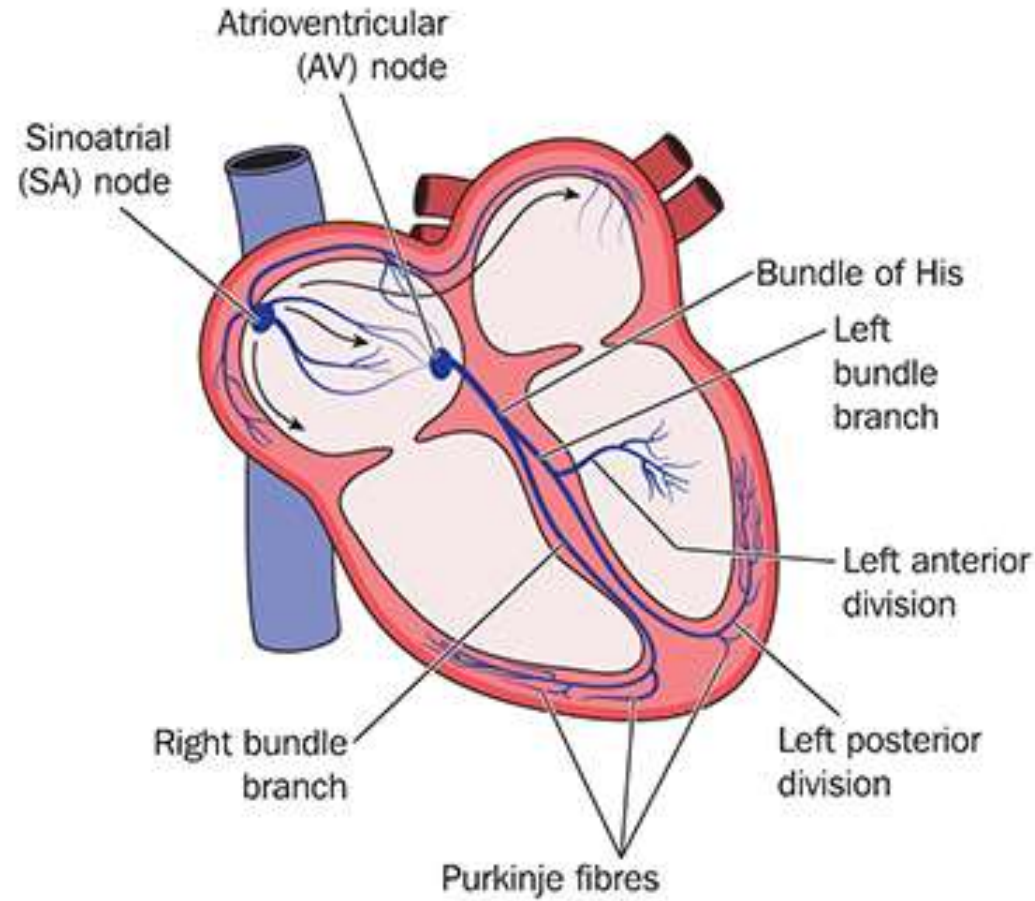




ARRHYTHMIAS

Arrhythmias





Class Description

To review the scope and impact of cardiac arrhythmia, discuss how ECG monitoring is done, and detail ECG findings indicative of cardiac arrhythmia

