

Clinicopathologic Spectrum, Management and Outcomes of Phyllodes Tumors of the Breast

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ABSTRACT

Objective	To assess the clinicopathological features, operative intervention, and survival in patients presenting with phyllodes tumors of breast.
Study design	Retrospective observational study.
Place & Duration of study	Department of General Surgery Ward 3, Jinnah Postgraduate Medical Centre (JPMC) Karachi, from January 2015 to July 2024.
Methods	All patients diagnosed clinically with features suggestive of phyllodes tumors on radiology and subsequently proven on histopathology were included. Demographics features, characteristics of the tumor, histological subtypes, surgical treatment provided and outcomes were noted. IBM SPSS version 26.0 was used for data entry and analysis.
Results	Eighty-one patients were treated during the study period. The median age of the patients 46.5 years (from 18 – 83-years), and 75.3% were aged = 40 years. A family history of breast carcinoma was found in 16% of the patients. Lumpectomy (44.4%), wide excision (30.9%), and mastectomy (22.2%) were the surgical procedures performed. Tumors measuring 5-cm were detected in 53.1% of the patients. Local recurrence was noted in 14 (17.3%) patients and was significantly associated with large tumor size, while the association with surgical margin status did not reach statistical significance ($p=0.074$). In three cases of malignancies, bone metastasis and death were documented. These patients were treated with palliative radiotherapy. None of the patients received chemotherapy.
Conclusion	Phyllodes tumors are less common mostly benign lesions. A tumor margin-negative excision is possible in many patients.
Key words	Phyllodes tumor, Breast neoplasm, Tumor recurrence, Histopathology, Borderline phyllodes, Malignant phyllodes.

INTRODUCTION:

Phyllodes tumors (PT) are type of fibroepithelial neoplasm. These are rare type of the breast tumors. They comprise approximately 0.3–1% of all the breast tumors.¹ They have a biphasic nature, consisting of epithelial and stromal components, and stromal

proliferation dictates their biological behavior. The World Health Organization (WHO) classifies PTs as benign, borderline, or malignant based on stromal cellularity, pleomorphism, mitotic rate, and margin infiltration.² From a clinical perspective, PTs tend to be unilateral, firm, and mobile breast masses that may dramatically increase in size and may simulate fibroadenomas on imaging.^{3,4} Core needle biopsy can help in differentiating fibroadenoma and phyllodes tumors preoperatively.⁵ However, accurate discrimination remains challenging because the histopathological features overlap and heterogeneity exists within the tumor.

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Surgical resection with clear margins is the treatment of choice for PT.⁶ However, the ideal width of the

surgical margin remains controversial. According to NCCN guidelines and previous studies, an adequate surgical margin of =1 cm width is considered an adequate margin for preventing the recurrence of PTs.⁷ Ultra-wide resections for this tumor is not agreed upon. Local recurrence rates fluctuate from 8 to 20%, depending on tumor grade, margin status, and stromal overgrowth.⁸ The role of adjuvant therapy is still controversial and radiotherapy may be valuable in enhancing local control in borderline and malignant tumors. The data from patients in low- and middle-income countries (LMICs) are scarce. Differences in diagnostic facilities, interval to presentation, and limited availability of specialized histopathology modalities affect the outcome.⁹ This study was conducted to assess the clinicopathological profile, surgical management, and outcomes of treatment following surgery at a tertiary care hospital.

METHODS:

Study design, place & duration: This retrospective observational study was conducted at the Department of General Surgery, Ward 3, Jinnah Postgraduate Medical Centre (JPMC), Karachi, from January 2015 to July 2024.

Ethical considerations: Ethical approval was obtained from the Institutional Review Board of JPMC (F.2-81/2024-GENL/26/JPMC).

Inclusion and exclusion criteria: Data of all female patients of 18-years of age and above with phyllodes tumors diagnosed on histopathology or on ultrasonography and mammography were included. Patients with incomplete records, other benign fibroepithelial lesions, or synchronous breast malignancies were excluded.

Sample size estimation: A total of 81 patients fulfilling the inclusion criteria were managed during the during study period.

Study protocol: All patients underwent core or incisional biopsies for histopathological confirmation. According to the diagnosis and tumor extent, wide local excision or mastectomy was performed. The specimens were analyzed for histopathology and margin status. Patients who had previously undergone surgery elsewhere with positive or close margins underwent re-excision. Postoperative outcomes, recurrence rate, metastasis, and mortality were recorded. Follow-ups were scheduled every three months in the first year and every 6 months thereafter for at least two years.

