

NCLEX Notes Week 7: Cardiovascular System

Heart and the Heart Layers

- The heart has three layers
 - The epicardium is the outermost layer of the heart.
 - The myocardium is the middle layer and is the actual contracting muscle of the heart
 - The endocardium is the innermost layer and lines the inner chambers and heart valves

Pericardial sac

- Encases and protects the heart from trauma and infection

Heart Chambers

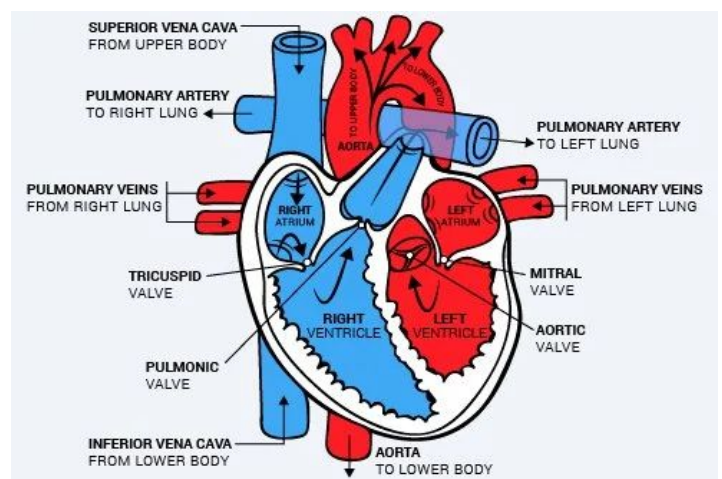
- right atrium
- right ventricle
- left atrium
- left ventricle

Blood Flow Order

- The right atrium receives deoxygenated blood from the body via the superior and inferior vena cava
- The right ventricle receives blood from the right atrium and pumps it to the lungs via the pulmonary artery
- The left atrium receives oxygenated blood from the lungs via 4 pulmonary veins
- The left ventricle is the largest and most muscular chamber. It receives oxygenated blood from the lungs via the left atrium and pumps blood into the systematic circulation via the aorta.

Valves of the Heart

- 2 atrioventricular valves
 - Tricuspid
 - Mitral
- 2 Semilunar valves
 - Pulmonic
 - Aortic



Sinoatrial Node

- The pacemaker of the heart
- Located at the junction of the superior vena cava and the right atrium

Heart Sounds

- The first heart sound is heard as the atrioventricular valves close and is heard loudest at the apex of the heart
- The second heart sound is heard when the semilunar valves close and is heard loudest at the base of the heart

Important Cardiac Labs

- Troponin
 - rises in 3 hrs of injury and persists for 7-10 days normal < 0.1 ng/mL; peaks at 12- 24 hours >2.2 = MI
- Myoglobin
 - oxygen-binding protein found in cardiac muscles: level rises in 2 hours of cell death and rapidly declines in 7 hours
 - Is not cardiac-specific
- Creatinine Kinase MB (CK-MB)
 - indicates myocardial ischemia; rises in 4-6 hours of injury and peaks 18 hours post-injury returns to normal in 2-3 days
- BNP(Brain Natriuretic Peptide)
 - Is released in response to atrial and ventricular stretch
 - elevated in CHF
 - 0-99 nanoliters

Electrocardiogram

- noninvasive procedure and is basically an ultrasound of the heart to detect structural and functional changes

Holter Monitoring

- continuous monitoring usually a 5 lead monitor attached with patients being informed to record any unusual events; used to detect dysrhythmias that may not be present continuously (i.e. SVT; PVCs, etc...)
- avoid showers during the time wearing Holter

Types of Cardiac Dysrhythmias

- Sinus Bradycardia
 - Atrial and ventricular rates are less than 60 beats per minute
- Sinus tachycardia
 - Atrial and ventricular rates are 100 to 180 beats per minute
- Atrial Fibrillation
 - Multiple rapid impulses from many foci depolarization in the atria in a totally disorganized manner at a rate of 350 to 600 times/minute
- Premature Ventricular Contractions
 - Early ventricular contractions result from increased irritability of the ventricles
- Ventricular Tachycardia
 - Occurs because of a reparative firing of an irritable ventricular ectopic focus at a rate of 140- to 250 beats/minute or more
 - Can lead to Cardiac Arrest

Management of Dysrhythmias

- Vagal Maneuvers
 - Induce vagal stimulation of the cardiac conduction system and are used to terminated supraventricular tachydysrhythmias
- Valsalva Maneuver
 - Instructs the client to bear down or induce a gag reflex to stimulate the vagal response

Cardioversion

- is a medical procedure that restores a normal heart rhythm in people with certain types of abnormal heartbeats (arrhythmias).
- Cardioversion is usually done by sending electric shocks to your heart through electrodes placed on your chest.

