



Providence Center for Advanced Heart Disease

Guide to Ventricular Assist Devices

Potential New Patient and Family Information Book



Contents

Topic	Page Number
Heart failure overview.....	3
What is an LVAD?.....	4
LVAD external equipment.....	5
Driveline and wearables.....	6
LVAD work-up.....	7
What to expect: Patient.....	8-9
What to expect: Caregiver ..	10
Living with an LVAD.....	11

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Heart Failure Overview

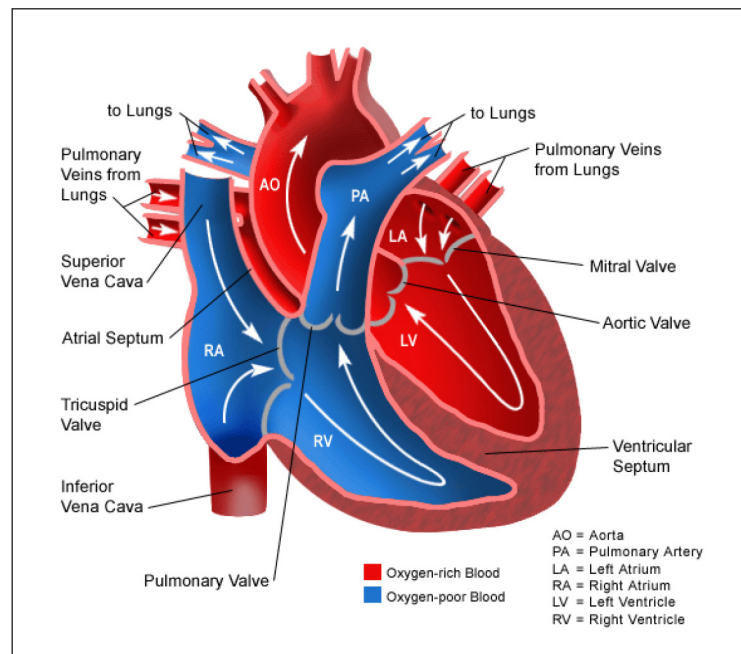
What is heart failure?

Our bodies depend on oxygen and nutrient rich blood being pumped by your heart to the rest of the body's cells so that the body can function normally. With heart failure, the heart isn't pumping as well as it should be and so the body isn't getting the blood supply, oxygen, and nutrients it needs. This results in fatigue and shortness of breath, making every day activities like walking or climbing stairs very difficult.

How does the heart normally work?

A healthy heart is a strong pump that continuously pumps blood throughout the circulatory system. It has four chambers, two on the left and two on the right. Blood is pumped from the body back into the right side of the heart (shown in blue) and then into the lungs. The blood receives oxygen in the lungs and then is returned to the left side of the heart (shown in red) where it is then pumped to the rest of the body. There are valves that control the blood flow between chambers as shown. With some patients, these valves can also fail and can be surgically replaced.

You can have left and/or right sided heart failure. Left sided heart failure is more common. We can implant long term devices into the left side of the heart called left ventricular assist devices, or LVADs, that help weak hearts pump blood to the rest of the body. As the right side of the heart supplied blood to the left, your right ventricle must be functioning well to consider having an LVAD placed.



What is an LVAD?

A left ventricular assist device (LVAD) is a pump that is surgically implanted into the heart in patients who have advanced heart failure. The LVAD helps circulate the blood when the heart can no longer support the circulation needs of the body. The pump sits below the left ventricle and connects the left ventricle to the aorta via cannulas. LVAD implantation is done by open heart surgery. The patient must always be connected to the controller and power source once implanted with an LVAD.

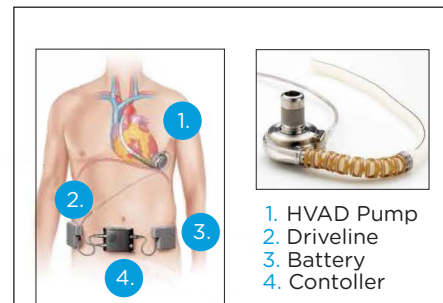
There are several types of LVADs, but all LVADs have the following parts:

- A cannula that removes blood from the left ventricle and delivers it into the pump
- A pump that helps push the blood to the rest of the body
- Another cannula that exits the pump and carries blood to the aorta
- An externally worn power source for the pump
- An externally worn controller for the pump
- A driveline that connects the internal pump to the external controller

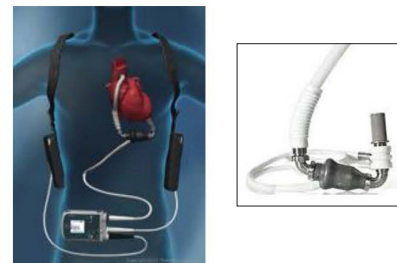
We implant three different LVADs at our center. The pump and driveline are inside the body. The controller and battery are outside the body and are always worn by the patient.

