

A Case of Aortoenteric Fistula Following Abdominal Aortic Reconstruction

Koji Tsutsumi, MD, PhD,¹ Yoshinobu Sato, MD,² and Mikihiro Ookura, MD¹

We report the case of a 64-year-old male patient with graft-enteric fistula. This complication might have been induced by sigmoid colonic ischemia resulting from injury to the mesocolon during abdominal aortic reconstruction. Although sigmoid colonic exteriorization was performed to avoid simultaneous colonic resection, graft-enteric fistula could not be prevented. Two further emergent operations were required to obtain complete remission from this complication, comprising bilateral extra-anatomical axillofemoral bypass grafts and infected graft removal, followed by an operation for left common iliac artery stump disruption. Although the patient remained in good health for 3 years with no complications, he died of aortic stump disruption 43 months after the last operation. (Ann Thorac Cardiovasc Surg 2007; 13: 282–286)

Key words: graft-enteric fistula, colonic exteriorization, extra-anatomical axillofemoral bypass grafts

Introduction

Graft-enteric fistula following prosthetic replacement for an abdominal aortic aneurysm remains a serious and fatal complication. Moreover, a simultaneous colonic resection with a prosthetic graft is considered too dangerous to perform during reconstruction, given the potential for graft contamination.

Case

A 64-year-old man was diagnosed with abdominal aortic aneurysm and referred to our hospital for surgical treatment. Two months earlier, abdominal aortic reconstruction had been attempted at another hospital, but was discontinued because cardiac arrest developed when the abdominal aorta was cross-clamped. Computed tomography (CT) revealed an infrarenal abdominal aortic aneurysm with a maximal diameter of 6 cm and a dilatation of bilateral common iliac arteries. Electrocardiography

(ECG) showed sinus bradycardia with first-degree atrioventricular block. Holter ECG revealed paroxysmal atrial fibrillation with a maximal ventricular arrest time of 2.4 s. Coronary artery angiography showed no significant stenosis. Y-graft replacement was planned for this patient following the prophylactic insertion of a temporary pacemaker lead to the right ventricle.

First operation at our hospital

Severe adhesions were encountered in the peritoneal and retroperitoneal spaces. A particularly severe adhesion was identified between the sigmoid colon and the abdominal aorta. Following a careful dissection of severely adhered tissues, aortic reconstruction with a 20 mm×10 mm bifurcated Woven Dacron graft was performed. Proximal anastomosis was performed at the abdominal aorta, 3 cm distal from the bifurcation of the left renal artery, and distal anastomosis was completed at both common iliac arteries. The condition of the arterial wall was good, and reconstruction was completed without difficulty. Because the bilateral internal iliac arteries were conserved, a reconstruction of the inferior mesenteric artery (IMA) was discarded without an evaluation of stump pressure or blood flow. The prosthetic graft was covered with aneurysmal wall as much as possible. At the end of the operation, a small part of the sigmoid colon within the dissected area displayed an injury of the mesocolon, and

From ¹Division of Cardiovascular Surgery and ²Department of Surgery, Sagamihara Kyodo Hospital, Sagamihara, Japan

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Address reprint requests to Koji Tsutsumi, MD, PhD: Division of Cardiovascular Surgery, Ashikaga Red Cross Hospital, 3–2100 Honjo, Ashikaga 326–0808, Japan.

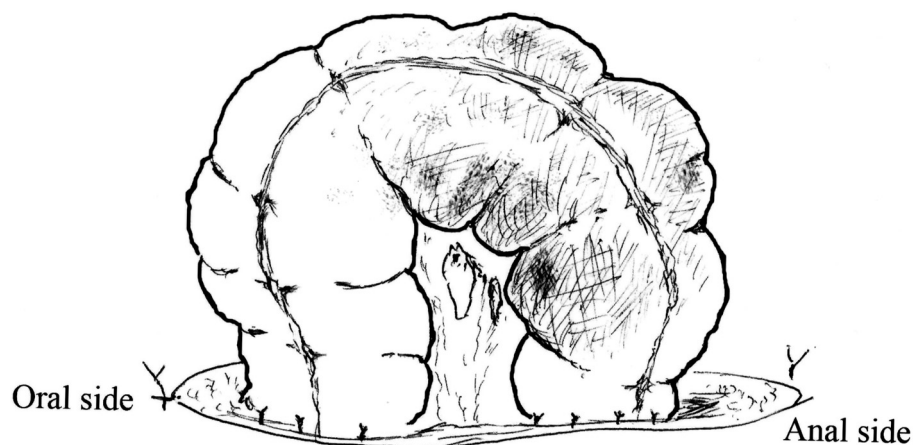


Fig. 1. Schema of the exteriorized sigmoid colon.

