OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

System Medical Advisory
March 21, 2016

Cardiac Arrest Pearls

Our System's Pit Crew approach incorporates current clinical science on the subject of out-of-hospital cardiac arrest by focusing on minimally interrupted, high quality CPR along with periodic assessment of the need for defibrillation. Survival from sudden cardiac arrest depends greatly on a focus on CPR and defibrillation with pauses in compressions only as needed to analyze the rhythm and deliver a shock if needed.

As a result of recent reviews of AED event data, it is appropriate to provide the following reminders to all System credentialed providers. These points are intended to assist providers in improving their resuscitation performance and, as a result, improve the likelihood of survival for our cardiac arrest patients. These points should be followed unless following them creates a safety hazard to the patient or providers.

1. ***Quickly power on the AED upon arrival at the patient's side.*** AEDs programmed to begin with 2 minutes of CPR should have pads applied and connected immediately. This allows the AED to begin recording verbalization by the on-scene providers. FR2 AEDs cannot be programmed for the 2 minute delay but should be turned on to capture the verbalizations and; the pads NOT connected until after approximately 200 compressions. This also applies to a witnessed cardiac arrest with an AED immediately available.

2. ***Verbalize all actions, observations, troubleshooting, patient responses and other pertinent information into the AED's voice recorder.*** The voice data gathered from the AED is helpful in understanding the circumstances faced by the on-scene providers and often helps identify AED device performance malfunctions.

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3. ***Interruptions to CPR for AED analysis and shock delivery should be kept to the absolute minimum*.** Recall the 5 elements of high quality CPR: minimal interruptions to compressions, adequate rate and depth of compressions, complete release of chest pressure after each compression, and avoidance of unnecessary CPR pauses.

4. ***Stop CPR only as needed for rhythm analysis (AED or Manual) and defibrillation*.** Consistent with our Pit Crew COG, interruptions to CPR should generally be limited to when the AED prompts to stand clear for rhythm analysis (approximately every 2 minutes) or when the manual defibrillator operator stops CPR for rhythm analysis (approximately every 200 compressions).

5. ***During AED Analysis, ensure there is no patient motion including movement of the AED cables.*** Some AEDs are more sensitive to detecting motion than others. Detected motion interrupts AED analysis and delays the total time for analysis (which increases the CPR interruption time).

6. ***Ensure defibrillation pads are securely attached to the patient and connected to the defibrillator.*** The manufacturers recommend application of the pads using a rolling motion to prevent pockets of air. Once applied, quickly and firmly press on the pads to ensure good contact with the patient's skin.

7. ***Do not initially place defibrillation pads in the anterior-posterior (AP) positions in adult cardiac arrest patients.*** The 2016 COGs do not include the routine placement of defibrillation pads in the AP position (Clinical Procedure CP – 03). Pads may be placed in the AP position once the patient meets criteria for Double Sequential External Defibrillation (DSED). The determination to use DSED is not made until well into the call timeline (Protocol CA-06) and the "possibility" of using it should not preempt normal AED pad placement. This procedure is used in a small proportion of cardiac arrest patients and may cause unnecessary interruptions to compressions.

8. ***Do not interrupt an AED analysis once it has begun or once a shock decision has been reached.*** As stated earlier, CPR and defibrillation when indicated are proven to improve the likelihood of survival and should not be delayed.

9. ***Once a fire department AED has been applied, we suggest <u>not</u> changing to a manual defibrillator until after the 3rd set of chest of chest compressions (Section 6 of the Team Leader's Pit Crew Checklist, Clinical Reference CR - 09).*** The first few minutes of a resuscitation attempt are critically important with respect to application of the proven therapies – high quality CPR and defibrillation if needed. This approach will minimize delays in compressions during these first few minutes and provide vital data needed to improve pit crew sequences.

    a. An obvious exception to this point is a situation in which the AED is not functioning correctly or is requiring 20 seconds or longer to reach a shock decision (Refer to Medical Directive 16-03, 11February2016).

    b. When changing from an AED to a manual defibrillator using different pads, initiate the change at the <u>beginning</u> of a CPR cycle. This approach will minimize delays in delivering a shock to a patient with a shockable rhythm.

