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Case Report

Malignant phyllodes tumor of the breast with liposarcomatous differentiation: A case report with imaging findings

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ABSTRACT

Phyllodes tumors are rare neoplasms that account for 2.5% of all fibroepithelial lesions, and 10%-20% exhibit malignant transformation. Malignant transformation often occurs in the form of stroma, and usually shows fibrosarcomatous differentiation. Liposarcomatous differentiation is a rare, developed stromal component of phyllodes tumors, and little is known about their imaging findings. We present the case of a 47-year-old woman who was diagnosed with a malignant phyllodes tumor of the breast that contained liposarcomatous elements. The patient underwent wide surgical excision of the mass and has been treated with adjuvant radiation therapy.

Introduction

Phyllodes tumor of the breast is a rare neoplasm that accounts for 2.5% of all fibroepithelial lesions [1,2]. It typically manifests as a rapidly growing, large, palpable mass and can be classified into benign, borderline, and malignant categories based on histological characteristics [3]. Malignant transformations occur in 10%-20% of phyllodes tumors, often in the form of stroma [4,5]. Malignant stromal transformation usually presents with fibrosarcomatous elements, and rarely shows heterologous elements. Other uncommon sarcomatous elements include leiomyosarcoma, osteosarcoma, angiosarcoma, chondrosarcoma, and rhabdomyosarcoma [2,3]. Liposarcomatous differentiation may also develop as stromal components of phyllodes tumors [3,6]. Because the disease is rare, very little is known about its imaging findings [3].

Here, we present the case of a malignant phyllodes tumor that contained liposarcomatous stromal differentiation and focus on its mammographic and sonographic features.

Case presentation

A 47-year-old woman with no family history of breast cancer presented with a 2-year history of a palpable mass in the right breast. The patient reported that it had increased in size. Physical examination revealed a 6.0 × 5.0 cm firm and fixed mass in the right breast.

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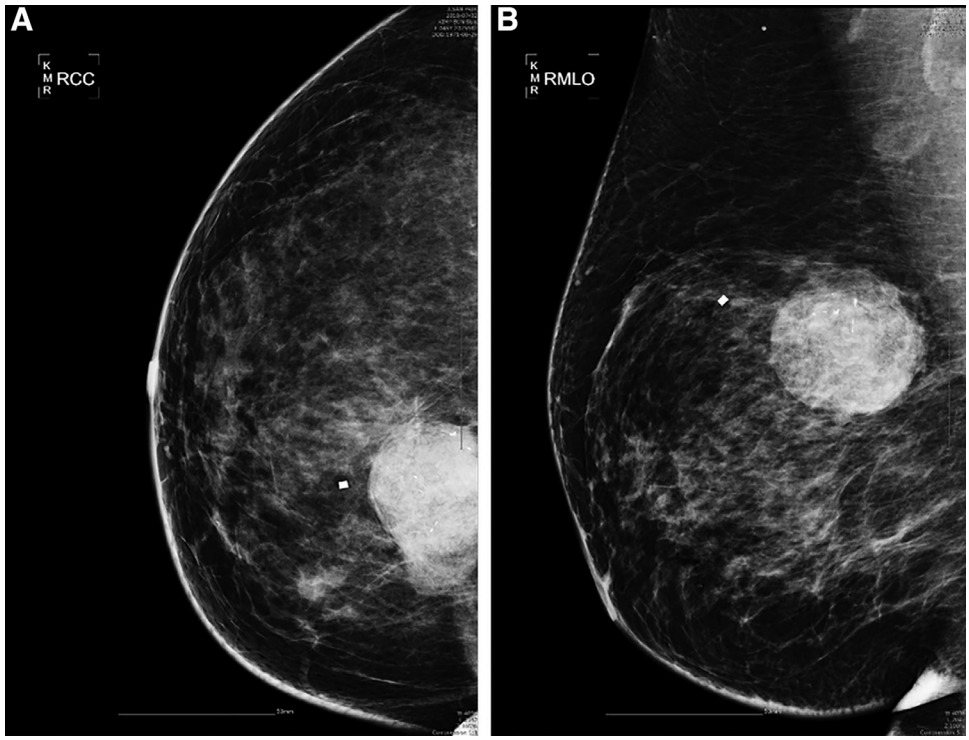

Fig. 1 – Standard mammographic view. (A) Right craniocaudal and (B) mediolateral oblique projections reveal a high-density mass with a partially indistinct margin in the upper medial portion. Asymmetry visible in the medial portion of the craniocaudal projection had no correlated lesion on ultrasound imaging.

Standard mammography revealed a heterogeneous high-density mass, 5.5 × 4.0 cm in size, with a partially indistinct margin in the upper medial portion of the breast over the palpable area (Fig. 1A, B). Microcalcifications were present within the mass. Asymmetry was observed in the medial portion of the right breast in the craniocaudal projection (Fig. 1A).

