

Ventricular Arrhythmias

Pathophysiology	Clinical manifestations
<p>Result from disorders of impulse formation, impulse conductions, or both</p>	<ul style="list-style-type: none"> - Irregular heart rate and rhythm - chest, the neck should back jaw, or arm pain - Cold. clammy skin - Diaphoresis - Decreased peripheral pulses - Dyspnea - Pallors - Nausea & vomiting - Palpitations - Weakness and fatigue
Risk factors	Diagnostic tests
<ul style="list-style-type: none"> - Age-related <ul style="list-style-type: none"> - Stiff muscles, less stretchy arterial walls, decreased stroke volume, and cardiac output - Cardiomyopathy - Conductions defects - Heart failure - MI - Valve disease - Acid-base imbalance - Alcohol - Caffeine and tobacco - Draining - Electrolyte imbalances - Sepsis - Hypoxia 	<ul style="list-style-type: none"> - Labs: CBC, electrolytes, troponin - EKG
Nursing interventions	Complications
<p>Initial</p> <ul style="list-style-type: none"> - If unresponsive assess circulation, airway, and breathing - If responsive monitor airway, breathing, and circulation - Apply o2 via nasal cannula or non-rebreather - Take vital signs - 12 lead ECG - Continuous ECG monitoring 	

<ul style="list-style-type: none"> - Identify dysrhythmia - Establish iv access - Obtain baseline labs 	
Treatment	Teaching

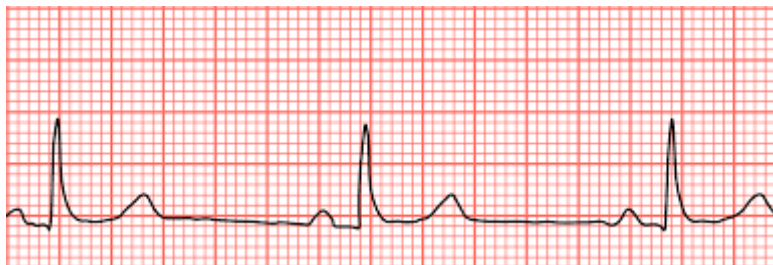
Types of Ventricular rhythms

1. Normal sinus rhythm



- a.
- b. Rhythm: regular
- c. Rate: 60-100
- d. P-wave: normal- upright
- e. Pr-interval: normal
- f. QRS: normal

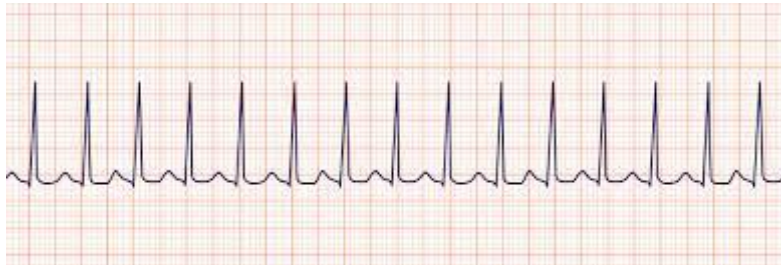
2. Sinus bradycardia



- a.
- b. Ecg characteristics
 - i. Rhythm: regular
 - ii. Rate: <60
 - iii. P-wave: normal
 - iv. Pr-interval: normal
 - v. QRS: normal
- c. Clinical associations: Common disease states with bradycardia is hypothyroidism, increased ICP, and MI
- d. Clinical significance: symptomatic bradycardia symptoms are
 - i. Pale cool skin
 - ii. Hypotension
 - iii. Weakness
 - iv. Angina
 - v. Dizziness or syncope

