CASE REPORT CRSLS

Gastric Bleeding After Laparoscopic Spleen-Preserving Distal Pancreatectomy

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ABSTRACT

Introduction: Laparoscopic spleen-preserving distal pancreatectomy for tumors of the pancreatic body and tail is becoming increasingly established at hepato-pancreato-biliary surgical departments worldwide. Spleen preservation is only recommended in benign or borderline lesions of the pancreas. We present a rare complication after laparoscopic spleen-preserving distal pancreatectomy.

Case Description: A 43-year-old woman with multiple endocrine neoplasia type 1 syndrome was referred to our department for surgical removal of a tumor in the pancreatic tail. A laparoscopic spleen-preserving distal pancreatectomy, including preservation of the splenic vessels, was performed. The patient was discharged on the tenth postoperative day after percutaneous drainage of peripancreatic fluid and transient fever. About 4 months postoperatively, she was admitted to her local hospital with recurrent anemia. Gastroscopy and abdominal computed tomography did not show any signs of bleeding, but prominent gastric varices and occlusion of the splenic vein were observed. The patient was referred back to our department, where an embolization of the splenic artery was performed with a percutaneous endovascular technique. She was discharged after 2 days with no recurrent anemia thereafter.

Discussion: Splenic artery embolization can be an effective treatment option for gastric variceal bleeding caused by splenic vein occlusion after laparoscopic spleen-preserving distal pancreatectomy.

Key Words: Laparoscopic pancreatic surgery, Distal pancreatectomy, Splenic artery embolization, Left-sided portal hypertension, Gastric variceal bleeding.

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INTRODUCTION

Laparoscopic spleen-preserving distal pancreatectomy for tumors of the pancreatic body and tail is becoming increasingly established at hepato-pancreato-biliary surgical departments worldwide. The advantages of the minimally invasive approach are less intraoperative bleeding,[1] faster postoperative recovery,[2] shorter hospital stay,[3] and improved cosmesis compared with the open approach. Spleen preservation is only recommended in benign or borderline lesions of the pancreas. There are 2 ways to preserve the spleen when one is performing a distal pancreatectomy—either by preserving the splenic vessels (splenic artery and vein) or by preserving the short gastric arteries and veins after division of the splenic vessels. The latter is known as the Warshaw technique.[4]

We present a rare complication after laparoscopic spleen-preserving distal pancreatectomy with preservation of the splenic vessels in a patient with multiple endocrine neoplasia type 1 syndrome.

CASE REPORT

A 43-year-old woman with multiple endocrine neoplasia type 1 syndrome was referred to our department for surgical removal of a 28 × 30–mm tumor in the pancreatic tail. A laparoscopic spleen-preserving distal pancreatectomy with preservation of the splenic vessels was performed, after the surgical procedures described earlier.[5] We used an endostapler (Endo GIA Black Reloads with Tri-Staple technology; Covidien, Dublin, Ireland) for transection of the pancreatic parenchyma and strengthened the staple line with a knotless wound closure device (V-Loc 180, size 3–0; Covidien).

On the second postoperative day, a fever developed and a significant elevation of the C-reactive protein level, from 74 to 313 mL/L, was registered. The serum amylase level was within the reference range (40 U/L). An abdominal computed tomography (CT) scan performed on the same day showed diffuse fluid surrounding the pancreatic transection area and between the stomach and left liver lobe. No signs of gastric varices were described by the radiologist. The intraoperatively placed peripancreatic drain (Silisoft 19 Charriere; Péters Surgical, Bobigny, France) was removed because the CT scan showed suboptimal positioning of this drain. Ultrasonography-guided percutaneous drainage was planned but was not performed because the amount of fluid seen with ultrasonography did not allow for puncture. On the sixth postoperative day, ultrasonographic control of the peripancreatic fluid was performed. A 90 × 60–mm loculation between the stomach and left liver lobe was found, and with the patient under local anesthesia, a percutaneous 8F pigtail catheter was introduced in the loculation. A thin yellow-brownish fluid was observed, but the amylase concentration of this fluid was not measured. On the next day, radiologic control with ultrasonography and abscessography with fluoroscopic spot filming did not show any remaining peripancreatic fluid, and the postoperatively placed drain was removed. The patient was discharged on the tenth postoperative day with a decreasing C-reactive protein level (102 mL/L) and without pain.

