

## Case Reports

aortic debranching by reducing both the number of anastomoses and the risk of bleeding.

Neurologic protection is a main concern during arch and thoracoabdominal aortic procedures. If antegrade selective cerebral perfusion has already shown to be the best method of brain protection,<sup>2</sup> more recent experimental and clinical studies have introduced the collateral network concept to comprehend spinal vascular remodeling after extensive thoracoabdominal aortic interventions. This notion indicates that restoring a good spinal cord perfusion is a time-dependent process and supports staged thoracoabdominal aortic repair to reduce the incidence of postoperative spinal cord injury.<sup>3</sup> Furthermore, relative to single-staged procedures, which combine at once the detrimental effects of visceral ischemia with those of nephrotoxic contrast media, staged repair seem to be associated with reduced postoperative renal failure rates and shorter hospital stay.<sup>4</sup> We were well aware that a patient's failure to complete treatment (as result of death while waiting or refusal) represents the main limitation of the staged approaches; however,

the previously mentioned arguments convinced us to subdivide treatment into fractions carrying less impact.

In conclusion, a staged hybrid approach for total aortic repair is feasible and can represent a valid form of treatment for selected patients with extensive aortic disease. It may help reduce morbidity and mortality among these high-risk patients.

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## Temporary extracorporeal left ventricular assist device support for implantable left ventricular assist device replacement cases

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Replacement of an implantable left ventricular assist device (LVAD) may be required for infection, thrombosis, or mechanical or electrical failure.<sup>1,2</sup> In certain instances, replacement of implantable LVADs poses a very high risk of either reinfection or death. This report describes 4 cases in which implantable LVADs required urgent removal but replacement of an implantable system was delayed by a period of support with an extracorporeal temporary device.

### CLINICAL SUMMARY

The first patient was a 58-year-old woman with ischemic cardiomyopathy who had received a HeartMate II (Thoratec Corporation, Pleasanton, Calif) as destination therapy. The patient presented approximately 18 months after implantation with persistent bacteremia and mediastinal purulence. Echocardiography showed vegetation around the inflow cannula. The decision was made to remove the device. Because of the extent of infection, the patient was supported with an extracorporeal device (Paracorporeal Ventricular Assist Device [PVAD]; Thoratec) while receiving antibiotic therapy. After 3 weeks of antibiotics, the patient had negative results of blood cultures and a normal white blood cell count. She was returned to the operating room, where the Thoratec PVAD was replaced with another HeartMate II device. The patient did well postoperatively and went on to live for approximately 3 years without any further episodes of bacteremia or other evidence of device infection.

The second patient was a 63-year-old man who presented with recurrent fevers and staphylococcal bacteremia despite intravenous antibiotics 1 year after receiving

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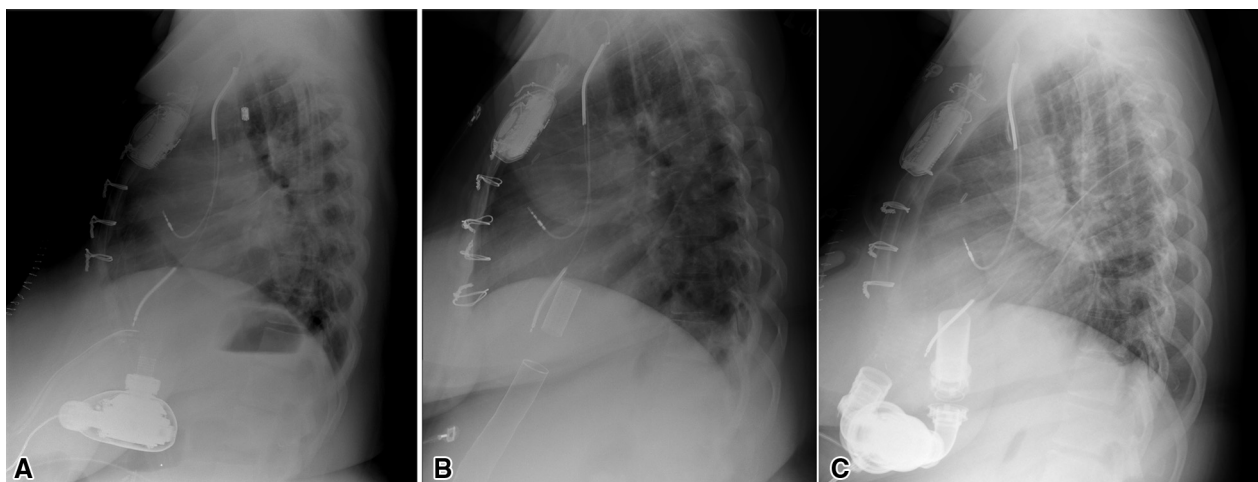
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**FIGURE 1.** Lateral chest radiographs from the same patient (patient 4) with VentrAssist (A), Thoratec PVAD (B), and HeartMate II (C) left ventricular assist devices in place.

a HeartMate II for ischemic cardiomyopathy. When the patient was taken to the operating room for pump exchange, purulence was noted in the anterior mediastinum and pump pocket. The patient also had significant vasoplegia, requiring multiple pressors. The patient therefore received a CentriMag LVAD (Thoratec) for support instead of another implantable device. Unfortunately, the patient continued to demonstrate hemodynamic instability postoperatively, progressing to multiorgan system failure. Although the bacteremia eventually resolved, the patient's condition was considered to be too unstable for him to receive an implantable system, and he died within 2 weeks of the HeartMate II removal.

