Case Report

Metaplastic Chondroid Breast Carcinoma: A Diagnostic Challenge

Milind Anil Bhatkule

Department of Pathology, Government Medical College and Superspeciality Hospital, Nagpur, Maharashtra, India

Abstract

Metaplastic carcinoma of the breast is a rare entity. Extensive chondroid differentiation is even rarer in metaplastic breast carcinoma (MBC). Here, we report a case of metaplastic chondroid carcinoma of the breast with very few areas showing usual ductal carcinoma and pseudosarcomatous areas. The tumor was characterized by an abundant chondromyxoid matrix. The definitive areas of classic invasive ductal carcinoma were very few. The peripheral portion of the tumor showed increased cellularity with pleomorphism and invasive growth pattern with giant tumor cells. This case is presented for its rarity and also of a diagnostic challenge, especially if the tumor is composed mainly of sarcomatous elements with extensive chondroid differentiation. Standard chemotherapy regimens are ineffective against MBC.

Keywords: *Chondroid differentiation, invasive ductal carcinoma breast, metaplastic carcinoma*

Introduction

Metaplastic breast carcinomas (MBCs) are one of the rare primary malignancies of the breast and represents only 0.25%–1% of the total breast cancers.[1] It is the heterogeneous group of tumors with comprising usual type breast carcinoma with metaplastic elements which can be homologous such as squamous or spindle or it may be heterologous such as chondroid, osseous, or lipomatous.[2-5] The prevalence of breast cancer with osseous/cartilaginous metaplasia is very rare that estimated to occur in only 0.003%–0.12% of breast cancer cases.[4] In general, the prognosis and optimal treatment blueprint of MBC is not well known. Treatment of MBC is largely analogous to other invasive ductal carcinoma (IDC) subtypes, but growing evidence depict that MBC is a distinct entity of breast cancers.[5] Here, we report a case of MBC posing a diagnostic challenge as there is an extensive heterologous component with chondroid differentiation as it becomes difficult to differentiate it from primary chondrosarcoma. It is important to differentiate as MBC is resistant to standard chemotherapy regimens requiring the different treatment pathway.[1,5]

Case Report

A 57-year-old female patient presented with a lump in the left breast for the past 2 months with recent increase in size. Clinical examination revealed firm-to-hard swelling measuring 4 cm × 3 cm × 3 cm in the upper, outer quadrant of the left breast. There were no palpable axillary lymph nodes. The ultrasound showed a well-defined hypoechoic lesion of 4 cm × 3 cm × 2 cm. The diagnosis offered on fine-needle aspiration cytology was poorly differentiated carcinoma with the background of chondromyxoid. She underwent lumpectomy and the specimen received on gross examination showed a well-defined mass of 4 cm × 3 cm × 3 cm with on cut section show grayish-white areas with glistening white lesion [Figure 1]. Histopathology of the tumor show small areas of clusters of large irregular pleomorphic tumor cells with anaplastic giant cells tumor [Figure 2]. Also seen are the large areas with extensive chondroid metaplasia [Figure 3]. Area with sarcomatoid spindle cells with large pleomorphic nuclei was seen [Figure 4]. Initially, diagnosis was difficult as it showed large areas with cartilaginous areas, but with extensive search, typical areas with IDC-like areas are found [Figure 2].

Discussion

Some literature reports of the MBC tumors are relatively large on presentation but often with node-negative during examinations. MBC presents with axillary nodal involvement less frequently than

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Address for correspondence:
Dr. Milind Anil Bhatkule, Department of Pathology, Government Medical College and Superspeciality Hospital, Nagpur, Maharashtra, India.
E-mail: milindbhatkule@gmail.com

