INTRODUCTION

Gastric metastasis or carcinomatosis from primary breast cancer is a rare phenomenon. It is more prevalent in the invasive lobular type of breast cancer, although the most common histologic subtype of breast cancer is the invasive ductal type (1-4). To date, there are only a few case reports demonstrating that gastric metastases were manifested as an initial presentation of gastric metastasis in a patient without a history of breast cancer. A $^{18}$F-fluorodeoxyglucose positron-emission tomography/computed tomography (FDG PET/CT) which showed increased FDG uptake in the stomach, abdominal mesentery and the right breast, and played pivotal roles in the detection of occult primary breast cancer and a diagnosis of gastric metastasis as an ancillary method for obtaining histological results and immunohistochemical stains.

CASE REPORT

A 57-year-old woman was admitted to our institution with a chief complaint of general weakness and suspicion of gastric malignancy through an outside hospital. She had a non-specific clinical history. A physical examination had no obvious findings according to the medical records. Upper gastrointestinal endoscopy showed a huge depressed-ulcerative lesion covered with whitish exudate at the lower body to the antrum of the stomach. Subsequently, endoscopic biopsy was also performed. Contrast-enhanced abdomen CT revealed diffuse gastric wall thickening, from the esophago-gastric junction to the distal antrum (Fig. 1). A large amount of ascites with nodular thickening of the peritoneum was also observed (Fig. 1). The preliminary histopathologic results of both endoscopic biopsy and peritoneal fluid-aspiration biopsy suggested that metastatic carcinoma is possible. A $^{18}$F-fluorodeoxyglucose positron-emission tomography/computed tomography (FDG PET/CT) was performed to confirm the diagnosis. The FDG PET/CT showed increased FDG uptake in the stomach, abdominal mesentery and the right breast, which suggested the presence of occult primary breast cancer and metastatic gastric cancer as an ancillary method for obtaining histological results and immunohistochemical stains.

Index terms
Breast Cancer
Metastases
Stomach
Positron-Emission Tomography
performed was performed to evaluate the primary malignancy and showed increased FDG uptake in the stomach, abdominal mesentery, and the right breast (Fig. 2). A breast sonography revealed irregular, spiculated and hypoechoic nodules with maximum diameters measuring approximately 24 mm with a surrounding hyperechoic rim in the right upper outer breast.

**Fig. 1.** Contrast-enhanced abdomen CT shows diffuse gastric wall thickening, from the esophago-gastric junction to the distal antrum (arrows), as well as a large amount of ascites.

**Fig. 2.** A 57-year-old woman underwent FDG PET/CT to find a primary malignancy. 
**A, B.** Coronal images of the FDG-PET scan represent increased FDG uptake in the right breast (black arrow), stomach (white arrows), abdominal mesentery, and thoracic vertebral body (arrowheads). 
**C.** Axial images of PET-CT fusion show highlighted pathological FDG uptakes in the stomach (white arrows) and the abdominal mesentery (arrowheads).

Note. FDG PET = $^{18}$F-fluorodeoxyglucose positron-emission tomography

**Fig. 3.** Breast sonography shows irregular spiculated and hypoechoic nodules with maximum diameters measuring approximately 24 mm with a surrounding hyperechoic rim in the right upper outer breast.

**Fig. 4.** A 57-year-old woman underwent sonography-guided breast biopsy for the right breast nodule. 
**A.** Microscopic findings of breast core specimens reveal invasive lobular cancer cells with well-circumscribed signet ring cells as well as cytoplasmic vacuoles and eccentric nuclei (arrows) (H&E, × 100).

**B.** Immunohistochemical staining of breast core specimens shows a positive estrogen receptor result (× 100).
tastases is a lobular type which accounts for only 8% of all breast cancers (2, 3). Generally, the metastatic patterns of lobular and ductal carcinoma of the breast are different, with a higher prevalence in the gastrointestinal system, gynecologic organ, and peritoneum-retroperitoneum metastases for lobular carcinoma (2, 3). In this case study, invasive lobular carcinoma, characterized by gastric endoscopic features of diffuse infiltrative patterns with ulceration, was also observed. Gastric metastasis from breast cancer generally occurs many years after receiving breast cancer treatment. Evidently, the mean interval between the primary diagnosis of breast cancer and GI metastasis was approximately 7 years (3). The stomach may be the first site of presentation of recurrent metastatic disease of breast cancer (4-7). In some cases, it may happen at the time of primary breast cancer diagnosis. Ciulla et al. (8) reported a case of stomach metastasis originating from occult breast lobular cancer, and the immunohistochemical diagnosis was primarily emphasized in order to distinguish gastric metastasis from primary gastric cancer. However, due to the mis-diagnosed endoscopic superficial biopsy, the patient underwent gastrectomy and only after an unnecessary operation was the breast cancer identified as the primary tumor (8). Consequently, the authors suggested an algorithmic use of targeted immunohistochemical markers such as the ER protein, PR protein, gross cystic disease fluid protein (GCDFP)-15, and cytokeratin (CK) 7 to determine the primary site of GI tumors. In general, an immunohistochemical analysis is regarded as helpful in such cases.

