Understanding Heart Blocks
Objectives

• Review anatomy of the electrical system of the heart
• Discuss 4 major heart blocks
• Provide a means to remain how to keep from getting them confused
• Discuss treatment options for patients experiencing a heart block
Assumptions and Disclosures

• Traditional terms will be used – not trying to offend anyone, SO...
• Thicken your skin
• Have fun with it
• Always remember...
  Its ALWAYS the guy’s fault
Review of the anatomy

Structures of the Heart

- Atrioventricular Node
- Sinoatrial Node
- Left Atrium
- Right Atrium
- Mitral Valve
- Tricuspid Valve
- His Bundle
- Left Ventricle
- Right Ventricle
- Purkinje Fibers
- Right and Left Bundle Branches
A bit of a refresher

Intrinsic Rates
- Sinoatrial Node = 60-100 beats per minute
- Atrioventricular Node = 40-60 bpm
- Purkinje Fibers = 20-40 bpm
The Norms – Meet P and QRS

Normal Sinus Rhythm

– Regular rhythm
– 60 – 100 bpm
– P wave for each QRS
– PR interval between .12 and .20 seconds
– QRS is less than .12 seconds
Normal Sinus Rhythm

- The default heart rhythm
- P wave is there and QRS follows each time and in a predictable manner
- PR interval is constant
- Perfect symmetry for our couple
1\textsuperscript{st} Degree Heart Block

- Transmission is slowed through the junction
- Creating prolonged PR interval $\Rightarrow$ PR interval is $> .20$ seconds

P-wave precedes each QRS-complex but interval is $> 0.2$ s
1st Degree Heart Block

- Relationship between P and QRS has changed
  - QRS is coming home later than usual, but at the same time every night
# 1st Degree Heart Block

## Symptoms
- May be asymptomatic
- Nausea
- Vomiting
- Chest Pain

## Treatment
- May not require treatment
- Patient may not know this is their underlying rhythm
- Treat symptoms
- Generally require prolonged monitoring of ECG (in or out of hospital)
2<sup>nd</sup> Degree Heart Block Type 1

2° AV Block Mobitz I

P Waves look Similar!

PR PR PR PR PR
2nd Degree Heart Block Type 1
Wenckebach

• Transmission of impulse through the AV node is progressively delayed until there is a dropped ventricular beat
  – This resets itself after the dropped beat
• Becomes a predictable conduction manner
  – 3:1, 4:1, etc.
2nd Degree Heart Block Type 1

• The relationship has changed
  – QRS is staying out longer and longer until it is dropped
  – After the dropped beat, QRS returns to P at a normal time but then stays out longer and longer again
  – Predictable manner, once the pattern is identified
2nd Degree Heart Block Type 1

Symptoms

• May be asymptomatic (athletes and patients with no structural heart disease)
• Light-headed or dizzy
• Chest pain
• Regularly irregular heartbeat
• Bradycardia may be present
• Hypotension

Treatment

• Treat symptoms
• Monitor for additional signs of ischemia
• Symptomatic bradycardia should be managed by increasing the heart rate with TCP (preferred) or Atropine (with caution if suspecting MI)
2nd Degree Heart Block Type 2

- PR interval in the conducted beats remains constant
- P waves march out
- RR interval surrounding the dropped beat is exactly the same from the preceding RR interval; however, dropped beat(s)
2\textsuperscript{nd} Degree Heart Block Type 2

- Usually a result of structural damage (ischemia) causing a failure of the conduction system at or below the Bundle of His
- Narrow QRS = block is within the Bundle of His (approx. 25%)
- Wide QRS = block is distal to the Bundle of His
- There may or may not be a pattern associated with the blocked complexes
2nd Degree Heart Block Type 2

• The relationship continues to get worse...
  – QRS is staying out more frequently and without warning
  – When QRS comes home it is at the same time, it may be later than expected or within a normal time
2nd Degree Heart Block Type 2

Symptoms
- May be asymptomatic (rare)
- Light-headed or dizzy
- Syncope
- Chest pain
- Regularly irregular heartbeat
- Bradycardia may be present
- Hypotension

Treatment
- Place pacer pads on patient
- Treat symptoms if they remain stable
- Monitor for additional signs of ischemia
- If symptomatic, do not delay in pacing
3rd Degree Heart Block

- Complete absence of AV conduction to the ventricles – “Complete Heart Block”
- Perfusing rhythm is maintained by a junctional or ventricular escape rhythm
3rd Degree Heart Block

• Atrial rate represented by P waves, ventricular rate results in bradycardia
• May be a result of progressive fatigue of AV nodal cells or a sudden onset of complete conduction failure throughout the Bundle of His/Purkinje fiber system
3rd Degree Heart Block

• The relationship is no longer existing
• QRS is now coming and going as he pleases
• P continues to fire at a regular rate, trying “to do the right thing”
• QRS usually changes in appearance (wide complex, since impulse is originating from the ventricles)
**3rd Degree Heart Block**

**Symptoms**
- Light-headed or dizzy
- Syncope
- Chest pain
- Bradycardia is usually present
- Hypotension

**Treatment**
- Place pacer pads on patient and begin pacing to maintain blood pressure
- Treat additional symptoms during transport
Let’s practice
Thank you for your time

Questions?

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