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Case Report

Metaplastic Carcinoma with Mesenchymal Differentiation –A Rare Tumor of Breast with Unique Presentation

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Abstract
Metaplastic carcinoma with mesenchymal differentiation of the breast is an infrequent tumor accounting to 0.08%–0.2% of all breast cancers, with only a few cases reported in the literature. Profound research has established the myoepithelial cells which have the potential of biphasic differentiation to be the cell of origin of the above tumor. Pathological assessment remains the gold standard for diagnosing metaplastic breast carcinoma. We are presenting 60 years female with metaplastic carcinoma with mesenchymal differentiation of the breast presenting as a predominantly ulceroproliferative cystic tumor.
Keywords: *Metaplastic carcinoma, Cystic degeneration, Breast.*

Introduction

Metaplastic carcinoma of the breast with mesenchymal differentiation (MCMD) previously known as breast carcinosarcoma is a rare and aggressive subtype of metaplastic breast cancer (MBC). Breast carcinosarcoma, is an uncommon mixed tumor composed of both malignant epithelial and mesenchymal cells, with an incidence of less than 0.2%.[1] The most important feature of this tumor is that there should be no evidence of a transition zone between the two malignant elements. We herein describe a unique case of metaplastic carcinoma of the breast in 60 years old lady, with metastasis to ipsilateral axillary lymph nodes. The mass was large and rapidly growing with signs of rupture and prominent cystic change.

Case Presentation

A 60-year-old woman presented with chief complaint of a large rapidly growing ulcerated left breast mass since four months. She revealed that she had first noticed a small lump seven months ago which for the last four months has rapidly increased in size. Her past medical history was unremarkable and she had no family history of breast or ovarian cancer. Physical examination revealed an ulcerated, indurated mass with focal boss elation. The nipple aerola complex was intact. Contralateral breast and axilla were normal. Multiple left axillary lymph nodes were enlarged,

mobile, and firm, with the largest node measuring 3 x 2 cm. Fine needle aspiration was attempted which yielded 15 ml of straw colour fluid. On cytological examination few scattered atypical cells with squamoid morphology was identified. On trucut needle biopsy features of squamous cell carcinoma was seen and possibility of metaplastic carcinoma was given. The patient underwent modified radical mastectomy with axillary clearance and the specimen was subjected for histopathological examination.

The modified radical mastectomy specimen measured 18X13X5.5cms. There was a large surface ulceration with bosselated nodularities involving the outer surface of breast sparing the nipple aerola complex. (Figure 1) On cut surface a solid cystic tumor measuring 5.5X4X2.5cms with areas of necrosis was noted. Deep resected margin was grossly free from tumor. Eighteen lymph nodes were retrieved from axillary pad of fat, four of which showed cystic change. Microsections revealed poorly differentiated invasive ductal carcinoma admixed with large areas of metaplastic squamous cell carcinoma characterized by polygonal cells with moderate amount of eosinophilic cytoplasm, with intercellular bridges. (Figure 2) Besides foci showed pleomorphic spindle shaped cells arranged in a haphazard pattern with increased mitosis. (Figure 3) Four out of the eighteen lymph nodes extracted showed metastatic squamous cell carcinoma with extensive areas of cystic degeneration. On immunohistochemical analysis the epithelial components were positive for Pan cytokeratin and mesenchymal component were positive for vimentin. The tumor cells were negative for estrogen receptor (ER), progesterone receptor (PR) and HER-2neu. The patient received adjuvant chemotherapy of four cycles of Doxorubicin/cyclophosphamide followed by four cycles of Docetaxel plus trastuzumab and radiotherapy to the chest wall and the axilla. She is asymptomatic and disease free, five months after suargery with follow-ups scheduled every 6 months.

Figure 1: Gross photograph showing an ulceroproliferative growth of breast

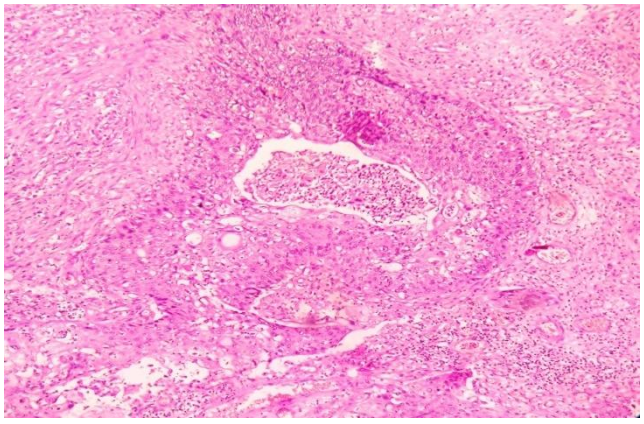

Figure 2: Photomicrograph of squamous cell carcinoma showing nests of tumor cells with necrosis and cavitation in the centre (100X, H&E)

