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CASE REPORT

Synchronous concomitant pancreatic acinar cell carcin and gastric adenocarcinoma: A case report and review of literature

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Abstract

BACKGROUND

Multiple primary malignant tumors are two or more malignancies in an individual without any relationship between the neoplasms. In recent years, an increasing number of cases have been reported. However, concomitant primary gastric and pancreatic cancer reported a relatively small incidence, involving no pancreatic acinar cell carcinoma reports. Here, we present the first case of concomitant pancreatic acinar cell carcinoma and gastric adenocarcinoma.

CASE SUMMARY

A 69-year-old male presented to our department with a history of vomiting, epigastric pain, and weight loss. Imaging revealed space-occupying lesions in the stomach and the tail of the pancreas, respectively. The patient underwent laparoscopic radical gastrectomy and pancreatectomy simultaneously. The pathologies of surgical specimens were completely different: The resected gastric specimen was moderate to poorly differentiated adenocarcinoma, whereas the pancreatic tumor was consistent with acinar cell carcinoma. The patient was treated with six cycles of oxaliplatin and S-1 chemotherapy. As of March 2021, the patient was healthy without any recurrence or metastasis. After thoroughly reviewing the literature on simultaneous pancreatic and gastric cancers at home and abroad, we discussed the clinical characteristics of these rare synchronous double cancers. Most of the cases had undergone surgery and adjuvant chemotherapy, and all of the cases were pathologically confirmed by the postoperative specimen.

CONCLUSION

Synchronous pancreatic acinar cells and gastric adenocarcinoma can occur and should be considered when tumors are found in these organs.

Key Words: Synchronous concomitant cancers; Pancreatic neoplasms; Stomach neoplasms; Pancreatic acinar cell carcinoma; Surgical procedures; Case report

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Core Tip: Acinar cell carcinoma of the pancreas is a rare form of pancreatic cancer, and the incidence of synchronous concomitant pancreatic and gastric cancer is relatively low. We report a patient with simultaneous acinar cell carcinoma of the pancreas with gastric cancer, and he underwent radical surgery for both the pancreas and the stomach. This is the first case of concomitant cancers related to pancreatic acinar cell carcinoma and gastric cancer. We also reviewed the literature on simultaneous pancreatic and gastric cancers.

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INTRODUCTION

Pancreatic and gastric carcinoma are the second and fifth most common digestive system tumors, respectively[1]. Pancreatic cancer is one of the deadliest malignancies and is usually diagnosed at an advanced stage, leading to poor overall survival, particularly the relatively low pancreatic acinar cell adenocarcinoma (PACC) incidence, accounting for approximately 1%–2% of exocrine pancreatic neoplasms[2]. This report describes the first case of concomitant cancers related to PACC and gastric adenocarcinoma. Furthermore, we review the literature of synchronous gastric and pancreatic tumors in the PubMed, Web of Science, CNKI, and Embase databases and discuss the principles of treatment and prognosis of concomitant gastric and pancreatic cancer.

CASE PRESENTATION

Chief complaints

A 69-year-old male came to our department with a history of vomiting, epigastric pain for 3 mo, and weight loss of approximately 5 kg.

History of present illness

The patient developed vomiting, epigastric pain for 3 mo.

History of past illness

The patient had no past illness.

Personal and family history

Two younger brothers of patient had lung cancer and laryngocarcinoma, respectively.

Physical examination

The patient was afebrile at 36.3 ℃, the heart rate was 65 beats *per* min, respiration was 17 breaths *per* min, and blood pressure of 131/86 mmHg. Clinical abdominal examination showed tenderness in the upper abdomen without mass upon palpation, soft and relaxed, and no rebound pain.

Laboratory examinations

Laboratory test results were normal, including blood, urine, and stool were within the normal ranges. However, the carcinoembryonic antigen in tumor markers was slightly elevated at 4.06 ng/mL (normal values: < 3.4 ng/mL).

