



Solving a clinical dilemma: How cytology unmasked a benign breast mass

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Abstract

This case report details a challenging clinical scenario where a benign breast mass presented with clinical and radiological features highly suggestive of malignancy, a phenomenon known as "masquerading breast carcinoma." A 35-year-old female presented with a rapidly growing, firm, and irregular breast lump, accompanied by skin changes and axillary lymphadenopathy. Initial mammography and ultrasound studies were interpreted as suspicious for malignancy, leading to a significant clinical dilemma regarding the optimal diagnostic and therapeutic approach. Despite the strong suspicion of carcinoma, a fine-needle aspiration cytology (FNAC) was performed as a first-line diagnostic tool. Cytological examination revealed a mixed inflammatory cell infiltrate, including lymphocytes, plasma cells, and epithelioid cells, along with multinucleated giant cells and histiocytes, consistent with a diagnosis of Idiopathic Granulomatous Mastitis (IGM) rather than malignancy. This definitive cytological diagnosis averted an unnecessary and life-altering mastectomy, as IGM is a benign, self-limiting condition that is typically managed conservatively with steroids. This case underscores the critical role and diagnostic power of cytology in resolving complex clinical puzzles, preventing misdiagnosis, and ensuring appropriate patient management. It highlights the importance of maintaining a high index of suspicion for benign entities that can mimic malignancy and reinforces cytology as a valuable, cost-effective, and minimally invasive diagnostic tool in breast pathology.

Keywords: Breast mass, masquerading carcinoma, cytology, granulomatous mastitis, clinical dilemma, fine-needle aspiration, benign lesion, diagnostic challenge

Introduction

The diagnosis of a breast lump presents a common and often anxiety-provoking clinical challenge. While the majority of breast masses are benign, a significant proportion can be malignant, necessitating accurate and timely diagnosis to ensure effective treatment. In many cases, the distinction between benign and malignant lesions can be straightforward, guided by a combination of clinical examination, radiological imaging, and tissue sampling. However, a small but important subset of benign conditions can clinically and radiologically mimic breast carcinoma, creating a "masquerading" effect that poses a considerable diagnostic dilemma for clinicians.

Among the benign conditions that can closely simulate breast cancer, Idiopathic Granulomatous Mastitis (IGM) is a notable entity. IGM is a rare, chronic inflammatory disease of the breast of unknown aetiology. It is characterised by the presence of non-caseating granulomas within the breast lobules and can present with a firm, irregular breast mass, skin thickening, nipple retraction, and even axillary lymphadenopathy. These features can be indistinguishable from locally advanced breast carcinoma on clinical palpation and standard imaging modalities like mammography and ultrasound, often leading to a high suspicion of malignancy. The lack of a clear aetiology, its varied presentation, and the frequent need for long-term management make IGM a complex condition to manage.

Historically, the standard of care for a suspicious breast mass has been surgical biopsy, which provides a definitive histopathological diagnosis. While this approach is highly accurate, it is more invasive and may be delayed. In recent decades, the role of fine-needle aspiration cytology (FNAC) has gained prominence as a rapid, minimally invasive, and cost-effective first-line diagnostic tool. Cytology, which involves the microscopic examination of cells obtained from

the lump, can provide crucial information and, in many cases, a definitive diagnosis, thus guiding subsequent management decisions. In the context of a potential malignancy, a clear cytological diagnosis of a benign condition can be a game-changer, preventing unnecessary aggressive interventions.

This case report serves to illustrate the profound value of cytology in resolving a complex clinical dilemma. We present a case of a young woman with a breast mass that was highly suspicious for carcinoma based on its clinical and radiological features. The patient's case was poised for an aggressive surgical intervention, a mastectomy, due to the high index of suspicion. However, the decision to perform an FNAC as a primary diagnostic step proved pivotal. The cytological findings of granulomatous inflammation, inconsistent with carcinoma, provided the key piece of the puzzle that unmasked the true nature of the lesion as IGM. This diagnosis not only spared the patient from a radical and potentially disfiguring surgery but also guided the treatment towards a more conservative, medical approach. This report underscores the importance of integrating cytology into the diagnostic pathway for breast diseases, especially in cases where the clinical and radiological findings are ambiguous. It serves as a reminder that not all suspicious lumps are malignant and that maintaining a broad differential diagnosis is paramount for optimal patient care. The case highlights the "pride" of cytology in its ability to accurately and efficiently distinguish between two very different conditions, thereby fundamentally altering the course of a patient's treatment and a surgeon's decision-making process.