Learning Objectives



Define Cardiac Arrhythmias



Define the differences in the treatment for each Arrhythmia



Define the different types of Arrhythmia



Identify Nursing responsibilities related to monitoring Arrhythmias



Identify each Arrhythmia

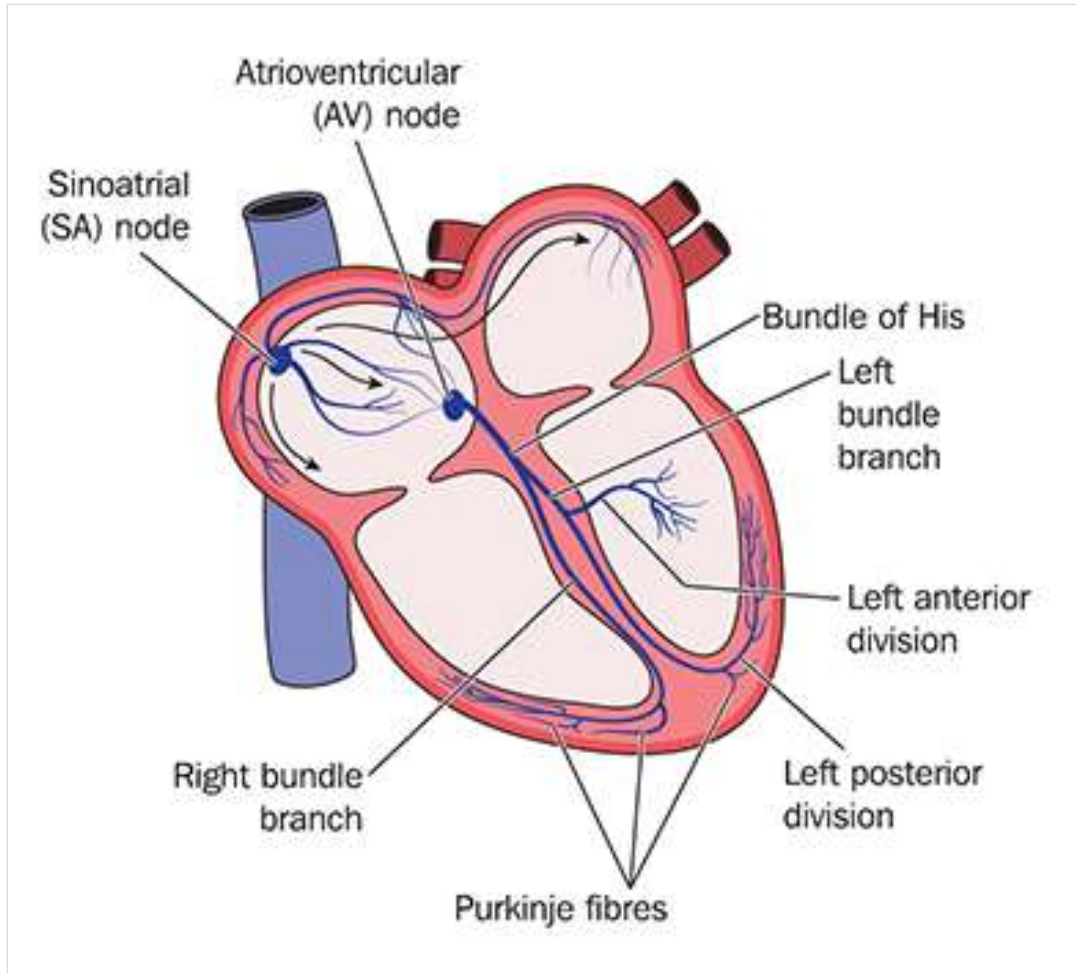
What is an Arrhythmia

From Greek, lack of rhythm,
from *arrhythmos*, unrhythmical,

An **Arrhythmia** is an abnormal rhythm of the heart and is caused by problems with your heart's electrical system. The electrical impulses may happen too fast, too slowly, or erratically – causing the heart to beat too fast, too slowly, or erratically.



