Open Surgery for Giant Bilateral Internal Iliac Artery Aneurysms with Compression of Neighboring Abdominal Structures: A Case Report

Atsushi Morishita, MD,1 Hideyuki Tomioka, MD,2 Seiichiro Katahira, MD,3 Takeshi Hoshino, MD,4 and Kazuhiko Hanzawa, MD5

We describe a patient with successfully treated giant bilateral internal iliac artery aneurysms that were associated with acute renal failure secondary to bilateral hydronephrosis, lumbosacral plexopathy, and ileus. After hemodialysis for 1 month, the patient underwent graft replacement of the abdominal aorta and iliac arteries, including complete obliteration of the internal iliac artery branches, reconstruction of the inferior mesenteric artery, and ureterolysis. Weaning from hemodialysis was achieved and postoperative renal function improved. Although the patient had serious preoperative co-morbidities, emergency traditional open surgery should be the gold standard for securely releasing compression of the neighboring organs instead of endovascular treatment.

Keywords: open surgery, abdominal structure compression, giant bilateral internal iliac artery aneurysm

Introduction

Because of the widespread use of various imaging modalities, asymptomatic internal iliac artery (IIA) aneurysms have been increasingly detected.1) Once clinical symptoms occur, it must be supposed immediately that the IIA aneurysms have ruptured or that they are compressing neighboring abdominal structures. Herein, we describe a patient with a history of home oxygen therapy who had giant bilateral IIA aneurysms associated with acute renal failure secondary to bilateral hydronephrosis, lumbosacral plexopathy, and ileus who was successfully treated with surgery.

Case Report

A 76-year-old man was admitted to our hospital complaining of a two-day history of left-sided low back pain, urinary retention, intermittent pain in his left thigh, and difficulty in standing. He had previously required home oxygen therapy for interstitial pneumonia (Fig. 1A). He was a smoker till the diagnosis of interstitial pneumonia. He had fever but was hemodynamically stable. However, the abdomen was distended, with no palpable masses and a diminished bowel sound. Abdominal computed tomography showed an infrarenal abdominal aortic aneurysm (AAA), 46 mm in diameter; bilateral common iliac artery aneurysms (left, 26 mm; right, 30 mm), and bilateral IIA aneurysms (right, 50 mm; left, 89 mm), with evidence of bilateral hydronephrosis (Fig. 1B). The patient’s white blood cell count was 18.8 × 10^3/L and C-reactive protein level was 36.0 mg/dL. The blood urea nitrogen and serum creatinine levels were 56.9 mg/dL and 4.9 mg/dL respectively. The following day, the patient experienced anuria and ileus. The patient was deemed unsuitable for surgery, because he was diagnosed with severe pulmonary disease as a comorbidity requiring home oxygen therapy. Hemodialysis was introduced to improve the acute renal failure secondary to bilateral hydronephrosis. Urine cultures showed an infection with Enterococcus faecalis, and blood cultures were negative. Stool cultures showed the growth of methicillin-resistant Staphylococcus aureus. An inflammatory response was observed despite the intravenous administration of panipenem/betamipron (1 g/day for three weeks) and vancomycin hydrochloride (500 mg after hemodialysis for a week).
Four weeks after admission, the patient’s white blood cell count was $16.5 \times 10^3/L$ and C-reactive protein level was 16.4 mg/dL. The blood urea nitrogen and serum creatinine levels were 37.7 mg/dL and 6.6 mg/dL respectively. Furthermore, follow-up computed tomography showed a rapid enlargement of the bilateral IIA aneurysms (right, 69 mm; left, 110 mm) (Fig. 1C, 1D). Simultaneously the thickened wall characterized in inflammatory aneurysms was not seen. Under the diagnosis of the infectious bilateral IIA aneurysms, a midline laparotomy was performed to expose the aneurysm. We decided to perform a graft exclusion technique using a rifampicin-immersing bifurcated knitted Dacron graft. Proximal anastomosis was performed with the infrarenal aorta. The distal external iliac arteries on both sides were anastomosed in an end-to-end fashion. Because the huge bilateral IIA aneurysms existed deep in the pelvis, it was difficult to reconstruct IIA on both the sides. After opening the anterior wall of the IIA aneurysms, the thrombus was removed. Subsequently, the ostia of the IIA branches were obliterated by 4-0 monofilament sutures from the inside of the aneurysm, which we manipulated by hand to ensure a bloodless field. It was useful to practice not only the manipulation by hand but also the interception of external iliac arteries intermittently for the purpose of reducing the back flow from the IIA branches. Additionally, ureterolysis from the adhesion of aneurysmal wall was possible. The inferior mesenteric artery was reimplemented to the left leg of the bifurcated graft, because IIAAs on both sides had been sacrificed. The patient was not extubated for 10 days postoperatively because respiratory dysfunction and ileus were prolonged. After the postoperative administration for three weeks with vancomycin hydrochloride (350 mg/day) and panipenem/betamipron (1 g/day), the infectious state was controlled. The patient’s renal function improved without requiring hemodialysis. The postoperative serum creatinine level was 1.38 mg/dL. To prevent the deterioration of renal function, oral antibiotics were not administered. Owing to the patient’s insufficient nutrition, he underwent intravenous hyperalimentation for 1 month. Postoperative computed tomography showed the recovery of bilateral hydronephrosis (Fig. 2A), no evidence of ileus, and the complete removal of bilateral IIA aneurysms (Fig. 2B). His morbidity was assisted with a crutch, and he was transferred to the rehabilitation department of the hospital on postoperative day 67. He is being follow-up once a month after discharging from the hospital.

