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CASE REPORT

Pancreatic Adenocarcinoma Presenting as Sinistral Portal Hypertension: An Unusual Presentation of Pancreatic Cancer

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A rare syndrome, sinistral (left-sided) portal hypertension resulting from splenic vein thrombosis secondary to pancreatic adenocarcinoma of the tail is presented here. Pancreatic cancer is notorious for presenting with vague and nonspecific symptoms, including but not exclusively weight loss, abdominal pain, and anorexia with or without jaundice. However, physicians should be aware that in the presence of splenic vein thrombosis, this finding alone puts pancreatic cancer high on the differential diagnosis.

INTRODUCTION

An uncommon form of upper gastrointestinal bleeding with an incidence of less than 1 percent, sinistral portal hypertension (SPH)[b] is a clinical syndrome should a thrombosis of the splenic vein manifest itself with bleeding gastric varices in a patient with a patent portal vein and normal hepatic function [1-3]. The phrase sinistral (segmental or left-sided) portal hypertension is used because the portal hypertension is confined to the left-side segment of the portal venous system, namely the splenic side. Splenic vein thrombosis (SVT) itself classically presents with the triad of isolated gastric varices, splenomegaly, and normal hepatic function [3]. The most common etiologies of SVT are pancreatic neoplasm, chronic pancreatitis, and pancreatic pseudocyst, although other causes include trauma, tuberculosis, retroperitoneal fibrosis, peptic ulcer disease, or a hypercoagulable state [2-12]. Although bleeding is the most common manifestation in this syndrome, SPH can occur without bleeding, and SVT can occur without evidence of SPH [2, 13].

SVT usually presents with isolated gastric varices resulting from decompression through the left gastric vein via the short gastric veins or epiploic venous system. However, SVT may present in the

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[b] *Abbreviations:* SPH, sinistral portal hypertension; SVT, Splenic vein thrombosis; CT, computed tomography.

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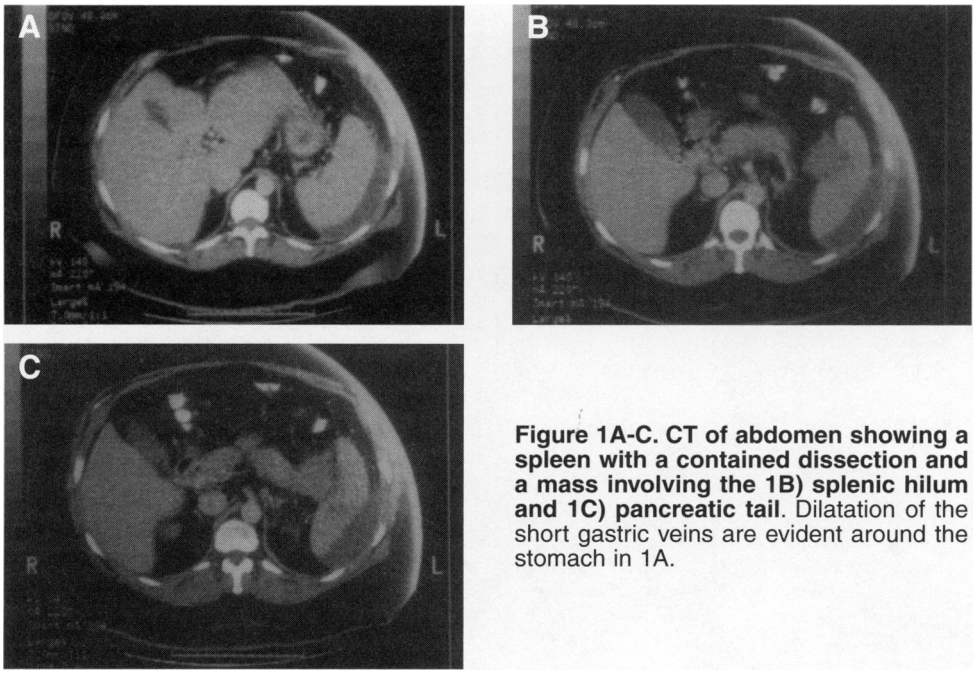

Figure 1A-C. CT of abdomen showing a spleen with a contained dissection and a mass involving the 1B) splenic hilum and 1C) pancreatic tail. Dilatation of the short gastric veins are evident around the stomach in 1A.

absence of gastric varices or the presence of esophageal varices, and, therefore, a high index of suspicion is required for the correct diagnosis in some cases. The reason for this variable presentation is due to variable drainage of the left gastric vein. In 17 percent of the population, the left gastric vein drains into the splenic vein preventing decompression via this route and instead, ultimately results in increased venous flow to the azygous venous system via esophageal veins, producing esophageal but not gastric varices [9, 14]. Regardless of the location of the varices, liver function is normal.

