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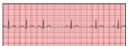





# Heart Arrhythmias

## Cheat Sheet



### EKG Interpretation Cheat Sheet

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Arrhythmias	Description	Causes	Treatment
<b>Sinus Arrhythmia</b> 	<ul style="list-style-type: none"><li>Irregular atrial and ventricular rhythms.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Irregular atrial and ventricular rhythms.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Irregular atrial and ventricular rhythms.</li><li>Normal P wave preceding each QRS complex.</li></ul>
<b>Sinus Tachycardia</b> 	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms are regular.</li><li>Rate &gt; 100 bpm.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms are regular.</li><li>Rate &gt; 100 bpm.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms are regular.</li><li>Rate &gt; 100 bpm.</li><li>Normal P wave preceding each QRS complex.</li></ul>
<b>Sinus Bradycardia</b> 	<ul style="list-style-type: none"><li>Regular atrial and ventricular rhythms.</li><li>Rate &lt; 60 bpm.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Regular atrial and ventricular rhythms.</li><li>Rate &lt; 60 bpm.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Regular atrial and ventricular rhythms.</li><li>Rate &lt; 60 bpm.</li><li>Normal P wave preceding each QRS complex.</li></ul>
<b>Sinoatrial (SA) arrest or block</b> 	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms are normal except for missing complexes.</li><li>Normal P wave preceding each QRS complex.</li><li>Pause not equal to multiple of the previous rhythm.</li></ul>	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms are normal except for missing complexes.</li><li>Normal P wave preceding each QRS complex.</li><li>Pause not equal to multiple of the previous rhythm.</li></ul>	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms are normal except for missing complexes.</li><li>Normal P wave preceding each QRS complex.</li><li>Pause not equal to multiple of the previous rhythm.</li></ul>
<b>Wandering atrial pacemaker</b> 	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms vary slightly.</li><li>Irregular PR interval.</li><li>P waves irregular with changing configurations indicating that they aren't all from SA node or single atrial focus; may appear after the QRS complex.</li><li>QRS complexes are uniform in shape but irregular in rhythm.</li></ul>	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms vary slightly.</li><li>Irregular PR interval.</li><li>P waves irregular with changing configurations indicating that they aren't all from SA node or single atrial focus; may appear after the QRS complex.</li><li>QRS complexes are uniform in shape but irregular in rhythm.</li></ul>	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms vary slightly.</li><li>Irregular PR interval.</li><li>P waves irregular with changing configurations indicating that they aren't all from SA node or single atrial focus; may appear after the QRS complex.</li><li>QRS complexes are uniform in shape but irregular in rhythm.</li></ul>
<b>Premature atrial contraction (PAC)</b> 	<ul style="list-style-type: none"><li>Pre-mature abnormal looking P waves that differ in configuration from normal P waves.</li><li>QRS complexes after P waves except in very early or blocked PACs.</li><li>P wave often buried in the preceding T wave or identified in the preceding T wave.</li></ul>	<ul style="list-style-type: none"><li>Pre-mature abnormal looking P waves that differ in configuration from normal P waves.</li><li>QRS complexes after P waves except in very early or blocked PACs.</li><li>P wave often buried in the preceding T wave or identified in the preceding T wave.</li></ul>	<ul style="list-style-type: none"><li>Pre-mature abnormal looking P waves that differ in configuration from normal P waves.</li><li>QRS complexes after P waves except in very early or blocked PACs.</li><li>P wave often buried in the preceding T wave or identified in the preceding T wave.</li></ul>





## Steps in EKG interpretation

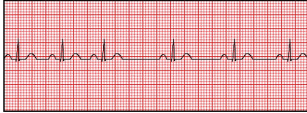


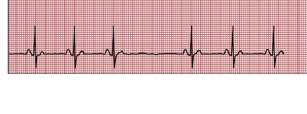


1. Determine the **rhythm** and **regularity**.
2. Calculate the **rate**.
3. Evaluate **P wave**.
4. Calculate **PR interval**.
5. Analyze **QRS complex**.
6. Examine **T wave**.
7. Calculate **QT interval**.
8. Look for **other characteristics**.





