Long-term mechanical circulatory support: A new disease state?

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The use of ventricular assist device (VAD) therapy has markedly increased over the past decade. Compared with first-generation pulsatile pumps, patients with contemporary continuous-flow VAD implants are living longer and with significantly improved outcomes.¹

With thousands of patients alive on mechanical circulatory support, complications will inevitably occur with a higher prevalence. Issues such as pump thrombosis, inlet malposition, outflow graft obstruction, infections, gastrointestinal bleeding, strokes, and other serious complications are still incompletely understood (Figure 1). Heart failure specialists will be needed to better understand the basic pathophysiology, to evaluate patient outcomes, and to develop optimal management practices as our collective experience with these problems expands.

The current report describes a novel therapeutic approach to the infrequent yet serious problem of outflow graft obstruction. Problems with outflow grafts have been described and include kinking caused by bend relief malfunction,² pump malposition,³ or pump migration⁴; obstruction due to thrombus⁵ or infectious growth⁶; and pseudoaneurysm formation due to infection or erosion of adjacent structures into the graft.⁷

For patients experiencing such complications, options are limited. For the select few who have sufficient myocardial recovery, pump explantation may be an option. This can be performed using a minimally invasive technique with ligation and retention of a small remnant of the outflow graft.⁸ When ongoing support is necessary, surgical revision with potential pump replacement may be required.⁹

Pham and colleagues¹⁰ describe the use of percutaneous radial artery catheterization with aortography and outflow graft cannulation for the diagnosis of an outflow graft obstruction alleviated successfully by the placement of a balloon-expandable stent graft. The current report is an

FIGURE 1. Continuous-flow left ventricular assist device in situ demonstrating potential complications throughout the body. AV, Atrioventricular; GI, gastrointestinal.

important contribution to the field because it stresses the fact that each complication presents an opportunity for novel therapeutic intervention, which may include the use of existing technologies for previously unrealized indications. This further emphasizes the importance of a multidisciplinary approach to all aspects of patient care. These less-invasive approaches to mitigate iatrogenic complications will allow more patients to achieve long-term success with their new and incompletely understood VAD-induced physiology.

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