

# Ventricular Assist Devices:

## *A Bridge to Recovery*

By Scott P. Edwards



Recovery from cardiac surgery can be challenging by any measure. For many patients, especially the elderly, the stress of surgery to repair blocked arteries or leaky valves can leave their hearts in a weakened state, unable to efficiently pump blood throughout the body, further complicating their recovery.

Dr. Daniel Engelman and his colleagues have had the greatest success using external VADs to treat patients with short-term right-sided heart failure.

However, a relatively new and evolving medical technology uses a device, called a ventricular assist device or VAD, to help many of these patients get back on their feet and lead an active life.

A VAD is a mechanical circulatory device used to either partially or completely replace the function of a failing heart. Some VADs are intended for short-term use in patients following surgery or a heart attack, while others are implanted for longer-term use in patients with heart failure as they await a transplant.

“Currently at Baystate, we’re using VADs in the short term as a bridge to recovery,” says Daniel Engelman, MD, a cardiac surgeon and surgical director of the Cardiac Intensive Care Unit at Baystate Medical Center. He adds that these mechanical support devices can be used to treat either right-sided heart failure, left-sided heart failure, or both. “The devices can also be used in patients with failing hearts following large heart attacks,” says Dr. Engelman.

### External VADs

Dr. Engelman and his colleagues have had the greatest success using external VADs to treat patients with short-term failure of the right heart. In right-sided heart failure, the right ventricle loses its ability to efficiently pump blood to the lungs for oxygenation. This compromised pumping function can cause blood to back up into other areas of the body, producing congestion that can affect the liver, gastrointestinal tract, and the limbs. Among the most common causes of right-sided heart failure are coronary artery disease and heart valve disease.

The device takes blood from the right atrium and sends it to a pump—Dr. Engelman describes it as a “spinning wheel inside a plastic casing”—which sends it back into the lungs for oxygenation followed by distribution



The external VAD used at Baystate Medical Center—the CentriMag by Thoratec Corporation—is an external device, about six inches in diameter, that sits next to the patient’s bed.

to the rest of the body and vital organs, just like a healthy heart would. The device is mechanically levitated, providing a contact-free environment to minimize complications such as hemolysis.

Over the past year, Dr. Engelman and his colleagues at Baystate have used the CentriMag with four patients, each in their 60-80s, suffering from right-sided heart failure. The heart failure was due to either a heart attack from coronary artery disease, or short-term

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weakness of the heart muscle seen immediately following cardiac surgery to repair damaged coronary arteries or heart valves. These patients used the device for three to six days, until they were able to maintain normal heart function.

"These patients had hearts that were unable to support themselves in the short term," says Dr. Engelman. "We used the device for several days until their hearts recovered. The device was outstanding for short-term failure of the right heart."

During VAD therapy, each of the patients received anticoagulant medication to minimize the risk of blood clotting in the VAD. Following successful removal of the device, each patient completed standard cardiac rehabilitation.

Dr. Engelman says Baystate is one of only a few hospitals in Massachusetts using VADs in high-risk elderly patients. "We're confident that in appropriate candidates, this technology can improve recovery rates and save lives," he says.

## Short-term VAD Support Aids Ware Man

Wallace Drenzek, age 82, doesn't remember being hooked up to a ventricular assist device (VAD) following his heart-valve repair surgery in January, but he was for five days.

In the fall of 2010, Mr. Drenzek and his wife Phyllis talked about taking a vacation, but he says he did not "feel up to it." Instead, Phyllis went on a cruise with one of their children. While she was away, Mr. Drenzek became weaker, losing both strength and weight. Then, during a follow-up visit after a colonoscopy in December, Mr. Drenzek's doctor was concerned about

Mr. Drenzek's breathing and sent him to the emergency room at Baystate Medical Center.

"They found that my heart wasn't working well," says Mr. Drenzek. Doctors at Baystate determined that his mitral and tricuspid valves were faulty and that some of his coronary arteries were clogged, which compromised his heart function, and booked him for surgery.

Following surgery, "Mr. Drenzek's heart was unable to support him in the short term, so we used the VAD as a bridge

to his recovery," says Daniel Engelman, MD, the Baystate cardiac surgeon who operated on Mr. Drenzek.

Mr. Drenzek, who was always very active, playing basketball twice a week until age 75, says he is doing well after his surgery and VAD therapy, still weak, but gaining strength. "I've had five operations over the past several months," he says, "but I feel much better now."

