Case Report

Oncoplastic Management of a Giant Malignant Phyllodes Tumor: Nipple-Sparing Mastectomy with Immediate Breast Reconstruction

Abordagem Oncoplástica de um Tumor Filoide Maligno Gigante: Mastectomia com Preservação do Complexo Areolo-Papilar e Reconstrução Mamária Imediata

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ABSTRACT

Malignant phyllodes tumors (MPTs) are rare, fast-growing breast neoplasms with a tendency to recur. We report the case of a 44-year-old woman with an 11 cm right breast mass diagnosed as a malignant phyllodes tumor. Due to the tumor's size and location, she underwent a nipple-sparing subcutaneous mastectomy with immediate implant-based reconstruction. Histopathology confirmed

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malignancy with high stromal cellularity and a Ki-67 index of 20%; margins were negative. The postoperative course was uneventful aside from minor superficial areolar necrosis. No adjuvant therapy was required. This case illustrates the potential safety and feasibility of nipple-sparing mastectomy with reconstruction in select MPT patients. While wide excision with 1 cm margins remains standard, total mastectomy may be appropriate for large tumors. The case supports the value of individualized, multidisciplinary approaches that integrate oncologic safety with cosmetic outcomes.

Keywords: Breast Neoplasms/surgery; Lymphatic Metastasis; Mastectomy, Segmental; Nipples/surgery; Phyllodes Tumor/surgery

RESUMO

Os tumores filoides malignos (TFMs) são neoplasias mamárias raras e de rápido crescimento, com tendência à recorrência. Relatamos o caso de uma mulher de 44 anos portadora de uma massa de 11 cm na mama direita, diagnosticada como tumor filoide maligno. Devido ao tamanho e à localização da lesão, a paciente foi submetida a uma mastectomia subcutânea com preservação do complexo areolo-papilar e reconstrução imediata com implante. O exame histopatológico confirmou malignidade, com alta celularidade estromal e índice Ki-67 de 20%, apresentando margens livres. O pós-operatório transcorreu sem intercorrências relevantes, exceto por pequena necrose superficial areolar. Não foi necessária terapia adjuvante. Este caso ilustra a viabilidade e a segurança potenciais da mastectomia com preservação do mamilo associada à reconstrução imediata em pacientes selecionados com TFM. Embora a excisão ampla com margens de 1 cm continue sendo o padrão, a mastectomia total pode ser apropriada em tumores volumosos. O caso reforça o valor de abordagens individualizadas e multidisciplinares que integrem segurança oncológica e resultado estético.

Palavras-chave: Mamilos/cirurgia; Mastectomia Segmentar; Metástase Linfática; Neoplasias da Mama/cirurgia; Tumor Filoides/cirurgia

INTRODUCTION

Phyllodes tumors (PTs) are rare fibroepithelial neoplasms of the breast, representing between 0.3% and 1% of all breast tumors and approximately 2.5% of fibroepithelial lesions overall.[1,2] First described by Johannes Müller in 1838 as cystosarcoma phyllodes, these tumors are histologically defined by a biphasic architecture of epithelial and stromal components, with the stromal compartment primarily dictating tumor behavior.[3,4] Based on histopathologic criteria, including stromal cellularity, atypia, mitotic activity, border characteristics, stromal overgrowth, and the presence of malignant heterologous elements. PTs are classified into benign, borderline, and malignant forms.[1,5]

Malignant phyllodes tumors (MPTs) constitute 10%–20% of PTs and display aggressive behavior with local recurrence rates ranging from 23% to 30% and distant metastasis in approximately 9%–28% of cases, most often to the lungs and bones.[5,6] These malignancies exhibit marked stromal pleomorphism, diffusely increased cellularity, high mitotic activity (>10 mitoses per high-power field), and infiltrative or permeative margins.[1,4] The identification of malignant heterologous elements, such as liposarcomatous or osteosarcomatous differentiation, is diagnostic of MPT, even in the absence of other malignant features.[1,5]

