DYSRHYTHMIA

Target Population: Adult

Dysrhythmia		
Potential Cause	**Signs and Symptoms**	**Risk Factors**
Atrial Fibrillation	• atrial heart rate is 400 beats per minute or greater • chest pain • dizziness • dyspnea • fatigue • may contribute to clot formation and potential emboli • P-wave and QRS relationship is unidentifiable, irregular ventricular response • palpitations • P-waves are unidentifiable • QRS complexes are present, normal duration • rapid ventricular response, may quickly lead to angina related to reduced cardiac output, syncope, heart failure • rhythm of ventricles irregularly irregular • unable to determine PR-interval • ventricular heart rate is greater than 100 beats per minute	• atrial enlargement • cardiac ischemia • hypertension • hyperthyroidism • pulmonary embolism • underlying heart disease, such as coronary artery disease, rheumatic heart disease, pericarditis, heart failure and valvular heart disease
Atrial Flutter	• atrial heart rate is 230 to 350 beats per minute, regular with flutter waves (saw-tooth pattern) • ectopic atrial focus fires at such a rapid rate, impulses are blocked at atrioventricular node; only every 2nd (2:1), 3rd (3:1) or 4th (4:1) flutter reaches the ventricles • fatigue • palpitations • P-wave and QRS relationship is 2 or more flutter waves for every QRS; irregular ventricular response depending on rate • P-waves are saw-tooth pattern of flutter waves • QRS complexes are present, normal duration • transient; rarely lasts greater than 24 hours • typically converts to normal sinus rhythm or progresses to atrial fibrillation • unable to determine PR-interval • ventricular response is 75 to 175 beats per minute, may be regular or irregular	• cardiac surgery • chronic obstructive pulmonary disease • pulmonary embolism • thyrotoxicosis • underlying heart disease, such as coronary artery disease or rheumatic heart disease
Cardiac Arrest: Pulseless Electrical Activity, Asystole	• absent muscle tone • apnea or agonal, gasping respirations • cyanotic • ECG (electrocardiogram) indicates asystole (“flatline”) • electrical activity is visible on ECG (electrocardiogram), but central pulses are absent • nonresponsive • pulse indeterminable • unconsciousness	• cardiovascular compromise, such as hypovolemic shock, septic shock or myocarditis • drug toxicity • metabolic disorder • neurologic compromise, such as central nervous system infection or status epilepticus • poisoning • respiratory failure

Potential Cause	Signs and Symptoms	Risk Factors
First-Degree Atrioventricular Block	• heart rate is 60 to 100 beats per minute • impulse originates in sinoatrial node, however, disturbance along pathway delays conduction through atrioventricular node • may occur in healthy person • often incidental finding, as rarely produces symptoms • PR-interval is prolonged, greater than 0.20 seconds • P-waves are present • P-wave precedes each QRS complex • QRS complexes are present, normal duration • rhythm is regular	• anoxia • atrioventricular node malfunction • cardiac medication, such as digitalis, quinidine, procainamide, clonidine or tricyclic antidepressant • excess vagal stimulation • hypokalemia • inferior wall myocardial infarction • myocardial ischemia • postoperative cardiac surgery • thyrotoxicosis • underlying heart disease, such as rheumatic heart disease or myocarditis
Idioventricular Rhythm, Accelerated Idioventricular Rhythm	• heart rate is 20 to 40 beats per minute • PR-interval is absent • P-wave and QRS relationship is absent • P-waves are dissociated from ventricular complexes or absent • QRS complexes are wide and bizarre • rhythm is regular or irregular Accelerated Idioventricular Rhythm: • heart rate is 40 to 100 beats per minute • PR-interval is absent • P-wave and QRS relationship is absent • P-waves are dissociated from ventricular complexes or absent • QRS complexes are wide and bizarre • rhythm is regular	• transient bradycardia associated with coronary reperfusion following administration of fibrinolytic therapy
Paroxysmal Supraventricular Tachycardia	• capillary refill delayed • chest pain or pressure • crackles in lungs • dizziness • heart rate is greater than 180 beats per minute • hepatomegaly • nervousness • pallor • pounding in chest • PR-interval is short or indeterminable • P-wave for each QRS complex may be buried or none seen • P-waves are present; may be distorted in shape, buried in QRS complex • QRS complexes are present, usually normal duration, may be wide • rhythm may have sudden start and stop (paroxysmal supraventricular tachycardia) • shock may be present, depending on length of time of condition • shortness of breath • weakness	• acidosis • anemia • anxiety • congenital heart disease • dehydration • exercise • fever • hyperdynamic cardiac activity, such as a response to catecholamine release, drug use, postoperative cardiac repair • hypoglycemia • hypoxemia • pain • stimulant use, such as nicotine, cocaine, caffeine or energy drinks • withdrawal from ethanol or sedative • Wolff-Parkinson-White syndrome (evident only after conversion to sinus rhythm)

