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Case Report

Giant phyllodes tumor of the breast: A case report ☆,☆☆

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ABSTRACT

Phyllodes tumors of the breast are rare fibroepithelial neoplasms that account for less than 1% of all breast tumors. They tend to affect middle-aged women, who present with a rapidly growing, palpable mass. Here we present a case of a 34-year-old female surrogate mother without any reported personal or family history of breast cancer who presented with a rapidly growing left breast mass, pathologically proven to be a phyllodes tumor. The patient was a G7P7 surrogate mother who received estrogen and progesterone injections for her twin surrogate pregnancy starting 4 months before embryo implantation, after which, she discovered a large palpable mass in the left breast at approximately week 7 gestational age. At the initial presentation, the patient was at week 23 gestational age. She underwent C-section delivery of the twins at this time and obtained further work-up of the mass. She had a core needle biopsy which yielded a benign fibroepithelial tumor. Due to the size of her breast mass and atypical morphology, including extension to the nipple, and skin ulceration, the patient subsequently underwent left mastectomy. At the time of mastectomy, which was 8 months after the initial work-up, the mass had grown to measure approximately 12 × 10 cm on physical examination and took up most of her left breast. It was completely resected and was pathologically determined to be a borderline phyllodes tumor. Only a few cases have been reported about the development of phyllodes tumor during pregnancy in the literature, and we believe this is the first case report of phyllodes tumor related to a surrogate pregnancy. Although the relationship between exogenous hormones and fibroepithelial tumors is not well understood, the case poses the clinical question if screening mammograms should be offered to patients undergoing exogenous hormonal therapy, regardless of age to establish a baseline and monitor for the development (if any) or growth of these tumors.

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Introduction

Phyllodes tumors of the breast represent a rare subset of fibroepithelial neoplasms, accounting for less than 1% of all breast tumors. They are known for their diverse clinical presentations and a wide spectrum of biological behavior, ranging from benign to malignant. Here, we present a compelling case of a 34-year-old female with a phyllodes tumor of the breast, a diagnosis that highlights the diagnostic and therapeutic complexities associated with this rare entity.

Phyllodes tumors, also known as cystosarcoma phyllodes, are characterized by the proliferation of both epithelial and stromal components [1], leading to the formation of a distinct fibroepithelial lesion. While they are typically benign, a subset can exhibit malignant features, such as stromal overgrowth, cellular atypia, and infiltrative margins, necessitating a comprehensive approach to diagnosis and management [2].

Case report

The patient was a 34-year-old G7P7 female who was a surrogate mother presenting with a rapidly growing mass in the left breast. The patient started noticing the mass at around week 7 of her most recent pregnancy, which was a twin surrogate pregnancy. The patient reported receiving estrogen and progesterone for 10 weeks before the embryo implantation. At the initial presentation, she was admitted for C-section delivery of her twin pregnancy at 23 weeks gestational age. During that admission, she underwent ultrasound of the left breast, which showed a large solid lobulated mass, corresponding to the palpable abnormality (Figs. 1A–C).

The mass demonstrated heterogeneous echogenicity and extended up to the nipple. There were some areas of shadowing and vascular flow. No dense calcification was identified. The margins were difficult to evaluate due to the large size.

The patient underwent CT chest the next day, which showed a lobulated, heterogeneously enhancing mass in the left breast, without extension to the chest wall (Fig. 2).

During this initial admission, the patient also underwent ultrasound-guided core needle biopsy of the left breast mass (Fig. 3) and the left axillary lymph node (image not shown). The biopsy result of the left breast mass at this time was determined to be benign fibroepithelial nodule. There were no malignant cells in the biopsied left axillary lymph node.

Mammogram showed a large hyperdense, lobulated mass which takes up almost the entire left breast, with possible extension to the skin surface and nipple retraction, highly suspicious for malignancy (Figs. 4A and B). The ultrasound and mammographic appearance of the mass, including large size taking up almost the entirety of the breast, nipple involvement, skin ulceration, etc. is not typical for a benign fibroepithelial tumor. The histopathological biopsy results were determined to be discordant with the imaging findings.

