

Artificial Heart Transplants

Meghan Fahey
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The first artificial heart transplant took place in 1982, using a device called the Jarvik-7. Five trial surgeries were done, and the surgery was discontinued shortly after due to many complications.

Roughly twenty years later, these artificial heart transplants are being tried again. This time, however, the AbioCor is being used.



Composed of plastic and titanium and weighing around two pounds, this device is expected to double the life expectancy of patients suffering from heart disease.

During this seven hour surgery, a patient's ventricles are removed, and the AbioCor takes their place, being attached to both atria, the aorta, and the pulmonary artery.

The AbioCor system consists of numerous parts:

-a hydraulic pump: shuttles hydraulic fluid from side to side. A gear inside this pump spins at 10,000 revolutions per minute to create pressure.

-a porting valve: opens and closes to let hydraulic fluid flow from one side of the artificial heart to the other. When it moves right, blood is pumped to the lungs through an artificial ventricle. When it moves left, blood is pumped to the rest of the body.

-a wireless energy-transfer system: consists of two coils, one internal, one external; this transports power by magnetic force from an external battery across the skin without piercing the surface. Internal coil receives the power and sends it to the internal battery and control device.

-an internal battery: rechargeable battery that is implanted in the patient's abdomen and allows the patient to remove the main battery pack for 30 to 40 minutes while performing certain activities such as showering.

-an external battery: Worn on a Velcro-belt pack around the waist. Each battery offers 4-5 hours of power.

-a controller: small electronic device implanted in patient's abdominal wall that monitors and controls the pumping speed of the heart.

To be a candidate for this surgery, the patient must fit the following requirements:

- ~Have end-stage heart failure
- ~Have a life-expectancy of less than 30 days
- ~Is not a candidate for a natural heart transplant
- ~Have no other viable treatment option.

The patient must also be large enough, so a grapefruit-sized device can fit inside their chest.

Sources:

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