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**Case Report**

# Case Report of a Benign Granular Cell Tumor Resembling Breast Carcinoma in a Young Woman: A Diagnostic Challenge

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## Keywords

Uncommon tumors · Granular cell tumor · Schwann cells · Breast

## Abstract

***Introduction:*** Granular cell tumors (GCTs) are uncommon, low-grade Schwann cell tumors found in the skin, soft tissue, and mucosal surfaces of the oral, gastrointestinal, and respiratory tracts. One in 1,000 breast cancer cases is GCT. Just 1–2% of GCTs are malignant GCTs. ***Case Presentation:*** This case report presents the clinical details and outcomes of a 34-year-old woman with a main concern of a palpable mass and pain in her right breast. In the clinical examination, we found a 1.5 × 2-cm palpable mass in her right breast with no axillary lymph node detection. The primary diagnosis was a benign GCT mimicking carcinoma of the breast. Upon evaluation, the mass was confirmed to be a benign GCT through pathology. The patient underwent breast-conserving surgery and sentinel lymph node dissection at the Cancer Research Center of Shahid Beheshti University of Medical Sciences on November 30, 2022. The surgical margins were found to be free of tumors, and there was no involvement of skin or axillary lymph nodes. The patient had a positive postoperative outcome, with no complications observed. ***Conclusion:*** The case highlights the importance of accurate diagnosis and appropriate surgical planning to avoid invasive procedures and unnecessary radical surgeries in cases of benign GCT mimicking carcinoma of the breast.



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## Introduction

Granular cell tumors (GCTs) are rare low-grade tumors originating from Schwann cells. They can develop in various tissues, including the skin, soft tissue, and mucosal surfaces of the oral, gastrointestinal, and respiratory tracts [1]. The existence of GCTs was initially suggested by Weber in 1854 and further described by Abrikossoff in 1926 [2]. In the breast, GCTs are predominantly found in the upper-inner quadrant, along the distribution of the supraclavicular nerve, presenting as painless palpable masses [3]. Approximately 1 in every 1,000 cases of breast cancer is believed to be associated with GCTs [4]. These tumors are more common in premenopausal women of middle age, particularly those of African-American descent [2]. Due to their clinical and radiological characteristics, GCTs can mimic malignant tumors, necessitating accurate recognition as a distinct entity [5]. Malignant GCTs (MGCTs) are extremely rare, accounting for only about 1–2% of all GCT cases [6].

## Case

In this case report, we present an exceptionally uncommon occurrence of a benign GCT located in the lower outer quadrant of the breast that was obtained by breast ultrasonography but not by mammography. A 34-year-old married female patient with no family history of cancer and a previous diagnosis of fibroadenoma reported feeling a mass and experiencing pain in the right breast for the past month. The patient denied any history of nipple discharge or erythema and had not used estrogen- or progesterone-containing medications. On examination, a palpable mass measuring approximately 20 mm was identified in the lower outer quadrant of the right breast (at 8 o'clock). No palpable axillary lymph nodes were observed.

Mammography performed in another country (Canada) revealed a 12-mm nodular opacity at 6 o'clock with a BI-RADS 0 classification (Fig. 1). However, the lesion at 8 o'clock was not visualized. Subsequent ultrasonography of the right breast in there identified an irregular mass at 8 o'clock, measuring 10 × 12 × 10 mm, with an area of punctate calcification within the region. No axillary lymphadenopathy was noted, and the BI-RADS classification was 4B. A core needle biopsy in there confirmed the diagnosis of a GCT. Following referral to our institute in Iran, the slides were reevaluated by our center's pathologist, confirming the benign nature of the GCT. The patient was scheduled for breast-conserving surgery and sentinel lymph node dissection at our cancer research center in Iran.

During the surgical procedure, frozen section analysis indicated a GCT with a diameter of 0.9 cm located in the subcutaneous area at 8 o'clock. Tumor-free margins were achieved, and no further tumor was detected.

The patient's postoperative recovery was uneventful, and she returned to Canada 1 week after the operation. Considering the potential for local recurrence, we advised the patient to undergo postsurgical surveillance and follow up with her physician in there for 10 years.

