Portal/splenic Vein Thrombosis Following Splenectomy in Gastric Cancer Surgery

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Although splenectomy is often performed along with en bloc node dissection in gastric cancer surgery, portal/splenic vein thrombosis (PSVT) has been rarely reported. We recently encountered a case of PSVT after a splenectomy was performed during gastric cancer surgery. A 53-year-old woman underwent total gastrectomy, splenectomy, and en bloc regional lymph node dissection for gastric cancer. An uneventful postoperative course ended with abrupt development of a fever and general fatigue. Laboratory tests showed elevated levels of liver transaminases and fibrinogen degenerative products. Contrast-enhanced computed tomography revealed splenic vein thrombosis and partial liver infarction. Immediate anticoagulant treatment resulted in clinical improvement and partial thrombolysis in 2 months. PSVT after splenectomy in haematological disorders has been recognized as a possibly lethal complication. However, it has been underappreciated in cases of splenectomy for gastric cancer. The present case demonstrates the importance of considering PSVT as a possible complication of splenectomy in gastric cancer surgery. [Asian J Surg 2010;33(4):208–11]

Key Words: gastric cancer, portal vein thrombosis, splenectomy

Introduction

Portal vein thrombosis is reportedly associated with liver cirrhosis and neoplastic diseases of the pancreas and liver.1 Its occurrence is also recognized as a postoperative complication after splenectomy for haematological disorders.2 Splenectomy is often coupled with en bloc node dissection in radical gastric cancer surgery in Japan,3 but portal vein thrombosis has rarely been reported and is underappreciated. We recently encountered a case of portal/splenic vein thrombosis (PSVT) after a splenectomy was performed as part of a radical gastric cancer surgery, which has heightened our awareness of portal vein thrombosis as a potential post-splenectomy complication in gastric cancer surgery.

Case report

A 53-year-old woman was admitted to our hospital for treatment of gastric cancer. Preoperative endoscopy showed that the lesion was located in the fornix (Figures 1A and 1B), had a depressed shape, and appeared to be widely spread with unclear margins. The depth of invasion was estimated to reach at least the submucosal layer, but it did not involve the serosa. The preoperative staging was T1N0M0 Stage IA. Based on these findings, the patient underwent total gastrectomy with splenectomy to dissect the nodes of the second tier, including those in the splenic hilum (Figures 2A and 2B). Histological examination of the resected specimens showed gastric carcinoma invading the subserosal...
layer with lymph node metastasis at one station of the first tier. The final staging was T2bN1M0 Stage II. The postoperative course was uneventful until postoperative day 6, when the patient abruptly developed a high fever of 38°C without other specific symptoms. The laboratory data showed elevations in liver transaminases (aspartate transaminase, 37 IU/L; alanine aminotransferase, 74 IU/L), biliary enzymes (alkaline phosphatase, 609 IU/L; gamma-glutamyltransferase, 117 IU/L), and fibrinogen degenerative products (14.9 μg/mL). Contrast-enhanced computed tomography (CT) showed a clot embolism along the splenic vein and a partially demarcated area in the posterior segment of the right lobe of the liver (Figures 3A and 3B). A diagnosis of PSVT was made, and anticoagulant therapy with heparin was initiated. The fever gradually subsided along with improvements in the laboratory data. The patient was discharged on postoperative day 15 without further complications. She continued to take warfarin for another 6 months. Although the liver infarction did not dissolve completely (Figures 3C and 3D), to date, the patient has remained free from symptoms for 1 year.

Discussion

Although splenectomy is usually performed for haematopoietic disorders, it is also coupled with gastric surgery for malignancy for the purpose of radical lymph node dissection around the splenic hilum.3 In spite of the frequency of splenectomy in gastric surgery, thrombosis related to splenectomy has been underappreciated.

The incidence of postsplenectomy PSVT has been reported to be 12.3%;2 the underlying diseases in these cases were mainly haematological disorders. The incidence of PSVT after splenectomy for gastric cancer surgery has not been reported to date. To our knowledge, only three cases have been reported in which PSVT developed after surgery.
splenectomy for en bloc lymph node dissection in gastric malignancy. Kogire et al reported a patient who experienced PSVT 19 days after total gastrectomy, splenectomy, and distal pancreatectomy. Anticoagulant therapy could not achieve thrombolysis, resulting in cavernous transformation of the portal system. Rattner et al described seven cases of PSVT after splenectomy, including one case of gastric carcinoma. In their series, two of the seven patients died, and in both cases, the interval from the onset of portal vein thrombosis to diagnosis and therapy was prolonged. This report indicates that PSVT is a life-threatening complication unless it is successfully treated. Fujitani et al presented a case of portal vein thrombosis 31 days after a splenectomy for gastric malignant lymphoma. The patient was treated with heparin and tissue plasminogen activator, which resulted in clinical improvement but failed to achieve thrombolysis.

The main pathogenic factors for postsplenectomy PSVT are a hypercoagulable state and stasis of blood in the stump of the splenic vein. In addition to elevation of the absolute platelet count, a cul-de-sac formation of the splenic vein is inevitable after splenectomy, leading to thrombosis that may centrally extend into the portal and superior mesenteric veins. Thus, PSVT can theoretically be anticipated after splenectomy, whatever the underlying disease. Why has PSVT after splenectomy in elective gastric surgery not been reported or received attention? The primary reason may be its low incidence. Another possible reason is that most cases of PSVT may have been overlooked or misdiagnosed. Empirically, the postsplenectomy complication of idiopathic fever is well appreciated. None of the symptoms are specific to PSVT, making it difficult to suspect PSVT initially in most patients, especially in patients after gastric surgery.

In conclusion, our case suggests that PSVT is a potential complication following splenectomy in gastric cancer surgery. Patients who develop an unexplained fever and elevated hepatobiliary enzyme and fibrinogen degenerative

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**Figure 3.** (A, B) Contrast-enhanced computed tomography (CT) scan on postoperative day 7. A clot embolism, (A) along with the splenic vein (arrow) and (B) a partially demarcated area (arrows) in the posterior segment of the right lobe of the liver was detected. (C, D) Contrast-enhanced CT scan 10 months after the surgery. (C) Partial lysis of the thrombus in the splenic vein (arrow) was noted, (D) while the liver infarction (arrows) did not dissolve completely.
products levels after splenectomy should undergo an imaging study to rule out PSVT.

References