Procedure: Mechanical CPR (mCPR) Devices

Background: Mechanical CPR devices (mCPR), for example, LUCAS® and AutoPulse® devices, have been proposed to improve the effectiveness of cardiopulmonary resuscitation (CPR). The initial thought behind this is the mechanical devices produce constant, reproducible chest compressions at the correct rate and depth when compared to manual CPR. However, after thorough literature reviews, the current evidence does not support this hypothesis. The gold standard of care remains bystander CPR, high quality chest compressions, and, when indicated, early defibrillation. The American Heart Association still considers manual CPR the gold standard. However, there are circumstances where mechanical CPR can be beneficial. These are the indications approved by SJCEMSC medical direction.

Indications: mCPR has been approved for patients 18 years of age and older whose body habitus will permit the use of the mechanical CPR device in the following scenarios:

1. **Limited staffing**. Smaller services, particularly those more rural services and volunteer services, may benefit from using mechanical CPR devices due to limited staffing on scene. In those instances, mCPR is permitted. In this circumstance, manual CPR must be performed for at least the first 3 cycles of CPR. After the third complete cycle of manual CPR, mCPR may be considered. The indication for mCPR must be documented in the patient care report (PCR).

2. **Prolonged resuscitation**. Rescuer fatigue leading to poor quality chest compressions can worsen outcomes in out-of-hospital cardiac arrest. In instances where resuscitation has been ongoing for a prolonged time (refractory VF, recurrent VF, ongoing CPR with PEA) mCPR is permitted. In this circumstance, manual CPR should have been performed for several cycles before mCPR is considered as this exception is only permitted in *prolonged or refractory* cases. The indication for mCPR must be documented in the patient care report (PCR).

3. **Resuscitation during transport of a pulseless patient**. There are rare scenarios where CPR must continue when moving a pulseless patient. Examples of this would include a patient who obtained ROSC while on scene and then lost pulses while en route to the hospital, a patient at a mass gathering event where protocol allows for them to be moved to a more secure, private location, a special circumstance requiring transport of a pulseless patient, and patients in an austere or unsafe environment. In these cases, mCPR is permitted. Except for the unsafe scene, manual CPR must be performed for at least the first 3 cycles of CPR. After the third complete cycle of manual CPR, mCPR may be considered and the patient moved. However, during the first 3 cycles of CPR, the mCPR may be applied. In the instance of an unsafe scene, the patient should be moved to a safe location immediately. The indication for mCPR must be documented in the patient care report (PCR).

Contraindications: 1. Less than 18 years of age; 2. Patient is too small (if the mCPR device does not adequately secure to the patient or the device compresses too deep); 3. Patient is too large (if the mCPR device does not adequately secure to the patient or the device will not compress deep enough); 4. Instances where the mCPR devices cannot be safely or appropriately attached to the patient; 5. Traumatic arrest

Notes/Precautions: **At no time should applying a mCPR device delay high quality CPR. The *gold standard* is still manual high-quality CPR with early defibrillation, when indicated.** It will likely take several cycles of high-quality CPR to get the mCPR device in place. mCPR is *not* permitted as first line resuscitation and is only permitted if the patient meets one of the criteria listed above. EMS Providers using mCPR devices must participate in at least one resuscitative scenario each year to demonstrate proficiency with the device. Please refer to the owner's procedure manual for specific instructions on application and administration of the mCPR device.