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Which Anatomy Presents the Greatest Technical Challenges for Iliac Branch Endografts?

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With currently available iliac branch devices, almost 40% of patients with extensive aortoiliac aneurysms may be suitable for endovascular repair, according to the manufacturers' indication for use and recently published literature.[1,2] With increasing operator experience and new material availability, these indications are often broadened today to allow treatment of most patients' anatomies.

One of the most common adverse features in extensive aneurysmal disease is the tortuosity of the iliac vessels secondary to the increasing diameter and length of the growing aortoiliac aneurysm. Common iliac aneurysms tend to grow deepening down into the small pelvis, rotating anteromedially due to the fixed point of the hypogastric bifurcation with elongation and tortuosity of the common and external iliac arteries.

In some patients, this tortuosity is associated with atherosclerotic changes of the arterial wall and extensive calcification that may limit endograft access, correct deployment, and expansion. External iliac tortuosity and calcification may necessitate the use of multiple introducers of increasing size to allow the advancement of the iliac branch device. In such settings, having smaller devices available that can be introduced in 16 Fr sheaths, such as the GORE® EXCLUDER® Iliac Branch Endoprosthesis (IBE), could be helpful to enable axial rotation for proper device orientation.

Another challenge is the risk of kinking the external iliac limb of the graft into the first segment of the external iliac artery, where its take-off angulation may increase after deployment. It is therefore of paramount importance to remove the stiff guidewire, taking multiple projections during the postdeployment angiographic control to avoid leaving sharp angulations. Early graft occlusion may be prevented by reinforcing the external iliac graft segment with a bare stent.

Excessive tortuosity in the common iliac arteries is usually a less critical challenge that can be dealt with by stiff guidewires. After deployment, the reinforcement of the proximal tubular segment of the iliac branch device with the mating iliac limb of the bifurcated abdominal graft will decrease the tortuosity of the resulting iliac axis.

Tortuosity of the hypogastric artery is less problematic, because the wire used for hypogastric stent grafting may be well advanced in one of the distal branches to support navigation through the proximal trunk; we use a stiff wire with a long, soft tip, 0.035 inch ABBOTT® SUPRA CORE Guidewire with success in such cases.

With the stiff guidewire in place in the external common iliac aneurysm, another challenge may be the increasing angulation at the level of the ostium of the hypogastric artery, with its functional occlusion that sometimes may impede access to the vessel for hypogastric component deployment. In such cases, after retraction of the wire and verification of the patency, a buddy hypogastric guidewire may be inserted from the contralateral access before advancement of the homolateral stiff wire to maintain the ostium patency.

The most challenging anatomical feature for an iliac branch device is the presence of a tight iliac bifurcation to accommodate both iliac limbs of the graft.

When the lumen is < 14 mm, all the available room may be occupied by the external iliac limb of the graft, leaving not enough space to cannulate the hypogastric ostium. This difficulty may even increase in the presence of a saccular aneurysm of the common iliac artery, where the hypogastric short segment of the graft may open during deployment. The best option here is to deploy the iliac branch device with the hypogastric branch opening opposite from the saccular expansion, leaving more room for the guidewire to navigate into the hypogastric ostium.

Lastly, a diseased, stenotic, proximal hypogastric artery may render difficult cannulation once the iliac branch device is in place. Careful evaluation should consider alternative options, most of the time occluding the diseased internal iliac artery. In selected cases, precannulation and gentle dilation of the hypogastric artery (avoiding dissection) before iliac branch device deployment may allow further access through the graft. ■

1. Karthikesalingam A, Hinchliffe RJ, Malkawi AH, et al. Morphological suitability of patients with aortoiliac aneurysms for endovascular preservation of the internal iliac artery using commercially available iliac branch graft devices. J Endovasc Ther. 2010;17:163–171.
2. Pearce BJ, Varu VN, Glocker R, et al. Anatomic suitability of aortoiliac aneurysms for next generation branched systems. Ann Vasc Surg. 2015;29:69-75.

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