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# GIANT CHOLESTEROL GRANULOMA OF THE BREAST MIMICKING CARCINOMA AND PHYLLODES TUMOR: A CASE REPORT

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## ABSTRACT

**Background:** Cholesterol granuloma of the breast is a rare benign inflammatory lesion characterized histologically by cholesterol clefts surrounded by foreign body giant cells and chronic inflammatory infiltrate. Clinically and radiologically, it may closely mimic breast carcinoma, making preoperative diagnosis difficult. Most reported cases in literature describe small lesions measuring only a few centimeters in diameter. Giant cholesterol granulomas of the breast are extremely uncommon and may create significant diagnostic uncertainty.

**Case Presentation** We report the case of a 75-year-old Indian woman who presented with a progressively enlarging right breast mass over two years associated with pain and stretching of the overlying skin. Clinical examination revealed a large 20 × 16 × 15 cm breast mass with prominent superficial veins and palpable axillary lymphadenopathy, raising suspicion for locally advanced breast carcinoma. Ultrasonography demonstrated a heterogeneous cystic lesion with solid components, suggesting a phyllodes tumour or malignancy. Because of significant skin thinning and the predominantly cystic nature of the lesion, preoperative core needle biopsy was deferred. The patient subsequently underwent right simple mastectomy with sentinel lymph node biopsy. Histopathological examination revealed numerous cholesterol clefts surrounded by foamy macrophages and foreign body giant cells within a background of chronic inflammatory infiltrate, confirming the diagnosis of cholesterol granuloma. No evidence of malignancy was identified.

**Conclusions** Cholesterol granuloma of the breast may closely mimic malignant breast tumors both clinically and radiologically. Although most reported lesions are small, this case demonstrates that cholesterol granuloma can occasionally present as a giant breast mass, creating significant diagnostic challenges. Awareness of this rare entity is important when evaluating suspicious breast lesions, and histopathological examination remains essential for establishing the definitive diagnosis.

**KEYWORDS** Cholesterol granuloma; Breast mass; Phyllodes tumor; Breast carcinoma; Granulomatous breast disease

## BACKGROUND

Cholesterol granuloma of the breast is a rare benign inflammatory lesion characterised histologically by cholesterol clefts surrounded by foreign body giant cells and chronic inflammatory infiltrate [1]. Although cholesterol granulomas are commonly described in sites such as the middle ear and petrous apex, involvement of the breast is uncommon [1-2]. The pathogenesis is believed to involve duct ectasia with rupture of lipid-filled ducts, resulting in leakage of lipid material into the surrounding breast tissue and subsequent granulomatous inflammatory reaction. Trauma, inflammation, and prior breast interventions have also been suggested as contributing factors [1-2].

Clinically and radiologically, cholesterol granuloma may closely mimic malignant breast tumours, often presenting as a palpable breast mass with suspicious imaging features [2]. Because of this overlap, definitive diagnosis usually requires histopathological examination.

While cholesterol granulomas generally present as small to moderately sized localized nodules typically measuring less than 3 to 5 cm, their manifestation as a “giant breast mass”, defined as any breast tumor exceeding 5 cm in diameter or 500 grams in weight, is an exceedingly rare clinical anomaly [3]. Managing giant breast masses presents a unique set of diagnostic and therapeutic hurdles, primarily because the classic “triple assessment” approach (clinical examination, radiological imaging, and tissue biopsy) may fail to yield a conclusive preoperative diagnosis [3]. We report a rare case of a giant cholesterol granuloma of the breast presenting as a large mass suspicious for malignancy. We aim to outline the significant diagnostic dilemmas posed by such massive, heterogeneous solid-cystic lesions, the critical limitations of standard preoperative

assessment, and the rationale for definitive surgical management when benign granulomatous conditions achieve such unprecedented, giant proportions.

## CASE PRESENTATION

A 75-year-old Indian woman presented to the outpatient department with a two-year history of a progressively enlarging lump in the right breast. Acute symptoms developed shortly before presentation, including pain for three days, bloody discharge from the lesion for two days, and fever for one day. The pain was dull, intermittent, and non-radiating. The patient also reported unintentional weight loss. She denied prior nipple discharge, nipple retraction, bone pain, jaundice, headache, or seizures. There was no history of similar swellings, prior breast surgery, chest wall radiation exposure, or use of oral contraceptive pills or hormone replacement therapy. On general examination, the patient appeared thin but hemodynamically stable, with no pallor, icterus, or generalized lymphadenopathy.

