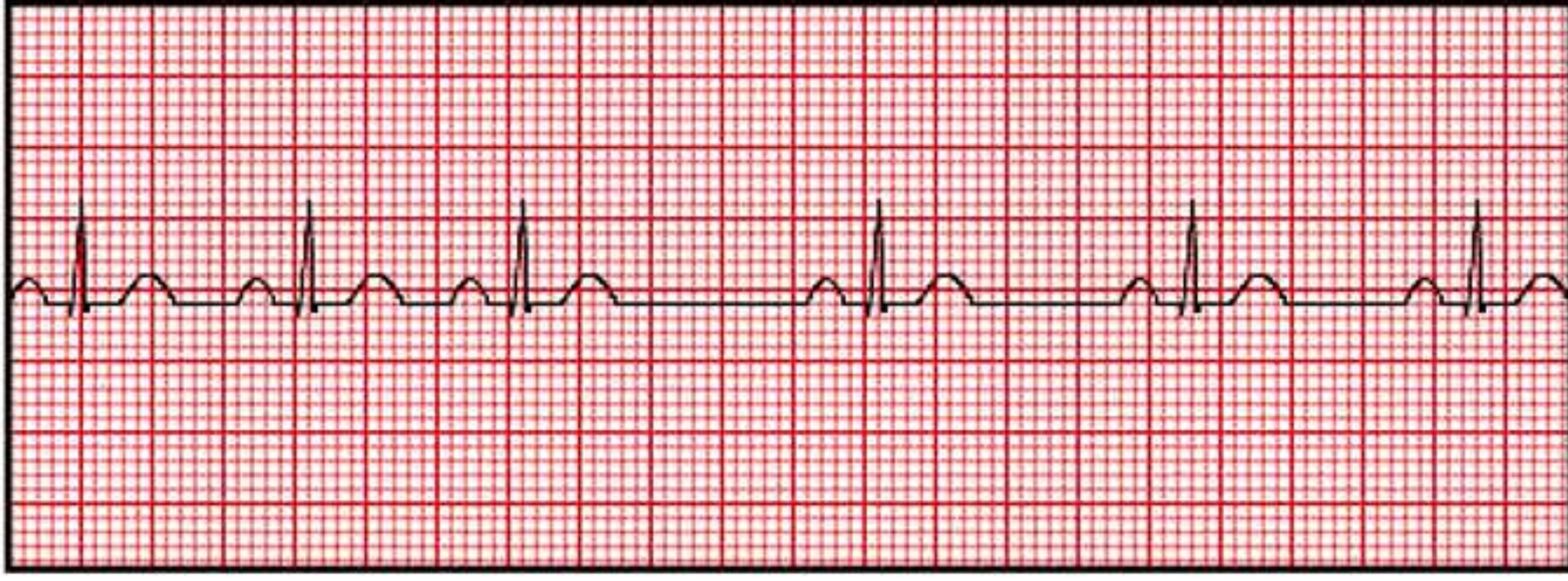
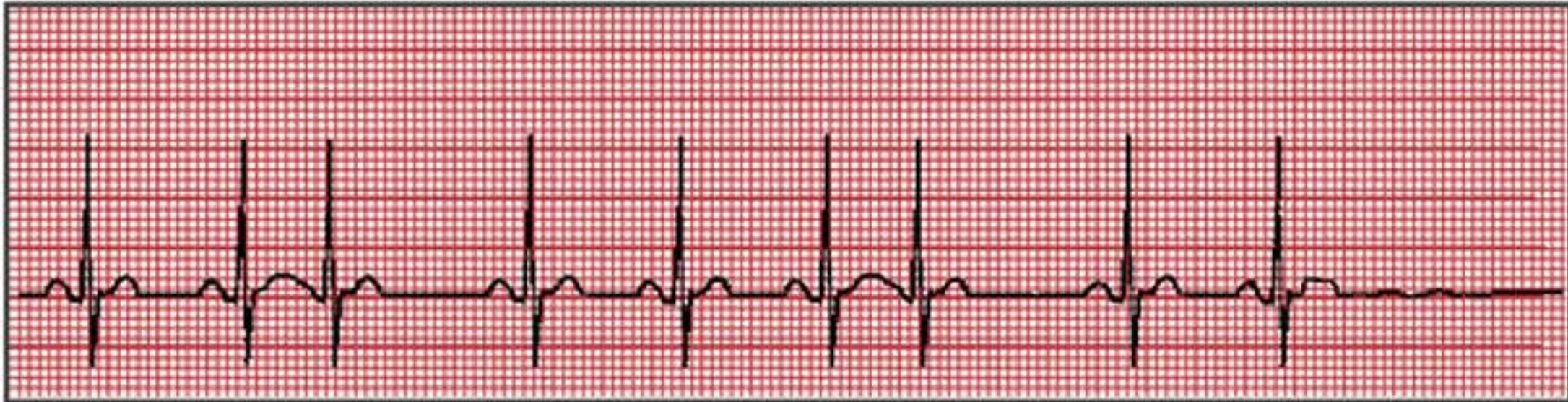


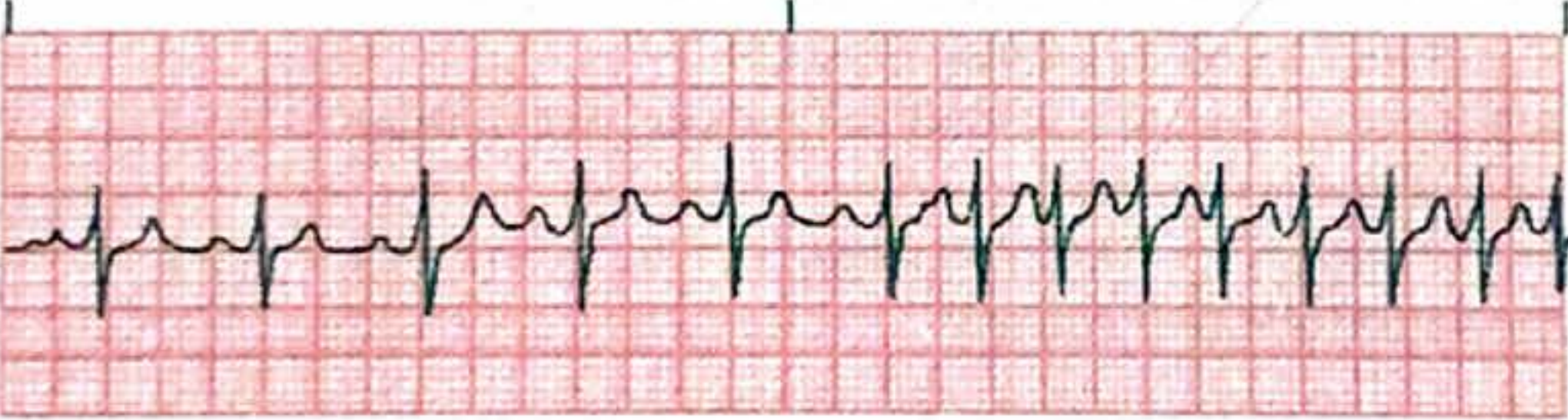
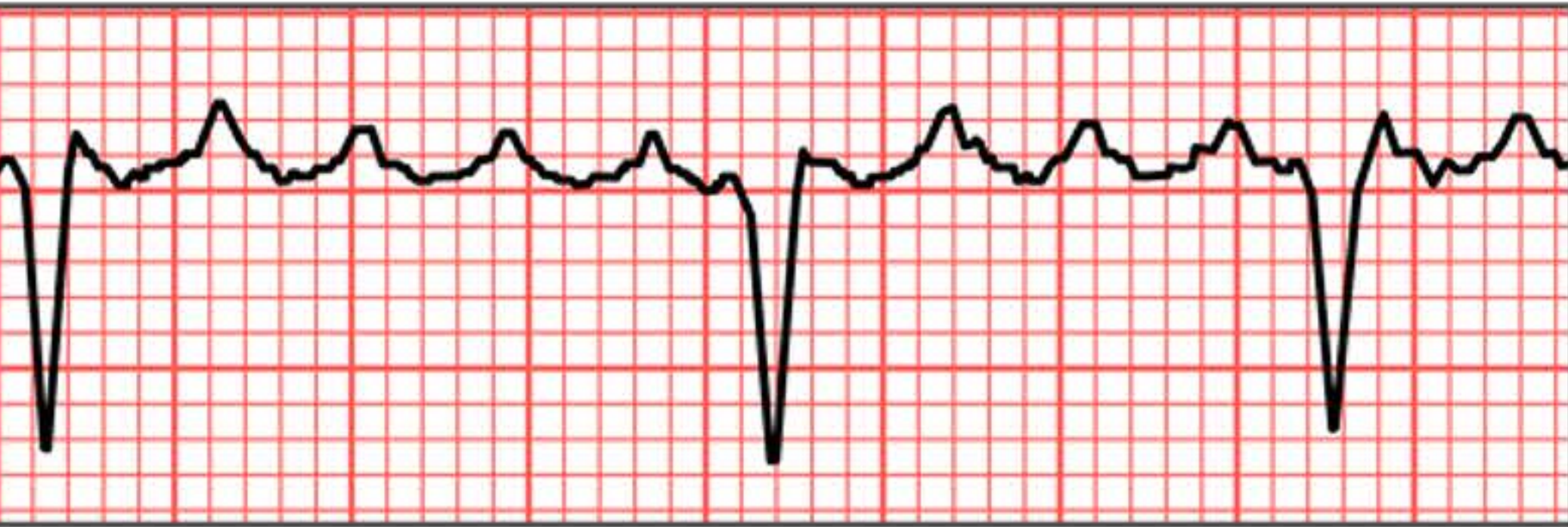
EKG Interpretation Cheat Sheet

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Arrhythmias	Description	Causes	Treatment
Sinus Arrhythmia 	- Irregular atrial and ventricular rhythms. - Normal P wave preceding each QRS complex.	- Normal variation of normal sinus rhythm in athletes, children, and the elderly. - Can be seen in digoxin toxicity and inferior wall MI.	Atropine if rate decreases below 40bpm.