Clinically, PTs most often occur in women aged 35 to 55 and typically present as firm, painless, and mobile breast masses that grow rapidly over weeks to months.[1,5,6] Tumor size varies widely, with a subset classified as "giant" PTs if larger than 10 cm, accounting for approximately 20% of cases.[4,6] PTs often arise in the upper outer quadrant of the breast and may appear multicentric in up to one-third of cases.[7]

Imaging features often mimic those of fibroadenomas, making preoperative diagnosis difficult. On mammography and ultrasound, PTs usually appear as well-circumscribed, lobulated, or oval masses, sometimes with internal clefts or cystic areas. Larger size, heterogeneous echotexture, and rapid growth may suggest PT over fibroadenoma, but these are not pathognomonic findings.[1,7] Magnetic resonance imaging may add further anatomical detail but does not reliably differentiate benign from malignant forms.[6]

Core needle biopsy remains the standard preoperative diagnostic tool, although histologic overlap with fibroadenomas often necessitates excision for definitive classification.[3,7] Histologically, PTs exhibit a leaf-like intracanalicular pattern with frond-like projections of stromal tissue into cleft-like epithelial-lined spaces. Malignant transformation is predominantly governed by stromal features such as overgrowth, cellular atypia, and mitotic index.[3,5]

Surgical excision remains the cornerstone of treatment. Wide local excision with 1 cm negative margins is the preferred approach for most PTs; however, mastectomy is indicated when margin clearance cannot be achieved or when the tumor-to-breast size ratio is prohibitive.[2,7] Local recurrence is strongly influenced by tumor grade, surgical margins, and stromal characteristics.[1,5]

Emerging molecular data have revealed a spectrum of genetic alterations. While most PTs harbor *MED12* mutations, more aggressive forms, particularly MPTs, often demonstrate *EGFR* mutations or amplifications. These changes are more common in MED12-wild-type PTs and have been associated with worse prognosis and may offer targets for future therapeutic interventions.[3]

Given the diagnostic complexity, unpredictable behavior, and potential for recurrence and metastasis in MPTs, these tumors represent a continuing challenge in breast oncology, warranting careful pathological assessment and tailored surgical planning.

CASE REPORT

A 44-year-old female with no relevant oncologic history presented in August 2023 after detecting a palpable lump in her right breast during self-examination. Initial evaluation with bilateral mammography and breast ultrasound revealed two solid nodules in the right breast, classified as BI-RADS 3. Progressive growth of the lesions was subsequently documented. By January 2025, the dominant mass measured 51 mm at the 12 o'clock position, with a secondary lesion measuring 23 mm at the 10–11 o'clock position. Ultrasound-guided core needle (trucut) biopsy of both nodules confirmed the diagnosis of phyllodes tumors (Fig. 1). Multidisciplinary evaluation by the surgical oncology and plastic surgery teams led to a recommendation for surgical resection, which the patient elected to undergo via a simple subcutaneous mastectomy at her request (Fig. 1).

