

## Case Report

# Huge gastrointestinal stromal tumor with peritoneal metastasis: a case report

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**Abstract:** A 66-year-old male with aggravating abdominal discomfort was admitted to Wujin Hospital Affiliated to Jiangsu University (Changzhou, China). An enhanced abdominal computed tomography scans demonstrated a large low-density region featuring an unclear border with uneven density on the left side of the abdominal cavity. The level of tumor marker carbohydrate antigen 125 was 437.90 U/ml exceeding the norm for 12 times. An exploratory laparotomy under general anesthesia was performed and revealed a huge, soft, uneven tumor that almost filled half the abdominal cavity. The whole tumor, a fraction of the greater curvature of stomach, tail of pancreas and the spleen were resected together. No evidence of liver metastasis, lymphadenopathy. But peritoneal metastasis and mesenteric metastasis were found. The tumor measured approximately 35 cm×29 cm×10 cm in diameter and weighed 6.8 kg. Histopathological examination of the resected specimen revealed a stromal cell neoplasm with a mitotic count of more than 10 mitoses per 50 high power fields. Immunohistochemical study indicated that the tumor cells were positive for CD117, DoG-1, CD34, CD50 and Ki-67 (20%). The final diagnosis was gastric gastrointestinal stromal tumor. The patient recovered well after surgery.

**Keywords:** Gastrointestinal stromal tumor, abdominal neoplasm, carbohydrate antigen 125, imatinib mesylate, KIT

## Introduction

Gastrointestinal stromal tumors (GISTs), while extremely rare, accounting for 0.1% to 3.0% of all gastrointestinal neoplasms, are the most common mesenchymal tumors of the gastrointestinal tract and are believed to originate from the interstitial cells of Cajal (ICCs) or related stem cells [1, 2]. GISTs appear everywhere in the alimentary canal where ICCs are present, including the gastric body (42.3%), prepyloric area (28.5%), small intestine (25%-30%), colon and rectum (3%-10%), and few originate from the mesentery, omentum or retroperitoneum outside the gastrointestinal tract [3]. The key factor for the occurrence of this disease is the mutation activating tyrosine kinase (KIT) and PDGFRA membrane receptors. In this paper, we study a case of a male patient treated for a very uncommon huge GIST with peritoneal metastasis, with a specific marker CA125 rising.

