Case Report

Myoepithelial carcinoma of the breast: A rare case presentation

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ABSTRACT

Myoepithelial carcinoma (MC) remains a rarely encountered lesion of the breast. The few cases that have surfaced firmly document the histopathology and immunohistochemistry of this tumor. Here, we present a case of infiltrating MC of the breast in a 44-year-old female who presented with a painful lump. With the subsequent biopsy, the diagnosis was made on the basis of histopathological and immunohistochemistry. Histological examination showed spindle cells with moderate to marked nuclear atypia. Immunohistochemistry showed reactivity in the spindle cells for smooth muscle actin, cytokeratin (AE1/AE3), and p63, indicating a myoepithelial cell lineage of tumor cells. We suggest MCs of the breast be managed with appropriate surgical clearance. A multidisciplinary approach is usually required.

Key words: Histopathological, Immunohistochemistry, Myoepithelial carcinoma

Breast carcinoma is the most common cancer among females in a majority of the Indian population [1]. The advances in research and management have improved breast cancer survival significantly in the past three decades globally. The myoepithelial cells (MECs) are the normal components of the breast parenchyma, which separate the ductal epithelia from the basement membrane and the stroma. Invasive ductal carcinoma (IDC) is the most common malignant histological variant that arises from the ductal epithelia. The MEC carcinoma, arising from the MECs, is extremely rare and only 38 cases have been reported in the indexed literature till date [1].

MECs display characteristics of the epithelial cell as well as smooth muscle cell differentiation and are usually located in the breast, throughout the mammary duct system, as a discontinuous layer of stellate cells between the continuous luminal epithelial layer and the basement membrane [1,2]. Therefore, the neoplasms that arise from MECs exhibit both epithelial and smooth muscle characteristics but lack ductal differentiation of the usual type of IDC [3]. Despite the fact that MECs are part of the structure of the human breast, pure myoepithelial neoplasms are extremely uncommon and the number of such case studies is limited [3,4].

We herein describe the clinical, radiological, and pathological characteristics of a case of myoepithelial carcinoma (MC) in a 44-year-old female presenting with a painful lump for 1 month to supplement the literature. The diagnosis was made with the help of histologic and immunohistochemical (IHC) studies of the needle biopsy sample.

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CASE REPORT

A 44-year-old female visited the medical oncology department of our hospital with a complaint of dragging pain radiating to the left shoulder that aggravates on exertion and a lump in the left breast for 1 month. There were no associated co-morbidities with restricted activities, but she was ambulatory and was able to carry out her routine work.

On general physical examination, her vitals were stable with a temperature of 97.2°F, respiratory rate of 18/min, and blood pressure 130/72 mm Hg. She was having a moderate built and nourished. On clinical examination, a lump of size 10 cm × 8 cm was present extending from the upper outer quadrant to the central compartment of the left breast. The lump was firm to hard in consistency, with restricted mobility. There were no skin changes. She had palpable lymph nodes in both axillae.

On imaging, ultrasonography (USG) revealed an irregular heterogeneous focal lesion of approximately 74 mm × 70 mm × 52 mm in the upper outer quadrant to the central compartment of the left breast, highly suspicious of BIRADS 4 score with 31 mm × 11.7 mm lymph node in the right axilla and 25 mm × 9 mm lymph node in the left axillary tail. The right breast appears clinically unremarkable.

She underwent a USG-guided needle biopsy from the lump and the biopsy was sampled in the department of pathology of our hospital. We received multiple grey-white soft tissue linear cores ranging from 0.5 to 2 cm in length. The biopsy was processed and stained with routine hematoxylin and eosin stain and special IHC staining were done on reflex.

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Microscopic examination revealed an invasive proliferation of spindle-shaped and small rhomboid cells present in sheets with the focal alveolar formation in part of the tumor. Moderate nuclear pleomorphism and size variation of nuclei were seen. Six mitotic figures per 10 high-power fields were noted. Necrosis was present and constituted >50% of core biopsy tissue submitted (Fig. 1a and 1b). IHC findings showed diffuse cytoplasmic positivity for pan-cytokeratin (CK) AE1/AE3, CK 5/6, and smooth muscle antigen (SMA) with focal positivity for p63, S-100 protein, and CK 14 (Figs. 1c-d and 2). Staining for glial fibrillary acidic protein was negative. The cells were negative for hormone receptors ER, PgR, and HER2 (Fig. 3) [Table 1]. On the basis of the histomorphological and IHC results, this case was signed out as a MC – triple negative for ER, PgR, and HER2.

