ALS Medical Cardiac Arrest

AUTHORITY: Division 2.5, Health and Safety Code, Sections 1797.220 & 1798 et seq.

PURPOSE:

The purpose of this policy is to provide direction for BLS and ALS responders for resuscitation of patients > 8 years-old in cardiopulmonary arrest due to pulseless ventricular tachycardia, ventricular fibrillation, or pulseless electrical activity using minimally interrupted cardiac resuscitation (MICR).

DEFINITIONS:

A. "EMS Agency" means the San Joaquin County Emergency Medical Services (EMS) Agency.
B. "MICR" means minimally interrupted cardiac resuscitation that focuses upon maintaining high quality chest compressions with both depth and rate.
C. "MICR Algorithm" means a representation of correct treatment choices in response to a patient’s cardiac rhythm.
D. "MICR Round" means the time required to complete 200 – 230 compressions, analyze the patient’s rhythm and provide a shock (if indicated).
E. "Passive Oxygen Insufflation" (POI) is the method of providing oxygen to a patient during the first eight (8) minutes of resuscitation with an oral pharyngeal airway (OPA), high flow oxygen via non-rebreather mask, and no ventilations.
F. "Pit Crew" means the configuration of EMS responders and their defined roles to resuscitate a patient in cardiopulmonary arrest.

POLICY:

I. Conduct resuscitation with goal of preserving cerebral and coronary function through meticulous attention to procedure.

A. Focus resuscitative efforts on accomplishing the following in rank order of importance:
   1. Provide high quality chest compressions with minimal interruption.
   2. Apply ECG or AED for analysis and defibrillation.
   3. Initiate POI.
   4. Provide epinephrine 1mg 1:10,000 via IV/IO each MICR Round.
B. Use a team approach ("Pit Crew").

II. Maintain a chest compression rate of 100 compressions per minute and alternate...
chest compression duties between pit crew team members after each MICR Round. Each MICR Round consists of between 200 and 230 chest compressions and will vary based upon AED analysis and shock pattern limitations.

III. Initiate (ACLS) and an advanced airway after MICR has been provided for four MICR Rounds (approximately eight minutes) and provide 8-10 ventilations per minute with a ratio of compressions to ventilations of 30 to 2.

IV. The first MICR Round is measured from the time that the first EMS personnel on-scene initiates the MICR procedure.

V. Contraindications for use of MICR include:
   A. Traumatic arrest
   B. Pediatric arrest
   C. Cardiac arrest due to known respiratory problem (e.g. asthma)
   D. Drowning

PROCEDURE:

I. Obtain patient history and document the following:
   A. Estimated down time
   B. Circumstances surrounding arrest
      1. Onset (witnessed or un-witnessed)
      2. Preceding symptoms
      3. Bystander CPR
      4. Duration of CPR
      5. Medications
      6. Environmental factors (hypothermia, inhalation, asphyxiation)

II. Treatment
   A. If cardiac arrest was not witnessed by EMS personnel, immediately begin treatment according to MICR Algorithm. Do not check pulse unless rhythm is organized at rhythm check prior to shock. In a cardiac arrest witnessed by EMS personnel, do an immediate rhythm check and shock if indicated, then follow the MICR Algorithm as described below:
      1. First MICR Round: While providing a minimum of 200 chest compressions (two minutes), apply ECG and configure for AED mode, ensure that airway is secure with an oral pharyngeal airway (OPA) and institute POI with high flow oxygen non-rebreather mask. If ALS is available start IV/IO and administer Epinephrine 1 mg (1:10,000) without interrupting chest compressions.
      2. Subsequent MICR Rounds: Following the first MICR Round (200+ chest compressions and approximately two minutes), stop compressions to analyze ECG. After analysis and while AED is charging, immediately perform thirty (30) chest compressions (less if required by AED limitations) then provide a single shock.
a) Do not check pulses unless rhythm is organized at rhythm check prior to shock.

b) Interruptions for defibrillation must be kept to a minimum.
   (1) Continue chest compressions immediately upon performing defibrillation.
   (2) Do stop compression to wait for an ECG analysis following defibrillation and do not interrupt chest compressions to perform BLS airway procedures, start IV/IOs, check pulses, or administer medications.

c) Rotate chest compression duties between Pit Crew members every MICR Round.

3. Follow treatment path as appropriate for Asystole, V-fib and Pulseless VTach, or PEA. Administer Epinephrine 1 mg (1:10,000) once every MICR Round.

4. Complete four MICR Rounds before transitioning to ACLS care.

5. For return of spontaneous circulation, see EMS Policy No.5726, Return of Spontaneous Circulation.

B. MICR Algorithm

**MICR Algorithm**

III. Transition to ACLS care following four MICR Rounds (eight minutes) provided by prehospital personnel.

A. Place either a King Airway or an oral tracheal tube and secure it with a commercial tube restraint. While oral tracheal intubation will usually interfere with continuous chest compressions, endeavor to not interrupt compressions for longer than fifteen (15) seconds.

B. Continue performing continuous chest compressions high quality, uninterrupted CPR ($\geq 100$/minute) with the compressions to ventilations ratio at 30:2.

C. Use waveform capnography from time of tube placement through the duration of the resuscitation attempt. Both numerical value (capnometry) and wave morphology MUST be obtained and documented every five (5) minutes.

D. Once an advanced airway is in place, compressions are given continuously at a rate of 8-10 ventilations per minute. **DO NOT HYPERVENTILATE.**
IV. Base Hospital Direction and Patient Transport

A. If patient fails to convert to a return of spontaneous circulation following MICR and standard ACLS treatment has been initiated for a total of fifteen (15) minutes, contact the Base Hospital to discuss discontinuation of resuscitative efforts or patient transport. If the patient remains in PEA or ventricular fibrillation prepare patient for transportation. Do not transport the patient unless ordered to do so by the Base Hospital or due to scene safety.