

SAN FRANCISCO EMERGENCY MEDICAL SERVICES AGENCY

Effective: 01/07/13

Protocol: P-009

Supersedes: 9/1/11

CARDIAC ARREST: OVERVIEW (MEDICAL ETIOLOGY, NON-TRAUMA RELATED) INCLUDES LVAD CONSIDERATIONS

SUBJECTIVE FINDINGS

- **History of Arrest:**
 - Witnessed collapse: time down and preceding symptoms.
 - Unwitnessed collapse: time down and preceding symptoms if known.
 - Bystander CPR and treatments, including first responder defibrillation, given prior to arrival.
- **Past Medical History:** Diagnosis, medications.
- **Scene:** Evidence of drug ingestion, hypothermia, trauma, DNR form or medallion, nursing home or hospice patient.
- **Presence of a Left Ventricular Assist Device (LVAD)** (protocol modifications for this circumstance are marked with a *).

OBJECTIVE FINDINGS

- Unconscious, with agonal or absent ventilation.
- Absence of pulse.*
- Signs of trauma or blood loss. See TRAUMATIC CARDIAC ARREST Protocol (P-031).
- Rigor, fixed dependent lividity (see Guidelines for Determining Death in the Field Policy).
- Air and skin temperature.

BLS Treatment	ALS Treatment
<ul style="list-style-type: none">• Initiate CPR with 200 immediate, uninterrupted chest compressions at a rate of 100 compressions/minute.*• Attach AED deliver shock at a dosage indicated by the device manufacturer if indicated.• Perform 200 additional chest compressions before the first pulse check or rhythm reanalysis by the AED. *• If hypothermic, remove wet clothing. Begin basic re-warming see HYPOTHERMIA Protocol (P-018).• If drug overdose is suspected see POISONING and OVERDOSE Protocol (P-020).• Standard cardiac arrest management: CPR*• Continue chest compression/ventilation cycle at 200 compression increments. *• Provide grief support and referrals for family, friends and bystanders as needed.	<ul style="list-style-type: none">• Defibrillate as necessary.• Follow each defibrillation with 2 minutes of CPR prior to rhythm and pulse checks.*• Delay advanced airway management until three cycles of 200 chest compressions are completed.• Advanced Airway Management if indicated. Supraglottic airway insertion preferred method for cardiac arrest patients.• Confirm tube placement, ventilate with 100% oxygen.• IV of NS.• Give Epinephrine (1 mg IV or IO) as soon as possible or with each 200 compression cycle.• See Specific Cardiac Arrest protocols for further pharmacological and other interventions.

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PRECAUTIONS AND COMMENTS

- Prioritize effective compressions in CPR with minimal interruption for ALS interventions. Defibrillation is only utilized before CPR on patients who have an arrest witnessed by EMS personnel.
- **Current American Heart Association Guidelines concerning Emergency Cardiac Care assessments and interventions shall always take precedence over local protocols when there is a conflict concerning techniques of resuscitation.**
- If an Automatic External Defibrillator is in place when ALS personnel arrive at the scene, quickly determine if it can be utilized as a manual defibrillator; if so keep it attached to the patient and utilize the device. If it cannot be utilized manually and has no EKG readout capability for ALS providers to use “real time” during the resuscitation, detach the device and utilize a manual monitor/defibrillator (See AED Policy for further details).
- Remove any NTG patches to avoid further vasodilatation during cardiac arrest and to prevent potential hazard if defibrillation becomes necessary.
- Follow Policy on Guidelines for Determining Death in the Field. This now includes the potential for family directed cessation of resuscitative efforts.

FIELD TREATMENT CONSIDERATIONS OF PATIENTS WITH AN LVAD

1. Provide pre-hospital care to the patient in a manner consistent with ALS and BLS treatment protocols for the patient’s condition with the following exceptions:
 - Do NOT perform chest compressions, as it will dislodge the LVAD and cause internal bleeding.
 - **Arrhythmias:** Do not disconnect power source, defibrillate per ACLS protocol.
 - DO follow the directions of the patient’s caregiver when moving and transporting the patient.
2. The **HeartMate (HM) II LVAD** replaces the pumping action of the left ventricle via a continuous blood flow mechanism, where there is no filling or emptying phase.
 - As a result, patients commonly have NO PALPABLE PULSE, NO OBTAINABLE PULSE OXIMETRY OR BLOOD PRESSURE, and only a “mean” arterial pressure detectable using a Doppler.
 - An LVAD patient’s ECG heart rate will differ from the pulse rate since the LVAD is not synchronized with the native heart rate.
3. Assess the patient’s airway and intervene per protocol. If you are unable to obtain pulse oximetry readings, you should assume the patient is hypoxic and place the patient on supplemental oxygen.
4. If the patient has an altered level of consciousness, immediately check for end-tidal CO₂ using capnography.

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5. Auscultate heart sounds to determine if the device is functioning. You should expect to hear a continuous “whirling” sound for most devices.
6. Assess the device for any alarms / malfunctions. Check with patient or caregivers for device reference materials or contact the VAD Center.
7. Start at least 1 large bore IV, and give a 1L fluid bolus (crystalloid) if you obtain a low blood pressure (systolic < 100) or are unable to obtain a blood pressure or the patient has an altered level on consciousness.
8. Contact the Base Hospital with questions or if directed by patient’s caregiver or VAD Center personnel to do something outside of your protocol.
9. Always transport the patient to the closest VAD Center (UCSF and CPMC are the two centers in San Francisco). You are authorized to BYPASS the closest facility in order to get the patient to a VAD Center, no matter the patient’s condition.
 - Call the VAD Center (open 24/7) per patient or patient’s caretaker’s contact to get advice on caring for the patient.
 - You are authorized to take orders from professionals at the VAD Center, as long as they are within your scope of practice.
 - Bring ALL of the patient’s equipment. Bring the patient’s caregiver to act as the information resource on the device. You are authorized to use the caregiver as an information resource on the device.
10. Upon arrival to Emergency Department, immediately plug in the device into an electrical socket.
11. In the event there are no signs of life, and end-tidal capnography is not consistent with life (< 10), you should immediately call the Base Hospital for in-field termination of care.
12. Attempt to locate a POLST form. Many patients have made end-of-life care decisions.