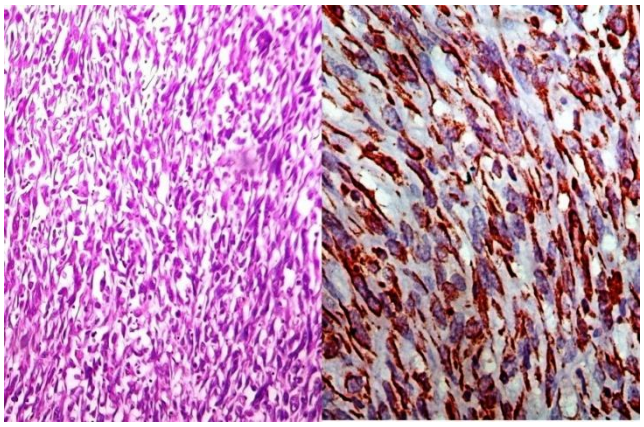

Figure 3: Photomicrograph showing the sarcomatous areas with strong cytoplasmic positivity for vimentin (400X, H&E and IHC)

Discussion

Huvos et al in 1973 was the one to first describe MBC with the definition of any mammary carcinoma with mixed epithelial and sarcomatoid components.[2] Based on the morphological

findings of tumor cells MBC are classified into purely epithelial (squamous, adenosquamous, fibromatosis like metaplastic carcinoma and spindle cell carcinomas) or mixed epithelial and mesenchymal (Metaplastic carcinoma with mesenchymal differentiation) components. The above tumor may arise with or without an accompanying conventional invasive carcinoma. The clinicopathological features which extricates MBC from invasive ductal carcinoma (IDC) are MBC are more likely to have larger tumor size, less lymph node metastasis, a higher histology grade and high percent of triple negative breast cancer, and a worse clinical outcome.[3]

Table 1: Histomorphological and Immunohistochemical characteristics of MCMD described by various studies

S.no	Age	Epithelial component	Mesenchymal component	Estrogen receptor	Progesterone receptor	Her2 neu	Lymph node metastasis
1.	50	Poorly differentiated carcinoma	Undifferentiated sarcoma	Negative	Negative	Negative	No
2	59	Invasive ductal carcinoma	Leiomyosarcoma	Negative	Negative	Negative	No
3	55	Invasive ductal carcinoma	Fibrosarcoma/ malignant fibrous histiocytoma	Negative	Negative	Negative	Yes
4	46	Invasive ductal carcinoma	Undifferentiated sarcoma	Negative	Negative	Negative	No
5	49	Invasive ductal carcinoma	Leiomyosarcoma	Negative	Negative	Negative	No
6	64	Invasive ductal carcinoma/ squamous cell carcinoma	Leiomyosarcoma	Negative	Negative	Negative	No
7	48	Invasive ductal carcinoma/ squamous cell carcinoma	Chondrosarcoma/ osteosarcoma	Negative	Negative	Negative	No
8	35	Undifferentiated carcinoma	Undifferentiated sarcoma	Negative	Negative	Negative	No
9	51	Mucinous carcinoma/ squamous cell carcinoma	Malignant fibrous histiocytoma	Negative	Negative	Negative	No

Extensive sampling of metaplastic carcinoma exhibits a mixture of different elements. Mixed epithelial and mesenchymal metaplastic carcinoma often show infiltrating carcinoma mixed with heterologous mesenchymal elements which can be benign chondroid and osseous differentiation to frank sarcoma (chondrosarcoma, osteosarcoma, rhabdomyosarcoma, liposarcoma, fibrosarcoma). Evidences in the literature have shown the majority of epithelial component are invasive ductal carcinoma, followed by squamous cell carcinoma, lipid-rich carcinoma and adenocarcinoma in descending order.[4] With regard to mesenchymal components it is fibrosarcoma followed by chondrosarcoma, osteosarcoma, liposarcoma and leiomyosarcoma. (Table 1)

Frequently used diagnostic modalities for making a diagnosis of breast carcinoma are mammography, sonography, and magnetic resonance mammography. However the diagnostic specificity of these three techniques in case of MCMD is minimal. Diagnosing breast lumps using frozen section has a sensitivity and specificity of more than 90 and 99%, respectively.[5] With regard to diagnosing MCMD there are certain limitations because the selected piece of

tissue may not be representative of the overall profile of tumor.

Lymph node metastasis in MCMD is reported to be less than in invasive ductal carcinoma.[6] However the pattern of lymph node metastasis is complicated consisting of predominantly carcinomatous or sarcomatous components or an admixture of both. In our case the metastatic deposits in the lymph node were only from the squamous cell carcinoma and hence all the four lymph nodes with metastatic deposits showed large areas of cystic degeneration.

The negative expression of ER, PR and HER-2 neu oncogene are well documented in various studies. Negative expression of ER and PR (89.4%) and HER-2 neu (78.9%) was reported by Jia et al, where else the positive expression of cytokeratin and vimentin in sarcomatous tissue were 19.74% and 82.89%, respectively.[7] Despite being a node negative carcinoma in most of the reported cases the overall and disease free survival of MCMD is significantly lower than invasive breast carcinoma. With regard to recurrence MCMD are known for early recurrence demanding regular follow-up in comparsion to IDC. The optimal treatment of choice for the above tumor is not well established in literature due to low incidence. A multidisciplinary approach consisting of mastectomy with or without axillary dissection followed by anthracycline or taxane based chemotherapy is recommended.

Conclusion

Metaplastic breast carcinomas are a heterogeneous group of malignancies exhibiting multiple morphologies on microscopy. There is a dreath of investigations at understanding the link between the phenotypic diversity of metaplastic carcinomas, gene and protein expression patterns, and their relationship with biological behavior. Appropriate knowledge about the above tumor will be imperative to develop tumor specific therapies in near future.

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