Sinus Tachycardia 	- Atrial and ventricular rhythms are regular. - Rate > 100 bpm. - Normal P wave preceding each QRS complex.	- Normal physiologic response to fever, exercise, anxiety, dehydration, or pain. - May accompany shock, left-sided heart failure, cardiac tamponade, hyperthyroidism, and anemia. - Atropine, epinephrine, quinidine, caffeine, nicotine, and alcohol use.	- Correction of underlying cause. - Beta-adrenergic blockers or calcium channel blockers for symptomatic patients.
Sinus Bradycardia 	- Regular atrial and ventricular rhythms. - Rate < 60 bpm. - Normal P wave preceding each QRS complex.	- Normal in a well-conditioned heart (e.g., athletes). - Increased intracranial pressure; increased vagal tone due to straining during defecation, vomiting, intubation, mechanical ventilation.	- Follow ACLS protocol for administration of atropine for symptoms of low cardiac output, dizziness, weakness, altered LOC, or low blood pressure. - Pacemaker
Sinoatrial (SA) arrest or block 	- Atrial and ventricular rhythms are normal except for missing complexes. - Normal P wave preceding each QRS complex. - Pause not equal to multiple of the previous rhythm.	- Infection - Coronary artery disease, degenerative heart disease, acute inferior wall MI. - Vagal stimulation, Valsalva's maneuver, carotid sinus massage.	- Treat symptoms with atropine I.V. - Temporary pacemaker or permanent pacemaker if considered for repeated episodes.
Wandering atrial pacemaker 	- Atrial and ventricular rhythms vary slightly. - Irregular PR interval. - 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. - QRS complexes are uniform in shape but irregular in rhythm.	- Rheumatic carditis due to inflammation involving the SA node. - Digoxin toxicity - Sick sinus syndrome	- No treatment if patient is asymptomatic - Treatment of underlying cause if patient is symptomatic.
Premature atrial contraction (PAC) 	- Premature, abnormal-looking P waves that differ in configuration from normal P waves. - QRS complexes after P waves except in very early or blocked PACs. - P wave often buried in the preceding T wave or identified in the preceding T wave.	- May prelude supraventricular tachycardia. - Stimulants, hyperthyroidism, COPD, infection and other heart diseases.	- Usually no treatment is needed. - Treatment of underlying causes if the patient is symptomatic. - Carotid sinus massage.

