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(CASE REPORT)

Primary well-differentiated liposarcoma of the breast: A case report

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Abstract

Primary liposarcoma of the breast is an uncommon mesenchymal malignancy contributing less than 0.3% to the overall number of mammary sarcomas . To this end, we report the case of a 53-year-old female with an enlarging, painless breast mass. After extensive local excision (lumpectomy), histopathologic findings were a multinodular fatty mass, multivacuolated lipoblasts with scalloped hyperchromatic nuclei. Diagnosis was supported by intensive immunohistochemical nuclear expression of MDM2, ruling out metaplastic carcinoma and malignant phyllodes tumors. The case highlights the clinical challenges in the diagnosis of rare breast sarcomas and underscores the potential for breast-conserving surgery with established oncological margins since R0 resection remains the major determinant of long-term prognosis.

The aim of this case report is to draw attention to the diagnostic difficulties posed by primary breast liposarcoma and to underline the value of immunohistochemical markers, particularly MDM2, in distinguishing this rare malignancy from benign adipocytic lesions and other breast tumors.

Keywords: Liposarcoma; Breast; Soft tissue; MDM2

1. Introduction

Primary liposarcoma of the breast is a very rare clinical entity, representing less than 0.3% of all mammary sarcomas and a minute fraction of all breast malignancies [1]. In terms of clinical heterogeneity, unlike typical breast cancers of epithelial origin, these tumors originate from the interlobular mesenchymal stroma[2]. A 53-year-old female with a rapidly enlarging mass is a challenging target for diagnostic workup, especially because the radiographic features are similar to those of giant lipomas or malignant phyllodes tumors [3,4]. Primary breast liposarcoma diagnosis is still a pathological "diagnosis of exclusion"[5]. It is necessary to provide a firm diagnosis based on the identification of malignant adipocytic features—lipoblasts, for example—and a total absence of any epithelial component or any “leaf-like” structures common with phyllodes tumors [2,6]. Because of its rareness, immunohistochemical indices, including the immunohistochemical markers, are essential in confirming the adipocytic lineage and excluding benign mimics [7]. Treatment has dramatically changed; whereas radical mastectomy used to be considered the gold standard, current practice favors breast-conserving surgery (wide tumorectomy) when it is feasible on an oncologic basis for the patient. The success depends significantly on the evaluation of the surgical margin, because the most important factor to prevent local recurrence and long-term prognosis is R0 surgery [3,8].

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2. Case report

We report the case of a 53-year-old woman with no significant family history of breast cancer, who had described a hard, non-painful, upper-outer quadrant breast mass. Unlike the common presentation of large tumors seen in mammary sarcomas, this lesion at its largest size was just 2.5 cm. When palpating, there was no skin response or palpable axillary lymphadenopathy on examination, as the mass was mobile and well-circumscribed. A small but well-defined radiolucent opacity was seen on mammography (Figure1).

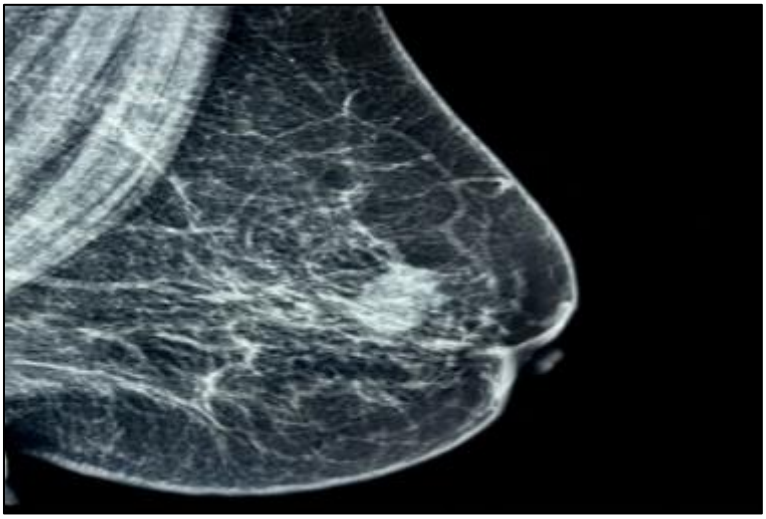

Figure 1 Mammographic imaging showing a breast mass with lobulated margins and heterogeneous component

Ultrasonography revealed a 2.5 cm heterogeneous hyperechoic nodule with distinct and regular borders, classified BI-RADS 5. Because of its size and fatty composition, the lesion was initially suspected to be either a straightforward lipoma or a small fibroadenoma upon examination. With local tumorectomy after a biopsy displaying atypical adipocytic proliferation, the patient came to surgery department for treatment. Since the size of the tumor was localized at 2.5 cm, breast-conserving surgery was easily performed with macroscopic margins of 1 cm, which provided a nice cosmetic result and oncologic safety (Figure2).

