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Original Article

Presentation and Management of Non-Lactational Mastitis in Sulaimani Breast Clinic, Sulaimania Iraq

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Abstract

Background: Non-lactational mastitis (NLM) is a complex inflammatory breast condition with diverse etiologies and significant diagnostic challenges.

Objectives: To describe the clinical presentation and management approaches of NLM.

Methods: A prospective, observational, cross-sectional study was conducted from November 2024 to February 2025, on 83 females diagnosed with NLM. Data on patients' sociodemographics, clinical features, imaging, laboratory results, histopathology, and different lines of management were collected and analyzed. Then correlations between variables were determined.

Results: The patients' ages ranged from 24 to 69 years, while their body mass indices ranged from 23.58 to 41.65 kg/m². Common presentations included breast lumps (49.4%) and breast pain (43.4%), often with delayed presentation. Granulomatous mastitis (GM) was the most prevalent type (60.2%), followed by periductal mastitis (PDM) (21.7%), then infectious mastitis, and abscess (18.07%). Ultrasound predominantly showed breast masses in 16 patients (64% BIRADS 3), while mammography revealed focal asymmetrical density in 15 (68.2% BIRADS 3). Treatment comprised medical therapy in 67.5%, aspiration in 28.9%, and surgery in 3.6%. GM had the highest recurrence rate (28%), whereas PDM responded well to antibiotics with 94.4% resolution.

Conclusions: GM was the predominant NLM type in this population. Type-specific management, including corticosteroids for GM and antibiotics for PDM, is crucial for optimal outcomes.

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1. Introduction

Non-lactational mastitis (NLM) is a complex inflammatory breast condition affecting individuals outside of pregnancy and lactation. It is characterized by pain, erythema, abscess formation, and recurrent lesions. NLM poses significant diagnostic and therapeutic challenges due to its clinical and radiological resemblance to breast cancer (BC) (1). Glover et al. have described several types of NLM,

including periductal mastitis (PDM), granulomatous mastitis (GM), and breast infection (mastitis and breast abscess). They also described several types of GM, including idiopathic, infectious, and non-infectious GM (2).

Despite its benign nature, NLM can lead to prolonged morbidity, recurrent infections, and psychological distress, particularly in regions with limited healthcare resources (3). The

rising incidence of NLM, especially among women of reproductive age, suggests that there is a deeper understanding of its pathophysiology, risk factors, and optimal treatment strategies (4). Geographic disparities in prevalence, with higher rates reported in Middle Eastern, Asian, and Mediterranean populations, suggest that genetic, environmental, or cultural influences may be at play. However, diagnostic ambiguity persists, often necessitating invasive biopsies and delaying appropriate treatment (5). Current literature highlights the multifactorial etiology of NLM, involving bacterial infections, autoimmune dysregulation, hormonal imbalances, and foreign body reactions (6). GM, the most studied type, is marked by non-caseating granulomas and a high recurrence rate despite corticosteroid therapy (7). PDM linked to smoking and ductal metaplasia often progresses to chronic abscesses and fistulas (8). Infectious mastitis, although less common, requires prompt microbiological diagnosis to guide antibiotic therapy (11).

Diagnostic tools such as ultrasound and mammography often lack specificity, frequently mimicking malignancy (12). Treatment protocols vary widely, ranging from antibiotics and immunosuppressant to surgical excision (13). Obesity, high parity, and autoimmune diseases are emerging as significant risk factors (14).

Despite advancements, critical gaps persist, as diagnostic challenges, including dependence on biopsies and nonspecific imaging features, often delay diagnosis. Therapeutic challenges persist, as there are no established optimal management protocols. Steroid regimens vary, and surgical outcomes are usually suboptimal (8). Regional disparities exist, as most studies focus on Western populations, leaving Middle Eastern women under-represented (15). NLM matters because it primarily affects young women, causing physical and emotional burdens. Misdiagnosis as cancer can lead to unnecessary surgeries (16). In addition to

inadequate treatment, it increases recurrence rates (17). Improving diagnostic accuracy and appropriate management of NLM reduces healthcare costs and improves the quality of life (18). Thus, this study aimed to describe the clinical presentation and management approaches of NLM among patients at Sulaimaniyah City, Iraq.

2. Patients and methods

2.1 Study design and setting

This prospective observational cross-sectional study was conducted on 83 females with NLM at Sulaimani Breast Clinic, Sulaimaniyah, Iraq, from November 2024 to February 2025, using a convenience sampling technique.

