AV DELAY (Not first degree AV block since there is no actual block; all P-waves are conducted)

- **Definition:** PR > 200 msec
- **Epidemiology:** Occurs in ~5% of general population
- **Implications:**
  - In otherwise healthy men, prolonged PR confers no additional mortality or risk of developing heart disease.
  - In patients with other conduction disturbances or other heart disease, meta analyses show that AV delay is associated with 39% increased risk for heart failure, 45% increase in atrial fibrillation, and 24% increased risk in all-cause mortality.
  - Markedly prolonged PR can lead to "pseudopacemaker syndrome": the close proximity of atrial systole to the preceding ventricular systole can produce symptoms similar to pacemaker syndrome and an increase in PCWP. Small studies suggest an improvement in symptoms with a dual-chamber pacemaker, but there is no basis for this in current guidelines.
- **Site of block:** The site of block is found in the compact AVN in 85% of patients, but could be located at any level of the AV conduction system. If the QRS is wide, the origin is infranodal in 45% of cases.

SECOND DEGREE HEART BLOCK

- **Definition:** More P waves than QRS complexes *with at least some conducted P waves* (vs. complete heart block)
- **Classification**
  - **Mobitz I:** PR prolongation followed by a nonconducted P wave
  - **Mobitz II:** A fixed ratio of P waves to QRS complexes *with a constant PR interval*
  - **2:1 AV block:** This is a distinct entity since it cannot be determined without further diagnostic maneuvers whether the block represents AV nodal block (akin to Mobitz I) or His-Purkinje system block (akin to Mobitz II)
- **Implications**
  - When faced with an AV block, the clinical decision at hand is whether the patient needs a permanent pacemaker. In order to decide this, one needs to determine the site of the block since AV nodal block has a more benign prognosis (and may not require a permanent pacemaker) whereas a block in the His Purkinje system almost always warrants a permanent pacemaker.
    - Syncope is more likely to occur in patients with His-Purkinje site of block.
    - In a series of 15 patients with second degree AV block and bundle branch block, intracardiac His bundle electrograms were recorded and it was found that syncope was more likely to occur in patients with block distal to the His than proximal to the His (66% vs. 25%, p<0.01).
    - Although Mobitz I can be seen in healthy individuals, Mobitz II is almost never observed in observational studies of healthy individuals.
    - In patients over 45 years old, Mobitz I block has a less benign course, with progression to higher degree block, development of symptomatic bradycardia.
    - Mobitz II block is usually located in the infra-His conduction system (wide QRS in 80% of cases) but can also happen in the His bundle itself (narrow QRS in 20% of cases). It has a higher rate of progression to complete heart block.
    - Survival is similar in patients with Mobitz I versus Mobitz II, but patients with Mobitz II have an increased rate of pacemaker implantation (although this relationship is biased by the AHA indications).
  - The Mobitz classification (I vs. II) uses a surface ECG pattern as a surrogate metric of the site of block, which is the true matter of interest as above. The Mobitz classification generally works well but breaks down in the setting of a 2:1 AV block where the site of the block could be in the AV node (no PPM needed) or in the His Purkinje system (PPM needed) and it is impossible to tell without further diagnostic maneuvers.

ADVANCED or HIGH GRADE HEART BLOCK

- **Definition:**
  - A consecutive sequence of three or more nonconducted P waves.
  - In contrast to complete heart block, some P waves are conducted.
AV BLOCK

SOURCES: