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Case Report

Diagnostic Puzzle - A Case of an Axillary Soft Tissue Granular Cell Tumor Mimicking A Breast Cancer Lymphadenopathy: Diagnostic Challenge and Surgical Treatment

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Abstract

Granular cell tumor (GCTs) is a rare soft tissue neoplasm of neural origin, often challenging to diagnose at first presentation due to its resemblance to other lesions and pathologies. Axillary localization poses a particular diagnostic challenge because of its potential to mimic lymphoproliferative disorders or metastatic breast disease. Accurate identification is crucial to avoid inappropriate treatment.

Case presentation: *We report the case of a 32-year-old Nigerian woman who presented with a painless, palpable mass in the left axilla, initially suspected to be an abnormal lymphadenopathy. Ultrasound and magnetic resonance imaging (MRI) revealed a well-circumscribed soft tissue lesion, making direct assessment essential for a definitive diagnosis. Complete surgical excision was performed. Final histopathological evaluation confirmed a benign granular cell tumor with negative surgical margins. The postoperative course was uneventful, and no recurrence was observed during follow-up.*

Conclusions: *This case highlights the importance of including granular cell tumor in the differential diagnosis of axillary masses. A multimodal diagnostic approach, incorporating imaging and histopathological confirmation, is essential for accurate diagnosis and appropriate treatment planning. Conventional open surgery remains a highly reliable and effective approach for achieving the best curative and prognostic outcome.*

Keywords: GCT, Abrikossoff, Misdiagnosis, Ultrasonography, MRI, Biopsy, Surgery, Follow-Up, Studies

1. Introduction

Granular cell tumors (GCTs) are rare soft tissue tumors that were first described by Abrikossoff in 1926 as "granular cell myoblastomas" [1]. While its histogenesis was initially a topic of debate, current evidence strongly supports a neural origin, specifically Schwann cells, as confirmed through immunohistochemical studies [4]. Clinically, GCTs often mimic other conditions, such as lymphadenopathy, subcutaneous lipoma, or breast carcinoma [3]. Despite its generally benign nature, the clinical significance of GCTs lies in their ability to mimic a range of conditions across clinical, radiological, and even intraoperative histological assessments [5,6]. Misdiagnoses may include lymphadenopathy, subcutaneous lipomas, or breast carcinoma. Thus, a precise diagnostic approach is essential [15]. Excisional biopsy remains an indispensable tool, providing both a definitive diagnosis and curative treatment in a single intervention [20]. This report presents the case of a young Nigerian woman who developed an axillary mass following her first cesarean delivery. Initially, presumed to be reactive lymphadenopathy, the lesion was ultimately diagnosed as Abrikossoff's GCT through histopathological examination.

Neoplastic		REACTIVE / METABOLIC
Benign	Malign	
Leiomyomas	MPNST	Surgical trauma
Rhabdomyomas	Melanoma	Chronic inflammation
Xanthomas	Leiomyosarcoma	Infection (MAI)
Schwannoma	Alveolar soft tissue sarcoma	Chemiotherapy infusions
Dermatofibroma	Dermatofibrosarcoma	Histiocytosis
Fibroxantoma	Angiosarcoma	Rosai-Dorfman disease
Basal cell carcinoma	PECOMA	Metabolic disease (Gaucher)
Paraganglioma	GIST	Erdheim-Chester disease

Table 1: Differential Diagnosis of GCT

1.1. Case Presentation

A 33-year-old Nigerian woman presented with a mass that had developed approximately seven years earlier following her first pregnancy. The lesion was located slightly below the left axillary hollow along the mid-axillary line. On physical examination, the mass was scarcely visible, as it was firm elastic, mobile over subcutaneous planes, tender, and moderately painful upon palpation.

