Incidental abdominal lymph node metastases from a known breast cancer in resected specimen of invasive pancreatic ductal adenocarcinoma: report of a case

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Abstract

Breast cancer is known to metastasize to all organs of the body. However, abdominal lymph node metastases from breast cancer are extremely rare. We herein report a resected case of an invasive pancreatic ductal adenocarcinoma (PDAC) in which abdominal lymph node metastases from breast cancer were diagnosed. A 54-year-old woman was pointed out to have a tumor in the pancreatic tail with dilatation of the distal pancreatic duct. She had undergone partial mastectomy for left breast cancer at the age of 51 years and had undergone partial liver resection for liver metastasis in the segment 3/4 6 months earlier. Computed tomography revealed a low-density tumor in the pancreatic tail with dilated distal main pancreatic duct. Magnetic resonance imaging (MRI) exhibited a high-intensity tumor in the pancreatic tail in diffusion-weighted images. With a diagnosis of pancreatic cancer, distal pancreatectomy and splenectomy with lymph nodes dissection was performed. Lymph node metastases along the splenic artery were pathologically similar to PDAC. However, lymph node metastases along the left gastric artery, common hepatic artery, celiac axis, and superior mesenteric artery were pathologically similar to breast cancer. Immunohistochemistry staining of abdominal lymph nodes with GATA-3 was positive, which strongly suggested metastatic breast cancer. Although she received chemotherapy with S-1 for breast cancer and PDAC for 4 months, MRI showed multiple liver metastases derived from breast cancer. Finally, she died 12 months after operation.

Keywords Pancreatic ductal adenocarcinoma · Abdominal lymph node metastases · Breast cancer

Abbreviations

PDAC	Pancreatic ductal adenocarcinoma
IHC	Immunohistochemistry
ER	Estrogen receptor
PgR	Progesterone receptor
HER2	Human epithelial growth factor receptor type 2
GATA-3	GATA-binding protein 3
CEA	Carcinoembryonic antigen
CA19-9	Carbohydrate antigen 19-9
DUPAN-2	Duke-Pancreas-2
CT	Computed tomography
MRI	Magnetic resonance imaging
EUS	Endoscopic ultrasound

MPD	Main pancreatic duct
DP	Distal pancreatectomy
UICC	Union for international cancer control
PET	Positron emission tomography

Introduction

Breast cancer is known to metastasize to all organs of the body, especially bone, lung, pleura, liver, and brain [1]. However, abdominal lymph node metastases from breast cancer are extremely rare. There were few reports on abdominal lymph node metastases from breast cancer, and metastatic pathways to abdominal lymph nodes are unclear. We herein report a resected case of an invasive pancreatic ductal adenocarcinoma (PDAC) with abdominal lymph node metastases which were judged to be from breast cancer.

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Case report

A 54-year-old woman was pointed out to have a tumor in the pancreatic tail with dilatation of distal pancreatic duct. She had undergone partial mastectomy for left breast cancer at the age of 51 years, and the pathological diagnosis was invasive ductal carcinoma, scirrhous type. Immunohistochemical (IHC) analyses showed estrogen receptor (ER)-positive, progesterone receptor (PgR)-negative, human epithelial growth factor receptor type 2 (HER2)-negative, and GATA-binding protein 3 (GATA-3)-positive. She underwent radiotherapy, after which chemotherapy consisted of fluorouracil, epirubicin, and cyclophosphamide (FEC) and docetaxel, and hormone therapy were given. At the age of 53 years, a solitary liver metastasis in the segment 3/4 of the liver was pointed out, for which she underwent partial liver resection. Thereafter, she had been given paclitaxel and bevacizumab (PTX + BV). Laboratory data showed slightly increased serum pancreatic

amylase of 213 U/l. Tumor markers were as follows: serum carcinoembryonic antigen (CEA) 6.4 ng/ml; carbohydrate antigen (CA) 19-9 41 U/ml; Duke-Pancreas-2 (DUPAN-2) 100 U/ml. Computed tomography (CT) revealed a low-density tumor in the pancreatic tail in early phase (Fig. 1a) and distal dilatation of the main pancreatic duct (MPD) (Fig. 1b) without lymph node metastasis. Magnetic resonance imaging (MRI) exhibited a high-intensity tumor in the pancreatic tail in diffusion-weighted images (Fig. 1c) with distal dilatation of MPD (Fig. 1d). Endoscopic ultrasound (EUS) showed a low echoic mass in the pancreatic tail with distal dilatation of MPD. EUS-guided fine-needle aspiration was class III. With a diagnosis of pancreatic cancer T1N0M0 clinical stage I, distal pancreatectomy (DP) and splenectomy with lymph nodes dissection was performed (Fig. 2a). The excised specimen showed a tumor in the pancreatic tail with the maximum diameter of 15 mm (Fig. 2b). Pathological examination revealed pancreatic ductal adenocarcinoma (PDAC) with lymph node metastases by adenocarcinoma (Fig. 2c). IHC analyses

Fig. 1 Computed tomography revealed a low-density tumor in the pancreatic tail in early phase (**a**, arrowhead) and a dilated distal pancreatic duct (**b**, arrow). Magnetic resonance imaging exhibited a high-

intensity tumor in the pancreatic tail in diffusion-weighted images (**c**, arrowhead) with distal dilatation of the main pancreatic duct (**d**)

