

Utah EMS Protocol Guidelines: Cardiac



Version 1 / November 1, 2013

Cardiac Patient Care Guidelines

These guidelines were created to provide direction for each level of certified provider in caring for cardiac patients. The Online Medical Consulting/Consultation (OLMC) physician will always be the final word on treatment in the field. If there are ever any discrepancies between the guidelines and the OLMC physician these should be documented and brought to the attention of the physician at the receiving hospital or the agency Medical Director for review.

General Approach to Medical Patient Care Guidelines

- Assess your patient prior to initiating a guideline.
- Pediatric reference tape-based dosing is preferred over calculated doses for infants and children.
- More than one guideline may apply.
- If conflicts arise between treatment guidelines contact OLMC for clarification.
- Providers may provide treatment up to the level of their certification only.
- Air Medical Transport Service personnel function under their own clinical guidelines.
- Contact your receiving hospitals and OLMC as soon as clinically possible for each patient.
- OLMC physician may change your treatment plan.
- Any variations to a guideline by the OLMC or physician should be clarified to ensure that the provider has properly characterized the situation.
- The OLMC physician has the final word on treatment once contact is made.
- The OLMC physician must approve usage of dosages in excess of the guidelines.

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Key to Symbols used in Guidelines



This symbol and yellow highlighted instructions precedes any treatment that requires OLMC prior to initiating the treatment unless otherwise specified.

BRADYCARDIA (Symptomatic)

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Assess for signs of poor perfusion, hypotension, altered mental status, signs of shock, chest pain, or acute heart failure.
 - Obtain a blood glucose level.
- ❑ Continuous ECG, ETCO₂, and Pulse Oximetry monitoring when available
- ❑ **Treatment Plan**
 - Only treat bradycardia if the patient is symptomatic (hypotension, altered mental status, chest pain, etc.)
 - If patient is less than 1 year old, follow the **Newborn Resuscitation Guideline**.
 - Attempt to identify and treat the underlying causes of bradycardia:
 - **H's** - Hypovolemia, Hypoxia, Hydrogen ion (Acidosis), Hyper/Hypokalemia, Hypothermia, Hypoglycemia
 - **T's** – Toxins (Overdose), Tamponade (Cardiac), Tension Pneumothorax, Thrombosis (ACS or Pulmonary), Trauma
 - Maintain airway; assist with breathing as necessary, provide oxygen
 - Pediatric patient (<8 year old)
 - Aggressive oxygenation with high flow oxygen and assisted ventilations with a BVM as indicated.
 - Begin chest compressions if persistent heart rate <60/min and signs of poor perfusion following aggressive oxygenation and ventilation
 - Ensure patient warmth.
- ❑ **Key Considerations**
 - In pregnant patients of >20 weeks gestation: Place wedge-shaped cushion or multiple pillows under patient's right hip in order to transport in left lateral decubitus position.
 - Current nationally established certification programs (ACLS, PALS, NRP etc.) may be used in lieu of these resuscitation guidelines. Any such variances in care should be documented in the patient care record.
 - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

AEMT

- ❑ Supportive care of airway, vascular access and fluid therapy *per IV-IO Access and Fluid Therapy guidelines*
- **Atropine 0.5 mg** IV/IO
 - Repeat as needed every 3 minutes until pulse or BP improved
 - Maximum total dose of 3mg
- **Epinephrine: 1 mg (1:10,000)** IV/IO push
 - Repeat every 3-5 minutes until pulse or BP improved
 - Consider 3-5 mg if arrest is from beta blocker overdose or anaphylaxis

PARAMEDIC

EMT

AEMT

- Supportive care of airway, vascular access and fluid therapy *per IV-IO Access and Fluid Therapy guidelines*
- **Epinephrine: 0.01 mg/kg = 0.1 ml/kg (0.1mL/kg of 1:10,000)** IV/IO
 - Repeat every 3-5 minutes until pulse or BP improved
- ❑ **Atropine 0.02 mg/kg** IV/IO
 - Minimum single dose of 0.1 mg
 - Maximum single dose of 0.5mg
 - Repeat Atropine every 3-5 minutes until pulse or BP improved or until Max 1mg for child and 2mg for adolescents.

PARAMEDIC

SYMPTOMATIC BRADYCARDIA

- ❑ **Transcutaneous pacing (TCP)** at an initial rate of 80 beats per minute if the patient does not respond to medications

Consider Sedation for TCP:

- ❑ Choose **ONE** benzodiazepine for treatment and maximize dosing. Contact OLMC before changing to a different medication.
- ❑ **Midazolam (Versed)**
 - Dosage is cut in half if the patient has received narcotics or alcohol
 - **IV/IO - 2-4mg** every 5 minutes to the desired effect or max dose of 10mg
 - **Intranasal or oral- 0.4 mg/kg** to a maximum of 10mg as a one-time dose
- ❑ **Diazepam (Valium)** – May be used as an alternative Follow the same safety parameters as with midazolam
 - **IV/IO – 5-10mg** every 5 min to the desired effect or max dose of 30mg
 - **Rectally** – Same dosage
- ❑ **Lorazepam (Ativan)** – May be used as an alternative. Follow the same safety parameters as with midazolam
 - **IV/IO – 1-2mg** every 5 min. to the desired effect or max dose of 4mg

① **Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.**

① **Epinephrine (1:1000) 2–10 mcg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg.

