Deep vein thrombosis caused by malignant afferent loop obstruction

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Afferent loop obstruction following gastrectomy is a rare but fatal complication. Clinical features of afferent loop obstruction are mainly gastrointestinal symptoms. A 56-year-old female underwent radical total gastrectomy with Roux-en-Y esophagojejunostomy for treatment of advanced gastric cancer. After fourteen months postoperatively, she showed gradual development of edema of both legs. Computed tomography (CT) scan showed disease progression at the jejunojejunostomy site and consequent dilated afferent loop, which resulted in inferior vena cava (IVC) compression. A drainage catheter was placed percutaneously into the afferent loop through the intrahepatic duct and an IVC filter was placed at the suprarenal IVC, and self-expanding metal stents were inserted into bilateral common iliac veins. With these procedures, symptoms related with afferent loop obstruction and deep vein thrombosis were improved dramatically. The follow-up abdominal CT scan was taken 3 weeks later and revealed the completely decompressed afferent loop and improved IVC patency. Surgical treatment should be considered as the first choice for afferent loop obstruction; however, because it is more immediate and less invasive, non-surgical modalities, such as percutaneous catheter drainage or stent placement, can be effective alternatives for inoperable cases or risky patients who have severe medical comorbidities.

Keywords: Afferent loop obstruction; Stomach cancer; Venous thrombosis; Interventional radiography

INTRODUCTION

Afferent loop obstruction is a rare and lethal complication of Billroth II gastrectomy or Roux-en-Y reconstitution following distal gastrectomy [1-3]. Afferent loop obstruction initially presents mainly as gastrointestinal (GI) symptoms, and the severity depends on the degree and duration of obstruction [6]. Afferent loop obstruction caused by complete ob-

struction of the afferent limb could lead to persistent epigastric pain and vomiting. In this acute condition, high intraluminal pressure can lead to ischemia and perforation of the bowel wall of the afferent loop, ultimately resulting in serious peritonitis. When there is the partial obstruction of the afferent limb, chronic symptoms such as intermittent postprandial pain can develop with projectile bilious vomiting. Once the diagnosis of afferent loop obstruction is made, prompt surgical intervention is required to reduce the high mortality rate associated with afferent loop obstruction and to minimize complications [3,6,7].

We recently encountered a patient with afferent loop obstruction who initially presented with lower extremity edema rather than GI symptoms. In this patient, the severely distended afferent loop compressed the inferior vena cava (IVC),

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consequently resulting in deep vein thrombosis (DVT) below the level of compression. Invasive surgery was not an option due to the patient's poor general condition, thus non-surgical interventions were performed successfully without complications.

CASE

The 56-year-old female had undergone a radical total gastrectomy with Roux-en-Y esophagojejunostomy for stage IIIc automatic gain control (AGC) and subsequently received adjuvant chemotherapy with TS-1. Thirteen months postoperatively, she showed gradual development of nausea and vomiting. Upper endoscopy showed anastomosis site stenosis. Therefore, endoscopic balloon dilatation was performed and a self-expanding metallic stent was inserted. Abdominal computed tomography (CT) scan showed recurrence of AGC at the jejunal loop, extending to the incision site of the abdominal wall, while there was no evidence of afferent loop obstruction (Fig. 1A). Afterwards, she received palliative chemotherapy with 5-fluorouracil and docetaxel for 7 months. However, because the disease had progressed with tumor ingrowth into the stent, another stent was inserted and the chemotherapy regimen was changed to 5-fluorouracil and oxaliplatin. However, after 2 months, edema of both legs became gradually aggravated; therefore she visited the emergency department under suspicion of DVT. On the initial laboratory finding, hemoglobin

was 9.0 dL/mg and other laboratory results reflecting liver, kidney function were within normal range. Lower extremity CT scan taken on admission showed disease progression at the anastomosis site and consequently dilated afferent loop, which resulted in IVC compression with DVT involving infrarenal IVC and downstream veins including both common iliac veins, left femoral veins, and popliteal veins (Figs. 1B-1D). Therefore, anticoagulation with dalteparin was initiated immediately and an IVC filter was placed at the suprarenal IVC. At the same time, a multi-side hole drainage catheter was placed percutaneously into the afferent loop through the intrahepatic duct (Fig. 2A). After decompression, lower extremity edema began to improve with ~1,000 cc of drainage every day through the catheter. However, because symptoms were not completely resolved, the patient underwent aspiration thrombectomy with heparin infusion, and self-expanding metal stents were inserted into bilateral common iliac veins (Fig. 2B). Finally, her symptoms showed dramatic improvement and the patient was discharged from the hospital. The follow-up abdominal CT scan taken 3 weeks later showed the completely

