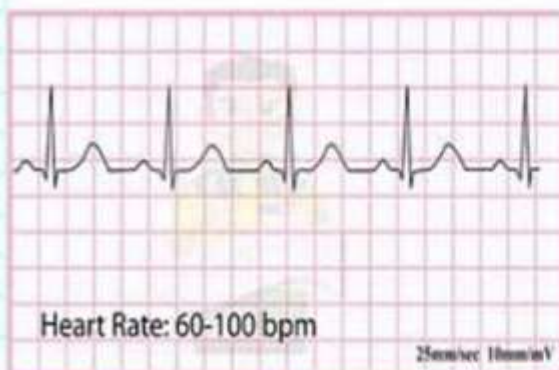


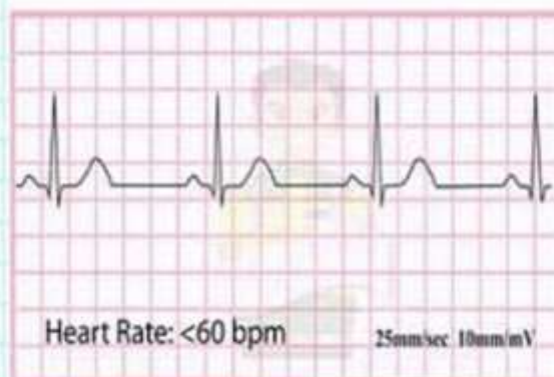
ECG Basics - Sinoatrial Node Rhythms

Normal Sinus Rhythm



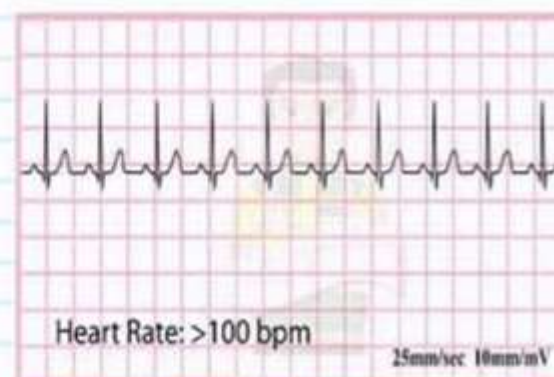
Rhythm Regular P Wave Before QRS
PR interval 0.12-0.20s QRS <0.12

Sinus Bradycardia



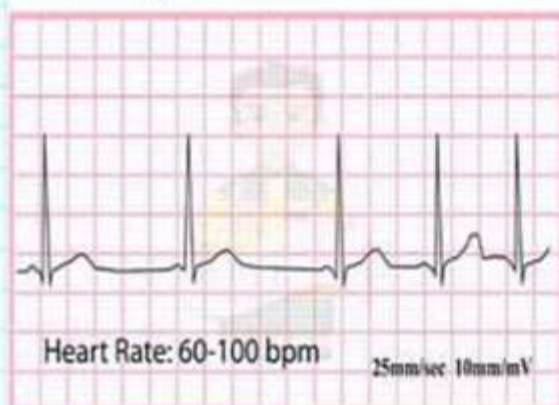
Rhythm Regular P Wave Before QRS
PR interval 0.12-0.20s QRS <0.12

Sinus Tachycardia



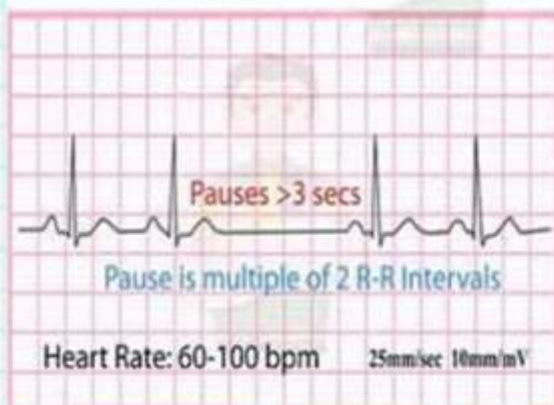
Rhythm Regular P Wave Before QRS
PR interval 0.12-0.20s QRS <0.12

Sinus Arrhythmia



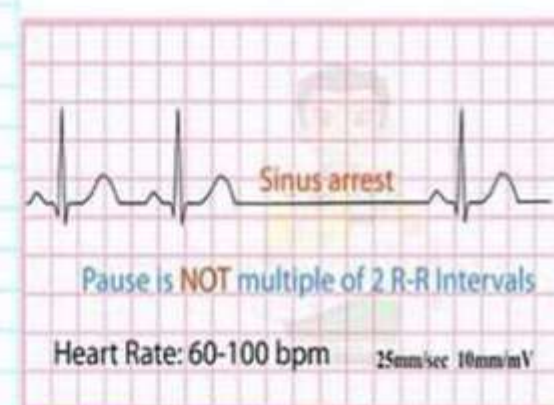
Rhythm Irregular P Wave Before QRS
PR interval 0.12-0.20s QRS <0.12