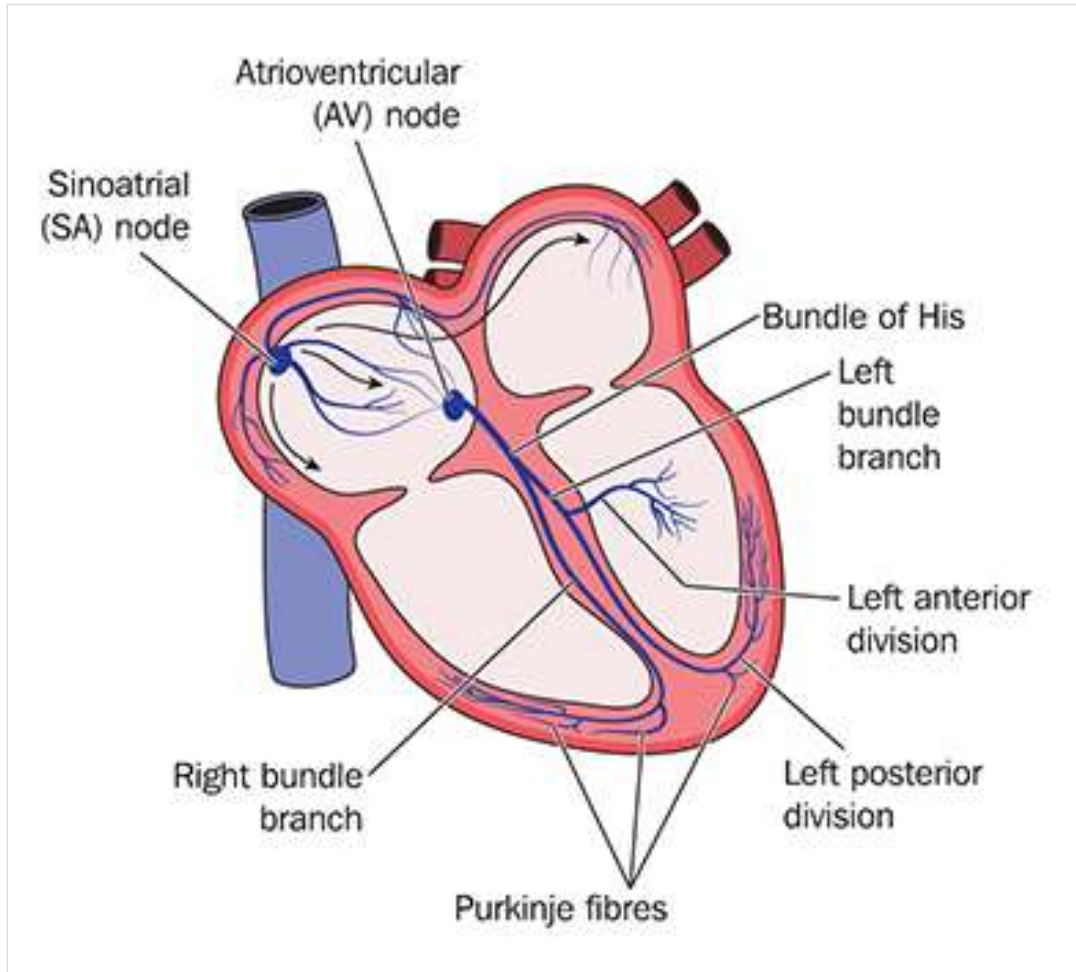
Arrhythmias



The Occurrence of cardiac arrhythmias is common and some can be serious or even life threatening. **Electrocardiogram (ECG) monitoring** is the standard practice for the monitoring of cardiac rhythms in hospitalized patients and, today, most patients with an indication for arrhythmia monitoring are monitored. Vigilant monitoring and prompt recognition of often of subtle ECG variations can improve outcomes by affording patients acute management before further deterioration occurs.

However, many Healthcare professionals indicate that they are not comfortable identifying ECG abnormalities. In-addition only one half of surveyed nurses indicated that they were knowledgeable about how to apply therapeutic interventions once an arrhythmia was identified.

Arrhythmias



ECG Monitoring: This presentation will focus on:



