

NCLEX Bootcamp Practice Question

Adult Health - Cardiovascular

Question: 1 — Type: matrixMultipleChoice

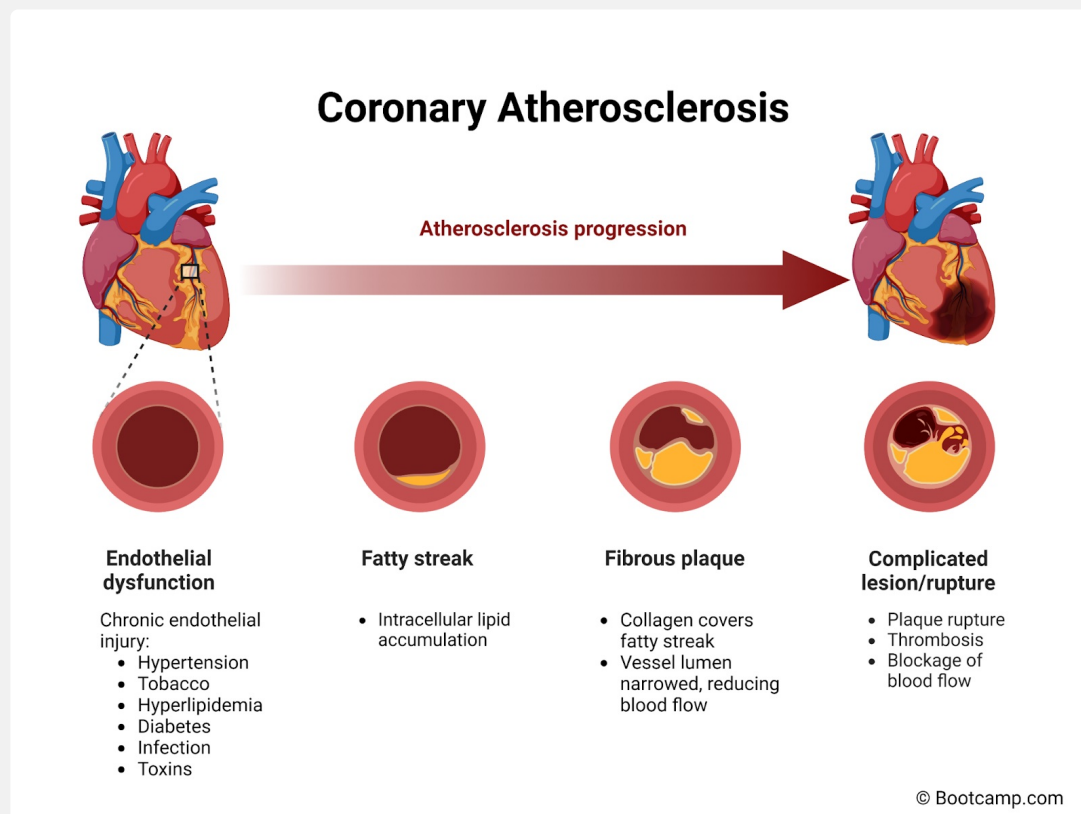
The nurse is providing dietary teaching to a client with a new diagnosis of coronary artery disease.

For each client statement below, click to specify whether the statement indicates understanding or no understanding of the dietary teaching provided.

Client Statement	Understanding	No Understanding
1. "Beans are a good source of fiber."	✓	
2. "I should not eat any pork products."		✓
3. "I should prepare meat by baking or grilling."	✓	
4. "Deli meat and cheese contain too much fat and sodium."	✓	
5. "I should limit my water intake so I don't experience swelling."		✓
6. "I will decrease my egg intake from 5 days a week to 2 days a week."	✓	

Note: Each row must have 1 response option selected.

Explanation:



Coronary artery disease (CAD) is characterized by atherosclerotic plaques within the coronary arteries. Clients with CAD should be instructed on dietary measures to reduce hypertension and cholesterol, which are the main contributors to CAD.

Teaching was effective if the client demonstrates understanding of these teaching points:

- Increasing intake of **high-fiber foods** such as whole grains, **beans and legumes**, lentils, and cruciferous vegetables helps to lower low-density lipoprotein (LDL) (i.e., "bad") cholesterol **[Choice 1]**.
- **Baking and grilling** with unsaturated fats (e.g., plant-based fats) decreases the amount of fat needed to prepare meat compared to frying **[Choice 3]**.
- Intake of **saturated fat** found in **cheese** and **red meat** contributes to the development of fatty streaks and plaque in the arteries **[Choice 4]**. Foods high in **sodium** such as **deli meat** increase water retention, fluid volume, and cardiac workload.
- Egg yolks are major sources of cholesterol and should be reduced or excluded from the diet **[Choice 6]**.

Ineffective teaching:

- Pork contains saturated fat, but can be eaten in moderation if the cuts are lean (tenderloin, loin chops, and loin roast) **[Choice 2]**.
- Drinking water helps rid the body of salt because water follows the osmotic gradient created by sodium **[Choice 5]**. Clients with congestive heart failure may be instructed to limit fluid intake, but those with CAD or hypertension only need to limit sodium intake.

Key Takeaway:

- Dietary measures for clients with CAD include increased intake of fiber and water and decreased intake of saturated fat and sodium.

Question: 2 — Type: multipleResponse

The nurse is discussing the importance of health maintenance activities with a client with coronary artery disease (CAD).

Which of the following should the nurse stress as benefits of exercise? **Select all that apply.**

1. Builds muscle
2. Prevents blood clots
3. Reduces hyperlipidemia
4. Increases activity tolerance
5. Decreases cardiac workload
6. Increases oxygen to heart muscle
7. Increases insulin sensitivity

Explanation:

The progression of coronary artery disease (CAD) can be slowed by adopting a number of health maintenance activities. **Physical inactivity** is a major modifiable risk factor for CAD.

All adult clients, especially those with atherosclerotic cardiovascular disease (i.e., CAD, stroke) should engage in **150 minutes per week of moderate-intensity exercise** (e.g., jogging, cycling, brisk walks) in order to:

- **Build muscle** mass, strength, and flexibility, improving mobility and increasing oxygen extraction from the muscles **[Choice1]**.
- Increase venous return and decreases platelet aggregation, which can **prevent blood clots** **[Choice 2]**.
- **Reduce hyperlipidemia** by promoting lipid metabolism, which increases levels of high-density lipoprotein (HDL) (i.e., “good” cholesterol) and lowers levels of triglycerides and low-density lipoprotein (LDL) **[Choice 3]**.
- **Increase exercise tolerance** and functional capacity by improving oxygenation to the heart and skeletal muscles **[Choice 4]**.
- Promote myocardial oxygen delivery of oxygen, increasing coronary blood flow and **decreasing cardiac workload** and oxygen demand **[Choices 5 and 6]**. Increased vascular flow also encourages development of collateral circulation and facilitates repair of inflammatory damage to the vascular endothelium.
- **Increase insulin sensitivity** and maintain a healthy weight **[Choice 7]**. Exercise increases the number of glucose uptake transporters on skeletal muscles, which lowers blood glucose levels and prevents diabetes, which is one of the most significant risk factors for CAD.

Key Takeaway:

- Exercise has many benefits for cardiovascular health including:
- Building muscle
- Preventing blood clots
- Reducing hyperlipidemia
- Increasing exercise tolerance
- Decreasing cardiac workload
- Decreasing inflammatory response
- Increasing glucose regulation

Question: 3 — Type: multipleChoice

The nurse has taught a client with a new permanent pacemaker.

Which of the following statements by the client would indicate a correct understanding of the teaching?

1. "Health care providers will be able to tell that I have a pacemaker in an emergency."
2. "I should expect to experience some chest discomfort and dizziness for the first week."
3. "I will contact my health care provider if my heart rate drops below the paced rate at rest."
4. "I need to ask airport security to do a pat down instead of walking through the metal detector."

Explanation:

Pacemakers are medical devices that emit electrical impulses to **maintain an adequate heart rate** in clients with defective electrical pathways (e.g., third-degree AV block, sick sinus syndrome).

Teaching was effective if the client demonstrates that:

- Client should monitor the heart rate regularly, and a **rate at or above the paced rate** should always be maintained [**Choice 3**]. Client should report irregularities in the rate to the health care provider immediately.

Corrected teaching:

- Clients should wear a **medical alert bracelet** or **carry identification** in case of emergency to ensure health care providers know the client has a pacemaker [**Choice 1**].
- The client should **report chest pain** and **dizziness to their provider immediately** because these are symptoms of inadequate perfusion that indicate **pacemaker failure** [**Choice 2**].
- Clients should avoid strong electromagnetic fields to prevent interference with the pacemaker's proper functioning (e.g., anti-theft devices, metal detector wands). However, it is **safe** to **walk through a metal detector** because electromagnetic fields generated by these detectors are not strong enough to cause harm to the pacemaker [**Choice 4**]. Additionally, the client should be instructed to notify security of the pacemaker because it may trigger an alarm.

Key Takeaway:

Clients with pacemakers should be taught to:

- Monitor their heart rate and report abnormalities.
- Report chest pain or dizziness.
- Avoid strong electromagnetic devices that may interfere with the pacemaker (e.g., metal detector wands, anti-theft devices).

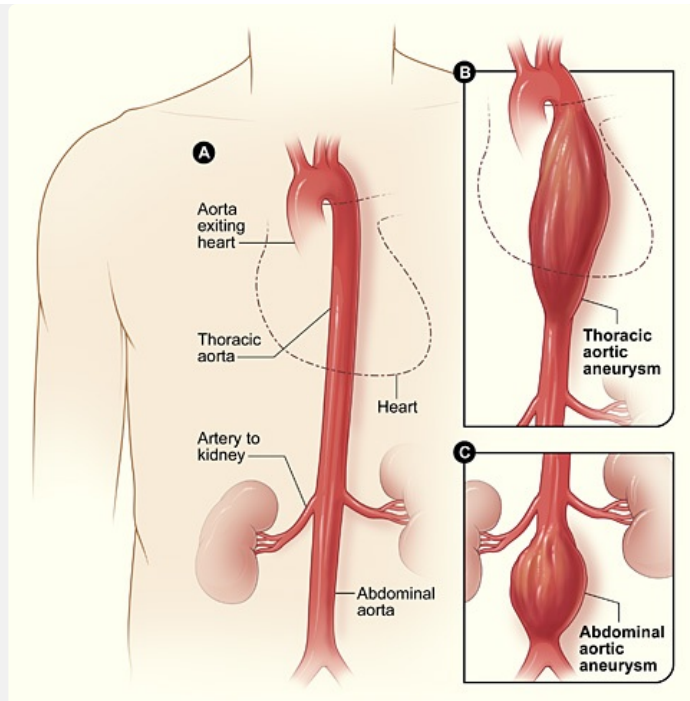
Question: 4 — Type: multipleChoice

The nurse is caring for a client with a suspected abdominal aortic aneurysm.

Which of the following findings would support a diagnosis of aortic aneurysm?

1. Chest pain relieved by leaning forward
2. Sudden dyspnea and stabbing chest pain
3. Gnawing abdominal pain and an abdominal bruit
4. Intermittent claudication and diminished pedal pulses

Explanation:



An **abdominal aortic aneurysm (AAA)** is a localized enlargement of the abdominal aorta. Signs and symptoms of a symptomatic AAA include **gnawing or throbbing abdominal or back pain**, the feeling of a **pulse in the abdomen**, and the presence of an **abdominal bruit** on auscultation [Choice 3]. A bruit is a **swishing sound** heard when an artery is partially occluded.

AAA is a **medical emergency** requiring immediate surgical intervention if it ruptures, as it can lead to life-threatening internal bleeding.

Incorrect:

Chest pain relieved by leaning forward

This symptom is typically associated with *pericarditis*, an inflammation of the sac surrounding the heart. The chest pain in pericarditis *worsens when lying flat and improves by leaning forward*.

Sudden dyspnea and stabbing chest pain

Chest pain that is sharp and worse with inspiration is typical of *pleuritic pain* associated with *pulmonary embolism* or *pneumothorax*. In pulmonary embolism, a blood clot travels to the lungs, causing dyspnea and pleuritic pain. In pneumothorax, a lung collapses, causing dyspnea and pleuritic pain.

Intermittent claudication and diminished pedal pulses

These symptoms are characteristic of *peripheral artery disease*, which is impaired perfusion to the extremities. Intermittent claudication refers to pain that occurs during exercise and is relieved by rest, while diminished pedal pulses indicate reduced blood flow.

Key Takeaway:

- An AAA is a localized enlargement of the abdominal aorta.
- Signs and symptoms include gnawing or throbbing abdominal or back pain, feeling an abdominal pulse, and abdominal bruit.

Question: 5 — Type: multipleChoice

The nurse has attended a staff education program about continuous cardiac telemetry.

Which of the following statements by the nurse would indicate a correct understanding of the teaching?

1. "I will use alcohol wipes to clean the skin before applying electrodes."
2. "Monitor alarm settings may be adjusted based on the client's condition."
3. "Limb leads should be applied about halfway down each limb, near the joint."
4. "If I see ventricular fibrillation on the monitor, I will immediately begin cardiopulmonary resuscitation (CPR)."

Explanation:

Frequent **insignificant alarms**, or alarms that do not indicate a critical or life-threatening situation for a client, lead to desensitization or **alarm fatigue**. When experiencing alarm fatigue, clinicians may not recognize true emergencies, resulting in a delay in taking necessary actions. This delay poses a **significant risk to client safety**.

The following steps can **prevent insignificant alarms**:

- **Adjust monitor alarm settings based on the client's condition** and facility guidelines **[Choice 2]**. However, it is **never appropriate to turn off alarms** completely.
- Replace leads and electrodes as needed.
- Discontinue continuous monitoring as soon as appropriate.
- Perform appropriate skin prep before initiating monitoring.

Incorrect:

Alcohol wipes to clean skin

Alcohol wipes *increase skin electrical impedance*, reducing the monitor's ability to detect cardiac signals. Instead, prep skin by *cleansing with soap and water*, drying, and removing excessive chest hair.

Ventricular fibrillation, begin CPR

When a monitor alarms or displays an abnormal rhythm (i.e., ventricular fibrillation), assess the client *immediately*. Client assessment takes priority over data displayed on monitoring devices. CPR is only initiated if a client has *no pulse or respiratory effort*.

Limb leads applied near joints

When applying leads, avoid placing them near joints. Instead, apply the leads to *non-moving areas* to reduce the chance of motion artifact, a movement that interferes with the accurate rhythm interpretation, leading to erroneous alarms.

Key Takeaway:

- To combat alarm fatigue:
 - Appropriately apply electrodes.
 - Ensure appropriate skin prep with soap and water.
 - Physically assess the client when a monitor alarms.
 - Adjust monitor parameters.

Question: 6 — Type: multipleChoice

The nurse is planning a staff education program about skin care for clients with chronic venous insufficiency.

Which of the following information should the nurse include?

1. Apply moisturizer to the lower extremities to prevent skin breakdown.
2. Change the Unna boot dressing on venous ulcers daily to promote healing.
3. Apply iodine to the venous ulcer before applying dressings to prevent infection.
4. Avoid putting compression stockings on the lower extremities to minimize irritation.

Explanation:

Chronic venous insufficiency (CVI) is characterized by **inadequate venous return** from the lower extremities. Appropriate skin care is imperative for clients with CVI to reduce the risk of skin breakdown and venous ulcers.

CVI causes **dry, flaky, and itchy skin**, increasing the risk of skin breakdown and ulcer formation. Regularly **applying moisturizer** is essential to **maintain skin integrity**, prevent dryness and itching, and reduce the risk of skin cracking **[Choice 1]**.

Incorrect:

Change Unna boot dressing daily

The Unna boot is a gauze-based dressing with zinc oxide that reduces edema, promotes wound healing, and maintains a sterile wound environment. *Health care providers* (HCPs) typically change the Unna boot dressing *weekly* to maintain adequate compression and support venous return. The nurse should instruct the client to report any discomfort or tightness caused by the boot, which can indicate arterial occlusion.

Apply iodine to ulcer wound bed

Normal saline or mild wound cleanser are used to clean venous ulcers before applying dressings. Iodine and peroxide *destroy granulation tissue* and *delay wound healing*.

Avoid compression stockings

Compression stockings are an important intervention for clients with CVI as they help improve venous return, reduce edema, and prevent the development of blood clots (deep vein thrombosis). Nurse should instruct client to *wear compression stockings daily*.

Key Takeaway:

- Clients with CVI are at an increased risk for skin breakdown and venous ulcers.
- Appropriate skin care for clients with CVI includes:
 - Applying moisturizer
 - Applying compression dressings daily
 - Collaborating with the HCP to manage wound care

Question: 7 — Type: multipleResponseSelectN

The nurse cares for a 63-year-old male client in the medical surgical unit.

Nurses' Notes

1200:	Client admitted to the unit 3 days after undergoing femoral popliteal bypass surgery on the left leg. Dressing over leg incision removed. Client reports his leg feels "sore and painful" at the incision site with pain severity at 4/10. Incision slightly reddened with no swelling. Wound edges approximated. Minimal serosanguineous drainage noted on dressing. Left leg cool to touch and pale compared to the right leg. Left pedal pulse +1. Capillary refill 5 seconds. Client able to flex and extend both the leg and foot slowly, but client reports feeling "some pins and needles."
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Which 4 findings are **most** concerning?

1. Incision pain
2. Pedal pulses
3. Capillary refill
4. Incision drainage
5. "Pins and needles"
6. Wound approximation
7. Left leg temperature and color

Explanation:

6 Ps of Neurovascular Impairment	
Finding	Description
Pain	Pain that is refractory to IV analgesics
Paresthesias	Pins and needles sensation
Pressure	Palpably tense or firm injured extremity with swelling present
Pulselessness	Weakened or absent pulses in the injured extremity
Pallor	Pale skin or cyanosis distal to the injury
Paralysis	Loss of sensation and function of the injured extremity
Note: Pulselessness, pallor, and paralysis are late findings associated with poor outcomes.	

This client is demonstrating signs of neurovascular **impairment** concerning for **arterial insufficiency**.

Peripheral arterial bypass grafting (e.g., femoral-popliteal bypass) is performed to restore perfusion in clients with peripheral arterial disease (PAD) by redirecting the blood flow around an atherosclerotic obstruction through a vascular or synthetic graft. Clients recovering from a femoral-popliteal bypass surgery are at risk for **graft thrombosis** and **limb ischemia**.

Weak peripheral pulses, prolonged **capillary refill**, **pallor**, **poikilothermia** (coolness to the touch), and **paresthesias** (“pins and needles”) indicate **insufficient peripheral perfusion [Choices 2, 3, 5, and 7]**. The nurse should immediately contact the surgical healthcare provider, as this indicates limb ischemia and risk for limb loss without immediate surgical correction.

Incorrect:

Incision pain

Although pain can also indicate limb ischemia, this client’s pain is moderate and superficial at the incision site, indicating an expected pain response to surgical intervention. Pain would be concerning for neurovascular impairment if it was severe and/or unrelieved by IV analgesics.

Incision drainage, Wound approximation

Wound approximation indicates that the healthy, granulating wound edges are healing together without evidence of separation (e.g., dehiscence). A scant (i.e., minimal) amount of clear, blood-tinged (i.e., serosanguinous) drainage is expected the day after a surgical procedure.

Key Takeaway:

- Clients recovering from a femoral-popliteal bypass surgery are at risk for graft thrombosis and limb ischemia.
- Weak peripheral pulses, prolonged capillary refill, pallor, poikilothermia (coolness to the touch), and paresthesias (“pins and needles”) indicate insufficient peripheral perfusion.

Question: 8 — Type: multipleChoice

The nurse has attended a staff education program about best practices for monitoring troponin levels for clients with cardiac problems.

Which of the following statements by the nurse would indicate a correct understanding of the teaching?

1. “Troponin levels peak 6 hours after a myocardial infarction (MI).”
2. “Troponin levels rise because the heart is stretched from fluid overload.”
3. “Troponin levels are the only reliable lab value to detect a cardiac problem.”
4. “Troponin should be drawn multiple times over 24 hours to monitor for an MI.”

Explanation:

Troponin is a cardiac biomarker released into the bloodstream when there is **damage to the heart muscle** (i.e., myocardial infarction [MI]). With damage and necrosis of cardiac muscles, troponin levels rise.

Serial monitoring of troponin over a specified period (e.g., **every 6 hours over 24 hours**) is essential for monitoring **troponin trends** from myocardial injury **[Choice 4]**. **Initial troponin** levels may be negative (i.e., not yet elevated); therefore, serial monitoring is important as troponin levels take **3-4 hours to rise** after MI. Rising troponin levels suggest **ongoing myocardial injury**, while declining troponin levels may suggest **myocardial damage** has resolved.

Incorrect:

“Troponin levels peak 6 hours after a MI.”

Troponin levels typically begin to *rise within 3-4 hours* after myocardial injury onset, *peak around 12-24 hours* post-MI, and may remain elevated for several days to weeks.

“Troponin levels rise because the heart is stretched from fluid overload.”

B-type natriuretic peptide (BNP) is a hormone released by the heart in response to fluid overload and can be used to confirm a suspected diagnosis of *heart failure*.

“Troponin levels are the only reliable lab value to detect a cardiac problem.”

Troponin is highly specific and reliable for detecting MI, but elevated *creatinine kinase (CK) levels* (i.e., an enzyme in cardiac muscle) can also help detect myocardial injury.

Key Takeaway:

- Serial troponin lab draws help monitor myocardial injury.
- Troponin rises within 3-4 hours and peaks at 12-24 hours.
- Troponin and CK levels rise during acute myocardial injury.

Question: 9 — Type: multipleChoice

The nurse reviews the Diagnostic Results for a client who is fatigued, reporting dizziness, and has a blood pressure of 100/60.

Diagnostic Results

1000:



Which of the following actions should the nurse take?

1. Administer IV push atropine.
2. Deliver transcutaneous pacing.
3. Administer the client's scheduled diltiazem.
4. Ask the client to perform the Valsalva maneuver.

Explanation:

Sinus Bradycardia



- **Rate:** <60 beats/min
- **Rhythm:** Regular
- **PR interval:** 0.12 to 0.20 seconds
- **P waves:** Present with 1 per QRS complex
- **QRS complex:** ≤0.10 seconds
- **Pulse activity:** Present

This client is in **sinus bradycardia** with a pulse of **30 (3 complexes in a 6-second strip x 10 = 30 bpm)**. Sinus bradycardia can be physiologic (e.g., during sleep) or can be caused by hypothyroidism, electrolyte imbalances, or heart block. Bradycardia can also be caused by beta-blockers (e.g., labetalol) or calcium-channel blockers (e.g., verapamil, diltiazem).

When heart rate decreases, the **cardiac output also decreases**, which causes **fatigue, dizziness, or syncope** due to inadequate cerebral perfusion. **Symptomatic bradycardia** is treated with **IV push atropine**, which blocks the action of the vagus nerve on the heart, increasing the heart rate [**Choice 1**].

Incorrect:

Deliver transcutaneous pacing

The nurse should always implement the *least invasive strategy first*. Transcutaneous pacing involves electrically pacing the heart using pacer pads, which is invasive, painful, and only considered in the treatment of sinus bradycardia *if drug therapy is unsuccessful* or if the client becomes *unstable* (i.e., systolic BP <90).

Administer the client's scheduled diltiazem

Diltiazem is a calcium channel blocker that *slows heart rate* to treat atrial fibrillation or supraventricular tachycardia. Giving diltiazem would *slow the client's heart rate further*.

Ask the client to perform the Valsalva maneuver

The Valsalva maneuver stimulates the vagus nerve and *slows the heart rate* to treat tachycardias, specifically supraventricular tachycardias. Using the Valsalva maneuver would *slow the client's heart rate further*.

Key Takeaway:

- Symptomatic bradycardia is treated with IV push atropine, which blocks the action of the vagus nerve on the heart, increasing the heart rate.

Question: 10 — Type: multipleChoice

The nurse has received information about assigned clients.

Which of the following clients is most likely experiencing hypovolemic shock?

1. A client with diabetic ketoacidosis who has delayed capillary refill
2. A client with a large burn who has urinated 100 mL in the last two hours
3. A client with a traumatic pelvic fracture who has a blood pressure of 112/78
4. A client with pyelonephritis with a temperature of 100.2 (37.8 C) and heart rate of 108

Explanation:

Hypovolemic shock occurs with **significant fluid loss** and causes hypotension, tachycardia, delayed capillary refill, confusion, and decreased urine output. The client with **diabetic ketoacidosis** (DKA) with **delayed capillary refill** is most likely experiencing hypovolemic shock **[Choice 1]**.

Insufficient insulin in DKA leads to fat breakdown, ketone production, fluid imbalances, and excessive urination, resulting in **profound dehydration and hypovolemia**. Hypovolemic shock reduces circulating blood volume, impairs tissue perfusion, and subsequently causes **delayed capillary refill** due to decreased blood flow to the capillaries.

Incorrect:

Large burn, urinated 100 mL in 2 hours

Large burns cause hypovolemic shock due to increased capillary wall permeability, which causes fluid to leak from capillaries into surrounding tissue resulting in decreased intravascular pressure. However, in this case, the client has *exceeded the minimum expected urine output of 30 mL/hr* by urinating 100 mL over 2 hours, indicating adequate perfusion.

Traumatic pelvic fracture, blood pressure 112/78

Clients with pelvic fractures are at high risk for hypovolemic shock due to substantial internal bleeding. However, the client's *blood pressure is normal*, indicating adequate perfusion.

Pyelonephritis with fever and fatigue

Tachycardia can occur due to fever, which is associated with increased metabolic demands, inflammatory response, and activation of the autonomic nervous system. Tachycardia is a compensatory mechanism to meet elevated oxygen and nutrient demands. However, if the client also exhibits *hypotension* or signs of *decreased perfusion*, it may indicate hypovolemic shock.

Key Takeaway:

- Hypovolemic shock occurs with significant fluid loss.
- Clients with DKA are at high risk for hypovolemic shock.

Question: 11 — Type: multipleChoice

The nurse has taught a client who underwent a mechanical valve replacement of the mitral valve.

Which of the following statements by the client would require follow-up?

1. "I will need to take antibiotics before having a root canal next month."

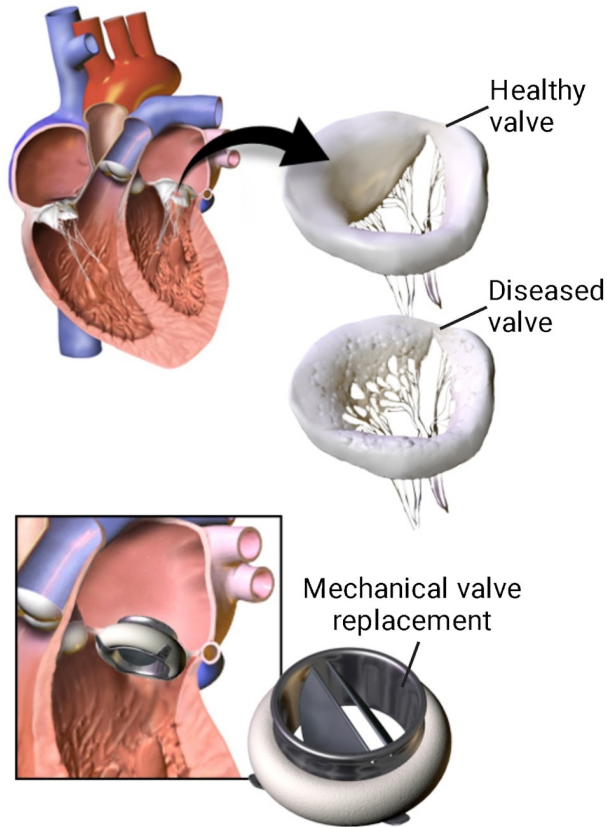
2. "I am so glad my fatigue will start to improve in the next couple of months."

3. "I will need to take a low dose of aspirin daily as an anticoagulant from now on."

4. "I will contact my primary health care provider if I develop new shortness of breath."

Explanation:

Valve Replacement



Mechanical valve replacements are indicated to replace a damaged or malfunctioning heart valve. Mechanical valves come with a **risk of thromboembolism**. The nurse should teach the client that:

- **Life-long anticoagulation with warfarin** is required to prevent clots from forming on the valve. **Aspirin is not potent enough** to prevent thromboembolism of a mechanical valve, and other anticoagulants (e.g., *rivaroxaban*, *apixaban*) are not indicated in clients with mechanical valves [**Choice 3**].
- Frequent monitoring of coagulation panels is required to ensure the client's **international normalized ratio (INR) reaches the goal of 2.5-3.5**, which is higher than the goal of 2.0-3.0 required for other indications (e.g., atrial fibrillation).

Correct understanding:

- **Prophylactic antibiotics** are indicated before invasive procedures, including dental work [**Choice 1**]. Any bacteria introduced into the bloodstream can form infectious vegetations on a mechanical valve, causing **infective endocarditis**.
- Clients who undergo valve replacements often experience improved cardiac function, leading to **improved heart failure symptoms**, such as fatigue, dyspnea on exertion, palpitations, syncope, chest pain, and edema [**Choice 2**].
- Any new or worsening heart failure symptoms could indicate a **leaking or failing valve** [**Choice 4**]. The client should also report any symptoms of **bleeding** (e.g., dizziness, fatigue) or **infective endocarditis** (e.g., chest pain, fever, chills).

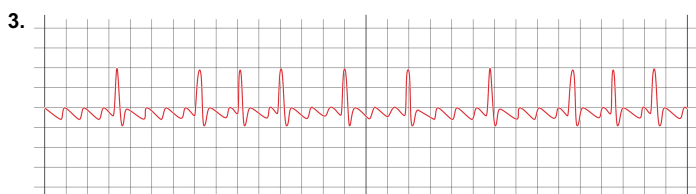
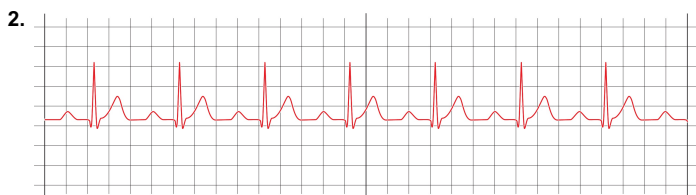
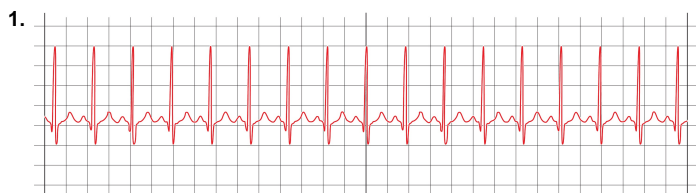
Key Takeaway:

- After a mechanical valve replacement, clients must take lifelong warfarin for anticoagulation and receive antibiotics before dental work or other invasive procedures.
- The client should report signs of heart failure, bleeding, or infective endocarditis.

Question: 12 — Type: multipleChoice

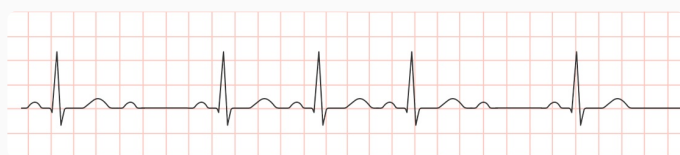
The telemetry nurse is monitoring four clients' telemetry waveforms at the nurses' station.

Which client should the nurse assess **first**?



Explanation:

Second Degree - Type II AV Block



- **Rate:** Atrial usually 60-100 beats/min; ventricular slower
- **Rhythm:** Atrial regular; ventricular regular or irregular
- **P waves:** More P waves than QRS complexes
- **PR interval:** Normal or prolonged; consistent length
- **QRS complex:** Widened; occasionally dropped (non-conducted)
- **Pulse activity:** Present
- **Summary:** Consistent PR interval with occasionally dropped QRS complexes

Non-conducted QRS complexes (i.e., missed beats) are characteristic of a **second-degree atrioventricular (AV) block**, in which electrical impulses from the sinoatrial (SA) node are either slowed (type 1) and/or blocked (type 2) at the AV node.

A **second-degree AV block** can decompensate into a **third-degree AV block**, in which the atria (P waves) and ventricles (QRS complexes) beat asynchronously in response to separate electrical signals. This can produce **life-threatening bradycardia** and **symptomatic hypotension** [Choice 4].

Incorrect:

Choice 1

A rhythm with round, upright P waves before each QRS complex at a rate >100/minute indicates sinus tachycardia. This is commonly physiologic (e.g., stress, activity), but can also indicate anemia, dehydration, or fever. This client requires follow-up but is not a priority.

Choice 2

A *consistently prolonged PR interval* indicates a first-degree AV block, which does not affect the heart rate. This is usually a chronic, *asymptomatic* conduction delay through the AV node caused by medications (e.g., beta-blockers) or a history of myocardial infarction. This does not take priority.

Choice 3

Sawtooth waves indicate atrial flutter, in which the atria flutter instead of beating in coordination with the ventricles. Clients may experience symptoms (e.g., dizziness) if the conduction rate to the ventricles is too slow or fast. This client's heart rate is approximately 60/minute; the nurse can assess this client next.

Key Takeaway:

- Non-conducted QRS complexes (i.e., missed beats) are characteristic of second-degree AV blocks.
- A second-degree AV block can decompensate into life-threatening bradycardia.

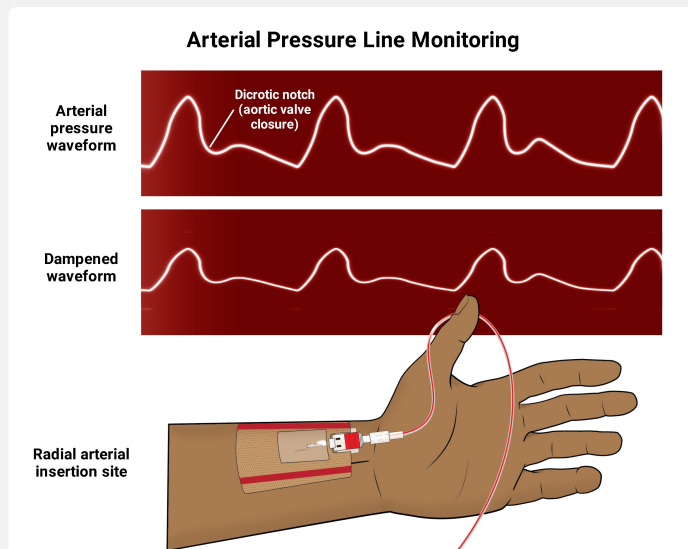
Question: 13 — Type: multipleChoice

An experienced nurse is supervising a new graduate nurse who is caring for a client with an arterial line.

Which action by the new graduate nurse would require **immediate** follow-up by the experienced nurse?

1. Flushes the pressure line intermittently when not in use
2. Applies pressure to the site for 1 minute after discontinuing the line
3. Connects new tubing to the client and then primes the line with a pressurized flush
4. Levels and zeroes the arterial line transducer at the phlebostatic axis before each use

Explanation:



Air embolism occurs if air enters the arterial system and **blocks the flow of blood**, leading to tissue ischemia, organ damage, and even death. A small bubble in a peripheral artery may not cause serious harm, whereas a large air bubble in a central artery, such as the pulmonary artery, can be fatal.

When connecting any new tubing to the client, **the tubing should first be primed with saline to remove any air from the tubing**. Empty IV tubing or pressure tubing contains up to 10-20 mL of air, which could cause an **air embolism** if flushed into the client with a pressure flush. The nurse should immediately intervene and instruct the nurse to **prime the line before connecting [Choice 3]**.

Incorrect:

Flushing the pressure line intermittently when not in use

Flushing the line when not in use helps to ensure patency of the line and prevent clotting.

Applying pressure to the site for 1 minute after discontinuing the line

Holding pressure for at least 1 minute prevents bleeding at the arterial insertion site. Pressure should be applied for 5 minutes in clients receiving anticoagulants (e.g., heparin, enoxaparin).

Leveling and zeroing the arterial line transducer

To ensure accurate readings, the pressure line transducer must be leveled before use at the *phlebostatic axis*, or the fourth intercostal space at the midaxillary line.

Key Takeaway:

- Flushing unprimed pressure tubing into an artery can cause a life-threatening air embolism.
- New tubing should first be primed with saline before connecting to the client.

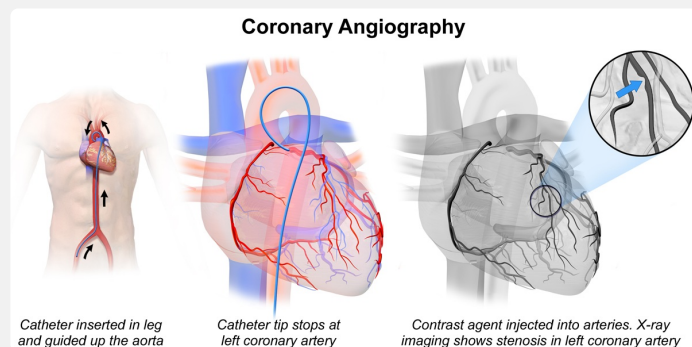
Question: 14 — Type: multipleChoice

The telemetry nurse receives a report on four clients.

The nurse should **first** assess

1. A client with chronic atrial fibrillation whose heart rate is 98/min on telemetry
2. A client with peripheral arterial disease who has leg pain and is asking for a heating pad
3. A client who had coronary angiography and stent placement one hour ago via femoral approach
4. A client with heart failure who had 600 mL pale yellow urine output after a dose of IV furosemide

Explanation:



Coronary angiography, also called **percutaneous coronary intervention (PCI)** when a stent is placed, is used to visualize the coronary arteries in a client with coronary artery disease.

A client who had a PCI one hour ago is at **high risk for bleeding** due to **anticoagulant and antiplatelet medications [Choice 3]**. Monitoring for bleeding after PCI includes taking vital signs frequently (e.g., every 15 minutes) and assessing for hematoma, bleeding from the insertion site, or diminished pedal pulses. The nurse should also review the client's ST-segment on telemetry to assess for stent reocclusion.

Incorrect:

Chronic atrial fibrillation with a heart rate of 98/min

A client with chronic atrial fibrillation has an irregular heart rhythm which is treated with beta-blockers (metoprolol) and calcium-channel blockers (diltiazem) to maintain a heart rate low enough to relieve symptoms (palpitations, dyspnea).

Heart failure with 600 mL urine output after IV furosemide

Increased urine output indicates a desired outcome of administration of furosemide, which is a loop diuretic. This reduces pulmonary and peripheral edema in heart failure.

Peripheral arterial disease (PAD) with leg pain

Leg pain (claudication) is a common symptom of PAD. This client should be instructed to dangle the legs, but this can wait until after the nurse assesses the client who underwent PCI.

Key Takeaway:

- A client who underwent PCI one hour ago is at high risk for bleeding due to anticoagulant and antiplatelet medications.
- The nurse should prioritize assessing this client for signs of bleeding and ST-segment changes.

Question: 15 — Type: multipleResponseSelectN

Health History

A 57-year-old client comes to the emergency department after feeling short of breath and having a cough for the past 2 days. The client reports sleeping on 2 pillows and waking up coughing several times a night; expresses feeling very fatigued lately and spending most of the day in the bed or chair. Client appears anxious. He has a history of hypertension, hyperlipidemia, chronic stable angina, and diabetes mellitus type 2. Client expresses concern of inability to afford current medications.

Assessment

Body System	1030
Neurologic	Oriented x 3
Respiratory	Crackles throughout all lung fields
Cardiovascular	S1, S2, and S3 present
Gastrointestinal	Bowel sounds normoactive x 4
Extremities	Capillary refill <3 seconds; pulses 2+ all extremities; 1+ pitting edema bilateral lower extremities

Vital Signs

	1030
T	98.9 F (37.1 C)
P	115
RR	25
BP	149/93
Pulse oximetry reading	89% on room air

Select the top 4 findings below that require **immediate** follow up.

1. Cough

2. Edema

3. Crackles

4. Respirations

5. Pulse oximetry

6. Blood pressure

7. Shortness of breath

8. Inability to afford medications

9. History of chronic stable angina

Explanation:

This client is demonstrating signs of *respiratory insufficiency*. **Shortness of breath**, adventitious lung sounds (**crackles**), tachypnea (**respirations 25**), and hypoxemia (**pulse oximetry 89%**) all suggest that the client is at risk for acute respiratory decompensation without immediate intervention [**Choices 3, 4, 5, and 7**].

Incorrect:

Cough, Edema, Blood pressure

The client demonstrates signs of likely excess fluid volume, such as a nighttime cough for the past 2 days, pitting edema, and high blood pressure. These findings are useful for diagnosis but are less concerning than signs of impending respiratory distress.

History of chronic stable angina

The nurse should recognize that a client with chronic stable angina is at risk for a myocardial infarction (MI). Although dyspnea is a common symptom of MI, this client is not currently experiencing chest pain, diaphoresis, or other signs suggestive of MI.

Inability to afford medications

While the client's inability to afford medications is an important problem for the nurse to address, this should be deferred until the client is stable enough for discharge planning.

Key Takeaway:

- The nurse should recognize that a client who has shortness of breath, crackles, tachypnea, and hypoxemia is at risk for respiratory failure and requires immediate attention.

Question: 16 — Type: multipleChoice

The nurse has reviewed the Laboratory Results from 1100.

Health History

A 57-year-old client comes to the emergency department after feeling short of breath and having a cough for the past 2 days. The client reports sleeping on 2 pillows and waking up coughing several times a night; expresses feeling very fatigued lately and spending most of the day in the bed or chair. Client appears anxious. He has a history of hypertension, hyperlipidemia, chronic stable angina, and diabetes mellitus type 2. Client expresses concern of inability to afford current medications.

Assessment

Body System	1030
Neurologic	Oriented x 3
Respiratory	Crackles throughout all lung fields
Cardiovascular	S1, S2, and S3 present
Gastrointestinal	Bowel sounds normoactive x 4
Extremities	Capillary refill <3 seconds; pulses 2+ all extremities; 1+ pitting edema bilateral lower extremities

Vital Signs

	1030
T	98.9 F (37.1 C)
P	115
RR	25
BP	149/93
Pulse oximetry reading	89% on room air

Laboratory Results

Laboratory Test and Reference Range	1100
Chemistry	
Sodium 136–145 mEq/L (136–145 mmol/L)	132 mEq/L (132 mmol/L)
Potassium 3.5–5.0 mEq/L (3.5–5.0 mmol/L)	3.8 mEq/L (3.8 mmol/L)
B-type natriuretic peptide <100 pg/mL (<100 pmol/L)	600 pg/mL (600 pmol/L)

The health care provider diagnoses the client with heart failure. Which of the following orders should the nurse **prioritize**?

1. Prepare client for chest x-ray.
2. Administer 2.5 mg PO enalapril.
3. Administer 40 mg IV furosemide.
4. Prepare client for an echocardiogram.

Explanation:

The primary problem causing the client's respiratory symptoms is a state of **fluid volume overload**. Administering an IV loop diuretic (e.g., **furosemide**) works rapidly to remove excess fluid and promote diuresis [**Choice 3**].

Loop diuretics block the reabsorption of sodium, chloride, potassium, and water in the loop of Henle. When diuresis occurs, excess fluid is removed, relieving pulmonary and peripheral edema and **restoring gas exchange in the lungs**. Diuresis also relieves fluid volume excess (i.e., high preload), reducing cardiac workload.

Incorrect:

Prepare client for chest x-ray, echocardiogram

Diagnostic tests such as a chest x-ray and echocardiogram are important to visualize cardiac and pulmonary structures in a client with heart failure. However, this client is in acute respiratory distress and likely not stable enough for transportation to radiology until IV furosemide is given.

