Malignant phyllodes tumor with extensive lipomatous differentiation.

Jeffrey Landy  
*Thomas Jefferson University*

Priya Johal  
*Thomas Jefferson University*

Alexander Sevrukov  
*Thomas Jefferson University*

Ida Teberian  
*Thomas Jefferson University*

Jason Shames  
*Thomas Jefferson University*

Follow this and additional works at: [https://jdc.jefferson.edu/radiologyfp](https://jdc.jefferson.edu/radiologyfp)

Recommended Citation

Landy, Jeffrey; Johal, Priya; Sevrukov, Alexander; Teberian, Ida; Shames, Jason; Sebastiano, Christopher; and Kaufman, Theresa, "Malignant phyllodes tumor with extensive lipomatous differentiation." (2020). *Department of Radiology Faculty Papers*. Paper 92.  
[https://jdc.jefferson.edu/radiologyfp/92](https://jdc.jefferson.edu/radiologyfp/92)

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's [Center for Teaching and Learning (CTL)](https://ctl.jefferson.edu). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in Department of Radiology Faculty Papers by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: JeffersonDigitalCommons@jefferson.edu.
Case Report

Malignant phyllodes tumor with extensive lipomatous differentiation

Jeffrey Landy MD*, Priya Johal MD, Alexander Sevrkov MD, Ida Teberian MD, Jason Shames MD, Christopher Sebastiano MD, Theresa Kaufman DO

Thomas Jefferson University Hospital, 111 S. 11th St., Philadelphia, PA 19107

A R T I C L E   I N F O

Article history:
Received 23 July 2020
Accepted 12 August 2020

Keywords:
Phyllodes
Lipomatous differentiation
Fibroadenoma
Hamartoma

A B S T R A C T

Phyllodes tumors are uncommon neoplasms of the breast. Lipomatous differentiation of malignant phyllodes tumor is a rare stromal alteration of this fibroepithelial tumor, demonstrated as a fat-containing mass on imaging. We present the case of a 46-year-old woman who was diagnosed with a malignant phyllodes tumor of the breast that demonstrated extensive lipomatous differentiation.

© 2020 Published by Elsevier Inc. on behalf of University of Washington.
This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)

Introduction

Phyllodes tumor is a rare fibroepithelial neoplasm of the breast, more commonly seen in middle-aged women. The most common presentation is that of a rapidly growing, palpable mass. Phyllodes tumors may be classified as benign, malignant, or borderline, a distinction which is largely made histologically based on the degree of nuclear atypia, tumor border, stromal cellularity, and mitotic activity. While Ductal carcinoma in situ (DCIS), Lobular carcinoma in situ (LCIS), or invasive cancers may arise from the epithelial component of phyllodes tumors, the stromal component may contain heterologous elements such as adipose tissue, cartilage, bone, skeletal muscle, and fibrous tissue. Lipomatous differentiation within a phyllodes tumor is an uncommon stromal alteration. Herein, we present a case of malignant phyllodes tumor with extensive lipomatous differentiation in a 46-year-old woman.

Case report

A 46-year-old woman presented for a screening mammogram, reporting a new lump in her upper outer left breast. Mammogram demonstrated a 35-mm fat-containing, oval mass with circumscribed margins in the 3 o’clock left breast, 9 cm from the nipple which corresponded to the palpable mass reported by the patient (Figs. 1 and 2). Breast sonography revealed an oval, parallel, hyperechoic mass in the left breast, corresponding to the mammographic finding and region of palpable concern (Figs. 3 and 4).

The patient underwent an ultrasound-guided core needle biopsy which showed fragments of fibroadipose tissue containing multiple foci of hypercellular spindle cell proliferation associated with benign ducts and focal fat necrosis. There was significant nuclear atypia and a few mitoses were present. Immunohistochemical stains showed that the spin-

* Corresponding author.
E-mail address: Jeffrey.landy@jefferson.edu (J. Landy MD).
https://doi.org/10.1016/j.radcr.2020.08.023
1930-0433/© 2020 Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)
Phyllodes tumors often present as a firm, palpable, mobile mass that demonstrates rapid growth often over a course of just several weeks. Imaging typically demonstrates a circumscribed, high density mass with oval, round, or lobulated shape. The mean size is 4-5 cm but can range from 1 to 20 cm. Associated calcifications are rare [1].

Certain imaging features of a phyllodes tumor may suggest malignancy. Partially obscured or indistinct tumor margins are more often seen in malignant phyllodes tumors. Tumor size of greater than 3 cm is associated with a higher likelihood of malignancy [1]. MRI may demonstrate restricted diffusion, suggestive of a malignant phyllodes tumor. Focal intraregional cysts are more common in malignant phyllodes tumors and are manifest on MRI by hyperintense slit-like spaces on T2-weighted images. While washout enhancement kinetics are suspicious for malignancy, up to 35% of the malignant phyllodes tumors may demonstrate persistent enhancement kinetics more typically associated with benignity [2].

Histologically, phyllodes tumors are biphasic, consisting of a hypercellular stromal component and cleft-like spaces lined by epithelium, often forming a leaflike pattern [3]. Sufficient sampling is necessary if the lesion appears ill defined (approximately 1 section per centimeter) and the tumor is classified based on the area of highest cellularity or floridity [4]. The tumors are divided into benign, intermediate, and malignant patterns based on several histologic characteristics, including an infiltrative margin, stromal overgrowth, mitotic count, amount of hypercellularity, and atypia [3].

Discussion

Phyllodes tumors often present as a firm, palpable, mobile mass that demonstrates rapid growth often over a course of just several weeks. Imaging typically demonstrates a circumscribed, high density mass with oval, round, or lobulated shape. The mean size is 4-5 cm but can range from 1 to 20 cm. Associated calcifications are rare [1].

