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Case Report

Metaplastic carcinoma of the breast with chondrosarcoma differentiation: a case report

Siyi Qin[1], Weigang Yan[2], Jinglong Li[3], Wei Dou[4], Hao Li[5], Chuanzi Qin[6]

1-3 Department of Breast Surgery, The Second Affiliated Hospital of Qiqihar Medical University, Qiqihar, China.

4 Department of Pathology, Clinical Pathology Diagnosis Center of Qiqihar Medical University, Qiqihar, China.

5 Department of Anaesthesiology, The Second Affiliated Hospital of Qiqihar Medical University, Qiqihar, China.

6 Department of Hepatobiliary Surgery, Heilongjiang Provincial Hospital, Heilongjiang, China.

Correspondence: Chuanzi Qin. **Email**: 15145035331@163.com

ORCID ID: 0009-0008-6024-3350

Abstract

The occurrence of metaplastic carcinoma with chondrosarcoma differentiation in breast tissue is extremely rare. A case of metaplastic carcinoma with chondrosarcoma differentiation in the right breast tissue of a woman in her mid-50s is reported here. The patient underwent a right mastectomy (palliative resection). After completing the palliative resection, she began adjuvant chemotherapy with a taxane backbone combined with trastuzumab monotherapy, i.e., chemotherapy plus targeted therapy. Post-operative surveillance was then performed. Till the time of writing this report, more than eight months after mastectomy, no metastasis has occurred.

Keywords: Case report; Breast cancer; Metaplastic carcinoma with chondrosarcoma; Malignant tumours.

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Introduction

Metaplastic breast cancer (MBC) is an exceptionally rare subtype, representing less than five percent of all breast cancer cases.[1] It contains a variety of heterogeneous components and has diverse pathological morphology. Compared with non-specific breast cancer, MBC exhibits greater aggressiveness and is associated with an unfavourable prognosis. In its 2019 classification, the World Health Organisation (WHO) defined the histological subtypes of MBC based on the tumour's stromal and epithelial components.[2] Due to its complex histological types, it can be easily misdiagnosed in clinical practice. Improving the understanding of the disease is helpful for early clinical diagnosis and treatment. Here, we report a case of metaplastic carcinoma of the breast with chondrosarcoma differentiation, which was successfully surgically resected with a stable post-operative treatment response, and provide immunohistochemical findings for differential diagnosis.

Case Report

A 55-year-old woman, who was suffering from a breast lump on the right side was initially treated in Qiqihar Traditional Chinese Medicine Hospital, Qiqihar City, Heilongjiang Province, China, in March 2025. Diagnostic core needle aspiration biopsy was performed at the Hospital, and histopathological results showed malignant tumour accompanied by sarcomatoid differentiation. Then On Mar 17, she was transferred to the Department of Breast Surgery, Second Affiliated Hospital of Qiqihar Medical College, Qiqihar City, where she received clear surgical management and systemic treatment. She reported having discovered a lump in her right breast approximately one and a half years ago. The lump was initially small but grew rapidly over the preceding six months.

Upon admission, physical examination revealed a large mass (approximately 13 x 10 cm) occupying the entire right breast, with unclear boundaries and a hard consistency (Figure 1). An enlarged lymph node was palpable in the right lower region, specifically along the lateral border of the pectoralis major muscle within the anterior axillary fold,

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measuring approximately 4 × 5 cm in size, firm in consistency, and fixed in position. However, the patient refused the recommended axillary lymph node biopsy because of serious concerns about invasive procedures; therefore, no histopathological confirmation of the lymph nodes could be obtained.

Imaging evaluation included colour Doppler ultrasound, which identified a significantly thickened breast parenchyma with a complex cystic-solid mass (104 x 86.1 mm) in the outer quadrant. Pre-operative chest CT confirmed a large right breast tumour without evidence of rib involvement (Figure 2). The histopathological findings were suggestive of a malignant tumour with sarcomatous differentiation, consistent with chondrosarcoma [immunohistochemistry: ER(-), PR(-), Ki-67(40%)].

