Commentary: The DARTS (Dissected Aorta Repair Through Stent Implantation) trial: Hitting the bull’s eye in acute type A aortic dissection?

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In the contemporary era of cardiovascular surgery, endovascular technologies continue to augment the surgeon’s armamentarium. Although somewhat belated, this is no less true for acute type A aortic dissection (ATAAD). Operative goals for patients with ATAAD include resection of the aortic segment containing the primary entry tear as well as restoration of true lumen perfusion to reverse malperfusion. However, the existence of distal anastomotic new entry (DANE) tears and a patent false lumen are becoming increasingly more recognized as reasons for ongoing malperfusion, need for reintervention, and reduced survival. The Asycrus Medical Dissection Stent (AMDS) has been designed to address these issues. During hypothermic circulatory arrest, the AMDS is an uncovered, hybrid stent prosthesis that is deployed in antegrade fashion as far as zone 5 in the setting of a hemiarch replacement. The proximal cuff is made of Teflon fabric and is designed to seal the false lumen at the distal anastomosis by mitigating the formation of DANE tears, whereas the uncovered stent is designed to promote true lumen expansion of the arch and descending thoracic aorta. The AMDS is a promising technological adjunct to open surgical repair that has been prospectively evaluated in the DARTS (Dissected Aorta Repair Through Stent Implantation) trial.1 In an updated report, the principal investigators report 3-year outcomes for the 47 patients enrolled in the DARTS trial.2 In the short term, 30-day mortality was 13% and new stroke was 22%, whereas 100% of devices were deployed successfully. At 3-year follow-up, mortality was 22%, whereas there were no device-related failures, including no cases of DANE, stent-induced aortic injury, branch vessel obstruction, or device-related reinterventions. These are truly impressive results, and the authors should be congratulated for their pioneering work.

In contemporary practice, patients with ATAAD who require more extensive distal repair typically undergo total arch replacement with or without frozen elephant trunk (FET). Reasons for total arch replacement may include arch tears, arch aneurysm, and supra-aortic branch vessel malperfusion, whereas reasons for FET may include large distal arch tears, as well as concomitant descending thoracic aorta aneurysm, rupture, or pseudoacoarctation.3,4 However, most patients in the United States continue to received hemiarch as the treatment of choice for acute TAAD, which is not the only avenue in which this technology may be useful. One can anticipate using this after supra-aortic debranching in zone 2 or 3 instead of a covered FET to mitigate any risk of spinal cord ischemia. Nevertheless, in the long run, reasons for extensive distal intervention during the index operation may include promotion of positive aortic remodeling, obliteration of the false lumen, and reduction of aortic reinterventions, which gets to the heart of the matter for DARTS.

CENTRAL MESSAGE
The role of AMDS will continue to evolve in contemporary practice as we seek solutions for patients with acute type A aortic dissection with malperfusion.
At 3-year follow-up for the AMDS prosthesis, positive aortic remodeling was 75% in the arch, whereas it was 64% in zone 3 and 50% in zone 6. Complete false lumen thrombosis was 35% in the arch, whereas it was 11% in zone 5. Moreover, the reintervention rate was 6% at 3 years, including 2 visceral stents, 2 supra-aortic stents, a subclavian coiling, and 1 thoracic endovascular aortic repair. These results are promising and, perhaps after the learning curve, they might compare reasonably well with patients undergoing zone 2 debranching with or without concomitant FET or delayed thoracic endovascular aortic repair.5,6 By resecting more diseased aorta and stabilizing the true lumen with a stent graft, these latter strategies aim to reduce the need for distal long-term reinterventions. However, most surgeons will likely continue to perform hemiarch replacements, and AMDS technology may help “democratize” the way we treat malperfusion in ATAAD. To be sure, downstream benefits must be balanced against the upfront operative risks of AMDS and hemiarch versus total arch replacement with FET.

Nevertheless, it must not be overlooked that the AMDS was successfully deployed in 100% of patients, along with acceptable short-term morbidity and mortality by current standards. These results were achieved in a very sick population, with nearly 60% presenting with end-organ malperfusion. Thus, it is likely that the AMDS hybrid prosthesis will become a valuable tool in the aortic surgeon’s armamentarium, particularly in patients with malperfusion. While the DARTS trial’s 3-year results are promising, long-term remodeling and reintervention data are necessary to determine whether the AMDS stent has hit the bull’s eye.

References