Ultrasound imaging revealed a solid mass at the 1 o'clock position of the right breast, measuring 4.6 × 2.8 × 4.5 cm. The mass was oval shaped with a heterogeneous hyperechoic, hypoechoic lateral rim, parallel orientation, and partial posterior acoustic shadowing (Fig. 2A). Mild peripheral vascularity was observed on color Doppler ultrasound imaging (Fig. 2B). There was no sonographic abnormality correlated with asymmetry detected on mammography. The axillary lymph node was not enlarged.

The margin of the mass was, to a large degree, well-defined but partially indistinct on ultrasound imaging, which correlated with the mammographic findings (Fig. 2B). In terms of echogenicity, there was a suspected focal cystic area within the hyperechoic findings (Fig. 2A). Thus, the mass was assessed as Breast Imaging Reporting and Data System category 4, and ultrasound-guided 14-gauge core biopsy revealed a stromal overgrowth with nuclear atypia and some lipoblasts.

Subsequent lumpectomy was performed and the specimen showed a well-demarcated round tumor, measuring 5.0 × 4.8 × 3.0 cm. There were considerable bright yellow fatty components and some cleft-like spaces (Fig. 3A). Microscopically, the tumor exhibited a typical leaf-like growth pattern with extensive stromal overgrowth and stromal hypercellularity (Fig. 3B). The stromal component consisted of nonheterologous spindle cells (Fig. 3C) and heterologous liposarcomatous areas characterized by atypical lipoblasts (Fig. 3D). The nonheterologous spindle-shaped stromal cells also showed malignant features that included nuclear pleomorphism and frequent mitotic figures. Within the tumor, less cellular and more fibrotic areas were present in which dystrophic calcifications were seen.

The patient has been treated with adjuvant radiation therapy and is stable 3 months after surgery.

Discussion

An unusual type of phyllodes tumor contains adipose tissue. Adipose differentiation in phyllodes tumors may range from mature fat to liposarcoma. In a study of 14 cases of phyllodes tumors with adipose stromal differentiation reported by Powell and Rosen [7], 13 (93%) were malignant.

Hyperechoic breast lesions have high predictive value for benignity; however malignancy cannot be excluded because such lesions account for 0.4% of all malignant lesions [8]. Breast masses with fatty or fibrous contents, either of vascular origin or with high cellularity, may present increased echogenicity upon ultrasound [8]. The mass in the present case exhibited predominantly hyperechoic findings on ultrasound, which may represent the presence of fat in the tumor. Several benign lesions containing adipose tissue might also

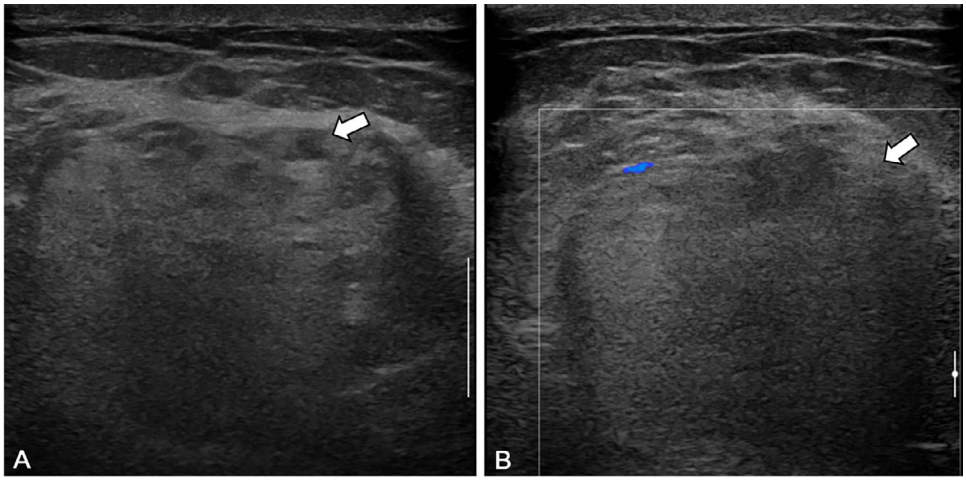

Fig. 2 – Ultrasound images. (A) The mass is an oval, parallel orientation and predominantly hyperechoic with focal cystic components (arrow). (B) The mass shows mild peripheral vascularity and partially indistinct margin (arrow).