Given the substantial size of the tumour, sarcomatous pathology, associated risk of spontaneous rupture, the large and fixed nature of the axillary lymph node, and the patient's explicit refusal of axillary clearance due to concerns regarding lymphoedema and functional impairment, the patient underwent a right palliative mastectomy in March 2025. The primary objectives of this procedure were to avert impending tumour fungation and to achieve cytoreduction in preparation for subsequent systemic therapy. The definitive post-operative pathology confirmed the diagnosis of metaplastic carcinoma with chondrosarcoma differentiation (tumour volume: 10.5 × 7.2 × 7 cm; Figure 3). Further immunohistochemical analysis of the resection specimen yielded the following results: ER(-), PR(-), HER2(2+), CK5/6 (partial +), Ki-67(80%), and P63 (minority +). Fluorescence in situ hybridisation (FISH) testing was positive for HER2 amplification. The posterior resection margin was defined by the pectoralis major fascia. Intra-operative assessment revealed no evidence of tumour invasion into the underlying pectoralis major muscle, which was therefore preserved. The gross specimen measured 19.5 × 9 × 7.5 cm, exhibiting a variegated cut surface and ill-defined borders (Figure 4). Wound closure was achieved without tension owing to careful pre-operative flap planning. A post-operative photograph at day 14 confirmed excellent healing with no evidence of seroma, haematoma, or wound dehiscence (Figure 5).

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The post-operative adjuvant regimen comprised six cycles of Paclitaxel, Cyclophosphamide combined with Trastuzumab, administered between April and August 2025 (specific dates: April 15, May 7, June 5, June 26, July 18, and August 11). Following the six cycles of adjuvant chemotherapy, the previously noted right axillary lymphadenopathy demonstrated marked regression on clinical examination, indirectly supporting the presence of nodal metastasis from the metaplastic carcinoma component. Although the standard recommendation for HER2-positive metaplastic carcinoma includes continuation of Trastuzumab for one year,[3] with consideration of dual anti-HER2 blockade given the high-risk features, the patient declined further anti-HER2 therapy after the initial six cycles due to financial constraints. Post-operative radiotherapy was also omitted for the same financial reasons. Maintenance therapy was subsequently transitioned to oral Capecitabine as a pragmatic alternative. At the latest follow-up in December 2025, the patient was clinically stable with no evidence of loco-regional recurrence or distant metastasis. Ongoing surveillance is planned.

Written informed consent was obtained from the patient for the publication of this case report and the accompanying images.

Discussion

The age at which MBC occurs is similar to that of invasive ductal carcinoma.[4] However, it is worth noting that the natural differences in the composition and proportional distribution of mesenchymal components often lead to variations in the biological behaviour of MBC. Among these tumours, certain subtypes exhibit growth characteristics such as rapid proliferation and high invasiveness, which are particularly evident and prominent when the tumour is first detected or when clinical symptoms appear, making this one of the important manifestations of its early biological behaviour. In the current case, the rapid growth of the right breast mass over a period of six months and the presence of a mixed cystic and solid mass on ultrasound were clues to these features.

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In clinical treatment, limited by the metaplastic changes of breast cancer and the restricted sampling range of biopsy tissue, cytological examination may be unable to accurately identify heterogeneous components.[5] Furthermore, although definitive diagnosis can be achieved in cases where carcinomatous or sarcomatous components predominate, most cases remain overlooked due to the low stromal component.[6] Although consensus guidelines recommend obtaining a minimum of four cores in a fan-shaped distribution to minimise histological underestimation in breast CNB,[7, 8] this protocol was not applied in the present case. The patient had already undergone a diagnostic core needle biopsy at the referring hospital, which provided sufficient tissue for a preliminary diagnosis. Additional repeat punctures would have entailed increased procedural costs, exacerbated patient discomfort, and diminished the overall care experience. Furthermore, given the hypervascular nature and large size of the tumour, even the marginal increase in bleeding risk associated with additional needle passes was deemed unwarranted. Consequently, a single-site biopsy followed by definitive surgical excision was prioritised.

The majority of MBCs are triple negative, but a minority of patients may be ER, PR, and/or HER2 positive. A study has shown that 12% of patients with sarcomatous breast cancer have positive expression of ER and/or PR, and 15% have positive expression of HER2, while only about 2% of patients have positive expression of ER, PR, and HER2.[9] In the current case, the post-operative pathology of the patient showed ER(-), PR(-), HER2(2+), CK5/6(partial +), Ki67(80%), P63(minority +), and HER2 amplification (+), which also confirmed the conclusions of previous studies. However, the metaplastic component is often insignificant, or the lesion is localised or difficult to observe. With the development of clinical medicine, there is an increasing evidence that the phenotypes is related to the diversity of gene expression.[10] Most pathological and immunohistochemical types of MBC are consistent with basal-like types.[11] The continuous innovation and development of novel gene sequencing technologies will provide a richer array of clinical diagnostic methods and tools, offering strong support for the precise diagnosis of related diseases.

