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Idiopathic Granulomatous Mastitis: From Diagnosis to Treatment - A Contemporary Evidence-Based Review and Proposed Clinical Management Algorithm

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Abstract: ***Background: Idiopathic granulomatous mastitis (IGM) is a benign but chronic inflammatory breast disorder that can closely mimic infection and inflammatory breast carcinoma. Although the number of publications has increased substantially, treatment remains heterogeneous and high-quality comparative evidence is limited. Objective: To synthesize contemporary evidence on the diagnosis, classification and treatment of IGM and to propose a practical, severity-based clinical management algorithm for surgical and breast-care practice. Methods: A contemporary narrative evidence review was undertaken using targeted searches of PubMed, PubMed Central and publisher databases through August 2026. Priority was given to systematic reviews, meta-analyses, randomized trials, multicentre cohorts, diagnostic studies and consensus statements. Evidence was synthesized qualitatively; no new meta-analysis was performed. Results: Core-needle biopsy is strongly supported for diagnosis, with exclusion of infectious and systemic granulomatous disease before the label 'idiopathic' is applied. Ultrasound is the principal imaging tool, while mammography and MRI are used selectively. The 2024 Turkish consensus introduced a practical clinical classification, and a 2025 treatment consensus linked severity to treatment intensity. A 2024 multicentre randomized non-inferiority trial found ductal lavage followed by observation non-inferior to oral corticosteroids for 1-year complete clinical response. A 2024 systematic review of intralesional corticosteroids reported high response rates, although comparative evidence remains limited. A 2026 multicentre cohort evaluated a Pittsburgh clinical/ultrasound classification and found markedly better response when treatment was concordant with its algorithm. Conversely, a 2026 scoping review found that most primary studies remain level 3–4 evidence and only three randomized trials were identified. Conclusion: Contemporary IGM management should be individualized according to clinical and imaging severity rather than defaulting to surgery or systemic corticosteroids. Mild localized disease may be observed; localized disease may be considered for intralesional/topical corticosteroids; systemic corticosteroids are reasonable for extensive inflammatory disease; methotrexate is a useful steroid-sparing option for selected resistant/recurrent cases; and surgery should be reserved for selected persistent, complicated or refractory disease. A standardized diagnostic framework and prospective validation of severity-based algorithms are the major priorities for future research.***

Keywords: Idiopathic granulomatous mastitis; granulomatous mastitis; breast inflammation; core-needle biopsy; intralesional corticosteroid; systemic corticosteroid; methotrexate; surgery; ductal lavage; treatment algorithm

1. Introduction

Idiopathic granulomatous mastitis is an uncommon chronic inflammatory disease of the breast characterized histologically by non-caseating, predominantly lobulocentric granulomatous inflammation. It most often affects women of reproductive age and is frequently reported in association with pregnancy or recent lactation. Clinically, it can present with a painful mass, erythema, abscesses, sinus tracts, skin ulceration, nipple retraction or axillary lymphadenopathy. These manifestations overlap substantially with bacterial mastitis, breast tuberculosis and inflammatory breast carcinoma, creating a recurring diagnostic dilemma.

The literature has expanded from case reports and retrospective surgical series to systematic reviews, consensus statements and a small but important number of randomized studies. Nevertheless, the evidence remains fragmented. A 2026 scoping review found that 69.7% of primary studies were level-4 evidence, 28.6% were level-3 evidence and only 1.7% were randomized trials; no level-1 treatment evidence was identified. The same review highlighted geographic concentration of evidence and probable duplication of patient populations. This weak evidence base makes it inappropriate to interpret pooled observational treatment rates as definitive proof of superiority.

The purpose of this review is therefore not merely to catalogue treatments, but to integrate diagnosis, severity classification, imaging, pathology and treatment evidence into a practical framework for contemporary clinical practice. The proposed algorithm is explicitly presented as an evidence-informed clinical framework rather than a validated international guideline.

2. Methods of the Review

This is a narrative evidence review. Targeted searches were performed in PubMed, PubMed Central and publisher databases using combinations of the terms 'idiopathic granulomatous mastitis', 'granulomatous mastitis', 'diagnosis', 'core needle biopsy', 'ultrasound', 'tuberculosis', 'corticosteroids', 'intralesional steroid', 'methotrexate', 'surgery', 'ductal lavage', 'randomized trial', 'classification', 'consensus', 'recurrence' and 'treatment algorithm'. Searches were updated through August 2026.