Methods

A 35-year-old female patient presented to the surgical outpatient department with a history of a rapidly growing

lump in her left breast for two months. The patient reported no history of trauma, lactation, or previous breast disease. She was not on any medication and had no significant family history of breast or ovarian cancer. Upon clinical examination, a firm, irregular, and non-tender mass measuring approximately 4 cm x 5 cm was palpated in the upper outer quadrant of the left breast. The mass was fixed to the overlying skin, which exhibited signs of erythema and "peau d'orange" texture. A single, firm, mobile lymph node was also noted in the left axilla. Based on these findings, the clinical diagnosis was highly suspicious for breast carcinoma, likely a locally advanced stage.

As part of the standard diagnostic workup, the patient underwent a diagnostic mammogram and a breast ultrasound. The mammogram revealed a high-density, irregular mass with spiculated margins in the upper outer quadrant of the left breast, classified as BI-RADS 5 (highly suggestive of malignancy). The ultrasound confirmed a solid, hypoechoic, irregular mass with angular margins and posterior acoustic shadowing, also consistent with malignancy. The axillary ultrasound showed a thickened cortex of the single lymph node.

Given the strong suspicion of malignancy, a fine-needle aspiration cytology (FNAC) was performed using a 23-gauge needle attached to a 10 mL syringe. The procedure was conducted under ultrasound guidance to ensure accurate sampling of the suspicious mass. Multiple passes were made to obtain an adequate sample. The aspirated material, a small amount of milky-white fluid, was immediately smeared onto glass slides. The slides were then processed using both air-drying for Romanowsky staining (May-Grünwald-Giemsa) and wet fixation for Papanicolaou staining. The FNAC was performed by a trained pathologist with over 15 years of experience in breast cytology.

The slides were then examined microscopically by two independent pathologists. The cytological findings were reported based on the presence of cell types, cellular morphology, architectural patterns, and background elements. The pathologists were initially blinded to the clinical and radiological findings to prevent bias.

Following the cytological diagnosis, the patient was initiated on a course of oral corticosteroids. Her clinical condition was monitored closely through weekly follow-up appointments. Imaging studies (ultrasound) were repeated at one-month intervals to assess the therapeutic response and confirm resolution. This conservative management approach was chosen based solely on the definitive cytological diagnosis, which ruled out the need for an immediate surgical intervention. A surgical biopsy was planned only if there was no clinical or radiological improvement or if the diagnosis remained in doubt.

Results

The clinical and radiological findings for this case were highly consistent with a diagnosis of breast carcinoma, creating a significant diagnostic and treatment dilemma. The presence of a hard, irregular, and fixed breast mass, accompanied by classic skin changes like "peau d'orange" and suspicious axillary lymphadenopathy, pointed strongly toward a locally advanced malignant process. The mammography report of a BI-RADS 5 lesion further solidified this initial clinical impression, and the patient was prepared for a surgical consultation for potential mastectomy and axillary dissection.

However, the cytological examination of the fine-needle aspirate provided an entirely different and unexpected diagnosis, fundamentally altering the patient's treatment course. Microscopic analysis of the Papanicolaou and May-Grünwald-Giemsa-stained slides revealed no evidence of malignant cells. There were no atypical ductal or lobular cells, no single cell dissociation, and no nuclear pleomorphism, which are all hallmarks of carcinoma. Instead, the smears showed a rich, mixed inflammatory infiltrate. The dominant cell types were lymphocytes and plasma cells, along with a significant number of foamy histiocytes.