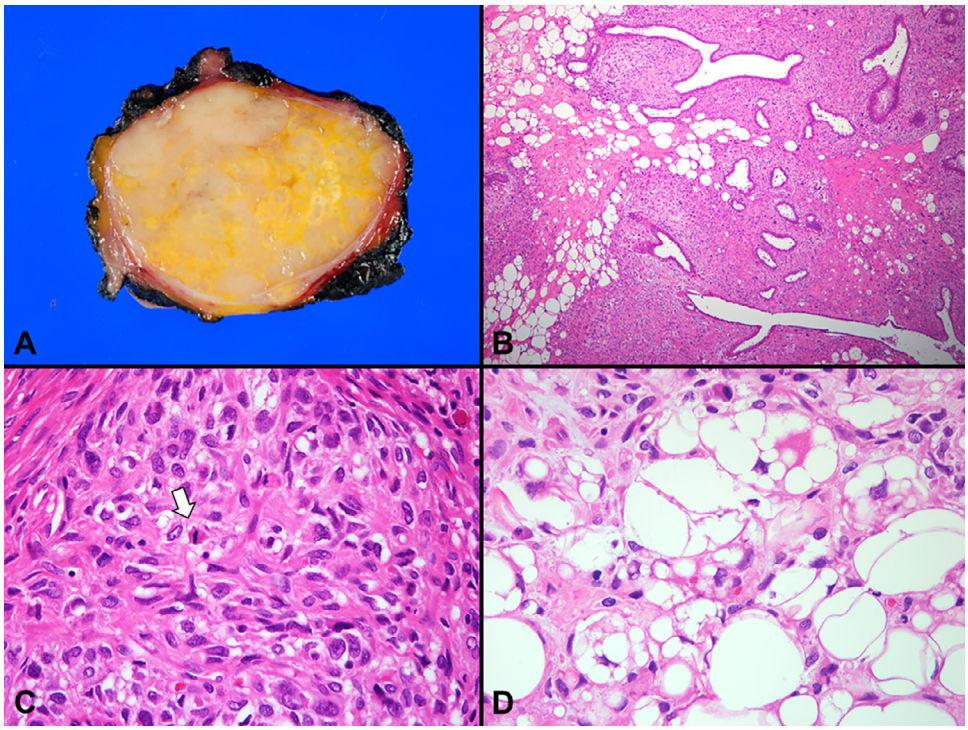

Fig. 3 – Histopathology of liposarcomatous foci in malignant phyllodes tumor. (A) Cut section reveals a delineated fleshy solid pale brown tumor with bright yellow areas and tiny cleft-like spaces. (B) Low magnification view of the tumor demonstrates a combination of stromal overgrowth of nonheterologous spindle cells, and multiple scattered areas of liposarcomatous differentiation (H & E, ×40). (C) Nonheterologous stromal cell component shows hypercellularity, nuclear pleomorphism, and frequent mitoses (arrow) (H & E, ×400). (D) Pleomorphic atypical lipoblasts with large scalloped hyperchromatic nuclei and multivacuolated cytoplasm are observed (H & E, ×400).

be hyperechoic, such as lipoma, fat necrosis, and hibernoma [9,10]. Uncommon malignant lesions of the breast that may present as hyperechoic nodules include lymphoma, angiosarcoma, and metastases [11-13].

Analysis of sonographic features has demonstrated that nonparallel orientation and noncircumscribed margins are more frequently found in malignant hyperechoic nodules than in benign nodules [14]. Such results suggest that the same sonographic characteristics used to evaluate hypoechoic or isoechoic nodules should be applied in cases of hyperechoic nodules to differentiate between malignant and benign lesions. Additionally, the presence of focal cystic areas within

the mass are more common in malignant than benign tumors [15]. In our case, the mass revealed a partially indistinct margin and focal cystic areas which suggest suspicious features.

Previous studies [15,16] report substantial overlap in the sonographic and mammographic features of benign, borderline, or malignant phyllodes tumors. Patient age (>55 years), irregular lesion shape, long lesion dimension (>7 cm), and size (>3 cm) were predictors of increased risk of borderline or malignant phyllodes tumors. Regarding magnetic resonance imaging (MRI), in a study by Yabuuchi et al [17], phyllodes tumor signal intensity lower than or equal to normal breast parenchyma signal intensity on T2-weighted images, as well as low apparent diffusion coefficient, corresponded to stromal hypercellularity. However, imaging findings of malignant phyllodes tumors, especially in cases containing liposarcomatous differentiation, have not yet been clearly identified. We could not present MRI images of the tumor, as the examination was not performed before surgery.

Liposarcoma can arise de novo and is less frequent than liposarcomatous overgrowth in phyllodes tumors [18,19]. In malignant phyllodes tumors, the lipomatous component closely resembles well-differentiated and pleomorphic subtypes seen in extramammary sites [20]. Primary liposarcomas should only be diagnosed after thorough sampling has excluded a phyllodes tumor. Although diagnosis of these 2 entities may be confused, the clinical impact appears to be similar [19].

Treatment of malignant phyllodes tumors of the breast requires complete surgical excision with tumor-free margins. The impact of adjuvant chemotherapy and radiotherapy is still uncertain [21].

Conclusion

There have been a few reports that describe imaging characteristics of malignant phyllodes tumors with liposarcomatous differentiation. The case we present shows a breast mass with fatty contents and high cellularity exhibited hyper echogenicity with some suspicious features. Although MRI images are not presented, knowledge from sonographic and mammographic findings of this rare breast neoplasm can help to avoid late diagnosis and serve as a reminder that hyperechoic breast lesions are not always benign.

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