Case Report

Matrix-Producing Metaplastic Carcinoma of the Breast with Predominant Chondroid Differentiation: An Unusual Presentation with Diagnostic Dilemma

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Abstract

We report a rare case of matrix-producing metaplastic carcinoma (MPMC) of the breast in a 50-year-old postmenopausal woman presenting with a rapidly enlarging recurrent breast mass and axillary lymphadenopathy. The tumor showed dominant chondroid differentiation without definitive carcinomatous or spindle cell elements, resulting in major diagnostic challenges. Nodal metastasis, rapid recurrence, and aggressive clinical progression ultimately confirmed the diagnosis of matrix-producing metaplastic carcinoma. This case highlights the diagnostic challenges and emphasizes the importance of correlating clinicopathological features when conventional histomorphology and epithelial markers are lacking.

Keywords: metaplastic breast carcinoma; matrix-producing; chondroid differentiation; breast sarcoma; nodal metastasis

Introduction

Metaplastic carcinoma of the breast (MCB) comprises less than 1% of all breast cancers and represents a heterogeneous group of neoplasms characterized by differentiation towards squamous and/or spindle cell and/or mesenchymal (mostly osseous/chondroid) elements. One rare subtype, matrix-producing metaplastic carcinoma (MPMC), exhibits direct transition from invasive carcinoma to cartilaginous or osseous matrix.[1, 2, 3] This subtype poses considerable diagnostic challenges, particularly when epithelial components are minimal or absent and immunohistochemistry (IHC) fails to demonstrate cytokeratin positivity. Such presentations may mimic primary breast sarcoma, malignant phyllodes tumor, or chondrosarcoma. Accurate diagnosis depends on correlating histopathology with clinical behavior and nodal involvement. Previous studies, including those by Kujur et al, Carlucci et al and several other authors highlight similar diagnostic dilemmas.[1, 4, 5] This case underscores these challenges and documents an unusually aggressive course.

Case Report

The patient was a 50-year-old postmenopausal woman who presented with a rapidly enlarging recurrent left breast mass. She previously underwent excision of a large breast lump six months back at an outside centre, where the tumor was diagnosed as myofibroblastoma. Six months later, the patient presented with rapid re-growth of mass with left axillary lymphadenopathy. CECT revealed a lobulated 68 × 40 × 24 mm retroareolar mass with skin involvement and no distant metastasis. Core biopsy was inconclusive, and a modified radical mastectomy was performed. Grossly, an 8 × 7.5 × 3 cm whitish mass was noted (Fig 1).

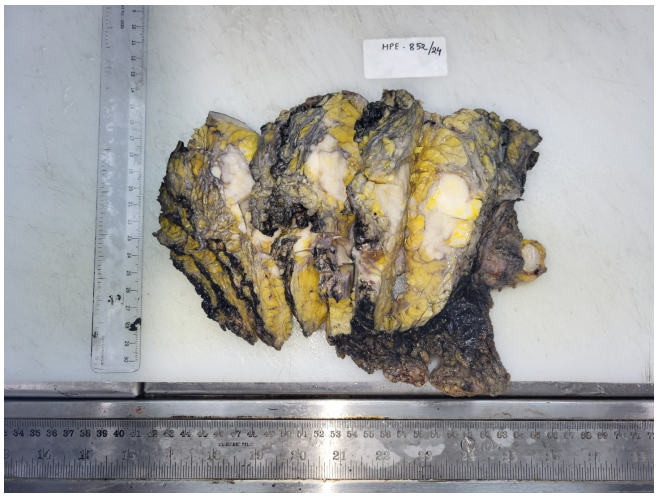

Figure 1: Gross appearance – an irregular, at places circumscribed homogenous whitish mass measuring 8 × 7.5 × 3 cm predominantly in the central compartment. The mass abuts overlying skin, nipple areola complex and base.

Histopathology showed discohesive cells showing moderate to marked cytologic atypia, embedded in abundant chondromyxoid matrix; and without frank carcinomatous or spindle cell component despite extensive sampling (Fig 2). Eight of twenty lymph nodes contained metastasis.

