

HeartAssist 5 Left Ventricular Assist Device (LVAD)

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Congestive heart failure is a condition in which the heart cannot supply enough blood or nutrients to the body's other organs. To make up for this, the heart tries to increase flow by enlarging the heart chambers, developing more muscle mass, and pump blood faster. These tactics mask the symptoms but do not solve them and heart failure continues to worsen until the heart is no longer able to keep the body functioning.

The HeartAssist 5 is a modern version of the DeBakey VAD manufactured by the US company, MicroMed Cardiovascular. This device consists of a 71mm by 30mm pump weighing at 92 grams. Despite its small size, it is able to assist the heart in pumping the blood from the failing left ventricle to the rest of the body allowing the patient to live a near normal life.

There are three main uses for this device. The first is called Bridge-to-Transplant where the LVAD is surgically implanted in patients who are on the waiting list for a new heart. During this time, the HeartAssist 5 actually improves flow to the organs deprived of adequate blood flow, rejuvenating them and making the patient a better candidate to receive a transplant. Another use is Destination Therapy in which the LVAD is permanently implanted under the heart. This is used when patients are ineligible for transplant do preexisting health problem. This can also be used if the individual prefers not to undergo the transplant surgery. The third use is known as Bridge to recovery and is most common in children born with heart problems.

The design of the heart pump allows this device to be implanted entirely in the pericardial space. This allows the patient to have full mobility such as bending over. It also reduces the

surgical dissection causing a faster recovery than other similar devices. This small design is achieved through a new axial flow pump which consists of smooth spinning blades that force the blood through the device and up into the aorta.

A flow probe attached to the device near the outflow cannula provides precise cardiac output information in real time, 24/7. This information can be used by doctors to monitor patient blood flow, compare data to patient blood flow history, and diagnose dehydration along with other conditions and more. This information is fed down a long wire called a driveline which connects to an external controller. This driveline also supplies power to the pump.

This device is CE mark approved for the pediatric VAD and the Adult VAD. It also has the FDA approval for the pediatric version and is undergoing review for approval in the adult VAD.

MicroMed Cardiovascular also recently received a \$2.8 million grant from the National Institute of Health to continue work on a totally artificial, pulse-less heart using two of these HeartAssist 5 VADs.

Sources:

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<http://www.sciencedaily.com/releases/2009/08/090817142741.htm>

http://www.micromedcv.com/united_states/index.html

http://www.micromedcv.com/united_states/newsroom/video-center.html

(Videos of the implantation can be found here)

