Cardiovascular System Disorders



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Clinical Medicine

Flashcards

Clinical Clues to DiagnosisPathophysiology

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- Atrial Fibrillation
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1 Angina Pectoris

 Chest pain referred to the jaw, neck, upper arms, and scapulae that is usually associated with activity, cold weather exercise, or smoking.

Usually subsides with rest.

- The coronary arteries that feed the heart muscle become occluded with atherosclerotic plaque. Increased oxygen demands cannot be met because of narrowing and noncompliance to dilation. Ischemic pain results and is referred to the jaw, inner upper arms, sternum, and between the scapulae.
- Causative events include the 4 Es—eating a large meal, excitement, environment (very cold or very hot), and exercise—as well as smoking.
- Types include stable angina; variant angina (Prinzmetal's), unstable angina, which can easily lead to MI; and silent ischemia, usually experienced by older adults, that damages the heart without pain.

2 Aortic Aneurysm

- Abdominal pain, nausea, or fullness relieved by position change.
- Pulsating mass in the abdomen.
- Auscultation with the bell of the stethoscope for a bruit adjacent to the umbilicus.

- Bulging or ballooning of the aorta due to atherosclerosis, hypertension, chronic obstructive pulmonary disease, smoking, trauma, or congenital anomaly. Commonly found in the abdominal aorta (abdominal aortic aneurysm [AAA]). Tends to run in families with Marfan's syndrome.
- Types include fusiform, saccular, and dissecting.
- May be completely asymptomatic until it ruptures.

3 Aortic Stenosis

 Presence of a loud, harsh midsystolic, crescendodecrescendo murmur that radiates to the side of the neck and down the left sternal border or apex. Heard loudest at the second right ICS. Low BP, • Fatigue, Dizziness & Chest pain.

- AS develops from thickening, scarring, calcification, vegetation, or fusing of the flaps of the valve.
- Left ventricular hypertrophy occurs as the sympathetic nervous system is activated to compensate for low cardiac output. When compensatory mechanisms fail, heart failure results.

4 Atrial Fibrillation

- Palpitations
- Skipping heartbeats
- Vertigo

- Atrial fibrillation (AF), or quivering of the atria, is caused by repeated reentry of stimuli to the atrioventricular (AV) node.
- Loss of atrial kick.
- Stimulation of the sympathetic nervous system, as well as increasing age, illness (e.g., hyperthyroidism), and the stress of surgery may initiate AF.
- Types of AF include paroxysmal, persistent, permanent, and lone.



5 Buerger's Disease

A disease of young men who smoke.
Thrombi develop in the legs, occluding circulation.
"Your cigarettes or your legs" is often the choice.

- BD also known as thromboangiitis obliterans is a disease of recurrent inflammation of the small and medium arteries of the legs that results in thrombus formation.
- Young men (aged 25–40) who smoke are affected. It is thought that substances in the tobacco products trigger an autoimmune response in these young men. Vasospasm and loss of arterial blood flow occurs.

6 Cardiogenic Shock

- Following MI
- Sudden onset of low BP
- Poor perfusion
- Tachycardia
- Arrhythmias

- AMI leads to decreased contractility of either the right or left ventricle, decreasing cardiac output to all body organ systems.
- CS may be caused by pericarditis and resulting cardiac tamponade.
- Stenosis of heart valves or sustained arrhythmia can cause CS.
- Drugs, used for preexisting hypertension, angina, or arrhythmias, may reach toxic levels and cause CS.

7 Cardiomyopathy

- Dyspnea
- Fatigue
- Edema of the ankles, and Possible atypical chest pain occurring with rest and not relieved with nitrates. MRI shows enlargement of the heart muscle or chambers.

- Enlargement of the heart muscle or chambers of the heart that causes heart failure.
- Major types: dilated and restrictive.
- Causes: Heredity, myocarditis, chronic alcohol or cocaine use, HIV, thiamine or zinc deficiencies, infections; or autoimmune disease.

8 Congestive Heart Failure

- Elevated BNP,
- Edema in the
- Extremities
- Shortness of breath
- Crackles and pleural effusion
- Jugular vein distention
- Hepatomegaly
- Splenomegaly

- The heart is a double pump. Any structural damage to the pump will cause heart failure.
- Left-sided heart failure causes backup of fluid in the lungs.
- Right-sided heart failure causes backup of fluid in the inferior and superior venae cavae.