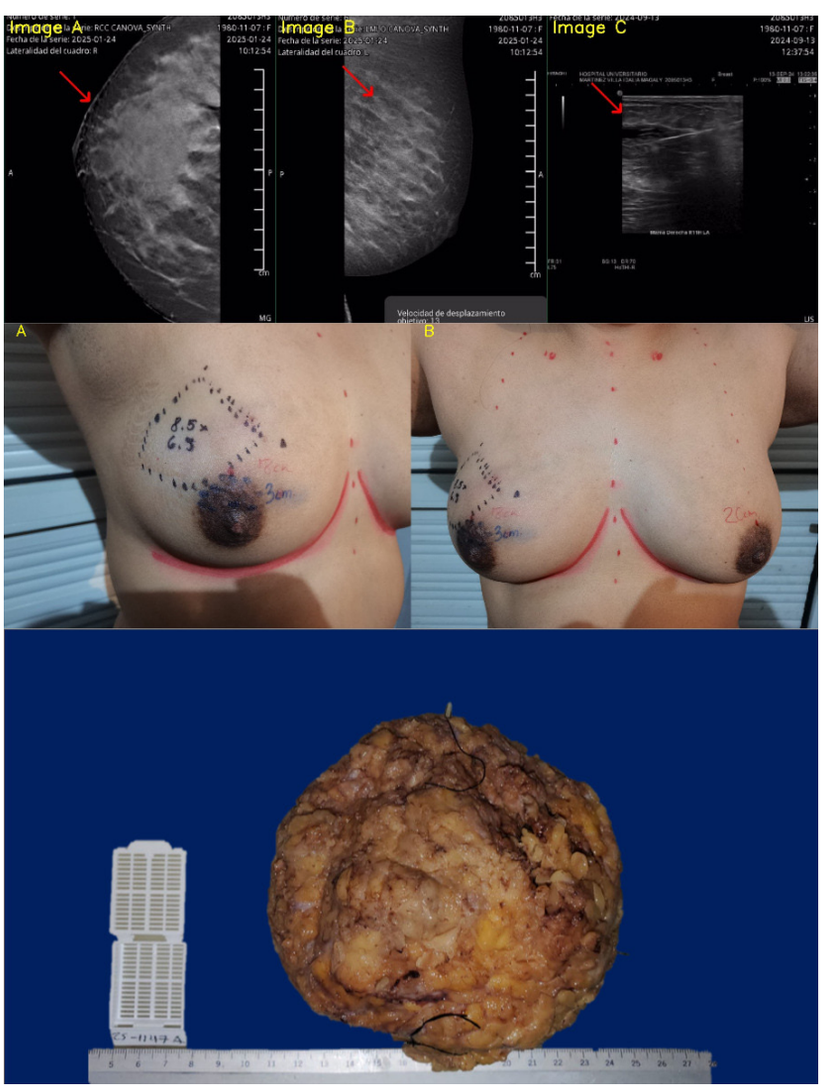

Figure 1. Upper row: Composite mammography and ultrasound images taken during core needle biopsy. (A) Hypoechoic, lobulated consistent with phyllodes morphology. (B) Tumoral extension toward the retroareolar region. (C) Core biopsy needle visible within the lesion during sampling. Middle row: (A) Left oblique view of the right breast showing preoperative skin markings. (B) Frontal view demonstrating preoperative symmetry assessment and planned incision lines. Bottom row: Gross specimen of malignant phyllodes tumor following subcutaneous mastectomy; photograph of the resected tumor mass measuring approximately 11 × 9 cm, displaying a lobulated, tan-brown surface with irregular contours and focal hemorrhagic areas.

The procedure, performed in May 2025, included preservation of the nipple–areola complex and immediate reconstruction with a 255-cc breast implant. Intraoperatively, a mass was identified in the upper outer quadrant and another in the retroareolar region, which had coalesced into a single tumor. Estimated blood loss was 50 mL, and no intraoperative complications were reported. Definitive histopathological analysis confirmed a malignant phyllodes tumor measuring approximately 11 cm in its greatest dimension (Fig. 1), with six mitoses per ten high-power fields (Figs. 2 and 3). No necrosis or heterologous elements were observed. All surgical margins were free of neoplastic involvement. Immunohistochemical staining revealed a Ki-67 proliferation index of approximately 20% (Fig. 3).

The patient had an uneventful postoperative recovery, with no systemic complications. On postoperative day 7, she developed a small, superficial area of nipple–areola complex necrosis. The lesion remained self-limited, showed progressive remission, and required no surgical intervention. By the fourth postoperative week, the area had fully stabilized with no further progression. The remainder of the wound healed appropriately (Fig. 4). Coordinated oncologic and surgical follow-up was continued.

