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Case Report

Gastric Wall Implantation of Pancreatic Cancer Due to Preoperative Endoscopic Ultrasound-Guided Fine Needle Aspiration: A Case Report

Hiromitsu Maehira[1], Masao Ogawa[1], Masayasu Kawasaki[1], Atsuo Imagawa[1], Ken Yuu[1], Aya Itoh[1], Naoto Mizumura[1], Kansuke Yamamoto[1], Hiroshi Yasuda[1], Sho Toyoda[1], Hiroshi Kawashima[1], Satoshi Okumura[1], Michiko Yoshimura[2], Masao Kameyama[1]

[1]*Department of Surgery, Bell Land General Hospital, Osaka, Japan*

[2]*Department of Pathology, Bell Land General Hospital, Osaka, Japan*

Introduction: Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) is often used to diagnose pancreatic tumors. In rare cases, preoperative EUS-FNA can be complicated by gastric wall implantation of pancreatic cancer.

Case presentation: A 66-year-old woman with pancreatic tail cancer underwent evaluation by EUS-FNA, followed by distal pancreatectomy and splenectomy. Twelve months postoperatively, a submucosal tumor was detected at the posterior gastric wall, at the location where the EUS-FNA was performed, and a boring biopsy from the submucosal tumor showed an adenocarcinoma. Therefore, we performed partial gastrectomy. Immunostaining results of the resected specimen were identical to those of the resected pancreatic cancer. The patient was diagnosed as having gastric wall implantation of pancreatic cancer due to EUS-FNA.

Conclusion: This case emphasizes the importance of monitoring the site of EUS-FNA for gastric wall implantation of pancreatic cancer, and boring biopsy is a useful diagnostic tool.

Key words: Biopsy – Pancreatectomy – EUS-FNA – Cancer of pancreas – Pancreatic neoplasms

Corresponding author: Hiromitsu Maehira, MD, Department of Surgery, Bell Land General Hospital, 500-3 Naka-ku Higashiyama, Sakai-shi, Osaka, 599-8247, Japan.
Tel.: +81 72 234 2001; Fax: +81 72 234 2003; E-mail: hiromitsu0103@gmail.com

Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) is a useful and safe method for diagnosing pancreatic tumors, with a complication rate of less than 1%.[1] Furthermore, it has been reported that preoperative EUS-FNA for pancreatic tumors is not associated with an increased risk of peritoneal or gastric wall cancer recurrence.[2] However, knowledge regarding gastric wall implantation of pancreatic cancer due to preoperative EUS-FNA is limited by the fact that this is an extremely rare event. We herein describe a case of curatively resected gastric wall implantation of pancreatic cancer due to preoperative EUS-FNA, which was diagnosed by boring biopsy.

Case Report

A 66-year old woman with poorly controlled diabetes mellitus was referred to our hospital for further examination. The abdominal contrast-enhanced computed tomography (CT) scan showed a 10-mm, low-density solid mass at the tail of the pancreas, with upstream pancreatic duct dilatation. Carcinoembryonic antigen, DU-PAN-2, and s-pancreatic-1 antigen levels were within normal limits, but the carbohydrate antigen 19-9 (CA19-9) level was increased [49 U/mL (normal level, <37 U/mL)]. The endoscopic ultrasonogram showed a hypoechoic mass in the tail of the pancreas, measuring 7 mm in diameter. EUS-FNA was performed using a 22-gauge needle (total passes = 6) through the posterior gastric wall (Fig. 1), and the cytologic examination demonstrated an adenocarcinoma of the pancreas. Open distal pancreatectomy and splenectomy were performed. Histologic findings of the resected specimen showed a 9-mm mass with no lymph node metastasis, and it was identified as moderately differentiated T1N0M0 adenocarcinoma. The patient's postoperative course was uneventful, and no adjuvant treatment was given; the CA19-9 level postoperatively decreased to 31 U/mL.