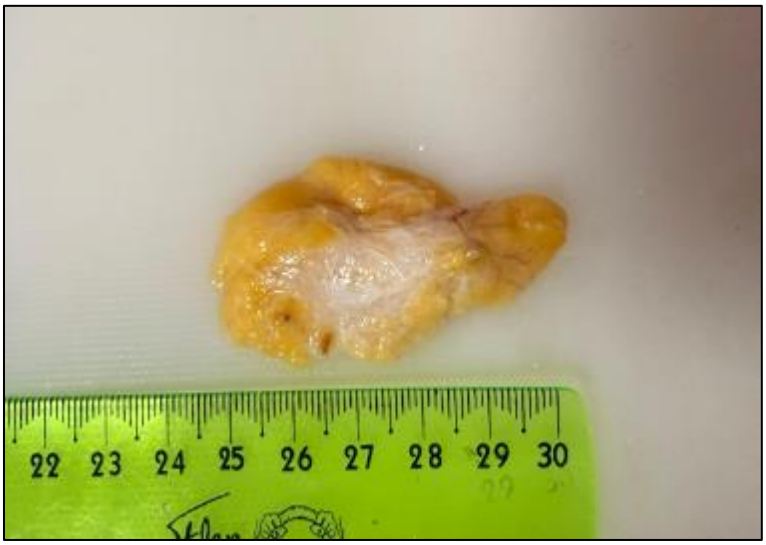

Figure 2 Gross examination of the surgical specimen showing a well-circumscribed yellowlobulated mass

The resection specimen yielded a well-delimited yellowish firm nodule of 2.5 x 2.2 x 1.8 cm. The cut surface was homogeneous (fatty) and without any necrotic or hemorrhagic sites present as in larger sarcomas. The tumor is small, but the cancerous features are readily present. Histopathological examination showed mature adipocytes with marked anisocytosis and nuclear atypia (Figure 3A). Lipoblasts (cells with hyperchromatic, 'scalloped' nuclei and lipid vacuoles)

were the defining feature of the diagnosis. Hyperchromatic spindle cells were seen in the fibrous septa within the stroma (Figure3B).

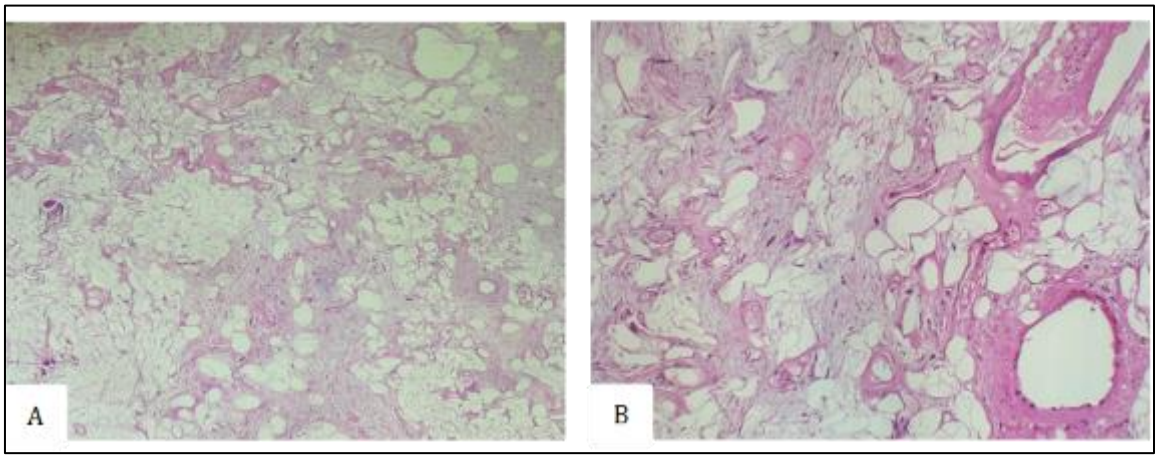

Figure 3 Microscopic examination showing atypical adipocytic proliferation composed of lipoblasts at medium magnification (A) (HEx100) and marked nuclear pleomorphism at high magnification (B) (HEx400)

IHC was used to distinguish these lesions from the stereotypical spindle cell lipoma. Tumor cells contained abundant nuclear expression of MDM2 (Figure4) and were positive for S100, CD34 and cytokeratins were negative.

