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Solitary Pancreatic Metastasis From Breast Matrix-Producing Carcinoma: A First Case Report

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Introduction: Breast matrix-producing carcinoma (MPC) is a rare histologic type. Pancreatic metastases from breast cancers are also rare. We report the first case of solitary pancreatic metastasis from breast MPC, treated with distal pancreatectomy.

Case presentation: A 56-year-old woman presented with a 56-mm mass in her right breast and a swollen right axillary lymph node. Both lesions had characteristic early ring enhancement on dynamic magnetic resonance imaging (MRI). Tumor biopsy revealed MPC. She underwent total mastectomy and axillary clearance. On histopathologic examination, the tumor was composed of extracellular matrix with areas of osseous and chondroid differentiation without spindle cells or osteoclasts, surrounded by a dense population of glandular epithelial tumor cells. On immunohistochemical analysis, the tumor cells were positive for AE1/AE3 and cytokeratin 5/6. The final diagnosis was breast MPC with axillary metastasis. Two years later, dynamic MRI displayed a mass in the pancreatic body with early ring enhancement, suspicious for solitary breast MPC metastasis. Distal pancreatectomy was performed. Histopathologic examination revealed bone and cartilaginous matrix with necrosis, surrounded by pleomorphic sarcomatous tumor cells. Tumor cells showed less cytokeratin positivity than the primary breast lesion. These findings were compatible with breast MPC metastasis.

Conclusion: Solitary pancreatic metastasis from breast MPC has not yet been reported. Surgical resection of malignant pancreatic metastases is controversial; however, considering that breast MPC has limited responsiveness to radiotherapy and chemotherapy, curative resection would be important in this case. The histopathologic features of MPC may reflect enhancement and calcification on radiologic studies.

Key words: Metastasectomy – Matrix-producing carcinoma – Metaplastic carcinoma – Breast cancer

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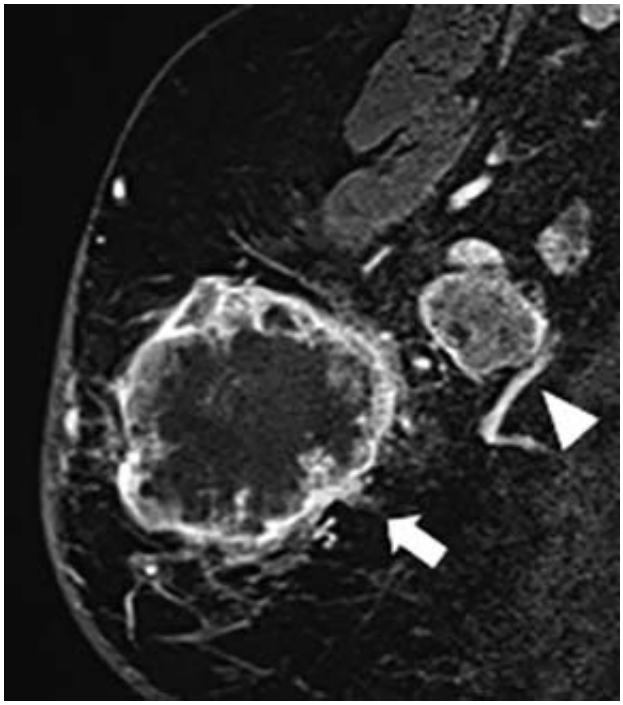

Fig. 1 Sagittal dynamic MRI images of the breast. Dynamic MRI of the breast tumor. Both the mass (arrow) and the axillary lymph node (arrowhead) were found to have characteristic irregular, spiculated margins and early ring enhancement.

Background

Metaplastic carcinoma of the breast (MCB) is an uncommon histologic subtype, accounting for less than 5% of breast cancer cases.[1–3] Wargotz *et al* classified MCB into 5 subtypes. In this classification, matrix-producing carcinoma (MPC) is one subtype characterized by mesenchymal elements showing an abrupt transition from the epithelial to mesenchymal components without the presence of intervening spindle cells.[4] Compared with invasive ductal carcinoma of the breast, patients with MCB have a poor prognosis.[5,6] Moreover, MPC is reported to have a worse prognosis than the MCB subtypes.[7]

Here, we present the case of a patient with solitary pancreatic metastasis from breast MPC treated with distal pancreatectomy. This is the first report of such a case.

