Bradycardia; Pulse Present

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

Signs and Symptoms
- HR < 50/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 < 50 / min and Symptomatic:
Hypotension, Acute AMS, Ischemic Chest Pain, Acute CHF, Seizures, Syncope, or Shock secondary to bradycardia
If asymptomatic with stable BP exit protocol

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

B — Search for Reversible Causes

B — 12 Lead ECG Procedure

IV / IO Protocol UP 6

P — Cardiac Monitor

A — **Normal Saline / LR 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 Push Dose 10 mcg q 2 min IV/IO
Repeat SBP < 90

Norepinephrine Push Dose 8-16mcq q 2 min IV/IO
Repeat SBP < 90

Norepinephrine 2 - 20 mcg / minute IV / IO

Epinephrine 1 - 10 mcg/min IV / IO
Titrate to SBP ≥ 90 mmHg

If No Improvement and Unstable
Transcutaneous Pacing Procedure
(Consider earlier in 2nd or 3rd AVB)

P — Consider Sedation only when stable
Midazolam 2 – 2.5 mg
IV / IO / IM / IN
Maximum 10 mg

Notify Destination or Contact Medical Control

Suspected Beta-Blocker or Calcium Channel Blocker

Follow Overdose/ Toxic Ingestion Protocol TE 7

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Bradycardia; Pulse Present

Remember Push Dose Pressors effects are temporary – if more than 2 doses are needed switch to the Norepi or Epi drips

	Infusion	Push-dose syringe
EPINEPHRINE	**Preparation:** ❑ Add 4 mg epinephrine 1:1,000 to 250 mL bag of Normal Saline Yields Epinephrine concentration of 16 mcg / mL ❑ Label the bag **Administration:** (1 – 10 mcg / min epinephrine) **IV Infusion Pump:** 4 – 38 mL / Hour **60 gtts / mL tubing:** 4 – 40 drips per minute	**Preparation:** ❑ Draw up 9 mL Normal Saline in 10 cc syringe ❑ Add the 1 mL epinephrine 1:10,000 Yields Epinephrine concentration of 10 mcg / mL ❑ Label the syringe **Administration:** **Push-Dose Epinephrine** ❑ Administer 1 mL (10 mcg epinephrine)

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.)