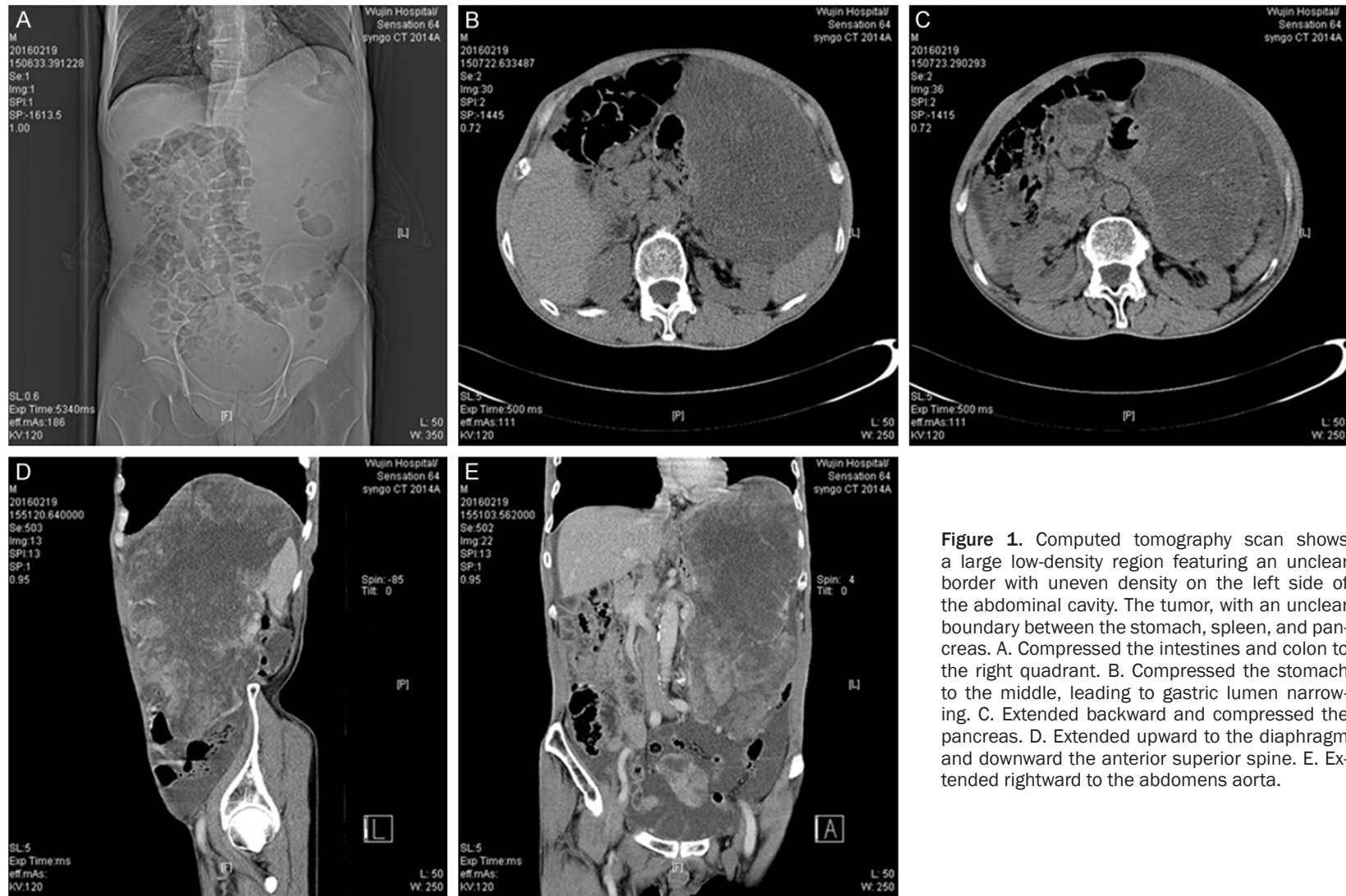
## Case report

A 66-year-old man, who presented with three months-long history of aggravating abdominal

discomfort that was mainly associated with distension and symptoms such as epigastric fullness, eructation, decrease of food intake and early satiety, was admitted to our hospital. He did not report any loss in body weight. A physical examination revealed an obvious mass in the left upper abdomen, extending from the abdominal median to the left hypochondrial region, with a rugged surface. His liver and spleen were not palpable distance from the costal margin, and were not tender on palpation. All routine blood and biochemical markers were normal. The serum levels of specific tumor markers (CEA, AFP and CA19-9) were within the normal range. However, the level of tumor marker carbohydrate antigen 125 was 437.90 U/ml exceeding the norm for 12 times. The level of d-dimer was 1.94 mg/L.

