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 who are > 8 years-old in cardiopulmonary arrest due to asystole, 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 (approx. two minutes), 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. The goal of cardiac resuscitation is to preserve cerebral and coronary function through meticulous attention to procedure and achieving return of spontaneous circulation (ROSC).

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 an advanced airway after completion of four MICR Rounds and continue resuscitative efforts based on the patient’s current cardiac rhythm and applicable treatment protocols.

IV. The starting point to measure the beginning of MICR Rounds is the time that the first EMS personnel on-scene initiates the MICR procedure (compressions), regardless of whether the first rounds include establishment of an I.V. or administration of epinephrine.

V. Contraindications for use of MICR include:
   A. Traumatic arrest.
   B. Pediatric arrest.
   C. Respiratory arrest due to known respiratory problem (e.g. asthma).
   D. Drowning.
   E. Obstructed Airway (including partial obstruction due to vomitus).

PROCEDURE:

I. Follow 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.

II. Treatment
   A. Follow the MICR Algorithm as described below:
      1. First MICR Round: While providing a minimum of 200 chest compressions (two minutes), apply ECG. Use either AED or manual mode, depending upon which method minimizes interruption of compressions, and does not delay administration of an IV/IO and Epinephrine. Ensure that the 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
quickly check for a pulse and for ECG analysis. 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) Interruptions for defibrillation must be kept to a minimum.
   (1) Continue chest compressions immediately upon performing defibrillation.
   (2) Do not stop chest compressions 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.

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

c) If ALS care is available, administer Epinephrine 1 mg (1:10,000) once every MICR Round.

3. For return of spontaneous circulation treat the patient in accordance with EMS Policy No.5726, Return of Spontaneous Circulation.

B. MICR Algorithm

MICR Algorithm

C. Approach to airway complications for BLS and ALS personnel
1. If BLS personnel determine that vomitus has compromised the patient’s airway, the BLS crews should suction the airway prior to applying an AED or POI.
2. If ALS personnel determine that vomitus has compromised the airway, the ALS crew should suction the airway and apply either an ETI or King Airway and transition to treatment described below in section III.

III. Transition to the following treatment after four MICR Rounds (eight minutes):

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 high quality, uninterrupted compressions (> 100/minute).
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.

E. Based upon ECG rhythm analysis, follow the treatment path specific to Asystole, V-fib and Pulseless VTach, or PEA per SJCEMSA policies.

IV. Base Hospital Direction and Patient Transport

A. If patient fails to convert to a return of spontaneous circulation following four MICR Rounds and the appropriate treatment path specified in SJCEMSA policies has been followed for a combined 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.