Administer enalapril

Enalapril is an angiotensin-converting enzyme (ACE) inhibitor that reduces blood pressure and fluid volume by blocking the renin-angiotensin-aldosterone system. Administering an ACE inhibitor is important to reduce blood pressure and cardiac afterload but does not directly address the client's fluid volume excess. Administration of furosemide alone may also lower the client's blood pressure and should be performed first.

Key Takeaway:

- Administering IV diuretics (e.g., furosemide) to a client with heart failure works rapidly to remove excess fluid in the lungs.
- Diuresis restores gas exchange and reduces cardiac workload.

Question: 17 — Type: matrixMultipleChoice

Health History

A 57-year-old client comes to the emergency department after feeling short of breath and having a cough for the past 2 days. The client reports sleeping on 2 pillows and waking up coughing several times a night; expresses feeling very fatigued lately and spending most of the day in the bed or chair. Client appears anxious. He has a history of hypertension, hyperlipidemia, chronic stable angina, and diabetes mellitus type 2. Client expresses concern of inability to afford current medications.

Assessment

Body System	1030
Neurologic	Oriented x 3
Respiratory	Crackles throughout all lung fields
Cardiovascular	S1, S2, and S3 present
Gastrointestinal	Bowel sounds normoactive x 4
Extremities	Capillary refill <3 seconds; pulses 2+ all extremities; 1+ pitting edema bilateral lower extremities

Vital Signs

	1030
T	98.9 F (37.1 C)
P	115
RR	25
BP	149/93
Pulse oximetry reading	89% on room air

Select whether each intervention is **anticipated** or **not anticipated** in the care of this client.

Intervention	Anticipated	Not anticipated
1. Obtain blood for culture.		✓
2. Obtain sputum for culture.		✓
3. Prepare for echocardiogram.	✓	
4. Draw serum renal function tests.	✓	
5. Administer supplemental oxygen.	✓	
6. Obtain 12-lead electrocardiogram.	✓	
7. Draw serum B-type natriuretic peptide.	✓	

Note: Each row must have 1 response option selected.

Explanation:

Immediate interventions for a client with heart failure are directed at providing *respiratory support* and facilitating *diagnostic tests* to assess for complications or underlying conditions.

Anticipated interventions include:

- **Preparing for an echocardiogram [Choice 3].** An echocardiogram visualizes the heart structure and ejection fraction (i.e., percent of blood ejected with each beat).
- Drawing blood for **serum renal function tests [Choice 4].** Reduced renal perfusion can precipitate acute kidney injury, and fluid overload may cause electrolyte imbalances.
- **Administering supplemental oxygen [Choice 5].** The nurse should apply supplemental oxygen (e.g., nasal cannula, non-rebreather) to maintain an oxygen saturation >92%. Positive-pressure ventilation (e.g., BiPAP) may be required if oxygenation fails to improve.

- **Obtaining a 12-lead electrocardiogram (ECG) [Choice 6].** Heart failure can be caused by a myocardial infarction or acute dysrhythmia that can be identified with an ECG.
- Drawing blood for a **serum B-type natriuretic peptide (BNP) [Choice 7].** The heart muscle releases BNP in response to stretching of the ventricles in a state of fluid overload.

Interventions that are **not anticipated** include:

- Obtaining **blood and sputum cultures [Choices 1 and 2].** Blood and sputum cultures would be anticipated in the care of a client with suspected pneumonia rather than heart failure exacerbation.

Key Takeaway:

- Immediate interventions for heart failure focus on providing respiratory support and facilitating diagnostic tests.
- Interventions include an echocardiogram, serum renal function tests, B-type natriuretic peptide, 12-lead electrocardiogram, and supplemental oxygen as needed.

Question: 18 — Type: multipleResponse

Two days later, the client has improved after receiving scheduled furosemide and enalapril and is now ready for discharge.

Health History

A 57-year-old client comes to the emergency department after feeling short of breath and having a cough for the past 2 days. The client reports sleeping on 2 pillows and waking up coughing several times a night; expresses feeling very fatigued lately and spending most of the day in the bed or chair. Client appears anxious. He has a history of hypertension, hyperlipidemia, chronic stable angina, and diabetes mellitus type 2. Client expresses concern of inability to afford current medications.

Assessment

Body System	1030
Neurologic	Oriented x 3
Respiratory	Crackles throughout all lung fields
Cardiovascular	S1, S2, and S3 present
Gastrointestinal	Bowel sounds normoactive x 4
Extremities	Capillary refill <3 seconds; pulses 2+ all extremities; 1+ pitting edema bilateral lower extremities

Vital Signs

	1030
T	98.9 F (37.1 C)
P	115
RR	25
BP	149/93
Pulse oximetry reading	89% on room air

Laboratory Results

Laboratory Test and Reference Range	1100
Chemistry	
Sodium 136–145 mEq/L (136–145 mmol/L)	132 mEq/L (132 mmol/L)
Potassium 3.5–5.0 mEq/L (3.5–5.0 mmol/L)	3.8 mEq/L (3.8 mmol/L)
B-type natriuretic peptide <100 pg/mL (<100 pmol/L)	600 pg/mL (600 pmol/L)

The client is being discharged home on enalapril, metoprolol, and furosemide. The nurse has provided discharge instructions to the client. Which client statement(s) indicate that the discharge teaching was effective? **Select all that apply.**

1. “It is best if I take my furosemide first thing in the morning when I wake up.”
2. “I should avoid eating pre-packaged foods and over-seasoning my food with salt.”
3. “I should contact my healthcare provider if I gain more than 3–5 lb (2.3 kg) in a week.”
4. “It is important to weigh myself weekly to ensure that I am not retaining too much fluid.”
5. “Certain over-the-counter medications, like antacids, can contain high amounts of sodium.”

Explanation:

Clients with heart failure are at high risk for readmission to the hospital, with as many as 1 in 4 clients decompensating and requiring readmission within 30 days of discharge. Discharge education plays a critical role in preventing heart failure exacerbations and readmission.

The nurse should instruct the client on the importance of adhering to the prescribed medication regimen and dietary recommendations. Teaching was **effective** if the client demonstrates understanding of these teaching points:

- Diuretics (e.g., **furosemide**, hydrochlorothiazide) are best taken in the morning to limit nighttime awakenings from frequent urination **[Choice 1]**.
- Sodium restriction below 2 grams daily is crucial, as high sodium intake can precipitate fluid retention. Use **table salt** sparingly and avoid **pre-packaged foods** (e.g., deli meat, frozen meals), which may have a very high sodium content **[Choice 2]**.
- Notify the healthcare provider (HCP) of a weight gain of **greater than 3-5 lbs (2.3 kg)** in one week **[Choice 3]**.
- Ask the HCP before using over-the-counter medications such as **antacids**, as these are often hidden sources of sodium **[Choice 5]**.

Ineffective:

- Clients should be taught to **weigh themselves daily** rather than weekly **[Choice 4]**. Weights should be taken at the same time, using the same scale, and wearing the same clothes. Some clients may be prescribed a dose of furosemide as needed if rapid weight gain occurs.

Key Takeaway:

Home discharge instructions for clients with heart failure emphasize:

- Taking medications as prescribed
- Weighing daily
- Reducing intake of sodium-containing foods and medications

Question: 19 — Type: dragAndDropCloze

Drag options from the choices below to fill in each blank in the following sentence.

Health History

A 57-year-old client comes to the emergency department after feeling short of breath and having a cough for the past 2 days. The client reports sleeping on 2 pillows and waking up coughing several times a night; expresses feeling very fatigued lately and spending most of the day in the bed or chair. Client appears anxious. He has a history of hypertension, hyperlipidemia, chronic stable angina, and diabetes mellitus type 2. Client expresses concern of inability to afford current medications.

Assessment

Body System	1030
Neurologic	Oriented x 3
Respiratory	Crackles throughout all lung fields
Cardiovascular	S1, S2, and S3 present
Gastrointestinal	Bowel sounds normoactive x 4
Extremities	Capillary refill <3 seconds; pulses 2+ all extremities; 1+ pitting edema bilateral lower extremities

Vital Signs

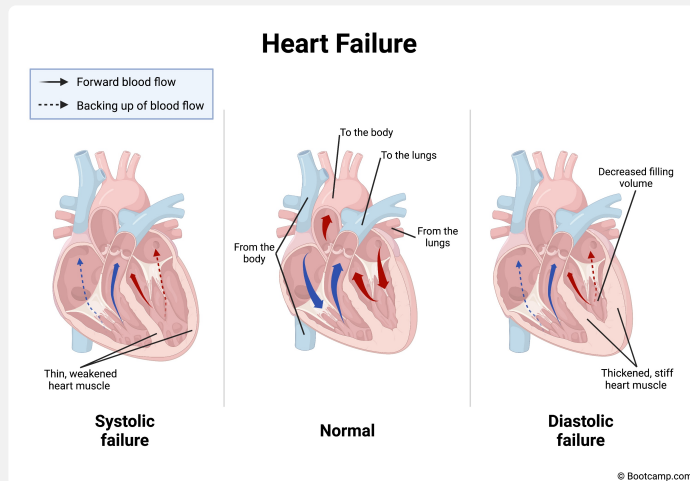
	1030
T	98.9 F (37.1 C)
P	115
RR	25
BP	149/93
Pulse oximetry reading	89% on room air

The client is at **highest** risk for developing [] and [].

1. respiratory failure
2. acute kidney injury
3. sepsis

4. pulmonary embolism

Explanation:



Heart failure is characterized by *reduced cardiac output* (i.e., reduced “forward flow”). This creates two major problems: a) fluid backs up from the left heart into the lungs, impairing gas exchange; and b) reduced cardiac output decreases organ perfusion.

Impaired gas exchange from pulmonary edema places the client at risk for **respiratory failure**. Reduced end-organ perfusion eventually damages all organs, but because the **kidneys** receive over 25% of our cardiac output, they are the most sensitive and often incur damage first.

Therefore, **the client is at highest risk for developing respiratory failure and acute kidney injury.**

Incorrect:

Sepsis

Sepsis occurs when a localized infection (e.g., pneumonia) travels to the bloodstream and becomes systemic. This client may be at risk for developing an infection during hospitalization but does not presently have a known or suspected infection.

Pulmonary embolism

Pulmonary embolism occurs when a thrombus – usually from deep vein thrombosis (DVT) – dislodges and travels to the pulmonary arteries, obstructing blood flow to the lungs. Being hospitalized will place the client at risk for DVTs, but this is not a problem at this time.

Key Takeaway:

In heart failure:

- Fluid backs up into the lungs, placing the client at risk for respiratory failure.
- Reduced cardiac output and organ perfusion place the client at risk for acute kidney injury.

Question: 20 — **Type:** dropdown **Rationale**

Complete the following sentence by choosing from the lists of options.

Health History

A 57-year-old client comes to the emergency department after feeling short of breath and having a cough for the past 2 days. The client reports sleeping on 2 pillows and waking up coughing several times a night; expresses feeling very fatigued lately and spending most of the day in the bed or chair. Client appears anxious. He has a history of hypertension, hyperlipidemia, chronic stable angina, and diabetes mellitus type 2. Client expresses concern of inability to afford current medications.

Assessment

Body System	1030
Neurologic	Oriented x 3
Respiratory	Crackles throughout all lung fields
Cardiovascular	S1, S2, and S3 present

Gastrointestinal	Bowel sounds normoactive x 4
Extremities	Capillary refill <3 seconds; pulses 2+ all extremities; 1+ pitting edema bilateral lower extremities

Vital Signs

	1030
T	98.9 F
	(37.1 C)
P	115
RR	25
BP	149/93
Pulse oximetry reading	89% on room air

The nurse recognizes that crackles throughout the lungs in this client are due to [Select] related to [Select].

Dropdown	Options
Dropdown 1	infective infiltrate collapsed alveoli fluid accumulation ✓
Dropdown 2	pneumonia heart failure ✓ reduced mobility

Explanation:

Adventitious Lung Sounds			
Sound	Description	Etiology	Common Causes
Crackles (Rales)	Intermittent “popping” that is coarse or fine in nature	Sudden opening of alveoli that are fluid-filled or were previously collapsed	Fluid overload from: Pneumonia Heart failure Alveolar collapse from: Atelectasis Pulmonary fibrosis
Rhonchi	Low-pitched musical or “snoring” sound	Air passing through thick secretions in large airways	Secretions from: Bronchitis Pneumonia COPD
Wheezes	High-pitched musical or whistling sound	Air passing through narrowed airways	Airway narrowing from: COPD Asthma Airway obstruction

In **heart failure**, fluid backs up from the heart into the lungs, causing pulmonary edema (i.e., fluid in the alveoli). Crackles are heard on auscultation as air opens previously fluid-filled airways. The client’s signs of **fluid accumulation** (e.g., pitting edema) suggest **heart failure** as the most likely cause of the symptoms.

Therefore, the nurse recognizes that crackles throughout the lungs in this client are due to **fluid accumulation** related to **heart failure**.

Incorrect:

Infective infiltrate, Pneumonia

Pneumonia causes a buildup of infective infiltrate (i.e., pus) within the alveoli, producing crackles heard over the affected area as air opens previously pus-filled airways. This client has crackles over all lung fields and lacks signs of infection (e.g., fever, chills, purulent sputum).

Alveolar collapse, Reduced mobility

Reduced mobility can cause atelectasis, in which the alveoli collapse from shallow inspiration. Crackles related to atelectasis will resolve with coughing, while crackles related to pulmonary edema will not. While this client reports fatigue and reduced mobility during the past few days, fluid overload symptoms make atelectasis a less likely cause of crackles.

Key Takeaway:

- Heart failure, pneumonia, and reduced mobility can all produce crackles heard on auscultation.
- The concurrent presence of fluid accumulation (e.g., pitting edema) suggests that heart failure is likely to cause crackles.

Question: 21 — Type: dropdown

History and Physical

A 71-year-old female client presents to the emergency department with epigastric pain and nausea that began 6 hours ago. Client states she had difficulty breathing when walking to the kitchen this morning and now feels short of breath. She has a history of hypertension, gastroesophageal reflux disease, hyperlipidemia, and coronary artery disease. On physical exam, she appears anxious, diaphoretic, and pale. S1 and S2 present. Crackles auscultated in bilateral lower lobes. Abdominal exam reveals hypoactive bowel sounds without guarding or tenderness to palpation. Capillary refill >3 seconds in all extremities. Peripheral pulses 1+ in all extremities. A capillary blood glucose test reveals a glucose level of 156 mg/dL (8.7 mmol/L) (reference range 74-106 mg/dL [4.1-5.9 mmol/L]).

Vital Signs

	1130
T	97.6 F (36.4 C)
P	118
RR	24
BP	78/52
Pulse oximetry reading	89% on room air

The nurse should recognize that the client is **most** likely experiencing [Select].

Dropdown	Options
Dropdown 1	a pneumothorax cardiogenic shock ✓ cardiac tamponade

Explanation:

Shock is defined as a state of systemic hypoperfusion. This client is experiencing shock as evidenced by profound *hypotension* and *hypoperfusion* (e.g., prolonged capillary refill, diminished peripheral pulses, hypoactive bowel sounds).

The presence of *respiratory distress* and *cardiac symptoms* (e.g., shortness of breath, epigastric pain) suggest that this client’s shock is of **cardiogenic** origin. Cardiogenic shock usually occurs when myocardial cell death from an MI impairs ventricular function. Impaired ventricular function (i.e., “pump failure”) causes severe hypotension, hypoperfusion, and pulmonary edema.

Therefore, **the nurse should recognize that the client is most likely experiencing cardiogenic shock.**

Incorrect:

Pneumothorax

A pneumothorax may also cause dyspnea, tachycardia, and shock. However, this client does not have hallmark findings associated with pneumothorax, such as the unilateral absence of breath sounds or tracheal deviation.

Cardiac tamponade

Cardiac tamponade occurs when fluid accumulates in the pericardial sac. This compresses the heart, preventing normal contraction and cardiac output. While this may cause hypotension, the client lacks other hallmark features of cardiac tamponade, such as distended neck veins and muffled heart sounds.

Key Takeaway:

- This client demonstrates signs of shock, as evidenced by profound hypotension and hypoperfusion.
- In cardiogenic shock, impaired ventricular function (i.e., “pump failure”) causes severe hypotension, hypoperfusion, and pulmonary edema.

Question: 22 — Type: matrix

History and Physical

A 71-year-old female client presents to the emergency department with epigastric pain and nausea that began 6 hours ago. Client states she had difficulty breathing when walking to the kitchen this morning and now feels short of breath. She has a history of hypertension, gastroesophageal reflux disease, hyperlipidemia, and coronary artery disease. On physical exam, she appears anxious, diaphoretic, and pale. S1 and S2 present. Crackles auscultated in bilateral lower lobes. Abdominal exam reveals hypoactive bowel sounds without guarding or tenderness to palpation. Capillary refill >3 seconds in all extremities. Peripheral pulses 1+ in all extremities. A capillary blood glucose test reveals a glucose level of 156 mg/dL (8.7 mmol/L) (reference range 74-106 mg/dL [4.1-5.9 mmol/L]).

Vital Signs

	1130
T	97.6 F (36.4 C)
P	118
RR	24
BP	78/52
Pulse oximetry reading	89% on room air

For each client finding below, click to specify if the finding is consistent with the disease process of pulmonary embolism, myocardial infarction, or gastroesophageal reflux disease. Each finding may support more than 1 disease process.

Client Finding	Pulmonary embolism	Myocardial infarction	Gastrointestinal reflux disease
Nausea	☐	☒	☒
Crackles	☒	☒	☐
Dyspnea	☒	☒	☐
Hypotension	☒	☒	☐
Epigastric pain	☐	☒	☒

Note: Each column must have at least 1 response option selected.

Explanation:

Pulmonary embolism (PE) develops when a deep vein thrombosis detaches from a vessel wall and travels to the lungs, occluding the pulmonary artery. This causes a mismatch between pulmonary blood flow and ventilation (i.e., ventilation-perfusion mismatch) and severely impairs gas exchange, producing **dyspnea**. Pulmonary embolism may produce adventitious lung sounds such as **crackles** or wheezes. High pulmonary pressures may strain the right heart, causing tachycardia and progressing to **hypotension**. Clients with PE may experience pleuritic chest pain that is sharp and worse on inspiration.

Myocardial infarction (MI) occurs when ischemia causes myocardial injury, such as when an atherosclerotic plaque obstructs coronary artery blood flow, causing myocardial cell death. Chest pain associated with an MI is often substernal but can also present as **epigastric pain** or radiate to the shoulder. Severe pain and vagal stimulation cause diaphoresis and reflex **nausea**. In severe cases, MI can impair ventricular function, leading to pulmonary edema, **dyspnea**, and **crackles**.

Gastroesophageal reflux disease (GERD) symptoms are due to the reflux of gastric contents into the esophagus and include **epigastric pain** following meals, heartburn, **nausea**, and regurgitation. Epigastric pain can mimic angina but is usually relieved by antacids.

In addition, **pulmonary embolism**, **myocardial infarction**, and **gastroesophageal reflux disease** can all produce chest discomfort.

Key Takeaway:

- In PE, ventilation-perfusion mismatch causes dyspnea and crackles. High pulmonary pressures can cause right heart strain and hypotension.
- MI causes chest pain and nausea. Impaired left ventricular function may cause hypotension, dyspnea, and crackles.
- GERD causes epigastric pain and nausea.

The nurse performs a 12-lead ECG and places the result in the client's Diagnostic Results from 1245.

History and Physical

A 71-year-old female client presents to the emergency department with epigastric pain and nausea that began 6 hours ago. Client states she had difficulty breathing when walking to the kitchen this morning and now feels short of breath. She has a history of hypertension, gastroesophageal reflux disease, hyperlipidemia, and coronary artery disease. On physical exam, she appears anxious, diaphoretic, and pale. S1 and S2 present. Crackles auscultated in bilateral lower lobes. Abdominal exam reveals hypoactive bowel sounds without guarding or tenderness to palpation. Capillary refill >3 seconds in all extremities. Peripheral pulses 1+ in all extremities. A capillary blood glucose test reveals a glucose level of 156 mg/dL (8.7 mmol/L) (reference range 74-106 mg/dL [4.1-5.9 mmol/L]).

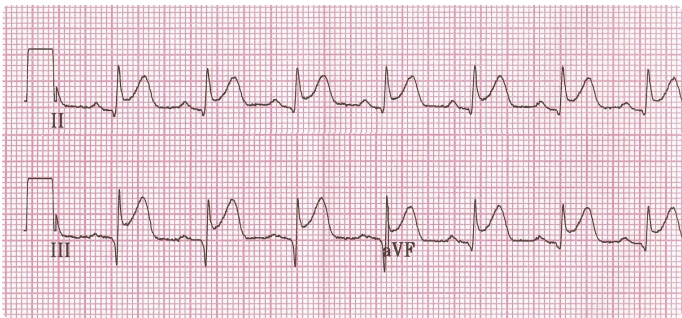
Vital Signs

	1130
T	97.6 F (36.4 C)
P	118
RR	24
BP	78/52
Pulse oximetry reading	89% on room air

Diagnostic Results

12-Lead ECG

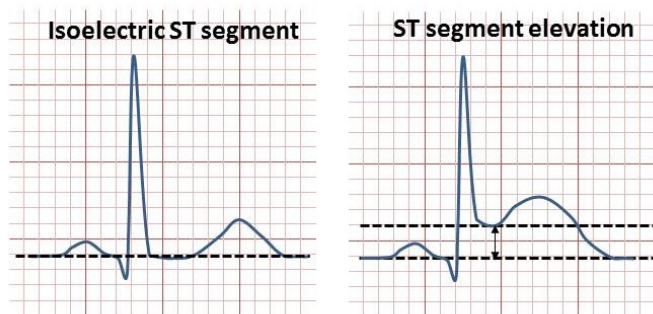
1245:



Which of the following healthcare orders should the nurse anticipate? **Select all that apply.**

1. Administer chewable aspirin PO.
2. Administer supplemental oxygen.
3. Administer nitroglycerin sublingually.
4. Obtain blood to measure troponin levels.
5. Administer norepinephrine by continuous infusion.
6. Prepare the client for percutaneous coronary intervention.

Explanation:



This client is demonstrating signs of an ST-elevation myocardial infarction (STEMI) with cardiogenic shock. A STEMI requires emergent *revascularization* to reperfuse dying myocardial tissue and prevent ventricular arrhythmias and death. Indicated interventions for MI and cardiogenic shock include:

- **Administering chewable aspirin PO [Choice 1].** The nurse should administer 162-325 mg aspirin (i.e., 2-4 baby aspirin) to prevent further platelet aggregation in the coronary arteries. Chewable options are preferred as they are more quickly absorbed.
- **Administering supplemental oxygen** as needed to maintain an oxygen saturation >90-93% [Choice 2].
- **Obtaining blood to measure troponin levels [Choice 4].** Troponin is a cardiac enzyme released during myocardial cell death. Troponins are measured serially to establish a trend (e.g., every 6 hours x 3).
- **Administering norepinephrine by continuous infusion [Choice 5].** Norepinephrine is a vasopressor used in shock to induce peripheral vasoconstriction, which raises blood pressure and increases end-organ perfusion.
- **Preparing the client for a percutaneous coronary intervention (PCI) [Choice 6].** A PCI is the definitive treatment for revascularization during an MI and involves opening and stenting the occluded coronary artery.

Incorrect:

Administer nitroglycerin sublingually

Nitroglycerin is administered in MI to dilate the coronary arteries and increase myocardial blood flow. However, systemic vasodilation may worsen hypotension. Nitroglycerin should be held if the systolic blood pressure is <90 mmHg.

Key Takeaway:

A STEMI requires emergent revascularization via PCI. Other interventions include:

- Administering aspirin to prevent further platelet aggregation
- Administering supplemental oxygen to maintain oxygen saturation >90-93%
- Measuring troponin
- Administering norepinephrine to raise blood pressure

Question: 24 — Type: highlight

The nurse has reviewed the 1500 and 1800 Nurses' Notes.

History and Physical

A 71-year-old female client presents to the emergency department with epigastric pain and nausea that began 6 hours ago. Client states she had difficulty breathing when walking to the kitchen this morning and now feels short of breath. She has a history of hypertension, gastroesophageal reflux disease, hyperlipidemia, and coronary artery disease. On physical exam, she appears anxious, diaphoretic, and pale. S1 and S2 present. Crackles auscultated in bilateral lower lobes. Abdominal exam reveals hypoactive bowel sounds without guarding or tenderness to palpation. Capillary refill >3 seconds in all extremities. Peripheral pulses 1+ in all extremities. A capillary blood glucose test reveals a glucose level of 156 mg/dL (8.7 mmol/L) (reference range 74-106 mg/dL [4.1-5.9 mmol/L]).

Vital Signs

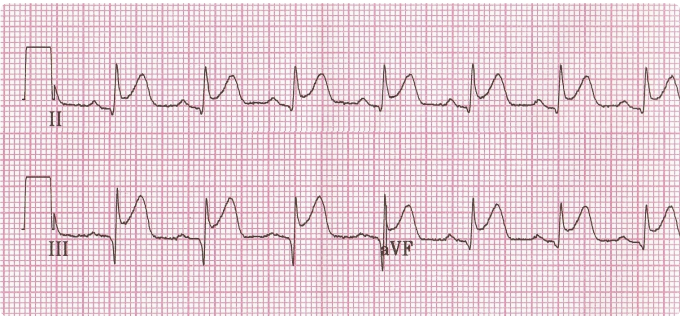
	1130
T	97.6 F (36.4 C)
P	118
RR	24
BP	78/52

Pulse oximetry reading	89% on room air
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Diagnostic Results 1

12-Lead ECG

1245:



Diagnostic Results 2

ECG

1310:



Nurses' Notes

Nurses' Notes

1500:	Client achieved return of spontaneous circulation and breathing at 1315. Client underwent percutaneous coronary intervention with stent placement and insertion of an intra-aortic balloon pump. Client transferred to the coronary intensive care unit. Denies any chest pain. Cardiac monitor displays sinus tachycardia with no ST-segment changes.
1800:	Client reports chest pain rated 3/10. Cardiac monitor reveals ST-segment elevation. Vital signs: T 98.0 F (36.7 C), BP 102/78, P 105, RR 18, pulse oximetry reading 96% on 2 L/min nasal cannula. Client oriented x 3 and drowsy. S1 and S2 auscultated with no murmurs. Crackles auscultated in lungs. Hypoactive bowel sounds. Warm upper extremities with 2+ pulses; cool lower extremities with 1+ pulses. Voided 50 mL dark urine since 1500.

Click to highlight the findings that would indicate the client has declined.

1800: Client reports ✓ chest pain rated 3/10. Cardiac monitor reveals ✓ ST-segment elevation. Vital signs: T 98.0 F (36.7 C), ✗ BP 102/78, ✗ P 105, RR 18, ✗ pulse oximetry reading 96% on 2 L/min nasal cannula. Client oriented x 3 and drowsy. S1 and S2 auscultated with no murmurs. Crackles auscultated in lungs. Hypoactive bowel sounds. Warm upper extremities with 2+ pulses; ✓ cool lower extremities with 1+ pulses. ✓ Voided 50 mL dark urine since 1500.

Explanation:

In addition to percutaneous coronary intervention performed for revascularization, this client required placement of an intra-aortic balloon pump (IABP). Intra-aortic balloon pump therapy (IABP) consists of percutaneously inserting a small, cylindrical balloon in the descending aorta. A pump inflates the balloon with helium during diastole and deflates the balloon during systole. Balloon deflation reduces cardiac afterload by creating “dead space” in the aorta for the left ventricle to eject into. Balloon inflation pushes blood into the coronary sinus, increasing myocardial perfusion.

Several complications may develop following myocardial infarction (MI), including complications from treatments or procedures. This client is

demonstrating signs of *coronary stent thrombosis* and *neurovascular impairment from intra-aortic balloon pump migration*:

- The combination of **chest pain** and **ST-segment elevation** suggests potential stent thrombosis and re-occlusion of the coronary arteries.
- **Cool lower extremities with 1+ pulses** and oliguria (e.g., **50 ml dark urine** in 2.5 hours) suggest that the IABP balloon migrated distally, occluding perfusion to the renal and lower extremity arteries.

Incorrect:

BP 102/78, P 105, Pulse oximetry reading 96%

These vital signs are outside the normal range but still represent client improvement.

Key Takeaway:

- Chest pain and ST-segment elevation suggest possible coronary stent thrombosis.
- Hypoactive bowel sounds, cool extremities, and oliguria suggest arterial occlusion by the IABP.

Question: 25 — **Type:** dragAndDropSelectN

History and Physical

A 71-year-old female client presents to the emergency department with epigastric pain and nausea that began 6 hours ago. Client states she had difficulty breathing when walking to the kitchen this morning and now feels short of breath. She has a history of hypertension, gastroesophageal reflux disease, hyperlipidemia, and coronary artery disease. On physical exam, she appears anxious, diaphoretic, and pale. S1 and S2 present. Crackles auscultated in bilateral lower lobes. Abdominal exam reveals hypoactive bowel sounds without guarding or tenderness to palpation. Capillary refill >3 seconds in all extremities. Peripheral pulses 1+ in all extremities. A capillary blood glucose test reveals a glucose level of 156 mg/dL (8.7 mmol/L) (reference range 74-106 mg/dL [4.1-5.9 mmol/L]).

Vital Signs

	1130
T	97.6 F (36.4 C)
P	118
RR	24
BP	78/52
Pulse oximetry reading	89% on room air

Drag the top 5 assessment findings that require **immediate** follow-up to the box on the right

1. Pulse
2. Nausea
3. Lung sounds
4. Capillary refill
5. Bowel sounds
6. Blood pressure
7. Shortness of breath
8. Capillary blood glucose

Explanation:

This client demonstrates signs of *shock*, *impaired tissue perfusion*, and *respiratory insufficiency*.

The client is experiencing shock, as evidenced by a profoundly decreased **blood pressure** (78/52). Hypotension impairs tissue perfusion, which can cause a reduced level of consciousness, decreased urine output, pallor, diminished peripheral pulses, and prolonged **capillary refill**.

Tachycardia is a response to shock in which the **pulse** rate increases (118) to compensate for a low cardiac output (cardiac output = heart rate x stroke volume).

In addition to signs and symptoms of shock, the client is also experiencing respiratory insufficiency, as evidenced by adventitious **lung sounds**,

shortness of breath, tachypnea, and low oxygen saturation.

Incorrect:

Nausea; Bowel sounds

In shock states, the body redirects blood away from non-vital organs (e.g., skin, intestines) toward the vital organs (e.g., brain, heart, lungs). This produces hypoactive bowel sounds and nausea; however, these findings are not as concerning as symptomatic hypotension and respiratory insufficiency.

Capillary blood glucose

The client is currently hyperglycemic with a blood glucose level of 156 mg/dL (8.7 mmol/L) (reference range 74-106 mg/dL [4.1-5.9 mmol/L]). Hemodynamic instability and respiratory insufficiency are more concerning than hyperglycemia; therefore, the nurse can defer following up on this abnormal finding.

Key Takeaway:

This client is demonstrating:

- Signs of shock, as evidenced by severely decreased blood pressure, high pulse rate, diminished peripheral pulses, and prolonged capillary refill
- Respiratory insufficiency, as evidenced by adventitious lung sounds and shortness of breath

Question: 26 — Type: dropdownRationale

The nurse notices a change in the client’s heart rhythm on the cardiac monitor in Diagnostic Results 2. The nurse finds the client unresponsive and calls for help. The nurse assesses the client and discovers she is not breathing and does not have a pulse. A code blue is called.

History and Physical

A 71-year-old female client presents to the emergency department with epigastric pain and nausea that began 6 hours ago. Client states she had difficulty breathing when walking to the kitchen this morning and now feels short of breath. She has a history of hypertension, gastroesophageal reflux disease, hyperlipidemia, and coronary artery disease. On physical exam, she appears anxious, diaphoretic, and pale. S1 and S2 present. Crackles auscultated in bilateral lower lobes. Abdominal exam reveals hypoactive bowel sounds without guarding or tenderness to palpation. Capillary refill >3 seconds in all extremities. Peripheral pulses 1+ in all extremities. A capillary blood glucose test reveals a glucose level of 156 mg/dL (8.7 mmol/L) (reference range 74-106 mg/dL [4.1-5.9 mmol/L]).

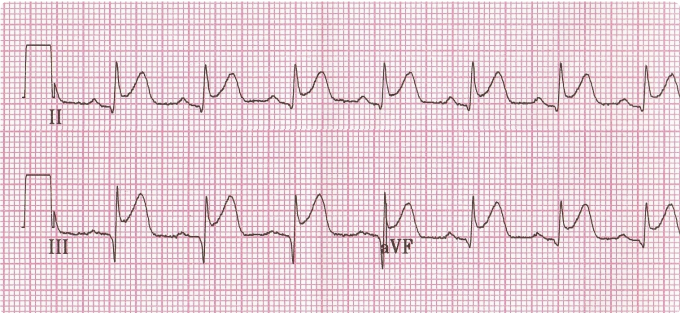
Vital Signs

	1130
T	97.6 F (36.4 C)
P	118
RR	24
BP	78/52
Pulse oximetry reading	89% on room air

Diagnostic Results 1

12-Lead ECG

1245:



Diagnostic Results 2

ECG

1310:



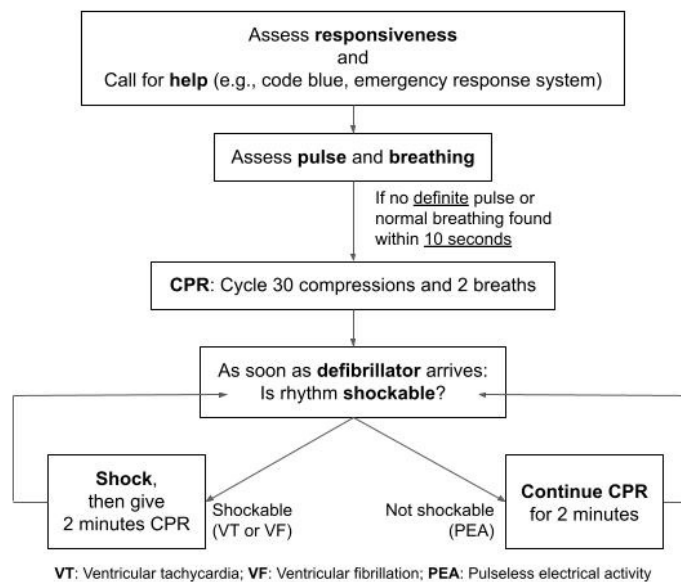
Complete the following sentence by choosing from the list of options.

The nurse should first [**Select**] and then [**Select**].

Dropdown	Options
Dropdown 1	apply defibrillator pads administer dobutamine IV administer epinephrine IV begin chest compressions ✓
Dropdown 2	apply defibrillator pads ✓ administer dobutamine IV administer epinephrine IV begin chest compressions

Explanation:

Basic Life Support Algorithm: In-Hospital



The monitor is displaying ventricular tachycardia. A client who is not breathing and does not have a pulse is in *cardiac arrest* and is not receiving blood flow to vital organs. Pulseless rhythms are fatal without immediate cardiopulmonary resuscitation (CPR).

If any client becomes unresponsive, the nurse should call for help to ensure a defibrillator is en route.

The most important action to take after calling for help is to **begin chest compressions**. High-quality chest compressions perfuse the client's heart and brain. Every minute of delay in initiating chest compressions reduces the chance of survival by up to 10%.

Once the defibrillator arrives, the second rescuer should **apply the defibrillator pads** as soon as possible and deliver a shock if the rhythm is shockable (i.e., pulseless ventricular tachycardia or fibrillation). Chest compressions should continue with minimal interruption until spontaneous circulation (i.e., palpable pulse) is restored.

Therefore, **the nurse should first begin chest compressions and then apply defibrillator pads.**

Incorrect:

Administer epinephrine IV

Epinephrine is administered during cardiac arrest to stimulate cardiac activity. While epinephrine should be administered as soon as possible, this should never delay initiation of CPR.

Administer dobutamine IV

Dobutamine is an inotrope that improves contractility and cardiac output in cardiogenic shock. Inotrope therapy will only benefit the client once a pulse is restored.

Key Takeaway:

- A client who does not have a pulse is in cardiac arrest.
- For a client in cardiac arrest, the nurse should first initiate chest compressions and then apply defibrillator pads.

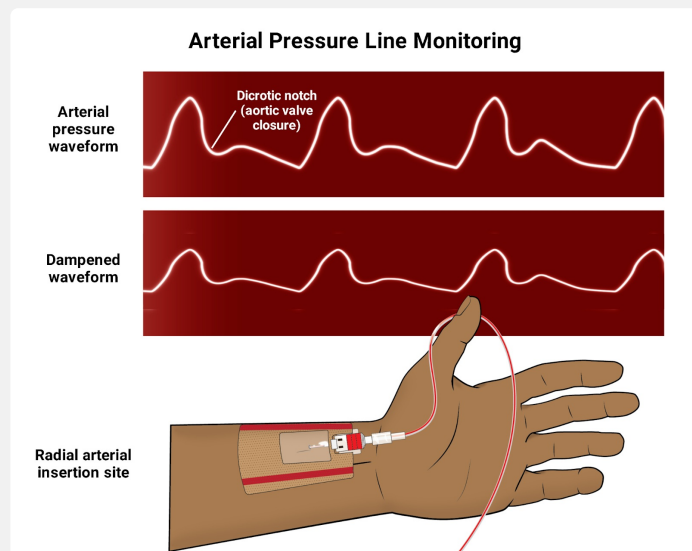
Question: 27 — Type: multipleChoice

The nurse is caring for a client with a right radial arterial line.

Which finding is **most** concerning?

1. Stopcock positioned at the level of the client's head
2. Blood oozing from the insertion site under the dressing
3. Pallor and coolness of the right thumb and second finger
4. Dampened waveform with noninvasive cuff pressure 118/94

Explanation:



Arterial line pressure monitoring is an invasive method of continuous blood pressure monitoring directly from an artery. Arterial lines are used in hemodynamically-unstable clients requiring careful titration of vasoactive medications (e.g., norepinephrine).

Arterial occlusion occurs when the arterial catheter **obstructs perfusion** to the distal extremity (i.e., thumb and second finger), causing **neurovascular impairment [Choice 3]**. The nurse should immediately **notify the healthcare provider** and anticipate **discontinuing the line**.

Incorrect:

Stopcock positioned at the level of the client’s head

The zero reference stopcock should be positioned level with the *phlebostatic axis*, which is at the fourth intercostal space and corresponds with the right atrium. Positioning the stopcock level with the tragus of the ear (i.e., the head) would be appropriate in *intracranial pressure* monitoring.

Blood oozing from the insertion site under the dressing

Small amounts of blood oozing from the insertion site can occur with trauma and movement. The nurse should clean the site and change the dressing, but this does not take priority.

Dampened waveform with noninvasive cuff pressure 118/94

A dampened waveform can indicate a low blood pressure; however, an adequate cuff pressure suggests a problem with the line or monitoring equipment rather than the client. The nurse should troubleshoot the waveform by flushing, leveling, and zeroing the line, but this does not take priority.

Key Takeaway:

- Arterial occlusion occurs when an arterial catheter obstructs perfusion to the distal extremity (i.e., thumb and second finger), causing neurovascular impairment.

Question: 28 — **Type:** multipleChoice

The nurse is caring for a client with cardiogenic shock who has a low cardiac output (CO) and increased systemic vascular resistance (SVR).

The nurse knows the low CO and high SVR means the client’s body is

1. dilating blood vessels to redistribute blood flow
2. trying to increase CO by increasing the heart rate
3. constricting vessels to improve blood flow to organs
4. decreasing cardiac workload by dilating peripheral vessels

Explanation:

Hemodynamic Monitoring Parameters		
Parameter	Range	Interpretation
Cardiac output (CO)	4-8 L/min	Amount of blood leaving the left ventricle per minute
Central venous pressure (CVP)	1-8 mmHg	Indicator of volume status (preload) measured in the right atrium
Pulmonary artery pressure (PAP)	15-30 mmHg systolic/ 5-30 mmHg diastolic	Amount of resistance in the pulmonary circulation
Systemic vascular resistance (SVR)	800-1400 dynes/sec/cm ⁻⁵	Amount of resistance (afterload) in the systemic circulation

Cardiogenic shock (i.e., “pump failure”) occurs when **acute decompensated heart failure** develops suddenly, usually due to acute coronary syndrome (ACS). In cardiogenic shock, contractility and cardiac output drop, causing **profound hypotension and hypoperfusion**.

In all shock states except distributive shock, the body responds to hypoperfusion with **compensatory vasoconstriction**, in which the peripheral blood vessels constrict to raise systemic vascular resistance (SVR) and blood pressure, **improving perfusion to vital organs** (e.g., heart, brain, lungs) **[Choice 3]**.

Incorrect:

Dilating vessels to redistribute blood flow

Dilating vessels would *lower* SVR, BP, and perfusion. Vasodilation is the primary *cause* of hypotension in *distributive shock states*, such as septic and anaphylactic shock, and is not a compensatory mechanism.

Trying to increase cardiac output (CO) by increasing heart rate

Increased heart rate *does* occur as a compensatory response to improve CO in all shock states except neurogenic shock, which is characterized by bradycardia. A client with cardiogenic shock will likely have tachycardia, but this would only affect the CO and would not be reflected in the SVR, which measures *vasoconstriction*.

Decreasing cardiac workload by dilating peripheral vessels

Dilating peripheral vessels can decrease cardiac workload by lowering afterload. This is the mechanism of *nitroglycerin* given in ACS. However,

vasodilation would *decrease* SVR, not increase it.

Key Takeaway:

- In all shock states except for distributive shock, the body attempts to improve perfusion to vital organs through compensatory vasoconstriction, in which the peripheral blood vessels constrict to raise SVR and BP.

Question: 29 — Type: multipleChoice

The intensive care unit nurse is caring for a client with septic shock who has a pulmonary artery catheter and whose blood pressure is being supported with continuous IV fluids and a titratable IV infusion of norepinephrine.

Which finding would cause the nurse to request an order to increase the rate of continuous IV fluids?

- 1. High cardiac output
- 2. Low central venous pressure
- 3. High pulmonary artery pressure
- 4. Low systemic vascular resistance

Explanation:

Hemodynamic Monitoring Parameters		
Parameter	Range	Interpretation
Cardiac output (CO)	4-8 L/min	Amount of blood leaving the left ventricle per minute
Central venous pressure (CVP)	1-8 mmHg	Indicator of volume status (preload) measured at the right atrium
Pulmonary artery pressure (PAP)	15-30 mmHg systolic/ 5-30 mmHg diastolic	Amount of resistance in the pulmonary circulation
Systemic vascular resistance (SVR)	800-1400 dynes/sec/cm ⁻⁵	Amount of resistance (afterload) in the systemic circulation

A pulmonary artery catheter is used to monitor certain hemodynamic parameters that guide treatment in shock.

The **central venous pressure** (CVP) (i.e., right atrial pressure) indicates the client's **preload**, or volume status. A **low CVP** indicates a **low fluid volume** and **need for IV fluid administration [Choice 2]**. Low CVP occurs in distributive shocks such as septic shock when widespread peripheral vasodilation and increased capillary permeability cause third spacing and fluid leaks out of the intravascular space.

