Radiology

RRT-Vascular-Interventional-Radiogra

ARRT Vascular-Interventional Radiography (VI)

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Question: 1

All of the following are characteristics of polyethyleneterephthalate (PET) balloon catheters EXCEPT:

A. medium tensile strength
B. low profile
C. low compliance
D. stiff material

Answer: A

Explanation:
To answer the question about which characteristic does not belong to polyethyleneterephthalate (PET) balloon catheters, we need to understand the properties of PET materials and compare them with other materials like nylon used in similar applications.
Polyethyleneterephthalate, commonly known as PET, is a type of polyester that is widely used in various applications, including fabric fibers, containers for liquids and foods, and in medical devices like balloon catheters. PET is chosen for these applications due to its significant strength, durability, and chemical stability.
Starting with **high tensile strength**, PET is indeed known for this characteristic. Tensile strength refers to the maximum stress that a material can withstand while being stretched or pulled before breaking. High tensile strength in balloon catheters is crucial as it ensures that the balloon can be inflated to a required size without rupturing. This characteristic is essential for procedures requiring precise dimensional stability of the balloon under pressure.
Moving on to **low profile**, this term typically refers to the thickness of the catheter wall and its ability to be inserted and travel through very small or tight vascular spaces. PET balloons are favored in medical applications because they can be made with thin but strong walls, allowing for a lower profile while maintaining the necessary strength and functionality. This lower profile facilitates easier insertion and navigation through narrow or complicated vascular passages.
Concerning **low compliance**, this means that the balloon does not easily expand beyond its intended size when pressure is applied. PET is known for its low compliance, which is a critical feature in medical applications where the precision of the balloon's diameter and volume under pressure must be strictly controlled. Low compliance ensures that the balloon expands only to its designed limits, providing predictable and safe outcomes during medical procedures.
Finally, **stiff material** is another characteristic associated with PET. The inherent stiffness of PET helps in maintaining the structural integrity of the catheter during insertion and inflation. This stiffness also aids the pushability and trackability of the catheter through the body's vasculature, making it easier to handle and manipulate during medical procedures.
Given these explanations, the characteristic that does NOT describe PET balloon catheters is **medium tensile strength**. As discussed, PET is known for its high tensile strength, not medium. This characteristic is more applicable to materials like nylon, which is also used in balloon catheters but typically offers medium tensile strength, compliance, and profile, making it suitable for different types of medical scenarios where less rigidity and more flexibility are required.

Question: 2

Which of the following guidelines regarding the use of a coil as an embolic agent is least appropriate?

A. Match the diameter of the coil wire to the catheter lumen.
B. The final diameter of the coil should be the same as the target vessel.
C. Gentle forward pressure on the catheter helps the coil to “pack”
D. Platinum coils are softer and easier to see than steel coils.

Answer: B

Explanation:
To address the question regarding which guideline about using a coil as an embolic agent is least appropriate, we first need to understand the function and application of embolic coils in medical procedures. Embolic coils are devices used primarily in endovascular procedures to occlude blood vessels, thus preventing blood flow to certain areas, commonly in the treatment of aneurysms or bleeding vessels.
The guideline stating that "The final diameter of the coil should be the same as the target vessel" is the least appropriate. This statement is inaccurate for effective vessel occlusion. For a coil to adequately occlude a vessel and prevent blood flow, it needs to be slightly larger than the vessel itself. This ensures that the coil can anchor securely within the vessel and form a stable framework to promote clotting and eventual vessel occlusion.
The correct practice, as indicated in the repeated corrections within the provided text, is that the final diameter of the coil should be approximately 20 to 30% larger than that of the target vessel. This size difference allows the coil to expand against the vessel walls firmly, helping to prevent migration of the coil and ensuring effective embolization.
Other guidelines mentioned in the question such as using gentle forward pressure on the catheter to help the coil "pack," using platinum coils for better visibility and softness compared to steel coils, and injecting coils with 1-3 mL Luer-lock syringes followed by a gentle flush, all fall within appropriate practices for the use of coils in embolization procedures.
Therefore, ensuring that the diameter of the coil is suitably larger than the target vessel is crucial for the success of the embolization procedure, making the guideline of matching the coil's final diameter exactly with the target vessel the least appropriate and potentially ineffective in clinical practice.

