Case Report ISSN 2639-944X

Journal of Medical - Clinical Research & Reviews

# Granular Cell Tumor (GCT) of the Breast: Case Report of an Uncommon Benign Neural Tumor with Malignant Imaging Characteristics

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**Received:** 01 January 2019; **Accepted:** 09 January 2019

**Citation:** Wegner U, Juette A, Ryan A.G, et al. Granular Cell Tumor (GCT) of the Breast: Case Report of an Uncommon Benign Neural Tumor with Malignant Imaging Characteristics. J Med - Clin Res & Rev. 2019; 3(1): 1-3.

## ABSTRACT

***Purpose and Objectives:*** *Granular-cell tumor is one of the rarest breast lesions and can be mistaken for malignancy on imaging. Distinguishing it histologically from all other breast malignancy mimics, the tumour has an exceptional origin from perineural cells. We report the imaging of a premenopausal patient, illustrating the sonographic and mammographic features, in combination with a review of the literature.*

***Case Report:*** *A 46- year old premenopausal female of African origin with a two month history of a painless hard breast mass was referred for further assessment, imaging evaluation and biopsy. On physical examination, the lesion was located at the 12 o'clock position, measured 2.8 cm and had an irregular surface. Ultrasound showed features consistent with malignancy i.e. the mass was taller than wide, was non-compressible and demonstrated posterior acoustic shadowing, and was therefore assigned BI-RADS 5. No associated findings such as skin thickening, hypervascularity or oedema were evident. There was no axillary lymphadenopathy. Histopathology of a core biopsy revealed a diagnosis of Granular Cell Tumor of the breast and no evidence of malignancy. Granular Cell Tumors of the breast are very rare, firm breast lesions of neural Schwann cell origin (in this case from the supraclavicular nerve). Complete excision of the tumor is recommended as there may be less than a 1% risk of malignant transformation; however, recurrence and metastases are very unlikely and thus only routine patient follow-up is required.*

***Conclusion:*** *Familiarity with this rare entity prevents unnecessarily radical surgery once the diagnosis is confirmed by prompt biopsy.*

## Keywords

Granular cell tumour, breast imaging, sonography, mammography, biopsy.

## Introduction

Granular Cell Tumors of the breast are very rare, firm breast lesions of neural Schwann cell origin with features suggesting malignancy on imaging. We report a case of a histology-proven solitary benign Granular Cell Tumor (GCT) of the breast, illustrating the radiological and histopathological features. The management of these lesions will be discussed in combination with a review of the literature.

## Case Report

A 46- year old premenopausal female of African origin with a two month history of a hard, painless breast mass was referred to the triple assessment breast clinic for clinical review, imaging evaluation and biopsy. On physical examination, the lesion was located at the 12 o'clock position, measured 2.8 cm and had an irregular surface. The overlying skin was unremarkable.

Bilateral mammography demonstrated a dense, slightly spiculate mass which was highly suspicious of malignancy (Figures 1a-b). No microcalcifications were visualised. Ultrasound of the whole breast with a linear 6-15 MHz transducer revealed an irregular solid lesion measuring approximately 2.8 cm located in the upper breast at the 11-12 o'clock position (Figure 2a). The mass had worrisome imaging characteristics i.e. the lesion was taller than wide with posterior acoustic shadowing, and was thus assigned BI-RADS 5 and RCR5 scores. No associated findings such as skin

ulceration, hypervascularity or oedema were evident. No other lesions were demonstrated on either mammography or ultrasound. There was no demonstrable ipsilateral axillary lymphadenopathy.

