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CASE REPORT

Obstructive pancreatitis secondary to a pancreatic metastasis from lung cancer treated with nasopancreatic drainage

Shinya Kawaguchi[1] · Takuya Ohtsu[1] · Shuzo Terada[1] · Shinya Endo[1]

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Abstract

A 44- and a 66-year-old woman underwent nasopancreatic drainage (NPD) to treat obstructive pancreatitis secondary to a pancreatic metastasis from lung cancer. Both patients were diagnosed with stage IV lung cancer and underwent chemotherapy for 17 and 15 months, respectively. Abdominal ultrasonography and computed tomography revealed a solid pancreatic tail tumor measuring 2.5 cm and 1.3 cm in diameter, respectively. Additionally, we observed dilatation of the upstream main pancreatic duct (MPD) and edematous parenchyma with peripancreatic inflammatory changes limited to the pancreatic tail. Both patients were diagnosed with moderately severe acute pancreatitis and received fluid resuscitation, an opioid analgesic, antibiotics, and a protease inhibitor. However, owing to unrelenting pain, we performed endoscopic retrograde cholangiopancreatography (ERCP) for pancreatic duct drainage in both patients. ERCP showed a stricture in the MPD in the pancreatic tail with upstream dilatation. A 5-Fr NPD tube was inserted to drain the dilated MPD, and cloudy pancreatic juice was drained. NPD tube placement led to pain relief in both patients. Pancreatic juice cultures grew *Enterococcus faecium* and *Enterobacter cloacae*, respectively. The NPD tube was later cut in both cases using a pair of scissor forceps.

Keywords Obstruction of the pancreatic duct · Bacterial infection · Pancreatic metastasis · Nasopancreatic drainage · Pain relief

Introduction

The primary tumor of pancreatic metastases is most commonly renal cell carcinoma (38.4%), followed by lung cancer (24.5%), colorectal cancer (11.3%), and sarcoma (6.3%) [1]. Pancreatic metastases are observed at the time of the postmortem examination in approximately 10% of patients with lung cancer [2]. However, metastasis-induced acute pancreatitis is rare and typically occurs in patients with advanced bronchogenic carcinoma [3]. We describe two patients with metastasis-induced obstructive pancreatitis from lung cancer who were successfully treated with nasopancreatic drainage (NPD).

✉ Shinya Kawaguchi
shinya-kawaguchi@i.shizuoka-pho.jp

[1] Department of Gastroenterology, Shizuoka General Hospital, 4-27-1, Kita-ando, Aoi-ku, Shizuoka, Shizuoka 420-8527, Japan

Case report

Case 1

A 44-year-old woman with a 22-year history of smoking and known poorly differentiated squamous cell lung cancer was admitted to our hospital with epigastric pain. She reported receiving chemotherapy for 17 months followed by palliative care. Her blood pressure was 103/76 mmHg, pulse rate was 73 beats per min (bpm), and body temperature was 36.4 °C. Laboratory tests revealed a white blood cell count of 19,200 cells/μL (reference range 3300–8600 cells/μL), a serum C-reactive protein concentration of 12.22 mg/dL (reference range < 0.14 mg/dL), and a serum amylase concentration of 241 IU/L (reference range 44–132 IU/L). Abdominal ultrasonography and computed tomography (CT) revealed a solid tumor measuring 2.5 cm in diameter in the pancreatic tail with dilatation of the upstream main pancreatic duct (MPD) and edematous pancreatic parenchyma with peripancreatic inflammatory changes limited to the pancreatic tail (Fig. 1). We did not detect any concomitant pancreatic cyst, abscess, or

