Endovascular Repair of Ruptured Iliac Artery Aneurysm
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Emergent stent-graft endovascular aneurysm repair in a 69-year-old male patient with ruptured bilateral iliac artery aneurysms is reported. Endoleak prevention and pelvic circulation preservation are the critical issues in endovascular repair for iliac artery aneurysms, especially when covering bilateral internal iliac arteries. Perioperative hemodynamic stability is crucial for preventing ischemic multi-organ failure after endovascular aneurysm repair.

Key Words: Endovascular aneurysm repair • Iliac artery aneurysm • Rupture • Stent-graft

INTRODUCTION

Endovascular aneurysm repair (EVAR) was first reported by Parodi et al in 1991, and since then has become a well-established and accepted alternative for repairing abdominal aortic aneurysm (AAA), even in emergent settings, with better short-term outcomes than conventional surgical repair.¹ ² However, the roles of EVAR remain controversial for the treatment of complicated AAA such as common iliac artery (CIA) or internal iliac artery (IIA) involvement. It is a challenging task to ensure complete exclusion without endoleak but also to preserve the pelvic circulation.³ Furthermore, the benefits of EVAR for ruptured AAA have not been well demonstrated, though some retrospective studies revealed favorable outcomes.² Hence, we report a case of ruptured iliac artery aneurysms involving bilateral CIAs and right IIA treated with an emergent complex EVAR with satisfactory results.

CASE REPORT

A 69-year-old gentleman with history of coronary artery disease, hypertension, dyslipidemia, benign prostate hypertrophy and chronic kidney disease was brought to our emergency department because of a sudden-onset, severe “splitting” low abdominal pain and near-syncope. On arrival, his blood pressure was 51/26 mmHg, and he presented with rebound tenderness over the lower abdomen. Immediate resuscitation was provided. Contrast-enhanced computed tomography revealed a large amount of retroperitoneal hematoma and bilateral CIA aneurysms, one 2.8 cm in diameter at the left CIA with iliac bifurcation involvement and one 7 cm in diameter at the proximal right CIA connecting to a IIA aneurysm of 5.5 cm in diameter with mural thrombi formation (Figure 1).

An emergent EVAR procedure was performed. Accesses to the bilateral common femoral arteries were established. The level of the renal arteries and the aortic bifurcation were identified by angiography. The bifurcated body of the stent graft (36 × 95 mm, Zenith®, Flex®, Cook Medical Inc., Bloomington, U.S.A.) was inserted over a guide wire via the right femoral route, positioned just below the renal level and oriented to achieve adequate direction of the contralateral limb gate. The contralateral limb (12 × 88 mm, Zenith® Flex®, Cook Medical Inc., Bloomington, U.S.A.) and a straight...
extender segment (12 × 54 mm, Zenith™ Flex®, Cook Medical Inc., Bloomington, U.S.A.) were advanced via the left femoral route. They were cannulated to the proximal devices and deployed one by one. After the completion of the ipsilateral limb (12 × 105 mm, Zenith™ Flex®, Cook Medical Inc., Bloomington, U.S.A.) implantation via the right femoral route in a similar way, balloon dilatation was performed to secure the fixation at each site of anastomosis. The final angiography confirmed the absence of immediate endoleak. The distal landing zones of the grafts were in the bilateral external iliac arteries with bilateral IIAs obliteration as planned. Hemodynamic parameters were stable and maintained throughout the procedure.

The postoperative course was uneventful, and the patient was transferred to ordinary ward two days after the operation. Contrast-enhanced computed tomography 3 days later revealed non-expanding retroperitoneal hematoma with complete exclusion of the aneurysms without evidence of endoleak (Figure 2A). The patient was discharged on day 14th with resolution of the retroperitoneal hematoma (Figure 2B).

DISCUSSION

Iliac artery aneurysm is uncommon, usually coexisting with a proximal aortic aneurysm and accounting for less than 20% of AAA. Isolated iliac artery aneurysm consists of only 1% to 2% of aortoiliac aneurysms, and the overall incidence is only 0.03%. Iliac artery aneurysm is usually multiple and bilateral, involving the CIA (70%) and IIA (20%). The median expansion rate of CIA aneurysm is 0.29 cm per year, and repair was recommended for patients with symptoms or aneurysm larger than 3.5 cm in diameter. Surgical repair for iliac artery aneurysm is more technically demanding, with higher mortality and morbidity than the AAA repair due to the deeper anatomical orientation.

Two randomized trials, the Endovascular Aneurysm Repair (EVAR) trial and the Dutch Randomized Endovascular Aneurysm Management (DREAM) trial have both concluded that for patients with non-ruptured AAA or healthy enough to receive surgical repair, the 30-day and aneurysm-related mortality were lower after endovascular repair than open repair. In the cases of iliac artery involvement, EVAR also showed a better outcomes regarding blood transfusion, length of hospital stay and mortality, even under the ruptured condition. Regarding the retroperitoneal hematoma in ruptured AAA, EVAR is also associated with less intra-abdominal compartment hypertension and host inflammatory response compared with open repair. Nevertheless, the possibility of endoleak and diminished pelvic blood supply after EVAR for iliac artery aneurysm remains a critical issue.

When endovascular grafting an iliac artery aneurysm with distal landing at the external iliac artery, type II endoleak due to the patent IIA retrograde flow will be inevitable. Adjunctive coil embolization of the IIA before endovascular grafting could prevent this complication. Several strategies to preserve pelvic circulation, including staged IIA embolization, IIA revascularization and the use of bifurcated iliac branch graft have been reported. Intraoperative monitoring of penile blood flow...
during EVAR may further convince the benefit of IIA bypass if indicated.\textsuperscript{10,11} Fortunately, these were not the scenario of our patient. The follow-up computed tomography confirmed adequate pelvic perfusion. Delayed thrombosis might occur in the partially occluded IIA s and further collaterals formation of the pelvic circulation would be anticipated. We believe that in our patient, hemodynamic stabilization might have been the key to achieving the uneventful result.

Despite higher medical cost, an emergent EVAR can be a valuable alternative for the management of ruptured iliac artery aneurysm. Pelvic circulation might be preserved if perioperative hemodynamics is appropriately maintained.

REFERENCES