

ADULT CARDIAC EMERGENCIES

Revised: October 2016

Reviewed 2023

CARDIOPULMONARY ARREST

NOTE: High quality CPR includes:

1. Chest Compressions at a depth of at least 2 inches
2. Rate of compressions between 100-120 per minute
3. Allowing for complete chest recoil
4. Minimizing interruptions between cycles to less than 10 seconds (Compression fraction >60%)
5. Switching providers frequently ~ about every 2 minutes

FR TREATMENT:

1. Check airway, breathing and circulation.
 2. If pulseless, begin high quality CPR and apply AED.
 - a. If the AED indicates “SHOCK ADVISED”, call out “CLEAR!” check for the safety of others, and push the SHOCK button
 - b. Immediately resume CPR after defibrillation.
 3. Ventilate with 100% oxygen.
 4. Manage airway with appropriate adjunct.
 5. Follow current AHA BLS guidelines.
 6. Relay information to incoming ambulance.
 7. If return of pulses, refer to RETURN OF SPONTANEOUS CIRCULATION Protocol.
-

BLS TREATMENT:

1. Continue **FR TREATMENT**.
 2. Consider the need for Blind Insertion Airway Device. (Combitube, King) per UNIVERSAL AIRWAY ALGORITHM.
 3. Initiate transport** Call for intercept per INTERCEPT CRITERIA.
 4. Contact Medical Control.
-

ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT**.
2. Ensure HIGH QUALITY CPR at All times.
3. Refer to appropriate dysrhythmia protocol keeping the following in mind:
 - a. Rhythm checks, defibrillation and medications are completed at the beginning of each 2-minute cycle.
 - b. Compression fraction should be >60% and ETCO₂ >10mmHg.
 - c. Consider placement of advanced airway per UNIVERSAL AIRWAY ALGORITHM.
4. If return of pulses, refer to RETURN OF SPONTANEOUS CIRCULATION Protocol.
5. Initiate Transport** Call for intercept per INTERCEPT CRITERIA.
6. Contact Medical Control

**** Only if transporting agency.**

CHEST PAIN (Acute Coronary Syndrome)

CRITERIA:

1. Chest pain consistent with cardiac ischemia; may include:
 - a. Respiratory difficulty
 - b. Nausea and vomiting
 - c. Diaphoresis
 - d. Dizziness
 - e. Epigastric, neck, jaw, or arm pain.
2. SBP > 90.

FR TREATMENT:

1. **INITIAL MEDICAL CARE.**
 2. Relay information to incoming ambulance.
-

BLS TREATMENT:

1. Continue **FR TREATMENT.**
 2. Administer ASPIRIN 325 mg PO or 81 mg x 4 PO.
 3. For apparent cardiac related chest pain with SBP>90, administer NITROGLYCERIN 0.4 mg SL.
 4. Repeat NITROGLYCERIN every 3-5 minutes to maximum of 3 doses as long as chest pain persists and SBP > 90.
-

ILS TREATMENT:

1. Continue **BLS TREATMENT.**
2. IV NS at KVO or saline lock.
3. Obtain 12 Lead EKG, if available. If dysrhythmia or ectopy present, proceed to appropriate protocol.
4. Contact Medical Control.

ASYSTOLE / PEA

ILS TREATMENT:

1. Initiate HIGH QUALITY CPR and follow CARDIOPULMONARY ARREST Protocol.
 2. NS WO IV/IO.
 3. EPINEPHRINE 1:10,000 1 mg IV/IO* every 3-5 minutes as long as asystole or PEA persists.
 4. Consider possible causes and treatments:
 - a. Hypovolemia (Volume infusion)
 - b. Hypoxia (Ventilation and oxygenation)
 - c. Massive Myocardial Infarction (Volume infusion)
 - d. Tension Pneumothorax (Needle decompression)
 - e. Acidosis/Hyperkalemia (Ventilation)
 - f. Drug Overdose (Refer to appropriate protocol)
 - g. Hypothermia (Refer to appropriate protocol)
 - h. Pericardial Tamponade (Rapid transport)
 - i. Massive Pulmonary Embolism (Ventilation, Volume infusion)
 6. Initiate transport** Call for intercept per INTERCEPT CRITERIA.
 7. Contact Medical Control.
-

** If administering medications by the endotracheal tube administer 2 - 2.5 times the IV dose.*

**** Only if transporting agency.**

ATRIAL FIBRILLATION **ATRIAL FLUTTER**

STABLE

CRITERIA:

1. Heart Rate > 150
2. QRS Complex < 0.12 seconds
3. SBP > 100

EXCLUSION:

1. Sinus Tachycardia
2. SBP < 90
3. Altered LOC
4. Chest pain
5. Respiratory difficulty
6. Pulmonary Edema / Acute CHF Exacerbation

ILS TREATMENT:

1. **INITIAL MEDICAL CARE.**
 2. IV NS at KVO, or saline lock, AC if possible.
 3. Obtain 12 Lead EKG, if available.
-

UNSTABLE

CRITERIA:

