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Case Report

A rare collision tumor of gastrointestinal stromal tumor of the stomach and pancreatic ductal adenocarcinoma

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Abstract: Collision tumors involving GIST are very rare. Herein, we report a collision tumor consisting of gastric gastrointestinal stromal tumor (GIST) and pancreatic ductal adenocarcinoma. The patient was a 76-year-old Chinese male, presenting with abdominal distension, haematemesis and melena. Both the CT scan images and the gross appearance demonstrated special features indicating the possibility of a tumor with two different elements, which were once ignored by the initial diagnosticians. Microscopic and immunohistochemical features identified a collision tumor involving GIST and pancreatic ductal adenocarcinoma. To our best, this is the first such a case reported in the English literature.

Keywords: Collision tumor, pancreatic ductal adenocarcinoma, GIST, diagnostic pitfall

Introduction

Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the gastrointestinal tract. Although synchronous or metachronous occurrence of separate GIST and other tumors is not uncommon [1-15], with a few cases of synchronous GIST and pancreatic neoplasms [1, 2, 9-15], collision tumors involving GIST are very rare [1, 16-22]. Herein, we report a collision tumor of gastric GIST and pancreatic ductal adenocarcinoma (PDAC), which provided diagnostic pitfalls due to its rarity and the morphologic properties of the two components involved in it.

Case presentation

A 76-year-old Chinese male presented with abdominal distension for one month and haematemesis with melena for two days. Physical examination revealed an upper abdominal mass. No significant past medical history was noted. The upper gastrointestinal endoscopy showed a raised nodular mass at the fundus of the stomach. Biopsy was performed, but no evidence of neoplasm was obtained. Abdominal CT scan demonstrated a large ill-defined inhomogeneous mass located in the body of the pancreas (**Figure 1**). The patient underwent a palliative tumor resection with distal pancreatectomy, partial gastrectomy and splenectomy in May 2013.

Grossly, there was a bulky, heterogeneous mass up to 10 cm involving both the pancreas and the stomach. The portion involving the pancreas was a poorly defined, infiltrative mass with a solid and firm appearance, and the cut surface was grayish yellow mixed with white in color. The portion attaching to the gastric wall by a narrow pedicle was a well-circumscribed 6 cm nodule with a fleshy, pink-tan cut surface (**Figure 2**). These two portions merged together into a single mass, and no definite boundary was seen.

Microscopically, the pancreatic part of the tumor revealed a diffuse infiltration of haphazardly arranged dysplasia glands involving the parenchyma of the pancreas with a desmoplastic reaction of the spindle-shaped myofibroblastic cells, suggestive of classic conventional PDAC (**Figure 3A**). However, the gastric part was composed of fasciculated arranged spindle cells, which exhibited minimal atypia with delicate cytoplasmic processes and fine chromatin. The spindle cells demonstrated a syncytial

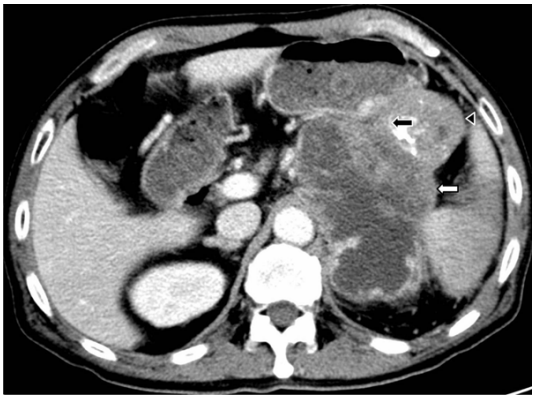

Figure 1. Contrast-enhanced CT scan showed a mass arising from the body and tail of the pancreas (white arrow). Note the relatively well-defined nodule (black arrowhead) with multiple calcifications, which adhered closely to the stomach. The boundary between the mass and the nodule could be delineated (black arrow).