Imaging examinations

Gastroscopy revealed a large ulcer of approximately 5.5 cm × 6.6 cm × 0.5 cm originating from the gastric fundus, and pathological biopsy revealed gastric

adenocarcinoma. In addition, abdominal contrast-enhanced computed tomography (CT) indicated uneven thickening in the antrum of the stomach with irregular mucosa and heterogeneous contrast enhancement on the antrum of the gastric wall and a space-occupying lesion of approximately 34 mm × 16 mm in the tail of the pancreas (Figure 1). However, there were no definite contraindications; therefore, the patient underwent laparoscopic exploration, which revealed the stomach and pancreatic masses. After evaluating the resectability of the gastric and pancreatic tumors, he underwent laparoscopic radical gastrectomy, gastric vagotomy, pancreatectomy, and splenectomy (Figure 2).

FINAL DIAGNOSIS

The resected stomach lesion was 5 cm × 5 cm × 1.5 cm, and the Lauren classification was the intestinal type. The pathology of the resected specimen from the stomach confirmed a moderately to poorly differentiated adenocarcinoma [pStage IIIB, T4aN2M0 *per* the American Joint Committee on Cancer (AJCC) eighth edition criteria] (Figure 3A). The tumor had invaded the serous membrane but did not involve the adjacent structures. Perineural and vascular infiltration were observed. Regional nodes were positive (4/32), and the resection margins were free of tumor cells. The cancer cells did not infiltrate the omentum, and there was no metastasis in the omentum lymph nodes.

Immunohistochemistry indicated positivity for pan-cytokeratin and villin and partial positivity for CK7 (Figure 3B). The tumor was negative for HER-2 (4B5) and CK20. The Ki-67 positivity was approximately 50% in a high-power field.

The volume of the resected pancreatic specimen was 4.1 cm × 2.2 cm × 1.5 cm. The pathology was consistent with PACC (pStage III, T3N1M0 *per* the AJCC eighth edition criteria) (Figure 4A and B). Perineural infiltration was observed, but there was no vascular infiltration. Regional nodes were negative, and the resection margins were free of tumor cells. Immunohistochemistry indicated positivity for CAM5.2, CK19, CK7, and membranous expression of beta-catenin and scattered positivity for carcinoembryonic antigen. The Ki-67 positivity was 30% in one high-power field (Figure 4C-F). The tumor was negative for vimentin, chromogranin A, synaptophysin, CD10, and CD56.

TREATMENT

One month after the operation, chemotherapy consisting of oxaliplatin and S-1 (SOX) was initiated and the patient was then treated with six chemotherapy cycles.

OUTCOME AND FOLLOW-UP

As of March 2021, the patient was healthy without any recurrence or metastasis.

DISCUSSION

Gastric cancer is characterized by a synchronous second primary cancer in 1.0%–5.0% of cases[3-5]. This is the fourth most common cancer associated with pancreatic carcinoma, comprising approximately 5% of all cases of gastric carcinoma associated with carcinoma of other organs[3]. Gastric cancer is the most common synchronous tumor associated with pancreatic cancer[6]. Patients with pancreatic and stomach cancers demonstrated significantly better OS (33.9 mo) than patients with only pancreatic cancer (17.0 mo)[6]. This may be because pancreatic cancer is generally early-stage when synchronous concomitant cancers are diagnosed.

A review of the literature on simultaneous pancreatic and gastric cancers at home and abroad revealed that synchronous concomitant tumors involving the two organs are rare, and PACC is more uncommon. Details of reported cases are shown in Table 1 [7-20], including our case. The average age at diagnosis is 67 years (42–77 years), and men are twice as likely to be diagnosed with synchronous pancreatic and gastric cancer than women. Pancreatic ductal adenocarcinoma (PDAC) is the most common