About 1 month after surgery, the patient was admitted to her local hospital with melena and anemia, with a hemoglobin level of 4.7 g/dL. She received transfusion of red cells. Gastroscopy, colonoscopy, capsule endoscopy, and abdominal CT did not show any source of bleeding. She was discharged but was readmitted 3 months later with recurrent anemia. On the basis of new diagnostic data obtained from abdominal CT and gastroscopy, prominent gastric varices and an occlusion of the splenic vein were described for the first time (**Figure 1**).

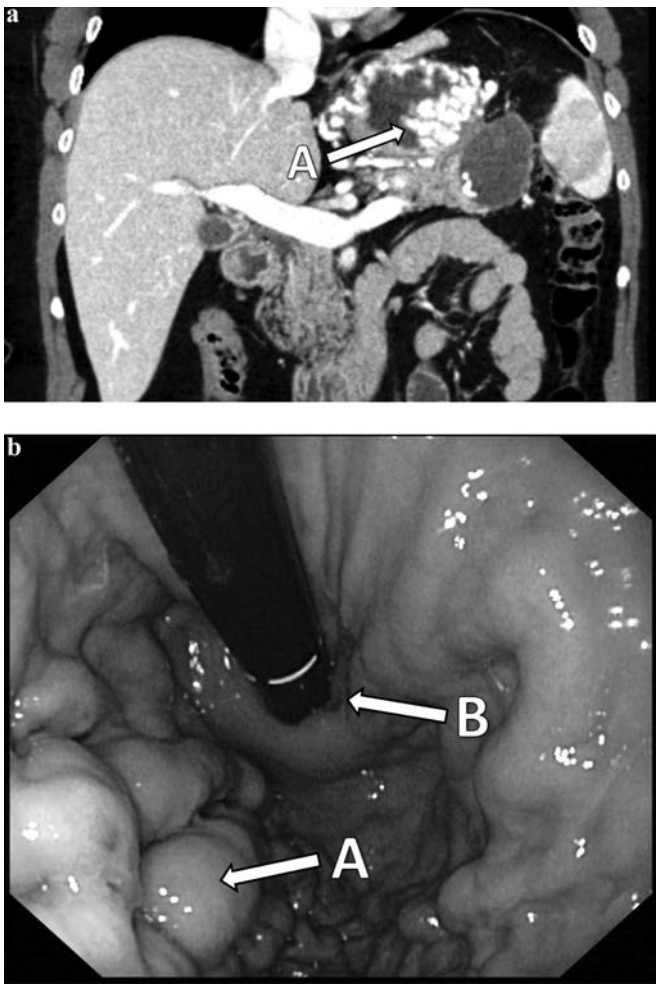

Figure 1. a, Abdominal CT scan before splenic artery embolization. (A, gastric varices.) b, Gastroscopy before splenic artery embolization. (A, gastric fundal varices; B, endoscope at cardia.)

The patient was referred to undergo percutaneous transcatheter occlusion of the splenic artery in the interventional radiology suite (**Figure 2**). After standard catheterization of the right femoral artery, a 6F, 90-cm introducer tray (Check-Flo; Cook Medical, Bloomington, Indiana) was advanced to the proximal part of the splenic artery over a 6F cobra guiding catheter, supported by a 4F glide catheter and a 0.035-inch glide wire (Terumo Interventional Systems, Tokyo, Japan). During fluoroscopic control, a vascular plug (Amplatzer Vascular Plug II; St. Jude Medical, Little Canada, Minnesota) with a diameter of 12 mm was placed proximal to the division of the splenic artery. The intra- and post-interventional courses were uneventful. The patient was discharged after 2 days, and at 17 months after intervention, she has not had any

