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Chondroid Differentiated Metaplastic Carcinoma of the Breast: A Case Report and Review of the Literature

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Abstract **Case Report**

Metaplastic carcinoma of the breast is an uncommon and heterogeneous malignancy, accounting for less than 1% of invasive breast cancers. It is defined by the coexistence of epithelial and mesenchymal elements, occasionally with chondroid differentiation, which makes diagnosis challenging. We report the case of a 66-year-old postmenopausal woman presenting with a firm right breast mass and mild nipple retraction. Imaging revealed a BI-RADS 5 lesion. Core biopsy showed invasive carcinoma with a chondroid component, consistent with metaplastic carcinoma. Immunohistochemistry demonstrated strong positivity for estrogen (80%) and progesterone (70%) receptors, HER2 negativity, and a Ki-67 index of 30%. This hormone receptor–positive profile is rare in metaplastic carcinoma, which is usually triple-negative, but may offer a therapeutic advantage with endocrine therapy. The absence of distant metastases at diagnosis further supports a favorable outlook. This case emphasizes the importance of accurate histopathological evaluation and a multidisciplinary, individualized management strategy for this rare breast cancer subtype.

Keywords: Breast cancer, metaplastic carcinoma, chondroid differentiation, hormone receptors, triple-negative.

INTRODUCTION

Metaplastic carcinoma of the breast is a rare and heterogeneous form of breast cancer, accounting for less than 1% of invasive carcinomas [1]. It is characterized by the presence of tumor cells showing epithelial differentiation associated with mesenchymal components, which may occasionally include chondroid or cartilaginous differentiation [2]. This specific histological subtype belongs to the category of metaplastic carcinomas with chondroid features, and its diagnosis can be challenging due to its rarity and morphological diversity [3].

Immunohistochemically, these tumors are frequently triple-negative, lacking expression of hormone receptors (estrogen and progesterone) and HER2, thereby limiting targeted therapeutic options [4]. Moreover, they are generally associated with a poorer prognosis compared with conventional invasive ductal carcinomas, due to their aggressive clinical course and relative resistance to standard therapies [5].

We report here a rare case of breast metaplastic carcinoma with chondroid differentiation, with the aim of better understanding its clinical, histopathological, and therapeutic characteristics, and comparing our experience with the existing literature.

CLINICAL PRESENTATION

A 66-year-old single, nulliparous woman with a medical history of type 2 diabetes mellitus on insulin therapy and postmenopausal status (without a history of oral contraceptive use) presented with a painless, firm nodule in the right breast, associated with mild nipple retraction, evolving over two months.

Clinical examination revealed a 5 × 5 cm nodule, mobile with respect to the deep plane but adherent to the superficial plane, located at the junction of the upper quadrants of the right breast, with poorly defined margins. No palpable axillary lymphadenopathy or cutaneous inflammatory signs were noted.

Mammography with complementary breast ultrasound showed a suspicious mass in the upper outer quadrant of the right breast, classified as BI-RADS 5 (ACR).

An ultrasound-guided core biopsy was performed, revealing mammary parenchyma with a tumoral proliferation arranged in small nests and trabeculae with some acini and clusters. The cells exhibited round to oval hyperchromatic, irregular nuclei with mitotic figures. The stroma was fibrous and hyalinized, with minimal inflammation (TILs < 1%). A cartilaginous lobule was identified, containing mononuclear elements without cytonuclear atypia or mitoses, and thin-walled vessels. No vascular tumor emboli or clear in situ ductal component was observed.

Final pathology: Invasive breast carcinoma, likely ductal NOS, SBR grade II (3+2+2), with a chondroid component, consistent with metaplastic breast carcinoma. No vascular invasion identified.

Immunohistochemistry supported a diagnosis of invasive breast carcinoma, NST (no special type), grade II according to the modified SBR grading system (Elston and Ellis), with strong nuclear expression of estrogen receptors (80%, Clone EP1, Neomarker), progesterone receptors (70%, Clone EP2, Neomarker), and a Ki-67 index of 30%. HER2 was negative.

Staging investigations, including thoraco-abdominopelvic CT and bone scintigraphy, revealed no evidence of distant metastases.

