

# Right Breast Metaplastic Carcinoma with Chondroid Differentiation (Chondrosarcoma)

Alya S. Binmahfouz, MD

Department of Radiology, Faculty of Medicine  
King Abdulaziz University, Jeddah, Saudi Arabia

## Correspondence

Dr. Alya S. Bin Mahfouz  
P.O. Box 4942, Jeddah 21412, Saudi Arabia  
e.M: asmahfouz@kau.edu.sa

Submission: 15 Jun. 2015

Accepted: 2 Sep. 2015

## Citation

Binmahfouz AS. Right breast metaplastic carcinoma with chondroid differentiation (chondrosarcoma). *JKAU Med Sci* 2015; 22 (4): 45-51. DOI: 10.4197/Med. 22.4.6

## Abstract

Metaplastic breast cancer is rare, representing < 5% of breast cancer (only eight cases have been reported so far). We present here a 42-year-old female complaining of a painless lump in the right breast for the previous two months. Physical examination revealed a palpable mass. Lumpectomy was performed and histopathologic examination revealed metaplastic breast carcinoma with foci of chondrosarcoma. The patient received adjuvant radiation therapy and chemotherapy and is currently following up as an outpatient. We also discuss different imaging diagnostic features of this specific type of breast cancer using mammography, ultrasonography, and magnetic resonance imaging.

## Keywords

Breast; Metaplastic carcinoma; Chondroid; Mammography; Ultrasound; MRI; Immunohistochemistry