Certain imaging features of a phyllodes tumor may suggest malignancy. Partially obscured or indistinct tumor margins are more often seen in malignant phyllodes tumors. Tumor size of greater than 3 cm is associated with a higher likelihood of malignancy [1]. MRI may demonstrate restricted diffusion, suggestive of a malignant phyllodes tumor. Focal intraregional cysts are more common in malignant phyllodes tumors and are manifest on MRI by hyperintense slit-like spaces on T2-weighted images. While washout enhancement kinetics are suspicious for malignancy, up to 35% of the malignant phyllodes tumors may demonstrate persistent enhancement kinetics more typically associated with benignity [2].

Histologically, phyllodes tumors are biphasic, consisting of a hypercellular stromal component and cleft-like spaces lined by epithelium, often forming a leaflike pattern [3]. Sufficient sampling is necessary if the lesion appears ill defined (approximately 1 section per centimeter) and the tumor is classified based on the area of highest cellularity or floridity [4]. The tumors are divided into benign, intermediate, and malignant patterns based on several histologic characteristics, including an infiltrative margin, stromal overgrowth, mitotic count, amount of hypercellularity, and atypia [3].
Malignant transformation may occur in up to 20% of phylloides tumors, often within its stromal component. Of those with malignant stromal differentiation, most display fibrosarcomatous components. Adipose stromal differentiation may also occur, ranging from mature fat to liposarcomatous transformation [5–8]. However, pure lipomatous differentiation is rare [9]. Powell and Rosen reported 14 cases of adipose differentiation, 13 of which were malignant [10].

One of the main differential considerations for a large, rapidly growing mass is fibroadenoma. As opposed to phylloides tumors, fibroadenomas are more likely to contain calcifications, are less likely to contain cystic spaces and are usually
Fig. 5 – At 5x magnification, the lesion demonstrates a hypercellular stroma and distorted glandular elements with extensive lipomatous differentiation.

Fig. 6 – At 20x magnification, compression of the glands into cleft-like spaces by the stromal overgrowth is seen. Mature adipose tissue is present throughout the tumor.

uniform in stromal cellularity and distribution of stromal and glandular elements [3]. Fibroadenomas also typically occur in a younger subset of patients, with the mean age between 25 and 35. Overall, imaging alone cannot reliably distinguish fibroadenoma from phyllodes tumors. Additional differential considerations include metaplastic carcinoma, primary breast sarcoma, and periductal stromal sarcoma which are largely distinguished histologically.

Given the extensive fat present within the mass on imaging, another differential diagnosis is a hamartoma, which is a benign, well-circumscribed tumor composed of all components of breast tissue (fibrous, fibrocystic, and adipose tissue), resulting in a “breast-within-a-breast” appearance on mammography. Histologically, disordered breast ducts and lobules are present, unlike the phyllodes tumor which has epithelium lined spaces and stromal overgrowth. Unlike the malignant
phyllodes tumor, hamartomas consist of bland appearing cells without atypia [11]. Typically, fat-containing masses such as hamartomas are considered benign on imaging. Given that this mass was palpable and represented a mammographic change from prior studies, further evaluation with biopsy was warranted.

Management of both benign and malignant phyllodes tumors involves wide excision without axillary staging, with subsequent clinical follow-up for 3 years.

REFERENCES

[1] Liberman L, Bonaccio E, Hamele-Bena D, Abramson AF, Cohen MA, Dershaw DD. Benign and malignant phyllodes tumors: mammographic and sonographic findings. Radiology 1996;198:121–4.
[2] Franceschini G, D’Ugo D, Masetti R, Palumbo F, D’Alba P, Mule A, et al. Surgical treatment and MRI in phyllodes tumors of the breast: our experience and review of the literature. Ann Ital Chir 2005;76(2):127–40.
[3] Zhang Y, Kleer CG. Phyllodes tumor of the breast; histopathologic features, differential diagnosis, and molecular/ genetic updates. Arch Pathol 2016;140(7):655–71.
[4] Tan B, Acs G, Apple S, Badve S, Bleiweiss I, Brogi E, et al. Phyllodes tumours of the breast: a consensus review. Histopathology 2016;68(1):5–21.
[5] Nayak M, Patra S, Mishra P, Sahoo N, Sasmal PK, Mishra TS. Malignant phyllodes tumor with heterologous differentiation: clinicopathological spectrum of nine cases in a tertiary care institute in Eastern India. Indian J Pathol Microbiol 2017;60:371–6.
[6] Argaez Cime NL, Gutierrez Vega P, Lopez Cruz J. Malignant phyllodes tumor with differentiation to liposarcoma. A report of a case and bibliographic review. Ginecol Obstet Mex 2005;73:145–50.
[7] Ayadi-Kaddour A, Zeddini A, Braham E, Ismail O, Mika M, Guelmami K. Malignant phyllodes tumor of the breast with liposarcomatous differentiation and intraductal hyperplasia. Breast Dis 2015;35:59–62.
[8] Austin RM, Dupree WB. Liposarcoma of the breast: a clinicopathologic study of 20 cases. Hum Pathol 1986;17:906–13.
[9] Pornchai S, Chirappapha P, Pipatsakulroj W, Lertsithichai P, Vassanasiri W, Sitathanee C, et al. Malignant transformation of phyllodes tumor: a case report and review of literature. Clin Case Rep 2018;6(4):678–85.
[10] Powell C, Rosen P. Adipose differentiation in cystosarcoma phyllodes. A study of 14 cases. Am J Surg Pathol 1994;18:720–7.
[11] Tse G, Law B, Ma T, Chan A, Pang L-M, Chu W, et al. Hamartoma of the breast: a clinicopathological review. J Clin Pathol 2002;55:951–4.