**DISCUSSION**

Although breast cancer is the second most common type of primary tumor capable of metastasis to the stomach next to malignant melanoma, gastric metastasis from breast cancer is relatively rare (1). The clinical study series reported that the incidence of gastric metastases among breast cancer patients ranged from 0.3% to 8.0% (1-3). Interestingly, the predominant histologic type of breast cancer with gastrointestinal (GI) metastases is a lobular type which accounts for only 8% of all breast cancers (2, 3). Generally, the metastatic patterns of lobular and ductal carcinoma of the breast are different, with a higher prevalence in the gastrointestinal system, gynecologic organ, and peritoneum-retroperitoneum metastases for lobular carcinoma (2, 3). In this case study, invasive lobular carcinoma, characterized by gastric endoscopic features of diffuse infiltrative patterns with ulceration, was also observed. Gastric metastasis from breast cancer generally occurs many years after receiving breast cancer treatment. Evidently, the mean interval between the primary diagnosis of breast cancer and GI metastasis was approximately 7 years (3). The stomach may be the first site of presentation of recurrent metastatic disease of breast cancer (4-7). In some cases, it may happen at the time of primary breast cancer diagnosis. Ciulla et al. (8) reported a case of stomach metastasis originating from occult breast lobular cancer, and the immunohistochemical diagnosis was primarily emphasized in order to distinguish gastric metastasis from primary gastric cancer. However, due to the mis-diagnosed endoscopic superficial biopsy, the patient underwent gastrectomy and only after an unnecessary operation was the breast cancer identified as the primary tumor (8). Consequently, the authors suggested an algorithmic use of targeted immunohistochemical markers such as the ER protein, PR protein, gross cystic disease fluid protein (GCDFP)-15, and cytokeratin (CK) 7 to determine the primary site of GI tumors. In general, an immunohistochemical analysis is regarded as helpful in such cases.

**Fig. 5.** Endoscopic biopsy was performed for a huge depressed-ulcerative lesion at the lower body of the stomach in a 57-year-old woman. **A.** Microscopic observation of the endoscopic biopsy finds diffuse tumor infiltration (arrows) with signet cells (arrowheads) similar to the primary breast cancer in the gastric stroma with intact mucosa [H&E, × 100]. **B.** Immunohistochemical staining of endoscopic stomach biopsy specimens represents in a positive estrogen receptor result (× 100).
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as the only reliable method capable of distinguishing gastric metastasis from primary gastric cancer (9). Metastatic breast cancer is positive for CK7, GCDFP-15, carcinoembryonic antigen, ER and PR, and it is negative for CK20 (8, 9). Alternatively, ERα expression is also considered as a reliable metric for the diagnosis of gastric metastasis in breast carcinoma (8, 9). In our case, only immunohistochemical markers of ER and PR were used and results showed ER-positive and PR-positive because specific immunohistochemical markers of CK7, GCDFP-15 and CK 20 were not available at our institution. Rather, FDG PET-CT was used as a useful alternative enabling an accurate and fast diagnosis in our case. It also showed a focal hot uptake in the right breast and diffuse, mild uptake in the stomach and abdominal mesentry. Lastly, comparison of microscopic features between endoscopic and breast core biopsy specimens enabled us to distinguish gastric metastasis from primary gastric cancer. Detection of the occult primary tumor is crucially important, since it might help in outlining a proper treatment approach, which in turn, may improve patient prognosis. Occasionally, additional diagnostic work-up, such as examining immunohistochemical markers, can be time consuming and expensive. FDG PET/CT can be an excellent and alternative whole-body imaging modality, allowing for the detection of an unknown primary tumor. However FDG PET/CT has limitations in that it can fail to detect small (< 1.0 cm) and low-grade malignant lesions (10). Moreover, breast cancer is the most common cause of false-negative results in FDG PET/CT for unknown primary tumors, and invasive lobular breast carcinomas have significantly lower FDG uptake compared with invasive ductal breast carcinomas (10). Nevertheless, FDG PET/CT was a valuable tool in the decision to manage our patient with occult primary breast invasive lobular cancer.

In conclusion, stomach metastasis could be the manifestation of occult breast cancer, even in patients without previous breast cancer history. FDG PET/CT might play an important role in the detection of occult primary breast cancer as an ancillary method to immunohistochemical studies.

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위 전이에 의해 발견된 유방의 잠재성 침윤성 소엽암: 증례 보고

김소중 · 정혜경 · 고경희 · 윤정현

유방암의 위 전이는 드물고 이는 유방암의 침윤성 소엽형에서 더 흔하다. 우리는 매우 드물게 유방암 과거력이 없는 환자에서 위 전이로 발견된 유방의 잠재성 침윤성 소엽암 증례를 보고하고자 한다. 위, 장간막, 우측 유방에 증가된 18F-fluorodeoxyglucose 섭취의 소견을 보였던 양전자방출전산화단층촬영술이 병리와 특수 면역조직화학염색 검사의 보조적인 역할로서 잠재성 일차 유방암을 찾고 위 전이를 진단하는 데 중요한 역할을 하였다.

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