Priority was given to systematic reviews and meta-analyses, randomized trials, large multicentre cohorts, diagnostic reviews and recent consensus statements. Reference lists of key reviews were also used to identify seminal publications. Because this manuscript is not a prospectively registered systematic review and no duplicate independent screening or formal quantitative risk-of-bias synthesis was performed, it should not be represented as a PRISMA systematic review or meta-analysis.

3. Etiology and Pathogenesis

The aetiology of IGM remains uncertain. Proposed mechanisms include an exaggerated immune response to extravasated milk products, ductal disruption, hormonal influences, pregnancy and lactation, oral contraceptive exposure, hyperprolactinaemia, genetic susceptibility and microbial triggers. An autoimmune mechanism is frequently proposed, but IGM should not be treated as a proven autoimmune disease.

Corynebacterium species, especially lipophilic species such as Corynebacterium kroppenstedtii, have been identified in some patients. The relationship remains controversial because culture and molecular detection may represent a trigger, colonization, or a distinct microbiological phenotype. Cystic neutrophilic granulomatous mastitis may overlap with cases historically classified as IGM. A 2026 diagnostic scoping review concluded that histopathology alone is insufficient for definitive etiological classification and advocated integration of clinical, microbiological and epidemiological information. The practical consequence is that the term 'idiopathic' should be applied only after reasonable exclusion of specific infectious, systemic and foreign-body causes.

4. Clinical Presentation

Most patients present with a unilateral breast mass accompanied by pain, erythema or skin inflammation. The disease may evolve into sterile collections, fistulae and ulceration. Bilateral or multifocal disease occurs less frequently but is clinically important because multifocality is associated with incomplete response in contemporary cohort data. Extramammary manifestations such as erythema nodosum and inflammatory arthralgia have also been reported.

IGM can be self-limited, but its natural history is prolonged and unpredictable. Some mild cases resolve over months with observation, whereas others progress despite multiple courses of antibiotics, corticosteroids or surgery. Treatment response should therefore be judged longitudinally and with objective clinical and imaging assessment.

5. Imaging

Ultrasound is the most useful first-line imaging modality for defining lesion morphology, collections, sinus tracts, skin involvement and multifocality, and for guiding aspiration or biopsy. Common findings include irregular hypoechoic masses, heterogeneous areas of inflammation, tubular extensions, collections and increased Doppler vascularity. The imaging appearance is nonspecific and may closely resemble carcinoma or infection.

Mammography may show focal asymmetry, an irregular mass or architectural distortion. MRI can demonstrate irregular enhancing masses, non-mass enhancement and microabscesses and may be helpful in mapping disease extent or assessing treatment response in selected complex cases. Imaging cannot by itself establish IGM or reliably exclude malignancy; radiological-pathological concordance remains essential.

A contemporary multicentre Pittsburgh study has moved beyond descriptive imaging by incorporating ultrasound into a severity classification: Type A represents a localized mass ≤2 cm, while Type D represents diffuse involvement. This is important because a treatment algorithm based on clinical findings alone may fail to capture disease burden.

6. Histopathology and Diagnostic Work-up

Core-needle biopsy is the preferred diagnostic procedure in most patients with a suspicious inflammatory or mass-like presentation. The 2024 Turkish consensus achieved 92% agreement that core-needle biopsy is necessary for diagnosis. Typical histology demonstrates non-caseating granulomas centred on lobules, with epithelioid histiocytes, multinucleated giant cells and a mixed inflammatory infiltrate. Microabscess formation and neutrophilic inflammation may occur.

Before immunosuppression is started, clinicians should actively exclude specific causes according to clinical context. Evaluation may include bacterial culture where a collection is aspirated, mycobacterial testing and appropriate stains or cultures, fungal studies when indicated, review for foreign material, and assessment for systemic inflammatory disease. In India and other tuberculosis-endemic settings, breast tuberculosis deserves particular attention because clinical and histological overlap can be substantial.

A diagnosis of IGM therefore requires three elements: compatible clinical/imaging findings; tissue demonstrating granulomatous mastitis; and reasonable exclusion of infectious, systemic, foreign-body and malignant causes.