DISCUSSION

MC of the breast is an extremely rare tumor. MC refers to the lesions consisting of tumor cells that exhibit a dual epithelial and smooth muscle differentiation [5,6]. These tumors arise commonly in salivary glands and very rarely in the skin, soft tissue, retroperitoneum, breast, vulva, stomach, and lung. A similar study was reported in Taiwan by the department of surgery as MC of the breast in a 73-year-old post-menopausal woman [7].

According to the World Health Organization, myoepithelial lesions are composed of a pure or dominant population of MECs. In association with the epithelial components, MECs give rise to a more common type of salivary gland-like neoplasms comprising of benign tumors of pleomorphic adenoma, adenomyoepithelioma (AME), and malignant neoplasms of adenoid cystic carcinoma, malignant AME. Pure myoepithelial lesions of the breast encompass myoepithelial hyperplasia, collagenous spherulosis, and MC (malignant myoepithelioma). In the latest classification, MC merges in phenotype with metaplastic carcinoma and has a propensity for metastasis [8]. Tavassoli proposed that there are three types of myoepithelial lesions in the breast: Myoepitheliosis, AME, and malignant myoepithelioma. Myoepitheliosis and AME consist of a significant population of MECs admixed with epithelial cells. AMEs are further classified into spindle cell, tubular, and lobulated variants based on the growth patterns. Malignant myoepithelioma is composed purely of MECs. It is an extremely rare tumor [9].

Commonly used myoepithelial markers are S-100, HMWCK, Calponin, and SMA. S100 protein is too non-specific in reactivity to be of significant value in the study of these lesions. Antibodies to SMA, muscle-specific actin, Calponin, and smooth-muscle myosin heavy chain, all stain normal MECs and most tumors containing MEC component. Due to their poor degree of differentiation, myoepithelial and metaplastic carcinomas are best examined with a panel that includes all antibodies to broad-spectrum keratins, all high-molecular-weight keratins, p63, as well as antibodies to myofilaments [4]. In our case, the tumor cells were immunoreactive for low-molecular-weight keratin (CK5/6), high-molecular-weight keratin (CK 14), broad-spectrum keratins (CK AE1/AE3), S100 protein, SMA, and p63 confirmed the diagnosis of MC. Benign adenomyoepithelial lesions variably express hormone receptors in the epithelial component. However, MCs typically are completely negative for hormone receptors [4]. Our case was also negative for ER, PgR, and HER2.

MCs are treated mainly by wide surgical excision, lymph node dissection, and adjuvant radiotherapy [8]. Breast conservation surgery is an appropriate treatment in selected patients but is associated with the risk of local recurrence without adjuvant radiotherapy. The role of chemotherapy and choice of agent is not the well-defined cause of the rarity of the lesion.

In our case, the patient's clinical picture is consistent with a MC of the breast according to histological characteristics and

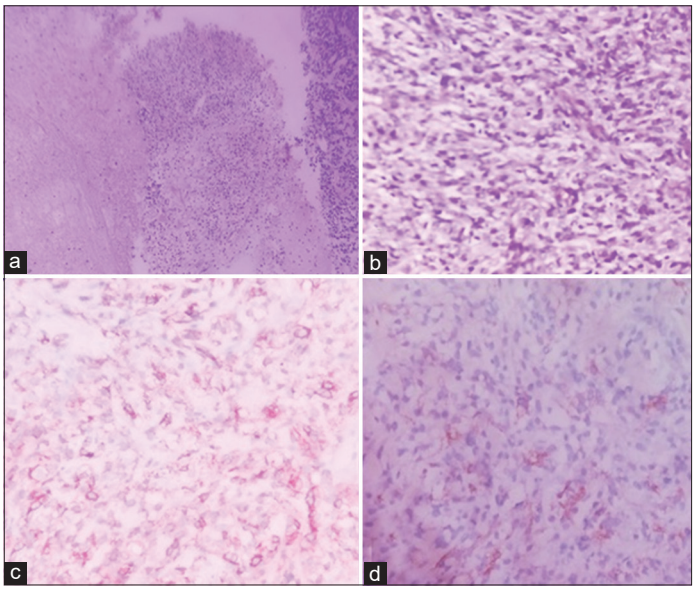

Figure 1: (a) Microphotograph of sheets of atypical spindle-shaped cells in a necrotic background (hematoxylin and eosin stain ×200); (b) atypical spindle cells with mitotic figures (hematoxylin and eosin ×400); (c) immunoreactive score 4+in neoplastic cells (immunohistochemical [IHC] stain, CK ×400); (d) immunoreactive score 4+ in neoplastic cells (IHC stain, SMA ×400)