Atrial arrhythmias – which occur when impulses originate in the atria



Sinus Node arrhythmias – arrhythmias resulting from sinus node dysfunction



Supraventricular tachycardias

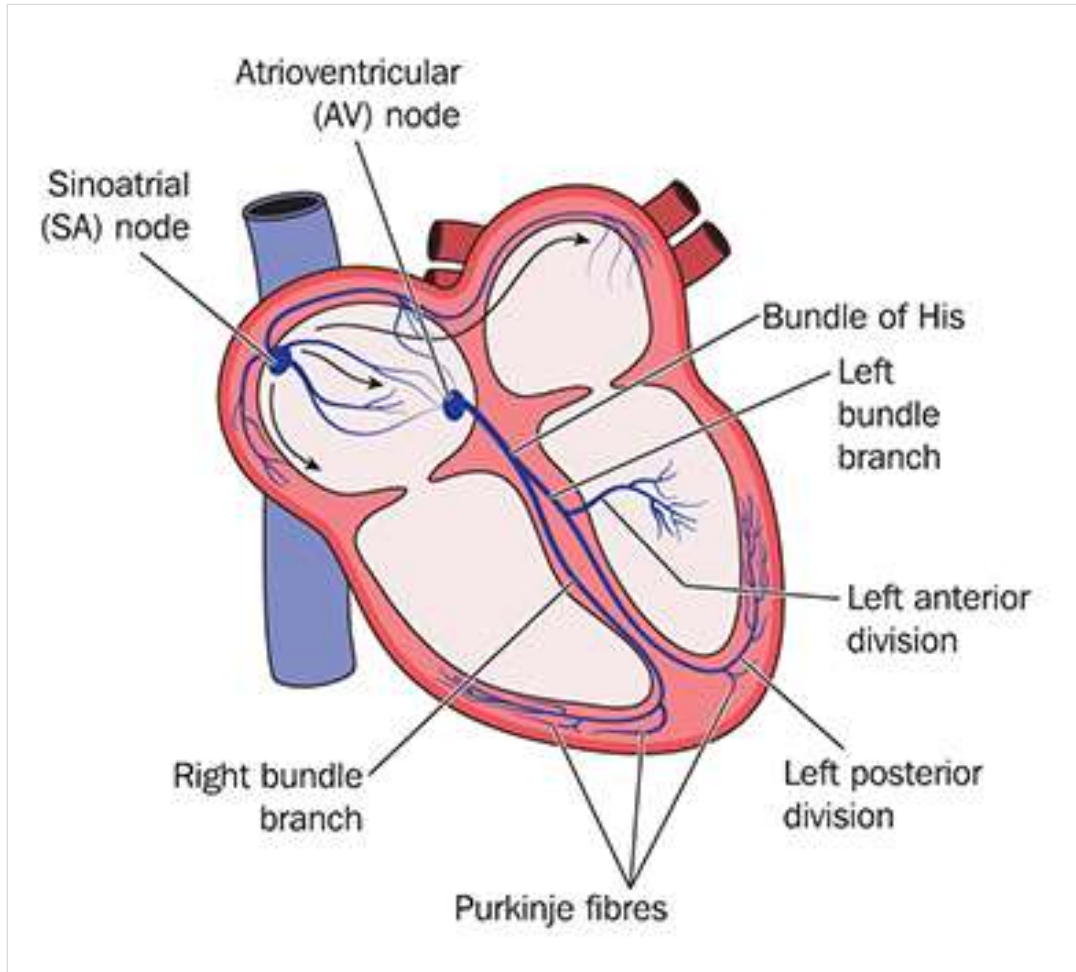


Ventricular arrhythmias – which occur when impulses originate in the ventricles



Acute Management and Interventions for Arrhythmias

Arrhythmias



Atrial Arrhythmias

Atrial Arrhythmias begin in the atria or the atrial conduction pathways and they are caused by the generation of ectopic beats outside of the sinus node.



Sinus Tachycardia



Atrial fibrillation



Atrial flutter

Arrhythmias

Sinus Tachycardia

In sinus tachycardia the rhythm follows the normal conduction pathway but at a rate greater than the normal inherent rate of 60-100 beats per minute. As a result, all features of the ECG should appear normal except for the heart rate, which will be over 100 beats per minute.



Symptoms and Complications:

Some people have no symptoms;



Rapid heartbeat or "palpitations" or fluttering feeling in chest or bounding pulse



Chest pain – pressure or tightness



Shortness of breath



Fatigue/tiredness

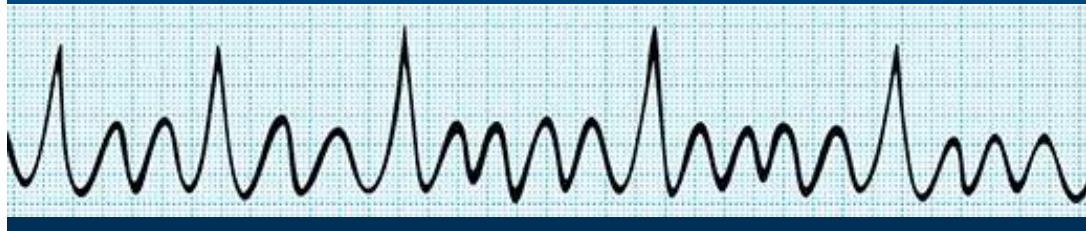


Lightheadedness or dizziness

Arrhythmias

Atrial Fibrillation/Flutter

In the United States, an estimated 5% of people, or 1 in 18, have an arrhythmia. Over a lifetime, as many as 1 in 4 adult Americans may develop an irregular heartbeat. Atrial fibrillation and atrial flutter are common arrhythmias and significant causes of morbidity and mortality.



Consider the following statistics for atrial fibrillation/flutter in the United States:

An estimated **2.7 to 6.1 million Americans** suffer from atrial fibrillation, making it the most common sustained cardiac tachyarrhythmia.

Each Year, the incidence and prevalence of the condition increase, and an expected **12.1 million people** may be affected in 2030.