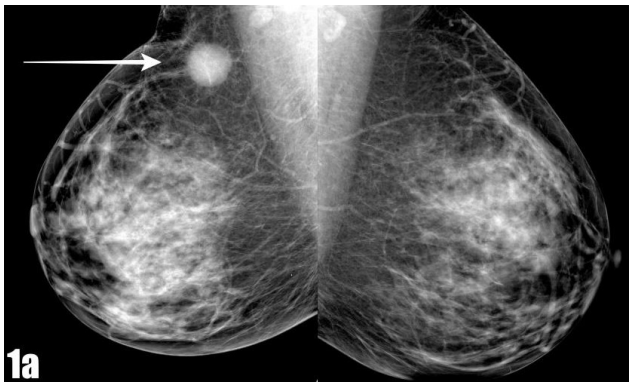


**Figure 1a:** A 46-year old female with a 2-month history of a hard right-sided breast mass. Bilateral mediolateral oblique mammograms demonstrating a dense well-defined mass within the right breast (arrow). The mass is closely located to the pectoralis major muscle.

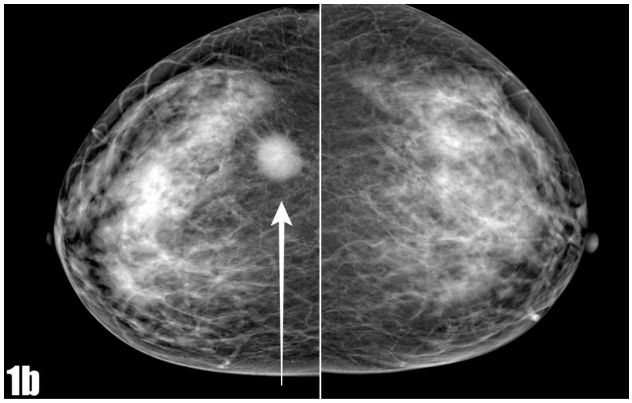


**Figure 1b:** Craniocaudal view showing the right upper outer quadrant granular cell tumour (arrow).

Subsequent ultrasound-guided core biopsies were performed after local asepsis and administration of local anaesthetic (Figure 2b). Histopathology revealed a diagnosis of Granular Cell Tumor of the breast. No malignant or atypical cells were observed to suggest aggressive features or malignant transformation (Figure 3).

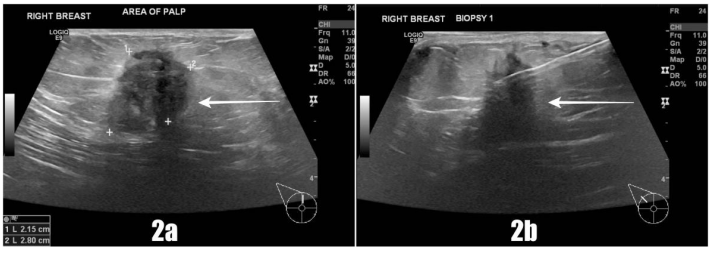


**Figure 2: a)** Ultrasound examination of the same patient. Image of the right breast shows an irregular, somewhat lobulated hypoechoic 2.8 cm mass (arrow). **b)** Subsequent ultrasound-guided biopsy was performed after local asepsis and anaesthesia (arrow).

The patient underwent wide local excision and the final histology findings were consistent with Granular Cell Tumour i.e. granular cytoplasm, small central round nuclei, small nucleoli and indistinct borders (Figure 4 – wide local excision specimen). The tumour cells were positive for S100 and CD68. The S100 protein was also supportive of the diagnosis.

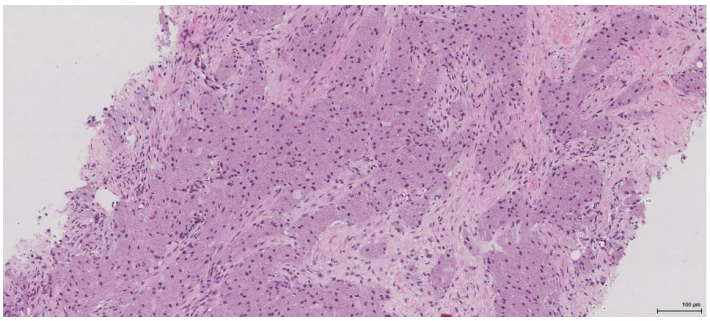

**Figure 3:** Microphotograph demonstrating granular cell tumour features with no evidence of associated atypia or malignancy.