Sinoatrial Exit Block



Rhythm Irregular P Wave Before QRS
PR interval 0.12-0.20s QRS <0.12

Sinus Pause



Rhythm Irregular P Wave Before QRS
PR interval 0.12-0.20s QRS <0.12

ECG Basics - Ventricular Rhythms

Idioventricular Rhythm



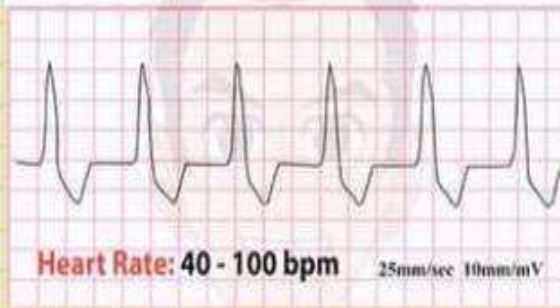
Rhythm: Regular

PR interval: N/A

P Wave: Absent or not related

QRS: Wide >0.12, atypical

Accelerated Idioventricular Rhythm



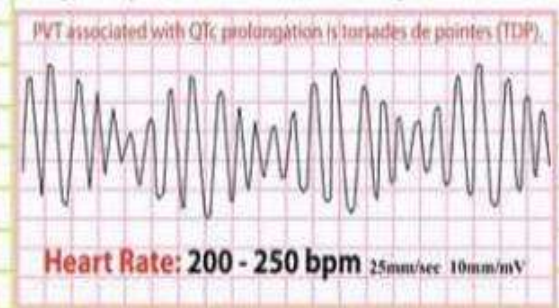
Rhythm: Regular

PR interval: N/A

P Wave: Absent or not related

QRS: >0.12

Polymorphic Ventricular Tachycardia



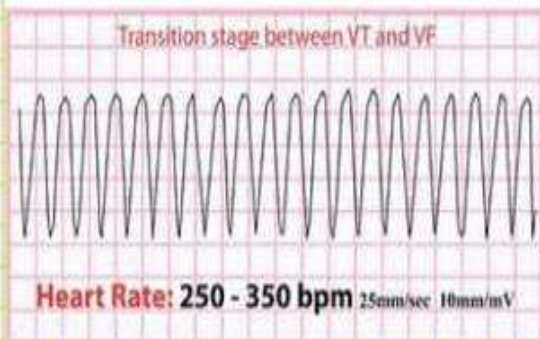
Rhythm: Irregular

PR interval: N/A

P Wave: Absent

QRS: Wide bizarre appearance

Ventricular Flutter



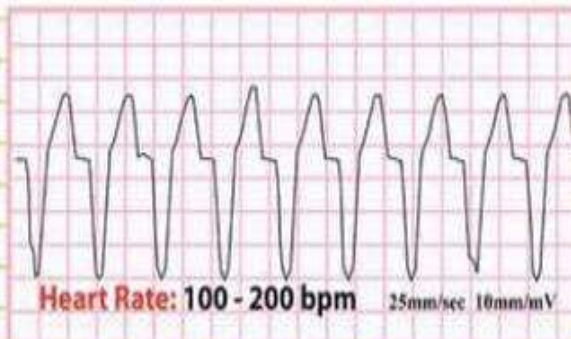
Rhythm: Regular

PR interval: Not measurable

P Wave: Absent

QRS: >0.12 Sinusoidal waveforms

Ventricular Tachycardia



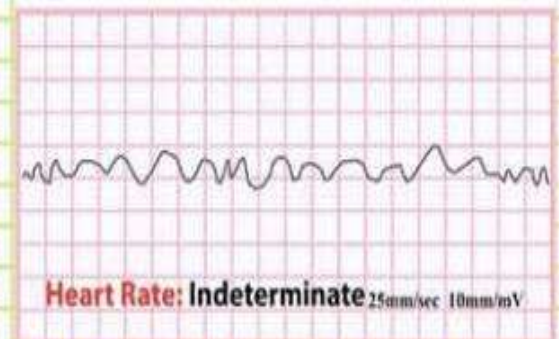
Rhythm: Regular

PR interval: Not measurable

P Wave: Dissociated atrial rate

QRS: Wide >0.12, atypical

Ventricular Fibrillation