7. Clinical Classification

The 2024 Turkish consensus proposed a simple clinical classification: Type 1 includes a lesion ≤2 cm and/or a collection; Type 2 includes a lesion >2 cm or a collection with skin inflammation; Type 3 includes skin ulceration, systemic findings and/or multiple foci; and Type 4 includes recurrent or treatment-resistant disease. Pregnancy/lactation was treated as a special clinical context. The classification was accepted by 94% of consensus participants.

A major development in 2026 was the Pittsburgh classification, which integrates clinical Types 1–5 with ultrasound Types A–D. In a multicentre cohort of 522 biopsy-proven patients, 86.4% received algorithm-concordant treatment. Complete response was achieved in 65.4% of concordant patients compared with 21.1% of discordant

patients. Multifocal disease was much more common among patients with near-complete or no response. These findings are encouraging but are observational and therefore cannot establish causation.

Rather than choosing one classification as definitively superior, this review proposes using the Turkish clinical classification as a practical language and incorporating ultrasound burden, particularly focality, collection and diffuse involvement, when selecting treatment.

8. Treatment Principles

The therapeutic goals are symptom control, complete disease resolution, prevention of recurrence, avoidance of unnecessary immunosuppression and preservation of breast form and function. Because IGM may resolve spontaneously and because many interventions carry morbidity, treatment intensity should be proportional to disease burden.

Supportive care includes analgesia, wound care, management of collections and appropriate counselling about the potentially prolonged course. Antibiotics should not be used reflexively as treatment for idiopathic inflammation. They are appropriate when there is proven or strongly suspected bacterial infection or when a specific organism has been identified.

Abscesses or significant collections may require ultrasound-guided aspiration or drainage. Drainage treats the collection but does not necessarily treat the underlying granulomatous inflammatory process.

9. Observation

Observation is increasingly accepted for selected mild disease. The 2025 Turkish treatment consensus reached 81% agreement for observation as first-line treatment in Type 1 disease and 85% for pregnancy/lactation. The approach requires planned clinical follow-up and imaging when indicated; it is not equivalent to no follow-up.

Observation is particularly attractive when symptoms are mild, lesions are small and localized, there is no progressive skin destruction, and the patient understands the expected time course. It should be reconsidered if the lesion enlarges, new foci appear, pain or ulceration progresses, or diagnostic uncertainty persists.

10. Corticosteroids

Systemic corticosteroids have historically been the most widely used medical therapy for moderate-to-severe IGM. Their major advantage is relatively rapid anti-inflammatory action; their disadvantages include metabolic, gastrointestinal, psychiatric, infectious and cosmetic adverse effects and the risk of relapse during tapering.

A 2021 systematic review/meta-analysis of 12 studies involving 559 patients found no statistically significant recurrence difference between steroid-only and surgery-only treatment in risk-ratio analysis, although recurrence was significantly higher with steroids alone than with steroid-plus-surgery in a pooled risk-difference analysis. These findings should be interpreted cautiously because the underlying studies were heterogeneous and largely observational.

The 2025 Turkish consensus recommended systemic steroids as first-line therapy for Type 3 disease (84% agreement). This is a severity-based recommendation rather than evidence that systemic steroids are superior for all IGM.

11. Intralesional and Topical Corticosteroids

Local corticosteroid therapy is one of the most important contemporary developments in IGM management because it may provide anti-inflammatory treatment while limiting systemic exposure. A 2024 systematic review identified eight studies involving 397 patients; 184 patients received intralesional steroid treatment. The review reported a 92.8% complete response rate, a mean response time of approximately 2.6 months and a reported recurrence rate of 6.6% in the intralesional group. However, dose, injection interval, lesion selection and concomitant therapy varied substantially.

The 2025 Turkish consensus favoured intralesional or topical steroids for Type 2 disease, although it did not reach the predefined 80% threshold for a single first-line treatment. The subsequent Pittsburgh algorithm also incorporates intralesional steroids extensively, particularly for localized disease and after aspiration of collections.

Local steroid therapy should therefore be regarded as a promising, increasingly evidence-supported option rather than as a proven universal standard. Prospective comparative trials are needed to define dose, injection technique, patient selection and long-term recurrence.