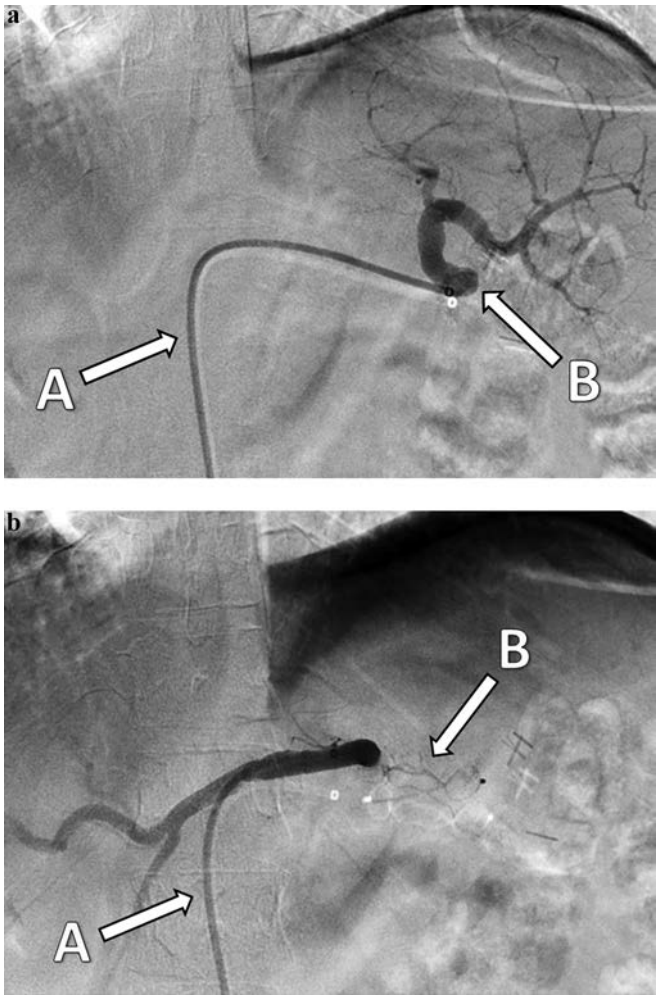

Figure 2. Digital subtraction angiography before and after splenic artery embolization. a, Angiography of splenic artery before embolization. (A, interventional catheter in splenic artery via right femoral artery; B, splenic artery.) b, Angiography of splenic artery after embolization. (A, interventional catheter in splenic artery via right femoral artery; B, vascular plug in splenic artery causing occlusion.)

recurrent anemia. Follow-up abdominal CT and gastroscopy did not show any gastric varices (**Figure 3**).

DISCUSSION

This case report is, to our knowledge, the first report of gastric variceal bleeding resulting from left-sided portal hypertension (LPH) due to occlusion of the splenic vein after spleen-preserving distal pancreatectomy with preservation of the splenic vessels.

LPH, also known as "sinistral" portal hypertension, is the result of an obstructed or thrombosed splenic vein that

