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CASE REPORT

Malignant Spindle Cell Tumor Breast—a Diagnostic Dilemma

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Abstract
Primary malignant spindle cell tumors are rare constituting 1.0% of breast malignancies. Spindle cell lesions occurring in soft tissues can occur in breast with overlapping morphologies. It can present as benign lesion and have inconclusive cytological findings, so easily missed if not properly dealt with. Stromal sarcoma should be diagnosed only after thorough sectioning and negative staining for p63, broad spectrum, and high molecular weight keratin. We present a case of right breast lump. Cytological features revealed fibro histiocytic lesion. There were no areas of necrosis, hemorrhage, or calcification. Histopathologically, it showed partially encapsulated tumor with cells arranged in sheets, composed of oval to epithelioid cells with spindling at places with moderate pleomorphism (mitotic activity 6–7/10 hpf). Differential diagnosis of primary stromal sarcoma, metaplastic sarcoma, and phyllodes was made. Immunohistochemistry revealed vimentin positivity with focal positivity of S-100. Desmin, cytokeratin and smooth muscle actin, p63, ER, PR, and Her2-neu were negative. A final diagnosis of primary breast sarcoma of neural origin was established with the help of histopathology and immunohistochemistry. To conclude, it is of utmost importance to identify primary stromal sarcomas as they are known to spread very rapidly and have a poor prognosis.

Keywords Spindle cell sarcoma · Metaplastic carcinoma · Immunohistochemistry

Introduction

Primary malignant spindle cell tumors are rare and constitute approximately 1.0% of all breast malignancies. All spindle cell lesions occurring in the soft tissues can occur in the breast with overlapping morphologies for different category of lesions so it is important to consider a wide differential diagnosis. The most important differential diagnoses are sarcomatoid/metaplastic carcinoma (MC), primary breast sarcoma, and phyllodes tumor (PT) [1]. Each of which presents with a diagnostic challenge. Primary breast sarcomas are histologically heterogeneous nonepithelial malignancy tumors having poor prognosis although relatively favorable than common breast carcinoma. We present this rare case of primary malignant breast sarcoma where the diagnosis was established based on histopathology as well as immunohistochemistry (IHC).

Presentations at meetings—Poster presentation in one

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Case Report

A 33-year-old female patient presented to the surgical department with a complaint of progressive swelling over the outer lower quadrant of right breast without pain for 2 months. There was no history of previous breast trauma, bleeding, or family history of breast cancer. On examination, there was a single 4 × 3.5 × 3 cm mass, firm and nontender. There was no retraction of nipple, overlying skin was normal, and no axillary lymph nodes were palpable. Fine needle aspiration cytology and excision biopsy was done to confirm the suspicion of carcinoma breast.

Cytological smears showed round to oval histiocytic cells along with spindle-shaped cells in hemorrhagic background. These cells have round to oval nuclei and moderate eosinophilic cytoplasm (Fig. 1a). There was no evidence of atypia or necrosis. Provisional diagnosis of fibro histiocytic lesion was given.

On excision biopsy, single gray white globular soft tissue piece measuring 4 × 3.5 × 3 cm was received. Cut surface showed grayish white areas (Fig. 1b). There were no necrotic areas, no areas of hemorrhage or calcification.

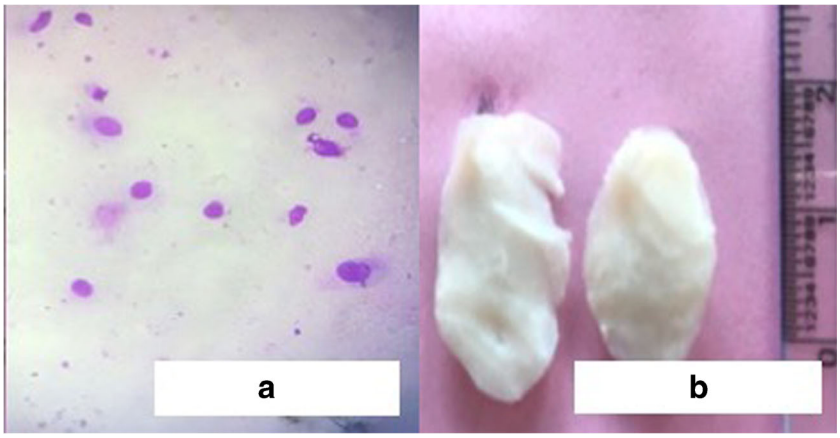

Fig. 1 **a** Cytological smears showed round to oval histiocytic cells along with spindle-shaped cells in hemorrhagic background (Giemsa, X400). **b** Gross picture showing gray white globular tissue piece measuring 4 × 3.5 × 3 cm. Cut surface showed grayish white areas

Microscopically, hematoxylin and eosin-stained sections revealed partially encapsulated tumor composed of cells arranged in sheets and clusters. Focally, these cells were oval to epithelioid with spindling at places. There was mild to moderate pleomorphism with mitotic activity 6–7/10 hpf (atypical mitosis). Focal areas of heterologous ossification were seen (Fig, 2a). At places, tumor was seen to infiltrate the capsule. However, no areas of necrosis or hemorrhage were seen.