And/or

① **Dopamine 2-20 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg. *(Goal is to maintain a mean arterial pressure (MAP) >70 mmHg)*

IF BRADYCARDIA IS SEVERE with SIGNS OF POOR PERFUSION

- ❑ **Transcutaneous pacing (TCP)** at an initial rate of 100 beats per minute if the patient does not respond to medications

Consider Sedation for TCP:

- ❑ Choose **ONE** benzodiazepine for treatment and maximize dosing. Contact OLMC before changing to a different medication.
- ❑ **Midazolam (Versed)**
 - Dosage is cut in half if the patient has received narcotics or alcohol
 - **IV/IO - 0.1 mg/kg, max dose of 4mg**
 - Do NOT exceed adult dosing
 - **Intranasal or oral- 0.4 mg/kg, max 10mg as a one-time dose**
- ❑ **Diazepam (Valium)** – May be used as an alternative. Follow the same safety parameters as with midazolam
 - **IV/IO - 0.1 mg/kg, max dose of 10mg**
 - Do not exceed adult dosing
 - **Rectally – 0.3 mg/kg PR**
- ❑ **Lorazepam (Ativan)** – May be used as an alternative. Follow the same safety parameters as with midazolam
 - **IV/IO – 0.1mg/kg, max dose of 4mg.**
 - Do NOT exceed adult dosing.

① **Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.**

① **Epinephrine (1:1000) 0.1–2 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.

And/or

① **Dopamine 2-20 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg

CARDIAC CHEST PAIN (ACUTE CORONARY SYNDROME)

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Assess for signs or symptoms suggestive of ischemia or infarction.
 - Ask patient to describe the pain utilizing the O-P-Q-R-S-T mnemonic.
 - Onset of the event, Provocation or Palliation, Quality of the pain, Region and Radiation, Severity, Time (history)
 - Determine whether the patient (male or female) has taken erectile dysfunction medications such as Viagra, Levitra or Cialis within the last 24 hours.
- ❑ Continuous ECG, ETCO₂, and Pulse Oximetry monitoring when available.
- ❑ **Treatment Plan** - All chest pain patients should receive oxygen therapy. Maintain O₂ saturations 90 – 94%.
- ❑ **Key Considerations**
 - Treatment protocols from current nationally established cardiac care certification programs (ACLS, PALS, etc.) may be used in lieu of these resuscitation guidelines.
 - In pregnant patients of >20 weeks gestation: Place wedge-shaped cushion or multiple pillows under patient's right hip in order to transport in left lateral decubitus position
 - Assess blood glucose level.

ADULT

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

EMT

- ❑ **324 mg aspirin**, preferably chewed, if patient is >18 years old and no reported allergies to aspirin
 - Administer even if patient takes a daily aspirin dose
- ❑ Assist patient with prescribed nitroglycerin: 1 pill SL every 5 minutes, up to 3 doses, as long as symptoms persist and SBP >100 mmHg
 - Do not administer nitroglycerin if patient (male or female) has taken erectile dysfunction medications within 24 hours

AEMT

AEMT

- ❑ Advanced airway, vascular access and fluid therapy per **IV-IO Access and Fluid Therapy Guidelines**
 - ❑ IV access prior to nitrates is preferred, if possible
 - ❑ Obtain 12 Lead EKG (If available)
 - ❑ All EKG's suggestive of acute MI should be immediately transmitted to a STEMI/PCI Receiving Center, if available, or to nearest ED
 - ❑ If the patient has a STEMI, then transport to the closest available STEMI/PCI receiving center, if available.
 - ❑ If STEMI/PCI receiving center not available, transport to closest available emergency department
 - ❑ Confirm destination choice with online medical control, if needed
- ❑ Chest pain with cardiac origin is a rare in children, consider other causes;
 - Asthma
 - Foreign body
 - Infection
 - Trauma

- ❑ **Normal saline 250–1000 mL** IV bolus if patient is hypotensive, use caution with a history or evidence of congestive heart failure
- ❑ **Nitroglycerin 0.4 mg (every 5 minutes) (max of 3 doses)** SL as long as symptoms persist and SBP >100 mmHg
 - **Administer with caution in patients with known inferior ST-Elevation MI**
- ❑ **If hypotension occurs following nitroglycerin administration, administer 500 mL bolus of NS and withhold further nitroglycerine**
- ❑ Pain medications per ***Pain and Anxiety Management Guideline***