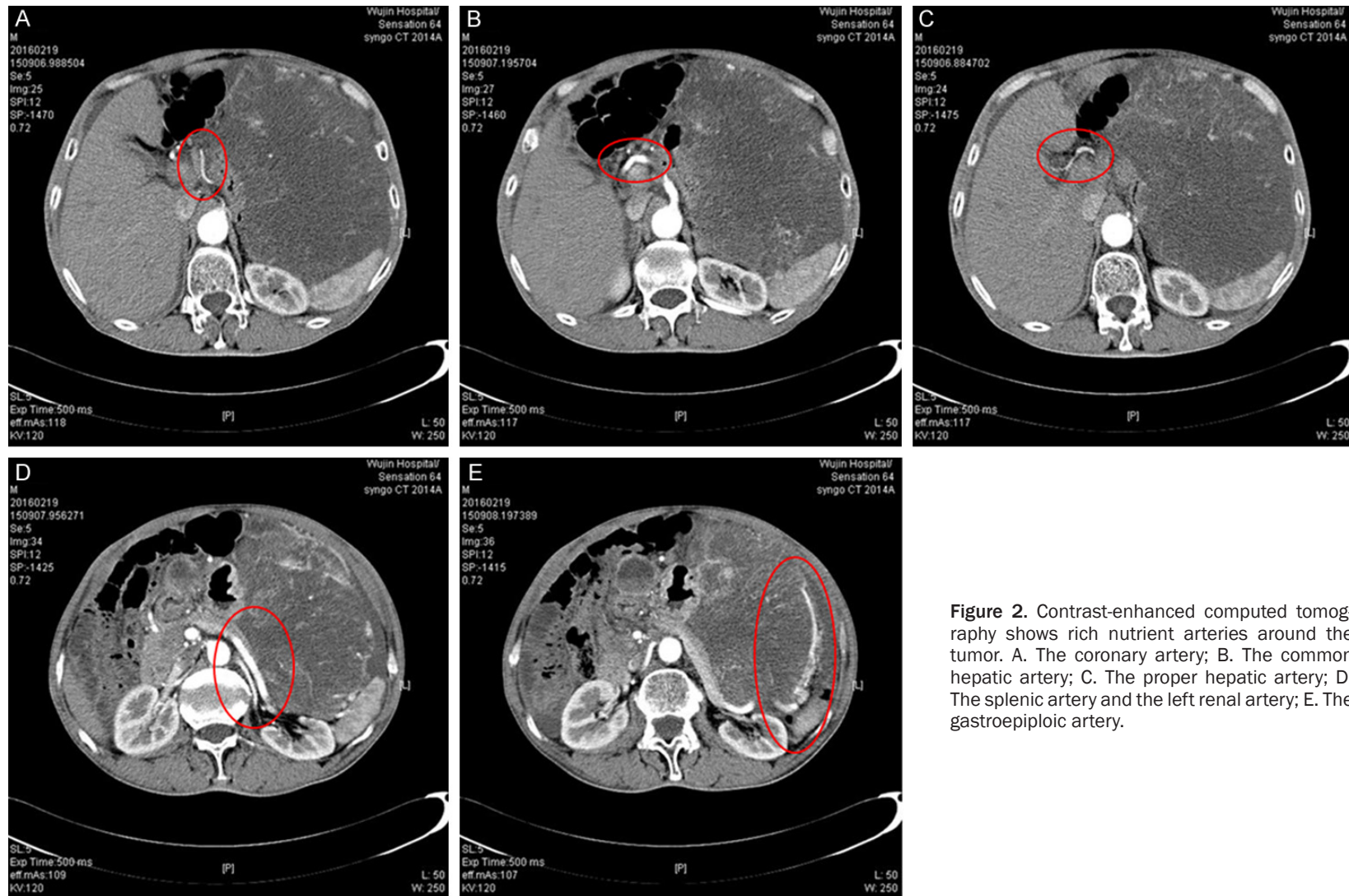
The gastroscopic examination did not show any abnormality. Enhanced abdominal computed tomography scans demonstrated a large low-density region featuring an unclear border with uneven density on the left side of the abdominal cavity, which was local enhancement after enhanced. The mass was up toward the dia-

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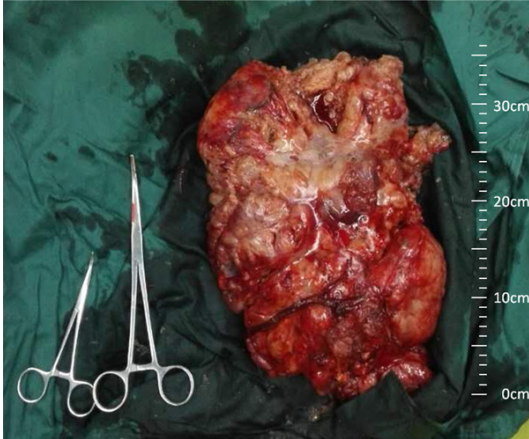
**Figure 1.** Computed tomography scan shows a large low-density region featuring an unclear border with uneven density on the left side of the abdominal cavity. The tumor, with an unclear boundary between the stomach, spleen, and pancreas. A. Compressed the intestines and colon to the right quadrant. B. Compressed the stomach to the middle, leading to gastric lumen narrowing. C. Extended backward and compressed the pancreas. D. Extended upward to the diaphragm and downward the anterior superior spine. E. Extended rightward to the abdomens aorta.