Both the oral and anal sides of the exteriorized sigmoid colon were sutured to surrounding tissues for fixation on the left lateral abdominal wall. Partial loss of the mesocolon was also seen.



Fig. 2. This CT shows positive enhancement at the wall of the sigmoid colon where the sigmoid colon was fixed to the intraperitoneal portion of the abdominal wall.

Some amount of ascites is also shown. *, anal side of the sigmoid colon; **, ascites; ***, exteriorized sigmoid colon.

worse, a partial loss of the mesocolon was also identified. The sigmoid colon where the mesocolon was damaged displayed signs of ischemia, including discoloration and spasm. Whether this ischemia was sufficient to result in necrosis was unclear, and sigmoid colonic exteriorization as a preventive measure to avoid simultaneous colonic resection was performed. Given the partial loss of the mesocolon, IMA reconstruction was abandoned. Using a pararectal incision, we exteriorized about 20 cm of sigmoid colon, including the 10-cm portion with suspected ischemia (Fig. 1). No other part of the intestinal tract displayed ischemic findings. Other preventive measures such as omental flap transposition could not be performed because of severe adhesion. At 2 days postopera-

tively, the exteriorized sigmoid colon displayed patchy necrosis. Necrosis was severe on the anal side of the exteriorized sigmoid colon, which we opened and examined by palpation and CT. Palpation confirmed that a continuity of the colonic mucosa was preserved on both the oral and anal sides of the colonostomy site, with no indication of either side of the exteriorized sigmoid colon falling into peritoneal space. CT showed a positive enhancement at the wall of the sigmoid colon from the anal-side portion, where the sigmoid colon was fixed with the abdominal wall to the intraperitoneal portion (Fig. 2). Postoperatively, a persistent low-grade fever was observed with an elevation of white blood cell count (12,000/mm³) and C-reactive protein level (5.6 mg/dL). Antibiotic