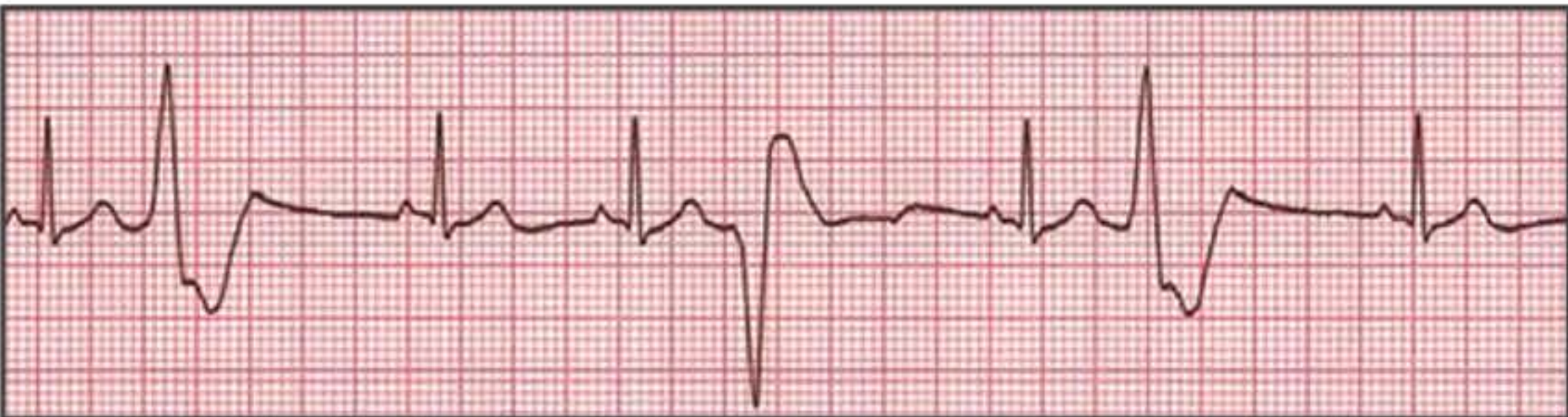
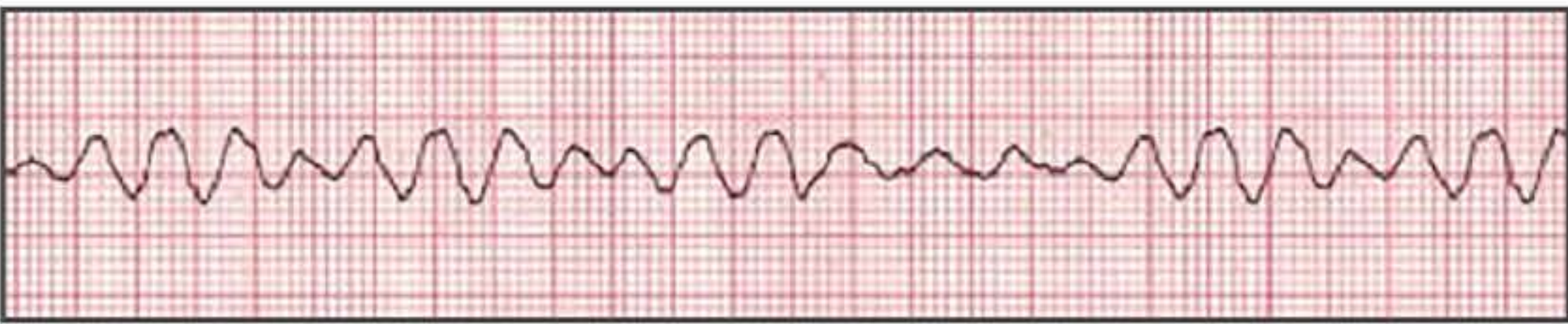
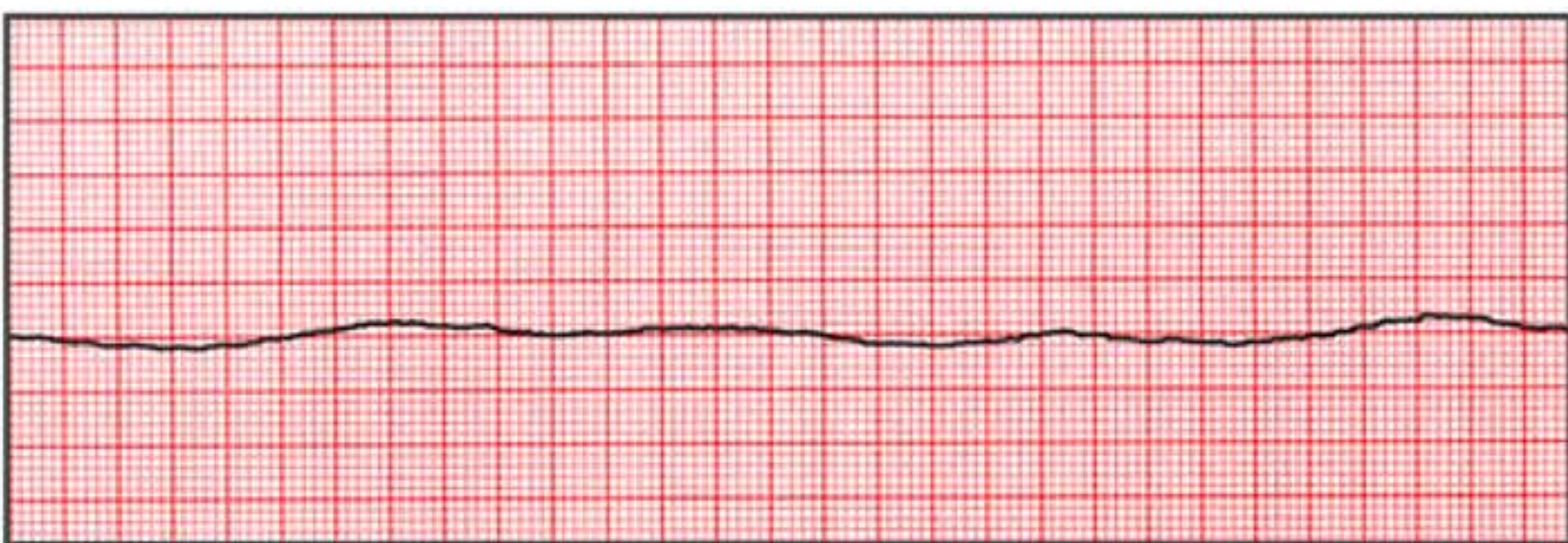
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Arrhythmias	Description	Causes	Treatment
Paroxysmal Supraventricular Tachycardia 	- Atrial and ventricular rhythms are regular. - Heart rate > 160 bpm; rarely exceeds 250 bpm. - P waves regular but aberrant; difficult to differentiate from preceding T waves. - P wave preceding each QRS complex. - Sudden onset and termination of arrhythmia - 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.	- Physical exertion, emotion, stimulants, rheumatic heart diseases. - Intrinsic abnormality of AV conduction system. - Digoxin toxicity. - Use of caffeine, marijuana, or central nervous system stimulants.	- If the patient is unstable prepare for immediate cardioversion. - If the patient is stable, vagal stimulation, or Valsalva's maneuver, carotid sinus massage. - Adenosine by rapid I.V. bolus injection to rapidly convert arrhythmia. - If a patient has normal ejection fraction, consider calcium channel blockers, beta-adrenergic blocks or amiodarone. - If a patient has an ejection fraction less than 40%, consider amiodarone.
Atrial Flutter 	- Atrial rhythm regular, rate, 250 to 400 bpm - Ventricular rate variable, depending on degree of AV block Saw-tooth shape P wave configuration. - QRS complexes are uniform in shape but often irregular in rate.	- Heart failure, tricuspid or mitral valve disease, pulmonary embolism, cor pulmonale, inferior wall MI, carditis. - Digoxin toxicity.	- If a patient is unstable with ventricular rate > 150bpm, prepare for immediate cardioversion. - If the patient is stable, drug therapy may include calcium channel blockers, beta-adrenergic blocks, or antiarrhythmics. - Anticoagulation therapy may be necessary.