PARAMEDIC

PARAMEDIC

CONGESTIVE HEART FAILURE/PULMONARY EDEMA

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Assess blood glucose level.
- ❑ Continuous ECG, ETCO₂, and Pulse Oximetry monitoring when available
- ❑ **Treatment Plan** - Maintain airway; assist with breathing as necessary, provide oxygen
- ❑ **Key Considerations**
 - Do not use nitroglycerin if the patient has taken erectile dysfunction medications in the last 24 hours.
 - In pregnant patients of >20 weeks gestation: Place wedge-shaped cushion or multiple pillows under patient's right hip in order to transport in left lateral decubitus position
 - Treatment protocols from current nationally established cardiac care certification programs (ACLS, PALS, etc.) may be used in lieu of these resuscitation guidelines.
 - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ Assist patient with prescribed nitroglycerin SL every 5 minutes, up to 3 doses, as long as symptoms persist and SBP >100 mmHg
 - Do not administer nitroglycerin if the patient (male or female) has taken erectile dysfunction medications within the last 24 hours

EMT

- ❑ Contact On-Line Medical Consultation

AEMT

- ❑ Advanced airway, vascular access and fluid per **IV-IO Access and Fluid Therapy guidelines**
 - IV access prior to nitrates is preferred if possible
 - Limit fluid bolus to 250–500 mL NS
- ❑ **Nitroglycerin 0.4 mg (every 5 minutes) (max of 3 doses)** SL if symptoms persist and SBP >100 mmHg. Maximize Nitroglycerin before considering Morphine
- ❑ **CPAP** –
 - Explain the procedure to the patient
 - Apply the mask and begin the CPAP
 - **CPAP** - Provide CPAP of 5 cm H₂O to begin. May increase to 10 mm H₂O if needed. **Further increase only with OLMC consultation.**

AEMT

- ❑ Advanced airway, vascular access and fluid per **IV-IO Access and Fluid Therapy guidelines**
- ❑ Contact On-Line Medical Consultation
- ❑ **CPAP** – ONLY use when the patient is on the machine at home. Maintain home settings and bring machine with the patient. If unable to adequately ventilate return to BVM or advance to intubation

- ① Contact OLMC to discuss further settings and treatment above the initial setup

PARAMEDIC

- ① **Furosemide** – Give 40 mg IV to the patient if they do not take it by prescription and if SBP >100 mmHg **OR**
Give IV two (2) times patient's prescribed oral dose up to maximum of 120 mg if SBP >100 mmHg
- ① **Epinephrine (1:1000) 2–10 mcg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg.
And/or
- ① **Dopamine 2-20 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg. (*Goal is to maintain a mean arterial pressure (MAP) >70 mmHg*)
- ① Contact OLMC to discuss further settings and treatment above the initial setup

PARAMEDIC

- ① Contact On-Line Medical Consultation
- ① **Epinephrine (1:1000) 0.1–2 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.
And/or
- ① **Dopamine 2-20 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg

EKG INSTRUCTIONS

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Assess for signs or symptoms suggestive of cardiac ischemia or infarction.
 - Determine the need for a 12 Lead EKG.
- ❑ Continuous ECG, ETCO₂, and Pulse Oximetry monitoring when available

ADULT

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

AEMT

- ❑ 12 Lead EKG (If available) on the following patients:
 - Pain in chest or upper abdomen
 - Cardiac dysrhythmia
 - Syncope or near syncope
 - Acute general weakness
 - Acute dyspnea
 - Post arrest if spontaneous circulation returns
 - Concern for ACS presentation
- ❑ Acquire and transmit EKG
- ❑ All EKG's suggestive of acute MI should be immediately transmitted to a STEMI/PCI Receiving Center, if available, or to nearest ED
- ❑ If the patient has a STEMI, then transport to the closest available STEMI/PCI receiving center, if available.
- ❑ If STEMI/PCI receiving center not available, transport to closest available emergency department

EMT

AEMT

- ❑ 12 Lead EKG (If available) on the following patients:
 - Pain in chest or upper abdomen
 - Cardiac dysrhythmia
 - Syncope or near syncope
 - Acute general weakness
 - Acute dyspnea
 - Post arrest if spontaneous circulation returns
 - Concern for ACS presentation

① Confirm with OLMC if there are any questions

PARAMEDIC

PARAMEDIC

LEFT VENTRICULAR ASSIST DEVICE (LVAD)

