



Complete Heart Block

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Mastering EKGs

AV Block – Basic Concepts

3 Degrees of AV Block

1st Degree – All atrial impulses are conducted to the ventricles, but with delay.

2nd Degree – Only some atrial impulses are conducted.

3rd Degree – No atrial impulses are conducted.

1st Degree AV Block

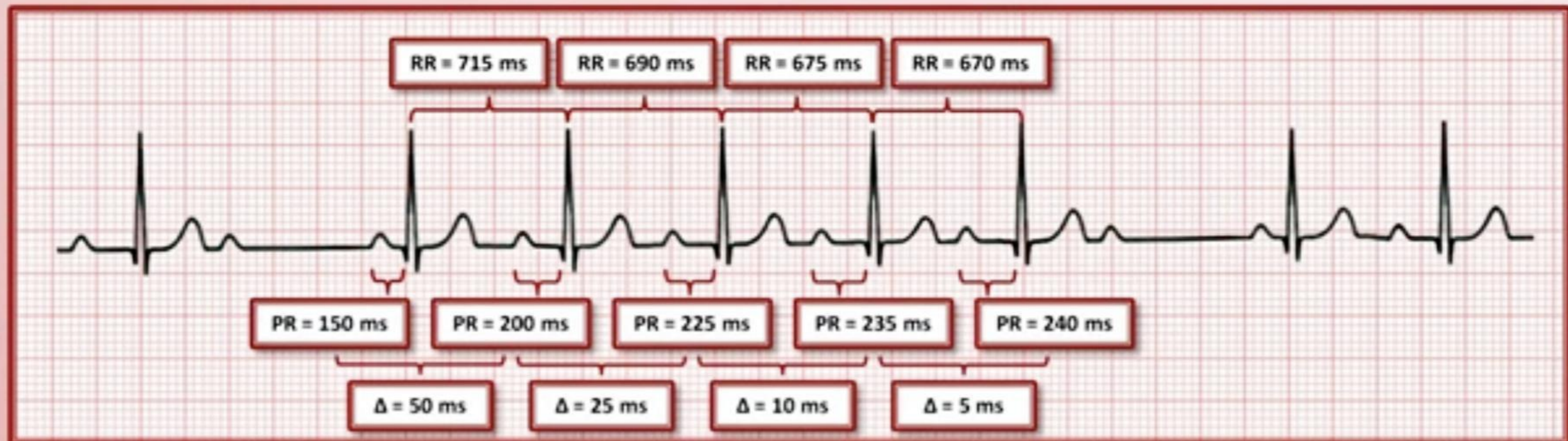
- All atrial impulses are conducted to the ventricles, but with delay.
- Every P wave is followed by a QRS complex, but the PR interval $> 200\text{ms}$.



2nd Degree AV Block

Type 1 (Wenckebach)

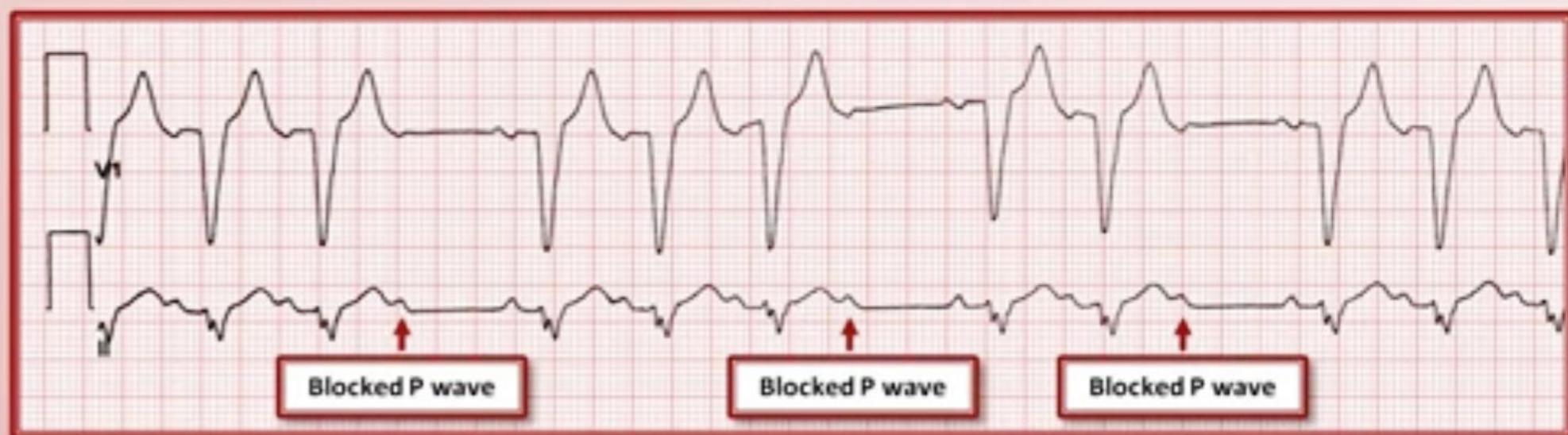
- Greatest change in PR interval classically happens between 1st and 2nd conducted P waves, and gets smaller with each successive P wave.
- An unexpected consequence: RR interval may progressively shorten.



