

3.1A Bradycardia – Adult DRAFT

EMT/ADVANCED EMT STANDING ORDERS

E/A

- Routine Patient Care.
- Consider the underlying causes of bradycardia (e.g., acute coronary syndrome, hyperkalemia, hypoxia, hypothermia).
- 12-lead ECG if available.

PARAMEDIC STANDING ORDERS

For symptomatic bradycardia:

If symptomatic and hemodynamically unstable:

- Consider atropine 0.5 mg IV every 3 – 5 minutes to a maximum of 3 mg.
- If atropine is ineffective:
 - Consider transcutaneous pacing.
 - Administer procedural sedation prior to or during transcutaneous pacing, if feasible:
 - Midazolam 2.5 mg IV/IN, may repeat once in 5 minutes; or 5 mg IM, may repeat once in 10 minutes, **OR**
 - Lorazepam 1 mg IV, may repeat once in 5 minutes; or 2 mg IM, may repeat once in 10 minutes, **OR**
 - Diazepam 2 mg IV; may repeat once in 5 minutes.
- Epinephrine infusion (Dilute epinephrine 1 mg in 1000 mL 0.9% normal saline for 1 microgram/mL) 2 -10 micrograms/minute via pump, **OR**
- Norepinephrine (4 mg in 1000 mL 0.9% normal saline for 4 microgram/mL) 1 - 30 micrograms/minute via pump, **OR**
- Dopamine infusion 2 – 10 micrograms/kg/minute, **OR**
- **Contact Medical Control** for expert consultation.

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Other Causes:

- For symptomatic beta blocker or calcium channel blocker overdose, consider glucagon 5 mg IV over 3 – 5 minutes.
- For suspected hyperkalemia with ECG changes or symptomatic calcium channel blocker overdose consider:
 - Calcium gluconate (10% solution) 2 grams IV over 5 minutes, with continuous cardiac monitoring, may repeat in 10 minutes if clinical indication persists **OR**
 - Calcium chloride (10% solution) 1 gram IV over 5 minutes, with continuous cardiac monitoring. May repeat in 10 minutes if clinical indication persists.



For calcium chloride administration, ensure IV patency and do not exceed 1 mL per minute.

PEARLS:

- Hyperkalemia should be suspected in dialysis or renal failure patients with ECG changes such as tall peaked T waves, loss of P waves, QRS widening and bradycardia.
- **When pushed to quickly, glucagon can cause nausea and vomiting.**

Bradycardia – Pediatric DRAFT 3.1P

EMT/ADVANCED EMT STANDING ORDERS

E/A

- Routine Patient Care.
- Consider the underlying causes of bradycardia (e.g. hypoxia, hypoglycemia, hypovolemia, and hypothermia).
- Begin/continue CPR if heart rate is <60 bpm with hypoperfusion despite adequate ventilation and oxygenation.
- 12-lead ECG if available.

PARAMEDIC STANDING ORDERS

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For symptomatic bradycardia:

If hemodynamically unstable:

- Epinephrine (1:10,000) 0.01 mg/kg IV (0.1 ml/kg of 1:10,000) every 3 – 5 minutes.
- Consider atropine 0.02 mg/kg IV for increased vagal tone or AV blocks, may repeat once (minimum single dose: 0.1 mg; maximum single dose 0.5 mg.)
- Consider transcutaneous pacing.
- Administer procedural sedation prior to/during pacing, if feasible:
 - Midazolam 0.05 mg/kg IV/IN (maximum dose 2.5 mg), may repeat once in 5 minutes **OR**
 - Diazepam 0.05 mg/kg IV (maximum dose 2 mg), may repeat once in 5 minutes.

Other Causes:

- For hypoglycemia see Hypoglycemia 2.10P Protocols.
- For symptomatic beta blocker or calcium channel blocker overdose, consider glucagon 0.025 – 0.05 mg/kg.
- For symptomatic calcium channel blocker overdose consider:
 - Calcium gluconate (10% solution) 100 mg/kg IV with a maximum 2 gm/dose over 5 minutes; may repeat in 10 minutes if clinical indication persists, **OR**
 - Calcium chloride (10% solution) 20 mg/kg IV (0.2 ml/kg) with a maximum 1 gm/dose over 5 minute; not to exceed 1 ml per minute. May repeat in 10 minutes if clinical indication persists.



For calcium chloride administration, ensure IV patency and do not exceed 1 mL per minute.

PEARLS:

- Combine age specific heart rates with signs of respiratory failure and shock while assessing. If child is asymptomatic, consider no treatment.

