Bilateral Retroperitoneal Approach to Repairing a Ruptured Right Iliac Artery Aneurysm in a Patient Who Has Undergone Transperitoneal Abdominal Surgery

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Received: February 16, 2010; Accepted: February 23, 2010

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An 84-year-old woman with a history of surgery for cholangiocarcinoma presented to Akita University Hospital with severe right lower abdominal pain, respiratory distress, and hypotension. Computed tomography scanning revealed a ruptured right common iliac artery aneurysm with a massive right retroperitoneal hematoma and a right internal iliac artery aneurysm. Under the bilateral retroperitoneal approach, we preformed an in-situ repair of an aneurysm rupture from the aorta to the left common and right external iliac arteries using a bifurcated knitted Dacron graft, and then we ligated the right internal iliac artery. The postoperative course of the patient was uneventful. The patient was discharged from hospital 52 days after surgery. In conclusion, a bilateral retroperitoneal approach may be a safe and useful strategy for in-situ repair of a right iliac artery aneurysm rupture in patients with peritoneal adhesions after transperitoneal abdominal surgery.

Key words: iliac aneurysm rupture, bilateral retroperitoneal approach

Introduction

A retroperitoneal approach in surgery for the aorta or iliac arteries is thought to be advantageous in patients with suprarenal abdominal aortic aneurysms, a horseshoe kidney, inflammatory aneurysms, or previous transperitoneal laparotomy. With transperitoneal abdominal surgery, there is the possibility of postoperative peritonitis complications causing severe intestinal adhesion or infected fluid collection, which during vascular surgery, could result in intestinal injury in dissecting the adhesion or graft infection. Although a left retroperitoneal approach is the standard for extraperitoneal aortic exposure, difficulties exist in repairing the right-side iliac artery aneurysm because of limited operative space. Here, we describe the use of a bilateral retroperitoneal approach for an in-situ graft replacement of a ruptured right iliac artery aneurysm in a patient with a history of bile duct surgery.

Case Report

An 84-year-old woman presented with severe right lower abdominal pain. Two days later she developed respiratory distress and hypotension and was transferred to Akita University Hospital. Contrast computed tomography (CT) scanning on admission revealed a ruptured right common iliac artery aneurysm (Fig. 1B) with a massive right retroperitoneal hematoma (Fig. 1A), bilateral common iliac artery aneurysms (Fig. 1C) and a right internal iliac artery aneurysm (Fig. 1D). Five years
earlier, the patient had surgery for cholangiocarcinoma, which included bile duct resection and reconstruction (i.e., end-to-side hepaticojejunostomy and Roux-Y jejunojejunostomy). To avoid dissecting peritoneal adhesions with a transperitoneal approach, we took a bilateral retroperitoneal approach for exposures of the aorta and right iliac arteries. The patient was placed in a supine position under general anesthesia. The abdominal incision was made parallel with and about 3 cm left to the midline downwards from the costal margin to the level of the symphysis pubis, which was deepened through subcutaneous tissue and the anterior rectus sheath. Then the parietal peritoneum was exposed by developing the plane between the posterior rectus sheath and peritoneum. Subsequently the retroperitoneal plane was developed to expose and tape the left iliac arteries and abdominal aorta. On the right side, an incision was made which began downwards from the midpoint between the subcostal margin and the iliac crest on the anterior axillary line, parallel with and about 3 cm above the inguinal ligament to the right lateral border of the rectus abdominis as described by Haimovici.\(^2\) After the external oblique and its aponeurosis were incised, the internal oblique muscle and the transversalis muscles were transected while developing the extraperitoneal plane, and then the right external and internal iliac arteries were exposed and taped. After systemic heparinization, the abdominal aorta was clamped below the inferior mesenteric artery and then bilateral external and iliac arteries were clamped. In-situ graft replacement was performed from the aorta to the left common iliac artery and the right external iliac artery using a bifurcated knitted Dacron graft (16 × 9 mm; Hemashield Gold, Boston Scientific, NJ, USA) and the right internal iliac artery was ligated. The right limb of the bifurcated graft was passed through the lumen of aneurysmal right common iliac artery. The operation took 406 minutes, and the intraoperative blood loss was 2268 mL. The patient remained in the intensive care unit (ICU) for 4 days. The postoperative course was uneventful, and the patient was discharged from the hospital 52 days after surgery. The postoperative CT scanning 110 days after the surgery revealed no abnormal graft configuration (Fig. 2).