## Discussion

GCTs are uncommon neoplasms that can occur in various anatomical locations. The tongue and soft tissues are the most frequent sites of origin, while breast GCTs account for approximately 5–15% of all GCT cases [7]. The majority of these tumors are benign, with less than 1% exhibiting malignant histological and clinical characteristics. In our case, the frozen section pathology report confirmed the benign nature of the tumor [8].

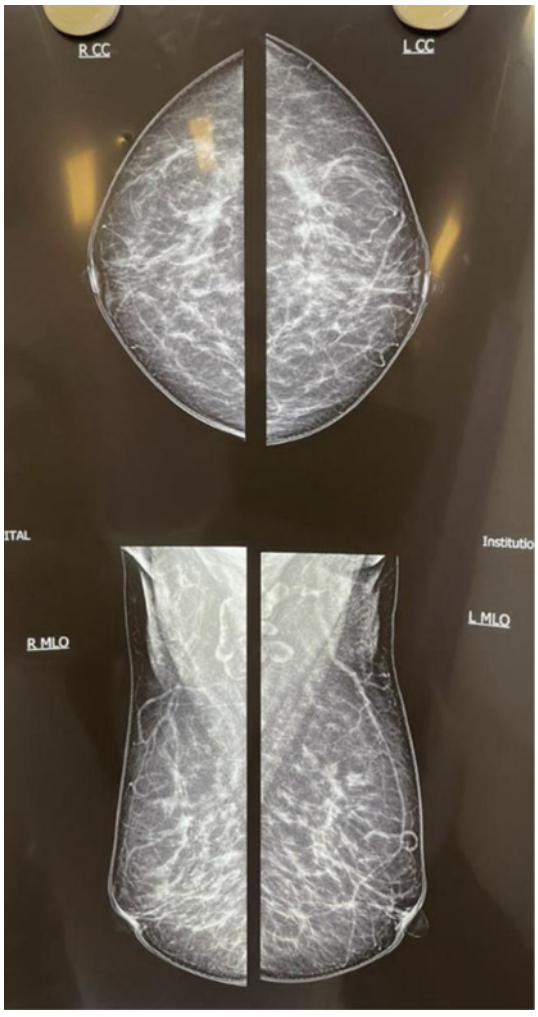


**Fig. 1.** Mammography of the patient. It revealed a 12-mm nodular opacity at 6 o'clock with a BI-RADS 0 classification.

Typically, GCTs of the breast present as solitary, painless masses in the upper-inner quadrant along the distribution of the supraclavicular nerve [3]. However, our case is unique as the mass was located in the lower outer quadrant of the right breast at the 8 o'clock position, deviating from the typical location and highlighting its rarity.

Our study aligns with previous findings that GCTs primarily affect women between the ages of 19 and 77 years, with a slightly higher incidence in premenopausal women [9]. Differentiating between benign and malignant breast GCTs based on mammography and ultrasonography characteristics is challenging. Due to metastasis, several instances of benign or atypical GCT were described as MGCT [6]. Ultrasonographic results are nonspecific, often revealing circumscribed masses or solid, heterogeneous masses with or without peripheral hypervascularization [10]. Mammograms may show well-circumscribed spherical masses or indistinct/spiculated densities resembling primary breast cancer.

Histological diagnosis of MGCTs involves the presence of necrosis, vesicular nuclei with large nucleoli, a high nuclear to cytoplasmic ratio, pleomorphism, spindling tumor cells, and an accelerated mitotic rate greater than 2 mitoses per 10 high-power fields (Fig. 2, 3) [6]. These criteria were established by Fanburg-Smith et al. [9]. In contrast, GCTs are considered benign when none of these characteristics are present [11].

