

# Bilateral GORE Iliac Branch Endoprosthesis with prior open abdominal aortic aneurysm repair

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## ABSTRACT

The GORE Iliac Branch Endoprosthesis (W. L. Gore & Associates, Flagstaff, Ariz) has been approved by the Food and Drug Administration for use in the treatment of aortoiliac and common iliac aneurysms, with promising results to date. The efficacy of using the device to overlap with a Dacron graft has yet to be elucidated. We present the case of a patient with prior open abdominal aortic aneurysm repair who we treated with bilateral iliac branch endoprostheses. (*J Vasc Surg Cases and Innovative Techniques* 2019;5:84-7.)

**Keywords:** Iliac Branch Endoprosthesis; Endovascular repair; Internal iliac artery aneurysm; Hypogastric aneurysm

Despite the ever-expanding use of endovascular aneurysm repair to treat abdominal aortic aneurysms (AAAs), there remains a significant population of patients who have been previously treated with open grafting. For these patients, the utility and safety of the latest endovascular techniques for treating iliac arterial disease, such as the GORE Iliac Branch Endoprosthesis (IBE; W. L. Gore & Associates, Flagstaff, Ariz), have yet to be established. We present the case of a patient who was treated with bilateral IBEs for internal iliac artery aneurysms (IIAAs), with the proximal ends of the IBEs deployed within a bifurcated Dacron graft. The patient's consent was obtained for the publication of this report.

## CASE REPORT

A 70-year-old man with a past medical history of atrial fibrillation, hypertension, hypercholesterolemia, coronary artery disease status post three cardiac stents, aortic valve repair, peripheral arterial disease status post left femoral-popliteal bypass, and AAA status post open repair with an aortobi-iliac Dacron graft in 2005 was referred for expanding bilateral IIAAs. He was asymptomatic and denied experiencing any pain or urologic or neurologic symptoms. Computed tomography imaging revealed bilateral IIAAs that measured 5.9 cm on the right and 4.3 cm on the left, in addition to a bifurcated Dacron graft with a 30-mm main diameter and 16-mm limbs. Furthermore,

the distal common iliac arteries were dilated to 26 mm on the right and 24 mm on the left (Fig 1). After explanation of the risks and benefits of the treatment modalities available, including open repair, hybrid reconstruction, and various endovascular techniques involving parallel grafts and bell-bottom iliac limbs, our patient opted for the bilateral off-label use of the IBE.

After percutaneous bilateral common femoral access was obtained under ultrasound guidance, two Perclose devices (Abbott Vascular, Santa Clara, Calif) were placed in a preclose technique and a stiff angled Glidewire (Terumo Interventional Systems, Somerset, NJ) was snared from the right to left side. On the right side, an IBE (23 mm × 14 mm × 10 cm) was then advanced over a stiff wire through a 16F DrySeal sheath (W. L. Gore & Associates) to the bifurcation of the right common iliac artery and deployed within the right iliac limb of the existing Dacron graft. On the left side, a 16F DrySeal sheath was advanced over the through-and-through wire such that the tip was in the proximal right common iliac artery. The internal iliac artery gate was then cannulated, and a Rosen wire (Cook Medical, Bloomington, Ind) was placed in the internal iliac artery. Building from distal to proximal, two 8×79-mm balloon-expandable polytetrafluoroethylene-covered VBX stents (Gore Medical) and then a 16-mm × 7-cm Gore IBE internal iliac extension were placed, with the distal end landing in the posterior division of the internal iliac artery. No arterial branches were visualized proximal to the distal seal zone. Postdilation angioplasty was performed. The right external iliac artery gate was then released, and a Gore contralateral leg endoprosthesis 16-mm × 9.5-cm iliac artery extension was deployed. Postdilation was again performed. Completion angiography demonstrated adequately sealed landing zones. Attention was then turned to the left side, which was completed in similar fashion without incident. Three 8-mm VBX stents with a 16-mm × 7-cm Gore IBE extension limb were used for the internal iliac artery, and a Gore contralateral leg endoprosthesis 14.5 mm × 10 cm was used as an extension limb for the external iliac artery. Completion angiography demonstrated good exclusion of the aneurysms bilaterally with no observed endoleaks (Fig 2). The Perclose devices were deployed to repair the right and left common femoral artery arteriotomies.

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**Fig 1.** Three-dimensional reconstruction of the preoperative computed tomography angiography image showing a right-sided internal iliac artery aneurysm (IIAA) measuring 5.9 cm and a left-sided IIAA measuring 4.3 cm. The distal common iliac arteries are also noticeably dilated.