Rhythm: Chaotic fibrillatory activity

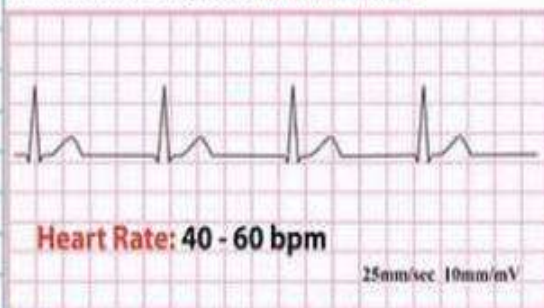
PR interval: N/A

P Wave: Absent

QRS: Fibrillatory baseline

ECG Basics - Junctional Rhythms

Junctional Rhythm with no P-waves



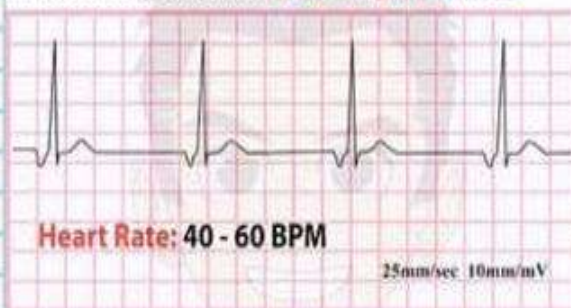
Rhythm: Regular

PR interval: 0.12-0.20s

P Wave: Absent or after QRS

QRS: <0.10

Junctional Rhythm with retrograde P-waves



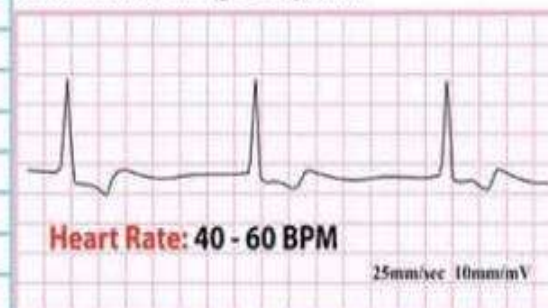
Rhythm: Regular

PR interval: 0.12-0.20s

P Wave: Inverted before QRS

QRS: <0.10

Junctional Escape Rhythm



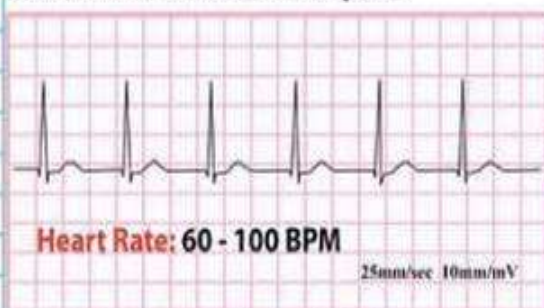
Rhythm: Regular

PR interval: 0.12-0.20s

P Wave: Absent, hidden, inverted or after QRS

QRS: <0.10

Accelerated Junctional Rhythm



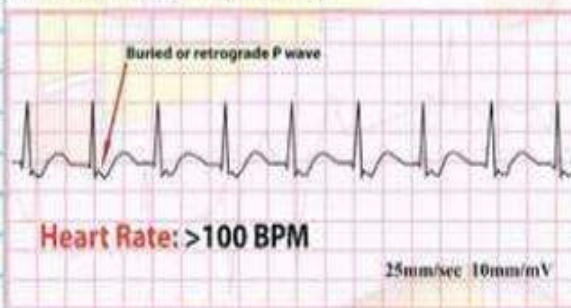
Rhythm: Regular

PR interval: 0.12-0.20s

P Wave: Absent, hidden, inverted or after QRS

QRS: <0.10

Junctional Tachycardia



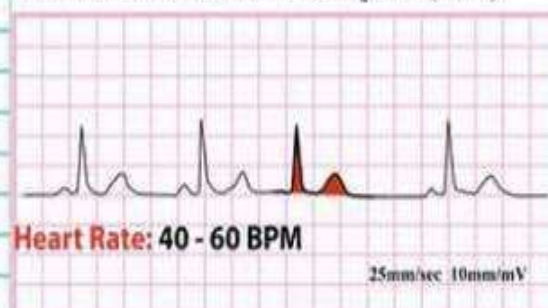
Rhythm: Regular

PR interval: Not measurable

P Wave: Absent, hidden, inverted or after QRS

QRS: <0.10

Premature Junctional Complex (PJC)