In any circumstance, the diagnosis of SVT is made most accurately by selective intra-arterial digital splenic angiogram [12]. CT scan as well as ultrasound may also demonstrate a splenic vein thrombus with the additional advantage of demonstrating any other abnormal abdominal, especially pancreatic, pathology [2, 3]. Splenectomy remains the most effective procedure in treating bleeding gastric varices [2, 3]. However, there have been rare reports that splenectomy may not be ideal and may actually exacerbate gastric variceal hemorrhage, thus requiring other forms of therapy [14].

CASE REPORT

The patient, a 51-year-old man who weighed over 370 pounds, was in his usual state of health until three months prior to admission when he started experiencing episodes of shortness of breath, dyspnea on exertion, weakness, fatigue, occasional light-headedness, constipation causing abdominal discomfort relieved after bowel movement, and diarrhea with melena that lasted for four days. He denied vision changes, chest pain, palpitations, fever or chills, dietary changes, weight changes, and any trauma. He also denied any history of alcohol abuse, dia-

betes, peptic ulcer disease, GI bleeding, anemia, heartburn, indigestion, nausea, vomiting, abdominal pain, aspirin, or NSAID use. He had stopped smoking 26 years prior. He visited his primary care physician two weeks prior to admission with these complaints and was found to have heme-positive stool secondary to GI bleeding of unknown origin. He was subsequently diagnosed with severe iron deficiency anemia, hypothyroidism, and new onset diabetes. He was started on iron, synthroid, and gluco-phage. Unfortunately, there was no improvement in his symptoms, and he was admitted to Yale-New Haven Hospital.

His physical exam was unremarkable except for a right goiter and heme-positive black, loose stool. His laboratory studies were remarkable only for a hematocrit of 12.4 percent and glucose of 276 mg/dl. Values for the following were normal: serum chemistries, divalent cations, white blood count, platelet count, amylase, lipase, total and direct bilirubin, alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, prothrombin time, and partial thromboplastin time.

Upper endoscopy and colonoscopy, performed to determine the cause of the gastrointestinal bleeding, showed extensive gastric varices in the stomach cardia, but no esophageal varices. No other source of bleeding was found elsewhere in the gastrointestinal tract. Given the presence of isolated gastric varices, computed tomography of the abdomen with contrast was performed to determine the presence of a splenic vein thrombosis. Unfortunately, the splenic vein as well as the

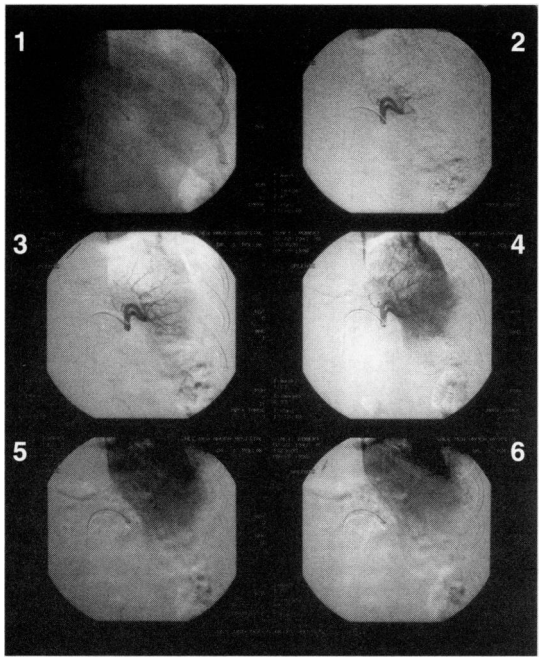

Figure 2. Digital splenic arteriogram from arterial to venous phase in sequence from 1 to 6. In sequence 1 before contrast injection into the splenic artery, only the catheter is seen. In sequence 2 to 4, the splenic artery is easily visualized. However, the splenic vein does not appear during the venous phase (sequence 5 to 6) indicating splenic vein thrombosis. Normally, the splenic vein would become apparent by sequence 5.

portal vein and superior mesenteric vein were not visualized. However, a 5 cm mass involving the pancreatic tail and splenic hilum was seen (Figure 1). The spleen itself was enlarged, but not markedly so, and showed evidence of a subcapsular hematoma. As the splenic vein was not visualized, digital splenic and superior mesenteric arteriograms were performed, which showed patent splenic artery and patent portal vein, but occluded splenic vein (Figure 2). In anticipation of a splenectomy, the splenic artery was embolized as a planned first stage of a two-step therapeutic plan. By this time, a total of eight units of blood was transfused during his hospitalization.

