Simultaneous presentation and resection of esophageal cancer and metastasis to the pancreas: a case report with literature review

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Case Report

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Abstract

Background

The frequency of metastasis to the pancreas is very low, and the frequency of metastasis from squamous cell carcinoma of the esophagus is even lower. Although curative resection of these metastatic lesions has been reported for some patients, the survival benefit of these procedures has not yet been clearly determined.

Case presentation

The patient was a 54-year-old man who was found to have lower thoracic esophageal cancer. Computed tomography showed a 2-cm tumor in the tail of his pancreas. Since no other obvious distal metastases were observed, the patient underwent simultaneous surgical procedures that excised both the esophageal squamous cell carcinoma and the pancreatic metastasis. Histopathologic examination confirmed squamous cell carcinoma in both specimens. The patient has been free of disease for 9 months since the resection. A literature review of all relevant cases to date found that the site of the primaries of all cases of esophageal cancers with metastasis to the pancreas was the lower thoracic esophagus.

Conclusion

Complete simultaneous resections of esophageal squamous cell carcinoma and a solitary metastasis to the pancreas is beneficial and may produce good outcomes. However, because of the low number of such reports, further studies are needed to confirm the benefits of surgery.

Background

Although the outcomes of patients with esophageal cancer have improved in recent years because of multidisciplinary treatments that include surgery, chemotherapy, and radiation therapy, the recurrence rate remains high and the prognosis remains poor. Even after radical esophagectomy, 30–50% of patients develop hematogenous or lymphatic metastases (1–3).

However, a metastasis from esophageal cancer to the pancreas is very rare, occurring in less than 1% of patients with esophageal cancer, and documented autopsies of patients with esophageal cancer have found metastases to the pancreas in 0–11% of cases. (4). Furthermore, less than 4.9% of metastatic tumors in the pancreas were derived from primary esophageal cancers (5–8).

Overall, metastatic disease in the pancreas is rare, accounting for less than 2% of all pancreatic malignancies (9). Here we describe a patient who underwent a simultaneous radical resection of his esophageal squamous cell carcinoma and a solitary metastasis to the pancreas, and also present a review of the literature. Solitary pancreatic metastases are rare and tend to be resected when discovered, but to the best of our knowledge, there are only a few reports on patients who have undergone resection of a solitary metastasis.

Case Presentation

In August 2021, a 54-year-old man was seen as an outpatient at the Nagoya City University Hospital (Aichi, Japan). His chief complaint was chest discomfort after eating, which had occurred for several months. He had smoked cigarettes for more than 30 years and had consumed 1.2 L of beer daily.

Esophagogastroduodenoscopy revealed a tumor that involved almost the entire circumference of the esophagus at a site 36 to 39 cm from the incisors (Fig. 1). Examination of a biopsy specimen revealed squamous cell carcinoma. Abdominal computed tomography (CT) showed a 22×20 mm mass in the pancreatic tail. Contrast enhancement of the tumor was poor during the early phase and showed progressive enhancement (Fig. 2). The levels of tumor markers were as follows: CEA 3.3 ng/mL (reference range < 4.1 ng/mL), CA19-9 2 U/mL (reference range < 37 U/mL), SCC 1.9 ng/mL (reference range < 2.5 ng/mL), DUPAN-2 25 U/mL (reference range < 150 U/mL), and SPan-1 6.8 U/mL (reference range < 30 U/mL). An endoscopic ultrasound-guided fine needle aspiration biopsy (EUS-FNA) could not be performed because of esophageal stricture, and the patient was determined to undergo resection of both the primary cancer in the esophagus and metastatic tumor in the pancreatic tail.

Simultaneous robot-assisted resections were performed. The histologic examination found squamous cell carcinoma in both the specimens from the esophagus and pancreatic tail (Fig. 3). The esophageal tumor had invaded the intrinsic muscular layer, and there was also carcinoma in situ (Fig. 4). The pancreatic mass was located near the superior margin of the pancreas, but did not contact either the main pancreatic duct or other organs. There was extensive infiltration around the splenic artery and vein (Fig. 5). All resection margins were negative. Several of the lymph nodes near the pancreas showed metastatic involvement. The surgical findings were diagnosed as
esophageal cancer with pancreatic metastasis. The patient recovered without postoperative complications and was discharged on postoperative day 34. He received 2 cycles of 5-fluorouracil/cisplatin chemotherapy after surgery. The patient remains recurrence-free at 9 months after surgery.