**Fig 2.** Intraoperative completion angiography demonstrating successful exclusion of both internal iliac artery aneurysms (IIAAs) without any observed endoleaks, with blood flow maintained to both external and internal iliac arteries bilaterally.

The patient tolerated the procedure well and was discharged on aspirin. He has remained asymptomatic, with no buttock claudication, erectile dysfunction, or other postoperative complications. Postoperative computed tomography angiography at 3 months showed continued exclusion of the aneurysms with no endoleaks (Figs 3 and 4).

## DISCUSSION

In contrast to common iliac artery aneurysms that commonly present with symptoms secondary to compression of nearby structures, 40% of IIAAs present with rupture.<sup>1-5</sup> This is in part due to the location of IIAAs deep in the pelvis, which precludes early symptoms.<sup>3,4</sup> As such, because of high operative mortality of ruptured iliac aneurysms, current literature recommends asymptomatic IIAA repair when maximum diameters exceed 3.0 cm.<sup>3,6</sup>

Several treatment modalities exist for the treatment of IIAAs. Open surgical approaches include ligation, bypass, and endoaneurysmorrhaphy; endovascular techniques include embolization, stenting, and the use of iliac branch devices.<sup>7,8</sup> Hybrid methods involving coil embolization followed by aneurysm ligation or graft replacement have also been described.<sup>9,10</sup> Head-to-head comparisons of the various techniques are limited,

although existing data suggest that endovascular IIAA repair is associated with shorter length of hospital stay and fewer postoperative complications compared with open repair.<sup>7</sup> Furthermore, given the age and comorbidities of our patient, an endovascular approach was deemed more preferable.<sup>11</sup>

In general, endovascular repair can be divided into two categories: those with preservation of internal iliac arterial perfusion and those without. Studies have shown that in endovascular aneurysm repairs for AAAs with concomitant IIAA repair as well as in isolated IIAA repair, preservation of both internal iliac arteries is associated with significantly lower rates of buttock claudication compared with preserving one internal iliac artery.<sup>7,8</sup> Another consideration is the timing of the procedures; successful staged endovascular repair of bilateral IIAAs has been reported.<sup>12</sup> Our patient was keen to avoid an additional operation and decided to proceed with the off-label use of the IBEs to reduce the risks of pelvic ischemic complications.

There are few studies examining the effect of secondary stent graft deployment within the limbs of an existing AAA graft.<sup>13</sup> However, there is evidence to suggest that doing so is safe; hybrid procedures involving use of a Dacron graft as an artificial landing zone to treat aortic



**Fig 3.** Three-dimensional reconstruction of the 3-month follow-up computed tomography angiography image revealing continued exclusion of the bilateral iliac artery aneurysms. The proximal sections of both iliac branch endoprostheses (IBEs) have been deployed within the limbs of the previously placed Dacron graft.



**Fig 4.** Representative axial image from the 3-month follow-up computed tomography angiography showing continued exclusion of the bilateral iliac artery aneurysms.

treatment of aortoiliac aneurysms and common iliac artery aneurysms. The device is a bifurcated stent graft with one limb designed for extension into the internal iliac artery and the other for extension into the external iliac artery. Preliminary data have shown 93% to 96% technical success (defined as successful deployment, patency of IBE limbs, and freedom from type I and type III endoleaks) in addition to 94% to 96% primary patency of internal iliac limbs and no device migration at 6 months.<sup>16,17</sup> In addition, case reports have shown that IBE use in the treatment of isolated IIAAs is technically feasible, with no reported complications to date.<sup>18,19</sup> Given the potential risk of “gutter leaks” and limb kinking from alternative techniques, such as parallel branch stent grafting, IBE deployment has the potential to become a preferred endovascular treatment of internal iliac aneurysms in the setting of previous open AAA repair.

### CONCLUSIONS

Given the appropriate anatomy, the Gore IBE can be used successfully to treat bilateral IIAAs in the setting of prior open AAA repair. Precise measurements are crucial to ensure procedural success.

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arch disease have been successfully performed without any type I or type III endoleaks or distal migration.<sup>14,15</sup> In our patient, the iliac limbs of the previously placed Dacron graft had dilated to around 18 mm bilaterally, and to pre-empt further (albeit minimal) dilation in addition to the possibility of a type III endoleak, a 23-mm IBE was deemed appropriate.

As for the IBE itself, the Food and Drug Administration approved the Gore IBE in March 2016 for use in the

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