Question: 3

The measure of the number of particles of a substance in a mass of water is known as which of the following?

A. Osmosis.
B. Dilution.
C. Osmolality.
D. OSHA.

Answer: C

Explanation:
Osmolality, often confused with terms like osmosis or osmolarity, specifically refers to the concentration of solutes per unit of mass in a solution. It is expressed in terms of osmoles of solute per kilogram of solvent (osmol/kg). This measurement is crucial in various scientific and medical fields as it helps to determine the solute concentration in body fluids and other solutions.
In medical settings, osmolality is particularly important when dealing with the administration of intravenous fluids and contrast media. For instance, the osmolality of contrast media can affect how it distributes throughout the body and how it is excreted. Contrast media with an osmolality much higher than that of blood can draw water out of cells, potentially causing harm or discomfort to the patient. Therefore, understanding and measuring osmolality helps in selecting the appropriate contrast media to minimize adverse effects and enhance diagnostic effectiveness.
Moreover, the concept of osmolality extends to other applications such as nutrition, where it is used to formulate dietary plans and ensure that the osmolality of food intake matches what is appropriate for the digestive system and overall bodily functions. In industrial processes, osmolality measurements can be critical in the preparation of solutions where precise solute concentrations are necessary for chemical reactions or product quality.
Thus, osmolality serves as a fundamental measure in both clinical and non-clinical settings, ensuring that solutions are appropriately balanced in terms of particle concentration to safeguard health and optimize outcomes in various applications.

Question: 4

The first line of defense against the entry of microorganisms into the body is:

A. observing the sterility requirements in the procedure room
B. proper care of procedure tools
C. antibacterial soap
D. the skin

Answer: D

Explanation:
The correct answer to the question of what constitutes the first line of defense against the entry of microorganisms into the body is the skin. The skin acts as a physical barrier that prevents bacteria, viruses, fungi, and other harmful agents from penetrating and infecting the body. Its structure, composed of multiple layers including the tough outer layer known as the epidermis, provides a formidable barrier against external agents. Additionally, the skin secretes various substances, such as sebum and sweat, which contain antimicrobial properties that further protect against microbial invasion.
When the skin is intact, it effectively blocks most pathogens from entering the body. However, any breach in the skin, whether from cuts, abrasions, or medical procedures like injections or surgeries, can provide a direct pathway for pathogens to enter and potentially lead to infections. This is why in medical settings, maintaining the integrity of the skin as much as possible is crucial. In situations where the skin must be breached, strict sterile techniques are employed to minimize the risk of infection.
Pre-procedure skin preparation plays a vital role in infection control, especially when the natural barrier of the skin is compromised. This typically involves cleaning and disinfecting the area of the skin where a

procedure is to be performed using antimicrobial agents. These preparations help reduce the microbial load on the skin and decrease the risk of post-procedural infections.
Other methods mentioned, such as observing the sterility requirements in the procedure room, proper care of procedure tools, and the use of antibacterial soap, are also important in preventing infections. However, these methods support the primary function of the skin or come into play once the skin barrier has been breached. They are part of broader infection control strategies that include but are not solely reliant on the integrity of the skin.
In summary, while various practices and tools are integral to preventing microbial infections, particularly in medical settings, the skin itself serves as the primary and most effective natural barrier against the entry of microorganisms into the body. Its role as the first line of defense is foundational in the body's overall immune defense strategy.