Local examination revealed massive asymmetrical enlargement of the right breast measuring approximately 15 × 15 cm, occupying most of the right anterior chest wall from the second to the sixth intercostal space (Figure 1). The mass was globular with a prominent downward dragging effect. The overlying skin was stretched and shiny with visibly engorged superficial veins. An area of early pressure necrosis measuring approximately 3 cm was noted in the upper outer quadrant. The nipple–areola complex was displaced inferolaterally, but the nipple was not retracted.

On palpation, a large 20 × 15 cm mass with variegated consistency was noted, replacing the entire breast tissue. The mass was mobile over the underlying pectoral fascia and not fixed to the overlying skin. A firm, mobile anterior axillary lymph node measuring approximately 2 × 2 cm was palpable on the right side. The left breast and axilla were unremarkable. Systemic examination was otherwise normal.

Ultrasonography of the right breast revealed a large heterogeneous lesion occupying almost the entire breast, predominantly cystic with internal floating echoes and ill-defined solid areas demonstrating internal vascularity. Multiple chunky calcifications were noted within the lesion.

Ultrasound examination of the axilla demonstrated multiple rounded hypoechoic lymph nodes, the largest measuring approximately 9.7 mm in short-axis diameter.

Core needle (Tru-Cut) biopsy was deferred because of the markedly stretched and thinned overlying skin, which posed a risk of non-healing sinus formation or fungation. In addition, the heterogeneous solid–cystic nature of the lesion raised concern for sampling error. Given the massive size of the tumour and the presence of pressure-related skin compromise, further imaging such as mammography, MRI, or PET–CT was deferred, and definitive surgical management was planned. Routine laboratory investigations, including complete blood count, liver and renal function tests, and inflammatory markers, were within normal limits.

### Differential Diagnosis

Given the patient's age and the massive, progressively enlarging nature of the lesion, the primary differential diagnosis focused on **locally advanced breast carcinoma** and **giant phyllodes tumour**, both of which were strongly suggested by the presence of solid components with internal vascularity, skin stretching, and palpable axillary lymphadenopathy. The heterogeneous solid-cystic architecture observed on ultrasonography further mirrored the typical radiological presentation of these aggressive tumours. Additionally, other inflammatory and granulomatous conditions were considered, including **tuberculous mastitis** and **idiopathic granulomatous mastitis,** which can mimic malignancy by presenting as firm masses with associated lymphadenopathy. Finally, rare entities such as **primary breast sarcoma** and **fat necrosis** remained possibilities due to their tendency to manifest as large, fast-growing masses with irregular ultrasonographic features or suspicious calcifications.

### Treatment

The surgical management of this massive breast lesion prioritized definitive excision followed by standard axillary staging. The patient underwent a Right Simple Mastectomy and Sentinel Lymph Node Biopsy (SLNB) under general anesthesia. An elliptical incision was used to remove the 20x15 cm specimen in toto, involving the right nipple-areola complex (Figure 2). Dissection extended superiorly to the clavicle, medially to the sternum, laterally to the clavipectoral fascia, and inferiorly to the inferior mammary fold. Despite clinical suspicion and the presence of a mobile anterior axillary node, a sentinel node biopsy was performed. The results were negative for malignancy, confirming that the palpable lymphadenopathy was reactive rather than metastatic. Blood loss was minimal at approximately 100 ml. The specimen was sent for histopathology and blood-stained discharge for culture and sensitivity.

### Outcome and Follow-up

The postoperative period focused on managing skin complications and confirming the definitive diagnosis through histopathology. Following the initial mastectomy, the patient developed necrosis of the superior skin flap. On postoperative day 3, excision of a necrosed superior skin flap and secondary suturing were performed. The definitive diagnosis of Cholesterol Granuloma of the right breast was confirmed via comprehensive examination of the mastectomy specimen. Subsequent follow-up demonstrated healthy wound healing with the flaps well-approximated (Figure 3). She was able to return to her normal daily activities within two to three weeks post-surgery.

Pathology –

Gross examination- The specimen measured 20 x 16 x 15 cm, featuring a 6 x 5.5 cm grey-white solid area amidst predominantly cystic and hemorrhagic regions.
On Microscopy- Sections revealed extensive cholesterol clefts surrounded by foamy macrophages and numerous foreign body-type multinucleated giant cells. A mixed inflammatory infiltrate comprising neutrophils and lymphocytes was noted extending into the surrounding fibro-fatty tissue. (Figure 4A-C)
Crucially, there was no evidence of atypia or invasive carcinoma in any of the sections studied, including the resected margins.