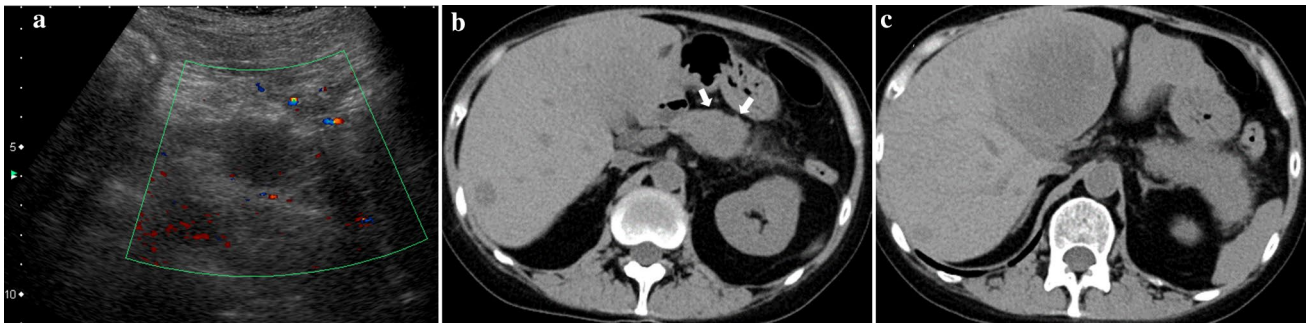

Fig. 1 **a** Abdominal ultrasonography images show a solid tumor measuring 2.5 cm in diameter in the pancreatic tail. **b, c** Computed tomographic images show edematous pancreatic parenchyma with peripancreatic inflammatory changes limited to the pancreatic tail (arrow)

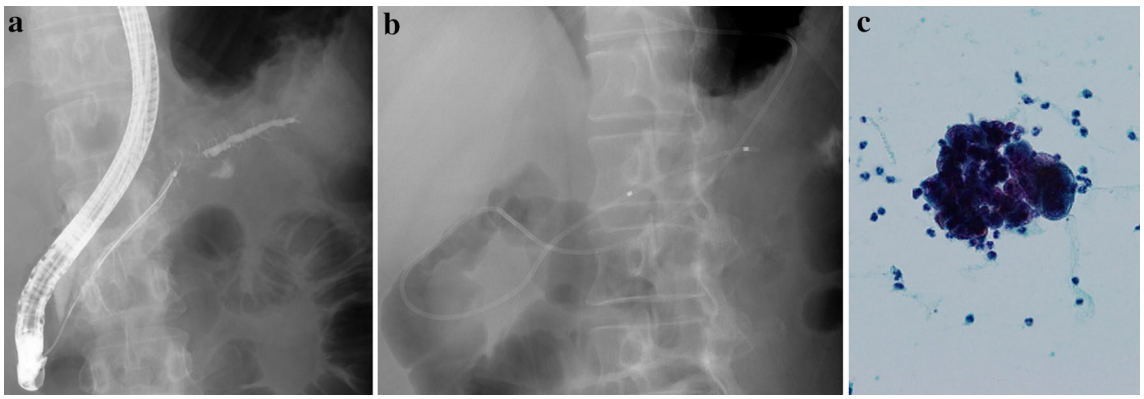

Fig. 2 **a** ERCP images show a stricture involving the main pancreatic duct in the pancreatic tail with upstream dilatation. **b** A 5-Fr nasopancreatic drainage tube is placed to drain the dilated main pancreatic duct. **c** Cytological examination of the pancreatic juice shows non-small cell cancer. *ERCP* endoscopic retrograde cholangiopancreatography

necrosis. She presented with stage IV lung cancer showing brain, lung, liver and lymph node metastasis. Pancreatic metastasis-induced moderately severe acute pancreatitis was diagnosed clinically, and she was treated with fluid resuscitation, an opioid analgesic, antibiotics, and a protease inhibitor. However, because of unrelenting pain, we performed endoscopic retrograde cholangiopancreatography (ERCP) to drain the pancreatic duct. ERCP showed a stricture of the MPD in the pancreatic tail with upstream dilatation (Fig. 2a). A 5-Fr NPD tube (pigtail, Olympus) was inserted on the 3rd day to drain the MPD (Fig. 2b), and cloudy pancreatic juice was drained. NPD tube placement led to pain relief. The numerical rating scale for pain before and after NPD placement showed a score of 10 and 0 points, respectively. Pancreatic juice cultures grew *Enterococcus faecium* and cytological examination of the pancreatic juice revealed lung cancer, which findings consistent with—poorly differentiated squamous cell carcinoma (Fig. 2c). The NPD tube was cut using a pair of scissor forceps (Olympus), 7 days after NPD placement (Fig. 3). The patient deceased 11 days later without any obstruction of the internal tube.

