

Unprecedented Case Study: Malignant Phyllodes Tumor Exhibiting Uncommon Rhabdomyosarcomatous Differentiation

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Abstract

Background: Phyllodes tumors (PTs) are a type of rare biphasic breast tumors that account for less than 1% of all breast tumors. Although malignant PT with heterologous sarcomatous differentiation is already a rare occurrence, it can further present with various types of differentiation, such as rhabdomyosarcomatous differentiation. **Case Report:** In this report, we describe the case of a 42-year-old woman who presented with a malignant PT with rhabdomyosarcomatous differentiation, an even rarer form of this tumor. To the best of our knowledge, only four confirmed cases of this type of PT have been documented in the literature. **Conclusion:** Due to its rarity, the diagnosis of malignant PT with rhabdomyosarcomatous differentiation can be challenging, and prompt recognition is essential for optimal patient management. Clinicians should keep this rare entity in mind when encountering patients with biphasic breast tumors and consider thorough pathological evaluation for accurate diagnosis and timely treatment.

Keywords: Breast Tumors, Biopsy, Mastectomy, Radiotherapy, Treatment Outcome.

Introduction

Phyllodes tumors (PTs) are rare tumors of the breast and account for less than 1% of all breast tumors. Malignant Phyllodes tumor (MPT) accounts for only 10-30% of all Phyllodes tumors [1] and malignant Phyllodes tumor with heterologous sarcomatous differentiation is still rarer. Histologically malignant Phyllodes tumors may show significant heterogeneity in morphology such as angiosarcoma, lipo-sarcomatous, fibrosarcomatous, chondro-sarcomatous, rhabdomyo-sarcomatous, or osteo-sarcomatous differentiation [2]. Proper histopathological diagnosis and subtyping of the sarcomatous components are essential for deciding the correct treatment and prognosis of patients with MPT. MPTs with rhabdomyosarcomatous differentiation are scarcely seen with only four confirmed cases documented till date to the best of the knowledge after a thorough search of literature [3]. Herein

we present the case of a 42 years old woman with a breast malignant PT with rhabdosarcomatous differentiation.

Case Report

A 42-year-old woman was admitted with a hard painful lump in left breast which had enlarged within two months. She had no past history of malignancy and no history of prior irradiation to the breast or chest region. She gave history of excision of left breast fibroadenoma 23 years back. Physical examination indicated a 6×6 cm hard mass located in the upper outer and middle quadrants of the left breast. The axillary lymph nodes were not palpable. Mammographically, a large well defined dense lesion with associated microcalcifications was noticed [Fig.1a]. CT scan showed a large well-defined mass in the left breast with increased internal vascularity and heterogenous enhancement [Fig.1b]. A left modified radical mastectomy with axillary clearance level was performed. The

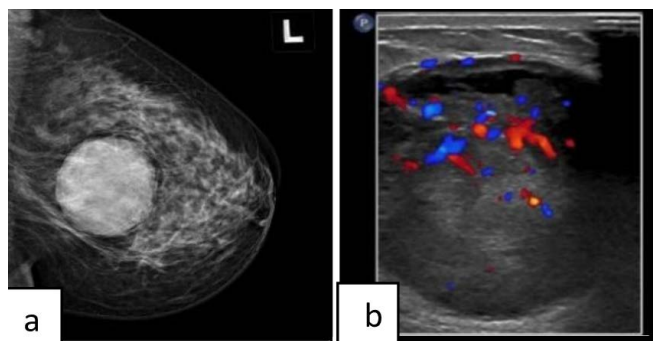


Fig.1 (a): A large well defined dense lesion with microcalcifications; **(b):** A large well-defined mass with increased internal vascularity and heterogenous enhancement.

specimen handled at the pathology laboratory was 26×25×6 cm in size. Series sections of the specimen showed a well-circumscribed firm to hard solid tumor mass measuring 8.5×6×5 cm, with a bosselated cut surface in a leaf-like pattern and necrosis [Fig.2]. The surgical margins of the resection were free of the tumor.

Microscopically, multiple hematoxylin and eosin-stained slides of the tumor revealed a biphasic tumor with spindled tumor cells proliferating in fascicles and displaying moderate to marked nuclear atypia with high mitotic rate 12/10 hpf. Heterologous rhabdomyosarcomatous differentiation was noted. No necrosis was observed [Fig.3a-d]. The cells express SMA diffusely while Desmin, Myogenin and MyoD1 are strongly positive in the areas of rhabdomyosarcomatous differentiation. Tumor cells were immunonegative for CD34, BCL2, PanCK, p63, ER, CD117, PR, Her2neu. Based on morphologic and immunohistochemical insignia, the case was diagnosed as a ‘malignant Phyllodes tumor of the breast with rhabdosarcomatous differentiation’. Evidence of the lymph node metastasis or a systemic spread following total surgical excision of the tumor was not found, and close follow-up was recommended.

