ELSEVIER

Selected Techniques

Iliac Stent Grafting to Facilitate Distal Suture during Abdominal Aortic Aneurysm Open Repair

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Background: We report a hybrid technique that aims to facilitate revascularization of heavily calcified iliac arteries during open repair of abdominal aortic aneurysms.
Methods: It consists of performing the prosthetic graft limb anastomosis on the proximal edge of an iliac leg stent graft that is deployed anterogradely or retrogradely in the common iliac artery and externalized in the retroperitoneum.
Results: We used this technique in 2 cases with satisfactory results and preserved patency of the implanted stent grafts.
Conclusion: This technique avoids anastomoses on heavily calcified iliac arteries or anastomoses on right femoral arteries during left retroperitoneal aortic approaches.

INTRODUCTION

Open repair is a durable option for abdominal aortic aneurysms (AAAs),[1] especially in case of hostile anatomy for endovascular repair (EVAR). However, in presence of heavily calcified iliac arteries, an aorto-bi-femoral bypass can be required. It implies femoral incisions, which are associated with significant access-related complications[2] and higher infection rate.[3]

We report a hybrid technique to treat AAA in 2 patients with heavily calcified iliac arteries. The principle is similar to the VORTEC technique used for aortic branch revascularization during hybrid repair of thoracoabdominal aortic aneurysms,[4,5] along the same lines as the EVREST hybrid technique which provides a sutureless aortic anastomosis during laparoscopic treatment of occlusive disease.[6] To facilitate the right iliac revascularization during left retroperitoneal approach, we deployed an iliac leg stent graft in the right common iliac artery. It was used as distal anastomotic site for the right prosthetic limb.

TECHNIQUE

The patient undergoing elective procedure gave informed consent. This article follows the principles outlined in the Declaration of Helsinki.

This hybrid technique was used in 2 patients needing open repair via a left retroperitoneal approach to deal with heavily calcified iliac arteries. These patients were deemed anatomically unsuitable for EVAR. Iliac leg stent-graft diameters and lengths were determined according to measurements on centerline reconstructions. The distal diameter was oversized by 15%. The length was calculated in such a way that the distal end landed at the level of the iliac bifurcation and the proximal end 2 to 4 cm above the aortic bifurcation. A distal iliac sealing zone of 3 cm was considered acceptable.

In the first case, the technique was used as a bailout procedure to deal with nonsuturable heavily calcified common iliac arteries. The iliac stent graft was

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Fig. 1. Intraoperative angiography showing the distal part of the iliac extension stent graft deployed at the right iliac bifurcation.

deployed in an anterograde fashion. This 87-year-old female patient presented a ruptured juxtarenal AAA. The aorta was approached via a left retroperitoneal incision. To reduce the overall renovisceral clamping time, an initial infrarenal aortic cross-clamping was performed. The aneurysmal sac was opened. Owing to difficulties to control iliac backflow with occlusion balloons, we closed the endarteriectomized aortic bifurcation using a 3.0 polypropylene running suture. Only then was the aortic cross-clamp shifted to supra-mesenteric position. A 20/11-mm polyester bifurcated graft (Lemaitre Vascular, Burlington, MA, USA) was sutured to the infrarenal aorta in an end-to-end fashion. Once the renal flow was restored, the origin of the right common iliac artery was punctured for anterograde placement of a short 9F sheath. Under fluoroscopic guidance, a 0.035-in guidewire was inserted down to the superficial femoral artery and exchanged for a Lunderquist extra-stiff guidewire (Cook Inc., Bloomington, IN). A Zenith Spiral-Z iliac leg stent graft (ZSLE 13—74-ZT iliac extension, Cook) was deployed and fully expanded with balloon dilatation above the iliac bifurcation, partly within the common iliac artery and partly projecting outside the artery (Fig. 1). Back-bleeding from the stent graft was controlled with balloon occlusion. The externalized end of the stent graft was sutured end-to-end to the right prosthetic graft limb using a Teflon-felt supported polypropylene 4.0 running suture (Fig. 2). The blood flow was restored, and 4 separate stitches were placed through the stent graft and the iliac artery wall to avoid stent-graft migration. The left prosthetic limb was anastomosed to the left common femoral artery. The postoperative course was uneventful. No postoperative CT scan was performed. The patient was well and alive after 6 months of follow-up, with fully patent iliac arteries on duplex scan.

In the second case, the iliac stent graft was deployed electively in a retrograde fashion. This 67-year-old female patient presented with a painful 70-mm suprarenal aneurysm, with shaggy lesions in the visceral segment and calcified iliac arteries (Fig. 3A and B). Open repair using extracorporeal circulation for selective visceral and renal perfusion was chosen. With the patient in a right lateral decubitus position and before the retroperitoneal cut-down, the proximal right superficial femoral artery was approached via a 4-cm incision. A 16 × 82—mm tubular Endurant iliac extension stent graft (Medtronic, Santa Rosa, CA, USA) was deployed above the iliac bifurcation, with the proximal end floating in the distal aneurysmal aorta. It was fully expanded by balloon dilatation. The delivery device was removed, and the superficial femoral artery was closed. The abdominal aorta was approached via a thoraco-phreno-lombotomy. A venous cannula was inserted in the left femoral vein. After infrarenal cross clamping, the aneurysmal sac was opened, and retrograde perfusion cannulas were inserted in the left common iliac artery and the right iliac extension stent graft. Extracorporeal circulation was started, insuring bilateral leg perfusion. The aortic cross-clamp was shifted to supraceliac position. The superior mesenteric artery, celiac trunk, and renal arteries were perfused selectively with coronary perfusion cannulas. Using a bifurcated polyester graft, a proximal bevelled anastomosis including the renal and visceral arteries was performed. The extracorporeal circulation was stopped. Blood flow in the right leg was restored as described above. Blood suffusion through the stent-graft fabric was observed for a few minutes and resolved after temporary packing. The left prosthetic limb was sutured to the left common iliac artery. Postoperatively, left prosthetic limb occlusion occurred, probably related to a technical problem concerning the left anastomosis (Fig. 3C). It was successfully treated with a crossover femoro—femoral bypass. Nine months later, the patient was alive and well. A CT scan showed fully patent right iliac reconstruction and femoro—femoral bypass.