



# Granular Cell Tumor of the Breast: Understanding the Cancer Mimic through a Series of Three Cases

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## Abstract

Granular cell tumors of breast are rare neoplasms, majority of which are benign. Their imaging appearances are often indistinguishable from breast cancer. They may demonstrate a few differentiating features and unlike breast cancer, typically follow a benign course. Histopathology and immunochemistry form the cornerstone of diagnosis of granular cell tumor. In this article, we presented a series of three cases of granular cell tumors with variable presentations. Our goal is to increase familiarity for these neoplasms and for the readers to be able to distinguish them from the more common entity of breast cancer, as their prognosis and management differ.

## Keywords

- ▶ granular cell tumor
- ▶ breast cancer

## Case Presentations

The first patient, a 66-year-old, had a focal asymmetry on screening mammogram and no sonographic correlate (▶**Fig. 1**). Stereotactic biopsy demonstrated granular cell tumor (GCT). Post-lumpectomy pathology confirmed GCT.

The second patient, a 53-year-old with a palpable left breast lump, had no suspicious findings on mammogram (▶**Fig. 2A and B**) and a mass with indistinct margins and posterior shadowing on ultrasound (▶**Fig. 2C**). Ultrasound-guided biopsy and post-lumpectomy pathology confirmed GCT.

The third patient, a 42-year-old, had an irregular mass on screening mammogram (▶**Fig. 3A and B**). On ultrasound, the mass had indistinct margins and posterior shadowing (▶**Fig. 3C**). Ultrasound-guided biopsy and post-lumpectomy pathology showed infiltrative GCT (▶**Fig. 4A–D**). Later that year, patient underwent surgery for a vulvar mass, which turned out to be GCT on pathology (▶**Fig. 5A, B**), making this a case of multifocal GCT. In a case review of breast GCTs published by Adeniran et al in 2004, 3 out of 17 cases had multifocal GCTs.<sup>1</sup>

## Discussion

GCTs are rare neoplasms, constituting 0.1% of breast tumors. Tongue is the commonest site for GCT and breast accounts for 5 to 6% cases. Majority are benign, with malignant cases constituting less than 1% of breast GCTs. The tumor is considered of neural or neuroectodermal origin, as favored by S100 protein positivity. Breast GCTs likely originate from Schwann cells of peripheral nerves in the lobular breast tissue.<sup>1,2</sup> They may mimic breast cancer clinically and radiologically.<sup>3,4</sup>

Breast GCTs are more common in premenopausal African American women. Most of them present as painless masses. Mammographic and sonographic features of GCT are variable and nonspecific. GCT may present as circumscribed or irregular mass. Typically, on ultrasound GCT is a solid hypoechoic mass with posterior shadowing.<sup>5</sup> Calcifications are generally not a feature of GCT. When GCT presents as a mass with indistinct or spiculated margins, as in our cases, it mimics cancer.<sup>6</sup> On magnetic resonance imaging (MRI), the tumor is isointense or slightly hyperintense, with variable enhancement patterns.<sup>1,2</sup>

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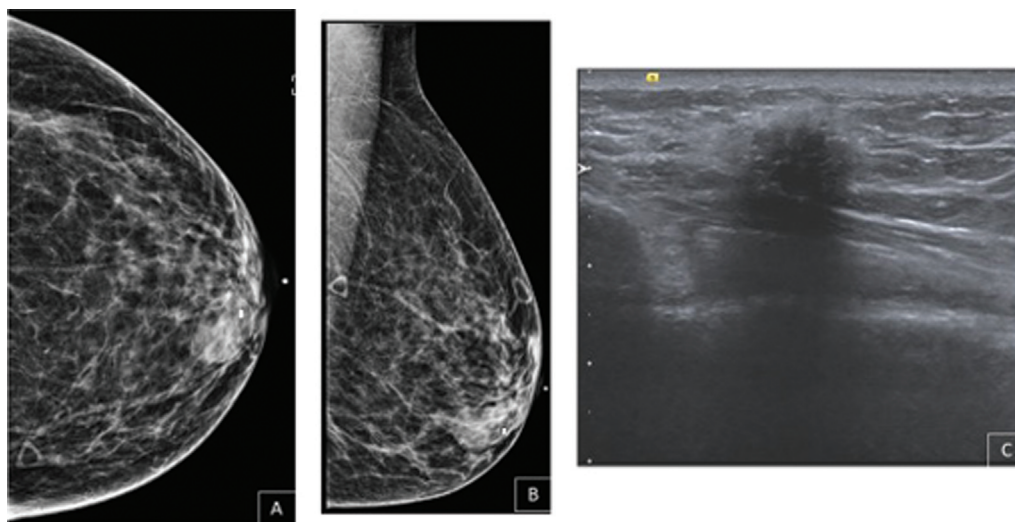
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**Fig. 1** A 66-year-old female patient with abnormal screening mammogram—Right breast two-dimensional craniocaudal (A) and mediolateral oblique (B) views as well as tomosynthesis views (C, D) demonstrate a 7.5 mm focal asymmetry (red circle) in the upper inner breast, 10 to 13 cm from the nipple.