Rhythm: Regular with premature beats

PR interval: 0.12-0.20s

P Wave: Absent, hidden, inverted or after QRS

QRS: <0.10

ECG Basics - Atrial Rhythms

Atrial Fibrillation



Heart Rate: Atria 350 - 650 bpm
Ventricles: Slow to rapid 25mm/sec 10mm/mV

- Rhythm: Irregular
- PR Interval: N/A
- P Wave: Fibrillatory Waves
- QRS: <0.12

Atrial Flutter

Types 2:1, 3:1, 4:1, or greater ratio (1:1) conduction is rare



Heart Rate: Atria 250 - 350 bpm
Ventricles: Slow or rapid 25mm/sec 10mm/mV

- Rhythm: Regular or variable
- PR Interval: N/A
- P Wave: Flutter waves
- QRS: <0.12

Atrial Bigeminy



Heart Rate: N/A
25mm/sec 10mm/mV

- Rhythm: Irregular
- PR Interval: 0.12 - 0.20s
- P Wave: Premature or hidden
- QRS: <0.12

Supraventricular Tachycardia (SVT)



Heart Rate: 150 - 250 bpm
25mm/sec 10mm/mV

- Rhythm: Regular
- PR Interval: Not always possible to measure
- P Wave: Often buried in the T waves
- QRS: <0.12

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Wandering Atrial Pacemaker



Heart Rate: 60 - 100 bpm
25mm/sec 10mm/mV

- Rhythm: Irregular
- PR Interval: 0.12 - 0.20s
- P Wave: 3 types or more different P wave morphologies
- QRS: <0.12

Multifocal Atrial Tachycardia (MAT)



Heart Rate: >100 bpm
25mm/sec 10mm/mV

- Rhythm: Irregular
- PR Interval: Variable
- P Wave: 3 types or more different P wave morphologies
- QRS: <0.12

Premature Atrial Contraction (PAC)



Heart Rate: N/A
25mm/sec 10mm/mV

- Rhythm: Irregular
- PR Interval: 0.12 - 0.20s
- P Wave: Premature (abnormal) or hidden
- QRS: <0.12

Wolff-Parkinson White (WPW)

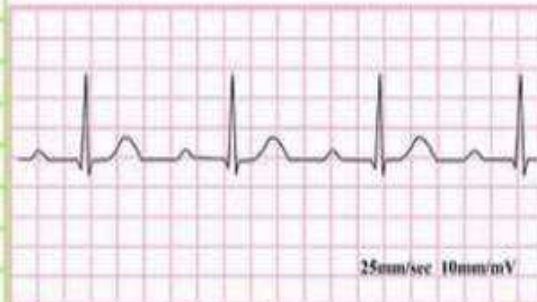


Heart Rate: Depends on rate of underlying rhythm
25mm/sec 10mm/mV

- Rhythm: Regular w/o A-fib
- PR Interval: Short <0.12
- P Wave: Normal unless A-fib
- QRS: >0.10 with delta wave

ECG Basics - Heart Blocks

First Degree AV Block



- Rhythm: Regular
- PR interval: Prolonged >0.20 sec
- P Wave: Normal
- QRS: <0.12

Second Degree AV Block - Type 1 (aka Mobitz 1, Wenckebach):

P-R INTERVALS BECOME PROGRESSIVELY LONGER UNTIL ONE P WAVE IS BLOCKED, AND A QRS IS DROPPED.



- Rhythm: Irregular
- PR interval: Increasingly Prolonged
- P Wave: Normal
- QRS: <0.12

Second Degree AV Block - Mobitz Type 2

Common ratio 2:1, 3:1, or 4:1



- Rhythm: Irregular
- PR interval: Normal (more P waves than QRS)
- P Wave: Normal
- QRS: Usually wide >0.10

3rd Degree AV Block

P waves are not related to the QRS complexes



- Rhythm: Regular
- PR interval: None
- P Wave: Normal does not relate to QRS
- QRS: Normal or wide

Complete Right Bundle Branch Block

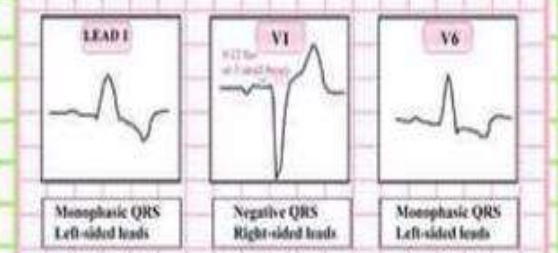


During a right bundle branch block, the right ventricle is not directly activated by impulses travelling through the right bundle branch.

* There should be a normal S wave in lead V1 (R, rS, rR' or q)

- Rhythm: Regular
- PR interval: Normal
- P Wave: Normal
- QRS: Wide >0.12

Complete Left Bundle Branch Block



- Rhythm: Regular
- PR interval: Normal
- P Wave: Normal
- QRS: Wide >0.12