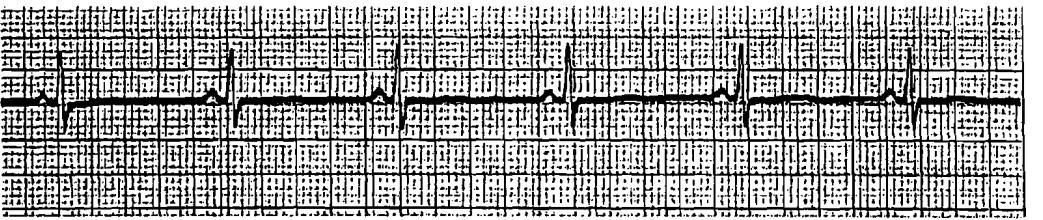
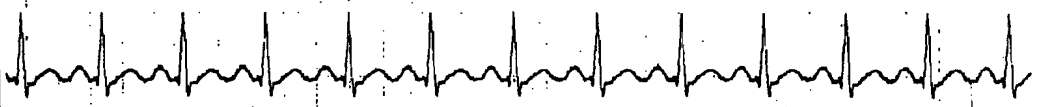
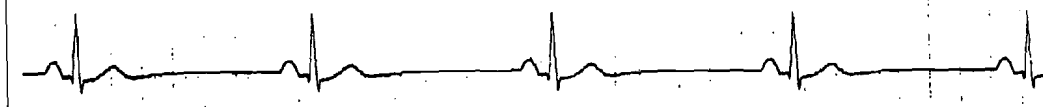

