

Symposium

Introduction

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Continuous-Flow Left Ventricular Assist Devices: Changing the Physiological Paradigm for Critical Care Nurses

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Critical care nurses rely on their understanding of human physiology as they navigate the use of infusion pumps, ventilators, drains, and monitoring devices that help them to support and detect changes in their critically ill patients. They know that a QRS complex on the ECG monitor should cause an associated upstroke on the arterial catheter tracing and that failure to do so may constitute pulseless electrical activity and an emergency. Even without an arterial catheter, critical care nurses know that the inability to measure blood pressure—using either a stethoscope to detect the familiar Korotkoff sounds or an automated noninvasive blood pressure device—may represent a critically low blood pressure that, without quick intervention, may cause significant harm to the patient. They rely on their ability to quickly and noninvasively evaluate oxygenation using pulse oximetry to guide oxygen and ventilator therapy and to indicate when changes in pulmonary function are occurring. Critical care nurses have learned to use all of their senses to detect minute changes in patient condition, early warning systems that can help them to avert negative outcomes.

What happens then when these guideposts on which critical care nurses have relied are abruptly taken away or altered? With the introduction of continuous-flow left ventricular assist devices (LVADs), nurses have had to learn (or be reminded of) alternative methods of determining the physiological stability of the patients in their charge. These nonpulsatile pumps, implanted in patients with class IIIb or class IV heart failure, have a positive impact on the quantity and quality of life.¹ The devices have transformed patients from being severely debilitated by the inability of their hearts to pump enough blood to meet their metabolic needs into ambulatory, active individuals able to return to the life that they worried they would have to leave behind because of their chronic illness.

It has been estimated that as many as 250 000 patients in the United States are in the late phase of systolic heart failure.² The only definitive therapy for this disease has been heart transplantation. Yet over the course of the last 10 years, only approximately 2300 donor hearts have been available for transplant annually.³ As a result, the vast majority of those with end-stage systolic heart failure manage their symptoms with an array of medications to minimize fluid retention, control neurohormonal response, and optimize forward blood flow. Left ventricular assist devices offer a new solution for this group of patients, and more than 570 implants have been reported in the United States since 2006.⁴

As this therapy is used in increasing numbers of patients, critical care nurses in implanting centers and nonimplanting centers alike may encounter these patients

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on their units. Because their care requires a full understanding of the similarities and specific challenges of these patients compared with those without such technology, this issue of *AACN Advanced Critical Care* highlights 5 topics that will help nurses' understanding. Expert professionals in the care of LVAD patients provide insight into issues including the physiology of continuous-flow pumps, management of the right side of the heart in the face of LVAD therapy, short-term LVADs used in the intensive care unit, perioperative management of patients implanted with an LVAD, and anticoagulation issues for these patients. The goal of this issue is to provide advanced critical care nurses with an increased understanding of this specialized intervention and to serve as a reference when caring for this unique population. As the use of LVADs both as a bridge to transplant and as the

final therapy for end-stage heart failure grows, critical care nurses may see increasing numbers of such patients. Using the specialized skills outlined in this issue will be a valuable part of your nursing assessment and care.

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