**Timeline of Events**

| Time | Event |
|---|---|
| 2 years before presentation | The patient noticed a gradually enlarging right breast swelling<br>Progressive course<br>Increase in size with associated pain and stretching of the overlying skin |
| Hospital presentation | A large breast mass was detected on clinical examination |
| Imaging | Ultrasonography showed a heterogeneous cystic lesion with solid components |
| Preoperative assessment | Malignancy and phyllodes tumour are considered<br>Anesthetic Assessment |
| Surgical management | Right simple mastectomy with sentinel lymph node biopsy |
| Histopathology | Cholesterol clefts with foamy macrophages and foreign body giant cells, confirming cholesterol granuloma.<br>Sentinel node biopsy was negative for malignancy. |
| Outcome | No malignancy identified<br>Patient resumes normal activities in a few weeks |

## DISCUSSION AND CONCLUSION

Cholesterol granuloma of the breast is a rare benign inflammatory lesion characterised histologically by cholesterol clefts surrounded by foreign body giant cells, foamy macrophages, and chronic inflammatory infiltrate [1-3]. While the exact pathogenesis remains a subject of ongoing debate, it is widely believed to represent an unusual development in the advanced stages of mammary duct ectasia or periductal inflammation. It is postulated that the obstruction, damage, or rupture of an ectatic duct or occasionally the spontaneous rupture of a breast cyst allows lipid-rich intraluminal material and cholesterol crystals to extravasate into the surrounding parenchyma, triggering a severe localized inflammatory cascade [2]. Despite its benign nature, a cholesterol granuloma can closely mimic breast malignancy both clinically and radiologically, creating significant diagnostic uncertainty [3-5].
Globally, cholesterol granulomas primarily affect middle-aged and older women (mean age of 57.5 years) and most frequently present as small, painless, palpable hard nodules discovered incidentally or through routine screening [5]. Documented sizes in the literature generally range from microscopic lesions to modest masses, such as 0.6 to 1.5 cm, an 8 mm mass, or occasionally up to 5 cm [1-2, 4-6].
The present case of an Indian woman in her seventies is globally exceptional because the tumor measured an astonishing 20 × 16 × 15 cm. By definition, a "giant breast mass" is any breast lesion exceeding 5 cm in diameter or 500 grams in weight [3]. While giant breast malignancies such as malignant phyllodes tumors or primary sarcomas are frequently reported in the literature, giant benign granulomatous masses are exceedingly rare [3]. A closely comparable case in recent literature is an Indian patient reported by Ethirajulu et al., who presented with a 17 × 12 × 6 cm (631 g) xanthogranulomatous mass that replaced the entire right breast [7]. Such massive proportions produce significant mechanical symptoms, including a dragging sensation and pressure-related skin changes, features that are typically associated with aggressive giant phyllodes tumours or locally advanced breast sarcoma [3].
Radiologically, cholesterol granuloma of the breast presents a profound diagnostic challenge because imaging findings are notoriously non-specific [4-5,8]. Mammography typically demonstrates high-density masses with indistinct margins and occasionally coarse or clustered microcalcifications. Ultrasonography frequently reveals irregular, heterogeneous hypoechoic masses with posterior acoustic shadowing, strongly mimicking carcinoma [1,4-5,9]. In some cases, such as the one described by Ahn et al., the mass can present as a complex intracystic lesion with solid components, radiologically mimicking a papillary neoplasm [9]. In the present case, ultrasonography demonstrated a large heterogeneous lesion with cystic areas and internal echoes, findings that strongly suggested a giant phyllodes tumour or primary breast malignancy.
Several reports in the literature have highlighted this diagnostic difficulty. Khan et al. described a case in a 28-year-old woman where physical examination and ultrasonography so strongly suggested a carcinomatous lesion that surgical excision was

required to rule out cancer [5]. While advanced imaging like dynamic contrast-enhanced MRI (DCE-MRI) has occasionally helped differentiate these lesions from cancer by demonstrating benign time-signal intensity curves, giant masses with skin compromise often render advanced imaging technically unfeasible or unreliable [10].

Current breast evaluation protocols emphasise the principle of triple assessment, comprising clinical examination, imaging, and tissue diagnosis, for all suspicious breast masses [11]. While core needle biopsy (CNB) is recommended as the initial diagnostic procedure and is superior to fine-needle aspiration (FNA), which is frequently inconclusive due to a paucity of epithelial cells, it has significant limitations in this context [12]. In very large, heterogeneous lesions with mixed cystic, solid, and necrotic components, sampling error is a major risk, and biopsy findings may fail to accurately represent the entire lesion. Ebrahim et al. noted similar diagnostic failures with core needle biopsies in giant, rapidly growing breast masses, necessitating surgical excision for a definitive answer [3].

