VENTRICULAR ASSIST DEVICES

Aliases:
- Ventricular assist device (VAD), left ventricular assist device (LVAD), right ventricular assist device (RVAD), biventricular assist device (BiVAD)

Patient Care Goals:
- Rapid identification of, and interventions for VAD-related malfunctions or complications resulting in cardiovascular compromise.

Patient Presentation:
- Adult patients that have had an implantable ventricular assist device (VAD), including a left ventricular assist device (LVAD), right ventricular assist device (RVAD), or biventricular-assist device (BiVAD), and have symptoms of cardiovascular compromise
- Patients with VADs that are in cardiac arrest

Treatment and Interventions: (see EMS VAD Troubleshooting Guide)
- Assess for signs of hypoperfusion including pallor, diaphoresis, and altered mental status.
- Assess the VAD:
  - Assess for alarms
  - Auscultate for pump sound “hum/whirring”
  - Utilize available resources to troubleshoot potential VAD malfunctions and to determine appropriate corrective actions to restore normal VAD function (see VAD EMS Troubleshooting guide)
  - Contact the patient’s VAD-trained companion, if available.
  - Contact the patient’s VAD coordinator, using the phone number on the device.
  - Check all the connections to system controller.
  - Change VAD batteries if indicated.
- Manage airway as indicated (see Airway Management Protocol)
- Manage respiratory distress as indicated (see Respiratory distress protocol)
- Initiate EKG monitoring and obtain 12-lead EKG (12-lead may be delayed for life-threatening interventions)
- Treat dysrhythmias as indicated (see Dysrhythmia protocol)
- Establish vascular access as indicated (see Vascular Access Protocol)
- Administer normal saline as indicated (see normal saline formulary and FRG)
- Treat shock as indicated (see Shock protocol)
- Obtain blood glucose and treat as indicated (see Hypoglycemia/Hyperglycemia protocol)
- Search for and correct reversible causes as indicated
Key considerations:

- If patient is experiencing VAD-related complications or cardiovascular problems, expedite transport to the medical facility where VAD was placed if patient’s clinical condition and time allows
- If patient has a functioning VAD and is experiencing a non-cardiovascular-related problem, transport to a facility that is appropriate for the patient’s main presenting problem without manipulating the device
- If patient is in cardiac arrest:
  - CPR should not be performed if there is evidence the pump is still functioning, the decision whether to perform CPR should be made based upon best clinical judgment in consultation with the patient’s VAD-trained companion and the VAD coordinator (or Direct Medical Oversight if VAD coordinator unavailable)
  - CPR may be initiated if:
    - You have confirmed the pump has stopped and troubleshooting efforts to restart it have failed, and
    - The patient is unresponsive and has no detectable signs of life.
- You do not need to disconnect the controller or batteries in order to:
  - Defibrillate/synchronized cardioversion
  - Acquire a 12-lead EKG
- Automatic non-invasive cuff blood pressures may be difficult to obtain due to the narrow pulse pressure created by the continuous flow pump
- Flow through many VAD devices is not pulsatile and patients may not have a palpable pulse or accurate pulse oximetry
- Although automatic non-invasive blood pressure cuffs are often ineffective in measuring systolic and diastolic pressure, if they do obtain a measurement, the MAP is usually accurate.
- Ventricular fibrillation, ventricular tachycardia, or asystole/PEA may be the patient’s “normal” underlying rhythm. Evaluate clinical condition and provide care in consultation with VAD coordinator and/or Direct Medical Oversight.
- The patient’s travel bag should accompany them at all times with back-up controller and spare batteries
- If feasible, bring the patient’s power module, cable, and display module to the hospital
- The most common cause for VAD alarms is low battery and power failure.