Protocol C-02b

SECTION: C-02b

TITLE: Adult Cardiopulmonary Arrest – ALS algorithms

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ADULT CARDIOPULMONARY ARREST – ALS

Box #1:

If adequate CPR is being performed upon arrival :

1. Confirm cardiopulmonary arrest.
2. Transition to High-Performance CPR (see *Appendix 30: High-Performance Resuscitation)* while applying DEFIB pads
3. Move on to, **"Box 4."**

Box #2:

Sudden, witnessed arrest in the presence of EMS:

1. Perform High-Performance CPR (see *Appendix 30: High-Performance Resuscitation*) only long enough to apply DEFIB pads.
2. Move on to, **"Box 4."**

Box #3:

If inadequate CPR, or no CPR at all, is being performed upon arrival:

1. Initiate/Perform High-Performance CPR (see *Appendix 30: High-Performance Resuscitation*)
2. During (and without interruption or compromising) High Performance CPR:
   a. Apply Defib pads
   b. Prepare/establish Airway Management and/or vascular access
   c. Medications/other Interventions
3. Move on to, **"Box #4," after** approximately 2 minutes/200-220 Compressions completed

Box #4:

Rhythm Check

1. ****Pre-charge Monitor *before* pause. Energy Settings as described in *Appendix 11: Electrical Therapy.***

VF/Pulseless VT:	Asystole/PEA:	ROSC:
a) Shock **b)** Immediately resume HP-CPR without pause for rhythm check. **c)** Advanced airway management/Vascular Access as appropriate	**a)** No shock indicated. **b)** Immediately resume HP-CPR. **c)** Advanced airway management/Vascular Access as appropriate	**a)** Evaluate for POST-ROSC /TTM protocol (See *Protocol C-09: POST-ROSC)* **b)** Advanced airway management and Vascular Access as appropriate **c)** Provide hemodynamic support and other interventions. **d)** Monitor closely for re-arrest

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ADULT CARDIOPULMONARY ARREST – ALS

Box #5:

Rhythm Check

1. ****Pre-charge Monitor before pause. Energy Settings as described in *Appendix 11: Electrical Therapy.***

VF/Pulseless VT:	Asystole/PEA:	ROSC:
a) **Shock** **b)** Immediately resume HP-CPR without pause for rhythm check. **c)** Advanced airway management/Vascular Access as appropriate *Medication Administration During CPR* **d)** Epinephrine **e)** Antiarrhythmic **f)** **Additional pharmacologic therapies as indicated**	**a)** No shock indicated. **b)** Immediately resume HP-CPR. **c)** Advanced airway management/Vascular Access as appropriate *Medications Administration During CPR* **d)** Epinephrine **e)** **Additional pharmacologic therapies as indicated**	**a)** Evaluate for POST-ROSC /TTM protocol (See *Protocol C-09: POST-ROSC)* **b)** Advanced airway management and Vascular Access as appropriate **c)** Provide hemodynamic support and other interventions. **d)** Monitor closely for re-arrest

Box #6:

Treat possible Causes

Search for & treat possible contributing factors:

a) **H**ypovolemia
b) **H**ypoxia
c) **H**ydrogen ion (acidosis)
d) **H**ypo-/hyperkalemia
e) **H**ypothermia
f) **T**oxins
g) **T**amponade, cardiac
h) **T**ension Pneumothorax
i) **T**hrombosis (coronary or pulmonary)
j) Other potential precipitating causes (i.e. Hypoglycemia, etc)
   a. **Obtain a BG as soon as feasible**.

Return to Box #5

*** HP-CPR refers to "High-Performance CPR" as described in *Appendix 30: High-Performance Resuscitation) Appendix 30.***

Continue this sequence until:

a) Transport/transfer of care is complete.
b) Resuscitative efforts are terminated. (See Appendix 26 "IN-FIELD DEATH/POST/DNR"
c) A rhythm/condition change occurs.

If a rhythm/condition change occurs, treat it according to its respective algorithm/protocol.

Consider as appropriate:

Electrical Therapy

- Deliver manual defibrillation as indicated. (See Appendix 11: Electrical Therapy).