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Assess for evidence that resuscitation should not be attempted per the **Death Determination Guideline**.
 - Evaluate for Medical Alert Bracelet with instructions. Follow instructions as able.
 - The LVAD consists of an implanted, continuous flow pump attached to the left ventricle, an external control device, and power supply secured by a harness
 - Every patient should have a backup equipment bag for his or her LVAD.
 - Patients and families are usually well educated on the power supply of their LVAD and the use of the emergency hand pump. Utilize them and follow their directions on scene.
 - Rhythm analysis, blood pressure, and oxygen saturation assessment.
 - Patients with non-pulsatile assist devices will not have a palpable pulse. Assess for signs of adequate perfusion using skin signs and blood pressure.
- ❑ Continuous ECG, ETCO₂, and pulse oximetry monitoring when available.
- ❑ **Treatment Plan**
 - Check to see if the patient is responsive.
 - Check if the LVAD is functioning by listening for a HUM.
 - Check the patient's rhythm.
 - Check for alarm lights and sounds – Continuous tone is URGENT.
 - Check cable connections.
 - Check power source.
 - Change controller if needed.
 - NO chest compressions unless you are unable to restart the pump.
 - Follow ACLS guidelines as needed.
- ❑ **Key Considerations**
 - Determine Type of Device – Heart Mate II, Jarvik 2000, or Heartware
 - Transport to the specialty center that implanted the device is preferable, if stable and transport times are reasonable.
 - Patients or their families should have a phone number to their LVAD coordinator. This person should be used as online medical consultation (OLMC). If the number is not available, contact the LVAD Coordinator at the University Medical Center (801-581-2121) for assistance.
 - Patients with implanted LVADs have a low intrinsic cardiac function/reserve that is, without mechanical assistance, incompatible with long-term survival.

ADULT

EMT

- ❑ BLS airway support as needed
- ❑ **EVEN WHEN ACLS RESUSCITATION IS UNDERTAKEN, DO NOT PERFORM CPR IN THESE PATIENTS UNLESS A HAND PUMP FOR THE DEVICE DOES NOT EXIST. RUPTURE OF THE VENTRICULAR WALL MAY OCCUR.** If the device has a hand pump, this may be undertaken at a rate of 60-90 beats per minute

AEMT

- ❑ Supportive care of airway, vascular access and fluid therapy per **IV/IO Access and Fluid Therapy Guidelines**
- ❑ LVADs are preload dependent and a fluid bolus may improve perfusion

PARAMEDIC

- ❑ ACLS medications as indicated

NEWBORN RESUSCITATION

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Glucose assessment via heel stick - Oral glucose is **not** indicated in the newborn
- ❑ Continuous ECG, ETCO₂, and pulse oximetry monitoring when available
- ❑ **Treatment Plan**
 - If the newborn is apneic, slow to respond, has slow or gasping respirations, or persistent central cyanosis
 - Suction (bulb syringe) mouth, then nose.
 - Warm and stimulate
 - Evaluate respirations, heart rate, and activity
 - If apneic, cyanotic, lethargic, HR<100
 - Perform manual airway maneuvers and provide BVM at rate of 30-40bpm with 100% oxygen
 - Assist ventilations with supplemental oxygen for at least 30 seconds
 - If no improvement or HR is <60 bpm, begin chest compressions
 - Compression/ventilation ratio of 3:1 and a rate of 120 events per minute
- ❑ **Key Considerations**
 - Treatment protocols from current national neonatal resuscitation certification programs (e.g. NALS, NRP) may be used in lieu of these guidelines

EMT AEMT

- ❑ Advanced airway placement may be indicated when:
 - BVM has been ineffective
 - Chest compressions are performed
- ❑ IV or IO NS at a keep open (approx. 10ml/hr.) rate to avoid volume overload
 - Only when required for fluid resuscitation or parenteral medication
 - IO access is only indicated when life-threatening conditions are present
- ❑ **Epinephrine**
 - **0.01-0.03 mg/kg = 0.1-0.3 ml/kg (1:10,000)** IV or IO
 - Repeat every 3-5 minutes until spontaneous heart rate remains > 60 bpm
- ❑ **Naloxone (Narcan) 0.1mg/kg** repeated every 2-3 min as needed for babies of suspected narcotic addicted mothers

EVIDENCE OF HYPOPERFUSION OR HYPOVOLEMIA

- ❑ NS (IV or IO) @ 10 mL/kg syringe bolus over 5-10 min
 - ① Additional boluses require physician approval

PARAMEDIC

- ❑ Endotracheal intubation may be indicated when:
 - BVM has been ineffective
 - Meconium aspiration with depressed respirations, decreased muscle tone, or heart rate <100 bpm
 - Chest compressions are performed
 - Insert a gastric tube in all intubated patients
- ❑ **Dextrose 10%** per **Glucose Emergencies - Hypoglycemia/Hyperglycemia Guidelines**