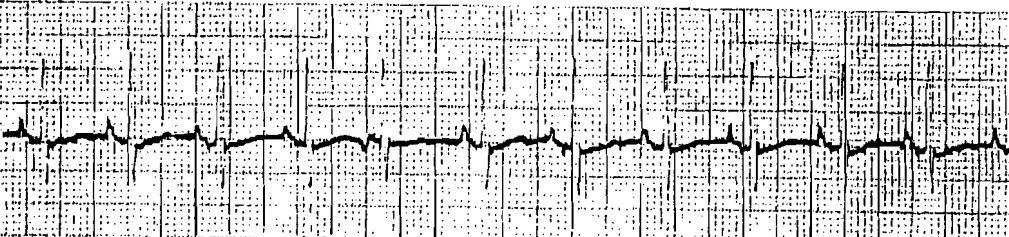


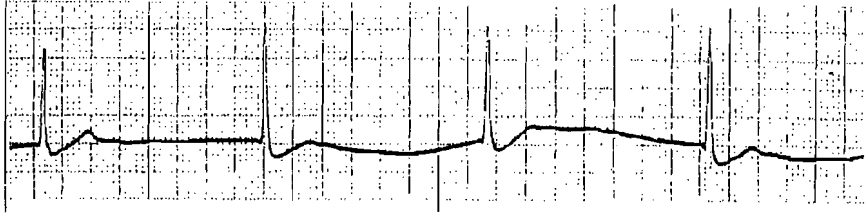


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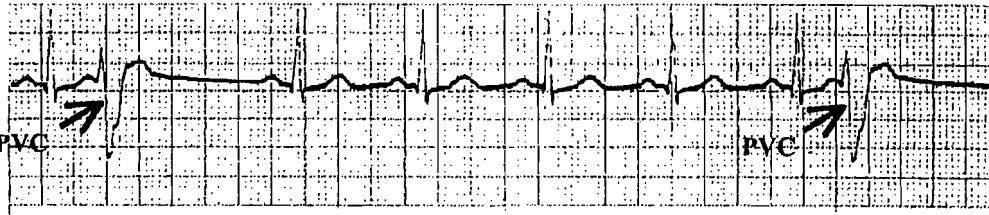
Rhythm	ECG Characteristics	Example
<p>Normal Sinus Rhythm (NSR)</p>	<p>Rate: 60-100 per minute Rhythm: R- R = P waves: Upright, similar P-R: 0.12 -0.20 second & consistent qRs: 0.04 – 0.10 second P:qRs: 1P:1qRs</p>	
<p>Sinus Tachycardia Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Exercise <input type="checkbox"/> Hypovolemia <input type="checkbox"/> Medications <input type="checkbox"/> Fever <input type="checkbox"/> Hypoxia <input type="checkbox"/> Substances <input type="checkbox"/> Anxiety, Fear <input type="checkbox"/> Acute MI <input type="checkbox"/> Fight or Flight <input type="checkbox"/> Congestive Heart Failure 	<p>Rate: > 100 Rhythm: R- R = P waves: Upright, similar P-R: 0.12 -0.20 second & consistent qRs: 0.04 – 0.10 second P:qRs: 1P:1qRs</p>	
<p>Sinus Bradycardia Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> intrinsic sinus node disease <input type="checkbox"/> increased parasympathetic tone <input type="checkbox"/> drug effect. 	<p>Rate: < 60 Rhythm: R- R = P waves: Upright; similar P-R: 0.12 -0.20 second & consistent qRs: 0.04 – 0.10 second P:qRs: 1P:1qRs</p>	

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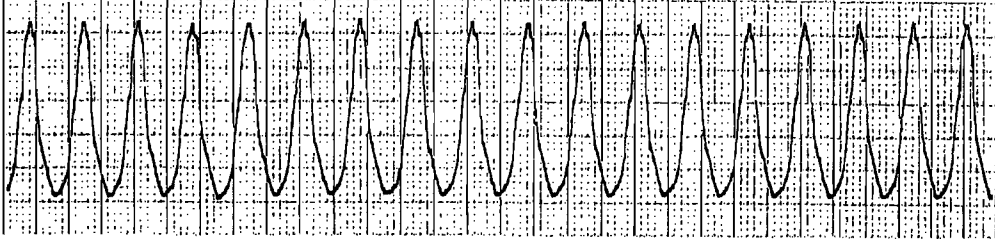
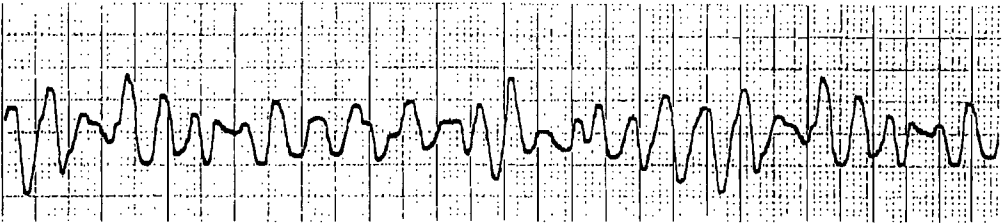
Rhythm	ECG Characteristics	Example
<p>Paroxysmal Atrial Tachycardia</p> <p>Causes:</p> <ul style="list-style-type: none"> □ Same as PACs 	<p>Rate: usually 160-220</p> <p>Rhythm: Regular</p> <p>P waves: differ in shape from Sinus Ps; usually difficult to identify (rate related)</p> <p>PR Interval: Normal when the Ps can be identified; short if WPW present</p> <p>qRs: usually normal</p> <p>Other: Onset sudden, often initiated by a PAC</p>	<p style="text-align: right;">▶ 10-37</p> 
<p>Premature Junctional Contraction (PJC)</p> <p>Causes:</p> <ul style="list-style-type: none"> □ Same as PACs 	<p>Rate: usually < 100, dependant on the underlying rhythm</p> <p>Rhythm: irregular</p> <p>P waves: Inverted before or after qRs or not visible</p> <p>PR interval: < 0.12 second when inverted P is before</p> <p>qRs</p> <p>qRs: 0.04 – 0.10 second</p> <p>P:qRs = 1:1 if Ps are visible</p>	

