Deciphering AV Blocks: Tips & Tools for Success

Course Objectives
- Discuss the anatomy and physiology of the cardiac system as it relates to the different types of AV Heart Blocks.
- Discuss potential complications for patient's experiencing an AV Heart block
- Describe appropriate treatment strategies to be taken for patients with AV Heart blocks

Review of the ECG Complex

Systematic Rhythm Strip Analysis
- Rhythm/Regularity
- Rate
- Identify/Examine P waves:
  - Upright? Same?
  - One preceding each QRS?
- Assess intervals
  - PR interval
  - QRS complex
  - QT interval
- Assess ST segment
- Evaluate T wave

Time to Test Your Knowledge

What is the main function of the AV node?
A. To serve as a back-up pacemaker if the SA node fails to generate an impulse.
B. To delay conduction in order for the ventricles to have time to fill.
C. To ensure the heart beats at a minimum rate of 40 – 60 bpm.
D. To allow time for the atria to contract.

Importance of AV Node
- AV node acts as the or a bridge between the atria and the ventricles
- AV node’s main responsibility is to delay conduction to allow ventricles time to fill
- **PR interval** is the time it takes for an impulse to conduct through the atria into the ventricles

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Basics of Atrioventricular Blocks

- A delay* or interruption in conduction of an impulse within either:
  - AV node
  - Bundle of His
  - Bundle Branches
- Conduction disturbance can be temporary or permanent
- In determining blocks, you need to assess:
  - Degree of Block
  - Location of Block
  - Rate of Rhythm

Types of AV Blocks

- 1st degree AV block
- 2nd degree AV Block Type 1 (Wenckebach)
- 2nd degree AV Block Type 2 (Mobitz II)
- 3rd degree AV Block (Complete Heart Block)
  When determining blocks PR interval is the key!

First-Degree AV Block

- Is not a stand alone rhythm (must name the underlying rhythm)
- Indicates delayed conduction through the atrium at the AV node
- PR interval greater than 0.20 sec
- PR interval stays constant with each ECG complex

Examples of 1st AV Blocks

Time to Test Your Knowledge

Your patient has just been diagnosed with a 2nd degree AV block. You are trying to determine the at which the block is occurring. You can determine this by:

A. Measuring the PR interval
B. Measuring the QRS complex
C. Measuring the QT interval
D. Assessing the rate of the rhythm

What are the two most common causes for a person to develop a 1st degree AV block?

A. Increase age and stimulants
B. Hypokalemia and stimulants
C. Injury to the SA node and cardiac medications
D. Injury to the AV node and cardiac medications
Treatment for 1st degree AV Block

• Usually is asymptomatic and requires no treatment.
• If new onset, check cardiac medications and notify provider.
• Assess to ensure the PR interval does not continue to increase.

Second-Degree AV Blocks

• Second-degree AV Blocks ARE stand alone rhythms
• SA node is in charge of generating impulses. However, some atrial impulses are blocked at the AV node
• More P waves than QRS complexes in a strip
• P waves are generated regularly and will march out across entire strip
  • Type I
    • Mobitz I aka Wenckebach
  • Type II
  • Mobitz II
  • 2:1 –
    • May be Type I or Type II - hard to distinguish without 12 lead ECG because every other beat is dropped

Second-Degree Type 1

• Failure of some impulses to be conducted through to the ventricles
• Sinus impulses have trouble passing through AV node (seen by lengthening PR intervals) until finally a sinus impulse does not make it through (P wave not followed by QRS complex)
• After dropped beat, cycle starts over again
• Location of block is at the AV node level so QRS complex should be narrow

Examples of 2nd Degree Type 1

Second-Degree AV Block Type I

• Causes
  • AV Nodal Ischemia
  • Cardiac Medications
  • Acute Inferior Wall MI
  • Hyperkalemia