Post Resuscitative Care Adult & Pediatric DRAFT

EMT/ADVANCED EMT STANDING ORDERS - ADULT

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- If feasible, acquire and transmit a 12-lead EKG.
- Initial ventilation rate of 10 - 12 BPM, then titrate to quantitative waveform capnography of 35 to 40 mm Hg, if available.
- ~~Maintain oxygen saturation at ≥ 94%.~~
- **Consider titrating oxygen lower for patients with SaO2 of 100%.**

ADVANCED EMT STANDING ORDERS - ADULT

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- Maintain systolic blood pressure of >90 mmHg OR MAP ≥65 mmHg.

PARAMEDIC STANDING ORDERS - ADULT

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For Post-resuscitation hypotension:

- Administer 0.9% NaCl in 250 – 500 ml boluses. Total volume should not exceed 2,000 ml.
- Consider: (An infusion pump is required for the use of these pressor agents)
 - Dopamine infusion 5 – 20 microgram/kg/min, **OR**
 - Norepinephrine infusion 1 – 30 microgram/min, **OR**
 - Phenylephrine 100 – 180 microgram loading dose followed by infusion 40 – 60 microgram/min, **OR**
 - Epinephrine infusion 2 – 10 microgram/minute titrated to effect.
- Consider nasogastric or orogastric tube for the intubated patient.

PARAMEDIC STANDING ORDERS - PEDIATRIC



For Post-Resuscitation Hypotension:

- IV 0.9% NaCl 20 ml/kg (may repeat x1), **AND/OR**
 - Consider: (An infusion pump is required for the use of these vasopressors)
 - Dopamine infusion 5 – 20 micrograms/kg/min, **OR**
 - Norepinephrine infusion 0.1 – 2 micrograms/kg/min titrated to effect, **OR**
 - Epinephrine 0.1 – 1 micrograms/kg/min titrated to effect.

Check with PICU folks re: dopamine
Joey

- For patients with return of spontaneous circulation after cardiac arrest not related to trauma or hemorrhage who are comatose without purposeful movement, consider transporting to a receiving facility capable of starting induced therapeutic hypothermia.
- If patient meets STEMI criteria transport per your STEMI guidelines/agreements. Notify receiving facility of a "STEMI Alert".

PEARLS:

- Avoid hyperventilation as it increases intrathoracic pressures, potentially worsening hemodynamic instability.

EMT/ADVANCED EMT STANDING ORDERS

E/A

- Routine Care.
- 12-lead ECG if available.

PARAMEDIC STANDING ORDERS

**Follow ACLS tachycardia guidelines as trained and credentialed.
For symptomatic tachyarrhythmias (other than sinus tachycardia):**

If symptomatic and hemodynamically unstable:

- Synchronized cardioversion:
 - Use the following initial energy doses, then escalate to the next higher energy level if no conversion. Biphasic devices: follow manufacturer's recommendations for dosing.
 - For narrow regular rhythm: 50 – 100J biphasic or 200J monophasic.
 - For narrow irregular rhythm: 120 – 200J biphasic or 200J monophasic.
 - For wide regular rhythm: 100J biphasic or monophasic.
 - For wide irregular/polymorphic VT: 120 – 200J biphasic or 360 monophasic, using unsynchronized defibrillation doses if unable to sync.
- Administer procedural sedation prior to or during cardioversion, if feasible:
 - Midazolam 2.5 mg IV/IN, may repeat once in 5 minutes or; 5 mg IM may repeat once in 10 minutes, **OR**
 - Lorazepam 1 mg IV, may repeat once in 5 minutes or; 2 mg IM, may repeat once in 10 minutes, **OR**
 - Diazepam 2 mg IV, may repeat once in 5 minutes.
- For regular, narrow complex: consider adenosine 6mg rapid IV.
- May repeat at dose of 12mg every 1 – 2 minutes x2 if no conversion.
- May repeat successful dose if rhythm recurs after conversion.

If symptomatic, but hemodynamically stable:

For narrow complex tachycardia (with a heart rate persistently >150bpm):

- Attempt vagal maneuvers, for regular rhythms.
 - If vagal maneuvers fail and the rhythm is regular:
 - Adenosine 6 mg rapid IV.
 - May repeat at dose of 12 mg in 1 – 2 minutes if no conversion.
 - May repeat successful dose if rhythm recurs after conversion.
 - Diltiazem 0.2 5mg/kg IV (maximum dose 20 mg) over 2 minutes.
 - May repeat dose in 15 minutes at 0.35 mg/kg (maximum dose 20 mg), if necessary.
 - Consider maintenance infusion at 5 – 15 mg/hour, **OR**
 - Metoprolol 5 mg IV over 2 – 5 minutes.
 - May repeat every five minutes to a maximum of 15 mg as needed to



- Diltiazem, metoprolol, amiodarone, and adenosine are contraindicated in patients with atrial fibrillation and a history of or suspected Wolff-Parkinson-White (WPW) syndrome.
- Medications should be administered cautiously in frail or debilitated patients; lower doses should be considered.