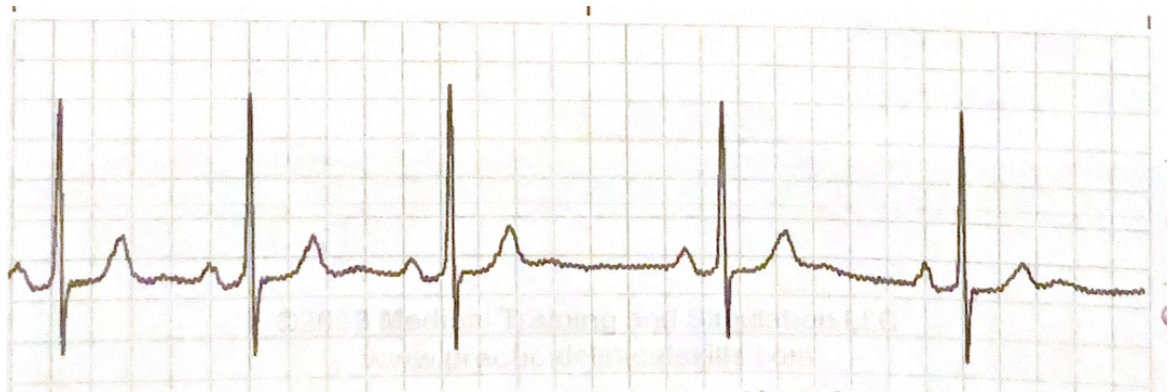
- vi. Confusion or disorientation
- vii. Shortness of breath
- e. Treatment
 - i. If it is due to drugs may have to be held stopped or reduced
 - ii. IV atropine
 - iii. Transcutaneous pacing or a dopamine or epinephrine drip

3. Sinus tachycardia



- a.
- b. ECG characteristics
 - i. Rhythm: 101-180
 - ii. Rate: normal
 - iii. P-wave: normal
 - iv. Pr-interval: normal
 - v. QRS: normal upright
- c. Clinical associations
 - i. Fever, pain, hypotension, hypovolemia, anemia, hypoxia, myocardial ischemia, heart failure, hyperthyroidism, Levophed, atropine, caffeine theophylline, or hydralazine
- d. Treatment
 - i. Effective pain management
 - ii. Vagal maneuvers
 - iii. Beta-blockers, adenosine, calcium channel blockers
 - iv. Unstable pts may need a cardioversion

4. Sinus arrhythmia



- a.
- b. Rate: 60-100

- c. This is where all the R-R are all going to be different (Sa node is firing irregularly)
- d. Everything else is pretty much characterized by normal sinus rhythm rates

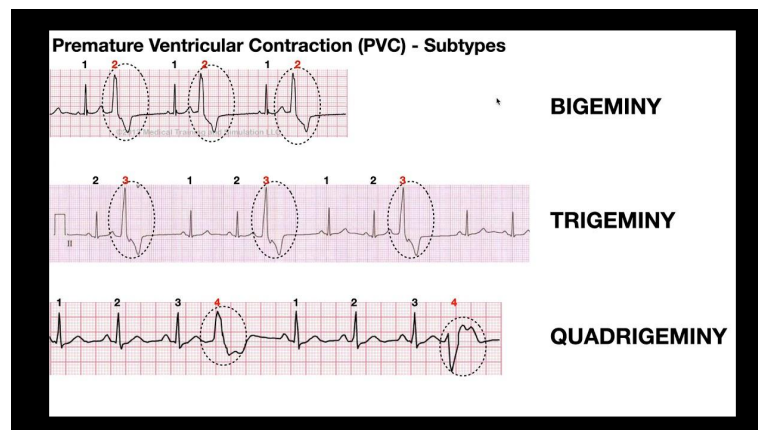
5. PAC

Premature Atrial Contraction (PAC)



- a.
- b. This beat comes earlier than the rest of the beats and it comes from the atria
 - i. Bigeminy: PAC is every other beat
 - ii. Trigeminy: PAC is every third beat
- c. This can be uniform (same form) or multifocal (different forms)
- d. Clinical associations
 - i. Pac can result from emotional stress or physical fatigue, caffeine, tobacco, or alcohol use. Hypoxia, electrolyte imbalances, hyperthyroidism, COPD, heart disease
- e. Treatment
 - i. Withdrawal from the source of stimulation may need beta blockers to decrease PACS

