Jefferson

# Surgical Solutions

A publication for friends and colleagues of Jefferson's Department of Surgery

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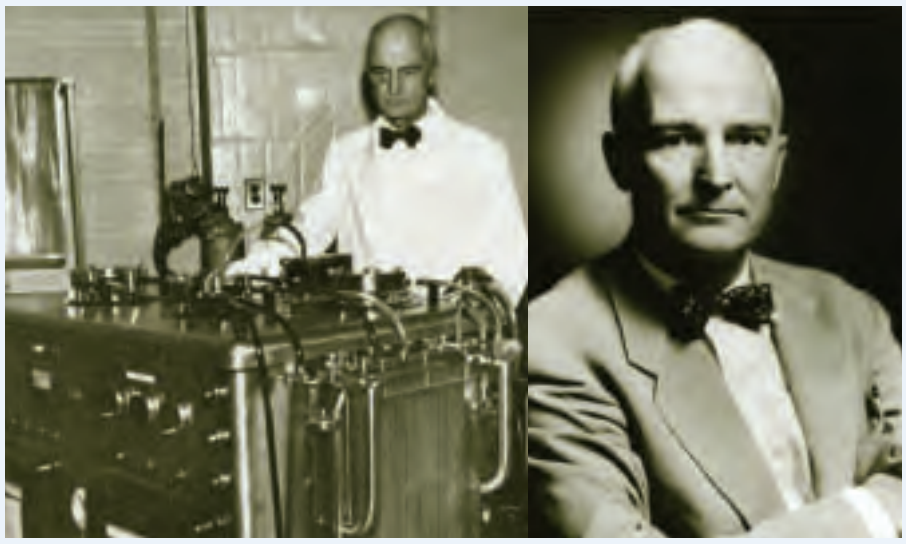
## 60 Years of Cardiothoracic Surgery at Jefferson: From the Heart-Lung Machine to the 'Portable' Total Artificial Heart



John H. Gibbon, Jr., MD, poses with his "Model II" heart-lung machine on the tenth anniversary of the world's first successful extracorporeal cardiac surgery. On May 6, 1953 at Jefferson Medical College Hospital, Dr. Gibbon and his staff, closed a very serious septal defect between the upper chambers of the heart of eighteen-year-old Cecelia Bavolek. Ms. Bavolek was connected to the device for three-quarters of an hour and for 26 crucial minutes she totally depended upon the machine's artificial cardiac and respiratory functions. (Images courtesy of Thomas Jefferson University Archives, Scott Memorial Library.)

On May 6, 1953, John H. Gibbon, Jr., MD – the third Samuel D. Gross Professor and Chair of the Department of Surgery (1946–1967) and Director of Experimental Surgery at Jefferson – performed the first successful surgery with the groundbreaking heart-lung machine he developed. With this operation, Dr. Gibbon launched a new era in cardiac surgery.

As we commemorate the 60th anniversary of Dr. Gibbon's milestone, patients of the Division of Cardiothoracic Surgery continue to benefit from Jefferson's commitment to continual innovation under the leadership of James Diehl, MD, FACS, and two highly specialized programs.

### State-of-the-art life support

The Adult Extracorporeal Membrane Oxygenation (ECMO) Program boasts survival rates that far exceed reported national rates. Established in 2010 by Nicholas Cavarocchi, MD, FACS, FCCP, Director of the Cardiac and Vascular Intensive Care Unit, the program's leading-edge equipment provides both cardiac and respiratory support (oxygen) to individuals with severely diseased or damaged heart and lungs.

At present, Jefferson is the only hospital in the area to utilize two transport devices – the SERVO-i ventilator and the CARDIOHELP (portable) ECMO machine. Using these devices, the Jefferson ECMO team (comprised of physicians and mid-level providers in the Cardiac ICU, JeffSTAT medical transportation staff, and respiratory therapists) is able to transport critically ill patients and place patients on ECMO before they are transferred to Jefferson. By placing patients on ECMO earlier than usual, we improve their chances of being successfully weaned from ECMO or having surgery with fewer complications.

### Continued innovation in treating advanced heart failure

The Cardiac Transplantation and Mechanical Circulatory Support Program, led by director John Entwistle, III, MD, PhD, offers several leading-edge treatment options to patients with advanced heart failure. Options include the latest-generation left ventricular assist devices (LVADs) and the SynCardia temporary Total Artificial Heart (TAH).

In 2012, the program acquired the SynCardia TAH device, which now boasts a mobile software driver (just recently approved by the FDA) to operate the device outside of a hospital setting. This allows some patients awaiting a heart transplant to return home and, in some cases, resume their normal activities.

Treatment options for end-state heart failure are a permanent LVAD, LVAD as a bridge to transplant, or a heart transplant. But LVAD options are viable only for patients with failure of the left side of the heart. For those with failure of the right side or both sides of the heart, and for those with cardiac amyloidosis ("stiff heart syndrome"), there has not been a good option for returning patients home. SynCardia's portable driver should change that, and Jefferson is working to identify an optimal candidate for the first implant procedure.

"Because of these advanced therapies – from the SynCardia TAH device and our LVAD capabilities to our unique ECMO equipment – Jefferson is able to successfully treat a sicker group of patients who otherwise would have a very poor prognosis," concludes Dr. Diehl. "We are honored to continue Dr. Gibbon's legacy of innovative patient care."

*A lecture on May 2nd will highlight the anniversary – see page 4.*

### *Surgeon Speaks*

Dr. Entwistle demonstrates the orientation of a Left Ventricular Assist Device.

"The surgical options for treating advanced heart failure are continually evolving. In addition to the introduction of new devices, such as the SynCardia Total Artificial Heart, we're finding new ways to manage patients previously thought untreatable.

"For example, Jefferson is joining heart centers across the country in learning how to better select patients for the Left Ventricular Assist Device (LVAD). Historically, patients with heart failure had not explored surgical treatments until their condition had progressed significantly. Thus, most patients receiving the LVAD were quite sick.

"Today, we're discovering that if we can catch some patients earlier in the process, we can obtain better results. For certain patients, the LVAD pump can support a high quality of life. In fact, I've had patients who have traveled abroad with the pump and others who have able to get back to work just a few months after surgery."

**John Entwistle, III, MD, PhD**
*Surgical Director, Cardiac Transplantation and Mechanical Circulatory Support, and Associate Professor of Surgery*

*To learn more visit:*
***www.jeffersonhospital.org/cardiothoracic***

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