International Surgery Journal
Tian J et al. Int Surg J. 2024 Dec;11(12):1993-1997
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20243538

Original Research Article

A 10-year retrospective study of 43 female patients presenting with idiopathic granulomatous mastitis

Jane Tian[1]*, Stephen Curry[2], Patrick Kamere Kiarie[2], Christina Sneed[2], Youssef Mourad[1], Shubham Bhatia[1], Maryam Hassanesfahani[1], Andrew Miele[3], Luke Keating[3], Martine A. Louis[1], Susan Saint John[1]

[1]Department of Surgery, Flushing Hospital Medical Center, Flushing, NY, USA
[2]St. George's University, School of Medicine, St. George, Grenada, West Indies
[3]Department of Research, Education and Innovation, Jamaica Hospital Medical Center, Queens, NY, USA

Received: 08 October 2024
Revised: 13 November 2024
Accepted: 15 November 2024

***Correspondence:**
Dr. Jane Tian,
E-mail: jane.y.tian@gmail.com

ABSTRACT

Background: Idiopathic Granulomatous Mastitis (IGM) is a rare inflammatory breast condition affecting middle aged women. IGM typically presents as a unilateral, painful and challenging-to-treat breast mass, with a high recurrence rate. Common treatments include corticosteroids and antibiotics, with surgical excision reserved for resistant cases. However, the absence of a standardized treatment protocol leads to variability in management across different settings and providers.
Methods: We present a case series of 43 patients diagnosed with IGM at a community hospital in New York, aiming to facilitate early recognition and treatment of this rare condition. This study identifies risk factors and reviews best practices in imaging and treatment, emphasizing the importance of considering IGM in the differential diagnosis, particularly in cases of recurrent disease.
Results: The sample comprised 43 patients with an average age of 34.65 years, 31 (72%) of whom were Hispanic. The most commonly reported symptoms were pain, mass, erythema, and swelling. In all cases, IGM was confirmed by histopathological examination. Treatment modalities included incision and drainage (I and D), corticosteroids, antibiotics, methotrexate and surgical intervention.
Conclusions: IGM is a rare condition often mistaken for breast cellulitis, abscess or carcinoma. Maintaining a high index of suspicion is crucial, particularly in Hispanic women who may be at increased risk. Histopathological diagnosis is essential to prevent unnecessary surgical interventions and antibiotic use, thereby reducing recurrence rates. Early initiation of corticosteroids or alternatives like methotrexate can optimize patient outcomes and reduce healthcare costs.

Keywords: Benign breast disease, Histopathology, Hispanic women, Idiopathic granulomatous mastitis, Inflammatory breast disease

INTRODUCTION

Idiopathic Granulomatous Mastitis (IGM) is a rare inflammatory breast condition first described by Kesler and Wolloch in 1972.[1] As a disease of exclusion, IGM remains understudied, with limited data on its incidence and prevalence.[2] In 2008, a physician in Indianapolis, Indiana, reported an unusually high cluster of seven multigravida Hispanic women diagnosed with IGM, later confirmed by the CDC, corresponding to a prevalence rate of 2.4 per 100,000 women and an estimated 12-fold higher prevalence among Hispanic women.[3] Despite

accounting for 24% of all inflammatory breast diseases, the etiology of IGM remains unclear.[2,4] There is no standardized treatment protocol for IGM. However, corticosteroids and antibiotics are commonly used, with surgical excision reserved for refractory cases. Due to the rarity of IGM, its nonspecific clinical presentation, ambiguous imaging findings, and the absence of standardized treatment guidelines, managing the disease presents a significant challenge for clinicians. In this case series, we present 43 patients diagnosed with IGM who received care at a community hospital in New York. Our study aims to identify sociodemographic and clinical risk factors associated with IGM, review best practices in imaging and treatment, and emphasize the importance of considering IGM in the differential diagnosis of inflammatory breast conditions, particularly in cases of recurrent disease.

METHODS

Study design

The current study is a 10-year retrospective case series of patients presenting with IGM.

Study place

Study was conducted at a New York area community hospital (Flushing Hospital Medical Center) were reviewed for possible inclusion.

Study duration

All patients seen between January 2012 and December 2022.

Inclusion criteria

To be included, patients needed to identify as female and have a confirmed diagnosis of IGM based on histopathological examination. Pathology findings with keywords such as granulomatous inflammation, epithelioid granuloma or histiocytes, or giant cells were considered positive for IGM.