OPTIONAL ORDERS BY MEDICAL CONSULTATION ONLY

- ① **Sodium bicarbonate 1-2 mEq/kg IV or IO**

POST CARDIAC ARREST MANAGEMENT / THERAPEUTIC HYPOTHERMIA

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Blood glucose assessment
- ❑ Continuous ECG, ETCO₂, and pulse oximetry monitoring when available
- ❑ **Treatment Plan**
 - Preferential transport to a STEMI/PCI receiving center, if available.
 - Consider initiation of **Therapeutic Hypothermia**
 - Inclusion Criteria:**
 - Cardiac arrest with ROSC
 - >14 years of age
 - GCS <9 (comatose)
 - Supraglottic Airway/Endotracheal Intubation with confirmed placement of airway
 - Contraindications:**
 - DNR order
 - Coma unrelated to cardiac arrest (e.g. Intoxication, sepsis, trauma, CVA, status epilepticus)
 - Uncontrolled bleeding or known coagulopathy
 - Pregnancy
 - Recent major surgery
 - Patient is awake and alert
 - Unable to establish an advanced airway

ADULT

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT
AEMT

- ❑ Advanced airway, vascular access and fluid therapy per **IV-IO Access and Fluid Therapy Guidelines**
- ❑ **Therapeutic Cooling Procedure** for eligible patients:
 - Establish bilateral large bore IV/IO access
 - If available, monitor and insure ETCO₂ at >20mmHg. The target is 35-40mmHg. Do not hyperventilate
 - Obtain a 12-lead ECG, if able, and transmit to OLMC
 - Rapidly infuse cold (4 degree Celsius) NS at 30ml/kg bolus not to exceed 2 liters
 - Narcotics may be required for control of shivering. Follow the **Pain and Anxiety Management Guideline**.

EMT
AEMT

- ❑ Advanced airway, vascular access and fluid therapy per **IV-IO Access and Fluid Therapy guidelines**
 - ❑ **Monitor closely for hypotensive shock.** Consult with OLMC for direction if blood pressure is less than pediatric lowest acceptable systolic blood pressures
 - Birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.
- 📌 **Discuss Therapeutic Cooling with OLMC, it is often contraindicated in patients less than 15 years old**

- Remove outer clothing while maintaining modesty
- Apply ice packs to the patient's groin and axilla
- Closely monitor the patient, keeping the temperature between 32-34 C° (89.6-93.2 F°)
- Discontinue cooling if patient awakens, develops an unstable arrhythmia, sustained SBP<80 or severe bleeding

① **Without previous antiarrhythmic therapy during arrest consider**

- **Lidocaine 0.5-1.5 mg/kg IV push**, (if not given Lidocaine during the arrest), followed by continuous infusion per Chart in Appendix of 2-4 mg/min

PARAMEDIC

- ❑ **Vecuronium** (optional) – Patient **MUST** be intubated to use.
 - **0.1mg/kg to a max of 10mg IV**.
 - This should be reserved for individuals with shivering, may be used in lieu of narcotics
- ❑ **With previous lidocaine or amiodarone therapy during cardiac arrest resuscitation consider:**
 - **Lidocaine**, begin continuous infusion **2-4 mg/min**
 - **Amiodarone**, begin infusion at **1mg/min**

① Maintain SBP >80 mmHg, utilizing pressors, if necessary

① **Epinephrine (1:1000) 2–10 mcg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg.

And/or

① **Dopamine 2-20 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg. (*Goal is to maintain a mean arterial pressure (MAP) >70 mmHg*)

PARAMEDIC

PULSELESS ARREST – NON-SHOCKABLE RHYTHM

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Assess for evidence that resuscitation should not be attempted per the **Death Determination Guideline**.
 - Assess for presence or absence of a pulse.
 - Determine rhythm – asystole, pulseless electrical activity, etc.
 - Assess blood glucose level.
- ❑ Continuous ECG, ETCO₂, and pulse oximetry monitoring when available
- ❑ **Treatment Plan**
 - Begin CPR
 - Consider Underlying Causes and Treat
 - **H's** - Hypovolemia, Hypoxia, Hydrogen ion (Acidosis), Hyper-/hypokalemia, Hypothermia, Hypoglycemia
 - **T's** – Toxins (Overdose), Tamponade (Cardiac), Tension Pneumothorax, Thrombosis (ACS or Pulmonary), Trauma
- ❑ **Key Considerations**
 - Pregnancy >20 weeks gestation - Place wedge-shaped cushion or multiple pillows under patient's right hip (L lateral decubitus position)
 - Treatment protocols from current nationally established cardiac care certification programs (e.g. ACLS, PALS) may be used in lieu of these resuscitation guidelines.
 - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ Begin CPR and apply AED

AEMT

- ❑ Advanced airway, vascular access and fluid therapy per the **IV/IO Access and Fluid Therapy Guidelines**
- ❑ **Epinephrine**
 - **1 mg (1:10,000) IV/IO push**
 - Consider 3-5 mg if arrest is from beta blocker overdose or anaphylaxis
 - Repeat every 3-5 minutes as long as patient remains pulseless
- ❑ Begin IV NS Bolus