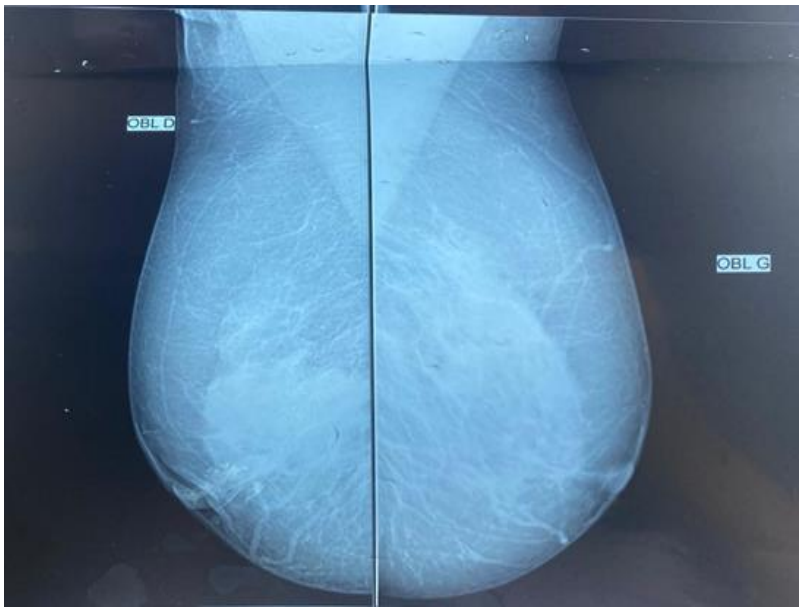

Figure 1

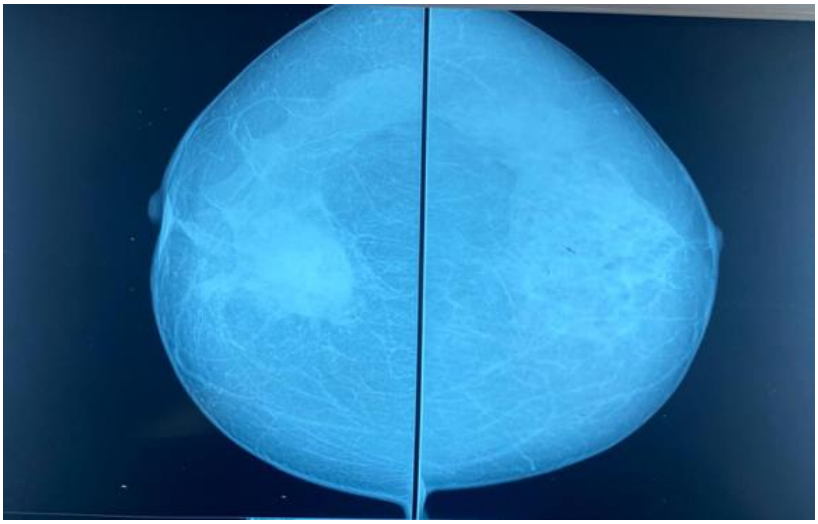

Figure 2

Breasts with partial fatty involution. Opacity in the upper outer quadrant (UOQ) of the right breast, with irregular margins, containing a few microcalcifications. No additional opacity or architectural distortion in the left breast. No suspicious microcalcification focus identified. Axillary extensions are free. Skin covering is thin and regular. Complementary breast ultrasound was performed.

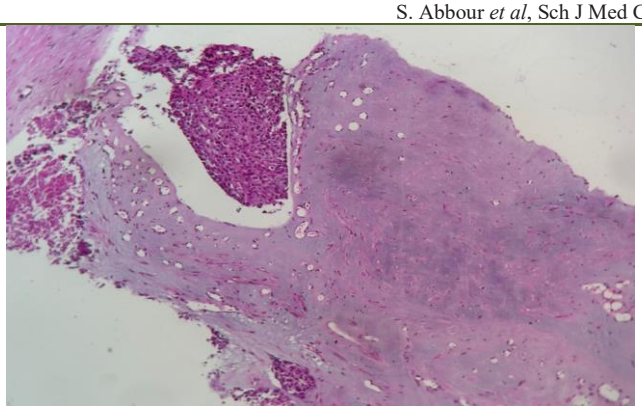

Figure 3: This image shows mammary parenchyma with tumor clusters and cords, fibrous hyalinized stroma, and a cartilaginous lobule without atypia

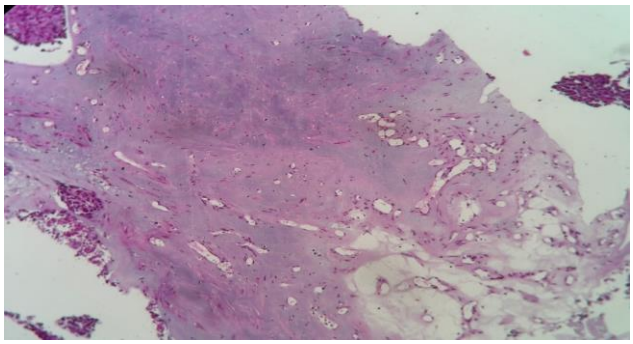

Figure 4: High-magnification image showing mammary parenchyma with tumor clusters, fibrous hyalinized stroma, and a cartilaginous lobule without atypia