DISCUSSION

Malignant phyllodes tumors (MPTs) are rare and diagnostically challenging fibroepithelial neoplasms that account for approximately 10%–20% of all phyllodes tumors. While surgical excision remains the cornerstone of treatment, the optimal surgical and adjuvant strategies continue to generate debate due to the scarcity of prospective studies and the biological heterogeneity of these tumors.[1,3,5]

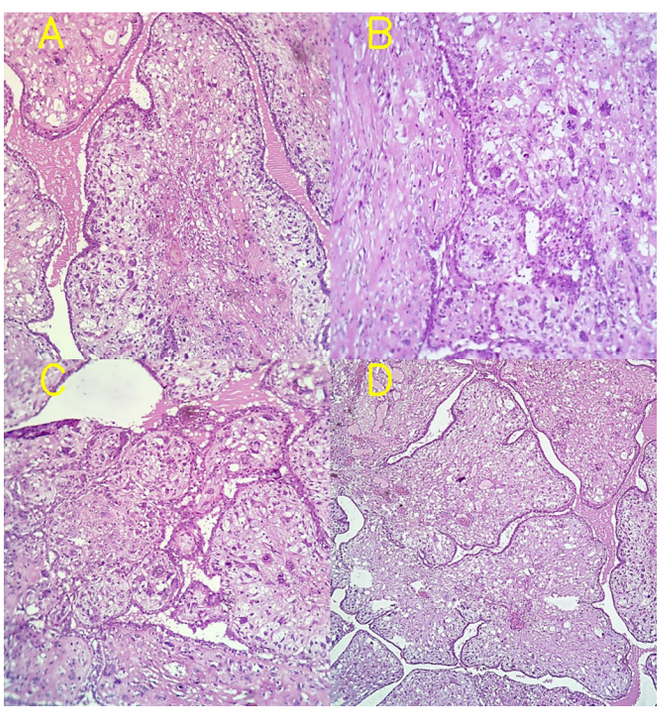

Figure 2. Histopathological features of a malignant phyllodes tumor. (A) Leaf-like (phyllodes) architectural patterns composed of cleft-like epithelial-lined spaces and stromal overgrowth. (B) Stromal hypercellularity with marked nuclear pleomorphism and crowding. (C) Increased stromal mitotic activity and cellular atypia, consistent with malignant transformation. (D) High-power view highlighting the cytologic pleomorphism of stromal cells without heterologous elements or necrosis.

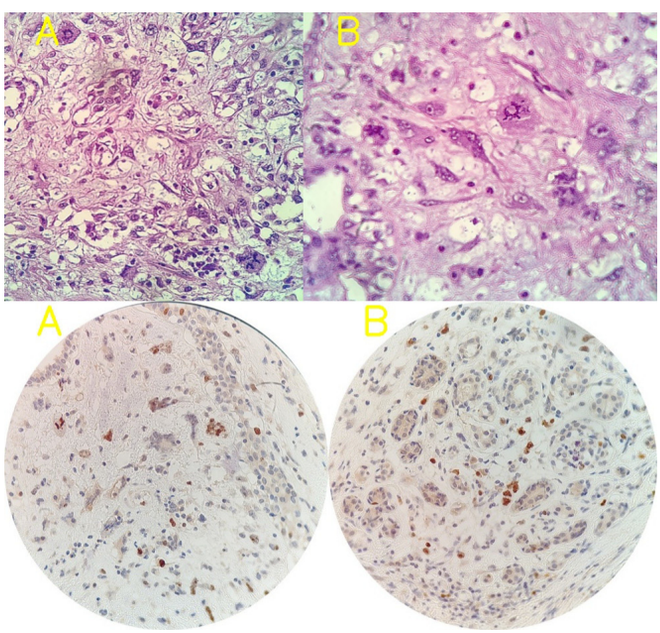

Figure 3. Upper row: High-power views of stromal mitotic activity in malignant phyllodes tumor; (A) and (B) Hematoxylin and eosin (H&E)–stained sections at high magnification reveal numerous mitotic figures within pleomorphic stromal cells. These findings illustrate markedly increased mitotic activity, a key diagnostic feature supporting the classification of this phyllodes tumor as malignant. No necrosis or heterologous elements were observed in the examined fields. Bottom row: Ki-67 immunohistochemical staining of malignant phyllodes tumor; (A) and (B) High-power photomicrographs showing Ki-67 immunopositivity (brown nuclear staining) in the stromal component of the tumor. The percentage of positively stained nuclei reflects the tumor cell proliferation index. In this case, approximately 20% of stromal cells exhibited Ki-67 positivity, consistent with increased mitotic activity and supporting the malignant nature of the phyllodes tumor.