The clinical presentation, anatomical location and limited medical history, because of the language barrier, suggest a differential diagnosis of reactive axillary lymphadenopathy or inflamed subcutaneous lipoma. The initial diagnostic approach included first-line imaging with soft tissue and cutaneous ultrasound to characterize the lesion further. Ultrasound revealed a round mass measuring approximately 12 × 8 mm, displaying features consistent with a lymph node, including intra- and perilesional vascularization. Given its proximity to the mammary glandular parenchyma and the vascularization identified on ultrasound, second-level imaging was recommended: bilateral breast magnetic resonance imaging (MRI) with and without contrast enhancement. MRI findings revealed bilateral heterogeneously fibro glandular breast structures with moderate baseline parenchymal enhancement. The left axillary nodule appeared hypointense on T2-weighted sequences and mildly hyperintense on STIR sequences, demonstrating high cellularity and partially irregular margins. The lesion measured 14 × 8 mm and exhibited intense postcontrast enhancement with a plateau-type kinetic curve (BI-RADS 4a), indicative of a suspicious lesion. A fine-needle aspiration biopsy (FNAB) guided by ultrasound was performed, and the cytological sample was analyzed via four dry slides and one cytolytic. vial. The findings confirmed a BI-RADS 4 classification, necessitating direct surgical assessment. The patient was prepared for an open excisional biopsy under prehospitalization conditions, which included laboratory tests, chest X-ray, electrocardiogram (ECG), and an anesthesiology consultation. The laboratory results were largely unremarkable, except for a significantly elevated creatine phosphokinase (C.P.K.) level of 458 U/L (reference range: 0–170 U/L), with no reported physical exertion in the preceding 15 hours. Surgical excision was performed via an open technique under local anesthetic infiltration, with intraoperative ultrasound guidance for precise localization. A transverse incision along Langer's lines facilitated subcutaneous dissection, revealing and isolating the lesion. The mass was excised between the superomedial margin of the latissimus dorsi muscle and the posterior edge of the serratus anterior muscle. The excised specimen, a whitish nodule approximately 15 mm in diameter, was initially suspected to be a lymph node and was fixed in formalin for histopathological evaluation. Hemostasis was achieved, and closure was completed with absorbable monofilament sutures for both the subcutaneous tissue and the skin. A compressive dressing was applied. At the seven-day postoperative follow-up, the surgical wound exhibited satisfactory healing with no signs of bruising, edema, or lymphorrhagia. Fifteen days post-surgery, histological analysis identified the lesion as Abrikossoff's granular cell tumor. The tumor was surrounded by healthy tissue with R0 surgical margins, confirming the diagnostic and curative success of the procedure. The patient required no further diagnostic tests or surgical interventions but was advised to begin annual ultrasound follow-up starting one year postoperatively.

2. Discussion

GCTs most commonly occur between the ages of 40 and 60, but they have been documented across all age groups, including rare congenital cases [11]. Reported incidence rates highlight variability, with some studies indicating a higher prevalence in women, whereas others report that up to 68% of cases occur in men [10]. These tumors present significant diagnostic and therapeutic challenges because of their rarity and biological variability [14]. Approximately 1,000 cases involving a wide range of organs and tissues have been reported in the literature. Commonly affected sites include the head and neck region (particularly the tongue and oral mucosa), skin, subcutaneous tissue, and soft tissues, as well as the breast, thyroid, mediastinum, respiratory tract, gastrointestinal tract, and nervous system8. The clinical presentation of GCTs is highly variable, with fewer than 10% being asymptomatic and incidentally discovered [22]. Ultrasonography typically reveals a solid, round, hypoechoic lesion lacking distinctive features, frequently leading to

misdiagnoses as lipomas or reactive lymph nodes [19].

