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Case report

Multimodal Imaging and Histopathological Correlation in Right Breast Carcinoma Associated with Malignant Phyllodes Tumor: A Case Report with Review of Literature

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Abstract
Breast cancer remains the most frequently diagnosed malignancy among women worldwide and is a major cause of cancer-related morbidity and mortality. Early detection and accurate pathological characterization are essential for appropriate therapeutic planning and improved patient outcomes. This report describes a case of right breast carcinoma evaluated through multimodal imaging and detailed histopathological assessment. A 62-year-old female presented with a progressively enlarging palpable mass in the right breast associated with visible asymmetry. Diagnostic evaluation included mammography, ultrasonography, and contrast-enhanced computed tomography. Imaging studies revealed a large irregular high-density mass with lobulated margins and internal calcifications highly suspicious for malignancy (BI-RADS 5), accompanied by axillary lymphadenopathy. Core needle biopsy followed by histopathological examination demonstrated invasive ductal carcinoma. Immunohistochemical analysis showed strong estrogen receptor and progesterone receptor expression, absence of HER2 overexpression, and a low Ki-67 proliferation index consistent with the Luminal A molecular subtype. The patient subsequently underwent a modified radical mastectomy with immediate reconstruction by tissue expander. Pathological examination revealed a malignant phyllodes tumor with an associated invasive ductal carcinoma component. This case highlights the importance of integrating clinical findings, radiological imaging, histopathology, and immunohistochemistry in the accurate diagnosis and biological characterization of complex breast tumours.
Keywords. Breast Carcinoma, Phyllodes Tumor, Mammography, Histopathology.

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Introduction

Breast cancer is the most commonly diagnosed malignancy among women worldwide and remains one of the leading causes of cancer-related mortality. According to recent global cancer statistics, breast cancer accounts for a significant proportion of newly diagnosed cancer cases among women and represents a major public health concern worldwide (1). Early detection and accurate characterization of breast tumors are essential for improving patient outcomes and guiding therapeutic decision-making. The diagnostic evaluation of breast lesions relies on a multidisciplinary approach integrating clinical examination, imaging techniques, and histopathological assessment (2).

Mammography remains the primary imaging modality for the detection of suspicious breast lesions, while ultrasonography plays an important complementary role, particularly in patients with dense breast tissue (3). Additional imaging modalities, such as computed tomography or magnetic resonance imaging may assist in staging and evaluation of disease extent in selected cases.

Histopathological examination remains the gold standard for the definitive diagnosis of breast tumors. Furthermore, immunohistochemical biomarkers including estrogen receptor (ER), progesterone receptor (PR), human epidermal growth factor receptor-2 (HER2), and Ki-67 proliferation index provide essential information regarding tumor biology, prognosis, and response to therapy (4,5). Phyllodes tumors are rare fibroepithelial neoplasms of the breast, accounting for less than 1% of all breast tumors (6). Although phyllodes tumors are typically characterized by stromal proliferation with benign epithelial components, rare cases have reported the coexistence of epithelial malignancies such as invasive ductal carcinoma within or adjacent to phyllodes tumors (7,8). Such unusual presentations may present diagnostic challenges and require careful clinicopathological correlation.

The present report describes a rare case of right breast carcinoma associated with a malignant phyllodes tumor, emphasizing the importance of multimodal imaging and comprehensive histopathological evaluation in the accurate diagnosis and management of complex breast neoplasms.

Case Presentation

A 62-year-old female patient presented with a palpable mass in the right breast that had progressively increased in size over time. Clinical examination revealed visible swelling of the right breast associated with breast asymmetry, raising suspicion of a malignant process (Figure 1). For further evaluation, diagnostic imaging including mammography, ultrasonography, and computed tomography was performed.

