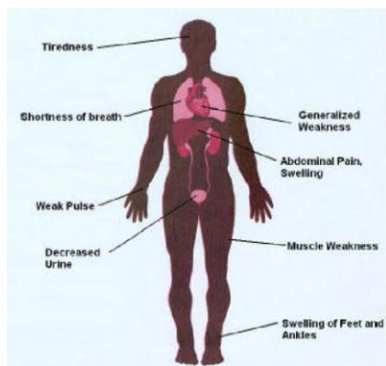


Left Ventricular Assist Devices



UHN

Patient Information



What is Heart Failure?

In Canada, 60,000 people develop Heart Failure each year. Heart failure occurs when the heart fails to pump enough blood to meet the needs of your body. This causes a build up of fluid in the lungs. The main symptoms of heart failure are shortness of breath, tiredness, swollen feet and weight gain due to too much fluid in the body.

Despite the finest medical and nursing therapies, the heart becomes so weakened that medications cannot relieve these symptoms. Sometimes, the only hope for survival is either a heart transplant or a heart assist device.

Who Decides If I Need an LVAD?

If your cardiologist feels you may benefit from an **Left Ventricular Assist Device (LVAD)**, they will call the Toronto General Hospital Heart Transplant team. Members of this team include Cardiologists, Cardiac Surgeons, Perfusionists, Nurses, and Social Workers. They will review your medical history and decide if an LVAD is needed. If you are not on the heart transplant list, the team will decide if you can be placed on the list.

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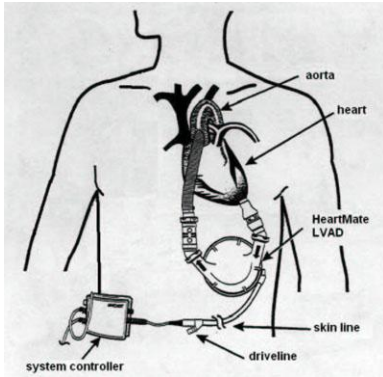
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What Is An LVAD?

LVADs are heart assist devices that take over the pumping action of the portion of the heart called the left ventricle. Toronto General Hospital uses two implantable LVAD systems, the HeartMate XVE and Novacor LVAS. Both LVAD systems consist of a blood pump, system controller and a power source.

1. Blood Pump

The blood pump is implanted below your heart and is attached to your heart and aorta. The blood pump contains valves that allow the blood to flow in only one direction, from the left ventricle, through the pump and out to the body. A Driveline connects the pump to the system controller and a power source. The Driveline exits the right side of your body just above your waist.



Novacor Blood pump



HeartMate Blood pump

2. System Controller



Novacor System controller



HeartMate System controller

The system controller attaches to the blood pump and tells it what to do. It will also alert you to any problems with a warning light and a loud alarm. The Novacor controller is about the size of a paperback novel. The HeartMate controller is about the size of a deck of cards. Both controllers are worn outside the body and are carried in a bag or worn on your belt.



3. Power Sources

Power is supplied to the LVAD from either a power unit or a set of rechargeable batteries. The power unit provides continuous power to the LVAD. It is used when you are not active such as when you are watching TV or sleeping. The power unit also acts as a battery charger. Batteries can fully charge in the unit in about 6 hours. A green light will let you know when the battery is fully charged and ready to use. A monitor attaches to the power unit. When you are attached to the power unit, information is sent through the driveline to the monitor. This information tells you how your LVAD is working.



Novacor Power pack



HeartMate Power Base unit

A set of rechargeable batteries allows you to get up and do things away from the power unit. The batteries are worn in a vest or carried in a fanny pack. The fully charged batteries will last about 6 hours under normal conditions such as reading a book or casual walking. An indicator on the controller will tell you how much battery power is left. When the battery power is low, you can either change the batteries or switch to the Power Unit. Low batteries can be recharged in the Power Unit.



How Does The LVAD Work?

Like a normal healthy heart, an LVAD can pump up to 10 litres of blood per minute. The rate of the pump varies depending on the operating mode and your activity. In a fixed rate mode, the LVAD will pump at the same rate all the time. The automatic mode allows the LVAD to change the pumping rate, depending on the needs of your body. The more you move, the faster the device pumps. When you watch T.V. or sleep, less blood flow is needed and the pump rate slows. It is normal for the pump rate to be different from your heart rate.



What Happens On The Day Of Surgery?

The day before your surgery, you will be transferred to the Coronary Care Unit (CCU) at the Toronto General Hospital. The nurses and doctors involved in your care will visit you to answer your questions. The night before surgery you will not be allowed to eat or drink anything after midnight. You are not allowed candy or gum.

Once you are under anaesthesia, the cardiac surgeon will make an incision from the top center of the chest down into the abdomen. Another small incision is also made in the abdomen to allow the driveline to exit the body. A heart lung bypass machine does the work of your heart and lungs while the surgeon implants the LVAD. The LVAD is placed in the left upper abdomen. After the LVAD is connected to the System Controller, the heart lung bypass machine will be discontinued. The incision will then be sewn up and covered with a bandage. While you are in surgery, a member of the surgical team will visit your family in the waiting room to update them about your progress.