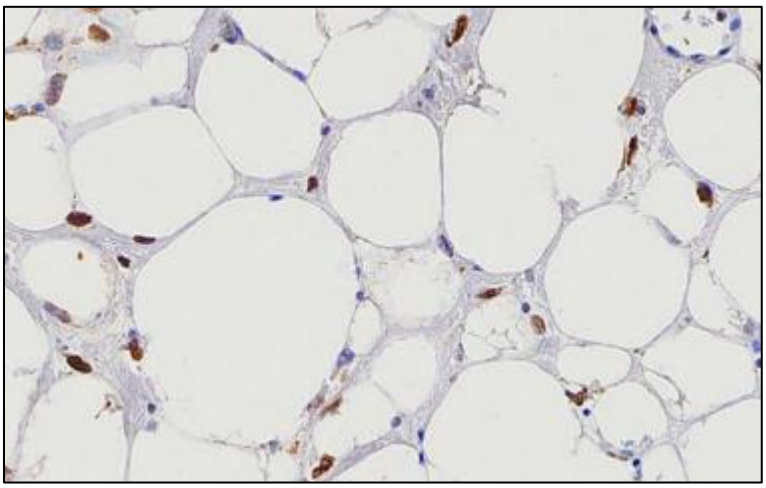

Figure 4 Immunohistochemical staining showing nuclear positivity for MDM2 in tumor cells

Histological examination shows an R0 resection margin of >10 mm. Due to the small size (2.5 cm) of the tumor and good differentiation of the liposarcoma, the prognosis is excellent. She was discharged from the hospital with a clinical and follow-up radiological plan of complete and regular check-ups.

3. Discussion

In this 53-year-old patient, the diagnosis of primary breast liposarcoma illustrates two important clinical and radiological paradoxes. First, the relatively small tumor size (2.5 cm) contrasts with the usual presentation of mammary sarcomas, which are most often diagnosed at a larger size due to their slow, insidious growth and the absence of specific early clinical signs [4]. In the present case, this early detection allowed complete surgical excision with negative margins, which is a favorable prognostic factor.

Second, the lesion was categorized as BI-RADS 5, a classification highly suggestive of malignancy but primarily associated with epithelial breast carcinomas rather than mesenchymal tumors [5]. This reflects a well-known limitation of breast imaging, as BI-RADS scoring is based on morphological suspicion of malignancy rather than histological type. In this case, imaging features such as architectural distortion, irregular margins, and fibrous septal thickening likely

accounted for the high suspicion score, mimicking the spiculated appearance typically seen in invasive carcinoma [9]. This overlap highlights the limited specificity of conventional imaging modalities in rare sarcomatous breast lesions.

From a pathological standpoint, the main diagnostic challenge is to distinguish primary breast liposarcoma from other spindle cell or adipocytic lesions, particularly phyllodes tumors or metaplastic carcinoma with heterologous differentiation. In the present case, extensive histological sampling demonstrated a complete absence of epithelial components, supporting a primary mesenchymal tumor rather than a biphasic lesion. This step is essential, as limited sampling may lead to misinterpretation, especially in heterogeneous tumors.

Immunohistochemistry was crucial for confirming the diagnosis. Strong nuclear MDM2 expression supported the diagnosis of well-differentiated liposarcoma and helped exclude benign lipomatous tumors, which are typically MDM2-negative. Although fluorescence in situ hybridization (FISH) or additional markers such as CDK4 are often used to increase diagnostic specificity, MDM2 immunohistochemistry alone, in the appropriate morphological context, remains a useful diagnostic tool.

Regarding treatment, the small tumor size allowed for breast-conserving surgery with wide local excision rather than mastectomy. Current evidence suggests that, in breast sarcomas, achieving negative surgical margins (R0 resection) is the most significant prognostic factor, whereas the extent of breast resection does not independently influence survival when margins are adequate [3,11]. Therefore, conservative surgery was appropriate in this case.

Finally, axillary lymph node dissection was not performed, in accordance with the biological behavior of soft tissue sarcomas, which spread predominantly via the hematogenous route rather than the lymphatic system [1,8]. This approach avoids unnecessary morbidity, particularly lymphedema, without compromising oncologic safety.

Overall, this case highlights the diagnostic difficulty of primary breast liposarcoma, its potential to mimic epithelial malignancies on imaging, and the central role of histopathology and MDM2 immunohistochemistry in establishing the diagnosis and guiding appropriate surgical management.

Limitations

This report has several limitations inherent to its design as a single-patient case study, which restricts the generalizability of its findings to the broader population of patients with primary breast liposarcoma. In addition, long-term clinical and radiological follow-up data are not yet available, as the patient is currently under scheduled surveillance; therefore, definitive conclusions regarding the risk of local recurrence or distant metastasis cannot be drawn at this stage. Moreover, preoperative imaging with conventional modalities, including mammography and ultrasound, remains non-specific and may not reliably distinguish primary breast liposarcoma from benign adipocytic lesions or other malignant breast tumors such as phyllodes tumor, emphasizing that histopathological examination remains essential for definitive diagnosis.

4. Conclusion

Breast liposarcoma is a rare malignant mesenchymal tumor. The diagnosis is based on histopathological examination, supported by MDM2/CDK4 immunohistochemistry. Complete surgical excision with negative margins (R0) remains the primary therapeutic goal, while the role of adjuvant therapies continues to be evaluated on a case-by-case basis.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding the publication of this paper.

Statement of informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. Ethical approval was not required for this type of study according to institutional policy.

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