

***Detroit East Medical Control Authority***  
**Protocols**  
LEFT VENTRICULAR ASSIST DEVICES

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***Left Ventricular Assist Devices***

A Left Ventricular Assist Device (LVAD) is an implanted device that pumps blood from the left ventricle into the aorta in an effort to support circulation. For some of these patients this device is a bridge to transplant but for others it is a “destination therapy” if transplant is not an option. Care of patients supported by these devices presents a challenge for care givers in the pre-hospital environment. This document provides guidance for the provision of emergency care for patients in the pre-hospital environment who have an LVAD in place. Contact Henry Ford Hospital ER for medical direction about a device with which you are unfamiliar. Contact Information:

- Henry Ford LVAD Program – call 24/7 LVAD Pager at 313-705-0089.
- LVAD’s create non-pulsatile flow; it may be difficult to obtain vital signs using standard equipment and or methods. Utilize skin color, mental status and capillary refill to assess the patient.
- The device supports left ventricular function and is dependent on some right heart function and adequate circulating volume. Even minor volume depletion may cause diminished perfusion and require fluid administration.
- LVAD patients are all anticoagulated.
- LVAD’s are powered electrically, a driveline exits the body, connects to a “controller” which in turn is connected to a power source. Proper functioning of the device is dependent on the integrity of these connections. Exercise caution related to the drive line, which exits through the skin in the upper abdomen. Do not cut, pull or damage it in any way. It will be secured by some type of binder or other method to protect it.
- Connections should not be forced together or apart. All connections are secured by some type of locking device.
- Generally, patients, their families and caregivers are familiar with the operation of the device and should accompany the patient as a resource for operation of the device if promptly available.
- All LVAD patients are assigned a hospital based coordinator who is available by phone and should be contacted urgently.
- All LVAD patients should have a “go bag” close by which contains an additional power supply as well as an extra controller. This should be brought with the patient to the hospital.
- Charged batteries, a controller and a power based unit should be brought with the patient to the hospital.
- If possible, the patient should be transported with four fully charged batteries. Two will be connected to the patient and the others will serve as backups.
- Most issues will be the result of medical problems rather than device failure.

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Pre-Medical Control

MFR/EMT/Specialist/Paramedic

1. Assess the patient for signs of life and function of the device
  - a. Awake and or alert
  - b. Satisfactory capillary refill
  - c. Audible whine/hum in the region around the heart and or left upper abdomen
  - d. Check all connections, tighten as indicated to be sure they are secure
  - e. Identify any alarms that are heard or visible on controller
  - f. CPR should be done in any patient who is unresponsive with no signs of perfusion. **Consult with Medical Control immediately if the device is non-functioning.**
  - g. If able, begin to assemble components or have the patient's LVAD competent companion gather components that will accompany patient:
    - Extra controller
    - Extra batteries
    - Power unit (charger) and or A/C adapter

Paramedic

2. Assess for other medical issues
  - a. Start an IV and a fluid bolus if volume depletion is felt to be present
  - b. Control bleeding
  - c. Attach monitor and assess rhythm
    - i. LVAD patients may have life threatening arrhythmias at baseline including VF or VT. Ask the patient, companion, or LVAD coordinator what the patient's baseline rhythm is.
    - ii. If the patient is unstable and they are in an arrhythmia that is not their baseline treat the arrhythmia
  - d. Move to appropriate medical protocol
    - i. Defibrillation, cardioversion and external pacing are allowed if indicated
  - e. CPR should be done in any patient who is unresponsive with no signs of perfusion. **Consult with Medical Control immediately if the device is non-functioning.**
  - f. Prepare for transport to MCA-approved LVAD hospital
3. Consult with LVAD Medical Control Center
  - a. Patient or companion should have emergency contact information
  - b. Report information from the controller including any alarms
  - c. Change battery or power source as requested
  - d. Change controller as requested-be sure patient is laying or sitting down as pump will stop briefly

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4. Transport to an MCA-approved LVAD Center:

Henry Ford LVAD program, all patients with LVAD should be transported to the LVAD center regardless of complaint.

Common LVAD devices in Michigan:

- Heart Mate II
- HeartWare

Device	Pulse	Defibrillation	Blood pressure	CPR
Heart Mate II	Dependent on native heart function	Yes- On batteries is best	Difficult to obtain, may get mean arterial pressure using standard equipment 75-90 mm Hg	CPR whenever indicated
Heart Ware	Dependent on native heart function	Yes- On batteries is best	Difficult to obtain, may get mean arterial pressure using standard equipment MAP < 85	CPR whenever indicated