Vasopressors (for all cardiac arrest rhythms unless contraindicated)

- Epinephrine
  - IV/IO: 1 mg 1:10,000 IVP every 3-5 minutes,

Airway Management:

- Secure the airway using means best determined by good clinical decision making.
- See "*Appendix 2: Advanced Airway Support Supplement* " for guidelines for current and anticipated clinical needs

Anti-arrhythmic therapy: (For maintenance infusions, see protocol C-09 – "Post-ROSC Care")

- Lidocaine (Xylocaine)
  - IV/IO: 1.0 to 1.5 mg/kg IV bolus, can repeat in 3-5 minutes not to exceed 3 mg/kg or 300 mg in 30 minutes (not including infusion)

- Amiodarone
  - IV/IO 300 mg initial dose.
  - Consider repeat x1 150 mg 3-5 min.

- Magnesium Sulfate
  - IV/IO: 2 g every 5 minutes,
  - 1st line for Torsades or refractory V-Fib/Pulseless V-Tach.
  - Administer in conjunction with lidocaine if hypomagnesemia is suspected.
  - Consider for refractory VF/pulseless VT.

Treat underlying causes:

- *Treat underlying causes simultaneously with High-Performance CPR but do not sacrifice the quality of CPR while doing so. High-Performance CPR remains the top priority.*

Sedation for CPR-induced consciousness (Confirm continued pulseless-ness):

- Ketamine:
  - IV/IO 1-2 mg/kg for CPR-induced consciousness. May repeat if needed in 5-10 minutes.

Other specific therapy:

- Sodium bicarbonate for known hyperkalemia, suspected acidosis, TCA toxicity, and prolonged resuscitation.
  - IV/IO: 1 mEq/kg repeated in 10 minutes (if still in arrest) at 0.5 mEq/kg. The minimum initial dose is 50 mEq.
  - Follow TCA recommendations if TCA overdose is suspected
  - Consider dilution of Bicarb if given IO

- Calcium chloride for suspected hyperkalemia, calcium channel blocker OD, or suspected hypocalcemia
  - IV/IO: 500-1000 mg IVP
  - Administer sodium bicarbonate at 1 mEq/kg afterward for suspected hyperkalemia. **Flush line thoroughly between medications**

- Narcan (naloxone) for suspected narcotic overdose *with cardiac arrest*
    - IV/IO: 2 mg repeated PRN

- Dextrose 50% for hypoglycemia
    - IV/IO: 12.5-50 g
    - (Consider dilution of Dextrose if given IO or through small veins)

Physician Pearls:

Continue the High-Performance CPR (see *Appendix 30: High-Performance Resuscitation)* sequence until:

1. Transfer to a higher level of care occurs.
2. Patient regains a pulse
    a. Initiate supportive care (i.e. oxygen via non-rebreather or BVM assisted breaths if necessary.)
    b. Monitor for rearrest closely
3. Resuscitative efforts are terminated (See *Protocol G-04: Special Resuscitation Situations*)

* In addition to BLS interventions, an advanced airway, and *at least* 20 minutes of rhythm-appropriate therapy should have been performed before considering termination of efforts. See *Protocol G-04: Special Resuscitation Situations* for further considerations.

ETCO2: Use waveform ETCO2 as a gauge for the effectiveness of resuscitation as well as monitoring ETT placement.

Treat underlying causes simultaneously with High-Performance CPR (see *Appendix 30: High-Performance Resuscitation) but do not sacrifice the quality of CPR while doing so.* *High-Performance CPR remains the top priority.* Search for, consider, & treat possible contributing factors (as the scope of practice allows):

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Toxins
- Tamponade, cardiac
- Tension Pneumothorax
- Thrombosis (coronary or pulmonary)
- Other potential precipitating causes (i.e. Hypoglycemia, etc)
    - Obtain a BG as soon as feasible.

VASCULAR ACCESS: IV access is the preferred method of vascular access with IO as a secondary option if IV access is unsuccessful.

ENERGY SETTINGS: See *Appendix 11: Electrical Therapy Procedures and Guidelines.* Most ACCESS AEDs and Monitors have been set to deliver max energy settings (200 j), though this does not preclude the use of different devices/settings when needed.