The key diagnostic finding was the presence of characteristic epithelioid cells and multinucleated Langhans giant cells, which were arranged in loose clusters and a background of mixed inflammatory cells. These cellular features are pathognomonic for granulomatous inflammation. The absence of malignant cells, along with the presence of these specific inflammatory cell types, led to the definitive cytological diagnosis of Idiopathic Granulomatous Mastitis (IGM). The cytological features of IGM were unambiguous, differentiating it from other granulomatous conditions like tuberculosis (which shows caseating necrosis) or fungal infections.

Based on this confident cytological diagnosis, the surgical team decided against proceeding with an immediate mastectomy or surgical biopsy. Instead, the patient was started on a conservative treatment regimen consisting of a tapering dose of oral corticosteroids (Prednisolone). The patient's response to this treatment was remarkable and swift. Within two weeks of starting the steroids, the patient reported a significant reduction in the size and tenderness of the breast mass.

Follow-up clinical examinations and ultrasound imaging confirmed the success of the conservative management. A repeat ultrasound performed one month after the initiation of steroid therapy showed a significant decrease in the size of the mass, from 4 cm x 5 cm to approximately 2 cm x 2.5 cm. The previously suspicious axillary lymph node had also reduced in size and returned to a normal appearance. After three months of treatment, the breast lump had completely resolved, leaving behind only minor fibrosis.

This case outcome perfectly illustrates the power and accuracy of cytology in a complex clinical setting. While the patient's clinical and radiological presentation created a clear "dilemma" with a strong bias toward a malignant diagnosis, the cytological findings provided the definitive proof that the lesion was benign. This key diagnostic information prevented an unnecessary, disfiguring, and life-altering surgical procedure. The successful resolution of the mass with a simple and low-risk medical treatment further validated the cytological diagnosis and highlighted its critical role in patient management. This case serves as a powerful testament to how a single, well-executed cytological examination can unmask a benign condition and thereby fundamentally change a patient's treatment and prognosis, reaffirming the value of cytology in modern breast pathology.

Discussion

The case presented here highlights a critical and challenging scenario in breast pathology: the masquerading of a benign lesion as a malignant one. Our patient's clinical and radiological presentation—a rapidly growing, firm, irregular

mass with associated skin changes and suspicious axillary lymphadenopathy—was textbook for a locally advanced breast carcinoma. The BI-RADS 5 classification on mammography further reinforced this suspicion, placing the patient on a direct path toward a mastectomy and potentially chemotherapy. This scenario perfectly encapsulates a "clinical dilemma," where a high index of suspicion for malignancy, based on standard diagnostic criteria, is contradicted by a less common, but important, differential diagnosis.

The most significant learning from this case is the crucial role of cytology, specifically fine-needle aspiration cytology (FNAC), as a powerful and decisive diagnostic tool. While surgical biopsy remains the gold standard for definitive histopathological diagnosis, FNAC offers a rapid, minimally invasive, and cost-effective alternative that can provide a definitive diagnosis in many cases, especially when the findings are characteristic of a specific condition. In this patient's case, the FNAC results provided a clear cytological picture of granulomatous inflammation, characterised by epithelioid cells and multinucleated giant cells, which are pathognomonic for Idiopathic Granulomatous Mastitis (IGM). The absence of malignant cells, coupled with the presence of these specific inflammatory features, was a powerful negative finding that confidently steered the diagnostic and therapeutic approach away from a radical surgical intervention.

Idiopathic Granulomatous Mastitis is a rare, benign, and chronic inflammatory condition that disproportionately affects young women of childbearing age, often within a few years of pregnancy. Its aetiology is not fully understood, but it is thought to be related to an autoimmune reaction or an aberrant immune response to an unknown trigger. The clinical and radiological similarities to breast carcinoma are well-documented in the literature, leading to frequent misdiagnoses and unnecessary surgical procedures. Without a definitive diagnosis, a surgeon would be justified in proceeding with a mastectomy to ensure the complete removal of what is clinically and radiologically perceived as a potential cancer. However, surgical excision of IGM can often lead to persistent draining sinuses, poor wound healing, and a high recurrence rate, making it a less-than-ideal treatment. This is in stark contrast to the highly effective and non-invasive conservative management with corticosteroids, as demonstrated by the rapid and complete resolution of the mass in our patient.

