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Case Report

Pathology Section

# Metaplastic Carcinoma Breast with Chondroid Differentiation: A Rare Case Report and Review of Literature

VISHAL DHINGRA, PRIYA SINGH, YAMINI JINDAL, VARSHA KUMAR, FAHEEMA HASAN

## ABSTRACT

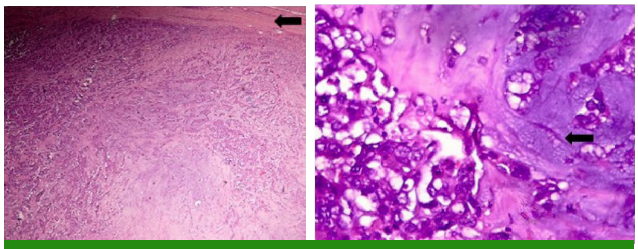
Metaplastic carcinoma of the breast is a rare tumour. Though metaplastic carcinoma is by itself a rare entity, however metaplastic carcinoma with chondroid differentiation makes it even rarer. These tumours are ER, PR, HER2 negative (triple negative) and portend poor prognosis. Present case is of 30 years female presented in Surgery Department with painless lump in upper outer quadrant and was advised ultrasonography. Ultrasonography revealed a neoplastic lesion. Her modified radical mastectomy was done and specimen was send to the Department of Pathology. Specimen measures 12 x 12 x 3 cm in size. On cutting a grey white, firm mass, measuring 2 x 2 x 1.5 cm was noted. On microscopy the diagnosis of metaplastic carcinoma with chondroid differentiation was made which was further confirmed by IHC showing ER, PR and HER2 negative and positivity for EGFR, CK5/6 and S100.

**Keywords:** Lump, Modified radical mastectomy, Triple negative

## CASE REPORT

A 30-year-old female, presented in Surgery Department with painless lump in upper outer quadrant of right breast at 11 o'clock position. She was advised ultrasonography that revealed a neoplastic lesion. Patient consent was taken. Her modified radical mastectomy was done and specimen was send to the Department of Pathology. Specimen with attached nipple areola complex, measuring 12 x 12 x 3 cm in size was received. On cutting a grey white, firm circumscribed mass, measuring 2 x 2 x 1.5 cm was noted in upper outer quadrant. Other areas show fibrofatty tissue. Grossly tumour seems to be uninvolved with the margins. Seven lymph nodes were resected out each measuring not more than 0.8 cm in diameter.

Microscopic examination showed a relatively well circumscribed tumour mass [Table/Fig-1]. The tumour cells were arranged in trabeculae, cords and sheets. Tumour cells showed marked pleomorphism, high N:C ratio, hyperchromatic to vesicular nuclei, prominent nucleoli and scant cytoplasm. Mitotic figures were more than 5/10 high power field. These tumour cells were admixed within chondrohyaline stroma along with spindle shaped cells and few atypical chondrocytes [Table/Fig-2]. Moderate lymphoplasmacytic infiltrate was seen. All the lymph nodes were free of malignancy. Based upon the morphology, differentials included were metaplastic carcinoma

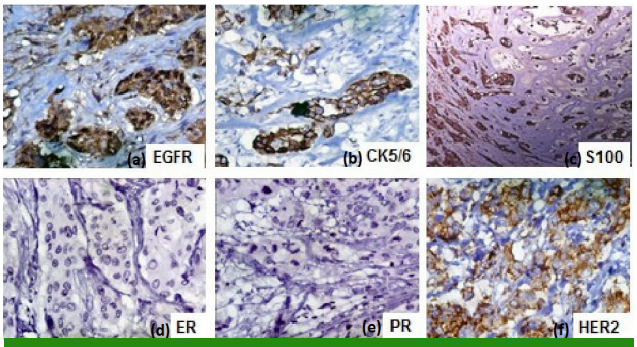


**[Table/Fig-1]:** Low power view showing well circumscribed tumuor mass with tumour cells arranged in trabeculae, cords and sheets. (H&E 100x) **[Table/Fig-2]:** High power view showing tumour cells admixed within chondrohyaline stroma (H&E 400x).

with chondroid differentiation, pleomorphic adenoma, malignant phyllodes tumour, primary chondrosacoma and malignant adenomyoepithelioma. Immunohistochemistry of the tumour was positive for EGFR, CK 5/6 and S100 and was negative for ER, PR and HER 2 [Table/Fig-3a-f]. Based on the morphology and IHC the diagnosis of metaplastic carcinoma with chondroid differentiation was made.

## DISCUSSION

Metaplastic Carcinoma Breast (MBC) is a rare entity accounting for approximately 0.25-1% of all invasive carcinomas [1]. World Health Organization (WHO) classifies MBC into epithelial type




**[Table/Fig-3a-f]:** ImmunohistoChemistry showing positive EGFR, CK5/6 & S100 and negative for ER, PR, HER 2.

and mixed type [2]. Epithelial-type is further classified into squamous cell carcinoma, adenocarcinoma with spindle cell differentiation and adenosquamous carcinoma. Mixed type MBC is further classified into carcinoma with chondroid metaplasia, carcinoma with osseous metaplasia and carcinosarcoma [2]. The term "metaplastic" is used because of admixture of epithelial and mesenchymal components. The synonyms for MBC used were adenosquamous carcinoma, carcinosarcoma, matrix producing carcinoma, sarcomatoid carcinoma, spindle cell carcinoma and squamous-cell carcinoma [3]. There are four variants of metaplastic carcinoma, namely, matrix producing carcinoma, carcinosarcoma, squamous cell carcinoma and spindle cell carcinoma [1]. Earlier study showed 91% of metaplastic carcinoma of any type display basal like phenotype, which as compared to IDC are more aggressive [4]. Whenever metaplastic carcinoma is suspected, careful gross sampling along with thorough histological and immunological examination should be done to confirm the presence of various epithelial and mesenchymal components.