Exclusion criteria

Patients with inflammatory breast disease attributable to other causes including tuberculosis or cancer were excluded. The current study was approved by the institutional review board of the hospital. The study was conducted, and the results reported, according to STROBE guidelines.

Based on the criteria above, 43 patients were identified as eligible for inclusion. Data on these patients was extracted from the hospital's electronic medical record (EMR) via chart review by members of the study team. Variables extracted from the EMR included sociodemographic characteristics (e.g., age, race), signs and symptoms related to GM (e.g. pain, mass, erythema, swelling), procedural characteristics (e.g., surgery type, imaging modality) and outcomes (e.g., follow-up appointments, disease resolution). Surgical options included incision and drainage (I and D), excision biopsy, lumpectomy or mastectomy. Disease resolution was defined as clinical resolution of symptoms and/ or improvement/ resolution seen on imaging. Reoccurrence was defined as a return of or worsening of symptoms after the initial treatment modality. Any patient requiring multiple I and Ds was also considered to have reoccurring disease. Descriptive statistics are reported for the EMR-extracted variables.

RESULTS

The study sample included 43 patients. The average age was 34.65 years (SD=6.57, range=16–52). The median parity of the sample was 2 (IQR = 2, range=0–4). Patient demographics were as follows, 31 patients identified as Hispanic (72%), 10 identified as Asian (23%) and 7 identified as Black (16%). Four patients (9%) had a positive smoking history, and 3 (7%) reported complications related to diabetes (as detailed in Table 1).

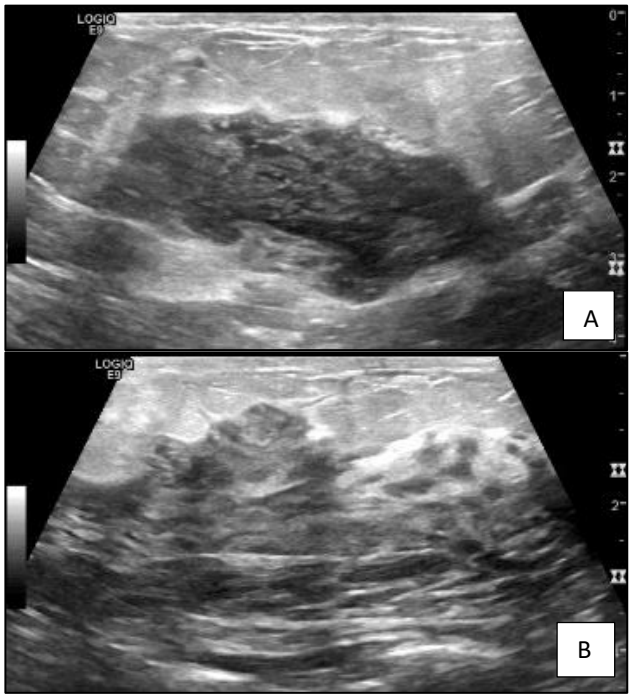

Figure 1: (A and B) Ultrasound findings of complex collections with appearances consistent with history of IGM.

The most commonly reported symptom and sign was pain in 31 patients (72%), a palpable mass in 17 patients (40%), erythema in 10 patients (23%), and swelling in 7 patients (16%). All 43 patients were diagnosed with IGM based on biopsy results. The most frequently utilized imaging modalities were ultrasound in 20 patients (47%), either alone or in combination with mammography

(Table 2). Thirty-two patients (75%) experienced symptoms for less than one year before receiving a diagnosis. Patients had a median of 2 visits before a confirmed histological diagnosis of IGM. Recurrence was observed in 13 patients (30%), with a median of 1 recurrence among these patients. Incision and drainage (I&D) were performed in 15 patients (35%), with a median of 1 I and D procedure overall. Antibiotic therapy was administered to 15 patients (35%), with 6 (14%) receiving multiple courses. Corticosteroids were used in 24 cases (56%), and 7 patients (16%) were treated with methotrexate, either as monotherapy or in combination with other medications (Table 3). The median follow-up duration was 11 months. Over half of all patients had positive outcomes, with 4 patients (9.3%) reporting symptomatic improvement and 19 (44.2%) reporting complete resolution of the disease. Resolution was confirmed clinically in 7 patients (16.3%) and on imaging in 19 patients (44.2%). Only 2 patients (5%) reported no improvement in their condition. However, 18 patients (42%) were lost to follow-up (see Table 4).