A battery of immunohistochemical (IHC) markers was performed in two panels to distinguish between most commonly seen differentials in breast with the scenario of the case. First panel for metaplastic carcinoma comprising of Pan Cytokeratin (Pan CK), epithelial membrane antigen (EMA), CK 5/6, and p63 were done. In second panel, we included markers of smooth muscle actin (SMA), vimentin, desmin, endothelial growth factor receptor(EGFR), CD 34, S 100, bcl_2, CD117, and CD10 considering stromal sarcoma and phyllodes tumor. The tumor was found to be vimentin positive and demonstrated focal S100 positivity (Fig. 2b) (Table 1).

Discussion and Conclusion

Most invasive breast neoplasms are epithelial tumors, and mesenchymal breast tumors are rarely seen. Annual incidence is approximately 4.6 cases/1,000,000 women, representing less than 1% of all breast malignancies. Although rare, primary breast sarcoma is a histologically heterogeneous nonepithelial malignancy. Due to its rarity, there have not been sufficient studies of its clinicopathological features so we are presenting the case of primary breast stromal sarcoma.

On clinical examination, it appears as a large well-defined unilateral mass, growing comparatively faster than epithelial breast carcinoma. Although physical examination and imaging tools can be of immense help, but excision/core biopsy is mandatory for proper diagnosis [2].

In our case, the patient presented with 4 × 3.5 × 3 cm swelling over the right side of the breast. Fine needle aspiration cytology (FNAC) was done which revealed low-yielding clusters of fibrohistocytic lesion. Diagnosing primary breast sarcoma in cytological aspirates is difficult not only because of its rarity but also since a variety of malignant neoplasms including malignant phyllodes tumor, metaplastic carcinoma, and primary breast carcinoma can have overlapping cytomorphologic features [3]. It is even difficult to differentiate between benign and malignant fibrohistiocytic lesion on cytological smears.

Spindle cell lesions of breast have a very far-ranging spectrum of histomorphology. Various patterns observed in tumor are storiform, fascicular, or haphazard with infiltrating

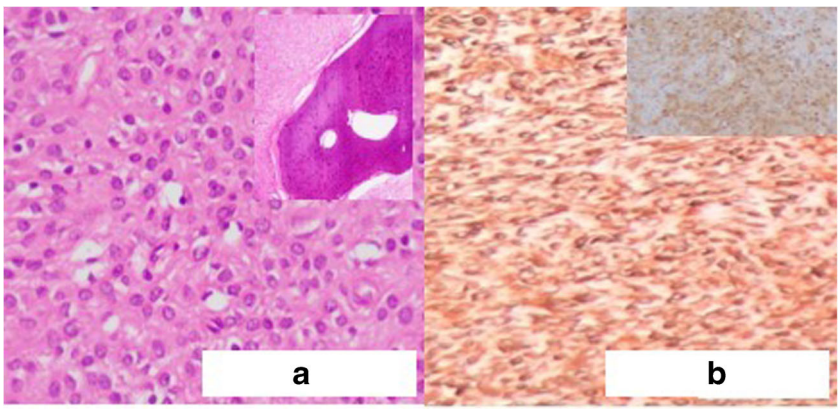

Fig. 2 **a** Tissue section showing oval to epithelioid cells with spindling at places. Cells show mild to moderate pleomorphism with focal areas of heterologous ossification (H&E, X400). **b** Tumor cells showing vimentin positivity and focal S100 positivity (X400, X100)

Table 1 Comparison of immunohistochemical markers in the present case and the various differential diagnosis