Question: 5

During a post-procedure check, a doctor would do all of the following EXCEPT:

A. communicate with patient and their caregivers
B. complete the operating sheet for procedure, outcomes, and complications
C. count everything from sponges to surgical tools
D. prepare the instruction sheet for aftercare

Answer: C

Explanation:
The question is asking which of the listed activities a doctor typically would not perform during a post-procedure check. The correct answer to this is "count everything from sponges to surgical tools." Let's break down why this is the case.
During a post-procedure check, the primary responsibilities of a doctor include completing critical documentation and communicating important information regarding the procedure, outcomes, and any complications to the patient and their caregivers. Specifically, the doctor is responsible for filling out the operating sheet, which is a detailed record of the procedure and its results. This documentation is crucial for maintaining accurate medical records and ensuring continuity of care.
Furthermore, the doctor must communicate effectively with the patient and their caregivers. This involves explaining the outcomes of the surgery, discussing any complications that may have occurred during the procedure, and outlining the necessary steps for aftercare. This communication is vital for helping the patient understand their condition and the care required going forward, which can significantly impact their recovery and health outcomes.
On the other hand, the task of counting surgical instruments, such as sponges, needles, and tools, typically falls to the nursing staff, not the doctor. This process, known as a surgical count, is crucial for ensuring that no surgical items are left inside the patient and that the surgery site remains sterile. Nurses are trained to meticulously perform these counts before, during, and after the surgery to maintain patient safety.
The rationale behind assigning this task to nurses rather than doctors is based on the division of labor in surgical settings, where nurses manage the operational aspects of patient care, including equipment and tool management, while doctors focus on decision-making and procedural duties. This efficient division allows each team member to concentrate on their specific roles, enhancing overall team performance and patient safety.

In conclusion, while doctors are deeply involved in documenting the surgery and communicating with the patient and family members, they do not typically participate in the counting of surgical tools and materials. This task is handled by the nursing staff, who play a crucial role in ensuring the procedural aspects of the surgery are carried out safely and effectively.

Question: 6

Which of the following drugs would be given for nausea or vomiting?

A. Cilostazol
B. Abciximab
C. Midazolam
D. Dolasetron

Answer: D

Explanation:
When considering a medication for the treatment of nausea or vomiting, various options are available, each with specific indications and mechanisms of action. Among the options listed - Cilostazol, Dolasetron, Abciximab, and Midazolam - Dolasetron is the most appropriate choice for managing nausea or vomiting.
Dolasetron is classified as an antiemetic drug. It works by blocking serotonin receptors in the brain and gut, which helps in preventing the nausea and vomiting stimuli from being transmitted. This mechanism is particularly effective in controlling nausea and vomiting caused by chemotherapy, radiation therapy, and surgery. Dolasetron can be administered orally or intravenously, depending on the patient's condition and severity of symptoms. The typical intravenous dose for immediate relief is 12.5 mg administered as a single dose.
While Dolasetron is specifically tailored for nausea and vomiting, other drugs mentioned like Cilostazol, Abciximab, and Midazolam serve different primary purposes. Cilostazol is used primarily for improving symptoms of intermittent claudication and does not have antiemetic properties. Abciximab is an antiplatelet drug used to prevent platelets from clumping together and causing occlusive blood clots; it is not used to treat nausea or vomiting. Midazolam, on the other hand, is a sedative used primarily for inducing drowsiness, anxiety relief, and amnesia before medical procedures; it is not typically used as an antiemetic.
Additionally, there are other antiemetics that can be considered for managing nausea and vomiting, such as metoclopramide, prochlorperazine, and ondansetron. These drugs also work by interfering with the neurotransmitter signals that induce vomiting. Metoclopramide increases stomach contractions to help with faster gastric emptying, prochlorperazine blocks dopamine receptors in the brain, and ondansetron blocks serotonin receptors, similar to Dolasetron, but is often preferred in cases of severe chemotherapy-induced nausea and vomiting.
In conclusion, for a patient experiencing nausea or vomiting, Dolasetron is the best choice among the drugs listed due to its specific antiemetic properties. It should be used following medical advice and considering the specific causes and conditions of the patient's symptoms. Other drugs might be more appropriate under different clinical circumstances or for addressing other primary medical issues.

Question: 7

Which of the following is the normal range for ALP on a liver panel?