Twelve months postoperatively, the serum CA19-9 level increased to 369 U/mL. The abdominal contrast-enhanced CT scan could not detect a recurrent lesion. However, the positron emission tomography/CT scan showed uptake of fluorodeoxyglucose (standardized uptake value, maximum 6.8) at the posterior gastric wall (Fig. 2). Gastroscopy examination demonstrated a submucosal tumor at the posterior gastric wall at the same location where EUS-FNA was performed 12 months prior (Fig. 3). Normal and boring biopsies of the submucosal tumor were obtained. The normal biopsy did not detect any cancerous cells, but an adenocarcinoma was identified by the boring biopsy. There were no other apparent metastatic lesions, and we performed open partial gastrectomy with curative intent.

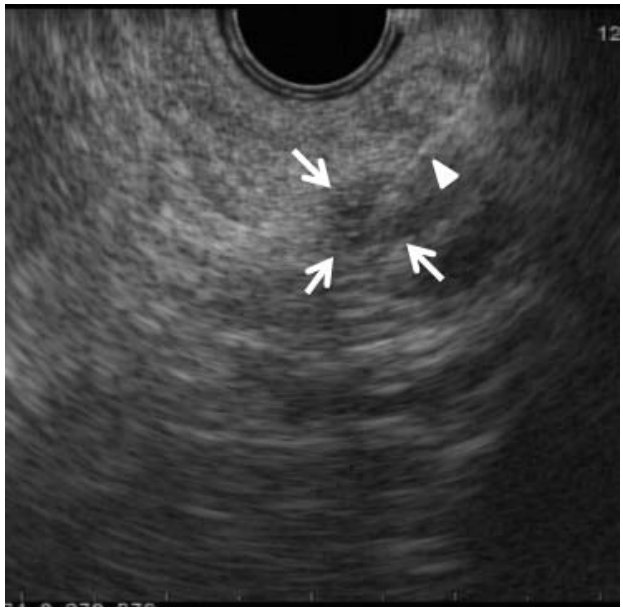

Fig. 1 Endoscopic ultrasonogram. The endoscopic ultrasonogram shows a hypoechoic mass in the tail of the pancreas (arrow). Endoscopic ultrasound-fine needle aspiration is performed using a 22-gauge needle (arrowhead) from the posterior gastric wall.

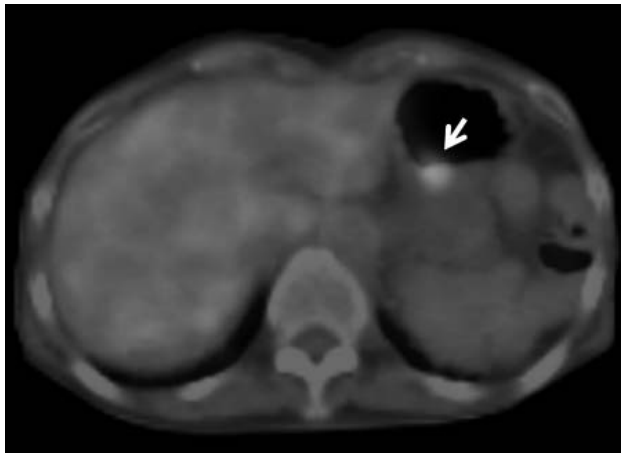

Fig. 2 Positron emission tomography/computed tomography (CT) scan. The positron emission tomography/CT scan shows uptake of fluorodeoxyglucose at the posterior gastric wall (arrow).

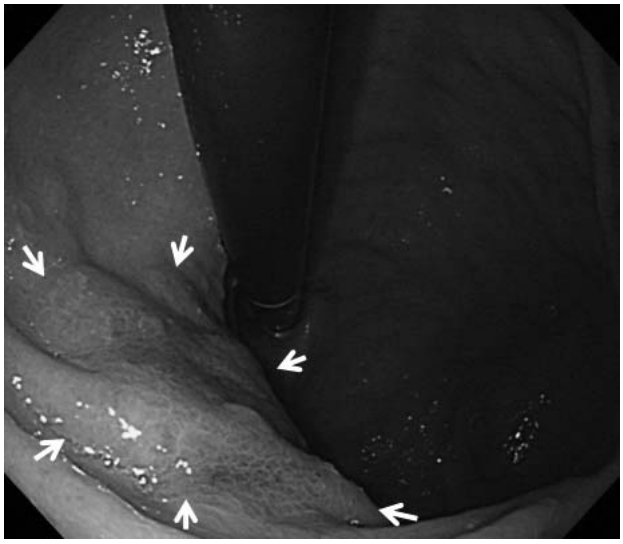

Fig. 3 Gastroscopy examination findings. A submucosal tumor is detected in the posterior gastric wall (arrow).