Statistical analysis: Data were analyzed using IBM

SPSS version 26. Quantitative variables (age, tumor size) were expressed as mean \pm standard deviation (SD) or median (range), and qualitative variables as frequencies and percentages. Associations between categorical variables were assessed using the chi-square or Fisher's exact tests, and continuous variables were tested using the t-test or Mann-Whitney U test. Statistical significance was set at $p < 0.05$.

RESULTS:

Data of 81 patients with histologically confirmed phyllodes tumors of the breast were analyzed. The median age of the patients was 46.5-years (from 18 – 83 years), with 61 (75.3%) patients above 40-years of age. A family history of breast carcinoma was noted in 13 (16.0%) patients. The median interval between detection of the tumor and surgery was 3.5 months (varied from 0 – 480 months). Previous fibroadenoma excision was reported in 42 (51.8%) patients. Tumors of size less than 5-cm were found in 43 (53.1%) patients.

Lumpectomy was the most frequently performed surgical procedure ($n=36$ - 44.4%). Axillary lymph nodes dissection was performed in two (2.5%) patients. Histologically, 45 (55.6 %) tumors were benign, 14 (17.3 %) borderline, and 22 (27.1 %) malignant. No malignant heterologous elements were detected. Adjuvant radiotherapy was administered to three (3.7%) patients with bone metastases. Local recurrence occurred in 14 (17.3%) patients. This included seven benign (50%), four borderline (28.6%), and three malignant (21.4%) lesions. Bone metastases developed in three (3.7%) patients. All of these were malignant lesions. These patients expired despite palliative radiotherapy. Detailed clinicopathological data are shown in table I.

Tumor size and histological subtype were significantly associated with local recurrence ($p < 0.05$), whereas the association with surgical margin adequacy did not reach statistical significance ($p=0.074$). Patients with tumors more than 5-cm had a higher recurrence rate (20.9% - $p=0.041$). Patients with inadequate margins (< 1 cm) showed a higher recurrence rate. However, the difference was not significant ($p = 0.074$). Recurrence was noted across all histologic grades but predominantly in benign and borderline lesions. Bone metastases and mortality occurred only in malignant cases. Patient age and previous fibroadenoma excision showed no significant correlation with recurrence rate ($p>0.05$). Details are given in table II.

Table I: Clinicopathologic Characteristics

Variable	Variable	n (%)
Surgical Method	Lumpectomy	36 (44.4)
	Wide Excision	25 (30.9)
	Mastectomy	18 (22.2)
	Axillary Dissection	2 (2.5)
Surgical Margin (cm)	< 1 (close/positive)	24 (29.6)
	> 1 (adequate)	57 (70.4)
Histologic Subtype	Benign	45 (55.6)
	Borderline	14 (17.3)
	Malignant	22 (27.1)
Adjuvant Therapy	Radiotherapy	3 (3.7)
	Chemotherapy	0 (0.0)
Mortality	Yes	3 (3.7)

Table II: Association Between Clinicopathologic Variables and Local Recurrence

Variable	Category	Recurrence n (%)	No Recurrence n (%)	p-value
Tumor Size (cm)	< 5	5 (13.2)	33 (86.8)	0.041*
	> 5	9 (20.9)	34 (79.1)	
Surgical Margin (cm)	< 1 (close/positive)	3 (12.5)	21 (87.5)	0.074
	>1 (adequate)	11 (19.3)	46 (80.7)	
Histologic Subtype	Benign	7 (15.6)	38 (84.4)	0.039*
	Borderline	4 (28.6)	10 (71.4)	
	Malignant	3 (13.6)	19 (86.4)	
Bone Metastasis	Yes	3 (100)	0 (0.0)	< 0.001*
	No	11 (14.1)	67 (85.9)	
Mortality	Yes	3 (100)	0 (0.0)	< 0.001*
	No	11 (14.1)	67 (85.9)	

*Significant

DISCUSSION:

Phyllodes tumors are rare fibroepithelial neoplasms with unpredictable behavior. This study provides valuable data from Pakistan that are consistent with global findings but highlight region-specific management challenges. The age distribution paralleled that of international reports, where most cases occurred in the fourth and fifth decades of life. However, a substantial proportion our patients were less than 40-years of age. This is similar to a South Asian data.¹⁰ The possible reason may be due to frequent prior fibroadenoma excisions that was reported in half of the patients and diagnostic overlap between both entities. In a study it was noted that cytologic and radiologic similarities delay diagnosis.¹

