Branched Endografts to Revascularize the Hypogastric Artery during Endovascular Aneurysm Repair with Iliac Aneurysms: How Well Do They Work?

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Iliac aneurysms accompany 15 to 20% of all abdominal aortic aneurysms. A subset of these is bilateral and therefore more complex to treat. The presence of iliac aneurysms adds a level of complexity to the repair of an aortic aneurysm whether by open or endovascular techniques. Exclusion may require internal iliac artery embolization, which has an increased risk of complications including claudication and bowel or spinal cord ischemia, and bilateral internal iliac artery occlusion severely increases the complication risk. Extension of the limbs into the external iliac artery increases the risk of limb occlusion, in my opinion, and the preservation of the internal iliac artery makes the overall procedure somewhat more complex but more appealing to the patient. Several publications by Lee, Lim, Cynamon and Vieth, Criado, Razavi, and Piccone have all noted significant levels of claudication, be it claudication that ranges from 13 to 60% in patients with internal iliac occlusion, sexual dysfunction, which can reach 60%, colon ischemia in 20% of the cases by some authors, or spinal cord ischemia in a total of 8 cases that I know of.

So, should we try to preserve an internal iliac artery? Well, that depends on the risk-to-benefit ratio. If the risk of preserving the internal iliac artery is that we are going to destabilize the aortic repair and put the patient at risk for rupture, then the answer is no. So in the context of this debate, I will assume that any reasonable approach to the internal iliac artery will not subject the patient to an increased risk of rupture of the more proximal repair. Assuming such a design exists, as we believe it does, what is the benefit?

Well, the benefit is that the patients will not have claudication, and they may have a lower incidence of sexual dysfunction and perhaps a lower incidence of colon and spinal cord ischemia. This opens up the door for treatment of a number of patients who have bilateral common iliac aneurysms that were previously not endovascular candidates and treatment that can be done in virtually all types of complex iliac artery anatomy. The device that we used is titled helical hypogastric branch device; it is created with the intention of maintaining our current design objectives for an abdominal aortic aneurysm (AAA) repair. The primary prosthesis has a bifurcation that is close to the aortic bifurcation. The entire iliac repair is within the iliac arteries so the aortic repair is not destabilized. It is versatile, it has been used in extremely torturous arteries, it has been used in arteries with very tight internal iliac artery stenosis, and it has been used to treat patients with both common and internal iliac artery aneurysms. It is modular, so there are only two devices that need to be shelved and they can be combined with any sort of device that we are intending to use it with. The mating device choice is probably the most limiting factor in that we just do not have well-developed small vessel stent grafts; however, we have used this device in conjunction with balloon-expandable stent grafts as well as the Viabahn and the fluency stent grafts. Granted, the procedure becomes slightly more complicated and this should be limited to people who have a significant amount of skill with endovascular grafting in general; however, the results that we have enjoyed in our series are worthy of significant attention.

At the time of the SVS, we had done approximately 21 internal iliac branches. Of these 21, 18 were technically successful in terms of maintaining a patent branch to the internal iliac artery throughout the follow-up, which is by definition limited given this new technology. However, it is of greater interest to look at the three patients where we failed.

In each of those patients, the branch device was inserted, and when we were unable to gain access to the internal iliac artery, we simply covered the branch with an extension limb and proceeded as if we had embolized the internal iliac artery. None of these patients had retrograde leaks through their internal iliac artery, and all of them suffered unilateral claudication on the side of the branch occlusion. Ultimately, in our experience, the cost of failure was no greater than the cost of embolizing the internal iliac prior to the procedure itself. Consequently, I have to conclude that if I were a patient and I were given the choice to maintain the patency of an internal iliac artery or not maintain the patency of an iliac artery, I would prefer to preserve internal iliac flow for obvious reasons. I think the burden is on the shoulders of the physicians who are perhaps intimidated to learn these new techniques that are required to maximize the benefits of endovascular repair. However, it is clear that the entire aorta is within the domain of the endovascular interventionalist and the hypogastric artery is the stepping stone for people to learn how to address these new technologies.