Additional Details About the AbioCor System

The AbioCor® System is an implantable artificial heart intended to replace the patient’s natural heart. It is designed for patients whose hearts are irreparably damaged or who are at risk of death by heart failure but have other vital organs that are viable.

An implanted, working AbioCor System includes 5 implanted components along with external components that control and power the implanted components.

The internal (implanted) components receive power and control signals from either the AbioCor Console or the Patient-Carried Electronics (PCE). The AbioCor Console is the primary interface and power source for the implanted components. The PCE is a more portable system designed to allow independent mobility.
**Thoracic Unit (Replacement Heart)**

The Replacement Heart (called the Thoracic Unit) is about the same size and shape as a natural heart and weighs a little over 2 pounds. It is implanted in the chest in place of the original diseased heart and connected to the blood vessels that supply blood throughout the body.

The AbioCor Replacement Heart has right and left Blood Pumps that take turns pumping blood to the lungs and other areas of the body. These pumps are like balloons that fill with blood and then squeeze it out. Like the natural heart, each Blood Pump has an inflow opening for incoming blood and outflow opening for outgoing blood. These openings are connected to the patient’s own arteries and veins during the implant surgery.
**Implanted Battery**

The Implanted Battery provides power to the Controller and the Replacement Heart. Like the Controller, the Implanted Battery is placed in the patient’s abdomen when the Replacement Heart is implanted. The Implanted Battery is sealed in a titanium case and connected to the Implanted Controller and the Implanted Transcutaneous Energy Transfer (TET) coil. The Implanted Battery is continuously charged through the skin by the External TET, which gets power from the Console or the PCE(Patient Carried Electronics).

The Implanted Battery lasts for about a year, and can be replaced by during a simple surgical procedure.
Implanted Controller

The Implanted Controller is the brain of the implanted parts of the AbioCor System. It performs several critical functions:

- monitoring of the Thoracic Unit and the other implanted components
- control of the Thoracic Unit
- communication with the external components and alarms (the AbioCor Console or Patient-Carried Electronics)

The Implanted Controller manages the **cardiac output rate** of the Replacement Heart to provide the needed blood flow. Most of the time, the Implanted Controller works automatically, but it can be operated manually by the clinician. The Implanted Controller is sealed in a titanium case, connected to the Replacement Heart by cables. It is implanted in the abdomen at the same time as the Replacement Heart.

The Implanted Controller monitors the AbioCor system to make sure it is working correctly. It also exchanges information with the Console to trigger an alarm if a problem occurs.

cardiac output rate: the amount of blood that flows through your heart, expressed in liters per minute (L/min); a liter is about 34 ounces, a little more than a quart
Implanted TET

The Implanted TET is located under the skin, usually in the upper chest area, and is shaped to conform to the shape of the body. It is connected to the Replacement Heart, Implanted Controller, and Implanted Battery. The Implanted TET receives electrical energy, in the form of radio waves, through the skin from the External TET to keep your AbioCor System charged.

The Implanted TET is the primary power source for the AbioCor System’s implanted components. It converts radio waves from the External TET into electrical energy usable by the implanted components. Because the radio waves used can pass through a small thickness of the skin, no wires that pass through the skin are needed.
External parts of the AbioCor System

The AbioCor System has external parts that work with the implanted components of the system. These external parts provide power to the AbioCor System, monitor its performance, and provide a way for the patient and clinician to adjust the system when it’s necessary.
The AbioCor Console is a specialized computer with a keypad and screen. It is plugged into a regular household electrical wall outlet to provide power to the AbioCor System through the Implanted TET and External TETs. The Console also contains a backup Battery that can supply power for 35 to 40 minutes if normal electrical power is interrupted.

The Console uses radio waves (like a cell phone) to send commands through the RF Antenna to the AbioCor Implanted Controller and to receive information from the Implanted Controller about how the Replacement Heart is functioning. The Console also notifies the patient and caregiver with alarm lights and sounds if a problem occurs with the AbioCor System.
Patient-Carried Electronics (PCE)

The Patient-Carried Electronics (PCE) is a portable system that provides battery power to the implanted AbioCor System through an External TET. (The TETs used with the PCE are the same as the ones used with the Console.) The PCE is carried in a nylon Battery Bag that you can wear over your shoulder. The PCE allows you to be mobile, away from the Console, for extended periods of time. Like the Console, the PCE monitors your AbioCor System, using alarm lights and sounds to inform the patient if there is a problem with the system.
PCE Battery Bag

The PCE Battery Bag holds 2 pairs of PCE Batteries and the Battery control electronics. The Battery Bag, which weighs about 10 pounds with the Batteries in place, has a shoulder strap so it can be easily carried. It has mesh pouches on the outside to hold the PCE Control Module and other small items. Plastic cardholders inside the top cover can be used to keep emergency phone numbers close at hand.
External TET

The External TET is a silicone ring containing electronics. The External TET transfers energy from the Console to the implanted components of the AbioCor System. The energy flows from the Console to the External TET, across the skin, and into the Implanted TET. The Implanted TET distributes this energy to the implanted AbioCor System components.

The External TET is placed directly over the location where the Implanted TET is located. A cable connected to the External TET is plugged into the back of the Console.
PCE Control Module

The PCE Control Module is a separate unit that is connected to the Battery Bag by the Battery Cable. It can also be connected directly to AC Power through the AC Power Adapter. The PCE Control Module does two main things:

- It converts Battery energy or AC power into energy that can be transmitted to the AbioCor System’s implanted parts through the TET.

- It notifies the patient about alarms for the PCE or for any of the AbioCor System’s implanted parts.
**PCE Batteries**
The PCE holds 2 pairs of Batteries—a total of 4 Batteries.

Each pair of Batteries provides power for the AbioCor’s implanted components for about one hour.