Atrial fibrillation raises an individual's risk of stroke by a factor of five and accounts for **15% to 20% of ischemic strokes**, depending upon age, annually.

130,000 deaths

Estimated per year due to atrial fibrillation

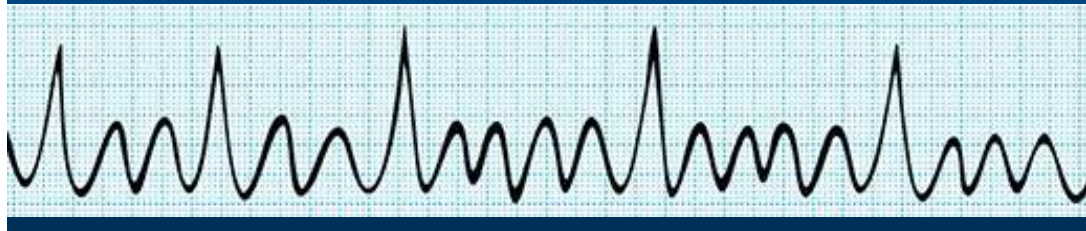
\$6 billion

Per year is spent on atrial fibrillation

Arrhythmias

Atrial Fibrillation

During fibrillation, the atria discharge at a rate of 350-600 beats/minute with as many as 200 beats/minute transmitted to the ventricles. Synchronized atrial contraction is lost and the atria quiver with fast and chaotic generation of impulses.



Symptoms, if present, may be subtle and include:



Intermittent palpitations



Unusual fatigue or weakness



Tachycardia



Dizziness



Decreased exercise tolerance



Shortness of breath or mild dyspnea

Arrhythmias

Atrial Fibrillation

Management of atrial fibrillation/atrial flutter should follow ACC/AHA Guidelines for Management of Patients with Atrial Fibrillation



General management focuses on:



Rate control – specifically, the control of the rapid ventricular rate



Rhythm control or conversion of hemodynamically unstable atrial fibrillation to sinus rhythm



Both rate and rhythm control

Arrhythmias

Atrial Fibrillation



Inpatient performance measures are:



CHA2DS2-VASc risk score documented prior to discharge



Anticoagulation prescribed prior to discharge



PT/INR planned follow-up documented prior to discharge for warfarin treatment

Arrhythmias

Sinus Bradycardia

Degeneration or damage to the sinoatrial node slows or blocks impulse generation and results in the loss of pace making function. Bradycardia or bradyarrhythmia is arbitrarily defined as a heart rate below 60 beats/minute.



Symptoms of Bradycardia May Include:



Dizziness or lightheadedness



Vertigo



Syncope



Angina



Dyspnea



Mental incapacity

Arrhythmias

Bradycardia



Treating the Underlying Medical Cause:



Not usually needed except with prolonged or repeated symptoms



Can usually be corrected with an [artificial pacemaker](#) to speed up the heart rhythm as needed



Some medications can cause a slow heartbeat, in this case, medication may be adjusted

Arrhythmias

Supraventricular Tachycardia

Electrical signals in the heart's upper chambers fire abnormally, which interferes with electrical signals coming from the sinoatrial (SA) node --- the heart's natural pacemaker. A series of early beats in the atria speeds up the heart rate. The rapid heartbeat does not allow enough time for the heart to fill before it contracts so blood flow to the rest of the body is compromised.



On ECG, Paroxysmal Supraventricular Tachycardia:



Fast usually 130-250 beats/minute



Has narrow QRS complex



Lacks visible P waves and if they are present, they appear after the QRS complex.

Arrhythmias

Supraventricular Tachycardia

Supraventricular tachycardia originates in the His bundle or the tissues above the ventricles, these beats are characterized by a rate exceeding 100 beats per minute.



Signs and Symptoms:



Dizziness or lightheadedness



Rapid heartbeat or "palpitations" or fluttering feeling in chest or bounding pulse



