion</td>
<td>edema</td>
</tr>
<tr>
<td></td>
<td>- Calcifications are rare</td>
<td>- Rim-enhancing irregular mass</td>
</tr>
<tr>
<td></td>
<td>- Skin and trabecular thickening</td>
<td>- Skin and trabecular thickening</td>
</tr>
<tr>
<td></td>
<td>- Axillary adenopathy</td>
<td></td>
</tr>
<tr>
<td>Inflammatory breast cancer</td>
<td>- Skin and trabecular thickening</td>
<td>- Increased parenchymal echogenicity</td>
</tr>
<tr>
<td></td>
<td>- Global asymmetry</td>
<td>- Multiloculated, nonvascular, hypoechoic fluid</td>
</tr>
<tr>
<td></td>
<td>- Axillary adenopathy</td>
<td>collections</td>
</tr>
<tr>
<td></td>
<td>- Less commonly multiple masses,</td>
<td>- Skin thickening</td>
</tr>
<tr>
<td></td>
<td>calcifications or architectural</td>
<td>- Dilated lymphatics</td>
</tr>
<tr>
<td></td>
<td>distortion</td>
<td></td>
</tr>
<tr>
<td>Invasive breast carcinoma</td>
<td>- Irregular mass with spiculated</td>
<td>- Streaky T2 signal correlating with parenchymal edema</td>
</tr>
<tr>
<td></td>
<td>or indistinct margins</td>
<td>- Rapid enhancement with delayed washout; enhancing</td>
</tr>
<tr>
<td></td>
<td>- Architectural distortion</td>
<td>irregular masses, non-masslike enhancement or reticular/</td>
</tr>
<tr>
<td></td>
<td>- May have calcifications</td>
<td>dendritic enhancement</td>
</tr>
<tr>
<td></td>
<td>- Axillary adenopathy</td>
<td>- Skin thickening and enhancement</td>
</tr>
<tr>
<td></td>
<td>- Irregular, hypoechoic vascular</td>
<td>- Irregular enhancing mass or</td>
</tr>
<tr>
<td></td>
<td>mass with indistinct, angular</td>
<td>segmental area of non-masslike</td>
</tr>
<tr>
<td></td>
<td>or spiculated margins</td>
<td>enhancement, which demonstrates</td>
</tr>
<tr>
<td></td>
<td>- Perilesional echogenicity</td>
<td>early washout kinetics (Type 3)</td>
</tr>
</tbody>
</table>

Table 2: Differential diagnosis table for granulomatous mastitis.

**ABBREVIATIONS**

AFB - acid-fast bacilli  
GM - granulomatous mastitis  
GMS - Grocott-Gomori methenamine silver  
IBC - inflammatory breast cancer  
I&D - incision and drainage  
MR - magnetic resonance  
MtF - male-to-female

**KEYWORDS**

granulomatous mastitis; transgender; breast; mammogram; ultrasound

**Online access**

This publication is online available at:  

**Peer discussion**

Discuss this manuscript in our protected discussion forum at:  
www.radiopolis.com/forums/JRCR

**Interactivity**

This publication is available as an interactive article with scroll, window/level, magnify and more features.  
Available online at www.RadiologyCases.com

Published by EduRad

www.EduRad.org