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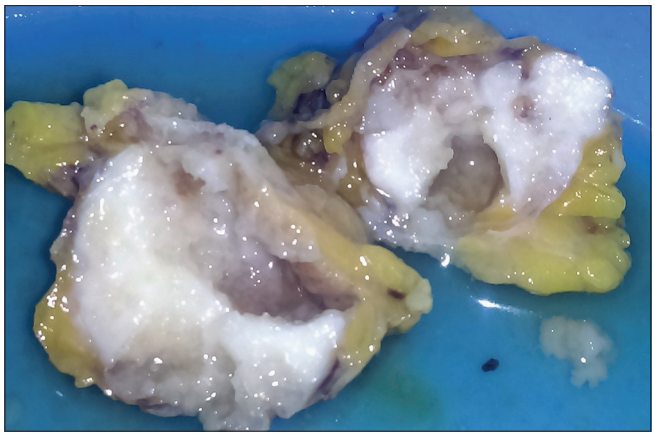

Figure 1: Gross photograph of the specimen showing glistening grayish-white cut surface

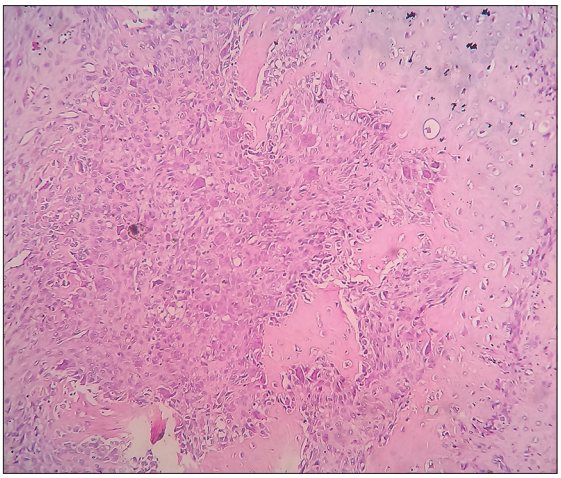

Figure 2: Photomicrograph showing of the tumor areas of clusters of large irregular pleomorphic tumor cells with anaplastic giant cells tumor in the periphery

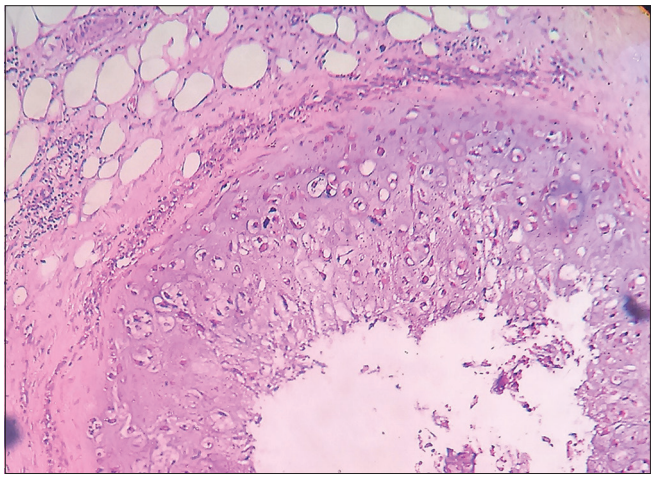

Figure 3: Photomicrograph showing large areas with extensive chondroid metaplasia with myxoid background (H and E, ×40)

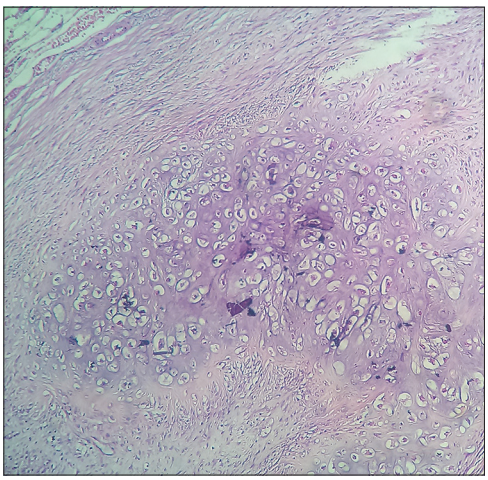

Figure 4: Photomicrograph showing chondroid areas with area with sarcomatoid spindle cells seen at periphery (H and E, ×40)