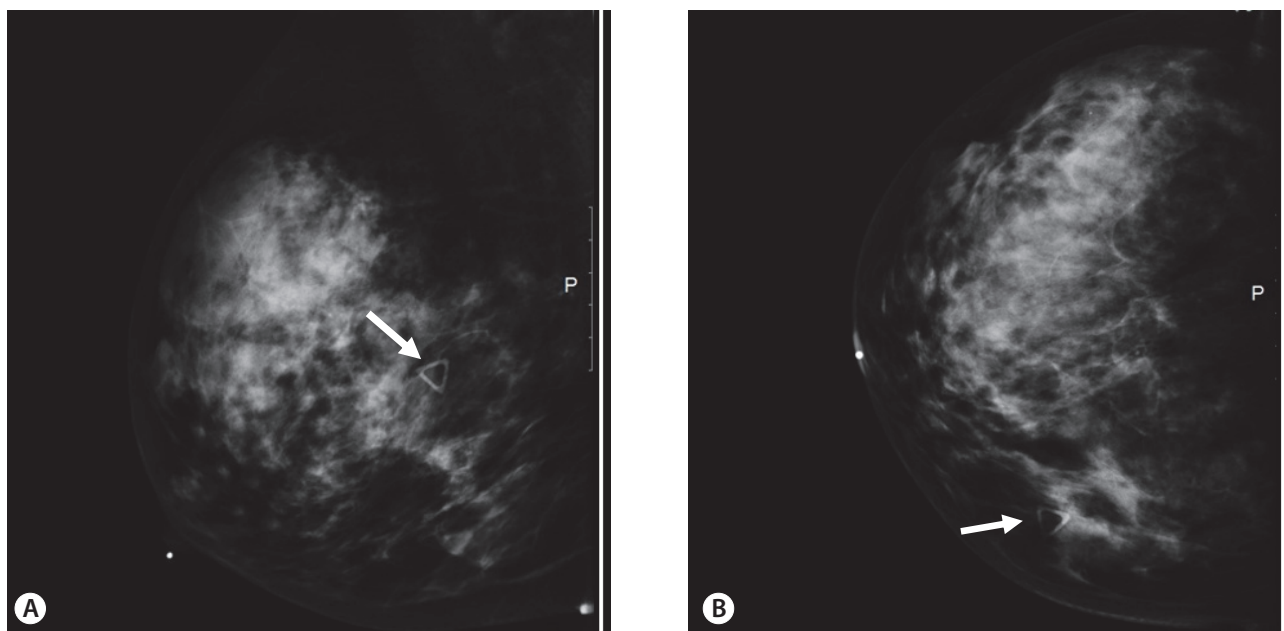
## Introduction

Metaplastic breast carcinoma with predominant chondrosarcoma is exceedingly rare. Most malignant breast tumors originate from the glandular tissue. However, in rare circumstances, the glandular tissue transforms into mesenchymal tissue, this is known as metaplasia. This occurs in < 5% of cases, and has a worse prognosis<sup>[1]</sup>. There are five types of metaplastic breast cancer: matrix-producing carcinoma, spindle cell carcinoma, squamous cell carcinoma, metaplastic with osteoclastic giant cells, and carcinosarcoma<sup>[2,3]</sup>. Additionally, pure breast sarcomas are rare, account for 0.5% of breast tumors, whereas carcinosarcomas are the rarest, encountered in < 0.1%.

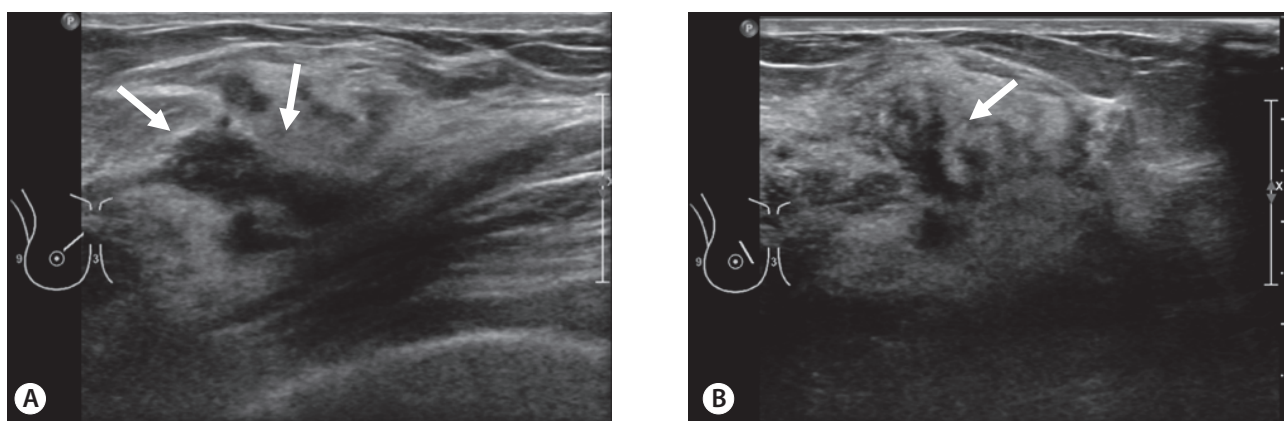
## Case Report

A 42-year-old female complained of a painless lump in the right breast for the previous 2 months. No associated nipple discharge or any other breast symptoms. Patient is married and has three children.

She is otherwise completely healthy and not on regular medications. She denied any case of breast cancer in her family. She had not received any prior screening mammograms. On clinical examination, there was a painless, mobile, hard lump of 3 x 1 cm at the upper inner quadrant of the right breast. The overlying skin, nipple, left breast and both axillae were unremarkable. Bilateral diagnostic mammography demonstrated an extremely dense breast parenchyma, which lowered the sensitivity of the mammogram, however, no mass, architectural distortion, or malignant microcalcifications were identified (Fig. 1). Targeted ultrasound of the palpable lesion in the right breast demonstrated a 2 x 1 cm ill-defined, vertically oriented, heterogeneously hypoechoic, micro-lobulated solid mass with irregular margins, at 2 o'clock, 5 cm from the nipple, with posterior shadowing and surrounding echogenic rim denoting desmoplastic reaction (Fig. 2). The lesion was highly suspicious ( Breast Imaging-Reporting and Data System (BI-RADS 5)) and further evaluation by gadolinium enhanced breast magnetic



**Figure 1.** Mammography of the right breast: (a) mediolateral oblique, and (b) craniocaudal views show extremely dense breast parenchyma, which lowers the sensitivity of the mammogram. No suspicious mass at the area of palpable abnormality (metallic marker corresponds to the palpable lesion, arrows), no microcalcifications or architectural distortion.

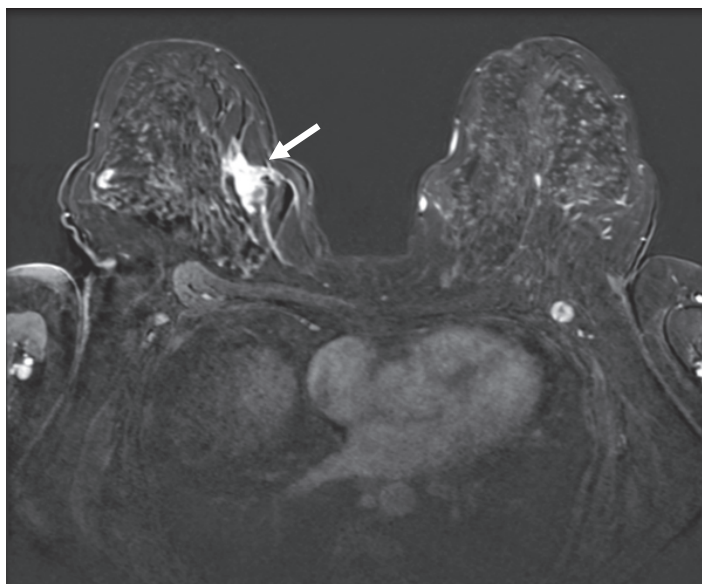


**Figure 2.** Radial (a) and antiradial (b) gray-scale ultrasound imaging of the right breast showing a 2 x 1 cm ill-defined, vertically oriented, heterogeneously hypoechoic, micro-lobulated solid mass (arrows) with irregular margins, at 2 o'clock, 5 cm from the nipple, with posterior shadowing and surrounding echogenicity denoting desmoplastic reaction.

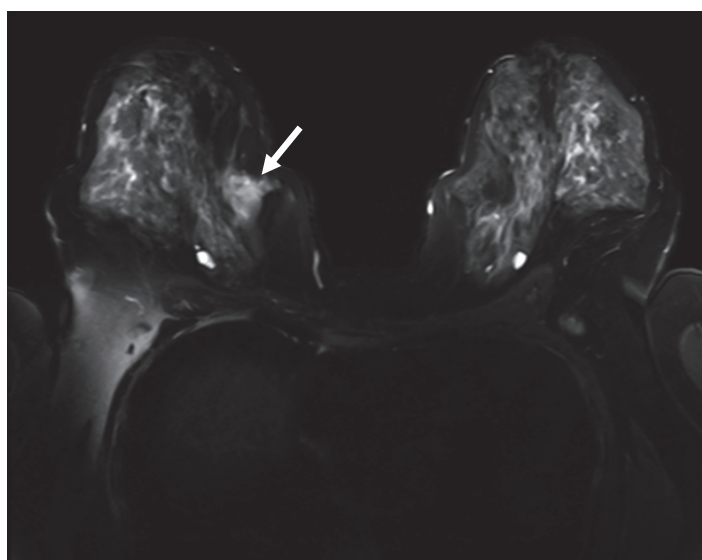
resonance imaging (MRI) was performed to exclude multifocality and to assess the left breast. The MRI showed an irregular, spiculated, intensely enhancing mass, at 2 o'clock of the right breast (Fig. 3), measuring 2.3 x 1 cm, with high T2 signal intensity (Fig. 4). The mass showed rapid enhancement with rapid washout (type 3 kinetic curve). No other satellite lesions. No involvement of the skin, nipple or chest wall. The left

breast was unremarkable. No abnormally enlarged axillary or internal mammary lymph nodes bilaterally.

At this point, the patient was informed of having a highly suspicious lesion in the right breast, and an ultrasound-guided core needle biopsy of the palpable lesion was obtained, using a 14-Gauge needle, which revealed invasive ductal carcinoma with mucinous



**Figure 3.** Axial T1-weighted fat suppressed subtracted early post contrast MRI showing an irregular, spiculated right breast intensely enhancing mass (arrow) at 2 o'clock, measuring 2.3 x 1 cm. The skin, nipple and chest wall are uninvolved. The left breast and both axillae are unremarkable.

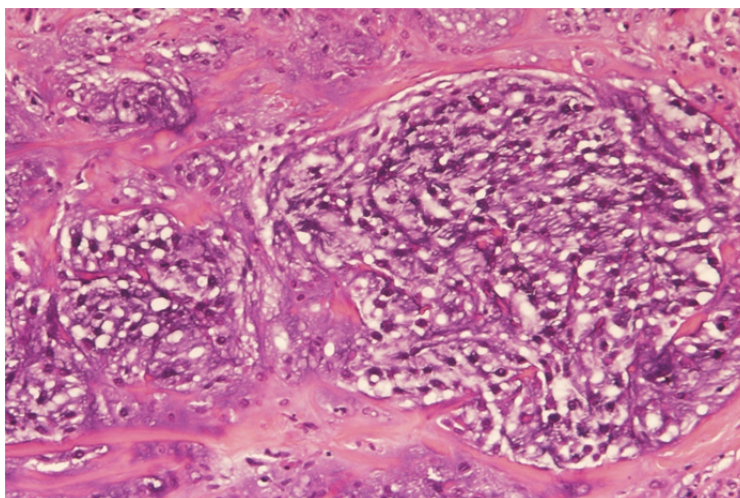


**Figure 4.** Axial T2-weighted fat suppressed MRI showing right breast high signal intensity lesion (arrow) at 2 o'clock with irregular spiculated margins, measuring 2.3 x 1 cm. The left breast and both axillae are unremarkable.

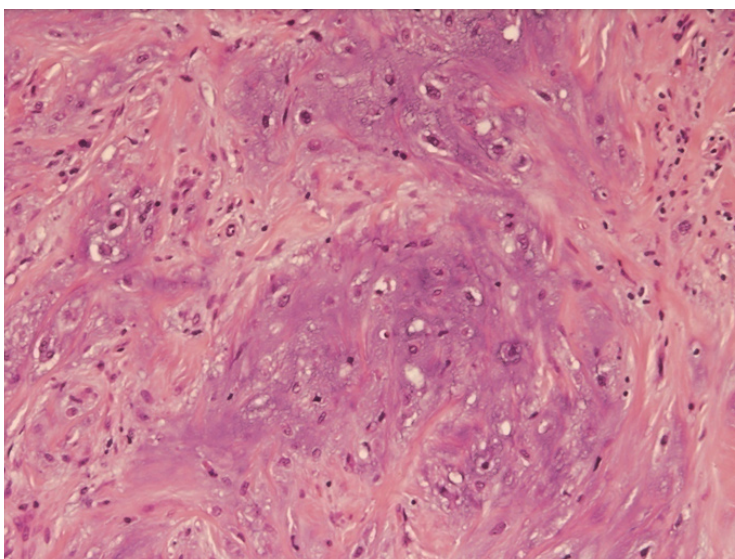
features, and foci of ductal carcinoma in situ (DCIS), solid type, of intermediate nuclear grade. The treatment options were discussed with the patient, and she elected to go for breast conserving surgery (lumpectomy and right axillary lymph node dissection) which confirmed the diagnosis of a 2.5 cm matrix producing metaplastic breast carcinoma (myxoid and chondroid matrix) with foci of chondrosarcoma,

associated with less than 5% DCIS (Figs. 5 and 6). The margins were clear. The tumor cells were estrogen receptor negative, progesterone receptor negative, and human epidermal growth factor receptor 2 (HER2) negative, while pancyto-keratin positive, S-100 protein positive, and vimentin positive. All dissected lymph nodes were free of metastatic deposits. Following surgery, the patient received radiation therapy





**Figure 5.** Photomicrograph (H&E stain, x40 low power magnification ) showing metaplastic carcinoma of the breast with chondroid differentiation.



**Figure 6.** Photomicrograph (H&E stain, x100 high power magnification) showing metaplastic carcinoma of the breast with chondroid differentiation.

and chemotherapy with cyclophosphamide and actinomycin-D, and she is currently doing well on regular follow-up. No evidence of recurrence or distant metastasis.

### Discussion

Metaplastic breast cancers are infrequent tumors, with less than a 5% incidence rate<sup>[1,2]</sup>. They constitute ductal carcinomas with metaplastic foci of nonglandular tissue<sup>[2]</sup>. There are five described histologic types: spindle cell carcinoma (most common); matrix-

producing; squamous cell carcinoma; metaplastic with osteoclastic giant cells; and carcinosarcoma (least common)<sup>[2]</sup>. The reported age at diagnosis ranges from 44 to 63 years with an average of 54 years<sup>[3]</sup>. As in our index case, patients frequently complain of a rapidly growing palpable mass, with a mean diameter at presentation of 4.2 cm<sup>[4]</sup>. Spread to the axillary lymph nodes is uncommon (25-30%); however, hematogenous metastasis to the lung and bone is more common<sup>[2]</sup>. On mammography, they exhibit a wide range of appearances ranging from benign to malignant, but commonly seen as a well-defined

round to oval mass, of high density relative to the surrounding normal parenchyma, with predominantly well circumscribed borders associated with portions of spiculated margins<sup>[1-5]</sup>, which is reported to be a salient feature of metaplastic breast carcinoma, likely due to the presence of a mixture of metaplastic and invasive components<sup>[5]</sup>. Architectural distortion is recognized, but calcification is less frequent in metaplastic carcinoma compared to invasive ductal carcinoma, although it is described in chondroid differentiation, which may exhibit amorphous, punctate or pleomorphic calcifications<sup>[1-6]</sup>. On sonography the lesions are round or ovoid, usually micro-lobulated, vertically oriented, with irregular or indistinct margins, highly vascularized, and show heterogeneous complex echogenicity, with mixed solid hypoechoic mass and internal cystic areas related to necrosis and hemorrhage. Posterior acoustic enhancement has been described in tumors with prominent cystic changes<sup>[1-5]</sup>. On MRI they often display irregular shape and margins, with hypointense or isointense signal on T1, and homogeneous or mottled hyper-intense signal on T2 related to myxoid matrix, necrosis, hemorrhage, or edema<sup>[1-6]</sup>. The enhancement pattern is heterogeneous or rim-like due to extensive central necrosis, and they commonly show early enhancement with plateau (type 2 kinetic curve) or rapid washout (type 3 kinetic curve)<sup>[2,6]</sup>. The vast majority of cases, including our presented patient, are triple negative (estrogen receptor, progesterone receptor, and HER2 negative)<sup>[2]</sup>. The definite diagnosis is made by excisional biopsy, which is superior to fine-needle aspiration cytology and core tissue biopsy, which might result in inadequate sampling due to necrosis and hemorrhage<sup>[2,3]</sup>.

The differential diagnoses include: malignant phylloides tumor, pure primary chondro-sarcoma, malignant adenomyoepithelioma, lymphoma, metastasis, necrotic invasive ductal carcinoma, intracystic papillary carcinoma, and mucinous carcinoma<sup>[2,6]</sup>. Management is similar to other types of breast malignancy, including surgery (mastectomy or lumpectomy with axillary lymph node dissection), adjuvant chemotherapy and possible radiation therapy. Chemotherapy is directed towards the sarcomatous elements of the tumor<sup>[3]</sup>. Hormonal therapy targeting other receptors (epidermal growth factor receptor) is currently under investigation<sup>[7]</sup>.

The 5-year survival rate is 40%, and prognosis depends on the grade of the sarcomatous component, tumor size (better prognosis if tumor < 4 cm), and presence or absence of lymph node metastasis<sup>[3,5]</sup>. The

overall prognosis is worse and the rate of recurrence is higher compared to invasive ductal or invasive lobular carcinoma. The presence of skin invasion, squamous cell carcinoma in the examined lymph nodes, and young age at presentation, indicate poorer outcome, irrelevant to the subtype of tumor<sup>[3]</sup>.