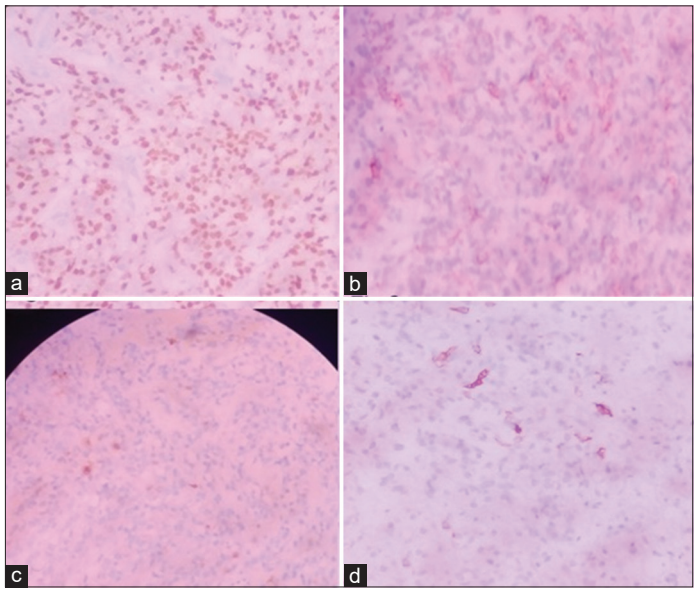

Figure 2: Immunoreactive score 4+ in neoplastic cells (a) immunohistochemical (IHC) stain, P63 ×400; (b) IHC stain, CK5/6 ×400); (c) IHC stain, S-100 ×400; (d) IHC stain, CK14 ×400)

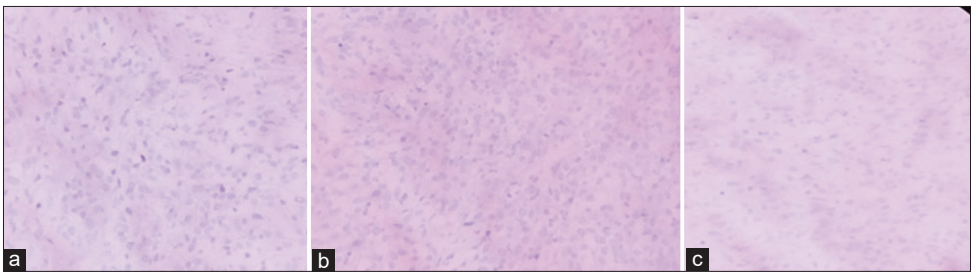

Figure 3: Non-immunoreactive score "0" in neoplastic cells (a) immunohistochemical (IHC) stain, ER ×400; (b) IHC stain, PR ×400; (c) IHC stain, HER-2 ×400

Table 1: IHC interpretation of biopsy

Antibody–	[Clone] –	Interpretation
CK –	[AE1+AE3] –	Immunoreactive score 4+ in neoplastic cells
SMA –	[1A4] –	Immunoreactive score 2+ in neoplastic cells
p63 –	[4A4] –	Immunoreactive score 4+ in neoplastic cells
CK5/6 –	[EPR–1600Y] –	Immunoreactive score 1+ in neoplastic cells
S-100 -	[4C4-9] -	Immunoreactive score 1+ in neoplastic cells
CK14 –	[EP1612Y] –	Immunoreactive score 1+ in neoplastic cells
GFAP –	[GA-5] –	Non-Immunoreactive score '0' in neoplastic cells

IHC: Immunohistochemical, GFAP Glial fibrillary acidic protein

expression of IHC positivity for cytokeratin and myoepithelial markers. So far, regular follow-up evaluations adopt an uneventful course. The development of IHC aids in the histological examination of the breast in which identification of MC is not readily feasible from the morphological features alone. MCs pursue an aggressive clinical course with locally invasive and metastatic potential.

CONCLUSION

MCs are extremely rare lesions of the breast that is difficult to diagnose clinically and histomorphology alone. Radical excision with elective adjuvant chemotherapy is the therapeutic strategy of choice to minimize local recurrence. Multiple aspects, including age, co-morbidity, and the patient's autonomy, should be taken into consideration while drawing a treatment plan. To date, there is limited published data on the biological behavior and long-term clinical outcome of mammary MCs. We, therefore, recommend a multidisciplinary approach based on an experienced team to formulate a treatment modality.

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