Gastric Tumor from Metastasis of Breast Cancer

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Abstract. Metastatic tumours of the stomach have been reported to result from various types of cancer. Among them, gastric metastasis from breast cancer has been recognised in 0.3-18% patients (1-4). Here, a rare case of metastatic gastric tumour derived from breast carcinoma is reported. Gastric endoscopy confirmed a large, friable mass (approximately 5 cm in diameter) in the upper part of the gastric body. The mass within the stomach was difficult to distinguish from primary gastric cancer, although biopsies of this lesion revealed the characteristics of adenocarcinoma. In addition, immunohistochemistry showed the positive expression of mammaglobin. Taken together, the evidence pointed to metastasis of breast cancer to the stomach. The patient was treated with hormonal therapy (letrozole), and the size of the metastasis in the stomach was markedly reduced. Therefore, a gastric metastasis from breast cancer was diagnosed successfully using immunohistochemistry and unnecessary surgery was avoided. In conclusion, although gastric metastatic tumours derived from breast carcinoma are rare, their accurate pre-operative diagnosis and appropriate systemic treatment is essential.

Metastatic cancer to the stomach is uncommon. The most frequently reported primary tumours include lung and breast cancer, as well as malignant melanoma (1-4). Metastases are more common in the gastric body and fundus and usually occur singularly rather than as multiple metastases. Diagnosis can be difficult as the tumour-free interval is often prolonged and benign lesions commonly appear. Gastric metastasis from breast cancer has been recognised in 0.3-18% patients (5-12).

Therefore, the discovery of a gastric tumour in a patient with a history of breast cancer is more likely to be a primary gastric lesion, but a metastasis from the breast cancer is possible and must not be ruled out. Differential diagnosis between the two tumours is essential for ensuring correct treatment and avoiding unnecessary surgery.

Recently, several immunohistochemical markers have become available for the diagnosis of metastatic breast carcinoma including oestrogen receptor (ER) (13), progesterone receptor (PR) (13) and gross cystic disease fluid protein (GCD FP-15) (14, 15). These are valuable diagnostic tools, but there is a need to further improve the sensitivity and specificity of the existing panel of breast carcinoma markers. Additionally, the lack of organ specificity of these breast carcinoma markers further demonstrates the need for new markers in the diagnosis of metastatic breast cancer.

Mammaglobin gene sequence fragments were first isolated in 1994 by Watson and Fleming (16) using a modified differential display polymerase chain reaction technique. Mammaglobin was originally identified as a breast cancer-restricted biomarker by differential screening, and subsequent studies have focused on further elucidating its function and expression profile (17-22). Furthermore, a recent study showed that mammaglobin is a valuable diagnostic marker for metastatic carcinoma of breast origin (15, 23).

This report presents a case that was diagnosed as a gastric tumour from metastasis of breast cancer using immunohistochemistry, in which unnecessary surgery was thus avoided.

Case Report

An 80-year-old woman was diagnosed with infiltrating ductal carcinoma of the left breast (pT2N2M0) and underwent a modified radical mastectomy in November 2007, followed by six courses of paclitaxel. In 2008, brain metastases were identified in the patient and she was treated with partial resection of the brain. Four months later, she suffered from abdominal pain. Her haematocrit level, urinalysis, chest and abdominal films, and liver function tests were all within the normal limits. However, an abdominal CT scan showed a well-defined, heterogeneous mass located in the upper part of the gastric body (Figure 1). Gastric endoscopy confirmed a large polypoid and friable mass that was bleeding and measured approximately 5 cm in diameter (Figure 2A). It was
unclear whether the mass within the stomach was a metastatic tumour from breast cancer or a primary gastric cancer, although biopsies of the lesion revealed the characteristics of adenocarcinoma (Figure 3A). Hence, immunohistochemistry using the strepavidin-avidin-biotin technique was performed with the following antibodies: oestrogen receptor protein (ER) (dilution 1:100; DAKO), progesterone receptor protein (PR) (dilution 1:100; DAKO), and mammaglobin (dilution 1:100; DAKO). Staining intensity used a four-point scale with signal intensity graded as 0 (negative), 1+ (weak), 2+ (moderate) and 3+ (strong). The proportion of positively stained tumour cells was also recorded. The signal intensity of 1+ was considered positive if ≥10% of the tumour cells were positively stained; ≥2+ signal intensity was considered positive if ≥1% of the tumor cells were positively stained. As a result, immunohistochemistry showed the positive expression of mammaglobin (Figure 3B) and the weak positive expression of the oestrogen and progesterone receptors (data not shown).

Consequently, histological and immunohistochemical analysis of the gastric specimens indicated a metastasis arising from the breast. The patient was considered for further hormonal therapy. One year later, gastric endoscopy showed a shrunken mass (about 3 cm in diameter) (Figure 2B), and the patient had not developed additional metastases.

**Discussion**

The most frequently reported primary tumours include lung and breast cancer, as well as malignant melanoma (1-4). Metastatic cancer to the stomach is uncommon. Among them, breast cancer metastasis to the stomach is relatively rare. The endoscopic findings of such lesions display great variability, including lesions with a benign appearance, diffusely infiltrative lesions, and localised tumour formation with nodules and/or ulceration (5-10). Furthermore, they are more common in the gastric body and fundus and are usually singular rather than multiple metastases (11, 12). Therefore, it is difficult to differentiate between metastatic cancer and primary cancer.

Immunohistochemical studies are useful as differential diagnostic tools. Metastatic breast cancer is usually positive for GCDFP-15, ER, PgR, and mammaglobin. Among them, ER and PgR positivity in gastric biopsies suggests metastasis of breast carcinoma to the stomach, but it should be noted that ER and PgR positivity of weak to moderate intensity has been reported in 32% and 12% of patients with gastric cancer, respectively (9). Since the ER and PgR positivity were weak in the present study, they were not useful for differentiating breast cancer from gastric cancer. Cytoplasmic positivity for mammaglobin is useful for confirming the mammary origin of a tumour since mammaglobin has been shown to have a high sensitivity for breast cancer (23, 24). Furthermore, the expression of GCDFP-15 has also been found to be a sensitive (55-76%) and specific (95-100%) marker for identifying a malignant lesion as metastatic breast cancer. Previous studies have shown that the expression of mammaglobin in lymph node metastases from breast cancer, as well as metastases from other organs, is higher than that of GCDFP-15, but shows lower specificity (15, 23). Therefore, mammaglobin seems to be useful in differentiating breast cancer, although in this study GCDFP-15 was not examined due to its lower specificity.

The metastasis of breast cancer to the stomach represents evidence of systemic disease, and systemic therapy, such as chemotherapy or hormonal therapy, rather than surgical resection is indicated (5). The decision-making process for surgical planning should be based on the clinical presentation and symptoms. The choice of systemic treatment is based on age, presenting symptoms, performance status, and ER and PgR status. In fact, in the present study, the patient was treated with hormonal therapy (letrozole), and the metastasis in the stomach was markedly reduced.

Accordingly, the diagnosis of metastatic breast carcinoma may require histochemical and immunohistochemical, as well as clinical information.

Although gastric tumours derived from metastatic breast carcinoma are rare, their pre-operative diagnosis and appropriate systemic treatment are important.
References