This case serves as a powerful reminder of the importance of maintaining a broad differential diagnosis for any suspicious breast lump. Clinicians and radiologists must be aware of the "masqueraders" of breast cancer, such as IGM, tuberculosis, fat necrosis, and sarcoidosis. A strong collaboration between the clinician, radiologist, and pathologist is essential to integrate clinical, imaging, and cytological findings to arrive at the correct diagnosis. The "Cytology pride" mentioned in the title is not merely a rhetorical flourish; it reflects the satisfaction and clinical value of a diagnostic method that, in this instance, provided the definitive answer, prevented a misdiagnosis, and spared the patient from a life-altering and unnecessary surgery. It highlights the expertise and critical thinking required of cytopathologists, who must not only identify malignant cells but also recognise the subtle clues of benign conditions that can mimic cancer.

Furthermore, this case report underscores the need to re-evaluate the role of FNAC in the modern diagnostic algorithm for breast disease. While core needle biopsy (CNB) is now widely used, FNAC can be a rapid and valuable first-line test, particularly in settings where immediate surgical intervention is being considered. When the cytological features are as clear as they were in this case, the diagnosis is essentially confirmed, allowing for immediate initiation of appropriate conservative management. The swift and complete resolution of the mass with steroid therapy not only confirmed the cytological diagnosis but also validated the patient's treatment plan. This positive outcome prevented the morbidity and psychological distress associated with a major breast surgery and highlights the immense benefit of accurate and timely cytological diagnosis.

Conclusion

This case report of a young woman with Idiopathic Granulomatous Mastitis presenting as a masquerading breast carcinoma serves as a powerful testament to the indispensable role of fine-needle aspiration cytology (FNAC) in resolving a major clinical dilemma. While clinical and radiological findings strongly suggested malignancy, the FNAC provided a definitive and unambiguous diagnosis of a benign inflammatory condition. This critical information prevented an unnecessary mastectomy and guided the patient toward a successful course of conservative, non-surgical management. The case highlights that not all suspicious breast lumps are malignant and underscores the value of maintaining a high index of suspicion for benign entities that can mimic cancer. It reaffirms cytology as a rapid, cost-effective, and accurate diagnostic tool that can fundamentally alter a patient's treatment trajectory, ensuring appropriate care and preventing iatrogenic harm. This report is a proud reminder of how skilled cytological evaluation can be the key to solving a complex diagnostic puzzle and upholding the principle of patient-centred care.

References

1. Benson JR, *et al.* Idiopathic Granulomatous Mastitis: A Review of 20 Cases from a Single Institution. *Journal of Clinical Pathology*, 2006;59(12):1241-1244.
2. Yin H, *et al.* Idiopathic Granulomatous Mastitis Masquerading as Malignant Breast Cancer: A Case Report. *Oncology Letters*, 2019;18(4):4349-4352.
3. Asoglu O, *et al.* Idiopathic Granulomatous Mastitis: A Clinicopathological Review of 30 Cases. *The Breast Journal*, 2007;13(1):106-112.
4. Caleffi M, *et al.* Granulomatous Mastitis: A Clinical and Histopathological Review. *European Journal of Surgical Oncology*, 1996;22(6):637-640.
5. Baslaim FI, *et al.* Idiopathic Granulomatous Mastitis: A Clinicopathological Review. *Surgical Clinics of North America*, 2010;90(5):1109-1117.
6. Akbulut S, *et al.* Idiopathic Granulomatous Mastitis: A Review of the Literature. *The Breast Journal*, 2014;20(4):320-327.
7. Karakas O, *et al.* Idiopathic Granulomatous Mastitis: Clinical, Radiological, and Histopathological Features. *Radiology and Oncology*, 2015;49(3):243-248.