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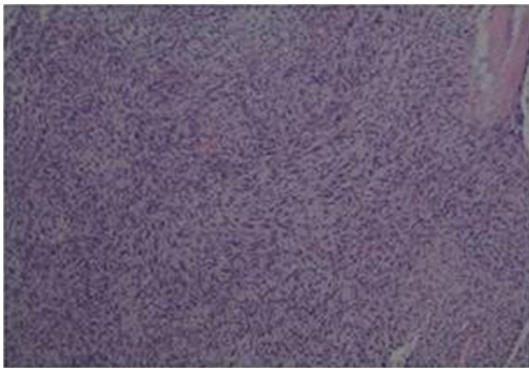


**Figure 2.** Contrast-enhanced computed tomography shows rich nutrient arteries around the tumor. A. The coronary artery; B. The common hepatic artery; C. The proper hepatic artery; D. The splenic artery and the left renal artery; E. The gastroepiploic artery.

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**Figure 3.** The tumor protrudes from the anterior wall of the fundus, on the greater curvature of the stomach, measuring 35 cm×29 cm×10 cm in diameter and weighing 6.8 kg.



**Figure 4.** Pathological analysis demonstrated a gastrointestinal stromal tumor with high degree of risk (hematoxylin and eosin; magnification, ×200).

phragm and down toward the anterior superior spine. There were no signs of lymphadenopathy or liver disease. But, the stomach, pancreas, spleen, left kidney, intestine, colonic were pressured and might be invaded (**Figure 1**).

Computed tomography angiography showed that there were a lot of nutrient arteries around the tumor. The coronary artery, common hepatic artery, proper hepatic artery, splenic artery, left renal artery, gastroepiploic artery next to the tumor were compressed (**Figure 2**).

An exploratory laparotomy under general anesthesia was performed and revealed a huge, soft, uneven tumor that almost filled half the abdominal cavity. It appeared to protrude from the anterior wall of the fundus of his stomach, on the greater curvature. The tumor was well-

demarcated from the liver and transverse colon, but the pancreas and spleen were involved with the tumor. Furthermore, the main nutrient vessels were Stomach retinal blood vessels and short gastric vessels. In order to completely extirpate the tumor, a fraction of the greater curvature of stomach, the tail of pancreas and the spleen were resected together. No evidence of liver metastasis, lymphadenopathy. But peritoneal metastasis and mesenteric metastasis were found. The tumor measured approximately 35 cm×29 cm×10 cm in diameter and weighed 6.8 kg (**Figure 3**).

On the first postoperative day afternoon, a lot of fresh blood was remarkably found exuding from abdominal cavity drainage tube. The level of hemoglobin dropped from 82 g/L in the morning to 66 g/L in the afternoon, which was 138 g/L before surgery. An emergency laparotomy was performed to hemostasis. We found that the visceral surface of diaphragm had a slight bit of bleeding, which was fused with the tumour in the first operation. Electrocoagulation and ligation were applied to control the hemorrhage during the surgery, while controlled hypotension was used after the surgery. The operation was plain sailing, and there was not any trouble after the second surgery.

Histopathological examination of the resected specimen revealed a stromal cell neoplasm with a mitotic count of more than 10 mitoses per 50 high power fields (**Figure 4**). Immunohistochemical analysis revealed the specimen to be CD117 positive, DoG-1 positive, CD34 positive, Desmin negative, S-100 negative, SMA negative, CD50 positive, CK negative, Vim positive, HMB-45 negative and Ki-67 positive (20%).