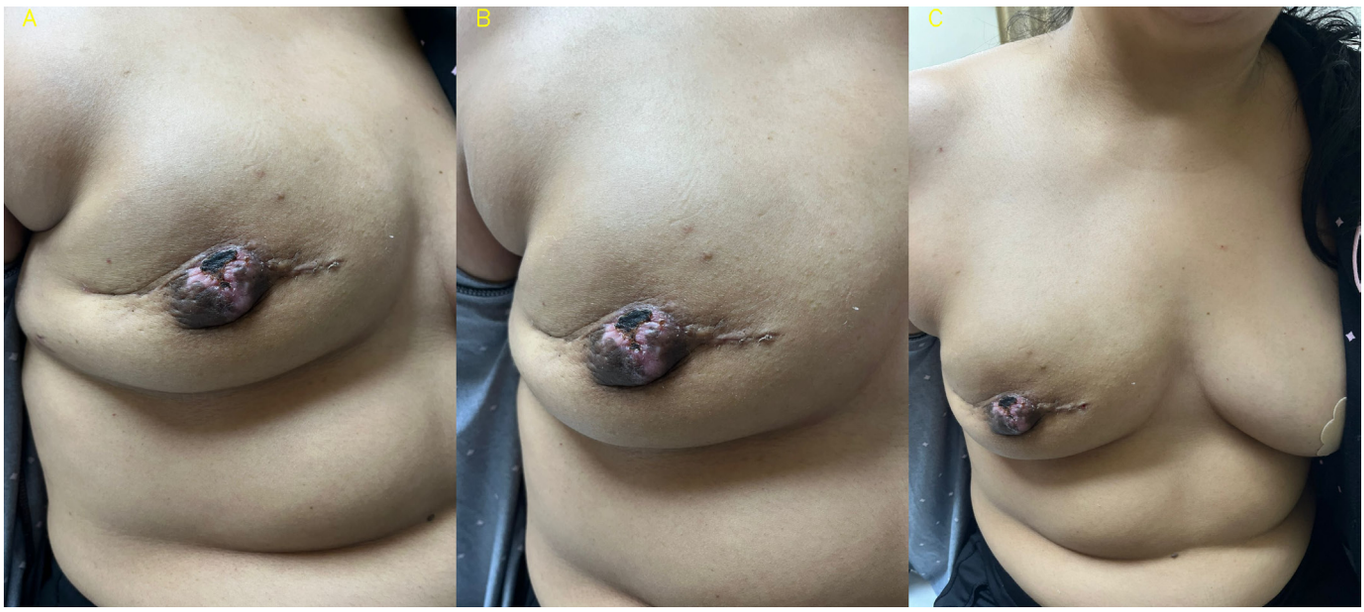

Figure 4. (A) Oblique view of the right breast during early postoperative follow-up, showing the surgical incision and favorable contour with preserved nipple–areola complex. (B) Additional oblique view demonstrating adequate implant projection and a localized, self-limited area of superficial areolar necrosis, currently in remission without signs of infection or tissue loss progression. (C) Frontal view showing maintained symmetry and proper positioning of the nipple–areola complex, with good adaptation of the skin envelope and healing trajectory.

The National Comprehensive Cancer Network (NCCN) recommends wide local excision with 1 cm margins for borderline and malignant PTs, without axillary surgery, given the extremely low incidence of nodal metastasis.[1,2] Breast-conserving surgery (BCS) is an appropriate approach when negative margins can be achieved and satisfactory cosmetic outcomes preserved. However, total mastectomy may be required for tumors that are large, multifocal, or located in a way that would compromise aesthetics or resection margins.[1,4]

Local recurrence remains a significant concern in MPTs, with rates as high as 23%–30%, even after margin-negative resections.[5,7] A recent meta-analysis demonstrated that positive margin status significantly increases the risk of local recurrence (OR 3.64), while margin width (<1 cm *vs* ≥1 cm) had no statistically significant impact.[8] These findings suggest that while wide excision remains a goal, rigid adherence to a 1 cm threshold may not be necessary in all cases — particularly when oncoplastic techniques allow for complete resection with narrower yet clear margins.

