EMS Adult Protocols

<table>
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<th>Protocol Title:</th>
<th>Cardiopulmonary Arrest</th>
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<td>Original Adoption Date:</td>
<td>08/2000</td>
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<tr>
<td>Date of Most Recent Update:</td>
<td>March, 2019</td>
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Introduction
As part of a quality Cardiopulmonary Resuscitation program, the emphasis should always remain on excellent Basic Life Support with quality compressions and accurate ventilations. The utilization of an Impedance Threshold Device, Active Compression and Decompression CPR, Automatic Compression system and other advanced life support procedures have clearly demonstrated an improvement in patient survival. Though no single procedure is 100% effective alone, a combination of quality, consistent BLS skills coupled with ALS skills has been shown to increase the likelihood of an out of hospital survival.

At a minimum all providers should take great care that:

*Interruptions during CPR should be minimal – when compressions stop, blood flow stops.*

During Ventilations
- The volume delivered is sufficient to produce visible chest rise.
- An Impedance Threshold Device is utilized appropriately with a BVM or the Transport Ventilator.

If the patient is intubated,
- End-Tidal Capnography is used continuously. With values charted after intubation and as the patient is turned over to emergency department staff at a minimum.
- Auscultation of breath sounds is verified and re-verified whenever the patient is moved.
- The automatic transport ventilator is used to assure accurate ventilation rates and volumes when ever possible.

During Compressions
• Compressions are performed during the preparation and application of a defibrillator, and defibrillation is performed as soon as possible.
• Compressions are performed at a rate of 100 - 120 per minute.
• Compression depth is appropriate for the age of the patient
  • Greater than 2 inches for adults
  • At least 1/3 of the AP Diameter of the chest for children, or approximately 2 inches.
  • At least 1/3 of the AP diameter of the chest for Infants, or approximately 1.5 inches.
• The compressor allows the chest to recoil fully after each compression.
• Compressors switch every 2 minutes or more frequently if fatigued
• An automatic compression system is utilized during movement and transport of the patient to assure consistent, quality compressions.

*NOTE: AT ANY TIME DURING THE RESCUSITATION, IF THE PATIENT REGAINS A PULSE REMOVE THE IMPEDANCE THRESHOLD DEVICE IMMEDIATELY.

Basic Treatment Guidelines:
Follow Initial protocol for all patients.

Arrest WITHOUT Bystander CPR:
(Perform high quality compressions and ventilations while a defibrillator is being applied. Perform defibrillation as soon as the device is applied and ready)

1. Assess Responsiveness, Breathing, and Circulation
   (Taking 5 seconds but no more than 10 seconds for each assessment)
   a. If NOT Breathing and NO pulse begin CPR
   b. Cycle 30 compressions with 2 ventilations (15:2 for 2 person CPR of a child or infant)
      i. Assure ventilation volume is enough to provide chest rise
         (Immediately apply an Impedance Threshold Device to BVM)
      ii. Assure depth of compressions are appropriate for the patient type.
      iii. Push hard and fast at a rate of 100 - 120 compressions per minute
      iv. Switch compressors every 2 minutes or sooner if compressor is fatigued
         (As available, immediately begin Active Compression/Decompression CPR utilizing a commercially available purpose-built device, such as the ResQ Pump at a rate specified by the manufacturer)

2. Continue with 30 Compressions and 2 ventilations cycle until AED or Manual Defibrillator arrives.

3. Analyze rhythm
   a. If shock advised deliver defibrillation
After defibrillation immediately resume CPR, starting with compressions first.
b. If NO shock advised, resume CPR, starting with compressions first.
4. Repeat Compression: Ventilation cycle, checking for shockable rhythm or a pulse after 5 cycles or about 2 minutes of CPR

**Arrest WITH bystander CPR:**

1. Assess Responsiveness, Breathing, and Circulation
   (Taking 5 seconds but no more than 10 seconds for each assessment)
   a. If NOT Breathing and NO pulse resume CPR
   b. Cycle 30 compressions with 2 ventilations (15:2 for 2 person CPR of a child or infant)
      i. Assure ventilation volume is enough to provide chest rise
         *(Immediately apply an Impedance Threshold Device to BVM)*
      ii. Assure depth of compressions are appropriate for the patient type.
      iii. Push hard and fast at a rate of 100 - 120 compressions per minute
      iv. Switch compressors every 2 minutes or sooner if compressor is fatigued
         *(As available, immediately begin Active Compression/Decompression CPR utilizing a commercially available purpose-built device, such as the ResQ Pump at a rate specified by the manufacturer)*
2. Repeat Compression: Ventilation cycle, checking for shockable rhythm or a pulse after 5 cycles or about 2 minutes of CPR
3. Analyze rhythm
   a. If shock advised deliver defibrillation
      i. After defibrillation immediately resume CPR, starting with compressions first.
   b. If NO shock advised, resume CPR, starting with compressions first.
4. Repeat Compression: Ventilation cycle, checking for shockable rhythm or a pulse after 5 cycles or about 2 minutes of CPR

**Transportation:**

1. Movement of the patient during extrication from their position on scene, in preparation for transportation, or during transportation, creates an environment in which the efficacy of BLS measures (particularly compressions) is negatively affected.
2. In the event which there is sufficient access to a patient in cardiopulmonary arrest, resuscitation efforts will be initiated according to this protocol, and will be continued on the spot for 5 rounds (5 cycles of 30:2 CPR), or 10 minutes, using an Active Compression/Decompression method when available.
3. In the event there is not sufficient access to the patient or scene safety disallows, the patient should be moved to the nearest accessible location to begin resuscitation efforts as outlined above.

4. An automated CPR device (such as the Lucas 2) will be deployed only when patient extrication and transport are initiated.

5. Traumatic Cardiac Arrests should be moved immediately to the ambulance for rapid transportation to the nearest trauma center.

**Advanced Treatment Guidelines:**
Follow current American Heart Association Pulseless Arrest guidelines.

**Double-Sequential Defibrillation:**

For persistent Ventricular Fibrillation refractory to 3 or more defibrillation attempts, double sequential external defibrillation should be performed by the following guidelines.

1. A second defibrillator must be available by means of administrative response or FD ALS Engine Company.

2. Ensure quality of CPR is not diminished during prolonged resuscitation.

3. Prepare the sites for the attachment of an additional set of external defibrillation pads by clearing the sites of fluid, hair, or other debris which may interfere with adhesion of pads and current transmission.

4. Apply a new set of external defibrillation pads in the Anterior – Posterior position, ensuring that the pads do not contact each other or the pads currently in use.

5. Assure the controls of both defibrillators are within reach of the paramedic performing the procedure.

6. At the next scheduled rhythm check the paramedic performing defibrillation will evaluate the patient's underlying rhythm.
   1. If a shockable rhythm is detected the paramedic will verify that both defibrillators are attached to the patient, and pads are well adhered without touching one another. Both defibrillators will be charged simultaneously. When both defibrillators are charged to maximum, and all persons are clear, the paramedic performing defibrillation will push both shock buttons as synchronously as possible. CPR will then resume as appropriate.
   
   2. If a non-shockable rhythm is present, care will resume according the protocol.