### Discussion

GISTs were first put forward as a group of mesenchymal tumors of neurogenic or myogenic differentiation, which lacked the immunohistochemical features of Schwann cells and did not have the ultrastructural characteristics of smooth muscle cells, by Mazur and Clark in 1983 [4]. GISTs can occur at any age, especially at 50 to 70 years old, few at young. The patients didn't have any discomfort in the early phase of the disease, until the tumor had grown up to about 5 cm long. The clinical manifestation of GISTs, such as abdominal distension,

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lower abdominal pain, GI bleeding and abdominal mass, varies with the size and location of tumors [5]. Patients with certain nongastric tumors (2.1-5 cm and > 5 mitoses per 50 high-power fields or 5.1-10 cm and ≤ 5 per 50 high-power fields) and those with tumor rupture are proposed to be included in the National Institutes of Health (NIH) high-risk category [6].

The main examinations of GISTs before surgery are endoscopy and upper gastrointestinal radiography. For endoscopic characteristic, the tumors are always located in the submucosal, of different size, sometimes with mucosal ulcer sometimes. It is valuable to confirm the invading area and the size of tumor by endoscopic ultrasonography. What is more, it is important to find whether hepatic metastases occur using computed tomography. In this case, computed tomography is more useful in showing the tumor location and other appearance nearby. However, it had its own limitation in displaying peritoneal metastasis. To this, CA125 showed its advantage in this case. Emoto has demonstrated that the degree of peritoneal metastasis was correlated with CA125 [7]. Indeed, it has been shown that CA125 on the cancer cell surface membrane contributes to the formation of metastasis to the peritoneum by initiating cell attachment to the mesothelial cells via binding to their cell surface molecule mesothelin [8]. Therefore, elevated CA125 may in fact have a causal relationship with the peritoneal metastasis.

Because of the insensitivity to conventional chemotherapy, surgical resection is the only way to cure the primary local GISTs. The main purpose of the operation is to remove the tumor and the invaded tissues around completely. It has a major impact on the prognosis of patients and tumor recurrence. In the current report, the spleen and the tail of pancreas were resected with the whole tumor. However, the histopathological examination of the spleen, the pancreas, and the lymph nodes were not involved by the tumor. Thus it can be seen that the capacity for invading neighboring organs and lymphatic metastasis of GISTs is very poor. In consequence, the surgical principles of gastrointestinal stromal tumor are composed of an R0 resection with a normal mucosa margin, no systemic lymph node dissection, and avoidance of perforation, which results in peritoneal seeding even in cases with otherwise low risk

profiles [9]. Laparoscopic surgery or laparoscopic and endoscopic cooperative surgery (LECS) may be an acceptable optional treatment to open surgery for gastric GISTs [10, 11]. In general, the neoplasm is well circumscribed and modest size for minimally invasive surgery. However, hemorrhage frequently occurs in huge tumor resection. And controlled hypotension must be an effective remedy.

Imatinib mesylate is a tyrosine kinase inhibitor with activity against ABL, BCR-ABL, KIT, PDGFRA, PDGFRB and CSF1R. The application of imatinib for the treatment of GIST remains a remarkable illustration of the ability and promise of targeted molecular therapy. There have been multiple trials testing the most appropriate dosing of imatinib. 400 mg/d has been found to have equivalent response rates and overall survival (OS) compared to higher doses, which are associated with more side effects. Indications for a higher dosing (800 mg/d) include patients with an exon 9 KIT mutation or those with tumors which continue to progress on the standard 400 mg/d dosage [12]. Evidence is mounting that only a select fraction of patients in the adjuvant setting may benefit from imatinib [13]. Unfortunately, most patients with metastatic disease develop resistance to imatinib, as occurs in other diseases with kinase inhibitors [14]. Thus, although imatinib has demonstrated that kinase inhibitor therapy is an integral component of cancer care, it has also revealed the challenges in treating a dynamic cancer with a static monotherapy.

In conclusion, the huge gastrointestinal stromal tumor occupying half the abdominal cavity with peritoneal metastasis is rare. According to fundamental surgical principles in the management of GISTs, we completely resected the tumor with a partial stomach, a little pancreas and the whole spleen. The patient has been followed-up after the operation. Furthermore, we will periodically examine the patient and follow support guidelines for medical therapy. We hope the presentation of this rare case could benefit others when they encounter similar problems.

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## Disclosure of conflict of interest

None.

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