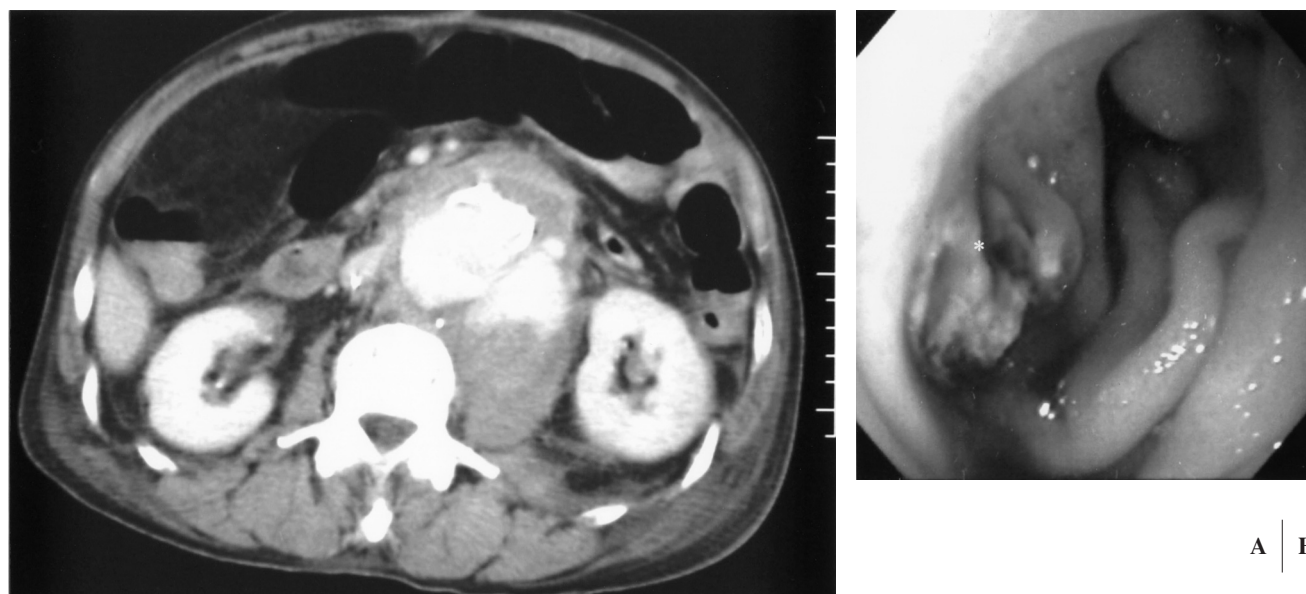


Fig. 3.

- A:** This computed tomography shows retroperitoneal hematoma around the proximal graft anastomotic site with a leakage of contrast medium.
- B:** Upper gastrointestinal endoscopy shows an ulcer with arterial pulsation at the 3rd portion of the duodenum. Neither active bleeding nor prosthetic graft is seen within the ulcer.

therapy with imipenem/cilastatin sodium (1.0 g/day) was initiated for 3 weeks, and no additional operation was performed. The general condition of the patient, including laboratory data, gradually improved, and he was discharged 53 days after the first operation.

Second admission

The patient was readmitted to our hospital on postoperative day 70, with the chief complaint being hematemesis. Because the postoperative course strongly suggested graft-enteric fistula, upper gastrointestinal endoscopy and CT were performed, but no conclusive findings were obtained. Intermittent hematemesis and progressive pyrexia continued until postoperative day 79, when CT and endoscopy identified the cause of bleeding, diagnosed as graft-duodenal fistula (Fig. 3).

Second operation

The patient first underwent bilateral extra-anatomical axillofemoral bypass grafts (EABs) as a revascularization procedure to secure circulation to the lower extremities prior to a complete removal of the infected graft. After an excision of the infected graft, the distal end of the abdominal aorta (just inferior to the bifurcation of bilateral renal arteries) and the proximal end of the left common

iliac artery were oversewn using two layers of 3-0 monofilament sutures. A severe adhesion was encountered around the proximal end of the right common iliac artery, and the fragility of the arterial wall because of infection would not allow the right common iliac artery stump to be oversewn directly. The right external and internal iliac arteries were dissected outside the cecum in retrograde fashion, and these arteries were then ligated individually. The duodenal defect was repaired with primary closure and the placement of jejunostomy and gastrostomy for decompression. Methicillin-resistant *Staphylococcus aureus* (MRSA) was detected from excised tissues and resected prosthetic graft cultures. Postoperative intravenous antibiotic with vancomycin (1 g/day) was administered for 4 weeks. Recovery from the second operation was good, and no signs of ischemia were observed in the abdominal organs or lower extremities. However, 38 days after the second operation, the patient again displayed pyrexia and intermittent bleeding from the site where the drain had been pulled out. Emergent CT could not detect the origin of bleeding, and only conservative therapy could be taken until 46 days after the second operation. On that day, CT detected left common iliac artery stump disruption as the cause of bleeding (Fig. 4). A second emergent operation was performed.