10. ***Follow the specific sequence and timing of therapies outlined in the Team Leader's Pit Crew Checklist, Clinical Reference CR-09.*** The sequence of therapies is intentional and designed to minimize interference to high quality CPR and timely defibrillation. Combining multiple actions during a single CPR cycle increases the risk of CPR interruption or a rushed task time (e.g., a rushed i-gel placement that results in non-ideal placement).

11. ***Once available, apply the CPR Feedback device ("Puck").*** CPR feedback is valuable in providing just in time improvements as a

means of improving CPR quality. The CPR feedback device ("puck") should be used anytime manual chest compressions are being applied to non-pediatric patients (Refer to COG CP-19).

12. ***Listen for the AED voice prompts and respond accordingly to each prompt.*** In order to minimize delays and to ensure prompt delivery of defibrillation when indicated, providers are asked to remain attentive to all AED prompts and respond to each prompt after the AED is applied to the patient. The response should be acted upon AND verbalized into the AED voice recorder describing troubleshooting actions/results. The following are common and critical AED prompts (*italicized text*) along with the recommended actions associated with each.

    a. "*plug in pads connector*" or "i*nsert connector firmly*" or "*press pads firmly to patient's bare skin*" or "p*lug in cable* "or "a*ttach defib. pads to patient's bare chest*"
    These indicate the AED is not detecting a complete patient circuit. Quickly ensure the pads connector is firmly plugged into the AED. Ensure the pads are making firm contact with the patient's skin. Press the pads firmly to the patient's chest. If these actions do not resolve the prompt, return to CPR until another defibrillator can be attached to the patient.

    b. "*replace pads*" or "*check defib. pads*"
    This indicates pads are not detected, damaged or not correctly applied. Quickly attempt to press the pads firmly on the patient's chest. If this fails, resume CPR and replace the pads.

    c. "*stop CPR*"
    Ensure compressions are stopped as soon as possible to avoid interfering with the analysis mode. Continuing compressions may result in an interrupted analysis and delayed shock decision. Ultimately, this leads to prolonged time with no CPR.

d. "*analyzing*" or "*don't touch patient, analyzing*" or "*stay clear of patient*"
As stated for the "stop CPR" prompt, ensure all movement is stopped during the analysis interval. This includes any movement of the AED cables. Feeling for a carotid pulse should not create sufficient motion to activate this prompt. However, the AED analysis has a greater priority than the pulse check.

e. "*analyzing interrupted*", "*stop all motion*", or "*cannot analyze*"
These prompts indicate the device has detected artifact that may be due to movement of the patient. Ensure all motion of the patient and AED cables is stopped. If the analysis interruption cannot be resolved or an AED shock decision cannot be reached within 20 seconds of stopping CPR, resume CPR immediately and ignore this prompt. Refer to Medical Directive 16-03, dated 11 February 2016, for additional information.

f. "*release shock button*"
This prompt indicates the shock button was pressed too soon. Do not press the shock button until it is illuminated or until the AED instructs you to do so. As always, the shock button should be pressed ONLY after ensuring no one is touching the patient.

g. "*attend to patient*"
This indicates the AED did not reach a decision or reached a no shock decision. Resume CPR. This prompt is likely to occur when analysis interruption persists.

h. "*low battery*" or "*replace battery*" or "*change battery*"
Low battery prompts should result in battery replacement as soon as possible. Be ready to resume CPR if the battery fails. Replace battery indicates the device will not function until a new battery is inserted. Once attached to a patient, the AED should be continued to be used until it no longer functions or

the battery is replaced, or another defibrillator is placed on the patient. This action is intended to avoid delays in delivering defibrillation once indicated by the AED.

i. "*Shock Cancelled*"
This prompt indicates the AED initially recognized a potentially shockable rhythm. On further analysis, the AED determined the rhythm is not a shockable rhythm or the patient's rhythm changed during the analysis. In any case, immediately resume CPR.

We will continue to evaluate our cardiac arrest performance and protocols as part of our ongoing efforts to improve out of hospital cardiac arrest survival within our System.

Please contact Louis Gonzales, Louis.Gonzales2@austintexas.gov, or any of the OMD staff should you have any questions or suggestions for improvement related to the above reminders.

Thank you for all you do.

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