Table 1 Reported cases of synchronous gastric and pancreatic tumors

Ref.	Age	Gender	Gastric tumorlocation	Gastric histology	Pancreatic tumor location	Pancreatic histology	Treatment
Eriguchi *et al*[7], 2000	76	Male	Upper gastric angle	Moderately differentiated tubular adenocarcinoma	Not mentioned	Well to moderately differentiated tubular adenocarcinoma	Surgically treated
Kubota *et al*[8], 2009	67	Male	Not mentioned	Moderately differentiated adenocarcinoma	Not mentioned	Absence of pancreatic histology	Chemotherapy: S-1, paclitaxel and lentinan
Meng *et al*[9], 2011	42	Male	Gastric antrum	Gastric GIST	Pancreatic head	Pancreatic GIST	Surgically treated
Shen *et al*[10], 2010	72	Female	Major gastric curvature	Gastric GIST	The head of the pancreas	Poorly differentiated PDAC; malignant fibrous histiocytoma	Surgically treated
Muroni *et al*[11], 2010	73	None	Gastric antrum and pyloric portion	Moderately differentiated adenocarcinoma	Uncinate portion of the pancreas	Poorly differentiated PDAC	Surgically treated
Dasanu *et al*[12], 2011	75	Male	Not mentioned	GIST	The head of the pancreas	Moderately to poorly differentiated carcinoma	Surgically treated
Kourie *et al*[13], 2013. case 1	56	Male	Anterior part of the antrum	Poorly differentiated adenocarcinoma with independent mucus-secreting cells	The head of the pancreas	Necrotic ductal adenocarcinoma	Chemotherapy: Folfirinox
Kourie *et al*[13], 2013. case 2	62	Male	Gastric wall of the greater curvature	Gastric adenocarcinoma with mucinous component	Tail of the pancreas	Tubular adenocarcinoma (ck7+; ck20-; ck19+)	Chemotherapy: Folfirinox
Ohtsubo *et al*[14], 2013	77	Male	In the middle of stomach	Adenocarcinoma stage IB, T2bN0M0	Pancreatic head	Adenocarcinoma stage IIA, T3N0M0	Treated with chemotherapy: S-1
Baba *et al*[15], 2015	70	Male	The fundal region and greater curvature of the stomach	Low grade gastric calcified stromal tumor (GIST)	The head of the pancreas	Adenocarcinoma	Surgically treated
Ghothim *et al*[16], 2015. case 1	73	Male	The antrum of the stomach	Adenocarcinoma (pT1N1M0 stage IB, G2)	The head of the pancreas	Ductal pancreatic cancer. (pT2N1M0, stage IIB, G3)	Surgically treated; gemcitabine in six cycles
Ghothim *et al*[16], 2015. case 3	74	Male	The antrum of the stomach	Gastric adenocarcinoma diffuse type (pT2bN2M0, G3)	Pancreatic head	Papillary mucinous carcinoma (pT2N0M0, stage IB, G1)	Surgically treated; Radiotherapy and chemotherapy
Fiore *et al*[17], 2015. case 1	63	Male	Not mentioned	Gastric GIST (T2N0)	Pancreatic head	Adenocarcinoma (T2N0)	Surgically treated
Santos-Fernández *et al*[18], 2015	64	Female	Prepiloric antral ulcer	Well differentiated gastric adenocarcinoma	Pancreatic tail	Pancreatic adenocarcinoma	Not mentioned
Arabadzhieva *et al*[19], 2016	60	Female	In the pyloric area	Gastric GIST	Pancreatic body	Pancreatic neuroendocrine tumor	Surgically treated
Yonenaga *et al*[20], 2016	63	Male	Antrum of the stomach	Poorly differentiated adenocarcinoma.	The body of the pancreas	PACC	Chemotherapy
Our case, 2021	69	Male	Antrum of the stomach	Gastric adenocarcinoma	The tail of the pancreas	PACC	Surgically treated; Chemotherapy

GIST: Gastrointestinal stromal tumors; PDAC: Pancreatic ductal adenocarcinoma; PACC: Pancreatic acinar cell carcinoma.

pancreatic tumor in these cases. Among the 17 synchronous concomitant cancer cases, PDAC accounted for 70.6% (12/17) and PACC accounted for 11.1% (2/17). The pathological type was not mentioned in the remaining three cases. The most common tumor location was the head of the pancreas, accounting for 66.7% of cases (10/15). Two cases of tumors in the body of the pancreas and three cases of tumors located in the tail of the pancreas have been described. In two cases, the tumor location was not reported. Eleven patients (64.7%) underwent surgery for pancreatic and gastric tumors. All were diagnosed pathologically after surgery—which is consistent with our