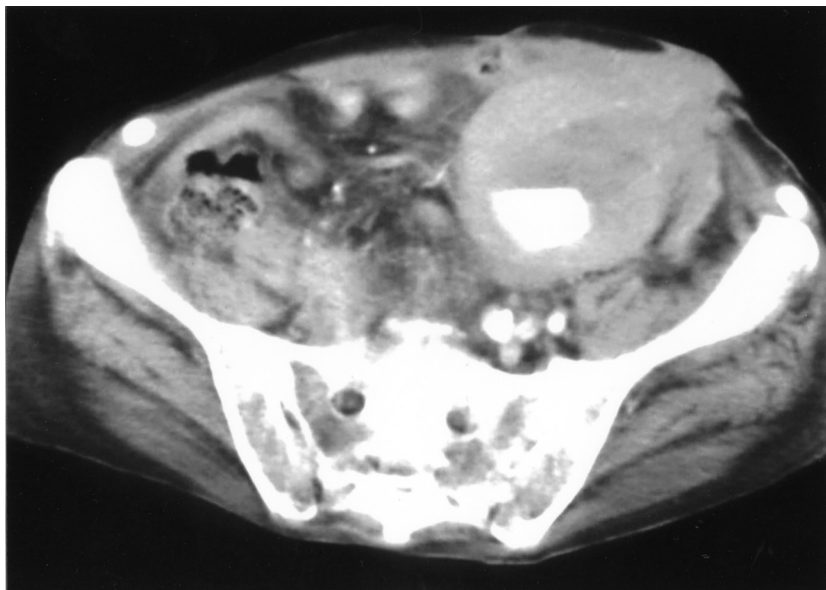


Fig. 4. This computed tomography shows a pseudoaneurysm originating at the previously oversewn proximal suture line of the left common iliac artery.

Third operation

First, the left external iliac artery was dissected proximal to the prior EAB anastomotic site to control the bleeding via a left supra-inguinal oblique incision. The left external and internal iliac arteries were then ligated from a retroperitoneal approach. Although bilateral internal iliac arteries and the IMA had consequently been ligated, no signs of ischemia were observed in the abdominal organs. The patient was discharged 145 days after the second emergent operation. The patient had remained in good condition for 3 years without developing any sign of a recurrence of infection. Follow-up CT has been checked out annually, and there was no sign of a new aneurismal change developing at the aortic stump site. However, he had sudden abdominal pain 43 months after the last operation and was in a collapsed condition when admitted to our hospital that day. Emergent CT showed retroperitoneal hematoma around the aortic stump site and a filling of blood into the intestinal tract. Based on these clinical findings, abdominal aortic stump disruption complicated with aorto-enteric fistula was diagnosed. Despite treatment, his condition rapidly deteriorated, and he died before reaching the operating room.

Discussion

The management of patients with graft-enteric fistula remains challenging and is associated with high morbidity and mortality rates.¹⁾ The purpose of surgical therapy is

to remove infected prostheses, close the enteric fistula, and revascularize the abdominal organs and lower extremities. Various operative strategies have been reported for this complication, including in situ aortic graft replacement with a variety of new aortic grafts (autogeneous, allograft, new prosthetic, and stent grafts). However, some concerns still exist for each method. These procedures thus appear to be of limited usefulness in all but a few patients for whom no other options are available.²⁻⁶⁾ Especially in the setting of gross infection, in situ repair using new aortic grafts, with the exception of the autogeneous graft, would imply a risk of persistent infection. From these results, though some concerns remain, the strategy of treating aortic graft infection with an excision of the infected graft and EAB appears acceptable.¹⁾ In the present case, infection control was achieved by two additional emergent operations, but the patient died of aortic stump disruption during the long-term period. EAB has a potential for aortic stump disruption. To improve the long-term results for such patients, we believe that some devices are necessary to prepare the aortic stump, or a new anatomical reconstruction would be required when infection control is achieved. However, prevention remains the most important avenue to focus on in regard to the aorto-enteric fistula. In the present case, a sigmoid colonic ischemia induced by injury to the mesocolon during the dissection of adhesions might have led to prosthetic graft contamination. Whether ischemic signs on the sigmoid colon would develop postoperatively into necrotic

perforation was unclear during the operation. Moreover, simultaneous colonic resection is generally considered too dangerous to perform during abdominal aortic reconstruction with prosthetic graft. Sigmoid colonic exteriorization was thus performed with the intention of preventing graft contamination, but this was not achieved. More aggressive surgical treatments, including additional sigmoidectomy, debridement, and drainage, should be seriously considered when patchy ischemic areas of the exteriorized sigmoid colon are seen to develop.²⁾ The present experience underlined the importance of obtaining a correct diagnosis of graft-enteric fistula or stump disruption, though this is not always easy. Repeated CT or endoscopic examinations are required to obtain accurate diagnoses in such highly suggestive patients.

Conclusion

The present report describes a patient who developed complications of sigmoid colonic ischemia during abdominal aortic reconstruction with prosthetic graft. Preventive measures were unable to prevent graft-enteric fistula, and two additional emergent operations were re-

quired to obtain complete remission.

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