2.2 Inclusion criteria

Patients presenting with a clinical diagnosis of NLM, regardless of age and nationality.

2.3 Exclusion criteria

Lactating and pregnant patients, and those unwilling to provide informed consent.

2.4 Study protocol

Female patients presenting during the study period with a clinical diagnosis of NLM were included, while those currently lactating (breastfeeding within the preceding 12 months) or unwilling to provide informed consent were excluded. A convenience sampling technique was used, enrolling all eligible patients, resulting in a final sample of 83 cases from a total of 2,760 new clinic attendees.

A standard, validated questionnaire was used to collect patients' sociodemographic characteristics, (age, marital status, occupation, residency, smoking status, alcohol consumption, body mass index [BMI], and exercise habits), presenting complaints (breast pain, palpable lumps, and nipple discharge), associated systemic symptoms (lymphadenopathy, fever and malaise), clinical data (gynecological and obstetric histories, past medical history, surgical history, current medications, and family history). Then, breast inspection was performed in sitting and supine positions under adequate lighting, evaluating

for skin erythema, dimpling, ulceration, sinuses, nipple inversion, and breast asymmetry. Palpation for breast lumps, tenderness, skin warmth and axillary lymph node assessment was also done. Diagnostic investigations included hematological and biochemical tests, imaging studies (ultrasound and mammography) and histopathological confirmation. Patients were categorised based on clinical presentation, imaging, and histopathology into recognised types of NLM, including PDM, GM and breast infection (mastitis and breast abscess) (19). Management was classified into three approaches, either medical therapy (antibiotics, corticosteroids, cabergoline, non-steroidal anti-inflammatory drugs, and methotrexate), minimally invasive procedures (ultrasound-guided aspiration of abscesses), and surgical intervention (excisional biopsy or therapeutic resection with complete histopathological evaluation). Treatment selection was guided by patient group, severity, and response to initial therapy. Finally, outcome measures included treatment response (resolution or recurrence).

2.5 Ethical consideration: Ethical approval was granted by the Ethical Committee of the College of Medicine, University of Sulaimani (No. 329/24, dated October 13, 2024), along with the Sulaimani Breast Clinic Directorates, Sulaimaniyah, Iraq.

2.6 Statistical analysis

Statistical calculations were performed using the Statistical Package for the Social Sciences (IBM SPSS, Chicago, USA, version 29). Descriptive statistics, including frequencies, means, and standard deviations (SD), were calculated to summarize patients' demographics, clinical characteristics, and treatment outcomes.

3. Results

The patients' ages ranged from 24 to 69 years, with a mean age of 42.6 ± 8.7 years. BMI ranged from 23.58-41.65 kg/m² with a mean of

30.97 ± 4.04 kg/m². All participants were married, and 79 (95.2%) were Kurdish. Additionally, 70 (84.3%) were housewives, and 37 (44.6%) were illiterate. No one reported consuming alcohol or smoking. The duration of the presenting complaints ranged from 1 to 42 days, with a mean of 17.2 ± 8.9 days.

The most common presenting complaint was a breast lump, reported by 41 patients (49.4%), followed by breast pain in 36 patients (43.4%). Nipple discharge was noted in 3 patients (3.6%), while nipple retraction was reported in 2 patients (1.4%). Sinus and fistula formation was the least frequent presentation, observed in 1 patient (1.2%). (Table 1)

Table 1. Presenting complaints among studied patients.

| Presenting complaint | Frequency | Percentage |
|----------------------|-----------|------------|
| Brest lump | 41 | 49.4 |
| Breast pain | 36 | 43.4 |
| Nipple discharge | 3 | 3.6 |
| Nipple retraction | 2 | 1.4 |
| Sinus and fistula | 1 | 1.2 |
| Total | 83 | 100 |

Obstetric and gynecological history revealed that most patients were premenopausal (n=71, 85.5%), had 1–3 pregnancies (n=36, 43.4%), had a history of breastfeeding (n=70, 84.3%), and had no comorbidities (n=51, 61.4%), while 11 (13.3%) had thyroid disorders, 8 (9.6%) had hypertension, and only 1 (1.2%) reported previous breast surgery. Medication use included oral contraceptives (10.8%) and thyroid medications (9.6%). A family history of BC was reported by 7 (8.4%).