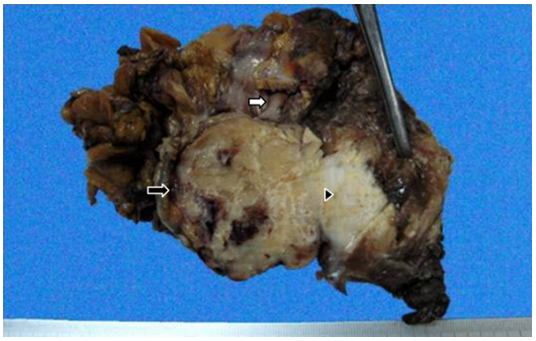

Figure 2. The collision tumor consisting of PDAC (arrowhead) and GIST (black arrow), which was attaching to the gastric wall by a narrow pedicle (white arrow).

appearance. Mitoses of these spindle cells numbered 3 per 5 mm^2. Fibrosis and calcification were seen in some areas. Notably, in the intermingled part of the mass, the malignant glands were found infiltrating into the spindle cells of the gastric part (**Figure 3B** and **3C**). Immunohistochemically, the adenocarcinoma cells were positive for cytokeratin AE1/AE3, while the reactive myofibroblastic cells were only positive for smooth muscle actin. Meanwhile, the spindle cells of the gastric part were positive for CD117 (**Figure 3D**), CD34, smooth muscle actin, and negative for DOG-1, desmin, S-100 protein and cytokeratin AE1/AE3. Molecular genetic test was performed on the gastric spindle-cell portion and *KIT* exon 11 mutation (Q556_V559delinsH) was observed.

Based on the aforementioned findings, the final diagnosis was a collision tumor of an advanced moderately differentiated PDAC and a low-risk gastric GIST [23].

The patient died 3 months after the surgery.

Discussion

Collision tumors consisting of GIST and other neoplasms have rarely been reported. To our best knowledge, there were less than 20 cases reported in the English literature [1, 16-22]. The most common cases reported were gastric tumors involving GIST and adenocarcinoma [16-19], while rare cases included GIST with inflammatory myofibroblastic tumor in a single gastric polypoid mass [20], gastric tumor involving collision of GIST and angiosarcoma [21], and rectal GIST involving prostatic adenocarcinoma [22]. Some other reported collision tumors involving GIST were actually composed of a gastric GIST and a closely associated tumor without intermingling with each other [24-27]. The current case is the first published example describing a collision tumor involving gastric GIST and PDAC.

Collision tumors could increase the complexity of the diagnosis and treatment process. Due to the rarity, it's unlikely for diagnosticians to be aware of a collision tumor initially. As in this case, neither the radiological report nor the initial macroscopical description of the tumor gave any suggestion to the possibility of a collision tumor at the very beginning. When a diagnosis of collision tumor was proposed based on the histology, both the CT scan and the gross specimen were reviewed. Actually, both of them did suggest a possible collision tumor when examined closely (**Figures 1** and **2**). In addition, the histological features of the two components in the current case may be confusing and also contribute to the diagnostic pitfalls. As we know, the extensive desmoplastic reaction of myofibroblasts is a property for most PDACs. So, when sampling was insufficient or only a biopsy was performed, the spindle tumor cells of the GIST here might be easily interpreted as the florid desmoplastic stroma of the PDAC. On the other hand, the small cluster of well differentiated carcinoma glands infiltrating into the GIST might be interpreted as non-neoplastic glands entrapped in the GIST as well [16]. Either situation could lead to a missed diagnosis of

