

## CLINICAL VIGNETTE

# Metaplastic Breast Cancer in a Young Woman: A Case report

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### Case Report

A 42-year-old woman underwent a screening mammogram and was found to have a right breast mass and abnormal appearing right axillary nodes. Breast MRI revealed multifocal breast masses and 5 abnormal appearing axillary nodes.

On breast biopsy, pathology was consistent with high grade invasive ductal carcinoma with chondroid differentiation consistent with metaplastic breast cancer (MpBC), matrix-producing type. The axillary node biopsy revealed metastatic disease. The tissue was Estrogen Receptor (ER) negative, Progesterone Receptor (PR) moderately positive, and human epidermal growth factor receptor (HER2) negative. She was felt to have stage IIIA T2N2M0 breast cancer.

Due to her locally advanced disease with nodal involvement, the patient received 6 cycles of neoadjuvant chemotherapy consisting of docetaxel, doxorubicin, and cyclophosphamide. Although she tested negative for the BRCA genes, the patient decided to then undergo bilateral mastectomies. The pathology after neoadjuvant chemotherapy revealed no residual cancer in her breast and 23 negative axillary nodes, consistent with a complete pathologic response.

She did receive postoperative radiation therapy given her stage III cancer at diagnosis, and she then was treated with tamoxifen. She remains in remission at this time.

### Discussion

Metaplastic breast cancer is characterized by the histologic presence of two or more cellular types, usually a mixture of epithelial and mesenchymal components. A rare type of breast cancer, MpBC accounts for less than 1% of all breast malignancies. As MpBC was not officially recognized as a distinct pathologic entity until 2000, there are limited data on clinical presentation, treatment, and outcomes.

Pathologically, MpBC consists of various combinations of carcinoma (usually poorly differentiated), epithelial (squamous), and mesenchymal (sarcomatous) components. The term “carcinosarcoma” has been used to describe metaplastic breast sarcomatoid carcinomas. The World Health Organization classifies MpBC into pure epithelial type and mixed epithelial and mesenchymal type.<sup>1</sup> The epithelial-type MpBC is further divided into squamous cell carcinoma, adenosquamous carcinoma, and adenocarcinoma with spindle cell differentiation, while the mixed type is subdivided into carcinosarcoma, carcinoma with osseous, and chondroid metaplasia. The patient discussed here has a mixed epithelial

and mesenchymal MpBC.

Some differences have been reported between patients with MpBC and those with typical infiltrating ductal carcinoma. The majority of MpBC presents as triple negative breast cancer with negative ER, negative PR, and negative HER 2 testing and usually has a worse prognosis than non-metaplastic triple negative breast cancer.<sup>2</sup> In the National Cancer Data Base,<sup>3</sup> the 892 patients with MpBC had a slightly older age than those with non-MpBC (61 vs 59). There was a mild increased proportion of MpBC in African Americans (14 vs 10%). Pathologic comparison revealed in the MpBC cases compared with infiltrating ductal carcinomas: fewer T1 tumors (30% vs 65%), more node negative tumors (78% vs 66%), more high grade tumors (68% vs 39%), and fewer ER positive tumors (11 vs 74%). One case-matched study of 55 patients with MpBC compared to those with infiltrating ductal carcinoma similarly found in MpBC a higher incidence of larger tumors, lower lymph node involvement, and higher incidence of triple negative breast cancer.<sup>4</sup> Recurrences in the MpBC patients were more common in the chest wall and lungs. In this study, the prognosis of MpBC was worse with a 5 year survival of 55% vs 85% for infiltrating ductal carcinoma. In addition, more patients with MpBC present with metastatic disease: 10 % vs 1 %.<sup>5</sup>

Given the small number of patients with MpBC, the pathologic heterogeneity, and the lack of randomized trials, the treatment used for MpBC is often comparable to that of standard breast cancer of the same stage, although survival is generally worse for MpBC. Patients with sarcomatoid components have often received doxorubicin-based or ifosfamide-based chemotherapy, but the patient numbers on reported studies are too small to correlate specific treatments to outcomes. There are not enough data to make chemotherapy decisions based on the metaplastic subtype. In addition, the data suggest that local therapy should be based on that appropriate for that stage of breast cancer.

The patient presented here was fortunate to have a complete pathologic response to neoadjuvant chemotherapy, which is an important prognostic indicator after neoadjuvant treatment. She continues to receive adjuvant endocrine therapy due to the PR positive nature of her cancer. Hopefully, she will continue to remain in remission. Her outcome appears more favorable than that of many women with MpBC.

MpBC presents with metastatic disease in 10% of patients, and up to half of patients with locally advanced disease will

develop distant metastases.<sup>6</sup> Genomic analysis<sup>7</sup> has revealed that MpBC has a high rate of PI3KCA mutations (47%) and occasional PTEN mutations (5%). Given the poor outcomes with standard therapies, future research in metastatic disease ideally will include targets of the PI3K/mTOR/Akt pathway, or other targeted therapies based on gene profiling.

## REFERENCES

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