# EKG Interpretation Cheat Sheet

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Arrhythmias	Description	Causes	Treatment
<b>Sinus Arrhythmia</b> 	<ul style="list-style-type: none"><li>Irregular atrial and ventricular rhythms.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Normal Variation of normal sinus rhythm in athletes, children, and the elderly.</li><li>Can be seen in digoxin toxicity and inferior wall MI.</li></ul>	<ul style="list-style-type: none"><li>Atropine if rate decreases below 40bpm.</li></ul>
<b>Sinus Tachycardia</b> 	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms are regular.</li><li>Rate &gt; 100 bpm.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Normal physiologic response to fever, exercise, anxiety, dehydration, or pain.</li><li>May accompany shock, left-sided heart failure, cardiac tamponade, hyperthyroidism, and anemia.</li><li>Atropine, epinephrine, quinidine, caffeine, nicotine, and alcohol use.</li></ul>	<ul style="list-style-type: none"><li>Correction of underlying cause.</li><li>Beta-adrenergic blockers or calcium channel blockers for symptomatic patients.</li></ul>
<b>Sinus Bradycardia</b> 	<ul style="list-style-type: none"><li>Regular atrial and ventricular rhythms.</li><li>Rate &lt; 60bpm.</li><li>Normal P wave preceding each QRS complex.</li></ul>	<ul style="list-style-type: none"><li>Normal in well-conditioned heart (e.g., athletes).</li><li>Increased intracranial pressure; increased vagal tone due to straining during defecation, vomiting, intubation, mechanical ventilation.</li></ul>	<ul style="list-style-type: none"><li>Follow ACLS protocol for administration of atropine for symptoms of low cardiac output, dizziness, weakness, altered LOC, or low blood pressure.</li><li>Pacemaker.</li></ul>
<b>Sinoatrial (SA) arrest or block</b> 	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms are normal except for missing complexes.</li><li>Normal P wave preceding each QRS complex.</li><li>Pause not equal to multiple of the previous rhythm.</li></ul>	<ul style="list-style-type: none"><li>Infection.</li><li>Coronary artery disease, degenerative heart disease, acute inferior wall MI.</li><li>Vagal stimulation, Valsalva's maneuver, carotid sinus massage.</li></ul>	<ul style="list-style-type: none"><li>Treat symptoms with atropine I.V.</li><li>Temporary pacemaker or permanent if considered for repeated episodes.</li></ul>
<b>Wandering atrial pacemaker</b> 	<ul style="list-style-type: none"><li>Atrial and ventricular rhythms vary slightly.</li><li>Irregular PR interval.</li><li>P waves irregular with changing configurations indicating that they aren't all from SA node or single atrial focus; may appear after the QRS complex.</li><li>QR complexes are uniform in shape but irregular in rhythm.</li></ul>	<ul style="list-style-type: none"><li>Rheumatic carditis due to inflammation involving the SA node.</li><li>Digoxin toxicity.</li><li>Sick sinus syndrome.</li></ul>	<ul style="list-style-type: none"><li>No treatment if patient is asymptomatic.</li><li>Treatment of underlying cause if patient is symptomatic.</li></ul>
<b>Premature atrial contraction (PAC)</b> 	<ul style="list-style-type: none"><li>Pre-mature abnormal looking P waves that differ in configuration from normal P waves.</li><li>QRS complexes after P waves except in very early or blocked PACs.</li><li>P wave often buried in the preceding T wave or identified in the preceding T wave.</li></ul>	<ul style="list-style-type: none"><li>May prelude supraventricular tachycardia.</li><li>Stimulants, hyperthyroidism, COPD, infection and other heart diseases.</li></ul>	<ul style="list-style-type: none"><li>Usually no treatment is needed.</li><li>Treatment of underlying causes if the patient is symptomatic.</li><li>Carotid sinus massage.</li></ul>