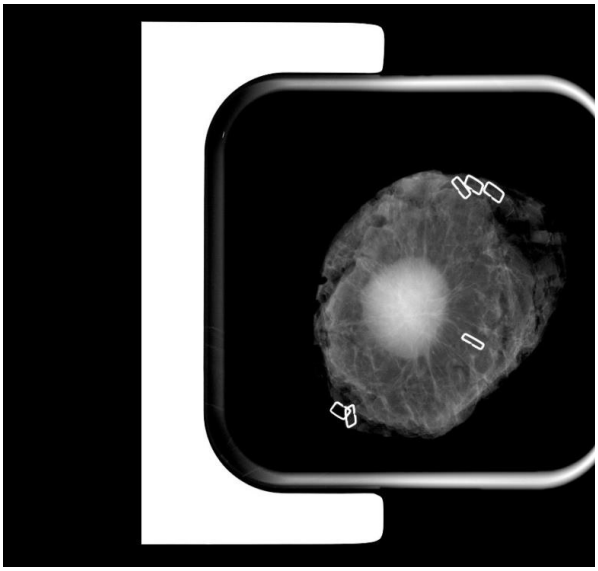

**Figure 4:** X ray Specimen following Wide-local excision confirms that the lesion is well excised with clear margins.

## Discussion

The presented sonographic and mammographic findings were consistent with the previously reported cases [1-3]. Crucially, there are no pathognomonic features to help differentiate this entity from carcinoma [3,4]. Mammography usually demonstrates a spiculate mass which makes it indistinguishable from a carcinoma [2,3]. At sonography this entity mostly reveals an irregular hypoechoic lesion with associated posterior shadowing. Moreover, occurrence in the breast is uncommon. Thus, the differential diagnosis based on imaging alone is broad and includes not only breast cancer, but also its variable potential mimics. Thus, it is important to be aware of this challenging breast cancer mimicker which demonstrates a highly suspicious imaging spectrum. GCT is most commonly found within the upper inner quadrant [3], unlike carcinoma, which usually occurs within the upper outer quadrant.

The first case of GCT was initially reported by Abrikossoff as a Myoblastic myoma of the breast in 1926. These tumors occur in

both sexes, more commonly in females. It is typically a benign condition that more frequently involves the skin or superficial soft tissues and very rarely occurs within the breast. Review of the literature reveals that this entity is more common in premenopausal African women and has a predilection for the upper breast in the distribution of the supraclavicular nerve [1,3]. The key histopathologic feature is the presence of cells with eosinophilic granular cytoplasm. Moreover, CD68 and S100 positive immunohistochemical staining support a neurogenic origin [3].

Complete wide local excision with clear margins is recommended as those neoplasms tend to recur; however, given the fact that both malignant transformation and metastases are very unlikely, only routine patient follow-up is required. Malignant presentation is unusual and accounts for approximately 2 % of all GCT [5]. In the case of an unlikely malignant presentation, additional regional lymph node dissection is indicated. Due to the rarity of this clinical scenario and the lack of evidence with regards to outcomes, both radiotherapy and chemotherapy remain controversial [5].

## Conclusion

Awareness of this unusual breast malignancy mimics is crucial to avoid invasive procedures and prevent patients from unnecessary delay of the diagnosis or radical surgeries. Thus, it is important to identify this condition on breast imaging and histopathologic analysis prior to further surgical management and planning.

Breast granular cell tumors are benign, however a few exceptions and rare malignant presentations in the setting of presumed transformation have been reported. Such cases are extremely rare and may be associated with metastatic disease.


## Acknowledgments

We would like to acknowledge Pathologist Dr. Nigam Shah from University Hospital Waterford in Ireland and thank him for his valuable microphotograph.

## Financial support and sponsorship

Nil.


## Conflicts of interest

There are no conflicts of interest.

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