Adult Bradycardia Administrative Guideline (Age ≥ 14)

History	Signs and Symptoms	Differential

• Past medical history
• Medications
  ◦ Beta-Blockers
  ◦ Calcium channel blockers
  ◦ Clonidine
  ◦ Digoxin
• Pacemaker
	• Chest pain
	• Respiratory distress
	• Hypotension or Shock
	• Altered mental status
	• Syncope
	• Lightheadedness/Dizziness
		• 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

Bradycardia (HR<60)
with symptoms or evidence of hemodynamic instability.

Unresponsive or unconscious

Yes → Begin CHEST COMPRESSIONS and ADMINISTER EPINEPHRINE PER **Cardiac Arrest - Medical AG**

No

Symptomatic Bradycardia

chest pain, shortness of breath, lightheadedness without shock or hemodynamic instability

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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

For 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

Bradycardia with Shock

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

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Immediate transcutaneous pacing

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

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

For 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 at a rate of <50 beats/minute. Bradycardia may present with altered mental status, chest pain, congestive heart failure, seizure, syncope, shock, pallor, diaphoresis, or other evidence of hemodynamic instability.

Do not delay chest compressions in patients who are unconscious. transcutaneous pacing for patients with evidence of severe hemodynamically instability, with poor perfusion, or altered mental status. **Initiate pacing prior to the administration of epinephrine or atropine.**

- Consider treatable causes for bradycardia
  - Common causes: 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.

- 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.
  - Use caution in the administration of atropine or epinephrine in acute MI, as elevated heart rate can worsen ischemia.
  - **Atropine:** 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 Clonidine).
    - Cardiac transplant patients, as it may cause paradoxical bradycardia.
  - **Epinephrine:** the preferred agent for bradycardia in the setting of unstable bradycardia, as it provides vasoconstriction in addition to chronotropy

- 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

- Overdose
  - Bradycardia is seen in several medication overdoses, including beta blockers, calcium channel blockers, and alpha-2 agonists (clonidine)
  - In clonidine overdoses, avoid use of atropine in the setting of normotension, as atropine may cause reflex hypertension in this unique setting

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