Atrial Fibrillation 	- Atrial rhythm grossly irregular rate > 300 to 600 bpm. - Ventricular rhythm grossly irregular, rate 160 to 180 bpm. - PR interval indiscernible. - No P waves, or P waves that appear as erratic, irregular base-line fibrillatory waves	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	- If a patient is unstable with ventricular rate > 150bpm, prepare for immediate cardioversion. - If stable, drug therapy may include calcium channel blockers, beta-adrenergic blockers, digoxin, procainamide, quinidine, ibutilide, or amiodarone. - Anticoagulation therapy to prevent emboli. - Dual chamber atrial pacing, implantable atrial pacemaker, or surgical maze procedure may also be used.
Junctional Rhythm 	- Atrial and ventricular rhythms are regular. - Atrial rate 40 to 60 bpm. - Ventricular rate is usually 40 to 60 bpm. - P waves preceding, hidden within (absent), or after QRS complex; usually inverted if visible. - PR interval (when present) < 0.12 second - QRS complex configuration and duration normal, except in aberrant conduction.	- Inferior wall MI, or ischemia, hypoxia, vagal stimulation, sick sinus syndrome. - Acute rheumatic fever. - Valve surgery - Digoxin toxicity	- Correction of underlying cause. - Atropine for symptomatic slow rate - Pacemaker insertion if patient is refractory to drugs - Discontinuation of digoxin if appropriate.