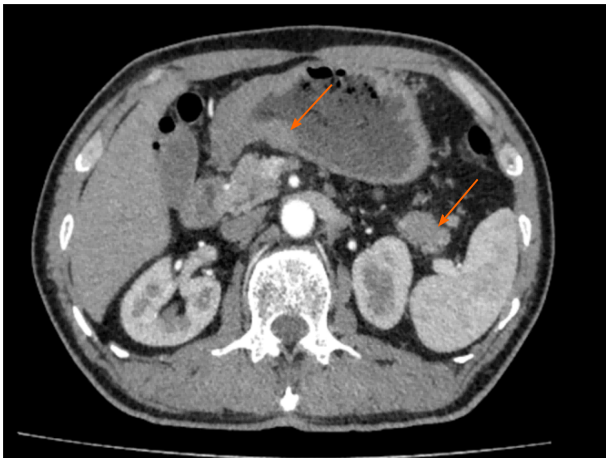

Figure 1 Imaging examinations performed before surgery. On contrast-enhanced computed tomography of stomach, arrow on the left showed uneven thickened with irregular mucosa and heterogeneous contrast enhancement on the antrum of gastric wall; arrow on the right indicated a space-occupying lesion about 34 mm × 16 mm in the tail of the pancreas.

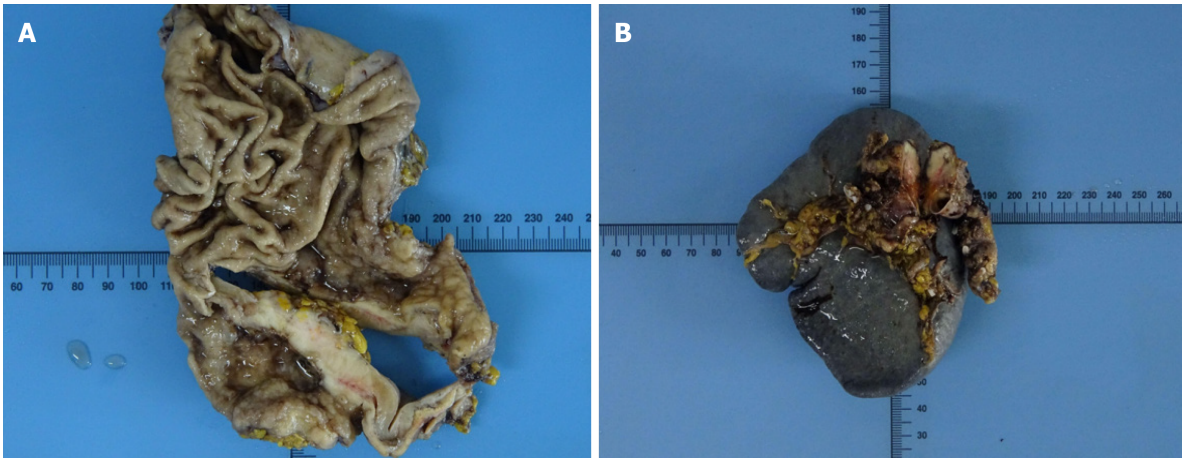

Figure 2 Resection specimen. A: Resection specimen of gastric tumor; B: Resection specimen of pancreatic tumor.

case—and none were diagnosed before surgery. These patients underwent curative resection; this may indicate that these patients were diagnosed at earlier stages and are likely to have better prognoses than patients with only pancreatic cancer. Nevertheless, concomitant cancers exist, and a second tumor should not necessarily be considered as a metastasis from another organ, leading to misdiagnosis and the abandonment of surgical resection.

The clinical manifestations of PACC are related to the location and size of the tumor. Unlike patients with PDAC, patients with PACC present with nonspecific symptoms, including abdominal discomfort, weight loss, weakness, nausea, vomiting, melena, and diarrhea[21]. However, the clinical symptoms of PDAC, such as painless obstructive jaundice, are uncommon in PACC[22].