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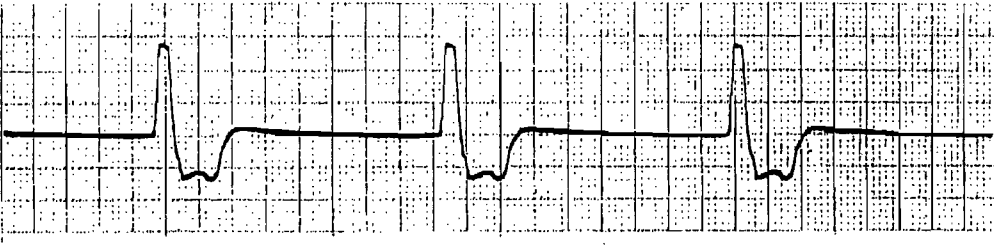
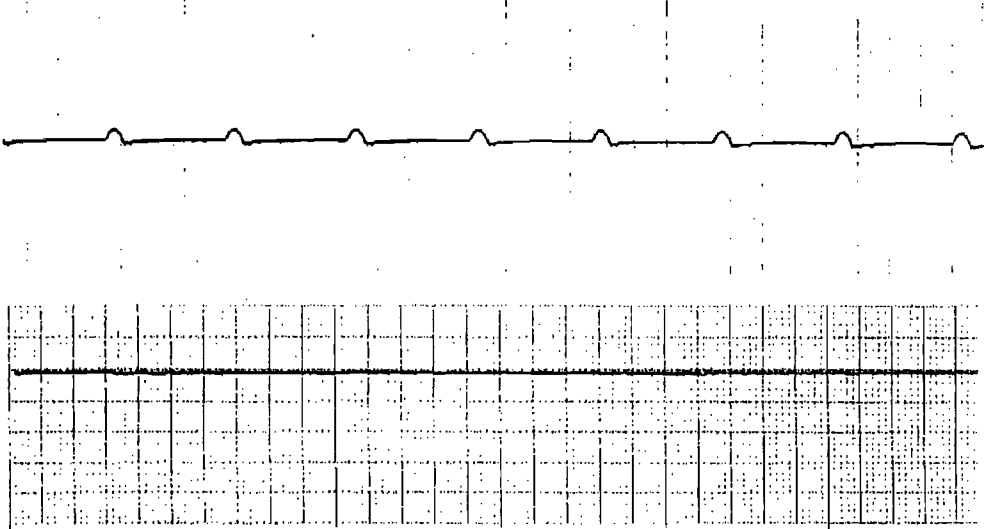
Rhythm	ECG Characteristics	Example
<p>Junctional escape Rhythm</p> <p>Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> healthy athlete at rest <input type="checkbox"/> related to medications- Beta Blockers, Calcium Channel Blockers, Dig Toxicity <input type="checkbox"/> or increased parasympathetic tone <input type="checkbox"/> Acute Inferior Wall MI <input type="checkbox"/> Rheumatic Heart Disease <input type="checkbox"/> Post-Cardiac Surgery <input type="checkbox"/> Valvular Disease <input type="checkbox"/> SA Node Disease <input type="checkbox"/> Hypoxia 	<p>Rate: 40-60 61 – 100 (accelerated)</p> <p>Rhythm: Regular</p> <p>P waves: Inverted before or after qRs or not visible</p> <p>PR interval: < 0.12 second when inverted P is before</p> <p>qRs: 0.04 – 0.10 second</p> <p>P:qRs 1:1 if Ps are visible</p>	
<p>Junctional Tachycardia</p> <p>Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Same as Paroxysmal Atrial Tachycardia (PAT) 	<p>Rate: 101-200</p> <p>Same as Junctional Escape Rhythms.</p>	
<p>Supraventricular Tachycardia (SVT)</p> <p>An umbrella term used when unable to distinguish which rhythm is present.</p> <p>Causes:</p> <p>Same as Sinus, Atrial, and Junctional Tachycardia, and Atrial Flutter</p>	<p>Rhythm: Absolutely regular</p> <p>Rate: > 150 per minute</p> <p>P Waves: Not visible (PRI not measurable)</p> <p>qRs: normal 0.04 – 0.10 sec</p>	

