Commentary: It's all about the distal

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In this issue of the *Journal*, Urbanski¹ reports his approach to the reconstruction of the transverse aortic arch with a multibranched Dacron polyester fabric graft. Acknowledging that as many as 45% of patients undergoing total transverse arch replacement may require a distal thoracic aortic intervention,² Urbanski¹ modified the arrangement of supra-aortic bypasses to be performed. As illustrated in his report,¹ the predesignated cannulation branch of the 4-branched graft is instead used for the bypass to the left subclavian artery (LSCA), and the predesignated LSCA branch is instead used for arterial cannulation. As with current commercially available multibranch Dacron polyester fabric aortic grafts in the United States, this configuration—with cannulation branch anterior and proximal to the most distal branch—may provide an increased landing zone (1.5 cm) for subsequent thoracic endovascular interventions (Figure 1). By using this supra-aortic reconstruction, Urbanski¹ lengthens the landing zone for future thoracic endovascular aortic repair without altering his general arch reconstruction.

To lengthen the landing zone during total arch replacement *without* use of the elephant trunk, others have proposed the “zone 2” arch replacement.³ Here, the distal anastomosis is performed at the zone 2 level and the left common carotid and innominate arteries are debranched with grafts originating from the ascending aortic graft. This approach moves the landing zone proximally into the ascending aortic graft, affording a technically easier distal anastomosis, because it is now more anterior, which also potentially reduces the incidence of recurrent laryngeal nerve injury. As appropriately noted by Urbanski,¹ the zone 2 arch approach requires longer bypasses, which raises concerns of graft kinking and decreased late patency. In addition, when reoperative cardiac surgery is required after previous zone 2 arch repair, the supra-aortic bypasses during the redo sternotomy may be an issue.

When dealing with transverse arch replacement, a technical concern is always the distal anastomosis. Although

US commercially available Dacron transverse aortic arch graft with multiple branches.

Central Message

Urbanski is to be commended for a new way to address the distal anastomosis in transverse arch replacement. It's all about the distal.

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the technique described may be of less significance as the use of the frozen elephant trunk expands, Urbanski¹ is to be commended for providing an interesting way to address the distal anastomosis, and facilitate a subsequent distal

FIGURE 1. US commercially available Dacron polyester fabric transverse aortic arch graft with multiple branches. The designated cannulation branch is positioned anteriorly and 1.5 cm more proximally to the most distal margin of the designated left subclavian artery branch.

intervention. Multiple considerations bear mention before performing the distal anastomosis.

1. Is the proximal descending thoracic aorta involved? If so, does it need to be addressed immediately, or can it be delayed? As the frozen elephant trunk prosthesis becomes more widely accepted and available in the United States, it likely has become the favored approach, because it immediately addresses the proximal descending thoracic aorta and provides the optimal landing zone for subsequent endovascular procedures. The approach described in this report, like the zone 2 approach, provides landing zones for subsequent interventions; however, the frozen elephant trunk may eventually be more applicable.
2. How deep is the patient's chest? If the chest is deep (>10 cm from anterior sternum to LSCA), then performing the distal anastomosis at the LSCA is challenging. A zone 2 arch repair mitigates this issue; however, the longer debranched bypasses—as well as addressing the LSCA—become an issue.
3. Is the LSCA revascularized at the time of the arch replacement, or at a later time by left carotid to subclavian artery bypass or branched thoracic endovascular aortic repair? What are the statuses of the left vertebral artery and posterior cerebral circulation? If the left vertebral artery is dominant, when should we revascularize the LSCA?

In the end, not only does this report of Urbanski¹ highlight issues to consider when performing transverse arch replacement but it also ultimately emphasizes that *it's all about the distal*.

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