

OhioHealth Emergency Medical Services Podcast Series
August 2021 Episode: Bradycardia

Objectives:

1. Review etiologies of bradycardia.
2. Discuss treatment strategies for bradycardic patients.
3. Discuss pacemaker malfunction.

Podcasters

- Dr. Drew Kalnow (Andrew.Kalnow@ohiohealth.com)
- Dr. Eric Cortez (Eric.Cortez@ohiohealth.com)
- Dr. Danni Schneider (Danni.Schneider@ohiohealth.com)

Case: 63-year-old male called for ill person. He complains of lightheadedness and palpitations. Blood glucose is normal, and he has normal mentation. His initial heart rate is 38 beats per minute and blood pressure is 95/60 mm Hg.

Danni's Initial Thoughts:

- Confirm heart rate on monitor with pulse rate
- Evaluate for signs and symptoms of bradycardia
 - Signs and/or symptoms may be intermittent
- Assess past medical history and medications
- Determine hemodynamic and perfusion status
- Consider underlying causes (primary versus secondary bradycardia)

Drew's Initial Thoughts:

- Determine what type of bradycardia is occurring
- Identify and treat reversible causes such as hypoglycemia
- Bradycardia may significantly reduce cardiac output which will negatively impact perfusion of other organs
- Obtain an ECG or a reliable rhythm strip

Eric's Initial Thoughts:

- Consider underlying etiology
- Cardiac versus non-cardiac causes
- Determine type of bradycardia
 - Sinus node dysfunction
 - AV node dysfunction
- Symptomatic versus asymptomatic
- Stable versus unstable

Underlying Causes:

- AV Nodal Blocks
 - 1st Degree: PR interval prolongation
 - Consider clinical relevance
 - 2nd Degree
 - Type I: increasing PR interval with eventual drop
 - May need to keep on rhythm strip to pick up pattern
 - Vagal tone, medications, intrinsic conduction delays
 - 2nd Degree Type II: dropped P waves
 - More severe
 - 3rd Degree: P and QRS dissociation
 - Progression of 2nd Degree Blocks
 - Atropine may or may not work

Figure 1 First Degree AV Block (<https://litfl.com/first-degree-heart-block-ecg-library/>)

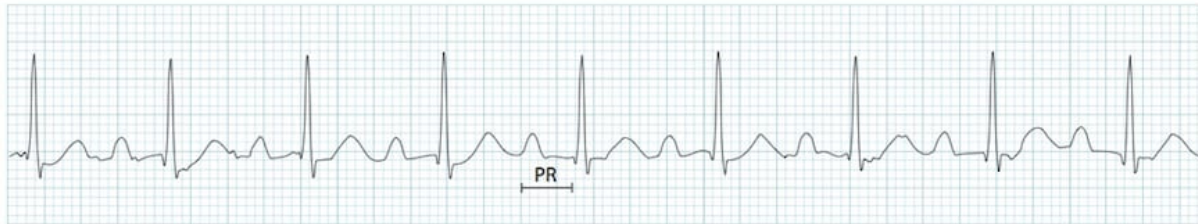


Figure 2 Second Degree Type I Block (<https://litfl.com/av-block-2nd-degree-mobitz-i-wenckebach-phenomenon/>)

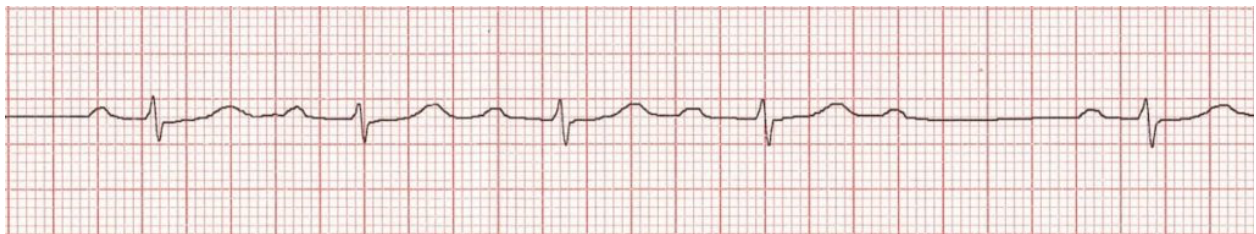


Figure 3 Second Degree Type II Block (<https://litfl.com/av-block-2nd-degree-mobitz-ii-hay-block/>)