Rhythm	ECG Characteristics	Example
<p>Premature Ventricular Complex (PVC)</p> <p>Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Gastric overload <input type="checkbox"/> Stress <input type="checkbox"/> Caffeine, Alcohol, Nicotine <input type="checkbox"/> Heart Disease <input type="checkbox"/> Acid-Base Imbalance <input type="checkbox"/> Electrolyte Imbalance <input type="checkbox"/> Cyclic Antidepressants <input type="checkbox"/> Hypoxia <input type="checkbox"/> Acidosis <input type="checkbox"/> Acute MI 	<p>Rate: Dependent upon underlying rhythm</p> <p>Rhythm: R – R ≠</p> <p>P waves: Usually absent, if present, not associated with PVC</p> <p>qRs: 0.12 second or greater; bizarre and notched</p> <p>ST & T: Often opposite in direction to the qRs.</p> <p>Timing</p> <p>One on a strip = Rare</p> <p>One in a row = Isolated</p> <p>Two in a row = Pair, couplet</p> <p>Three in a row = V Tachycardia</p> <p>Pattern</p> <p>Every other = Bigeminy</p> <p>Every third = Trigeminy</p> <p>Morphology</p> <p>Similar shape = Uniformed</p> <p>Different shape = Multifomed</p> <p>Location</p> <p>R – on – T = PVC falls on the T wave of the complex before the PVC</p>	 <p>The image shows a single-lead ECG strip on a standard grid. The rhythm is regular sinus. Two premature, wide, and bizarre QRS complexes are present, each marked with a black arrow and the label 'PVC'. The first PVC occurs early in the cycle, and the second occurs later. The baseline shows a regular P-R-T sequence between the PVCs.</p>

