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Commentary: Keep working: Current endovascular arch-repair technology still has a way to go

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CENTRAL MESSAGE

Present endovascular arch stenting technology is far from perfect, and using it involves a steep learning curve. Knowing the devices and their limitations is important when treating arch pathologies.

In this issue of *JTCVS Techniques*, D'Onofrio and colleagues[1] present an interesting report of endovascular arch exclusion in 4 patients with a previous bio-Bentall procedure for type A aortic dissection. The authors used 2 different arch stents, a custom-made device and an off-the-shelf device, in 2 patients each.

Endovascular repair of the aortic arch after previous repair of a type I aortic dissection is novel. Most reported endovascular arch repairs have been performed to treat arch aneurysm; few have been done for aortic dissection.[2-4] The learning curve in these repairs can be significant and can influence short-term outcomes.[2,5] Various arch stent devices, branched and fenestrated, have been tried for aortic arch pathologies, with no clear winner.

Although it includes only 4 patients, D'Onofrio and colleagues' report calls attention to the advantages and disadvantages of the current technology and raises concerns about the increasing use of these devices in cases of chronic arch dissection. Even though the 2 described devices are completely different, the technical aspects of the procedures used to place them had certain common features. In all 4 patients, the proximal landing zone was the previous Dacron graft, which offered a safety net to the operators by eliminating the risk of retrograde ascending dissection—a major concern when the ascending aorta is native.

In patients with a prior Bentall procedure, although the diameter of the surgical graft is not a limiting factor per se for the current arch repair technology, other issues can result in imprecise deployment, including kinking of the graft (which is not unusual); variability in the length of the proximal surgical graft, which can increase over time; and the variable position of the coronary buttons. That said, there is no question that manipulating stent grafts and wires is much more forgiving inside a Dacron graft than inside the native aorta. The presence of a mechanical Bentall, commonly performed in younger individuals, also can be a limiting or prohibiting factor when these individuals present for endovascular arch exclusion later in life. Properly positioning the stiff wire in the left ventricle, as we do during transcatheter aortic valve replacement, is essential for accurate stent deployment. In addition, although dissection of the supra-aortic vessels did not contraindicate endovascular arch repair in the patients in the present series, it remains a real concern, and its presence potentially can influence patient outcomes.

The single-branched, modular, off-the-shelf graft used by the authors requires a double surgical bypass of the supra-aortic vessels, which in patients with already dissected vessels could increase the risk of malperfusion and stroke. In contrast, the other device described—a double-branched, custom-made graft—requires a single surgical bypass (left subclavian artery to left common carotid artery bypass). The long-term fate of these bypasses is unclear. Furthermore, placing the double-branched device requires inserting a large sheath into the diseased supra-aortic vessels

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and retrograde branch insertion, which could increase the risk of stroke owing to manipulation of wires and stent grafts inside diseased neck vessels. Careful patient selection, knowledge of existing technology, and wire skills are key to producing better outcomes in these high-risk patients. Although promising and appealing, the current technology still has significant drawbacks that make its widespread use unappealing at this time.

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