



# Ventricular Assist Device Program

## **UofL Health – Jewish Hospital Advanced Heart Therapies Program Contact Information**

### **HOURS**

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# Ventricular Assist Devices

## Patient and Family Information

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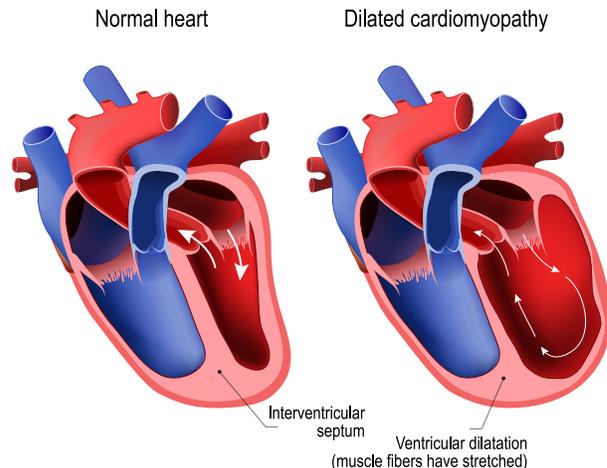
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## Heart Failure

Heart failure often develops after other conditions have weakened the heart. Over time, it can no longer keep up with the normal demands to pump blood throughout the body. The term “congestive heart failure” comes from blood backing up into, or congesting, the liver, abdomen, lower extremities, and lungs.

Heart failure can involve the left side, right side, or both side of the heart. Typically it begins on the left side with the left ventricle, the heart’s main pumping chamber.

Most common causes of heart failure include Coronary Artery Disease, Drug/Alcohol Abuse, Viral Infections, and Abnormal Genetics. In some patients, the cause is unknown.



## Treatment of Heart Failure

Heart failure is a chronic disease needing lifelong management. With treatment, signs and symptoms can improve, and the heart sometimes becomes stronger. For most people, the treatment of heart failure requires the balance of the right medications, low sodium diet, fluid restrictions, and a pacemaker that help the heart beat and contract properly.

## Medications

Heart failure is treated with a combination of medications. Depending on the symptoms, it may require one or more of the following drugs:

**Angiotensin-converting Enzyme (ACE) Inhibitors** – A vasodilator, which widens blood vessels to lower blood pressure, improves blood flow, and decreases the workload on the heart. Examples are Enalapril, Lisinopril, and Captopril.

**Angiotensin II Receptor Blockers (ARBs)** – Have the same benefits as ACE inhibitors. They may be an alternative for people who cannot tolerate ACE inhibitors. Examples are Losartan and Valsartan.

**Digoxin** – Increases the strength of heart muscle contractions. It also can slow the heartbeat. Digoxin may reduce heart failure symptoms.

**Beta Blockers** – Slows heart rate and reduces blood pressure. Also reduces the signs and symptoms of heart failure and improves heart function. Examples are Carvedilol and Metoprolol.

**Diuretics** – Sometimes called water pills, increase urination and help keep fluid from collecting in the body. This also decreases fluid in the lungs, so that breathing is easier. Some diuretics make the body lose potassium, so the doctor may also prescribe a potassium supplement. Examples are Bumex and Lasix.

**Aldosterone Antagonists** – A water pill that does not cause potassium loss and has additional properties that help the heart work better. May reverse scarring of the heart and may help individuals with severe heart disease live longer. Examples are Spironolactone and Eplerenone.

**Primacor or Dobutamine** – Both are IV medications that are given either continually or intermittently. They work by increasing the strength and force with which the heart pumps blood through the body and widens blood vessels, which allows blood to flow through the body more easily.

## Ventricular Assist Device (VAD)

When symptoms cannot be controlled by medications alone, it is time to consider alternative therapy. VADs are mechanical pumps that are implanted into a person's weakened heart to help it pump blood throughout the body. It does not replace the heart, but assists it in pumping blood more effectively.

VADs can be used as a bridge to transplant (BTT), which means it can help a person survive until a donor heart becomes available for transplant. As a BTT, the VAD allows a person to be discharged to home while awaiting transplant.

