3090 VENTRICULAR ASSIST DEVICES

EMT | EMT-IV | AEMT | INTERMEDIATE | PARAMEDIC

Ventricular Assist Device (VAD)

***Contact VAD Coordinator as soon as possible** at 24/7 pager # (303) 266-4522.
For pediatric patients contact the Children's Hospital Colorado transplant coordinator pager at (303) 890-3503.

Summary: A Ventricular Assist Device (VAD) is a mechanical device used to support circulation in a patient with significant cardiac ventricular dysfunction. The device is surgically implanted in the heart and provides continuous blood flow from left ventricle to aorta by a pump and graft.

- LVAD patients can be identified by an electric driveline cable that comes directly out of their abdomen and connects to an external control pack powered by two external batteries they will be wearing with a bag, harness or vest.
- The patient still has underlying heart function and rhythm that can be assessed and treated as appropriate per protocols.
- These patients are always on blood thinners, most likely Coumadin.

Assess the patient

Typically, LVAD patients have no discernible pulse. Blood pressure measurement requires manual BP cuff and Doppler which the patient may have. Typical goal "systolic" is 70-90mmHg. See **Monitoring Considerations** below. Utilize Other parameters to define "stable". for patient assessment:

- Level of consciousness
- Respiratory rate and work of breathing
- Signs of perfusion: skin color/temperature, capillary refill (HR >100 is hemodynamically unstable)
- Cardiac monitor, SpO_2, blood glucose level, 12-Lead EKG

Is the patient alert, showing signs of perfusion? stable?

Alert, perfusing well STABLE

- Address any non-LVAD medical problems according to protocol
- Transport to closest University of Colorado Hospital for further treatment, if practical
- Contact VAD Coordinator*

Not alert and/or perfusing well UNSTABLE

- Determine if VAD is running and functioning properly (Auscultate chest for whirling sounds, examine VAD control unit for alarms)
- Assist ventilation as necessary
- Rule out other causes of altered mental status

Common VAD Complications

- CVA
- TIA
- Arrhythmias
- Infections
- Sepsis
- Obstructions
- Pump Failure
- Bleeding

VAD RUNNING

- 250 mL bolus
- Notify destination of VAD patient inbound
- Consider chest compressions if apneic with no clinical evidence of perfusion
- Initiate ACLS (PALS if patient pre-pubescent) and address underlying dysrhythmia or other problems per protocol

VAD NOT RUNNING

- Address VAD alarms/faults (power source?)
- Consider chest compressions if required
- Address VAD alarms/faults
- Consider defibrillation if required
- Notify destination of VAD patient inbound
- Initiate ACLS (PALS if patient pre-pubescent)

- Notify destination of VAD patient inbound
- Consider chest compressions if apneic with no clinical evidence of perfusion
- Consider defibrillation if arrhythmia and poor perfusion

Initiate ACLS (PALS if patient pre-pubescent) and address underlying dysrhythmia or other problems per protocol

Approved by EMS Medical Director October 1, 2020

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Monitoring Considerations:

- Since there is non-pulsatile continuous flow, a pulse is usually not present and the BP must be obtained with a Doppler, usually from the brachial artery. Dopplered BP is more reflective of a MAP and should be 70-90 mmHg.
- Pulse oximetry monitoring may or may not be obtainable due to normal non-pulsatile state. If unable to obtain O2sat then patients' oxygenation status should be assessed via color and level of consciousness and if in doubt treat patient with high flow oxygen and/or intubation if indicated per clinical assessment.
- Continuous waveform capnography (either inline if patient is intubated or via sidestream nasal cannula) may be helpful in monitoring trends in patient's overall ventilation and perfusion status.
- Patients may be defibrillated, cardioverted and receive CPR if indicated.
- If the patient is unconscious follow the ACLS algorithm but look at the device controller to see if there is a red alarm. If there is a red alarm then start CPR and follow ACLS resuscitation guidelines.
- If there is NOT a red alarm then look for other causes for altered level of consciousness such as hypoglycemia, stroke, CNS depression from meds etc.

Considerations:

- Patients are instructed to call 911 for:
  - All major red alarms which are triggered when the CI < 2.5L/min which is usually caused by low flow, low batteries or drive line failure.
  - If the AICD fires, which most patients have, this usually indicates VT/VF.
  - If focal neurologic symptoms suggesting TIA or stroke occur
  - If significant bleeding occurs and does not stop with application of pressure
- Due to the continuous flow, patients can remain fairly asymptomatic despite being in VT/VF/AF. They may only complain of vague symptoms like fatigue. If patient appears clinically stable, obtain 12 lead EKG and conservatively manage.
- The VAD is very preload dependent so "low flow" alarm may be triggered by dehydration
- Patients with a VAD are not allowed to swim, shower, undergo MRI, or travel without well documented plans.
- Local fire departments, electrical companies, and hospitals should be aware of VAD patients in their service area

Key Points

- Unstable VAD patients should be transported to the nearest appropriate facility. University of Colorado Hospital is the only facility in the region that definitively treats VAD patients—and is therefore the preferred destination when patient condition is stable and conditions/operational factors allow transport.
- ***Contact VAD Coordinator as soon as possible at 24/7 pager # (303) 266-4522. For pediatric patients contact the Children's Hospital Colorado transplant coordinator pager at (303) 890-3503.** Provide patient name, DOB, condition & ETA at destination for consultation and/or if transporting to University of Colorado Hospital. VAD coordinator will call back.
- VAD patient family members are excellent resources to assist with patient history and evaluation/repair of VAD alarms/faults.
- **It is vital to transport the patient's back-up batteries and emergency equipment with the patient.**
- Device specific information for EMS can be found at: https://www.mylvad.com/medical-professionals/resource-library/ems-field-guides