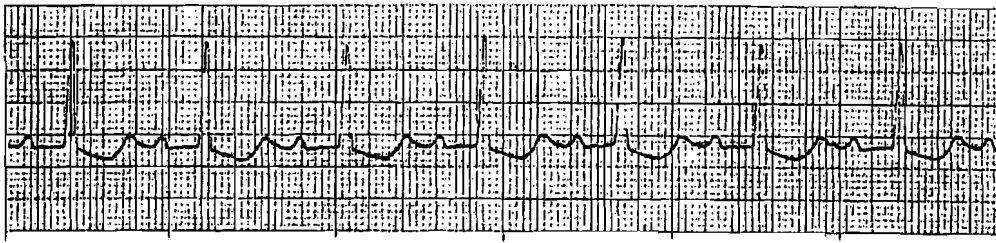
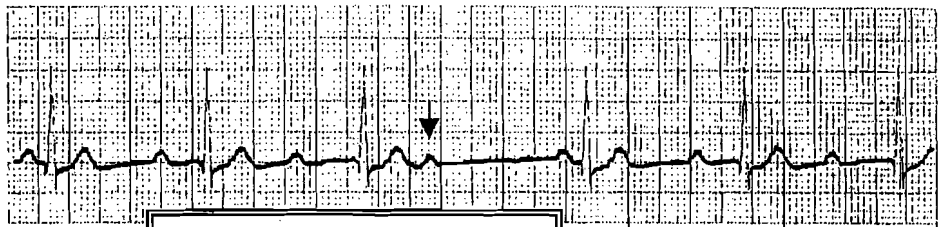
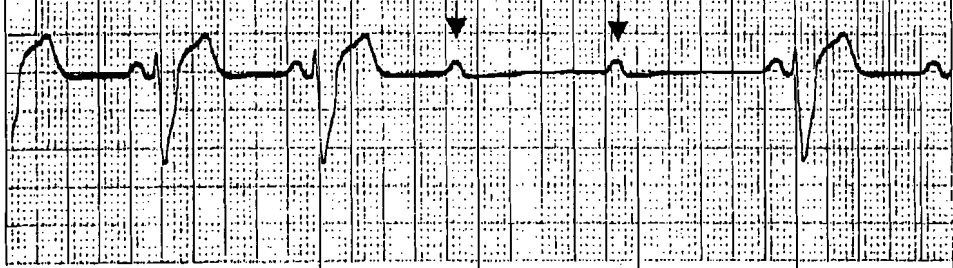
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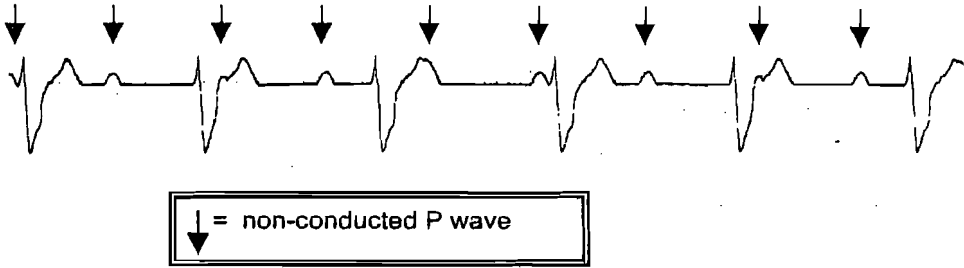
Rhythm	ECG Characteristics	Example
<p>Ventricular Tachycardia</p> <p>Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Same as PVCs <input type="checkbox"/> R on T Phenomenon 	<p>Rate: > 100 per minute and usually not > 220</p> <p>Rhythm: Usually regular</p> <p>P Waves: Ø P waves or if present, not associated with qRs</p> <p>qRs: <u>Wide</u> (≥ 0.12 sec), bizarre</p> <p>ST/T wave: Opposite direction of qRs</p> <p>A group of three PVCs in a row or more at a rate greater than 100/minute or more constitutes Ventricular Tachycardia.</p>	
<p>Ventricular Fibrillation</p> <p>Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Acute Myocardial Infarction <input type="checkbox"/> Untreated Ventricular Tachycardia <input type="checkbox"/> Hypothermia <input type="checkbox"/> R-on-T PVCs <input type="checkbox"/> Electrolyte imbalance <input type="checkbox"/> Electrical shock 	<p>Rate: Ø</p> <p>Rhythm: Ø regularity, chaotic undulating waves</p> <p>P Waves: Ø</p> <p>qRs: Ø</p> <p>ST/T Wave: Ø</p> <p>Organized activity: Ø</p> <p>No Cardiac Output or Pulse</p>	

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Rhythm	ECG Characteristics	Example
<p>Idioventricular Rhythm</p> <p>Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Myocardial Infarction <input type="checkbox"/> Digitalis toxicity <input type="checkbox"/> Metabolic imbalances <input type="checkbox"/> Post resuscitation rhythm 	<p>Rate: 20-40 per minute</p> <p>Rhythm: R – R =</p> <p>P waves: No P waves associated to qRs</p> <p>qRs: > 0.12 sec, notched, bizarre appearance</p> <p>ST/T : Opposite direction of qRs</p> <p>Rate > 40 to 100 = Accelerated</p>	 <p>The ECG shows a regular rhythm with narrow QRS complexes. There are no P waves visible before the QRS complexes. The QRS complexes have a characteristic notched appearance. The rhythm is regular, with R-R intervals that are approximately equal.</p>
<p>Asystole</p> <p>Causes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Extensive myocardial damage <input type="checkbox"/> Acute respiratory failure <input type="checkbox"/> Ischemia or Infarction <input type="checkbox"/> Traumatic cardiac arrest <input type="checkbox"/> Ventricular aneurysm <input type="checkbox"/> Countershock <input type="checkbox"/> Hypoxia, Hypothermia <input type="checkbox"/> Hyperkalemia, Hypokalemia <input type="checkbox"/> Preexisting acidosis <input type="checkbox"/> Drug overdose 	<p>Rate: Ventricular rate = 0</p> <p>Rhythm: Ø unless Ps are present, then regular or irregular</p> <p>P waves: may be present</p> <p>qRs: Ø</p> <p>P:qRs Ø</p>	 <p>The ECG shows a flat line, indicating no electrical activity. There are no P waves, QRS complexes, or T waves visible. The baseline is relatively flat, with only minor noise or artifacts present.</p>