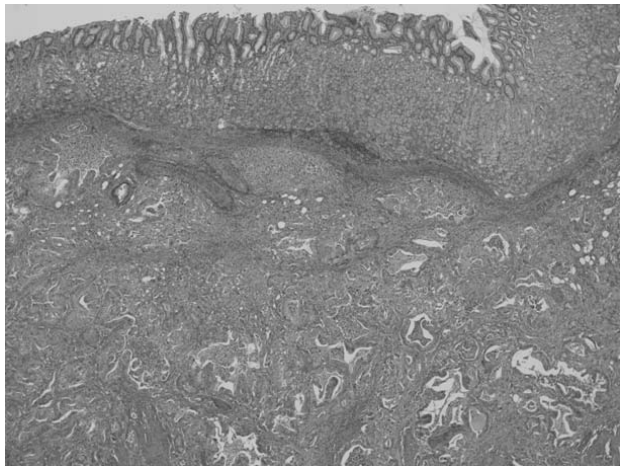

Fig. 4 Pathologic findings. The tumor consists of well to moderately differentiated adenocarcinoma cells, and it extends from the submucosa to the subserosa. Hematoxylin eosin + Victoria blue staining, original magnification ×40.

Pathologic findings of the resected stomach specimen showed a 28 mm × 9 mm tumor extending from the submucosa to the subserosa (Fig. 4). The tumor consisted of well to moderately differentiated adenocarcinoma cells, and it was positive for vascular and lymphatic involvement. Immunohistologically, the resected stomach specimen was positive for cytokeratin 7, slightly positive for cytokeratin 20, and diffusely positive for CA19-9. These results were identical to those of the adenocarcinoma detected in the pancreas; therefore, we diagnosed the resected stomach lesion as gastric wall implantation of pancreatic cancer due to preoperative EUS-FNA. The patient underwent adjuvant chemotherapy with S-1 starting at 1 month after partial gastrectomy; 8 months after partial gastrectomy, there were no signs of recurrence.

Discussion

This patient's medical course emphasizes an important clinical issue, namely, gastric wall implantation of pancreatic cancer caused by preoperative EUS-FNA performed for the diagnosis of a pancreatic cancer.

We identified a case of gastric wall implantation of pancreatic cancer due to preoperative EUS-FNA. This case highlights the importance of being aware of the possibility of pancreatic cancer seeding after EUS-FNA. Endoscopic ultrasonography is useful for evaluating pancreatic tumors because of its high spatial resolution. It has been reported that endoscopic ultrasonography has high diagnostic accuracy for detecting small pancreatic tumors.[3] However, this technique has limited value in differentiating between benign and malignant tumors.[4] EUS-FNA, which is an added pathologic diagnostic tool to endoscopic ultrasonography, is useful for qualitatively diagnosing a pancreatic tumor. Importantly, the complication rate of this technique has been reported to be less than 1%,[1] and preoperative EUS-FNA for pancreatic cancer is not associated with an increased rate of peritoneal or gastric wall cancer recurrence.[2,5] Gastric wall implantation caused by EUS-FNA for pancreatic cancer, as described in this case, is extremely rare. Only 7 cases of gastric wall implantation of pancreatic cancer due to EUS-FNA have been reported to date.[6–12]

The clinical features of the patients described in these previous reports are summarized in Table 1. The median age of patients was 68 years. Patients' diagnoses included solid tumors (5 cases) and cystic tumors (3 cases), as well as 2 patients with a final diagnosis of T1N0M0. EUS-FNA was performed using a 22-gauge needle in all cases, and the frequency of puncture ranged from 2 to 6 times. At a median period of 21 months after primary surgery, gastric wall implantation was detected. The serum CA19-9 level had increased in 6 patients. In one of the reported cases, there was no evidence of recurrence 16 months postoperatively for gastric wall implantation.[11] If EUS-FNA for pancreatic cancer is performed for a definitive diagnosis, it is necessary to consider the risk of tumor seeding

Table 1 Clinical features of previously reported patients with gastric wall implantation of pancreatic cancer due to EUS-FNA