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The rarity of metaplastic breast cancer (MBC), compounded by historical inconsistencies in its classification and the even scarcer prevalence of its chondrosarcomatoid variant, results in a significant lack of clinical expertise and high-level evidence to guide optimal treatment.[12] The current knowledge is predominantly derived from case reports and small case series, which are insufficient to establish definitive therapeutic guidelines. In these reports, mastectomy emerges as the most frequently employed surgical approach. This preference is largely attributed to the aggressive nature of MBC, which often presents with large tumour size (frequently exceeding 5 cm and lymph node involvement, necessitating concomitant axillary lymph node dissection based on nodal status.[13] Chondrosarcoma is an exceedingly rare type of primary breast sarcoma with high heterogeneity. Chondrosarcoma usually occurs in middle-aged and elderly women, and the tumour volume is usually large. The size of a breast sarcoma reported by Agrawal et al. was 9 × 8 cm, while in the current case report,[14] the tumour volume reached 10.5 × 7 cm. Based on previous case reports, surgery continues to be the primary treatment modality for most breast neoplasms.[11] Given the large tumour size and its invasion into the skin, indicating locally advanced disease, a right total mastectomy was performed. Postoperative pathological examination revealed two grey-white areas on the overlying skin, measuring 3.5 × 2.5 cm and 3 × 2.5 cm, respectively. For metaplastic carcinoma with chondrosarcomatous differentiation, which is notably aggressive and often has indistinct margins, mastectomy remains a standard approach for achieving local control. This management principle aligns with strategies described in recent case reports of this specific subtype.[15] The choice of post-operative radiotherapy and chemotherapy is still one of the major problems for clinicians. Given the paucity of reported cases, the efficacy of chemotherapy and radiotherapy remains undefined.[16] In this case, Taxanes combined with Trastuzumab was selected based on the patient's tolerance. During the subsequent treatment, follow-up of the patient will be continued in order to pay attention to the prognosis and recurrence.

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Conclusion

This case underscores the diagnostic challenge posed by metaplastic breast carcinoma with chondrosarcoma differentiation due to its rarity and rapid growth. Although optimal systemic therapy remains undefined, this report demonstrates that a combination of mastectomy and tailored adjuvant therapy can achieve initial disease control. Long-term follow-up is essential to evaluate the ultimate prognosis of this aggressive variant.

Data availability: The datasets created and analysed in this study are not publicly available. Data requests can be addressed to the corresponding author (Chuanzi Qin).

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Figure 1: Clinical photograph of the right breast at presentation, showing a large, irregular mass

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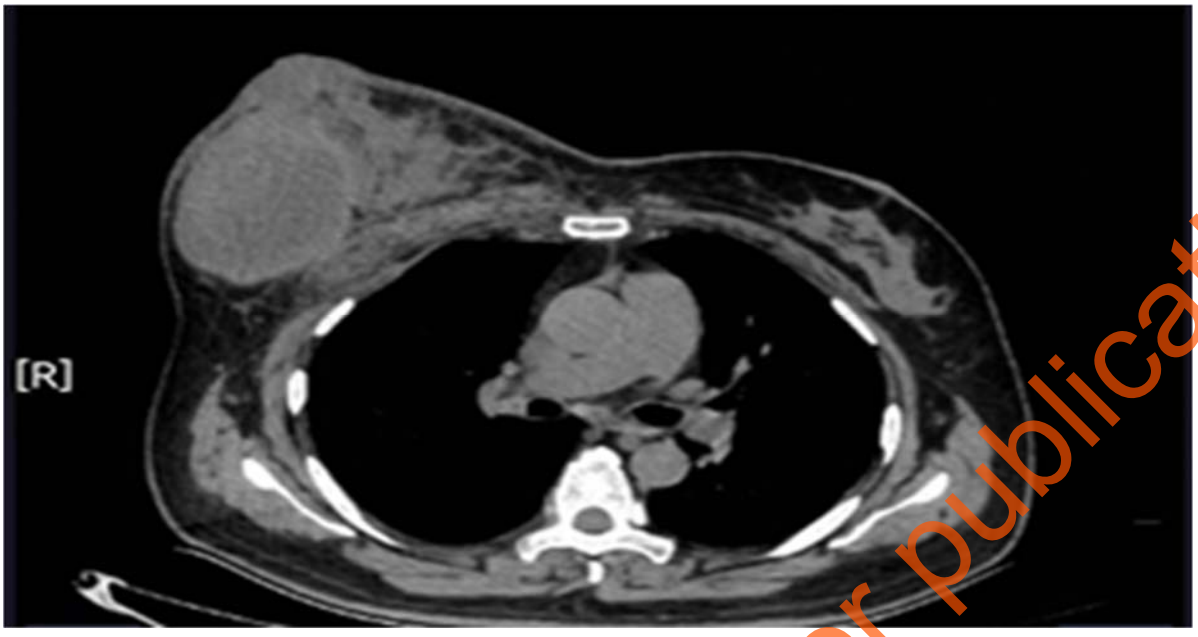


