Adult Bradycardia Administrative Guideline (Age ≥ 14)

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

Signs and Symptoms
- Chest pain
- Respiratory distress
- Hypotension or Shock
- Altered mental status
- Syncope
- Lightheadedness/Dizziness

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

Stable Symptomatic Bradycardia (HR <60)
chest pain, shortness of breath, lightheadedness without shock or hemodynamic instability

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Administer atropine or epinephrine, but do not use simultaneously:

Administer **atropine sulfate 1 mg** rapid push IV/IO
May repeat every 3-5 minutes to a **max total dose of 3 mg**

OR

Administer **push dose epinephrine 20 mcg (2 mL)** IV/IO
(14 years or older only)
Repeat every 2 minutes, titrate to goal SBP 90 mmHg

Shock with bradycardia
Shock, evidence of poor perfusion, or end organ compromise (altered mental status, diaphoresis, pallor)

GCS 3 AND apnea or agonal breathing (periarrest)

Initiate chest compressions
Administer **epinephrine 1 mg (cardiac dose)**
Assess for pulse after 2 minutes

<u>If pulseless</u>
Transition to
OHCA AG

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Immediate **transcutaneous pacing** for patients not requiring CPR

Consider sedation if needed for pacing:
midazolam 0.05 mg/kg IV/IO
Max initial dose 2.5 mg

May repeat **x1 at full initial dose** after 10 minutes to a max total dose of 5 mg

Administer **push dose epinephrine 20 mcg (2 mL)** IV/IO
Repeat every 2 minutes, titrate to goal SBP 90 mmHg

Administer **20 mL/kg NS/LR fluid bolus** with <u>pressure bag</u>
May repeat x 1
hold for signs of fluid overload

P

wide complex bradycardia and history of renal failure, consider hyperkalemia and administer **calcium chloride 1g** IVP

Consider **20 mL/kg NS/LR** fluid bolus. Hold for signs of fluid overload
May repeat x 1

DRUG PREPARATION:

Preparation of push dose epinephrine (14 years or older only):
Mix 1 mL of 1 mg/10 mL (CARDIAC) epinephrine with 9 mL NS. This results in a 10 mcg/mL concentration

Education/Pearls

A bradycardic rhythm should be interpreted in clinical context, with pharmacological treatment reserved for significant symptoms or when signs of shock are present. Otherwise, closely monitor the patient and reassess regularly. Bradycardia typically causes symptoms when present at a rate of <50 beats/minute. Bradycardia may present with altered mental status, chest pain, congestive heart failure, seizure, syncope, shock, pallor, diaphoresis, cardiac arrest, or other evidence of hemodynamic instability.

Patients with profound bradycardia are at high risk of cardiac arrest, but many patients proceed through bradycardia prior to arresting. If you suspect cardiac arrest, do not use this AG and instead assume the presence of PEA and proceed directly to the **OHCA (Medical) AG**. Proceed to managing cardiac arrest in any patient with:

- Agonal or absent breathing
- GCS 3

Consider treatable causes for bradycardia, which include electrolyte abnormalities (e.g. hyperkalemia), myocardial ischemia, medication overdose (see below for more details), infections, hypoxemia, and hypothyroidism.

- Consider hyperkalemia in patients with ECG evidence of wide complex bradycardic rhythms and consider treatment with calcium chloride.
- Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory efforts.
- Consider opioid overdose, as well as medication overdoses, such as beta blockers, calcium channel blockers, and alpha-2 agonists (clonidine)

Medications: The two primary drugs utilized for chronotropy (increase in heart rate) are atropine and epinephrine. While both medications generally increase the heart rate, only epinephrine provides additional support as a peripheral vasopressor, increasing blood pressure through a second mechanism.

- Use caution in the administration of atropine or epinephrine in acute MI, as elevated heart rate can worsen ischemia. Pressors are often required in acute MI, despite this caution.
- **Epinephrine:** the preferred agent for bradycardia in the setting of unstable bradycardia, epinephrine provides vasoconstriction in addition to chronotropy.
- **Atropine:** an additional agent for bradycardia, atropine only increases a patient's heart rate and has no direct effect on peripheral blood pressure. Use caution when administering atropine in the setting of:
  - Overdoses, as administration may cause worsening bradycardia in certain scenarios (such as alpha agonist overdose, like with Clonidine).
  - Cardiac transplant patients, as it may cause paradoxical bradycardia.

Transcutaneous Pacing (TCP)

- Immediately use TCP in patients with evidence of poor perfusion or with high-degree AV block (2nd or 3rd degree) without IV/IO access.
- If time allows, transport to a cardiac receiving center because transcutaneous pacing is a temporizing measure and patients may need to go to the cath lab for pacemaker placement.
- Consider sedation or pain control for TCP, utilizing $EtCO_2$ for all patients receiving sedation
- Verify mechanical capture every 2-4 minutes when pacing a patient
- Patients in cardiac arrest or who are post-ROSC should not be paced; instead, use chest compressions and push-dose pressors, respectively.

Once at the hospital, consider having one crew member monitor the pacing equipment and monitor until hospital pads are successfully placed on the patient.