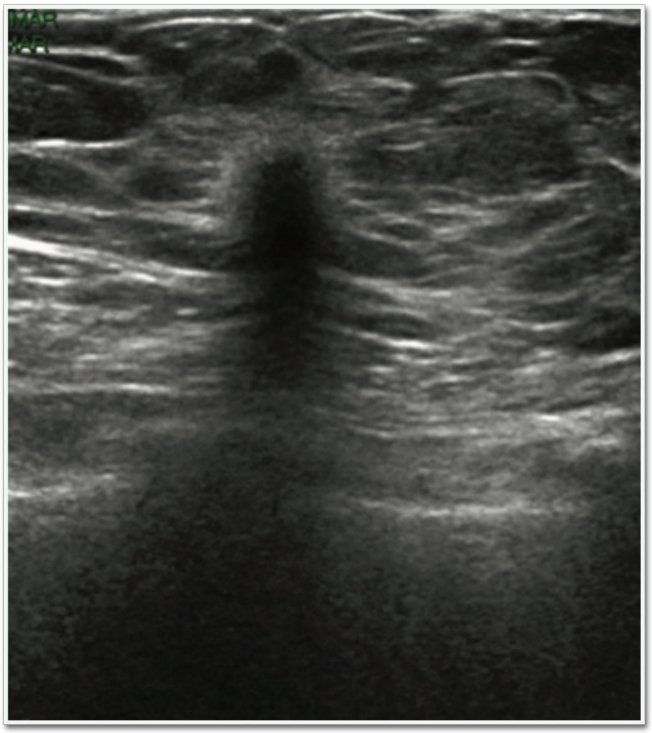

Figure 1: The Ultrasound Examination Reveals a Solid, Hypoechoic, Rounded Nodule with Finely Irregular Margins. The Nodule Shows a Hyperechoic Perilesional Halo and Posterior Attenuation of the Ultrasonic Beam

In our case, the lesion exhibited these same ultrasonographic features, closely mimicking a range of other pathological conditions—both neoplastic and inflammatory—thereby further complicating the diagnostic process. Microscopically, GCTs are composed of large, ovoid or polygonal cells with abundant eosinophilic cytoplasmic granules [20]. Benign lesions exhibit low mitotic activity and lack cellular atypia. However, features such as a Ki-67 proliferation index above 10%, the presence of mitotic figures, or necrosis may suggest aggressive behavior, although these findings alone are insufficient to confirm malignancy; metastasis remains the definitive criterion for malignancy [7,8]. The histogenesis of GCT has been debated for many years. While Abrikossoff initially proposed a muscular origin, immunohistochemical studies have conclusively supported a neural origin, specifically from Schwann cells [17]. This hypothesis is reinforced by tumor positivity for the S-100 protein and neuron-specific enolase (NSE), as well as electron microscopy findings of lamellar structures resembling myelin.

Its neural origin is supported by tumor positivity for S-100 protein and neuron-specific enolase (NSE), as well as electron microscopy findings showing lamellar structures resembling myelin [16]. While most GCTs exhibit benign behavior, even in the presence of atypical morphology, atypical lesions rarely metastasize and are generally confined locally, resembling incompletely excised benign lesions [9]. Consequently, atypical GCTs are considered part of a spectrum with classical GCTs. Lesions with unfavorable parameters are described as being “at increased risk for metastasis” rather than outright malignant. Malignant GCTs are exceedingly rare, accounting for less than 2% of cases. These tumors are characterized by rapid growth, large size, and high mitotic indices [20]. Metastases, although uncommon, have been documented in regional lymph nodes, lungs, liver, and bones [24-26]. Unlike benign GCTs, which predominantly affect premenopausal women, malignant GCTs lack estrogen receptor expression, excluding hormonal involvement in their pathogenesis [21]. Variants of GCTs that do not express the S-100 protein are classified as “nonneural GCTs” [12]. Typically, of cutaneous origin, these variants often present as polypoid masses. Despite the absence of S-100 expression, they demonstrate reactivity for markers such as CD68, NKIC3, CD10, and α1-antitrypsin [13].