Discussion

When squamous cell carcinoma is detected in pancreatic tumors, there are two possibilities: primary pancreatic cancer or pancreatic metastasis. Adenocarcinoma accounts for about 75–81% of primary pancreatic cancers, and pure squamous cell carcinoma is very rare (10–13). According to a 1992 report from Japan, squamous cell carcinoma accounted for only 0.7% of 1,300 cases of pancreatic cancer (14). Normally, squamous epithelium does not exist in the pancreas, but inflammation from conditions such as pancreatitis can lead to squamous epithelialization of ductal columnar cells.

Squamous cell carcinoma of the pancreas is thus thought to arise from squamous metaplasia of ductal columnar cells secondary to chronic inflammation (15). However, metastases to the pancreas account for less than 2% of all pancreatic malignancies (9). Metastases from kidney, lung, breast, colon, and skin (melanoma) cancers, along with sarcomas, frequently involve the pancreas (7). However, metastases even from squamous cell carcinoma of the lung, which is the most frequent primary cancer to metastasize to the pancreas, account for only 1.1% of cases (16). Thus, simultaneous primary and metastatic squamous cell carcinoma of the pancreas is rare. Of note, there are few metastases from a primary cancer of the esophagus to the pancreas; therefore, the advantages and disadvantages of resection remain unknown.

Resection for pancreatic metastases from renal cell or ovarian cancers and complete resection of metastases from any primary cancer have been reported to be beneficial in prolonging survival (8,9,16,17). Solitary pancreatic metastases tend to be resected, although our literature search only discovered 4 patients who underwent resection of pancreatic metastases from esophageal squamous cell carcinoma (18–20). Furthermore, resection of simultaneous metastases was reported for only one of the 4 cases (21).

A review of the surgical data of 5 reported cases (4 from the literature search plus our case), showed that every patient underwent distal pancreatectomy and was discharged without postoperative complications (Table 1) (18–21). Postoperative adjuvant 5-fluorouracil/cisplatin chemotherapy was administered to 3 patients and there was a report of no recurrence for up to 24 months (18). The lower thoracic esophagus was the site of the primary tumor in 3 cases. One case report did not provide the location of the primary tumor. All pancreatic metastases occurred in the pancreatic tail.

Blood drains from the cervical esophagus into the superior vena cava via the inferior thoracic vein, and blood drains from the upper or middle thoracic esophagus into the superior and inferior vena cava via the azygous and hemi azygous veins. On the other hand, blood draining from the lower thoracic esophagus and the abdominal esophagus flows into the portal system via the paraesophageal vein and the left and short gastric veins (22). Thus, esophageal carcinoma in the lower thoracic esophagus may be more prone to metastasize to the pancreas than esophageal squamous cell carcinomas located elsewhere, because drainage via the paraesophageal vein to the splenic vein is the predominant route of blood flow. The anatomy of the draining veins may also account for the frequency of pancreatic metastases to the pancreatic tail.

Squamous cell carcinomas discovered in the pancreas must be determined to be either a primary cancer or metastatic disease. The frequency of pancreatic metastases from squamous cell carcinoma is much higher than the frequency of primary squamous cell carcinoma of the pancreas; thus, it is generally reasonable to assume that a pancreatic tumor is a metastasis from squamous cell carcinoma of the esophagus (23). The histopathologic findings in our patient showed neoplastic changes in the esophageal mucosa, and also carcinoma in situ. These findings indicate that the primary tumor was located in the esophagus. Additionally, the histopathologic findings of the specimen from the pancreas showed that the tumor was not in contact with the main pancreatic duct and that there were no atypical findings seen in the main pancreatic duct. Both the esophageal and pancreatic tumors showed extensive venous invasion and similar histopathologic profiles. Given these data, we finally diagnosed the tumor in the pancreas as a pancreatic metastasis from esophageal cancer.

