Bradycardia-Adult

Aliases

Heart block, junctional rhythm

Patient Care Goals

1. Maintain adequate perfusion.
2. Treat underlying cause:
    a. Hypoxia
    b. Shock
    c. Second or third-degree AV block
    d. Toxin exposure (beta-blocker, calcium channel blocker, organophosphates, digoxin)
    e. Electrolyte disorder
    f. Hypoglycemia
    g. Increased intracranial pressure (ICP)
    h. Other

Patient Presentation

Inclusion Criteria

1. Heart rate less than 50 beats per minute with either symptoms (AMS, CP, CHF, seizure, syncope, shock, pallor, diaphoresis) or evidence of hemodynamic instability
2. The major ECG rhythms classified as bradycardia include:
    a. Sinus bradycardia
    b. Second-degree AV block
        i. Type I —Wenckenbach/Mobitz I
        ii. Type II —Mobitz II
    c. Third-degree AV block complete block
    d. Ventricular escape rhythms

Exclusion Criteria

No recommendations

Patient Management

Assessment, Treatment, and Interventions

a. Manage airway as necessary.

    i. Administer oxygen ***[EMR]*** as appropriate for dyspnea or distress with a target of achieving greater than 93% saturation for most acutely ill patients.
b. Initiate monitoring and perform 12-lead ECG
c. Establish IV access ***[AEMT].***
d. Check blood glucose and treat hypoglycemia per the Hypoglycemia and Hyperglycemia guidelines
e. Consider underlying etiologies for bradycardia: Toxin/Drugs (Poisoning and Overdose Universal Care Guideline), Medications (Beta-blockers Poisoning/Overdose Guideline, Calcium channel blockers Poisoning/Overdose Guideline), Acute Coronary Syndrome, Hypothermia, Head Injury, Stroke, Spinal cord injury, Cholinergic nerve agents.
f. Consider the following additional therapies if symptomatic bradycardia and hemodynamic instability continue:
    i. **Atropine *[PARA]* 1mg IVP every 3-5 minutes, max 3 mg**
    ii. Vasopressor medications titrated to a MAP greater than 65 mmHg (in order of preference)
        1. **Epinephrine *[PARA]***
            a. **Infusion: 0.05-2mcg/kg/min OR 2-10mcg/min**

b. **Push dose: 5-20mcg every 3-5minutes (**Mix 1ml of epinephrine 1mg/10mL in 9ml of NS yielding a new mixture of 100 mcg in 10 ml = 10 mcg/1 mL)

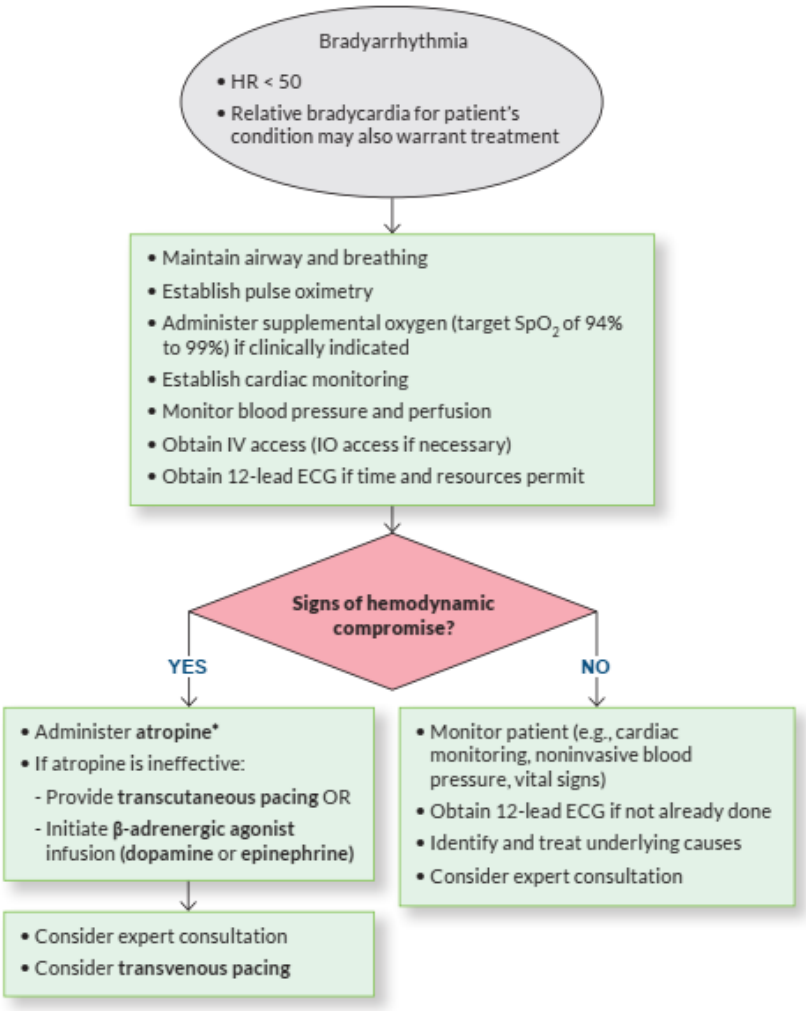
2. **Norepinephrine infusion *[PARA]* 0.025- 3 mcg/kg/min**
3. **Dopamine *[PARA]*: 2-20mcg/kg/min**
4. **Dobutamine [Inter-facility] 0.5-1 mcg/kg/min then titrate to effect 2-20 mcg/kg/min. May increase up to 40mcg/kg/min per medical consultation**