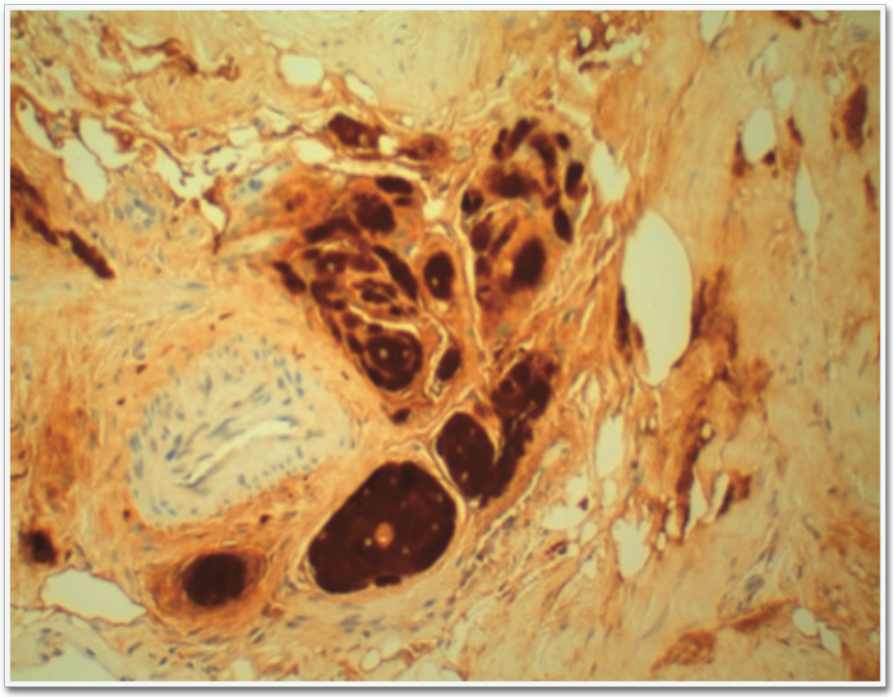

Figure 2: Immunoreactivity for S-100, a Marker for Schwann Cells and other Cells Originating from the Neural Crest

This classification remains controversial, as some nonneural GCTs exhibit NSE and PGP9.5 positivity, suggesting neural differentiation. These are sometimes referred to as "primitive GCTs."

Macroscopically, GCTs vary in consistency, ranging from soft to firm, and in color, from gray–white to pale yellow. Larger tumors are often associated with poorer clinical outcomes [2]. Histologically, GCTs are characterized by large, polygonal, round, or elongated cells arranged in sheets or cords. The cytoplasm contains abundant eosinophilic granules that are PAS positive and diastase resistant [12]. Subepidermal or submucosal GCTs, particularly in locations such as the esophagus, vagina, or bladder, may induce pseudoepitheliomatous hyperplasia, mimicking well-differentiated squamous carcinoma [18]. However, invasive features such as vascular or perineural infiltration, commonly observed in benign cutaneous GCTs, should not be considered indicators of poor prognosis [23]. A distinctive histological feature of GCTs is the presence of "Milian pustulo-ovoid bodies," which are eosinophilic granules surrounded by a clear halo [5]. These structures aid in differentiating true GCTs from other neoplasms with similar characteristics, such as melanocytic or fibrohistiocytic tumors. MRI is the preferred imaging modality for evaluating and characterizing GCTs because of its superior soft-tissue resolution [22].

Benign GCTs typically appear iso- or slightly hyperintense relative to muscle on T1-weighted MR images. On T2-weighted sequences, the lesions may exhibit central isointensity and peripheral signal enhancement. In contrast, malignant GCTs demonstrate invasive features, such as vascular or perineural invasion, and may present with central necrosis or diffuse signal alterations [13]. In this clinical case, differential diagnosis proved crucial in guiding the diagnostic process, particularly in light of the heterogeneous radiological findings. The comparison between different imaging modalities, including ultrasound and MRI, yielded inconclusive results, with no definitive features able to reliably support a specific diagnosis. In particular, the historadiological mimicry of the lesion with various other pathological conditions—both neoplastic and nonneoplastic—made the radiological interpretation of the differential diagnosis ambiguous, thus making direct assessment indispensable. The primary treatment for GCTs is complete surgical excision with clear margins (R0). Open excisional biopsy is the preferred method, as it minimizes the risk of recurrence—even years later—and provides a definitive histological diagnosis.