• Treatment
  • Asymptomatic
  • Check medications
  • Observe patient for symptoms
  • Observe for increasing block
  • Symptomatic
    • Discontinue contributing medications if able
    • Give IVP atropine
    • Transcutaneous pace patient
    • Observe for increasing block

Time to Test Your Knowledge

You receive a call from the telemetry technician informing you that your patient is dropping beats. The tele tech is not sure if the patient is in 2nd AV block type 1 or is having non-conducted PACs. How can you tell the difference?
A. March the R Waves out across the strip
B. March the P waves out across the strip
C. Measure the PR interval
D. Get a 12 lead ECG to confirm

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**Second Degree AV Block Type 2**

- Conduction delay occurs below AV node
- P waves plot through across strip and are identical
- PR interval is **constant** on completed complexes
- There may be **more than one P wave** per QRS complex
- QRS complex may be **narrow** or **wide**
  - Narrow
  - Wide

**Examples of 2nd Degree Type 2**

**Time to Test Your Knowledge**

You are caring for an 80 year old patient s/p Anterior Wall MI four days ago. He was transferred to your med-surg/tele floor this morning in a Sinus Bradycardia 50's. Suddenly, the monitor alarms and you see the patient is in 2nd degree AV Block type 2. What is your next action?

A. Assess patient for s/s of decreased Cardiac Output, notify the provider
B. Call a code blue
C. Print a strip and analyze it so you can report it to the provider when you call him
D. Ask the NA to go take a set of vitals on the patient

**Second Degree AV Block Type 2**

- Can occur in conduction patterns
- Caused most often by:
  - Ischemia caused by Anterior Wall MI
  - Degeneration of conduction system related to aging
  - Acute Myocarditis
- Pay attention to ventricular rate with this rhythm
- Can progress into Complete Heart Block

**Examples of 2nd Degree Type 2**

**2nd degree AV block**

**Type I**
- Narrow QRS
- Exercise improves block
- Atropine improves block

**Type II**
- Wide QRS
- Exercise worsens block
- Atropine worsens block
Examples of 2:1 2nd AV Blocks

3rd Degree AV Block/Complete AV Block
- Atria and Ventricles beat independently from each other
  - Atrial rate 60 – 100 bpm
  - Ventricular rate 20 – 40 bpm
- SA node impulse is blocked from Ventricles and a secondary pacemaker stimulates the ventricles (AV Dissociation)
- Can progress to Asystole rapidly

Examples of 3rd Degree AVB

3rd Degree AV Block
- Common Causes:
  - Acute IWMI
  - Acute AWMI
  - Age with conduction issues not related to MI
  - Digoxin Toxicity
  - Patients may or may not be symptomatic, depends on ventricular rate
  - For symptomatic patients, treatment may include:
    - Pacing Patient
    - Atropine may help with narrow QRS complex but will have little effect on wide QRS complex
    - Vaspressors to increase BP

AV Block Decision Tree

Case Study #1: Mr. Ramirez
Mr. Ramirez is a 45 year old male admitted to your unit s/p Inferior Wall MI. He has a PMH of idiopathic cardiomyopathy, ESKD, a-fib, HF and CAD. His AM labs were K+5.7, Na+ 132, Cr 6.9, BNP 1850. He had dialysis 2 days ago. Per report you are told the patient is confused, seeing “spiders” crawling all over his bed. He is alert and oriented to self only. You print out your AM tele strip and see this rhythm:
Case Study #1: Mr. Ramirez

What is the above rhythm?
A. SR with 1st degree AV Block
B. 2nd degree AV Block Type 1
C. 2nd degree AV Block Type 2
D. 3rd degree AV Block

Case Study #1: Mr. Ramirez

What is your next action?
A. Call the dialysis nurse, the patient needs dialysis STAT
B. Call a code blue, you don’t know how long the patient will be stable
C. Assess the patient, get a set of VS and notify provider
D. Do nothing, per night shift he matches report

