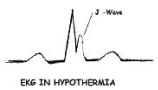
CARDIAC ARREST: ADULT (BLS & ALS)

SIGNS & SYMPTOMS:
1. Absent pulse (carotid and one other location)
2. Absent or agonal breathing
3. Skin: pale, cool, cyanotic, mottled
4. Neuro: unconscious, seizure activity (initially)
5. J (Osborn) ECG wave in hypothermia



EKG IN HYPOTHERMIA

OBTAIN HISTORY OF:
1. Witnessed or unwitnessed collapse
2. PMH/Meds/Allergies
3. DNR status
4. Bystander CPR
5. Down time
6. Potential causes: MI, CVA, OD, electrocution, diabetes, airway obstruction, trauma

CONTRAINDICATIONS:
1. The automatic transport ventilator (Autovent 2000) is contraindicated in patients < 90 lb.
2. Combitubes are contraindicated in patients < 5 feet.

PRECAUTIONS:
1. Pulse oximetry and end-tidal CO_2 monitoring in low perfusion states may be unreliable.
2. Remove medication patches prior to defibrillation.

NONTRAUMATIC BLS CARDIAC ARREST CARE:
1. Suction as necessary to clear the airway.
2. Ventilate initially with 100% 0_2 using oral airway, bag-valve system or demand valve. Ventilate with 2 ventilation for every thirty compressions in an unprotected airway and a one breath every 5-6 sec. with continuous CPR with a Combitube or ET tube in place. Consider ResQPOD when appropriate and available. Switch to ATV when time permits.
3. Check for pulse.
4. If no pulse, perform CPR (compression rate 100/min) until AED is available or perfusion is restored. Ensure full recoil of the chest wall.
5. Apply defibrillation patches per manufacturer recommendation:
   A. One patch and cable to upper right chest, below collarbone.
   B. One patch and cable to midaxillary area below left breast.
6. Turn on AED and follow voice and text prompts.
7. Stop CPR. Assure that patient is motionless and all personnel are clear. Analyze.
8. If a shockable rhythm is detected, the AED will begin charging. Assure that all personnel are still clear. Deliver shock.
9. Consider ALS response.
10. If no pulse, perform 5 cycles of CPR (approximately 2 minutes). Ventilate and insert Combitube (if ≥ 5 feet) during this time if ready.
11. After two minutes, check pulse, analyze, and repeat a shock if indicated. Continue with 5 cycles of CPR (approximately 2 minutes).
12. After two more minutes, non-transport services should check pulse, analyze, and repeat a shock, if indicated, while waiting for ALS to arrive. Transport services should prepare patient for transport and deliver last shock, if indicated, just prior to leaving the scene.
13. If there is no shock indicated after ANY analysis, it means the AED is detecting a non-shockable rhythm and a pulse should be checked.
    A. If no pulse is present, continue CPR for 5 cycles (approximately 2 minutes) before reanalyzing. If a shock is not indicated after 2 analyses, then prepare patient for transport and reanalyze every three to five minutes (ambulance must be stopped to analyze). If patient is not in a shockable rhythm, repeated analysis only delays needed CPR.
    B. If pulse is present, manage and support ABCs as necessary. Prepare for transport.
14. Contact medical control for further orders.
15. Patients who are transported should be secured on a longboard.
16. Transport to closest appropriate medical facility.
17. EMT with IV training- intravenous lines should be started enroute.

NONTRAUMATIC ALS CARDIAC ARREST CARE (In addition to above and as appropriate):
1. Apply ECG monitor