Markers	Pan CK	EMA	CK 5/6 (HMW)	SMA (Leiomyosarcoma)	Desmin (Rhabdomyosarcoma)	Vimentin	EGFR	p63	CD 34	bcl2	CD 117	S100 (Neural origin)	C10
Primary sarcoma	–	–	–	+	+	+	–	–	–	–	–	Focally +	–
Phyllodes tumor	–	–	–	–	–	+	+	–	+	+	+	–	+
Metaplastic carcinoma	+	+	+	+	+	+	–	+	–	–	–	–	–
Our case	–	–	–	–	–	+	–	–	–	–	–	Focally +	–

borders. Tumor cells may be cytologically bland or highly pleomorphic. Mostly seen in two arrangements that is either biphasic and monophasic [4]. Diagnosis of biphasic tumors is much simpler as they comprise of sarcomatoid and carcinomatous component resembling most of the sarcoma of mesenchymal origin like osteosarcoma, chondrosarcoma, and fibrosarcoma. On the other hand, alternatively monophasic tumors comprise predominantly spindle as in our case which makes the diagnosis difficult. The tumoral cells might have fluctuating patterns of cellular pleomorphism and areas of heterologous differentiation. In our case, monophasic pattern was seen showing sheets and clusters of oval to spindle cells, mild to moderate pleomorphism, mitotic activity 6–7/10 hpf (atypical mitosis) with heterologous ossification.

The histological features of this case having the monophasic spectrum need to be differentiated from PT and MCs as observing both epithelial and stromal components is diagnostic in all the three cases. In occasional cases of spindle cell carcinomas, morphological evidence of epithelial differentiation is missing; hence, IHC of epithelial markers is mandatory for considering stromal sarcoma in the differential. In that regard, it is important to note that spindle cell carcinomas may only demonstrate focal (or no) immunoreactivity with antibodies directed against broad spectrum and low molecular weight cytokeratins (such as CAM5.2, AE1/AE3, or CK7 antibodies), and antibodies directed against high molecular weight cytokeratins (such as 34 E12, CK 5/6, and CK14 antibodies). P63 is often more sensitive in this setting [5, 6]. In our case, we used Panel 1 comprising of PanCK, CK5/6, EMA, and p63 to rule out most commonly seen metaplastic carcinoma. Our case showed no positivity for panel 1 markers ruling out metaplastic carcinoma. Second possibility of mesenchymal tumors or stromal lesions was considered, so in panel 2, vimentin for mesenchymal origin and CD117, CD10, EGFR, bcl2, and CD34 stromal markers for phyllodes tumor were performed. Vimentin was found to be strongly positive thus confirming mesenchymal lesion. As it is now recommended to use histological description by the cell of origin [6], desmin, SMA, and S100 were done to identify and specify the origin. Breast sarcoma classification includes the following: malignant fibrous histiocytoma, fibrous sarcoma, angiosarcoma, and spindle cell sarcoma. Other known sub-types (leiomyosarcoma, liposarcoma, rhabdomyosarcoma, osteosarcoma, chondrosarcoma, synovial sarcoma, and neurosarcoma) have also been described in smaller percentages of many case reports or series [5–7]. The presenting case is malignant peripheral nerve sheath tumor (MPNST).

It is of utmost importance to identify primary stromal sarcomas as they have a poor prognosis although relatively favorable than common breast carcinoma. In primary breast sarcoma, adequate surgical tumor excision, tumor grade, and tumor diameter seem to be the most important prognostic factors. Distinguishing subtypes of primary breast sarcoma is relevant as some subtypes may have poorer prognosis [8]. Primary stromal breast sarcoma is more aggressive than metaplastic carcinoma and phyllodes tumor with a different treatment modality. MPNST breast has a poor 5-year survival rate, so it is a must to identify such cases to achieve local control and avoid poor outcome and treatment failure.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

References

1. Al-Nafussi A (1999) Spindle cell tumors of the breast: practical approach to diagnosis. Histopathology 35(1):1–13
2. Al-Benna S, Poggemann K, Steinau HU, Steinstraesser L (2010) Diagnosis and management of primary breast sarcoma. Breast Cancer Res Treat 122(3):619–626
3. Pencavel T, Allan CP, Thomas JM, Hayes AJ (2011) Treatment for breast sarcoma: a large, singlecentre series. Eur J Surg Oncol 37(8): 703–708
4. Bousquet G et al (2007) Outcome and prognostic factors in breast sarcoma: a multicenter study from the rare cancer network. RadiotherOncol 85(3):355–361

5. Koker MM, Kleer CG (2004) p63 expression in breast cancer: a highly sensitive and specific marker of metaplastic carcinoma. Am J Surg Pathol 28:1506–1512
6. Carter MR, Hornick JL, Lester S, Fletcher CD (2006) Spindle cell (sarcomatoid) carcinoma of the breast: a clinicopathologic and immunohistochemical analysis of 29 cases. Am J SurgPathol 30:300–309
7. Schnitt SJ, Collins LC. Spindle cell lesions. In: Biopsy interpretation of the breast. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins 2008; 20(5): 323–343
8. Nizri E, Merimsky O, Lahat G (2014) Optimal management of sarcomas of the breast: an update. Expert Rev Anticancer Ther 14(6): 705–710