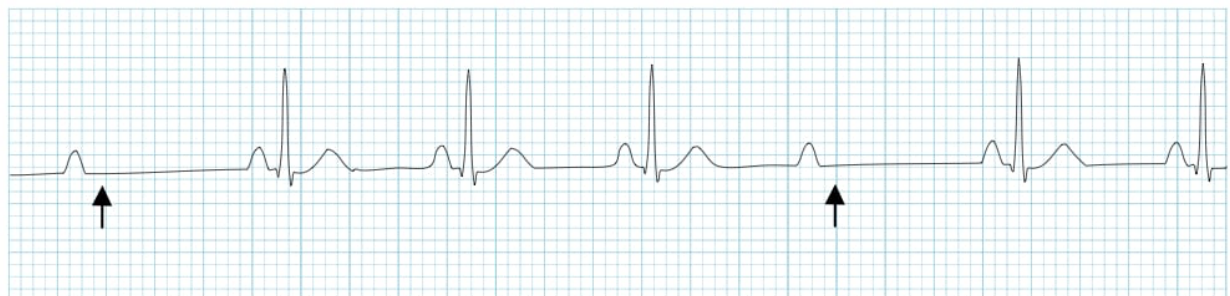
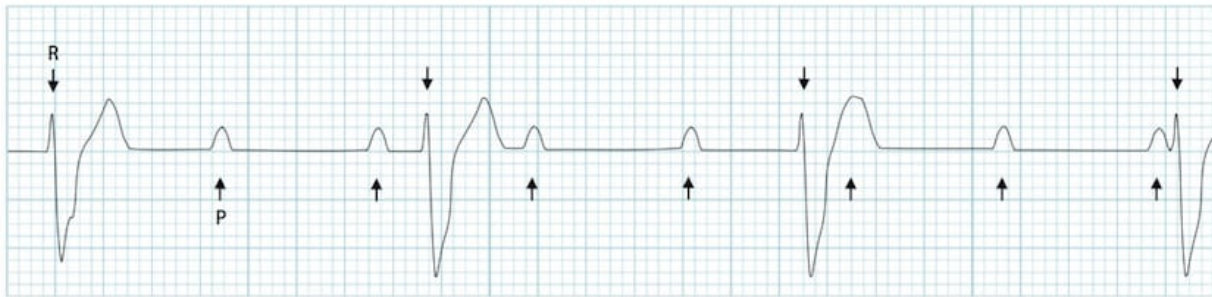


Figure 4 Third Degree Block (<https://litfl.com/av-block-3rd-degree-complete-heart-block/>)



- External Causes
 - Medications: may happen at therapeutic and supratherapeutic levels
 - Beta blockers
 - Calcium channel blockers
 - Cholinergic agents (environmental too)
 - Alpha blockers
 - Digoxin (cardiac glycoside)
 - Propofol infusion syndrome (critical care transports)
 - BRASH Syndrome (<https://emcrit.org/pulmcrit/brash-syndrome-bradycardia-renal-failure-av-blocker-shock-hyperkalemia/>)
 - Hyperkalemia
 - Acidosis
 - Ischemia
 - Neurogenic (think Cushing's Triad)
 - Lyme Disease

Treatment

- Drew's Initial preparation
 - IV Fluid to assure proper volume status and augment cardiac output
 - Prepare atropine
 - Place transcutaneous pacing pad
 - Be prepared to act
 - Antidote for toxicities
- Five Treatment Considerations
 - Treat the underlying cause
 - IV fluid
 - Atropine takes away parasympathetic tone
 - Vasopressors/chronotropic agents (epinephrine; dopamine)
 - Chronotropic agents: increases heart rate
 - Transcutaneous pacing
 - Consider pain medication or sedation if feasible
 - Consider starting at pain dose for ketamine

- Induction/Paralytic Agents
 - Be cautious with succinylcholine in the setting of bradycardia
 - Rocuronium is likely a better option, but succinylcholine may still be used
 - Etomidate or ketamine are good induction agents
- Patients with pre-existing internal pacemakers with bradycardia
 - Consider issues with the pacemaker
 - The fastest beat per minute wins
 - Typical pacemakers are set to 60 beats per minute
 - Bradycardia in the setting of an internal pacemaker should make you think about pacemaker failure
 - Look at your rhythm strip for pacer spikes and correspond with pulse rate
 - Placing a magnet over the pacemaker will default to overdrive mode
 - Default mode is typically at a set rate and paces without sensing intrinsic cardiac activity
 - This may be more effective than transcutaneous pacing