Mammographic examination of both breasts demonstrated breast density type B. In the right breast, a large irregular high-density lesion with lobulated margins and dystrophic calcifications was identified, exhibiting suspicious malignant characteristics. No architectural distortion or additional microcalcifications were observed elsewhere in the breast (Figure 2). The left breast showed no evidence of mass lesions or suspicious calcifications. The nipple position and morphology were normal, and the skin and subcutaneous tissues appeared unremarkable.

Breast ultrasonography revealed homogeneous background echotexture of both breasts. In the right breast, a large lobulated heterogeneous hypoechoic solid mass with cystic changes and internal calcifications was identified, measuring approximately 12 × 10 cm. Evaluation of the right axilla demonstrated two pathological lymph nodes measuring 1.4 × 1 cm and 0.7 × 0.7 cm (Figure 3). In contrast, the left breast showed no focal solid or cystic lesions on ultrasonographic examination. The nipple position and morphology were preserved, and no abnormalities were observed in the overlying skin or subcutaneous tissues. The left axilla demonstrated only non-significant reactive lymph nodes. Based on the imaging findings, the right breast lesion was classified as a highly suspicious malignant mass with associated axillary lymphadenopathy (BI-RADS 5). The left breast showed no abnormal findings and was categorized as BI-RADS 1.

Figure 1. Clinical photograph demonstrating marked swelling and asymmetry of the right breast before surgical treatment.

Figure 2. Mammography showing a large, irregular, high-density mass with lobulated margins in the right breast.

Multiple core biopsy fragments from the right breast lesion were sent for histopathological assessment. The specimen consisted of several elongated grey-white soft tissue cores measuring between approximately 0.2 and 2 cm in length. The tissue fragments were entirely processed and embedded in paraffin blocks for microscopic examination.

Microscopically, the examined sections revealed an infiltrative epithelial neoplasm composed of malignant ductal cells arranged predominantly in cords, nests, and small glandular structures infiltrating a fibrous desmoplastic stroma. The tumor cells demonstrated moderate nuclear pleomorphism with enlarged hyperchromatic nuclei and inconspicuous nucleoli. Cytoplasm was moderate in amount, and cellular borders were indistinct in some areas.

Tubular formation was partially preserved, while the majority of tumor structures showed irregular duct-like or solid patterns. Mitotic activity was relatively low, with approximately five mitotic figures identified per ten high-power fields. No definite evidence of ductal carcinoma in situ (DCIS) was observed in the examined biopsy cores. Furthermore, lymphovascular invasion and perineural invasion were not identified within the available tissue sections.

Histological grading according to the Nottingham modification of the Scarff–Bloom–Richardson grading system demonstrated tubular formation score two, nuclear pleomorphism score two and mitotic count score one. The combined total score of five corresponded to Grade I (well-differentiated carcinoma). Overall, the histomorphological features were diagnostic of Invasive ductal carcinoma of the breast (no special type), histologic grade 1.

Immunohistochemical analysis was performed to further characterize the tumor and determine its receptor status. The neoplastic cells demonstrated strong nuclear immunoreactivity for estrogen receptors (ER), with approximately 80% of tumor cells showing positive staining of strong intensity (3+). The calculated Allred score was eight, indicating a positive ER status.Progesterone receptor (PR) immunostaining also revealed strong nuclear positivity in approximately 70% of tumor cells with strong staining intensity (3+), corresponding to an Allred score of eight and confirming positive PR expression. Human epidermal growth factor receptor 2 (HER2) immunohistochemical staining was negative, with a score of zero, indicating absence of HER2 overexpression. Assessment of tumor proliferative activity using the Ki-67 labeling index demonstrated a low proliferative rate, with approximately 5% of tumor cells showing nuclear positivity. Based on the immunohistochemical profile characterized by strong ER and PR positivity, absence of HER2 overexpression, and low Ki-67 proliferative index, the tumor was classified as Luminal A molecular subtype.