The patient was subsequently discharged to be followed up on an outpatient basis. During her outpatient work-up, the patient also underwent an MRI of the breasts at 4 months after the initial presentation/ ultrasound-guided core biopsy.

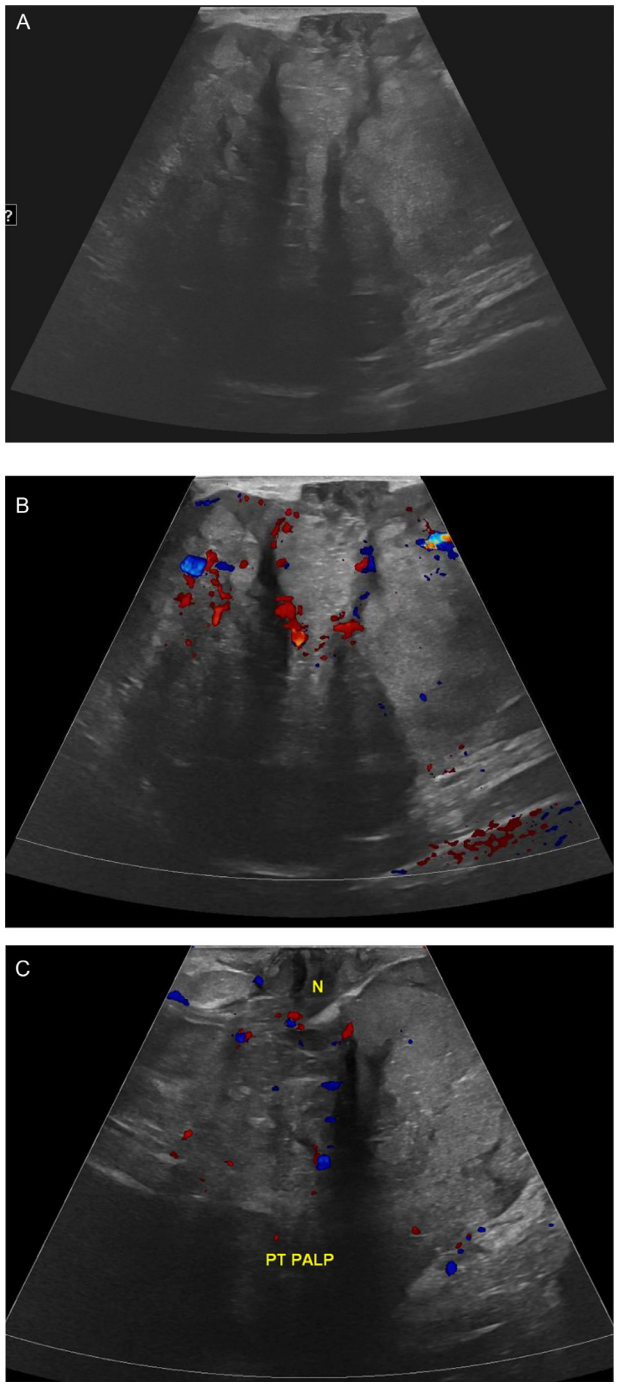

Fig. 1 – (A) Ultrasound of the upper outer quadrant of the left breast shows a large lobulated mass with heterogeneous echogenicity. (B) Left breast upper outer quadrant radial with Doppler Flow demonstrates internal vascular flow. (C) Ultrasound of the left breast retro-areolar region in transverse view showing extension of the mass to the nipple.

