CASE REPORT

A Resected Case of Solitary Pancreatic Metastasis from Adenocarcinoma of the Lung

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ABSTRACT

Context Primary lung cancer frequently metastasizes to distant organs; however, the pancreas is a relatively infrequent site of metastasis. Because most metastatic cases in the pancreas tend to be discovered in patients only after malignant disease has become widely disseminated, it is extremely rare that a metachronous metastatic lesion limited to the pancreas is discovered with postoperative imaging and is surgically resectable. Most patients demonstrate accompanying metastases to other organs, especially in cases of lung cancer, which prove to be surgically unresectable when diagnosed. Although several cases have been reported of patients who underwent pancreatic resection for curative intent, most patients died from recurrent disease.

Case report We report herein an unusual case of secondary tumor of the pancreas (primary tumor: adenocarcinoma of the lung) with hopefully curative resection. The interval between the surgical treatment of lung cancer and the metachronous pancreatic metastasis was 22 months; there has been no recurrence of disease during the 24 months of follow-up after a pylorus-preserving pancreaticoduodenectomy.

Conclusion Surgical treatment should be considered in patients with pancreatic metastasis from other organs if the disease is localized in the pancreas or if metastasis in other organs is controlled with chemotherapy and/or radiotherapy.

INTRODUCTION

Metastatic tumors of the pancreas are rarely found clinically, although their incidence has been reported to be approximately 12% among malignant disease autopsies [1]. Primary lung cancer frequently metastasizes to distant organs, such as the liver, adrenal gland, bone and kidney; however, the pancreas is a relatively infrequent site of metastasis [1]. Because most metastatic cases of the pancreas are found incidentally in patients with widely disseminated malignant disease [2], it is extremely rare that a metachronous, metastatic lesion revealed by postoperative imaging is found to be limited to the pancreas, and is surgically resectable [3]. We report here a case of secondary tumor of the pancreas successfully resected in a case of primary lung cancer.

CASE REPORT

A 56-year-old man was admitted to our hospital on August 12th, 2004 having suffered right shoulder pain for 5 months. Preoperatively, he was diagnosed with lung cancer (adenocarcinoma), which had directly invaded the superior vena cava using chest roentgenography and CT (Figure 1ab). No

distant metastases were shown by brain CT, abdominal CT and PET (cT4N0M0, stage IIIB). A right upper lobectomy with partial resection of the superior vena cava and a mediastinal lymph node dissection was
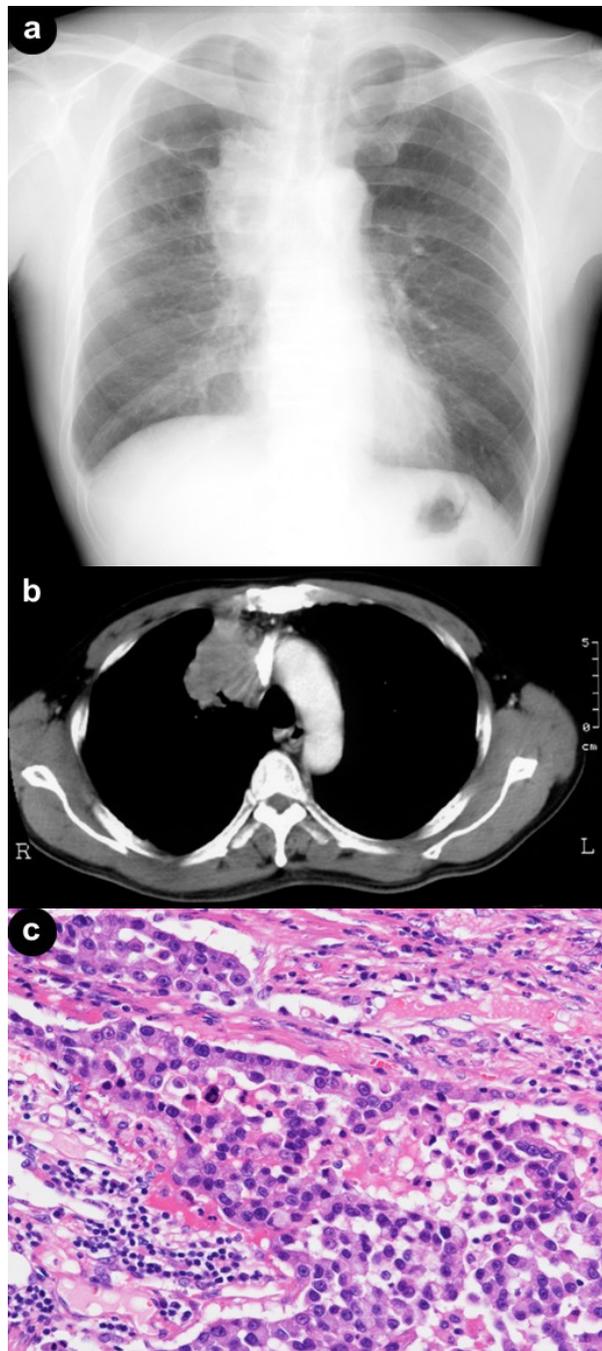
Figure 1. a. Chest roentgenography showed an irregular bulging mass at the right hilum of the lung, next to the superior vena cava. **b.** A chest CT-scan identified a mass displacing the superior vena cava, suspicious of superior vena cava invasion. **c.** Microscopic findings of the lung tumor, showing poorly differentiated adenocarcinoma with vascular infiltration (hematoxylin and eosin staining).