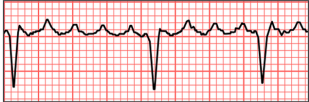










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Arrhythmias	Description	Causes	Treatment
<b>Paroxysmal Supraventricular Tachycardia</b> 	<ul style="list-style-type: none"> <li>Atrial and ventricular rhythms are regular.</li> <li>Heart rate <math>&gt; 160</math> bpm; rarely exceeds 250 bpm.</li> <li>P waves regular but aberrant; difficult to differentiate from preceding T waves.</li> <li>P wave preceding each QRS complex.</li> <li>Sudden onset and termination of arrhythmia.</li> <li>When a normal P wave is present, it's called paroxysmal atrial tachycardia; when a normal P wave isn't present, it's called paroxysmal junctional tachycardia.</li> </ul>	<ul style="list-style-type: none"> <li>Physical exertion, emotion, stimulants, rheumatic heart diseases.</li> <li>Intrinsic abnormality of AV conduction system.</li> <li>Digoxin toxicity.</li> <li>Use of caffeine, marijuana or central nervous system stimulants.</li> </ul>	<ul style="list-style-type: none"> <li>If the patient is unstable prepare for immediate cardioversion.</li> <li>If the patient is stable, vagal stimulation, or Valsalva's maneuver, carotid sinus massage.</li> <li>Adenosine by rapid I.V. bolus injection to rapidly convert arrhythmia.</li> <li>If a patient has normal ejection fraction, consider calcium channel blockers, beta-adrenergic blocks or amiodarone.</li> <li>If a patient has an ejection fraction less than 40% consider amiodarone.</li> </ul>
<b>Atrial Flutter</b> 	<ul style="list-style-type: none"> <li>Atrial rhythm regular, rate, 250 to 400 bpm.</li> <li>Ventricular rate variable, depending on degree of AV block.</li> <li><u>Saw-tooth</u> shape P wave configuration.</li> <li>QRS complexes are uniform in shape but often irregular in rate.</li> </ul>	<ul style="list-style-type: none"> <li>Heart failure, tricuspid or mitral valve disease, pulmonary embolism, cor pulmonale, inferior wall MI, carditis.</li> <li>Digoxin toxicity.</li> </ul>	<ul style="list-style-type: none"> <li>If a patient is unstable with ventricular rate <math>&gt; 150</math> bpm, prepare for immediate cardioversion.</li> <li>If the patient is stable, drug therapy may include calcium channel blockers, beta-adrenergic blocks, or antiarrhythmics.</li> <li>Anticoagulation therapy may be necessary.</li> </ul>
<b>Atrial Fibrillation</b> 	<ul style="list-style-type: none"> <li>Atrial rhythm grossly irregular rate <math>&gt; 300</math> to 600 bpm.</li> <li>Ventricular rhythm grossly irregular, rate 160 to 180 bpm.</li> <li>PR interval indiscernible.</li> <li>No P waves, or P waves that appear as erratic, irregular baseline fibrillatory waves.</li> </ul>	<ul style="list-style-type: none"> <li>Heart failure, COPD, thyrotoxicosis, constrictive pericarditis, ischemic heart disease, sepsis, pulmonary embolus, rheumatic heart disease, hypertension, mitral stenosis, atrial irritation, complication of coronary bypass or valve replacement surgery.