Discussion

Phyllodes tumors (PTs) are rare biphasic tumors of the breast and account for less than 1% of all



Fig.2: Cut surface of the tumor showing homogenous grey-white areas.

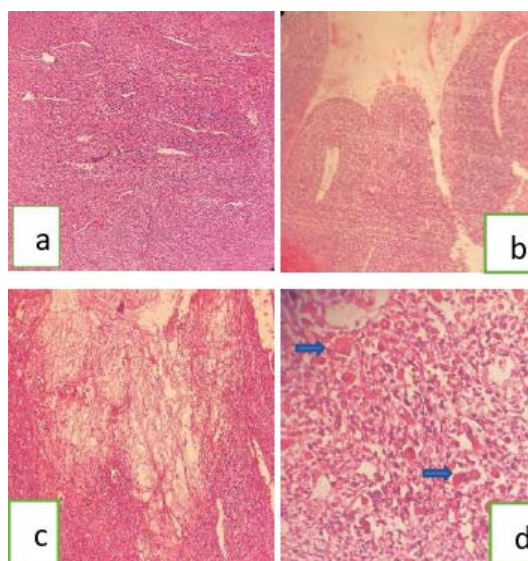


Fig.3 (a): Section showing a sarcomatous pathology (H&E×10); **(b):** Section showing an intracanalicular growth pattern with leaf-like projections into dilated lumen (H&E×10); **(c):** Section showing necrotic area (H&E×10); **(d):** Section showing diffuse sheets of polygonal cells with abundant densely eosinophilic cytoplasm and vesicular nucleus with prominent nucleoli (rhabdomyoblasts) (arrows) (H&E×40).

breast tumors. Malignant PT arises in woman in their 40's, with the majority of cases between 35 to 55 years old. Phyllodes tumors, first described as cytosarcoma Phyllodes by Muller in 1838 [4], display a wide range of clinical, histological and cytological features [5,6]. The term "sarcoma" was initially used because of its fleshy appearance, a more modern term is Phyllodes tumor (PT). The

presence of dual population of both epithelial and stromal cells is necessary for the diagnosis of PT [4]. Based on atypia, mitotic activity or overgrowth in the stroma, PTs can be classified by histopathological features as benign, borderline or malignant [7]. Although the histological appearances of PTs are relatively poor predictors of their behavior, all PTs have the potential to become malignant [4]. Phyllodes tumor can only be found in mammary tissue and on histology they have a component of epithelial as well as metaplastic mesenchymal origin [5]. PTs are interpreted as a continuum of the spectrum of fibroepithelial neoplasms of breast tissue; benign PTs can be difficult to distinguish from fibroadenomas while malignant PTs can grow in size quickly and metastasize early [6]. The metastatic spread of malignant PT is mainly hematogenous to lung, with infrequent lymphatic involvement, hence axillary lymph nodes are not palpable at presentation in most cases [8]. The characteristic histological features are related to the stroma and PTs are differentiated from fibroadenomas by marked stromal overgrowth and hypercellularity [6]. Malignant Phyllodes tumors may show significant heterogeneity in morphology such as angiosarcoma, liposarcomatous, fibrosarcomatous, chondrosarcomatous, rhabdomyo-sarcomatous, or osteo-sarcomatous differentiation [2]. Marked fibrosarcomatous changes of the stromal component are seen with the epithelial component being absent/negligible.

A thorough search of literature shows that heterologous sarcomatous transformation towards liposarcoma, fibrosarcoma, angiosarcoma, osteosarcoma, chondrosarcoma, osteoclast like giant cells and rhabdomyosarcoma have been occasionally encountered in the said order of frequency. Recent literature suggests that liposarcoma as a heterologous component is no longer a histological criterion of malignancy, because atypical adipocytes in liposarcoma do not harbour MDM2 aberrations or CDK4 amplification. Primary rhabdomyosarcomas (RMS) occurring in breast are also exceedingly rare, mostly present as

metastasis from other sites. Genetic abnormalities associated with Phyllodes tumors are loss of nuclear Beta-Catenin, amplification of MYC and aberrant expression of TP53. Other described cytogenetic changes seen specifically in the malignant ones include gain in chromosome 1q and losses at chromosome 13 [1].

The prognosis of Phyllodes tumor is quite good. The five-year survival rate for malignant Phyllodes tumors was 82% [9]. In 15% of cases, PT will locally recur [10]. Treatment of MPTs is complete surgical excision with wide clear margins of at least 1 cm. Unlike primary rhabdomyosarcoma, where adjuvant radiation therapy/chemotherapy are beneficial, their role in MPTs with rhabdomyosarcomatous differentiation is not very well known because of the rarity of such cases [1].

Conclusion

Our findings showed that diagnosis of this tumor should be performed using a combination of clinical, pathological, and immunohistochemical staining results. The main treatment for malignant PT is extensive local resection or total mastectomy.

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