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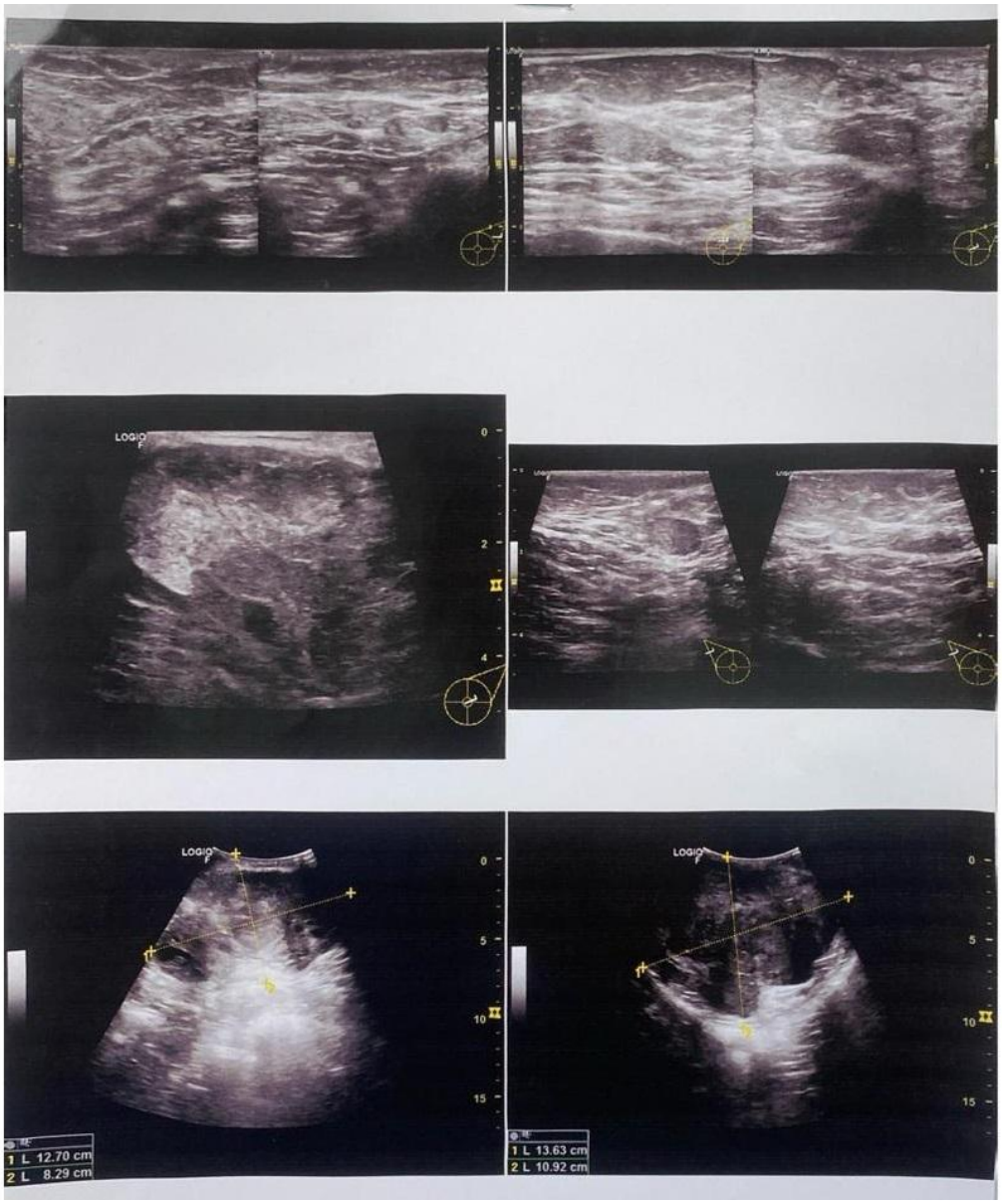

Figure 3. Breast ultrasonography revealing a heterogeneous hypoechoic solid lesion with cystic changes and internal calcifications.