**Fig. 2** A 53-year-old female patient with a palpable left breast lump—Left breast two-dimensional craniocaudal (A) and mediolateral oblique (B) views do not demonstrate any suspicious finding underneath the palpable marker. A circumscribed left breast retroareolar mass is noted with a biopsy clip within it. Targeted ultrasound (C) of the palpable lump shows a 1.1 cm × 0.9 cm × 1.2 cm mass at 10:00, 11 cm from the nipple, with indistinct margins and posterior shadowing.

It is important to differentiate GCT from breast cancer, as their treatment and prognosis are different. Treatment for breast GCT is complete tumor resection and prognosis is excellent. Inadequate resection can cause local recurrence. In contrast, treatment of breast cancer involves multidisciplinary approach, with some combination of surgery with chemotherapy, endocrine therapy and radiation.

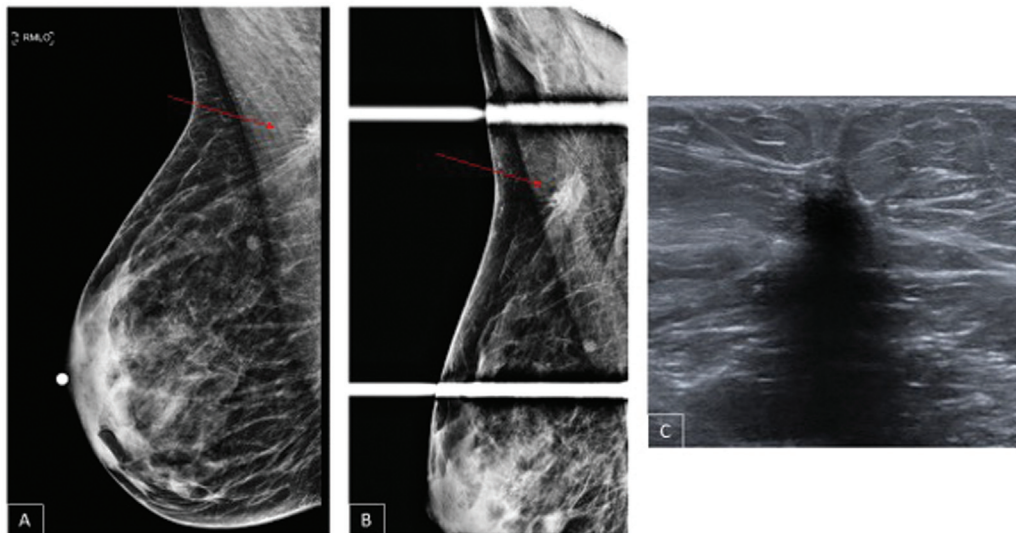
Some imaging features of breast GCTs distinguishing them from breast cancers are relatively homogeneous appearance, absence of microcalcifications, lack of surrounding edema, and lack of rapid washout on MRI. Additionally, there is lack of rapid growth and axillary lymphadenopathy, unlike cancers and the very rare malignant GCTs, which may exhibit these features. Unlike breast cancers, breast GCTs are not hypermetabolic on fluorodeoxyglucose positron emission tomography.<sup>1,2</sup>

Histopathological examination with core needle biopsy along with immunohistochemistry is needed to make the