Incorrect:

High cardiac output

Cardiac output (CO) is calculated from the client's heart rate and the amount of volume that leaves the left ventricle with each beat. In septic shock, the client's heart rate increases to compensate for poor perfusion; therefore, high CO is an expected value in septic shock and would not indicate need for IV fluids.

High pulmonary artery pressure

The pulmonary artery pressure (PAP) measures resistance in the pulmonary circulation. A high PAP occurs when the pulmonary arteries are constricted (e.g., pulmonary hypertension) or obstructed (e.g., pulmonary embolism). However, CVP is the best reflection of preload.

Low systemic vascular resistance

Systemic vascular resistance (SVR) indicates how constricted or dilated the peripheral blood vessels are. In septic shock, widespread peripheral vasodilation occurs, which decreases the SVR. Low SVR indicates a need for increased rates of IV vasopressors such as norepinephrine.

Key Takeaway:

- CVP is an indicator of preload, or volume status.
- A low CVP indicates a low volume status and need for IV fluid administration.

Question: 30 — Type: multipleChoice

The critical care charge nurse is observing nurses caring for critically-ill clients.

It would require intervention if a nurse

- 1. decreases the norepinephrine infusion rate for a client with a BP of 110/70

2. administers an epinephrine infusion through an 18-gauge peripheral venous access device

3. pauses a milrinone infusion for a client who had a 30-second run of ventricular tachycardia

4. transfers a client to the telemetry unit 24 hours after a dopamine infusion was discontinued

Explanation:

Vasopressors are **high-alert medications** that must be carefully monitored and titrated in an intensive care unit. Vasopressors are prescribed for a **goal BP** (e.g., mean arterial pressure [MAP] ≥ 65), and the nurse slowly increases the medication rate to find the **lowest effective dose** and then **weans the dose** as hypotension resolves.

Vasopressors raise BP through **peripheral vasoconstriction**, which can cause **tissue necrosis** if peripheral extravasation occurs. To reduce the risk of necrosis, vasopressors are only given through a central venous access device (CVAD), not a peripheral VAD, except in emergencies [**Choice 2**].

Incorrect:

Decreases norepinephrine rate for client with BP 110/70

Vasopressors are given to treat hypotension, defined as a systolic BP < 90 mmHg or MAP < 65 mmHg. The client's BP has *improved to a normal range*, so decreasing the dose based on the client's hemodynamic response is appropriate.

Pauses milrinone for 30-second run of ventricular tachycardia (VT)

Milrinone has positive inotropic effects but can also cause *arrhythmias*. If a client develops a new arrhythmia, like VT, the nurse should pause the infusion and assess the client's hemodynamic status.

Transfers client to telemetry 24 hours after dopamine discontinued

After 24 hours without vasopressors, if the client's BP is stable, transferring them to a telemetry unit for continued cardiac monitoring is appropriate.

Key Takeaway:

- Vasopressor doses are slowly increased to find the lowest effective dose and then weaned as hypotension resolves.
- Vasopressors should only be given through a central VAD because peripheral extravasation can cause tissue necrosis.

Question: 31 — Type: multipleChoice

The nurse is screening clients for those at increased risk for developing distributive shock.

At the **highest** risk for developing distributive shock is the client admitted for

1. pneumonia

2. diabetes insipidus

3. a myocardial infarction

4. a tension pneumothorax

Explanation:

Distributive shock includes **septic, anaphylactic, and neurogenic shock**, which are caused by **abnormal vasodilation** and decreased systemic vascular resistance. The **client with pneumonia** is at risk for developing distributive shock if the infection spreads to the bloodstream and induces a systemic inflammatory response [**Choice 1**]. The release of inflammatory mediators during sepsis can result in increased capillary permeability and reduced intravascular volume, leading to **septic shock**.

Other types of distributive shock include **anaphylactic shock** caused by allergic reactions and **neurogenic shock** caused by autonomic nervous system disruption. Treatment for distributive shock involves addressing the underlying cause and restoring perfusion with fluid resuscitation and vasoactive medications.

Incorrect:

Diabetes insipidus

In diabetes insipidus, the deficiency or dysfunction of antidiuretic hormone (ADH) leads to polyuria and excessive fluid loss, which can cause severe dehydration and *hypovolemic shock*.

Myocardial infarction

A myocardial infarction deprives the cardiac muscle of oxygen, leading to myocardial cell death and possibly heart failure due to reduced pumping capacity. This weakened pumping ability can result in inadequate perfusion to vital organs, resulting in *cardiogenic shock*.

Tension pneumothorax

Tension pneumothorax occurs when air accumulates in the pleural space, causing the lung to collapse, which puts pressure on the heart and major blood vessels. This pressure impedes the heart's ability to pump blood effectively and obstructs blood flow returning to the heart, leading to *obstructive shock*.

Key Takeaway:

- Distributive shock is caused by decreased systemic vascular resistance related to widespread vasodilation
- Clients with pneumonia are at high risk for sepsis and shock.

Question: 32 — **Type:** multipleResponse

The intensive care unit nurse reviews the hemodynamic data for a client with shock and observes a low central venous pressure (CVP), high cardiac output (CO), and low systemic vascular resistance (SVR).

Which of the following are possible causes of this client's shock? **Select all that apply.**

1. Septic
2. Obstructive
3. Neurogenic
4. Cardiogenic
5. Anaphylactic
6. Hypovolemic

Explanation:

Types of Shock					
	Common Conditions	Etiology	CVP	CO	SVR
Hypovolemic	• Hemorrhage • Dehydration (e.g., diarrhea)	Fluid volume loss 	↓	↓	↑
Distributive	• Neurogenic • Septic • Anaphylactic	Massive vasodilation 	↓	↑	↓
Obstructive	• Cardiac tamponade • Pulmonary embolism • Tension pneumothorax	Blood flow obstruction 	↑	↓	↑
Cardiogenic	• Arrhythmias • MI • Heart failure	Pump failure 	↑	↓	↑

CVP = Central Venous Pressure **CO** = Cardiac Output **SVR** = Systemic Vascular Resistance

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Distributive shock is caused by **widespread vasodilation** and is the only form of shock that causes a **low systemic vascular resistance (SVR)**, which is a hemodynamic measurement indicating how constricted or dilated the peripheral blood vessels are.

Vasodilation in distributive shock occurs either from cytokine release in **septic shock** or **anaphylactic shock**, or from loss of sympathetic nervous system tone in **neurogenic shock** [Choices 1, 3, and 5]. Distributive shock is characterized by life-threatening **hemodynamic instability** and **hypoperfusion**:

- **Low blood pressure** (i.e., systolic ≤ 90 mmHg or mean arterial pressure ≤ 65 mmHg).
- **Low central venous pressure (CVP)** (i.e., right atrial volume) caused by increased capillary permeability and third spacing.
- **High cardiac output (CO)** as the heart rate increases to compensate for hypotension.
- **Low systemic vascular resistance (SVR)** due to widespread peripheral vasodilation.

Incorrect:

Obstructive

Obstructive shock occurs when a pneumothorax or cardiac tamponade obstructs forward flow of blood from the heart. Obstructive shock would cause *high CVP* as blood builds up in the heart and *low CO* from obstruction of forward flow.

Cardiogenic

Cardiogenic shock is characterized by *low CO* from severe heart failure and *high CVP* as blood builds up in the heart.

Hypovolemic

Hypovolemic shock is characterized by *high SVR* as the body vasoconstricts to compensate for volume loss from hemorrhage or dehydration.

Key Takeaway:

- SVR is an indicator of how constricted or dilated the peripheral blood vessels are.
- Distributive shock is caused by widespread vasodilation and is the only form of shock that causes a low SVR.

Question: 33 — Type: multipleChoice

The nurse enters a client's room and finds the client unresponsive, not breathing, and without a pulse.

The nurse should **first**

1. Start chest compressions
2. Get the crash cart and defibrillator
3. Obtain a 12-lead electrocardiogram
4. Try to wake the client with a sternal rub

Explanation:

If a client is unresponsive, not breathing, and without a pulse, the immediate priority is to initiate cardiopulmonary resuscitation (CPR) by **starting chest compressions [Choice 1]**. By providing **high-quality chest compressions**, the nurse manually pumps the heart to maintain blood flow until more advanced interventions can be implemented.

Incorrect:

Get the crash cart and defibrillator

If the client is pulseless, the nurse should immediately begin CPR and call for help (e.g., press the code button) so that other staff can bring the crash cart and defibrillator to the bedside. The nurse should not leave the client to obtain equipment; the priority is to provide immediate chest compressions while others obtain equipment.

Obtain a 12-lead electrocardiogram (ECG)

While obtaining an ECG is important for diagnosing and assessing cardiac conditions, it is not the immediate priority when faced with an unresponsive, pulseless, and non-breathing client. Chest compressions take precedence over obtaining an ECG.

Try to wake the client with a sternal rub

Performing a sternal rub is not the appropriate initial action when the client is unresponsive, not breathing, and without a pulse. This scenario indicates a critical condition requiring immediate intervention, and the priority is to initiate chest compressions rather than attempting to wake the client.

Key Takeaway:

- When a nurse encounters a client who is unresponsive, not breathing, and without a pulse, the immediate action is to start chest compressions to ensure circulation and oxygen delivery to vital organs until further advanced measures can be implemented.

Question: 34 — Type: multipleChoice

The nurse is caring for a client with shock who has a pulmonary artery catheter and is receiving a titratable infusion of IV norepinephrine. The client becomes hypotensive, and the nurse notes that the client's systemic vascular resistance (SVR) is low.

Which intervention should the nurse take to raise the SVR?

1. Request an order for dobutamine
2. Increase the rate of norepinephrine
3. Request an order for an IV fluid bolus
4. Place the client in Trendelenburg position

Explanation:

Hemodynamic Monitoring Parameters		
Parameter	Range	Interpretation
Cardiac output (CO)	4-8 L/min	Amount of blood leaving the left ventricle per minute
Central venous pressure (CVP)	1-8 mmHg	Indicator of volume status (preload) measured at the right atrium
Pulmonary artery pressure (PAP)	15-30 mmHg systolic/ 5-30 mmHg diastolic	Amount of resistance in the pulmonary circulation
Systemic vascular resistance (SVR)	800-1400 dynes/sec/cm ⁻⁵	Amount of resistance (afterload) in the systemic circulation

A pulmonary artery catheter is used to monitor hemodynamic parameters that guide treatment in shock.

The **systemic vascular resistance** (SVR) indicates the amount of resistance in the systemic circulation (i.e., how constricted or dilated the peripheral vessels are). A **low SVR** indicates **vasodilation**, which occurs in distributive shock when widespread vasodilation and increased capillary permeability cause fluid to leak out of the intravascular space.

Vasodilation is treated with IV vasopressors, such as **norepinephrine and epinephrine**, which raise the blood pressure by constricting the peripheral blood vessels. The nurse should titrate vasopressors to reach a goal blood pressure (e.g., mean arterial pressure >65 mmHg) **[Choice 2]**.

Incorrect:

Request an order for dobutamine

Dobutamine is an *inotrope*, which increases cardiac contractility to raise *cardiac output and index*.

Request an order for an IV fluid bolus

Fluid status is reflected in the *central venous pressure*. This client may require an IV fluid bolus if the CVP is also low, but IV fluids will not increase the SVR.

Place the client in Trendelenburg position

Trendelenburg position (angled with head down) can be harmful because it limits diaphragmatic expansion and can cause pulmonary edema. The nurse should instead raise the client's legs on several pillows. This maneuver increases venous blood return to the heart, which raises the *preload* (CVP).

Key Takeaway:

- SVR indicates the amount of resistance in the systemic circulation.
- A low SVR indicates vasodilation, which is treated with IV vasopressors that constrict the peripheral vessels.

Question: 35 — Type: multipleChoice

The nurse is assessing a client in the intensive care unit with suspected shock.

What are the early signs and symptoms of neurogenic shock?

1. Hypotension, bradycardia, and warm, dry skin
2. Hypertension, bradycardia, and warm, dry skin
3. Hypotension, tachycardia, and cool, clammy skin
4. Hypertension, tachycardia, and cool, clammy skin

Explanation:

Types of Shock

	Common Conditions	Etiology	CVP	CO	SVR
Hypovolemic	- Hemorrhage - Dehydration (e.g., diarrhea)	Fluid volume loss 	↓	↓	↑
Distributive	- Neurogenic - Septic - Anaphylactic	Massive vasodilation 	↓	↑	↓
Obstructive	- Cardiac tamponade - Pulmonary embolism - Tension pneumothorax	Blood flow obstruction 	↑	↓	↑
Cardiogenic	- Arrhythmias - MI - Heart failure	Pump failure 	↑	↓	↑

CVP = Central Venous Pressure CO = Cardiac Output SVR = Systemic Vascular Resistance

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Neurogenic shock occurs from **loss of sympathetic nervous system (SNS) tone**, usually due to a spinal cord injury at thoracic spine level 6 (T6) or above. Loss of SNS tone causes **massive vasodilation**, **peripheral blood pooling**, and **reduced organ perfusion**. **Early** neurogenic shock signs include:

- **Hypotension** (i.e., systolic ≤ 90 mmHg or mean arterial pressure ≤ 65 mmHg) caused by peripheral vasodilation and decreased central venous pressure.
- **Bradycardia** (i.e., < 60 bpm) caused by impaired baroreceptors and the loss of sympathetic tone. **Bradycardia is the distinguishing feature of neurogenic shock**, as other shock states cause **compensatory tachycardia**.
- **Temperature dysregulation** (i.e., warm, dry skin) occurs when peripheral blood pooling impairs the ability to release heat **[Choice 1]**.

Incorrect:

Hypertension, bradycardia, and warm, dry skin

Hypertension and bradycardia in a client with a spinal injury would indicate *autonomic dysreflexia* from *increased* sympathetic tone. *Hypotension* is seen in neurogenic shock due to *loss* of sympathetic tone, causing massive vasodilation.

Hypotension, tachycardia, and cool, clammy skin

Hypotension with tachycardia are early signs of *anaphylactic*, *septic*, and *obstructive shock*, not neurogenic shock, which causes *bradycardia*. Cool, clammy skin is a *late* sign of neurogenic shock after heat disperses.

Hypertension, tachycardia, and cool, clammy skin

Tachycardia and cool, clammy skin could be *late* signs of neurogenic shock; however, *hypotension*, not hypertension, would be present.

Key Takeaway:

- Neurogenic shock causes loss of SNS tone and massive vasodilation.
- Signs of neurogenic shock include hypotension, bradycardia, and warm, dry skin.

Question: 36 — Type: multipleChoice

The nurse is caring for a client with cardiogenic shock.

The nurse recognizes that which of the following medications is likely to be prescribed to improve cardiac output?

1. Heparin
2. Epinephrine
3. Dobutamine
4. Furosemide

Explanation:

Vasoactive Medications			
Class	Medications	Action	Use
			Shock, heart failure, cardiac arrest,

Vasopressors (Catecholamines)	Dopamine, Epinephrine, Norepinephrine	↑ BP through vasoconstriction ↑ HR, contractility	anaphylaxis, severe asthma
Inotropes	Dobutamine Milrinone	↑ Contractility	Heart failure, cardiogenic shock
Vasodilators	Nitroglycerin Nitroprusside	↓ BP through vasodilation ↓ Cardiac workload	Angina, acute coronary syndrome, hypertensive emergency, heart failure

Cardiogenic shock (i.e., “pump failure”) occurs when **acute decompensated heart failure** develops suddenly, usually due to acute coronary syndrome. In cardiogenic shock, cardiac output drops and causes **profound hypotension and hypoperfusion**. One of the main goals of treatment in cardiogenic shock is to **improve cardiac output**.

Dobutamine is a synthetic catecholamine that primarily **increases the force of heart contractions**, which improves cardiac output without causing significant vasoconstriction **[Choice 3]**. This makes it a common choice for improving cardiac output in clients with cardiogenic shock.

Incorrect:

Heparin

Heparin is an anticoagulant used to prevent blood clots (e.g., pulmonary embolism). While preventing clots is important in many cardiac conditions, heparin does not directly improve cardiac output.

Epinephrine

Epinephrine is a catecholamine that increases heart rate and contractility and constricts blood vessels. It is most commonly used in conditions like anaphylaxis or cardiac arrest. While it can increase cardiac output, it can also significantly *increase the heart's oxygen demand*, which could be harmful in clients with cardiogenic shock, especially if the shock is due to acute coronary syndrome.

Furosemide

Furosemide is a diuretic commonly used in heart failure to reduce fluid overload but doesn't directly improve cardiac output. In fact, excessive diuresis could potentially reduce preload too much and thereby decrease cardiac output.

Key Takeaway:

- Cardiogenic shock is a severe, life-threatening form of heart failure that occurs when cardiac output drops, causing hypotension and hypoperfusion.
- Dobutamine treats cardiogenic shock by increasing cardiac contractility.

Question: 37 — Type: multipleChoice

The nurse is caring for a client with septic shock.

Which of the following would be the **most** reliable indicator of improved perfusion?

1. Skin temperature
2. Capillary refill time
3. Pulse oximetry reading
4. Level of consciousness

Explanation:

Types of Shock

	Common Conditions	Etiology	CVP	CO	SVR
Hypovolemic	- Hemorrhage - Dehydration (e.g., diarrhea)	Fluid volume loss 	↓	↓	↑
Distributive	- Neurogenic - Septic - Anaphylactic	Massive vasodilation 	↓	↑	↓
Obstructive	- Cardiac tamponade - Pulmonary embolism - Tension pneumothorax	Blood flow obstruction 	↑	↓	↑
Cardiogenic	- Arrhythmias - MI - Heart failure	Pump failure 	↑	↓	↑

CVP = Central Venous Pressure CO = Cardiac Output SVR = Systemic Vascular Resistance

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Septic shock is a type of distributive shock that occurs when inflammatory mediators are released in response to **infection**, inducing widespread **vasodilation**. Promptly identifying and correcting the cause while providing **fluid resuscitation** to **restore perfusion** is needed.

Capillary refill time (CRT) is a rapid and direct measurement of peripheral perfusion that is considered as reliable as lactate levels in determining perfusion status **[Choice 2]**. CRT of **<3 seconds** indicates **sufficient perfusion**. Brisk CRT indicates that blood, oxygen, and nutrients are effectively supplied to end organs (e.g., kidneys, brain).

Incorrect:

Skin temperature

While skin temperature changes can indicate altered perfusion, it is also influenced by factors like room temperature. Additionally, warm, flushed skin is present in early septic shock, even with inadequate perfusion. In contrast, CRT is a more *direct measure of perfusion* status.

Pulse oximetry

Pulse oximetry measures the levels of oxygen in the blood. Although it decreases with inadequate perfusion, pulse oximetry does not reflect *immediate changes in perfusion* and can be altered by *other factors* (e.g., respiratory conditions).

Level of consciousness

Level of consciousness (LOC) reflects how well the brain is receiving or using oxygen and nutrients and is decreased with ineffective cerebral perfusion. Although LOC may improve with increased perfusion, it *may be delayed* as perfusion is restored and can be *altered by other factors* (e.g., acidosis, hypoxemia, brain injury).

Key Takeaway:

- Shock is a life-threatening emergency caused by inadequate perfusion.
- Capillary refill time is a reliable indicator of perfusion status.

Question: 38 — Type: multipleChoice

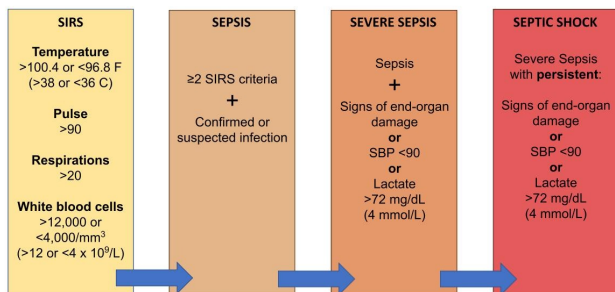
The nurse is caring for a client with pneumonia who spikes a fever and has a drop in blood pressure to 88/58.

Which order should the nurse implement **first**?

- Administer IV fluid bolus
- Administer IV antibiotics
- Draw 2 sets of blood cultures
- Initiate IV norepinephrine infusion

Explanation:

Progression of Sepsis



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Septic shock occurs when inflammatory mediators (e.g., cytokines) are released in response to **infection**, inducing widespread **vasodilation and increased capillary permeability**. Priority treatment includes aggressive **fluid resuscitation** to improve intravascular fluid volume and tissue perfusion. Recommendations include the rapid administration of a 30 mL/kg **bolus of crystalloid IV fluids** (e.g., 30 mL x 100 kg = 3000 mL) [Choice 1].

Incorrect:

Administer IV antibiotics, Draw 2 sets of blood cultures

At least two blood cultures should be obtained to identify pathogens before antibiotics are administered. However, improving perfusion is the top priority for this client.

Initiate IV norepinephrine infusion

Vasopressors (e.g., norepinephrine) cause vasoconstriction and are indicated if a client remains hypotensive *despite fluid resuscitation*. Vasopressors are more effective if given after intravascular fluid volume has been replaced.

Key Takeaway:

- Aggressive fluid resuscitation is a priority intervention for clients in septic shock to improve intravascular volume and tissue perfusion.
- Collecting blood cultures, administering antibiotics, and giving vasopressors are indicated after IV fluid administration.

Question: 39 — Type: multipleChoice

The nurse is caring for a client with suspected obstructive shock.

Which of the following findings would support a diagnosis of obstructive shock?

- Decreased afterload
- Increased cardiac output
- Increased central venous pressure
- Decreased systemic vascular resistance

Explanation:

Types of Shock

	Common Conditions	Etiology	CVP	CO	SVR
Hypovolemic	• Hemorrhage • Dehydration (e.g., diarrhea)	Fluid volume loss 	↓	↓	↑
Distributive	• Neurogenic • Septic • Anaphylactic	Massive vasodilation 	↓	↑	↓
Obstructive	• Cardiac tamponade • Pulmonary embolism • Tension pneumothorax	Blood flow obstruction 	↑	↓	↑
Cardiogenic	• Arrhythmias • MI • Heart failure	Pump failure 	↑	↓	↑

CVP = Central Venous Pressure CO = Cardiac Output SVR = Systemic Vascular Resistance

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Obstructive shock occurs when a physical obstruction (e.g., cardiac tamponade, tension pneumothorax) **disrupts normal blood flow** in the cardiovascular system, decreasing the **cardiac output**. The obstruction **prevents adequate pumping of blood** to and from the heart. As the blood accumulates in the heart and vena cava, the **central venous pressure (CVP) increases [Choice 3]**.

Incorrect:

Decreased afterload

When blood flow is obstructed, the heart has to work harder to pump blood effectively. The increased force the left ventricle has to overcome to eject blood through the aortic valve represents an *increased afterload*.

Increased cardiac output

Cardiac output (CO) is calculated from the client's heart rate and the amount of volume that leaves the left ventricle with each beat. In obstructive shock, direct pressure on the heart and major blood vessels prevents blood from adequately being pumped from the heart. Therefore, *decreased CO* is an expected finding in obstructive shock.

Decreased systemic vascular resistance

As a compensatory response to the blood flow resistance within the systemic circulation, the body tries to maintain adequate tissue perfusion by *increasing the systemic vascular pressure (SVR)*.

Key Takeaway:

- Obstructive shock is caused by an obstruction preventing adequate blood flow to and from the heart.
- Signs of obstructive shock include:
 - Decreased CO
 - Increased SVR
 - Increased CVP
 - Increased afterload

Question: 40 — Type: multipleChoice

The nurse enters a client's room and finds the client unresponsive.

The nurse should **first**

1. Start chest compressions
2. Get the crash cart and defibrillator
3. Try to wake the client with a sternal rub
4. Assess for pulse and respirations for 10 seconds

Explanation:

When a nurse encounters an unresponsive client, the immediate priority is to assess for the **presence or absence of a pulse and respirations for no more than 10 seconds [Choice 4]**. If a pulse is absent, immediate cardiopulmonary resuscitation (CPR) is indicated to restore circulation.

Incorrect:

Start chest compressions, Get the crash cart and defibrillator

These actions would be indicated if the nurse is unable to confirm presence of a pulse and respirations within 10 seconds. If the client is pulseless, the nurse should immediately begin CPR and call for help (e.g., press the code button) so that other staff can bring the crash cart and defibrillator to the bedside.

Try to wake the client with a sternal rub

A sternal rub is a technique used to elicit a pain response from an unresponsive client, but it is not necessary if a client is confirmed to be pulseless.

Key Takeaway:

- When encountering an unresponsive client, the nurse's initial action should be to assess for pulse and respirations for 10 seconds.

- If a client is unresponsive, the nurse should immediately initiate CPR without delay.

Question: 41 — Type: multipleChoice

The nurse is monitoring a client for shock.

Which of the following would indicate that the client is in the compensatory stage of shock?

1. Hypotension; irregular pulse; slow, shallow respirations
2. Hypotension; rapid, bounding pulse; rapid, deep respirations
3. Normal blood pressure; increased pulse rate; cool, clammy skin
4. Rapid, weak pulse; rapid, shallow respirations; cool, clammy skin

Explanation:

Stages of Shock		
Compensatory	Progressive	Refractory
Tachycardia and vasoconstriction redirect blood flow to vital organs	Compensatory mechanisms fail and blood pressure drops	Organ damage is severe and client stops responding to treatment
• BP normal (compensated) • Pulse ↑ • Skin cool, clammy from vasoconstriction	• BP ↓ (compensation fails) • Pulse ↑, bounding • Rapid, deep respirations (final compensation)	• BP ↓↓ • Pulse ↑↑, weak, irregular • Slow, shallow respirations

Shock is a life-threatening condition characterized by **hypotension** (systolic BP <90) and **hypoperfusion**.

During the **compensatory phase**, the body attempts to restore perfusion by **increasing heart rate** to pump more blood and **vasoconstricting** to redirect blood to the vital organs. **Blood pressure will be within normal limits**, and the skin may be **cool and clammy** due to superficial vasoconstriction [**Choice 3**].

Eventually, the body's compensatory mechanisms start to fail, and the client develops **hypotension and hypoperfusion** that can lead to **end-organ failure**.

Incorrect:

Hypotension; irregular pulse; slow, shallow respirations

These findings indicate the *refractory* stage of shock, in which organ damage is so severe that the client does not respond to treatment. This stage might be indicated by very low blood pressure, irregular or absent pulse, and slow, shallow respirations.

Hypotension; rapid, bounding pulse; rapid, deep respirations

These findings indicate the *progressive* stage of shock when the body's compensatory mechanisms start to fail and blood pressure drops. Rapid, bounding pulse and rapid, deep respirations indicate the body's final attempts to compensate.

Rapid, weak pulse; rapid, shallow respirations; cool, clammy skin

In the compensatory phase, the client's *pulse should be strong* as the body tries to increase cardiac output. Rapid, weak pulse is more indicative of *refractory shock* when compensatory mechanisms have failed.

Key Takeaway:

- In the compensatory phase of shock, the body compensates for hypoperfusion by vasoconstricting and increasing heart rate.
- A client in the compensatory phase of shock will have normal blood pressure, tachycardia, and cool, clammy skin.

Question: 42 — Type: multipleChoice

The nurse is caring for a client following coronary artery bypass grafting (CABG).

Which of the following findings would require **immediate** follow-up?

1. Voice hoarseness
2. Incisional chest pain
3. Muffled heart sounds

4. Temperature of 96.9 F (36.0 C)

Explanation:

Coronary artery bypass grafting (CABG) is **cardiovascular surgery** that creates an alternate route for cardiac blood flow to bypass a blocked coronary artery to maintain adequate perfusion to the heart. It is used to treat vessel disease and acute myocardial infarctions.

Cardiac tamponade occurs when **fluid accumulates in the pericardium** (sac around the heart), compressing cardiac chambers and preventing adequate cardiac filling and output. Following cardiac surgery, clients are at risk for cardiac tamponade due to postoperative bleeding around the heart or pericardial effusion caused by inflammation.

Manifestations include **muffled heart sounds** (caused by pericardial fluid buildup), jugular vein distention (JVD), and signs of decreased cardiac output (hypotension) **[Choice 3]**. Tamponade is life-threatening, requiring immediate interventions (e.g., pericardiocentesis) to prevent shock and death.

Incorrect:

Voice hoarseness

Hoarseness *commonly occurs* after endotracheal intubation. Unless symptoms of respiratory distress occur (e.g., dysphagia, dyspnea), this is not concerning.

Incisional chest pain

Chest pain or discomfort is *expected following CABG* due to surgical trauma. However, severe or persistent pain that does not respond to interventions requires follow-up.

Temperature 96.9 F (36.0 C)

Hypothermia is *expected following CABG* as cooling methods are used to decrease body temperature during surgery, and administration of vasoactive medications, like epinephrine, causes vasoconstriction. Although warming interventions are needed, muffled heart sounds are more concerning.

Key Takeaway:

- Following CABG, muffled heart sounds, JVD, and decreased cardiac output indicate cardiac tamponade.
- Cardiac tamponade is a life-threatening complication caused by fluid buildup in the pericardial sac.

Question: 43 — Type: multipleChoice

The nurse has taught a client who is scheduled for a cardiac exercise stress test about preparing for the procedure.

Which of the following statements by the client would indicate a correct understanding of the teaching?

1. "I should not take my amlodipine on the morning of the test."
2. "The test will not be stopped until I reach my target heart rate."
3. "I can't eat, but I can have my usual cup of black tea before the test."
4. "The test will measure how much blood my heart is pumping to my body."

Explanation:

Cardiac stress testing evaluates myocardial exercise tolerance and **screens for asymptomatic coronary artery disease**.

Testing monitors the **heart's response to exercise** (e.g., bike, treadmill) or, for clients unable to exercise, vasodilators (e.g., dobutamine) are administered to increase the heart rate and imitate the myocardial response to exercise. If **ischemia signs occur** (e.g., chest pain), myocardial perfusion imaging is performed using **injected radionuclide** to evaluate areas with poor perfusion.

Client teaching focuses on the purpose and how to prepare (e.g., comfortable clothes, shoes for walking). **Teaching was effective** if the client understands that:

- **Beta blockers** (e.g., metoprolol) and **calcium channel blockers** (e.g., amlodipine) **suppress the myocardial response**, preventing the heart from reaching the target heart rate. These medications should be **withheld** on the morning of the test **[Choice 1]**.

Corrected teaching:

- The **goal of cardiac stress tests** is to reach the client's **target heart rate**. However, the test is **stopped if signs of ischemia** are experienced (e.g., chest pain, shortness of breath, dizziness, dysrhythmias) **[Choice 2]**.
- **Stimulants** such as caffeine and tobacco are **withheld** before the test, preventing **tachycardia and hypertension** **[Choice 3]**.
- An **exercise stress test** monitors **myocardial perfusion**. **Echocardiograms** visualize heart structures and **measure ejection fraction** **[Choice 4]**.

Key Takeaway:

Exercise stress test teaching includes:

- The test measures the heart's response to exercise.
- Withhold beta-blockers, calcium channel blockers, caffeine, and tobacco.
- The test is stopped once the target heart rate is reached or when signs of myocardial ischemia occur.

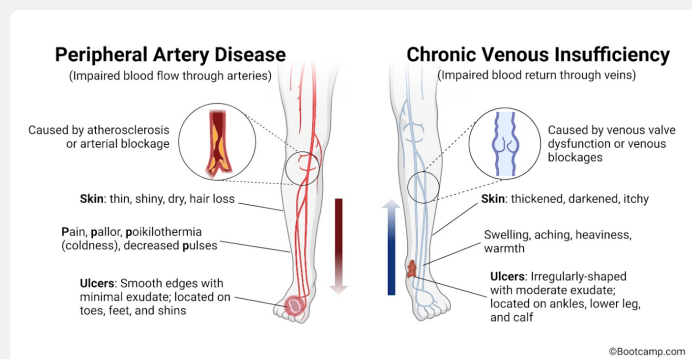
Question: 44 — Type: multipleChoice

The nurse is caring for a client with suspected chronic venous insufficiency.

Which of the following findings would support a diagnosis of chronic venous insufficiency?

1. Absent pedal pulse
2. Intermittent leg cramping with exercise
3. Ulcers on the toes with well-defined edges
4. Brown discoloration to the lower extremities

Explanation:



Chronic venous insufficiency (CVI) is a condition characterized by **inadequate blood return** from the lower extremities, resulting from elevated pressure in the veins that stretches the vessels and damages their valves over time.

Manifestations of CVI include **peripheral edema** in the lower legs, which worsens with prolonged standing or sitting. CVI also causes skin changes, which include a **thick, leathery appearance** and **brownish discoloration** on the lower legs from hemosiderin deposits **[Choice 4]**.

Incorrect:

Absent pedal pulse

Decreased or absent pedal pulses are associated with *arterial insufficiency* (i.e., peripheral artery disease). While edema resulting from CVI can make pedal pulses difficult to locate, they are not expected to be absent with CVI.

Intermittent leg cramping with exercise

Intermittent claudication occurs with *arterial insufficiency* which causes intermittent *cramping leg pain* that primarily *occurs during exercise*. In contrast, pain associated with CVI is described as a *dull ache or heaviness* in the lower extremities exacerbated by prolonged periods of standing or sitting.

Ulcers on the toes with well-defined edges

Arterial ulcers are associated with *arterial insufficiency* and develop on the feet or toes. Arterial ulcers are characterized by deep, painful, non-healing ulcers with well-defined edges and a pale wound bed. Venous ulcers from CVI develop on the *lower leg* and are *irregularly shaped with irregular edges* with a *reddish-pink wound bed*.

Key Takeaway:

- CVI is caused by inadequate blood return from the lower extremities.
- CVI manifestations include edema, dull leg pain, ulcers with irregular edges, and brownish skin discoloration.

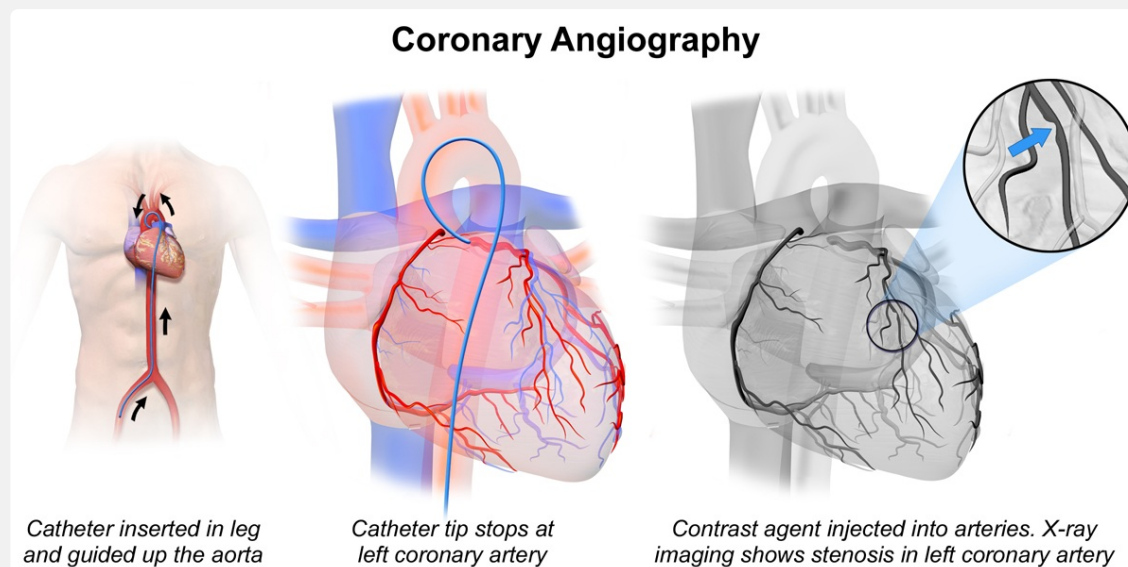
Question: 45 — Type: multipleResponse

The nurse is caring for a 68-year-old male who just underwent a coronary angiography via a femoral artery approach.

Which interventions should the nurse anticipate in the initial post-procedure care of this client? **Select all that apply.**

1. Place the client on a fluid restriction.
2. Monitor the puncture site for swelling.
3. Place the client on continuous cardiac monitoring.
4. Assist the client up to the chair to prevent atelectasis.
5. Palpate the client's bilateral pedal pulses every 15 minutes for the first hour.

Explanation:



In **coronary angiography**, a catheter is advanced through an artery (e.g., femoral) and to the coronary arteries where dye is injected and visualized under x-ray in order to estimate the severity of coronary atherosclerosis. A percutaneous coronary intervention (PCI) can be performed simultaneously to stent obstructing lesions.

Post-procedure care includes these interventions:

- Frequently monitor the client's **groin site** for any signs of **hemorrhage** such as swelling [**Choice 2**]. If a hematoma develops, the nurse should immediately apply **firm downward pressure** proximal to the site.
- Place the client on **continuous cardiac monitoring** to monitor for **arrhythmias** or **ST-segment changes** that could indicate myocardial infarction [**Choice 3**].
- **Every 15 minutes for 1 hour**, the nurse should monitor for hemorrhage by assessing the client's vital signs, groin, and **neurovascular status** of the lower extremities [**Choice 5**].

Incorrect:

- After angiography, clients require large volumes of **oral and IV fluids** to flush out the IV contrast medium and prevent **nephrotoxicity** (i.e., contrast nephropathy) [**Choice 1**].
- Clients who underwent angiography via a femoral artery approach must be on **strict bedrest** with the **head of the bed flat** until **hemostasis** is achieved (e.g., 4-6 hours) [**Choice 4**]. Ambulating, coughing, or bending at the waist increases intra-abdominal pressure and can cause **hematoma** formation.

Key Takeaway:

- After coronary angiography, the nurse should:
 - Monitor the groin site and neurovascular status of lower extremities
 - Place the client on a continuous cardiac monitor

- Administer IV fluids to flush out IV contrast
- Maintain bed rest until hemostasis is achieved

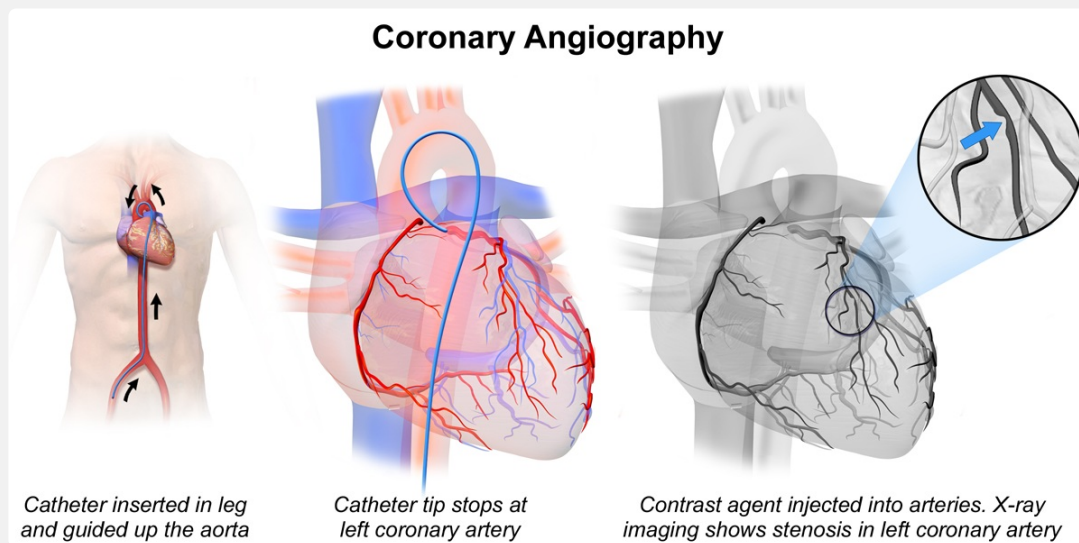
Question: 46 — Type: multipleResponse

The nurse is caring for a 68-year-old male undergoing scheduled coronary angiography and placement of a drug-eluting stent via a femoral artery approach.

Which client statements indicate correct understanding of the pre-procedure instructions? **Select all that apply.**

1. "I won't eat or drink anything after midnight before the procedure."
2. "It's normal to feel hot and flushed as the dye is being injected."
3. "The only major risks of the procedure are bleeding and infection."
4. "My spouse will come drive me home as soon as the procedure ends."
5. "I will stop taking my metformin at least 24 hours before the procedure."
6. "My groin is going to be shaved with an electric razor and then cleaned."
7. "Having this heart stent put in means I can stop taking my blood thinners."

Explanation:



In **coronary angiography**, a catheter is advanced through an artery (e.g., femoral) and to the coronary arteries, where dye is injected and visualized under x-ray in order to estimate the severity of coronary atherosclerosis. A percutaneous coronary intervention (PCI) can be performed simultaneously, in which obstructing lesions are stented open.

Clients should **understand** these teaching points:

- The client may receive procedural sedation and should be made **NPO** for 6 to 12 hours before the procedure **[Choice 1]**.
- The client may experience **palpitations, flushing,** and an **urge to cough** as the catheter is advanced or the dye is injected **[Choice 2]**.
- Taking **metformin** within 24 hours of receiving **IV contrast dye** can precipitate life-threatening **lactic acidosis** and is contraindicated **[Choice 5]**.
- The client will be assisted to **shave** the groin with an electric razor and **clean** the insertion site with **chlorhexidine solution** **[Choice 6]**.

No understanding:

- Coronary angiography carries several major risks that can occur if the catheter or a blood clot obstructs arterial flow, including **stroke, myocardial infarction,** and **death** **[Choice 3]**.
- **Strict bedrest** is required for 4-6 hours after the procedure until hemostasis is achieved at the groin puncture site **[Choice 4]**.
- **Dual antiplatelet therapy** with **aspirin** and a P2Y12 inhibitor (e.g., **clopidogrel**) will be continued for a minimum of 6 months to prevent thrombosis of the stent **[Choice 7]**.

Key Takeaway:

- Before coronary angiography, the client should be taught to:

- Remain NPO
- Expect flushing
- Hold metformin for 24 hours
- Shave and clean the groin site

Question: 47 — Type: multipleChoice

The nurse is caring for a client hospitalized with heart failure.

Which client finding is **most** concerning?

1. Frothy, pink-tinged sputum
2. Paroxysmal nocturnal dyspnea
3. Blood pressure of 92/67 mmHg
4. 2+ pitting lower extremity edema

Explanation:

Frothy, pink-tinged sputum is a sign of pulmonary edema, which is a potentially life-threatening complication of heart failure **[Choice 1]**. **Pulmonary edema** occurs when there is an accumulation of fluid in the lungs, which can make it difficult for the client to breathe and can lead to **respiratory failure**.

The nurse should immediately assess this client's airway, breathing, and circulation, and anticipate administration of supplemental oxygen and diuretics.

Incorrect:

Paroxysmal nocturnal dyspnea (PND)

PND, waking up at night gasping for air, is a common symptom of heart failure. While this symptom can indicate worsening heart failure, it is not as concerning as frothy, pink-tinged sputum.

Blood pressure of 92/67 mmHg

This blood pressure is lower than the normal range, but it is not necessarily a concerning finding for a client with heart failure. Some clients with heart failure may have low blood pressure due to medications (e.g., angiotensin-receptor/neprilysin inhibitors [ARNIs]) or the body's compensatory mechanisms to maintain cardiac output.

2+ pitting lower extremity edema

Pitting edema occurs when there is an accumulation of fluid in the tissues, which can cause swelling and indentations that remain when pressure is applied to the area, but this is not more concerning than pulmonary edema and impending respiratory failure.

Key Takeaway:

- Frothy, pink-tinged sputum indicates the presence of pulmonary edema and the potential for respiratory failure.