What To Expect After Your Surgery



After your surgery, you will recover in the Cardiovascular Intensive Care Unit (CVICU). This unit is specifically designed for patients who have undergone heart surgery. After heart surgery, you are attached to a breathing machine until you can breathe on your own.

When you wake up, you will hear and feel the LVAD working. The pump may seem loud at first, but most patients say they get used to it in 1-2 days. You will also notice tubes and IV lines that were put in during the surgery. As you get better these will be removed. The physiotherapists and nurses will help you get out of bed to sit in a chair and start walking around your room. Most VAD patients stay in the CVICU for 3-7 days. How long you will stay will depend on how well you recover after the surgery. The doctors and nurses will let you and your family know when you are ready to be transferred to the Cardiovascular Surgical ward.

Families are encouraged to visit. On the day of the surgery your family will be able to visit about one hour after your arrival in the CVICU. Families are encouraged to talk to the nurse to negotiate visiting time and to let them know about any special visiting requests such as young children or home clergy.

Road To Recovery

The key to a successful recovery after LVAD implantation is rehabilitation and infection prevention. Physiotherapists and nurses will assist you with walking and with your deep breathing and coughing exercises.



Prevention of infection is also important for your recovery. You will be given antibiotics through an intravenous line for the first few days. The nurses caring for you will change the dressings over the incision and the driveline exit sites to help prevent infection.



Nutrition also affects your recovery. Some patients report poor appetite and a feeling of fullness after eating due to the location of the pump near the stomach. During the initial days, frequent small meals rather than a few large meals can relieve the fullness.

During your time on the Cardiovascular Surgical Ward, you and your family member will be trained on the operation and care of your LVAD system. You will become familiar with battery changes, alarm settings and what to do in an emergency. You will learn how to change your Driveline dressing and check for signs of infection. When your exit site is healed the nurse practitioner will show you how to use the shower bag so you can take a shower.

Living With Your HeartMate LVAD

With the changes in your life, you will feel many different emotions. It is important that you and your family discuss your concerns with the medical and nursing staff. A multidisciplinary team of dietitians, physiotherapists, social workers and the psychosocial team are available to help you and your family adjust to your new lifestyle.

Throughout your hospital stay, the LVAD team will closely monitor your progress. You and your family will receive individualized teaching to learn about the LVAD system. You will learn that the LVAD is easy to operate and very reliable. After you recover from your surgery and your LVAD training you will be discharged home.

When you go home, the LVAD team will provide you with all the equipment you will need to care for your device. This equipment is on loan to you and remains the property of Toronto General Hospital. The Ministry of Health does not fund our equipment. Our equipment is purchased with donations from private citizens and companies. We work very hard to raise the money needed to help patients who require an LVAD. One of the ways you can help us help others, is to take good care of your equipment. Then we can use our donations to buy new equipment and not replacing lost or mistreated equipment. Before leaving hospital, we will write down the equipment you will be taking with you and ask you to sign an Agreement that you will return the equipment in good working order.



The LVAD will provide you with better circulation, organ function and help you become stronger. Most patients tell us they are able to do many activities they were not able to do when they were very sick with heart failure.

Commonly Asked Questions

1. How long can an LVAD support me?

Patients have been supported for nearly 4 years on a single LVAD. In extremely rare circumstances, a second LVAD has provided up to 7 years of support.

2. How does having an LVAD affect my status on the transplant list?

If you are on the transplant list, you will receive high priority (status 3) for a donor heart.

3. Will I be taking new medications after getting the LVAD?

After LVAD implantation, you will have different medication needs. Patients often require less medication than before surgery. Your doctor will determine which medications you will need. Most patients will need to take blood thinners while their LVAD is implanted. The nurses and pharmacist involved in your care will make sure you know each of your pills and what they do.

4. Will I be able to shower with the LVAD?

Once your doctor feels that your incision is healed, you will be able to shower. The nurse practitioner will show you how to cover and protect the electrical connections so that you can safely take a shower. You will not be able to swim or submerge under water.

5. Will I have to be on a special diet?

At first, you will be eating smaller and more frequent portions, but once you are eating well and without discomfort, you may return to a normal diet. It will be important that you drink plenty of liquids.

6. How long can I expect to be in hospital after the LVAD is in place?

You and the LVAD team will decide when you are ready for discharge. Most patients are ready for discharge within two weeks to 1 month after surgery. It is important that you are very comfortable with the care of the LVAD.

7. Can I have sex?

Many patients are able to resume sexual activity once the surgical wound has healed.

8. Are there restrictions on my activities?

We recommend that you do not drive alone or engage in strenuous physical activities. You may walk, jog or ride a bike.



You may also play golf or tennis. You will be the final decision-maker for the level of activity that you are comfortable with.

University Health Network Mechanical Circulatory Support Team

It is very important that all your questions are answered. The Mechanical Circulatory Support (MCS) team is available to respond to your concerns.

Cardiac Surgeons

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Dr. Terry Yau	416 340-4074

Perfusion Services

Stephen Harwood, Perfusion	416 340-4800 ext. 4146
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Cardiologists

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Dr Diego Delgado	416 340-3940

Nurse Practitioners

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