12. Methotrexate and Other Immunosuppressive Therapy

Methotrexate is used primarily as a steroid-sparing agent or in resistant/recurrent disease. In a 64-patient single-centre series, most patients were treatment-resistant and methotrexate monotherapy was associated with complete resolution in a substantial proportion of patients. The study supports feasibility but cannot establish efficacy relative to other treatments.

The 2025 consensus supported immunosuppressive therapy for Type 3 disease when systemic steroids are contraindicated and for resistant Type 4 disease. Methotrexate requires appropriate laboratory monitoring and careful reproductive counselling; it is contraindicated during pregnancy and is generally avoided during breastfeeding.

Azathioprine and other immunomodulators have been used in selected cases, but the evidence base is smaller than that for methotrexate.

13. Surgery

Surgery can achieve rapid control of a localized lesion and remains useful for selected refractory or complicated cases. Historical meta-analysis found high pooled complete-remission rates after surgery, but those data came predominantly from non-randomized studies. Surgery also carries risks of poor wound healing, scarring, breast distortion and recurrence, particularly when inflammation is active or disease is multifocal.

The contemporary trend is therefore away from routine first-line excision. The 2025 consensus reached 81% agreement that surgery should not be the first treatment option for Type 1 or Type 2 disease. In the 2026 Pittsburgh cohort, surgery at presentation was used in 16.9% of patients, while a smaller group required subsequent surgery for residual disease.

Reasonable indications for surgery include persistent localized disease despite appropriate medical therapy, selected complicated disease, diagnostic uncertainty that cannot be resolved by needle biopsy, and selected residual/recurrent lesions after multidisciplinary assessment. Mastectomy should be an exceptional salvage procedure rather than a routine treatment.

14. Ductal Lavage

A 2024 multicentre open-label randomized non-inferiority trial compared ductal lavage followed by observation with oral corticosteroids in 140 patients. At one year, complete clinical response was 85.5% in the ductal-lavage group and 87.3% in the oral-corticosteroid group, meeting the prespecified non-inferiority criterion. The study provides important proof-of-concept that a non-systemic strategy may achieve outcomes comparable to systemic corticosteroids in selected patients.

However, ductal lavage is technique-dependent, requires duct cannulation and is supported by a relatively small randomized evidence base. It should currently be considered an emerging option rather than routine standard of care.

15. Evidence from Systematic Reviews and Meta-analyses

The 2017 systematic review/meta-analysis of 15 studies reported pooled complete remission rates of 90.6% for surgery, 71.8% for oral steroids and 94.5% for oral steroids plus surgery; pooled recurrence rates were 6.8%, 20.9% and 4.0%, respectively. These results are useful historically but should not be interpreted as randomized comparisons.

The 2019 systematic review of 3,060 patients demonstrated substantial geographic variation: corticosteroids were used in 69–78% and surgery in 63–83% of patients depending on development-index group. The authors concluded that there was no consensus on optimal treatment.

A 2024 meta-analysis of 57 observational studies plus two randomized trials included 3,035 patients and 19 treatment strategies. Surgical monotherapy had the highest pooled remission among monotherapies, while steroid-plus-surgery had the highest pooled remission among combination strategies. Observation and methotrexate had among the lowest pooled recurrence estimates. Importantly, 96.6% of the included articles were non-randomized observational studies. The 2026 umbrella review synthesized six systematic reviews/meta-analyses, 97 unique primary studies and 113 study occurrences. Steroid-based combinations had the most consistent favourable signal, while local steroid and methotrexate strategies appeared promising. Yet the methodological quality of the included reviews was low or critically low, and the authors emphasized that firm treatment recommendations cannot yet be established.

16. What Has Changed in 2024–2026?

Several developments justify a contemporary review. First, the 2024 Turkish consensus established a common diagnostic and clinical classification language. Second, the 2025 treatment consensus linked treatment intensity to clinical severity and formally moved away from routine first-line surgery for mild disease. Third, the 2024 randomized ductal-lavage trial introduced meaningful randomized evidence for a non-systemic approach. Fourth, the 2026 Pittsburgh multicentre cohort integrated clinical and ultrasound severity and demonstrated a strong association between algorithm concordance and complete response. Fifth, the 2026 scoping review exposed the continuing methodological weakness and geographic concentration of the evidence base.