MRI with contrast showed an irregular, lobulated, and multiseptated mass that occupied the entire left breast. The mass demonstrates heterogenous T2 intermediate signal intensity (Fig. 5A). There were areas of cystic degeneration within this mass (Fig. 5B). The mass demonstrates typical phyllodes

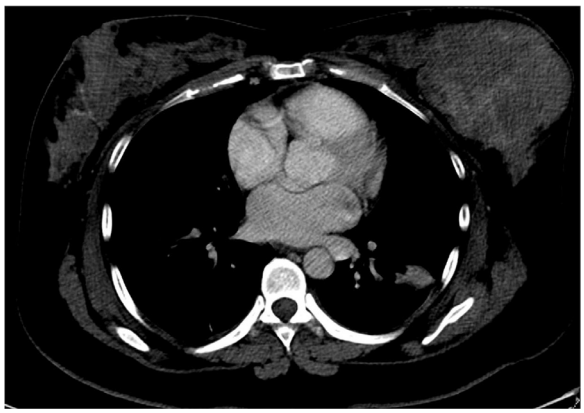

Fig. 2 – Axial CT chest with contrast demonstrates a large, lobulated, heterogeneously enhancing mass in the left breast.

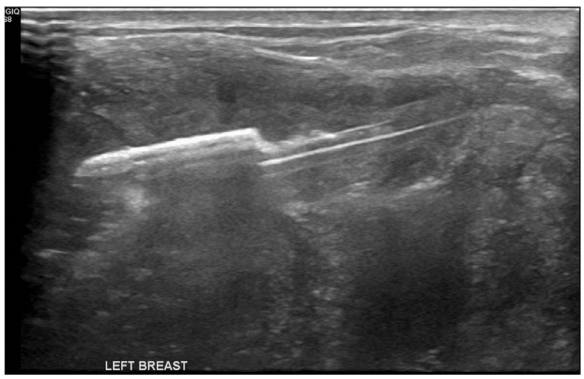

Fig. 3 – Ultrasound-guided core needle biopsy of the left breast mass.

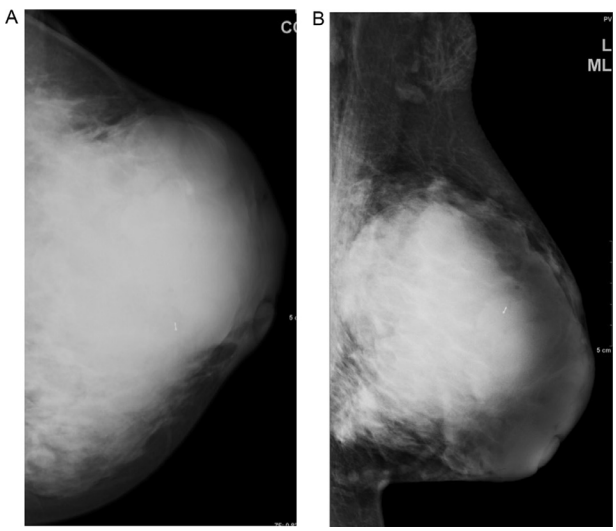

Fig. 4 – (A) Mammogram of the left breast cranio-caudal view demonstrating a large lobulated hyperdense mass that takes up almost the entire breast tissue and nipple retraction. (B) Mammogram of the left breast medial-lateral view demonstrating a large lobulated hyperdense mass that takes up almost the entire breast tissue and nipple retraction.