adenocarcinoma of the breast on which accounts between 6% and 26% of the cases.[1] Two histologically various classifications of MBC have been described by Tse *et al*.[6] Wargotz and Norris.[7] The World Health Organization histologically classifies MBC into: (1) epithelial type and (2) mixed type. Epithelial-type MBC is classified into: (i) squamous cell carcinoma, (ii) adenocarcinoma with spindle cell differentiation, and (iii) adenosquamous carcinoma. Mixed-type MBC is further classified into: (i) carcinoma with chondroid metaplasia, (ii) carcinoma with osseous metaplasia, and (iii) carcinosarcoma.[1] The tumor shows varying proportions of carcinomatous and pseudosarcomatous elements. The pseudo sarcomatous component may mimic malignant fibrous histiocytoma, rhabdomyosarcoma, osteosarcoma chondrosarcoma, or a combination of these.[8] The spindle cell component frequently resembles a reactive process, namely, granulation tissue or a low-grade sarcoma which can pose a diagnostic challenge. In the present case, sarcomatous component resembled a low-grade sarcoma. Three major theories have been proposed to explain the coexistence of biphasic components. The collision theory for biclonal origin suggests synchronous growth of the carcinomatous component (CC) and heterogeneous sarcomatous component (HSC) from separate progenitor cells which collide to form one tumor. The combination theory for monoclonal origin suggests a common multipotential progenitor cell. The conversion/metaplastic theory for monoclonal origin suggests that HSC is derived from the CC through the metaplastic process. The coexpression of S-100, vimentin, and/or cytokeratin in both (CC and HSC) is evidence of the metaplastic process. Definitive genetic evidence of monoclonal or biclonal origin is still limited.[1]

The differential diagnosis of MBC depends on the degree of atypia observed in the tumor and includes nodular fasciitis, fibromatosis, exuberant scars, myofibroblastomas, pseudoangiomatous stromal hyperplasia, primary or metastatic sarcoma, and malignant phyllodes tumor.[3]

MBCs are mostly estrogen receptor, progesterone receptor, and Her2-neu negative and tend to have a worse prognosis than other triple-negative breast cancers.[2,9]

Cytokeratin and vimentin positivity is the defining feature. Basal markers, which can be used as therapeutic targets, are commonly expressed, namely, CK14 and 17, epidermal growth factor receptor, caveolin-1, and vascular endothelial growth factor.[8] The spindle cells express myoepithelial markers (34 bE 12 and smooth muscle cell actin).[8] A higher percentage of AE1/AE3 expression, ranging from 63% to 100% is reported in recent studies.[6,7,10] A p63 expression in tumor cells is also a sensitive and specific marker for metaplastic carcinoma of the breast.[11]

There is no "standard" therapy for all patients with MBC, due to its rarity and intratumoral heterogeneity.[2,12] Most MBCs are managed by radical mastectomy followed by chemotherapy and radiotherapy. Traditional chemotherapy and hormonal therapies for IDC are ineffective against MBC and often associated with poorer survival.[2] Shah *et al*. suggested that regardless of the type of surgery performed, adjuvant radiation improved both disease-specific and overall survival for all patients undergoing treatment for MBC.[2,5] The prognosis is similar to that of comparable stage of adenocarcinoma, and thus, treatment should follow similar principles.[8,13] The mesenchymal element involved seems to be important in determining outcome.[12]

Conclusion

MBC are rare primary breast carcinoma with low rate of axillary lymph node involvement. Very rarely, these tumors may show extensive chondroid differentiation with very little usual tumor area. Hence, extensive search should be made to identify this entity. MBC s are triple negative so requiring the aggressive therapy as they are known for recurrences.[14] Current MBC treatment is paralleled with other subtypes of IDC, but there was some vague evidence in the literature regarding its behavior and type of recurrence that gave estimable clues to experts for running valuable studies to improve the treatment results. Consequently, targeting metaplastic component of MBC can improve the systemic therapy more efficacious in further clinical trials.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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