These developments suggest that the field is moving from a procedure-centred model toward a severity-stratified, multidisciplinary and response-adapted model.

17. Proposed Evidence-Informed Clinical Management Algorithm

Step 1- Clinical suspicion: consider IGM in a painful or inflammatory breast mass, especially in a woman of reproductive age or with recent pregnancy/lactation, but maintain a broad differential diagnosis.

Step 2- Imaging: perform targeted breast ultrasound. Add mammography according to age, screening status and malignancy risk; reserve MRI for selected cases requiring extent assessment or problem solving.

Step 3- Tissue diagnosis: obtain image-guided core-needle biopsy for suspicious or persistent lesions. Confirm granulomatous mastitis and assess radiological-pathological concordance.

Step 4- Exclude specific causes: evaluate for bacterial, mycobacterial and fungal infection as clinically indicated; consider sarcoidosis, foreign-body reaction, systemic inflammatory disease and malignancy.

Step 5- Classify severity: document lesion size, number of foci, skin inflammation/ulceration, collections, systemic manifestations, recurrence/resistance and ultrasound extent.

Step 6- Mild/localized disease: observation is reasonable when disease is small, clinically mild and non-progressive. Intralesional or topical corticosteroid therapy may be considered for symptomatic localized disease.

Step 7- Moderate/extensive inflammatory disease: consider systemic corticosteroids when disease is extensive, multifocal, ulcerative or associated with systemic manifestations, after infection has been reasonably excluded.

Step 8- Resistant/recurrent disease: reclassify the disease and consider methotrexate or another steroid-sparing immunosuppressive strategy. Combination therapy may be appropriate in selected patients.

Step 9- Collections: drain clinically significant abscesses/collections, preferably with ultrasound guidance when deep.

Step 10- Surgery: reserve for selected refractory localized disease, persistent complications, residual disease or unresolved diagnostic/therapeutic problems. Avoid routine first-line surgery for mild localized IGM.

Step 11- Response assessment: document complete clinical response and objective imaging response. Do not stop prolonged therapy solely because symptoms have improved if substantial radiological disease persists.

Step 12-Long-term follow-up: monitor for recurrence, especially in multifocal, resistant or previously recurrent disease.

18. Proposed Algorithm at a Glance

Inflammatory breast mass / abscess / suspicious lesion
↓
Targeted ultrasound ± mammography / MRI when indicated
↓
Image-guided core biopsy
↓
Granulomatous inflammation confirmed?
→ No: pursue alternative diagnosis
→ Yes: exclude TB / fungal infection / bacterial infection / foreign body / systemic disease / malignancy
↓
IGM established
↓
Severity assessment: size + skin involvement + collections + multifocality + systemic features + recurrence/resistance + ultrasound extent
↓
Mild localized → Observation ± local/topical steroid
Moderate/localized symptomatic → Intralesional/local steroid ± drainage
Extensive / ulcerative / systemic → Systemic corticosteroid ± steroid-sparing therapy
Resistant/recurrent → Reclassification → Methotrexate / combination therapy ± selected surgery
Diffuse uncontrolled disease / selected refractory complications → Multidisciplinary surgical consideration
↓
Clinical + ultrasound reassessment
↓
Complete clinical and radiological response → structured follow-up

19. Research Gaps and Future Directions

The strongest research need is standardization. Future studies should use explicit diagnostic criteria, predefined microbiological exclusion, a common severity classification, standardized definitions of complete response and recurrence, uniform treatment protocols and at least 12 months of follow-up.

Prospective multicentre registries are needed to define natural history and prognostic factors. Randomized trials should compare observation, intralesional steroids, systemic steroids and steroid-sparing strategies in clearly stratified disease. Local steroid trials should report dose, injection technique and lesion size. Surgical studies should incorporate cosmetic outcomes and patient-reported quality of life, not merely recurrence.

Geographic diversity is also essential. The 2026 scoping review found that nearly half of published patients originated from Turkey, suggesting that current evidence may not generalize fully to other populations. Studies from India and other tuberculosis-endemic settings are particularly valuable if they clearly separate IGM from tuberculous mastitis using standardized microbiological and pathological criteria.

