Granulomatous Mastitis

A Breast Care Conundrum

Femi-Abodunde A, Agrawal Y, Ellis J, Lee SS, Jordan SG

University of North Carolina School of Medicine
Department of Radiology
Chapel Hill, North Carolina
Disclosures

Abiola Femi-Abodunde, MD: Nothing to disclose
Yash Agrawal: Nothing to disclose
Joshua Ellis: Nothing to disclose
Sheila Lee, MD: Nothing to disclose
Sheryl Jordan, MD: Nothing to disclose
Granulomatous Mastitis (GM)

This exhibit educates radiologists and trainees on:

- Mimickers of GM
- Key clinical findings and pathophysiology to assist in accurate diagnosis
- Unique challenges in the management and surveillance of GM

There are overlapping imaging features between GM and the above diseases, contributing to its diagnostic challenge.

- Puerperal/Non-puerperal mastitis
- Inflammatory breast cancer
- Sarcoidosis
- Sclerosing lymphocytic lobulitis (Diabetic mastopathy)
- Tuberculous mastitis
- Wegener’s granulomatosis
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- Palpable mass 1-20 cm
- Pain
- Erythema
- Breast enlargement (usu unilateral but may be bilateral)
- Fluid collections and fistulae
- Adenopathy (usu unilateral)

Visual inspection is key in assuring radiologists contribute to patient care in most meaningful and accurate manner.
Granulomatous Mastitis (GM)

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- Mimickers of GM
- Key clinical findings and pathophysiology to assist in accurate diagnosis
- Unique challenges in the management and surveillance of GM

- Little or no inter-specialty consensus on management and surveillance
- Underrepresented diagnosis in ACR BI-RADS® Atlas 5th Edition
- Distinctive appearance and presentation of GM frequently not known to providers
- Patient herself frequently not known to providers

Education of providers is key!
Dear Dr, I have...

- Breast Pain and Tenderness
- Breast Redness
- Palpable mass
Granulomatous mastitis (GM) is a chronic inflammatory breast disease of unknown prevalence, first described by Kessler and Wolloch in 1972.

Demographics have been shown to be parous premenopausal women with history of lactation. Strong reported associations with pregnancy, lactation, hyperprolactinemia.

There have been case studies reporting male occurrence.

- Breast Pain and Tenderness
- Breast Redness
- Palpable mass
GM: Lactation

• In some studies, large subset of patients reported 3-36 month nursing duration with GM occurring 6 months-2 years post cessation of breast feeding

• Statistically insignificant association between non-lactating breast and GM in patients with exclusive unilateral breast feeding suggesting Mammary Duct-Associated Inflammatory Disease Sequence (MD-AIDS)

★ Breast Pain and Tenderness
★ Breast Redness
★ Palpable mass
GM: Pathophysiology

- GM has been theorized to occur secondary to local granulomatous response to an injured ductal epithelium.
- On H&E, infiltrating granulomas, composed of neutrophils.


Image provided by Dr. Benjamin Calhoun, UNC
Induration and tenderness overlying the left upper outer quadrant with pink nipple discharge. Healed scar above the areola from prior incision & drainage (I&D).

Left CC mammogram demonstrating ill-defined focal asymmetry in the upper outer breast.

Spot compression magnification view shows persistent asymmetry.

Ultrasound-guided biopsy of an ill-defined hypoechoic mass with suggestion of skin tract. Path=GM.
Fistulae x 2 from prior core needle biopsy (Path=GM) 6 months earlier

Multi-site right breast peri-areolar discoloration and scarring from previous surgical I&D

Targeted ultrasound of the right breast upper outer quadrant demonstrates an irregular angulated hypoechoic mass

Expanded field of view ultrasound of the 7-10:00 right breast demonstrates several irregular hypoechoic masses, diffuse architectural distortion, and cutaneous fistula formation

GM: Imaging Magnetic Resonance

Thereafter, MR-guided core needle biopsy (Path=GM)

Sagittal T1-weighted imaging with fat saturation indicating a 1 cm mass in the right breast inferiorly

Sagittal post-contrast T1-weighted imaging with fat saturation indicating enhancing 1 cm mass
GM: Imaging Summary

- **Mammography**
  - Focal or global asymmetry
  - Irregular mass(es)
  - Normal findings
  - Skin thickening

- **Ultrasonography**
  - Irregular hypoechoic mass(es)
  - Circumscribed hypoechoic mass(es)
  - Abscess +/- sinus tract

- **MRI**
  - T2 hyperintensity
  - Rim enhancing
  - Contrast enhancement with variable kinetics
GM: The Clinical Conundrum

• GM is relapsing disease that frequently leads to patients undergoing multiple procedures that may lead to adverse effects including, but not limited to, non-healing sinus tracts

• GM underrepresented diagnosis in ACR BI-RADS® Atlas

• No formal interdisciplinary consensus on treatment algorithm for GM

• Institution/practice dependent
GM: Helpful Algorithms in Rad Literature

Hovanessian Larsen et al. AJR 2009
GM: The Clinical Conundrum

In 811 pages of BI-RADS® Atlas:
1 description of “chronic granulomatous abscess”
1 description of “granulomatous mastitis”
Isolated to captions of figures in the Ultrasound section

The text itself is devoid of descriptions of GM
GM: The Clinical Conundrum

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Further, the Atlas does not offer GM as a PATHOLOGY CODE in DATA DICTIONARY, with latter a key guide practices use in reporting their federally-mandated required audits