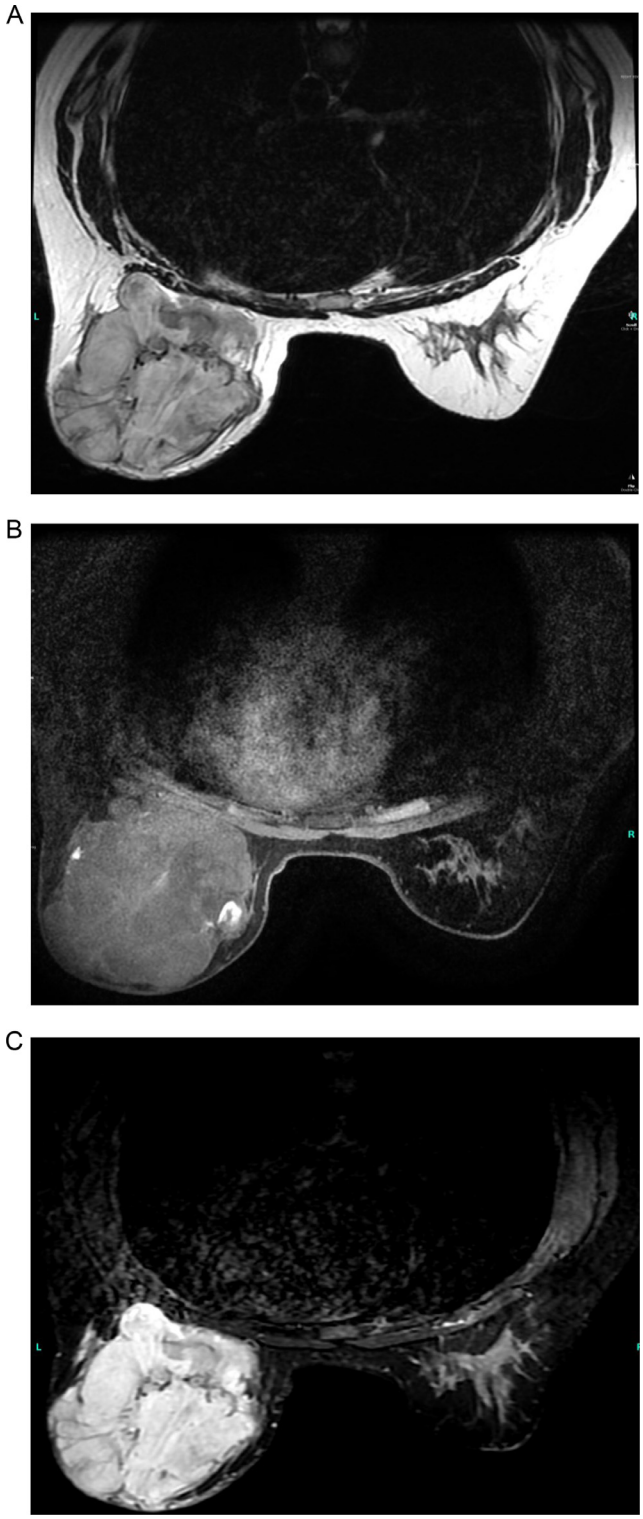

Fig. 5 – (A) Axial T2 nonfat saturation showing a large left breast mass with heterogenous intermediate T2 signal intensity. (B) Axial T2 noncontrast fat saturation shows a large left breast mass with a few foci of cystic degeneration. (C) Axial T2 STIR demonstrates a left breast with heterogenous STIR signal hyperintensity.