20. Strengths and Limitations of This Review

Strengths include integration of diagnostic, imaging, pathological and treatment evidence; emphasis on recent consensus and randomized data; explicit recognition of evidence quality; and presentation of a practical management algorithm.

Limitations are those of a narrative review: the search was targeted rather than fully systematic, no duplicate independent screening was performed, no formal risk-of-bias tool was applied to every primary study, and no new meta-analysis was conducted. Some pooled estimates in the literature arise from heterogeneous retrospective studies and overlapping patient populations. The proposed algorithm should therefore be considered evidence-informed and hypothesis-generating until prospectively validated.

21. Conclusion

IGM is a benign but potentially prolonged inflammatory breast disorder that can closely mimic infection and breast cancer. Modern diagnosis should be tissue-based and should incorporate appropriate exclusion of specific granulomatous causes. Ultrasound is central to defining extent and guiding biopsy or drainage, while clinical and imaging severity should influence treatment intensity.

The therapeutic direction is shifting from routine surgery toward individualized conservative and medical management. Observation is appropriate for selected mild disease; local corticosteroids are increasingly attractive for localized disease; systemic corticosteroids remain useful for extensive inflammatory disease; methotrexate has an important steroid-sparing role in selected resistant or recurrent disease; and surgery should be selective rather than routine. Recent randomized and multicentre evidence

supports this evolution but does not yet establish a universal treatment standard.

The proposed clinical algorithm should be regarded as a practical framework for multidisciplinary care and as a platform for future prospective validation. The next phase of IGM research should prioritize international collaboration, standardized classification, patient-reported outcomes and adequately powered randomized trials.

Table 1: Key contemporary evidence in IGM

Study	Design / population	Main contribution	Interpretation
Lei et al., 2017	Systematic review/meta-analysis; 15 studies	Pooled CR 90.6% surgery, 71.8% oral steroids, 94.5% steroids+surgery; recurrence 6.8%, 20.9%, 4.0%	Historical pooled evidence; mostly non-randomized
Martinez-Ramos et al., 2019	Systematic review; 3,060 patients	Marked geographic variation in steroid, surgery and antibiotic use	Demonstrates lack of standardized treatment
Godazandeh et al., 2021	Systematic review/meta-analysis; 12 studies, 559 patients	No significant RR difference steroid-only vs surgery-only; steroid-only had higher recurrence than steroid+surgery by RD	Heterogeneous observational evidence
Emiroglu et al., 2024	Modified Delphi consensus	92% supported core-needle biopsy; 94% accepted clinical classification	Strong consensus, not comparative treatment evidence
Wijesinghe et al., 2024	Systematic review; 8 studies, 397 patients	Intralesional steroid literature: 184 treated; 92.8% complete response reported	Promising but heterogeneous
Chen et al., 2024	Multicentre open-label randomized non-inferiority trial; n=140	Ductal lavage+observation non-inferior to oral corticosteroids for 1-year CR	Important randomized evidence; technique-dependent
Emiroglu et al., 2025	Modified Delphi consensus	Observation Type 1; systemic steroids Type 3; IMT resistant disease; avoid routine first-line surgery Type 1/2	Severity-based consensus framework
Soran et al., 2026	Multicentre cohort; n=522	Algorithm concordance associated with higher CR; multifocality associated with poorer response	Promising validation, but observational
2026 scoping review	Evidence-base appraisal	69.7% level-4, 28.6% level-3, 1.7% level-2; no level-1 evidence	Highlights major methodological gaps
2026 umbrella review	6 systematic reviews/meta-analyses; 97 unique primary studies	Steroid combinations had most consistent favourable signal; local steroid/MTX promising	Overall certainty remains limited

Table 2: Proposed diagnostic work-up

Step	Assessment	Purpose
1	History and examination	Pregnancy/lactation, drugs, prior breast procedures, systemic symptoms, TB exposure, autoimmune symptoms
2	Targeted ultrasound	Mass morphology, collections, sinus tracts, skin involvement, multifocality; guide procedures
3	Mammography when indicated	Assess architectural distortion/asymmetry and malignancy risk
4	MRI in selected cases	Map extent or solve complex diagnostic/response questions
5	Core-needle biopsy	Establish granulomatous mastitis and assess pathology
6	Microbiology	Culture/AFB/fungal testing as clinically indicated; avoid assuming all granulomas are idiopathic
7	Systemic evaluation	Consider sarcoidosis, autoimmune disease and foreign-body reaction when suggested by history/examination
8	Radiology-pathology concordance	Ensure imaging abnormality is adequately explained by tissue diagnosis