Angina (chest pain), pressure or tightness



Shortness of breath

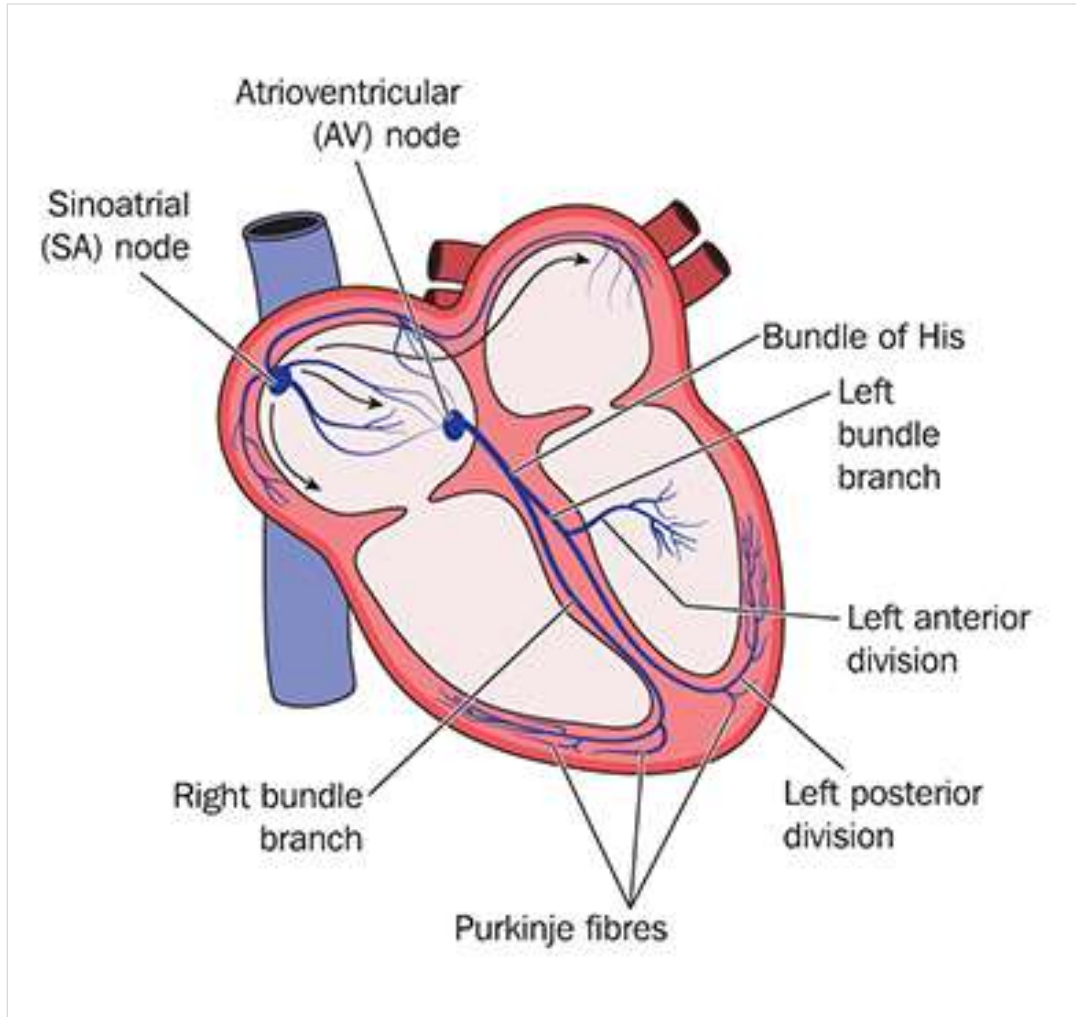


Fainting (syncope), Fatigue/tiredness



Cardiac Arrest (in extreme cases)

Arrhythmias



Ventricular Arrhythmias

Ventricular arrhythmias arise in the ventricles or ventricle conduction system and are potentially lethal arrhythmias. Both Ventricular Tachycardia and Ventricular fibrillation commonly lead to cardiac arrest or sudden cardiac death.

In many cases, ECG identification is the first and only indication of a cardiac arrest. The three types of ventricular tachyarrhythmias that can lead to cardiac arrest are:



Ventricular Fibrillation



Sustained Ventricular Tachycardia

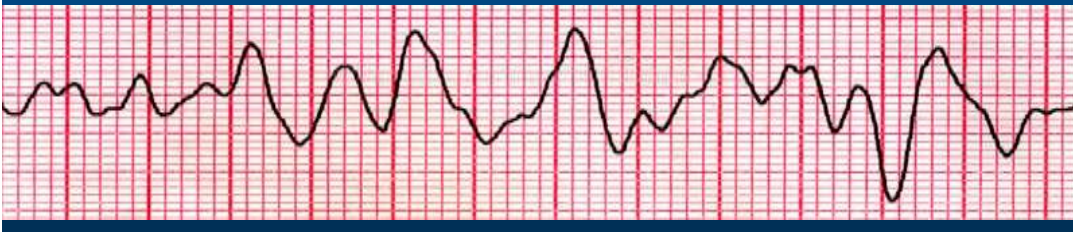


Torsade de Pointes

Arrhythmias

Ventricular Fibrillation

During ventricular fibrillation, electrical activity within the ventricles is chaotic, rapid, and uncoordinated. Contractions are completely ineffective, the heart quivers and cardiac output is absent.