9 Coronary Artery Disease

 Shortness of breath with activity in a client with risk factors for heart disease such as a history of Elevated blood lipids Smoking Poor dietary habits Sedentary lifestyle Obesity

- CAD results in interruption of blood flow that can cause ischemia or infarction as a result of atherosclerosis.
- The inflammation attracts low-density lipoproteins (LDL) and binds them to the site. The triglyceride core of the LDLs is spilled into the underlayer of the intima. Macrophages envelop these fats and are now termed "foam cells."
- This is the "fatty streak" seen in early stages of atherosclerosis. As the area enlarges, more LDL, macrophages, platelets, and smooth muscle fibers are drawn to the site and accumulate under the intima, narrowing the vessel.
- This causes reduced blood flow and higher blood pressure in the small coronary vessels.

10 Deep Vein Thrombosis

- Positive homans' sign
- Redness or warmth in an area of pain in the leg
- Edema unilaterally in the arm or leg

- Causes of DVT include venous stasis, vessel wall injury, and hypercoagulability. Perinatally, women are at increased risk because of excess clotting factors.
- Areas where blood flows more slowly, usually where veins are bending are more prone to DVT.
- Postsurgery clients are at greater risk due to ↓ activity.
- Septicemia resulting in hemolysis and dehydration can contribute to DVT.

11 Graft-Versus-Host Disease

 Approximately 31/2 months following solid organ, bone marrow, or stem cell transplant, damage to the epithelial cells of the skin, GI tract, and hepatocytes occurs from an immune attack initiated by the transplanted tissue.

- GVHD can occur following solid organ, bone marrow, or stem cell transplant. The graft cells recognize the host cells as foreign.
- Phase 1 of GVHD involves the host tissue that has been prepared for transplant by use of chemotherapy and radiation therapy. The injured tissue releases cytokines, which stimulate the host's CD4+ cells.
- In phase 2 of GVHD, activated CD4+ cells cause the graft to activate T killer cells and NK cells that mount an immune response against susceptible tissues of the host (epithelial tissue, GI tract, and hepatocytes).
- In phase 3 of GVHD, immune cells and cytokines begin to damage host tissues.

12 Hypertension

 BP readings of greater than 119 mm Hg systolic or greater than 79 mm Hg diastolic classify the client as prehypertensive. The client may have no symptoms or, in severe cases, headache and nosebleed.

- BP is determined by CO, which is determined by heart rate multiplied by the stroke volume. The heart rate can be affected by stimulation of the SNS responding to arterial baroreceptors that measure BP and by chemoreceptors that measure CO2 levels. Other mechanisms that alter BP include the renin-angiotensinaldosterone system, exercise, emotions, and taking medications that cause vasoconstriction. High blood pressure damages the intima of arteries, making way for infiltration of macrophages, muscle fibers, cholesterol, and fatty acids that form atherosclerotic plaque.
- PVR is the resistance to blood flow through arterioles creating a high afterload.

13 Leukemia

- Low-grade fever
- Lymphadenopathy
- Bleeding tendency
- Infections
- Anemia.
- Bone marrow biopsy shows many immature WBCs.

- Leukemia can be acute or chronic and affect lymphocytes, monocytes, granulocytes, erythrocytes, and platelets. Due to a mutation in the stem cells of the bone marrow, immature WBCs (blasts), proliferate uncontrollably in the bone marrow, lymph tissue, and spleen. In the bone marrow, the immature and ineffective WBCs crowd the normal WBCs, RBCs, and platelets, greatly reducing their number.
- Types include ALL, AML, CLL, CML.

14 Metabolic Acidosis

- ABG shows pH of less than 7.35,
- PCO2 in the range of 35– 45 mm Hg or decreasing to compensate, and
 HCO3_ of less than 22 mEq/L.

- Normal pH of the body is 7.35–7.45. ABG analysis diagnoses metabolic acidosis; pH is low, CO2 is within normal range or decreasing to compensate, and HCO3_ is low.
- Buffering systems are initiated by the body when the pH goes out of range. The first to react are cellular buffers. In metabolic acidosis, H+ are absorbed into the cells, causing a shift of K+ into the extracellular area.
- The lungs are the second buffering system to activate. When pH is low, CO2 is released through rapid and deep respirations. The kidneys are the last buffering system to activate; and it may take as long as 1–2 days for them to begin to affect pH. In metabolic acidosis, the kidneys secrete H+.
- Causes include diarrhea (loss below the waistlose base), CRF, lactic acidosis, salicylate poisoning, methanol and alcohol poisoning, paraldehyde poisoning, and diabetic ketoacidosis.