Case Presentation

A 56-year-old woman was found to have a 56-mm mass in her right breast and a swollen right axillary lymph node. Both the mass and the lymph node had

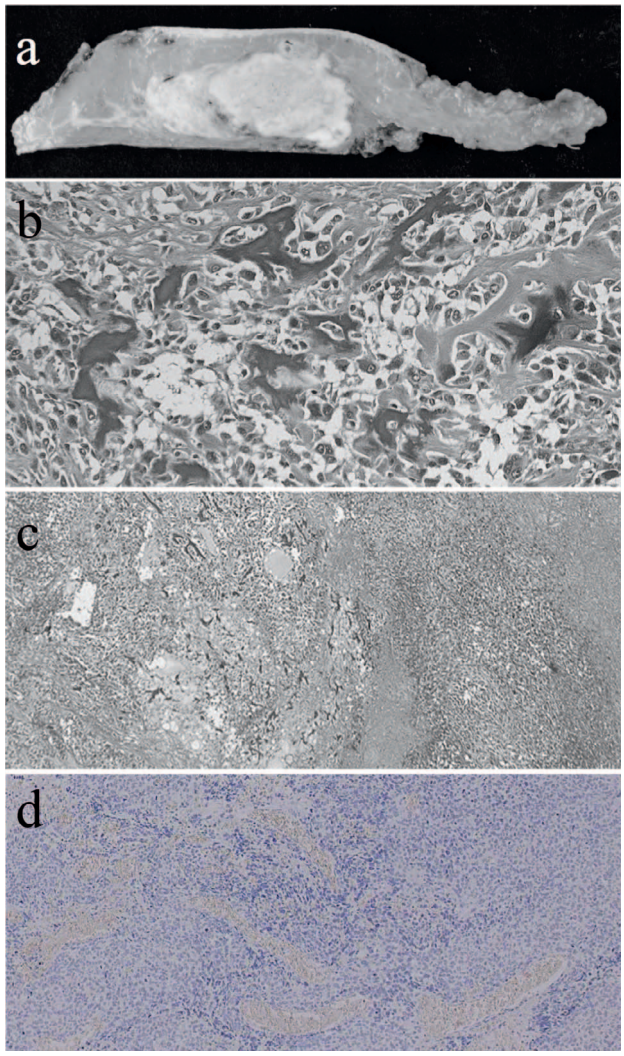

Fig. 2 Macroscopic and histopathologic findings of the breast tumor. (a) Macroscopic findings. The size of the tumor was 56 × 35 mm. (b) Histopathologic analysis showed the tumor to be composed of extracellular matrix containing osseous and chondroid differentiation without spindle cells or osteoclasts. (c) The matrix (left of the image) was surrounded by a dense population of glandular epithelial tumor cells (right). (d) The glandular epithelial tumor cells were positive for cytokeratin 5/6.

characteristic irregular shapes, spiculated margins, and early ring enhancement on dynamic magnetic resonance imaging (MRI) (Fig. 1). Biopsy showed MPC. She underwent total mastectomy and axillary lymph node clearance. On histopathologic examination, the tumor was composed of extracellular matrix containing osseous and chondroid differentiation without spindle cells or osteoclasts. This matrix was surrounded by a dense population of glandular epithelial tumor cells (Fig. 2a–c). On

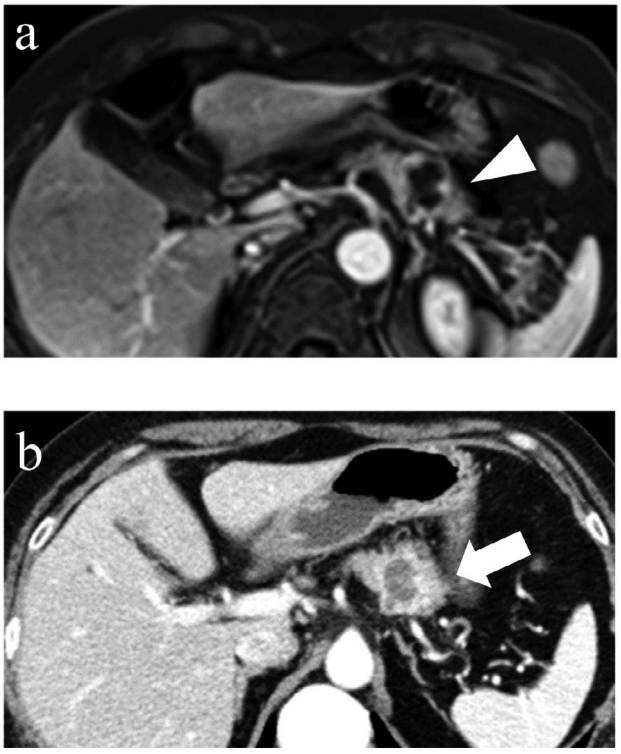

Fig. 3 Preoperative imaging study of the pancreatic tumor. (a) Abdominal MRI displayed a mass in the body of the pancreas (white arrowhead) with early ring enhancement, similar to the primary breast tumor. (b) Abdominal computed tomography revealed an irregular mass (white arrow) with small calcifications and ring enhancement.