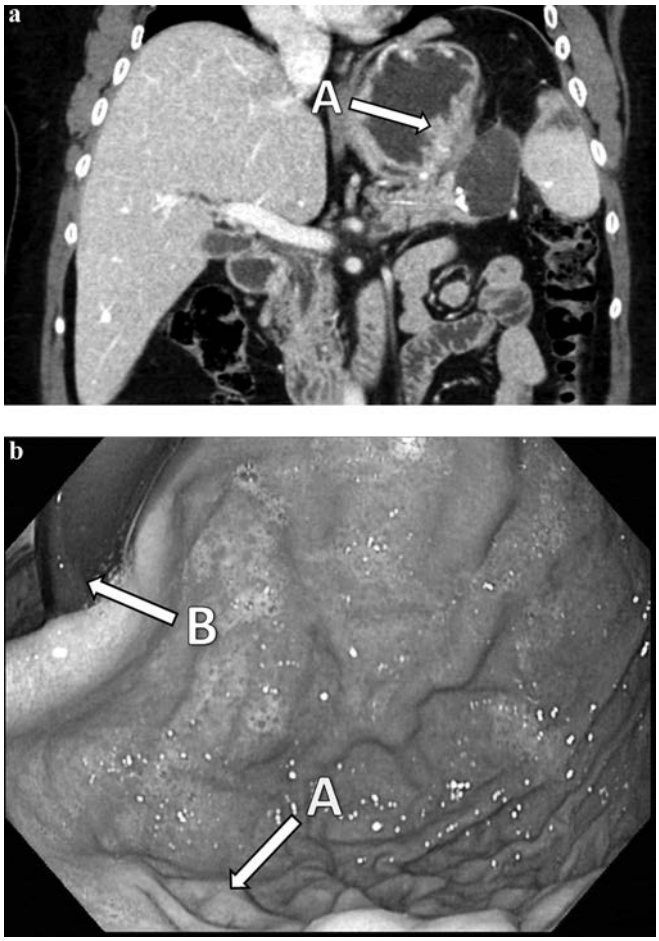

Figure 3. a, Abdominal CT scan after splenic artery embolization. (A, no gastric varices.) b, Gastroscopy after splenic artery embolization. (A, no gastric fundal varices; B, endoscope at cardia.)

results in increased collateral circulation through the short gastric veins and left gastric vein and back into the portal system, with subsequent development of gastric varices.[6] The pathophysiology of LPH was first described by Greenwald and Wasch[7] in 1939. Most cases of LPH are the result of pancreatic diseases such as acute and chronic pancreatitis, pancreatic pseudocysts, or pancreatic carcinoma or pancreatic surgery with division of the splenic vessels.[6,8,9] There are also nonpancreatic causes of LPH, such as trauma,[10] splenic cysts,[11] and renal carcinoma.[12] Gastric variceal bleeding caused by LPH is rare and occurs in about 4% of patients.[13] LPH should be suspected in patients with upper gastrointestinal bleeding and/or gastric varices, splenomegaly, and normal liver function.[14]

There are 2 curative treatment options for variceal bleeding caused by LPH—splenectomy[15–18] and splenic artery embolization.[19] Splenectomy is primarily indicated in patients with

acute life-threatening hemorrhage. The advantages of splenectomy include prevention of hypersplenism and reduction of possible future recurrent bleeding, whereas the disadvantages include the risk of surgical morbidity or death and potential for overwhelming postsplenectomy infection. Splenic artery embolization has the advantage of being minimally invasive and preserving the immunologic function of the spleen. Thus prevention of surgical morbidity or death and overwhelming postsplenectomy infection is maintained. The disadvantages of splenic artery embolization include the risk of post-interventional splenic abscess and septicemia due to splenic infarction.

In the patient in this case report, obstruction of the splenic vein developed after laparoscopic spleen-preserving distal pancreatectomy with preservation of the splenic vessels. When the abdominal CT scan obtained on the second postoperative day was reassessed, the splenic vein was obstructed over a short distance near the pancreatic transection plane and the postoperatively developing peripancreatic fluid. This suggests that there may have been surgical reasons for the occurrence of LPH, such as thermal damage to the splenic vein through heat produced by the bipolar tissue sealing device applied or obstruction of the splenic vein associated with stapling of the pancreatic parenchyma, in our patient. On the basis of our experience with laparoscopic distal pancreatectomy, postoperative development of fluid in close relation to the pancreatic transection plane is relatively common without being associated with obstruction of the splenic vein. Thus it seems more probable that the venous obstruction was caused by technical surgical factors. However, the exact reason for the splenic vein occlusion remains unknown. Another observation that was made when the different postoperative CT scans were reassessed was a remaining and increasing loculation at the pancreatic transection plane, which seemed to obstruct the splenic vein increasingly over time. Simultaneously, gastric varices developed.

In conclusion, this report shows that splenic artery embolization can be an effective treatment option for gastric variceal bleeding caused by splenic vein occlusion after laparoscopic spleen-preserving distal pancreatectomy. The case presented illustrates a rare complication after pancreatic surgery that could have been diagnosed earlier, even though initial gastroscopy was without pathologic findings. When upper gastrointestinal bleeding is occurring after distal pancreatectomy, a 3-phase abdominal CT scan should be obtained in addition to gastroscopy to evaluate the possibility of LPH and associated gastric variceal bleeding. At our institution, we recommend curative treatment with embolization of the splenic artery in symptomatic patients with LPH without severe hemorrhage and recommend splenectomy in symptomatic patients with LPH and severe hemorrhage. The management of asymptomatic patients should be expectant, and these patients should be thoroughly informed about the potential risks of bleeding.[20]

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