performed on August 17th, 2004. The defect of the superior vena cava was replaced by a ringed polytetrafluoroethylene graft. The resected specimen revealed a well-circumscribed whitish mass measuring 7.5x6.0x4.5 cm, next to the superior vena cava without invasion of adventitial layer. No lymph node metastasis was detected (pT3N0, stage IIB), and radical resection (R0) was suggested. Microscopic examination showed acinar-type poorly differentiated adeno-carcinoma (G3) (Figure 1c). The post-operative course was uncomplicated and chemotherapy with carboplatin and paclitaxel was carried out for 6 months. During a subsequent follow-up, an evaluation including physical examination, chest X-rays and clinical imaging indicated no evidence of recurrence. He later began to suffer from right back pain in July 2005. At approximately the same time, elevated serum CEA levels were detected, and a nodule in the head of the pancreas was subsequently discovered with contrast CT scanning on June 2006. He was admitted to our hospital for further investigation.

There were no notable physical findings. Laboratory findings were as follows: total bilirubin 1.3 mg/dL (reference range: 0.2-1.2 mg/dL), AST 189 U/L (reference range: 10-27 U/L), ALT 423 U/L (reference range: 5-33 U/L), LDH 220 U/L (reference range: 106-211 U/L), alkaline phosphatase 565 U/L (reference range: 104-338 U/L), amylase 91 U/L (reference range: 43-116 U/L), CEA 21.0 ng/mL (reference range: 0-5 ng/mL). Tumor markers including CA 19-9, DU-PAN-2, Span-1, and hormones including serum glucagon, gastrin, and vasoactive intestinal polypeptide were within normal limits.

Abdominal dynamic CT scanning revealed a well-defined lesion 2 cm in diameter, minimally enhanced, in the head of the pancreas after administration of an intravenous contrast agent (Figure 2a). MRI scans showed a mass with low intensity on T1-weighted images and high intensity on T2-weighted imaging. MRCP showed stenosis of the intrapancreatic portion of the common bile duct, but did not show blockage, stenosis
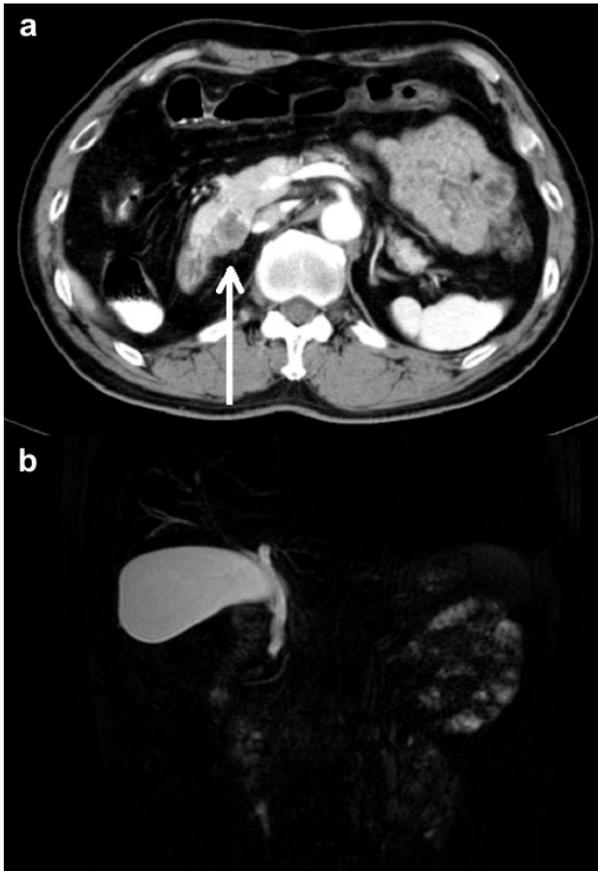
Figure 2. a. An abdominal CT scan showed a 2 cm mass located in the head of the pancreas in the early phase (arrow). **b.** Magnetic resonance cholangio‑pancreatography showed stenosis of the intrapancreatic portion of the common bile duct, but did not show blockage, stenosis or dilatation of the pancreatic duct.