6. PVC

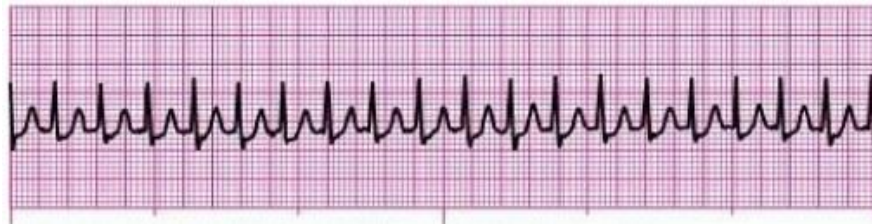


- a.
- b. Essentially the same thing as a PAC but the "beat" comes from the ventricle instead of the atria
- c. ECG characteristics
 - i. Rate and rhythm: underlying rhythm can be any rate or irregular rhythm, PVCs occur at variable rates
 - ii. P wave: not usually visible hidden in the PVC
 - iii. Pr interval: not measurable
 - iv. Qrs complex: wide and disoriented

does not want you to count pac/pvs in v rate dvc to you not knowing if it is perfusing

- d. Clinical significance
 - i. Occurs when there are three or more consecutive PVC's
 - ii. Often associated with caffeine, alcohol, nicotine, aminophylline, epinephrine, isoproterenol, electrolyte imbalances, hypoxia, fever, exercise, and emotional stress
- e. Treatment
 - i. Therapy for hypoxia, electrolyte replacement

7. SVT



- a.
- b. ECG characteristics
 - i. Rhythm: regular
 - ii. Rate: 151-220
 - iii. P-wave: abnormal shape and could be hidden in the t-wave
 - iv. Pr-interval: normal or shortened
 - v. QRS: normal
- c. Clinical associations
 - i. In a normal heart, this is associated with overexertion, emotional stress, deep inspiration, and stimulants. This is also associated with rheumatic heart disease, digitalis toxicity, and CAD
- d. Clinical significance
 - i. prolonged episode will cause decreased CO due to reduced stroke volume
 - ii. Manifestations: hypotension, palpitations, dyspnea and angina
- e. Treatment
 - i. Vagal stimulation and drug therapy
 - ii. IV adenosine is the drug of choice short half-life (10 seconds) beta blockers and calcium channel blockers are options
 - iii. Synchronized cardioversion is done when the pt is unstable

8. Atrial flutter



- a.
- b. ECG characteristics
 - i. Rhythm: irregular
 - ii. Rate: <100

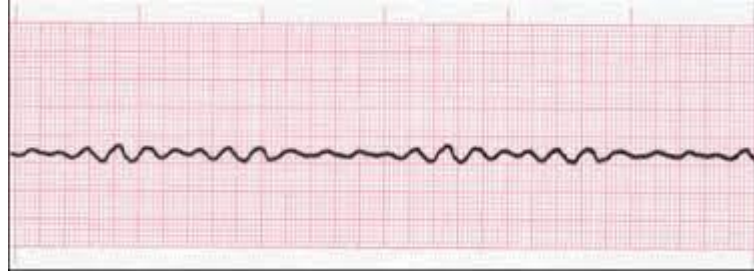
- iii. P-wave: gonna see a saw tooth pattern
- iv. Pr-interval: not measurable
- v. QRS: normal
- vi. Qt: not measurable
- c. Clinical associations
 - i. It is associated with CAD, hypertension, mitral valve disorder, p.e, chronic lung disease, cor pulmonale, cardiomyopathy, and hyperthyroidism
 - ii. Use of drugs digoxin, quinidine, and epinephrine
- d. Clinical significance
 - i. High ventricular rates and loss of atrial kick that is associated with this decreased CO,
 - ii. Have an increased risk for stroke, warfarin causes a decrease in clots
- e. Treatment
 - i. Calcium channel blockers and beta blockers
 - ii. Cardioversion

9. Atrial fibrillation



- a.
- b. ECG characteristics
 - i. Rhythm: irregular
 - ii. Rate: <100
 - iii. P-wave: fibrillary waves
 - iv. Pr-interval: not measurable
 - v. QRS: normal
 - vi. Qt: not measurable
- c. Clinical associations
 - i. Occurs in pts with underlying heart disease, CAD, valvular heart disease, cardiomyopathy and hypertensive heart disease, HF, and pericarditis
 - ii. Develops acutely with: alcohol intoxication, caffeine, electrolyte problems, stress, and heart surgery
- d. Clinical significance
 - i. Decrease the ventricular response
 - ii. Thrombi may form in the atria
- e. Treatment
 - i. Drugs: calcium channel blockers amiodarone and digoxin

