



CARDIAC ARREST

Effective: January 1, 2025
Replaces: January 1, 2024

1. Patient Care Goals

- 1.1. Return of spontaneous circulation (ROSC)
- 1.2. Preservation of neurologic function
- 1.3. High-quality chest compressions/CPR with minimal interruption from recognition of cardiac arrest until confirmation of ROSC or field termination of resuscitative efforts
- 1.4. Recognition and treatment of reversible causes of cardiac arrest
- 1.5. For medical (non-traumatic) causes of cardiac arrest without obvious signs of death, 20 minutes of resuscitation efforts on-scene prior to making transport decision
- 1.6. Treatment consistent with patient's wishes as documented in Advanced Health Care Directives, POLST or DNR orders

2. BLS Treatment

- 2.1. If patient shows signs of obvious death (**Policy 600**), do not resuscitate
- 2.2. Confirm status of DNR / POLST / End of Life Option Act, if possible
 - 2.2.1. Do not delay care and/or CPR while confirmation is being made (**Policy 604**)
- 2.3. Address any areas of significant blood loss with hemorrhage control measures, regardless of any active bleeding or hemorrhage (**700-M17**)
 - 2.3.1. Apply tourniquet(s) proximal to any large wound, laceration, or amputation of the extremities, regardless of any active bleeding or hemorrhage
- 2.4. **Apply Spinal Motion Restriction (SMR) if indicated (700-M11)**
- 2.5. If traumatic cardiac arrest is suspected **initiate transport** to appropriate trauma center, all remaining care to be completed en route to trauma center (**Policy 602**).
- 2.6. High quality uninterrupted CPR (**700-S01**)
 - 2.6.1. Mechanical CPR devices are always prohibited in traumatic arrests and in non-traumatic arrest unless the patient will be transported during CPR (**700-M13**)
- 2.7. Routine Medical Care – Adult (**700-S04**)
- 2.8. **Supraglottic airway device** (LMA Supreme)
 - 2.8.1. If Supraglottic airway attempts fail:
 - 2.8.1.1. **Oropharyngeal airway (OPA)**
- 2.9. **BVM** – Ventilate once every six seconds (1:6), with supplemental oxygen
- 2.10. **Apply AED** and follow device instructions

3. ALS Treatment

- 3.1. Place patient on cardiac monitor and treat accordingly
 - 3.1.1. If the traumatic arrest patient is asystolic on initial contact, do not resuscitate
- 3.2. If traumatic cardiac arrest is suspected **initiate transport to appropriate receiving trauma center**, all remaining care to be completed en route to trauma center (**Policy 602**).
- 3.3. **Endotracheal Tube (ETT) with Bougie**, at least one attempt (**700-M01**)
 - 3.3.1. If ETT attempt(s) fail:
 - 3.3.1.1. **Supraglottic airway device** (LMA Supreme)
 - 3.3.2. If both ETT and Supraglottic airway attempts fail:



3.3.2.1. **Oropharyngeal airway (OPA)**

- 3.4. **Apply ETCO₂** continuous numeric and waveform monitoring as soon as possible, ETCO₂ values less than 10mmHg ensure CPR rate, depth and chest recoil is adequate
- 3.5. **Vascular Access (IV) or Vascular Access (IO)**, per procedure **(700-M13)**

4. Ventricular Fibrillation and Pulseless Ventricular Tachycardia

- 4.1. **Defibrillation at manufacturer's suggested values (example: 100, 150, 200 joules)**
- 4.1.1. Starting with lowest energy setting
- 4.1.2. Each subsequent counter shock increasing in energy
- 4.2. **Epinephrine (1:10,000) 1mg IV / IO**, repeat every 3-5 minutes for the duration of the arrest (Epinephrine is not indicated in traumatic cardiac arrest with hypovolemia from exsanguinating hemorrhage)
- 4.3. **Amiodarone 300mg IV / IO**
- 4.3.1. If after 5 minutes rhythm remains refractory, **Amiodarone 150mg IV / IO**, for a max cumulative dose of 450mg

5. Asystole (Non-Traumatic)

- 5.1. **Epinephrine (1:10,000) 1mg IV / IO**, repeat every 3-5 minutes for duration of arrest
- 5.2. Provider may consider termination of resuscitative efforts after a total of at least twenty (20) minutes of EMS provider resuscitation if:
- 5.2.1. Arrest was not witnessed by the EMS provider
- 5.2.2. No return of spontaneous circulation (ROSC) prior to transport

6. Pulseless Electrical Activity (PEA)

- 6.1. Identify and treat any reversible causes:
- 6.1.1. **Hypovolemia:** Reassess any hemorrhage control interventions to ensure they are adequately addressing blood loss and reapply if necessary **(700-M17)**. Consider a rapid **500ml Fluid bolus**, repeat once if needed **(700-A10)**
- 6.1.2. **Hypoxia:** Ensure that the patient is adequately ventilated, utilizing an airway adjunct and bag valve mask with a supplemental oxygen supply
- 6.1.2.1. Ensure proper chest rise and fall
- 6.1.2.2. Reassess any sucking chest wounds or flail segment interventions
- 6.1.2.3. If there is question of endotracheal tube placement (esophageal intubation), provider should extubate the patient and return to a BLS airway
- 6.1.3. **Hyperkalemia:** Peaked T-waves, with possible widening of the QRS complex
- 6.1.3.1. Consider **Calcium Chloride 10mg/kg IV / IO**, max dose 1gm
- 6.1.3.2. Flush the IV tubing well between injections
- 6.1.3.3. Consider **Sodium Bicarbonate 1mEq/kg IV/ IO**, max dose 50mEq
- 6.1.4. **Tension Pneumothorax:** If tension pneumothorax is suspected or the patient has a traumatic injury to the chest, perform bilateral pleural decompression if not already completed. **(700-M02)**
- 6.2. **Epinephrine (1:10,000) 1mg IV / IO**, may repeat every 3-5 minutes for the duration of the arrest (Epinephrine is not indicated in traumatic cardiac arrest with hypovolemia from exsanguinating hemorrhage)
- 6.3. Treat any rhythm changes according to correct treatment protocol.
- 6.3.1. If the PEA changes to asystole, the provider may follow the criteria in section 4.2.