The preoperative confirmation that the tumor in the pancreas is a solitary metastasis, which leads to the possibility of a complete resection, is important, because resection of a solitary metastasis is associated with improved survival (8,9). In general, the differentiation between a pancreatic metastasis of esophageal cancer and a primary pancreatic cancer can be made by a preoperative EUS-FNA biopsy for tissue diagnosis (24,25). When a tumor is found in the pancreas concomitant with an esophageal squamous cell carcinoma that is located in the lower esophagus, the pancreatic tumor should be considered a metastasis. The confirmation of the diagnosis is essential for deciding on the treatment, and should be obtained from a preoperative diagnosis of specimens from EUS-FNA or from Positron emission tomography-computed tomography (PET-CT).
Thus far however, there have not been any published prospective or case-controlled clinical trials that compared the efficacy of resection with the nonoperative treatment of pancreatic metastases. The surgical mortality of pancreatic surgery has been shown to be less than 5% (9), and since the 5 patients in the published literature remain alive, surgery for patients with a solitary pancreatic metastasis from esophageal squamous cell carcinoma may improve outcomes and should be considered. However, the follow-up periods of the previous reports were short, and further observation of these patients is needed to determine the prognosis of such cases.

**Conclusion**

We have reported this case because a solitary pancreatic metastasis from esophageal cancer is rare and requires careful therapeutic consideration. Finally, the treatment guidelines for esophageal cancer with a solitary pancreatic metastasis should be established.

**Abbreviations**

CT  
Computed tomography  
CEA  
Carcinoembryonic antigen  
CA19-9  
Carbohydrate antigen 19–9  
SCC  
Squamous cell carcinoma antigen  
DUPAN-2  
Duke pancreas-2  
SPan-1  
S-pancreas-1 antigen  
EUS-FNA  
Endoscopic ultrasound-guided fine needle aspiration biopsy  
PET-CT  
Positron emission tomography-computed tomography

**Declarations**

Ethics approval and consent to participate

Not applicable.

Consent for publication

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal upon request.

Availability of data and materials

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Author's contributions

YD participated in all aspects of this report: management of the patient, conceptualization of the report, and writing of the draft. MY, IN and KH performed a preoperative diagnosis of the patient. YH, HI, KS, TT and MM managed the patient. HK performed the histological
examination. YM and ST managed the patient and supervised the study. All authors have read and approved the final manuscript and agree to be held accountable for all aspects of the report.

Acknowledgements

Not applicable

References


**Table**

**Table.1** Reported cases of pancreatic metastasis from esophageal cancer

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age</th>
<th>Sex</th>
<th>Location of Esophageal cancer</th>
<th>Synchronous/Metachronous</th>
<th>TNM</th>
<th>Location of pancreatic metastasis</th>
<th>Surgery</th>
<th>Adjuvant therapy</th>
<th>Recurrence (Follow-up months)</th>
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<td>DP</td>
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<td>FP</td>
<td>None(4months)</td>
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<tr>
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<td>Pt</td>
<td>DP</td>
<td>FP</td>
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<td>F</td>
<td>-</td>
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<td>FP</td>
<td>None(9months)</td>
</tr>
</tbody>
</table>

Abbreviations: M, male; F, female; Lt, lower thoracic esophagus; Pt, pancreatic tail; DP, distal pancreatectomy; 5-FU, 5-fluorouracil; FP, 5-fluorouracil/cisplatin

**Figures**

**Figure 1**

Esophagogastroduodenoscopy. A tumor encompassing 75% of the circumference of the lower thoracic esophagus. The tumor is located 36 to 39 cm from the incisors.
Figure 2

Contrast-enhanced computed tomography scan of the pancreatic tumor (indicated by the arrow) in early phase (a) and in late phase (b). The tumor showed gradual enhancement.

Figure 3

Pathological findings of the pancreatic tumor showing squamous cell carcinoma (hematoxylin and eosin stain, ×40) (a). Immunohistochemical findings revealed staining positive for p40 (b).
Figure 4

Pathological findings showing that the esophageal cancer had invaded the intrinsic muscular layer (a) (hematoxylin and eosin stain, ×10) and also showed carcinoma in situ (b) (hematoxylin and eosin stain, ×40).

Figure 5

Pathological findings of the pancreatic specimen (hematoxylin and eosin stain). The tumor was located at a distance from the main pancreatic duct (white arrow) and had extensively infiltrated the splenic vein (black arrow).