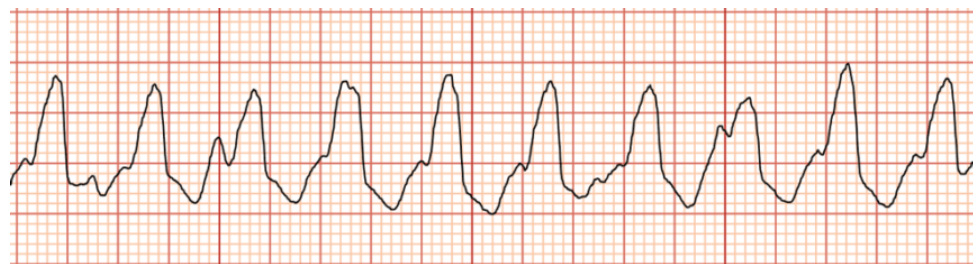
10. Ventricular fibrillation *your ventricles are just quivering; not perfusing*



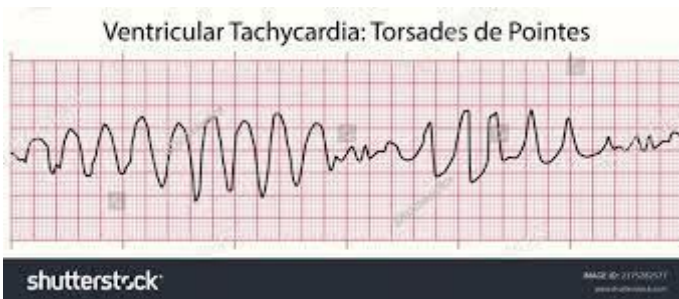
- a.
- b. Ecg characteristics
 - i. Rate and rhythm are not measurable and irregular
 - ii. P wave: absent
 - iii. Pr interval: not measurable
 - iv. Qrs complex: not measurable
- c. Clinical associations
 - i. MI, myocardial ischemia, cardiac catheterization, electric shock, hyperkalemia, hypoxemia, acidosis, and drug toxicity
- d. Clinical significance
 - i. If not treated quickly pt will not make it
- e. Treatment
 - i. CPR and ACLS with the use of defibrillation
 - ii. Give epi and amioderone

f.

11. Ventricular tachycardia *you can also have non-sustained v-tach*



a.



b.

- c. Ecg characteristics
 - i. Rate and rhythm: 150-250 beats for min and irregular to regular
 - ii. P wave: not usually visible
 - iii. Pr interval: not mesurbale
 - iv. Qrs complex: wide and distorted

- d. Clinical associations
 - i. MI, CAD, significant electrolyte imbalances, cardiomyopathy, long QT syndrome, drug toxicity, and central nervous system disorders
- e. Clinical significance
 - i. Causes a severe decrease in cardiac output decreased ventricular diastolic filling times and loss of atrial contraction
- f. Treatment
 - i. Preipitaing causes must be identified and treated
 - ii. Monooprohic treatment
 - 1. Stable: iv procainamide, lidocaine, or amiodarone
 - iii. Polymorphic treatment
 - 1. Stable IV magnesium, isoproterenol, phenytoin, and external pacing
 - iv. If PT is unstable
 - 1. Without pulse start Cardiopulmonary resuscitation and rapid defibrillation

12. Asystole



- a.
- b. Ecg characteristics
 - i. Pulses electrical activity
- c. Clinical associations
 - i. Heart disease and severe cardiac conduction system problem
- d. Clinical significance
 - i. Pt with asystole has end-stage heart disease or has prolonged arrest and cannot be resuscitated
- e. Treatment
 - i. CPR and ACLS measures with drug therapy and epinephrine

Coronary Artery Disease (CAD)