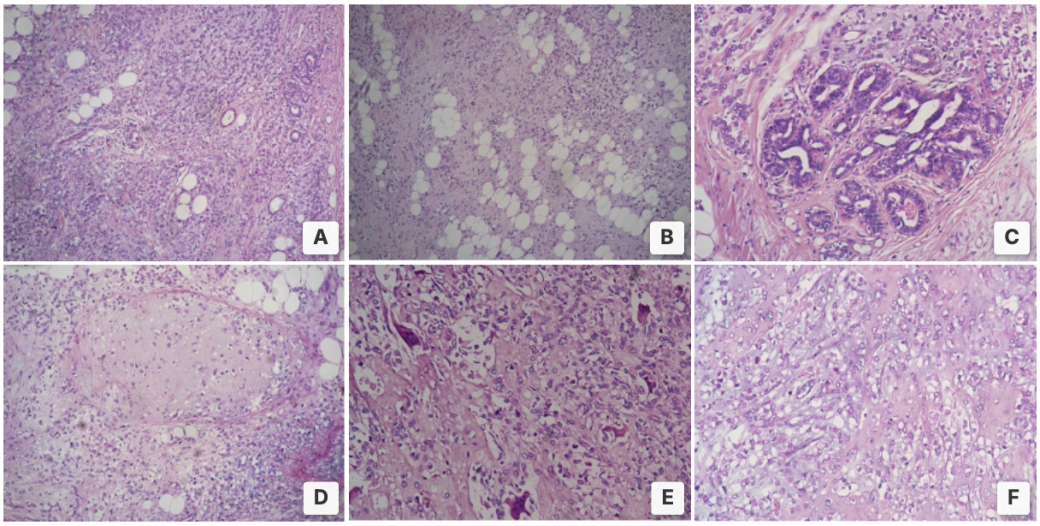

Figure 2: H&E: A) B) discohesive cells in abundant chondromyxoid matrix (low power-10x); C) entrapped benign ductal and glandular components (high power-40x); D) foci of frank chondroid differentiation (low power-10x); E) scattered osteoclast type giant cells at some foci (high power-40x); F) moderate to marked cytologic atypia (high power-40x).

IHC demonstrated vimentin, s100p positivity and very focal positivity for PanCK, EMA as illustrated in Fig 3. The tumor was triple-negative (ER, PR, Her2/neu). Additional immunohistochemistry markers, including SMA, CD34, CD10 and p63, were negative. Table 1 summarizes the IHC antibodies used, along with their respective clones and expression patterns in the tumour.

The differential diagnoses included high grade carcinoma showing malignant chondroid differentiation (matrix-producing metaplastic carcinoma), malignant phyllodes tumor with malignant heterologous chondroid differentiation, and primary breast chondrosarcoma; the latter was excluded due to nodal metastasis. Clue of previously excised tumour to be a spindle cell neoplasm assisted in reaching to these differentials.

Postoperatively, the patient defaulted follow-up and returned three months later with an 11.7 cm chest wall recurrence infiltrating muscles and intercostal spaces, with regional nodes (supraclavicular, axillary, and internal mammary) but no

Table 1: Illustrating the IHC antibodies used with their respective clones and expression patterns.

IHC Antibody	Clone	Company	Expression
PanCK	AE1/AE3	Pathn Situ	Focal
EMA	E29	Pathn Situ	Very focal
SMA	1A4	Pathn Situ	Negative
s100p	EP32	Pathn Situ	Positive
Vimentin	V9	Biogenex	Positive
ER	EP1	Pathn Situ	Negative
PR	EP2	Pathn Situ	Negative
Her 2-neu	EP3	Pathn Situ	Negative
CD10	NEPP	Pathn Situ	Negative
CD34	QBend10	Pathn Situ	Negative
p63	GA4	Pathn Situ	Negative

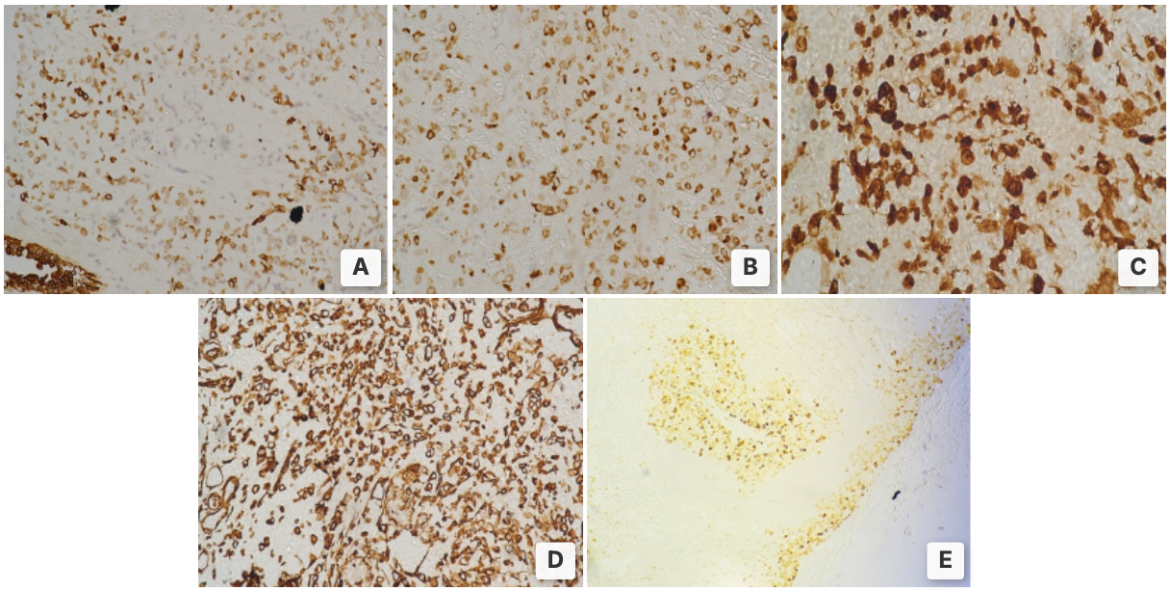

Figure 3: Immunohistochemistry: (A) PanCK and (B) EMA – focal expression in tumour cells (low power-10x); (C) s100p – positive (nuclear and cytoplasmic expression) (high power-40x); (D) vimentin – positive (low power-10x); (E) PanCK expression seen in the nodal tumour deposit (low power-10x).

