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INVITED COMMENTARY

Joseph J. Ricotta, II, MD, MS, *Atlanta, Ga*

Large aneurysms of the thoracoabdominal aorta are at high risk for rupture and death. Conventional surgical repair requires a demanding operation that involves wide aortic exposure and interruption of blood flow to visceral organs that have little tolerance for ischemia. Open surgery for thoracoabdominal aortic aneurysms (TAAAs) has greatly developed over the past decades to provide patients adequate management with good functional results and reduced perioperative morbidity. However, despite much advancement in surgical technique, preoperative evaluation, and perioperative care of patients with TAAAs, open surgical repair of TAAAs remains a formidable challenge for the vascular surgeon. In a recent meta-analysis of 7833 patients who underwent open surgical repair of TAAAs, the overall risk of death within 30 days was 7%, while in-hospital mortality was 10%, with significant associated morbidity ranging from a 7.5% incidence of spinal cord ischemia, to a 19% rate of renal failure and a 36% rate of pulmonary dysfunction.[1]

In light of these sobering results for open repair, alternative approaches to the treatment of thoracoabdominal aortic aneurysms have been developed, particularly for those patients considered to be at high risk for open repair. One approach, which is reported by Hughes and colleagues in this current study, combines conventional visceral artery bypass with stent graft implantation, the so-called "debranching" or "hybrid" technique. As pointed out by the authors, the potential advantages of this technique are that it substitutes a laparotomy for thoracoabdominal exposure, eliminates aortic mobilization and cross-clamping, and reduces duration of visceral ischemia compared with conventional open repair. However, despite these theoretic advantages, the open component of this technique still requires extensive exposure and carries the potential for substantial blood loss and fluid requirements. It is still an extensive intra-abdominal operation with high complication rates, especially in high-risk patients who would not tolerate conventional open repair. A recent review of 107 high-risk patients who underwent hybrid TAAA repair reported a perioperative mortality of 16%, paraplegia/paraparesis rate of 7%, renal failure in 10%, and a major perioperative complication rate in 51%.[2] While the results in the present study are slightly better and the authors should be congratulated on their surgical expertise and very good outcomes, it must be kept in mind that for truly high-risk patients, this is a substantial operation with a significant risk of mortality and major morbidity. In this study, no specific quantifying measures were provided to determine a patient's surgical risk. For patients with chronic lung disease, it is unclear whether they are on oxygen replacement therapy or whether their forced expiratory volume in one second is <1 liter. In addition, the authors used an age cutoff of 65 years as criteria for high risk, and the mean cardiac ejection fraction of the patients considered high risk in this study was 54%. Neither of these parameters would meet high-risk criteria by most reporting standards. It is possible that at least some of the patients in this study were not truly high risk and would have tolerated conventional open surgical repair with similar good outcomes.

While the hybrid approach of visceral debranching and thoracic endovascular aortic repair (TEVAR) represents a viable alternative to open surgery for patients with TAAAs, it is not the long-term solution for high-risk patients. Fenestrated and branched endografts have been developed as a minimally invasive, total endovascular alternative for the treatment of complex aortic aneurysms in high-risk patients. Midterm results for treatment of TAAAs are excellent and demonstrate the benefits of avoiding extensive aortic and visceral vessel surgical exposure and maintaining visceral perfusion during the repair.[3,4] Successful results with fenestrated and branched endografting require appropriate patient selection, proper device design, high-resolution imaging, technical expertise with endovascular grafting and visceral vessel cannulation and stenting, and meticulous postoperative follow-up. Long-term results and larger series are still needed to further delineate the safety and efficacy of these devices. However, as the technology and technique evolve and become more widely disseminated, fenestrated and branched stent grafts appear destined to play an increasingly important role in the management of these complex aneurysms.

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