or dilatation of the pancreatic duct (Figure 2b). Endoscopic retrograde cholangiography was performed and demonstrated that the bile duct was displaced by the mass; however, a pancreatogram was unsuccessful. Bile duct cytology did not yield a diagnosis.

Given the history of lung cancer and the fact that only the CEA levels were elevated while tumor markers characteristic of primary pancreatic cancer remained normal, a metastatic tumor was suspected. No other metastases were verified by brain CT, chest CT and PET. A pylorus-preserving pancreaticoduodenectomy was thus performed on July 20th, 2006. The resected specimen was a yellowish-white tumor located in the head of the pancreas and measuring 2.3 cm at its largest diameter, which had displaced the common bile duct (Figure 3a). Pathologic examination revealed

poorly-differentiated adenocarcinoma closely mimicking the histology of the primary lung cancer (Figure 3b), which yielded the final diagnosis of metastatic non-small cell lung carcinoma. After surgery, serum CEA levels normalized. The patient is doing well, and there has been no recurrence of the disease during 24 months of follow-up.

DISCUSSION

Metastasis to the pancreas from malignancy is rare and the incidence is reported as 1.6% in autopsy patients [2] and 3-12% of patients with malignant tumors examined by autopsy [1, 2]. As regards lung cancer, metastatic
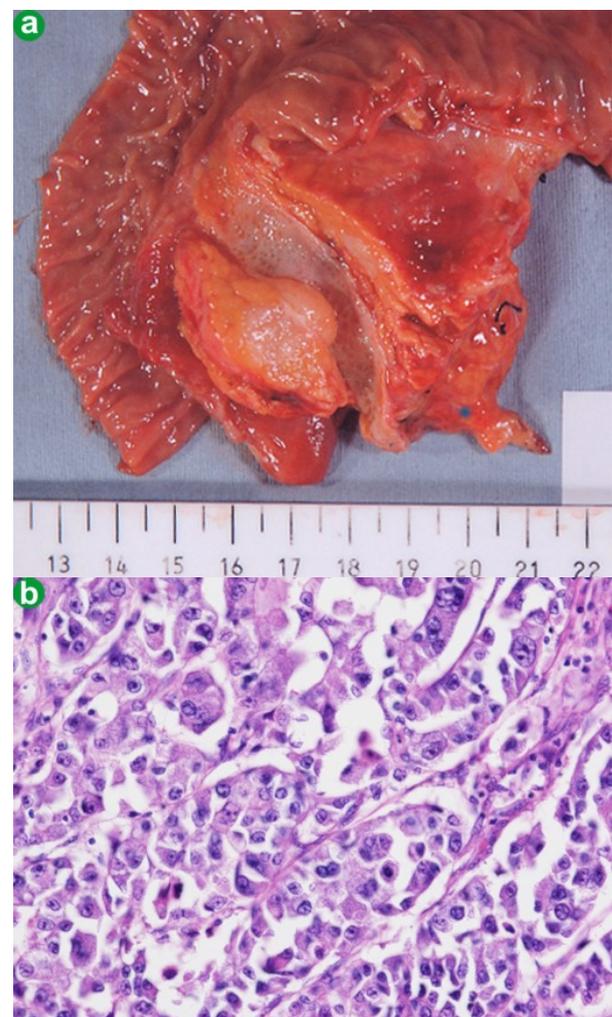
Figure 3. a. Macroscopic findings. A yellowish-white tumor displacing the bile duct was located in the head of the pancreas, measuring 2.3 cm in the largest diameter. **b.** Microscopic findings, showing poorly-differentiated adenocarcinoma, closely mimicking the histology of the primary lung cancer (hematoxylin and eosin staining).

involvement of the pancreas is reported in up to 18% of patients [1, 4]. In Japan, Maeno *et al.* reported 26 patients with pancreatic metastasis out of 850 lung cancer patients (3%) [4]. Among patients with small-cell lung cancer, 10.5% (13/124 cases) had pancreatic metastases while, among patients with adenocarcinoma, only 2.3% (9/379 cases) had pancreatic metastases [4].

