The Montgomery County Hospital District Paramedic Podcast
Episode #109: Breaking Down Bradycardia
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Take Home Points

- Bradycardia is clinically significant if SHOCK and SLOW
- Unstable Bradycardia Causes: Electrical/Plumbing Failure, Electrolytes, & Toxins
- Always think about causes before treatment
- Be a patient medication list detective
- Do not use Bicarb unless concern for HyperK or Toxin

When Should We Be Concerned with Bradycardia?

•**Bradycardia alone shouldn't be scary but combined with hypoperfusion is what matters (SHOCK + SLOW).** Four signs that the patient is not perfusing properly are AMS, Hypotension, Hypoxia, and Pallor.

Four Main Causes for Unstable Bradycardia:

1. **Electric Failure**: Heart Blocks
2. **Plumbing Failure**: STEMI/Acute Occlusion
3. **Electrolytes**: Potassium/Hyperkalemia
4. **Toxicity**: Cardiotoxins = B-Blockers/Sodium Channel Blockers, OGP's

1. Electrical Failure

•**These patients normally present with general weakness, near-syncope/syncope, and dyspnea**. They also tend to have no pain on presentation.

•**There are often no signs of ischemia on the ECG**. Look for P wave association with QRS complexes.

•**Treatment:** For higher blocks, use atropine and epinephrine. Definitive EMS treatment includes TC pacing and epinephrine gtt.

2. Plumbing Failure

•**Plumbing failure – Acute MI.** Right sided AMI with bradycardia often includes cardiogenic shock.

•**Ischemia on ECG = Leads II,III,aVF.** RCA supplies the SA/AV node.

•**Treatment:** Same as Electrical Failure but **with** emergent revascularization key upon ED arrival.

3. Electrolytes

•**Always consider hyperkalemia in any bradycardic patient.** Especially for ESRD patents and make sure to look for fistulas and hemodialysis catheters.

•**The ECG will tend to be wide, bizarre, and slow.**

•**Treatment: CALCIUM FIRST** then Albuterol and Bicarbonate

•**Do not give bicarbonate randomly as a "kitchen sink" cardiac arrest treatment**. Studies show that patients trend towards worse outcomes.

•**If you believe that hyperkalemic or ingestion is possible - Bicarb and Calcium should be used early**

4. Toxins

•**There are a variety of medications and exposures that can cause bradycardia.** Always review the med list for potential offenders and ask about new medications.

•**Beta-Blockers and Calcium Channel Blockers**: Pacing and vasopressors

•**Organophosphates:** LARGE amounts of Atropine

•**Sodium Channel Blockers (Benadryl, Seroquel, Methadone, Propranolol, etc):** Bicarbonate until QRS narrows

MCHD Cases

•Below are three recent MCHD cases to solidify the different causes and treatments of unstable bradycardia.

Case #1: 71 y/o Male with Dyspnea

•Patient had a recent CABG and history of DM. Upon arrival, patient presents bradycardic and is in cardiogenic shock. Due to presentation, patient was immediately TC paced. This patient had both electrical and plumbing failure that led to a complete heart block.

Case #2: Elderly Male with Worsening Malaise

•Patient was pale, cool, and diaphoretic on presentation. The EKG was slow/bizarre and wide. Medication list review with the family revealed that his Flecainide dosage had recently increased. Flecainide is a sodium channel blocker, and the patient was given Sodium Bicarbonate. Blood pressure and heart rate improved en route to hospital.

Case #3: 51 y/o Male with AMS

•Patient's family reported a medical history of diabetes and new onset AMS that continued to worsen throughout the day. Associated symptoms of nausea, vomiting, and diarrhea. Upon exam, patient had a glucose around 400, low ETCO2, and the EKG looked slow and wide. Patient was given Calcium/NAHCO3 and fluids due to concern for hyperkalemia from DKA.