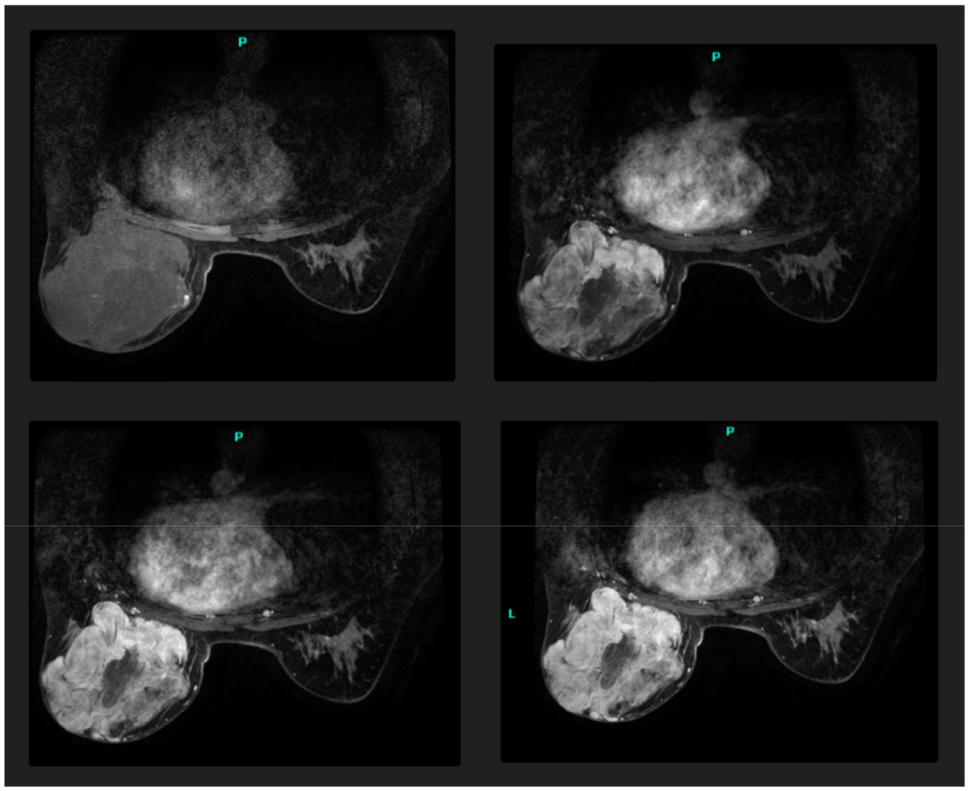

Fig. 6 – MRI of the breast with contrast: Immediately after contrast injection (top left), 60 seconds after contrast injection (top right), 180 seconds after contrast injection (bottom left), and 300 seconds after contrast injection (bottom right) showing mixed enhancement patterns, predominantly plateau kinetics with areas of washout enhancements.

characteristics with heterogenous STIR signal hyperintensity (Fig. 5C). It also demonstrates mixed enhancement patterns, with predominantly plateau kinetics and areas of wash-out enhancement (Fig. 6). The anterior aspect extends to the skin surface. There was no chest wall involvement (Fig. 7).

The patient underwent left breast mastectomy at 8 months after initial presentation/ultrasound-guided core biopsy. At this point, the patient reported that the mass had grown significantly in the month prior. The patient reported significant pain and redness in her left breast. On physical examination, the mass had grown to take up almost the entirety of her left breast, measuring 12 × 10 cm (Fig. 8A). There was a 1 cm area of skin ulceration lateral to the nipple (Fig. 8B). There were bilateral nipple retractions, however per patient, the nipple retraction has been present since her childhood. The area of ulceration was draining purulent fluid.

Histologically, the tumor demonstrated typical phyllodes characteristics, including a leaf-like growth pattern of the stromal and epithelial cells (Figs. 9A–C). The pathology result of the mass was a borderline phyllodes tumor.

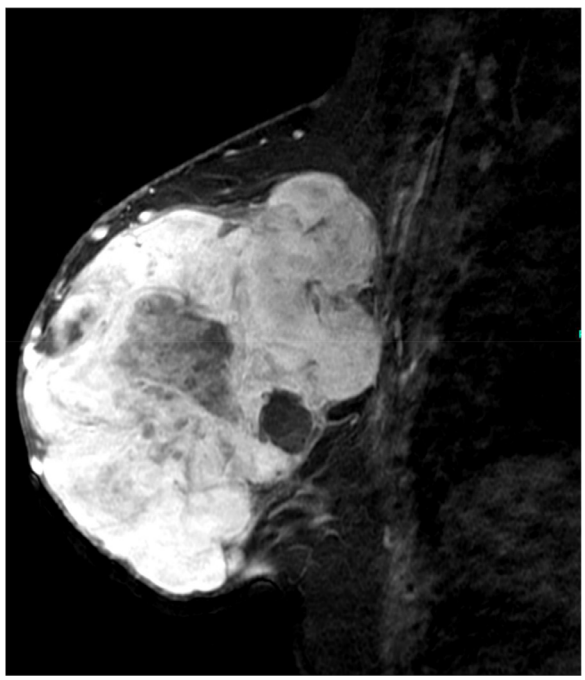

Fig. 7 – Sagittal T1 fat saturation of the left breast shows extension of the mass to the skin surface.