Case Study #1: Mr. Ramirez

Based on Mr. Ramirez PMH and reason for admission, what is most likely the cause of this rhythm?
A. ESKD
B. Inferior Wall MI
C. Atrial fibrillation
D. Cardiomyopathy

Case Study #2: Mr. Jones

Mr. Jones is a 56 year old who is admitted for COPD exacerbation. He is a 1 pack per day smoker who has a PMH of HTN, CAD, HL, GERD and obesity. He is on several different cardiac medications, and states he has a hard time remembering when to take which medication. He admits that he frequently doubles up on doses when he forgets to take them. When you connect him to the monitor, you see the following rhythm:

Case Study #2: Mr. Jones

What is the above rhythm?
A. SR with 1st degree AV Block
B. 2nd degree AV Block type 1
C. 2nd degree AV Block type 2
D. 3rd degree AV Block

Case Study #2: Mr. Jones

What is most likely the cause for this rhythm in Mr. Jones?
A. COPD
B. HTN
C. CAD
D. Doubling up on his cardiac medications
Case Study #2: Mr. Jones

During his hospitalization, Mr. Jones converts into a normal sinus rhythm and is ready to be discharged home. As the RN providing the discharge instructions what do you want to teach Mr. Jones regarding his cardiac medications?

A. It is okay to double up on your cardiac medications every once and awhile.
B. It is important to take your cardiac medications as scheduled.
C. Do not take your cardiac medications if you are having chest pain.
D. You should not have any side effects from your medications if you take them as prescribed.

Case Study #3: Mr. Green

Mr. Green is a 91 year old admitted to your unit for Right Lower Leg cellulitis. He has a PMH of HTN, COPD, BPH, macular degeneration, Sick Sinus Syndrome. In report you are told the patient is in SR with 1st AV block with PRI of 0.24 secs and a Right BBB. Mr. Green takes the following medications: amlodipine, gabapentin, heparin, omeprazole, lisinopril and vancomycin. Upon assessing your strip at the beginning of your shift, you notice the following rhythm:

What is the above rhythm?
A. SB with 1st degree AV Block
B. 2nd degree AV Block Type I
C. 2nd degree AV Block Type II
D. 3rd degree AV Block

Case Study #3: Mr. Green

What is most likely the cause for this rhythm in Mr. Green?
A. Infection
B. HTN
C. Age
D. COPD

Case Study #3: Mr. Green

If Mr. Green became symptomatic, what are some possible treatment options available for him?
A. Pace the patient to maintain adequate Cardiac output
B. Discontinue his cardiac medications to see if they are the cause
C. Give Atropine IVP to increase HR
D. All of the above are possible options

Case Study #4: Mrs. Smith

Mrs. Smith is a 62 year old admitted to your unit with a diagnosis of syncope. She was gardening this morning when she became dizzy and fell to the ground. Her next door neighbor saw her collapse and called 911. By the time paramedics arrived she had regained consciousness and felt ok but was transported to the hospital for evaluation. She is admitted as an observation patient. Her PMH is positive for HTN and HL which she is taking medications for but can’t remember which ones. When you hook her up to the monitor, you see the following rhythm.

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Case Study #4: Mrs. Smith

What is the above rhythm?
A. 1st degree AV Block
B. 2nd degree AV Block 2:1 conduction
C. Sinus Bradycardia with non-conducted PACs
D. 3rd degree AV Block

Case Study #4: Mrs. Smith

As the RN caring for Mrs. Smith, what assessment finding would indicate to you that Mrs. Smith might be symptomatic?
A. K+ level of 3.4
B. Temperature of 99.9°
C. Abnormal 12 lead ECG
D. She needs assistance getting from the wheelchair to bed

Remembering AV Blocks

The Heart Block Poem

If the R is far from P, then you have a FIRST DEGREE. Longer, longer, longer, drop! Then you have a WENKEBACH.

If some Ps don't get through, then you have MOBITZ II.

If Ps and Qs don't agree, then you have a THIRD DEGREE.

Questions?

• Email: Allison.Perkins@Va.gov

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