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# Iliac Side Branches for the Treatment of Iliac and Aortoiliac Aneurysms

Iliac branch devices should be the standard of care in degenerated common iliac arteries > 18 mm.

BY AFSHIN ASSADIAN, MD

**E**ndovascular aneurysm repair (EVAR) of infrarenal aortic aneurysms is a well-established therapy, as reflected by an increasing number of available devices, as well as a still-increasing shift from open repair to EVAR. However, the enthusiasm for EVAR has led to an unhealthy shift of indications, with patients being treated outside the instructions for use, leading to relevant morbidities and mortalities.<sup>1</sup> The majority of complications arose from treating aortic necks that were either too short or too diseased due to disease progression or type I endoleak. As a result, in order to increase durability, fenestrated and branched devices are increasingly used, primarily to seal in a healthy portion of the aorta aiming at a durable procedure.<sup>2</sup>

In contrast to efforts to seal in healthy proximal aortic segments, the focus on the distal sealing zone is still negligible. Diseased common iliac arteries are viewed as suitable landing zones for EVAR, and compromises are frequently made, as reflected by the availability of devices with iliac graft diameters of up to 24 mm. Importantly, aortoiliac aneurysms account for up to 40% of treated abdominal aneurysms and are thus a relevant entity.<sup>3</sup>

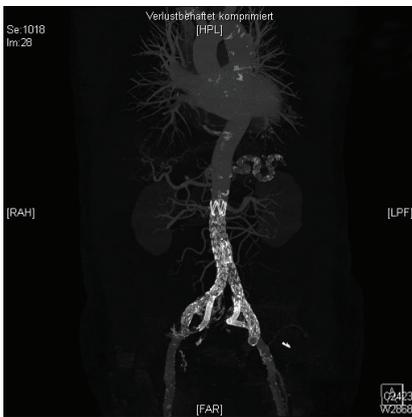
## DEFINITION OF DISEASED COMMON ILIAC ARTERY

The diameter of the diseased common iliac artery should be put into context with patient characteristics and diameter of “healthy” arteries. In general, a healthy common iliac artery has a diameter of up to 1 cm. Any dilation of up to 1.5 cm is considered an ectasia, and dilations > 1.5 cm are considered aneurysms.<sup>4</sup> This definition may be too aggressive because the majority of common iliac arteries are in this range; iliac artery diameters should also be compared with diameters of the healthy aortic neck and external iliac arteries. Other definitions are too liberal, defining a diameter  $\geq 1.7$  cm in males or  $\geq 1.5$  cm in females as ectatic and a diameter > 2.5 cm as aneurysms.<sup>5</sup>

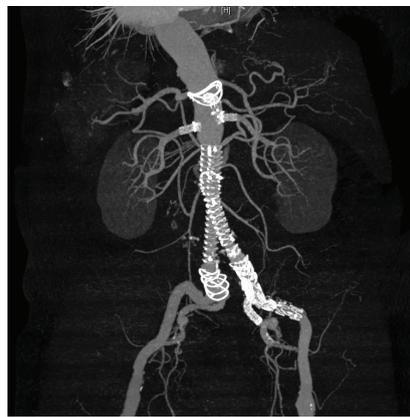
## STRATEGIES TO MANAGE ANEURYSMATIC ILIAC ARTERIES

Considering the aforementioned definitions, it is virtually impossible to land a graft in a healthy common iliac artery. Practically, a distal landing zone with no calcification or thrombus longer than 25 mm and a diameter < 16 mm would be considered suitable for good long-term results. Data demonstrate a significantly slower progression of disease, and thus dilatation, in iliac arteries < 16 mm compared to larger common iliac arteries after EVAR.<sup>6</sup> Yet, common iliac arteries up to 20 mm in diameter are also considered a suitable landing zone, potentially at the cost of long-term results. Other operators perform coil embolization of hypogastric arteries and extend the landing zone to the external iliac artery.<sup>7</sup> Compared to preserving techniques of the hypogastric arteries, this results in a significantly higher incidence of gluteal claudication<sup>7</sup> and potentially lethal complications after EVAR, such as ischemic colitis. Especially in complex anatomies with two patent hypogastric arteries and a prominent inferior mesenteric artery, sacrificing both hypogastric arteries may be fatal.