Table 1: Patient demographics including age, ethnicity, social history, pregnancy and parity status (n=43).

Patient demographics	N	%
Mean age	34.65	
Ethnicity		
Hispanic	31	0.72
Asian	10	0.23
Black	7	0.16
History (Hx)		
Hx of Smoking	4	0.09
Family Hx of breast cancer	5	0.12
Family Hx of other cancer	5	0.12
Pregnancy		
Pre-menopausal	15	0.35
Post-menopausal	1	0.02
Pregnant and lactating	2	0.05
Parity		
P0	10	0.23
P1	10	0.23
P2	11	0.26
P3	2	0.05

Table 2: Diagnostic findings including imaging modality used and pathology results (n=43).

Diagnostic findings	N	%
Imaging modality		
Ultrasound	20	0.47
US mammogram	20	0.47
Pathology results		
Describes IGM	40	0.93
Unavailable	3	0.07
Eosinophilia	0	0

Table 3: Different treatment approaches utilized both non-surgical and surgical (n=43).

Treatment approach	N	%
Medications		
No antibiotics	22	0.51
One antibiotic	15	0.35
Multiple antibiotics	6	0.14
Prednisone	24	0.56
Methotrexate	7	0.13
Surgery		
No surgery	38	0.88
ID	15	0.38
ID (median)	1	0
Other surgery	5	0.12

Table 4: Long- term follow-up results (n=43).

	N	%
Median duration of prednisone in months (IQR)	4.5 11.8	
Median length of follow up in months (IQR)	11.0 30.8	
Follow-up Ultrasound findings		
Complete resolution/ normal	19	44.2
Improved	7	16.3
Stable	6	14
Worsened	4	9.3
Missing	7	16.3
Follow up outcome		
Lost to follow-up	18	41.9
Improved	4	9.3
Resolution	19	44.2
Stable disease	2	4.6

DISCUSSION

Prior research conducted in Texas by Mohammed and colleagues suggests that Hispanic women may be at an increased risk for IGM, with 31 of their 41 identified IGM patients being of Hispanic origin.[5] Our findings support this notion, as 72% of our sample was of Hispanic origin. However, evidence regarding the risk of IGM by race and ethnicity has been mixed.[6] Previous studies have also identified associations between IGM and factors such as pregnancy, breastfeeding, smoking, diabetes, hyperprolactinemia, and the use of psychiatric medications.[5,7,8] In our cohort, 9% of patients had a history of smoking, 5% were pregnant or lactating at the time of diagnosis, 12% had a history of breast cancer, 31% were multiparous, 12% had a history of other cancers and 7% reported complications associated with diabetes.

One proposed mechanism of IGM involves excessive mammary secretions leading to duct ectasia and perforation, with superimposed infection, antigen presentation and reactive lymphocytic infiltration.

Additionally, the inconsistent elevation of autoantibodies, including rheumatoid factor, ANA and anti-dsDNA, suggests a potential autoimmune component.[7]

IGM typically presents as a unilateral, painful, and difficult-to-treat breast mass associated with overlying inflammation or fistulae, with a recurrence rate of up to 50%.[9] In our study, 72% of patients presented with breast pain, and 40% reported a palpable mass. IGM may also mimic breast cancer, leading to skin tissue distortion, nipple retraction and potential penetration into the pectoralis major muscle, causing lymphadenopathy. However, there is no definitive distinction between IGM and breast cancer on ultrasound (US) or mammography.[4,10] In our sample, US was utilized in 47% of patients, with an additional 47% undergoing mammography.

Imaging findings were variable, ranging from abscesses to masses suspicious for malignancy. Breast Imaging Reporting and Data System (BIRADS) scores ranged from 2 to 5. While US may better characterize IGM lesions by identifying tubular hypoechoic foci associated with irregular hypoechoic masses, it is limited in excluding malignancy (as shown in Figure 1). Mammogram findings can be nonspecific, often showing focal asymmetric thickening.[11] Only four US reports mentioned suspicion of IGM, highlighting the need for further workup when mastitis is suspected on breast US.