Defibrillation

- the stopping of fibrillation of the heart by administering a controlled electric shock in order to allow restoration of the normal rhythm.

Automated external defibrillator

- is used to help those experiencing sudden cardiac arrest.

Pacemaker

- A temporary or permanent device that provides electrical stimulation and maintains the heart rate when the client's intrinsic pacemaker fails to provide a perfusing rhythm

Coronary Artery Disease

- Narrowing or obstruction of 1 or more coronary arteries as a result of atherosclerosis
- Decreased perfusion to the myocardial tissue

Symptoms

- Chest pains
- Palpitations
- Dyspnea
- Syncope
- Cough
- Hemoptysis
- Excessive fatigue

Angina

- Chest pain resulting from myocardial ischemia caused by inadequate myocardial blood and oxygen supply
 - Treatment
 - Sublingual Nitroglycerin should relieve pain
 - Can be taken every 5 minutes for max of three doses
 - If pain is not relieved, call emergency services

Stable Angina

- Occurs with activities that involve exertion or emotional stress

Unstable Angina

- Unpredictable degrees of exertion or emotion and increases in occurrence, duration, and severity over time

Symptoms

- Palpitations
- Dyspnea
- Pallor
- Sweating
- Tachycardia
- Hypertension

Myocardial Infarction

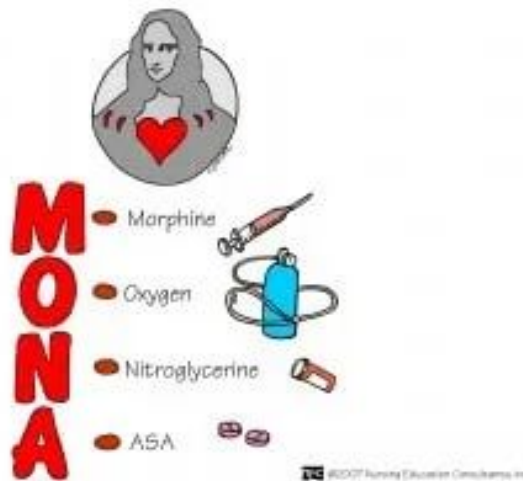
- Occurs when myocardial tissue is abruptly and severely deprived of oxygen

Risk Factors

- Atherosclerosis
- Coronary Artery Disease
- Hypertension
- Smoking
- Obesity

Myocardial Infarction Treatment

IMMEDIATE TREATMENT OF AN M.I.



Pulmonary Edema

- Condition caused by excess fluid in the lungs.
- Fluid collects in the numerous air sacs in the lungs, making it difficult to breathe.
 - Treatment

Current Mnemonic: **POND**

- **P**: Position / PPV
- **O**: Oxygen
- **N**: Nitroglycerin
- **D**: Diuretics

Heart Failure

- The inability of the heart to maintain adequate cardiac output to meet the metabolic needs of the body because of impaired pumping ability
 - Types
 - Left-Sided
 - Right-Sided



Cardiogenic Shock

- Failure of the heart to pump adequately thereby reducing cardiac output and compromising tissue perfusion

Pericarditis

- Is an acute or chronic inflammation of the pericardium

Symptoms

- Pains on the anterior chest
- Fever
- Chills
- Fatigue
- Malaise
- Elevated white blood cell count

Myocarditis

- Acute or chronic inflammation of the myocardium as a result of pericarditis, systemic infection, or allergic response

Symptoms

- Fever
- Dyspnea

- Tachycardia
- Chest Pain

Endocarditis

- Inflammation of the inner lining of the heart and heart valves

Symptoms

- Fever
- Anorexia
- Fatigue
- Cardia Murmurs
- Heart Failure

Cardiac Tamponade

- Occurs when the space between the parietal and visceral layers of the pericardium fills with fluid

Symptoms

- Jugular vein distention
- Distant muffled heart sounds
- Narrowing pulse pressure

Aortic Aneurysms

- Is an abnormal dilation of the arterial wall caused by localized weakness and stretching of the remedial layer or the wall of the aorta

Hypertension

- Increased blood pressure
- Normal is 120/80