

ECG Rhythm Interpretation

Module IV b

Supraventricular and Ventricular Arrhythmias

Course Objectives

- To recognize the normal rhythm of the heart - “Normal Sinus Rhythm.”
- To recognize the 13 most common rhythm disturbances.
- To recognize an acute myocardial infarction on a 12-lead ECG.

Learning Modules

- ECG Basics
- How to Analyze a Rhythm
- Normal Sinus Rhythm
- Heart Arrhythmias
- Diagnosing a Myocardial Infarction
- Advanced 12-Lead Interpretation

Arrhythmias

- Sinus Rhythms
- Premature Beats
- Supraventricular Arrhythmias
- Ventricular Arrhythmias
- AV Junctional Blocks

Supraventricular Arrhythmias

- *Atrial Fibrillation*
- *Atrial Flutter*
- *Paroxysmal Supraventricular Tachycardia*

Rhythm #5



- Rate? 100 bpm
- Regularity? irregularly irregular
- P waves? none
- PR interval? none
- QRS duration? 0.06 s

Interpretation? *Atrial Fibrillation*

Atrial Fibrillation



- Deviation from NSR
 - No organized atrial depolarization, so no normal P waves (impulses are not originating from the sinus node).
 - Atrial activity is chaotic (resulting in an irregularly irregular rate).
 - Common, affects 2-4%, up to 5-10% if > 80 years old

Atrial Fibrillation



- **Etiology:** Recent theories suggest that it is due to multiple re-entrant wavelets conducted between the R & L atria. Either way, impulses are formed in a totally unpredictable fashion. The AV node allows some of the impulses to pass through at variable intervals (so rhythm is irregularly irregular).

Rhythm #6



- Rate? 70 bpm
- Regularity? regular
- P waves? flutter waves
- PR interval? none
- QRS duration? 0.06 s

Interpretation? *Atrial Flutter*

Atrial Flutter



- Deviation from NSR
 - No P waves. Instead flutter waves (note “sawtooth” pattern) are formed at a rate of 250 - 350 bpm.
 - Only some impulses conduct through the AV node (usually every other impulse).

Atrial Flutter



- **Etiology:** Reentrant pathway in the right atrium with every 2nd, 3rd or 4th impulse generating a QRS (others are blocked in the AV node as the node repolarizes).

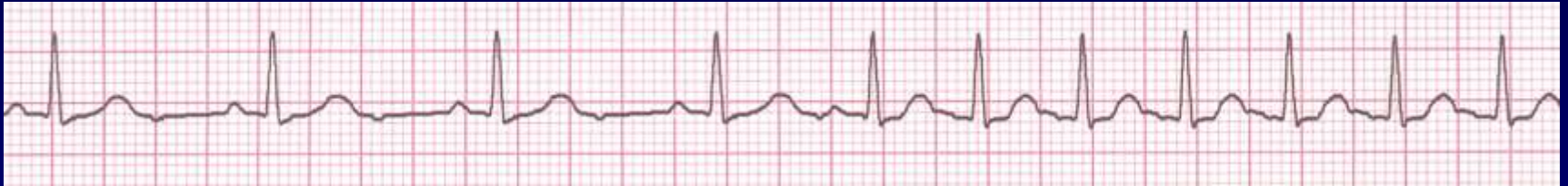
Rhythm #7



- Rate? 74 → 148 bpm
- Regularity? Regular → regular
- P waves? Normal → none
- PR interval? 0.16 s → none
- QRS duration? 0.08 s

Interpretation? *Paroxysmal Supraventricular Tachycardia (PSVT)*

PSVT



- Deviation from NSR
 - The heart rate suddenly speeds up, often triggered by a PAC (not seen here) and the P waves are lost.

PSVT



- **Etiology:** There are several types of PSVT but all originate above the ventricles (therefore the QRS is narrow).
- Most common: abnormal conduction in the AV node (reentrant circuit looping in the AV node).

Ventricular Arrhythmias

- *Ventricular Tachycardia*
- *Ventricular Fibrillation*

Rhythm #8



- Rate? 160 bpm
- Regularity? regular
- P waves? none
- PR interval? none
- QRS duration? wide (> 0.12 sec)

Interpretation? *Ventricular Tachycardia*

Ventricular Tachycardia



- Deviation from NSR
 - Impulse is originating in the ventricles (no P waves, wide QRS).

Ventricular Tachycardia



- **Etiology:** There is a re-entrant pathway looping in a ventricle (most common cause).
- Ventricular tachycardia can sometimes generate enough cardiac output to produce a pulse; at other times no pulse can be felt.

Rhythm #9



- Rate? none
- Regularity? irregularly irreg.
- P waves? none
- PR interval? none
- QRS duration? wide, if recognizable

Interpretation? *Ventricular Fibrillation*

Ventricular Fibrillation



- Deviation from NSR
 - Completely abnormal.

Ventricular Fibrillation



- **Etiology:** The ventricular cells are excitable and depolarizing randomly.
- Rapid drop in cardiac output and death occurs if not quickly reversed