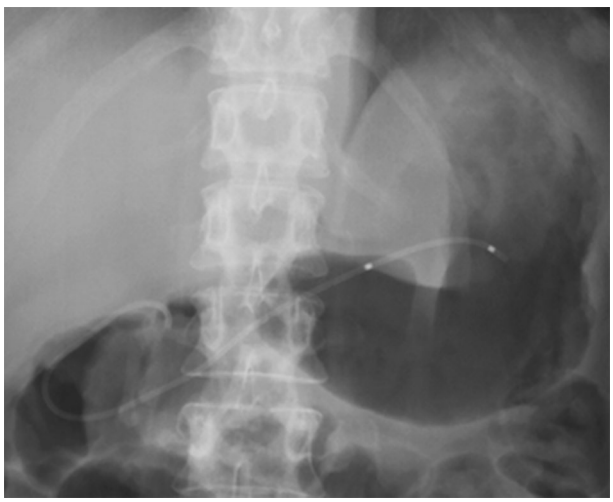

Fig. 3 The image shows the NPD tube is cut using a pair of scissor forceps. *NPD* nasopancreatic drainage

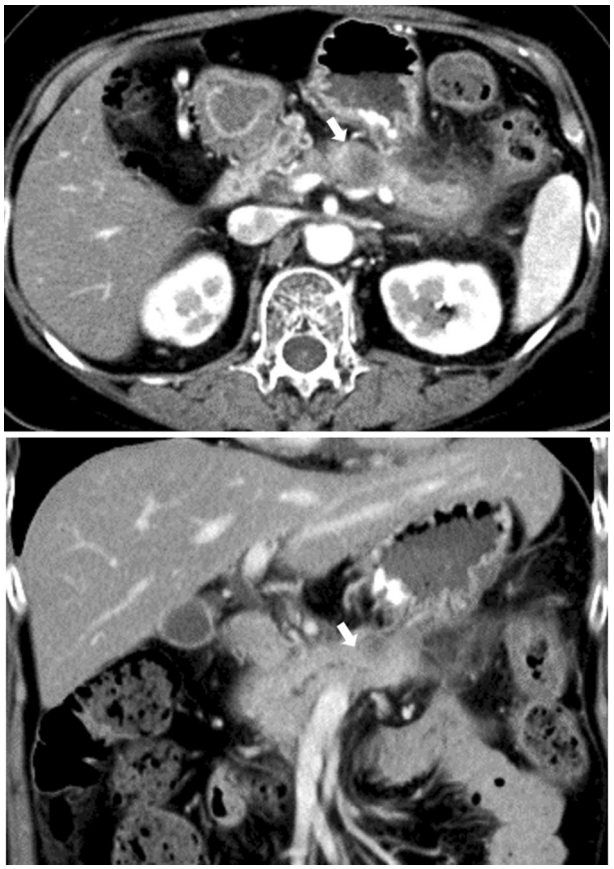

Fig. 4 Computed tomography images show a solid tumor measuring 1.3 cm in diameter in the pancreatic body with dilatation of the upstream main pancreatic duct and edematous pancreatic parenchyma with peripancreatic inflammatory changes limited to the pancreatic tail (arrow)