Table 3: Treatment options: evidence, strengths and limitations

Treatment	Best-fit setting	Potential benefit	Major limitations
Observation	Mild, small, localized, non-progressive disease; pregnancy/lactation	No treatment toxicity; spontaneous remission possible	Slow course; requires close follow-up
Drainage	Clinically significant collections	Relieves collection and symptoms; enables microbiology	Does not necessarily control underlying IGM
Topical steroid	Superficial inflammatory/skin component	Low systemic exposure	Limited evidence; technique and adherence issues
Intralesional steroid	Localized symptomatic lesions	High reported response; low systemic exposure	Dose/technique not standardized; comparative evidence limited
Systemic corticosteroid	Extensive, ulcerative or systemic inflammatory disease	Rapid anti-inflammatory effect	Systemic adverse effects; relapse during taper
Methotrexate	Resistant/recurrent or steroid-sparing indication	Useful steroid-sparing option	Monitoring; reproductive toxicity; contraindicated in pregnancy

Surgery	Selected refractory/complicated localized disease	Rapid removal of persistent lesion	Scarring, wound morbidity, distortion; not ideal for multifocal active inflammation
Ductal lavage	Selected centres / emerging approach	Randomized non-inferiority evidence vs oral steroids	Specialized technique; limited replication

Table 4: Turkish clinical classification and treatment consensus

Category	Clinical description	Consensus-informed approach
Type 1	Lesion ≤2 cm and/or collection	Observation first-line; local/topical steroid may be considered
Type 2	Lesion >2 cm or collection with skin inflammation	Local/intralesional or topical steroid favoured; no single treatment reached formal consensus
Type 3	Skin ulceration, systemic findings and/or multiple foci	Systemic corticosteroids first-line; immunosuppressive therapy if steroids contraindicated
Type 4 resistant	Treatment-resistant disease	Combination therapy and/or immunosuppressive therapy
Type 4 recurrent	Recurrence after prior response	Reclassify before selecting treatment
Pregnancy/lactation	Special context	Observation first-line when feasible; avoid methotrexate

Table 5: Pittsburgh clinical/ultrasound concept and evidence

Feature	Pittsburgh framework	Clinical relevance
Clinical classification	Types 1–5, from minimal skin irritation to widespread involvement	Captures clinical severity
Ultrasound classification	Types A–D, from localized mass ≤2 cm to diffuse disease	Adds objective disease burden
Multifocality	≥2 foci	Associated with near-complete/no response in the 522-patient cohort
Algorithm concordance	Treatment matched to clinical + ultrasound classification	86.4% concordance; CR 65.2% in concordant vs 21.1% in discordant patients
Limitations	Retrospective multicentre cohort	Association does not prove algorithm causality; prospective validation required

Table 6: Proposed endpoints for future IGM trials

Domain	Recommended endpoint
Primary efficacy	Complete clinical AND radiological response
Recurrence	Recurrence after documented complete response
Time to response	Time from treatment initiation to complete response
Safety	Standardized adverse-event grading
Quality of life	Validated patient-reported instrument
Cosmesis	Patient- and clinician-reported cosmetic outcome
Disease burden	Pain, drainage, wound care and number of visits
Reproductive outcomes	Pregnancy/lactation status and medication exposure
Follow-up	At least 12 months; longer where feasible

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Evidence appraisal and interpretation

The central difficulty in interpreting IGM literature is confounding by indication. Patients with small localized lesions are more likely to receive observation or local treatment, whereas patients with ulceration, multifocal disease or recurrent disease are more likely to receive systemic corticosteroids, methotrexate or surgery. Consequently, an apparently higher remission rate with surgery does not demonstrate that surgery is biologically superior. The same limitation applies to recurrence: patients selected for surgery may have different disease severity and follow-up than patients treated medically. [4,5,7,15]

Definitions of treatment response also vary. Some studies define remission by disappearance of the palpable mass, whereas others require clinical and radiological resolution. Recurrence may mean any new inflammatory symptom, a new mass after complete healing, or persistent disease that never fully resolved. These differences make pooled recurrence estimates difficult to compare. Future studies should distinguish incomplete response from true recurrence and should use a predefined interval of complete remission before recurrence is counted.

