Phyllodes tumor: The impostor

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Learning objectives

- To review the imaging findings of phyllodes tumor.

- To describe those imaging findings and pathological and clinical features that suggest phyllodes tumor rather than fibroadenoma.

Background

Phyllodes tumor, originally described as cystosarcoma phyllodes, is a rare breast fibroepithelial neoplasm that accounts for about 0.3-1.0% of all breast tumors and represents up to 2-3% of fibroepithelial breast lesions.

Its prevalence peak occurs during the 5th decade. The most common clinical presentation is a palpable, painless and rapidly growing mass. This finding in middle-aged and older women suggests phyllodes tumor rather than fibroadenoma.

Ulceration of the skin or invasion of the chest wall may occur in patients with very large phyllodes tumors. Lymph node involvement is rare, so axillary nodal staging is not usually necessary.

Histologically, phyllodes tumor is similar to a fibroadenoma since it is composed of epithelial and stromal components. However, phyllodes tumor shows expansion and increased cellularity of the stroma. The term "phyllodes", which means leaf-like, describes the typical papillary projections that are seen on pathologic examinations. Anyway, a phyllodes tumor can be difficult to distinguish from a proliferative fibroadenoma at core-needle biopsy, and excision may be necessary to make the diagnosis. Fig. 1 on page 3

Phyllodes tumors may develop de novo or from existing fibroadenomas. They can be classified into benign (which represents approximately 60% of phyllodes tumors), borderline (20%), and malignant (20%), based on the histological characteristics such as margin, stromal cellularity, stromal overgrowth, tumour necrosis, cellular atypia and the number of mitoses per high power field.

Local recurrence is about 21% and it is usually due to incomplete surgical excision. Because of this, complete local excision with a broad surgical margin is recommended even for low-grade tumors.
Approximately 25 % of them present hematogenous spread, most frequently pulmonary and bone metastasis.

Radiological and histopathological management of these situations are important in order to make accurate differential diagnosis between fibroadenoma and phyllodes tumor. It will allow precise surgical plannings and avoid re-interventions that would not have been necessary.

Images for this section:

**Fig. 1:** Low-power photomicrograph (hematoxylin-eosin stain) of biopsy specimen shows the typical features of a benign phyllodes tumor.
Findings and procedure details

The typical mammographic appearance of phyllodes tumor is a benign appearing lesion as a large round or oval, well-circumscribed, isodense mass. Calcifications are uncommon in contrast to fibroadenomas. Fig. 2 on page 5

At ultrasonography it can also resemble a fibroadenoma since phyllodes tumor usually manifests as a solid oval, round or lobular mass. Some features like heterogeneous internal echogenicity, presence of cystic components and posterior enhancement can suggest the diagnosis of phyllodes tumor. Color Doppler sonography has been used to distinguish malignant from benign tumors; however, the reliability of color Doppler sonography in the diagnosis of phyllodes tumors requires further study. Fig. 2 on page 5, Fig. 3 on page 5, Fig. 4 on page 6, Fig. 6 on page 8

The number of phyllodes tumors reported on MRI is limited, anyway several studies conclude that phyllodes tumor should be suspected when some characteristic morphologic signs are seen such as well-defined margins, round or lobulated shape and inner septations. In addition, it has been reported that cystic changes with irregular walls and tumor signal intensity lower than that of breast tissue on T2-weighted images, or signal intensity higher than that of normal breast tissue on T1-weighted images is suggestive of malignancy in phyllodes tumor. Fig. 4 on page 6, Fig. 7 on page 9

Additionally, dynamic breast MRI could help to differentiate between benign and malignant phyllodes tumor, though its specificity is really low. Fig. 8 on page 10

In our poster we show three cases of phyllodes tumor and describe their imaging findings on mammography, US and MRI:

- CASE 1: 75-year-old woman with a rapidly growing mass in the left breast. The histological study demonstrated a borderline phyllodes tumor. Fig. 2 on page 5

- CASE 2: 29-year-old woman with history of multiple phyllodes tumors, some of which arose in the surgical site and other ones developed de novo. All of them were described as benign phyllodes tumor at pathologic examination. Fig. 3 on page 5, Fig. 4 on page 6, Fig. 5 on page 7