LVADs are implanted at our center as destination therapy, meaning at the time of implant the patient does not qualify for heart transplant.

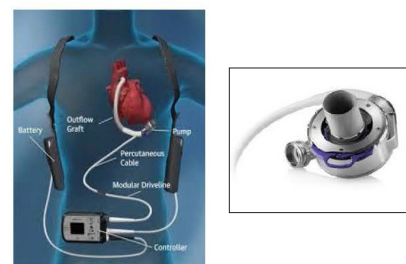
Once implanted with an LVAD, there will be continual follow up with the cardiology team. The patient will be on anti-coagulation indefinitely to prevent a clot from forming in the device. Usual anti-coagulation therapy includes aspirin and warfarin. Warfarin is managed with weekly INR draws.



HeartWare® HVAD



HearMate II®



HearMate 3®

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LVAD External Equipment

Patients who undergo LVAD implant will learn how to manage the equipment shown below.

For each device there is a controller that operates the implanted pump, batteries that hook up to and power the controller, a wall power source, and a battery charger.

HeartWare HVAD®



Controller



Battery



AC adaptor for wall power



Battery charger

HeartMate®



Controller



Batteries



Mobile Power unit for wall power



Battery charger

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Driveline and Wearables

Driveline exit site

The patient will have a driveline that exits the abdomen and connects the internal pump to the external controller and power source. This exit site will be covered with a sterile dressing that gets changed every day for the first 6-8 weeks, then once a week after that. The caregiver will be trained on how to do this dressing and will be responsible for managing the site.



Wearing the equipment

The patient will always be connected to an external controller and power source. This must be on the patient at all times in order for the pump to function. The controller is a small computer that controls the functioning of the pump and allows the patient to look at the pump numbers and any alarms that come on. The controller must always be connected to a power source, either batteries during the day that enables to patient to be ambulatory, or wall power when sleeping. Patients wear the controller and batteries in a vest or a shoulder bag. Whenever out of the house, a patient ALWAYS carries a travel bag with an extra controller, fully charged batteries, and emergency contact information.



Travel bag

LVAD Work-up

We have an extensive work up the patient must go through to make sure that the LVAD is the best option.

This work up includes:

- imaging studies (x-rays, CTs, ultra sound)
- lab work to look at organ function, clotting ability, blood type, etc
- evaluation by our surgeon, cardiologist, LVAD coordinator, social worker, dietician, physical therapist, occupational therapist, speech therapist, and palliative care team

We have all of our candidates meet with at least one patient who has already received an LVAD.

Once the evaluation is done, we decide if the patient is a candidate for surgery. If so, we allow the patient to decide if they want to proceed with implant.

If the patient is discharged home prior to the implant hospitalization, we try to arrange for a couple of LVAD coordinator run education sessions done outpatient. This allows us time to teach you the device prior to implant. If the patient will have the implant immediately, then the education is all done post implant while in the hospital.

There is some paper work that needs to be completed prior to implant. This includes signing a patient agreement, completing some quality of life forms, a home inspection checklist, and consent for the procedure.

After the surgery, all the LVAD education is done (or finished) with the patient and caregiver once the patient is on the step down unit.

What to Expect: Patient

Surgery

The LVAD implantation is an open heart surgery. The cardiovascular surgeon determines if any other repair is needed at time of surgery, such as repairing or replacing a heart valve. The surgery can last anywhere from 4-12 hours depending on the extent of the surgery.

Hospital Stay

Once the surgery is done, the patient will be transferred to the cardiovascular intensive care unit (CICU). The patient will be sedated and intubated (a breathing tube) and will have multiple chest tubes draining fluid from around the heart and lungs. Medications will be administered through the IV that will assist with the heart function, control pain, and prevent infection. These tubes and medications will be weaned over the next couple days. Once the patient is awake, breathing on their own, and stable, they will be transferred to the step down unit where the focus becomes physical rehabilitation, education on the LVAD, and nutrition. Over the next 7-10 days, the rest of the chest tubes will be removed, and once the patient and caregiver have completed education on the LVAD, discharge will be planned.

Discharge Plan

Depending on the physical condition of the patient, there are several options for discharge. Ideally, the patient will be strong and well enough to go home with home health services (RN, physical therapy) a couple days a week. If the patient needs more physical rehabilitation prior to going home, a short 1-3 week stay at an inpatient rehabilitation facility (IRF) can be considered. Finally, if the patient is not strong enough to go home or to an IRF, they will either go to a skilled nursing facility or adult foster home until they regain health.