Discussion

Phyllodes tumors (PT) are rare fibroepithelial neoplasms of the breast that exist as a spectrum of fibroadenoma, benign, borderline, or malignant phyllodes tumors based on histologi-

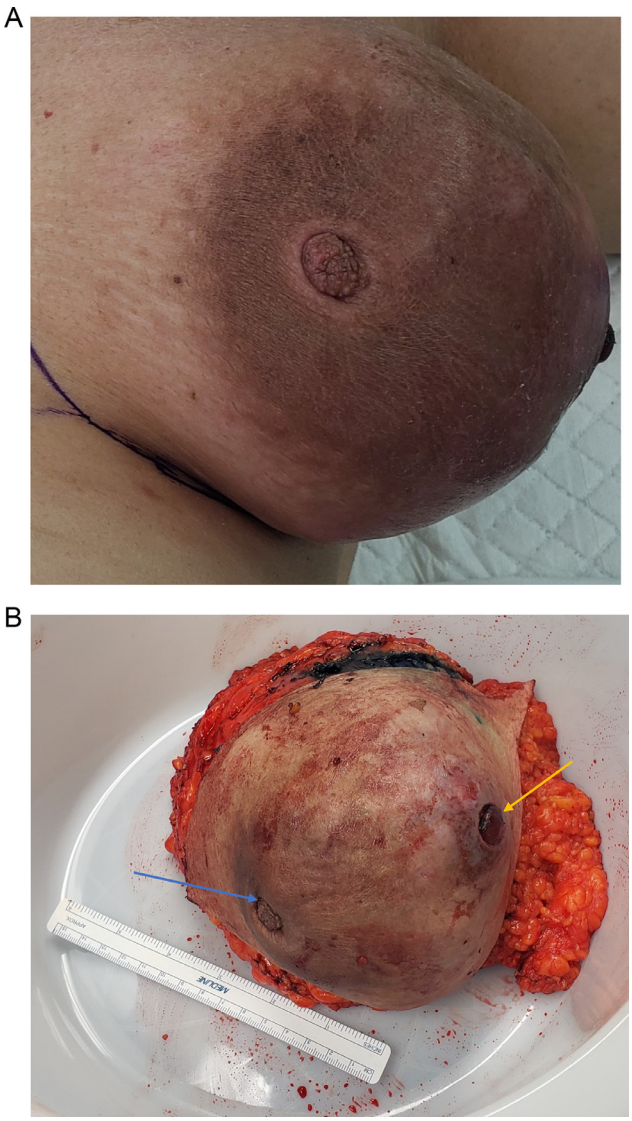

Fig. 8 – (A) Large mass on the left breast with an area of skin ulceration on the far-left lateral aspect of the breast (not enfaced). (B) Gross specimen of left breast mastectomy showing a large breast mass taking up almost the entirety of the left breast with a 1cm area of skin ulceration (yellow arrow) lateral to the nipple (blue arrow).