Case no.	Author	Age (years)/ sex	Tumor property	FNA needle size (gauge)	FNA frequency	TNM classification	Time to detection of gastric wall implantation postoperatively	Size of the gastric wall implantation	Increased CA19-9 level	Operation	Prognosis
1	Paquin *et al*[6]	65/male	solid	22	5 times	T1N0M0	16 mo	50 mm	yes	none	12 mo Death due to dissemination
2	Ahmed *et al*[7]	79/male	cystic	N.D.	N.D.	T2N0M0	36 mo	45 mm	N.D.	TG	N.D.
3	Chong *et al*[8]	55/female	cystic	22	2 times	T2N0M0	26 mo	40 mm	yes	none	N.D.
4	Katanuma *et al*[9]	68/female	solid	22	4 times	T2N0M0	22 mo	N.D.	N.D.	N.D.	N.D.
5	Tomonari *et al*[10]	78/male	solid	22	2 times	T3N0M0	28 mo	32 mm	yes	SG	N.D.
6	Sakurada *et al*[11]	87/female	cystic	22	N.D.	T2N0M0	19 mo	20 mm	yes	PG	16 mo Alive without rec.
7	Minaga *et al*[12]	63/female	solid	22	3 times	T3N0M0	8 mo	12 mm	yes	PG	N.D.
8	Present case	68/female	solid	22	6 times	T1N0M0	12 mo	28 mm	yes	PG	8 mo Alive without rec.

CA19-9, carbohydrate antigen 19-9; EUS-FNA, endoscopic ultrasound-guided fine needle aspiration; FNA, fine needle aspiration; N.D., not described; no., number; NRT, radiation therapy; PG, partial gastrectomy; rec., recurrence; SG, subtotal gastrectomy; TNM, tumor, nodes, metastasis; TG, total gastrectomy.

through the puncture site. In the case that pancreatic cancer was diagnosed based on imaging findings and surgical resection was planned, physicians should not perform EUS-FNA for histologic confirmation. Furthermore, if the gastric area through which the puncture is performed is not resected, then patients should be periodically followed up with using gastroscopy, CT, and magnetic resonance imaging. Moreover, if the puncture site is recognized intraoperatively, for example adhesion around the tumor to the gastric wall, simultaneous resection of the gastric wall that EUS-FNA punctured may be considered. If gastric wall implantation is identified, then the goal of treatment may be considered curative resection, which is associated with long-term recurrence-free survival, as described for previous patients with this diagnosis.[11]

In the present case, boring biopsy, not normal biopsy, proved to be useful for diagnosing gastric wall implantation of pancreatic cancer. Boring biopsy is a method used to sample lesions that penetrate deeper than the submucosal layer, and it is performed from the mucosal surface, using repeated punctures with normal biopsy forceps.[13] Gastric cancer can be diagnosed by normal biopsy because this form of cancer arises from the mucosal layer. However, the diagnosis of gastric wall implantation using normal biopsy may not be possible since tumor cells are seeded to the muscularis propria or subserosa. A boring biopsy is indicated in patients with signs suggestive of submucosal tumors such as gastrointestinal stromal tumors, scirrhous gastric cancers that are not detected by normal biopsy, and other types of gastric cancers that form in the submucosa. In patients with signs suggestive of gastric wall implantation after EUS-FNA for pancreatic cancer, such as in our case, boring biopsy should be considered in addition to normal biopsy.

Gastric wall implantation of pancreatic cancer may occur if the puncture site of EUS-FNA for pancreatic cancer remains in the stomach. Unfortunately, due to the rarity of this presentation, the long-term prognosis of patients with this diagnosis is unclear. Therefore, it is controversial to perform curative resection or systemic chemotherapy for gastric wall implantation of pancreatic cancer. For these reasons, it is important to continue to report cases of gastric wall implantation of pancreatic cancer to improve physicians' knowledge regarding the long-term prognosis of affected patients.

Acknowledgments

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. The study protocol was approved by the ethics committee at our hospital (Bell Land General Hospital Ethics board approval number 2017-0017), and written informed consent was obtained from the patient for participate of this case report. The authors have no conflicts of interest to disclose. The authors declare no financial or any other type of support.

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