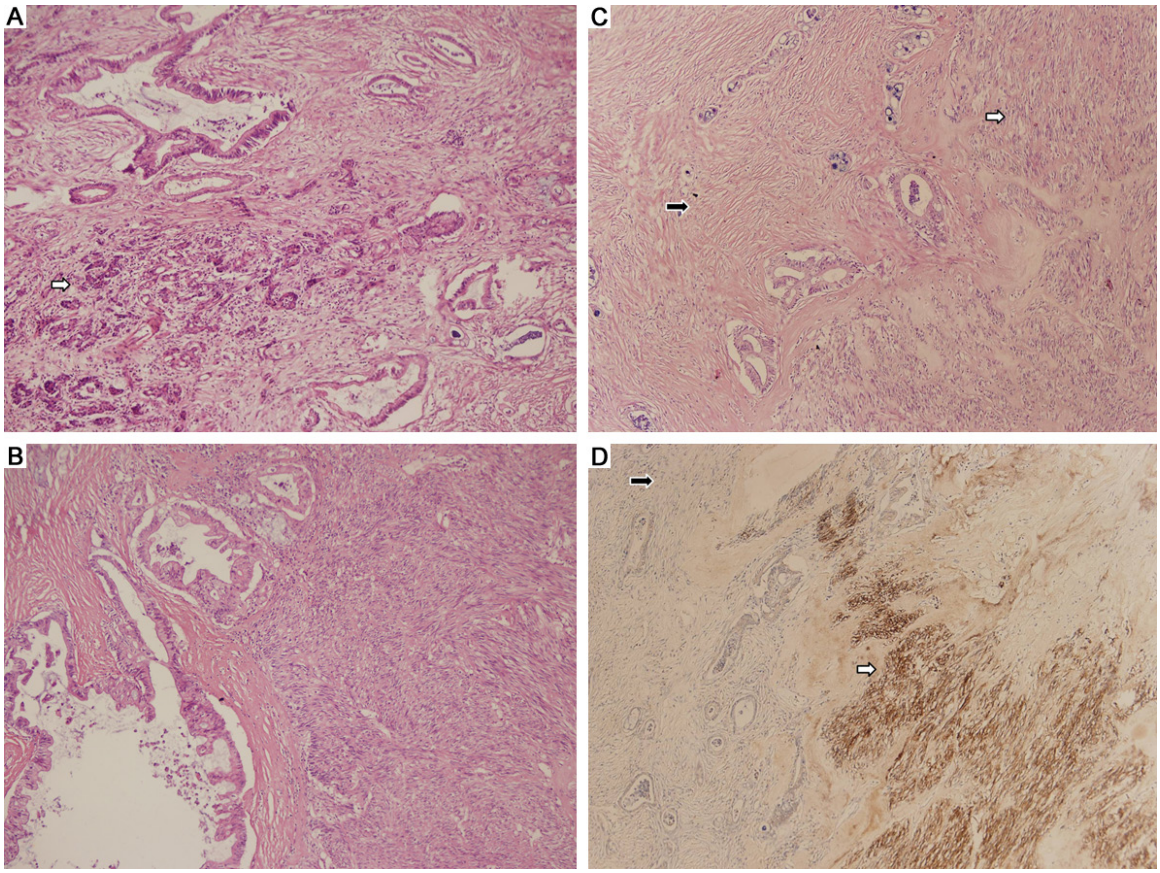

Figure 3. A. The PDAC with desmoplastic stromal reaction in the parenchyma of pancreas (white arrow) (×100). B and C. At the merging interface of collision tumor. The adenocarcinoma glands were infiltrating into the GIST (×100). C and D. The tumor cells (white arrows) of GIST were strongly positive for CD117, while the reactive myofibroblastic cells (black arrows) were negative (×100).

one of the components of the collision tumor. Besides, there are also some other uncommon lesions which demonstrate a biphasic histological feature and should be considered in the differential diagnostic list, including carcinosarcoma, pancreatic mucinous cystic neoplasm with sarcomatous stroma [28] and primary phyllodes tumor of the pancreas [29]. Therefore, sufficient sampling, attentive observation of the morphologic traits, essential differential immunohistochemical markers, and careful clinicopathological correlation should be required and would be much helpful in confirming the diagnosis.

PDACs are much more aggressive than GISTs, with the mean survival time of 3-5 months for untreated patients. So, it was the PDAC in this case that determined the prognosis of the patient.

In summary, we report a rare collision tumor of gastric GIST and PDAC, which presented with special radiological and macroscopic features once ignored by the diagnosticians. The final diagnosis has been based on the careful review of the clinical, histopathological, immunohistochemical and molecular features of the tumor.

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Disclosure of conflict of interest

None.

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