7. Hypothermic Cardiac Arrest

- 7.1. Assess pulse for 45 seconds
- 7.2. If no pulse is present, **Start CPR**
- 7.3. If defibrillation is indicated, limit to one (1) shock until patient is warm
- 7.4. If patient presents with dysrhythmias, treat as appropriate but withhold IV medications until patient's temperature rises above 86°F
- 7.5. Consider rewarming measures (**700-A09**)
 - 7.5.1. Patients that are hypothermic can be unresponsive to pharmaceutical therapy and electrical therapy and should be transported with CPR and warming measures

8. Ventricular Assist Device (VAD) Cardiac Arrest

- 8.1. High quality uninterrupted CPR (**700-S01**) may be provided if:
 - 8.1.1. Patient is unresponsive, apneic and there is a device failure alarm with no rotor hum upon auscultation
 - 8.1.2. **Mechanical CPR devices are contraindicated**
- 8.2. If there is presence of rotor hum with no failure alarm, continue with airway management, do not perform chest compressions (**700-M01**)
- 8.3. Defibrillation(s) by manual defibrillator or AED may only be delivered if the patient is unresponsive
- 8.4. Any VAD patient in cardiac arrest, that does not meet obvious death criteria (**Policy 600**) shall be transported to either Kaiser Santa Clara or Stanford Hospital
- 8.5. Treat the cardiac arrest VAD patient with the guidelines found in the Ventricular Assist Device protocol (**700-S11**)
- 8.6. If further guidance is required during patient care, make **BASE CONTACT**

9. Pregnant Cardiac Arrest

Any pregnant patient beyond 20 weeks gestation (uterine fundus palpated at or above the umbilicus) in cardiac arrest, that does not meet obvious death criteria (**Policy 600**) shall be transported to either Stanford Hospital or Santa Clara Valley Medical Center (for potential resuscitative hysterotomy)

10. Drowning or Mechanical Asphyxiation

- 10.1. Any drowning or mechanical asphyxiation patient, in cardiac arrest, with suspected head or spinal injury shall be transported to a Trauma Center (**Policy 602**)
 - 10.1.1. Hanging - suspended (feet not touching the ground) at time of discovery
 - 10.1.2. Drowning secondary to diving or unwitnessed drowning
- 10.2. If head or spinal injury is not suspected, transport to the closest hospital (**Policy 602**)

11. Traumatic Cardiac Arrest

- 11.1. **Initiate Immediate Transport to appropriate receiving trauma center**, all care to be completed en route to trauma center (**Policy 602**).
- 11.2. Epinephrine is not indicated in traumatic cardiac arrest with hypovolemia from exsanguination; otherwise epinephrine can be used in traumatic cardiac arrest
- 11.3. Consider pelvic binding (if available) for suspected pelvic fracture (**700-A17**)
- 11.4. Consider Tranexamic Acid (TXA) when suspected hemorrhagic shock after return of Spontaneous Circulation (ROSC) occurs (**700-M17**)

12. Return of Spontaneous Circulation (ROSC)

- 12.1. If any Return of Spontaneous Circulation (ROSC) occurs,



- 12.1.1. If systolic blood pressure is less than ninety (90) mmHg,
 - 12.1.1.1. **500ml Fluid bolus**
 - 12.1.1.2. **Dopamine 10–20 mcg/kg/min IV**, titrate to SBP greater than 90 mmHg
- 12.1.2. Continue ventilations at a rate and volume to keep ETCO₂ between 30–40 mmHg
- 12.1.3. Obtain a quality **12 Lead ECG (700-M09)**
- 12.1.4. If wide complex tachycardia, perform **synchronized cardioversion (700-A14)**
- 12.1.5. Transport to closest STEMI receiving center, unless a traumatic cardiac arrest

13. Pertinent Assessment Findings

- 13.1. Obvious signs of death (**Policy 600**)
- 13.2. Evidence of STEMI after ROSC
- 13.3. Reversible causes of cardiac arrest
 - 13.3.1. Hypoxia
 - 13.3.2. Hypovolemia
 - 13.3.3. Hypothermia
 - 13.3.4. Hypo-/hyperkalemia
 - 13.3.5. Tension Pneumothorax
 - 13.3.6. Toxins (e.g. tricyclic antidepressants, beta blockers, opioids)
- 13.4. ETCO₂ lower than 10mmHg despite high quality CPR

14. Key Documentation Elements

- 14.1. Resuscitation attempted and all interventions performed
- 14.2. Arrest witnessed
- 14.3. Location of arrest
- 14.4. First monitored ECG rhythm
- 14.5. CPR prior to EMS arrival
- 14.6. Outcome upon arrival at hospital
- 14.7. Any ROSC
- 14.8. Presumed cardiac arrest etiology



15. Treatment Flow Charts