2. Identify rhythm:
   A. **Ventricular fibrillation/pulseless ventricular tachycardia**:
      1. Defibrillate at 360 J, or equivalent biphasic setting.
      2. If no change resume CPR.
      3. Establish advanced airway (ET, if unsuccessful try Combitube). Ventilate with 100% 0_2.
      4. Establish IV of NS. Attempt IO if unable to establish IV.
      5. Administer epinephrine 1:10,000 1.0 mg IV. May repeat every 3-5 minutes before medical control contact.
      6. Defibrillate at 360 J or equivalent biphasic setting between drug administrations.
      7. Administer Amiodarone 300 mg IV/IO, may repeat a second dose in 3-5 minutes of 150 mg. Must contacte Medical Control Physician for further Amiodarone orders.
      8. Defibrillate at 360 J or equivalent biphasic setting between drug administrations.
      9. If **Torsades Des Pointes or suspected hypomagnesemia** - Consider magnesium sulfate 2 gm (4 cc of 50% solution) diluted in 10 cc NS slow IV push over 1-2 minutes.
   B. Asystole:
      1. Continue CPR.
      2. Confirm true asystole in one additional lead.
      3. Establish advanced airway (ET, if unsuccessful try Combitube). Ventilate with 100% 0_2.
      4. Establish IV of NS. Attempt IO if unable to establish IV.
      5. Administer 1.0 mg epinephrine 1:10,000 IV. If no change, l.0 mg IV may be repeated every 3 - 5 minutes before medical control contact.
      6. Administer atropine 1.0 mg IV. If no change, 1.0 mg IV may be repeated every 3 - 5 minutes after initial dose until a total dose of 3 mg has been given before medical control contact.
   C. Pulseless electrical activity (PEA):
      1. Continue CPR.
      2. Establish advanced airway (ET, if unsuccessful try Combitube). Ventilate with 100% 0_2.
      3. Establish IV of NS. Attempt IO if unable to establish IV.
      4. Administer epinephrine 1:10,000 1.0 mg IV. If no change, l.0 mg IV may be repeated every 3 - 5 minutes after initial dose before medical control contact.
      5. Consider possible causes and treat as indicated:
         a) Hypovolemia: Establish 2 large bore IVs and run wide open; consider PCT.
         b) Hypoxia: Oxygenate.
         c) Hypothermia: Warm and transport to Level 1 Trauma Center
         d) Cardiac tamponade: Perform pericardiocentesis.
         e) Tension pneumothorax: Perform unilateral or bilateral chest decompression.
         f) Tablets: Contact Medical Control Physician.
         g) Acidosis: Consult with physician for possible sodium bicarbonate.
         h) Hyperkalemia: Consult with physician for possible calcium chloride.
      6. In pulseless bradycardia, administer atropine 1.0 mg IV after epinephrine if indicated. If no change, 1.0 mg IV may be repeated 3 - 5 minutes after initial dose.
3. In known or suspected drug overdose: Consider 2 mg Narcan.
4. If hypoglycemia is suspected, check blood sugar and treat as indicated.
5. If transporting, place patient on longboard. Immobilize head with V-block and C-collar if patient is intubated. Document ETT placement after each move and before entering emergency department.
6. If appropriate, transport to closest appropriate medical facility.
7. All patients who have a return of spontaneous circulation should have a 12-lead ECG done if possible.
8. Further orders come from monitoring physician.

TRAUMATIC BLS CARDIAC ARREST CARE:

1. While manually stabilizing the neck, open the airway using the modified jaw thrust or chin lift technique. Provide manual stabilization during all advanced airway procedures and until the patient is secured on a board.
2. If unable to ventilate due to traumatic airway obstruction, transport immediately and consider ALS response.
3. May use AED as monitor, shock if indicated, but **DO NOT** delay transport!
4. Control major external bleeding.
5. Assess chest for life-threatening injuries, i.e. sucking chest wound or flail chest, and treat as appropriate.
6. Expose as indicated and perform PCT survey.
7. Apply C-collar while log-rolling onto backboard. Check back for injuries. Have PCT in place on board and secure around patient. Inflate legs if no evidence of penetrating trauma.
8. Prepare for immediate transport. Attempt to keep scene times to five minutes.

9. Consider ALS response.
10. Begin transport to Level I Trauma Center.
11. EMT with IV training- establish two large bore IVs enroute and run fluids wide open.