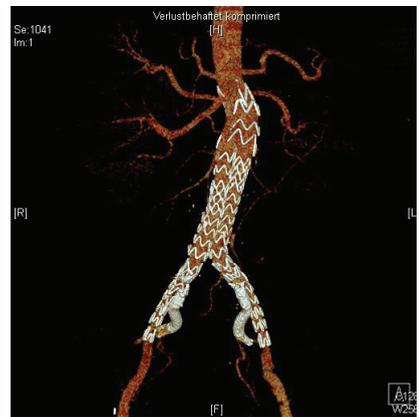
The ideal option to manage aortic aneurysms is to preserve as many branch arteries as possible to maintain quality of life and to land the endograft in a healthy portion of the vascular bed, which will provide reliable long-term results (Figures 1–3). Iliac branch devices are an effective and practical solution to fulfill these criteria. Because desirable proximal and distal diameters and lengths of devices vary widely, off-the-shelf solutions that address the preservation of branch arteries and ideal endograft landing zones are mandatory to allow for expedited treatment of aortoiliac aneurysms. Also, dedicated stent grafts designed to fit the branch vessel as well as the graft are desirable. As imaging and proficiency in endovascular techniques have evolved, additional placement of a branched iliac



**Figure 1.** Bi-iliac aneurysm treated with an abdominal stent graft (E-tegra, JOTEC GmbH), an iliac branched device (E-liac, JOTEC GmbH), and a bridging stent (E-ventus BX, JOTEC GmbH).



**Figure 2.** Aortoiliac aneurysm treated with a fenestrated graft (Vascutek, a Terumo Company) and an iliac branched device (E-liac, JOTEC GmbH).



**Figure 3.** Aorto bi-iliac aneurysms treated with a combination of an abdominal stent graft with an E-liac stent graft and an E-ventus BX (both JOTEC GmbH) as a bridging stent.

device in a standard case should not last longer than 20 minutes and thus allow for implantation under local anesthesia, as should be the case for all standard EVAR procedures. Technically, an inner lumen > 18 mm is required to allow for successful implantation. Access vessels suitable for a standard EVAR are also sufficient to allow the application of a branched device. Common iliac arteries fulfilling these criteria should be treated with an iliac branch device for the sake of patient safety and long-term durability of EVAR.

### JOTEC E-liac Stent Graft

The JOTEC E-liac stent graft has the widest range of proximal and distal diameters and lengths of all currently available off-the-shelf devices. In our experience, the flexible stent graft design allows good conformability to the vessel shape, which minimizes the risk of kinking in angulated anatomies. The 18 F delivery system is adapted for crossover maneuvers and is easy to use. Also, the E-liac stent graft can be used with the E-ventus BX balloon-expandable connecting stent graft (JOTEC GmbH), which, in our practice, is favorable to self-expandable stent grafts that connect and seal into the hypogastric artery. Finally, specially designed, custom-made stent grafts based on the E-liac device are usually available within 3 weeks of submitting CT scans, allowing for the treatment of an even wider range of disease.

### THE IMPORTANCE OF REIMBURSEMENT OF BRANCHED DEVICES

One of the most crucial issues hindering the widespread application of these devices is the lack of appropriate reimbursement internationally. The total cost of

the graft and any additional wires, stents, catheters, and sheaths can be between €5,000 and €10,000, depending on the medical system and case complexity. This has to be addressed in order to establish an important and useful treatment strategy as gold standard for aortoiliac aneurysms.

### CONCLUSION

Iliac branch devices are an important tool to improve immediate- and long-term results of EVAR. By using these devices, a healthy distal landing zone can be achieved by preserving hypogastric perfusion. ■

*Afshin Assadian, MD, is from the Department of Vascular and Endovascular Surgery, Wilhelminenspital in Vienna, Austria. He has stated that he has no financial interests related to this article. Dr. Assadian may be reached at afshin\_assadian@yahoo.de.*

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