Case 2

A 66-year-old woman with poorly differentiated lung adenocarcinoma was admitted to our hospital with epigastric pain. She reported receiving chemotherapy for 15 months with subsequent palliative care. Her blood pressure was 106/48 mmHg, pulse rate was 82 bpm, and body temperature was 36.8 °C. Laboratory tests revealed a white blood cell count of 5600 cells/μL, a serum C-reactive protein concentration of 13.26 mg/dL, and a serum amylase concentration of 447 IU/L. Abdominal CT revealed a solid tumor measuring 1.3 cm in diameter in the pancreatic body with dilatation of the upstream MPD and edematous parenchyma with peripancreatic inflammatory changes limited to the pancreatic tail (Fig. 4). We did not detect any concomitant pancreatic cyst, abscess, or necrosis. She presented with stage IV lung cancer showing brain, breast, and lymph node metastasis. We diagnosed her clinically with pancreatic metastasis-induced moderately severe acute pancreatitis, and she was treated with fluid resuscitation, an opioid analgesic, antibiotics and a protease inhibitor. However, because of unrelenting pain, we performed ERCP to drain the pancreatic duct. The ERCP showed a stricture of the MPD in the pancreatic body with upstream dilatation (Fig. 5a). A 5-Fr NPD tube was inserted on the 3rd day to drain the dilated MPD (Fig. 5b), and cloudy pancreatic juice was drained. NPD tube placement led to pain relief. The numerical rating scale for pain before and after NPD placement showed a score of 10 and 4 points, respectively. Pancreatic juice cultures grew *Enterobacter cloacae*. The NPD tube was cut using a pair of scissor forceps, 7 days after NPD placement (Fig. 6). The patient deceased 3 months later without any obstruction of the internal tube.

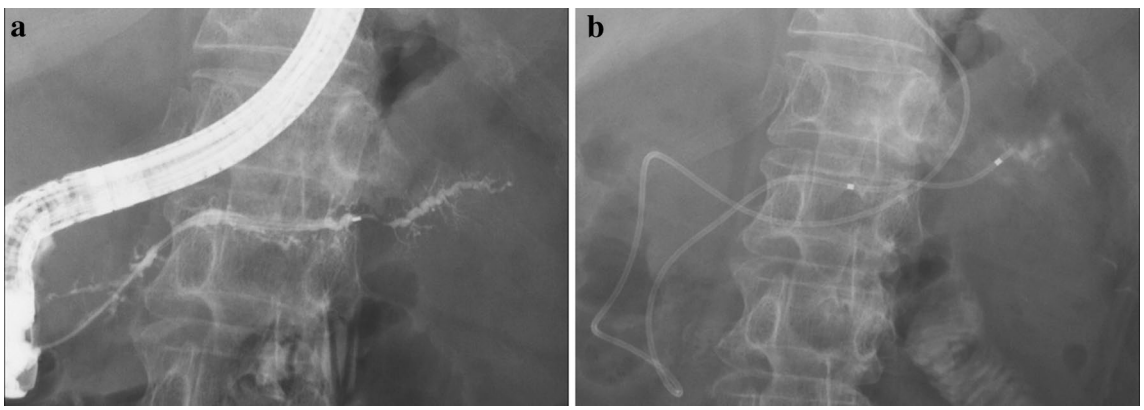

Fig. 5 **a** ERCP images show a stricture of the main pancreatic duct in the pancreatic body with upstream dilatation. **b** A 5-Fr nasopancreatic drainage tube is placed. *ERCP* endoscopic retrograde cholangiopancreatography

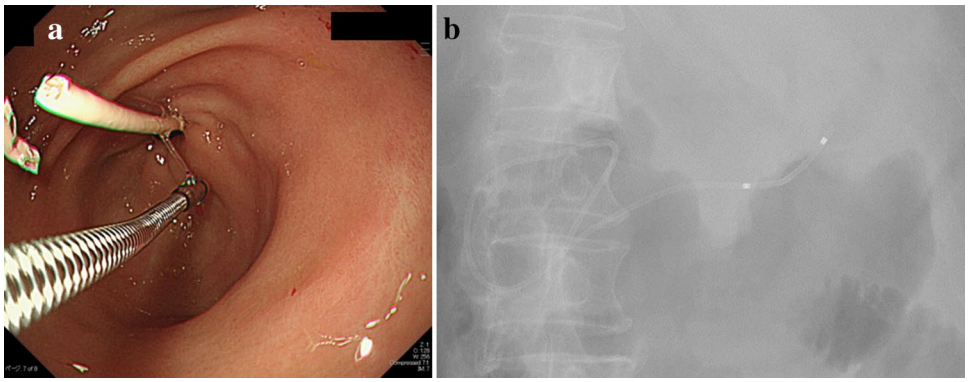

Fig. 6 The image shows the NPD tube is cut using a pair of scissor forceps. *NPD* nasopancreatic drainage

Discussion

Pancreatic metastases are observed at the time of the postmortem examination in approximately 10% of patients with lung cancer [2]. Metastasis-induced acute pancreatitis is rare and typically occurs in patients with known advanced bronchogenic carcinoma [3] and only develops in only 0.12% [4]. Standard treatment approaches to metastatic lung cancer are indicated in patients who recover from acute pancreatitis.