When introducing the new Cardiac Arrest protocol mention the updated red box for WPW

Protocol Continues

3.6A Tachycardia – Adult DRAFT

Protocol Continued

PARAMEDIC STANDING ORDERS - ADULT

For wide complex tachycardia:

- Only for regular rhythm with monomorphic QRS:
 - Consider: adenosine 6 mg rapid IV.
 - May repeat at dose of 12 mg after 1 – 2 minutes if no conversion.
 - May repeat successful dose if rhythm recurs after conversion.
 - Consider:
 - Amiodarone 150 mg IV mixed with 50 – 100 ml of 0.9% NaCl or D5W over 10 minutes.
 - May repeat once in 10 minutes.
 - If successful, consider a maintenance infusion of 1 mg/minute.
 - Lidocaine (considered second-line therapy) 1 – 1.5 mg/kg IV.
 - May repeat once in 5 minutes to maximum of 3 mg/kg.
 - If successful, consider a maintenance infusion of 1 – 4 mg/minute.

Lido vs amio vs placebo study finishing up; ask Jim

Procainamide

For polymorphic Ventricular Tachycardia/Torsades de Pointes:

- Consider magnesium sulfate 1 – 2 grams IV over 5 minutes.

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Cardiac Protocol 3.6A

PEARLS:

- Consider and treat potential underlying causes, e.g., hypoxemia, dehydration, fever.
- Wide complex tachycardia should be considered Ventricular Tachycardia until proven otherwise
- Signs and symptoms of hemodynamic instability:
 - Hypotension
 - Acutely altered mental status
 - Signs of shock
 - Signs of acute heart failure
 - Ischemic chest pain
- Adenosine should be administered rapidly through a proximal (e.g., antecubital) vein site followed by a rapid saline flush.

Tachycardia – Pediatric DRAFT 3.6P

EMT/ADVANCED EMT STANDING ORDERS

E/A

- Routine Patient Care.
- 12-lead ECG if available.

PARAMEDIC STANDING ORDERS

~~If symptomatic tachyarrhythmias (other than sinus tachycardia):~~

~~If symptomatic and hemodynamically unstable:~~

~~For narrow complex/probable SVT:~~

- Adenosine 0.1 mg/kg IV not to exceed 6 mg (first dose).
 - Repeat once at 0.2 mg/kg not to exceed 12 mg (subsequent dose).
- If adenosine is ineffective or for wide complex, perform synchronized cardioversion:
 - 0.5 – 1 J/kg; if unsuccessful, increase to 2 J/kg.
- Administer procedural sedation prior to or during cardioversion, if feasible:
 - Midazolam 0.05 mg/kg IV/IN (maximum dose 2.5 mg), may repeat once in 5 minutes **OR**
 - Diazepam 0.05 mg/kg IV (maximum dose 2 mg), may repeat once in 5 minutes.

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~~If symptomatic but hemodynamically stable:~~

~~For narrow complex, probable supraventricular tachycardia, or regular wide complex tachycardia (monomorphic QRS ONLY):~~

- Adenosine 0.1 mg/kg IV not to exceed 6 mg (first dose).
 - May repeat once at 0.2 mg/kg IV not to exceed 12 mg (subsequent dose).
- **For wide complex:**
 - Contact online **Medical Control** for consideration of amiodarone 5 mg/kg IV (maximum: 300 mg) over 20-60 minutes.



PEARLS:

- Consider and treat potential underlying causes, e.g., hypoxemia, dehydration, fever.
- Signs and symptoms of hemodynamic instability:
 - Hypotension
 - Acutely altered mental status
 - Signs of shock
- Probable Sinus Tachycardia:
 - Compatible history consistent with known cause
 - P waves are present and normal
 - Variable R-R and constant P-R interval
 - Infants: rate usually <220/min
 - Children: rate usually <180/min
- Probable Supraventricular Tachycardia:
 - Compatible history (vague, nonspecific); history of abrupt onset / rate changes
 - P waves absent / abnormal
 - Heart-rate is NOT variable
 - Infants: rate usually >220/min
 - Children: rate usually >180/min
 - Adenosine should be administered rapidly through a proximal (e.g., antecubital) vein site followed by a rapid saline flush