Pathological examination with immunohistochemical staining, particularly for S-100 protein, is crucial for confirming the diagnosis of GCTs [10]. GCTs typically exhibit negative expression of

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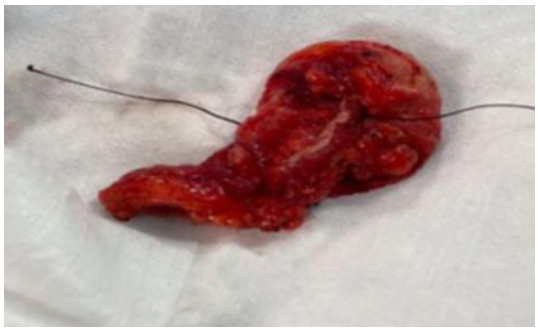

**Fig. 2.** Granular cell tumour of the breast (GCTB), low magnification. The image displays clusters and trabeculae of large round to polygonal cells with abundant, eosinophilic, and granular cytoplasm.

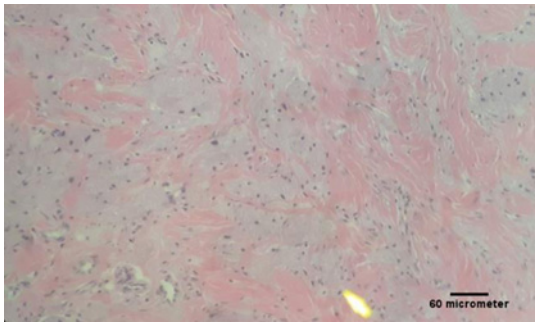


**Fig. 3.** Granular cell tumour of the breast (GCTB), high magnification. The tumor cells have centrally located nuclei that are small, uniform, and hyperchromatic. The cytoplasm of the tumor cells is finely granular.

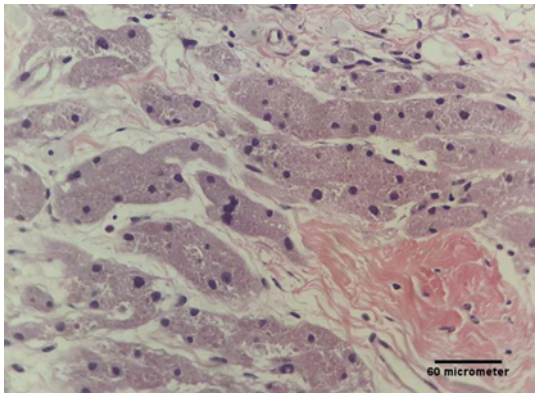


**Fig. 4.** Granular cell tumour of the breast (GCTB), gross macroscopic image of dissected mass. The image shows a creamy colored poorly circumscribed nodule 0.9 cm in diameter.

estrogen, progesterone, and androgen receptors, indicating a lack of direct influence by sex hormones on tumor development [3]. Grossly, GCTs resemble scirrhous carcinoma, characterized by a hard, greyish-white (Fig. 4) appearance [4]. Axillary staging is unnecessary for benign GCTs as they do not spread to regional lymph nodes. The probability of local recurrence ranges from 2% to 8% with negative surgical margins and exceeds 20% with positive surgical margins. However, recurrence of benign GCTs does not indicate a poor prognosis, and these tumors generally have a favorable outcome [12]. Therefore, it is not required to return and remove positive surgical margins if the tumor is benign. Postoperative surveillance for approximately 10 years is recommended, along with the evaluation and reporting of surgical margins to prevent recurrences. These tumors have an extremely favorable prognosis and adjuvant chemotherapy or radiation has not been shown to improve survival [11].

As shown in Figures 2–4, the images display clusters and trabeculae of large round to polygonal cells with abundant, eosinophilic, and granular cytoplasm. The tumor cells have centrally located nuclei that are small, uniform, and hyperchromatic. The cytoplasm of the tumor

cells is finely granular. S100, CD68, and NSE immunostains were positive, while HMB45, Melan-A, and keratin were negative. Proliferative activity was low (Ki-67 of less than 2%). The CARE Checklist has been completed by the authors for this case report, attached as supplementary material (for all online suppl. material, see https://doi.org/10.1159/000538771).

## Conclusion

In conclusion, awareness of uncommon breast cancer mimics such as GCTs is crucial to avoid unnecessary invasive procedures and radical surgeries. Early identification through breast imaging and histopathologic analysis is essential for appropriate surgical planning. While most GCTs of the breast are benign, rare cases of malignant transformation and metastatic disease have been reported, although these occurrences are exceedingly uncommon.