Fig. 1. Computed tomography (CT) scan of abdomen. (A) CT scan taken at the time of initial tumor recurrence. There was no obvious afferent loop obstruction. (B-D) CT scan taken at the time of both leg edema (10 months after initial recurrence). Tumor mass induced a distended afferent loop (B, arrow), resulting in thrombosis in the infrarenal inferior vena cava (C, arrow) and bilateral common iliac veins (D, arrows).

Fig. 2. Percutaneous interventions for treatment of afferent loop obstruction and deep vein thrombosis. (A) A multi-side hole drainage catheter (white arrowhead) was inserted percutaneously into the afferent loop through the common bile duct. At the same time, an inferior vena cava (IVC) filter (white arrow) was placed at the suprarenal IVC. Black arrowhead denotes a metallic stent which was previously inserted at the esophagojejunal anastomosis site. (B) Self-expanding metal stents (arrows) were placed percutaneously at the bilateral common iliac veins.

Fig. 3. Follow-up abdominal computed tomography scan taken 3 weeks later. The afferent loop was completely decompressed after percutaneous drainage. White arrow denotes the tip of the drainage catheter.

decompressed afferent loop with much improved IVC compression and DVT, while disease had progressed with an increased amount of malignant ascites (Fig. 3). Since then, due to the patient's poor general condition, we were not able to proceed with further chemotherapy, and, after receiving 3 months of best supportive care, the patient expired.

DISCUSSION

Afferent loop obstruction is a rare but serious complication of Billroth II gastrectomy or Roux-en-Y procedure, which occurs in approximately 0.3-1.0% of cases [6,8,9]. In most cases, clinical presentations of afferent loop obstruction have been described as GI symptoms such as abdominal pain or vomiting, caused by increased intraluminal pressure and distension of the afferent limb [10], but, afferent loop obstruction sometimes presents with atypical symptoms. In the current patient, afferent loop obstruction initially presented as a DVT of IVC and downstream veins, which has not been previously reported. The largely distended afferent limb had a mass effect on IVC, thereby generating venous stasis and formation of a thrombus below the infrarenal IVC.

Diagnosis of afferent loop obstruction based on clinical symptoms is challenging, thus clinical suspicion of afferent loop obstruction in patients with previous history of gastrectomy is very important, and the possibility of afferent loop obstruction-induced mass effects should be considered.

Treatment of afferent loop obstruction can be categorized as surgical and non-surgical [12]. Although surgical conversion has been regarded as a standard treatment for afferent loop obstruction, in recent years, non-surgical procedures have been performed more frequently in patients who were not able to tolerate surgical procedures [13,14]. In particular, in most recent cases, afferent loop obstruction was caused by underlying malignancy and invasive surgical procedures were not an option due to patients' poor medical condition [12,14], therefore, an increasing number of patients with afferent loop obstruction will be candidates for non-surgical treatments.

There are two different routes for non-surgical treatment of afferent loop obstruction: the percutaneous and peroral routes [12]. The percutaneous route, which accesses the obstructed afferent limb through a percutaneous transhepatic catheter or enterostomy tube, is better for approaching the proximal or mid portion of the afferent loop [13]. Shortcomings of the percutaneous route include patients' inconvenience and

increased risk of infection. Peroral routes use endoscopy for the placement of stents and are usually better for approaching distal obstruction at the anastomosis site [14]. While an endoscopically placed self-expanding metal stent minimizes patients' inconvenience and risk of infection, its shortcomings include stent migration and tumor ingrowth. Therefore, when choosing an appropriate treatment modality for afferent loop obstruction, clinicians should consider the pros and cons of each procedure and patients' underlying medical conditions.

In conclusion, afferent loop obstruction can present as various clinical manifestations other than GI symptoms which should be included for differential diagnosis of patients with a previous surgical history of gastrectomy. Although surgical conversion is the treatment of choice, non-surgical interventions including percutaneous catheter drainage or stent placement can also be performed with immediate and excellent palliation in patients who are not amenable to surgery because of their medical comorbidities.

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