The diagnosis of metastatic pancreatic tumors is clinically difficult, even when the patient has had surgical resection of carcinomas in other organs. A series by Klein *et al.* [5] in which the CT characteristics of pancreatic tumors are described suggested that a multiplicity of tumors or a hypervascularity reflecting a degree of vascular perfusion would be characteristic of secondary pancreatic tumors. However, it is difficult to distinguish secondary from primary pancreatic tumors by CT, especially if a solitary mass is observed [6]. ERCP may also not be very helpful in making this differentiation [7]. Furthermore, US cannot differentiate secondary pancreatic tumors from primary adenocarcinoma of the pancreas [8].

Recently, there have been several reports of pancreatic resection in the treatment of metastatic lesions [3, 9, 10, 11, 12,13, 14, 15]. Indications for resection of secondary pancreatic tumors have not been clearly defined, and most reports of resected cases are of metastases from renal cell carcinoma. In contrast, surgery was performed in very few cases of patients with secondary pancreatic tumors from lung cancer [10, 11, 13, 14] because most lung cancer patients suffered from widespread disease [4] which was surgically unresectable when diagnosed [3, 12, 15]. Maeno *et al.* [4] also reported that more than one metastatic site in the abdomen was observed in 25 out of 26 cases (96.2%) with pancreatic metastasis from lung cancer, suggesting unresectability and poor prognosis. In Japan, there have been eight reported cases of resected metastatic pancreatic tumor from non-small-cell lung cancer between 1983 and 2006 [16, 17]. All cases demonstrated accompanying metastasis to other organs

(such as the brain, liver and pleura) which had previously been treated and controlled using chemotherapy and/or radiation. In the case presented here, although there was no accompanying metastasis at the time of publication, long-term follow-up is highly desirable.

In one series, the mean survival time reported after the diagnosis of secondary pancreatic tumor was 8.7 months (range 1-28 months), although only four of 27 patients received curative surgical therapy [3]. Several studies suggest that the prognosis after excision of a solitary metastatic lesion is highly dependent on the nature of the primary tumor [9, 15]. Median survival after surgical excision is better for pancreatic metastasis developing from renal or colorectal cancer [3, 14, 15]. In 1996, Robbins *et al.* [9] reported 15 cases of solitary pancreatic metastasis arising from renal cell carcinoma, of whom 12 underwent definitive surgical resection; 11 of these were alive at the time of publication. Additionally, patients with resected pancreatic metastasis from renal cell carcinoma survived an average of 26.6 months in one study [13] and a median of 4.8 years in another [14]. In contrast, intrapancreatic metastases from lung cancer are very rarely resectable because the spread of the metastases is usually quite rapid [3, 12, 13]. Although Z'graggen *et al.* [12] and Moussa *et al.* [15] reported four patients each with secondary metastasis from lung cancer (including small cell lung cancer), there were no resectable cases mainly due to local invasion and metastases in other organs. Regarding three reported resections (one distal pancreatectomy and two pancreatico-duodenectomies) with intent to cure, two patients died from the disease while one remained alive with disease (median survival time not shown) [14]. Nakeeb *et al.* [10] also reported a patient with metastatic disease resulting from squamous cell carcinoma of the lung who underwent a pancreatico-duodenectomy but who died three months later. Nevertheless, surgical treatment should be discussed and attempted if potentially curative resection is feasible or if the disease involving other organs is controlled since the

median survival time in resected cases is 15.0 months (range: 4-29 months) as compared to 6.3 months in cases without resection (among seven Japanese non-small-cell lung cancer patients) [17]. To confirm indications for the resection of secondary pancreatic tumors and select appropriate patients for pancreatic resection, additional studies are required.

CONCLUSION

We present a rare case of solitary pancreatic metastasis from adenocarcinoma of the lung undergoing potentially curative resection. Surgical treatment should be considered in patients with pancreatic metastasis from other organs if the disease is localized in the pancreas or if the metastasis in other organs is controlled using chemotherapy and/or radiotherapy.

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