Question: 48 — Type: multipleChoice

The triage nurse is taking the vital signs of a 44-year-old male client in the emergency department who is reporting nausea, dizziness, and substernal chest pain radiating to the jaw.

The nurse should **first**

1. Complete a 12-lead ECG
2. Draw blood for serum troponin levels
3. Administer nitroglycerin, aspirin, and prasugrel
4. Ask the client about family history of heart disease

Explanation:

The nurse should recognize that nausea, dizziness, and substernal chest pain radiating to the jaw are classic signs of **acute coronary syndrome**, especially in a client with multiple **risk factors**. A **12-lead ECG is the most appropriate initial diagnostic test** for assessing chest pain or other symptoms suggestive of a heart attack **[Choice 1]**. The ECG can be performed at the bedside to quickly rule out the most severe form of acute coronary syndrome, which is an ST-segment elevation myocardial infarction (STEMI).

Incorrect:

Drawing blood for serum troponin; Administering nitroglycerin, aspirin, prasugrel

These are essential actions to be performed soon after completing the initial assessment, but they do not take priority over the ECG. Serum troponin levels may not show changes for several hours after a heart attack, and medications such as nitroglycerin, aspirin, and prasugrel may be given after an ECG is obtained and other important interventions have been initiated.

Asking about family history

Although it is important to gather information about the client's family history of heart disease, this action does not take priority over obtaining an ECG in the immediate assessment phase.

Key Takeaway:

- A 12-lead ECG is the most appropriate initial diagnostic test for assessing chest pain or other symptoms suggestive of a heart attack.

Question: 49 — Type: dropdown

History and Physical

Client has been intermittently experiencing a “racing heartbeat” for the past few weeks that lasts from minutes up to one hour. She notes this sometimes occurs after a meal or drinking coffee. She states that today, the racing heartbeat has not stopped. She denies chest pain or syncope with these events. Client states, “I do feel a little short of breath today too.” Client has a history of hypertension, coronary artery disease, myocardial infarction 4 years ago with percutaneous coronary intervention, and arthritis.

Vital Signs

	1400
T	97.5 (36.4 C)
P	131
RR	23
BP	102/78
Pulse oximetry reading	96% on room air

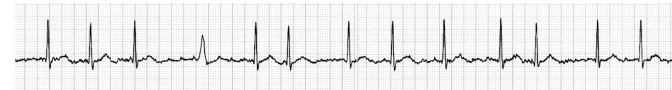
Nurses' Notes

1400:	Client is alert and oriented x 3. Upon auscultation, heart sounds are irregular with S1 and S2 present. Peripheral pulses 2+ bilaterally. Capillary refill less than 3 seconds in upper and lower extremities. Client is married and is the primary caregiver for her spouse. Client reports being unable to refill current medication prescriptions and notes that she has not taken her medications in a few days.
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Diagnostic Results

12-lead electrocardiogram (ECG)

1430:



Medications

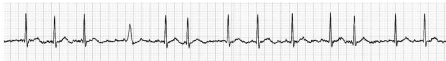
- Aspirin 81 mg daily
- Losartan 50 mg daily
- Atorvastatin 40 mg daily
- Metoprolol succinate 50 mg daily

Complete the following sentence by choosing from the lists of options.

The nurse should recognize that the client is experiencing **[Select]** and decreased **[Select]**.

Dropdown	Options
Dropdown 1	atrial flutter atrial fibrillation ✓ supraventricular tachycardia
Dropdown 2	afterload cardiac output ✓ systemic vascular resistance

Explanation:

Atrial Fibrillation

• Rate: 100-175 beats/min • Rhythm: Irregularly irregular • PR interval: Not measurable • P waves: Chaotic, non-discernable fibrillatory waves with undulating baseline • QRS: Normal (typically) • Pulse: Present and rapid

This client is experiencing **atrial fibrillation**, as evidenced by the replacement of round, upright P waves with fine, fibrillatory waves and an irregular R-R interval. In atrial fibrillation, abnormal electrical impulses are initiated by ectopic foci rather than the sinoatrial node, causing the atria to *fibrillate* rather than contract.

The absence of organized, forceful atrial contraction prevents complete atrial emptying. This decreases the volume of blood ejected into the ventricles to be pumped throughout the body (stroke volume), which **decreases cardiac output**.

Therefore, the nurse should recognize that the client is experiencing **atrial fibrillation** and **decreased cardiac output**.

Incorrect:

Atrial flutter

In atrial flutter, sawtooth waves occur at 200-350 beats per minute. The ventricular rate is regular and usually occurs after a set number of flutter waves (e.g., 2:1, 4:1).

Supraventricular tachycardia

Supraventricular tachycardia occurs when a myocardial cell above the bundle of His repeatedly stimulates the atrioventricular node. The rhythm is regular and very rapid.

Afterload, Systemic vascular resistance

Afterload, best represented by mean arterial blood pressure, is the pressure the left ventricle must overcome to pump blood into the aorta. A factor affecting afterload is systemic vascular resistance, the resistance to flow caused by systemic vasoconstriction.

Key Takeaway:

- Fibrillatory waves instead of P waves and irregular R-R intervals indicate atrial fibrillation.
- Chaotic electrical activity causes the atria to fibrillate instead of contract in an organized fashion.
- Lack of forceful atrial contraction prevents complete atrial emptying, decreasing cardiac output.

Question: 50 — **Type:** multipleChoice

The nurse is teaching a client newly diagnosed with varicose veins.

Which of the following information should the nurse include?

1. Avoid compression hose while sitting.
2. Vein stripping is typically needed to manage pain.
3. Develop a running routine to improve venous circulation.
4. Sit down and elevate the legs if experiencing leg pain or swelling.

Explanation:

Varicose veins are **enlarged, superficial veins caused by faulty venous valves** that occur primarily in the lower extremities. Varicose veins are either primary (not involving deep veins) or secondary (caused by deep vein thrombosis [DVTs]).

Symptoms include leg pain, ankle swelling, and heaviness in the legs. If DVTs lead to varicose veins, chronic venous insufficiency signs like edema, pigmentation, and venous ulcers may develop.

Treatment includes preventing disease progression and maintaining adequate venous return. Clients should be instructed to use the **3 “E”s** to manage symptoms: **elastic compression hose, exercise, and elevation**. **Elevating the legs while sitting** improves venous circulation and reduces blood pooling in the lower extremities **[Choice 4]**.

Incorrect:

Compression hose should be avoided while sitting

Compression hose should be worn, especially *during prolonged sitting* or standing, to provide support and improve blood flow.

Vein stripping needed for pain management

Conservative measures, including compression, exercise, and elevation, are the first-line treatment. Other treatments include thermal ablation to repair the vein or sclerotherapy to shrink the vein. Surgical vein removal (stripping) is *only used if first-line treatments were ineffective*.

Develop running routine

Exercise improves venous return by assisting muscle contractions to pump blood back to the heart. However, clients should *avoid high-impact exercises* like running, as they place additional strain on the veins and *exacerbate varicose veins*. Instead, clients should take part in *low-impact exercises like walking*.

Key Takeaway:

- To manage symptoms, clients with varicose veins should use elastic compression hose, exercise, and elevation.

Question: 51 — Type: multipleChoice

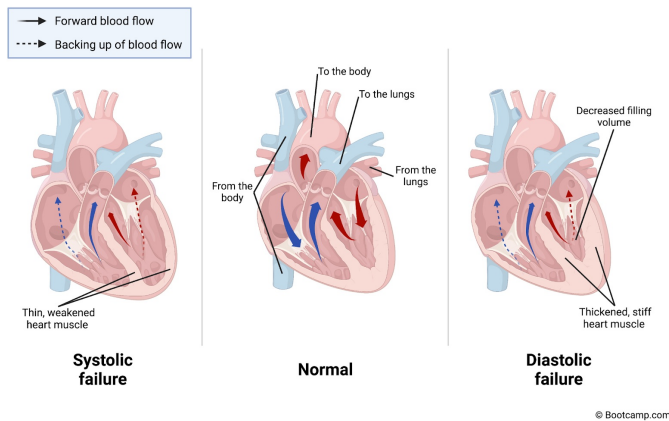
The nurse is screening clients for those at increased risk for developing heart failure.

At **highest** risk for developing heart failure is the client who

1. Had rheumatic fever as a child
2. Smokes two packs of cigarettes daily
3. Does not exercise and has a desk job
4. Has high blood pressure and cholesterol

Explanation:

Heart Failure



Major risk factors for the development of heart failure are **hypertension**, which increases cardiac workload, and **coronary artery disease (CAD)**, which decreases myocardial oxygen supply and damages the heart.

High cholesterol increases risk for coronary atherosclerosis, which narrows the coronary arteries that supply blood to the heart muscle. **Hypertension** causes the heart to work harder to pump blood throughout the body and can cause hypertensive heart disease, which is characterized by structural and functional changes in the heart, including **left ventricular hypertrophy** (enlargement of the heart's left pumping chamber).

Therefore, the client with hypertension and high cholesterol has the two major risk factors for heart failure and should be counseled on lifestyle changes for risk reduction **[Choice 4]**.

Incorrect:

Had rheumatic fever as a child

Rheumatic fever places a client at risk for rheumatic heart disease and mitral stenosis, but does not directly cause heart failure.

Smokes two packs of cigarettes daily, Does not exercise and has a desk job

Smoking is a risk factor for lung cancer, chronic obstructive lung disease, and coronary artery disease, and a *sedentary lifestyle* is a risk factor for obesity, diabetes, and coronary artery disease. However, the client with hypertension and high cholesterol has both major risk factors for heart failure and is at greater risk.

Key Takeaway:

- The major risk factors for the development of heart failure are hypertension, which increases cardiac workload, and CAD, which decreases myocardial oxygen supply and damages the heart.

Question: 52 — Type: multipleResponse

The nurse is caring for a client with heart failure.

Which of the following client findings would support a diagnosis of right-sided heart failure? **Select all that apply.**

- Abdominal ascites
- Dyspnea on exertion
- Crackles in the lungs
- Lower extremity edema
- Jugular venous distention

Explanation:

Feature	Left-sided heart failure	Right-sided heart failure
Definition	The left side of the heart is unable to pump blood effectively, leading to fluid buildup in the lungs .	The right side of the heart is unable to pump blood effectively, leading to fluid buildup in the body .
Symptoms	Pulmonary edema: crackles, cough, confusion Impaired organ perfusion: fatigue, decreased urine output	Systemic venous congestion: peripheral edema, ascites, hepatomegaly ("cardiac cirrhosis"), jugular venous distention

Right-sided heart failure occurs when the right ventricle is unable to pump blood forward effectively to the left ventricle. This causes fluid to back up from the right ventricle into the systemic circulation. The following client findings would support a diagnosis of right-sided heart failure:

- **Abdominal ascites**, which is a buildup of fluid in the **peritoneal cavity** [Choice 1].
- **Lower extremity edema** [Choice 4].
- **Jugular venous distention** is an abnormal bulging of the jugular veins in the neck that occurs as blood backs up from the high-pressure right ventricle [Choice 5].

Incorrect:

Dyspnea on exertion, Crackles in the lungs

Symptoms of pulmonary edema are more commonly associated with left-sided heart failure, which occurs when the left side of the heart is unable to pump blood effectively.

Key Takeaway:

- Right-sided heart failure causes symptoms of systemic venous congestion, including abdominal ascites, lower extremity edema, and jugular venous distention.
- Left-sided heart failure causes symptoms of pulmonary vascular congestion, including dyspnea and crackles.

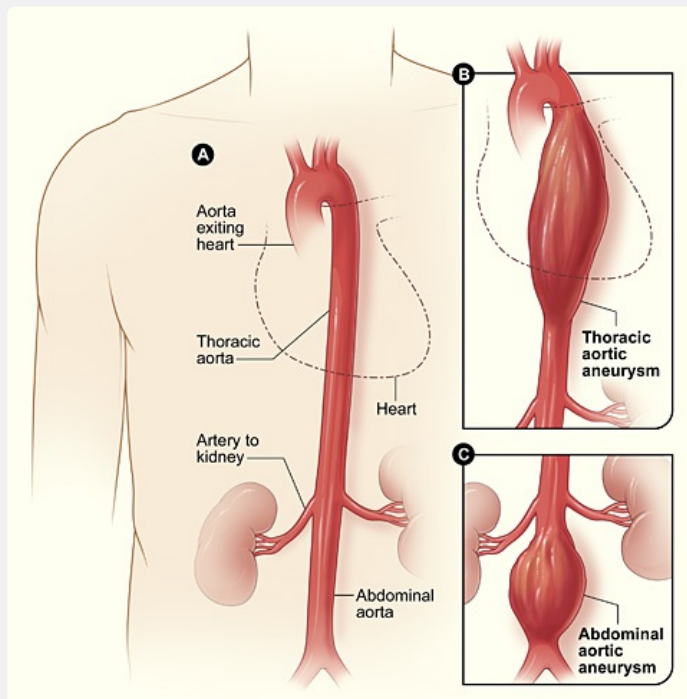
Question: 53 — Type: multipleChoice

The nurse is caring for a client who had an endovascular repair of an abdominal aortic aneurysm 2 hours ago.

Which of the following would be a **priority** for the nurse to include in the plan of care?

1. Assess and document the client's hourly urine output.
2. Measure the client's temperature and white blood cell count.
3. Measure the serum creatinine and blood urea nitrogen levels.
4. Palpate the pedal pulses and temperature of lower extremities.

Explanation:



An **abdominal aortic aneurysm** (AAA) is a localized enlargement of the abdominal aorta. If the AAA grows large enough, it could **rupture**, which is potentially fatal due to **severe internal bleeding**. One of the surgical treatments for AAA is an **endovascular repair**, which involves stenting the aneurysm to prevent rupture.

Following AAA repair, **monitoring perfusion to the lower extremities** is crucial since the aorta supplies blood to the lower half of the body. Diminished or absent pedal pulses or cold or pale lower extremities indicate a clot or graft occlusion **impairing blood flow [Choice 4]**.

Incorrect:

Assess hourly urine output, Measure creatinine and blood urea nitrogen

Urine output, creatinine levels, and blood urea nitrogen (BUN) levels are all indicators of *renal function*. The nurse should monitor these values to assess adequacy of *renal perfusion* distal to the repaired AAA; however, the most immediate potential complication to watch for after an AAA repair is decreased blood flow to the lower extremities.

Measure client's temperature and white blood cell count

These interventions help monitor for signs of infection. Still, infection would not be an immediate concern in the first few hours after surgery and isn't the highest priority in the immediate postoperative period.

Key Takeaway:

- Following endovascular repair of AAA, the nurse should prioritize monitoring lower extremity perfusion since the aorta supplies blood to the lower half of the body.
- Diminished or absent pedal pulses could indicate impaired blood flow.

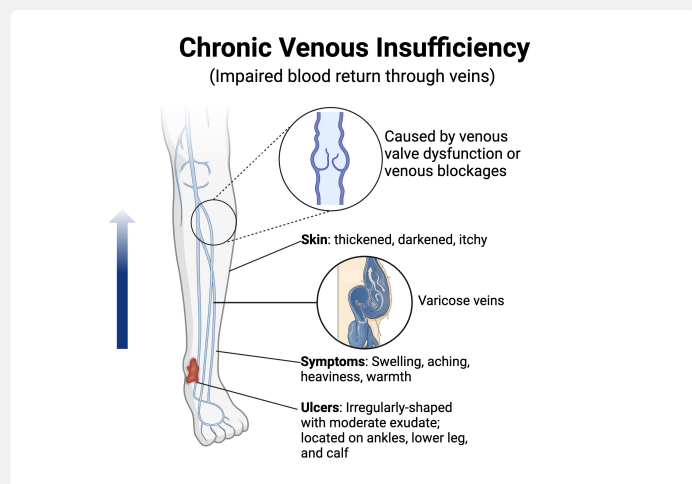
Question: 54 — Type: multipleChoice

The nurse has taught a client with chronic venous insufficiency.

Which of the following client statements indicate that teaching was effective?

1. "I should apply heat packs to my legs to alleviate pain."
2. "I should avoid crossing my legs while sitting or standing."
3. "I should avoid wearing compression stockings while sitting."
4. "I should perform strength training and avoid aerobic exercises."

Explanation:



Chronic venous insufficiency (CVI) is a condition characterized by **inadequate blood return** from the lower extremities. Venous pooling causes skin discoloration, discomfort, and edema to the lower extremities. Without appropriate management, venous ulcers can develop.

Teaching is **effective** if the client understands to:

- **Avoid crossing legs while sitting or standing [Choice 2]**. Crossing the legs compresses the veins, obstructing blood flow and exacerbating symptoms. The nurse should also instruct the client to **elevate the legs** when possible to improve circulation.

Further teaching is needed that:

- **Heat can worsen symptoms [Choice 1]**. Heat dilates blood vessels and increases blood flow, worsening venous pooling and leading to increased swelling and discomfort. *Cold packs and elevating the legs* are recommended for pain relief.
- **Clients should wear compression stockings as frequently as possible [Choice 3]**. Compression stockings exert pressure on the legs,

promoting venous return and preventing blood from pooling in the veins. Wearing well-fitting compression stockings can alleviate edema and discomfort, reducing the risk of complications. Clients should also be instructed to assess their lower extremities for wounds or skin breakdown frequently.

- **Aerobic exercise improves blood flow [Choice 4].** Although strength training is appropriate, *aerobic exercise promotes circulation* and aids in the pumping of blood back to the heart, reducing venous stasis. However, clients should avoid *prolonged* standing and walking to minimize edema.

Key Takeaway:

- Clients with CVI should be educated on interventions to improve circulation, including:
 - Compression stockings
 - Aerobic exercise
 - Elevating the legs
 - Avoiding crossing the legs

Question: 55 — Type: matrixMultipleChoice

The nurse discusses lifestyle changes to manage blood pressure with a 47-year-old male client with a history of myocardial infarction, hypertension, and high cholesterol.

For each statement made by the client, click to specify whether the statement indicates an understanding or no understanding of the teaching provided.

Client Statements	Understanding	No Understanding
1. "I should limit myself to 3 or 4 beers after work."		✓
2. "My smoking helps me whenever I feel irritable or stressed."		✓
3. "I'll tell my wife to start buying 1% milk instead of whole milk."	✓	
4. "When I eat out, I'll order a baked potato instead of french fries."	✓	
5. "When the weather is nice, I'll go for a 30-minute walk on my lunch break."	✓	
6. "I'll try focusing on my breathing when I start to feel overwhelmed at work."	✓	

Note: Each row must have 1 response option selected.

Explanation:

Client education on blood pressure management should focus on lifestyle changes. Lifestyle changes aim to control blood pressure and reduce the risk for cardiovascular disease, thereby improving overall health.

Clients should demonstrate **understanding** of these teaching points:

- **Limit sodium intake** to 2300 mg daily, as sodium causes fluid retention and elevates BP. Clients should avoid highly-processed or packaged foods (e.g., canned food, deli meat, frozen meals) and heavily-salted items (e.g., fries) **[Choice 4]**.
- **Reduce intake of saturated fats** to manage cholesterol levels by avoiding fried foods and selecting low-fat dairy and lean meats **[Choice 3]**.
- Participating in **regular exercise** (e.g., 30-minute walk daily or at least 150 minutes/week) promotes cardiovascular health, weight loss, and stress reduction **[Choice 5]**.
- Using **stress management** techniques (e.g., breathing exercises when feeling overwhelmed) promotes relaxation, which reduces tension and blood pressure **[Choice 6]**.

Incorrect understanding:

- Alcohol consumption should be limited to **two drinks a day for men** and **one a day for women** **[Choice 1]**.
- **Smoking** when irritable or stressed provides temporary stress relief through the release of dopamine, but the nicotine in tobacco products causes vasoconstriction and increases blood pressure **[Choice 2]**.

Key Takeaway:

- Client education on blood pressure management should focus on lifestyle changes, including:
 - A heart-healthy diet (e.g., low-fat, low-sodium)
 - Regular physical activity

Question: 56 — **Type:** multipleChoice

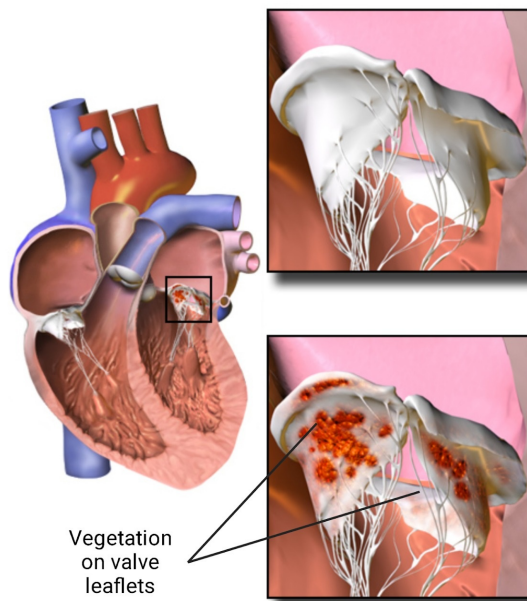
The nurse is assessing a client with infective endocarditis from a vegetation on the mitral valve.

Which assessment finding is **most** concerning?

1. Temperature of 100.6 F (38.1 C)
2. Asymmetrical smile and right arm weakness
3. Splinter hemorrhages on the bilateral fingernail beds
4. Systolic murmur at the left midclavicular 5th intercostal space

Explanation:

Infective Endocarditis



Infective endocarditis is an infection of the endothelial lining that covers the inner surface of the heart (i.e., endocardium) that occurs when bacteria enter the bloodstream (e.g., from dental procedures, IV drug use) and deposit on **valve leaflets**, forming **vegetations** that induce **platelet aggregation**. Clinical manifestations include fever, chills, fatigue, and signs of valvular regurgitation (e.g., murmur, heart failure).

Vegetation fragments can break off and form **septic emboli** that travel through the circulation and **occlude arterial blood flow** to the extremities, brain, or other organs. Occlusion of the cerebral arteries by septic emboli causes ischemic stroke, indicated by neurologic changes such as **unilateral arm weakness or facial droop [Choice 2]**.

Incorrect:

Temperature of 100.6 F (38.1 C)

Fever is an expected finding in infective endocarditis. This client may require an antipyretic, but this is not the most concerning finding.

Splinter hemorrhages on bilateral fingernail beds

Splinter hemorrhages are small infarctions from septic emboli occluding arterial flow to the periphery. Infarction of peripheral tissues is not as concerning as infarction in the central nervous system.

Systolic murmur at the left midclavicular 5th intercostal space

A vegetation can damage the mitral valve causing mitral regurgitation and a systolic murmur at the point of maximal impulse. This is an expected finding in clients with endocarditis of the mitral valve.

Key Takeaway:

- Infective endocarditis occurs when bacteria form vegetations on valve leaflets.

- Vegetation fragments can embolize and occlude arterial blood flow to the brain, causing signs of ischemic stroke.

Question: 57 — Type: matrixMultipleChoice

The nurse is providing discharge teaching to a client with a diagnosis of deep vein thrombosis (DVT) who is being discharged home on warfarin.

For each statement made by the client, click to specify whether the statement indicates an understanding or no understanding of the teaching provided.

Client Statement	Understanding	No Understanding
1. "I should call an ambulance if I feel chest pain or shortness of breath."	✓	
2. "I'll be able to reduce my risk for another DVT if I start a walking regimen."	✓	
3. "I should eat healthier by substituting red meat with a kale salad once a week."		✓
4. "I'll buy some compression stockings to wear when I fly across the country next month."	✓	
5. "I can stop taking the warfarin once my international normalized ratio (INR) is between 2 and 3."		✓

Note: Each row must have 1 response option selected.

Explanation:

Clients with **deep vein thrombosis** should be instructed on medication therapy and measures to improve venous return. The client should demonstrate **understanding** of these teaching points:

- **Call an ambulance for chest pain or shortness of breath**, which are symptoms of a pulmonary embolism, in which a piece of the DVT breaks off and travels to the lungs, impairing gas exchange **[Choice 1]**.
- A **walking regimen** promotes circulation and the prevention of new blood clots **[Choice 2]**.
- **Wearing compression stockings** while sitting for long periods, such as during a cross-country flight, improves venous return and reduces swelling **[Choice 4]**.

No understanding:

- The client should maintain a healthy diet by **reducing red meat intake**; however, inconsistent amounts of foods high in **vitamin K** (i.e., leafy greens such as **kale**, spinach, collard greens) may act as an antidote to warfarin **[Choice 3]**. Warfarin treats venous thrombosis by blocking the effects of vitamin K, which is essential in the production of clotting proteins.
- **Anticoagulation therapy** (e.g., enoxaparin, apixaban, **warfarin**) should be taken indefinitely to prevent the DVT from getting larger and to reduce the risk of a pulmonary embolism **[Choice 5]**. The international normalized ratio (INR) indicates the time it takes for blood to clot, which should be monitored frequently while on warfarin therapy to ensure therapeutic levels.

Key Takeaway:

Teaching for a client with DVT on warfarin should include:

- Symptoms of pulmonary embolism (e.g., dyspnea).
- Maintain consistent vitamin K intake
- Methods to promote venous return (e.g., compression stockings, exercise)

Question: 58 — Type: multipleChoice

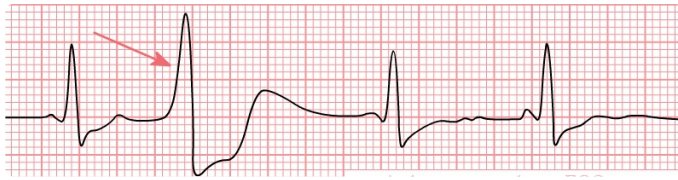
The nurse is caring for a client on a cardiac monitor who is experiencing frequent premature ventricular contractions (PVCs) with 2+ radial pulses.

Which of the following actions should the nurse take **first**?

1. Administer amiodarone.
2. Assess the client's potassium level.
3. Notify the client's health care provider.
4. Document the PVCs in the client's health record.

Explanation:

Premature Ventricular Contractions



- **Rate:** Any rate, PVCs occur at variable rates
- **Rhythm:** Regular or irregular
- **P waves:** Absent before PVC, present in baseline rhythm
- **PR interval:** Not measurable
- **QRS:** Wide and bizarre, usually >0.10 sec
- **Pulse activity:** Present

Premature ventricular contractions (PVCs) are early, **abnormal heartbeats from the ventricles**. They appear as wide, distorted QRS complexes. PVCs are typically benign in healthy clients but may indicate electrical irritability of cardiac muscle in clients with heart disease.

Priority actions focus on identifying and addressing the underlying cause, as PVCs can result in ventricular tachycardia or ventricular fibrillation. Common causes include hypoxia, fever, exercise, and electrolyte imbalances. Therefore, the most appropriate action is to **assess the client's electrolyte levels**, particularly potassium, as hypokalemia can cause PVCs **[Choice 2]**.

Incorrect:

Administer amiodorone

Antiarrhythmic medications (amiodorone) may be indicated if the client is experiencing inadequate cardiac output or decreased perfusion. However, this client's *radial pulses are 2+*; therefore, the priority is *first identifying* the underlying cause of PVCs.

Notify the health care provider (HCP)

The HCP should be informed about the frequent PVCs, as changes to the client's treatment plan or further diagnostic testing may be indicated. However, the nurse should *first review important client data* (e.g., electrolyte levels) to provide all necessary information when contacting the HCP.

Document PVCs in health record

Accurate documentation is crucial for client care, as it provides a detailed record of the client's cardiac rhythm and any changes over time. However, documentation can be performed *after* the client's condition has been further assessed.

Key Takeaway:

- PVCs are abnormal ventricular beats that are typically benign in healthy clients.
- Priority action focuses on identifying and addressing the underlying cause (e.g., electrolyte imbalances).

Question: 59 — Type: multipleChoice

The nurse is assessing a client with chronic venous insufficiency.

Which of the following findings would require **immediate** follow-up?

1. Pain in the calf area with redness, swelling, and warmth
2. Open venous ulcer on the lower leg with delayed healing
3. Itchy rash on the lower extremity that is crusting and itchy
4. Edema and dull pain in the lower legs after prolonged standing

Explanation:

Calf pain, redness, swelling, and warmth are indicative of a **deep vein thrombosis (DVT)**, which requires immediate follow-up **[Choice 1]**.

Clients with **chronic venous insufficiency (CVI)** are at high risk for DVT due to **venous stasis**. Stagnant blood flow in the lower extremities leads to blood clot formation in the veins that can dislodge and travel to the lungs resulting in a potentially fatal **pulmonary embolism**. Urgent treatment with anticoagulant therapy would be indicated.

Incorrect:

Open venous ulcer with delayed healing

Clients with CVI are at risk for venous ulcers with delayed healing due to decreased blood flow to the wound site. Although venous ulcers require wound care to prevent infection, they are *chronic manifestations* of CVI and, therefore, do not necessitate immediate follow-up.

Itchy rash with crusting

Clients with CVI can develop eczema due to chronic inflammation, impaired skin barrier function, and persistent edema. This makes the skin prone to dryness, itching, and irritation. Although the client may need wound care and symptom management, immediate follow-up is not required.

Edema and dull pain in the lower legs

Edema and dull pain are common symptoms of CVI and are *expected findings*, particularly after prolonged periods of standing or sitting. The nurse should provide client education on strategies to alleviate swelling and promote venous circulation; however, immediate follow-up is not required.

Key Takeaway:

- Clients with CVI are at risk for venous ulcers, edema, eczema, and DVTs.
- DVTs require immediate intervention to prevent life-threatening complications (e.g., pulmonary embolism)

Question: 60 — Type: bowtie

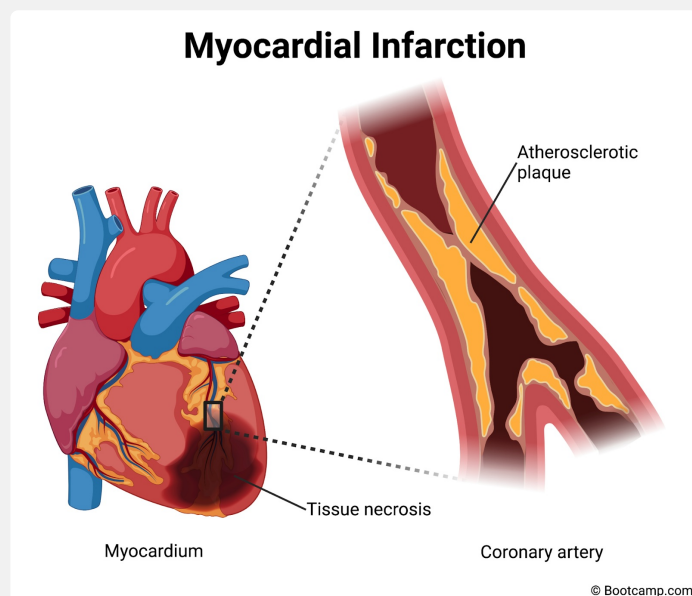
The nurse is reviewing the client's History and Physical to prepare the client's plan of care.

History and Physical

A 48-year-old male client with hypertension, smoking, and obesity comes to the emergency department reporting nausea and 7/10 substernal and left arm pressure. The pain started after the client had a meal of scrambled eggs, hash browns, toast, and coffee. The nurse notes that the client is pale and diaphoretic. Vital signs P 108, RR 22, BP 102/68, pulse oximetry reading 92% on room air.

Complete the diagram by dragging the choices below to specify what condition the client is most likely experiencing, 2 actions the nurse should take to address that condition, and 2 parameters the nurse should monitor to assess the client's progress.

Explanation:



This client has classic signs of **acute coronary syndrome (ACS)** and several ACS risk factors (e.g., male >45, obesity, hypertension, smoking). In ACS, an atherosclerotic plaque ruptures, triggering coronary thrombosis.

The nurse should complete a **12-lead ECG** to rule out ST-elevation myocardial infarction and draw **troponin levels** to confirm presence of ACS.

Medications to treat ACS work by *dilating the coronary arteries* (nitroglycerin) and *inhibiting platelet aggregation* (**ticagrelor** and aspirin).

Incorrect:

Conditions:

- **Ruptured aortic aneurysm:** Aortic aneurysm rupture causes a tearing back pain.
- **Gastroesophageal reflux disease (GERD):** GERD can cause burning epigastric pain, which is more likely to resemble ACS in an older adult female.
- **Upper gastrointestinal (GI) bleeding:** Upper GI bleeding can cause pallor due to blood loss, but GI bleeding is usually painless.

Actions:

- **Administer oxygen:** Oxygen is only indicated in ACS if the client is hypoxemic (oxygen saturation <90%).
- **Administer morphine:** Morphine is a last-resort treatment for chest pain that is unrelieved by antiplatelets and coronary vasodilators.
- **Administer pantoprazole:** Proton-pump inhibitors reduce stomach acid, which would be indicated in GERD.

Parameters:

- **Nausea severity:** The nurse should monitor for improvement in the client's symptoms, but this does not take priority over monitoring of troponin and 12-lead ECG findings.
- **Passage of stool, Fecal occult blood test:** These tests would be indicated if monitoring for blood in the stool of a client with a GI bleed.

Key Takeaway:

- Suspected ACS is evaluated with troponin levels and 12-lead ECG.
- The nurse should give antiplatelets (ticagrelor) and nitroglycerin (a vasodilator).

Question: 61 — Type: multipleChoice

The nurse is teaching a client newly diagnosed with chronic venous insufficiency.

Which of the following would be a **priority** for the nurse to include?

1. Proper use of compression stockings
2. Proper skin care and wound prevention
3. Importance of elevating legs after standing
4. Importance of regular exercise and movement

Explanation:

Compression stockings are the **priority** intervention for managing **chronic venous insufficiency (CVI)** [Choice 1]. Compression therapy improves venous return, reduces edema, and alleviates symptoms, which **prevents complications** such as **venous ulcers** and **deep vein thrombosis**.

The nurse should educate the client about the correct application and removal techniques, the recommended duration for wearing compression stockings (e.g., daily), and the importance of regular assessment for proper fit and effectiveness.

Incorrect:

Proper skin care and wound prevention

Clients with CVI should be educated on proper skin care and wound prevention due to the increased risk of venous ulcers and eczema. However, compression stocking education is the priority because it can *reduce the risk of skin complications and wounds*.

Elevating legs after standing

Elevating the legs after standing promotes venous blood flow and reduces swelling. However, it is not the priority compared to the proper use of compression stockings, which provide continuous support to the venous system throughout the day and *reduce the risk of edema*.

Regular exercise and movement

Regular exercise and movement are beneficial for promoting circulation and aiding venous return. However, this is not the priority compared to properly using compression stockings. Exercise takes time to improve CVI, so compression therapy will be *more immediately effective in preventing complications*.

Key Takeaway:

- Compression stockings are the priority intervention for clients with CVI to prevent complications.

- Clients with CVI should be educated on:
 - Compression stockings
 - Skin and wound care
 - Elevating legs
 - Regular exercise and movement

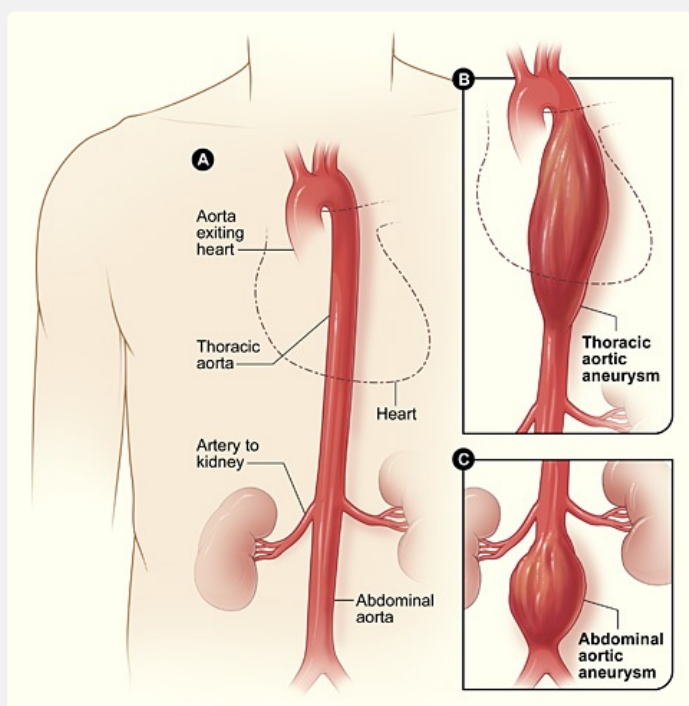
Question: 62 — **Type:** multipleChoice

The nurse is caring for a client with an abdominal aortic aneurysm.

Which of the following interventions should the nurse include in the client's plan of care?

1. Frequently assess for the presence of any back pain
2. Administer aspirin for mild to moderate abdominal pain
3. Palpate the abdominal mass to monitor aneurysm growth
4. Administer IV fluids to keep the systolic blood pressure over 140

Explanation:



An **abdominal aortic aneurysm (AAA)** is a localized enlargement of the abdominal aorta. The nurse should prioritize **monitoring for signs of rupture**, which is potentially fatal due to **severe internal bleeding**. The nurse should frequently **assess for the presence of any back pain**, especially if it's **sudden and severe**, as this can indicate rupture [**Choice 1**].

The nurse should also avoid **palpating the abdomen**, which could put pressure on the aneurysm or **increase the client's blood pressure**, which strains the weakened aortic wall.

Incorrect:

Administer aspirin for mild to moderate abdominal pain

Aspirin is an antiplatelet medication that can *increase the risk of bleeding*, especially if the aneurysm ruptures, and might mask symptoms of rupture (i.e., pain).

Palpate abdominal mass to monitor aneurysm growth

Palpating an abdominal aneurysm is *contraindicated*, as it could potentially cause a rupture and lead to severe internal bleeding. Typically, the size of an AAA is monitored via imaging studies, like ultrasound or CT scan.

Administer IV fluids to keep systolic blood pressure over 140

Hypertension strains the walls of the aneurysm, increasing the risk of rupture. To avoid unnecessary pressure on the aneurysm, the nurse should administer antihypertensives and beta-blockers (i.e., esmolol) to keep the *systolic BP 100-120 mmHg* and the *pulse under 60*.

Key Takeaway:

- When caring for a client with an AAA, the nurse should monitor back pain, a sign of rupture that is potentially fatal due to severe internal bleeding.

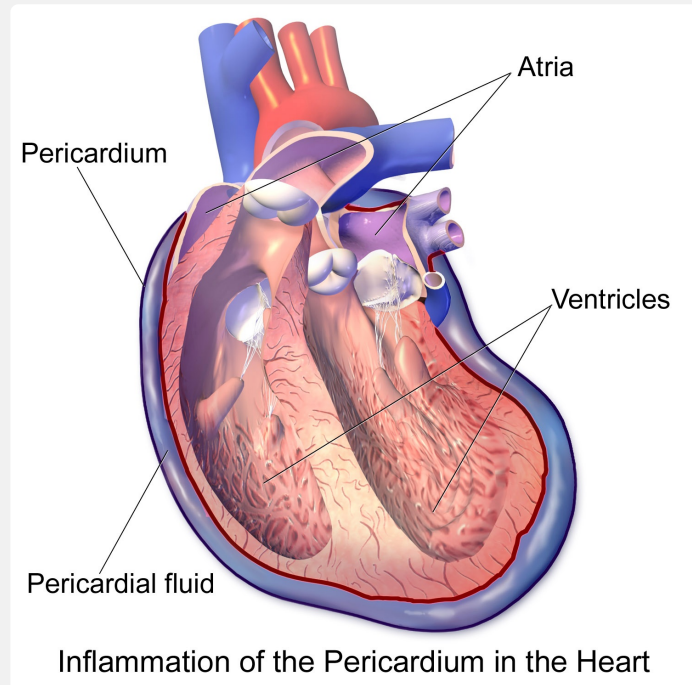
Question: 63 — Type: multipleChoice

The nurse is caring for a client with suspected pericarditis.

Which of the following findings would support a diagnosis of pericarditis?

1. Splinter hemorrhages in nail beds
2. Increased chest pain when leaning forward
3. Cardiac murmur at left lower sternal border
4. Widespread ST elevations on a 12-lead ECG

Explanation:



Pericarditis occurs when the **pericardium becomes inflamed** due to infectious (viral) or noninfectious (myocardial infarction, autoimmune disorders) causes. Pericarditis can lead to cardiac tamponade, where inflammation causes fluid buildup in the pericardial sac that constricts the heart, preventing complete cardiac contractions.

Pericardial inflammation impairs the repolarization of cardiac tissue and manifests as **widespread ST elevations on an ECG [Choice 4]**. The rhythm should return to baseline after the inflammation is treated with anti-inflammatory medications. Other manifestations include **fever, leukocytosis, and dyspnea**.

Incorrect:

Splinter hemorrhages

Splinter hemorrhages are reddish-brown lines on the nails and are characteristic of *endocarditis*, inflammation of the innermost layer of the heart. Valvular vegetations composed of fibrin, platelets, leukocytes, and bacteria form within the heart, with small fragments breaking off and causing splinter hemorrhages when lodged in nail beds.

Chest pain when leaning forward

Pericarditis pain is aggravated by inhalation or *lying down*. Sitting upright and leaning forward can reduce pressure on the inflamed pericardium and minimize the rubbing between its layers. This change in position leads to a temporary reduction in pain.

Murmur

A murmur is an abnormal heart sound caused by incomplete closure of a heart valve and is not characteristic of pericarditis. However, pericarditis produces a *pericardial friction rub*, a scratching, high-pitched sound heard at the left lower sternal border caused by rubbing of the inflamed, roughened sac against the epicardium.

Key Takeaways:

Pericarditis manifestations include:

- Widespread ST elevations
- Fever and leukocytosis
- Pericardial friction rub
- Relief when sitting up and leaning forward

Question: 64 — Type: multipleChoice

The nurse reviews the Diagnostic Results for a client who became unresponsive and has no palpable pulse. The nurse observes that the client has gasping respirations.

Diagnostic Results

12-lead electrocardiogram (ECG)

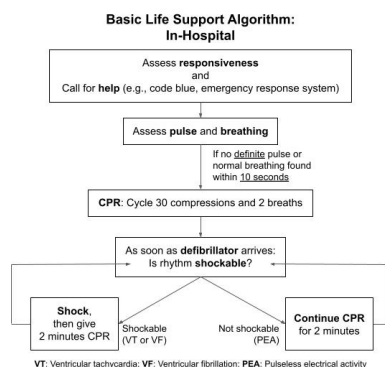
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Which of the following actions should the nurse take?

1. Initiate chest compressions.
2. Administer IV push atropine.
3. Obtain a 12-lead electrocardiogram.
4. Deliver rescue breaths with a bag-valve mask.

Explanation:



Pulseless electrical activity (PEA) is characterized by the **presence of organized electrical activity** on the electrocardiogram (ECG) **without the presence of a palpable pulse**. PEA occurs when there is a disconnect between the electrical system and mechanical action of the heart. ECG activity may appear normal, but the **heart fails to contract**.

PEA often indicates a severe systemic problem, such as hypoxia. The immediate treatment for **any pulseless rhythm** is maintaining organ perfusion with **high-quality chest compressions [Choice 1]**.

Incorrect:

Administer IV push atropine

Atropine is used to treat symptomatic bradycardia, but it is not the treatment for PEA. Given that the client is unresponsive and *pulseless*, despite electrical activity on the ECG, initiating CPR is the priority over administering atropine.

Obtain 12-lead ECG

Although a 12-lead ECG can provide more information about the heart's electrical activity, the client's current status (unresponsive and no palpable pulse) requires *immediate life-saving measures* such as initiating chest compressions. Time spent to obtain a 12-lead ECG could be used instead to perform potentially life-saving interventions.

Deliver rescue breaths with bag-valve mask

Rescue breathing with a bag-valve mask is indicated when a client is not breathing but *has a pulse*. This client does not have a pulse, so chest compressions take priority.

Key Takeaway:

- PEA is characterized by the presence of organized electrical activity on the ECG without the presence of a palpable pulse.
- The immediate treatment for any pulseless rhythm is high-quality chest compressions.

Question: 65 — Type: matrixMultipleChoice

The nurse caring for a 62-year-old female client in the emergency department has reviewed the client's Vital Signs and History and Physical.

Vital Signs

	1100	1115
T	98.2 F (36.8 C)	97.5 F (36.4 C)
P	80	93
RR	18	20
BP	190/90	200/100
Pulse oximetry reading	95% on room air	96% on room air

History and Physical

Body System	Findings
Neurological	Client drowsy and oriented to person and place but not time; cooperative, slightly anxious; no blurred vision; reports frontal headache 8/10 and dizziness
Cardiovascular	S1 and S2 present; client reports chest discomfort; client measured BP of 210/100 at home and called ambulance
Respiratory	Chest clear on auscultation, no adventitious sounds; respirations unlabored and regular
Gastrointestinal	Nausea, no vomiting; bowel sounds present in all quadrants
Psychosocial	Client lives alone in a subsidized apartment complex; unemployed; history of hypertension, angina, and anxiety; client told paramedics she has not been taking blood pressure medications for over 2 months because they were "too expensive"

For each potential nursing intervention, click to specify whether the intervention is anticipated or not anticipated in the care of the client.

Potential Nursing Interventions	Anticipated	Not Anticipated
1. Prepare the client for a head CT	✓	
2. Perform a 12-lead electrocardiogram (ECG)	✓	
3. Administer labetalol 100 mg PO once		✓
4. Calculate the mean arterial pressure (MAP)	✓	
5. Target a BP of 130/80 within the first hour		✓
6. Perform frequent neurologic checks	✓	
7. Monitor BP every 5-15 minutes with an automatic, noninvasive BP machine	✓	

Note: Each row must have 1 response option selected.

Explanation:

Hypertensive emergency is a sudden, severe rise in BP (>180/120) accompanied by signs of **end-organ damage** (e.g., chest pain, **neurologic**

changes in *hypertensive encephalopathy*). BP should be lowered **gradually** to avoid a sudden decrease in organ perfusion that can precipitate **cerebral and cardiac ischemia**.

Anticipated interventions include:

- **Preparing the client for a head CT** to rule out hemorrhagic stroke, which also causes severe headache and hypertension [**Choice 1**].
- **Performing a 12-lead electrocardiogram (ECG)**, as extreme hypertension increases cardiac workload and can precipitate myocardial infarction (MI) [**Choice 2**].
- **Calculating the mean arterial pressure (MAP)**, which is the average of the systolic and diastolic pressures and better reflects the body's autoregulation of BP [**Choice 4**].
- **Performing frequent neurologic checks** to monitor for cerebrovascular ischemia as BP is lowered [**Choice 6**].
- **Monitoring BP every 5-15 minutes** to closely and slowly titrate medications for a goal MAP [**Choice 7**].

Interventions that are **not anticipated** include:

- Administering labetalol PO [**Choice 3**]. Oral medications do not work quickly enough to treat hypertensive emergency. This client requires treatment with rapid-onset **IV antihypertensives** (e.g., IV nicardipine).
- Targeting a BP of 130/80 in one hour [**Choice 5**]. MAP should be lowered **by no more than 20-25% in the first hour**, as a rapid drop in BP can cause a stroke or MI.

Key Takeaway:

Interventions for hypertensive emergency include:

- Ruling out complications (e.g., with ECG, head CT).
- Titrating antihypertensives to lower MAP by <25% in the first hour.
- Performing frequent neurologic checks.

Question: 66 — Type: multipleChoice

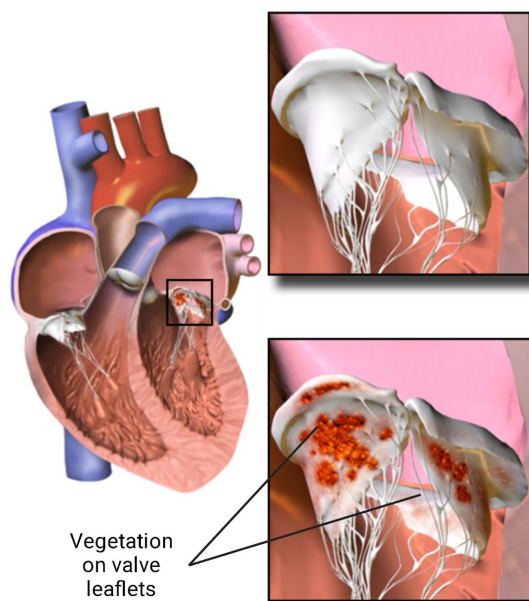
The nurse is caring for a client with infective endocarditis of the mitral valve who is being readmitted to the hospital from home with a suspected peripherally-inserted central catheter (PICC) line infection.

Which order should the nurse **prioritize**?

1. Discontinue the PICC line.
2. Collect 2 sets of blood cultures.
3. Prepare the client for an echocardiogram.
4. Insert a peripheral vascular access device (VAD).

Explanation:

Infective Endocarditis



Infective endocarditis occurs when bacteria in the bloodstream (e.g., from dental procedures, IV drug use) deposit and form **vegetations** on the

heart valves. Infective endocarditis often requires treatment with several weeks of **IV antibiotics** administered at home through a PICC line. In infective endocarditis, bacteria are in direct contact with the bloodstream and can re-circulate and **infect foreign bodies** (e.g., implanted pacemakers, **PICC lines**).

The priority intervention is **discontinuing the PICC line**, which is a source of infection and possible sepsis **[Choice 1]**. The tip of the line can be cut and cultured to identify the infectious organism.

Incorrect:

Collect 2 sets of blood cultures

Blood cultures are indicated to identify the infectious organism. However, discontinuing and culturing the PICC line will provide culture data while also removing the infectious source.

Prepare the client for an echocardiogram

An echocardiogram will help visualize changes in the severity of valvular vegetation and regurgitation. This client is being readmitted for secondary PICC line infection, and there is no indication of worsening valve function (e.g., heart failure). Therefore, the echocardiogram can be delayed.

Insert a peripheral vascular access device (VAD)

A new VAD is indicated to administer IV antibiotics. However, antibiotics should not be initiated until cultures are collected, so this action can be deferred.

Key Takeaway:

- Infective endocarditis requires several weeks of treatment with IV antibiotics, usually through a PICC line.
- If a PICC line becomes infected, the priority action is discontinuing the line to remove the source of infection.

Question: 67 — Type: highlight

The nurse is performing a screening risk assessment for a client admitted to the medical surgical unit.

Health History

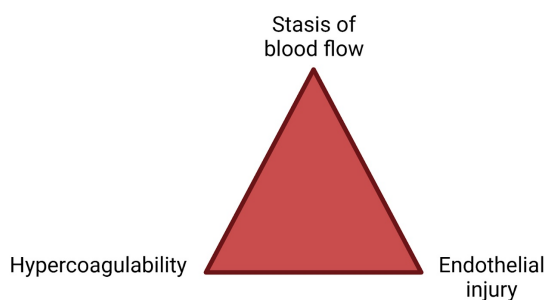
72 year-old client admitted to the orthopedic unit for open reduction internal fixation of a nondisplaced femoral neck fracture. Sustained a fall after tripping over the family dog. Alert and oriented to person, place, and time. Reports left hip pain 4 out of 10 on the numerical rating scale. Abdomen obese, nontender. Last bowel movement today. Peripheral intravenous line in the right antecubital vein. History of depression, cigarette smoking, and benign prostatic hyperplasia.

Click to highlight the findings from the client's history that increase the risk of venous thrombosis.

✓ 72 year-old client admitted to the orthopedic unit for open reduction internal fixation of a ✓ nondisplaced femoral neck fracture. Sustained a fall after tripping over the family dog. Alert and oriented to person, place, and time. Reports left hip pain 4 out of 10 on the numerical rating scale. Abdomen ✓ obese, nontender. Last bowel movement today. ✗ Peripheral intravenous line in the right antecubital vein. History of ✗ depression, ✓ cigarette smoking, and ✗ benign prostatic hyperplasia.

Explanation:

Virchow's Triad



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Risk factors for developing venous thromboembolism (VTE) (e.g., deep vein thrombosis, pulmonary embolism) are related to *venous stasis*, *endothelial damage*, and blood *hypercoagulability*.

Advanced age (e.g., **72 years old**) and **obesity** both decrease circulation and induce changes in the vein walls and valves, making clients more prone to developing venous stasis. Long bone fractures (e.g., **nondisplaced femoral neck fracture**) lead to immobility, venous stasis, and trauma to blood vessels, which damages the vascular endothelium. Inflammation and atherosclerosis-related to **cigarette smoking** causes additional endothelial damage.

Incorrect:

Peripheral IV line

A peripheral IV line in an upper extremity does not increase the risk of VTE. A peripheral IV line placed in a *lower extremity*, however, can decrease mobility and potentially create local endothelial damage (e.g., thrombophlebitis). Central catheters (e.g., peripherally inserted central catheter [PICC]) can cause endothelial damage due to catheter length and duration of use.

Depression

Depression alone does not directly increase the risk for venous thrombosis. If depression presents as physical inactivity, immobility can contribute to venous stasis and VTE.

Benign prostatic hyperplasia (BPH)

BPH is a localized genitourinary disease that does not cause hypercoagulability, venous stasis, or endothelial damage; however, the presence of prostate cancer or other malignancies would contribute to VTE risk.

Key Takeaway:

Risk factors for developing venous thrombosis include:

- Obesity
- Tobacco use
- Advanced age
- Fractured leg or hip

Question: 68 — **Type:** multipleChoice

Four clients have arrived at the emergency department.

Which client should the nurse assess **first**?

1. A 68-year-old female with indigestion, nausea, and shoulder pain
2. A 19-year-old female with sickle cell anemia reporting severe pain in the lower back and legs
3. A 48-year-old male with a superficial stab wound to the lower leg covered with a clean, dry pressure bandage
4. An 82-year-old male with chronic anemia who has a hemoglobin of 7.6 g/dL (76 g/L) (reference range: 14-18 g/dL [140-180 g/L])

Explanation:

Females experiencing a myocardial infarction (MI) are less likely to report chest pain and can have vague clinical manifestations instead, including **weakness, shortness of breath, nausea, indigestion, and diaphoresis**. Clients with MI symptoms require emergent 12-lead electrocardiogram, troponin levels, and possible percutaneous coronary intervention to restore cardiac perfusion and to prevent **lethal dysrhythmias** and **sudden cardiac death** [**Choice 1**].

Incorrect:

Sickle cell anemia with severe pain

Sickle cell anemia is an inherited condition that results in sickle-shaped red blood cells. The cells can clump together in response to dehydration or another trigger, which obstructs blood flow systemically and causes a painful *vaso-occlusive crisis*. This client requires urgent administration of oxygen, pain medication, and fluids. However, the client at risk for sudden cardiac death takes priority.

Stab wound to the lower leg

Clients with penetrating trauma (e.g., gunshot, stabbing) require urgent wound care, imaging, and possible interventions to restore blood volume if bleeding. However, this client's wound dressing is clean and dry, indicating that bleeding is controlled.

Hemoglobin level of 7.6 g/dL (76 g/L)

A client with anemia requires a possible blood transfusion. However, this is a chronic condition for this client and the hemoglobin level is not low

enough to require immediate transfusion (e.g., <7 g/dL [70 g/L]).

Key Takeaway:

- Females with an MI may only develop vague symptoms other than chest pain, such as weakness, nausea, and indigestion.
- A client with signs of MI should be evaluated immediately with a 12-lead electrocardiogram.

Question: 69 — Type: multipleResponse

The nurse cares for a client admitted to the medical-surgical unit with a deep vein thrombosis (DVT) of the left leg.

Which of the following does the nurse anticipate as part of this client's interprofessional care? **Select all that apply.**

1. The healthcare provider orders a 1000 mL/day fluid restriction.
2. A physical therapist assists the client in ambulating in the halls.
3. The pharmacist confirms the client's weight for dosing of enoxaparin.
4. The dietician counsels the client to increase intake of kale and spinach when warfarin therapy is initiated.
5. The unlicensed assistive personnel (UAP) applies lotion and massages the client's bilateral lower extremities.

Explanation:

Interprofessional care for a client with deep vein thrombosis (**DVT**) focuses on preventing the clot from growing (e.g., anticoagulation) and breaking off and traveling to the lungs (i.e., pulmonary embolism).

The physical therapist should assess the client's mobility status and perform gentle exercises, as appropriate, to promote circulation (e.g., **ambulating in the hall**), preventing further clot formation and decreasing edema and pain [**Choice 2**].

Enoxaparin is a low-molecular-weight heparin (LMWH) anticoagulant used to prevent and treat venous thrombosis. Enoxaparin dosing is based on the client's weight; therefore, the **pharmacist should confirm the client's weight** to prevent medication errors related to over- or under-dosing [**Choice 3**].

Incorrect:

Orders 1000 mL/day fluid restriction

Clients with DVT should maintain adequate hydration as dehydration can cause hypercoagulability. Therefore, fluid intake is encouraged.

Counsels to increase kale and spinach when warfarin is initiated

If anticoagulation with warfarin is prescribed, the dietician should recommend *consistent* intake of green, leafy vegetables (e.g., kale, spinach) to avoid fluctuations in vitamin K levels. Vitamin K interferes with the action of warfarin.

Applies lotion and massages bilateral lower extremities

The UAP should *avoid massaging* the affected extremity to prevent the thrombus from breaking off and traveling (embolizing) to the pulmonary artery (i.e., pulmonary embolism).

Key Takeaway:

Care of a client with DVT focuses on preventing the clot from growing and/or breaking off and traveling to the lungs and includes:

- Anticoagulation therapy (e.g., enoxaparin, warfarin)
- Adequate fluid intake
- Early, gentle mobilization

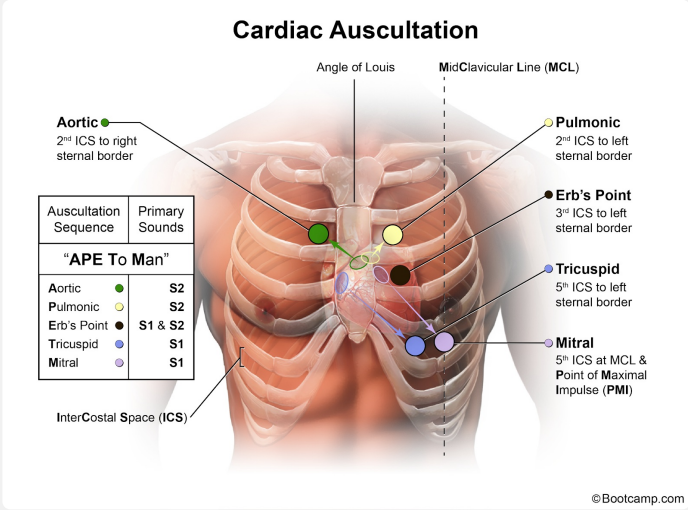
Question: 70 — Type: hotSpot

The nurse is assessing a client admitted for syncope on exertion and dyspnea. The client has a history of aortic stenosis.

Over which of the following locations should the nurse auscultate for the client's murmur? **Click on the correct location.**

1. None

Explanation:



Valvular disorders (e.g., stenosis, regurgitation) are best heard over their respective auscultation areas.

The aortic valve is auscultated at the **2nd intercostal space at the right sternal border**. In **aortic stenosis (AS)**, there's a **narrowing of the aortic valve opening**, which restricts blood flow from the left ventricle into the aorta. This results in a **systolic ejection murmur** best heard at the base of the heart and often radiates to the carotids (can be heard over the neck).

AS can result from **congenital abnormalities defects, rheumatic fever, or age-related calcification** of the valve. As the disease progresses, individuals may experience a triad of symptoms from decreased cardiac output: **angina, syncope, and dyspnea on exertion**. If left untreated, the heart must work harder to pump blood through the narrowed valve, leading to **left ventricular hypertrophy** and, ultimately, heart failure.

Incorrect:

Auscultation at the **2nd intercostal space at the left sternal border** would detect abnormalities in the **pulmonic valve** (e.g., pulmonic stenosis).

Auscultation at the **4th or 5th intercostal space at the left sternal border** would detect abnormalities in the **tricuspid valve** (e.g., tricuspid regurgitation).

Auscultation at the **5th intercostal space at the midclavicular line** would detect abnormalities in the **mitral valve** (e.g., mitral valve prolapse).

Key Takeaway:

- Aortic stenosis is caused by a narrowing of the aortic valve opening.
- Aortic stenosis causes a systolic murmur heard at the 2nd intercostal space, right sternal border.

Question: 71 — Type: multipleChoice

The nurse is caring for a client who reports palpitations. The nurse measures the client's Vital Signs, obtains a 12-lead ECG per protocol, and places the rhythm strip in the client's Diagnostic Results. The unlicensed assistive personnel brings the defibrillator to the bedside.

Diagnostic Results

12-lead electrocardiogram (ECG)

1000:



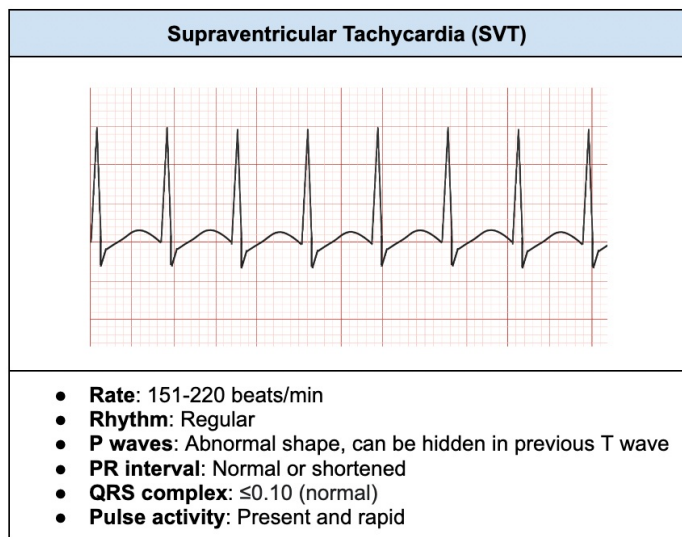
Vital Signs

T	1000
P	98.9 F (37.1 C)
RR	214
BP	22
Pulse oximetry reading	98/64
	97% on room air

Which **initial** action should the nurse anticipate taking?

1. Administer an IV bolus of amiodarone
2. Use the defibrillator to deliver a shock for defibrillation
3. Ask the client to “bear down as if having a bowel movement”
4. Use the defibrillator to deliver a shock for synchronized cardioversion

Explanation:



Rapid, narrow QRS complexes without discernable P waves indicate **supraventricular tachycardia (SVT)**, in which an ectopic foci repeatedly discharges electrical signals that stimulate the ventricles to beat rapidly. Without adequate time for ventricular filling, this can cause shock, altered mental status, and **pulselessness**.

The **Valsalva maneuver** is a quick, low-risk intervention for clients experiencing **stable** tachydysrhythmias SVT (i.e., **without signs of shock**) [Choice 3]. Asking the client to **bear down as if having a bowel movement** induces vagal stimulation of the SA and AV nodes to fire strong enough impulses to reassume a normal, organized rhythm.

Incorrect:

Administer an IV bolus of amiodarone

Amiodarone terminates supraventricular and ventricular tachycardias by blocking sympathetic receptors and ion channels (e.g., calcium, potassium). Amiodarone may be given if vagal maneuvers fail; however, amiodarone is highly toxic to the lungs, liver, and thyroid. The nurse should attempt *less invasive methods first*.

Use the defibrillator to deliver a shock for defibrillation

Ventricular fibrillation and *pulseless* ventricular tachycardia require cardiopulmonary resuscitation with high-quality chest compressions and defibrillation. Ventricular tachycardia can deteriorate into ventricular fibrillation, which requires defibrillation; however, this client has a pulse.

Use the defibrillator to deliver a shock for synchronized cardioversion

Synchronized cardioversion applies a timed dose of electricity to restore normal cardiac conduction. This is an invasive maneuver that may be attempted if vagal maneuvers fail.

Key Takeaway:

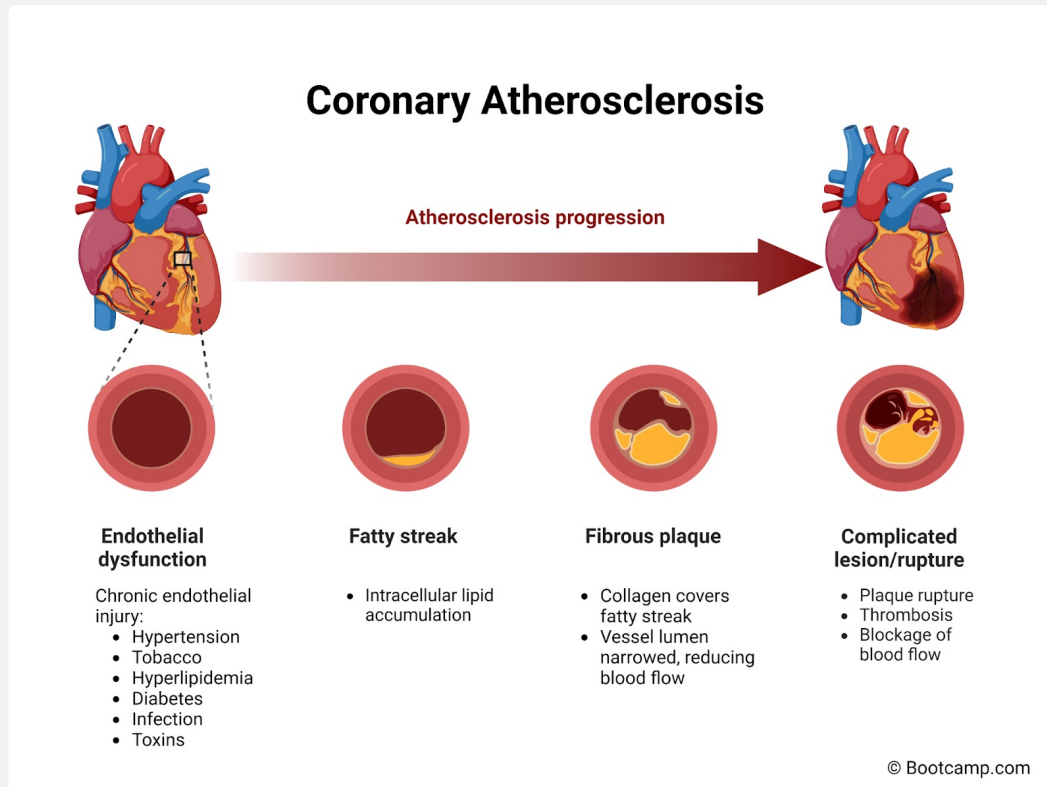
- Rapid, narrow QRS complexes without P waves indicate supraventricular tachycardia.
- The Valsalva maneuver is a quick, low-risk intervention to terminate stable tachydysrhythmias.

The client with chronic stable angina asks the nurse, "What causes my chest pain?"

How should the nurse respond?

1. "Lack of oxygen to your heart muscle causes chest pain."
2. "Your heart is not able to pump blood to your body adequately."
3. "Your myocardium is experiencing hypoxemia from hypoperfusion."
4. "You are having spasms in the arteries around your heart when you smoke."

Explanation:



Narrowing of the coronary arteries from **atherosclerosis** can cause myocardial ischemia with poor cardiac perfusion, especially during times of increased oxygen demand (exertion, stress). **Lack of oxygen to the heart muscle causes chest pain** (i.e., angina) and is usually manifested as midsternal chest pressure or discomfort, shoulder pain, and jaw pain that is relieved by rest or nitrate therapy **[Choice 1]**.

Incorrect:

"Your heart is not able to pump blood to your body adequately."

An inability of the heart to pump blood adequately to meet the body's needs is known as heart failure. Unless chronic stable angina progresses to heart failure, impairments in cardiac perfusion are short-lived and do not affect perfusion to the body.

"Your myocardium is experiencing hypoxemia from hypoperfusion."

Although this information is technically correct, the statement contains complex medical terms that most clients would not understand. Client education should be presented at the client's level of understanding without the use of medical jargon.

"You are having spasms in the arteries around your heart when you smoke."

This statement describes Prinzmetal's angina (variant angina) that is precipitated by spasms of the coronary arteries, not by atherosclerosis. It often occurs at rest and may be precipitated by substances that constrict arteries (smoking, cocaine, cold environment).

Key Takeaway:

- Pain from chronic stable angina is caused by narrowing of the coronary arteries by atherosclerosis.
- Chest pain is precipitated by physical exertion or stress which increases oxygen demand and results in short-term lack of perfusion to the cardiac muscle.

Question: 73 — Type: multipleChoice

The nurse is caring for a client with a myocardial infarction (MI) who is experiencing chest pain that is unrelieved following three doses of nitroglycerin. The nurse reviews the client's Vital Signs from 0900.

Vital Signs	
	0900
T	98.7 F (37.0 C)
P	92
RR	18
BP	108/78
Pulse oximetry reading	97% on room air
Pain	8/10

Which of the following actions should the nurse take?

1. Administer morphine IV.
2. Apply supplemental oxygen.
3. Administer the fourth dose of nitroglycerin.
4. Coach the client on deep breathing exercises.

Explanation:

Acute myocardial infarction (MI) occurs when cardiac tissue fails to receive adequate oxygenation. **Morphine** is used during MIs to **relieve chest pain** that is unresolved following nitroglycerin. Additionally, morphine **reduces anxiety and cardiac workload** by lowering the heart's oxygen demand, contractility, blood pressure, and heart rate.

This client continues to have chest pain despite receiving three doses of nitroglycerin. Therefore, the nurse should administer morphine IV **[Choice 1]**.

Incorrect:

Apply supplemental oxygen

Supplemental oxygen is typically administered to clients experiencing an MI who are *hypoxic or dyspneic* to maintain an oxygen saturation $\geq 90\%$. Oxygen is no longer automatically administered for MIs due to the risk for oxygen toxicity, which causes oxygen-induced vasoconstriction, worsening cardiac ischemia. Since the client's oxygen saturation is normal, oxygen is not indicated.

Administer fourth dose of nitroglycerin (NTG)

The standard protocol for acute chest pain involves administering up to three doses of sublingual NTG over 15 minutes (5 minutes apart). If the pain is unrelieved after three doses, more aggressive treatment is needed. Administering additional NTG is not indicated due to the *risk of significant hypotension*.

Coach client on deep breathing

While deep breathing exercises reduce stress and improve oxygenation, it *does not address the unrelieved chest pain* of a myocardial infarction. Instead, morphine should be administered to address pain.

Key Takeaway:

- Morphine is administered for clients experiencing an MI who have unrelieved chest pain following NTG administration.
- Morphine provides pain relief and has vasodilatory effects that reduce cardiac workload.

Question: 74 — Type: matrixMultipleChoice

The nurse cares for a 52-year-old male client at the clinic who is being sent home with an ambulatory blood pressure monitor (ABPM).

For each client statement, click to specify whether the statement indicates an understanding or no understanding of the teaching provided.

Client Statements	Understanding	No Understanding
1. "The device will take my blood pressure every 30 minutes throughout the day."	✓	
2. "I should wear the device during the day and remove it before bed."		✓

3. "I'll create a daily log so I can track what I was doing throughout the day."	✓	
4. "I'll try to keep my arm still when I feel the cuff squeezing my arm."	✓	
5. "The purpose of this test is to help my health care provider diagnose me with any cardiac arrhythmias."		✓

Note: Each row must have 1 response option selected.

Explanation:

Ambulatory blood pressure monitoring (ABPM) is worn on the wrist or upper arm and measures a client's BP at home when in-office BP readings are suspected to be an inaccurate. ABPM is useful to identify "**white-coat hypertension**," in which clients' BP rises during clinic visits but returns to normal at home.

The client should demonstrate **understanding** of these teaching points:

- The device will measure BP at preset intervals (e.g., every 15-30 minutes) throughout a 24-hour period **[Choice 1]**.
- Maintain a log of daily activities or symptoms that might correlate with changes in BP (e.g., exercising, feeling dizzy) **[Choice 3]**.
- When the blood pressure cuff begins to inflate, remain still and keep the arm relaxed at the side **[Choice 4]**.

No understanding:

- The device should be worn around the clock and **should not be removed during sleep**, as several causes of secondary hypertension (e.g., pheochromocytoma, Cushing syndrome) can cause nocturnal spikes in BP **[Choice 2]**.
- The purpose of ABPM is to determine the client's baseline BP for treatment purposes **[Choice 5]**. A client with suspected arrhythmias should undergo **Holter monitoring**, in which electrodes are worn at home for a predetermined period (e.g., 14 to 30 days) to detect electrocardiogram changes.

Key Takeaway:

- ABPM measures BP around the clock to confirm suspected white-coat hypertension or establish a baseline BP for treatment.
- Clients undergoing ABPM should maintain a log of daily activities and relax the arm at the side when the BP cuff inflates.

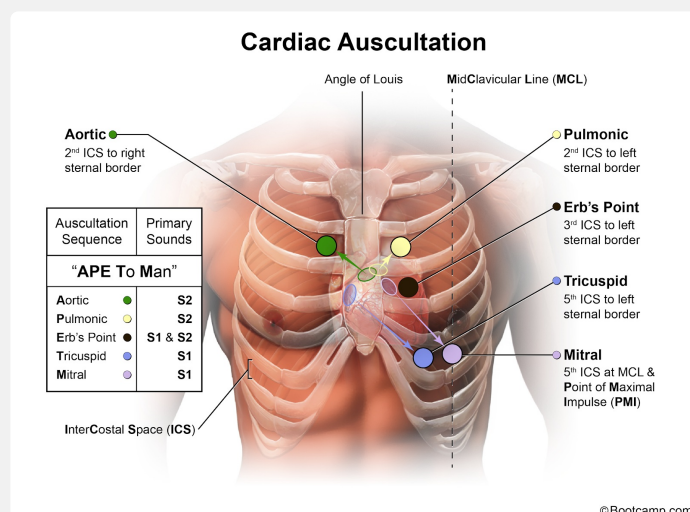
Question: 75 — Type: hotSpot

The nurse is assessing a client admitted due to syncope on exertion and dyspnea. The client has a history of mitral valve prolapse.

Over which of the following locations would the nurse auscultate for the client's prolapse? Click on the correct location.

1. None

Explanation:



Valvular disorders (e.g., stenosis, regurgitation, prolapse) are best heard over their respective auscultation areas.

The mitral valve is auscultated in the **5th intercostal space at the midclavicular line (apex)**. In **mitral valve prolapse (MVP)**, there is an incomplete closure of the mitral valve, creating a mid-systolic click and murmur best heard with the client in the left lateral position. The murmur occurs when the valve leaflets prolapse and blood flows backward from the left ventricle into the left atrium, and a click is heard when the leaflets abruptly close.

MVP occurs in about 3% of the population. While most are asymptomatic, about 10% may experience chest pain, syncope, and palpitations. Treatment includes beta-blockers and valve replacement. Untreated MVP may progress to left ventricular heart failure due to the buildup of blood in the left ventricle.

Incorrect:

Auscultation at the 2nd intercostal space at the right sternal border would detect abnormalities in the **aortic valve** (e.g., aortic stenosis).

Auscultation at the 2nd intercostal space at the left sternal border would detect abnormalities in the **pulmonic valve** (e.g., pulmonic stenosis).

Auscultation at Erb's point, located at the 3rd intercostal space at the left sternal border, would detect abnormalities in the **aortic or pulmonic valve**.

Auscultation at the 4th or 5th intercostal space at the left sternal border would detect abnormalities in the **tricuspid valve** (e.g., tricuspid regurgitation).

Key Takeaway:

- MVP is caused by incomplete closure of the mitral valve leaflets.
- MVP causes a regurgitation murmur and mid-systolic click best heard at the 5th intercostal space, midclavicular line, with the client in a left lateral position.

Question: 76 — Type: multipleResponse

The clinic nurse educates a 21-year-old female client who works as a server in a restaurant on lifestyle changes to manage her Raynaud phenomenon.

Which of the following statements should the nurse include? **Select all that apply.**

1. "Limit or completely avoid caffeinated food and beverages."
2. "Limit or completely avoid cigarettes or other nicotine products."
3. "Wear warm gloves or mittens whenever outdoors in the winter."
4. "Monitor your hands and toes for any injuries or breaks in the skin."
5. "Keep a small dish towel handy at work to use to handle cold beverages."

Explanation:

Raynaud disease is a **vasospastic phenomenon** of the small arteries in the fingers, toes, nose, and ears. **Episodes** occur in response to a trigger, usually **cold exposure, stress, or medications** with vasoconstrictive effects (e.g., tobacco, caffeine). The trigger induces painful vasospasm, which decreases perfusion to the affected area, causing the skin to turn **white** or **blue**, followed by **redness** once blood flow is restored.

Client education should focus on **reducing vasospastic episodes** and **managing symptoms**:

- Avoid **vasospastic medications** such as caffeine, tobacco, amphetamines, and over-the-counter decongestants (e.g., pseudoephedrine) **[Choices 1 and 2]**.
- Avoid **exposing the fingers or toes to extreme cold**. The client should always cover the hands in cold weather and should avoid direct contact with cold objects **[Choices 3 and 5]**.
- **Prevent injury** to the fingers or toes and **monitor for skin damage [Choice 4]**. Frequent attacks can cause the fingernails and skin to become brittle, which can lead to gangrenous ulcers.
- Vasospastic episodes can be treated with **topical vasodilators** (i.e., nitroglycerin paste) or by **immersing the hands in warm water**.
- Engage in **stress-management** techniques (e.g., guided meditation).

Key Takeaway:

- Raynaud phenomenon occurs when exposure to a trigger induces painful vasospasm.
- Clients with Raynaud phenomenon should avoid triggers by limiting cold exposure, nicotine, caffeine, and stress.

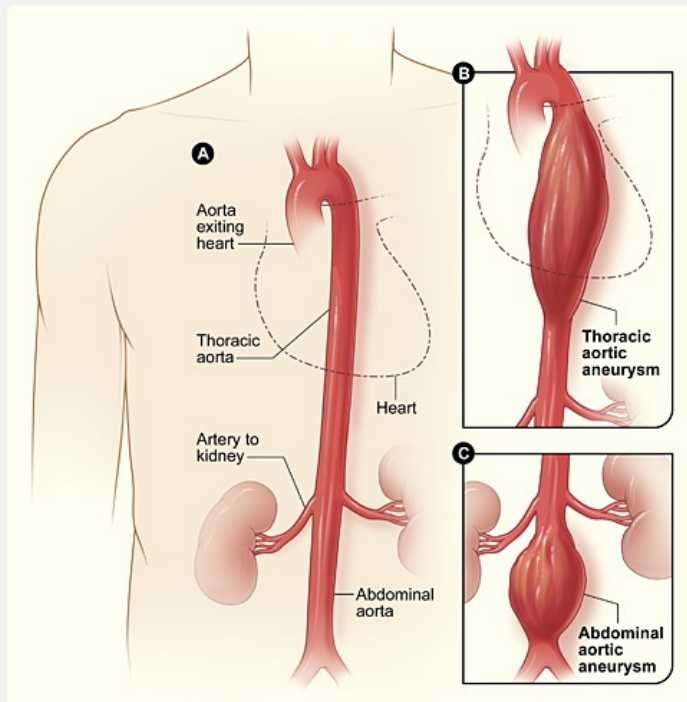
Question: 77 — Type: multipleChoice

The nurse is caring for a client with an abdominal aortic aneurysm.

Which of the following findings would require **immediate** follow-up?

1. Presence of abdominal bruit
2. Low back pain radiating to the groin
3. Systolic blood pressure 100 mmHg
4. Voice hoarseness and difficulty swallowing

Explanation:



An **abdominal aortic aneurysm (AAA)** is a localized enlargement of the abdominal aorta. The nurse should prioritize **monitoring for signs of rupture**, which is potentially fatal due to **severe internal bleeding**.

The **rupture of an AAA** often presents with **sudden, severe abdominal or back pain** that may radiate to the groin, buttocks, or legs [**Choice 2**]. This is a medical emergency requiring immediate follow-up and potentially emergency surgery.

Incorrect:

Presence of abdominal bruit

An abdominal bruit (a sound heard over an artery when listening with a stethoscope) can indeed indicate the presence of an AAA, but it doesn't mean the aneurysm is about to rupture. This would not necessitate immediate follow-up, although the bruit should be documented and reported to the provider.

Systolic blood pressure 100 mmHg

Hypertension strains the walls of the aneurysm, increasing the risk of rupture. To avoid unnecessary pressure on the aneurysm, the nurse should administer antihypertensives and beta-blockers (i.e., esmolol) to keep the *systolic BP between 100-120 mmHg* and the *pulse under 60*.

Voice hoarseness and difficulty swallowing

These symptoms could indicate pressure from the AAA on the esophagus, but they do not indicate rupture.

Key Takeaway:

- In a client with an AAA, sudden, severe abdominal or back pain radiating to the groin, buttocks, or legs indicates possible rupture, a medical emergency requiring possible emergency surgery.

new prescription for amlodipine 5 mg PO.

For each statement made by the client, click to specify whether the statement indicates an understanding or no understanding of the teaching provided.

Client Statements	Understanding	No Understanding
1. "The goal is for my blood pressure to be under 130/80 mmHg."	✓	
2. "I should start taking water aerobics classes at the local community center."	✓	
3. "I can stop taking my blood pressure medicine once I feel better."		✓
4. "Managing my blood pressure decreases my chance of having a stroke."	✓	
5. "I usually take my blood pressure first thing in the morning after my coffee."		✓
6. "I'll start using light balsamic dressing instead of ranch dressing on my salads."	✓	
7. "I should limit myself to 2 glasses of wine with dinner."		✓
8. "I should sit at the side of the bed for a few minutes before getting up in the morning."	✓	

Note: Each row must have 1 response option selected.

Explanation:

Hypertension education focuses on lifestyle modifications. Clients should demonstrate **understanding** of these teaching points:

- **Antihypertensive therapy targets a goal blood pressure <130/80 mmHg for adults [Choice 1].** It may take several weeks for the client's average BP to reach this goal.
- Physical activity (e.g., **water aerobics**) lowers BP, promotes relaxation, and helps maintain a normal weight **[Choice 2]**.
- Hypertension is a "silent killer" because it is often asymptomatic until it affects target organs (e.g., heart, brain) **[Choice 3]**. The client should only stop taking her medication at the direction of her healthcare provider.
- Hypertension is the most significant risk factor for stroke **[Choice 4]**.
- Dietary approaches to stop hypertension (DASH) include adequate fruits, vegetables, and decreased saturated fat (e.g., **using light dressings**) **[Choice 6]**. These dietary changes help lower BP and cholesterol levels.
- Orthostatic hypotension, a common side effect of antihypertensive medications, can be reduced by **sitting on the bedside for a few minutes** before standing **[Choice 8]**.

No understanding:

- **Having a cup of coffee before taking BP [Choice 5].** Caffeine is a stimulant that increases BP; therefore, avoiding coffee before measuring BP should be encouraged.
- To decrease the risk of heart disease and stroke, women should limit alcohol intake to **no more than 1 drink** (5 oz [148 mL] or 1 glass of wine) **per day [Choice 7]**.

Key Takeaway:

Hypertension education focuses on lifestyle modifications and behaviors that assist the client to control BP and adhere to treatment including:

- BP monitoring
- Physical activity
- Stroke risk and prevention
- Dietary changes (e.g. DASH diet)
- Orthostatic hypotension

Question: 79 — **Type:** multipleChoice

The nurse is planning care for a post-operative knee replacement client with a history of diabetes and smoking.

Which of the following would the nurse include in the client's plan of care?

1. Place pillows under the knees while supine.

2. Maintain bed rest for 48 hours postoperatively.
3. Apply sequential compression devices to the lower legs.
4. Avoid compression stockings until the surgical dressing is removed.

Explanation:

This client displays risk factors in all three categories of the *Virchow triad*, or key risk factors for **deep vein thrombosis (DVT)**: **venous stasis** (knee replacement surgery), **damage to the endothelium** (diabetes), and **hypercoagulability** (smoking).

Therefore, the nurse should plan to **apply sequential compression devices (SCDs) [Choice 3]**. SCDs utilize inflatable leg sleeves to apply intermittent pressure, **stimulating blood flow and preventing venous stasis**. This encourages effective blood return to the heart. They should be worn continuously while at rest or immobilized.

Incorrect:

Place pillows under the knees

Elevating the lower extremities above the level of the heart and *keeping the legs uncrossed* is recommended to promote venous return, reducing DVT risk. However, placing a pillow under the knees creates a *bend at the hips and knees*, reducing the normal blood flow through the veins in the legs and *increasing the risk of DVTs*.

Bed rest for 48 hours postoperatively

Early and frequent ambulation is an effective prophylaxis for DVTs recommended for clients postoperatively. However, clients recovering from joint surgery impacting mobility may require extra assistance with ambulation.

Avoid compression stockings until dressing is removed

Compression stockings promote venous return and are commonly used to prevent DVTs postoperatively. It is *essential to wear them postoperatively* for the duration of hospitalization. When properly applied, the compression stockings ensure the surgical dressing remains intact.

Key Takeaway:

DVT prophylaxis includes:

- Sequential compression devices
- Compression stockings
- Early and frequent ambulation
- Positioning the lower extremities above the heart with legs uncrossed

Question: 80 — **Type:** multipleChoice

The nurse is caring for a client hospitalized with heart failure.

Which meal item would be appropriate to include on this client's lunch tray?

1. Broiled cod with roasted potatoes and carrots
2. Deli turkey and cheddar sandwich with baked chips
3. Chicken Caesar salad with croutons and ranch dressing
4. Vegetable stir fry from a takeout restaurant served with brown rice

Explanation:

Clients with heart failure are limited to **2 grams of sodium** and **2 liters of fluid intake** daily.

Broiled cod with roasted potatoes and carrots is a good choice because it is a **low-sodium**, nutrient-dense meal that is **low in saturated fat** and high in protein **[Choice 1]**. Fish is also a good source of **omega-3 fatty acids**, which have been shown to have cardiovascular benefits.

Incorrect:

Deli turkey and cheddar sandwich with baked chips

Packaged bread, cured or preserved meats (e.g., deli meats), cheese, and chips or other snack foods may contain large quantities of sodium. Cheese is also high in saturated fat.

Chicken Caesar salad with croutons and ranch dressing

This is also not an appropriate meal choice for a client with heart failure, as it is high in *sodium*, *saturated fat*, and *calories*. The croutons and ranch dressing can add additional sodium and calories, while the chicken may be high in saturated fat if it is fried.

Vegetable stir fry from a takeout restaurant served with brown rice

Takeout meals may contain high levels of *sodium*. The sauce used in the stir fry may also be high in calories and sodium, while the brown rice may be high in carbohydrates.

Key Takeaway:

- Broiled cod with roasted potatoes and carrots is an appropriate meal choice for a client with heart failure, as it is a low-sodium, nutrient-dense meal that is low in saturated fat and high in protein.

Question: 81 — Type: multipleChoice

The nurse is talking with a client who is scheduled for surgery to treat varicose veins in the legs.

Which of the following information should the nurse include?

1. Avoid compression hose until the incision is healed.
2. Report leg swelling and redness to the provider immediately.
3. Remain on bedrest for the first 24 hours to prevent incision damage.
4. Expect a tingling sensation and hypersensitivity distal to the surgical site.

Explanation:

Varicose veins are **enlarged, superficial veins caused by faulty venous valves** that occur primarily in the lower extremities. Treatment typically focuses on conservative interventions, including compression hose, exercise, and elevation. However, surgical treatments are sometimes needed. These include thermal ablation to repair the affected vein, sclerotherapy to shrink the vein, and surgical vein removal (stripping).

Postoperative interventions following these procedures aim to **enhance venous return, address pain, and prevent complications** such as deep vein thrombosis (DVT), nerve damage, and infection. Nurse should instruct clients to **report leg swelling and redness immediately**, as these are signs of a DVT, which, if left untreated, can result in a life-threatening pulmonary embolism **[Choice 2]**.

Incorrect:

Avoid compression hose until healed; Remain on bedrest for 24 hours

Compression hose should be worn as frequently as possible. Additionally, *early and frequent ambulation is recommended* postoperatively. Both compression hose and ambulation promote adequate circulation and prevent complications such as DVTs.

Anticipate tingling sensation and hypersensitivity

Nurse should instruct clients to *report hypersensitivity and paresthesias*, a tingling or "pins and needles" sensation distal to the surgical site. These sensations indicate *nerve damage*, a common complication due to the proximity of nerves to commonly affected vessels.

Key Takeaway:

After surgery for varicose veins, clients should be instructed to:

- Wear compression hose
- Ambulate frequently
- Report tingling or numbness
- Report redness or swelling

Question: 82 — Type: dragAndDropSelectN

Nurses' Notes

Day 1

1400:

Client is a 67-year-old Black female who presents to the emergency department 1 hour after experiencing substernal chest pain while push-mowing her grass. Client describes pain as heavy and dull, accompanied by shortness of breath, dizziness, and nausea, which resolved about 10 minutes after stopping the activity. Denies radiating pain. Reports similar episodes 2 weeks ago while she was climbing several flights of stairs and about 1 month ago when she was helping her grandson build a snowman. Both episodes stopped after she rested for about 10-15 minutes. Reports history of coronary artery disease (CAD), type 2 diabetes, hypertension, hyperlipidemia, and hypothyroidism. Client is concerned because her father died suddenly from a myocardial infarction at age 55. Reports type 2 diabetes mellitus in mother. Client is an only child. Past surgeries include total vaginal hysterectomy at age 48 for fibroid tumors, followed by a 7-year period of hormone replacement therapy (HRT) with estrogen. Former heavy smoker; quit 15 years ago. Client is 185 pounds (84.1 kg) and reports a height of 64 inches (162.6 cm) (BMI 32). Current medications include amlodipine 10 mg once daily, metformin 1000 mg once daily, rosuvastatin 10 mg once daily, and levothyroxine 75 mcg once daily before breakfast.

Vital Signs

	Day 1: 1405
T	98.9 (37.1 C)
P	103
RR	18
BP	168/98
Pulse oximetry reading	97% on room air

Assessment

Body System	Findings
Neurological	Alert; oriented to person, place, time; somewhat anxious
Pulmonary	Lungs clear to auscultation in all lobes; no cough
Cardiovascular	Regular rhythm; S1 and S2 present; no murmurs, gallops, or thrills; no pain with movement or palpation
Gastrointestinal/Genitourinary	Bowel sounds normoactive all quadrants; abdomen soft and nontender; no scars noted; denies dysuria
Reproductive	Postmenopausal; not currently on hormone replacement therapy; vaginal delivery x 1
Extremities	Warm; pulses 2+ bilaterally; no edema present
Psychosocial	Divorced 12 years ago with adult triplet children, 4 grandchildren; retired probate attorney; volunteers part-time; exercises 3-4 times a week; drinks alcohol occasionally

Drag the top 5 findings that would require follow-up to the box on the right.

1. Nausea

2. Dizziness

3. Alcohol intake

4. Smoking history

5. Blood pressure

6. Shortness of breath

7. Pain characteristics

8. Levothyroxine therapy

Explanation:

The client is demonstrating signs of *decreased tissue perfusion*.

- **Shortness of breath, dizziness,** and chest **pain characteristics** (e.g., with exertion) indicate an imbalance between oxygen supply and demand in the lungs, brain, and heart.
- Increased **blood pressure** and pulse are compensatory responses to physiological (e.g., decreased tissue perfusion) or psychological stressors. Clients experiencing hypertension with signs of decreased tissue perfusion (e.g., chest pain, dyspnea, dizziness) require assessment and treatment to prevent complications (e.g., stroke).
- Pain from decreased cardiac tissue perfusion and decreased perfusion to the gastrointestinal system stimulate the brain's vomiting center, leading to **nausea**.

Incorrect:

Levothyroxine therapy

Chest pain and tachycardia are side effects of levothyroxine, but the client’s other symptoms (e.g., dysrhythmias, insomnia, tremors, headache) are not consistent with an adverse reaction to levothyroxine.

Alcohol intake

More information is needed about the alcohol use history (e.g., frequency, amount), but symptoms of decreased tissue perfusion are the priority.

Smoking history

The client’s smoking history should be addressed but does not take precedence over the client’s acute symptoms.

Key Takeaway:

- Shortness of breath, chest pain, dizziness, elevated blood pressure, and nausea indicate an imbalance of oxygen supply and demand and impaired tissue perfusion.
- Exertion can increase the imbalance between oxygen supply and demand.

Question: 83 — Type: multipleResponse

The client is kept another night and experiences no more episodes of chest pain. The telemetry unit nurse reviews the Diagnostic Results from 0845.

Nurses' Notes

Day 1

Emergency Department

1400:

Client is a 67-year-old Black female who presents to the emergency department 1 hour after experiencing substernal chest pain while push-mowing her grass. Client describes pain as heavy and dull, accompanied by shortness of breath, dizziness, and nausea, which resolved about 10 minutes after stopping the activity. Denies radiating pain. Reports similar episodes 2 weeks ago while she was climbing several flights of stairs and about 1 month ago when she was helping her grandson build a snowman. Both episodes stopped after she rested for about 10-15 minutes. Reports history of coronary artery disease (CAD), type 2 diabetes, hypertension, hyperlipidemia, and hypothyroidism. Client is concerned because her father died suddenly from a myocardial infarction at age 55. Reports type 2 diabetes mellitus in mother. Client is an only child. Past surgeries include total vaginal hysterectomy at age 48 for fibroid tumors, followed by a 7-year period of hormone replacement therapy (HRT) with estrogen. Former heavy smoker; quit 15 years ago. Client is 185 pounds (84.1 kg) and reports a height of 64 inches (162.6 cm) (BMI 32). Current medications include amlodipine 10 mg once daily, metformin 1000 mg once daily, rosuvastatin 10 mg once daily, and levothyroxine 75 mcg once daily before breakfast.

Telemetry Unit

1500:

Client admitted to telemetry unit for evaluation of chest pain. Telemetry monitor applied and displays NSR. Lungs clear x 4; abdomen soft and nontender; extremities warm and dry; pulses 2+. Client denies chest pain, nausea, dizziness, or paresthesia. Resting comfortably in semi-Fowler's. Client scheduled for cardiac biomarkers at 1730 and 2330 and exercise stress test scheduled in the morning. Client will be NPO after midnight.

Day 2

0830:

Client up to bathroom with assistance. Voided 325 mL, clear, yellow urine. Vital signs stable, monitor displays normal sinus rhythm. Denies pain; talkative and in good spirits. Transported via wheelchair for stress test.

1030:

The client returns to the telemetry unit. No complaints voiced at this time.

1130:

Responded to the client's call bell. Client in bed and reports having just been to the bathroom. Client is complaining of chest tightness and shortness of breath. Cardiac monitor displays ST segment depression.

Vital Signs

	Day 1: 1405	Day 1: 1500	Day 2: 1130
T	98.9 (37.1 C)	98.3 (36.8 C)	-

P	103	88	92
RR	18	20	24
BP	168/98	128/84	148/90
Pulse oximetry reading	97% on room air	98% on room air	95% on room air

Assessment

Body System	Findings
Neurological	Alert; oriented to person, place, time; somewhat anxious
Pulmonary	Lungs clear to auscultation in all lobes; no cough
Cardiovascular	Regular rhythm; S1 and S2 present; no murmurs, gallops, or thrills; no pain with movement or palpation
Gastrointestinal/Genitourinary	Bowel sounds normoactive all quadrants; abdomen soft and nontender; no scars noted; denies dysuria
Reproductive	Postmenopausal; not currently on hormone replacement therapy; vaginal delivery x 1
Extremities	Warm; pulses 2+ bilaterally; no edema present
Psychosocial	Divorced 12 years ago with adult triplet children, 4 grandchildren; retired probate attorney; volunteers part-time; exercises 3-4 times a week; drinks alcohol occasionally

Laboratory Results

Laboratory Results and Reference Range	1430	1730	2330
Sodium 136-145 mEq/dL (136-145 mmol/L)	142 mEq/dL (142 mmol/L)	-	-
Potassium 3.5-5.0 mEq/dL (3.5-5.0 mmol/L)	3.8 mEq/dL (3.8 mmol/L)	-	-
Glucose 74-106 mg/dL (4.1-5.9 mmol/L)	99 mg/dL (5.5 mmol/L)	-	-
Creatinine Male: 0.6-1.2 mg (53-106 µmol/L) Female: 0.5-1.1 mg/dL (44-97 µmol/L)	0.8 mg/dL (71 µmol/L)	-	-
Thyroid stimulating hormone (TSH) 2.0-10 µU/mL (2.0-10 mU/L)	2.0 µU/mL (2.0 mU/L)	-	-

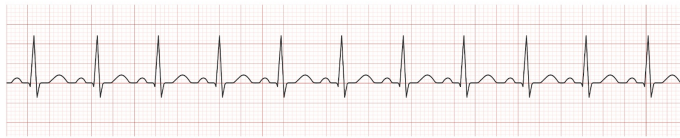
Laboratory Results 2

Laboratory Results and Reference Range	1430	1730	2330
Cholesterol (Total) <200 mg/dL (<5.2 mmol/L)	204 mg/dL (H) (5.28 mmol/L) (H)	-	-
High density lipoproteins (HDL) Male: >45 mg/dL (>0.75 mmol/L) Female: >55 mg/dL (>0.91 mmol/L)	62 mg/dL (1.61 mmol/L)	-	-
Low density lipoproteins (LDL) <130 mg/dL (<3.37 mmol/L)	129 mg/dL (3.34 mmol/L)	-	-
Troponin I <0.03 ng/mL (<0.03 mcg/L)	0.01 ng/mL (0.01 mcg/L)	0.02 ng/mL (0.02 mcg/L)	0.02 ng/mL (0.02 mcg/L)
D-dimer <0.4 mcg/mL (2.19 nmol/L)	0.1 mcg/mL (0.55 nmol/L)	-	-

Diagnostic Results

12-lead electrocardiogram (ECG)

Day 1: 1430



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Day 2: 0845

Exercise stress test echocardiography performed for evaluation of chest discomfort and coronary artery disease. Age-predicted heart rate of 160 was achieved without chest discomfort or significant shortness of breath. ECG was negative for ischemia.

The client is being prepared for discharge. The nurse has provided discharge instructions to the client about her disease process, lifestyle modifications, pain control, and new prescriptions for carvedilol, aspirin, and sublingual nitroglycerin. Which of the following client statements indicate that the discharge teaching was effective? **Select all that apply.**

1. "I should not abruptly stop taking my carvedilol."
2. "I can buy the over-the-counter coated baby aspirin."
3. "If I have chest pain, I should stop what I'm doing and rest."
4. "I should stop doing aerobic exercise because it may cause chest pain."
5. "The type of angina I have is caused by spasms in the arteries around my heart."
6. "I will call emergency services if my chest pain doesn't stop 5 minutes after taking one nitroglycerin tablet."
7. "I should avoid adding salt to my food, eat more vegetables, and limit my intake of red meat and cheese."

Explanation:

Clients with coronary artery disease (CAD) and chronic stable angina (CSA) are at high risk for acute coronary syndrome (e.g., unstable angina, myocardial infarction [MI]) if lifestyle changes are not implemented. Discharge education is critical in preventing CAD progression and should include information about prescribed medications and dietary recommendations.

Teaching was **effective** if the client demonstrates understanding of these teaching points:

- Abrupt discontinuation of **beta blockers** can cause *rebound angina* and may precipitate an MI [**Choice 1**].
- **Over-the-counter, enteric-coated baby** aspirin prevents platelet aggregation, and the enteric coating decreases the risk of peptic ulcer formation [**Choice 2**].
- Clients should **stop and rest** when experiencing **chest pain**, which reduces cardiac oxygen consumption and relieves pain associated with CSA [**Choice 3**].
- Clients should call emergency services (EMS) if angina is unrelieved or worse after 5 minutes [**Choice 6**]. The client may then take **up to 3 total** nitroglycerin tablets, 5 minutes apart while waiting for EMS.
- Limiting foods that contain large amounts of *sodium* (processed foods) and *cholesterol* (red meat) helps control blood pressure and lipid levels. Increasing **vegetables without added salt** provides essential nutrients [**Choice 7**].

Ineffective teaching:

- To improve activity tolerance and slow CAD progression, it is recommended to gradually increase aerobic exercise to 30 minutes five times a week [**Choice 4**].
- Prinzmetal's or variant angina is caused by **arterial spasms** [**Choice 5**]. This client is experiencing CSA caused by CAD.

Key Takeaway:

- Clients with CAD should take medications correctly and limit sodium, fat, and cholesterol.
- If chest pain is unrelieved or worse, 5 minutes after one dose of nitroglycerin, the client should call EMS.

Nurses' Notes

Day 1

Emergency Department

1400:	Client is a 67-year-old Black female who presents to the emergency department 1 hour after experiencing substernal chest pain while push-mowing her grass. Client describes pain as heavy and dull, accompanied by shortness of breath, dizziness, and nausea, which resolved about 10 minutes after stopping the activity. Denies radiating pain. Reports similar episodes 2 weeks ago while she was climbing several flights of stairs and about 1 month ago when she was helping her grandson build a snowman. Both episodes stopped after she rested for about 10-15 minutes. Reports history of coronary artery disease (CAD), type 2 diabetes, hypertension, hyperlipidemia, and hypothyroidism. Client is concerned because her father died suddenly from a myocardial infarction at age 55. Reports type 2 diabetes mellitus in mother. Client is an only child. Past surgeries include total vaginal hysterectomy at age 48 for fibroid tumors, followed by a 7-year period of hormone replacement therapy (HRT) with estrogen. Former heavy smoker; quit 15 years ago. Client is 185 pounds (84.1 kg) and reports a height of 64 inches (162.6 cm) (BMI 32). Current medications include amlodipine 10 mg once daily, metformin 1000 mg once daily, rosuvastatin 10 mg once daily, and levothyroxine 75 mcg once daily before breakfast.
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Telemetry Unit

1500:	Client admitted to telemetry unit for evaluation of chest pain. Telemetry monitor applied and displays NSR. Lungs clear x 4; abdomen soft and nontender; extremities warm and dry; pulses 2+. Client denies chest pain, nausea, dizziness, or paresthesia. Resting comfortably in semi-Fowler's. Client scheduled for cardiac biomarkers at 1730 and 2330 and exercise stress test scheduled in the morning. Client will be NPO after midnight.
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Vital Signs

	Day 1: 1405	Day 1: 1500
T	98.9 (37.1 C)	98.3 (36.8 C)
P	103	88
RR	18	20
BP	168/98	128/84
Pulse oximetry reading	97% on room air	98% on room air

Assessment

Body System	Findings
Neurological	Alert; oriented to person, place, time; somewhat anxious
Pulmonary	Lungs clear to auscultation in all lobes; no cough
Cardiovascular	Regular rhythm; S1 and S2 present; no murmurs, gallops, or thrills; no pain with movement or palpation
Gastrointestinal/Genitourinary	Bowel sounds normoactive all quadrants; abdomen soft and nontender; no scars noted; denies dysuria
Reproductive	Postmenopausal; not currently on hormone replacement therapy; vaginal delivery x 1
Extremities	Warm; pulses 2+ bilaterally; no edema present
Psychosocial	Divorced 12 years ago with adult triplet children, 4 grandchildren; retired probate attorney; volunteers part-time; exercises 3-4 times a week; drinks alcohol occasionally

Laboratory Results

Laboratory Results and Reference Range	1430
Sodium 136-145 mEq/dL (136-145 mmol/L)	142 mEq/dL (142 mmol/L)
Potassium 3.5-5.0 mEq/dL (3.5-5.0 mmol/L)	3.8 mEq/dL (3.8 mmol/L)
Glucose 74-106 mg/dL	99 mg/dL (5.5 mmol/L)

(4.1-5.9 mmol/L)	
Creatinine Male: 0.6-1.2 mg (53-106 µmol/L) Female: 0.5-1.1 mg/dL (44-97 µmol/L)	0.8 mg/dL (71 µmol/L)
Thyroid stimulating hormone (TSH) 2.0-10 µU/mL (2.0-10 mU/L)	2.0 µU/mL (2.0 mU/L)

Laboratory Results 2

Laboratory Results and Reference Range	1430
Cholesterol (Total) <200 mg/dL (<5.2 mmol/L)	204 mg/dL (H) (5.28 mmol/L) (H)
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D-dimer <0.4 mcg/mL (2.19 nmol/L)	0.1 mcg/mL (0.55 nmol/L)

Diagnostic Results

12-lead electrocardiogram (ECG)

Day 1: 1430



For each potential order, click to specify which order is anticipated or not anticipated for the client.

Potential Orders	Anticipated	Not Anticipated
1. Carvedilol PO	✓	
2. Aspirin PO	✓	
3. Exercise stress test	✓	
4. Morphine sulfate 2 mg IV		✓
5. Serial cardiac biomarkers	✓	
6. 2 L/min O ₂ per nasal cannula		✓
7. Nitroglycerin 0.4 mg sublingual PRN	✓	
8. Emergent percutaneous coronary intervention (PCI)		✓

Note: Each row must have 1 response option selected.

Explanation:

Chronic stable angina (CSA) interventions aim to decrease *cardiac workload* (e.g., decreasing pulse, contractility) and *relieve chest pain*. Diagnostic testing can rule out myocardial injury.

Anticipated orders:

- **Carvedilol PO:** Beta blockers decrease pulse, blood pressure, and cardiac oxygen demand by blocking beta receptors in the heart normally stimulated by catecholamines [Choice 1].
- **Aspirin PO:** Aspirin inhibits platelet aggregation and clot formation, preventing myocardial infarction [Choice 2].
- **Exercise stress test:** This test evaluates heart function by monitoring vital signs and ECG while the client walks on a treadmill [Choice 3].
- **Serial cardiac biomarkers:** Troponin T and I are released by myocardial cells 4 to 6 hours after injury. They are tracked over several hours to rule out MI [Choice 5].
- **Nitroglycerin 0.4 mg sublingual PRN:** Nitrates dilate coronary vessels and improve myocardial blood supply [Choice 7].

Orders that are not anticipated:

- **Morphine sulfate 2 mg IV:** Only if rest and nitroglycerin are ineffective can morphine be administered for pain [Choice 4].
- **2 L/min O2 per nasal cannula:** The client's oxygen saturation is 97%; oxygen is not indicated [Choice 6].
- **Emergent PCI:** PCI is an invasive procedure to relieve coronary artery blockage [Choice 8]. In CSA, the coronary arteries are not fully blocked.

Key Takeaway:

Anticipated orders with CSA include:

- Medications to reduce cardiac workload and improve oxygenation (e.g., nitroglycerin)
- Exercise testing to assess myocardial response to increased demand
- Serial biomarkers (i.e., troponin) to rule out myocardial injury

Question: 85 — Type: dragAndDropCloze

The nurse reviews the Vitals Signs and Nurses' Notes from Day 2 at 1130.

Nurses' Notes

Day 1

Emergency Department

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Day 2

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0830:	Client up to bathroom with assistance. Voided 325 mL, clear, yellow urine. Vital signs stable, monitor displays normal sinus rhythm. Denies pain; talkative and in good spirits. Transported via wheelchair for stress test.
1030:	The client returns to the telemetry unit. No complaints voiced at this time.
1130:	Responded to the client's call bell. Client in bed and reports having just been to the bathroom. Client is complaining of chest tightness and shortness of breath. Cardiac monitor displays ST segment depression.

Vital Signs

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Laboratory Results

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Glucose 74-106 mg/dL (4.1-5.9 mmol/L)	99 mg/dL (5.5 mmol/L)	-	-
Creatinine Male: 0.6-1.2 mg (53-106 µmol/L) Female: 0.5-1.1 mg/dL (44-97 µmol/L)	0.8 mg/dL (71 µmol/L)	-	-
Thyroid stimulating hormone (TSH) 2.0-10 µU/mL (2.0-10 mU/L)	2.0 µU/mL (2.0 mU/L)	-	-

Laboratory Results 2

Laboratory Results and Reference Range	1430	1730	2330
Cholesterol (Total) <200 mg/dL (<5.2 mmol/L)	204 mg/dL (H) (5.28 mmol/L) (H)	-	-
High density lipoproteins (HDL) Male: >45 mg/dL (>0.75 mmol/L) Female: >55 mg/dL (>0.91 mmol/L)	62 mg/dL (1.61 mmol/L)	-	-
Low density lipoproteins (LDL) <130 mg/dL (<3.37 mmol/L)	129 mg/dL (3.34 mmol/L)	-	-

Troponin I <0.03 ng/mL (<0.03 mcg/L)	0.01 ng/mL (0.01 mcg/L)	0.02 ng/mL (0.02 mcg/L)	0.02 ng/mL (0.02 mcg/L)
D-dimer <0.4 mcg/mL (2.19 nmol/L)	0.1 mcg/mL (0.55 nmol/L)	-	-

Diagnostic Results

12-lead electrocardiogram (ECG)

Day 1: 1430



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Drag words from the choices below to fill in each blank in the following sentence.

When responding to the client's situation, the nurse should , , and .

1. administer oxygen
2. obtain a 12-lead ECG
3. administer IV morphine
4. administer nitroglycerin
5. notify the health care provider

Explanation:

The client is experiencing a *change in chest pain characteristics* (occurring at rest) and *ECG changes* (ST depression), which indicate acute coronary syndrome (e.g., unstable angina, myocardial infarction) may be occurring.

Interventions for clients potentially experiencing cardiac damage include:

- **Obtaining a 12-lead ECG** to determine whether the client is actively experiencing myocardial injury or dysrhythmias. If the client displays ST-segment depression, emergent PCI is indicated.
- **Administering nitroglycerin** sublingually to dilate coronary vessels, improve perfusion and oxygenation to the heart muscle, and relieve pain.
- **Notifying the healthcare provider** to determine additional interventions that may be urgently needed (e.g., PCI, morphine, antiarrhythmics).

Therefore, when responding to the client's situation, the nurse should obtain a **12-lead ECG**, **administer nitroglycerin**, and **notify the healthcare provider**.

Incorrect:

Administer oxygen

Supplemental oxygen is needed to increase the oxygen supply to the myocardium if oxygen saturation drops below 94%. If administered when the client is not hypoxic, oxygen may increase the risk of myocardial injury.

Administer morphine

Morphine is administered only if pain is unrelieved by other interventions (e.g., nitroglycerin). The nurse should consider morphine if nitroglycerin fails to relieve the client's pain.

Key Takeaway:

- Clients with chronic stable angina who have a sudden change in chest pain characteristics (pain at rest, ST depression) should receive nitroglycerin and an ECG, and the healthcare provider should be notified.

Question: 86 — Type: dropdown

The emergency department nurse reviews the initial Laboratory and Diagnostic Results from 1430.

Nurses' Notes

Day 1

Emergency Department

1400:	Client is a 67-year-old Black female who presents to the emergency department 1 hour after experiencing substernal chest pain while push-mowing her grass. Client describes pain as heavy and dull, accompanied by shortness of breath, dizziness, and nausea, which resolved about 10 minutes after stopping the activity. Denies radiating pain. Reports similar episodes 2 weeks ago while she was climbing several flights of stairs and about 1 month ago when she was helping her grandson build a snowman. Both episodes stopped after she rested for about 10-15 minutes. Reports history of coronary artery disease (CAD), type 2 diabetes, hypertension, hyperlipidemia, and hypothyroidism. Client is concerned because her father died suddenly from a myocardial infarction at age 55. Reports type 2 diabetes mellitus in mother. Client is an only child. Past surgeries include total vaginal hysterectomy at age 48 for fibroid tumors, followed by a 7-year period of hormone replacement therapy (HRT) with estrogen. Former heavy smoker; quit 15 years ago. Client is 185 pounds (84.1 kg) and reports a height of 64 inches (162.6 cm) (BMI 32). Current medications include amlodipine 10 mg once daily, metformin 1000 mg once daily, rosuvastatin 10 mg once daily, and levothyroxine 75 mcg once daily before breakfast.
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Vital Signs

	Day 1: 1405
T	98.9 (37.1 C)
P	103
RR	18
BP	168/98
Pulse oximetry reading	97% on room air

Assessment

Body System	Findings
Neurological	Alert; oriented to person, place, time; somewhat anxious
Pulmonary	Lungs clear to auscultation in all lobes; no cough
Cardiovascular	Regular rhythm; S1 and S2 present; no murmurs, gallops, or thrills; no pain with movement or palpation
Gastrointestinal/Genitourinary	Bowel sounds normoactive all quadrants; abdomen soft and nontender; no scars noted; denies dysuria
Reproductive	Postmenopausal; not currently on hormone replacement therapy; vaginal delivery x 1
Extremities	Warm; pulses 2+ bilaterally; no edema present
Psychosocial	Divorced 12 years ago with adult triplet children, 4 grandchildren; retired probate attorney; volunteers part-time; exercises 3-4 times a week; drinks alcohol occasionally

Laboratory Results

Laboratory Results and Reference Range	1430
Sodium 136-145 mEq/dL (136-145 mmol/L)	142 mEq/dL (142 mmol/L)
Potassium 3.5-5.0 mEq/dL (3.5-5.0 mmol/L)	3.8 mEq/dL (3.8 mmol/L)
Glucose 74-106 mg/dL (4.1-5.9 mmol/L)	99 mg/dL (5.5 mmol/L)
Creatinine	0.8 mg/dL

Male: 0.6-1.2 mg (53-106 µmol/L) Female: 0.5-1.1 mg/dL (44-97 µmol/L)	(71 µmol/L)
Thyroid stimulating hormone (TSH) 2.0-10 µU/mL (2.0-10 mU/L)	2.0 µU/mL (2.0 mU/L)

Laboratory Results 2

Laboratory Results and Reference Range	1430
Cholesterol (Total) <200 mg/dL (<5.2 mmol/L)	204 mg/dL (H) (5.28 mmol/L) (H)
High density lipoproteins (HDL) Male: >45 mg/dL (>0.75 mmol/L) Female: >55 mg/dL (>0.91 mmol/L)	62 mg/dL (1.61 mmol/L)
Low density lipoproteins (LDL) <130 mg/dL (<3.37 mmol/L)	129 mg/dL (3.34 mmol/L)
Troponin I <0.03 ng/mL (<0.03 mcg/L)	0.01 ng/mL (0.01 mcg/L)
D-dimer <0.4 mcg/mL (2.19 nmol/L)	0.1 mcg/mL (0.55 nmol/L)

Diagnostic Results

12-lead electrocardiogram (ECG)

Day 1: 1430



Complete the following sentence by choosing from the list of options.

The client is **most likely** experiencing [**Select**].

Dropdown	Options
Dropdown 1	unstable angina myocardial infarction pulmonary embolism chronic stable angina ✓

Explanation:

Comparison of Chest Pain Etiologies				
Characteristics	Chronic Stable Angina (CSA)	Unstable Angina (UA)	Myocardial Infarction (MI)	Pulmonary Embolism (PE)
Chest Pain	Substernal; intermittent, predictable; precipitated by exertion or stress; lasts <10 min; relieved with rest and/or nitrates; some may be asymptomatic	Substernal; may be constant; unpredictable; can occur at rest; lasts >10 min; poorly relieved by rest or nitrates	Severe, substernal or epigastric, may radiate (neck, jaw, arm); occurs without cause; lasts >30 min; relieved with nitrates and opioids	Sharp, stabbing
ECG changes	Possible ST segment depression	ST depression, T wave inversion	STEMI: ST-segment elevation,	Nonspecific, fleeting

	and/or T wave inversion		dysrhythmias; presence of U wave	
			<i>NSTEMI</i> : possible ST-segment depression and T wave inversion; dysrhythmias; U wave	
Lung sounds	Clear	Clear	Clear/Crackles (if ventricular failure present)	Crackles (backflow from lungs)
Elevated Troponin (indicates cardiac injury)	No	No	Yes	No
Elevated D-dimer (indicates fibrinolysis)	No	No	No	Yes
Additional findings that may be present in CSA, UA, MI, and PE include: - Dyspnea - Tachypnea - Tachycardia - Fatigue - Anxiety				

Chronic stable angina (CSA) is chest pain that is exertional and relieved by rest or nitrates. CSA is caused by partial blockage of ≥ 1 coronary artery with an atherosclerotic lesion that results in insufficient blood supply to part of the heart muscle and is precipitated by factors that increase metabolic demands (e.g., exertion). Diagnostic tests will reveal normal troponin levels and possible temporary ECG changes. This client's ECG shows sinus tachycardia but no other abnormalities.

Therefore, the nurse should recognize that the client is most likely experiencing **chronic stable angina**.

Incorrect:

Unstable angina (UA)

In UA, an atherosclerotic plaque ruptures, and platelets aggregate to form a thrombus. Ischemia occurs but does not cause permanent injury. This client's pain is relieved by rest, and her ECG lacks ST changes, indicating she is not experiencing UA.

Myocardial infarction (MI)

Myocardial infarction is a complete blockage of a coronary artery by a thrombus and results in permanent myocardial damage. The client's normal troponin levels indicate she has not experienced an MI.

Pulmonary Embolism (PE)

A PE is a blood clot that embolizes from another part of the body (e.g., legs [deep vein thrombosis], right ventricle) and lodges in the pulmonary vasculature. The client's lung sounds are clear, and her d-Dimer is normal, suggesting the client does not have a PE.

Key Takeaway:

- Chronic stable angina is characterized by predictable, short episodes of chest pain that are precipitated by increased metabolic demands (e.g., stress) and is relieved by rest and nitrate therapy.

Question: 87 — Type: multipleResponse

Nurses' Notes

Day 1

Emergency Department

1400:	Client is a 67-year-old Black female who presents to the emergency department 1 hour after experiencing substernal chest pain while push-mowing her grass. Client describes pain as heavy and dull, accompanied by shortness of breath, dizziness, and nausea, which resolved about 10 minutes after stopping the activity. Denies radiating pain. Reports similar episodes 2 weeks ago while she
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was climbing several flights of stairs and about 1 month ago when she was helping her grandson build a snowman. Both episodes stopped after she rested for about 10-15 minutes. Reports history of coronary artery disease (CAD), type 2 diabetes, hypertension, hyperlipidemia, and hypothyroidism. Client is concerned because her father died suddenly from a myocardial infarction at age 55. Reports type 2 diabetes mellitus in mother. Client is an only child. Past surgeries include total vaginal hysterectomy at age 48 for fibroid tumors, followed by a 7-year period of hormone replacement therapy (HRT) with estrogen. Former heavy smoker; quit 15 years ago. Client is 185 pounds (84.1 kg) and reports a height of 64 inches (162.6 cm) (BMI 32). Current medications include amlodipine 10 mg once daily, metformin 1000 mg once daily, rosuvastatin 10 mg once daily, and levothyroxine 75 mcg once daily before breakfast.

Vital Signs

	Day 1: 1405
T	98.9 (37.1 C)
P	103
RR	18
BP	168/98
Pulse oximetry reading	97% on room air

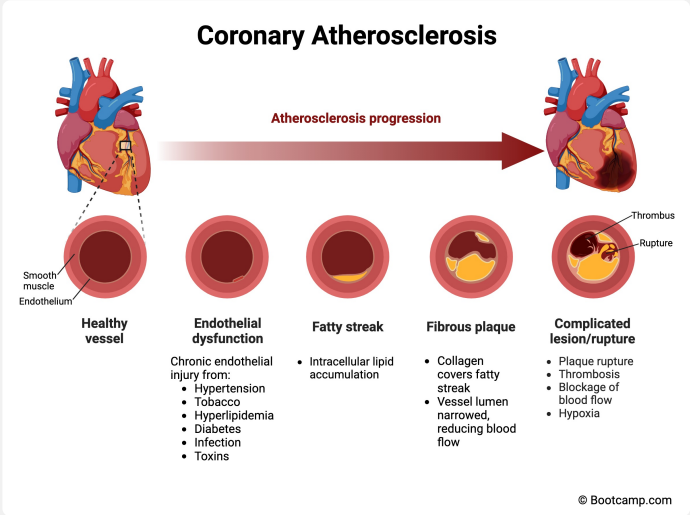
Assessment

Body System	Findings
Neurological	Alert; oriented to person, place, time; somewhat anxious
Pulmonary	Lungs clear to auscultation in all lobes; no cough
Cardiovascular	Regular rhythm; S1 and S2 present; no murmurs, gallops, or thrills; no pain with movement or palpation
Gastrointestinal/Genitourinary	Bowel sounds normoactive all quadrants; abdomen soft and nontender; no scars noted; denies dysuria
Reproductive	Postmenopausal; not currently on hormone replacement therapy; vaginal delivery x 1
Extremities	Warm; pulses 2+ bilaterally; no edema present
Psychosocial	Divorced 12 years ago with adult triplet children, 4 grandchildren; retired probate attorney; volunteers part-time; exercises 3-4 times a week; drinks alcohol occasionally

Which of the following factors have likely contributed to the client’s development of coronary artery disease? **Select all that apply.**

1. BMI
2. Race
3. Hypertension
4. Family history
5. Hyperlipidemia
6. Smoking history
7. Diabetes mellitus

Explanation:



The client is experiencing cardiovascular and pulmonary alterations as a result of *decreased cardiac tissue perfusion* exacerbated by *coronary artery disease*. This client also meets the criteria for metabolic syndrome.

A BMI >30 (i.e., obesity) is a risk factor for hypertension, diabetes, and high cholesterol, which can lead to cardiovascular disease (CVD) **[Choice 1]**. Obesity is associated with development of type 2 **diabetes mellitus**, which is the most significant risk factor for CVD and is considered a CVD “risk equivalent” **[Choice 7]**. Diabetes impairs glucose and lipid metabolism, leading to vascular endothelial dysfunction. Having diabetes doubles the risk of CVD in males and triples the risk in females.

Race is an important risk factor for CVD. Black clients have a higher risk for developing hypertension, hyperlipidemia, and heart disease **[Choice 2]**.

Hypertension leads to hardening of the arterial walls, and **hyperlipidemia** (high cholesterol) can cause arterial plaque formation narrowing arterial lumens **[Choices 3 and 5]**. These arterial changes are known as *atherosclerosis* and can diminish blood flow to vital organs.

A **family history** of CVD in a first-degree relative is a risk factor for development of heart disease **[Choice 4]**. Risk is greatest if the family history includes development of CVD at a young age (<55 for males; <65 for females).

Smoking contributes to plaque formation by decreasing high-density lipoprotein (HDL) levels and increasing low-density lipoprotein (LDL) and triglyceride levels **[Choice 6]**.

Key Takeaway:

- Risk factors for cardiovascular disease include BMI >30, diabetes, race, hypertension, hyperlipidemia, smoking, and family history.

Question: 88 — Type: highlight

The nurse has reviewed the updated Nurses’ Notes from 1832. Click to highlight the findings in the Nurses Notes’ that indicate the client is experiencing complications of treatment.

Nurses’ Notes

Day 1: Emergency Department

1327:	The client arrives at the emergency department from her home via ambulance. The client was recently discharged from the hospital following treatment for a urinary tract infection. She appears drowsy but is responsive to verbal stimuli. The client states, “I called the ambulance today because I just wasn’t feeling right. I am just tired, and I have some pain in my stomach and back. I think those antibiotics don’t agree with my stomach.” Client has an 18-gauge peripheral IV in the right hand inserted by emergency medical services that is saline-locked. No other interventions have been completed at this time.
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Intensive Care Unit

1832:	Client transported to the intensive care unit with telemetry monitoring. Vital signs: T 100.9 F (38.3 C), P 108, BP 112/76, RR 29, pulse oximetry reading 93% on oxygen at 2 L/min via nasal cannula. A normal saline 3 L bolus has been administered and norepinephrine IV is currently infusing to the right hand with swelling and pallor at the IV site. Client reports dyspnea while at rest; fine crackles auscultated in bilateral bases. Cardiac monitor displays sinus tachycardia. Client reports mild nausea and is requesting sips of water for thirst and dry mouth. She also reports pain in her right hand.
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Vital Signs

	1334	1400
T	101.2 F (38.4 C)	101.4 F (38.5 C)
P	125	148
RR	25	32
BP	92/64	72/58
Pulse oximetry reading	91% on room air	94% on 2 L/min nasal cannula
Pain Level	6/10	6/10
Weight	220 lbs (100 kg)	220 lbs (100 kg)

History and Physical

Body System	Findings
Neurological	Oriented to person and place; disoriented to time; appears drowsy but is responsive to verbal stimuli; reports lightheadedness
Pulmonary	Tachypneic; reports mild dyspnea on exertion; lung sounds clear throughout; reports dry, chronic cough; smokes 1 pack per day for the past 10 years

Cardiovascular	Sinus tachycardia; S1 and S2 present with no murmurs; 1+ peripheral pulses in bilateral upper and lower extremities; pulses weak and thready; capillary refill >3 seconds; history of hypertension
Gastrointestinal/Genitourinary	Abdomen soft and nontender; bowel sounds hypoactive x 4 quadrants; lower abdominal and lower back pain; decreased appetite for 2-3 days; decreased urination with foul-smelling urine; recent hospital admission for urinary tract infection; discharged home with ciprofloxacin PO; antibiotic course complete
Skin	Skin and mucous membranes pink, dry, intact; skin warm with no rashes
Psychosocial	Widowed and lives alone; has one adult child who lives in another state; client is retired and volunteers once a week at a local library

Laboratory Results

Laboratory Test and Reference Range	1400
Chemistry	
Creatinine 0.6–1.2 mg/dL (53–106 µmol/L)	6.0 mg/dL (458 µmol/L)
Blood urea nitrogen 10-20 mg/dL (3.6–7.1 mmol/L)	62 mg/dL (22 mmol/L)
Serum lactate 5–20 mg/dL (0.6–2.2 mmol/L)	72 mg/dL (4 mmol/L)

Intensive Care Unit

1832:	Client transported to the intensive care unit with telemetry monitoring. Vital signs: ✗ T 100.9 F (38.3 C) , P 108 , BP 112/76 . ✓ RR 29, pulse oximetry reading 93% on oxygen at 2 L/min via nasal cannula. A normal saline 3 L bolus has been administered and norepinephrine IV is currently infusing to the right hand with ✓ swelling and pallor at the IV site . Client reports ✓ dyspnea while at rest; ✓ fine crackles auscultated in bilateral bases. Cardiac monitor displays ✗ sinus tachycardia . Client reports ✗ mild nausea and is requesting sips of water for ✗ thirst and dry mouth . She also reports ✓ pain in her right hand .
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Explanation:

Clients requiring aggressive treatment for shock are at risk for complications from administration of IV fluids and vasopressors:

- Pulmonary edema* can occur with large volumes of rapid IV fluid administration. Indicators of pulmonary edema include tachypnea (**RR 29**), hypoxemia (**pulse oximetry reading 93%**), **dyspnea**, and **crackles**. Respiratory insufficiency in sepsis is also concerning for acute respiratory distress syndrome.
- In a *vasopressor extravasation*, medication (e.g., norepinephrine) infiltrates into peripheral tissues, causing severe localized vasoconstriction and tissue ischemia. **Swelling and pallor at the IV site**, as well as **pain in the right hand**, indicate extravasation that requires immediate intervention to prevent tissue necrosis. Vasopressors should be administered through a central line only; peripheral IVs are only for short-term, emergent vasopressor infusion.

Incorrect:

T 100.9 F (38.3 C); P 108; BP 112/76; Sinus tachycardia

Fever is an expected finding in sepsis. The client's BP has increased, and pulse rate has decreased, indicating improvement in hemodynamic status.

Mild nausea; Thirst; Dry mouth

In septic shock, the sympathetic nervous system compensates for hypotension by vasoconstricting to redirect blood flow away from less vital organs (e.g., skin, gastrointestinal tract) toward the heart, lungs, and brain. Nausea and dry mucous membranes are expected findings related to compensatory vasoconstriction. The client's ability to verbalize these symptoms indicates an improvement in cerebral perfusion.

Key Takeaway:

Treatment complications from IV fluid and vasopressor administration include:

- Pulmonary edema is indicated by dyspnea, decreased oxygen saturation, tachypnea, and crackles.
- Swelling, pallor, and pain at the IV site indicate extravasation of vasopressors.

Complete the following sentence by choosing from the lists of options.

Nurses' Notes

Day 1: Emergency Department

1327:

The client arrives at the emergency department from her home via ambulance. The client was recently discharged from the hospital following treatment for a urinary tract infection. She appears drowsy but is responsive to verbal stimuli. The client states, "I called the ambulance today because I just wasn't feeling right. I am just tired, and I have some pain in my stomach and back. I think those antibiotics don't agree with my stomach." Client has an 18-gauge peripheral IV in the right hand inserted by emergency medical services that is saline-locked. No other interventions have been completed at this time.

Vital Signs

	1334
T	101.2 F
	(38.4 C)
P	125
RR	25
BP	92/64
Pulse oximetry reading	91% on room air
Pain level	6/10
Weight	220 lbs (100 kg)

History and Physical

Body System	Findings
Neurological	Oriented to person and place; disoriented to time; appears drowsy but is responsive to verbal stimuli; reports lightheadedness
Pulmonary	Tachypneic; reports mild dyspnea on exertion; lung sounds clear throughout; reports dry, chronic cough; smokes 1 pack per day for the past 10 years
Cardiovascular	Sinus tachycardia; S1 and S2 present with no murmurs; 1+ peripheral pulses in bilateral upper and lower extremities; pulses weak and thready; capillary refill >3 seconds; history of hypertension
Gastrointestinal/Genitourinary	Abdomen soft and nontender; bowel sounds hypoactive x 4 quadrants; lower abdominal and lower back pain; decreased appetite for 2-3 days; decreased urination with foul-smelling urine; recent hospital admission for urinary tract infection; discharged home with ciprofloxacin PO; antibiotic course complete
Skin	Skin and mucous membranes pink, dry, intact; skin warm with no rashes
Psychosocial	Widowed and lives alone; has one adult child who lives in another state; client is retired and volunteers once a week at a local library

The nurse recognizes that the client is experiencing [Select] related to [Select].

Dropdown	Options
Dropdown 1	anaphylaxis a pulmonary embolism systemic inflammatory response ✓
Dropdown 2	infection ✓ antibiotic administration recent hospital admission

Explanation:

Systemic Inflammatory Response Syndrome (SIRS) Criteria	
Temperature	>100.4 or <96.8 F (>38 or <36 C)
Pulse	>90
Respirations	>20
	>12,000/mm ³ (12.0 x 10 ⁹ /L) or

White blood cell count	<4,000/mm ³ (4.0 x 10 ⁹ /L) or ≥10% immature neutrophils
Sepsis = Presence of a known or suspected infection + ≥2 SIRS criteria	

A **systemic inflammatory response** (SIRS) is widespread inflammation that occurs when the body produces an exaggerated immune response to a stressor (e.g., trauma, tissue ischemia, **infection**). This client meets several SIRS criteria, including:

- Temperature >100.4 F (38 C)
- Heart rate >90/min
- Respiratory rate >20/min

Additionally, the client's lower urinary tract symptoms suggest the presence of a urinary tract **infection**. The presence of two SIRS criteria combined with a suspected infection is known as *sepsis*.

Therefore, the nurse should recognize that the client is experiencing a **systemic inflammatory response** related to **infection**.

Incorrect:

Anaphylaxis, Antibiotic administration

Anaphylaxis is a hypersensitivity reaction to an allergen (e.g., food, medication) that causes severe systemic vasodilation and hypotension. A client is at risk for anaphylaxis with any antibiotic administration; however, this client is not demonstrating hallmark signs of anaphylaxis, such as rash, facial edema, or stridor from airway compromise.

Pulmonary embolism, Recent hospital admission

Reduced mobility during a hospital admission increases the risk of a pulmonary embolism. Signs of a pulmonary embolism include tachycardia, hypotension, decreased oxygen saturation, dyspnea, and tachypnea. While the client is experiencing some of these symptoms, the presence of an infection and the absence of hypoxemia make pulmonary embolism a less likely cause.

Key Takeaway:

- SIRS is widespread inflammation that results from stressors, including trauma, ischemia, and infection.
- Some common clinical cues of SIRS include tachycardia, hypotension, and tachypnea.
- When SIRS is present alongside a confirmed or suspected infection, it is known as sepsis.

Question: 90 — Type: multipleChoice

The nurse has reviewed the updated Vital Signs and Laboratory Results from 1400.

Nurses' Notes

Day 1: Emergency Department

1327:

The client arrives at the emergency department from her home via ambulance. The client was recently discharged from the hospital following treatment for a urinary tract infection. She appears drowsy but is responsive to verbal stimuli. The client states, "I called the ambulance today because I just wasn't feeling right. I am just tired, and I have some pain in my stomach and back. I think those antibiotics don't agree with my stomach." Client has an 18-gauge peripheral IV in the right hand inserted by emergency medical services that is saline-locked. No other interventions have been completed at this time.

Vital Signs

	1334	1400
T	101.2 F (38.4 C)	101.4 F (38.5 C)
P	125	148
RR	25	32
BP	92/64	72/58
Pulse oximetry reading	91% on room air	94% on 2 L/min nasal cannula

Pain Level	6/10	6/10
Weight	220 lbs (100 kg)	220 lbs (100 kg)

History and Physical

Body System	Findings
Neurological	Oriented to person and place; disoriented to time; appears drowsy but is responsive to verbal stimuli; reports lightheadedness
Pulmonary	Tachypneic; reports mild dyspnea on exertion; lung sounds clear throughout; reports dry, chronic cough; smokes 1 pack per day for the past 10 years
Cardiovascular	Sinus tachycardia; S1 and S2 present with no murmurs; 1+ peripheral pulses in bilateral upper and lower extremities; pulses weak and thready; capillary refill >3 seconds; history of hypertension
Gastrointestinal/Genitourinary	Abdomen soft and nontender; bowel sounds hypoactive x 4 quadrants; lower abdominal and lower back pain; decreased appetite for 2-3 days; decreased urination with foul-smelling urine; recent hospital admission for urinary tract infection; discharged home with ciprofloxacin PO; antibiotic course complete
Skin	Skin and mucous membranes pink, dry, intact; skin warm with no rashes
Psychosocial	Widowed and lives alone; has one adult child who lives in another state; client is retired and volunteers once a week at a local library

Laboratory Results

Laboratory Test and Reference Range	1400
Chemistry	
Creatinine 0.6–1.2 mg/dL (53–106 µmol/L)	6.0 mg/dL (458 µmol/L)
Blood urea nitrogen 10-20 mg/dL (3.6–7.1 mmol/L)	62 mg/dL (22 mmol/L)
Serum lactate 5–20 mg/dL (0.6–2.2 mmol/L)	72 mg/dL (4 mmol/L)

The healthcare provider diagnoses the client with septic shock. The nurse receives the following health care orders. Which order should the nurse perform **first**?

1. Administer a 3000 mL IV bolus of normal saline.
2. Insert an indwelling urinary catheter using sterile technique.
3. Collect 2 sets of blood for culture and sensitivity by venipuncture.
4. Titrate IV norepinephrine infusion to keep systolic BP ≥90 mmHg.

Explanation:

The client’s vital signs and lab results indicate a progression to septic shock. Priority treatment includes aggressive *fluid resuscitation* to improve intravascular volume and tissue perfusion. Recommendations include rapidly administering a 30 mL/kg bolus of crystalloid fluids (e.g., 30 mL x 100 kg = 3000 mL), followed by evaluating fluid responsiveness **[Choice 1]**.

Incorrect:

Collect two sets of blood for culture and sensitivity by venipuncture

At least two blood cultures should be obtained to identify pathogens before administering antibiotics. However, improving perfusion is the top priority for this client.

Insert indwelling urinary catheter using sterile technique

Although indwelling urinary catheters should be avoided in a client with a urinary tract infection, a critically ill client may require an indwelling catheter for strict intake and output monitoring. Interventions to address perfusion take priority over catheter insertion.

Titrate IV norepinephrine infusion for mean arterial pressure ≥65 mmHg

Vasopressors (e.g., norepinephrine) cause vasoconstriction and are indicated if a client remains hypotensive despite fluid resuscitation. Vasopressors are titrated to maintain a mean arterial pressure ≥65 mmHg or systolic blood pressure ≥90 mmHg. Vasopressors treat hypotension and are more effective if given after intravascular fluid volume has been replaced.

Key Takeaway:

- Aggressive fluid resuscitation is a priority intervention for clients in septic shock to improve intravascular volume and tissue perfusion.
- Collecting blood cultures and giving vasopressors are indicated following IV fluid administration.

Question: 91 — Type: matrixMultipleChoice

Nurses' Notes

Day 1: Emergency Department

1327:	The client arrives at the emergency department from her home via ambulance. The client was recently discharged from the hospital following treatment for a urinary tract infection. She appears drowsy but is responsive to verbal stimuli. The client states, "I called the ambulance today because I just wasn't feeling right. I am just tired, and I have some pain in my stomach and back. I think those antibiotics don't agree with my stomach." Client has an 18-gauge peripheral IV in the right hand inserted by emergency medical services that is saline-locked. No other interventions have been completed at this time.
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Vital Signs

	1334
T	101.2 F (38.4 C)
P	125
RR	25
BP	92/64
Pulse oximetry reading	91% on room air
Pain level	6/10
Weight	220 lbs (100 kg)

History and Physical

Body System	Findings
Neurological	Oriented to person and place; disoriented to time; appears drowsy but is responsive to verbal stimuli; reports lightheadedness
Pulmonary	Tachypneic; reports mild dyspnea on exertion; lung sounds clear throughout; reports dry, chronic cough; smokes 1 pack per day for the past 10 years
Cardiovascular	Sinus tachycardia; S1 and S2 present with no murmurs; 1+ peripheral pulses in bilateral upper and lower extremities; pulses weak and thready; capillary refill >3 seconds; history of hypertension
Gastrointestinal/Genitourinary	Abdomen soft and nontender; bowel sounds hypoactive x 4 quadrants; lower abdominal and lower back pain; decreased appetite for 2-3 days; decreased urination with foul-smelling urine; recent hospital admission for urinary tract infection; discharged home with ciprofloxacin PO; antibiotic course complete
Skin	Skin and mucous membranes pink, dry, intact; skin warm with no rashes
Psychosocial	Widowed and lives alone; has one adult child who lives in another state; client is retired and volunteers once a week at a local library

Select whether each intervention is **anticipated** or **not anticipated**.

Potential Interventions	Anticipated	Not Anticipated
1. Administer oxygen.	✓	
2. Prepare client for a head CT.		✓
3. Draw blood for lactic acid levels.	✓	
4. Place client in Trendelenburg position.		✓
5. Initiate continuous telemetry monitoring.	✓	
6. Administer 3 L IV bolus of normal saline.	✓	
7. Collect 2 sets of blood cultures from the client's IV line.		✓

Explanation:

Care for a client with sepsis focuses on *restoring perfusion*, *preventing complications*, and treating the *source of infection*.

Anticipated interventions include:

- **Administering oxygen** to maintain oxygen saturation $\geq 92\%$ **[Choice 1]**.
- **Drawing blood for lactic acid levels [Choice 3]**. With hypoperfusion, tissues must rely on anaerobic metabolism, leading to a buildup of lactic acid in the blood. Lactic acid levels aid in the diagnosis of sepsis and measure the effectiveness of IV fluid treatment.
- **Initiating continuous telemetry monitoring**, as clients with hypoperfusion are at risk for dysrhythmias or cardiac ischemia **[Choice 5]**.
- **Administering 3 L IV bolus of normal saline** to improve perfusion **[Choice 6]**. Sepsis treatment includes administration of 30 mL/kg of crystalloid fluids (e.g., 30 mL x 100 kg = 3000 mL).

Interventions that are **not anticipated** include:

- **Preparing the client for a head CT [Choice 2]**. The client is not demonstrating neurological deficits (e.g., stroke-like symptoms such as numbness, paresthesia, and aphasia), indicating the need for a head CT.
- **Placing client in the Trendelenburg position [Choice 4]**. The Trendelenburg position is not recommended for hypotension because it may reduce cardiac output, cause pulmonary edema, and limit diaphragmatic expansion.
- **Collecting two sets of blood cultures from the client’s IV line [Choice 7]**. Blood cultures should be drawn from two separate sites using venipuncture to reduce sample contamination.

Key Takeaway:

Clients with sepsis require:

- Supplemental oxygen
- Continuous telemetry monitoring
- Bolus of 30 mL/kg crystalloid IV fluids
- Lactic acid levels to measure perfusion
- Blood cultures collected by venipuncture

Question: 92 — Type: multipleResponse

Nurses' Notes

Day 1: Emergency Department

1327:	The client arrives at the emergency department from her home via ambulance. The client was recently discharged from the hospital following treatment for a urinary tract infection. She appears drowsy but is responsive to verbal stimuli. The client states, "I called the ambulance today because I just wasn't feeling right. I am just tired, and I have some pain in my stomach and back. I think those antibiotics don't agree with my stomach." Client has an 18-gauge peripheral IV in the right hand inserted by emergency medical services that is saline-locked. No other interventions have been completed at this time.
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Vital Signs

	1334
T	101.2 F (38.4 C)
P	125
RR	25
BP	92/64
Pulse oximetry reading	91% on room air
Pain level	6/10
Weight	220 lbs (100 kg)

History and Physical

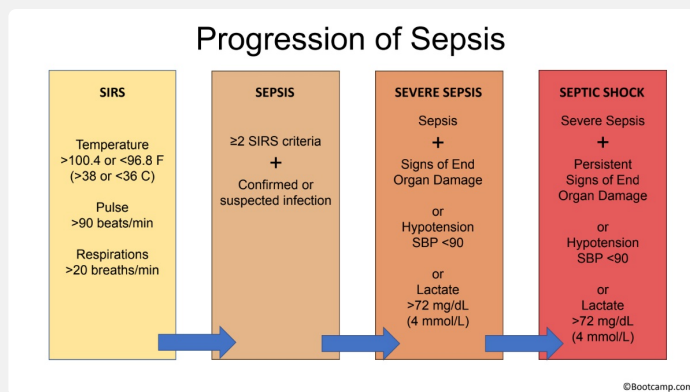
Body System	Findings
Neurological	Oriented to person and place; disoriented to time; appears drowsy but is responsive to verbal stimuli; reports lightheadedness
Pulmonary	Tachypneic; reports mild dyspnea on exertion; lung sounds clear throughout; reports dry, chronic cough; smokes 1 pack per day for the past 10 years
Cardiovascular	Sinus tachycardia; S1 and S2 present with no murmurs; 1+ peripheral pulses in bilateral upper and lower extremities; pulses weak and thready; capillary refill >3 seconds; history of hypertension
Gastrointestinal/Genitourinary	Abdomen soft and nontender; bowel sounds hypoactive x 4 quadrants; lower abdominal and lower back pain; decreased appetite for 2-3 days; decreased urination with foul-smelling urine; recent hospital admission for urinary tract infection; discharged home with ciprofloxacin PO; antibiotic course complete

Skin	Skin and mucous membranes pink, dry, intact; skin warm with no rashes
Psychosocial	Widowed and lives alone; has one adult child who lives in another state; client is retired and volunteers once a week at a local library

Which of the following complications is the client at risk of experiencing? **Select all that apply.**

1. Septic shock
2. Acute kidney injury
3. Acute respiratory distress syndrome
4. Multiple organ dysfunction syndrome
5. Disseminated intravascular coagulation

Explanation:



Signs of infection combined with systemic inflammatory response syndrome (SIRS) criteria indicate this client is experiencing *sepsis*. Sepsis can lead to a variety of systemic complications:

- **Septic shock** occurs when inflammatory mediators (e.g., cytokines) induce widespread vasodilation and increased capillary permeability, leading to dangerously low blood pressure **[Choice 1]**.
- Severe hypoperfusion in septic shock can lead to organ failure; for example, inadequate perfusion to the kidneys can cause **acute kidney injury [Choice 2]**. Failure of two or more organ systems (e.g., kidneys, lungs) is called **multiple organ dysfunction syndrome (MODS) [Choice 4]**.
- **Acute respiratory distress syndrome (ARDS)** is a sudden and severe type of respiratory failure with refractory hypoxemia (i.e., inadequate oxygenation despite oxygen support) **[Choice 3]**. ARDS occurs when inflammatory mediators damage alveoli and impair gas exchange.
- **Disseminated intravascular coagulation (DIC)** occurs when inflammatory mediators activate the body's clotting cascade **[Choice 5]**. In DIC, the widespread formation of clots consumes available platelets and clotting factors, placing the client at high risk for bleeding. Clients with DIC are at risk for emergencies related to both bleeding and clotting.

Key Takeaway:

- Clients experiencing systemic inflammatory response syndrome are at risk for complications, including MODS, ARDS, septic shock, acute kidney injury, and DIC.

Question: 93 — **Type:** multipleResponseSelectN

Nurses' Notes

Day 1: Emergency Department

1327:

The client arrives at the emergency department from her home via ambulance. The client was recently discharged from the hospital following treatment for a urinary tract infection. She appears drowsy but is responsive to verbal stimuli. The client states, "I called the ambulance today because I just wasn't feeling right. I am just tired, and I have some pain in my stomach and back. I think those antibiotics don't agree with my stomach." Client has an 18-gauge peripheral IV in the right hand inserted by emergency medical services that is saline-locked. No other interventions have been completed at this time.

Vital Signs

	1334
T	101.2 F (38.4 C)
P	125
RR	25
BP	92/64
Pulse oximetry reading	91% on room air
Pain level	6/10
Weight	220 lbs (100 kg)

History and Physical

Body System	Findings
Neurological	Oriented to person and place; disoriented to time; appears drowsy but is responsive to verbal stimuli; reports lightheadedness
Pulmonary	Tachypneic; reports mild dyspnea on exertion; lung sounds clear throughout; reports dry, chronic cough; smokes 1 pack per day for the past 10 years
Cardiovascular	Sinus tachycardia; S1 and S2 present with no murmurs; 1+ peripheral pulses in bilateral upper and lower extremities; pulses weak and thready; capillary refill >3 seconds; history of hypertension
Gastrointestinal/Genitourinary	Abdomen soft and nontender; bowel sounds hypoactive x 4 quadrants; lower abdominal and lower back pain; decreased appetite for 2-3 days; decreased urination with foul-smelling urine; recent hospital admission for urinary tract infection; discharged home with ciprofloxacin PO; antibiotic course complete
Skin	Skin and mucous membranes pink, dry, intact; skin warm with no rashes
Psychosocial	Widowed and lives alone; has one adult child who lives in another state; client is retired and volunteers once a week at a local library

Select the top 5 findings below that would require **immediate** follow-up.

1. Cough

2. Pulse rate

3. Lives alone

4. Urine output

5. Blood pressure

6. Smoking status

7. Respiratory rate

8. Capillary refill time

9. Recent hospitalization

Explanation:

The client's assessment findings indicate *ineffective systemic tissue perfusion* and require immediate intervention to address hemodynamic instability and restore systemic perfusion.

- Low **blood pressure** results in decreased perfusion, which can damage vital organs and lead to cardiac arrest if severe **[Choice 5]**.
- Delayed **capillary refill** and decreased **urine output** indicate hypoperfusion to the extremities and kidneys **[Choices 4 and 8]**.
- Compensatory responses for hypoperfusion include an increased **respiratory rate** and **pulse rate** **[Choices 2 and 7]**.

Incorrect:

Cough; Smoking status

The client reports smoking one pack per day and a chronic cough. Smokers often have a chronic cough, which is less concerning than a new-onset cough. Although smoking cessation education is an important intervention for this client, the nurse must first address the hemodynamic instability.

Lives alone; Recent hospitalization

The client's living situation and recent hospitalization indicate the need for referral to case management or social work to ensure the client has appropriate resources available upon discharge. However, this is not a priority intervention at this time.

Key Takeaway:

- Hypotension, tachycardia, delayed capillary refill, and decreased urination indicate hypoperfusion, which can lead to organ failure and cardiac arrest.

Question: 94 — Type: multipleResponse

The nurse reviews the Day 2 0800 Progress Notes.

History and Physical

A 68-year-old male client presents to the emergency department with intermittent substernal chest pain during activity that began yesterday evening and has worsened this morning. The client describes the pain as heavy pressure that radiates to his neck and jaw. He rates chest pain as 7/10. He states that the pain was previously relieved by rest but is now more persistent. Client reports that he took three nitroglycerin tablets sublingually in the past hour, which partially relieved his pain. He denies fever or chills. Client has a history of chronic stable angina, hypertension, coronary artery disease, osteoarthritis, and type 2 diabetes mellitus. He is a former smoker and smoked one pack per day for 20 years. He appears anxious and diaphoretic. S1 and S2 present. Lung sounds clear. Capillary refill <3 seconds in all extremities.

Vital Signs

	1000	1200
T	98.2 F (36.8 C)	98.0 F (36.7 C)
P	105	93
RR	21	18
BP	115/83	110/75
Pulse oximetry reading	96% on room air	95% on room air

Diagnostic Results

12-Lead ECG

1000:



Laboratory Results

Laboratory Test and Reference Range	1000
Chemistry	
Sodium 136–145 mEq/L (136–145 mmol/L)	142 mEq/L (142 mmol/L)
Potassium 3.5–5.0 mEq/L (3.5–5.0 mmol/L)	4.5 mEq/L (4.5 mmol/L)
Blood urea nitrogen (BUN) 10–20 mg/dL (3.6–7.1 mmol/L)	15 mg/dL (5.4 mmol/L)

Laboratory Results 2

Laboratory Test and Reference Range	1000
Chemistry	
Creatinine Male: 0.6–1.2 mg/dL (53–106 µmol/L);	1.2 mg/dL (92 µmol/L)

Female: 0.5–1.1 mg/dL (44–97 µmol/L)	
Glucose 74–106 mg/dL (4.1–5.9 mmol/L)	195 mg/dL (10.8 mmol/L)
Troponin I <0.03 ng/mL (<0.03 mcg/L)	2.5 ng/mL (2.5 mcg/L)

Progress Notes

Day 1

1200:	Client received loading doses of aspirin and ticagrelor and was placed on IV nitroglycerin. Client was transferred to the cardiac catheterization lab where he underwent percutaneous coronary intervention via the femoral artery approach. A drug-eluting stent was placed in the left anterior descending coronary artery. The client was transferred to the coronary care unit in stable condition.
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Day 2

0800:	Client vital signs remained stable overnight with no further chest pain and no arrhythmias noted on cardiac monitoring. He is now stable for discharge with plans to follow up with a visit to the cardiology clinic in one week.
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The nurse in the coronary care unit has provided discharge teaching to the client. Which of the following client statements indicate that the teaching was effective? **Select all that apply.**

1. "I will continue taking both aspirin and ticagrelor after I am discharged from the hospital."
2. "I can take naproxen or ibuprofen if I have aches or pains in my joints from physical activity."
3. "If I fall and hurt myself or if I hit my head, I should contact my healthcare provider immediately."
4. "I should slowly increase my activity level to a goal of 30-60 minutes of brisk walking at least 5 days a week."
5. "I should keep a bottle of nitroglycerin tablets available in my house and my car in case I experience chest pain again."
6. "I can gradually resume sexual activity once I can climb two flights of stairs or walk a block without experiencing chest pain."

Explanation:

Discharge teaching for clients who have experienced a myocardial infarction (MI) aims at reducing the risk of complications. Teaching was **effective** if the client understands the following points:

- Dual antiplatelet therapy (DAPT) with **both aspirin and a P2Y₁₂ inhibitor** (e.g., ticagrelor, clopidogrel) is taken for at least 6 months to a year after MI to reduce the risk of coronary stenosis **[Choice 1]**.
- DAPT inhibits platelet aggregation and can cause life-threatening bleeding in response to even mild injuries. If the client sustains a **head injury**, he should **contact his healthcare provider** or go to the nearest emergency department **[Choice 3]**.
- Physical activity improves cardiovascular health and reduces the risk of future MIs. Clients should **gradually increase activity levels** to a goal of **150 minutes of activity weekly** at the level of brisk walking **[Choice 4]**. **Sexual activity** is considered safe once the client can tolerate climbing two flights of stairs or walking one block **[Choice 6]**.

Ineffective teaching:

- Clients taking DAPT should avoid **non-steroidal anti-inflammatory drugs** (NSAIDs) (e.g., **naproxen, ibuprofen**), as these increase the risk of bleeding **[Choice 2]**.
- Nitroglycerin is unstable in heat and should only be stored in a dry place at room temperature (e.g., **do not store in the car** or bathroom) **[Choice 5]**.

Key Takeaway:

After an MI:

- Clients take DAPT for at least 6 months.
- While taking DAPT, clients should avoid NSAIDs and treat any head injury like a medical emergency.
- Gradually resume physical and sexual activity as tolerated.

History and Physical

A 68-year-old male client presents to the emergency department with intermittent substernal chest pain during activity that began yesterday evening and has worsened this morning. The client describes the pain as heavy pressure that radiates to his neck and jaw. He rates chest pain as 7/10. He states that the pain was previously relieved by rest but is now more persistent. Client reports that he took three nitroglycerin tablets sublingually in the past hour, which partially relieved his pain. He denies fever or chills. Client has a history of chronic stable angina, hypertension, coronary artery disease, osteoarthritis, and type 2 diabetes mellitus. He is a former smoker and smoked one pack per day for 20 years. He appears anxious and diaphoretic. S1 and S2 present. Lung sounds clear. Capillary refill <3 seconds in all extremities.

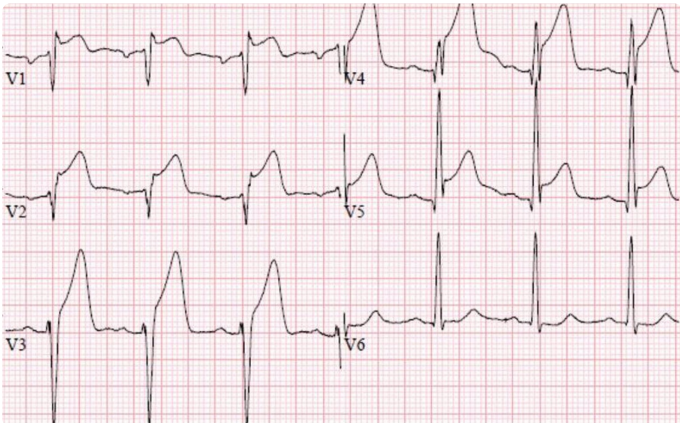
Vital Signs

	1000
T	98.2 F (36.8 C)
P	105
RR	21
BP	115/83
Pulse oximetry reading	96% on room air

Diagnostic Results

12-Lead ECG

1000:



Laboratory Results

Laboratory Test and Reference Range	1000
Chemistry	
Sodium 136–145 mEq/L (136–145 mmol/L)	142 mEq/L (142 mmol/L)
Potassium 3.5–5.0 mEq/L (3.5–5.0 mmol/L)	4.5 mEq/L (4.5 mmol/L)
Blood urea nitrogen (BUN) 10–20 mg/dL (3.6–7.1 mmol/L)	15 mg/dL (5.4 mmol/L)

Laboratory Results 2

Laboratory Test and Reference Range	1000
Chemistry	
Creatinine Male: 0.6–1.2 mg/dL (53–106 µmol/L); Female: 0.5–1.1 mg/dL	1.2 mg/dL (92 µmol/L)

(44–97 μmol/L)	
Glucose 74–106 mg/dL (4.1–5.9 mmol/L)	195 mg/dL (10.8 mmol/L)
Troponin I <0.03 ng/mL (<0.03 mcg/L)	2.5 ng/mL (2.5 mcg/L)

Which client findings require **immediate** follow-up by the nurse? **Select all that apply.**

1. Pulse
2. Respirations
3. Troponin results
4. Pain characteristics
5. Past medical history
6. Response to nitroglycerin
7. Electrocardiogram findings

Explanation:

The nurse should suspect *coronary ischemia* in clients with **exertional, substernal chest pain [Choice 4]**. Coronary ischemia occurs either when the heart’s demand for oxygen is too great (e.g., during activity) and/or when the supply of oxygenated blood through the coronary arteries is insufficient (e.g., atherosclerosis).

This imbalance of supply and demand can cause myocardial injury. Injured myocytes release cardiac **troponin** enzymes into the blood **[Choice 3]**. When ischemia is severe and extensive, death of the myocardium causes **electrocardiogram (ECG) changes** (e.g., ST segment changes, bundle branch block) **[Choice 7]**.

Nitroglycerin is administered to dilate the coronary arteries and relieve the imbalance of oxygen supply and demand. If the client’s pain **fails to respond to nitroglycerin**, this could indicate that more invasive and emergent interventions are required to restore myocardial blood flow **[Choice 6]**.

Incorrect:

Pulse; Respirations
The client’s pulse and respirations are mildly elevated, which is likely a response to chest pain and anxiety associated with myocardial ischemia.

Past medical history
This client’s past medical history contains several risk factors for atherosclerotic cardiovascular disease, including hypertension, smoking, and diabetes mellitus. These components of the client’s history are useful in assessing his risk for myocardial infarction but do not require immediate follow-up.

- Key Takeaway:**
- Exertional, substernal chest pain may indicate coronary ischemia.
 - The presence of chest pain, elevated troponins, and ECG changes are concerning for myocardial injury.
 - Inadequate response of coronary chest pain to nitroglycerin indicates more invasive interventions to restore myocardial perfusion are needed.

Question: 96 — Type: dragAndDropSATA

The nurse has reviewed the client’s Progress Notes and updated Vital Signs from 1200.

History and Physical

A 68-year-old male client presents to the emergency department with intermittent substernal chest pain during activity that began yesterday evening and has worsened this morning. The client describes the pain as heavy pressure that radiates to his neck and jaw. He rates chest pain as 7/10. He states that the pain was previously relieved by rest but is now more persistent. Client reports that he took three nitroglycerin tablets sublingually in the past hour, which partially relieved his pain. He denies fever or chills. Client has a history of chronic stable angina, hypertension, coronary artery disease, osteoarthritis, and type 2 diabetes mellitus. He is a former smoker and smoked one pack per day for 20 years. He appears anxious and diaphoretic. S1 and S2 present. Lung

sounds clear. Capillary refill <3 seconds in all extremities.

Vital Signs

	1000	1200
T	98.2 F (36.8 C)	98.0 F (36.7 C)
P	105	93
RR	21	18
BP	115/83	110/75
Pulse oximetry reading	96% on room air	95% on room air

Diagnostic Results

12-Lead ECG

1000:



Laboratory Results

Laboratory Test and Reference Range	1000
Chemistry	
Sodium 136–145 mEq/L (136–145 mmol/L)	142 mEq/L (142 mmol/L)
Potassium 3.5–5.0 mEq/L (3.5–5.0 mmol/L)	4.5 mEq/L (4.5 mmol/L)
Blood urea nitrogen (BUN) 10–20 mg/dL (3.6–7.1 mmol/L)	15 mg/dL (5.4 mmol/L)

Laboratory Results 2

Laboratory Test and Reference Range	1000
Chemistry	
Creatinine Male: 0.6–1.2 mg/dL (53–106 µmol/L); Female: 0.5–1.1 mg/dL (44–97 µmol/L)	1.2 mg/dL (92 µmol/L)
Glucose 74–106 mg/dL (4.1–5.9 mmol/L)	195 mg/dL (10.8 mmol/L)
Troponin I <0.03 ng/mL (<0.03 mcg/L)	2.5 ng/mL (2.5 mcg/L)

Progress Notes

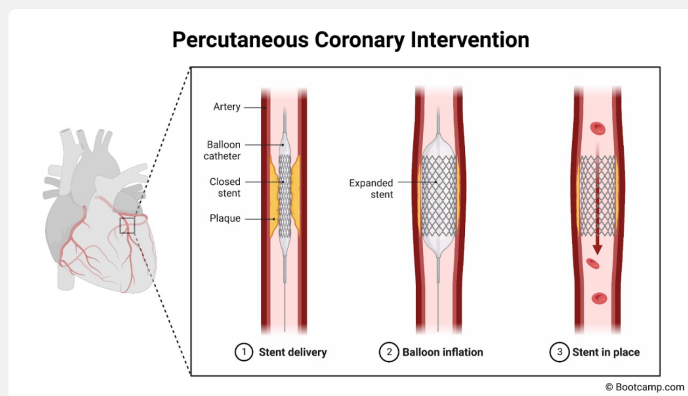
1200:

Client received loading doses of aspirin and ticagrelor and was placed on IV nitroglycerin. Client was transferred to the cardiac catheterization lab where he underwent percutaneous coronary intervention via the femoral artery approach. A drug-eluting stent was placed in the left anterior descending coronary artery. The client was transferred to the coronary care unit in stable condition.

The nurse in the coronary care unit is caring for the client immediately after stent placement. Drag the potential interventions the nurse should take to the box on the right. Choose only the interventions that are appropriate.

1. Encourage intake of oral fluids.
2. Administer metoprolol 25 mg PO.
3. Monitor insertion site for bleeding.
4. Keep the affected lower extremity extended.
5. Assess dorsalis pedis pulses every 15 minutes.
6. Apply pressure above puncture site if a swollen, indurated area develops.

Explanation:



Percutaneous coronary intervention (PCI) involves threading a catheter through the femoral artery in the groin into the coronary arteries. A balloon opens the coronary obstruction, which is then secured with a stent.

Clients undergoing PCI are at risk for *life-threatening hemorrhage*. Antiplatelet medications administered during PCI further increase the risk of bleeding.

To reduce the risk of bleeding complications, the nurse should:

- **Monitor the insertion site for bleeding** and **assess dorsalis pedis pulses every 15 minutes**. Bleeding may not be obvious, like a hematoma, but it can occur insidiously in the retroperitoneal space. This would cause weak, thready peripheral pulses but no visible bleeding.
- **Keep the affected lower extremity extended** to reduce pressure on the groin insertion site.
- If a **swollen, indurated area** develops (i.e., hematoma), the nurse should **apply firm pressure above the puncture site** to occlude arterial flow.

PCI can also cause acute kidney injury (AKI) from IV contrast (i.e., contrast nephropathy). The nurse should **encourage the intake of oral fluids** to flush the IV contrast and prevent AKI.

Beta blockers (e.g., **metoprolol**) **should be administered** to all clients with MI who do not have contraindications (e.g., heart block, severe bradycardia). By slowing the heart rate, beta blockers prevent fatal arrhythmias and decrease oxygen demand.

Key Takeaway:

- To prevent life-threatening hemorrhage post-PCI, monitor for bleeding, assess pedal pulses, keep the lower extremity extended, and apply pressure above the puncture site if a hematoma develops.
- Beta blockers decrease oxygen demand.
- Fluid intake prevents contrast-induced AKI.

Question: 97 — Type: dropdownRationale

Complete the following sentences by choosing from the lists of options.

History and Physical

A 68-year-old male client presents to the emergency department with intermittent substernal chest pain during activity that began yesterday evening and has worsened this morning. The client describes the pain as heavy pressure that radiates to his neck and jaw. He rates chest pain as 7/10. He states that the pain was previously relieved by rest but is now more persistent. Client reports that he took three nitroglycerin tablets sublingually in the past hour, which partially relieved his pain. He denies fever or chills. Client has a history of chronic stable angina, hypertension, coronary artery disease, osteoarthritis, and type 2 diabetes mellitus. He is a former smoker and smoked one pack per day for 20 years. He appears anxious and diaphoretic. S1 and S2 present. Lung sounds clear. Capillary refill <3 seconds in all extremities.

Vital Signs

	1000
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Pulse oximetry reading	96% on room air

Diagnostic Results

12-Lead ECG

1000:



Laboratory Results

Laboratory Test and Reference Range	1000
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Laboratory Results 2

Laboratory Test and Reference Range	1000
Chemistry	
Creatinine	1.2 mg/dL

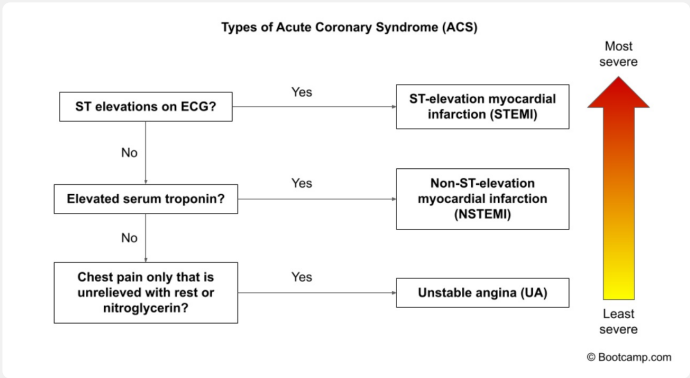
Male: 0.6–1.2 mg/dL (53–106 µmol/L); Female: 0.5–1.1 mg/dL (44–97 µmol/L)	(92 µmol/L)
Glucose 74–106 mg/dL (4.1–5.9 mmol/L)	195 mg/dL (10.8 mmol/L)
Troponin I <0.03 ng/mL (<0.03 mcg/L)	2.5 ng/mL (2.5 mcg/L)

This client is potentially experiencing [Select].

This suspicion is **best** supported by the client's [Select].

Dropdown	Options
Dropdown 1	chronic stable angina an ST-elevation myocardial infarction ✓ a non-ST-elevation myocardial infarction
Dropdown 2	serum troponin 12-lead ECG results ✓ evolving chest pain

Explanation:



If a client's ischemic chest pain is not relieved with rest, the angina is no longer considered stable and is termed *acute coronary syndrome* (ACS). There are three types of acute coronary syndrome:

- ST-elevation myocardial infarction (STEMI) if there are troponins and ST segment elevations,
- Non-ST-elevation myocardial infarction (NSTEMI) if troponins are elevated but ST segments are not, or
- Unstable angina if the pain is unrelieved with rest but is not associated with elevated troponins and ST segments.

This client has both ST elevations and elevated troponin levels. Therefore, this client is potentially experiencing an **ST-elevation myocardial infarction**. The client's **12-lead ECG results** best supports this suspicion.

Incorrect:

Chronic stable angina

Chronic stable angina is exertional chest pain that is relieved with rest or nitroglycerin. This client's pain was unrelieved with rest and was not fully relieved with nitroglycerin.

A non-ST-elevation myocardial infarction (NSTEMI), Serum troponin

Both STEMI and NSTEMI acute coronary syndromes present with elevated troponin levels. NSTEMI produces elevations in serum troponins only. However, more severe ischemic damage causes ST elevations and elevated troponin levels. The presence of ST changes is the most significant indicator of myocardial damage.

Evolving chest pain

Chest pain is not a reliable indicator of acute coronary syndrome. Many clients, especially females, older adults, or clients with diabetes, may experience acute coronary syndrome with only dyspnea, nausea, or diaphoresis and no chest pain.

Key Takeaway:

- STEMI is the most severe form of ACS, characterized by elevated troponins and ST segments.

Question: 98 — Type: matrixMultipleChoice

History and Physical

A 68-year-old male client presents to the emergency department with intermittent substernal chest pain during activity that began yesterday evening and has worsened this morning. The client describes the pain as heavy pressure that radiates to his neck and jaw. He rates chest pain as 7/10. He states that the pain was previously relieved by rest but is now more persistent. Client reports that he took three nitroglycerin tablets sublingually in the past hour, which partially relieved his pain. He denies fever or chills. Client has a history of chronic stable angina, hypertension, coronary artery disease, osteoarthritis, and type 2 diabetes mellitus. He is a former smoker and smoked one pack per day for 20 years. He appears anxious and diaphoretic. S1 and S2 present. Lung sounds clear. Capillary refill <3 seconds in all extremities.

Vital Signs

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T	98.2 F (36.8 C)
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RR	21
BP	115/83
Pulse oximetry reading	96% on room air

Diagnostic Results

12-Lead ECG

1000:



Laboratory Results

Laboratory Test and Reference Range	1000
Chemistry	
Sodium 136–145 mEq/L (136–145 mmol/L)	142 mEq/L (142 mmol/L)
Potassium 3.5–5.0 mEq/L (3.5–5.0 mmol/L)	4.5 mEq/L (4.5 mmol/L)
Blood urea nitrogen (BUN)	15 mg/dL

10–20 mg/dL (3.6–7.1 mmol/L)	(5.4 mmol/L)
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Laboratory Results 2

Laboratory Test and Reference Range	1000
Chemistry	
Creatinine Male: 0.6–1.2 mg/dL (53–106 µmol/L); Female: 0.5–1.1 mg/dL (44–97 µmol/L)	1.2 mg/dL (92 µmol/L)
Glucose 74–106 mg/dL (4.1–5.9 mmol/L)	195 mg/dL (10.8 mmol/L)
Troponin I <0.03 ng/mL (<0.03 mcg/L)	2.5 ng/mL (2.5 mcg/L)

For each potential nursing intervention, click to specify whether the intervention is indicated or not indicated for the care of this client.

Potential intervention	Indicated	Not Indicated
1. Administer ticagrelor 180 mg PO.	✓	
2. Initiate continuous cardiac monitoring.	✓	
3. Administer aspirin 325 mg crushed PO.	✓	
4. Initiate nitroglycerin 5 mcg/min continuous IV infusion.	✓	
5. Regularly assess peripheral pulses and capillary refill.	✓	
6. Assess the client's exercise tolerance with a walk test.		✓
7. Administer 2 L/min supplemental oxygen via nasal cannula.		✓

Note: Each row must have 1 response option selected.

Explanation:

Care for the client with a myocardial infarction aims at *restoring coronary perfusion*. Interventions that are **indicated** include:

- **Administering** loading doses of **antiplatelet medications** (e.g., **ticagrelor**, **aspirin**) to inhibit further thrombosis in the coronary arteries [**Choices 1 and 3**].
- **Initiating continuous cardiac monitoring** and **regularly assessing peripheral perfusion** to monitor hemodynamic status [**Choices 2 and 5**].
- **Initiating nitroglycerin via continuous IV infusion** to dilate the coronary arteries and increase blood supply to the dying myocardium [**Choice 4**].

Interventions that are **not indicated** include:

- **Assessing the client's exercise tolerance with a walk test** [**Choice 6**]. A walk test is done routinely before hospital discharge to determine whether a client can safely return home without supplemental oxygen support. This client is experiencing an acute MI and should be kept on bed rest to reduce myocardial oxygen consumption.
- **Administering 2 L/min supplemental oxygen via nasal cannula** [**Choice 7**]. Supplemental oxygen should not be administered routinely to clients with MI. Supplemental oxygen is reserved for clients with an oxygen saturation ≤94%.

Key Takeaway:

Care for the client with an MI includes:

- Administering antiplatelet medications (e.g., ticagrelor, aspirin) to inhibit coronary thrombosis
- Initiating continuous cardiac monitoring and performing frequent peripheral vascular assessments
- Initiating IV nitroglycerin to dilate coronary arteries

History and Physical

A 68-year-old male client presents to the emergency department with intermittent substernal chest pain during activity that began yesterday evening and has worsened this morning. The client describes the pain as heavy pressure that radiates to his neck and jaw. He rates chest pain as 7/10. He states that the pain was previously relieved by rest but is now more persistent. Client reports that he took three nitroglycerin tablets sublingually in the past hour, which partially relieved his pain. He denies fever or chills. Client has a history of chronic stable angina, hypertension, coronary artery disease, osteoarthritis, and type 2 diabetes mellitus. He is a former smoker and smoked one pack per day for 20 years. He appears anxious and diaphoretic. S1 and S2 present. Lung sounds clear. Capillary refill <3 seconds in all extremities.

Vital Signs

	1000
T	98.2 F (36.8 C)
P	105
RR	21
BP	115/83
Pulse oximetry reading	96% on room air

Diagnostic Results

12-Lead ECG

1000:



Laboratory Results

Laboratory Test and Reference Range	1000
Chemistry	
Sodium 136–145 mEq/L (136–145 mmol/L)	142 mEq/L (142 mmol/L)
Potassium 3.5–5.0 mEq/L (3.5–5.0 mmol/L)	4.5 mEq/L (4.5 mmol/L)
Blood urea nitrogen (BUN) 10–20 mg/dL (3.6–7.1 mmol/L)	15 mg/dL (5.4 mmol/L)

Laboratory Results 2

Laboratory Test and Reference Range	1000
Chemistry	
Creatinine Male: 0.6–1.2 mg/dL (53–106 µmol/L);	1.2 mg/dL (92 µmol/L)

Female: 0.5–1.1 mg/dL (44–97 µmol/L)	
Glucose 74–106 mg/dL (4.1–5.9 mmol/L)	195 mg/dL (10.8 mmol/L)
Troponin I <0.03 ng/mL (<0.03 mcg/L)	2.5 ng/mL (2.5 mcg/L)

Select the 2 complications the nurse is **most** concerned about the client developing.

- 1. Pericarditis
- 2. Heart failure
- 3. Acute kidney injury
- 4. Ventricular arrhythmias
- 5. Abdominal aortic aneurysm

Explanation:

The most lethal complications of acute coronary syndrome are **heart failure** (i.e., cardiogenic shock) or **ventricular arrhythmias**.

When the cardiac muscle begins to die, left ventricular ejection weakens, which may lead to a decreased cardiac output and **heart failure** or, if severe with hypotension, cardiogenic shock **[Choice 2]**.

Dying myocardial cells also conduct electricity abnormally, which impairs repolarization and can precipitate lethal **ventricular arrhythmias** such as ventricular fibrillation or pulseless ventricular tachycardia (i.e., sudden cardiac death) **[Choice 4]**.

Incorrect:

Pericarditis

Pericarditis is inflammation of the pericardial sac surrounding the heart. This can occur after recovery from MI as the body sends inflammatory mediators to heal the damaged myocardium. However, this is not as emergently concerning as the risk for heart failure and arrhythmias.

Acute kidney injury

This client may develop acute kidney injury due to decreased cardiac output or if IV contrast is required, but this risk is not emergent.

Abdominal aortic aneurysm

This client has several risk factors for abdominal aortic aneurysm (e.g., age, male gender, smoking). He should undergo screening for an aneurysm, but this is not of immediate concern.

Key Takeaway:

- Death of cardiac muscle can weaken left ventricular ejection, causing heart failure.
- Dying myocardial cells conduct electricity abnormally, which can precipitate lethal ventricular arrhythmias.