The time to diagnosis of IGM is often delayed; one study reported an average of 73 days between symptom onset and diagnosis.[5] In our study, seven patients (16%) underwent more than two procedures before receiving a diagnosis of IGM, suggesting potential over-treatment and increased healthcare costs. The cornerstone of IGM diagnosis is histopathological analysis, which confirms the disease by identifying noncaseating granulomas without foreign body material in breast biopsy tissue, along with associated inflammation.[3] It is crucial to rule out acid-fast bacilli and fungi through special stains, making microbiological studies particularly important in patients who undergo I and D.

The *Corynebacterium* species, particularly C. kroppenstedtii, has been increasingly implicated in IGM.[6] A retrospective study of 37 patients found 41 strains of C. kroppenstedtii and an association with hyperprolactinemia linked to antipsychotic medication, advocating for routine prolactin level checks in women with *C. kroppenstedtii*.[8] Other case reports have also noted a specific association between Risperidone and IGM, likely secondary to its dopaminergic effects causing hyperprolactinemia, with improvement in breast lesions following the cessation of Risperidone.[12,13] In our sample, only 14% of patients had prolactin levels checked, with 67% having elevated levels. However, none of the patients with elevated prolactin were on antipsychotics. Among the seven patients with microbial organisms identified in cultures, three harbored Corynebacterium, while the remainder grew Staphylococcus and Streptococcus species. IGM should be diagnosed when other causes of granulomatous inflammation have been excluded.[7,8]

The natural course of IGM involves either resolution or recurrence, as observed in various studies. In the 2008 study in Indianapolis, 2 of 7 patients (28%) achieved resolution, while 5 of 7 (71%) experienced recurrence, with none receiving steroids.[3] In another study across 22 centers, recurrence rates ranged from 5% to 50%, even after surgical excision, suggesting that longer follow-up may provide a more accurate recurrence rate.[14] In our patient sample, with a mean follow-up time of 27 months, 30% had at least one recurrence, 44% had complete disease resolution, 28% were lost to follow-up before resolution and 19% did not return for post-diagnostic follow-up visits.

The optimal treatment for IGM remains unclear, but corticosteroids are often recommended as a first-line treatment due to their ability to reduce disease duration, recurrences, and the need for surgical intervention.[15] A study found that 7 out of 8 patients managed with steroids alone or with antibiotics achieved complete disease remission within ten months, suggesting that non-surgical management can be effective.[16] Methotrexate is a viable alternative for patients who do not respond to prednisone, with additional options including azathioprine, mycophenolate mofetil and etanercept. A study reported that 94% of patients showed improvement when treated with methotrexate, and 75% achieved complete disease resolution after failing other treatments, highlighting its efficacy and favorable side effect profile, particularly for treatment-resistant patients.[7] In our sample, prednisone was used in 56% of cases, and 16% were treated with methotrexate, either alone or in combination with other medications.

Long-term monitoring for recurrence is essential in managing IGM patients, and surgical intervention can help prevent recurrence. A retrospective study of 31 patients with IGM found that I and D of abscesses had the highest recurrence rate (50%), while surgery or steroids during the initial admission had lower relapse rates (8.3%). Surgical excision was found to be superior to steroid therapy in terms of complications and healing time, with refractory disease after surgery benefiting from steroid therapy.[4] The use of I and D remains controversial due to the potential development of sinus tracts, and it is generally recommended only to address associated abscesses.[9]

In our study, I and D was performed in 35% of patients, with a median of 1 procedure per patient. Antibiotics were administered to 35% of patients, with 14% receiving multiple courses. Two patients underwent lumpectomy, one due to failure of conservative management and the other due to a rapidly growing mass. One patient opted for a simple mastectomy as definitive

treatment and another was managed with a partial mastectomy.

Our findings should be interpreted in light of several limitations. This was a retrospective, single-center study conducted in a racially, ethnically, and socioeconomically diverse community hospital setting, which may limit the generalizability of the results. When querying our database, the inclusion criteria were based on a diagnosis of "granulomatous mastitis" from histopathology reports in the electronic medical records. Including cases not classified under this diagnosis but presenting with typical clinical features suggestive of IGM could have strengthened our sample.

However, our study does include a relatively large and diverse sample, with many cases providing follow-up data of one year or more. Although our data suggest a differential risk for IGM among Hispanic women, these findings may reflect an overrepresentation of Hispanic/Latino patients in the broader hospital population.