The third patient was a 60-year-old woman who received a HeartMate II LVAD as destination therapy for nonischemic cardiomyopathy. Unfortunately, the patient experienced multiple episodes of hemolysis requiring 2 separate HeartMate II replacements within 18 months of the initial procedure. Five months after her second exchange, she presented with severe hemolysis, oliguria, and pump dysfunction. Although echocardiography showed moderately improved left ventricular systolic function, she had acute renal failure, due in part to hemolysis. The patient was taken to the operating room for HeartMate II removal, and a CentriMag LVAD was placed for the purposes of determining whether the patient might be a candidate for LVAD weaning. Although efforts to wean her from the CentriMag were unsuccessful, her renal function eventually normalized. She then had the CentriMag exchanged for an implantable system. Because of her recurrent issues with the HeartMate II, an HVAD system (HeartWare Inc, Framingham, Mass) was used. The patient did well postoperatively and did not have further hemolysis.

The last patient was a 30-year-old woman who required a VentrAssist LVAD (Ventracor, Sydney, Australia) for

nonischemic cardiomyopathy. Approximately 2 weeks after the implant procedure, she had increased LVAD power consumption, presumably from pump thrombosis. She soon became hypotensive and oliguric despite multiple pressors and an intra-aortic balloon pump. She was therefore taken urgently to the operating room for removal of the thrombosed pump. Intraoperatively, both ventricles were markedly dilated and dysfunctional, with no apparent flow through the VentrAssist outflow graft. The VentrAssist device was removed, and a temporary extracorporeal Thoratec PVAD was placed (Figure 1). After the patient's condition stabilized with Thoratec PVAD support during the course of several weeks, she returned to the operating room for successful exchange of the PVAD for a HeartMate II (Figure 1).

## DISCUSSION

Some patients requiring device exchanges can present with such extreme cardiovascular compromise or high likelihood of reinfection that replacement with another implantable system would be a risky or even futile procedure. Placement of an extracorporeal device, however, is easier and less expensive than replacement with an implantable system.<sup>3</sup> In this series, we present 4 cases in which highly unstable patients requiring device explantation were supported with extracorporeal ventricular assist systems. This temporary support with an extracorporeal device allowed for determination of the feasibility and appropriateness of another implantable device. In 3 of the cases, after 3 weeks of clinical stability or antibiotic treatment, the patients recovered enough to receive an implantable system with successful long-term outcomes.

## CONCLUSIONS

In the case of a highly unstable or persistently bacteremic patient in need of urgent LVAD removal, an interval of

support with an extracorporeal temporary device may be appropriate.

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## Recurrent esophagopericardial fistula in a patient with human immunodeficiency virus

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Esophagopericardial fistulas are rarely reported but carry a high mortality. They can arise from a variety of conditions, but most (75%) have a benign etiology.<sup>1</sup> *Candida* esophagitis is known to cause complications such as stricture, hemorrhage, and tracheoesophageal fistula.<sup>2</sup> We present a case of esophagopericardial fistula associated with *Candida* esophagitis in a patient with advanced human immunodeficiency virus (HIV) infection.

CLINICAL SUMMARY

A 37-year-old man with a history of HIV infection and noncompliance with antiretroviral medications reported

chest pain and nausea. His CD4 count was 43 cells/mm<sup>3</sup>, and the viral load was 17,000 copies/mL. An electrocardiogram showed diffuse ST-segment elevation, consistent with pericarditis. An esophagogram revealed a large communication between the esophagus and pericardium (Figure 1). A chest radiograph showed a pneumopericardium (Figure 2). Esophagogastroduodenoscopy 2 weeks previously had shown only esophagitis, without evidence of a stricture.

Because of the uncertainty of the fistula's location, a right thoracotomy was performed. The pericardium was opened, and 500 mL of purulent fluid was drained. Cultures later grew *Candida krusei* and  $\alpha$ -hemolytic *Streptococcus* species. Further inspection revealed a 3-cm opening on the posterolateral wall of the esophagus near the gastroesophageal junction. The esophagus was closed around an 18F biliary T-tube with the side arm exiting through the perforation and advanced inside a 28F chest tube. Additional drains were placed in the pericardium and pleural space; no attempt was made to close the pericardium. Gastrostomy and jejunostomy tubes were placed.

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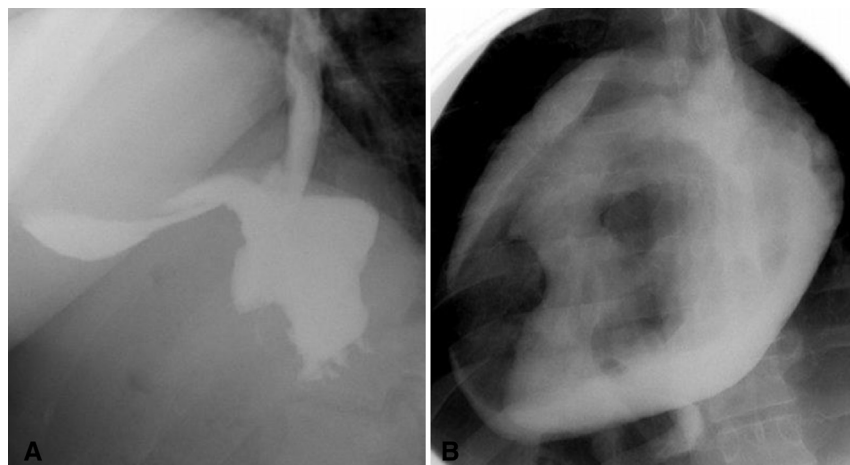


FIGURE 1. The diagnostic esophagogram showed contrast extravasation from the distal esophagus (A), which quickly filled the pericardial sac (B).