# Metaplastic carcinoma of the breast: report of two cases in clinical, mammographic, and sonographic findings with histopathological correlation

# มะเร็งเต้านมชนิดเมตาพลาสติก : รายงานผู้ป่วย 2 รายในทางคลินิก, แมมโมแกรม, คลื่นเสียงความถี่สูง และ พยาธิวิทยา


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## ABSTRACT

Metaplastic breast carcinoma is a very rare breast malignancy. It regards as ductal carcinomas that undergo metaplasia into nonglandular mesenchymal tissue, consisting with squamous, spindle cell, chondroid (cartilaginous) or osseous differentiation. The clinical presentation is usually a palpable mass. Axillary lymph node metastasis is infrequent. No specific mammographic features are found. The mass often shows high density. The borders vary from well-circumscribed to speculated margins. Associated microcalcifications are uncommon. On sonographic examination, complex echogenicity with solid and cystic components may be seen and is highly suggestive of metaplastic breast carcinoma. It relates to necrosis and cystic degeneration found histopathologically. Excisional biopsy is preferred for tissue diagnosis because aspiration cytology or core-needle biopsy may miss the metaplastic component.

มะเร็งเต้านมชนิดเมตาพลาสติก เป็นมะเร็งที่พบได้น้อยมาก เกิดจากการเปลี่ยนแปลงของ Ductal carcinoma เป็นชนิด squamous, spindle cell, chondroid (cartilaginous) หรือ osseous ผู้ป่วยมักคลำพบก้อนที่เต้านม ไม่ค่อยพบการกระจายไปที่ต่อมน้ำเหลืองที่รักแร้ ก้อนที่พบในแมมโมแกรมไม่มีลักษณะเฉพาะ มักเป็นก้อนที่มีความทึบรังสีกว่าเนื้อเต้านม ขอบเขตอาจเรียบหรือไม่ก็ได้ มักไม่มีหินปูนอยู่ภายในก้อน ลักษณะก้อนที่พบจากคลื่นเสียงความถี่สูงมักเป็นก้อนเนื้อที่มีส่วนที่เป็นน้ำเนื่องจากเนื้อตาย การวินิจฉัยทางพยาธิวิทยาจำเป็นต้องได้ชิ้นเนื้อมากพอ ได้แก่ การทำ excisional biopsy เนื่องจากการเจาะตรวจอาจไม่ได้ส่วนที่เป็น metaplasia

## INTRODUCTION

Metaplasia is a process in which glandular epithelium differentiates into nonglandular mesenchymal tissue. [1] Metaplastic carcinoma of the breast is an overt infiltrating ductal carcinoma with extensive squamous differentiation and/or spindle cell proliferation, chondroid (cartilaginous) or osseous heterologous elements. [2] It is a very rare breast neoplasm accounting for less than 1 % of all breast malignancies. [2] Differentiating metaplastic breast carcinoma from breast sarcoma is important because the natural history, surgical treatment, chemotherapy regimen and prognosis differ. [3] To our knowledge, according to the rarity of this type of breast neoplasm, little has been reported on the radiologic findings in metaplastic carcinoma, especially the sonographic findings. [1, 3-7]

The purpose of this study was to describe the mammographic and sonographic findings of metaplastic carcinoma of the breast and to correlate the radiologic features with clinical and histopathologic findings.

## MATERIALS AND METHODS

A retrospective review of the pathological data of 3,531 histopathologically proven breast cancer cases diagnosed at Ramathibodi hospital during January 1992 to September 2004 revealed 6 cases of metaplastic carcinoma. Three cases were excluded from the study because no imaging was obtained. Another case was excluded because the mammogram was destroyed. The history, physical examination, mammographic and sonographic findings were reviewed for the remaining two cases.

Mammography by routine craniocaudal and mediolateral oblique views was performed including spot compression magnification view to verify the lesion. Our breast diagnostic center has two mammographic machines, Lorad M-IV (TREX Medical corporation, Lorad division, Danbury, CT, U.S.A.) and Sonographe DMR+ (General electric medical systems, Waukesha, WI, U.S.A.) The mammograms were retrospectively reviewed by three radiologists who were specialists in breast imaging. The evaluation was performed as consensus interpretations.

Each mammographic lesion was characterized according to size (measured as the maximum dimension on mammogram), mass characteristics (shape, margin, density and location), presence and type of microcalcifications, architectural distortion and other associated findings present such as skin change or nipple retraction. Breast compositions were categorized as almost entirely fat, scattered fibroglandular densities, heterogeneously dense and extremely dense using the American College of Radiology's Breast Imaging Reporting and Data System (BI-RADS) [8]

Sonography was performed with high-resolution (Linear array L12-5 50 mm.) sonographic equipment (HDI 5000; Philips ultrasound, Bothell, WA, U.S.A.). The sonographic films of each patient were reviewed after the mammograms and were assessed for lesion shape, margin, echogenicity and

posterior acoustic patterns.

Microscopic slides of the patients were reviewed by a pathologist who was breast pathology specialist. The specific metaplastic components were identified.

## CASE REPORT

### *Case 1*

A 54-year-old postmenopausal woman presented with a 4-cm mass in the right axilla for 3 weeks. An excisional biopsy was done at a community hospital. The pathology disclosed metastatic carcinoma. She was referred to Ramathibodi Hospital for further management. No family history of breast cancer was existed. No palpable mass was detected on the physical examination. The mammogram revealed a 1.4-cm, lobular mass with partially indistinct border located at the lower-inner quadrant of the right breast. It had high density compared to the glandular tissue. (Figure 1a, b and c) No microcalcification, architectural distortion or skin change was associated. The breast composition was heterogeneously dense. On ultrasound, this mass appeared as a circumscribed, lobular hypoechoic mass with small internal cystic space. Mild posterior acoustic enhancement was noted. (Figure 2)

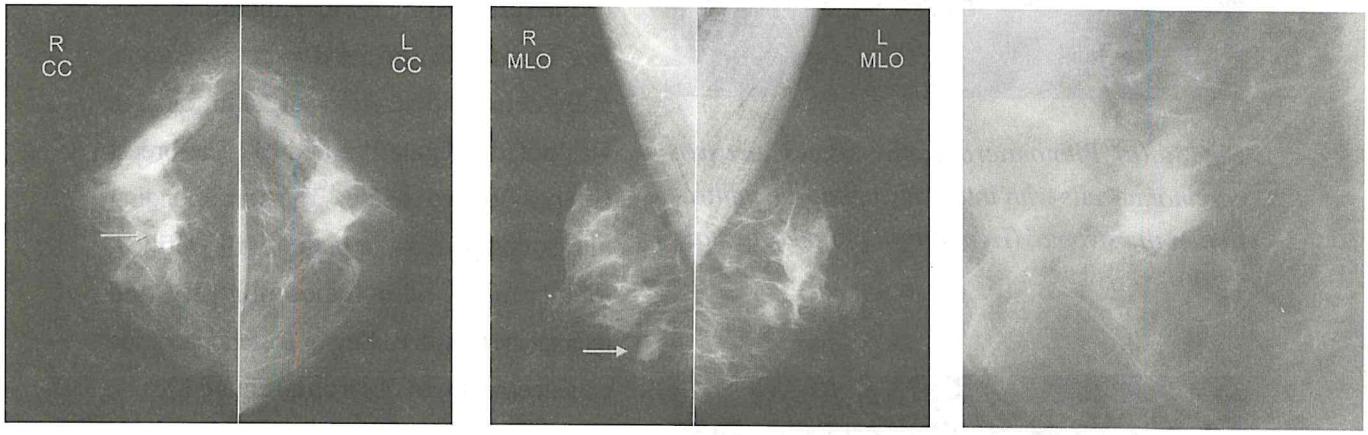



***Fig 1:*** *Mammography in (a) craniocaudal, (b) mediolateral oblique and (c) spot compression magnification views demonstrate a 1.4-cm, high-density, lobular mass with partially indistinct border at the lower-inner quadrant of the right breast (arrows)*

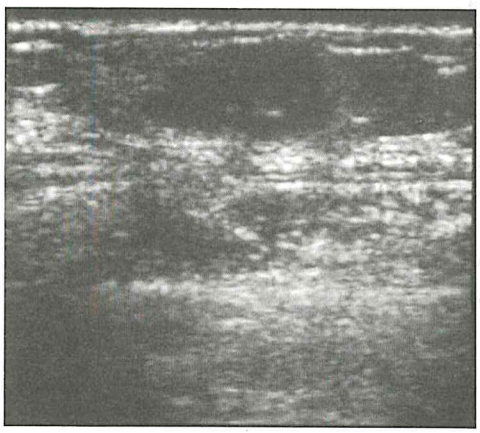


***Fig 2:*** *Sonography shows a circumscribed, lobular hypoechoic mass with small internal cystic spaces.*

Core needle biopsy using a 14-gauge needle was performed under ultrasound guidance. The pathology was carcinoma with squamous metaplasia. (Figure 3 a and b) Definite surgical treatment was planned, but the patient lost follow-up since December 2000.

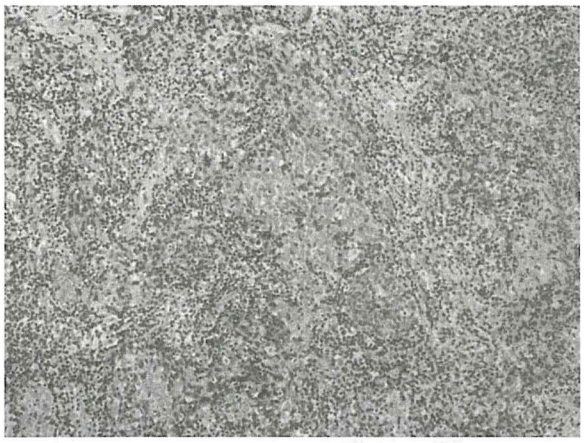
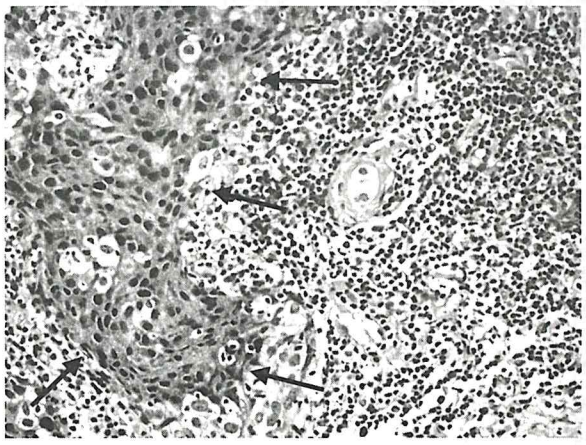


***Fig 3:*** *(a) Photomicrography shows invasive carcinoma cells with intense lymphocytic infiltration in the stroma. (Hematoxylin and eosin stain x 100).*



*(b) There is nest of squamous metaplastic cells (area within the arrows) (Hematoxylin and eosin stain x 200)*

***Case 2***

A 43-year-old female presented with a rapidly growing lump in her left breast for 1 month. She was surgically menopausal after total hysterectomy due to myoma uteri 4 years ago. No family history of breast cancer was noted. Physical examination revealed a 4-cm circumscribed, moveable mass with smooth surface and firm consistency at the upper-outer quadrant of the left breast. There was a 2-cm moveable left axillary lymph node as well. Mammogram showed a round, high-density mass with indistinct border at the upper-outer quadrant of the left breast. Its maximum diameter was 4.5 cm. No associated microcalcification, architectural distortion or skin change was noted. (Figure 4 a and b) The breast composition was dense. The corresponding ultrasound revealed a partially ill–defined, lobular mass with hypoechogenity and internal cystic space. Strong posterior acoustic enhancement was observed. (Figure 5)

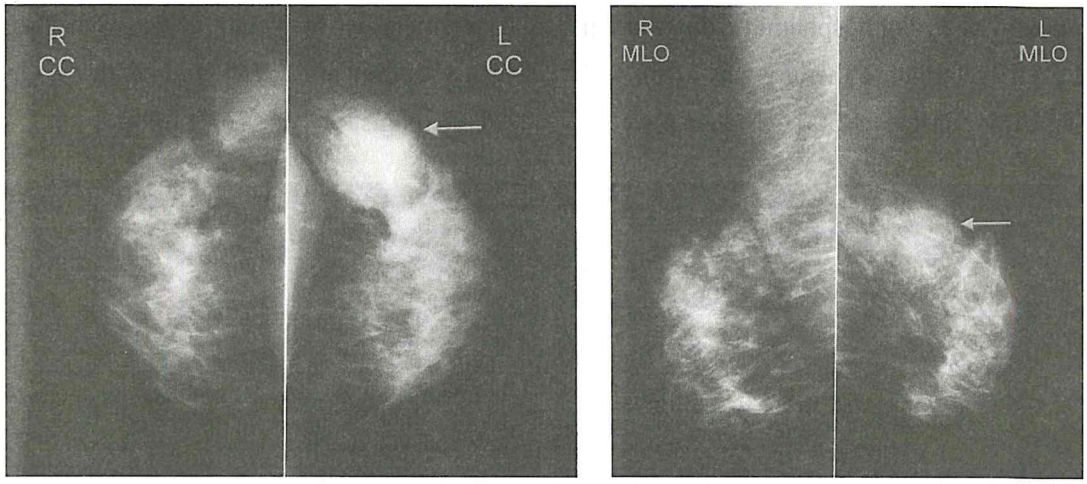



***Fig 4:*** *Mammography in (a) craniocaudal and (b) mediolateral oblique views show a 4.5-cm, high-density mass with indistinct border at the upper-outer quadrant of the left breast (arrows)*

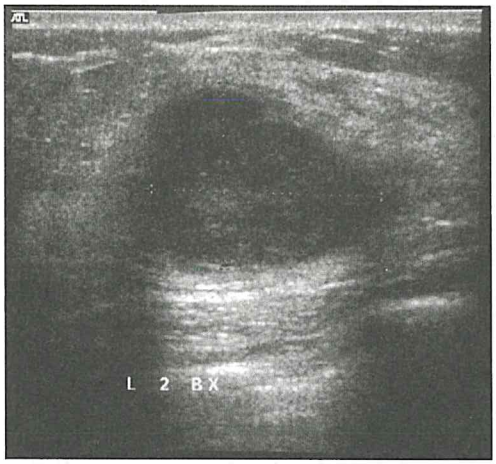



***Fig 5:*** *The corresponding sonogram reveals a partially ill-defined lobular mass with hypoechogenicity and internal cystic spaces.*

The patient was undergone core needle biopsy under ultrasound guidance. The initial pathology reported medullary carcinoma. No distant metastasis was detected. Modified radical mastectomy was performed, followed by immediate breast reconstruction using transverse rectus abdominis muscle flap. The final pathology was invasive ductal carcinoma grade III with two components of metaplasia, which were cartilaginous and spindle cell. (Figure 6 a, b and c) The pathological tumor size was 4.5 cm. Deep surgical margin was 2 mm. One of eleven axillary lymph nodes contained metastatic foci. Estrogen and progesterone receptors including HER 2/neu were negative. Adjuvant chemotherapy was started. The regimen

composed of cyclophosphamide, doxorubicin and 5-FU. Radiation therapy was given with a total tumor dose of 4,500 cGy over 6 weeks. The patient was well and no recurrent disease was noted on her last follow-up with the medical oncologist on 30th August 2004.

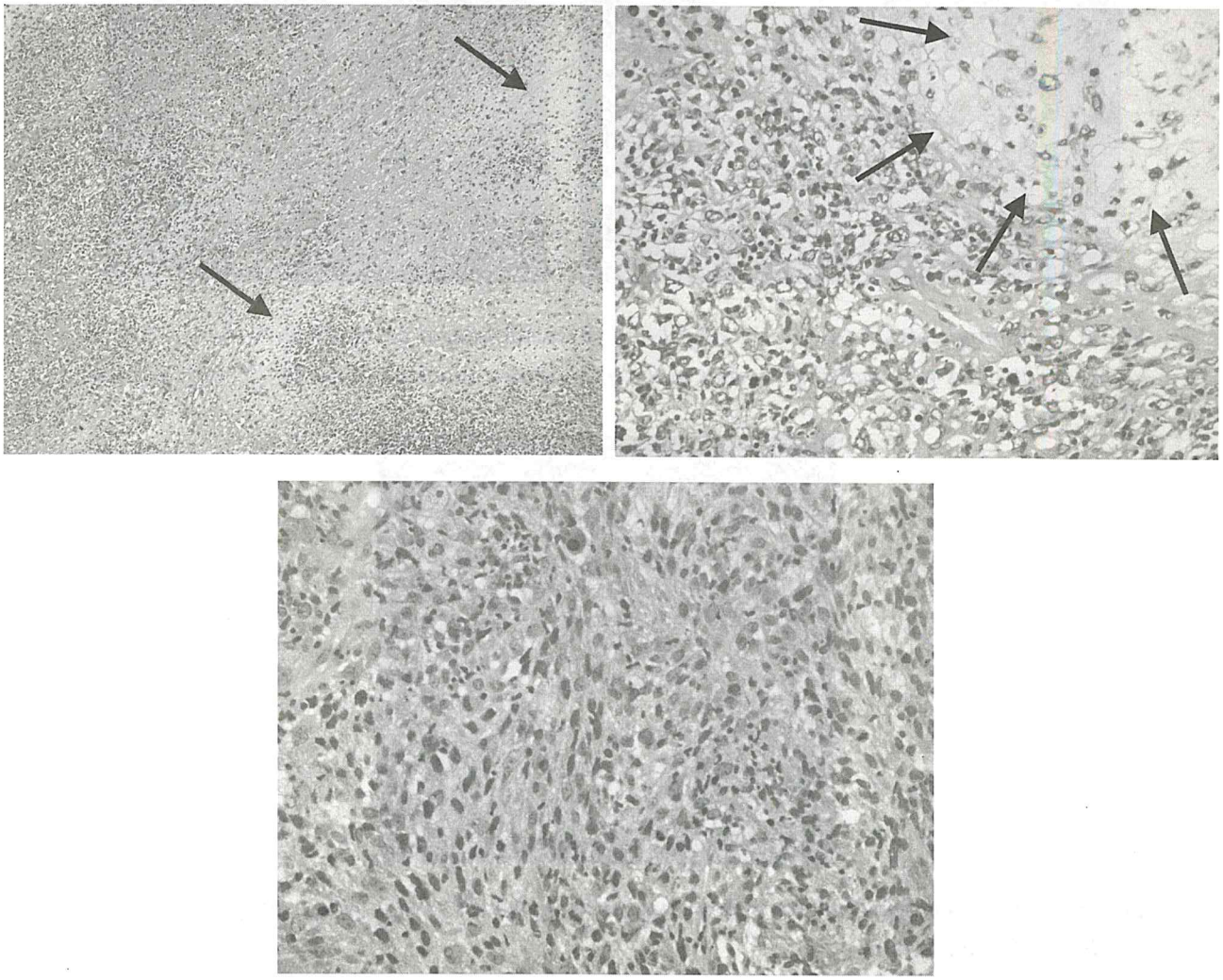


***Fig 6:*** *(a) The photomicrograph shows invasive carcinoma cells admixture with cartilaginous tissue (arrows) (Hematoxylin and eosin stain x 40)*