Question: 100 — Type: multipleResponse

The nurse provides education to a client with peripheral arterial disease.

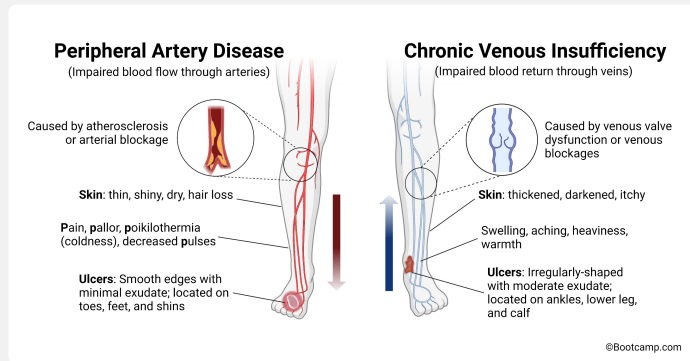
Which of the following statements does the nurse include during the health teaching? **Select all that apply.**

- 1. "Avoid crossing your legs while seated."
- 2. "Wear compression stockings to reduce swelling."
- 3. "Apply ice packs to your legs if they are sore."
- 4. "Check for cuts or blisters on your feet every day."
- 5. "Sleep with your legs elevated above the level of your heart."

6. "Making the decision to quit smoking will improve blood flow."

7. "If you feel pain during your walking, stop to rest, and then try to walk farther."

Explanation:



Peripheral arterial disease (PAD) occurs when atherosclerosis impairs arterial blood flow to the extremities, most often the legs. Inadequate perfusion to the lower extremities causes pain (i.e., **intermittent claudication**), poor wound healing, paresthesias, and pale, shiny, hairless skin.

Education should focus on optimizing **blood flow** and **preventing complications**:

- Clients with PAD should **avoid crossing the legs**, as this occludes arterial blood flow [**Choice 1**].
- **Inspect the feet daily** for any injuries to avoid wounds going unnoticed, as these heal poorly in clients with PAD [**Choice 4**].
- **Smoking cessation** is one of the most important interventions for PAD, as nicotine induces **vasoconstriction** [**Choice 6**].
- Exercise improves arterial flow, but is often painful for clients with PAD. Clients should be taught to **walk to the point of discomfort, rest briefly, and then walk farther** [**Choice 7**].

Incorrect:

- **Constrictive garments** (e.g., **compression stockings**) occlude arterial flow and should be avoided [**Choice 2**]. Compression stockings are indicated in **peripheral venous insufficiency**.
- **Ice or cold temperatures** should be avoided, as they cause vasoconstriction and reduce arterial flow [**Choice 3**].
- Clients with PAD can elevate the legs, but **not above heart level**, as this reduces arterial flow [**Choice 5**]. Elevating the legs above heart level is appropriate for a client with **peripheral venous insufficiency** with inadequate *venous return*.

Key Takeaway:

Clients with PAD should:

- Avoid crossing the legs or elevating legs above heart level.
- Inspect the feet daily.
- Stop smoking.
- Walk to the point of discomfort, rest, and then walk a little farther.

Question: 101 — **Type:** multipleChoice

The nurse observes a coworker who is assisting the health care provider to perform electrical cardioversion for a client with atrial fibrillation.

Which of the following actions by the coworker would require the nurse to intervene?

1. Turns the synchronizer switch to the ON position
2. Verifies the client received pre-procedure heparin
3. Administers IV diazepam before the shock is delivered
4. Applies a nasal cannula to the client before the shock is delivered

Explanation:

Electrical cardioversion is used to **restore normal heart rhythm** in atrial fibrillation or supraventricular tachycardia. Electrodes are placed on the chest, and the defibrillator delivers a **synchronized shock**. This shock momentarily stops the heart, allowing the **heart's natural pacemaker to reset** and restore a normal rhythm.

The major safety concerns when delivering synchronized cardioversion are to ensure the **defibrillator is synchronized** and that **personnel and oxygen equipment are “all clear” from the bed before discharging the defibrillator**. This is because oxygen can **ignite under sparks** produced during electrical cardioversion and **start a fire**. The nurse should **remove the nasal cannula before delivering the shock** [Choice 4].

Correct actions not requiring intervention:

Turns synchronizer switch to ON position

Turning ON synchronization during electrical cardioversion ensures the shock is *delivered on the R wave* of the QRS complex to avoid inducing ventricular fibrillation.

Verifies client received pre-procedure heparin

Anticoagulation is critical before cardioversion in atrial fibrillation to decrease the risk of *embolic ischemic stroke*. Blood can *pool and clot in the atria* during fibrillation, and returning the heart to normal rhythm may *dislodge* these clots to the brain.

Administers IV diazepam before shock delivered

Electrical cardioversion is an uncomfortable procedure, and a sedative like diazepam is often administered before the shock is delivered to enhance client comfort.

Key Takeaway:

- Before cardioversion, ensure the defibrillator is synchronized and that personnel and oxygen equipment are “all clear” before discharging the defibrillator.

Question: 102 — **Type:** multipleChoice

The nurse is caring for a client with heart failure.

Which of the following should the nurse monitor as the **best** indicator of the client's fluid volume status?

1. Intake and output
2. B-type natriuretic peptide
3. Daily standing scale weights
4. Presence of peripheral edema

Explanation:

When caring for a client with **heart failure**, it is important for the nurse to monitor for **fluid volume excess**, which can precipitate an **acute exacerbation**. The **best** indicator for fluid volume status is **standing scale weights at the same time each day** before the client has eaten or had anything to drink. This method provides an accurate assessment of fluid volume status, as **changes in weight indicate fluid retention or loss** [Choice 3].

The nurse should report a weight gain of **>3 lbs (1.4 kg) in a week or >2-3 lbs (1-1.4 kg) overnight** and anticipate administration of diuretics.

Incorrect:

Intake and output

Intake and output monitoring may not be as accurate as daily weights, as it does not take into account insensible losses or other factors that may affect fluid balance.

B-type natriuretic peptide (BNP)

BNP is a hormone released by the heart in response to fluid overload and can be used to confirm a suspected diagnosis of heart failure exacerbation. BNP is not the best indicator of fluid volume status and is usually not measured more than once during a hospitalization.

Peripheral edema

Peripheral edema may not develop until 4-7 L of fluid is retained and can be affected by other factors such as medication use and positioning.

Key Takeaway:

- The best indicator for monitoring a client's fluid volume status in heart failure is daily standing scale weights, as it provides an accurate and

Question: 103 — **Type:** dragAndDropSATA

The nurse is preparing to educate the client with coronary artery disease (CAD) about current risk factors for CAD that the client can address to improve cardiovascular health.

Which of the following does the nurse recognize as modifiable risk factors?

Drag the appropriate risk factors for coronary artery disease education to the box on the right.

1. White

2. Age 74

3. Male sex

4. Consumes high-fat diet

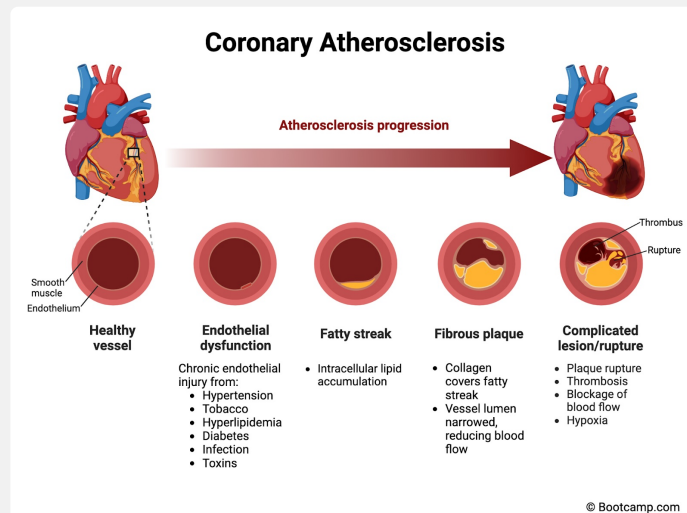
5. Family history of heart disease

6. Takes a walk once per week

7. Anxiety and depression

8. Smokes ½ pack cigarettes per day

Explanation:



Risk factors for coronary artery disease (CAD) include *nonmodifiable* and *modifiable* factors. Only modifiable risk factors can be changed to improve cardiovascular health.

Modifiable risk factors that are appropriate to include in client education:

- **Consumes high-fat diet:** Decreasing saturated fats and increasing fiber, complex carbohydrates, and mono- and polyunsaturated fats can lower the risk for cardiovascular disease.
- **Takes a walk once per week:** Thirty minutes of moderate activity (e.g., walking, cycling, swimming) several times a week (total of 150 minutes/week) will increase HDL levels, lower blood pressure, and control weight.
- **History of anxiety and depression:** Employing stress management techniques, reassessing priorities, getting adequate rest and sleep, and seeking professional help can lower cardiovascular risks.
- **Smokes ½ pack cigarettes per day:** Cigarette smoking increases LDL levels, vessel inflammation, and thrombus formation. The client should start a smoking cessation program and change habits that trigger tobacco cravings.

Incorrect:

Nonmodifiable risk factors include:

- **Age 74:** Physiological changes occur with age (e.g., enlarged left ventricle, arterial stiffness) and contribute to the development of CAD.

- **Male sex:** The highest incidence of CAD is among middle-aged males.
- **Family history of heart disease:** Clients with a first-degree male relative who developed CAD before age 55 or a female relative before age 65 are at greatest risk.
- **White:** White males have the highest overall incidence of CAD; although, Blacks develop CAD earlier and have higher death rates.

Key Takeaway:

Modifiable risk factors for CAD include:

- Sedentary lifestyle
- Tobacco use
- High-fat diet
- Anxiety and stress

Adult Health - Endocrine

Question: 104 — **Type:** multipleChoice

The nurse is supervising a graduate nurse in the care of a client with a pheochromocytoma.

Which action by the graduate nurse would cause the supervising nurse to **intervene**?

1. Instructs the client to avoid caffeine-containing beverages
2. Palpates for an abdominal mass during the shift assessment
3. Assists the client to change positions slowly to avoid dizziness
4. Discards the initial void after beginning a 24-hour urine collection

Explanation:

Pheochromocytoma is a rare complication of an adrenal medulla tumor that overproduces catecholamines, including epinephrine and norepinephrine. If left untreated, it can result in **hypertensive crisis** and life-threatening complications (e.g., encephalopathy, diabetes, multiple organ failure, death).

Clinical manifestations include **severe uncontrolled hypertension**, headache, tachycardia, sweating, abdominal pain, and chest pain. Common causes of exacerbation include trauma, stress, and **direct mechanical pressure to the tumor**. Palpating the mass can cause a **sudden release of catecholamines** resulting in severe hypertension. As a result, the nurse should **never palpate the abdomen because this can lead to an acute life-threatening exacerbation [Choice 2]**.

Incorrect:

Avoid caffeine

Clients should be instructed to avoid caffeine and tyramine, as these can exacerbate catecholamine excess, leading to hemodynamic instability caused by severe hypertension and tachycardia.

Change position slowly

Clients should change positions slowly because treatment typically involves adrenergic receptor blockers to manage hypertension. As a result, orthostatic hypotension can occur. Clients should be educated to change positions slowly to prevent hypotension.

Discard initial void for a 24-hour urine test

When performing a 24-hour urine collection test, the first voided specimen should be discarded and the time is documented as the beginning of the 24-hour period. This is the appropriate technique when performing this test.

Key Takeaway:

- Pheochromocytoma is associated with an overproduction of catecholamines and can result in disease exacerbation manifested by severe uncontrolled hypertension.
- Never palpate the abdomen of a client with pheochromocytoma, as this can release more catecholamines and precipitate hypertensive crisis.

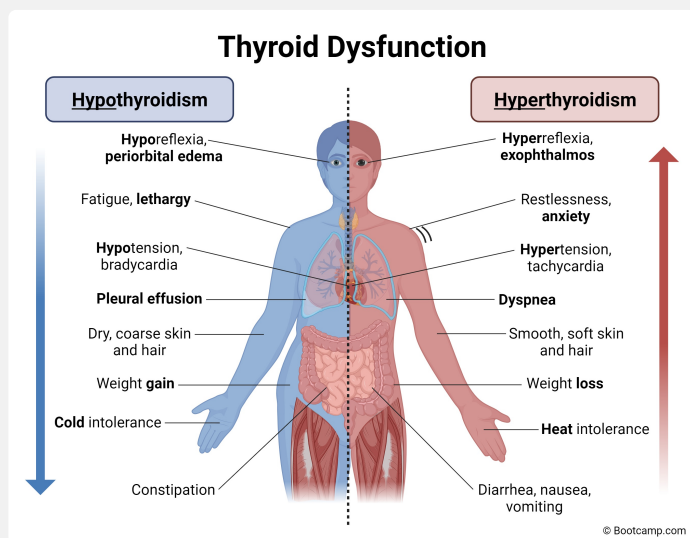
Question: 105 — **Type:** multipleResponse

The nurse assesses a 36-year-old female client at the clinic who says she believes she has an “overactive thyroid.” The nurse is asking the client about recent symptoms.

Which of the following symptoms, if reported by the client, would cause the nurse to suspect a diagnosis of hyperthyroidism? **Select all that apply.**

1. Palpitations
2. Dry and thinning hair
3. Feeling “sweaty”
4. Feeling “exhausted”
5. Experiencing constipation
6. Increase in irritability or agitation
7. Dry eyes or vision changes
8. Unintended weight loss

Explanation:



Hyperthyroidism involves the excessive secretion of thyroid hormones that stimulate metabolism and increases **sympathetic nervous system activity**. The nurse should assess for signs of hyperthyroidism (i.e., thyrotoxicosis) which that resemble a **hyperactive, hypermetabolic** state:

- **Palpitations** in hyperthyroidism occur when thyroid hormones overstimulate the heart, which increases heart rate and stroke volume and can precipitate atrial fibrillation **[Choice 1]**.
- An increased energy expenditure and basal metabolic rate can cause **diaphoresis** and **unintended weight loss** **[Choices 3 and 8]**.
- Hyperarousal and activation can cause feelings of **irritability** and agitation **[Choice 6]**.
- Exophthalmos (protrusion of eyeballs), caused by increased fat deposits and edema in the orbital tissues and ocular muscles. Inability to fully close the eyelid can lead to dry eye and vision changes **[Choice 7]**.

Incorrect:

Dry and thinning hair, Feeling “exhausted,” Experiencing constipation

Hypothyroidism, characterized by undersecretion of thyroid hormone, slows metabolism and causes a hypometabolic state. Hypothyroidism causes symptoms generally opposite to those of hyperthyroidism, including dry and thinning hair, fatigue and lethargy, and constipation. Hyperthyroidism instead causes soft and smooth hair, agitation and irritability, and diarrhea.

Key Takeaway:

- Hyperthyroidism causes hypermetabolism and increased sympathetic nervous system activity.
- Signs of hyperthyroidism include
 - Palpitations
 - Diaphoresis and weight loss
 - Irritability

- Exophthalmos

Question: 106 — **Type:** multipleChoice

The home care nurse cares for a 70-year-old male client who reports feeling hungry, weak, and "shaky," and is found to have a low blood glucose level.

Which action by the nurse is appropriate at this time?

1. Turn the client onto his left side
2. Give the client crackers with cheese
3. Offer the client half a cup of orange juice
4. Administer 1 mg of glucagon intramuscularly

Explanation:

This client is demonstrating signs of **mild hypoglycemia**.

In the home setting, hypoglycemia (blood glucose <70 mg/dL [3.9 mmol/L]) should be treated with **15 grams of carbohydrate** (e.g., half a cup of fruit juice, glucose tablets or gel, or 6-10 hard candies). Blood sugar is **reassessed after 15 minutes** and treatment may be repeated if glucose remains low.

Incorrect:

Turn the client onto his left side

Repositioning a client onto their side prevents aspiration. This intervention would be appropriate for a client with hypoglycemia who has an *altered mental status*. This client is conscious and requires oral administration of fast-acting carbohydrates (e.g., fruit juice).

Give the client crackers with cheese

The client should be offered a carbohydrate with protein or fat (e.g., crackers and cheese) *only once the glucose level is corrected* and has stabilized. The client's glucose should first be corrected by administering 15 grams of fast-acting carbohydrates.

Administer 1 mg of glucagon intramuscularly

Glucagon injection is performed for clients with symptoms of *severe hypoglycemia* (e.g., unable to swallow, unconscious, blood glucose <20 mg/dL [1.0 mmol/L]). *Oral glucose* is the preferred form of glucose replacement in clients with hypoglycemia who are alert, responsive, and able to swallow.

Key Takeaway:

- The first intervention for an alert client experiencing mild hypoglycemia (blood glucose <70 mg/dL [3.9 mmol/L]) is administering 15 grams of carbohydrate.
- Fast-acting carbohydrates include fruit juice, glucose tablets or gel, and hard candies.

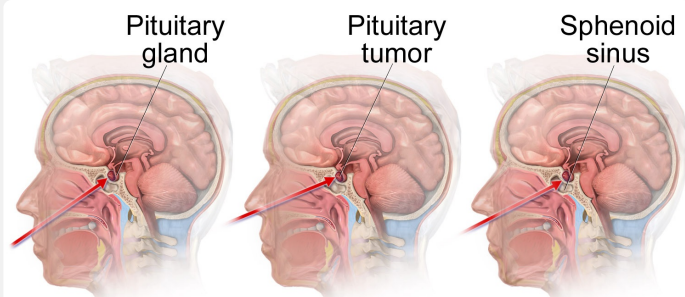
Question: 107 — **Type:** multipleChoice

The nurse is caring for a client who just underwent a transsphenoidal hypophysectomy.

Which client finding requires **immediate** follow-up?

1. Increase in urine output to 200 mL/hr.
2. Client reports impaired sense of smell.
3. Client reports feeling constipated after surgery.
4. Clear nasal drainage that tests negative for glucose.

Explanation:



Routes Used to Remove Pituitary Tumor

Transsphenoidal hypophysectomy is a surgical procedure to remove a **tumor on the pituitary gland**. It involves accessing the pituitary through a microincision made in the gum line under the upper lip, along the base of the nasal cavity, and **through the sphenoid sinus**.

The **pituitary gland** is responsible for many body functions, including secretion of **antidiuretic hormone (ADH)**, which normally causes the renal tubules to **retain water** in cases of hypovolemia or increased serum osmolality. Surgical trauma involving the pituitary gland can cause hyposecretion of ADH from the posterior pituitary, causing **diabetes insipidus (DI)**. Characteristics of DI include **large amounts of dilute urine (polyuria)**, sometimes exceeding 200 mL/hr. The healthcare provider should be notified for excessive urine output after hypophysectomy [Choice 1].

Incorrect:

Client reports impaired sense of smell

Loss of smell is a temporary side effect of transsphenoidal hypophysectomy. If it persists, the healthcare provider should be notified.

Client reports feeling constipated after surgery

The nurse should encourage a high-fiber diet and administer stool softeners to prevent straining and increased intracranial pressure, but this does not take priority.

Clear nasal drainage that tests negative for glucose

Postoperative nasal drainage that is *positive* for glucose indicates *leaking cerebrospinal fluid*, a complication of transsphenoidal hypophysectomy, and should be reported immediately.

Key Takeaway:

- Clients who have undergone transsphenoidal hypophysectomy should be monitored for polyuria caused by hyposecretion of ADH.

Question: 108 — **Type:** multipleChoice

The nurse is caring for a client who has undergone a transsphenoidal hypophysectomy and observes that there is clear nasal drainage on the postoperative "mustache" dressing.

Which of the following actions should the nurse take?

1. Lower the head of the bed to 15°.
2. Instruct the client to blow the nose.
3. Replace the saturated nasal packing.
4. Test the nasal drainage for the presence of glucose.

Explanation:

A **transsphenoidal hypophysectomy** is a surgical procedure performed through the nose to remove the **pituitary gland**, usually due to a tumor (i.e., pituitary adenoma). A nasal drip pad (i.e., mustache dressing) is applied postoperatively to collect blood or drainage.

Clear nasal drainage post-transsphenoidal hypophysectomy is concerning for **cerebral spinal fluid (CSF) leakage**, which can occur if the dura mater is damaged intraoperatively.

The nurse should test the nasal drainage for glucose with a dipstick to confirm the presence of CSF because **CSF contains glucose**, while

nasal secretions do not **[Choice 4]**. Confirming the presence of CSF leakage is crucial before deciding on further interventions or management.

Incorrect:

Lower head of bed (HOB)

After a transsphenoidal hypophysectomy, the HOB should remain $\geq 30^\circ$ to promote normal drainage and *avoid increasing intracranial pressure*, which could delay wound healing or cause a CSF leak.

Blow nose

Blowing the nose, coughing, sneezing, and performing the Valsalva maneuver are *contraindicated* post-hypophysectomy because they *increase intracranial pressure* and increase the risk for complications, such as CSF leak and hemorrhage.

Replace nasal packing

Monitoring and replacing *mustache dressings* is appropriate; however, the nasal packing *should remain in place for 2-4 days postoperatively*. Removing the packing early increases the risk of bleeding and delayed healing.

Key Takeaway:

- Transsphenoidal hypophysectomy is a surgical procedure that removes the pituitary gland via the nose.
- Postoperatively:
 - Test nasal drainage for glucose if concerned about CSF leak
 - Keep HOB $\geq 30^\circ$
 - Do not remove nasal packing
 - Avoid activities that increase intracranial pressure

Question: 109 — **Type:** multipleResponseSelectN

The nurse cares for a 38-year-old female client who underwent a partial thyroidectomy 1 day ago to treat her hyperthyroidism.

Select the top 3 client findings the nurse should **prioritize**.

1. Voice hoarseness

2. Numbness of the fingertips

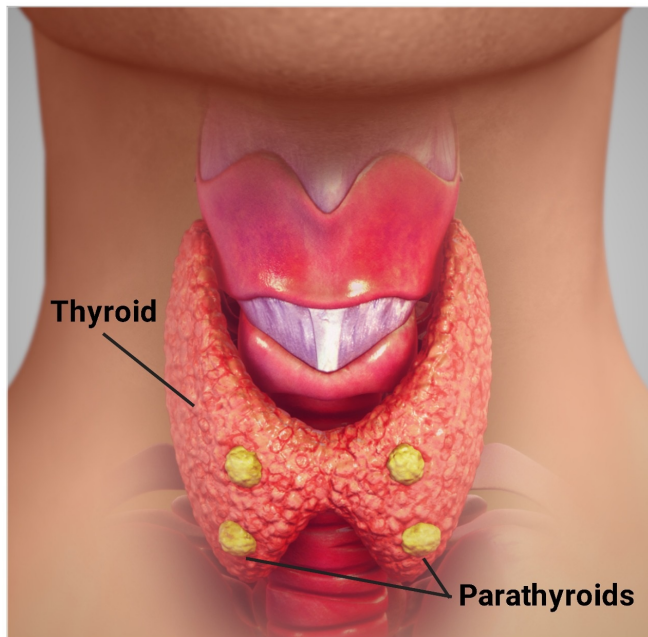
3. Tingling around the mouth and lips

4. Hand tenses up while taking the blood pressure

5. Client eating chicken noodle soup her husband brought

Explanation:

Thyroid and Parathyroid



A **thyroidectomy** is a partial or total surgical removal of the thyroid indicated for hyperthyroidism or tumors of the thyroid. This client is demonstrating signs of suspected **hypocalcemia**.

Thyroidectomy can cause damage to or unintentional removal of the parathyroid glands, resulting in **hypoparathyroidism**. Inadequate circulating parathyroid hormone disrupts the body's calcium homeostasis and prevents mineral absorption from the bones, leading to **hypocalcemia**.

Low calcium levels lower the threshold for nerve cell depolarization, which causes **neuromuscular excitability**. Signs of hypocalcemia include **tetany** (e.g., Trousseau sign, Chvostek sign [twitching cheek]), **numbness and tingling** (i.e., paresthesias) **of the circumoral region** or the **fingers** and toes [**Choices 2, 3, and 4**].

If the client develops signs of hypocalcemia, the nurse should prepare to administer **IV calcium gluconate** to prevent arrhythmias from myocardial cell irritability.

Incorrect:

Voice hoarseness

Hoarseness expected for the first 3-4 days after surgery due to edema. The client should be reassured that vocal quality will return, but this is not the priority.

Client eating chicken noodle soup

Clients are able to consume liquids as soon as tolerated after surgery and can begin eating soft foods the day after surgery. The nurse should assess the consistency of any food brought from home to ensure it is appropriate for a soft diet, but this is not the priority.

Key Takeaway:

- Because of the proximity of the thyroid gland to the parathyroid glands, thyroidectomy can cause hypoparathyroidism and resultant hypocalcemia.
- Hypocalcemia lowers the threshold for neuromuscular excitability, causing tetany and paresthesias.

Question: 110 — **Type:** multipleChoice

The nurse is preparing sick day education for a client with diabetes mellitus.

In addition to instructing the client to monitor blood glucose, which of the following teaching points about sick day management should receive **highest** priority?

1. Staying hydrated

2. Getting adequate sleep
3. Checking ketones in the urine
4. Maintaining intake of solid food

Explanation:

Illness and stress increase cortisol and adrenaline levels, which trigger glucose release from the liver and increase insulin resistance, causing **hyperglycemia**, even when not eating. Clients should closely monitor blood glucose and **stay hydrated [Choice 1]**.

Adequate hydration helps **dilute blood glucose** and ensures adequate kidney perfusion to help **excrete excess glucose**. **Dehydration** worsens hyperglycemia and **increases the risk** of life-threatening complications of diabetes, including **diabetic ketoacidosis (DKA)** and **hyperglycemic hyperosmolar state (HHS)**.

Guidelines include:

- Drinking 8-12 ounces (240-360 mL) of liquid every hour while awake.
- Checking blood glucose every 4 hours, even if not eating.

Incorrect:

Adequate sleep

Inadequate sleep raises cortisol levels, *reducing insulin sensitivity* and worsening hyperglycemia. When ill, adult clients need more than 7-9 hours of sleep. Although sleep is important, adequate hydration *directly prevents* serious complications such as DKA.

Maintaining food intake

Although clients should continue their usual diet to avoid ketosis from inadequate food intake, solid food is not the priority. *Fluids containing carbohydrates* can be used instead if nausea or vomiting prevents solid food intake.

Checking ketones

Checking for ketones is essential when blood glucose readings exceed 240 mg/dL (13.8 mmol/L) because consistently high ketone levels indicate DKA. However, ketone monitoring may not be required with adequate hydration and glucose control. Additionally, unlike adequate hydration, checking ketones does not *prevent* DKA.

Key Takeaway:

- Dehydration in diabetic clients can trigger DKA and HHS.
- Ketones should be checked if blood glucose exceeds 240 mg/dL (13.8 mmol/L).

Question: 111 — Type: multipleChoice

The intensive care unit nurse is preparing to admit a new client who has diabetic ketoacidosis.

Which of the following orders does the nurse anticipate in the care of this client?

1. Administer regular insulin via slow IV push
2. Rapidly infuse an IV bolus of 0.9% sodium chloride
3. Administer a continuous IV infusion of 0.45% sodium chloride
4. Switch to IV fluids containing dextrose once blood sugar is <350 mg/dL (19.4 mmol/L)

Explanation:

In **diabetic ketoacidosis (DKA)**, hyperglycemia induces an **osmotic diuresis** in which large volumes of urine are lost, leading to severe dehydration.

Treatment begins with **IV fluid replacement** and correction of **electrolyte imbalances**. Rapid infusion of **IV bolus 0.9% sodium chloride** will help correct hyperglycemia and dehydration by **promoting renal excretion of glucose** and **replacing fluid losses** caused by excessive diuresis **[Choice 2]**.

Incorrect:

Administer a continuous IV infusion of 0.45% sodium chloride

This hypotonic infusion does not provide adequate fluid replacement to maintain perfusion to organs or enough sodium needed for replacement. Hypotonic fluids should be reserved for clients who may not tolerate higher sodium levels or infusion rates, such as those with heart failure.

Administer regular insulin via slow IV push

Continuous regular insulin IV infusion of 0.1 unit/kg/hr lowers glucose levels and promotes potassium movement into cells. IV push insulin is only indicated to treat hyperkalemia and is always given alongside dextrose to prevent hypoglycemia.

Switch to IV fluids containing dextrose once blood sugar is <350 mg/dL (19.4 mmol/L)

Isotonic fluid should be replaced by a 5% dextrose infusion when the blood sugar reaches 250 mg/dL (13.9 mmol/L) to prevent rapid drops in blood sugar that can cause cerebral edema.

Key Takeaway:

- IV fluid replacement with 0.9% sodium chloride solution corrects dehydration and hyperglycemia.
- Dextrose 5% solution is given when blood sugar levels are <250 mg/dL (13.9 mmol/L) to prevent hypoglycemia.

Question: 112 — **Type:** multipleResponse

The nurse cares for a 38-year-old female client who underwent a partial thyroidectomy 3 days ago to treat her hyperthyroidism.

Which of the following interventions should the nurse implement? **Select all that apply.**

1. Ensure calcium gluconate is available.
2. Assess for tingling in the toes and fingers.
3. Inform the client that voice hoarseness is expected.
4. Remind the client to limit conversations with visitors.
5. Coach the client to perform neck exercises twice daily.
6. Place a tracheostomy set and suction catheter at the bedside.
7. Keep the head of the bed elevated to at least semi-Fowler's position.

Explanation:

A **thyroidectomy** is a partial or total surgical removal of the thyroid. Postoperative complications include **airway obstruction** from edema or bleeding. Surgical manipulation of the thyroid can stimulate overactivity of the remaining thyroid tissue, causing a life-threatening **thyrotoxicosis** (i.e., "thyroid storm"). The client can also develop **hypoparathyroidism** if the parathyroids are damaged or removed during surgery.

In anticipation of postoperative complications:

- **Assess for tingling in the toes and fingers**, which are signs of tetany and hypocalcemia from lack of parathyroid hormone (which regulates calcium balance) **[Choice 2]**. **Ensure calcium gluconate is available** in case the client exhibits signs of tetany (muscle twitching) or hypocalcemia **[Choice 1]**.
- **Inform the client that vocal hoarseness is expected** for 3-4 days after surgery **[Choice 3]**.
- **Remind the client to limit conversations with visitors** to promote laryngeal nerve healing **[Choice 4]**.
- **Place a tracheostomy set and suction catheter at the bedside**, in the event of an airway obstruction or respiratory emergency **[Choice 6]**.
- **Elevate the head of the bed to at least semi-Fowler's position** to promote venous return and prevent airway edema **[Choice 7]**.

Incorrect:

Coach the client to perform neck exercises twice daily

Neck exercises place tension on the suture line and may cause wound complications (e.g., dehiscence). Neck flexion should be avoided.

Key Takeaway:

Postoperative care after thyroidectomy includes:

- Assessing for stridor

- Ensuring calcium gluconate is available
- Assessing for tingling in the toes and fingers
- Monitoring for voice hoarseness
- Limiting client conversations
- Keeping a tracheostomy set and suction catheter at the bedside

Question: 113 — **Type:** multipleChoice

The nurse has taught a client with type 2 diabetes about blood glucose monitoring.

Which of the following statements by the client would indicate a correct understanding of the teaching?

1. "I should monitor my blood sugar once a day in the morning."
2. "When I feel ill, I will need to check my blood sugar more frequently."
3. "When I get an abnormally high reading, I will immediately take more insulin."
4. "I can reuse my lancet a couple of times as long as I don't share it with anyone else."

Explanation:

Sick Day Guidelines for Type 2 Diabetes Mellitus	
Guideline	Rationale
Check blood glucose every 4 hours, even if not eating.	Stress and illness can cause a release of hormones, such as glucagon, which can raise blood glucose levels.
Contact healthcare provider if blood glucose is >300 mg/dL (16.7 mmol/L) twice in a row.	Hyperglycemia can lead to slower healing and raise the risk of complications.
If able to eat, continue usual diet with increased intake of non-caloric fluids (e.g., water, sugar-free jello).	The body requires additional caloric and fluid intake during the healing process.
If food intake is decreased, supplement with fluids containing carbohydrates (e.g., soups, juices, sugar-containing soft drinks).	
Check with the health care provider which over-the-counter cold medications are safe to take.	Some over-the-counter medications can raise blood glucose levels.

To ensure effective blood glucose control, diabetic clients need education on **self-monitoring blood glucose levels**. This helps clients identify and manage complications like hypoglycemia or hyperglycemia and supports informed decisions about food intake, activity routines, and medication dosages.

Teaching is **effective** if the client understands that:

- **Stress and illness can affect blood sugar levels.** During such times, blood glucose should be **monitored more frequently** to maintain a safe range and to adjust treatment as needed [**Choice 2**].

Corrected teaching:

- Monitoring fasting blood sugar **once daily is not sufficient** for managing diabetes effectively [**Choice 1**]. Blood glucose levels fluctuate throughout the day due to meals, physical activity, and medication. Regular monitoring **before meals, at bedtime, and when symptomatic** is recommended for effective diabetes management.
- Clients should **follow provider recommendations** for insulin administration [**Choice 3**]. In the case of abnormal or unexpected readings, the client should first **review glucometer instructions and then reassess the blood glucose**. If multiple abnormal results persist, the client should **promptly seek treatment**.
- Clients should be instructed **never to reuse testing supplies** (e.g., glucometer strips, lancets) [**Choice 4**]. To prevent infection, clients should be instructed to clean the testing site and always use fresh testing supplies with each new blood glucose test.

Key Takeaway:

- Client teaching for self-glucose monitoring includes:
 - Using new supplies with each test (lancet, testing strip)
 - Reassessing abnormal results and reporting abnormalities to the provider
 - Checking blood glucose before meals and at bedtime

Question: 114 — **Type:** multipleResponse

The nurse is providing education to a client with uncontrolled type 2 diabetes mellitus who is taking insulin and metformin.

Which client statement(s) demonstrate understanding of the teaching? **Select all that apply.**

1. "My abdomen is a good place to give myself insulin."
2. "I should check the bottoms of my feet once a week."
3. "If I take enough insulin, I don't have to be as strict with my diet."
4. "I should schedule regular vision exams with my eye care provider."
5. "My healthcare provider may need to increase my metformin dose in the future."
6. "If I am sick and can't eat much, I don't need to worry about checking my blood sugar as frequently."

Explanation:

Type 2 diabetes mellitus is characterized by an elevation in blood glucose due to **systemic insulin resistance**. Hyperglycemia causes microvascular damage which increases the risk for complications including retinopathy, atherosclerosis, and neuropathy.

- There are multiple sites available for the **subcutaneous injection** of insulin, but many clients find the abdomen an accessible site **[Choice 1]**.
- Regular vision testing from an eye provider can **detect the early signs of retinopathy**, which is the leading cause of blindness in adults **[Choice 4]**.
- Over time, cells will become more **resistant to insulin** and the pancreas will produce less insulin over time, necessitating higher doses of glucose-lowering medications **[Choice 5]**.

Ineffective teaching:

- Foot checks should be performed **daily** to assess for swelling or damage to the feet **[Choice 2]**. Peripheral neuropathy impairs pain sensations foot injury and hyperglycemia raises the risk of infection.
- Clients with type 2 diabetes mellitus can prevent complications and improve insulin sensitivity by following a **diet low in saturated fats, calories, and carbohydrates** **[Choice 3]**. Whole grains, fresh fruits and vegetables, and lean protein are recommended dietary choices.
- During illness, blood glucose levels can rise even without food consumption. It is important for the client to **perform blood glucose checks** every 4 hours and follow other sick day guidelines **[Choice 6]**.

Key Takeaway:

- Clients with type 2 diabetes mellitus should perform daily foot checks, follow sick-day guidelines, and expect increases to glucose-lowering medications as the disease progresses.
- Complications from prolonged hyperglycemia can include cardiovascular disease, neuropathy, and retinopathy.

Question: 115 — Type: multipleChoice

The nurse is discussing blood sugar management with a client recovering from hyperglycemic hyperosmolar syndrome (HHS).

Which statement by the client would prompt the nurse to request a dietary consult?

1. "I need to keep taking my insulin when I am sick."
2. "I need help understanding how to use my insulin pen."
3. "I really do not understand how to do carbohydrate counting."
4. "I should limit carbohydrates to avoid getting really high blood sugars."

Explanation:

Hyperglycemic hyperosmolar syndrome (HHS) is a life-threatening complication of uncontrolled diabetes that causes severe hyperglycemia and dehydration. After recovering from HHS, it is crucial for the client to understand how to manage blood sugar to prevent future episodes.

Carbohydrate counting is an essential part of blood sugar management that involves tracking the amount of carbohydrates consumed in each meal or snack and adjusting insulin doses accordingly. The client's **lack of understanding of how to count carbohydrates** indicates a need to request a **dietary consult** to ensure the client has the necessary tools to maintain consistent carbohydrate intake and adjust insulin doses accordingly **[Choice 3]**.

Incorrect:

I need to keep taking my insulin when I am sick

This statement demonstrates a correct understanding of blood sugar management during illness. Insulin doses may need to be adjusted during times of illness to avoid hyperglycemia.

I need help understanding how to use my insulin pen

This statement indicates that the client needs help with insulin pen usage. Although this is an important aspect of blood sugar management, this would be the responsibility of the nurse or diabetic nurse educator.

I should limit carbohydrates

This statement demonstrates an understanding of limiting carbohydrates in blood sugar management but does not indicate a need for a dietary consult.

Key Takeaway:

- Carbohydrate counting involves tracking the amount of carbohydrates consumed and adjusting insulin doses accordingly.
- Lack of understanding of how to count carbohydrates indicates a need to request a dietary consult.

Question: 116 — Type: dropdown

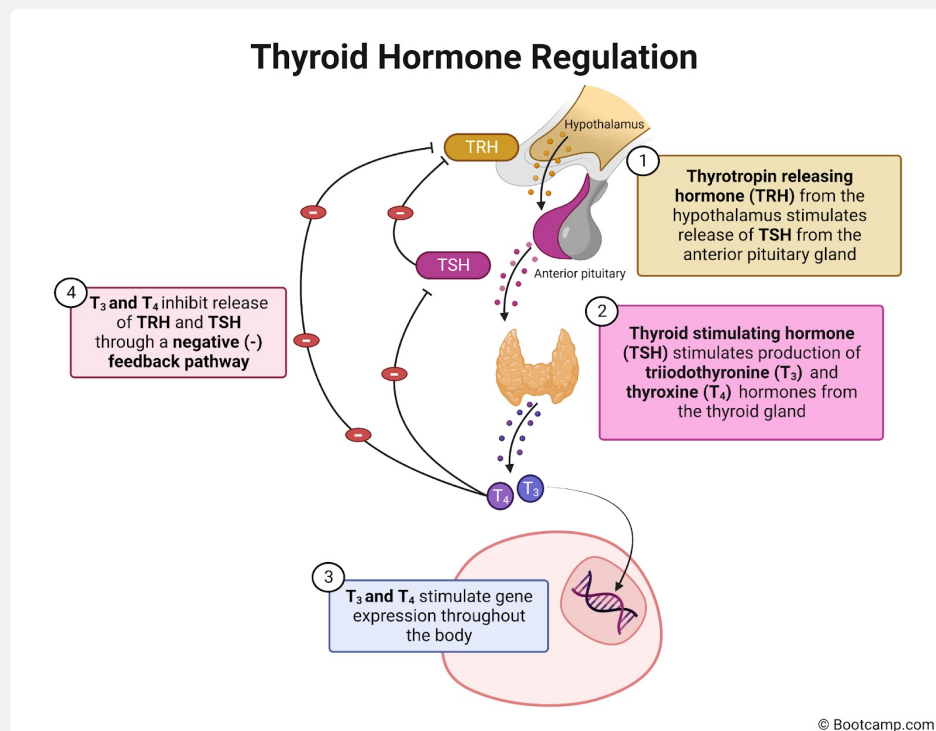
The nurse draws a serum thyroid panel for a client with a suspected diagnosis of secondary hypothyroidism from a pituitary tumor.

Which thyroid panel results would be consistent with a diagnosis of secondary hypothyroidism? Complete the following sentence by choosing from the lists of options.

The nurse expects a client with secondary hypothyroidism to have thyroid-stimulating hormone (TSH) levels that are [**Select**] and thyroxine (T4) levels that are [**Select**].

Dropdown	Options
Dropdown 1	low ✓ high unaffected
Dropdown 2	low ✓ high unaffected

Explanation:



Hypothyroidism occurs when the thyroid gland fails to produce sufficient thyroid hormones (i.e., triiodothyronine [T₃] and thyroxine [T₄]) to support the metabolic functions of the body. Normal thyroid hormone regulation functions on a *negative feedback loop*:

1. When T₃ and T₄ levels are too low to meet metabolic demands, the pituitary gland increases secretion of *thyroid-stimulating hormone* (TSH).

2. TSH stimulates the thyroid gland to produce more T3 and T4.

3. Presence of adequate circulating T3 and T4 inhibits further production of TSH by the pituitary (i.e., negative feedback).

Secondary hypothyroidism occurs due to damage or destruction of the *pituitary gland* or hypothalamus, most commonly from a pituitary tumor. The diseased pituitary gland is unable to secrete TSH (i.e., **TSH levels are low**). Without a signal from the pituitary gland (TSH), the thyroid gland is unable to increase thyroid hormone production to meet the metabolic demands of the body, so the T3 and **T4 levels remain low**.

Therefore, **the nurse expects a client with secondary hypothyroidism to have thyroid-stimulating hormone (TSH) levels that are low and thyroxine (T4) levels that are low.**

Incorrect:

High, Low

A *high* TSH level would indicate *primary* hypothyroidism, in which a normally-functioning pituitary secretes TSH in response to *low* T3 and T4 levels secreted from a diseased thyroid gland.

Key Takeaway:

- The pituitary gland responds to low levels of T3 and T4 by increasing TSH levels.
- In secondary hypothyroidism, a diseased pituitary gland cannot secrete sufficient TSH; therefore, the thyroid gland produces insufficient T3 and T4.

Question: 117 — Type: matrixMultipleChoice

Nurses' Notes

1730:	Client is a 22-year-old male whose mother calls 911 because she found him unresponsive in his home. Upon arrival at the emergency department, the client is lethargic, confused, and unable to focus. Client has an IV established in the right antecubital space. Reporting nausea. Fruity breath odor noted. Weight is 138 lb (62.7 kg); height reported by mother as 71 inches (180 cm). Monitor displays sinus tachycardia. Client's mother reports the client is single and lives alone. Mother states that client has been "quite sick" in the last few days with nausea and has suffered weight loss over the past few months, but she couldn't persuade him to see a healthcare provider. Mother reports the client had "a bad bout of the flu" a few months ago and has not seemed to "bounce back." She states the client has a history of asthma and occasionally uses a steroid inhaler but denies other past medical history.
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Assessment

Body System	Findings
Neurological	Lethargic, confused, unable to focus
Cardiovascular	Tachycardic, regular rhythm
Respiratory	Lung sounds clear bilaterally; deep, rapid breathing
Integumentary	Skin pale, cold, diaphoretic; poor turgor; dry mucous membranes
Gastrointestinal	Hypoactive bowel sounds in all quadrants; abdomen soft and non-distended
Extremities	1+ pulses; no edema

Vital Signs

	1730
T	97.8 F (36.5 C)
P	101
RR	27
BP	106/68
Pulse oximetry reading	97% on room air

Laboratory Results

Laboratory Result and Reference Range	1750
Hematology	