

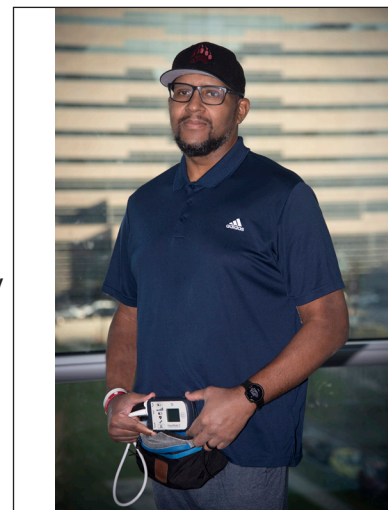
LEFT VENTRICULAR ASSIST DEVICE (LVAD)

What is a left ventricular assist device?

A **L**eft **V**entricular **A**ssist **D**evice (LVAD) is a pump that is attached to your heart. It helps pump blood out of the bottom left chamber of your heart (left ventricle) to your aorta and the rest of your body. An LVAD is put in place during open-heart surgery.

As heart failure gets worse, your heart struggles more and more to pump blood out of the left ventricle. This causes your symptoms to get worse. You may feel more tired, have more swelling in your legs, have more trouble breathing, feel confused, lose your appetite and become bloated. The lack of blood to your body can also cause damage to organs like your kidneys and liver. These problems increase your risk of dying.

An LVAD is not a cure for heart failure. **An LVAD helps your heart — it does not replace your heart.**



How can an LVAD help me?

An LVAD is a treatment option to help you live longer and have a better quality of life. You may hear your healthcare team refer to an LVAD as chronic therapy, destination therapy or bridge-to-transplant (if you are waiting for a heart transplant)

How do I get an LVAD?

Your healthcare provider may talk to you about an LVAD if you have advanced heart failure. **It is not a treatment option for every patient.** You may not be able to have an LVAD if you have a medical condition, such as a problem with blood clotting, kidney failure, liver disease, lung disease, or infection.

Every patient interested in an LVAD must have a detailed evaluation and a support person dedicated to helping them.

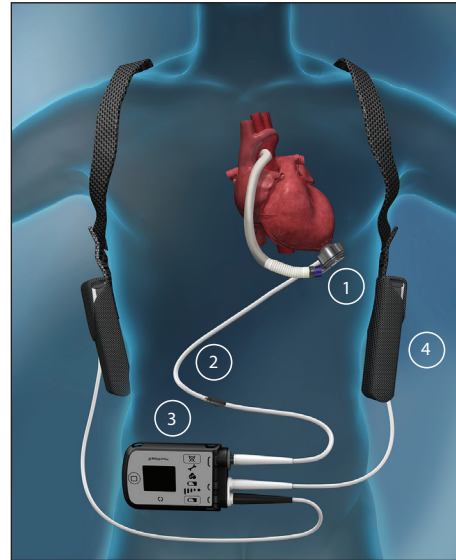
Choosing to have an LVAD

It may be difficult to accept that you do not have many treatment options. We understand that you may want anything available to help you. But before you choose to have an LVAD, you must understand what this option involves. **Please carefully read this information**, use the Learning Checks throughout the handout, and **write down your questions and concerns to share with your healthcare provider.**

An LVAD has four basic parts.

1. The **pump unit** is placed inside your chest.
2. The **driveline** is attached to the pump unit and comes out of your body through your abdomen.
3. The **control system** is attached to the driveline outside of your body
4. A **power supply** keeps the LVAD running.
The LVAD MUST have power at all times (rechargeable batteries or power cord)

Cleveland Clinic uses the HeartMate 3 LVAD (shown to the right).



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Learning Check: Can you answer these questions?

- How does an LVAD help your heart?
- Which LVAD does Cleveland Clinic use?
- What are the 4 parts of an LVAD?

Evaluation for an LVAD

You will need a detailed evaluation to be considered for an LVAD. It includes several tests and a review by the Heart Failure Committee.

Tests

■ Electrocardiogram (ECG/EKG)

An electrocardiogram records your heart's electrical activity. The information about your heart rate and rhythm is printed out so the doctor can review it.

■ X-Rays

X-rays are used to check the size and shape of your heart.

■ Blood tests

Blood tests can show how the lack of good blood flow is affecting your organs. Organs such as the kidneys and liver often get stressed or damaged as the heart gets weaker.