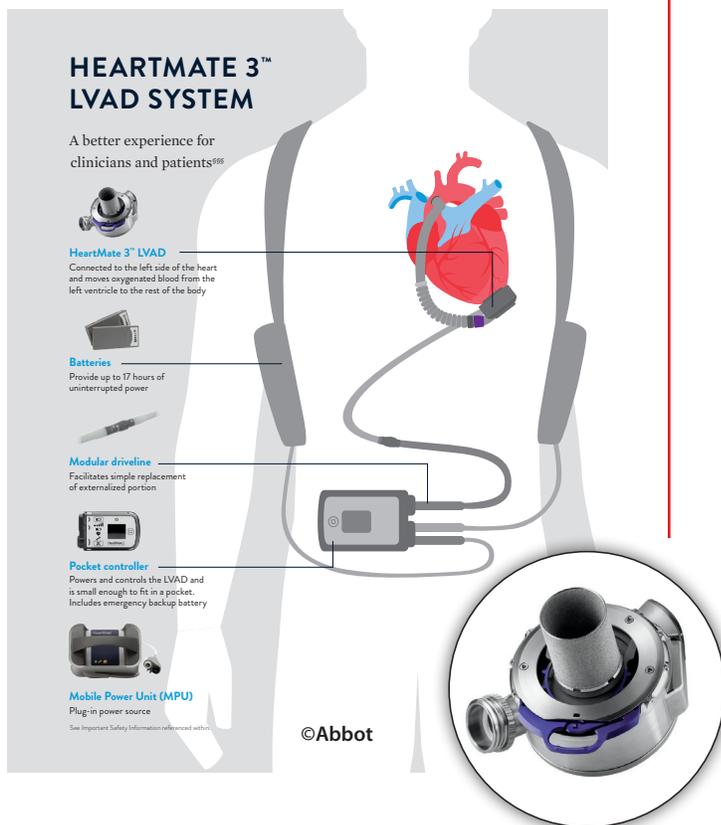
A VAD can also be used as destination therapy (DT), a permanent solution, which is an alternative to heart transplantation. It can be used in people who are not current transplant candidates.

Whichever the use may be, the goal of having a VAD placed is that it can provide effective support, maintain or improve organ function, improve exercise performance, and enable a person to have a better quality of life.

## Types of VADs

There are several types and sizes of VADs available. The type of VAD selected depends on an individual's needs, medical condition and insurance approval. The components of the VAD vary, according to specific device, but in general, they all consist of a pump unit (implanted into the heart), a computer (called a controller), and an energy supply. The energy supply consists of either AC power or battery power. The internal pump of the VAD is connected with a drive line to the controller and batteries, which remain outside of the patient's body.

**HeartMate III** – a magnetically levitated centrifugal pump designed to minimize red blood cell damage. Allows for an artificial pulse.



**Heartware (HVAD)** – a miniaturized centrifugal pump. This pump has one moving part, the impeller (rotor), which spins at 2,000 to 3,000 revolutions per minute.



## Our Specialized Team

Our team of experts include cardiothoracic surgeons and perfusionists who work together to surgically implant the VAD, and specialized VAD coordinators, who are advanced practice registered nurses (APRN) and registered nurses (RN), that assist with care coordination and education before and after implantation.

## VAD Evaluation Process

All potential VAD patients undergo a series of consultations and clinical tests to ensure the indications for VAD placement have been met. These include: blood work, ultrasound, echocardiogram, cardiac catheterization, and pulmonary function test, as well as consultations with a dietitian, social worker, financial coordinator, cardiologist, cardiothoracic surgeon and palliative care specialists.

Once testing is completed, the results are presented at the multidisciplinary team meeting. At this point, the team's recommendation will be discussed with the patient and their caregiver.

## What to Expect with Surgery and Recovery

Regardless of which VAD you receive, they all share common factors. All VADs are implanted in the operating room and require an open-heart procedure under general anesthesia. A special catheter is inserted into a vein in your neck and threaded into an artery that goes from the lungs to the heart, called a Swan-Ganz catheter. This catheter can be used to give medication and measure the pressure in the heart. A breathing tube is inserted into your mouth and down the windpipe to maintain your airway and deliver anesthesia. A urinary catheter is also inserted into your bladder, which is used to measure and collect urine. Additionally, chest tubes are used to drain excess fluid off from the chest area. Once the surgery is completed, all incisions are closed. In total, the surgery usually takes four (4) to six (6) hours.

Once VAD implantation has been completed, you will be transferred to the Cardiovascular Intensive Care Unit (CVICU). In CVICU, a specialized team of nurses will help you recover from surgery by stabilizing your blood pressure and heart rate, monitoring the VAD, adjusting IV (intravenous) medications, administering medications for pain, and weaning you from the ventilator (breathing machine). Additionally, chest tubes are used to drain excess fluid off from the chest areas during surgery. These tubes are generally removed within the first few days after surgery. The chest tubes will remain in place until the drainage from them decreases.

There will most likely be some pain or discomfort at your incision sites after surgery. It is very important to let the nurses know that you are having pain so that they can give you pain medication. If you are having pain, it may be hard for you to do the things that your nurse asks, such as coughing, deep breathing, or moving.

