1. **Initial Stabilization:** The first priority in the approach to bradycardia is to stabilize the unstable patient
   a. Put pads on patient, obtain the crash cart and ACLS medications, get airway equipment set up
   b. Obtain an EKG: determine type of bradycardia.
      i. Sinus vs AV nodal block (Mobitz I and II, 3\textsuperscript{rd} degree complete heart block). Wide (> 120 msec) vs narrow complex. Evaluate for STEMI, evidence of hyperkalemia.
   c. Atropine: 0.5-1 mg. May not work in 2\textsuperscript{nd} and 3\textsuperscript{rd} degree blocks but is a reasonable first treatment
      i. Can temporize situation until pressors/TC pacing available
   d. If patient is hypotensive, altered, has chest pain must intervene emergently skip ahead to step 3’s general treatments (fluids, TC pacing, inotropes/pressors to stabilize patient)

2. **Evaluate for 3 Immediate Life Threats:** Evaluate for these three emergent causes of bradycardia
   a. Hyperkalemia
      i. Can cause severe bradycardia and hypotension, typically wide complex
      ii. Determine if history of dialysis, presence of a fistula
      iii. Evaluate EKG for wide QRS, loss of P waves, peaked T waves
      iv. Send VBG with electrolytes
      v. Consider empirically giving calcium gluconate
   b. Calcium Channel Blocker (CCB)/Beta Blocker (BB) Overdose
      i. CCB
         1. Typically verapamil or diltiazem (peripherally acting CCB can cause hypotension with reflex tachycardia)
         2. Hyperglycemic – CCB overdose causes hyperglycemia by inhibiting insulin release from pancreatic islet cells, helps to differentiate from BB toxicity
      ii. BB
         1. Metoprolol, atenolol, carvedilol, propranolol, sotolol
      iii. Also evaluate for possible digoxin or clonidine overdose
   c. STEMI
      i. Generally an RCA lesion taking out the AV node, look for inferior STEMI distribution
3. **Treatment**
   a. **General: Goal to improve HR and BP**
      i. Fluid bolus
      ii. Inotropes/Vasopressors: epinephrine, isoproterenol, dopamine, NE, dobutamine
      iii. **Transcutaneous Pacing/Transvenous pacing**
         1. Transcutaneous: set HR to 80 and pacing threshold usually between 40-80 mA, observe for capture with QRS complex following pacer spike, check for a pulse to match pacemaker
         2. Transvenous: place as right internal jugular or left subclavian, ideally use 7 French cordis/pacemaker kit, inflate balloon at 20 cm, set to VOO (pacing, no sensing), turn to 20 mA, and advance until ventricular capture/pulse
   b. **Disease Specific Treatments**
      i. **Hyperkalemia**
         1. Calcium gluconate/chloride
         2. Insulin/glucose, beta agonists, furosemide, bicarb (if acidotic)
         3. Dialysis
      ii. **CCB/BB**
         1. Glucagon (BB specific)
         2. High dose insulin therapy (1U/kg insulin bolus)
         3. Intralipid
         4. Consider ECMO if available
      iii. **STEMI:**
         1. Aspirin, heparin gtt
         2. Cath Lab
         3. Lytics if cath lab unavailable
      iv. **Stable heart block management:**
         1. Mobitz Type I: generally benign
         2. Mobitz Type II: consider as precursor of complete HR, admit for pacemaker
         3. 3rd degree complete heart block: admit for pacemaker

References:
- Barrueto, F. Calcium channel blocker poisoning. Last updated: Feb 22, 2017. Uptodate.com
- Mount, DB. Treatment and prevention of hyperkalemia in adults. Last updated: Sep 29, 2016 uptodate.com

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