Pathophysiology	Clinical manifestations
<p>Characterized by atherosclerosis (lipid deposits in the artery) this takes many years to develop this is also known as “hardening of the arteries”</p> <p>Stages</p> <ol style="list-style-type: none"> 1. Chronic endothelial injury 2. Fatty streak 3. Fibrous plaque resulting from smooth muscle cell proliferation 4. Complicated lesion 	<ul style="list-style-type: none"> - None at the early stages of the disease - Critical to identify those who are at risk <p><i>Chronic symptoms</i></p> <ul style="list-style-type: none"> - Angina - <i>Chronic stable angina</i> refers to chest pain that occurs intermittently over a long period of time with a similar pattern of onset, duration, and intensity of symptoms. <ul style="list-style-type: none"> - It is often provoked by physical exertion, stress, or emotional upset. - EKG changes – may or may not see change (ST segment depression OR T wave inversion) - describe a pressure, heaviness, or discomfort in the chest. Discomfort is often described as a squeezing, heavy, tight, or suffocating sensation. May show dyspnea, fatigue, nausea. - The pain of chronic stable angina usually lasts for only a few minutes and commonly subsides when the precipitating factor is resolved (e.g., resting, calming down, using sublingual nitroglycerin) - Other types (table 33-9) <ul style="list-style-type: none"> - <i>Silent ischemia</i> refers to ischemia that occurs in the <i>absence of any subjective symptoms</i>. Patients with diabetes have an increased prevalence of silent ischemia. - ANGINA IS WARNING SIGN OF HEART ATTACK

	<ul style="list-style-type: none"> - <i>Prinzmetal's</i> - Coronary vasospasm <ul style="list-style-type: none"> - Occurs primarily at rest - Triggered by smoking and increased levels of some substances (e.g., histamine, epinephrine, cocaine) - May occur in the presence or absence of CAD - <i>Microvascular</i> – Myocardial ischemia secondary to microvascular disease affecting the small, distal branches of coronary arteries <ul style="list-style-type: none"> - Triggered by activities of daily living (e.g., shopping, work) vs. physical exercise (exertion) - These patients usually have positive stress test results and have an inconsistent response to nitrates. - Nitro does not work for this - No ecg changes - <i>Unstable</i> – Rupture of unstable plaque, exposing thrombogenic surface <ul style="list-style-type: none"> - New-onset angina – very sudden - Chronic stable angina that increases in frequency, duration, or severity - Occurs at rest or with minimal exertion - Lasts more than 10 min
Risk factors	Diagnostic tests
<i>Modifiable</i>	<ul style="list-style-type: none"> - Chest x-ray: determines the

<ul style="list-style-type: none"> - Hyperlipidemia - Hypertension - Tobacco use - alcohol use - Physical inactivity - Obesity <p><i>Contributing</i></p> <ul style="list-style-type: none"> - Diabetes - Metabolic syndrome (HTN, diabetes, hyperlipidemia) - Psychological - Homocysteine - Substance abuse <p><i>Nonmodifiable</i></p> <ul style="list-style-type: none"> - Increasing age - Middle aged men (over age 45) - Women over 55 until 75 years old - Race <ul style="list-style-type: none"> - White men have the highest incidence - African americans have a early age of onset - Native americans die from heart disease later than expected - Hispanic have significant lower rate of CAD - Family hx 	<p>enlargement, cardiac classifications, and pulmonary congestion</p> <ul style="list-style-type: none"> - EKG - Stress test - Labs: biomarkers, isoenzymes, lipids, CRP (inflammatory marker), homosystemien, bnp (rules out respiratory causes) or CHF peptide and NT-Pro-BMP - PET scan: - Angiography: visualizes the coronary arteries - Chest x-ray - <u>Arteriogram</u>: looks at the arteries and electrical flow of the heart - Coronary heart cath: look at abnormalitis in the heart muscle <p style="color: purple; font-size: small;">→ Make sure NOT on metformin or nitrate bc contrast dye</p>
Nursing interventions	Complications
<ul style="list-style-type: none"> - Important to teach UAP to communicate chest pain or shortness of breath or pulse/BP out of range - Good I&O tracking - Low sodium diet - 	
Treatment	Teaching
<p><i>Medications</i></p> <ul style="list-style-type: none"> - Nitroglycerin (nitrate): sublingual under tongue, take at the start of chest pain Q5 min max of 3 doses- go to ER if chest pain does not resolve <ul style="list-style-type: none"> - Watch out for hypotension, dizziness, confusion, high fall 	<ul style="list-style-type: none"> - Low saturated fat diet, high fiber - Smoking cessation - Flu and covid vaccines - Addressing psychological aspects - Increase activity moderate activity 30 mins x 5 days a week - Heart caths are at risk for bleeding