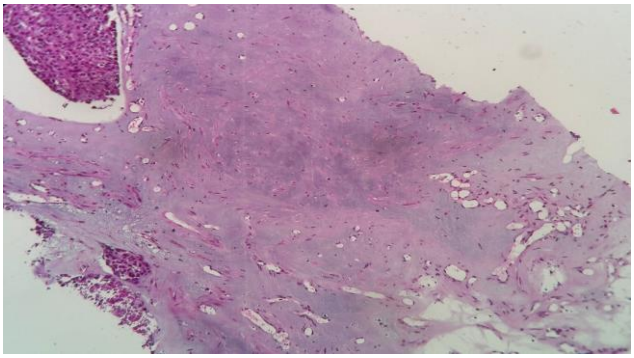

Figure 5: The tumor is composed of cells with round to oval, irregular, hyperchromatic nuclei, exhibiting mitoses. The stroma is fibrous and hyalinized, with minimal inflammatory infiltrate (TILs less than 1%), and contains a cartilaginous lobule with mononuclear elements showing no cytonuclear atypia or mitoses, and thin-walled vessels

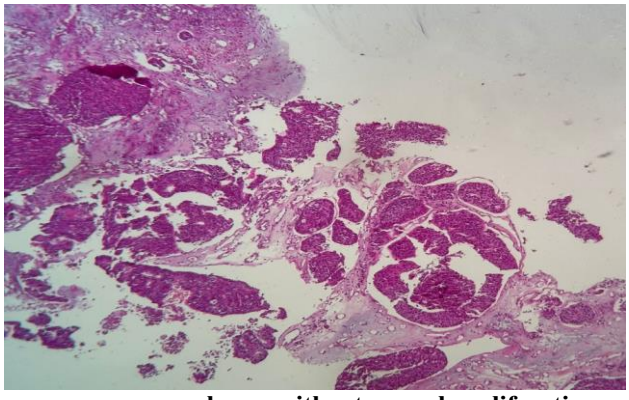

Figure 6: The sections show mammary parenchyma with a tumoral proliferation arranged in small clusters and cords, with a few acini and solid masses

DISCUSSION

Metaplastic breast carcinoma is a rare and heterogeneous entity, representing less than 1% of invasive breast cancers [6,7]. It encompasses several histological subtypes characterized by the coexistence of epithelial and mesenchymal components, such as chondroid differentiation, as seen in our case. This morphological peculiarity may complicate differential diagnosis with primary mesenchymal breast tumors such as sarcomas or phyllodes tumors [3,4].

Clinical Features

These tumors typically affect postmenopausal women, with a mean age of 50–65 years [8,9], consistent with our patient's age. Clinically, they usually present as a hard, painless, rapidly enlarging breast mass [10]. Nipple retraction, though uncommon, may indicate advanced tissue infiltration [11]. In our case, the tumor measured 5 × 5 cm, was mobile in depth but adherent superficially, and associated with mild nipple retraction, without palpable nodes or inflammatory signs. This aligns with published data, where clinical lymph node involvement is uncommon [12].

Radiologic Findings:

Radiologically, metaplastic breast carcinomas often display atypical features. Mammography usually reveals a heterogeneous mass, frequently without microcalcifications, limiting diagnostic specificity [13]. Ultrasound may show heterogeneous masses with cystic or necrotic areas, reflecting the metaplastic nature of the tumor [14]. In our case, the BI-RADS 5 classification justified biopsy for histological confirmation.

Histopathology and Immunohistochemistry

Histology is essential for diagnosis. Metaplastic carcinomas exhibit variable architecture, with mesenchymal differentiation such as chondroid, osseous, or spindle cell components [15]. Our biopsy revealed malignant epithelial proliferation associated with a benign-appearing cartilaginous lobule, necessitating careful interpretation.

Immunohistochemistry plays a pivotal role. Unlike the majority of metaplastic breast carcinomas, which are triple-negative in 64–90% of cases [16,17], our patient showed strong positivity for ER (80%) and PR (70%), which is rare but clinically significant, conferring eligibility for endocrine therapy [18]. The Ki-67 proliferation index of 30% indicates moderate proliferative activity.

MANAGEMENT

Surgery remains the cornerstone of treatment. Mastectomy is frequently performed due to the often-large size and infiltrative nature of these tumors [19]. Breast-conserving surgery combined with radiotherapy may be an option in selected cases [20]. Axillary lymph node dissection is recommended for accurate staging, despite the rarity of nodal involvement [21].

Adjuvant chemotherapy is frequently used given the aggressive nature of metaplastic carcinomas, although response is variable and some subtypes exhibit relative resistance to conventional regimens [22]. Endocrine therapy is particularly valuable in hormone receptor–positive cases, as in our patient [23]. Adjuvant radiotherapy is indicated depending on surgical margins and contributes to local control [24].

PROGNOSIS

The prognosis of metaplastic breast carcinoma is generally poorer than that of conventional invasive ductal carcinoma, with higher rates of local recurrence and distant metastasis (bone, lung, liver) [25,26]. However, hormone receptor positivity is associated with improved outcomes [27]. The absence of distant metastasis at diagnosis, as in our case, is also favorable.

CONCLUSION

This case highlights an atypical presentation of metaplastic breast carcinoma with chondroid differentiation and hormone receptor positivity, a rare but clinically relevant finding. A multidisciplinary approach combining accurate imaging, thorough histopathological evaluation, and individualized treatment—surgery, endocrine therapy, and potentially chemotherapy and radiotherapy—is essential to optimize outcomes in these patients.

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