**Discussion**

A transperitoneal approach is a widely accepted technique for in-situ graft replacement of aneurysms in the
abdominal aorta and iliac arteries. If there is no peritoneal adhesion, this approach may be considerably more effective in an emergency operation such as aneurysm rupture, because the time to clamp the proximal aorta or artery to the rupture site can be shorter using the transperitoneal approach than the retroperitoneal approach, which may be a crucial factor determining the patient’s prognosis. Dissecting peritoneal adhesions during vascular surgery could be a time-consuming process in patients with a history of previous abdominal surgery. Weibel and Majno demonstrated in a study of 752 consecutive autopsies that peritoneal adhesions were more often associated with a history of laparotomy than without (67 and 28%, respectively). In a multinational study of 448 adult patients with intraperitoneal adhesions and a history of one or more abdominal operations, Luijendijk et al. found that the adhesions were in the omentum (68%), small bowel (67%), abdominal wall (45%), colon (41%), female reproductive organs (23%), or retroperitoneum (14%). Postoperative leakage has been reported in 5%–6% of gastric cases (with lymphadenectomy), 3.4%–6.0% of colorectal cases, 7%–16% of pancreatic cases, and 7.2% of hepatic cases, all of which are closely associated with intraabdominal abscess formation. A delayed or repeat occurrence of an abdominal or pelvic abscess has been reported in patients with a history of abdominal surgery. These studies suggest that a transperitoneal approach for vascular surgery in patients with previous abdominal surgery may increase the risk of encountering a localized abscess during the dissection of adhesions, resulting in postoperative panperitonitis or graft infection.

Endovascular treatment may be a promising alternative to aneurysm repair in patients with previous abdominal surgery because endovascular repair has significantly improved outcomes in patients with abdominal aortic aneurysms and can be a first-line treatment for common iliac artery aneurysms. However, internal iliac artery occlusion during endovascular aneurysm repair has been reported to result in impotence and buttock claudication caused by decreased penile and gluteal blood flow. In patients with calcified, tortuous, and stenotic iliac arteries, a retroperitoneal conduit for delivery of sheaths (e.g., a Dacron tube graft anastomosed to the right external iliac artery) has been recommended. Our patient, however, was not a candidate for sheath delivery and endograft deployment using the retroperitoneal conduit, because her proximal right external iliac artery was severely calcified and presumably stenotic (Fig. 3).

Transperitoneal and retroperitoneal approaches have been compared in terms of postoperative results. Kalko et al. studied 153 patients who had undergone aortic surgery for aorta-iliac occlusive disease and concluded that the retroperitoneal approach was associated with significantly fewer postoperative pulmonary complications, rapid recovery of gastrointestinal functions, shorter ICU and hospital stays, and less perioperative blood loss.
Wachenfeld-Wahl et al. reported no difference between the two approaches in terms of postoperative complications including gastrointestinal, pulmonary, cerebral or cardiovascular complications in patients with infrarenal abdominal aortic aneurysms. These studies suggest that retroperitoneal approaches may not be strategically inferior or have perioperative risks compared to transperitoneal approaches even in patients without peritoneal adhesions. A bilateral retroperitoneal approach is more invasive than a unilateral retroperitoneal approach. Potential consequences including gastrointestinal, pulmonary, cerebral or renal approaches even in patients without peritoneal adhesions may be a safe and useful strategy for in-situ repair of a right iliac artery aneurysm rupture in patients with predicted peritoneal adhesions or abscess formation.

In conclusion, rupture of a right iliac artery aneurysm in patients with a history of transperitoneal abdominal surgery is rare, but a bilateral retroperitoneal approach may be a safe and useful strategy for in-situ repair of a right iliac artery aneurysm rupture in patients with predicted peritoneal adhesions or abscess formation.

References