■ Echocardiogram (echo)

An echocardiogram uses sound waves to create pictures of your heart and valves. The test helps your doctor see how well your heart is pumping.

■ Metabolic Stress Test

A metabolic stresstest can help determine if your heart failure is advanced enough to consider LVAD therapy.

During the test, you will wear a special mask to measure your breathing while you walk on a treadmill or ride a stationary bike.

■ Heart Catheterization

A heart catheterization is a test that uses a long, thin tube (catheter) that is inserted into a blood vessel. The catheter is inserted through a small opening made in the neck, groin or arm. There are two types of heart catheterization. A left heart catheterization checks for blocked

areas in your coronary arteries. A right heart catheterization is used to check the strength of your heart, the pressures inside your heart, and can help determine if an LVAD is right for you.

Your evaluation team

You will meet with several evaluation team members who help decide if an LVAD is right for you. They specialize in different areas, so you get a complete assessment of your condition and needs.

■ **Social Worker**

The social worker will talk to you about the support system you have and concerns about your ability to live with an LVAD.

■ **Palliative Medicine**

Palliative medicine specialists help manage the stress and symptoms of heart failure. Controlling these things helps improve the quality of your life. These team members will help you set personal goals for your treatment.

■ **Bioethicist**

You may meet with a bioethicist to make sure you understand what LVAD therapy is and how it will affect your long-term care. If you are approved to receive an LVAD, it is very important that you make a decision about the treatment without the influence of others.

■ **LVAD Team**

The LVAD team includes nurse practitioners (NPs), physician assistants (PAs) and nurses. They help coordinate your care before and after you get your LVAD. They will also make sure you are prepared for life with an LVAD. The team will work with you while you are both an inpatient (staying in the hospital) and outpatient (coming and going for follow-up appointments).

■ **Cardiac Surgeon**

A cardiac surgeon who is specially trained in operating on patients with poor heart function and implanting LVADs.

■ **Heart Failure Cardiologist**

A heart failure cardiologist who specializes in treating patients with advanced heart failure.

■ **Other Doctors**

Other doctors may be involved in your team. For example, if you have lung or kidney problems, you may need to see a doctor who specializes in diseases of those organs.

LVAD surgery

What happens during surgery?

The LVAD is implanted during open heart surgery. The surgery is done under general anesthesia and you will be asleep the entire time. The procedure lasts 4-6 hours.

The surgeon will make an incision down your chest and open your chest bone (sternum) to reach your heart and attach the LVAD. Depending on your situation, your surgeon may need to make an incision on the left side of your chest (thoracotomy). During surgery, a heart-lung bypass machine may be used to move oxygen-rich blood throughout your body. A breathing machine (ventilator) will take over for your breathing during the surgery. The incision will be closed after the LVAD is in place.

Recovery

You will start your recovery in an intensive care unit (ICU). You will be connected to several tubes and wires:

- You will have an IV to get fluids and medication, including medicine to help your heart.
- You may have a feeding tube that runs through your nose into your stomach.
- You will have a tube in your bladder (Foley catheter) to drain urine.
- You will have tubes in your chest to drain blood and other fluid that collects in the area.
- You may have pacemaker wires in your chest to keep your heart beating properly. These wires are usually removed within a few days.
- You may need to stay on the ventilator for several days until you can safely breathe on your own.



Caregiver Information



You will choose one or more people to be your caregiver after your surgery and while you have the LVAD. Your caregiver(s) play a critical role in your recovery and success with the LVAD.

You will not be able to drive after LVAD surgery. Your LVAD team will let you know when you can drive, based on how well you are doing when you come for follow-up appointments.

You will not be able to lift more than 5 pounds for up to 8 weeks after surgery.

Caregiver responsibilities include:

- Learning about the LVAD, including in-hospital training
- Changing your LVAD dressing
- Taking you to and from appointments until you can drive
- Help you with daily activities, such as running errands, personal care, cleaning, cooking, etc.

For more information about LVADs and being a caregiver for a patient with an LVAD, visit:

mylvad.com
or
lvaddecisionaid.com



Learning Check: Can you answer these questions?

- What are some of the tests that are part of an LVAD evaluation?
- What does an LVAD evaluation team do?
- Who are some members of an LVAD evaluation team?
- What type of support do you need after getting an LVAD?