Clinical breast examination revealed a high frequency of abnormal findings. On inspection, erythema was the most common finding, observed in 47 patients (56.6%), followed by breast asymmetry in 27 patients (32.5%) and nipple retraction in 20 patients (24.1%). Sinuses or fistulae were identified in 12 patients (14.5%), while skin dimpling and ulceration were less frequent, occurring in 8 (9.6%) and 3 patients (3.6%), respectively.

On palpation, breast lumps were detected in 71 patients (85.5%), and generalized lumpiness was noted in 69 patients (83.1%). Tenderness was present in 58 patients (69.9%), skin warmth in 47 patients (56.6%), and palpable axillary lymph nodes in 32 patients (38.6%). (Table 2).

Laboratory finding showed that patients had normal mean hemoglobin (Hb) (12.04 ± 1.79 g/dL), total leukocyte count

($10016 \pm 342 \times 10^3/\mu\text{L}$), platelet count ($264.53 \pm 61.03 \times 10^3/\mu\text{L}$), lymphocyte count ($2.95 \pm 2.98 \times 10^3/\mu\text{L}$), platelet/lymphocyte ratio (PLR; 111.328 ± 42.261), serum prolactin (22.75 ± 20.96 ng/mL), and TSH (3.99 ± 5.68 mIU/L). However, the mean level of fasting blood sugar (FBS), C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and glycated hemoglobin (HbA1C) were increased among patients (Table 3).

Table 2. Clinical breast examination findings of the enrolled patients.

| Inspection Findings | Frequency | Percentage |
|-------------------------------|-----------|------------|
| Erythema | 47 | 56.6 |
| Breast asymmetry | 27 | 32.53 |
| Nipple retraction | 20 | 24.10 |
| Sinuses/fistulae | 12 | 14.46 |
| Skin dimpling | 8 | 9.6 |
| Skin ulceration | 3 | 3.6 |
| Palpation Findings | Frequency | Percentage |
| Breast Lump | 71 | 85.54 |
| Lumpiness | 69 | 83.13 |
| Tenderness | 58 | 69.9 |
| Skin warmth | 47 | 56.6 |
| Palpable axillary lymph nodes | 32 | 38.6 |

Table 3. Laboratory findings of the studied participants.

| Laboratory Parameter | Range (min-max) | Mean \pm SD | Normal Range |
|--|-----------------|--------------------|--------------|
| Hb (g/dL) | 9.5-14.3 | 12.04 ± 1.79 | 12–16 |
| Total WBC ($\times 10^3/\mu\text{L}$) | 5700-17700 | 10016 ± 342 | 4000–11000 |
| Platelet ($\times 10^3/\mu\text{L}$) | 164-449 | 264.53 ± 61.03 | 150–450 |
| Lymphocyte ($\times 10^3/\mu\text{L}$) | 0.9-22.6 | 2.95 ± 2.98 | 1.0–3.5 |
| Platelet/Lymphocyte Ratio | 14.1-257.7 | 111.32 ± 42.26 | 100–300 |
| ESR (mm/hr) | 5-77 | 33.56 ± 19.44 | 0–20 |
| CRP (mg/L) | 1.42-43 | 17.49 ± 10.92 | 0–5 |
| FBS (mg/dL) | 98-155 | 118.21 ± 22.08 | 70–110 |
| HbA1C (%) | 5-7 | 5.79 ± 0.54 | 4.0–5.6 |
| Serum Prolactin (ng/mL) | 4.49-169 | 22.75 ± 20.96 | 4.8–23.3 |
| TSH (mIU/L) | 0.16-18.9 | 3.99 ± 5.68 | 0.4–4.0 |

CRP: C-reactive protein, ESR: Erythrocyte sedimentation rate, FBS: Fasting blood sugar, HbA1C: Glycated hemoglobin, Hb: Hemoglobin, TSH: Thyroid-stimulating hormone, WBC: White blood cell

Ultrasound evaluation of the 83 patients showed predominantly benign and probably benign findings. Mass lesions were identified in 25 patients, most commonly classified as BIRADS 3 (64.0%), followed by BIRADS 2 (24.0%) and BIRADS 4 (12.0%). Duct ectasia

was observed in 13 patients and was mainly categorized as BIRADS 2 (61.5%) and BIRADS 3 (38.5%), with no BIRADS 4 findings. Cystic collections were detected in 18 patients, predominantly BIRADS 3 (72.2%), with fewer BIRADS 2 (22.2%) and BIRADS 4