Once the initial recovery period is over and you are stable, you will be transferred to a unit of Jewish Hospital called Five (5) Towers at Jewish Hospital. This is where you will remain until discharge, unless you need inpatient rehabilitation at Frazier Rehabilitation Center. During your recovery and stay in the hospital, you will become more familiar with your new VAD and resume daily activities such as getting out of bed, eating, and exercising. You and your family will also expand your knowledge of the VAD and work toward establishing a daily routine. This will include a three (3) hour VAD class for you and your caregivers to learn more in depth about the VAD so that everyone is more comfortable managing it upon discharge. Additionally there will be daily education regarding how to perform the driveline exit site care.

## Family Role and Expectations

The role of the family and significant caregivers is essential. This role is just as critical and can be just as exhausting as what the patient experiences. Therefore, it is important that caregivers understand the active role and responsibilities they will have.

As the patient progresses from CVICU to Five (5) Towers at Jewish Hospital, the caregivers will become more involved in the daily care. They will be taught how to perform the daily exit site dressing change and how to monitor for signs of infection. As previously mentioned, the caregivers will attend a three-hour VAD education class where they will learn how to operate and maintain the VAD and monitor changes in the patient. Caregivers and the patient will demonstrate adequate knowledge and self-confidence before leaving the hospital and returning home. Between the VAD coordinators, Five (5) Towers at Jewish Hospital nurses, and perfusionists, we will make sure you are very comfortable with the VAD before your discharge.

## Going Home with a VAD

While living at home with your VAD, it is vital that you follow instructions. You must know and understand the warnings and cautions that go along with having a VAD. Some of the tasks you will have at home include:

- Daily driveline dressing care
- Daily weights and VAD readings
- Knowledge and discipline of taking medications
- Being available for home health to visit
- Going to lab for blood work when asked
- Calling for issues as discussed prior to discharge
- Coming to all clinic appointments
- Taking care of VAD equipment as instructed prior to discharge

Follow activity limitations listed below:

- Do not take baths or go swimming (no submersion in water) while implanted with a VAD.
- You may shower only after your doctor has approved it. You may only take a shower while using the shower kit.
- Do not let water or fluids get onto your controller.  
If water gets into the pump or vent filter, it can cause the pump to stop.
- Do not play contact sports.
- Avoid jumping up and down.
- Do not lift more than ten (10) lbs for at least eight (8) weeks. Obtain approval from your doctor before lifting more.
- Do not drive initially. Driving, usually okay to resume after 8 weeks, only with approval from surgery team.
- Returning to work can be discussed on an individual basis depending on the type of job.

## Lab Tests

You will be on a medication called Coumadin (Warfarin) which thins your blood and helps to prevent clots from forming in the pump. Your blood will be drawn (called an INR) to see what your range of thinness is. Your target INR goal level will be between 2.0-3.0, unless otherwise stated. Prior to any clinic visit, we will first draw your blood to check your INR. Upon discharge from the hospital, a home health nurse will come to your home and draw the lab work that is needed. Once discharged from home health, you will be able to go to your local lab for blood work. We will make every effort to connect you with an outside company that can supply you with a home INR machine.

## Clinic Visits

Upon discharge, you will be scheduled for weekly follow-up visits to our clinic, then spaced to monthly visits as long as you are recovering and healing appropriately. You will also be asked to come in if you call with a problem that doesn't require an ER visit. You will be seen by a VAD coordinator, a perfusionist, and a doctor at your visit. During your visit, you will be seen by a VAD coordinator, a perfusionist, and a physician who will evaluate your progress and document your VAD history to ensure everything is functioning properly. We will also go over your medication list to ensure you are taking them correctly. It is very important to bring an updated medication list with you to each clinic visit.

**It is important to keep your lab draws and clinic appointments in order for us to maximize your care.**

## Medical Care

You may have a CT scan or X-rays, but not an MRI or MRA. You will continue to see your primary care physician or family doctor for non-heart or -VAD related issues. If another doctor prescribes medication for you, please call our office before taking it. Some medications interfere with your Coumadin. If you do not have a primary care physician, now is the time to get one. We will need their help in managing your care for non-heart/VAD related issues. If you are in need of any procedures that require sedation, those procedures have to be done at our hospital, where the VAD team is located.

## Pain

You should be virtually pain free by the time you go home. However, you will be sent home with one prescription for pain medication, if needed. The VAD team does not prescribe routine pain medications outside of your surgical pain window of four (4) weeks post VAD implant. If you have any change or increase in pain, call your VAD Coordinator. If you had a pre-existing medical condition that required pain medication prior to the VAD, you will need to follow up with your primary care or pain management doctor for pain medications.