**Discussion**

IIA aneurysms existing in a deep anatomical position of the pelvis are infrequently considered a pulsatile mass, in contrast to abdominal aortic aneurysms. The mortality rate associated with IIA aneurysm rupture is reported to be high compared with that of AAA rupture. Symptoms associated with the appearance of IIA aneurysms, except in cases of rupture, are primarily caused by the compression of adjacent structures, which can cause neurological, urological, and gastroenterological symptoms. These clinical symptoms were all recognized as coincidental findings in the present case. Regarding symptom presentation, IIA aneurysms have been reported to be associated with venous insufficiency and deep vein thrombosis. The urological symptoms present as hematuria and urinary retention. These occur primarily because of the extrinsic obstruction of the bladder and the ureter. Visible hematuria must be considered a rare entity caused by a uretero-iliac aneurysm fistula. Hydronephrosis due to ureter entrapment has been reported. However, there have been few reported instances of the patient’s conditions deteriorating to acute renal failure,
such as in the present case. Additionally, gastroenterological symptoms may present as constipation, abdominal distension, ileus, lower abdominal pain, and melena. These occur because of the compression of the sigmoid colon and rectum. Neurological symptoms present as low back pain, radiating pain to the anterior aspect of the thigh, and numbness and weakness of the leg. These symptoms are associated with the progressive compression of the lumbosacral plexus.

Available treatments for IIA aneurysms include both open surgery and endovascular aneurysm repair. It is necessary to perform both coil embolization of the distal branches of the IIA and placement of the stent-graft to extend to the external iliac artery for occupying the orifice of the IIA aneurysm in endovascular aneurysm repair. The obliteration of the IIA branches, whether through open or endovascular surgery, can result in ischemic colitis, sexual dysfunction, urinary retention, and occasional buttock claudication. Endovascular aneurysm repair is certainly a less invasive approach. However, rare complications related to endovascular treatment have been reported, such as a ureteral fistula due to an indwelling ureteral stent with a stent-graft for inflammatory AAA, and hydronephrosis after embolization of IIA aneurysms.

We selected open surgery for the following reasons. First, the compression of the neighboring organs need to be securely released. Therefore, even if we could perform endovascular treatment rapidly, there is a possible high-risk of endoleak for giant aneurysms, which is why we did not perform it. Second, reconstruction of the inferior mesenteric artery was mandatory for preserving postoperative blood supply in the pelvis, because it was presumed that not only reconstructing the bilateral IIAs would be difficult but also that the collateral circulation was poor, as it had been damaged by severe atherosclerotic change. Third, ureterolysis from the adhesion of aneurysmal wall was thought to have contributed to the prompt improvement of renal failure.

With regard to the timing of operation, a staged approach, which perform nephrostomy or ureteric stent insertion before open surgery, was not adopted here because of the possibility of rupture and spread of infection following these procedures. On the other hand, Morita et al. reported that emergency surgical repair could result in recovery of renal function completely, even in an IIA aneurysm associated with acute renal failure secondary to hydronephrosis.

We decided to preferentially improve the acute renal failure secondary to bilateral hydronephrosis, because we were concerned about the possible spread of ischemia secondary to broad surgical dissection in an immunosuppressive state, which consisted of retrograde infection due to hydronephrosis and septicemia deteriorated from pyelonephritis, although the leakage of urine into the post-peritoneal space was not confirmed. Although another useful alternative for preventing graft infection is to fill the omentum, we were unable to do so in the present case because the omentum was not available owing to poor growth.

**Conclusion**

We described a case in which we successfully surgically treated giant bilateral IIA aneurysms associated with acute renal failure secondary to bilateral hydronephrosis, lumbosacral plexopathy, and ileus in a patient with a history of home oxygen therapy. Even though the patient had serious preoperative co-morbidities, emergency traditional open surgery, rather than endovascular treatment, should be the gold standard for managing the secure release of compression of the neighboring organs.

**Disclosure Statement**

The authors have no conflict of interest.

**References**