## Acknowledgment

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## Statement of Ethics

Ethical approval is not required for this study by local or national guidelines. The patient was asked to sign an informed consent form to publish, and all identity and personal information about the patient remained protected. The patient was asked to sign an informed consent form to participate, and all identity and personal information about the patient remained protected. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

## Conflict of Interest Statement

The authors have no conflicts of interest or competing interests to declare.

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## Author Contributions

Mohammad Esmaeil Akbari was involved in the counseling and treatment of the patient. Afshin Moradi examined and interpreted the pathology. Atieh Akbari and Parisa Behravan collected all the required case information, images, slides, and reports and contributed to writing manuscripts. All the authors reviewed the literature and contributed to both writing and editing the manuscript. All the authors read and approved the final manuscript.

## Data Availability Statement

The data that support the findings of this study are not publicly available due to privacy reasons but are available from the corresponding author upon reasonable request.

## References

1 Fink T, Deb S, Clouston D, Thornton C, Chakrabarti A. Novel case of a granular cell tumour mimicking breast malignancy and a metachronous axillary skin lesion. J Surg Case Rep. 2022;2022(3):rjac140. https://doi.org/10.1093/jscr/rjac140
2 Fujiwara K, Maeda I, Mimura H. Granular cell tumor of the breast mimicking malignancy: a case report with a literature review. Acta Radiol Open. 2018;7(12):2058460118816537. https://doi.org/10.1177/2058460118816537
3 Oberc A, Armstrong K, Ko H-M, Grant A, Mullen JBM, Williams P. Case report of a breast granular cell tumor in a young transgender man. Int J Surg Case Rep. 2022;93:106978. https://doi.org/10.1016/j.ijscr.2022.106978
4 Al-Balas M, De Leo A, Serra M, Santini D, Taffurelli M. Granular cell tumour of the breast: a rare presentation of a breast mass in an elderly female with a subsequent breast cancer diagnosis. SAGE Open Med Case Rep. 2019;7:2050313X1984115. https://doi.org/10.1177/2050313x19841154
5 Pujani M, Singh K, Raychaudhuri S, Agarwal C, Khandelwal A, Menia R, et al. Granular cell tumor breast masquerading as a malignancy cytologically: a rare case presenting a diagnostic dilemma. Indian J Surg Oncol. 2020;11(2):321–4. https://doi.org/10.1007/s13193-020-01055-0
6 Akahane K, Kato K, Ogiso S, Sakaguchi K, Hashimoto M, Ishikawa A, et al. Malignant granular cell tumor of the breast: case report and literature review. Breast Cancer. 2015;22(3):317–23. https://doi.org/10.1007/s12282-012-0362-1
7 Karikalan B, Pasupati T, George SM Granular cell tumor of the breast-case report and review of literature.
8 Abreu N, Filipe J, André S, Marques JC. Granular cell tumor of the breast: correlations between imaging and pathology findings. Radiol Bras. 2020;53(2):105–11. https://doi.org/10.1590/0100-3984.2019.0056
9 Niveditha E, Harikrishnan V. Granular cell tumor of the breast: an imposter of carcinoma. Eur J Mol Clin Med. 2022;9:2022.
10 Yoo H, Song SE, Lee JH, Cho KR. Granular cell tumor originating from the pectoral muscle: a rare extramammary finding on mammography. J Korean Soc Radiol. 2022;83(5):1195–200. https://doi.org/10.3348/jksr.2022.0020
11 Olivier L, Naraynsingh V, Hassranah D, Cassim C, Cassim CR. Abrikossoff tumor clinically mimicking carcinoma in accessory axillary breast tissue. Cureus. 2022;14(1):e21733. https://doi.org/10.7759/cureus.21733
12 Swamy N, Jennings P, Taylor R, Harter SB, Kumarapeli AR, Bryant-Smith G. Revisiting the inscrutable granular cell tumors in the breast and beyond: an institutional experience: the inscrutable granular cell tumor. Arch Breast Cancer. 2022;9:204–12. https://doi.org/10.32768/abc.202292204-212