Your recovery continues in a step-down unit. In this stage of recovery you will:

- Work with physical therapists to get stronger.
- Learn about the medications you need, including medication to prevent blood clots and manage your heart failure. You will learn what each medication is for, when you need to take each one and the possible side effects.
- Learn about your LVAD, including the parts, driveline care, bandage changes, battery replacement, and what to do in case of a potential emergency.
- Show that you understand the LVAD and the care involved.

- Show that you can complete basic self-care activities like washing and getting dressed.
- Learn about activity guidelines, diet and how and when to contact your healthcare team. A member of your healthcare team is available 24 hours a day, 7 days a week, to answer urgent questions.

Pain management during recovery

Managing your pain is a priority for your healthcare team. Your healthcare team will talk to you about opioids before the LVAD implant. **Tell your nurse as soon as you feel pain** so it can be managed with medication and other techniques.

LVAD training

You will be responsible for the care of your LVAD, equipment, continuous power supply and routine driveline dressing changes.

You and your caregiver will need to complete hands-on LVAD training before you leave the hospital to learn these things.

Leaving the hospital

Every patient recovers differently. The amount of time you stay in the hospital depends on your individual needs. A typical hospital stay after LVAD surgery is two to three weeks. But, your health before the surgery, other health problems you have, and any complications after surgery all affect your recovery.

Our goal is to help you recover as quickly as possible so you can go home. You may need to stay in a temporary care or rehabilitation center until you are strong enough to go home. Your healthcare team will help you and your family if you need an extended recovery.



You must have a working phone and be able to use voice mail so the LVAD team can stay in touch after you leave the hospital.

Lifestyle changes

You will need to make lifestyle changes after you have an LVAD. Your healthcare team will talk to you about these changes before you leave the hospital. It is very important to make the changes to get the most benefit from the treatment.

What are the benefits of LVAD surgery?

Greater life expectancy

Patients with advanced heart failure who have an LVAD tend to live longer than those who are treated with medical therapy alone.

Better quality of life

Patients who go home after an LVAD implant report a better quality of life than those who stay in the hospital. An LVAD can help patients with advanced heart failure take part in activities that were not possible before the implant. Most patients with an LVAD return to their normal daily activities.

Fewer symptoms of heart failure

An LVAD can help improve and reduce symptoms of heart failure, such as shortness of breath, extra fluid and fatigue. Controlling symptoms will help you feel better and do more.

Risks of LVAD surgery

There are risks with every surgery. Your doctor will talk to you about the risks that are specific to LVAD surgery and how we help reduce them.

Some of the most common risks are:

- **Infection:** The way an LVAD is connected creates a risk of serious infection. Germs can get into the opening in your skin used to connect the driveline from the mechanical pump (inside your body) to the power source (outside your body). Proper care helps reduce the risk of infection.
- **Blood clots and stroke:** You will take medication to help prevent blood clots. Blood clots can break away and block blood flow through your pump. They can also travel to your brain and cause a stroke. Even while taking medication, there is still a chance that blood moving through your LVAD will clot.
- **Bleeding:** The medications you will take to prevent blood clots increase your risk of bleeding. The LVAD also increases this risk, although it is not clear why. Bleeding usually happens in the stomach and intestines, but can also affect your nose and brain.
- **Right heart failure:** The right side of the heart also gets weaker as heart failure gets worse. In most cases, it is strong enough to work well with an LVAD. But sometimes, the right ventricle cannot handle the extra blood flow caused by

the LVAD. If this happens, you may need IV medication or temporary support from a ventricular assist device (VAD) attached to the right side of your heart

- **LVAD malfunction:** The LVAD has many parts. As with any machine, there is always a risk of mechanical failure. We will teach you what to do and who to call if you have a problem with your LVAD.

Follow-Up Visits

You must go to your follow-up appointments as scheduled. Missing appointments increases your risk of complications, and we cannot refill your medications.

You will have many follow-up visits after you get your LVAD. You will have weekly appointments for a few weeks, which will taper off to monthly visits. The visits are needed to make sure your LVAD is working as it should and that you are doing well. You will have blood work, an EKG, echo, ICD check and other tests.

After the first year, you will have fewer visits. Your doctor will let you know how often you need to be seen. If you are waiting for a heart transplant you will need to be seen at Cleveland Clinic at least once every three months.

If you do not live near Cleveland Clinic you may be able to have your follow-up visits with an LVAD-trained team near your home. Your Cleveland Clinic doctor will talk to you about this option, if needed.

Frequently asked questions

It is normal to have many questions about how an LVAD will affect you and those who are close to you. Here are some of the most common questions patients have. Please do not hesitate to ask us any questions you have.

