Emergency Cardiovascular Care: EMT-Intermediate Treatment Algorithms

Algorithms for the Conscious Patient
Prehospital Medication Profiles

Algorithm Focus
- Bradycardia
- Acute Pulmonary Edema and Shock
- Hypothermia

Perspective regarding the EMT-Intermediate algorithms
- The algorithms parallel AHA ACLS standards
  - Frequent references are made to local standing orders in all of the algorithms
- The algorithms are patient-focused
  - The EMT-I must decide whether the treatment algorithm is appropriate for the patient
  - Causes for the dysrhythmia or presentation should be explored as the EMT-I works through the algorithm

Assessment Through the Algorithm
- First, determine if the patient is stable or critical
- Put the patient’s presentation into perspective
  - Is the slow heart rate because of a conduction system failure, or is the slow heart rate occurring because the person is having an MI?
  - The algorithm may still be considered, but other therapies specific to the cause are utilized

“Unstable” or “Sick” Criteria
- New onset
- Drop in BP (<90mm Hg)
- Absence of pulse or BP
- Changes in LOC
  - Dizziness
  - Confusion
  - Lethargy
  - Coma

The Bradycardia Algorithm

Diagram of Bradycardia Algorithm
Bradycardia Algorithm

- "Relative v. absolute"
- Attempt to find the cause
  - Pacemaker failure
  - Prescription meds
  - Overdose
  - Hypoxia
  - MI
  - Sick sinus or AV node
- Serious Signs
  - Hypotension
  - Decreased LOC
  - Cardiogenic shock

Atropine

- Parasympatholytic
  - Directly counters the actions of the vagus nerve
  - Vagus nerve primarily influences the SA and AV nodes
- Actions
  - Increases the rate of firing at the SA node and increases conduction through the AV node

Atropine Administration

- Packaged as a preload syringe
  - 1 mg
- Dosing options
  - 0.5mg to 1.0mg boluses
  - Every 3-5 minutes to a total of 0.04mg/kg

Contraindications

- Relative bradycardia in the setting of an AMI
  - WHY?
- 2nd and 3rd degree heart blocks
  - These rhythms reveal a significant dysfunction at the AV junction
  - Atropine may cause the irritated AV junction to disconnect further from the ventricles
  - The ventricular rate will slow even further!

Bradycardia Tips

- Mild signs/symptoms?
  - Start with oxygen and perform a focused history and physical before considering atropine
  - If atropine is considered, start with the lower dose (0.5mg) and reassess the patient for changes

Bradycardia Tips

- Major signs/symptoms?
  - Start with BLS care
  - Evaluate the “relativity” of the slow HR on the patient’s cardiac output (CO)
    - Is it so low that it is significantly impacting CO?
      - A full dose of atropine may be warranted
    - If it’s not the sole cause for low CO, then how much is it contributing to the low CO?
      - Other therapies may take priority
      - A smaller dose of atropine may be used to support CO
Algorithm Practice: Bradycardia

You are called to the residence of a 65 year-old male complaining of being “unusually tired.” The patient states that he hasn't had much energy today and gets dizzy when he sits up too quickly.

Stable or Unstable?
The patient denies any recent illness or surgery, productive cough, chest pain, or GI bleeds. His blood pressure is 142/80 while supine, HR of 52, and RR of 14. Patient appears pale. He is alert and answers questions.

Questions For You

• What is the primary cause of his problem?
• Any secondary considerations to keep in mind?
• So, what are you going to do for him? - Defend your rationale!

Which Algorithm??

• Bradycardia Algorithm
• Ischemic Chest Pain Algorithm
  - “VOMIT”
  - “MONA”
  - Cath Lab/Thrombolytic candidate screening

Final Thoughts on Bradycardia

• Don’t fit your patient into the algorithm!
• Stable v. Unstable assessment is first
• Consider causes early on
  - Don’t forget initial supportive care while you are contemplating this
• Think \( CO = SV \times HR \) when evaluating or debating your treatment options
Pulmonary Edema, Shock and Hypotension Algorithm

Treatment Options

- Acute Pulmonary Edema
  - Usually a consequence of chronic CHF
  - Nitroglycerin, morphine and Lasix administration
    - All 3 drugs will drop BP – monitor BP closely

- Volume Problem
  - CHF patients can suffer from hypovolemia
    - Vomiting, diuretics, trauma, dehydration
    - Pulmonary edema may still be present
  - Connect the volume problem with a cause and be conservative with fluid challenges

- Pump problem
  - Acute dysfunction of cardiac contractility
  - Pulmonary edema and hypotension result from the left ventricle’s inability to move fluid out into the body
  - Treatment: ALS intercept and supportive care

- Rate problem
  - Significant tachycardias do not allow for adequate filling time of the chambers
    - Poor cardiac output (shock)
    - Back-up of fluid (pulmonary edema)
  - Oxygen, IV, attempt vagal maneuvers for narrow-complex rhythms, call for ALS intercept

Hypothermia

Treatment Options

- Volume Problem
  - CHF patients can suffer from hypovolemia
    - Vomiting, diuretics, trauma, dehydration
    - Pulmonary edema may still be present
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- Hypothermia
  - Low core temperature
  - Requires rewarming measures
  - Vagal maneuvers for narrow complex rhythm
  - Call for ALS intercept

Hypotension Algorithm

2005 EMT-Intermediate Curriculum: Bridge Course
• "Initial Therapy"
  - Appropriate management considerations for all hypothermic patients
  - The timing of these actions may vary in relation to the severity of the patient’s condition

Summary of Conscious Patient Algorithms

• Avoid the temptation to interpret isolated signs and symptoms
  - Try to connect them to a primary cause
  - If this is difficult to do, then apply the patient’s presentation to the physiology of cardiac output
• Use objective evidence from your patient assessment when determining a treatment plan