Endoscopic ultrasonography (EUS) and imaging findings such as CT and magnetic resonance imaging (MRI) help achieve a correct preoperative diagnosis for concomitant cancers[23]. CT is a valuable tool for the accurate preoperative evaluation of the local extent of gastric cancer; EUS can be used for histopathological confirmation [24]. PACC tumors tend to be solid when small and contain cystic or necrotic areas when large. These tumors generally lack dilatation of the biliary or pancreatic ducts on CT[25]. However, PACC can be difficult to diagnose based on radiological findings alone. EUS-guided fine-needle aspiration (EUS-FNA) has a very high sensitivity (> 85%) and specificity (> 95%) for diagnosis of malignancy in a solid pancreatic mass compared to cross-sectional imaging (CT/MRI)[26]. Whereas the position of the pancreas is relatively deep and EUS-FNA is difficult. An experienced radiologist can give a preliminary imaging diagnosis of PDAC, which tends to be hypovascular, appearing hypoechoic on imaging[27]. However, it is difficult to distinguish whether

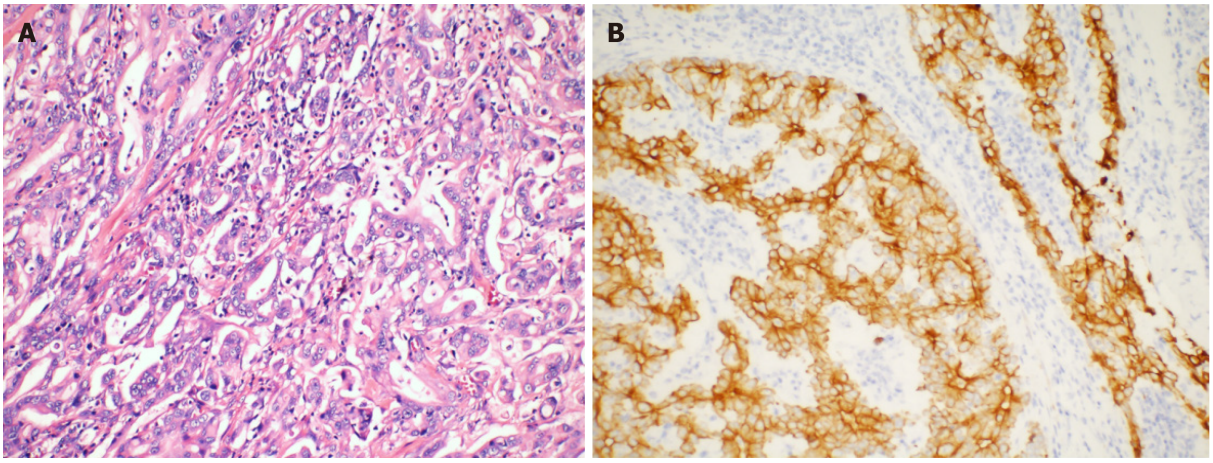

Figure 3 Microscopic examinations of gastric. A: Routine histology, stained using hematoxylin-eosin, shows gastric adenocarcinoma (magnification: × 200); B: Immunohistochemical staining of gastric tumor cells is partial positive for Cytokeratin 7 (magnification: × 200).