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Premature Atrial Contractions	Note: Generally transient, not unusual in healthy person. • heart rate is 60 to 100 beats per minute • irritable atrial ectopic focus conducts a beat before the next beat due • palpitations • PR-interval is normal or prolonged • P-wave precedes each QRS complex • P-waves are present, premature beats have different shapes • QRS complexes are present, normal duration, noncompensatory pause • rhythm is irregular	• anxiety • atrial enlargement • chronic pulmonary disease • digitalis toxicity • electrolyte imbalance • fatigue • fever • heart failure • hypoxia • indicates atrial irritability; may precede supraventricular tachycardia, atrial flutter, atrial fibrillation or atrial tachycardia • infection • ischemia • myocardial ischemia or infarction • stimulant use, such as caffeine, nicotine or cocaine • strong emotions
Premature Ventricular Contractions (Premature Ectopic Beats or Extrasystole)	• chest pressure or pain • dizziness • fatigue • heart rate varies with underlying rhythm • palpitations • PR-interval is normal with sinus beats; missing with premature complexes • P-waves are present with each sinus-conducted QRS complex; not present with premature QRS complex • QRS complexes are normal duration of sinus-conducted complexes; greater than 0.12 seconds in premature complexes • rhythm is irregular • shortness of breath	• acidosis • alcohol • anxiety • caffeine • electrolyte imbalance, such as hypokalemia or hypomagnesemia • hypovolemia • hypoxia • infection • medications, such as digitalis, phenothiazine or tricyclic antidepressant • myocardial infarction • myocardial ischemia • pacemaker malfunction • prevalence increases with age • underlying heart disease, such as myocardial hypertrophy
Second-Degree Atrioventricular Block: Mobitz Type I (Wenckebach)	• atrial beats are regular; ventricular beats are irregular • heart rate is 60 to 100 beats per minute • impulse transmission through atrioventricular node progressively delayed until a beat is dropped; repeats ("longer, longer, longer, drop – now you have a Wenckebach") • P-wave precedes each QRS complex until QRS is dropped; pattern repeats • PR-interval lengthens with each cycle until QRS complex is dropped; pattern then repeats • QRS complex follows each P-wave until dropped in repeating pattern • QRS complexes, when present, have normal duration (cyclic missed conduction) • transient	• inferior wall myocardial infarction • medication, such as digoxin, beta-blocker or calcium channel blocker • myocarditis • postoperative cardiac surgery