Fig. 2 Distal pancreatectomy and splenectomy with lymph nodes dissection was performed (a). The excised distal pancreas showed a tumor in the pancreatic tail with the maximum diameter of 15 mm (b, arrow). Pathological examination revealed pancreatic ductal adenocarcinoma (c)

revealed ER-negative, PgR-negative, and GATA-3-negative in PDAC. Lymph node metastases along the splenic artery were pathologically similar to PDAC (Fig. 3a), and IHC analyses showed ER-negative, PgR-negative, and GATA-3-weak positive (Fig. 3b). However, lymph node metastases along the left gastric artery, common hepatic artery, celiac axis, and superior mesenteric artery were pathologically similar to breast cancer, and IHC analyses indicated ER-positive, PgR-negative, and GATA-3-positive (Fig. 3c–f). These findings suggested these metastatic abdominal lymph nodes were of breast cancer in origin (Fig. 4). TNM classification based on union for international cancer control (UICC) 8th edition of PDAC was pT1cN1M0, stage IIB. After operation, the patient developed a rupture of pseudoaneurysm of the common hepatic artery caused by pancreatic fistula, for which coil embolization and nasogastric drainage were performed. Thereafter, the patient made a satisfactory recovery, and was discharged on postoperative day 57. Although she received chemotherapy with S-1 for breast cancer and PDAC for 4 months, MRI showed multiple liver metastases derived

from breast cancer. Despite restarting chemotherapy with FEC, the patient died 12 months after operation.

Discussion

Treatment strategy about the mixture of primary pancreatic cancer and recurrent breast cancer is controversial. Pancreatic cancer is one of the most lethal malignancies with a 5-year survival rate below 8% [2], while the 5-year survival rate for localized disease was 29.3% [3]. Pancreatic resection contributes better prognosis for patients with localized primary pancreatic cancer. In the current case, we performed resection of PDAC, considering that its clinical stage was stage I and disease control of breast cancer was good. Since positron emission tomography (PET) had not been performed before operation, there is a possibility that PET-CT could have detected lymph node metastasis and might have helped a diagnosis of lymph node metastasis. Moreover, as for the regimen of postoperative chemotherapy, we need to consider both breast cancer and

Fig. 3 HE staining (a) and IHC of GATA-3 (b) of lymph node metastases along the splenic artery. HE staining (c) and IHC of GATA-3 (d) of breast cancer. HE staining (e) and IHC of GATA-3 (f) of lymph node metastases along the left gastric artery, common hepatic artery, celiac axis, and superior mesenteric artery. Lymph node metastases along the left gastric artery, common hepatic artery, celiac axis, and

superior mesenteric artery showed glandular structure (e), which were similar to her primary breast cancer (c). IHC of GATA-3 was positive for primary breast cancer and abdominal lymph node metastases (d, f), and weak positive for lymph node metastases along the splenic artery (b)

Fig. 4 Distribution of intraabdominal lymph nodes. Lymph node metastases along the splenic artery were derived from PDAC (arrowheads). Lymph node metastases along the left gastric artery, common hepatic artery, celiac axis, and superior mesenteric artery were judged to have derived from breast cancer (arrows)

PDAC. In the current case, disease control of breast cancer had been good with PTX + BV. Although S1 covers both diseases, we should have taken into consideration about

this responsiveness for determining adjuvant chemotherapy for pancreatic cancer, given that the patient developed multiple liver metastases from breast cancer.

Metastatic patterns of breast cancer depend on pathological type. The rate of metastasis to the gastrointestinal system is higher in invasive lobular cancer type rather than invasive ductal cancer type [4]. Therefore, abdominal lymph node metastasis from breast cancer of invasive ductal type, such as this presentation, seems to be rare. The route of abdominal lymph node metastases from breast cancer was unclear. In the current case, the patients had liver metastasis before and tumor cell may expand from liver to abdominal lymph node via hepatic portal lymph node. In general, liver metastasis from breast cancer is hematogenous [5]. However, there were a few reports of lymphatic metastasis [6]. This route is estimated as follows: breast cancer spread to parasternal lymph node, prepericardial lymph node, falciform ligament on the liver, and finally metastasize to the liver. In this case, liver metastasis was located in the segment 3/4 of the liver, which was close to the falciform ligament of the liver. Therefore, liver metastasis might have been caused by lymphatic route. Considering that the patient developed multiple liver metastases after operation, lymph node metastases was reached to the hepatic portal lymph

node when the liver resection was performed before imaging studies could detect lymph node metastasis.

To best of our knowledge, our case is the first report that describes a case that had lymph node metastases derived from both PDAC and breast cancer. This report would provide insight into the treatment strategy for the mixture of primary pancreatic cancer and recurrent breast cancer. In conclusion, we described a resected case of invasive PDAC with abdominal lymph node metastases from breast cancer. To determine treatment strategy for the mixture of primary pancreatic cancer and recurrent breast cancer, responsiveness of breast cancer to chemotherapy need to be considered.

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Compliance with ethical standards

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