🕒 **Contact OLMC before terminating efforts in the field**

PARAMEDIC

🕒 **Establish OLMC for further orders or therapies**

EMT

- ❑ Begin CPR and apply AED

AEMT

- ❑ Advanced airway, vascular access and fluid therapy per the **IV/IO Access and Fluid Therapy Guidelines**
- ❑ **Epinephrine**
 - **0.01 mg/kg = 0.1 ml/kg (1:10,000) IV/IO push**
 - Repeat every 3-5 minutes as long as patient remains pulseless
 - May repeat initial dose
- ❑ Begin 20ml/kg bolus of NS, reassess and repeat if needed to a max of 60cc/kg

🕒 **Contact OLMC before terminating efforts in the field**

PARAMEDIC

🕒 **Establish OLMC for further orders or therapies**

PULSELESS ARREST: SHOCKABLE (VENTRICULAR FIBRILLATION or PULSELESS VENTRICULAR TACHYCARDIA)

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Assess for presence or absence of a pulse.
 - Determine probable rhythm – ventricular fibrillation or pulseless ventricular tachycardia
 - Assess blood glucose level.
- ❑ Continuous ECG, ETCO₂, and pulse oximetry monitoring when available
- ❑ **Treatment Plan**
 - Begin CPR
 - Assume cardiac origins for all adult arrests unless evidence to the contrary. Consider underlying causes and treat when possible.
 - **H's** - Hypovolemia, Hypoxia, Hydrogen ion (Acidosis), Hyper/hypokalemia, Hypothermia, Hypoglycemia
 - **T's** – Toxins (Overdose), Tamponade (Cardiac), Tension Pneumothorax, Thrombosis (ACS or Pulmonary), Trauma
- ❑ **Key Considerations**
 - Assess for evidence that resuscitation should not be attempted.
 - Pregnancy >20 weeks gestation - Place wedge-shaped cushion or multiple pillows under patient's right hip (L lateral decubitus position)
 - Transport these patients to the nearest emergency department without delay while attempting to provide continuous compressions and defibrillation, as there is a potential to perform emergency cesarean section.
 - Treatment protocols from current nationally established cardiac care certification programs (e.g. ACLS, PALS) may be used in lieu of these resuscitation guidelines.
 - AED is only to be used > 1 year of age. Use a pediatric system, if available, for ages 1 to 8 years old.
 - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ If arrest is **witnessed**
 - Defibrillate immediately if AED or manual defibrillator is available.
- ❑ If **un-witnessed** or defibrillator is not immediately available.
 - Begin high quality CPR (100 compressions per minute with minimal interruptions, 2 minute cycles)
 - When AED arrives, attach to patient and defibrillate if a shock is advised
- ❑ Resume CPR immediately after each shock and continue for 2 minutes or until asked to hold by the AED
- ❑ Check pulse and assess rhythm / shock if advised after each 2 minutes cycle of compressions
- ❑ Place an NP or OP airway and a non-rebreather mask with high-flow oxygen during the first 2-3 cycles of CPR/defibrillation. After 2-3 cycles apply

EMT

- ❑ If arrest is **witnessed**
 - Defibrillate immediately if AED or manual defibrillator is available. **2 J/kg** for the first attempt
- ❑ If **un-witnessed** or defibrillator is not immediately available.
 - Begin high quality CPR
 - When AED arrives, attach to patient and defibrillate if a shock is advised
- ❑ Resume CPR immediately after each shock and continue for 2 minutes (5 cycles) or until asked to hold by the AED
- ❑ Check pulse and assess rhythm / shock if advised after each 2 minutes cycle of compressions
- ❑ Place an NP or OP airway and apply asynchronous BVM breaths at a rate of 1 breath every 4-6 seconds

asynchronous BVM breaths at a rate of 1 breath every 6-8 seconds

AEMT

- ❑ Vascular access and fluid therapy per **IV-IO Access and Fluid Therapy Guidelines**
- ❑ Airway management as above with use of a supraglottic airway device instead of BVM, if available
- ❑ **Defibrillation: 360J** for a monophasic defibrillator or **200J** for a biphasic
- ❑ Resume CPR (2 minute cycle) immediately following shock delivery, then perform rhythm analysis

PERSISTENT OR RECURRENT VF/VT PRESENT

- ❑ **Epinephrine**
 - **1 mg (1:10,000) IV push**
 - Repeat every 3-5 minutes

ANTIARRHYTHMICS

- ❑ May use any **ONE** antiarrhythmic available, either amiodarone or lidocaine
- ❑ **Amiodarone**
 - **300mg IV/IO** for refractory VF/pulseless Vtach
 - Second dose is 150mg IV/IO
- ❑ **Lidocaine**
 - **1-1.5 mg/kg IV/IO push** or one time dose of 1.5 mg/kg
 - May repeat every 3-5 min up to 3 mg/kg