TRAUMATIC ALS CARDIAC ARREST CARE (In addition to above and as appropriate):

1. Ensure an open airway and adequate ventilation using an advanced airway. If unable to use an advanced airway, insert oral/nasal and use bag-valve-mask to ventilate.
2. Perform surgical airway ASAP if unable to ventilate due to traumatic airway obstruction.
3. Perform pericardiocentesis ASAP if cardiac tamponade is suspected.
4. Perform needle chest decompression ASAP if tension pneumothorax is suspected.
5. If V-fib or V-tach, follow algorithm above, remembering that defibrillation is generally not effective until circulating volume has been restored. Do not delay scene times to defibrillate.
6. If asystole or PEA, follow algorithm above. Do not delay scene times to administer medications.
7. Attempt pericardiocentesis and bilateral needle chest decompression prior to considering discontinuation of resuscitation efforts in traumatic arrest.

HYPOTHERMIC BLS CARDIAC ARREST CARE:

1. Take 30 - 45 seconds to confirm pulselessness or profound bradycardia. Perform CPR if no pulse is felt after 30 - 45 seconds.
2. Maintain horizontal position and perform all treatments and transportation as gently as possible to avoid precipitating V-fib.
3. Remove wet garments and protect against further heat loss and wind chill through the use of blankets and heated patient compartment.
4. If the patient fails to respond after three initial shocks, subsequent shocks should be avoided.
5. Severe hypothermia is frequently preceded by other disorders (e.g. drug overdose or trauma). Assess for and treat these underlying conditions while simultaneously managing the hypothermia.
6. Transport to a Level I Trauma Center if profound hypothermia is suspected.

HYPOTHERMIC ALS CARDIAC ARREST CARE (In addition to above and as appropriate):

1. Withhold CPR (compressions and ventilations) in patients without a pulse that have an organized electrical rhythm (PEA) other than V-tach.
2. Administered medications can accumulate to toxic levels if used repeatedly in the severely hypothermic patient. If the patient fails to respond after one shock or first line drug therapy, subsequent defibrillations and additional medication should be avoided.
3. In the hypothermic patient that has not yet developed cardiac arrest, some physical manipulations (advanced airway intubation, pacing, etc.) have been reported to precipitate V-fib. However, when urgently indicated, such procedures should not be withheld.

SPECIAL NOTES:

1. The Cardiac Arrest/Advanced Procedures Data Collection Form must be completed on ALL cardiac arrests regardless of whether the AED shocked the patient. Any patient who is transported to a medical facility with a ET/Combitube in place must have the last section of the form signed by the receiving physician or anesthetist.
2. Following the run, send (all that are applicable) to the Regions Hospital EMS office within 72 hours:
   A. A copy of the run report
   B. Cardiac Arrest/Advanced Procedures Data Collection Form
   C. Printed code summary
3. Replace all used supplies. Check, maintain, and service AED per manufacturer recommendations.
4. If, despite above treatment, the patient still does not have a pulse or is not perfusing, and in conjunction with the monitoring physician, it may be appropriate to terminate the resuscitation effort. Once resuscitative efforts have begun, they may be discontinued only after consulting a physician. Due to the relative ineffectiveness of CPR in a moving ambulance and the risk to providers, ALS resuscitation of a medical cardiac arrest should usually occur in the field in its entirety and the patient only receiving transportation in unique situations or after return of spontaneous circulation (ROSC). If the pulse is lost enroute after ROSC, stop the ambulance and continue treating the arrest. If ROSC is lost again when enroute, continue to work the arrest enroute to the hospital.
5. Time spent at the scene, assessing and managing the patient‘s ABCs is time well spent. Secondary surveys, if performed, however, should be done enroute.
6. Defibrillation must be accomplished as soon as possible. Bring the AED to the patient; do not bring the patient to the AED. Immediate defibrillation takes priority over advanced airway management (Combitube).

7. (BLS) - If patient converts with a return of pulse then rearrests, begin the guideline over again. Nine shocks may be delivered before contacting medical control.
8. The monitoring physician may supersede these orders at any time.
9. (BLS) - Do not attempt rhythm interpretation unless specifically trained. Document and report AED action instead.
10. Patients who are in cardiac arrest due to or associated with carbon monoxide poisoning should be transported to the closest hospital. If the patient has a return of spontaneous circulation, they should be transported to Hennepin County Medical Center for treatment.
11. Follow manufacturer recommendations for daily and monthly equipment checks.
12. It may be necessary to shave or dry the chest to ensure good patch contact.