distant metastasis. Biopsy outside was reported as chondrosarcomatous morphology. Following chemoradiotherapy, partial regression was observed; however disease progressed with bilateral axillary nodes, diaphragmatic nodes, and peritoneal deposits.

The clinical course supported malignant epithelial behavior consistent with matrix-producing metaplastic carcinoma.

Discussion

Matrix-producing metaplastic carcinoma is characterized by abrupt transition from invasive carcinoma to cartilaginous or osseous matrix without an intervening spindle cell component.[1] It is a special type of invasive carcinoma, reported to occur in only 0.003–0.12% of breast cancer.[4] The WHO Classification of Tumors of the Breast, 5th edition classifies metaplastic carcinomas based on histological pattern into epithelial-only carcinomas (with low-grade adenosquamous carcinoma, high grade adenosquamous carcinoma or pure squamous cell carcinoma), pure (monophasic) sarcomatoid (spindle cell or matrix-producing) carcinomas, and biphasic epithelial and sarcomatoid carcinomas.[6]

Metaplastic carcinoma of the breast with predominant chondroid differentiation (MPMC) typically presents as a rapidly enlarging mass, is commonly triple-negative, and is known for its aggressive behavior with high recurrence rates and limited response to chemotherapy. Although lymph node metastasis occurs less frequently than in invasive ductal carcinoma, its presence is clinically significant and helps distinguish MPMC from primary breast sarcoma. Published literature, including reports by Verma et al, Carlucci et al. and other case series, consistently highlights the tumour's poor prognosis and propensity for rapid progression. Our case aligns with these observations, demonstrating swift recurrence and the development of distant nodal and peritoneal metastases within months. Importantly, any rapidly growing breast mass should prompt consideration of metaplastic carcinoma in the differential diagnosis.[1, 2, 7]

Peritoneal metastasis from breast cancer is an uncommon metastatic pattern but carries significant prognostic impact, being

associated with advanced disease and poorer survival compared with typical visceral sites. Recent reports indicate that isolated peritoneal disease, though rare, may be amenable to cytoreductive strategies such as surgery with or without hyperthermic intraperitoneal chemotherapy in carefully selected patients. Metaplastic breast carcinoma, an aggressive triple-negative subtype, is known for atypical metastatic behavior; while peritoneal-only spread is rarely documented, its aggressive biology warrants consideration of such unusual presentations in clinical practice.[8, 9, 10, 11]

Disease free survival and overall survival is less in metaplastic carcinoma as compared to invasive ductal carcinoma of the breast and other forms of triple-negative breast cancers.[12]

The diagnosis is challenging, particularly when epithelial/spindle cell component are inconspicuous and IHC is non-contributory. Several authors, including Tsukuda et al.[4], Carlucci et al.[1] and Kujur et al.[5] have noted cases emphasizing diagnostic complexity; and where nodal metastasis served as the key diagnostic clue supporting epithelial malignancy. In our case, morphology showed dominant chondroid differentiation with no identifiable epithelial component. Immunohistochemistry was not helpful. Differential diagnoses included malignant phyllodes tumor and primary chondrosarcoma; however, the presence of nodal metastasis strongly supported a diagnosis of epithelial malignancy as supported by other authors.[2, 5, 13]

The primary tumour blocks and slides could not be retrieved for review. According to our hypothesis, the primary tumor despite being metaplastic carcinoma was probably of low-intermediate grade initially, possibly fibromatosis-like metaplastic carcinoma. The phenotypic transition from the fibromatosis-like metaplastic carcinoma/spindle cell type to predominantly matrix producing type could have supervened at a late stage. The initial diagnosis of myofibroblastoma suggests a significant sampling error or diagnostic pitfall in the first surgery.

This case reinforces the importance of extensive sampling, awareness of metaplastic patterns, and integrating clinical–radiological correlation for final diagnosis.

Conclusion

Matrix-producing metaplastic carcinoma is a rare and diagnostically challenging breast malignancy and therefore requires a high degree of suspicion. Predominantly chondroid/chondrosarcomatous morphology and lack of epithelial/spindle elements can mimic sarcoma or malignant phyllodes tumor. Clinical behavior, recurrence pattern, and nodal involvement played a major role in reaching the correct diagnosis in this case. Early recognition is critical due to its aggressive course.

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