The benefit of adjuvant radiotherapy (RT) in MPT remains controversial. Some retrospective studies have shown that RT may reduce local recurrence, particularly in borderline and malignant subtypes, or when BCS is performed in large tumors or close-margin resections.[1,5,7] However, no clear survival benefit has been established, and the decision to offer RT is typically individualized, taking into account factors such as tumor size, stromal overgrowth, recurrence risk, and patient preference.[2,6]

Chemotherapy is not routinely recommended due to the absence of strong evidence supporting its benefit in localized disease. In high-risk patients—those with tumors >5 cm, stromal overgrowth, or unresectable positive margins—chemotherapy may be considered on a case-by-case basis as part of shared decision-making.[1,5]

The current case underlines several key clinical considerations. First, although surgical management followed standard guidelines, the decision-making process must incorporate tumor biology, anatomical feasibility of resection, and patient-specific factors, particularly in cases where mastectomy is necessary for margin clearance. Second, the rarity of MPT and its overlapping imaging characteristics with fibroadenoma make preoperative diagnosis difficult, reinforcing the importance of histologic confirmation through core needle biopsy and heightened clinical suspicion in rapidly enlarging masses.[6,7]

Finally, the role of a multidisciplinary team—including surgical oncology, plastic surgery, and radiation oncology—is vital in ensuring both oncologic safety and cosmetic restoration.

As oncoplastic and reconstructive techniques evolve, the threshold for mastectomy may decrease when BCS becomes increasingly achievable, even in larger lesions.

To our knowledge, reports of nipple-sparing mastectomy with immediate reconstruction for MPT remain exceedingly rare, making this case a valuable contribution to both oncologic and aesthetic surgical planning. Given the limited availability of prospective data and the ongoing evolution of surgical techniques, case reports like this one remain valuable contributions to the understanding and refinement of MPT management. They highlight real-world dilemmas and help guide individualized treatment pathways for future patients.

CONCLUSION

Malignant phyllodes tumors remain rare and unpredictable breast neoplasms that challenge clinicians due to their rapid growth, histologic variability, and limited prospective treatment data. This case demonstrates that nipple-sparing mastectomy with immediate reconstruction can be a viable, oncologically safe option in appropriately selected patients, even for tumors of considerable size. Surgical planning must balance margin clearance with functional and aesthetic considerations, ideally within a multidisciplinary framework. While wide excision remains the mainstay of treatment, individualizing decisions about adjuvant therapy and extent of surgery is essential, particularly given the absence of standardized systemic treatment protocols. This case adds to the evolving discussion on integrating oncologic safety and reconstructive outcomes in the management of malignant phyllodes tumors.

LEARNING POINTS / TAKE-HOME MESSAGES

- Malignant phyllodes tumors are rare fibroepithelial breast neoplasms, representing 10%–20% of all phyllodes tumors, with high local recurrence risk despite margin-negative resections.
- Nipple-sparing mastectomy with immediate implant-based reconstruction can be an oncologically safe and cosmetically favorable option in selected cases of large MPTs, when negative margins are achievable.
- Preoperative differentiation between phyllodes tumors and fibroadenomas is challenging; rapid growth and large size should raise clinical suspicion.
- A multidisciplinary approach integrating surgical oncology, pathology, and reconstructive surgery is essential to balance tumor control with optimal cosmetic outcomes.
- Rigid adherence to 1 cm margins may not be necessary if complete excision with clear margins is achieved using oncoplastic techniques.

ETHICAL DISCLOSURES

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CONTRIBUTORSHIP STATEMENT

MJY: Writing the manuscript, data collection and analysis.
MSRG, RDD, MGG and MRO: Analysis and review of the manuscript.
All authors approved the final version to be published.

DECLARAÇÃO DE CONTRIBUIÇÃO

MJY: Redação do manuscrito, recolha e análise de dados.
MSRG, RDD, MGG e MRO: Análise e revisão do manuscrito.
Todos os autores aprovaram a versão final a ser publicada.

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