In the present case, the massive size of the tumour, the associated skin compromise, and the significant symptoms prompted definitive surgical management. Complete surgical excision is essential in these giant presentations, not only to provide symptomatic relief but also to rule out concurrent malignancies. Our patient underwent a simple mastectomy with sentinel lymph node biopsy as a definitive therapeutic and diagnostic procedure. The sentinel node was found to be negative, which further avoided lymph node dissection and morbidity for the patient. Furuhira et al. and Hu et al. have documented rare but critical cases where breast cholesterol granulomas coexisted with invasive ductal carcinoma within the same mass, an overlap that a limited biopsy might easily miss [13-14].

Histopathological examination remains the gold standard for definitive diagnosis [1,3,5]. Characteristic microscopic findings, including numerous cholesterol clefts, foreign body giant cells, and lipid-laden macrophages (foamy histiocytes) without cellular atypia, reliably differentiate cholesterol granuloma from invasive carcinoma, as well as from other granulomatous breast conditions like fat necrosis, idiopathic granulomatous mastitis, and tuberculous mastitis [4-6].

This case highlights that cholesterol granuloma of the breast, although benign, may present as a massive, tissue-replacing breast tumour with clinical and radiological features highly suspicious for malignancy. Awareness of this rare entity is paramount when evaluating giant breast masses, as definitive diagnosis and exclusion of concurrent cancer ultimately rely on comprehensive histopathological examination.

## PATIENT'S PERSPECTIVE

The patient reported that the breast swelling had gradually increased in size over the past two years and was associated with discomfort and a dragging sensation, which caused considerable anxiety due to the fear of breast cancer. The progressive enlargement of the mass also caused stretching of the overlying skin and difficulty with daily activities.

After undergoing surgical treatment, the patient expressed relief that the condition was benign and was satisfied with the outcome of the surgery. She reported improvement in symptoms following removal of the mass and appreciated the explanation provided regarding the rare nature of the condition.

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## DECLARATIONS

Ethics approval and consent to participate. Ethical approval was waived by the institutional ethics committee as this study represents a single case report.

**Consent for publication**

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent form is available for review by the Editor-in-Chief of this journal.

**Availability of data and materials**

All data generated or analysed during this study are included in this published article.

**Competing interests**

The authors declare that they have no competing interests.

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**Authors' contributions**

AR contributed to the conception of the report, patient management, data collection, literature review and drafting of the manuscript. VS and ST contributed to patient management and collection of clinical data. SR supervised the clinical

management of the case and critically revised the manuscript for important intellectual content. MN contributed to literature review and manuscript editing. All authors read and approved the final manuscript.

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15. FIGURE LEGENDS /CAPTIONS

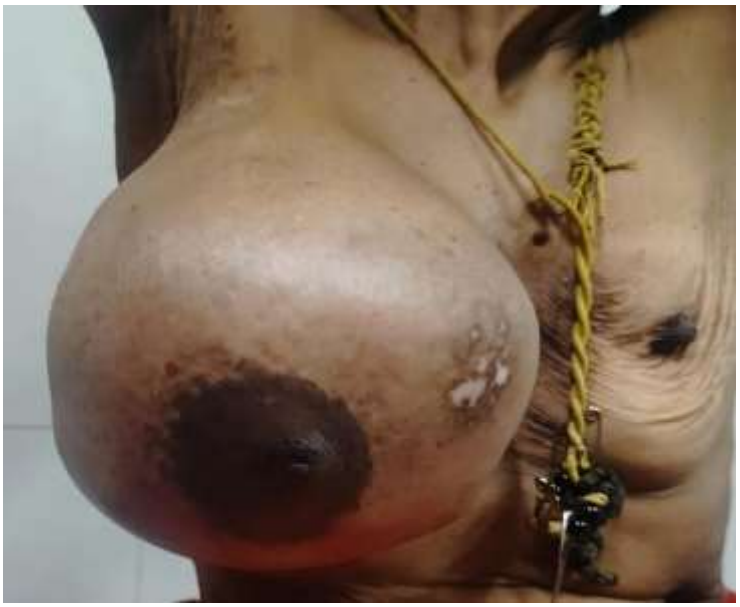

Figure 1. Clinical photograph showing massive enlargement of the right breast caused by a large breast mass. The lesion produces marked asymmetry with stretched, shiny overlying skin and prominent superficial veins. The nipple–areola complex

is displaced inferiorly, and an area of pressure-related skin change is visible. These clinical features raised suspicion of a giant phyllodes tumour or locally advanced breast carcinoma.