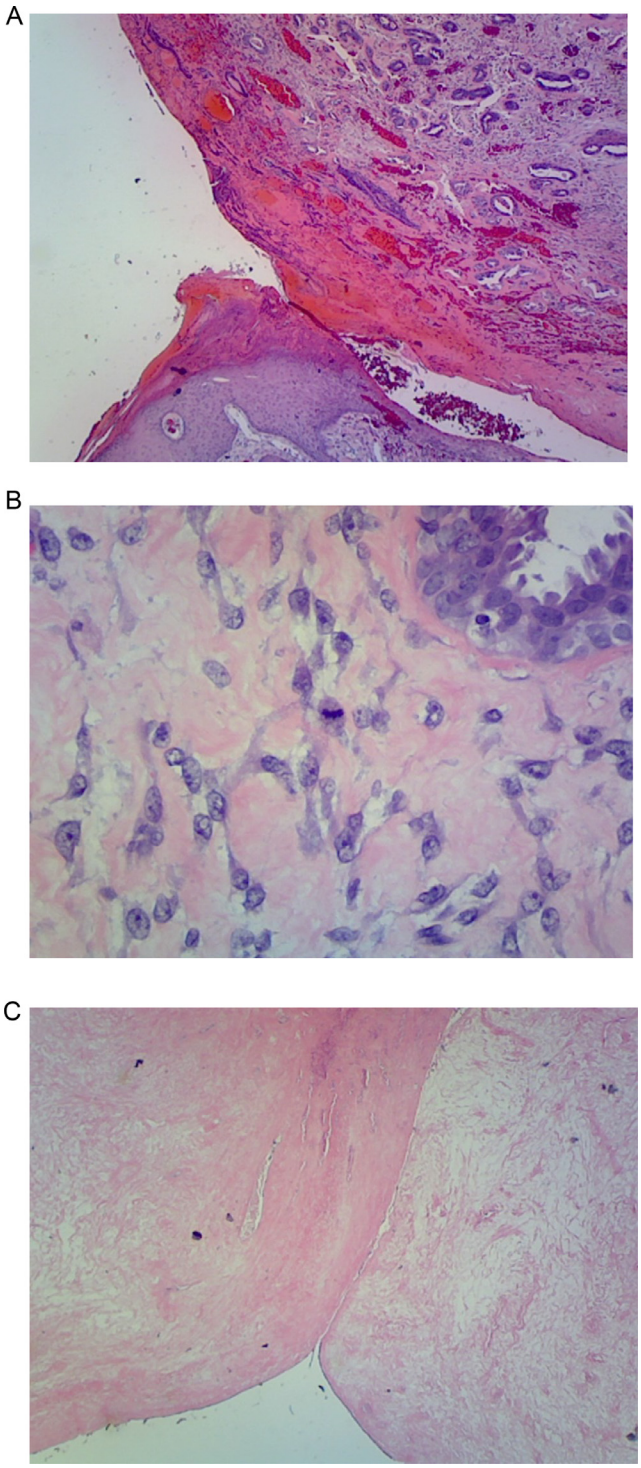

Fig. 9 – (A) Hematoxylin and eosin stain of the resected specimen, showing tumor tissues with skin ulceration. (B) High power image showing mild to moderate atypia of the stromal cells and mitosis. (C) Low-power image showing leaf-like stroma.

cal morphology [3,10]. The name phyllodes derives from the Latin word "phyllodium," which means "leaf-like" based on the gross appearance of a leafy and bulky tumor [4,5]. They typically present in middle-aged women as a rapidly growing, palpable mass [6,7]. The mean age at presentation for fibroadenoma is 27 years old, benign phyllodes tumor is 39 years old, borderline phyllodes tumor is 42 years old, and malignant phyllodes tumor is 47 years old [8]. There is some association with dilated skin veins, and discoloration [9]. Skin involvement, including skin ulceration and nipple retraction is uncommon [10], although there have been reported cases of skin and nipple involvement. Benign PTs make up 35%-64% of PTs and are characterized by minimal stromal hypercellularity, cellular pleomorphism, and 0-4 mitoses/high power field (hpf). Borderline PTs demonstrate moderate stromal hypercellularity, cellular pleomorphism, and 5-9 mitoses/hpf. Malignant PTs have marked stromal hypercellularity, cellular pleomorphism, and greater than 10 mitoses/hpf [6,11]. Risk factors for PTs are not identified, however, there have been reports

of association of chromosomal abnormalities at +1q, +5p, +7, +8, −9p, −10p, −6, and −13 with borderline and malignant PTs [12]. Asian patients are disproportionately diagnosed at an earlier age compared to other ethnicities [13].

Imaging plays an important role in the initial diagnosis and coordination of care for patients with PTs. On ultrasound, the mass usually appears as a large heterogenous solid mass with lobulated margins and sometimes coarse microcalcifications [14]. It also often contains a solid component with internal vascularity [15]. On mammography, they usually appear as a large hyperdense mass that may take up a significant portion of the breast, and may or may not be well-circumscribed [16,17]. They have similar imaging characteristics as fibroadenomas, and therefore cannot be reliably distinguished from fibroadenomas based on imaging alone [18–20].

The role of MRI in the diagnosis of PTs remains controversial [21,22]. On T1 weighted sequences, the mass usually appears heterogeneously hypointense with possible areas of T1 hyperintensity due to hemorrhage [23]. On STIR sequences, the tumor can have slit-like T2 signal hyperintensity in slit-like cystic clefts [24]. The tumor also often demonstrates high STIR signal intensity due to edema. On T1 postcontrast sequences, the tumor can have heterogeneous enhancements with washout kinetics and dark internal septations [25].