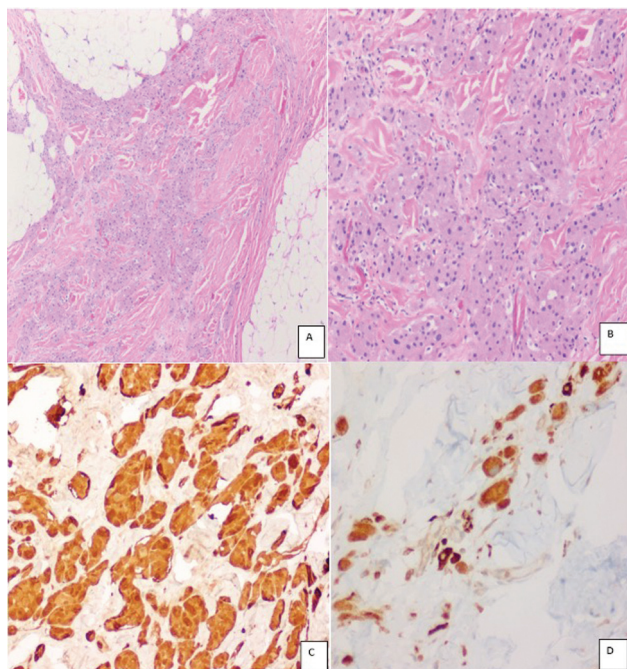
diagnosis of GCT. Fine-needle aspiration may not be diagnostic. Microscopy shows sheets or cords of polygonal cells, abundant granular eosinophilic cytoplasm, and bland small round nuclei, without atypia or marked nuclear pleomorphism. On immunohistochemistry, positive reaction to S100 and CD 68 antibodies, with strong cytoplasmic and nuclear staining for S100 protein, is diagnostic. GCTs stain negative for cytokeratin, myoglobin, desmin, neurofilament protein, glial fibrillary acidic protein, and lysozyme.<sup>1,2</sup> A definitive diagnosis of GCT on image-guided biopsy prior to surgery helps with optimal treatment planning and radical surgery can be prevented.<sup>7</sup>

## Conclusion

GCT in breast is a rare but important mimic of breast cancer with better prognosis. Understanding the differences in

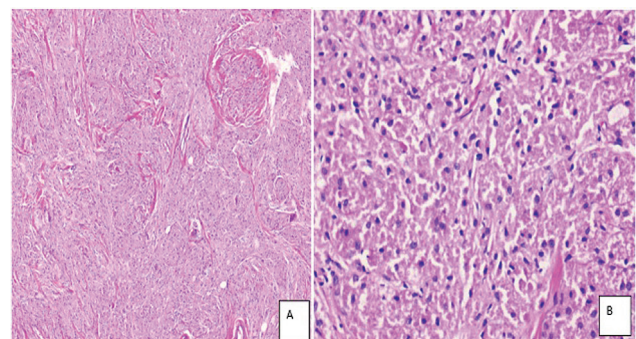


**Fig. 3** A 42-year-old female patient with abnormal screening mammogram—Right breast two-dimensional mediolateral oblique view (A) demonstrates one view posterior upper asymmetry with architectural distortion, 12 cm from the nipple. Spot compression mediolateral oblique view (B) of the right breast asymmetry demonstrates a 1 cm × 1.5 cm irregular mass. Targeted ultrasound of the right breast (C) shows a 1.3 × 0.9 × 1.4 cm irregular mass with indistinct margins and posterior shadowing at 10:00, 10 cm from the nipple.



**Fig. 4** Granular cell tumor of the breast. Histopathology slides show sheets and cords of polygonal cells with well-defined borders, abundant eosinophilic granular cytoplasm, and prominent nucleoli (A, B). S100 immunostain (C) and CD68 immunostain (D) are diffusely positive in the tumor cells.

imaging features and the significance of immunochemistry is crucial to avoiding excessive or unnecessary treatment.



**Fig. 5** Granular cell tumor of the vulva. Histopathology slides show sheets of polygonal cells with eosinophilic granular cytoplasm (A, B).

### Key Learning Points

- Breast granular cell tumors are benign neoplasms that can mimic breast cancer clinically and on imaging.
- Breast granular cell tumors have variable imaging features.
- Histopathology and immunochemistry serve as the gold standard for diagnosis of breast granular cell tumors.

**Conflict of Interest**  
None declared.

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