Commentary: Staying out of trouble—Zone 0 frozen elephant trunk and arch debranching for type A aortic dissection

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Roland Assi, MD, MMS (left), and Pavan Atluri, MD (right).

Central Message

Zone 0 frozen elephant trunk and arch debranching for type A acute aortic dissection is another tool in the surgeon's armamentarium.

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Yamamoto and colleagues¹ report their experience in Japan with a novel technique for the repair of acute type A aortic dissection. Their noncomparative series includes 108 consecutive patients between 2014 and 2018 who underwent the same procedure regardless of the location of intimal tear. This operation consists of the resection of the ascending aorta from just above the sinotubular junction to just below the brachiocephalic artery, debranching of all arch vessels under moderate hypothermic circulatory arrest and antegrade cerebral perfusion, antegrade deployment of a stent graft into the proximal descending thoracic aorta all the way up to zone 0, and replacement of the ascending aorta with a branched graft, which is then anastomosed to the proximal end of the stent graft and the arch vessels. The technique is similar to others used for open debranching in arch aneurysms, but its application for acute type A dissection is relatively novel.²⁻⁴ Technically, the stent graft used (which is not on the US market) is designed with a stentless cuff at the proximal end that makes the graft-to-graft anastomosis less challenging than a graft-to-rigid stent anastomosis, as in the classic frozen elephant trunk procedure. The technical outcomes are excellent (operative mortality, 6.5%; stroke, 3.7%; paraplegia, 0%), and the remodeling of the aorta is full at the level of the stented portion; as expected, however, remodeling decreases significantly in proportion to the distance from the distal end of the stent graft.

Yamamoto and colleagues¹ used short frozen elephant trunks, only 6 cm in length in 41.7% of patients, and the longest stent used was 12 cm, with a good portion of the stent being deployed across the arch. This relatively conservative strategy is likely responsible for the absence of spinal cord injury in their series, but it may account for the few early postoperative complications: 1 case of false-lumen rupture and a 5% rate of distal extension thoracic endovascular

aortic repair for true-lumen compression or false-lumen rapid expansion during the same hospitalization.

It is intriguing that only about 30% of patients had an arch or descending thoracic aorta tears. In other words, 70% of patients underwent total arch debranching without a primary arch and descending thoracic aorta pathology. Despite the good technical outcomes, there is no evidence-based justification for arch replacement or debranching in the absence of arch tear; this is not to say that absence of a tear is a contraindication, either. The desired effects of downstream aortic remodeling in patients without arch tears can be effectively achieved with a hemiarch replacement with frozen elephant trunk, however, which requires 5 fewer suture lines than the technique described Yamamoto and colleagues.¹

Maybe the most remarkable aspect of this report is the fact that the 3 operating surgeons conducted the same operation on all comers during 4 years with little harm to patients, given that type A dissection is an extremely variable and dynamic disease. This eliminates some of the selection bias and allows an objective evaluation of the proposed intervention.

In our opinion, zone 0 frozen elephant trunk with arch debranching is a valid concept for type A aortic dissection and has a place in the surgeon's armamentarium, perhaps as a safe alternative to total arch replacement in complex arch tears.

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