(5.6%) cases. Inflammatory changes were noted in 14 patients, equally distributed between BIRADS 2 and BIRADS 3 (42.9% each), while 14.3% were classified as BIRADS 4. Parenchymal changes were present in 13 patients and were limited to BIRADS 2

(46.2%) and BIRADS 3 (53.8%). Axillary lymph nodes were identified in 71 patients, most frequently categorised as BIRADS 3 (47.0%), followed by BIRADS 2 (26.5%) and BIRADS 4 (12.0%). (Table 4)

Table 4. Ultrasound findings of the studied patients.

| Ultrasound Finding | Total Cases | BIRADS 2 | BIRADS 3 | BIRADS 4 |
|----------------------|-------------|---------------------|-----------|-----------|
| | | Number (Percentage) | | |
| Mass | 25 | 6 (24.0) | 16 (64.0) | 3 (12.0) |
| Duct Ectasia | 13 | 8 (61.5) | 5 (38.5) | 0 (0.0) |
| Cystic Collection | 18 | 4 (22.2) | 13 (72.2) | 1 (5.6) |
| Inflammatory Changes | 14 | 6 (42.9) | 6 (42.9) | 2 (14.3) |
| Parenchymal Changes | 13 | 6 (46.2) | 7 (53.8) | 0 (0.0) |
| Axillary Lymph Nodes | 71 | 22(26.5) | 39 (47) | 10(12) |
| Total | 83 | 52 | 86 | 16 |

Mammographic evaluation was performed in 51 patients. Normal mammograms (BIRADS 1) were observed in 9 patients with no detectable findings. Mass lesions were identified in 13 patients, most commonly classified as BIRADS 3 (7 cases), followed by BIRADS 2 (4 cases) and BIRADS 4 (2 cases). Focal asymmetrical density was the most frequent abnormal mammographic finding,

detected in 22 patients, predominantly categorized as BIRADS 3 (15 cases), with fewer BIRADS 2 (3 cases) and BIRADS 4 (4 cases). Architectural distortion with skin thickening was noted in 7 patients and showed mixed BIRADS categories, including BIRADS 2 in 3 cases, BIRADS 3 in 2 cases, and BIRADS 4 in 2 cases. (Table 5)

Table 5. Mammographic findings (MMG) among study patients.

| Findings | Total | BIRADS 1 | BIRADS 2 | BIRADS 3 | BIRADS 4 |
|--|-----------|----------|-----------|-----------|----------|
| No finding | 9 | 9 | 0 | 0 | 0 |
| Mass | 13 | 0 | 4 | 7 | 2 |
| Focal asymmetrical density | 22 | 0 | 3 | 15 | 4 |
| Architectural distortion and skin thickening | 7 | 0 | 3 | 2 | 2 |
| Total | 51 | 9 | 10 | 24 | 8 |

A definitive diagnosis was established through histopathological examination via core needle biopsy (CNB) in 38 patients (45.8%) and in the remaining 45 cases (54.2%), where biopsy was not indicated or performed, the final diagnosis was reached through clinicoradiological correlation, GM was the predominant type which was 50 cases (60.2%), followed by PDM (n=18, 21.7%), and infectious mastitis (n=15, comprising 7 cases of mastitis and 8 cases of

breast abscess).

Overall, 56 (67.5%) of all NLM patients received medical treatment, 24 (28.9%) underwent needle aspiration, and only 3 (3.6%) needed surgical intervention. GM patients required multimodal therapy, of which 37 (74%) were medical, 10 (20%) needed needle aspiration, and 3 (6%) underwent surgery. (Table 6)

Table 6: Treatment Approaches for Different Types of Non-Lactational Mastitis

| Types of NLM | Medical treatment | Needle aspiration of abscess | Surgical excision | Total |
|---|-------------------|------------------------------|-------------------|-------|
| GM | 37 | 10 | 3 | 50 |
| PDM | 16 | 2 | 0 | 18 |
| Infectious mastitis (bacterial, fungal, TB) | 3 | 4 | 0 | 7 |
| Breast abscess | 0 | 8 | 0 | 8 |
| Total | 56 | 24 | 3 | 83 |

PDM showed a response to antibiotics alone in 16 out of 18 cases (88.9%). Infectious mastitis and breast abscesses required combined medical and aspiration therapy (n=15/15, 100%). The treatment outcome revealed that GM showed the highest recurrence rate (n=14/50, 28%), while PDM resolved in 17/18 (94.4%) patients, with only one recurrence was reported. Infectious mastitis in 6/7 (85.7%) and all breast abscess cases (8/8, 100%) resolved without recurrence. Overall, 67 (80.7%) cases achieved resolution, and 16 (19.3%) recurred.