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Rhythm	ECG Characteristics	Example
<p>1st degree AV Block</p>	<ul style="list-style-type: none"> ◆ 1P : 1 qRs ◆ Prolonged PRI (> 0.20 sec not > 0.40 sec) 	
<p>2nd degree AV Block, Type I <i>Wenckebach</i></p>	<ul style="list-style-type: none"> ◆ More P waves than qRs ◆ PRI progressively increases in a cycle until P appears w/o qRs. ◆ Cyclic pattern reoccurs ◆ R - R ≠ 	 <p style="text-align: center;">↓ = non-conducted P wave</p>
<p>2nd degree AV Block, Type II <i>fixed</i></p>	<p>More P waves than qRs</p> <ul style="list-style-type: none"> ◆ PRI consistent ◆ qRs normal or wide (bundle branch block) ◆ R - R ≠ or R - R = 	 <p style="text-align: center;">↓ = non-conducted P wave</p>

Rhythm	ECG Characteristics	Example
<p>3rd degree AV Block</p> <p><i>-variable</i></p>	<ul style="list-style-type: none"> ◆ More P waves than qRs ◆ P not r/t qRs (P too close, P too far) ◆ PRI <u>varies</u> greatly ◆ qRs normal or wide ◆ R – R = 	

ACLS Drug Therapy (based on 2000 AHA Guidelines) revised 10/29/01

Drug Name	Indications	Mechanism of Action	Precautions	Dose <i>Note: Follow IV push meds with fluid bolus</i>
Oxygen	<ul style="list-style-type: none"> ◆ Acute Chest Pain ◆ Suspected hypoxemia of any cause ◆ Cardiopulmonary Arrest 	correct hypoxemia by O2 tension ↑ O2 content ↑ tissue oxygenation	<ul style="list-style-type: none"> ◆ O2 Toxicity with high FIO2s ◆ May cause ↑CO2 if a CO2 retainer 	2 –6 LPM by NC for CP/mild distress NRB Mask for mod. Distress/ CHF Bag/Mask Ventilation Bag/ETT Ventilation
Epinephrine	ANY CARDIAC ARREST: <ul style="list-style-type: none"> ◆ Shock refractory VF & Pulseless VT ◆ Asystole ◆ PEA 	↑ SVR, BP, HR, Contractility of heart, automaticity ↑bloodflow to heart & brain ↑ AV conduction velocity		1 mg IV Push (10 ml of 1:10,000 solution) Repeat q 3-5" Endotracheal dose = 2-2.5 times IV dose Intracardiac if other routes not possible
Vasopressin Pitressin®	<ul style="list-style-type: none"> ◆ Shock refractory VF & <u>Pulseless VT</u> only ◆ Can use instead of EPI initially ◆ Also used for hemodynamic support in Septic Shock 	Non-adrenergic Peripheral Vasoconstrictor ↑bloodflow to heart & brain	<ul style="list-style-type: none"> ◆ <u>Half life = 10 – 20"</u> --- must wait to start EPI. ◆ Not recommended in CAD 	For refractory VF/Pulseless VT Only as 1 st inotropic – before EPI 40 U IV single dose--1 time only Can defibrillate every 60 seconds after administration of Vasopressin
Atropine	<ul style="list-style-type: none"> ◆ Symptomatic Bradycardia ◆ Ventricular Asystole (2nd line) ◆ PEA if rate is brady 	Parasympatholytic action: -accelerates rate of sinus node discharge -improves AV conduction	<ul style="list-style-type: none"> ◆ ↑ myocardial O2 demand; worsening ischemia 	Asystole or PEA 1 mg IV every 3-5" Bradycardia 0.5 to 1 mg every 3-5" Repeat to total dose of 0.04 mg/kg Endotracheal dose = 2-2.5 times IV dose