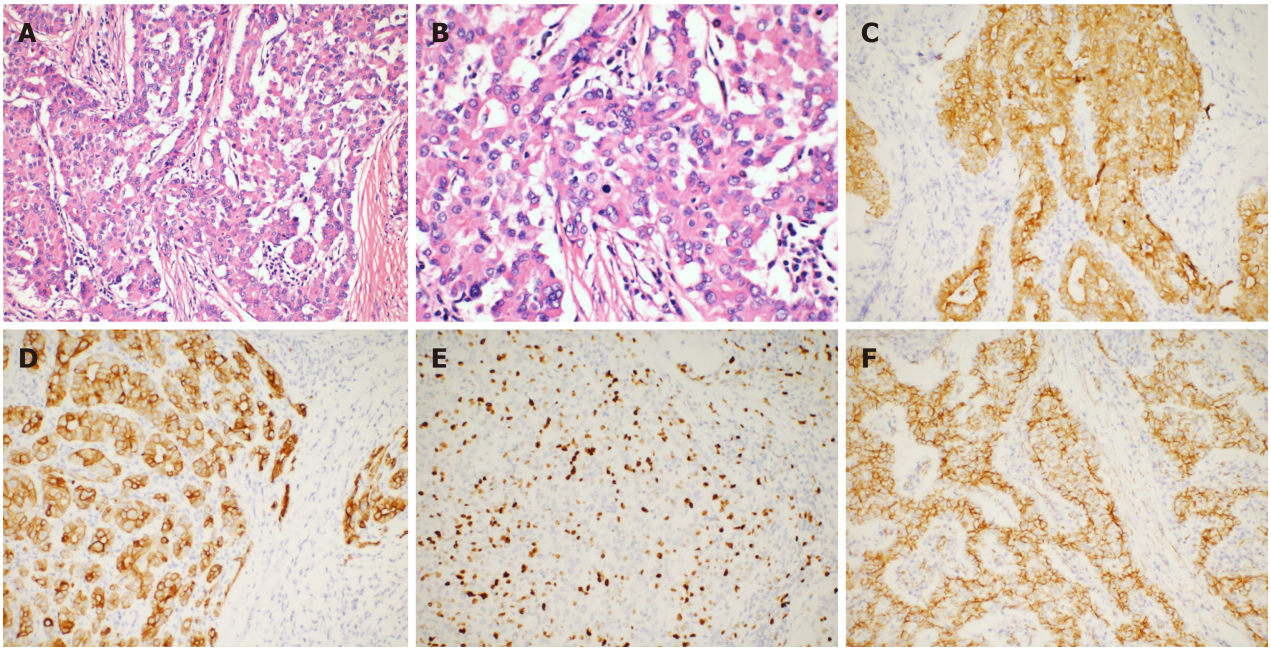

Figure 4 Microscopic examinations of pancreas. A: Routine histology, stained using hematoxylin-eosin, shows pancreatic acinar cell adenocarcinoma (magnification: × 200); B: Nuclear division in pancreatic acinar cell carcinoma (magnification: × 400); C: Immunohistochemical staining of pancreatic tumor cells: CAM5.2 expression in pancreatic tumor (magnification: × 200); D: CK19 expression in pancreatic tumor (magnification: × 200); E: Ki-67 partial expression in pancreatic tumor (+ 30%) (magnification: × 200); F: Membranous expression of beta-catenin in pancreatic tumor (magnification: × 200).

or not the primary tumor has metastasized to other organs in imaging, because tumors can also metastasize through the hematogenous or the lymphatic pathway in addition to direct invasion. If necessary, preoperative pathology must be performed to opt for the correct surgical approach. The present case of abdominal CT revealed a 41-mm heterogenous mass with a clear boundary in the tail of the pancreas, which is suggestive of a primary tumor.

The prevalence of pancreatic metastasis of gastric cancer is extremely rare with, only 12 cases of isolated pancreatic metastasis in gastric cancer have been reported in the literature[28]. Correspondingly, metastatic gastric tumor secondary to pancreatic carcinoma is clinically unusual, with only seven cases of gastric metastasis of pancreatic cancer have been reported in the literature[29-35]. In all these cases, the histopathology and immunohistochemical of primary cancer and metastatic cancer are consistent. However, this is completely different from our case. The histopathology of the two resected specimens was different, showing adenocarcinoma in the stomach and acinar cell carcinoma in the pancreas. Moreover, immunohistochemical studies showed differences in staining at the two sites. Finally, we concluded that both of

them were primary tumors and not metastatic tumors.

PACC is associated with a better prognosis than PDAC but a worse prognosis than pancreatic neuroendocrine tumors[36]. Metastatic PACCs are generally not curable and are treated with systemic chemotherapy[37]. The treatment regimens have not yet been standardized. Takahashi *et al*[38] reported that platinum-containing regimens exhibited some potential efficacy in patients with advanced PACC. The response to platinum-containing regimens was 40%, and the overall survival tended to be better in patients who had received a platinum-containing regimen[38]. Simultaneous removal of concomitant primary carcinomas should be attempted; radiotherapy and chemotherapy should also be considered for patients who need adjuvant treatment decided by both disease stages[39]. If adjuvant treatment is required, the physician should select an antineoplastic therapy that considers both cancers. In our case—whether gastric adenocarcinoma or PACC—the optimal chemotherapy regimen was SOX.

CONCLUSION

The presence of synchronous multiple primary malignancies does not necessarily signify an unfavorable prognosis as long as adequate diagnosis and effective treatment are performed. In the future, well-powered clinical trials will be needed to augment our understanding of these processes.

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