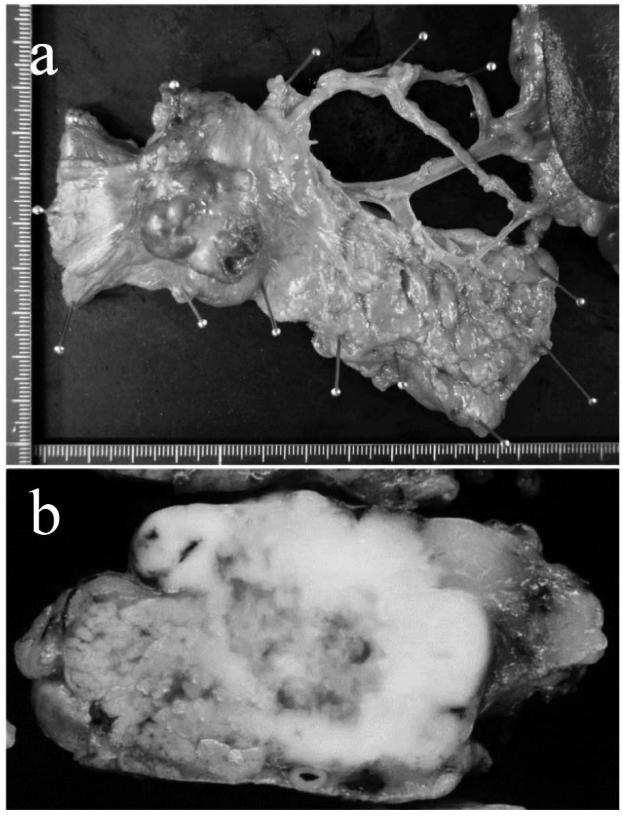

Fig. 4 Macroscopic finding of the pancreatic tumor. (a) Resected specimen. The size of the tumor was 22 × 30 mm. (b) Cross-section of the tumor. Necrotic and hemorrhagic contents were surrounded by white, firm tissue.

immunochemical analysis, the tumor cells were negative for estrogen receptor (ER), progesterone receptor (PR), and HER2, and positive for AE1/AE3 and cytokeratin 5/6 (Fig. 2d). The final diagnosis was breast MPC with axillary metastasis. She underwent adjuvant chemotherapy (FEC100: 5-fluorouracil 500 mg/m^2, epirubicin 100 mg/m^2, cyclophosphamide 500 mg/m^2; 4 cycles of docetaxel 100 mg/m^2 [1 hour, q3w]).

Two years later, positron emission tomography indicated strong uptake only by a mass in the pancreatic body. Abdominal MRI displayed a mass in the body of the pancreas with early ring enhancement, similar to the breast MPC (Fig. 3a). Abdominal contrast-enhanced ultrasonography and computed tomography revealed an irregular hypoechoic mass with small calcifications and mild ring enhancement in the arterial phase (Fig. 3b). Solitary metastasis from the breast MPC was suspected, and distal pancreatectomy was performed, during which 1 firm infiltrative tumor was found in the body of the pancreas; no other metastasis or tumor dissemination was detected (Fig. 4). Histopathologic examination revealed bone and cartilaginous matrix with necrosis, surrounded by pleomorphic sarcomatous tumor cells (Fig. 5), which were negative for ER, PR, and HER2, and less cytokeratin positivity than the primary tumor. These findings were compatible with metastasis from the breast MPC.

After complete resection, we discussed the use of secondary adjuvant chemotherapy. Considering that this recurrence developed following the first adjuvant chemotherapy and that there was no obvious evidence for chemotherapy use with this type of tumor, we decided not to perform additional chemotherapy. Two years after the second surgery, no recurrence has been detected.

