Commentary: Roadmap to improved success with high risk thoracoabdominal aortic aneurysm patients

Puja Kachroo, MD
Associate Professor of Cardiac Surgery

Department of Surgery, Division of Cardiothoracic Surgery; Washington University School of Medicine, Barnes-Jewish Hospital, St. Louis, Missouri

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Corresponding Author: Puja Kachroo, MD, Washington University School of Medicine, Barnes-Jewish Hospital, Department of Surgery, Division of Cardiothoracic Surgery, Campus Box 8234, 660 S. Euclid Ave., St. Louis, MO 63110, Phone: 314-362-2821, Fax: 314-747-4216, Email: puja@wustl.edu
Central Message: High risk TAAA patients undergoing repair benefit from carefully selecting and utilizing a myriad of operative techniques and critical care management strategies.

Central Picture: Puja Kachroo, MD

Thoracoabdominal aortic aneurysm (TAAA) repair is viewed by most surgeons as an already daunting proposition. Iannaccone et al. have taken on the formidable challenge of operating on higher risk patients with thoracoabdominal disease.\(^1\) The manuscript is organized by taking a deeper dive into patient comorbidities, anatomic considerations and the urgency of repair. The authors identify a number of key concepts that should be highlighted for all aortic surgeons.

Limiting lung manipulation/pulmonary contusions, volume resuscitation, extensive thoracotomies for type I TAAAs, and injury to phrenic/recurrent laryngeal nerves during dissection, are important surgical considerations to limit respiratory failure. Patients with depressed ejection fractions may benefit from treatment of coronary disease preoperatively, and there are current ACC/AHA guidelines that outline cardiac risk stratification for noncardiac surgery.\(^2\)

The clamp and sew method still has a role in select patients (extent I, III, IV TAAAs) by avoiding heparinization as well the inflammatory effects of cardiopulmonary bypass (CPB). Gambria et al. have described its success, with adjuncts such as renal preservation solution, performing in line mesenteric shunting, and decreasing afterload prior to cross clamping.\(^3\) The decision to utilize left heart bypass (less heparin), partial CPB if there is inadequate pulmonary
reserve for single lung ventilation, or total CPB with circulatory arrest due to inability to clamp, will also have consequences for various patient groups, including those with renal dysfunction. Among those requiring dialysis, continuous veno-veno dialysis postoperatively avoids large fluid shifts and hemodynamic instability as compared to standard hemodialysis.

Endovascular treatment, while standard of care for acute complicated type B aortic dissections, may be limited in the setting of dissections, infections, connective tissue disorders, and renal insufficiency. Augmenting spinal cord perfusion pressures by CSF management and reimplantation of intercostal arteries (especially T8-L1), may help combat one of the most devastating complications. Luckily, mycotic aneurysms are rare, and the authors present excellent results with 71% 5-year survival without recurrent infection or reintervention by in situ graft replacement, flap coverage, and lifelong antibiotic suppression. Most patients also die of ruptured aneurysms without intervention. If complete repair is not possible, temporizing with endovascular coverage followed by definitive repair to prevent failure with endoleaks, may be a feasible strategy.

As with every surgery with fixed risk factors, multidisciplinary discussion should include: (1) preoperative risk stratification and optimization, (2) identifying anatomic considerations and early signs of instability, (3) timing of repair, (4) utilizing various open or endovascular surgical techniques. The modern surgeon must be familiar with clamp and sew techniques, all perfusion strategies, and their associated complications. Endovascular repair remains an important tool in the armamentarium to address these high risk patients, whether it is as a definitive strategy or as a bridge to open repair. With meticulous detail to a variety of complex issues and building upon existing expertise, the authors have made thoughtful advancements to provide excellent long term results in this extremely high risk population.