Figure 2. Gross specimen following right simple mastectomy showing a large rounded breast mass measuring approximately 20 × 16 × 15 cm. The specimen includes the nipple–areola complex and demonstrates a bulky tumour replacing the majority of the breast tissue. The external surface appears lobulated with areas of cystic change and haemorrhage. A measuring scale is shown for reference.

Figure 3. Postoperative photograph showing the right chest wall following mastectomy with a healing surgical incision in the axillary region. The wound demonstrates satisfactory healing following excision of the necrotic superior skin flap and secondary suturing.

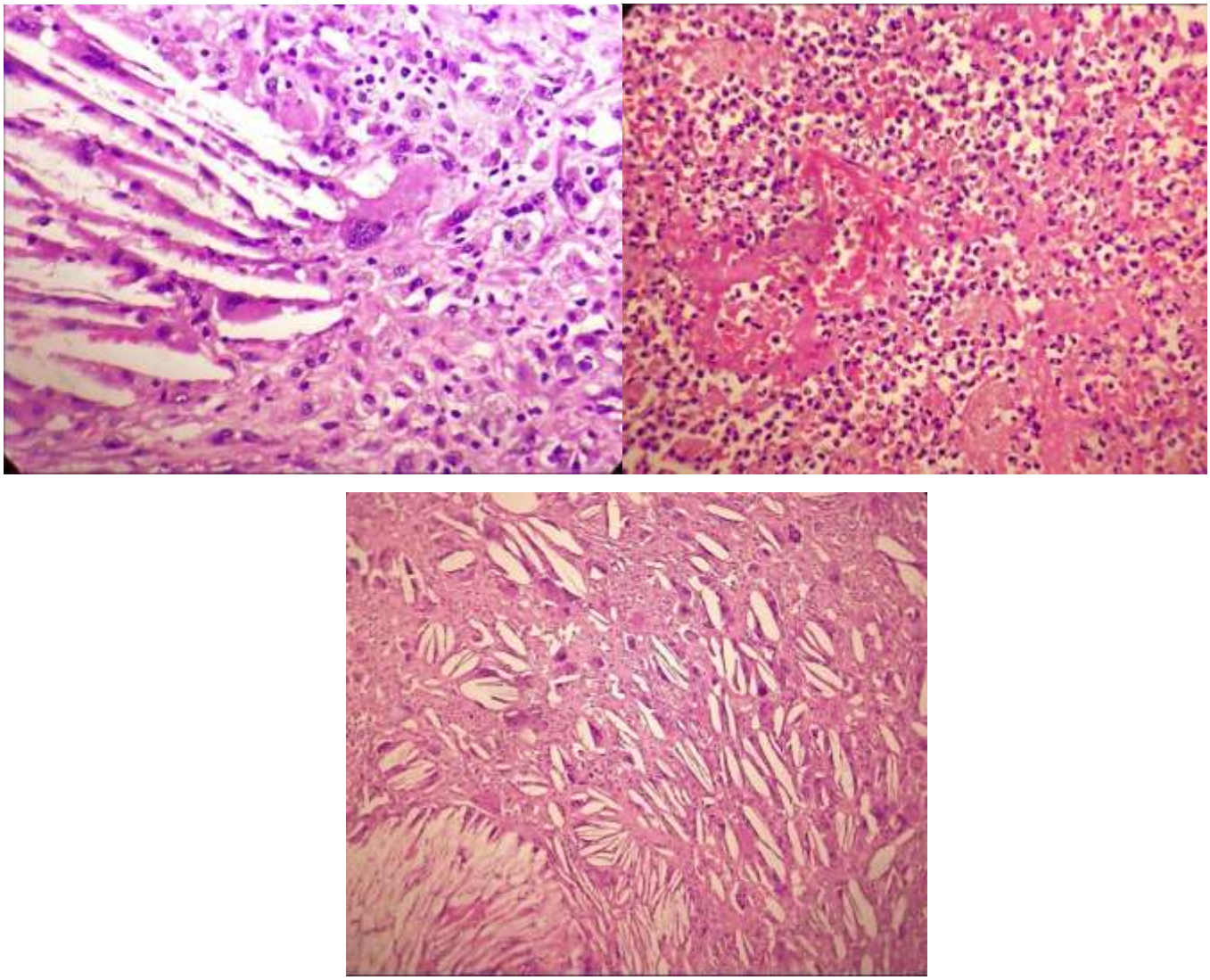

**Figure 4. Histopathology of cholesterol granuloma (H&E stain).**

A: Low-power view showing multiple cholesterol clefts.
B: Granulomatous inflammatory reaction.
C: High-power view showing cholesterol clefts with foreign body giant cells.