

## A. General Principles for Cardiac Arrest Emergencies

### 1. Cardiac Arrest Emergencies Philosophy/Practices

- a. Cardiac arrest resuscitations are a team effort by the members of the Houston Fire Department. Each and every level of care is essential to the success of resuscitation. Properly performed and managed BLS skills will resuscitate some cardiac arrest patients and provide the necessary groundwork for the ALS resuscitation of the others. HFD members involved in a cardiac arrest resuscitation shall know their tasks before hand and work in sync with other HFD members.
- b. **Chest compressions are believed to be the most vital task in a cardiac arrest resuscitation.** Any interruption in chest compressions shall be minimal and members on scene should verbalize to all present when chest compressions have been discontinued for more than 10 seconds.
- c. Airway management remains an important part of cardiac arrest management. There is a decreased demand in the amount of ventilation and oxygenation a pulseless patient requires. Additionally, studies have shown that hyperventilation is detrimental to the successful resuscitation of a cardiac arrest patient because the increased intrathoracic pressure produced by hyperventilation decreases perfusion to the heart. Therefore, be extremely mindful of ventilation rates and volumes.
- d. Airway Management
  - Adults : Initial airway management will be performed with Bag Valve Mask ventilation. A supraglottic airway will be inserted (if the appropriate size is available) as soon as possible during the initial stages of resuscitation. If these methods fail, proceed with endotracheal intubation ensuring no interruption in chest compressions. Assuming successful ventilations with the supraglottic airway, securing of the airway via an endotracheal tube shall be considered at an appropriate point later in the resuscitation effort that will allow the individual performing the intubation to do so in a controlled, focused fashion. It is unacceptable to interrupt chest compressions more than momentarily while performing endotracheal intubation. Appropriate periods to endotracheally intubate include: 1) patient acquires return of spontaneous circulation, 2) prolonged unsuccessful resuscitative efforts prior to a transport or 3) when directed to intubate by the EMS Supervisor or on-line EMS Physician. Bilateral breath sounds shall be confirmed and EtCO<sub>2</sub> detector, when available, shall be connected to confirm ventilation.
    - In cases of sole respiratory arrest (pulses present) in ADULTS only, credentialed paramedics may place the endotracheal tube as the initial airway device. Its placement must be confirmed via EtCO<sub>2</sub>, pulse oximetry and auscultation of bilateral breath sounds. Be extremely mindful of increased vagal tone produced by intubation which can lead to bradycardia and full cardiac arrest.
  - Pediatrics : Initial airway management will be performed with Bag Valve Mask ventilation. A supraglottic airway will be inserted (if the appropriate size is available) as soon as possible during the initial stages of resuscitation. Endotracheal intubation shall be performed ONLY if ventilation is unsuccessful with the BVM or supraglottic airway, ensuring no interruption in chest compressions during intubation.
    - In cases of sole respiratory arrest (pulses present) in pediatric patients, credentialed EMT's or paramedics may place a supraglottic airway device as the initial airway device. Its placement must be confirmed via pulse oximetry and auscultation of bilateral breath sounds. Be extremely mindful of increased vagal tone produced by airway stimulation which can lead to bradycardia and full cardiac arrest.
- e. The guidelines are arranged as follows:
  - 1) "Unresponsive Person" : This is where each patient encounter should begin.
  - 2) "Pulseless Patient : BLS First on Scene" and "Pulseless Patient : ALS First on Scene" : These guidelines describe the steps which should be taken in the initial stages of a cardiac arrest prior to the arrival of a full complement of responders. Given a limited number of personnel, priority

is given to chest compressions, rhythm analysis (with defibrillation as required) and airway maintenance/ventilation.

- 3) “Cardiac Arrest Resuscitation” : This contains the guidelines for cardiac arrest resuscitation once ALS is on scene along with sufficient additional resources. In order to provide for maximal chest compressions, more than two persons are required to perform the actions detailed in this guideline.