Another important issue is overlap among study populations. Patients may appear in several retrospective series from the same specialist centres, and systematic reviews may therefore count overlapping cohorts more than once. The 2026 evidence-base scoping review specifically highlighted the geographic concentration and methodological limitations of IGM research. [16] This reinforces the need for prospective registries and multicentre studies with transparent recruitment periods and unique patient identifiers.

The present review therefore gives greater weight to randomized evidence and well-described prospective or multicentre cohorts than to isolated remission percentages. Consensus statements are useful for establishing practical terminology and clinical priorities, but they should not be confused with comparative treatment efficacy. This distinction is particularly relevant when discussing intralesional corticosteroids and newer algorithms: both are promising, but prospective validation remains necessary.

Implications for surgical practice in India

For the general surgeon, IGM is best approached as a diagnostic and longitudinal management problem rather than as an abscess that must be excised. The first surgical contribution is obtaining adequate tissue diagnosis and ensuring that the pathology explains the imaging abnormality. The second is managing collections with aspiration or image-guided drainage while obtaining microbiological specimens

when indicated. The third is recognizing when surgery is likely to add morbidity without improving disease control.

The Indian setting adds a specific diagnostic priority because tuberculosis remains an important cause of granulomatous breast inflammation. A patient with granulomatous inflammation should not be labelled idiopathic solely because routine bacterial culture is negative. The clinical history, epidemiological risk, imaging pattern, histopathology and mycobacterial investigations should be integrated before immunosuppression is commenced. This approach is consistent with the broader principle that IGM is a diagnosis of exclusion. [6,10,17]

A practical multidisciplinary pathway may involve a breast surgeon/general surgeon, breast radiologist, pathologist and microbiology or infectious-disease specialist when infection is plausible. Rheumatology or internal medicine input can be useful for resistant disease requiring steroid-sparing therapy. Such a model is particularly relevant for patients with recurrent disease, systemic manifestations or uncertainty between infectious and idiopathic granulomatous inflammation.

Proposed treatment matrix

A useful way of translating the evidence into practice is to match treatment intensity to disease phenotype. Small, minimally symptomatic and non-progressive lesions can be observed. A localized symptomatic lesion can be considered for intralesional corticosteroid therapy, particularly when systemic steroid toxicity is undesirable. A significant collection should be aspirated or drained and investigated microbiologically. Extensive, ulcerative, multifocal or systemically inflammatory disease may justify systemic corticosteroids, with a plan for tapering and early assessment of response. Resistant or recurrent disease should trigger reclassification and consideration of methotrexate or another steroid-sparing strategy. Surgery is best reserved for selected persistent localized disease, complications or diagnostic/therapeutic problems that cannot be managed conservatively. [10-14]

This matrix is deliberately different from an intervention ranking. It recognizes that the correct treatment depends on the phenotype of disease at presentation and on the patient's reproductive status, comorbidities, infection risk and preferences. In this context, the most clinically useful question is not “Which treatment has the highest pooled remission?” but “Which treatment provides adequate disease control with the least avoidable morbidity for this patient?”

Citation and reference format

References are numbered consecutively in order of first citation and cited in the text using Arabic numerals in square brackets, consistent with Vancouver/NLM conventions. The reference list uses standard journal abbreviations and DOI identifiers where available.

Patient-centred decision making

Patient preference is particularly important in IGM because treatment can extend over months and may affect breastfeeding, employment, appearance and psychological well-being. Before treatment escalation, clinicians should explain the expected natural history, uncertainty of the evidence, likely duration of therapy and possible adverse effects. For a patient with a small lesion, observation may be preferable to an intervention with uncertain incremental benefit. Conversely, a patient with painful ulcerative disease may reasonably prioritize faster inflammatory control despite the risks of systemic corticosteroids. Cosmetic outcome should be discussed before excision, especially when the lesion is close to the nipple-areolar complex or when disease is multifocal. Shared decision making is therefore not an adjunct to the algorithm; it is a core component of selecting the least morbid effective strategy.