PARAMEDIC

- ❑ Consider endotracheal intubation
- ❑ **Vasopressin**
 - Give 40 units IV/IO in place of the 1st or 2nd dose of epinephrine.
 - May be more effective than epinephrine in cases of beta blocker overdose
- ❑ **Magnesium** - Give 1-2gm IV over 2 minutes for Torsades de Pointes

AEMT

- ❑ Advanced airway, vascular access and fluid therapy per **IV-IO Access and Fluid Therapy Guidelines**
- ❑ **Defibrillation: 2 J/kg** for the first shock with either a monophasic or biphasic defibrillator. Second shock at **4J/Kg** and subsequent shocks at **≥4J/Kg** to a maximum of 10J/Kg or the adult dose
- ❑ Resume CPR (2 minute cycle) immediately following shock delivery, then perform rhythm analysis

PERSISTENT OR RECURRENT VF/VT PRESENT

- ❑ **Epinephrine**
 - **0.01 mg/kg = 0.1 ml/kg (1:10,000) IV or IO push**
 - Repeat every 3-5 minutes
 - May repeat initial dose

ANTIARRHYTHMICS

- ❑ May use any **ONE** antiarrhythmic available, either amiodarone or lidocaine
- ❑ **Amiodarone**
 - **5mg/kg IV/IO**
 - May repeat up to 2 times for refractory VF/pulseless VT
 - Do not exceed 300mg for VFib/Pulseless Vtach
- ❑ **Lidocaine**
 - **1 mg/kg IV/IO**
 - May repeat every 3-5 minutes up to 3 mg/kg

PARAMEDIC

- ❑ Consider Endotracheal Intubation
- ❑ **Vasopressin** - Not Recommended.
- ❑ **Magnesium** - Give 25-50mg/kg IV/IO for Torsades de Pointes. Maximum 2grams

TACHYCARDIA (With a Pulse)

ALL PROVIDERS

- ❑ Focused history and physical exam
 - Assess blood glucose level
 - Determine probable rhythm – sinus tachycardia, supraventricular tachycardia, ventricular tachycardia, etc.
- ❑ Continuous ECG, ETCO₂, and pulse oximetry monitoring when available
- ❑ Perform a 12 EKG if possible.
- ❑ **Treatment Plan**
 - Identify and treat the underlying cause (e.g. hypotension, pain, medication, heart failure, etc.)
- ❑ **Key Considerations**
 - Pregnancy >20 weeks gestation - Place wedge-shaped cushion or multiple pillows under patient's right hip (L lateral decubitus position)
 - Treatment protocols from current nationally established cardiac care certification programs (e.g. ACLS, PALS, etc.) may be used in lieu of these resuscitation guidelines.
 - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

EMT

AEMT

AEMT

- ❑ Vascular access and fluid therapy per ***IV-IO Access and Fluid Therapy Guidelines***

- ❑ Vascular access and fluid therapy per ***IV-IO Access and Fluid Therapy Guidelines***

SUPRAVENTRICULAR TACHYCARDIA

SUPRAVENTRICULAR TACHYCARDIA

- ❑ In stable patients, obtain a 12 Lead EKG, if possible, to establish a baseline
- ❑ In stable patients, may perform maneuvers to increase vagal tone (Valsalva, ice pack to face, Trendelenburg position, etc.)

- ❑ In stable patients obtain a 12 Lead EKG, if possible, to establish a baseline
 - Infants: SVT rate usually greater than 220 bpm with no variation
 - Children: SVT rate usually greater than 180 bpm with no variation
- ❑ In stable patients, may perform maneuvers to increase vagal tone (Valsalva, ice pack to face, Trendelenburg position, etc.)

PARAMEDIC

- ❑ **Adenosine**
 - May be given for narrow complex tachycardia if regular and monomorphic
 - 6mg IV/IO initially
 - If no conversion, repeat with 12mg IV/IO
 - May repeat ever 3 minutes to max 3 doses

Stable Wide Complex (QRS > 120 msec) Tachycardia

🕒 **If stable, consult with OLMC prior to medication administration**

Antiarrhythmic medications:

- ❑ May use any **ONE** antiarrhythmic available
- ❑ **Amiodarone**
 - Give 150mg IV/IO over 10 minutes
 - Second dose is 150mg IV/IO over 10 minutes if needed
- ❑ **Lidocaine**
 - 1-1.5 mg/kg IV
 - May repeat every 3-5 min up to 3 mg/kg
- ❑ **Procainamide**
 - Give 15mg/kg to max 1000mg IV/IO over 60 minutes.
 - Stop infusion for:
 - Conversion of rhythm
 - Complete the infusion
 - Drop of SBP<100 mmHg
 - QRS width increases by >50%
 - Severe Bradycardia or AV block