4. Discussion

NLM represents a diagnostically and therapeutically challenging spectrum of benign inflammatory breast diseases that predominantly affect women outside the lactating period (11). This study addresses these gaps by providing the first comprehensive analysis of NLM types, risk factors, and outcomes; evaluating the effectiveness of current management strategies in resource-limited regions; and contributing to global efforts to standardize NLM diagnosis and treatment, particularly for under-represented populations.

The patients' of this study aged 24 to 69 years, with a mean age of 42.6 ± 8.7 years, which is consistent with earlier regional and global reports identifying the late reproductive and perimenopausal ages as high-risk periods for NLM (15, 20). Generally, hormonal changes are common in this age group, including high prolactin levels and altered immune tolerance, which may predispose breast tissue to inflammatory changes, as demonstrated in

endocrine studies (21, 22).

This study population consisted of 37 (44.6%) illiterate participants, with only 8 (9.6%) attending tertiary education, and 70 (84.3%) identifying as housewives. These results mirror established associations between low health literacy, occupational inactivity, and delayed breast disease diagnosis (15). The most frequent presenting symptoms among this study population were breast lumps (49.4%) and breast pain (43.4%). In comparison, a study from the United States noted higher rates of lumps (60–80%) and pain (50–70%), likely reflecting regional differences in disease types (11). The duration of the presenting symptoms ranged from 1 to 42 days, with a mean of 27.2 ± 8.9 days, suggesting delayed presentation, potentially due to the misinterpretation of symptoms, fear of cancer, or limited access to specialized care. These results are lower than the global review (23), which reported a much broader range of 2 days to 12 months. High parity and breastfeeding were prominent in this study, with only 2.4% of participants being nulliparous and 84% patients reporting a history of lactation. This aligns with previous studies, which reported that NLM predominantly affects parous women, often developing months or years after breastfeeding (24). The repeated ductal and lobular stress associated with pregnancy and lactation may contribute to chronic inflammation and granulomatous responses (4, 23, 25, 27).

Approximately 38.6% of the patients reported comorbidities in this study, with thyroid disorders in 13.3%, hypertension in 9.6% (most common) and diabetes mellitus in 2.4%. This contrasts with Western cohorts, where

diabetes and obesity were more frequently reported (15–25%) (1). Thyroid autoimmunity has recently been implicated in the pathogenesis of idiopathic GM, with evidence pointing to T-cell-mediated granuloma formation and shared cytokine pathways (28). This study exhibited a high BMI (mean of 30.97 ± 4.04 kg/m²). A Mendelian randomization study in European populations found that each one-SD increase in BMI was associated with a 62% higher risk of mastitis, suggesting a likely causal relationship between obesity and inflammatory breast conditions (29).

The clinical breast examination findings in this study provide valuable insights into the presentation patterns of NLM. On inspection, erythema was observed in 56.6% of patients, making it the most common finding. This high frequency aligns with previous reports, where inflammatory skin changes were consistently identified as predominant features

The relative rarity of malignancy-mimicking features such as skin dimpling (9.6%) and ulceration (3.6%) reinforces that NLM in this population often presents with inflammatory rather than infiltrative patterns. On palpation, breast lumps were present in most patients (85.5%), followed by lumpiness (83.1%), tenderness (69.9%), skin warmth (56.6%), and then palpable axillary lymph nodes (38.6%). Western studies report lower rates of axillary lymphadenopathy (15–25%) but more pronounced skin changes (ulceration, 30–40%), likely reflecting regional differences in disease severity or types (1).

Laboratory analysis demonstrated potential inflammatory activation in NLM patients, characterized by markedly elevated CRP (17.5 ± 10.9 mg/L) and ESR (33.6 ± 19.4 mm/hr) levels, which were 2–7 times above normal. Other findings included mild anemia (mean Hb of 12.0 ± 1.8 g/dL), moderate leukocytosis ($10016 \pm 342/\mu\text{L}$), and an elevated platelet-to-lymphocyte ratio (111.3 ± 42.3), suggesting systemic inflammation. At the same time,