Discussion

In this case, the metastatic lesion showed ring enhancement and calcification, similar to the primary tumor. These characteristic features can be explained

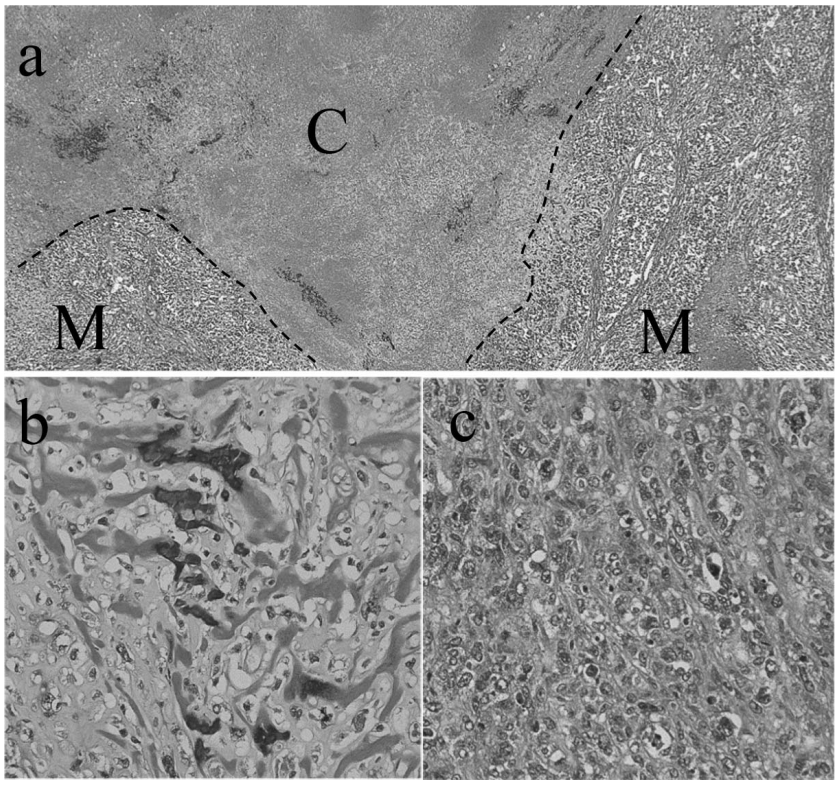

Fig. 5 Histopathologic examination of the pancreatic tumor. (a) Low-power view. The dotted line represents the border line between the central zone and the marginal zone. C, central zone; M, marginal zone. (b) Bone and cartilaginous matrix undergoing necrosis was present in the central part of the tumor. (c) In the marginal zone of the tumor, a dense population of pleomorphic sarcomatous tumor cells were present.

on the basis of the histologic findings. The peripheral zone of the tumor was composed of densely populated tumor cells. However, the central zone contained abundant stromal collagen and cartilaginous matrix undergoing necrosis. These histologic patterns resulted in sharp rim enhancement and atypical calcifications in the center of the tumor.

These radiologic features were similar to the features described in previous reports,[1,3] thus preoperative diagnosis for this patient was relatively easy. Regarding ring enhancement, there are other potential diagnoses, such as adenosquamous carcinoma of the pancreas, neuroendocrine tumor, and focal autoimmune pancreatitis.[8–10] These diagnoses had to be considered prior to surgical intervention.

Malignant metastases to the pancreas are uncommon. Hence, it may be difficult to acquire strong evidence demonstrating what patients would show survival benefit from pancreatic metastasectomy. The most common cancers reported to metastasize to the pancreas include renal cell cancer, colon cancer, melanoma, sarcoma, breast, and lung cancer.[11] Among these types of cancer, there is better evidence for the utility of pancreatic metastasectomy for renal cell carcinoma. In patients with breast cancer, the best candidates for surgery are patients with no evidence of additional metastatic disease, good performance status, and a long disease-free interval after treatment.[12]

Breast MPC is a rare histologic type, and solitary pancreatic metastasis from breast MPC has not yet been reported in the literature. Hence, there is no direct evidence to support the role of pancreatic metastasectomy in this patient. However, considering that breast MPC has limited responsiveness to radiotherapy and chemotherapy,[5] curative resection could be an appropriate treatment option in this case.

Conclusion

In conclusion, solitary pancreatic metastasis of MPC is extremely rare. Considering that breast MPC has limited responsiveness to radiotherapy and chemotherapy, curative surgical resection for solitary metastasis could be beneficial with close observation. The histopathologic arrangements of the tumor cells may reflect characteristic ring enhancement and calcification on radiologic studies.

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