- CASE 3: 48-year-old woman with history of breast cancer and who subsequently had a left mastectomy. She showed a growing mass in the subcutaneous cellular tissue of the
surgical site. The histological examination revealed a benign phyllodes tumor. **Fig. 6** on page 8, **Fig. 7** on page 9, **Fig. 8** on page 10

**Images for this section:**

**Fig. 2:** CASE 1. Phyllodes tumor in a 75-year-old woman. (a) Craniocaudal (b) and mediolateral oblique mammograms of the left breast demonstrate a lobular mass in upper inter-quadrant with partially well-defined margins but microlobulated and ill-defined in its deeper region. (c) US shows an irregular mass with microlobulated borders, heterogeneous echogenicity mainly hypoechoic and a combined posterior acoustic pattern. (d) Needle core-needle biopsy and surgery demonstrated a borderline phyllodes tumor.
**Fig. 3:** CASE 2. Phyllodes tumor and fibroadenoma in a 29-year-old woman who had also multiple bilateral fibroadenomas and a history of a previous phyllodes tumor. (a, b) US shows two masses in lower outer quadrant of the right breast not seen on previous studies, both with well defined margins, hypoechoic and with posterior acoustic enhancement. The superficial and bigger one that is lobular and more heterogeneous corresponded to a phyllodes tumor (arrow) and was surgically excised. The deeper and round one was described as a fibroadenoma (star) at core-needle biopsy.
Fig. 4: CASE 2. The same patient 7 months later. (a) US shows a new mass in lower outer quadrant of the right breast in the same surgical site, which is oval, well defined, hypoechoic and manifests low flow at Color Doppler. Another bilateral lesions were also described that remained stable comparing to previous studies (b-d) MRI. (b) Axial STIR image manifests a circumscribed round-oval mass which shows high intensity signal localised in lower outer quadrant of the right breast (arrow) (c, d) Contrast-enhanced T1-weighted fat-saturated image (c) and subtraction image (d) show an intense enhancing mass with some central non-enhancing small areas (blue arrow). Some bilateral non-specific enhancing foci were also seen. Mind the magnetic susceptibility artifact in the surgical site in c (red arrow).
**Fig. 5:** CASE 2. Finally it was decided to remove three suspicious lesions. (a) As they were nonpalpable, three ultrasound-guided hookwire were inserted: one in lower outer quadrant and two in inner quadrants of the right breast. Craniocaudal (b) and mediolateral (c) mammograms of the right breast show the hookwires correctly placed. Mind the high density of the breast.
Fig. 6: CASE 3. 48-year-old woman with left mastectomy and reconstruction secondary to breast cancer. (a,b) US shows a large, oval, circumscribed, heterogeneous mainly hypoechoic mass with flow signal at Doppler. The images show a silicone prosthesis located behind the mass.
Fig. 7: CASE 3. Previous MRI 5 years before (a) and actual MRI (b-d). (a,b) Sagittal T2-weighted images shows a large, lobular, well defined mass which is heterogeneously hyperintense with inner septations in the subcutaneous cellular tissue of the left breast that has significantly increased. (b) Axial image of both breasts from T1-weighted, fat-saturated contrast-enhanced, manifests a high intense mass-like enhancement (c,d) Contrast-enhanced T1-weighted fat-saturated subtraction image show an intense enhancement with non-enhancing inner septations. Mind the silicone prosthesis located behind the lesion.
Fig. 8: CASE 3. (a) Contrast-enhanced T1-weighted fat-saturated subtraction images shows the lesion previously described. (b) Enhancement curve for the ROI in "a" shows a type II pattern with a rapid initial rise followed by a plateau in the delayed phase.
Conclusion

Although phyllodes tumor and fibroadenoma have similar imaging features, the age of the patient, the tumor size, a rapid growth and some US and MRI features may suggest a phyllodes tumor rather than a fibroadenoma prior to biopsy.

Phyllodes tumor can be difficult to distinguish from a proliferative fibroadenoma, so core-needle biopsy or excision may be necessary to make the diagnosis.

Personal information

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