</li> </ul>	<ul style="list-style-type: none"> <li>If a patient is unstable with ventricular rate <math>&gt; 150</math> bpm, prepare for immediate cardioversion.</li> <li>If stable, drug therapy may include calcium channel blockers, beta-adrenergic blockers, digoxin, procainamide, quinidine, ibutilide, or amiodarone.</li> <li>Anticoagulation therapy to prevent emboli.</li> <li>Dual chamber atrial pacing, implantable atrial pacemaker, or surgical maze procedure may also be used.</li> </ul>
<b>Junctional Rhythm</b> 	<ul style="list-style-type: none"> <li>Atrial and ventricular rhythms are regular.</li> <li>Atrial rate 40 to 60 bpm.</li> <li>Ventricular rate is usually 40 to 60 bpm.</li> <li>P waves preceding, hidden within (absent), or after QRS complex; usually inverted if visible.</li> <li>PR interval (when present) <math>&lt; 0.12</math> second.</li> <li>QRS complex configuration and duration normal, except in aberrant conduction.</li> </ul>	<ul style="list-style-type: none"> <li>Inferior wall MI, or ischemia, hypoxia, vagal stimulation, sick sinus syndrome.</li> <li>Acute rheumatic fever.</li> <li>Valve surgery.</li> <li>Digoxin toxicity.</li> </ul>	<ul style="list-style-type: none"> <li>Correction of underlying cause.</li> <li>Atropine for symptomatic slow rate.</li> <li>Pacemaker insertion if patient is refractory to drugs.</li> <li>Discontinuation of digoxin if appropriate.</li> </ul>
<b>Premature Junctional Conjunctions</b> 	<ul style="list-style-type: none"> <li>Atrial and ventricular rhythms are irregular.</li> <li>P waves inverted; may precede be hidden within, or follow QRS complex.</li> <li>QRS complex configuration and duration normal.</li> </ul>	<ul style="list-style-type: none"> <li>MI or ischemia.</li> <li>Digoxin toxicity and excessive caffeine or amphetamine use.</li> </ul>	<ul style="list-style-type: none"> <li>Correction of underlying cause.</li> <li>Discontinuation of digoxin if appropriate.</li> </ul>
<b>First-degree AV block</b> 	<ul style="list-style-type: none"> <li>Atrial and ventricular rhythms regular.</li> <li>PR interval <math>&gt; 0.20</math> second.</li> <li>P wave preceding each QRS complex.</li> <li>QRS complex normal.</li> </ul>	<ul style="list-style-type: none"> <li>Inferior wall MI or ischemia or infarction, hypothyroidism, hypokalemia, hyperkalemia.</li> <li>Digoxin toxicity.</li> <li>Use of quinidine, procainamide, beta-adrenergic blocks, calcium.</li> </ul>	<ul style="list-style-type: none"> <li>Correction of underlying cause.</li> <li>Possibly atropine if PR interval exceeds 0.26 second or symptomatic bradycardia develops.</li> <li>Cautions use of digoxin, calcium channel blockers, and beta-adrenergic blockers.</li> </ul>