2nd Degree AV Block

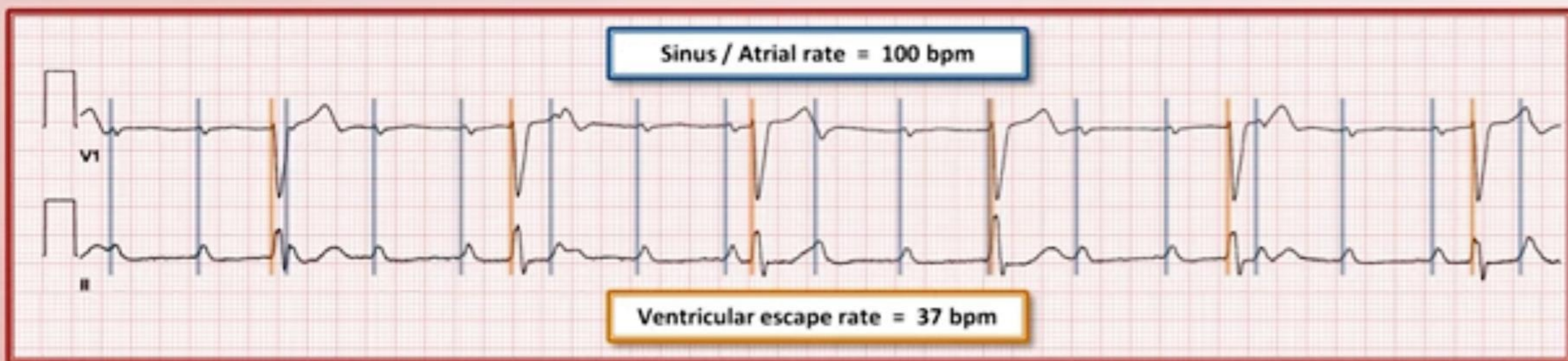
Type 2

- PR is constant, and P waves are intermittently blocked, often at unpredictable intervals.
- Since the location of type 2 block is usually distal to the actual AV node and His bundle (i.e. infra-Hisian), most patients with type 2 block have a wide QRS complex.



3rd Degree AV Block

- No atrial impulses are conducted to the ventricles.
- P waves have no relationship to QRS complexes. (a.k.a. AV dissociation)
- Also known as “complete AV block” or “complete heart block”.



3rd Degree AV Block

- Although 3rd degree AV block results in AV dissociation, not all AV dissociation is a consequence of 3rd degree block.
- AV dissociation also may be produced by any situation in which the ventricular rate exceeds the atrial rate:
 - Severe sinus bradycardia or sinus arrest, with a junctional or ventricular escape rhythm
 - Ventricular tachycardia

Typical Etiologies of AV Block

	1 st degree	2 nd degree, type 1	2 nd degree, type 2	3 rd degree
• Degeneration of the conduction system • Ischemia/Infarction • Cardiomyopathy • Infiltration (e.g. amyloidosis, lymphoma) • Muscular dystrophy • Myocarditis / Endocarditis • Connective tissue disease • Congenital heart disease • Neonatal lupus syndrome • Post-procedure (e.g. cardiac surgery, catheter ablation, alcohol septal ablation, transcatheter aortic valve replacement)	✓		✓	✓
• Medications (e.g. beta blockers, Ca²⁺ channel blockers, digoxin, amiodarone) • High vagal tone	✓	✓		✓
• Extreme tachycardia		✓		
• Normal variant	✓			

Degree	Type	Relationship of P waves to QRS complexes	QRS Width	Prognosis and Treatment
1 st	-	Every P wave is followed by a QRS complex, but PR interval is prolonged	Either normal or prolonged.	Benign, except under highly unusual circumstances.
2 nd	Type 1 (Wenckebach)	PR interval progressively lengthens until a P wave is blocked.	Either normal or prolonged.	- Usually benign, but may progress to 3rd degree block. - Pacemaker may be indicated if etiology is not reversible and patient is symptomatic.
	Type 2	PR interval is constant, with some P waves intermittently blocked.	Usually prolonged.	- Potentially life-threatening with a high risk of progressing to 3rd degree block. - Pacemaker is indicated if etiology is not quickly reversible.
	2:1	Every other P wave is blocked.	- Normal strongly suggests an intranodal location of block. - Prolonged can be consistent with any location of block.	Depends upon level of block.
3 rd	-	Complete dissociation of P waves and QRS complexes	- Normal suggests escape rhythm from AV node or His bundle. - Wide suggests escape rhythm from ventricles.	- Life-threatening. - Unless etiology is immediately reversible, pacemaker is necessary. - Urgency of pacemaker placement depends upon symptoms, width of the QRS complex, and the ventricular escape rate.