## Conclusion

Metaplastic breast carcinomas are rare and show no specific or distinctive imaging findings. Nonetheless, they should be considered in the differential diagnosis of a rapidly growing palpable mass in a perimenopausal woman, that is partially spiculated on mammogram, microlobulated on ultrasound with complex echogenicity and cystic areas, and exhibit hyper-intense signal on T2 weighted MRI. Histopathologic examination and immunocytochemistry are the mainstay of diagnosis.

## Acknowledgment

I would like to thank Dr. Najlaa BinMahfouz for providing the pathology images and descriptions.

## Conflict of Interest

The author has no conflict of interest.

## Disclosure

The author did not received any type of commercial support either in forms of compensation or financial for this study. The author has no financial interest in any of the products or devices, or drugs mentioned in this article.

## Ethical Approval

Obtained.

## References

- [1] Leddy R, Irshad A, Rumboldt T, Cluver A, Campbell A, Ackerman S. Review of metaplastic carcinoma of the breast: imaging findings and pathologic features. *J Clin Imaging Sci* 2012; 2: 21.
- [2] Choi BB, Shu KS. Metaplastic carcinoma of the breast: multimodality imaging and histopathologic assessment. *Acta Radiologica* 2012; 53(1): 5-11.
- [3] Günhan-Bilgen I, Memiş A, Ustün EE, Zekioglu O, Ozdemir N. Metaplastic carcinoma of the breast: clinical, mammographic, and sonographic findings with histopathologic correlation. *AJR Am J Roentgenol* 2002; 178(6): 1421-1425.

Right Breast Metaplastic Carcinoma with Chondroid Differentiation (Chondrosarcoma)  
*A.S. Binmahfouz*

- [4] Knipe H, Kruger G, et al. Metaplastic breast carcinoma. Accessed <<http://radiopaedia.org/articles/metaplastic-breast-carcinoma>>.
- [5] Greenberg D, McIntyre H, Bierre T. Metaplastic breast cancer: case report. *Australas Radiol* 2004; 48(2): 243-247.
- [6] Velasco M, Santamaría G, Ganau S, Farrús B, Zanón G, Romagosa C, Fernández PL. MRI of metaplastic carcinoma of the breast. *AJR Am J Roentgenol* 2005; 184(4): 1274-1278.
- [7] Shah DR, Tseng WH, Martinez SR. Treatment options for metaplastic breast cancer. *ISRN Oncol* 2012;2012: 706162.

## تقرير عن حالة سرطان الثدي الحوولي مع تمايز شبه غضروفي (سرطان غضروفي) في الثدي الأيمن

علياء بن محفوظ

قسم الأشعة، كلية الطب، جامعة الملك عبد العزيز  
جدة - المملكة العربية السعودية

**المستخلص.** نستعرض في هذا التقرير حالة مريضة تبلغ من العمر اثنين وأربعين عاماً، تشتكي من ورم في الثدي الأيمن خلال الشهرين الماضيين. الفحص الطبي كشف عن وجود كتلة. بعد عملية استئصال الورم والفحص المجهرى، شخصت بورم سرطاني نادر في الثدي، يسمى بسرطان الثدي الحوولي مع تمايز شبه غضروفي، وهو ورم خبيث تتحول فيه خلايا الثدي من نسيج الثدي الطبيعي الى خلايا سرطانية، ومن ثم تتحول الى خلايا غضروفية سرطانية. تلقت المريضة علاج اشعاعي وعلاج كيميائي وهي تتابع حالياً مع الطبيب المعالج في العيادات الخارجية. يعد هذا النوع من السرطان نادر جداً حيث يشكل أقل من ٥٪ من أنواع سرطان الثدي، وقد سجلت الإحصائيات ثمانية حالات مشابهة على مستوى العالم حتى الآن. كما نناقش هنا وسائل تشخيص هذا الورم باستخدام صورة الثدي الشعاعية، الأشعة فوق الصوتية، والتصوير بالرنين المغناطيسي.