## DISCUSSION

Metaplasia is defined as the transformation of one form of tissue into another form. [3] Metaplastic breast carcinomas are regarded as ductal carcinomas that undergo metaplasia into nonglandular mesenchymal tissue. [1,3] The contributing factor in this process is not well understood. [5] The degree of differentiation varies from small foci to complete glandular replacement. [3,5] Associated ductal carcinoma in situ might be present in 50% of cases. [5] The

morphologies of metaplastic breast carcinomas are heterogeneous, consisting with ductal adenocarcinoma with squamous differentiation, a spindle-cell pattern of growth, and/or heterologous mesenchymal elements. [1-5] The most frequently encountered subtype reported in literatures is squamous metaplasia. [3] Bellino et al. [9] reported eleven cases of metaplastic breast carcinomas. Six cases showed chondroid metaplasia, three cases were spindle cell carcinoma and two cases were metaplastic squamous carcinoma. The six cases treated in Ramathibodi hospital consisted of 4 cases of squamaous metaplasia, one case of spindle cell type and one case of mixed cartilaginous and spindle cell metaplasia.

Clinically, metaplastic carcinomas are usually seen in women with a median age of 50 years old. [1, 10-13] The age of our patients were 54 and 43 years old. The presenting symptom is usually a palpable mass [1-3, 5], which is rapidly growing. [2,3] The size of the lesions range from 1.6-18 cm. [3,5, 11-13] The median size is about 3-4 cm. [3,5,11-13] Axillary lymph node metastasis is infrequent, not exceeding 25-30%. [1,3,9] An exception is the series of Chao et al. [11], which reports seven out of fourteen patients (50%) had axillary lymph node metastases at the time of diagnosis. Nodal metastases are not as commonly seen with metaplastic breast carcinomas as with non-metaplastic carcinomas of the same size but are definitely more common with metaplastic breast carcinomas than with sarcomas. [3,4] Both patients in our series had axillary lymph node metastases. However, the number of our patients is too few to accurately determine the frequency of lymph node involvement.

The mammographic appearance of metaplastic breast carcinoma has been described in case reports or in small series [1,3-5,7] There are no known specific radiological features. [1,5] The density of the mass is usually high compared to the surrounding glandular tissue. [1,3] The masses in our series also showed high density. The borders vary from well-circumscribed to spiculated margins. [1,3-7] Most studies do not find associated microcalcifications [1,3,5] and architectural distortion. [1,4,5,6] However, Park et al. [3] finds a high rate of associated architectural distortion. Gunhan-Bilgen et al. [1] concludes that a high-density mass without associated microcalcifications might be useful in suggesting the diagnosis.

On sonographic examination, many studies describe the complex internal echogenicity with solid and cystic components, which was consistent with necrosis and cystic degeneration on pathologic examination. [1,2,3,5] Our two cases showed internal cystic spaces as well. We suggested that metaplastic carcinoma, although a rare tumor, should be considered in the differential diagnosis of breast masses with solid and cystic components.

The diagnosis of metaplastic breast carcinoma may be made with aspiration cytology or core-needle biopsy, but excisional biopsy is preferred because diagnostic errors resulting from inadequate samples are avoided, especially in cases of associated necrosis or

hemorrhage. [1-4,7] In one case of our series, the patient was initially diagnosed with medullary carcinoma from core-needle biopsy. It might be explained by the sampling tissue retrieved only the epithelial part. Several studies stated that the distinction between metaplastic breast cancer and sarcoma is important because the surgical treatment, chemotherapy regimens, and metastatic pathways are different. [1,4,6]

The determination of prognosis for metaplastic breast carcinoma is limited by the uncommon occurrence of this cancer. [1,5] Survival most likely depends on tumor size, histologic type, grade, lymph node status, and perhaps depends on the type and grade of the mesenchymal component. [1,5,6,10,11]

In conclusion, metaplastic carcinoma of the breast is a rare breast malignancy. It usually manifests as a mass on the physical examination and imaging studies. No pathognomonic mammographic feature is noted. Complex echogenicity with solid and cystic components may be seen sonographically and is highly suggestive of metaplastic breast carcinoma. It relates to necrosis and cystic degeneration found histopathologically.

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