1. How long can I be supported by an LVAD?

The amount of time you can receive support from an LVAD varies. It depends on the type of LVAD you have, whether it is being used as a bridge to transplant or chronic therapy, and your overall health. Many Cleveland Clinic patients have been living with an LVAD for more than 5 years.

2. Do I have to stay attached to the LVAD all day, every day?

Yes. Once the LVAD is in place, it must always have a power source (batteries or plugged in). If you go for even a short time without power, you could die.

Make sure you contact your electric company after you get your LVAD to be added to their priority list. They will give you paperwork for you and your LVAD team to complete.

3. What do I do if there is a power outage?

If there is a power outage, use the extra batteries for your LVAD to keep it powered. If you need to recharge the batteries, you can go to the nearest hospital or fire station. **Your LVAD must have power at all times to avoid the risk of death.**

4. What happens if the LVAD stops working?

This is an emergency situation you will learn how to handle before you leave the hospital after your LVAD surgery. If the LVAD stops, you will likely have heart failure symptoms that can begin quickly. Your heart will keep beating. Remember that the LVAD does not replace your heart; it helps it work better.

5. Can my LVAD be replaced?

If you have a problem with your LVAD, your doctor will talk to you about options to correct the issue. This may include surgery to replace your LVAD.

6. Does having an LVAD mean I won't need to go back in the hospital?

An LVAD is not a cure for heart failure. It can help you live longer, improve your quality of life and reduce symptoms of heart failure. Your risk of a hospital stay depends on how well you do with the device and if you have problems that require treatment in the hospital, such as bleeding, infection and stroke. These are some of the risks that come with having an LVAD.

7. Will I still need heart medications after I have an LVAD?

Most patients with an LVAD need to keep taking medications to help their heart. An LVAD does not fix the heart or cure heart failure, and the medications help your heart work the best it can.

8. Who pays for the LVAD?

We will talk to you about the costs of the treatment and your insurance coverage before the LVAD procedure. Your insurance will likely cover the costs of the procedure itself, but there may be extra costs related to the device that are not covered.

9. How do I bathe with an LVAD?

The electrical parts of the LVAD cannot get wet. You cannot submerge yourself in water. You cannot take a bath, swim or use a hot tub. You can shower once your LVAD team gives you the okay. They will give you waterproof supplies and show you how to use them to keep the equipment dry.

10. Can I have sex after I have an LVAD?

Yes. You can safely have sex after you recover from LVAD surgery.

11. Can I exercise after I have an LVAD?

Yes. It is important to live an active life after you have your LVAD. Cardiac rehabilitation is an important part of your recovery. The rehab specialists will help you design an exercise plan. Your doctor will talk to you about restrictions because of the LVAD, such as swimming, contact sports, and weight lifting limits.

12. Is it safe to become pregnant after I have an LVAD?

We discourage pregnancy for patients with LVADs. The exact risks are unknown. But, the therapy, including medications, would be dangerous or even deadly to the developing baby. All women of child-bearing age who have an LVAD must use two forms of birth control unless they decide not to have sex. If you are a woman who is able to get pregnant, talk to your gynecologist about the types of birth control that are right for you.

13. Can I travel after I have an LVAD?

Yes. You will have to take all your LVAD equipment with you. If flying, the equipment and your medications should go in your carry-on bag. We will give you documentation to use at airport security. We also ask that you give us advance notice of your travel plans so we can help you locate an LVAD center near your destination in case of an emergency.

14. What if I can't make medical decisions for myself?

We encourage all patients to complete a healthcare power of attorney and living will (advance directives) to make sure you receive your preferred treatment if you are unable to make your own decisions. For more information about advance directives, please ask a member of your healthcare team. It is also important to review your advance directives on a regular basis to make sure they still reflect your preferences.

15. Will I ever get a heart transplant?

If the LVAD is in place as bridge-to-transplant therapy, the goal is to use the device until a donor heart is available for transplant. However, there is no guarantee you will have a transplant. Your eligibility can change due to your medical condition, complications, or other factors.

If the LVAD is in place as chronic therapy, it is meant as a final treatment option, and a transplant is not an option. For more information about transplant options and eligibility, please talk to your doctor.



Learning Check: Can you answer these questions?

- What are three things that happen during LVAD surgery?
- What are three things to expect during your recovery?
- What are some of the risks of LVAD surgery?
- What questions do you have about LVAD surgery or recovery?

