

Cardiovascular Assessment

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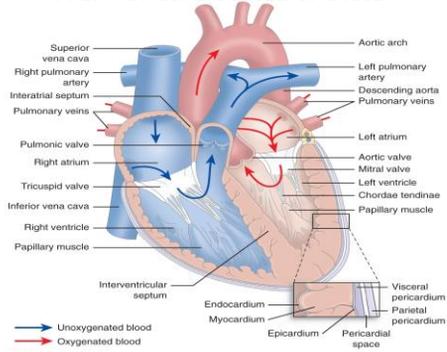
Overview of Anatomy and Physiology

- ❖ Three layers: endocardium, myocardium, epicardium
- ❖ Four chambers: Right atrium and ventricle, left atrium and ventricle
- ❖ Atrioventricular valves: tricuspid and mitral
- ❖ Semilunar valves: aortic and pulmonic
- ❖ Coronary arteries
- ❖ Cardiac conduction system (electrophysiology)
- ❖ Cardiac hemodynamics

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A & P of Cardiovascular System



Cardiac Output #2

- ❖ Stroke volume (SV): amount of blood ejected with each heartbeat
 - Preload: degree of stretch of cardiac muscle fibers at end of diastole
 - Afterload: resistance to ejection of blood from ventricle
 - Contractility: ability of cardiac muscle to shorten in response to electrical impulse

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Influencing Factors

- ❖ Control of heart rate
 - Autonomic nervous system, baroreceptors
- ❖ Control of stroke volume
 - Preload: Frank-Starling Law
 - Afterload: affected by systemic vascular resistance, pulmonary vascular resistance

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Contractility

- ❖ Contractility increased by catecholamines, SNS, certain medications
- ❖ Increased contractility results in increased stroke volume
- ❖ Decreased by hypoxemia, acidosis, certain medications

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Assessment

- Color
- Mucous membranes
 - Jugular vein distention
- Capillary refill
- Heart
 - Valves
 - Murmur
 - Pulse deficit
 - Pulse pressure
 - Cardiac output
 - Stroke Volume
- Peripheral pulses
 - Carotid
 - Apical
 - Brachial
 - Radial
 - Ulnar
 - Femoral
 - Popliteal
 - Posterior tibial
 - Dorsalis pedis
- Edema
 - Pitting/ non-pitting

Laboratory Tests

- Cholesterol
- High Density Lipoproteins (HDL)
- Low Density Lipoproteins (LDL)
- Triglycerides
- Cardiac Enzymes
 - CPK, CK-MB, troponin
- Brain type Natriuretic Peptide (BNP)
- C- Reactive Protein
- D-dimer
- Homocysteine levels

Diagnostic Tests

- CXR
- Electrocardiography (ECG)
- Cardiac Stress Testing
 - Exercise
 - Pharmacological
- Echocardiogram/ TEE
- Cardiac Catheterization
 - Angiography

Electrocardiography

- ❖ 12-lead ECG
- ❖ Continuous monitoring
 - Hardwire
 - Telemetry
 - Lead systems
 - Ambulatory monitoring

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Cardiac Stress Testing

- ❖ Exercise stress test
 - Patient walks on treadmill with intensity progressing according to protocols
 - ECG, V/S, symptoms monitored
 - Terminated when target HR is achieved
- ❖ Pharmacologic stress testing
 - Vasodilating agents given to mimic exercise

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Diagnostic Tests

- ❖ Radionuclide imaging:
 - Myocardial perfusion imaging
 - Positron emission tomography
 - Test of ventricular function, wall motion
 - Computed tomography
 - Magnetic resonance angiography

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Echocardiography

- ❖ Noninvasive ultrasound test that is used to:
 - Measure the ejection fraction
 - Examine the size, shape, and motion of cardiac structures
- ❖ Transthoracic
- ❖ Transesophageal

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Cardiac Catheterization

- ❖ Invasive procedure used to diagnose structural and functional diseases of the heart and great vessels
- ❖ Right heart catheterization
 - Pulmonary artery pressure and oxygen saturations may be obtained; biopsy of myocardial tissue may be obtained
- ❖ Left heart catheterization
 - Involves use of contrast agent

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Hemodynamic Monitoring

- Central Venous Pressure Monitoring
- Pulmonary Artery Pressure Monitoring
- Intra-arterial Blood Pressure Monitoring