<ul style="list-style-type: none"> <ul style="list-style-type: none"> risk, headache - Keep in a dark cool area, replace every few months - ACE inhibitors <ul style="list-style-type: none"> - Ends in -pril - Example lisinopril - Decreases ventricular remodeling and decreased blood pressure - Watch out for dry cough and angioedema - ARBS <ul style="list-style-type: none"> - End in -satan - Used in pts who are intolerance of ACE inhibitors - Losartan - Beta blockers <ul style="list-style-type: none"> - End in -lol - Decreases myocardial contractility and also decreases demand of oxygen - Hold if pt hr is less than 60 - Watch for s/s of hypoglycemia - Calcium channel blockers <ul style="list-style-type: none"> - Given if beta blockers were not tolerable - Systemic vasodilation, decreases hr - Watch out for orthostatic hypotension - Statins <ul style="list-style-type: none"> - Monitor liver enzymes, get baseline liver panel before therapy - Teach pt how to have a low cholesterol diet - Sodium current inhibitors <ul style="list-style-type: none"> - Co-therapy, help with vascular portion decrease blood pressure - Example ranexa - Morphine <ul style="list-style-type: none"> - Vasodilator to reduce preload and myocardial O₂ consumption - Used in an acute setting 	<ul style="list-style-type: none"> - Check the 6 P's
--	---

<ul style="list-style-type: none">- Antiplatelets<ul style="list-style-type: none">- Warfarin, heparin, aspirin<ul style="list-style-type: none">- Aspirin initial 162-325 mg <p><i>Cardiac catheterization</i></p> <ul style="list-style-type: none">- Preoperative<ul style="list-style-type: none">- NPO 6-12 hours before procedure- Look at kidney function in order to determine if they can handle dye- Post procedure<ul style="list-style-type: none">- Watch for bleeding- Frequent vitals- High risk of bleeding lie supine for an extended period of time <p><i>Coronary revascularization</i></p> <ul style="list-style-type: none">- Bloon moves buildup of cholesterol to the side	
---	--

Type	Etiology	Characteristics
Chronic stable angina	Myocardial ischemia (usually from CAD) caused by an O ₂ supply/demand mismatch	<ul style="list-style-type: none"> • Episodic pain lasting a few minutes • Provoked by exertion or stress • Relieved by rest or nitroglycerin
Prinzmetal's angina	Coronary vasospasm	<ul style="list-style-type: none"> • Occurs primarily at rest • Triggered by smoking and increased levels of some substances (e.g., histamine, epinephrine, cocaine) • May occur in presence or absence of CAD • Treatment may include long-acting nitrates and/or calcium channel blockers
Microvascular angina	Myocardial ischemia from microvascular disease affecting the small, distal branches of coronary arteries	<ul style="list-style-type: none"> • More common in women • Triggered by activities of daily living (e.g., shopping, work) vs. physical exercise (exertion) • Treatment may include nitroglycerin
Unstable angina	Rupture of unstable plaque, exposing thrombogenic surface	<ul style="list-style-type: none"> • New-onset angina • Chronic stable angina that increases in frequency, duration, or severity • Occurs at rest or with minimal exertion • Lasts more than 10 min

