Bradycardia; Pulse Present

History
- Past medical history
- Medications
  - Beta-Blockers
  - Calcium channel blockers
  - Clonidine
  - Digoxin
- Pacemaker

Signs and Symptoms
- HR < 60/min with hypotension, acute altered mental status, chest pain, acute CHF, seizures, syncope, or shock secondary to bradycardia
- Chest pain
- Respiratory distress
- Hypotension or Shock
- Altered mental status
- Syncope

Differential
- Acute myocardial infarction
- Hypoxia / Hypothermia
- Pacemaker failure
- Sinus bradycardia
- Head injury (elevated ICP) or Stroke
- Spinal cord lesion
- Sick sinus syndrome
- AV blocks (1°, 2°, or 3°)
- Overdose

Heart Rate < 60 / min and Symptomatic:
Hypotension, Acute AMS, Ischemic Chest Pain, Acute CHF, Seizures, Syncope, or Shock secondary to bradycardia
Typically HR < 50 / min

NO → Exit to Appropriate Protocol(s)

YES

	Airway Protocol(s) AR 1, 2, 3 ***if indicated***
	Respiratory Distress Protocol AR 4 ***if indicated***
	Chest Pain: Cardiac and STEMI Protocol AC 4 ***if indicated***
	Search for Reversible Causes
B	12 Lead ECG Procedure CSP 1
	IV / IO Access Protocol UP 6
P	Cardiac Monitor
A	**Normal Saline Fluid Bolus 500 mL – 2 L NS IV / IO** *(Unless Acute CHF)* **Maximum 2 L**
P	**Atropine 1 mg IV / IO** *May repeat every 3 – 5 minutes* **Maximum 3 mg**
P	**Epinephrine 1 - 10 mcg/min IV / IO** Titrate to SBP ≥ 90 or MAP ≥ 65 mmHg
P	*Consider* **Push-Dose Epinephrine 10 mcg IV / IO** *May repeat every 2 minutes*
P	**If No Improvement Transcutaneous Pacing Procedure** ***(Consider earlier in 2nd or 3rd AVB)***

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia
Hypoglycemia
Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Suspected Beta-Blocker or Calcium Channel Blocker

Follow Overdose/ Toxic Ingestion Protocol TE 7

P	Consider Sedation **Midazolam 2.5 mg IV / IO / IN 5mg IM** **Age ≥ 65: 1 mg IV / IO / IN 2.5mg IM** Repeat every 5 minutes as needed **Maximum 10 mg**

Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

Bradycardia; Pulse Present

Push-Dose Vasopressor Agent

1. **Indications**
   - a. Peri-intubation hypotension
   - b. Post-arrest (post-ROSC) hypotension
   - c. Hypotension requiring initiation of vasopressor drip – prior to drip setup
   - d. Unstable bradycardia (as a supplement to other therapy)
2. **Instructions**
   - a. Draw up 1mL of 1:10,000 epinephrine
   - b. Waste 1mL of saline from a 10mL saline flush
   - c. Add the 1mL of epinephrine to the remaining 9mL of saline
     - i. This yields epinephrine in a concentration of 10mcg/mL
   - d. Place a medication added label on this syringe to identify it as a vasopressor
   - e. Administer 10mcg (1mL) every 2 minutes as needed to achieve desired blood pressure or heart rate

Norepinephrine (Levophed) Drip Rates

For the following chart, add **4mg** norepinephrine to **250mL** NS or D5W. Use **60 gtts/mL** IV Set

Desired Dose (mcg/min)	4 mcg/min	8 mcg/min	12 mcg/min	16 mcg/min	20 mcg/mi	24 mcg/min	28 mcg/min	30 mcg/min
Drip Rate (drops/min)	15 gtts/min	30 gtts/min	45 gtts/min	60 gtts/min	75 gtts/min	90 gtts/min	105 gtts/min	113 gtts/min

Norepinephrine Infusion Preparation

1) **Draw 4mL off and discard from a 250 mL bag** of NS or D5W
2) **Add 4mg** (1mg/mL) **norepinephrine** (Levophed) resulting in 250mL of a 16 microgram/milliliter solution of norepinephrine.
3) Connect and prime a **60 gtts/mL IV set** for medication administration.
4) Using high contrast sticker, label IV bag with medication name, amount added, date/time added, resulting concentration and provider initials

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.**
- **Consider hyperkalemia with wide complex, bizarre appearance of QRS complex, and bradycardia. Give Calcium Chloride or Gluconate in addition to Sodium Bicarbonate if hyperkalemia suspected.**
- **12-Lead ECG:**
  - **12 Lead ECG not necessary to diagnose and treat**
  - **Obtain when patient is stable and/or following rhythm conversion.**
- **Unstable condition**
  - **Condition which acutely impairs vital organ function and cardiac arrest may be imminent.**
  - **If at any point patient becomes unstable move to unstable arm in algorithm.**
- **Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory effort.**
- **Atropine:**
  - **Atropine is considered a first line agent in symptomatic bradycardia.**
  - **Ineffective and potentially harmful in cardiac transplantation. May cause paradoxical bradycardia.**
- **Symptomatic bradycardia causing shock or peri-arrest condition:**
  - **If no IV or IO access immediately available start Transcutaneous Pacing, establish IV / IO access, and then administer atropine and/or epinephrine.**
  - **Epinephrine or Dopamine may be considered if no response to Atropine.**
- **Symptomatic condition**
  - **Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.**
  - **Symptomatic bradycardia usually occurs at rates < 50 beats per minute.**
  - **Search for underlying causes such as hypoxia or impending respiratory failure.**
- **Serious Signs / Symptoms:**
  Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute CHF.
- **Transcutaneous Pacing Procedure (TCP)**
  - **Indicated with unstable bradycardia unresponsive to medical therapy.**
  - **If time allows transport to specialty center because transcutaneous pacing is a temporizing measure.**
  - **Transvenous / permanent pacemaker will probably be needed.**
  - **Immediate TCP with high-degree AV block (2d or 3d degree) with no IV / IO access.**
- Consider treatable causes for bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)