15 Metabolic Alkalosis

- ABG shows pH of greater than 7.45,
- PCO2 in the range of 35– 45 mm Hg or rising to compensate, and HCO3_ of greater than 26 mEq/L.

- Normal pH of the body is 7.35–7.45. The ABG diagnoses metabolic alkalosis, pH is high, CO2 is within normal range or increasing to compensate, and HCO3_ is high.
- Buffering systems are initiated by the body when the pH goes out of range. The first to react are cellular buffers. In metabolic alkalosis, H+ are released from the cells, causing a shift of potassium ions (K+) into the cells.
- The lungs are the second buffering system to activate. When pH is high, CO2 is held by slow, shallow respirations.
- The kidneys are the last buffering system to activate, and it may take as long as 1–2 days for them to begin to affect pH. In metabolic alkalosis, the kidneys hold H+.
- Causes include persistent vomiting; gastrointestinal suction; diarrhea; and use of loop diuretics, antacids, licorice, glucocorticoids, and mineralocorticoids.

16 Multiple Myeloma

- Pathologic fractures from severe osteoporosis
- Bleeding tendency
- Infections
- Anemia affecting those in the fifth to seventh decades of life.

- Mutation of plasma cells (type of Blymphocyte) that infiltrate the bone marrow, bone tissue, liver, spleen, lymph nodes, lungs, adrenal glands, kidneys, skin, and GI tract.
- MM has a poor prognosis.

17 Myocardial Infarction

 Severe chest pain that refers to the jaw, upper arms, neck, and scapula and is described as "crushing." Accompanied by shortness of breath, elevated BP, and sweating.

- When blood flow diminishes to the heart muscle, the sympathetic nervous system is activated, raising the blood pressure and heart rate. This increases the oxygen and glucose needs of the cardiac cells.
- Cardiac necrosis from lack of perfusion occurs centrally, surrounded by varying levels of ischemic tissue radiating outward from the site.
- Necrotic cardiac tissue will never resume its prior ability to contract but rather will form scar tissue.
- Damage can occur to the pacing system of the heart, causing lethal arrhythmias.

18 Myocarditis

- Fever,
- Chest pain, and
- Activity Intolerance.

- The myocardium is infiltrated by inflammatory cells leading to necrosis of muscle cells and fibrosis.
- Causes include viral, bacterial, protozoan, and fungal infections.
- Inflammatory and autoimmune causes or exposure to chemicals or toxins, and radiation therapy.
- Women who are pregnant, those undergoing radiation therapy to the chest area, and the elderly are also at risk.

19 Pericarditis

- Pericardial friction rub.
- Substernal radiating chest pain that increases in intensity with deep inspiration or lying flat. Pain is somewhat relieved by sitting upright and leaning forward.
- CBC and ESR may indicate inflammation or infection is present.

- Pericarditis is an inflammation of the pericardial sac. The pericardial sac is a fibrous tissue layer that surrounds the heart. Under normal circumstances, it contains and is bathed with approximately 25–50 mL of serous fluid. In pericarditis, the volume may increase to 1,500 mL.
- Many diseases, conditions, and drugs can inflame the pericardial sac.
- Hemopericardium may be caused by trauma and in-hospital procedures.

20 Peripheral Arterial Disease

- Symptoms occur late in the disease and include intermittent claudication in the calves associated with activity.
- Color changes in the legs, with hair loss and dry, flaky skin, may occur.

- PAD is caused by progressive narrowing of the lumen of the arteries by atherosclerotic plaque buildup.
- If arteries are totally occluded, necrosis and ulceration (gangrene) develop, and the limb is no longer viable.

21 Raynaud's Disease

 Vasospasm and vasoconstrictive ischemia of the tips of the nose, fingers, hands, feet, and toes when in contact with cold objects or cold temperatures.

- A disease of women, RD causes vasospasm and vasoconstrictive ischemia of the tips of the nose, fingers, hands, feet, and toes when in contact with cold objects or cold temperatures. Ischemia is followed by a period of hyperemia. Diagnosis is made when the ischemic attacks occur for 2 or more years.
- Endothelin 1 and angiotensin may be causative agents.
- Secondary RD is associated with autoimmune/ collagen disorders and persons with occupations that involve vibratory tools like jackhammers.

22 Respiratory Acidosis

ABG shows pH of less than 7.45,
PCO2 of greater than 45 mm Hg, and HCO3_ within range or rising to compensate.