1. Heart rate > 150
2. QRS Complex < 0.12 seconds
3. Serious signs or symptoms, including:
 - a. SBP < 90
 - b. Chest pain
 - c. Respiratory difficulty
 - d. Altered LOC
 - e. Pulmonary edema

ILS TREATMENT:

1. **INITIAL MEDICAL CARE.**
 2. IV NS at KVO, or saline lock, AC if possible.
 3. **SYNCHRONIZED CARDIOVERSION**, if available.
 - a. Synchronized cardioversion at 100J-200J-300J-360J or equivalent biphasic setting.
-

BRADYCARDIA

NOTE: If patient presents with Second Degree-Mobitz II or Third Degree Heart Block, apply external pacing pads immediately to anticipate onset of symptoms.

CRITERIA:

1. Heart rate < 60 with serious signs or symptoms, including:
 - a. SBP < 90
 - b. Chest pain
 - c. Respiratory difficulty
 - d. Altered LOC
 - e. Pulmonary edema
 - f. Signs or symptoms of shock

ILS TREATMENT:

1. **INITIAL MEDICAL CARE.**
 2. IV NS at KVO; if lungs clear and SBP < 90, consider 500 ml fluid bolus.
-

CARDIOGENIC SHOCK

CRITERIA:

1. Signs of cardiac insufficiency, including:
 - a. Chest pain
 - b. Respiratory difficulty
 - c. Pulmonary edema
 - d. SBP < 90

ILS TREATMENT:

1. **INITIAL MEDICAL CARE.**
 2. If dysrhythmia present, proceed to appropriate protocol.
 3. IV NS at KVO, or saline lock if pulmonary edema is present.
 4. If lung sounds are clear, consider fluid bolus 500 ml NS. Titrate to maintain SBP between 90-100 or MAP > 65.
 5. Call for intercept per INTERCEPT CRITERIA.
-

CHF/PULMONARY EDEMA

CRITERIA:

1. Respiratory difficulty
2. Rales
3. SBP > 90 or MAP > 65
4. HR >60 or <150.

EXCLUSIONS:

1. SBP <90 or MAP < 65 (refer to CARDIOGENIC SHOCK protocol)

ILS TREATMENT:

1. **INITIAL MEDICAL CARE.**
 2. Obtain 12 Lead EKG, if available.
 3. If SBP > 90 or MAP > 65:
 - a. Administer NITROGLYCERIN 0.4 mg SL x1
 - b. Apply CPAP, if available
 - c. Consider additional NITROGLYCERIN 0.4 mg SL every 5 minutes x 2 doses
 - If CPAP is already applied, do not remove CPAP to administer NITRO
 4. IV NS at KVO, or saline lock.
 5. If wheezing is present and if ETCO2 waveform supports concurrent bronchospasm (if available) refer to BRONCHOSPASM/ASTHMA/COPD Protocol.
-

POST CARDIAC ARREST COOLING

NOTE: Mild to moderate hypothermia (32-36 degrees C) has been shown to improve overall survival from cardiac arrest and to improve neurologic outcomes in several studies following certain types of cardiac arrest.

NOTE: Do not initiate this protocol unless the receiving facility will continue induced hypothermia.

CRITERIA:

1. Age >18
2. Resuscitation started within 15 minutes of collapse
3. Return of spontaneous circulation with persistent coma (GCS \leq 8)

EXCLUSIONS:

1. Coma secondary to medications (i.e. overdose), witnessed seizure, trauma
2. Pregnancy

FR/BLS TREATMENT:

1. Apply ice packs to bilateral neck, groin and axillae. Change ice packs every 15 minutes or more frequently as necessary.
 2. Do not allow patient to shiver.
 3. Do not hyperventilate.
 4. Initiate transport** Call for intercept per INTERCEPT CRITERIA.
 5. Contact Medical Control.
-

ILS TREATMENT:

1. Continue **FR/BLS TREATMENT**.
 2. Do not allow patient to shiver.
 3. Monitor ETCO₂, if available; target 35-40 mmHg.
-

**** Only if transporting agency.**

RETURN OF SPONTANEOUS CIRCULATION (ROSC)

**NOTE: A sharp increase in ETCO₂ Capnography may indicate ROSC.
A sharp decrease in ETCO₂ Capnography may indicate ARREST.**

CRITERIA:

1. Return of palpable pulses after Resuscitation.

FR/BLS TREATMENT:

1. Reassess Airway, Breathing and Circulation.
 - b. If ventilation assistance is required, ventilate at 10-12 breaths per minute.
 - c. Do not hyperventilate.
 - d. Titrate to maintain oxygen saturations $\geq 94\%$.
 2. Provide **INITIAL MEDICAL CARE**.
 3. Consider **POST CARDIAC ARREST COOLING**.
 4. Initiate transport** Call for intercept per INTERCEPT CRITERIA.
 5. Reassess patient. If patient becomes pulseless, begin CPR and follow **CARDIOPULMONARY ARREST** Protocol.
-