Premature Junctional Conjunctions 	- Atrial and ventricular rhythms are irregular. - P waves inverted; may precede be hidden within, or follow QRS complex. - QRS complex configuration and duration normal.	- MI or ischemia - Digoxin toxicity and excessive caffeine or amphetamine use	- Correction of underlying cause. - Discontinuation of digoxin if appropriate.
First-degree AV block 	- Atrial and ventricular rhythms regular - PR interval > 0.20 second. - P wave preceding each QRS complex. - QRS complex normal.	- Inferior wall MI or ischemia or infarction, hypothyroidism, hypokalemia, hyperkalemia. - Digoxin toxicity. - Use of quinidine, procainamide, beta-adrenergic blocks, calcium	- Correction of the underlying cause. - Possibly atropine if PR interval exceeds 0.26 second or symptomatic bradycardia develops. - Cautious use of digoxin, calcium channel blockers, and zbeta-adrenergic blockers.

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Arrhythmias	Description	Causes	Treatment
Second-degree AV block Mobitz I (Wenckebach) 	- Atrial rhythm regular. - Ventricular rhythm irregular. - Atrial rate exceeds ventricular rate. - PR interval progressively, but only slightly, longer with each cycle until QRS complex disappears. - PR interval shorter after dropped beat.	- Severe coronary artery disease, anterior wall MI, acute myocarditis. - Digoxin toxicity	- Atropine, epinephrine, and dopamine for symptomatic bradycardia. - Temporary or permanent pacemaker for symptomatic bradycardia. - Discontinuation of digoxin if appropriate.
Third-degree AV block (complete heart block) 	- Atrial rhythm regular. - Ventricular rhythm regular and rate slower than atrial rate. - No relation between P waves and QRS complexes. - No constant PR interval. - QRS interval normal (nodal pacemaker) or wide and bizarre (ventricular pacemaker).	Inferior or anterior wall MI, congenital abnormality, rheumatic fever.	- Atropine, epinephrine, and dopamine for symptomatic bradycardia. - Temporary or permanent pacemaker for symptomatic bradycardia.
Premature ventricular contraction (PVC) 	- Atrial rhythm regular - Ventricular rhythm irregular - QRS complex premature, usually followed by a complete compensatory pause - QRS complexes are wide and distorted, usually >0.14 second. - Premature QRS complexes occurring singly, in pairs, or in threes; alternating with normal beats; focus from one or more sites. - Ominous when clustered, multifocal, with R wave on T pattern.	- Heart failure; old or acute myocardial ischemia, infarction, or contusion. - Myocardial irritation by ventricular catheters such as a pacemaker. - Hypercapnia, hypokalemia, hypocalcemia. - Drug toxicity by cardiac glycosides, aminophylline, tricyclic antidepressants, beta-adrenergic. - Caffeine, tobacco, or alcohol use. - Psychological stress, anxiety, pain	- If warranted, procainamide, lidocaine, or amiodarone I.V. - Treatment of underlying cause. - Discontinuation of drug causing toxicity. - Potassium chloride IV if PVC induced by hypokalemia. - Magnesium sulfate IV if PVC induced by hypomagnesaemia.
Ventricular Tachycardia 	- Ventricular rate 140 to 220 bpm, regular or irregular. - QRS complexes wide, bizarre, and independent of P waves - P waves no discernible - May start and stop suddenly	- Myocardial ischemia, infarction, or aneurysm - Coronary artery disease - Rheumatic heart disease - Mitral valve prolapse, heart failure, cardiomyopathy - Ventricular catheters. - Hypokalemia, Hypercalcemia. - Pulmonary embolism. - Digoxin, procainamide, epinephrine, quinidine toxicity, anxiety.	If pulseless: initiate CPR; follow ACLS protocol for defibrillation. If with pulse: If hemodynamically stable, follow ACLS protocol for administration of amiodarone; if ineffective initiate synchronized cardioversion.
Ventricular Fibrillation 	- Ventricular rhythm and rate are rapid and chaotic. - QRS complexes wide and irregular, no visible P waves	- Myocardial ischemia or infarction, R-on-T phenomenon, untreated ventricular tachycardia, - Hypokalemia, hyperkalemia, Hypercalcemia, alkalosis, electric shock, hypothermia. - Digoxin, epinephrine, or quinidine toxicity.	If pulseless: start CPR, follow ACLS protocol for defibrillation, ET intubation, and administration of epinephrine or vasopressin, lidocaine, or amiodarone; ineffective consider magnesium sulfate.
Asystole 	- No atrial or ventricular rate or rhythm. - No discernible P waves, QRS complexes, or T waves	- 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. - Cocaine overdose.	Start CPR.