Acute obstructive suppurative pancreatic ductitis (AOSPD) is a rare condition defined as suppuration in the MPD without associated pseudocyst, abscess, or necrosis [5] because usually, pancreatic juice shows significant antibacterial activity [6]. In addition to MPD obstruction, the following features are considered to be risk factors for AOSPD: alcohol consumption, smoking, diabetes mellitus, immune dysfunction, a history of chronic pancreatitis, or a prior ampullary procedure. Main symptoms of AOSPD are abdominal pain and infectious symptoms, and endoscopic pancreatic drainage is effective for its treatment [7, 8]. Bacteria disrupts the tight junctions of the pancreatic duct epithelium via PAR-2 activation by secreting serine protease causing pancreatic inflammation. Pancreatic juice leakage through the injured pancreatic duct epithelium might be exacerbated by elevated intrapancreatic duct pressure leading to hypersecretion of the pancreatic juice following PAR-2 activation [9]. This altered pancreatic juice flow may be a result of metastatic pancreatic tumors. Pancreatic pain is indicative of PAR-2 activation, and unrelenting pain may indicate persistent PAR-2 activation with destruction of the epithelial tight junctions and leakage of the pancreatic juice. Thus, unrelenting pancreatic pain may suggest persistent pancreatitis [10].

Pancreatic duct stenting helps achieve significant pain relief and short-term improvement of the quality of life in most patients with pancreatic duct obstruction secondary to pancreatic carcinoma [11, 12]. Pain relief indicates improvement in pancreatitis. In our view, patients with pancreatitis and severe pain may be candidates for NPD placement, and the effectiveness of this procedure can be determined by the degree of pain relief achieved post-procedure. Restoration of the obstructed pancreatic juice flow and drainage of contaminated pancreatic juice are effective in treating this condition [10].

Both NPD and a pancreatic stent (PS) can be selected for pancreatic duct drainage [13, 14]. NPD facilitates obtaining a pancreatic juice sample and performing pancreatography whenever needed. Moreover, the tube is rarely occluded, and the integrity of the pancreatic duct, preferable for treating pancreatic ductitis, is maintained. Conversely, the PS occludes easily and induces pancreatitis, and it is easy for the duodenal juice to move into the pancreatic duct and damage its integrity [15]. Thus, we speculated that NPD is a better alternative in relieving infections than PS placement.

In our patients, NPD removal was associated with the risk of recurrent obstructive pancreatitis because the pancreatic duct showed a pancreatic tumor-related stricture. In such cases, maneuvering a guidewire past the area of pancreatic duct stenosis is difficult. Performing repeated ERCP in the terminal phase of lung cancer might worsen a patient's condition. Therefore, we used a pair of scissor forceps to cut the 5-Fr NPD tube approximately 3 cm away from the major papilla. After the NPD tube had been successfully cut, the external drainage tube was switched to an internal tube [16].

We describe the efficacy of NPD to treat obstructive pancreatitis in patients with pancreatic metastasis from lung cancer. AOSPD and obstructive pancreatitis should be considered in the differential diagnosis in a patient with metastasis-induced pancreatitis presenting with severe abdominal pain and inflammation. Moreover, based on our findings, we define AOSPD as a bacterial infection of the pancreatic duct causing pancreatic duct obstruction and the discharge of suppurative pancreatic juice or positive pancreatic juice culture findings. Notably, pancreatic duct drainage effectively treats AOSPD. To our knowledge, no previous reports have described NPD to treat obstructive pancreatitis. A greater number of case reports need to be evaluated to gain a better understanding regarding the pathogenesis of this rare clinical entity.

Compliance with ethical standards

Conflict of interest Shinya Kawaguchi, Takuya Ohtsu, Shuzo Terada and Shinya Endo declare that they have no conflict of interest.

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