Metaplasia is a reversible and adaptive change in which there is replacement of one adult cell type to another, and earlier study revealed that it's a genetic origin through reprogramming of stem cells [5], which was further confirmed immunologically by CD44 positivity [6]. Recent studies of MBCs revealed a prominent epithelial to mesenchymal transition signature as well as enrichment for inducers of tumour stem cell characteristics [7,8], or through a process of differentiation [9], cytogenetic and molecular studies suggest that the glandular and non-glandular components of these tumours originate from a common cell population [10]. In comparison to IDC (Invasive Ductal Carcinoma), prognosis and treatment of MCB is unknown. But several studies showed patients with MCB have larger and higher-grade tumours at the time of diagnosis with lesser hormone receptor positivity (triple negative) and lesser involvement of the regional lymph nodes [11,12]. This was similar to our present case which was triple negative with no lymph nodes involvement.

Metaplastic carcinoma is a challenge to both pathologist and clinician, as distinction of MBC from other malignancy is necessary, because the surgical treatment and radiotherapy and /or chemotherapy are different [3]. Present case was negative for ER, PR and HER 2 and positive for EGFR, CK 5/6 and S100 were in keeping with the expectations for metaplastic carcinoma with chondroid differentiation. One study showed 10.3% of patients with MBC had metastatic disease as compared to only 0.9% of patients with IDC at the time of diagnosis. Hence, the incidence of stage IV disease at the time of presentation is higher in MBC than IDC [13].

The aetiology of metaplastic carcinoma is presently unknown. MBC has no specific radiological features [3]. It varies from well-defined to ill-defined mass and can be both calcified (speculated) or non-calcified [14]. Differential diagnosis for tumours showing the features of metaplastic carcinoma with chondroid differentiation are pleomorphic adenoma, malignant phylloides tumour, primary chondrosarcoma and malignant adenomyoepithelioma. The morphology and IHC of these differentials are summarized in [Table/Fig-4].

On the basis of gross, histomorphology and immunohistochemistry, pleomorphic adenoma, malignant adenomyoepithelioma, malignant phylloides and primary chondrosacoma were ruled out. Final diagnosis of metaplastic carcinoma with chondroid differentiation was made.

| Differential Diagnosis | Gross | Histomorphology | IHC |
|---|---|---|---|
| Metaplastic Carcinoma with Chondroid Differentiation | Well circumscribed/ indistinct borders | Admixture of adenocarcinoma along with dominant areas of chondroid differentiation | CK5/6 (+), S100 (+), CK14 (+), p63 (+) |
| Pleomorphic Adenoma | Well circumscribed nodule | Glands, nests and single epithelial and myoepithelial cell immersed in chondromyxoid stroma | CK5/6 (-), S100 (+), CK14 (+), p63 (+) |
| Malignant Phyllodes Tumour | Well circumscribed mass | Malignant heterologous elements are present in presence of benign epithelial component | CK5/6 (-), S100 (-), CK14 (-), p63 (-) |
| Primary Chondrosacoma | Infiltrative borders | Atypical chondrocytes showing mild to severe atypia in chondromyxoid background. | CK5/6 (-), S100 (+), CK14 (-), p63 (-) |
| Malignant Adenomyoepithelioma | Large tumours partially well circumscribed | One or both components of AME become malignant. In high grade malignancy showing myoepithelial differentiation, a component of AME is required. | CK5/6 (+), S100 (+), CK14 (+), p63 (+) |

**[Table/Fig-4]:** Comparison of gross, histology and immunohistochemistry of the differential diagnoses.

## CONCLUSION

Metaplastic carcinoma with chondroid differentiation is a rare tumour. It has poor prognosis irrespective of whether metastasis to lymph node is present or absent. As it is negative for ER, PR and HER2, it does not respond to hormone therapy and trastuzumab. Therefore, it should be diagnosed, correctly, as its implications are significant for the patient. The purpose of the case report is to highlight the various aspects of metaplastic carcinoma that will assist, in making the correct diagnosis of this rare tumour.

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**AUTHOR(S):**

1. Dr. Vishal Dhingra
2. Dr. Priya Singh
3. Dr. Yamini Jindal
4. Dr. Varsha Kumar
5. Dr. Faheema Hasan

**PARTICULARS OF CONTRIBUTORS:**

1. Assistant Professor, Department of Pathology, M.L.N. Medical College, Allahabad, Uttar Pradesh, India.
2. Resident, Department of Pathology, M.L.N. Medical College, Allahabad, Uttar Pradesh, India.
3. Resident, Department of Pathology, M.L.N. Medical College, Allahabad, Uttar Pradesh, India.
4. Assistant Professor, Department of Pathology, M.L.N. Medical College, Allahabad, Uttar Pradesh, India.
5. Resident, Department of Pathology, M.L.N. Medical College, Allahabad, Uttar Pradesh, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Yamini Jindal
Resident, Department of Pathology,
M.L.N. Medical College,
Allahabad-211002, Uttar Pradesh, India.
E-mail: yaminijindal5@gmail.com



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