## Diet

It is vital to eat foods high in protein and calories. Salt and fluid intake needs to be controlled, as well. If you are diabetic, you need to follow a diet low in sugar. Because of where the pump is located, some patients lose their appetite after surgery. This usually goes away over time. If you feel full quickly during meals, try eating more (6-8) smaller meals throughout the day. A healthy, well-balanced diet can help you recover more quickly from surgery. It will give you more energy to be active. A dietitian is available for you, if needed, for education on what you should and should not be eating.

## Alcohol, Smoking and Nicotine Products

Smoking and secondhand smoke cause your arteries to tighten and will decrease blood flow, which will make your pump work harder and could potentially cause clots to form. It also lowers your ability to fight off infection. Therefore, do not smoke. If you have been approved for bridge-to-transplant and you are smoking or using a tobacco product, you will not be eligible for a transplant until you have stopped. Any BTT patient who was smoking prior to the VAD will undergo random nicotine screens as proof of smoking cessation.

Absolutely no alcohol is permitted as it interferes with some medications, mainly Coumadin, causing your blood to be too thin. Alcohol also makes you urinate more often, which can cause you to become dehydrated. It will also impair your ability to understand and react to system alarms.

## Prepare When Leaving Home

When leaving home for any period of time, **including when you come to clinic**, you will have to **always** take extra back up VAD equipment with you, to use in case the equipment you're wearing has a problem. This includes a controller, two batteries, and battery clips.

## Follow-up Instructions

The VAD team is on call for our patients at all times. Upon discharge we will go over a list of instructions on when to call us. The list will include:

- Any sign of infection at the driveline site (temp over 100.5, chills, redness, swelling, odor, increased pain, or new or different colored drainage)
- New, increased, or change in color of drainage from sternal incision
- Any strange bleeding or bruising
- Any time you aren't feeling well
- Any time you are running a fever or have chills
- Any VAD concerns: alarms, driveline issues, abnormal sounds or feelings, or new pain
- If you are going to the ER
- Numbness, tingling, or weakness in any arm or leg
- Blurred vision, confusion, or speech problems
- Shortness of breath or dizziness
- Nose bleeds that won't stop
- Tarry, dark or bloody stools
- Chest pain or headaches that won't go away
- Defibrillator fires (shocks)
- Weight gain of more than five (5) pounds over three (3) days
- Problems with any equipment or if replacements are needed
- VAD flow less than three (3) or more than seven (7) for a sustained period of time
- Power Elevations that are greater than ten (10) or one (1) Watt higher than your average reading.
- Pulsatility index less than three (3) or more than seven (7) for a sustained period of time
- Alarms other than battery alarms
- VAD failure (pump stops)

**For an appointment change or medication refill, please call during regular business hours – 8:30 a.m. to 4:30 p.m. Monday through Thursday and 8:30 a.m. to 4:00 p.m. on Fridays. It is important to plan ahead with medications and not wait until there are only a few pills left, refills should be requested during normal office hours.**

# Living with a VAD

## Patient Expectations

1. Keep lab appointments
2. Keep clinic appointments
3. Comply with home health schedule
4. Keep appointments with outside physicians who help manage your care
5. Provide a working phone number to VAD coordinator at all times
6. Notify the VAD office of address or insurance changes
7. Promptly return calls from VAD office
8. Do not gain more weight than your baseline (your healthy weight)
9. Do not use nicotine, in any form, if listed for transplant. Random screens will be done
10. Notify the VAD office if outside physicians want to start a new medication
11. Do not take over the counter medications without discussion with a VAD coordinator first
12. Take care of VAD equipment and follow all recommendations regarding use of equipment
13. Participate in an exercise program, like cardiac rehab, then continue to exercise on own once cardiac rehab is completed
14. Do not use alcohol, drugs or nicotine due to their association with poor outcomes
15. Participate in all care; don't rely 100 percent on caregiver
16. Keep track of when refills are needed and contact the VAD office, your local pharmacy, or Pharmacy Plus during regular business hours. You should always have at least a five-day supply of medications on hand. Do not wait until you have one pill left

## Caregiver Expectations

1. Help manage medications until patient can manage on own
2. Drive patient to lab and doctor appointments until patient able to do on own, minimum of eight (8) weeks post implant. Has to be approved by surgeon first.
3. Participate in clinic appointments
4. Attend three (3) hour VAD class after VAD placed and prior to patient discharge
5. Learn and perform driveline dressing changes using technique taught by RN
6. Be available to meet with VAD team during regular business hours for education
7. Help with providing healthy meals
8. Help with encouraging physical activity; includes driving to cardiac rehab, if needed
9. Encourage independence so that VAD patient is not 100 percent reliant on you
10. Do things for yourself in order to maintain emotional and physical health





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