Fine needle aspiration (FNA) biopsies are inferior to core-needle biopsy in the diagnosis of PTs, due to the paucity of tissue samples in FNA biopsy [26]. PTs, which demonstrate a high degree of stromal cellularity, can be missed on FNA [27]. Even with core needle biopsy, inadequate sampling can lead to the underestimation of the malignant potential of the mass. In our case, initial core biopsy yielded a benign fibroepithelial tumor, however, histopathology upon mastectomy was determined to be a borderline phyllodes tumor. It is challenging to distinguish phyllodes from fibroadenoma on both imaging and histology as fibroepithelial lesions, spindle cell lesions, and cellular fibroadenomas can represent PTs. The distinction between benign, borderline, and malignant PTs are also often difficult and subjective [27].

Surgical resection is the treatment of choice for PTs. Historically, mastectomy was the recommended treatment for borderline and malignant PTs. Nowadays, breast-conserving surgeries (BCS) are considered effective if a clean surgical margin is achieved [28]. The surgical clean margin width has been shown to have no correlation with local recurrence [29], as long as the surgical margin is free of cancerous cells. The only factor that predicts local recurrence is the involvement of tumor cells at the surgical margin. Other authors suggest that the overall disease-free survival rate has no correlation with the extent of surgical resection [30].

In our case, the tumor displayed the typical appearance of a fibroepithelial tumor on imaging, although again, the distinction between fibroadenomas and PTs could not be determined based on imaging alone. The occurrence of PTs in pregnancy is extremely rare and only a few case reports have been found in the literature [31]. It is unclear if there is a correlation between changing levels of hormones during gestation and the development or growth of PTs as there are very few case reports in the literature. The case also emphasizes again the challenges of accurately diagnosing phyllodes tumors on imaging and core-needle biopsy. Even when the initial core needle biopsy was a benign fibroepithelial nodule, the tumor size, rapid growth, and aggressive features including skin ulceration necessitated total mastectomy. It is crucial for radiologists to recommend surgical excision because a core-needle biopsy can sometimes be inadequate, especially if the tumors exhibit worrisome imaging and clinical features.

Postmastectomy, the patient underwent left breast reconstruction with a skin graft. She did not report any new symptoms of palpable lumps, pain, redness, or discomfort. Because the patient underwent a total mastectomy, adjuvant radiation therapy was not pursued. However, some authors have suggested that adjuvant radiation therapy may reduce the risk of local recurrence from 18% to 3% if the patient was treated with breast-conserving surgery [32]. Large size of tumors and positive margins have been associated with a high rate of local recurrence and distant metastasis [33], and therefore ongoing surveillance is important in these patients.

Conclusion

This case is especially unique due to the patient's recent history of exogenous estrogen and progesterone injections for surrogacy purposes and subsequent development of the phyllodes tumor during her pregnancy. There are very few cases of phyllodes tumor during pregnancy reported in the literature. We believe this is the first case report of phyllodes tumor developing during a surrogate pregnancy following exogenous hormones injections. The relationship between exogenous hormones, fluctuating hormonal levels during pregnancy, and phyllodes tumors are poorly understood. However, the case may highlight the role of screening mammogram or ultrasound in patients exposed to exogenous hormones to establish a baseline or monitor the growth of masses like fibroadenoma or phyllodes tumors regardless of the patient's age. This is because patients pursuing fertility treatments are often at an age below the recommended commencing age for screening mammograms. This case also underscores the challenges in accurately diagnosing phyllode tumors preoperatively. It is extremely important for the radiologist to recommend surgical excision despite the initial benign core-needle biopsy results, if clinical and imaging features are concerning. Tissue sampling can be inadequate in such a large tumor with extensive hemorrhage and can underestimate the malignant potential of a mass. The management of phyllodes tumor involves timely diagnosis and intervention by the radiologist, surgeon, and surgical oncologist. Long-term follow-up with is important in surveillance for recurrence and metastasis.

Patient consent

Informed written consent was obtained from the patient for publication of this Case Report and all imaging studies. Consent form on record.

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