

	COUNTY OF SACRAMENTO EMERGENCY MEDICAL SERVICES AGENCY	Document #	8833.08
	PROGRAM DOCUMENT: Ventricular Assist Device (VAD)	Initial Date:	08/01/10
		Last Approved Date:	05/01/17
		Effective Date:	05/01/19
		Next Review Date:	09/01/20

 EMS Medical Director

 EMS Administrator

Purpose:

- A. To serve as the treatment standard for ~~Emergency Medical Technicians or Paramedics~~ treating patients with a VAD.
- B. ~~This policy applies to VADs for left, right, and both ventricles (LVADs, RVADs, and BiVADs)~~

Authority:

- A. California Health and Safety Code, Division 2.5
- B. California Code of Regulations, Title 22, Division 9

Protocol:

BLS
<ol style="list-style-type: none"> I. Consider oxygen therapy per Respiratory Distress: Airway management PD # 8020 II. If the patient is unresponsive, check the power supply and the connections. III. Chest Compressions ONLY if unresponsive, apneic, mean arterial pressure of < 50 mmHG, and VAD is presenting with a Red Heart Alarm. IV. Collect all VAD equipment (power unit, spare batteries, and black emergency bag). V. Transport patients experiencing VAD related problems to the appropriate receiving facility providing VAD services. Patients who meet critical trauma criteria or have severe burns shall be taken to UC Davis.
ALS
<ol style="list-style-type: none"> I. Advanced airway adjuncts as needed. II. If auscultated blood pressure (see precautions A) is < 60 mmHG, pulmonary edema is not present and patient exhibits symptoms such as dyspnea, hypotension, syncope, and loss of consciousness then: <ul style="list-style-type: none"> • Establish vascular access; titrate to a systolic blood pressure of 70 mmHg not exceeding 1500 ml of fluid. • If patient remains unconscious with mean arterial pressure of < 50 mmHG, after IV fluid, begin CPR • Patients with total artificial hearts (BiVADs) do not respond to CPR and should not receive medication of CPR. III. Cardiac Monitoring. IV. Defibrillation or cardioversion is not contraindicated. V. Patients with mechanical devices in ventricular tachycardia or ventricular fibrillation may still have a perfusing rhythm and be conscious; these patients should not receive CPR.

Precautions:

- A. The two (2) most common cause of VAD pump failures are disconnection of the power and failure of the driveline.
- B. VAD patients will not have a systolic and diastolic blood pressure in the absence of a pulse. The blood pressure can be palpated or auscultated with a 70-90 mmHg as an acceptable range. Automatic blood pressure cuffs are not reliable when used on a VAD patient.
- C. Chest compressions and blunt thoracoabdominal trauma can disrupt the anastomoses between the left ventricle, VAD and the ascending aorta.
- D. Loss of cardiac output from a VAD failure, indicated by a “red heart” alarm, may present cause the following symptoms:
 - a. Dyspnea
 - b. Nausea
 - c. Hypotension
 - d. Syncope
 - e. Loss of Consciousness
 - f. Pulmonary Edema.
- E. The patient or caregiver will interpret any VAD controller unit alarms.
- F. Do not separate the patient from the caregiver. The caregiver is trained in managing the VAD equipment.
- G. VAD patients may also have an Implanted Cardioverter-Defibrillator (ICD) or pacing ICD.
- H. Blood pressure and pulse oximetry may not be measurable.
- I. Cardiac monitoring heart rate will differ from the pulse rate since the VAD is not synchronized with the native heart. The pulse rate reflects the rate supporting perfusion.
- J. VAD Program Coordinator will likely be in contact with the patient/caregiver by phone and can be used as a resource in determining if the presenting chief complaint is a pump-related problem or a patient related problem.

~~BLS TREATMENT~~

~~Supplemental O₂~~ as necessary to maintain SpO₂ ≥ 94%. Adjust flow and delivery mode as needed. ~~Airway adjuncts as needed.~~

If the patient is unresponsive, check the power supply and the connections

~~Chest Compressions ONLY~~ if unresponsive, apneic, mean arterial pressure of < 50 mmHG, and VAD is presenting with a Red Heart Alarm.

~~Collect all VAD~~ equipment (power unit, spare batteries, and black emergency bag).

~~Transport~~ patients experiencing VAD related problems to the appropriate receiving facility providing VAD services. Patients who meet critical trauma criteria or have severe burns shall be taken to UC Davis.

~~ALS TREATMENT~~

~~Advanced airway~~ adjuncts as needed.

~~If auscultated blood pressure~~ (see precautions A) is less than 60 mmHG, pulmonary edema is not present and patient exhibits symptoms such as dyspnea, hypotension, syncope, and loss of consciousness then: Establish Intravenous access with Normal Saline, titrate to a systolic blood pressure of 70 mmHg not exceeding 1500 ml of fluid.

If patient remains unconscious with mean arterial pressure of < 50 mmHG, after IV fluid, begin CPR

Patients with total artificial hearts (BiVADs) do not respond to CPR and should not receive medication of CPR

~~Cardiac Monitoring.~~

~~Defibrillation or cardioversion~~ is not contraindicated.

Patients with mechanical devices in ventricular tachycardia or ventricular fibrillation may still have a perfusing rhythm and be conscious; these patients should not receive CPR.

~~Precautions:~~

- ~~K. The two (2) most common cause of VAD pump failures are disconnection of the power and failure of the driveline.~~

- ~~L. VAD patients will not have a systolic and diastolic blood pressure in the absence of a pulse. The blood pressure can be palpated or auscultated with a 70-90 mmHg as an acceptable range. Automatic blood pressure cuffs are not reliable when used on a VAD patient.~~
- ~~M. Chest compressions and blunt thoracoabdominal trauma can disrupt the anastomoses between the left ventricle, VAD and the ascending aorta.~~
- ~~N. Loss of cardiac output from VAD failure and a “red heart” alarm may present patient symptoms such as dyspnea, nausea, hypotension, syncope, loss of consciousness or pulmonary edema.~~
- ~~O. The patient or caregiver will interpret any VAD controller unit alarms.~~
- ~~P. Do not separate the patient from the caregiver. The caregiver is trained in managing the VAD equipment.~~
- ~~Q. VAD patients may also have an Implanted Cardioverter-Defibrillator (ICD) or pacing ICD.~~
- ~~R. Blood pressure and pulse oximetry may not be measurable.~~
- ~~S. Cardiac monitoring heart rate will differ from the pulse rate since the VAD is not synchronized with the native heart. The pulse rate reflects the rate supporting perfusion.~~
- ~~T. VAD Program Coordinator will likely be in contact with the patient/caregiver by phone and can be used as a resource in determining if the presenting chief complaint is a pump-related problem or a patient related problem.~~