## 2. BLS / ALS Level

- a. The electronic information captured by the AED or ALS monitor is considered part of the quality improvement process and **shall** be downloaded from each ALS monitor and AED to HFD EMS headquarters for each case requiring CPR, electroshock therapy, 12 lead ECG, or intubation (*Ref 9.04 Procedure for Downloading AED, LifePak15 Data*).
- b. In performing the baseline assessment, be sure to ascertain the patient’s code status. Does the patient have a State of Texas Pre-Hospital (Out-of-Hospital) DNR papers? If so, where is the paperwork and is it valid? (*Ref. 6.17 Out-of-Hospital DNR Orders*)
- c. Resuscitation efforts may be withheld from individuals who meet obviously dead criteria:
  - 1) Dead-on-Arrival (DOA):
    - Decapitation
    - Rigor Mortis
    - Dependent Lividity
    - Decomposition
    - Incineration
    - Obvious Mortal Wounds
  - 2) Absence of any signs of life (pulse, respirations, or any spontaneous movement) on EMS arrival associated with a penetrating head injury (GSW, stab, etc.), or penetrating extremity injury with obvious exsanguination.
  - 3) Absence of any signs of life (pulse, respirations or any spontaneous movement) on EMS arrival for greater than five minutes associated with a penetrating injury to the chest or abdomen and a greater than 10 minute transport time to a Trauma Center.
  - 4) Absence of any signs of life (pulse, respirations or any spontaneous movement) on EMS arrival associated with blunt trauma.

## 3. ALS Level

- a. Patients should be afforded substantial resuscitative efforts on scene prior to transport; medical CPR, in both adult and pediatric patients, is not a “load and go” situation.
- b. The utilization of video laryngoscopy shall be the standard initial technique for intubation. The bougie may be used to assist placement as well. Most importantly, **WHEN IN DOUBT, TAKE IT OUT** (ET tube). Correct endotracheal tube placement is of paramount importance (*Ref. 7.02 C.*). No more than three attempts at intubation shall occur per patient.
- c. When in doubt, pump it out (if unsure about rhythm; asystole versus VF, assume asystole and treat accordingly, be sure to check for proper gain).
- d. In cardiac arrest, the preferred access route for medication shall be:  
Adolescents/Adults: 1) peripheral IV (including external jugular), 2) humeral IO, 3) dialysis access catheter if present, and lastly, 4) tibial IO.  
Neonate/Infant/Children: 1) tibial IO, 2) peripheral IV (no external jugular).
- e. Renal Dialysis and Cardiac Arrest
  - 1) In non-arrest, do not take blood pressures or attempt IV’s in the same area of the dialysis access or catheter.
  - 2) If accessing a Vas Cath, Tetssio or Quinton catheter (Central Line used for temporary dialysis with red and blue ports), remove at least 3-5 ml of the catheter fluid (heparin solution) from either port. Then flush the port with 10 ml of Normal Saline, prior to attaching IV tubing and infusing fluids or medications.
- f. Transcutaneous Pacing is generally most successful in patients with symptomatic bradycardia. Pacing pulseless patients shall only be performed under the direction of on-line medical control.

- g. If the underlying etiology of the cardiac arrest is identified by patient history or clinical signs or values, HFD personnel shall reference the appropriate guideline and treat this cause as indicated concomitant with the appropriate cardiac arrest guideline.
- h. If the AED is being utilized upon ALS arrival, ALS personnel shall allow the AED to complete the upcoming analysis including a shock if required. Immediately after this, the patient shall be switched over to the ALS monitor. For adolescents/adults, detach the AED pads from the AED and connect to the ALS monitor. For neonates/infants/children, remove the AED Infant/Child pads and attach the Pediatric pads to the ALS monitor and the patient.
- i. In pulseless patients, the blood glucose sample shall be obtained from a vein rather than a fingerstick.