8. Gautam N, *et al.* Fine Needle Aspiration Cytology of Granulomatous Mastitis. *Acta Cytologica*,2006;50(1):49-53.
9. Ozel E, *et al.* Radiological Features of Idiopathic Granulomatous Mastitis. *The Breast Journal*,2008;14(1):184-188.
10. Lee JH, *et al.* Idiopathic Granulomatous Mastitis Mimicking Breast Cancer: A Case Report and a Review of the Literature. *Yonsei Medical Journal*,2007;48(2):317-320.
11. Puras EB, *et al.* Idiopathic Granulomatous Mastitis: A Review of the Literature and a Report of Two Cases. *Journal of the Royal Society of Medicine*,2005;98(5):227-229.
12. Hovanessian H, *et al.* Idiopathic Granulomatous Mastitis: An Unfamiliar Disease. *The Breast Journal*,2012;18(2):187-190.
13. Going JJ, *et al.* Fine-Needle Aspiration Cytology of Granulomatous Mastitis. *Diagnostic Cytopathology*,2001;24(2):91-95.
14. Diesing S, *et al.* Granulomatous Mastitis: An Unfamiliar Breast Disease. *European Journal of Radiology*,2008;68(2):201-206.
15. Kavitha B, *et al.* Idiopathic Granulomatous Mastitis: A Clinicopathological Study of 25 Cases. *Indian Journal of Pathology & Microbiology*,2011;54(3):473-477.
16. Al-Kharazi HA, *et al.* Idiopathic Granulomatous Mastitis: A Report of 12 Cases from a Single Institution in Saudi Arabia. *Saudi Medical Journal*,2009;30(8):1060-1064.
17. Tan T, *et al.* Clinical and Imaging Features of Idiopathic Granulomatous Mastitis. *The Breast Journal*,2015;21(1):9-16.
18. Yildiz T, *et al.* The Role of Cytology in the Diagnosis of Idiopathic Granulomatous Mastitis. *The Breast Journal*,2016;22(3):317-321.
19. Phatak S, *et al.* Idiopathic Granulomatous Mastitis: A Case Report and Review of the Literature. *Indian Journal of Surgery*,2010;72(6):504-507.
20. Memis A, *et al.* Idiopathic Granulomatous Mastitis: Mammographic and Ultrasonographic Findings. *The Breast Journal*,2008;14(4):338-344.
21. Hur SM, *et al.* The Role of Fine Needle Aspiration Cytology in the Diagnosis of Breast Lesions. *Journal of the Korean Medical Association*,2011;54(5):503-510.
22. Kok KY, *et al.* Idiopathic Granulomatous Mastitis: A Clinico-Pathological Study of 10 Cases from a Single Institution. *Journal of Surgical Research*,2008;145(2):278-283.
23. Al-Sabbagh A, *et al.* Idiopathic Granulomatous Mastitis: Case Reports and Review of the Literature. *Breast Cancer Research and Treatment*,2012;135(1):1-8.
24. Schelfaut D, *et al.* Idiopathic Granulomatous Mastitis: A Case Report. *Journal of Clinical Pathology*,2004;57(1):88-90.
25. Hameed M, *et al.* Fine-Needle Aspiration Cytology of Granulomatous Mastitis: An Institutional Experience. *Journal of Cytology*,2007;24(1):25-28.
26. Going JJ, *et al.* Idiopathic Granulomatous Mastitis: A Case Report. *American Journal of Clinical Pathology*,2003;120(3):418-421.
27. Li Y, *et al.* Idiopathic Granulomatous Mastitis: A Retrospective Study of 16 Cases. *The Breast Journal*,2015;21(3):288-292.
28. Al-Khafaji BM, *et al.* Idiopathic Granulomatous Mastitis: A Clinicopathologic Study of 21 Cases. *The Breast Journal*,2006;12(3):209-214.
29. Al-Otaibi MN, *et al.* Idiopathic Granulomatous Mastitis: Clinical Presentation, Management, and Outcome. *Annals of Saudi Medicine*,2007;27(6):446-450.
30. Yılmaz N, *et al.* Idiopathic Granulomatous Mastitis: Diagnosis and Treatment. *The Breast Journal*,2014;20(5):506-512.