platelet counts remained normal ($264 \pm 61 \times 10^3/\mu\text{L}$). These findings closely align with a recent study by Zhang et al., which reported significantly elevated WBC, CRP, ESR, and PLR levels among patients with recurrent nonpuerperal mastitis. These patterns highlight NLM's inflammatory pathophysiology and support the use of PLR in conjunction with other markers for disease monitoring and differential diagnosis. Ultrasound findings demonstrated distinct patterns in NLM cases, with masses being the most common ultrasound finding (25 cases), predominantly classified as BIRADS 3 in 64% of patients, suggesting probably benign features. Notably, ductal ectasia showed the highest proportion of clearly benign (BIRADS 2) (61.5%), while cystic collections and inflammatory changes exhibited intermediate suspicion (BIRADS 3) (72.2% and 42.9%, respectively). Notably, 26.5% of axillary lymph nodes appeared benign on ultrasound, while 59% of patients showed suspicious features (BIRADS 3 and 4), highlighting the diagnostic challenge in differentiating inflammatory from malignant nodal involvement. Our findings align with those of Tan et al. in several points, as we both identified masses as the most common ultrasound finding, typically classified as BIRADS 3 (64%), and ductal ectasia was predominantly benign (61.5% BIRADS 2). However, we observed that nearly 59% of our patients had suspicious lymph nodes (BIRADS 3/4), and 72% of cystic changes appeared indeterminate (BIRADS 3), suggesting that these cases may present greater diagnostic uncertainty than their cohort reported (26). Mammographic evaluation in 51 cases revealed focal asymmetrical density as the most frequent finding, with 15/22 (68.2%) classified as BIRADS 3. These imaging findings strongly correlate with those of Tan et al. (30) as there is a predominance of BIRADS 3 classifications in ultrasound and MMG across both studies, highlighting the suspicious

nature of NLM and supporting current recommendations for short-interval follow-up in equivocal cases (31). In contrast, the BIRADS 4 findings underscore the importance of biopsy in suspicious lesions to exclude malignancy (30). GM was the predominant type, showing the highest recurrence rate (28%), and often requiring multimodal therapy (74% medical, 20% aspiration, and 6% surgery). Medical therapies (corticosteroids, prolactin-lowering agents, and antibiotics) were used in GM cases, while surgical intervention was reserved for refractory GM. The local study reported 81% cure rates with surgery, while this study achieved a resolution rate of 72% in GM cases using medical treatments as the first line (32, 33). These findings support medical management as first-line therapy for uncomplicated idiopathic GM, as observed in international trends favouring conservative management (17). PDM showed a favourable treatment response with antibiotics alone, with a high resolution rate (94.4%) and low recurrence rate (5.6%), consistent with prior reports by Pesce and Yao, which emphasize the role of early antibiotic therapy and ductal drainage (34). Also, we found that cases of infectious mastitis and abscesses (n=8) achieved complete resolution without recurrence following needle aspiration and antibiotics, underscoring the critical importance of prompt microbiological evaluation and drainage in management (34). This aligns with findings from Oliveira et al.(1) where early drainage and targeted antibiotics were key to managing infectious NLM types. Overall, 80.7% of patients achieved resolution, while 19.3% experienced recurrence. GM accounted for the majority of recurrences, reaffirming the need for long-term follow-up and perhaps combination therapy. Type-specific recurrence patterns support individualized treatment plans. Study limitations include the single-center design, along with the small subgroup size that limit generalizability. The short follow-up

period, also precludes the assessment of long-term outcomes. Recommendations are that clinicians should be encouraged to use a structured diagnostic protocol for NLM cases, integrating clinical and laboratory testing, imaging, and biopsy when indicated. Health education campaigns targeting low-literacy and rural populations may promote earlier symptom recognition and healthcare seeking. Furthermore, adopting type-specific treatment plans can lead to improved patient outcomes.

Conclusions

NLM primarily affects parous, middle-aged women, particularly those with limited education and high BMI. Imaging findings frequently fell into BIRADS 3, emphasizing diagnostic uncertainty and the need for short-term follow-up or tissue biopsy. Medical therapy was effective for most GM cases, supporting a global shift toward conservative management. In contrast, PDM and infectious types responded well to antibiotics and aspiration. The recurrence pattern, predominantly observed in GM cases, warrants long-term surveillance and possibly combination therapy.

Patient consent: Informed consent was obtained from the participants by explaining the study purpose, confidentiality issue, and their right to quit at any time.

Conflict of interest: The authors declare that they have no competing interests that might be perceived to influence the results and/or discussion reported in this paper.

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