Protocol 700-C5: Ventricular Assist Devices

Revision 5/22/18
Effective 8/1/18

- Purpose
  - Provide prehospital personnel with guidelines on how to assess and treat patients with ventricular assist devices (VAD). A VAD is a device that supplements or replaces the cardiac ventricle in pumping blood to the body. The ventricle in these patients is weak and can't pump enough blood to meet normal demands.
  - Patients with VADs present prehospital providers with unique assessment difficulties because of issues related to the VAD. While first generation VADs had a pumping mechanism, second generation VADs (which most patients today have) do not. This feature makes palpating a pulse impossible.
  - Prehospital EMS providers will not be able to obtain a pulse-oximetry reading or a blood pressure on patient's that have second generation VADs. In trauma patients, this makes evaluation and assessment very difficult. Also, automatic blood pressure devices are not accurate.
  - Prehospital EMS providers should rely upon the patient's level of consciousness, skin signs, capillary refill, etc. to make any clinical decisions. It should also be noted that many patients with a VAD, also have an implanted cardioverter-defibrillator (ICD) and/or a pacemaker/ICD.
  - An $EtCO_2$ value of <20 mm Hg in an unresponsive, correctly intubated, pulseless patient with a left ventricular assist device (VAD) would seem to be a reasonable indicator of poor systemic perfusion and should prompt rescuers to initiate chest compressions.
- Procedure
  - Always assess the patient first.
  - The patient's needs may have nothing to do with a problem with the VAD.
  - Auscultate for heart sounds to determine if the device is functioning.
  - You should expect to hear a continuous "whirring" sound for most devices.
  - Assess the device for any alarms/malfunctions.
  - Check with the patient or caregivers for device reference materials or contact the VAD center directly.
  - Start a least 1 large bore (18g or greater) IV in a proximal vein and give a 1-liter Normal saline bolus of 0.9% if the patient appears to be in shock.
- Follow the appropriate treatment protocol based upon the patient's clinical condition, with the following exceptions:
  - Warning: DO NOT perform chest compressions unless there are signs of inadequate perfusion with an $EtCO_2$ < 20 and the patient is unresponsive and properly intubated and ventilated.
  - Warning: DO NOT disconnect the VAD power source except during transport
  - DO follow the directions of the patient's caregiver when moving or transporting patient.
- Contact the base hospital for any questions regarding medical direction.
- Arrhythmias
  - If defibrillation or cardio-version is required, then follow the appropriate treatment protocol.
  - These pumps are insulated so that electrical therapy should not be an issue.
  - Defibrillate per ACLS protocol.

- Warning: do not defibrillate directly over the VAD.

❖ Altered Mental Status
  - ➢ Immediately check blood glucose and end-tidal CO2 using capnography.
    - Low values (<20mmHg) likely indicate the cause of altered mental status as hypoperfusion.
    - These patients and/or their VAD assistants are taught to call 911 in any emergency and then contact the on-call VAD coordinator immediately.
    - These VAD coordinators will typically be on the phone when first responders arrive and can help troubleshoot the devices but cannot provide medical control.
    - Paramedics are authorized to take direction from the VAD center provided the direction is within your ALS scope of practice.
❖ When transporting these patients to the hospital, bring:
  - ➢ the entire VAD emergency bag
  - ➢ power source
  - ➢ battery and charger.
  - ➢ Whenever possible plug the unit into a 120 VAC power source as soon as possible.
❖ The patient and/or the patient's VAD assistant will be able to advise prehospital personnel of the requested transport destination.
  - ➢ If neither the patient nor the assistant can determine a destination, or the patient's condition does not warrant transportation to a VAD center, contact the base hospital for direction

Special Considerations

❖ Due to long ground travel distances, transportation of VAD patients will generally be done by air. If this is impossible then ground transport is authorized to Kaiser Santa Clara or to Stanford, as these are the two closest VAD capable hospitals. Strong preference toward the patient's host hospital is authorized.
❖ There are no absolute medication contraindications for VAD patients. If possible, avoid medications that reduce cardiac preload such as nitrates, as these patients are dependent upon preload.
❖ Warning: Chest compressions are usually contraindicated in patients with VADs, unless there are no other signs of life.
❖ Chest compressions and blunt trauma to the chest and/or abdominal trauma may dislodge the VAD grafts and cause sudden death.
❖ Warning: Do Not determine death in the field for patients with VAD's. The base hospital should be contacted for VAD patients that are unresponsive.
❖ These patients are at high risk for the following conditions:
  - ➢ Hemorrhage
  - ➢ Stroke
  - ➢ Sepsis
  - ➢ Dysrhythmias