Figure 2: Pre-operative chest CT in the mediastinal window, showing a large, heterogeneous soft-tissue mass within the right breast

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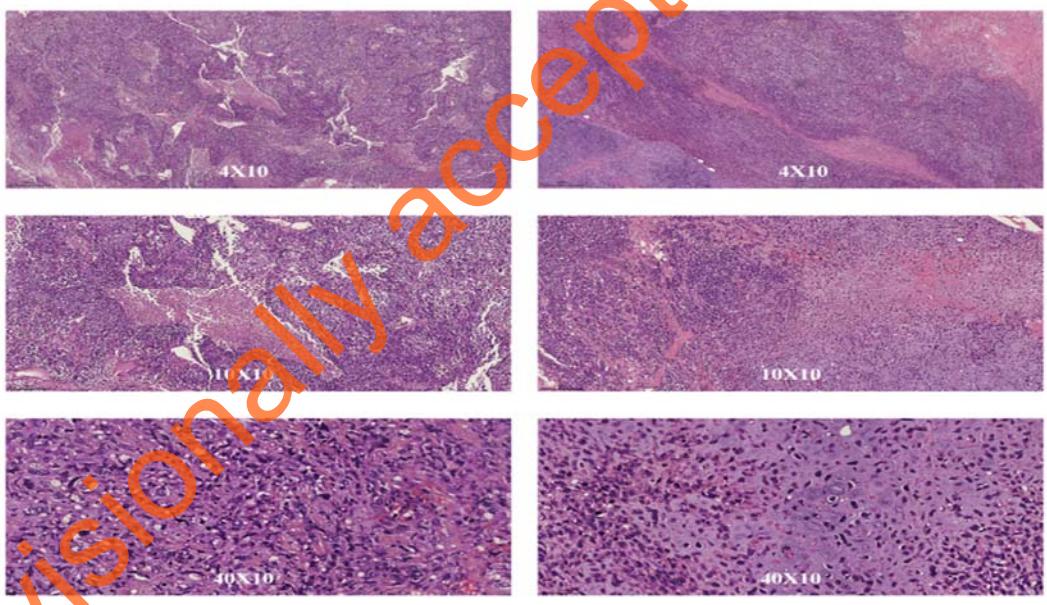


Figure 3: HE staining of tumour tissue, revealing metaplastic carcinoma of the breast with prominent chondrosarcomatous differentiation

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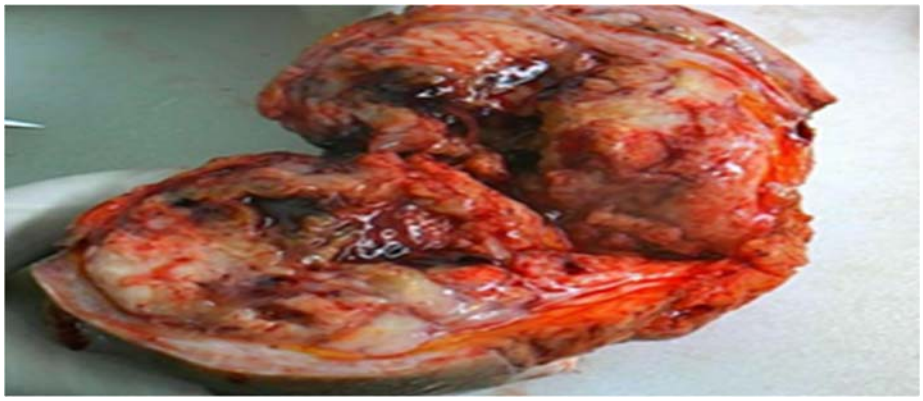


Figure 4: Gross view of the tumour, demonstrating an irregularly contoured mass with a heterogeneous cut surface, focal myxoid changes, and indistinct tumour boundaries.



Figure 5: Clinical appearance of the surgical site on post-operative day 14.

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AUTHORS' CONTRIBUTIONS:

SQ: Concept, data curation, formal analysis, writing-original draft and final approval.

WY: Concept, methodology, supervision, writing, review, editing and final approval.

JL, WD & HL: Data curation, writing, review, editing and final approval.

CQ: Data curation, resources, writing, review, editing and final approval.

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