Potential Cause	Signs and Symptoms	Risk Factors
Second-Degree Atrioventricular Block Mobitz II	• altered level of consciousness • bradycardia; ventricular slower than atrial • confusion • diminished peripheral perfusion • exercise intolerance • fatigue • hypotension • increased work of breathing • one or more P-waves preceding each QRS complex • PR-interval normal or lengthened for each conducted QRS complex • QRS complexes, when present, are normal or prolonged duration • rhythm is usually regular; may be irregular • syncope or near-syncope • transient dizziness, lightheadedness	• anorexia • digitalis toxicity • hyperkalemia • inferior or anterior wall myocardial infarction • organic lesion in conduction pathway • postoperative cardiac surgery
Sinus Bradycardia	Note: Usually benign; may be normal, such as in athletes or during sleep; may also lead to heart failure. • confusion • exercise intolerance • fatigue • heart rate is less than 60 beats per minute • PR-intervals are normal • P-wave precedes each QRS complex • P-waves are present • QRS complexes are present, normal duration • regular rhythm • syncope, near-syncope • transient dizziness, lightheadedness	• anorexia nervosa • eye surgery • hypothermia • hypothyroidism, myxedema • hypoxia, anoxia • increased vagal tone from vomiting, increased intracranial pressure, straining with stool or vomiting • medications (cardiac glycoside, beta-blocker, calcium channel blocker) • myocardial infarction of inferior wall • obstructive jaundice
Sinus Node Dysfunction, Sick Sinus Syndrome	• ECG (electrocardiogram) characteristics vary based on presenting rhythm • palpitations • syncope	• cardiomyopathy • connective tissue disease • increased age • inflammatory disease • ischemia • medication, such as beta-blocker, calcium channel blocker, digitalis or quinidine
Third-Degree (Complete) Atrioventricular Block	Note: May progress to heart failure if decreased ventricular rate causes hemodynamic instability. • atrial heart rate is 60 to 100 beats per minute; ventricular: less than 60 beats per minute • dizzy, lightheadedness • fatigue • P-wave and QRS relationship is absent or completely independent of each other • PR-interval is inconsistent or nonexistent • presyncope or syncope (Morgagni-Adams Stokes episodes) • P-waves are present, occur regularly • QRS complexes are present, may be normal duration or greater than 0.12 seconds; slow and narrow if QRS is junctional escape beat; wide (greater than or equal to 0.12 sec) if ventricular escape beat • rhythm is regular • weakness	• anterior myocardial infarction • congenital anomaly • digitalis toxicity • infection, such as myocarditis or Lyme disease • postoperative cardiac surgery • underlying heart disease

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Ventricular Fibrillation	Note: Disorganized electrical activity of ventricles results in ineffective ventricular quivering and ineffective cardiac output. • cyanotic • heart rate is indeterminable • irregular or absent breathing • Irregular rhythm • limp muscle tone • no pulse; indeterminable • nonresponsive • PR-interval is absent • P-wave and QRS relationship is absent • P-waves are absent • QRS complexes are absent • sudden loss of consciousness	• electrical shock • often follows ventricular tachycardia • same as for ventricular tachycardia
Ventricular Tachycardia	Note: Rapid ventricular tachycardia may deteriorate to ventricular fibrillation if it does not self-terminate. • dizziness (may occur when heart rate approximately 130 beats per minute) • fatigue • heart rate is 120 to 200 beats per minute; may range from 400 to 500 beats per minute • loss of consciousness (may occur when ventricular rate approximately 200 beats per minute) • near-syncope, syncope • nonsustained ventricular tachycardia: lasts less than 30 seconds, terminates spontaneously • palpitations • poor peripheral perfusion • PR-interval is absent • pulse difficult to palpate • P-wave and QRS relationship is absent • P-waves are absent • QRS complexes are greater than 0.06 to 0.14 seconds and unusual shape • regular rhythm • series of 3 or more successive or consecutive premature ventricular contractions/ventricular beats greater than 100 beats per minute • sustained ventricular tachycardia: lasts longer than 30 seconds, requires termination due to hemodynamic instability, rare in patients without underlying heart disease • Torsades de pointes ("twisting of points"): polymorphic in short-long-short sequence, rarely supports perfusion; may present as syncope, seizure or cardiac arrest	• acidosis • acquired heart disease • acute hypoxemia • acute myocardial infarction (primary cause) • cardiac tumor • congenital heart disease • drug toxicity, such as digitalis and quinidine • hypothermia • long-QT syndrome • metabolic imbalance, such as hyperkalemia, hypokalemia or hypocalcemia • myocarditis • respiratory failure • toxin or poison exposure • underlying heart disease, such as cardiomyopathy, primary conduction disturbance, valvular heart disease, left ventricular hypertrophy