At laparotomy, the surgeon found a large indurated mass involving the pancreatic tail and spleen, which on biopsy proved to be pancreatic adenocarcinoma, moderately-to-poorly differentiated, infiltrating into the peripancreatic soft tissue and spleen. Metastatic tumor was identified in one out of seven lymph nodes, liver, and the perirenal fascia. TNM classification of T4N1M1 and pathologic stage IVB, grade 2-3 (AJCC 1997) was given.

COMMENT

Sinistral portal hypertension resulting from splenic vein thrombosis is a well known complication of pancreatic cancer [1-3, 5, 7, 9, 11, 12, 15-17]. This condition is not surprising as any blockage of the splenic vein would result in the accumulation of blood and, therefore, pressures upstream, particularly on the left side of the portal venous circulation. Because the splenic vein runs in close association with the pancreas for its entire length, any inflammation, let alone malignancy, may involve the splenic vein. Inflammation may induce spasm resulting in stasis and subsequent intimal damage, thereby predisposing to thrombosis [9]. Pancreatic carcinoma may cause SVT by direct invasion, extrinsic compression via mass effect, or hypercoagulable state [2, 9, 11, 15, 16]. Depending on the series, pancreatic cancer and pancreatitis are the two most common causes of SVT [2, 3, 5, 7, 9, 17].

SVT secondary to carcinoma of the pancreatic tail specifically must occur rarely, given the dearth of reports in the literature. Oddly enough, the very first report in the literature of splenic vein thrombosis causing gastric varices and bleeding was in fact secondary to carcinoma of the pancreatic tail [15]. After this first report, several other case reports of SVT and carcinoma of the pancreatic tail appeared [11, 12, 16]. In all but one case, discovery of the carcinoma arising in the tail of the pancreas occurred beyond the time at which resection was curative. Pancreatic cancer in general, but especially those not involving the head, seldom produces symptoms early enough so that it can be completely removed at operation.

The difficulty in diagnosis is apparent in this case report, in which the patient initially presented with signs and symptoms of severe anemia secondary to gastrointestinal bleeding. The patient lacked many of the "classic" vague and nonspecific symptoms of pancreatic cancer including abdominal pain, weight loss, anorexia, and jaundice. Weakness and fatigue seen in 30 percent of patients with pancreatic cancer can just as easily be due to his severe anemia. These symptoms were, in fact, alleviated with blood transfusions. Seen in 20 to 81 percent of patients with pancreatic cancer, only his new onset diabetes mellitus was suggestive of pancreatic cancer, but only in hindsight [18].

Only after his laboratory studies, upper endoscopy, and colonoscopy did a picture of SVT become apparent, given his normal liver functions and isolated gastric varices, which probably had been chronically bleeding slowly over months.

Hypersplenism was not readily apparent, given his normal platelet count, and splenomegaly was not striking on CT and at laparotomy, which argued against SPH and SVT. It should be noted that normal spleen size is not uncommon in splenic vein occlusion regardless of etiology. However, the presence of gastric varices without esophageal varices is a very specific sign of isolated SVT [17]. In any case, an intra-arterial digital splenic angiogram was definitive for SVT. Digital superior mesenteric angiogram ruled out portal vein thrombosis leading to the diagnosis of sinistral portal hypertension. Since the catheters were already in place, embolization of the splenic artery was carried out as a preoperative adjunct to splenectomy as has been advocated [2]. Indeed, it was only after discovering isolated gastric varices suggesting SVT that there was the suspicion of pancreatic pathology, confirmed by CT. The possibility of pancreatic cancer at this point was entertained, later confirmed at laparotomy, and consequently diagnosed by pathological examination.

The etiology of SVT in this case report was probably secondary to compression by mass effect. On pathological examination, the splenic vein was shown to be encased, but not invaded by pancreatic adenocarcinoma. Thrombi were not readily apparent, though they were seen in tributaries.

Pancreatic cancer should be suspected in patients with sinistral portal hypertension [1]. It is a rare condition that unfortunately does not help the physician in diagnosing pancreatic cancer any earlier. In the one case described in the literature in which resection was curative, the mass involved the hilum of the spleen adjacent to the splenic vein, causing splenomegaly secondary to compression and early gastric bleeding [16]. All other cases were not as fortunate. Although cure may not be achieved with splenectomy and distal pancreatectomy, extraordinary palliation can be accomplished by reducing gastric bleeding and subsequent blood transfusions. With relief from anemia and reduced tumor burden, pain and symptoms of anemia would be markedly reduced although prognosis would be unchanged.

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