- Normal pH of the body is 7.35–7.45. The ABG analysis diagnoses respiratory acidosis; pH is low, CO2 is high, and HCO3_ is within normal range or rising to compensate.
- Buffering systems are initiated by the body when the pH goes out of range. The first to react are cellular buffers. In respiratory acidosis, H+ are absorbed into the cells, causing a shift of K+ out of the cells.
- The lungs are the second buffering system to activate. When pH is low, CO2 is released through rapid and deep respirations.
- The kidneys are the last buffering system, and it may take as long as 1–2 days for them to begin to affect pH. In respiratory acidosis, the kidneys secrete H+.
- Causes include COPD, hypoventilation, sleep apnea, and drug use that suppresses respiratory function..

23 Respiratory Alkalosis

- ABG shows pH of greater
 - than 7.45,
- PCO2 of less than 35 mm
 Hg, and
- HCO3_ within the range of 22–26 mEq/L or

decreasing to compensate.

- Normal pH of the body is 7.35–7.45. The ABG analysis diagnoses respiratory alkalosis; pH is high, CO2 is low, and HCO3_ is within normal range or decreasing to compensate. Buffering systems are initiated by the body when the pH goes out of range. The first to react are cellular buffers. In respiratory alkalosis, H+ are released from the cells, causing a shift of K+ into the cells.
- The lungs are the second buffering system to activate. When pH is high, CO2 is held by slow, shallow respirations.
- The kidneys are the last buffering system to activate, and it may take as long as 1–2 days for them to begin to affect pH. In respiratory alkalosis, the kidneys hold H+.
- Causes include pain, anxiety, fever, CVA, tumor, and trauma.

24 Rheumatic Endocarditis

- Fever
- Chest pain
- Dyspnea
- Cough
- Arthritic symptoms
- Chorea and
- Ankle edema develop 2–3 weeks after strep. Throat (beta-hemolytic streptococci).

- BHS that cause throat infection or impetigo travel to the bloodstream, causing bacteremia. The BHS infect the heart typically 2–3 weeks after the initial infection. May occur in clients in childhood and recur as rheumatic endocarditis at any age.
- All layers of the heart are affected, with generalized inflammation of all heart structures.
- The endocardium is affected by vegetation deposited on the valves.
- The end result of cardiac structural anomalies is CHF.

25 Varicose Veins

 Visible, tortuous, bulging veins that cause discomfort in the leg and changes in body image.

- Venous return in the body is dependent on the muscular contractions of the skeletal muscle pump. Competency of the valves within the veins cause forward flow that is eventually returned to the heart.
- In pregnancy, the pressure of the fetus causes venous hypertension, and hormones make the valves less competent, which ↑ incidence of varicose veins of the legs and anus to occur.
- Superficial varicosities are more visible than more deeply located varicosities.

26 Venous Stasis Ulcer

Ulcer that occurs on the lower extremities in the presence of edema and brown, leathery skin.
Described as "wet" and exudes a large amount of serous fluid.

- Blood is not returned efficiently to the heart and venous pressure ↑ in the lower extremities. The ↑ venous pressures cause backflow of blood into the capillary exchange beds and leakage of serous fluid containing wastes into the interstitial space.
- Edema in the interstitial space prevents capillary access for all cells and can be severe.
- Increased pressure in a vein causes a small rupture that becomes a deeper wound that cannot heal because of poor capillary access to inflammatory agents, oxygen, and glucose. The wound ulcerates because of inflammatory substances trapped in the subcutaneous tissue, damaging the valves in the veins and exuding serous fluid.

27 Ventricular Fibrillation

- Loss of consciousness,
- No peripheral pulses or blood pressure.



- VF is associated with CAD, MI, and structural or inflammatory cardiac conditions. It may be precipitated by antiarrhythmic drug administration, atrial fibrillation, cardioversion, and hypoxic states.
- VF causes include hyperkalemia and hypomagnesemia, cardiac catheterization and placement of pacemaker wires.
- Congenital conditions that predispose to VF include Marfan's syndrome, tetralogy of Fallot, Kawasaki's disease, long QT syndrome, and Wolff-Parkinson-White syndrome also predispose to VF.

28 Ventricular Tachycardia

- Client may be lightheaded
- Unconscious and
- Pulseless.

- In ventricular tachycardia (VT), the ventricles replace the sinoatrial (SA) node as the pacemaker of the heart.
- PVCs often precede VT.
- VT may be caused by MI, myocardial irritability, and cardiomyopathy.
- Abnormally low levels of K+, Ca++, and Mg+; digoxin toxicity; RA, SLE, and respiratory acidosis.
- Cardiac catheterization and pacing wires.