ILS TREATMENT:

1. Continue **FR/BLS TREATMENT**.
 2. Obtain 12 Lead EKG, if available.
 3. Treat hypotension (SBP < 90 or MAP < 65) according to SHOCK Protocol with NS IV fluids.
 4. Monitor ETCO₂, if available; Target 35-40mmHg.
 5. Consider placement of advanced airway per UNIVERSAL AIRWAY ALGORITHM.
 6. Initiate transport**
-

**** Only if transporting agency.**

TACHYARRHYTHMIA – STABLE

CRITERIA:

1. Heart rate > 150
2. SBP > 90 or MAP > 65
3. Regular ventricular heart rate.
4. Monomorphic

EXCLUSION:

1. If irregular ventricular heart rate; see **ATRIAL FIB/FLUTTER PROTOCOL**.

ILS TREATMENT:

1. **INITIAL MEDICAL CARE**
2. Obtain 12 Lead EKG, if available.
3. NS at KVO
4. Perform modified Valsalva maneuvers**.
5. If no change in rhythm, contact Medical Control.

****Modified Valsalva Maneuver**

1. Have patient blow through a 10 cc syringe in a semi recumbent position for 15 seconds
2. Lay patient flat and lift their legs to 45 degrees for 15 seconds
3. Return patient to the semi recumbent position for 45 seconds before reassessing cardiac rhythm

TACHYARRHYTHMIA – UNSTABLE

CRITERIA:

1. Heart rate > 150
2. Serious signs or symptoms, including:
 - a. SBP < 90 or MAP < 65
 - b. Chest pain
 - c. Respiratory difficulty
 - d. Acutely altered LOC
 - e. Pulmonary edema
 - f. Signs or symptoms of shock

ILS TREATMENT:

1. **INITIAL MEDICAL CARE.**
 2. Immediate SYNCHRONIZED CARDIOVERSION at 100J or equivalent biphasic setting, if available.
 3. IV NS at KVO.
 4. If no response to initial energy dose, repeat SYNCHRONIZED CARDIOVERSION at 200J-300J-360J or equivalent biphasic setting as needed, if available.
 5. If tachycardia persists, contact Medical Control.
 6. If cardioversion is successful, obtain 12-Lead EKG if available.
-

VENTRICULAR ECTOPY

NOTE: Assumes cardiac chest pain protocol is already initiated.

NOTE: Never treat third degree heart block, idioventricular rhythm or ventricular escape beats with Antidysrhythmics.

CRITERIA:

1. Chest pain consistent with cardiac ischemia
2. Heart rate > 60
3. SBP > 90 or MAP > 65
4. No treatable cause (i.e. hypoxia)
5. Premature Ventricular Complexes, including:
 - a. > 6 PVCs per minute
 - b. Couplets
 - c. Salvos or runs of V-tach
 - d. R on T phenomenon
 - e. Multifocal PVC's

ILS TREATMENT:

1. **INITIAL MEDICAL CARE.**
 2. Obtain 12-Lead EKG, if available.
-

V-FIB/PULSELESS V-TACH

ILS TREATMENT:

1. Continue high quality CPR per CARDIOPULMONARY ARREST Protocol
2. Continue defibrillation at 360J or equivalent biphasic shock or as directed by AED every 2 minutes.
3. EPINEPHRINE (1:10,000) 1.0 mg IV/IO q 3-5 minutes as long as patient remains pulseless.
4. If Return of Spontaneous Circulation is achieved refer to ROSC Protocol.
5. Initiate transport** Call for intercept per INTERCEPT CRITERIA.
6. Contact Medical Control.

**** Only if transporting agency.**

VAD (Ventricular Assist Device)

VAD atlas: http://www.mylvad.com/assets/ems_docs/2013-field-guide.pdf

SPECIFIC SITUATIONS:

1. If VAD is alarming, follow manufacturer's instructions or look at VAD atlas. Attempt to contact VAD Specialist via manufacturer's phone number (on machine or wallet card).
2. "Low flow alarm" states are usually improved by NORMAL SALINE IV 250ml bolus, up to 500ml. Monitor for signs of CHF.
3. If there is a potentially lethal dysrhythmia, follow appropriate ILS/ALS protocol. Do not detach or power off VAD. All VADs can be left on for defibrillation, cardioversion, and external pacing.
 - a. For HeartMate XVE, keep current < 40 mA.
 - b. For Thoratec PVAD w/ TLC II the need to pace is very rare since it is a BiVAD.
4. **CPR should NOT be performed on patients with Thoratec PVAD w/ TLC II.**
5. If indicated, CPR may be performed on patients with: HeartWare HVAD, VentrAssist LVAD, HeartMate II, or Jarvik 2000 FlowMaker.
6. If a VAD that features a hand pump (HeartMate XVE, or Thoratec PVAD w/ TLC II) loses power or the motor fails and there is no flow on meter and no normal machine sound over the precordium, hand pumping is indicated. The hand pumping rate should be 60 to 90/minute. Foot pumping is acceptable.