Unstable Tachycardia – Synchronized Cardioversion

If no response to previous interventions and the patient has “Serious Signs or Symptoms” such as:

- Acute Cardiac Chest Pain
 - Active Congestive Heart Failure/Pulmonary Edema
 - Altered Mental Status
 - SBP < 90 mm Hg
 - Signs of Shock:
 - Cool, clammy, or pale skin
 - Weak or thready pulse
- ❑ **Synchronized Cardioversion**
 - Indicated immediately in the unstable patient
 - **Initial energy doses:**
 - Narrow Regular: **50-100J** (mono- or bi-phasic)

PARAMEDIC

- ❑ **Adenosine**
 - May be given for narrow or wide complex tachycardia if regular and monomorphic.
 - **0.1mg/kg IV/IO to max 6mg**
 - If no conversion, repeat with 0.2mg/kg IV/IO to max. 12mg
 - May repeat every 3 minutes up to max 3 doses

Stable Wide Complex (QRS > 120 msec) Tachycardia

🕒 **If stable, consult with OLMC prior to medication administration**

Antiarrhythmic medications:

- ❑ May use any **ONE** antiarrhythmic available
- ❑ **Amiodarone**
 - Give 5mg/kg IV/IO over 20-60 minutes
 - May repeat up to 2 times for refractory VF/pulseless VT
 - Do not exceed 300mg for VFib/Pulseless Vtach
- ❑ **Lidocaine**
 - 1 mg/kg IV/IO
 - May repeat every 3-5 minutes up to 3 mg/kg
- ❑ **Procainamide**
 - Give 15mg/kg to max 1000mg IV/IO over 30-60 minutes.
 - Stop infusion for:
 - Conversion of rhythm
 - Complete the infusion
 - Drop of SBP<70 + 2x age
 - QRS width increases by >50%
 - Severe Bradycardia or AV block

Unstable Tachycardia – Synchronized Cardioversion

If no response to previous interventions and the patient has “Serious Signs or Symptoms” such as:

- Active Congestive Heart Failure/Pulmonary Edema
 - Altered Mental Status
 - Lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.
 - Signs of Shock:
 - Cool, clammy, or pale skin
 - Weak or thready pulse
- ❑ **Synchronized Cardioversion**
 - Indicated immediately in the unstable patient

- Narrow Irregular: **120-200J** biphasic and **200J** monophasic
- Wide Regular: **100J** (mono- or bi-phasic)
- Wide Irregular: defibrillate without synchronization
- If no response, may increase energy dose to maximum: 360 J (monophasic) or 200 J (biphasic)

Sedation prior to Cardioversion

- ❑ Choose **ONE** benzodiazepine for treatment and maximize dosing. Contact OLMC before changing to a different medication.
- ❑ **Midazolam**
 - Dosage is cut in half if the patient has received narcotics or alcohol.
 - Consider the size of the patient for dosing.
 - **IV/IO - 2-4mg** every 5 minutes to the desired effect or max dose of 10mg.
 - **Intranasal or oral - 0.4 mg/kg** to a maximum of 10mg as a one-time dose
- ❑ **Diazepam** – May be used as an alternative. Follow the same safety parameters as with midazolam
 - **IV/IO – 5-10mg** every 5 min to the desired effect or max dose of 30mg
- ❑ **Lorazepam** – May be used as an alternative. Follow the same safety parameters as with Midazolam.
 - **IV/IO – 1-2mg** every 5 min. to the desired effect or max dose of 4mg

① **Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.**

- Initial energy dose is **0.5-1 J/kg**
- If no response double energy dose to **2 J/kg**

Sedation prior to Cardioversion

- ❑ Choose **ONE** benzodiazepine for treatment and maximize dosing. Contact OLMC before changing to a different medication.
- ❑ **Midazolam**
 - Dosage is cut in half if the patient has received narcotics or alcohol.
 - Consider the size of the patient for dosing.
 - **IV/IO - 0.1 mg/kg, max dose of 4mg.**
 - Do NOT exceed adult dosing.
 - **Intranasal or oral- 0.4 mg/kg** to a maximum of 10mg as a one-time dose.
- ❑ **Diazepam** – May be used as an alternative. Follow the same safety parameters as with Midazolam.
 - **IV/IO - 0.1 mg/kg, max dose of 10mg.**
 - Do NOT exceed adult dosing.
 - **Rectally – 0.3 mg/kg PR.**
- ❑ **Lorazepam** – May be used as an alternative. Follow the same safety parameters as with Midazolam.
 - **IV/IO – 0.1mg/kg, max dose of 4mg.**
 - Do NOT exceed adult dosing.

① **Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.**