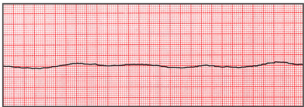






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<b>Second-degree AV block Mobitz I (Weber-Jenckins)</b> 	<ul style="list-style-type: none"> <li>Atrial rhythm regular.</li> <li>Ventricular rhythm irregular.</li> <li>Atrial rate exceeds ventricular rate.</li> <li>PR interval progressively, but only slightly, longer with each cycle until QRS complex disappears.</li> <li>PR interval shorter after dropped beat.</li> </ul>	<ul style="list-style-type: none"> <li>Severe coronary artery disease, anterior wall MI, acute myocarditis.</li> <li>Digoxin toxicity.</li> </ul>	<ul style="list-style-type: none"> <li>Atropine, epinephrine, and dopamine for symptomatic bradycardia.</li> <li>Temporary or permanent pacemaker for symptomatic bradycardia.</li> <li>Discontinuation of digoxin if appropriate</li> </ul>
<b>Third-degree AV block (complete heart block)</b> 	<ul style="list-style-type: none"> <li>Atrial rhythm regular.</li> <li>Ventricular rhythm regular and rate slower than atrial rate.</li> <li>No relation between P waves and QRS complexes.</li> <li>No constant PR interval.</li> <li>QRS interval normal (nodal pacemaker) or wide and bizarre (ventricular pacemaker).</li> </ul>	<ul style="list-style-type: none"> <li>Inferior or anterior wall MI, congenital abnormality, rheumatic fever.</li> </ul>	<ul style="list-style-type: none"> <li>Atropine, epinephrine, and dopamine for symptomatic bradycardia.</li> <li>Temporary or permanent pacemaker for symptomatic bradycardia.</li> </ul>
<b>Premature ventricular contraction (PVC)</b> 	<ul style="list-style-type: none"> <li>Atrial rhythm regular.</li> <li>Ventricular rhythm irregular.</li> <li>QRS complex premature, usually followed by a complete compensatory pause.</li> <li>QRS complexes are wide and distorted, usually &gt; 0.14 second.</li> <li>Premature QRS complexes occurring singly, in pairs, or in threes; alternating with normal beats; focus from one or more sites.</li> <li>Ominous when clustered, multifocal, with R wave on T pattern.</li> </ul>	<ul style="list-style-type: none"> <li>Heart failure; old or acute myocardial ischemia, infarction, or contusion.</li> <li>Myocardial irritation by ventricular catheters such as pacemaker.</li> <li>Hypercapnia, hypokalemia, hypocalcemia.</li> <li>Drug toxicity by cardiac glycosides, aminophylline, tricyclic antidepressants, beta-adrenergic.</li> <li>Caffeine tobacco or alcohol use.</li> <li>Psychological stress, anxiety, pain.</li> </ul>	<ul style="list-style-type: none"> <li>If warranted, procainamide, lidocaine, or amiodarone I.V.</li> <li>Treatment of underlying cause.</li> <li>Discontinuation of drug causing toxicity.</li> <li>Potassium chloride IV if PVC induced by hypokalemia.</li> <li>Magnesium sulfate IV if PVC induced by hypomagnesemia.</li> </ul>
<b>Ventricular Tachycardia</b> 	<ul style="list-style-type: none"> <li>Ventricular rate 140 to 220 bpm, regular or irregular.</li> <li>QRS complexes wide, bizarre, and independent of P waves.</li> <li>P waves no discernible.</li> <li>May start and stop suddenly.</li> </ul>	<ul style="list-style-type: none"> <li>Myocardial ischemia, infarction, or aneurysm.</li> <li>Coronary artery disease.</li> <li>Rheumatic heart disease.</li> <li>Mitral valve prolapse, heart failure, cardiomyopathy.</li> <li>Ventricular catheters.</li> <li>Hypokalemia, Hypercalcemia.</li> <li>Pulmonary embolism.</li> <li>Digoxin, procainamide, epinephrine, quinidine toxicity, anxiety.</li> </ul>	<ul style="list-style-type: none"> <li>If pulseless: initiate CPR; follow ACLS protocol for defibrillation.</li> <li>If with pulse: if hemodynamically stable, follow ACLS protocol for administration of amiodarone; if ineffective initiate synchronized cardioversion.</li> </ul>
<b>Ventricular Fibrillation</b> 	<ul style="list-style-type: none"> <li>Ventricular rhythm and rate are rapid and chaotic.</li> <li>QRS complexes wide and irregular, no visible P waves.</li> </ul>	<ul style="list-style-type: none"> <li>Myocardial ischemia or infarction, R-on-T phenomenon, untreated ventricular tachycardia.</li> <li>Hypokalemia, Hyperkalemia, Hypercalcemia, alkalosis, electric shock, hypothermia.</li> <li>Digoxin, epinephrine, or quinidine toxicity.</li> </ul>	<ul style="list-style-type: none"> <li>If pulseless: start CPR, follow ACLS protocol for defibrillation, ET intubation, and administration of epinephrine or vasopressin, lidocaine, or amiodarone; ineffective consider magnesium sulfate.</li> </ul>
<b>Asystole</b> 	<ul style="list-style-type: none"> <li>No atrial or ventricular rate or rhythm.</li> <li>No discernible P waves, QRS complexes, or T waves.</li> </ul>	<ul style="list-style-type: none"> <li>Myocardial ischemia or infarction, aortic valve disease, heart failure, hypoxemia, hypokalemia, severe acidosis, electric shock, ventricular arrhythmias, AV block, pulmonary embolism, heart rupture, cardiac tamponade, hyperkalemia, electromechanical dissociation.</li> <li>Cocaine overdose.</li> </ul>	<ul style="list-style-type: none"> <li>Start CPR.</li> </ul>