What to Expect: Patient

First Year After Implant

Six weeks after implant and after the patient has graduated from home health services, cardiac rehab will begin at one of over five locations. Cardiac rehab sessions are 2-3 times per week for 36 sessions. At this time, patients will also start to go to an anti-coagulation clinic for management of their INR and warfarin dosing. There will be frequent follow up with the cardiologist (weekly, then monthly, then quarterly, then 1-2 per year; more frequently if complications arise). If the patient needs to be hospitalized, they must always come to Providence St. Vincent so that we can manage the LVAD.

What to Expect: Caregiver

We implant LVADs because we can improve quality of life. Your loved one may be struggling with poor quality of life right now due to physical limitations because of their heart failure. Our hope is that with this device, you and your loved one can get back to many of the activities you once enjoyed. We have patients who travel all over the world, dance, golf, and enjoy being able to spend time with their family and friends.

We ask a lot out of our caregiver, especially in the first couple of weeks to months. Our hope is that after this recovery phase is over, the patient can return to independence with daily cares. The exception to that is care for the driveline exit site, but we do have patients who learn to do their own dressing once they are a few months out from implant.

After implantation, you will learn all about the device and management. This will happen in frequent, hour long sessions in the hospital with your LVAD coordinator. It is required that you be present for these sessions. During this time, we will also teach you how to do the sterile driveline dressing change. Once you have done this a couple times with the LVAD coordinator, you will do it each day with the bedside nurse until it is mastered. When the patient leaves the hospital, you will be in charge of doing this dressing change every day.

Once your loved one leaves the hospital, it is required that a caregiver be present 24/7 for the first couple of months. The patient will be regaining strength and recovering from surgery, so many need help with daily cares for the LVAD such as changing out batteries, recording LVAD numbers, or putting equipment into the wearable vest or shoulder bag. In addition to these LVAD cares, the patient will likely need help sponge baths, getting dressed, cooking, and other activities of daily living until they are strong enough to be fully independent. Your loved one fatigue easily in the first few weeks, so it is important you are present to help them if need be.

What to Expect: Caregiver

The caregiver will be responsible for driving the patient to weekly clinic appointments, lab draws, and any other follow up that is needed.

We will train one primary caregiver on the LVAD cares and dressing. If other family members or friends wish to be trained, we then ask the primary caregiver to train them. We are happy to provide as many copies of education handouts as necessary to other loved ones.

The further out the patient gets from surgery, it is our hope that she/he gets closer to normal strength and functioning and the less the patient needs to rely on their caregiver.

Living With An LVAD

What Can I Expect?

The first 6 months are the hardest as your body recovers from the implant, you learn how to live with the device, and you have very frequent follow up and rehabilitation sessions. The goal during this time is to get back your physical strength and optimize your health and nutrition. We want to get you back to the best possible health state you can!

Limitations

You will always be connected to the external controller and power source. Therefore, you will not be able to submerge in water (swim, hot tubs, baths). You can shower after the first couple of months at the discretion of your LVAD team, but must use a special shower bag and cover the driveline exit site. You can not participate in contact sports that risk tugging or pulling on the driveline. You cannot do any abdominal strengthening such as sit ups, nor can you do twisting or torqueing motions with your abdomen. The driveline that connects the implanted pump to the external controller is tunneled through your abdomen, so doing these motions can damage this driveline and increase your risk for infection.

How Will I Feel?

Once your body recovers from surgery, we hope you are feeling as good as you did when your heart was functioning better. We hope you don't have any issues with shortness of breath or fatigue related to heart failure. We want you to be able to travel, explore, and engage in the things you enjoyed that you haven't been able to do as your heart failure worsened.

Living With An LVAD

Is This a Cure?

LVADs are not a cure for heart failure. LVADs are a tool we can use to help manage your heart failure. You will likely remain on a couple of heart medications in addition to aspirin and warfarin. You may need to take a diuretic (water pill) daily or as needed for fluid weight management. On occasion, you may need to be hospitalized for heart failure management, but our goal is that this occurs far less often than pre-LVAD.

Support Group

We have a number of patients living with LVADs. We offer support groups quarterly for patients and loved ones. In addition, if you wish to share your contact information with other LVAD patients you may do so. Many of our patients call or visit each other on a frequent basis.

Our Mission

As expressions of God's healing love, witnessed through the ministry of Jesus, we are steadfast in serving all, especially those who are poor and vulnerable.

Values

Compassion, Dignity, Justice,
Excellence, Integrity



CARDIAC CLINICAL CARE