Contrast-enhanced CT of the chest, abdomen, and pelvis performed on 21 October 2025 demonstrated a large heterogeneously enhancing soft-tissue mass in the right breast measuring approximately 11.5 × 10.4 cm, consistent with the known primary malignancy (Figure 4). Comparison with the previous examination dated 8 July 2025 showed mild interval increase in lesion size. Several right axillary lymph nodes were noted, the largest measuring 15 × 11 mm, suggestive of nodal metastatic involvement. The lungs, mediastinum, liver, spleen, pancreas, kidneys, and adrenal glands were unremarkable, with no suspicious lesions identified. No pleural effusion, ascites, or distant metastatic disease was detected.

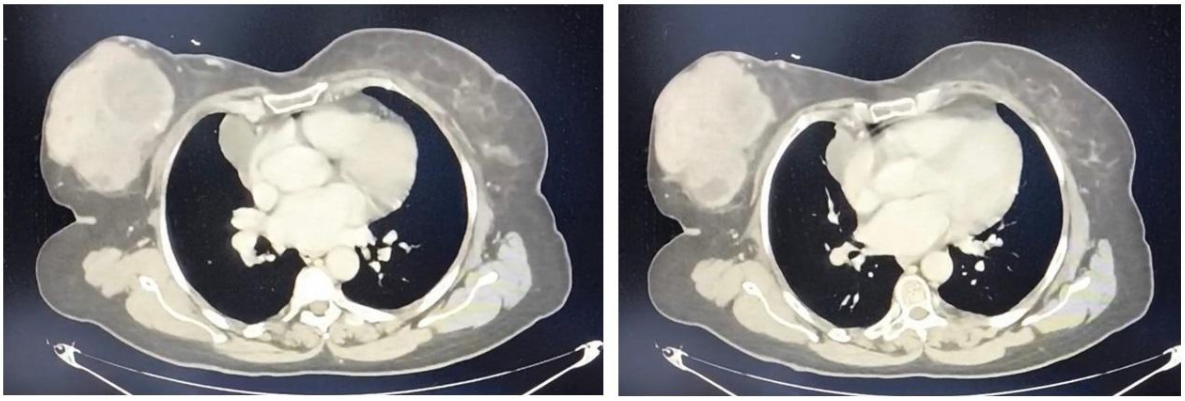

Figure 4. Contrast-enhanced CT scan demonstrating right breast mass with enlarged right axillary lymph nodes.

Based on clinical and radiological findings, a modified radical mastectomy of the right breast tumour was performed, followed by immediate reconstruction using a tissue expander, and the specimen was submitted for pathological examination.

Histopathological examination of the modified radical mastectomy specimen revealed a large malignant phyllodes tumor measuring 13 cm in maximum dimension, occupying most of the breast parenchyma (Figure 5). Microscopically, the tumor showed classical features of malignant phyllodes tumor, including exaggerated leaf-like architecture, marked stromal overgrowth, moderate to severe stromal atypia, high mitotic activity, and areas of necrosis. Within approximately one-third of the tumor circumference, the epithelial component demonstrated invasive ductal carcinoma (IDC), forming well-differentiated tubular structures with mild nuclear atypia and low mitotic activity. The invasive carcinoma measured approximately 5 cm and was classified as Nottingham grade I (score 3/9). In addition, foci of low-grade ductal carcinoma in situ (DCIS) with a cribriform pattern were identified. All surgical margins were free of tumor with greater than one cm clearance, and no lymphovascular invasion was detected. Examination of 13 axillary lymph nodes revealed no evidence of metastatic carcinoma (0/13). According to the AJCC 8th edition staging system, the invasive carcinoma was staged as pT2N0.

Figure 5. Gross surgical specimen of the excised breast tumour showing a firm whitish cut surface.

