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Commentary: Double trouble—Thoracoabdominal aortic aneurysm and heart failure

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Patients with reduced ejection fraction are often challenging and require careful operative planning to protect the myocardium and ensure a safe cardiovascular operation. Similarly, open thoracoabdominal aortic repair is a major operation that imposes considerable stress on the body. At experienced centers, there is substantial risk, with operative mortality exceeding 7%.¹ In this issue of *JTCVS Techniques*, Ando and colleagues² present their management of a Crawford extent II thoracoabdominal aortic repair in a patient with severely reduced ejection fraction (<10%). Given the restrictions for transplant listing and durable left ventricular assist device eligibility in Japan, the group had to first treat a dissected and aneurysmal aorta before the patient could be a candidate for these advanced heart failure therapies.

The authors used deep hypothermic circulatory arrest and cardioplegia-induced cardiac arrest with an ascending endo-balloon to control the aorta for the proximal anastomosis. Systemic flow was subsequently resumed by switching to arterial perfusion via a graft side branch. After completing the aortic reconstruction, they successfully separated from cardiopulmonary bypass with only an intra-aortic balloon pump and inotropic support. The authors' strategy was successful, but careful patient selection and optimization are critical, as the effects of even a brief

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CENTRAL MESSAGE

This report presents an operative strategy for open thoracoabdominal aortic repair in carefully selected patients with significantly reduced left ventricular function.

arrest with severe systolic dysfunction are concerning for further injury and mortality.³ It is also critical in higher-risk patients undergoing thoracoabdominal aortic repair to optimize respiratory function and renal protection and minimize perioperative bleeding. When an important organ system is already compromised as in this patient with advanced heart failure, there is no tolerance for even temporary dysfunction of the other organ systems.

To avoid circulatory arrest in proximal descending thoracic aneurysms, when possible, the arch may be clamped in zone 2 to control the aorta and the left subclavian separately occluded. The lower body and viscera can be supported with cardiopulmonary or left heart bypass. Alternatively, extent II thoracoabdominal repairs can be staged with proximal thoracic endovascular aortic repair with or without covering the left subclavian artery, followed by distal open completion.⁴ The stented descending thoracic aorta can then be clamped and controlled in the retrocardiac aorta. This facilitates a less extensive operative exposure and allows clamping without circulatory arrest, which may limit morbidity. Staging the repairs also allows time for stabilization of the collateral network perfusing the spinal cord, which may in turn may offer protection from spinal cord injury.⁵

In summary, Ando and colleagues² used intra-aortic balloon counterpulsation perioperatively to efficaciously support a patient with severely depressed ventricular function through major aortic surgery. As endovascular aortic

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repair has evolved, so too have transcatheter devices and extracorporeal support for heart failure.⁶ These devices permit an array of new operative strategies to treat patients with complex aortic diseases and support high-risk patients through perioperative cardiogenic shock. We must continue to use all the tools in our armamentarium to treat sick patients and optimize their outcomes.

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