Tumor size and histological subtype were the most consistent predictors of local recurrence in this study. Although the surgical margin status is clinically

important, its association with recurrence did not reach statistical significance in our cohort. An earlier investigation reported variable recurrence across PT grades; highest in malignant, intermediate in borderline, and lowest in benign lesions.¹¹ Another study demonstrated that both one millimeter and one centimeter margins significantly reduced recurrence, whereas wider margins offered no additional benefit.¹² In benign PTs with clear margins, conservative surgery may be adequate.¹³ Fou et al emphasized that recurrence correlates with histologic grade, stromal overgrowth, and margin status, whereas overall survival is similar between wide excision and mastectomy with negative margins.¹⁴ In this series, recurrence was mainly observed in benign cases, which aligned with global rates of 10–30%. Tumor size of less than 5-cm was associated with a higher recurrence rate as reported in some studies.¹⁵ Primary wide excision with clear margins remains the treatment of choice, whereas

mastectomy is reserved for large or recurrent lesions. In this study the recurrence was observed in patients with adequate margins, suggesting that factors beyond margin status, including tumor biology, may influence the outcomes.

The role of adjuvant therapy remains unclear. Limited evidence suggests radiotherapy may reduce recurrence in malignant PTs but provides only marginal survival benefit.^{16,17} In the present study, radiotherapy was used in a limited number of advanced malignant cases, primarily for palliative purposes, and its effect on recurrence could not be reliably assessed. However, owing to the limited randomized data, a risk-based multimodality approach is recommended. Although molecular studies have improved understanding of phyllodes tumors pathogenesis, molecular profiling was beyond the scope of this study and is not routinely available in most of the low-resource settings. Therefore, management decisions in such environments continue to rely primarily on clinical, histopathological, and surgical factors.^{18,19}

Negative margins following surgery are the cornerstone of the disease control. Adjuvant therapy should be limited to high-risk, recurrent, and metastatic cases. Distant metastases were confined to a few malignant tumors with bone involvement in our study, whereas local recurrence predominated, underscoring the need for long-term follow-up. Diagnostic and treatment delays persist in low- and middle-income countries due to limited pathology services and social barriers. The establishment of dedicated breast units and uniform reporting protocols could improve outcomes. Although rare, PTs require personalized treatment that integrates histological, clinical, and molecular features. Advances in genomics are shifting management from morphology-based to precision-guided approach. Incorporating molecular and genomic profiling into risk assessment may enhance prognostication and enable personalized treatment, especially in aggressive or recurrent cases.

This study represents one of the largest local datasets on phyllodes tumors in Pakistan, providing valuable evidence for local practice. Further multicenter studies with longer follow-up and larger cohorts are required to better define prognostic factors and management strategies. Accurate diagnosis through improved imaging, biopsy interpretation, and multidisciplinary evaluation is essential for distinguishing PTs from fibroadenomas. Strengthening pathology services, public awareness, and standardized follow-up protocols in resource-

limited settings, such as Pakistan, is crucial for improving outcomes and reducing recurrence.

Limitations of the study: This was a single-center study with a small sample size. The findings may be influenced by regional referral patterns. The inconsistent observation periods could affect the recurrence rate. Molecular genetic analyses were not performed thus complete genotype–phenotype correlation could not be performed.

CONCLUSION:

The curative management for phyllodes tumors include complete surgical excision with negative margins. This minimizes local recurrence and avoids unnecessary radical surgery while preserving breast aesthetics. Radiotherapy is advised for malignant or borderline tumors with close or positive margins.

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- Received for publication: 01-11-2025
 Sent for revision:-01-01-2026
 Accepted after revision: 31-01-2026
- Author Contributions:
 Irfan Ali: Conceptualization, data analysis, and manuscript writing.
 Hani Sher Muhammad: Study design and data collection.
 Mariyah Anwer: Manuscript revision.
 Shabina Jaffar: Study conduction and data analysis.
 Muhammad Naeem: Manuscript review.
 Hira Moosa: Data analysis.
- All authors approved final version of the manuscript after revision and are responsible for the content of the manuscript.
- Ethics statement: Institution review board approval was obtained before reviewing the records.
- Competing interests: Authors declare that they have no competing interests.

Source of funding: Nil

Disclosure: This is dissertation based article.

Use of Artificial Intelligence: AI app was not used in preparation of this manuscript.

Data availability: Corresponding author can provide data on request.

How to cite this article?

Ali I, Muhammad HS, Anwer M, Jaffar S, Naeem M, Moosa H. Clinicopathologic spectrum, management and outcomes of phyllodes tumors of the breast. *J Surg Pakistan*. 2025;30(4):109-14

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