During the postoperative follow-up visits, the incision appears well-approximated with no evidence of dehiscence, erythema, or discharge, indicating an uncomplicated healing process. The surrounding skin shows mild postoperative changes consistent with normal recovery. The contour of the breast is well preserved, reflecting a favourable aesthetic outcome achieved through reconstruction with a tissue expander. Overall, the clinical appearance suggests good surgical technique, appropriate wound care, and successful early reconstructive results (Figure 6).

Figure 6. 2 weeks postoperative follow-up photograph of the right breast showing well-healed surgical incision and satisfactory breast contour following reconstruction using a tissue expander.

Discussion

Breast cancer remains a major global health problem and continues to represent one of the most frequently diagnosed malignancies among women worldwide (1). Advances in imaging technology and molecular pathology have significantly improved the detection and biological characterization of breast tumors. However, rare pathological combinations may still pose diagnostic challenges and require careful clinicopathological correlation. Phyllodes tumors are uncommon fibroepithelial neoplasms of the breast characterized by biphasic proliferation of epithelial and stromal components. They account for less than 1% of all breast tumors and are classified as benign, borderline, or malignant based on histological criteria, including stromal cellularity, mitotic activity, stromal atypia, tumor margins, and stromal overgrowth (6,9). Malignant phyllodes tumors represent the least common subtype but are associated with aggressive biological behavior and increased risk of local recurrence.

The coexistence of invasive ductal carcinoma within a phyllodes tumor is extremely rare. Several studies have reported isolated cases in which epithelial malignancies such as ductal carcinoma in situ or invasive ductal carcinoma were identified within or adjacent to phyllodes tumors (7,8,10). The pathogenesis of this unusual association remains uncertain. Some authors suggest that malignant transformation of the epithelial component may occur within the fibroepithelial tumor, whereas others propose that the carcinoma and phyllodes tumor may arise as independent neoplastic processes within the same breast.

In the present case, the initial core needle biopsy demonstrated invasive ductal carcinoma, whereas examination of the surgical specimen revealed a malignant phyllodes tumor containing a well-differentiated invasive ductal carcinoma component. This discrepancy highlights an important limitation of core needle biopsy in large heterogeneous breast masses, where sampling may capture only a limited portion of the lesion. Comprehensive pathological evaluation of the entire surgical specimen therefore remains essential for establishing the definitive diagnosis.

Immunohistochemical analysis also plays a critical role in the characterization of breast carcinoma and in guiding therapeutic decision-making. The tumor in the present case demonstrated strong estrogen receptor and progesterone receptor expression, absence of HER2 overexpression, and a low Ki-67 proliferation index, findings consistent with the Luminal A molecular subtype. Luminal A breast cancers are generally associated with favorable prognosis, lower proliferative activity, and high responsiveness to endocrine therapy (5,11).

From a clinical perspective, accurate identification of both tumor components has important therapeutic implications. Surgical excision with adequate margins remains the primary treatment for malignant phyllodes tumors, while management of invasive ductal carcinoma may involve endocrine therapy, chemotherapy, or targeted therapy depending on tumor stage and receptor status (12). Therefore, multidisciplinary collaboration among surgeons, radiologists, and pathologists is essential for optimal management of such complex cases.

This case underscores the importance of integrating clinical examination, radiological imaging, histopathology, and immunohistochemistry to achieve an accurate diagnosis and appropriate treatment planning in rare breast tumor presentations.

Conclusion

This case demonstrates the diagnostic importance of integrating clinical examination, imaging modalities, histopathology, and immunohistochemistry in the evaluation of complex breast tumours. The rare coexistence of malignant phyllodes tumour with invasive ductal carcinoma may pose diagnostic challenges, particularly when limited biopsy samples are obtained. Comprehensive pathological examination of the surgical specimen is essential for accurate diagnosis and appropriate treatment planning.

Ethical Statement

Written informed consent was obtained from the patient for publication of clinical images and medical information.

Conflict of Interest

The author declares no conflict of interest.

Author Contribution

Author responsible for clinical documentation data preparation, manuscript writing, and final approval.

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