What's Going On:



Rhythm is abnormal and activity is totally disorganized



Rate is abnormal because the atrial rate cannot be determined and the ventricular rate is 350-450 beats per minute



P wave is abnormal (no recognizable P waves)



No recognizable QRS complex

Arrhythmias

Ventricular Tachycardia

Ventricular Tachycardia results from an impulse generated in the ventricle that causes retrograde depolarization. Sustained ventricular tachycardias, which last more than 30 seconds require rapid diagnosis and treatment as this arrhythmia causes severe hypotension, loss of consciousness and cardiac arrest.



What Does it Look Like on ECG:



The atrial rate cannot be determined and the ventricle rate is fast, 100-250 beats/minute



The P wave is usually absent



All the QRS complexes are wide, regular, and exhibit an increased amplitude

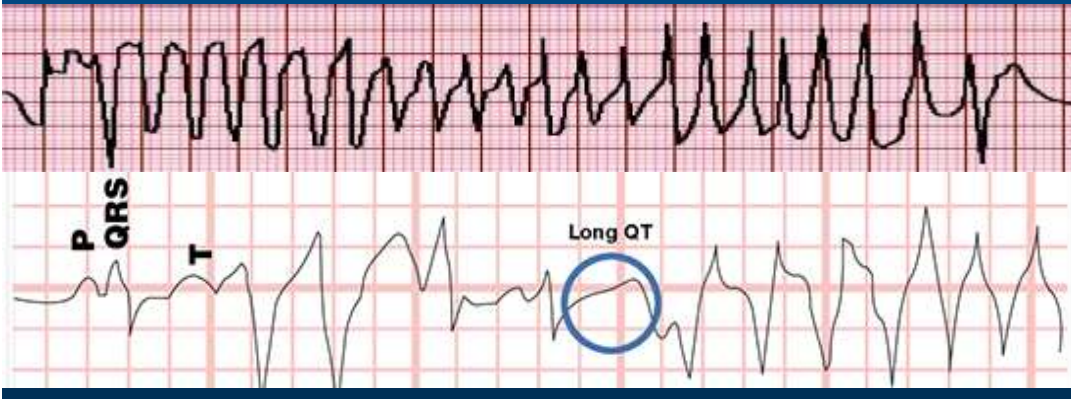


The T wave is in the opposite direction when compared to the QRS complex

Arrhythmias

Torsade de Pointes

Torsade de Pointes translates as “twisting of the spikes” which describes the appearance of the ECG tracing. Torsade de pointes is an example of an atypical, polymorphic ventricular tachycardia. It is heralded by QT-interval prolongation on ECG.



ECG Features of Torsade de Pointes include:



The rhythm is irregular with irregular R-R intervals



The typical heart rate range is 160-250 beats per minute



P waves are typically absent



QRS complexes are wider and they rotate around the ECG baseline, deflecting both upward and downward for several beats. The hallmark “twisting” might not be seen in every lead.



QT is prolonged

Arrhythmias



Knowledge for ECG Monitoring Staff Members:



The specific monitoring system used in the hospital unit, including its operation and limitations of the associated software



Appropriate electrode placement, including skin prep, landmarks for accurate lead placement, and best practices for electrode application



Appropriate setting of heart rate and ECG parameters



Evaluation of pauses



Diagnosis of specific rhythms (follow ACLS protocol when applicable)

Arrhythmias

Acute Management and Intervention



Maintaining heart rate alarms at appropriate limits to rapidly detect bradycardia or tachycardia



Preventing hypoxia-induced arrhythmia by administering supplemental oxygen and maintaining SPO2 levels greater than 90%



Maintaining therapeutic levels of antiarrhythmic medications while monitoring for/preventing toxicity



Maintaining one or more patent IV sites to facilitate administration of emergency medications as needed



Providing patient information and education to promote compliance and relieve anxiety



Monitoring electrolyte and replacing as needed

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