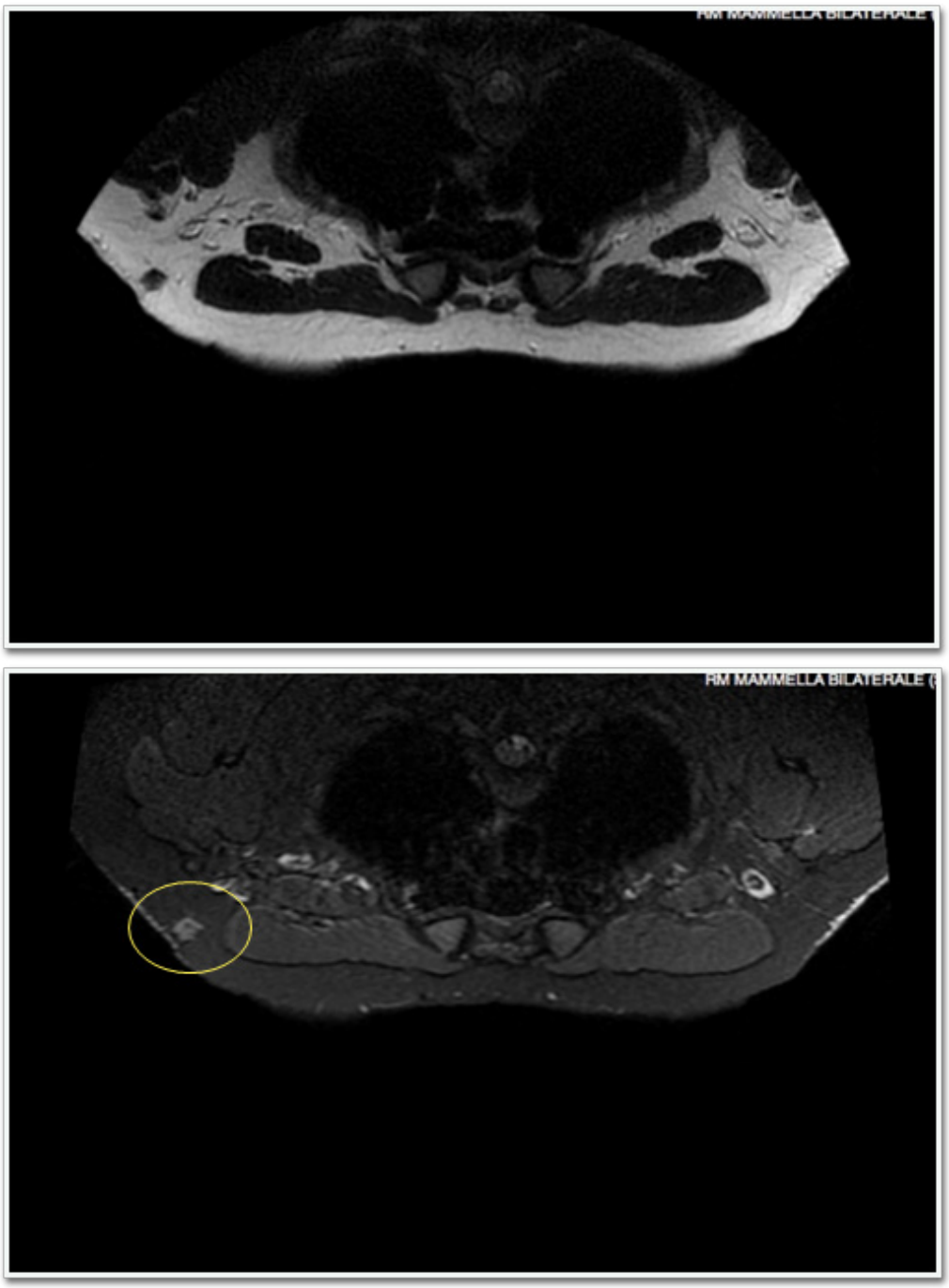

Figure 3: Magnetic Resonance Imaging (MRI) Reveals the Lesion as a Nodular Formation with Hypo Intensity on T2-Weighted Sequences and Mild Hyperintensity on STIR Sequences, Exhibiting High Cellularity and Partially Irregular Margins

3. Conclusion

The clinical and radiological characteristics of GCTs make diagnosis challenging because of the biological and clinical variability of these tumors. MRI remains the most effective diagnostic tool, enabling differentiation between benign and malignant lesions through detailed signal analysis, but even with minimal clinical suspicion, histological confirmation is essential. Since GCTs are predominantly benign, accurate diagnosis allows for the avoidance of unnecessary treatments. Despite advances in minimally invasive and robotic techniques, traditional open excisional biopsy remains the gold standard for GCTs. This approach ensures precise lesion removal, adequate margin assessment, and secure sampling for histological evaluation. This was particularly evident in the present case, where the differential diagnosis based on radiological imaging proved inconclusive and failed to accurately determine the nature of the lesion, which could only be definitively diagnosed through direct surgical assessment and subsequent histopathological examination of the excised specimen.

Declarations

Ethics approval and consent to participate not applicable.
Consent for publication not applicable.
Availability of data and materials not applicable.
The authors declare that they have no competing interests.
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Author Contributions

D. Cattel: Conceptualization, Writing - original draft
F. Steccanella: Review & editing, Supervision
G. Fabbrocile and E. Donnarumma: Data curation
A. Puzziello: Supervision

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