iii. Transcutaneous pacing ***[PARA]***; if pacing is performed, consider sedation or pain control

1. Set Pacer rate to 80 bpm
2. Set Pacer output to 10mA and increase until mechanical capture
    a. If patient's mental status is unresponsive, start at 140mA and titrate down

ADULT BRADYARRHYTHMIA

ALS - 2020 VERSION



Medications	
Atropine	• 1 mg IV bolus every 3 to 5 min, up to a max dose of 3 mg
Dopamine	• 5 to 20 mcg/kg/min titrated to effect
Epinephrine	• 2 to 10 mcg/min titrated to effect

Signs of Hemodynamic Compromise
• Changes in mental status
• Ischemic chest discomfort
• Hypotension
• Signs of shock
• Acute heart failure

*Consider implementing transcutaneous pacing or β-adrenergic agonist therapy immediately for patients with second-degree AV block type II or third-degree AV block. Consider implementing transcutaneous pacing immediately if vascular access is difficult to achieve.

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Patient Safety Considerations

If pacing is performed, consider sedation or pain control.

Notes and Educational Pearls

Key Considerations

1. Observe for signs of decreased end-organ perfusion: chest pain (CP), shortness of breath (SOB), decreased level of consciousness, syncope or other signs of shock/hypotension.
2. Be aware that patients who have undergone cardiac transplant will not respond to atropine.
3. Consider potential culprit medications including beta-blockers, calcium channel blockers, sodium channel blockers/anti-depressants, digoxin, and clonidine.
   Note: If medication overdose is considered, refer to appropriate guidelines in the Toxins and Environmental section
4. Consider whether the differential diagnosis includes the following: MI, hypoxia, pacemaker failure, hypothermia, sinus bradycardia, athletes, head injury with increased ICP, stroke, spinal cord lesion, sick sinus syndrome, AV blocks, overdose, cholinergic nerve agents.
5. Consider hyperkalemia in the patient with wide complex bradycardia.
6. Manage bradycardia via the least invasive manner possible, escalating care as needed.
   - Third-degree heart block or the denervated heart (as in cardiac transplant) may not respond to atropine and in these cases, proceed quickly to chronotropic agents (such as epinephrine or dopamine), or transcutaneous pacing.
   - Dopamine is not indicated for pediatric patients.
   - In cases of impending hemodynamic collapse, proceed directly to transcutaneous pacing.
7. Be aware of acute coronary syndrome as a cause of bradycardia in adult patients.
8. When dosing medications for pediatric patients, dose should be weight-based for non-obese patients and based on ideal body weight for obese patients.
9. Although dopamine is often recommended for the treatment of symptomatic bradycardia, recent research suggests that patients in cardiogenic or septic shock treated with norepinephrine have a lower mortality rate compared to those treated with dopamine.
10. **Caution:** Norepinephrine can theoretically cause reflex bradycardia.

Pertinent Assessment Findings

No recommendations

Quality Improvement

Associated NEMSIS Protocol(s) (eProtocol.01)

9914115—Medical-Bradycardia

Key Documentation Elements

1. Cardiac rhythm and rate
2. Time, dose, and response of medications given
3. Pacing: Time started or stopped, rate, joules, capture and response, rate,
4. Patient weight
5. Pediatric length-based tape color (for pediatrics who fit on tape)
6. History of event supporting treatment of underlying causes

Performance Measures

1. Blood sugar obtained
2. Correct medication(s) and dose given for patient condition, age and weight
3. Correct application and use of cardiac pacing
4. Use of sedation or pain management with cardiac pacing

EMS Compass® Measures (for additional information, see www.emscompass.org)

- *PEDS-03: Documentation of estimated weight in kilograms.:* Frequency that weight or length-based estimate are documented in kilograms

- *Hypoglycemia-01: Treatment administered for hypoglycemia.* Measure of patients who received treatment to correct their hypoglycemia

References

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