CONCLUSION

IGM is a rare, recurrent inflammatory disease of the breast that can have a significant psychological impact on patients. Due to its clinical presentation, IGM is often mistaken for breast cellulitis, abscesses or malignant conditions such as breast carcinoma. Therefore, maintaining a high index of suspicion, particularly in Hispanic women who may be at increased risk, is crucial. Breast ultrasound and mammogram findings are typically nonspecific, making histopathological diagnosis essential to prevent unnecessary surgical interventions or antibiotic use and to reduce the recurrence rate. Early intervention with corticosteroids or alternative treatments such as methotrexate can optimize patient outcomes and reduce overall healthcare costs.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Kessler E, Wolloch Y: Granulomatous mastitis: a lesion clinically simulating carcinoma. AM J Clin Pathol. 1972;58:642–6.
2. Wolfrum A, Kümmel S, Theuerkauf I, Pelz E, Reinisch M. Granulomatous mastitis: a therapeutic and diagnostic challenge. Breast Care (Basel). 2018;13(6):413-8.
3. Centers for disease control and prevention: Idiopathic granulomatous mastitis in Hispanic women – Indian, 2006–2008. MMWR Morb Mortal Wkly Rep. 2009;58:1317–21.
4. Kayahan M, Kadioglu H, Muslumanoglu M. Management of patients with granulomatous mastitis: analysis of 31 cases. Breast Care (Basel) 2012;7:226–30.
5. Somala M, Statz A, Lacross JS, Lassinger BK,. Granulomatous mastitis: a 10-year experience from a large inner city county hospital. J Surg Res. 2013;184(1):299-303.
6. Taylor GB, Paviour SD, Musaad S, Jones WO, Holland DJ, A clinicopathological review of 34 cases of inflammatory breast disease showing an association between corynebacterium infection and granulomatous mastitis. Pathol. 2003;35(2):31-5.
7. Nguyen MH, Molland JG, Kennedy S, Gray TJ, Limaye S. Idiopathic granulomatous mastitis: case series and clinical review. Intern Med J. 2021;51(11):1791-7.
8. Wong SCY, Poon RWS, Chen JHK, Tse H, Lo JYC, Ng TK, et al. Corynebacterium kroppenstedtii Is an Emerging Cause of Mastitis Especially in Patients With Psychiatric Illness on Antipsychotic Medication. Open Forum Infect Dis. 2017;6;4(2):96.
9. Yukawa, M., Watatani, M., Isono, S. Management of granulomatous mastitis: a series of 13 patients who were evaluated for treatment without corticosteroids. International surgery, 2015;100(5):774–82.
10. Çalış, H., Kilitçi, A. (2018). Granulomatous Mastitis Concurrence with Breast Cancer. European journal of breast health. 14(1):58–60.
11. Yilmaz E, Lebe B, Usal C, Balci P. Mammographic and sonographic findings in the diagnosis of idiopathic granulomatous mastitis. Eur Radiol. 2001;11(1):2236–40.
12. Holla S, Amberkar MB, Kamath A, Kamal Kishore MK, Ommurugan B. Risperidone induced granulomatous mastitis secondary to hyperprolactinemia in a non-pregnant woman-a rare case reported in a bipolar disorder. J Clin Diagn Res. 2017;11:1–3.
13. Lin CH, Hsu CW, Tsao TY, Chou J. Idiopathic granulomatous mastitis associated with risperidone-induced hyperprolactinemia. Diagn Pathol 2012;7:2.
14. Uysal E, Soran A, Sezgin E. Factors related to recurrence of idiopathic granulomatous mastitis: what do we learn from a multicentre study. ANZ J Surg. 2018;88:635-9.
15. Rodin JH, -Bureau GP, Hugol D, Gompel A. Management of granulomatous mastitis: a series of 14 patients. Gynecological Endocrinol. 2012;11:921-4.
16. Sakurai K, Fujisaki S, Enomoto K. Evaluation of follow-up strategies for corticosteroid therapy of idiopathic granulomatous mastitis. Surg Today. 2011;41:333–7.

Cite this article as: Tian J, Curry S, Kiarie PK, Sneed C, Mourad Y, Bhatia S, et al. A 10-year retrospective study of 43 female patients presenting with idiopathic granulomatous mastitis. Int Surg J 2024;11:1993-7.