GM is not listed or described in the Mammography or MR sections of the Atlas, in any published revision, or as a Special Case in the Ultrasound section
GM: Interdisciplinary Disagreement

- No formal interdisciplinary consensus on treatment algorithm
- Due to the rarity and self-limiting course of disease, two different treatment approaches have been proposed and validated across the surgical and radiographic literature
  - Surgical literature concludes that GM is associated with localized infection and requires antibiotics and surgical drainage, with no role for corticosteroids.
  - Breast clinic literature concludes that corticosteroids help patients enter remission quicker and advocate for the use of corticosteroids as temporizing therapy.
Surgery

• Seminal article is Kok et al which advocates initial approach by surgeons.
• In their study of 43 patients, 93% underwent surgical procedure as the main treatment (excision or incision and drainage).
• Recurrence rate 23%

Breast Clinic

• Pandey et al strongly advocate for corticosteroids and short interval follow up prior to any consideration for surgery.
• In their study of 49 patients, 90% were treated with oral steroids.
• Complete resolution rate 80%
Case 1

A 37 year old Latino female G4P3013, hx of DM presents to the Emergency Department with a 2 week history of left breast pain and acute onset of bloody discharge. Denies any recent trauma or constitutional symptoms.

On physical exam tenderness to palpation on lateral inferior left breast. No warmth, swelling or erythema. No palpable lymph nodes. Ultrasound was obtained.

Patient discharged home with referral to UNC breast surgical clinic for further evaluation.

A diagnostic mammogram was requested.

Targeted ultrasound of the lateral inferior breast demonstrates heterogenous echogenicity with irregular hypoechoic mass and architectural distortion measuring 2.7 cm (left) with no definite fluid collection or flow on doppler (right). Assessment: BIRADS 3

MLO view of the left breast demonstrating peri-areolar and areolar skin thickening. No suspicious masses or asymmetry on magnified views (right). Assessment: BIRADS 4A

Core Needle Biopsy confirmed GM
Teaching Point #1: Clinical and imaging features are often non-specific and require histopathological diagnosis of the granulomas comprised of neutrophils.
Case 2

A 45 year old female presents to the Emergency department with a progressively enlarging and painful right breast mass with a sensation that ‘her breast might pop’. Denies any recent trauma or constitutional symptoms.

Previous imaging findings were inconclusive and she seeks a second opinion because of persistent symptoms.

On physical exam, erythema and warmth in 3-4 o’clock position. Underlying irregular mass. Exquisite tenderness to palpation. No palpable lymph nodes.

Ultrasound was obtained.

Targeted ultrasound demonstrates irregular non-circumscribed 3.3 cm mass with heterogeneous echotexture favored to represent an abscess. BIRADS 2. Patient underwent an ultrasound guided core needle biopsy.

No organisms seen on H & E. GM was subsequently diagnosed.
Teaching Point #2:
GM overlaps with infectious mastitis. This can yield delays in diagnosis and treatment if not considered. Biopsy and/or steroids may be delayed.
Case 3

A 65 year old Latino female presents to rural health clinic with progressively enlarging left breast mass and progressive unilateral nipple retraction. Denies any recent trauma or constitutional symptoms.

On physical exam, there is peri-areolar erythema, nipple inversion and a centrally located 5x5 cm firm mass.

Mammogram and ultrasound were obtained, followed by CNB.

Surg path = Marked acute inflammation with granulomas, features consistent with cystic neutrophilic granulomatous mastitis

Assessment BIRADS 5

LMLO mammogram with increased density in the retro-areolar region, nipple retraction and skin thickening with an irregular mass. 2 cm enlarged axillary lymph node seen

Image provided by Dr. Benjamin Calhoun, UNC

US with Irregular not circumscribed hypoechoic shadowing mass

Assessment BIRADS 5
Teaching Point #3:
Mass, axillary lymphadenopathy, skin thickening, and nipple retraction are common in GM and imitate cancer. This may result in overestimation of malignancy risk by radiologists.
Case 4

A 39 year old Latino female referred from rural health clinic with a 6 month history progressively enlarging right breast mass and pain, recently biopsied complicated by sinus tract formation.

PMH remarkable for breast prior I&Ds

RMLO view indicating low-density mass in the middle depth at the area of palpable concern, with predominantly obscured margins

Targeted ultrasound with indeterminate irregular shaped solid hypoechoic mass at the area of palpable concern. Assessment BIRADS 5

Biopsy-confirmed Granulomatous Mastitis
Teaching Point #4:
Poor provider awareness and multiple providers (ER and rural health clinic) may yield varied treatment regimens and several incision & drainage or biopsy breast procedures.
Our preliminary findings

Total Patients In Our UNC Biopsy-proven GM Cohort
65

Mean Age at Diagnosis
37.8 years (21-67)

62% are of Latino Ethnicity

Predilection for ethnic minorities
Latina women are disproportionately affected.

Clinical & imaging features are similar to other conditions, including malignancy. Core needle biopsy is indicated.

Enhancing provider awareness is key to establishing a formalized surveillance and treatment algorithm.

Chronic inflammatory disease that is a histopathologic diagnosis.

GRANULOMATOUS MASTITIS
References


References


Contact Information

All questions & queries can be directed to abiola.femi-abodunde@unchealth.unc.edu