Chronic Heart Failure

Pathophysiology	Clinical manifestations
<p>Interfering with normal mechanisms regulating CO₂ may cause HF</p> <p>Causes of heart failure are divided into two subgroups primary and precipitating factors</p>	<p><i>Right-sided heart failure (rocks the body with fluid)</i></p> <ul style="list-style-type: none"> - Peripheral edema - Gonna see weight gain, edema, JVD and abdominal growth - Symptoms can be remembered by the word Swelling <p><i>Left-sided heart failure (left things lungs)</i></p> <p>Most common</p> <ul style="list-style-type: none"> - Pulmonary edema - Crackles in the lungs - Frothy pink, blood tinted sputum - Dyspnea and orthopnea (difficulty breathing while lying flat) - Symptoms can be remembered by the work drowning <ul style="list-style-type: none"> - Fatigue after usual daily activities - Dyspnea when lying down - PND when pt is asleep, pt awakens in a panic, feeling of suffocation. Pt will have the feeling of wanting to sit or stand up - A dry nonproductive cough - Tachycardia - Edema - Dusty skin - Angina <p>Can be remembered by FACES</p> <ul style="list-style-type: none"> - Fatigue - Activities limited - Chest congestion - Edema or ankle swelling - Shortness of breath
Risk factors	Diagnostic tests
<p>- Black/Hispanic Americans develop HF at an earlier age</p> <p>Primary factors</p> <ul style="list-style-type: none"> - Cardiomyopathy - Congenital heart defects 	<ul style="list-style-type: none"> - Cardiopulmonary exercise stress test - 6-min walk tests - Sleep studies - BNP - Echocardiogram

<ul style="list-style-type: none"> - HTN - Hyperthyroidism - Myocarditis - Valvular disorders <p>Precipitating factors</p> <ul style="list-style-type: none"> - Anemia - Dysrhythmias - Hyperkalemia - Hypothyroidism - Obstructive sleep apnea - P.E. 	
Nursing interventions	Complications
<p>H: head of bed over 45 degrees O: oxygen P: push furosemide +morphine E: end sodium and fluids</p> <ul style="list-style-type: none"> - High fowler's position - CPAP machine - Continuous ECG and pulse ox monitoring <p><i>Goals for HF pts</i></p> <ol style="list-style-type: none"> 1. Decrease symptoms 2. Decreases peripheral edema 3. Increase in exercise tolerance 4. Adherence to treatment plan 5. No complications related to heart failure 	<ul style="list-style-type: none"> - Pleural effusion - Atrial fibrillation or ventricular dysthymia - Renal failure - Hepatomegaly
Treatment	Teaching
<ul style="list-style-type: none"> - Balloon pump - Cardioversion <p><i>Medication management</i></p> <ul style="list-style-type: none"> - ACE inhibitors <ul style="list-style-type: none"> - Reduced afterload and SVR, inhibits ventricular hypertrophy - End in pril - Possum sparing - Causes low blood pressure - ARBS <ul style="list-style-type: none"> - For pts unable to tolerate ACE inhibitors - Promotes after load reduction and vasodilation - Lowers blood pressure - Spars the potassium - End in sartan - Aldosterone antagonists 	<ul style="list-style-type: none"> - Deit: low sodium less than 2 grams per day and fluid restrictions - Daily weights <ul style="list-style-type: none"> - Call HCP about a weight gain over 3 lbs over 3 days or 3-5 pound gain over 1 week - Increase activity slowly - Avoid extreme heat and cold - Get the annual flu, pneumococcal vaccine - After ADL's plan a rest period - Avoid emotional upsets, shar concerns of depression <p><i>What to report to HCP</i></p> <ul style="list-style-type: none"> - Weight gain over 3 pounds in 2 days or 3-5 pounds in a week - Difficulty breathing

<ul style="list-style-type: none"> - Monitor serum potassium levels and renal function in pts taking this drug - Beta blockers <ul style="list-style-type: none"> - Major side effects including worsening of heart failure, hypotension, fatigue and bradycardia - Ends in -lol - Calcium channel blockers <ul style="list-style-type: none"> - Lowers hr and bp - Ends in -dipine -zem and -amil - Digoxine <ul style="list-style-type: none"> - Monitor renal function and serum potassium levels - Helps create deeper contraction - Dilators <ul style="list-style-type: none"> - Example: nitroglycerine - Lowers bp, decreased resistance - Diuretics <ul style="list-style-type: none"> - Reduces edema, pulmonary venous pressure, and preload - End in -ide think the body is dried - Potassium wasting and sparing <p>Surgical treatment options</p> <ul style="list-style-type: none"> - LVAD works for the heart - Heart transplant 	<ul style="list-style-type: none"> - Waking up breathless at night - Frequent dry hacking cough - Fatigue, weakness - Swelling of the ankles feet or abdomen, swelling of the face or difficulty breathing (ace inhibitor side effects) - Dizziness or fainting
--	--