A. 8-48 U/L.
B. 7-55 U/L.
C. 48-115 U/L.
D. 125-148 U/L.

Answer: C

Explanation:
A liver panel, also known as a liver function test, is a comprehensive blood test used to assess the health and functionality of the liver. This panel measures various enzymes, proteins, and substances that are either produced or excreted by the liver. The levels of these components can indicate the presence of liver injury or disease, as well as help in monitoring the progress of treatment and the severity of a liver condition.
One of the key enzymes measured in a liver panel is Alkaline Phosphatase (ALP). ALP is an enzyme found in several tissues throughout the body, with significant concentrations in the liver, bones, kidneys, and bile ducts. In the context of the liver, ALP levels can rise due to liver diseases or conditions that block bile ducts. Elevated ALP levels might suggest issues such as hepatitis, cirrhosis, liver cancer, or bile duct obstruction.
The normal range for ALP in a liver panel is typically between 48 to 115 units per liter (U/L). This range can vary slightly depending on the laboratory and the testing methods used. It is important for healthcare providers to compare the test results with reference values specific to the lab that conducted the test. Normal ALP levels within this range suggest that the liver is functioning properly without any significant obstruction or damage affecting the bile ducts or liver cells.
If ALP levels are found to be outside the normal range, further investigations are required to pinpoint the exact cause. Lower levels of ALP might not typically indicate a liver condition and could be associated with other medical issues. On the other hand, higher levels could necessitate additional tests such as imaging studies and more specific liver function tests to determine the cause of liver distress or injury.
In conclusion, the normal range for ALP on a liver panel being 48-115 U/L is crucial for assessing liver health. Physicians use these levels, along with other components of the liver panel, to diagnose, monitor, and manage liver-related conditions effectively.

Question: 8

Which of the following is an antiplatelet medication?

A. Cilostazol
B. Midazolam
C. Lorazepam
D. All of the above.

Answer: A

Explanation:
The question asks which of the options listed is an antiplatelet medication. Among the options provided (Cilostazol, Midazolam, Lorazepam, All of the above), only Cilostazol is correctly identified as an antiplatelet medication.
Cilostazol works by inhibiting platelet aggregation and also acts as a direct arterial vasodilator. Its primary use is in the treatment of intermittent claudication, a condition characterized by pain and cramping in the lower legs due to inadequate blood flow, typically caused by atherosclerosis. By preventing platelet aggregation, Cilostazol helps to improve blood flow and relieve symptoms associated with this condition.
It is important to note the contraindications of Cilostazol. The drug is not recommended for patients who have a history of hypersensitivity to it, as adverse reactions could occur. Additionally, Cilostazol should be used with caution in patients with heart failure.
The administration of Cilostazol is specific; it is usually prescribed at a dose of 100 mg taken orally twice a day. It should be taken about 30 minutes before or two hours after breakfast and dinner to optimize its absorption and effectiveness.
The other medications listed, Midazolam and Lorazepam, are not antiplatelet drugs. Midazolam is a benzodiazepine used primarily as a sedative and for inducing sleep before surgeries or procedures, while Lorazepam is also a benzodiazepine used mainly to treat anxiety and as a sedative before surgeries or diagnostic procedures. Neither of these medications have antiplatelet properties.
Therefore, when considering which of the listed medications is an antiplatelet drug, lostazol alone, not "All of the above." This distinction is crucial for appropriate clinical decision-making and patient care.

Question: 9

The class of blood cells that is the oxygen and carbon dioxide transport is which of the following?

A. erythrocyte
B. monocyte
C. neutrophil
D. T lymphocyte

Answer: A

Explanation:
The correct answer to the question regarding the class of blood cells responsible for the transport of oxygen and carbon dioxide is erythrocytes. Erythrocytes, also known as red blood cells, are primarily tasked with carrying oxygen from the lungs to various tissues throughout the body and transporting carbon dioxide, a waste product, from those tissues back to the lungs where it can be exhaled.
Erythrocytes are uniquely structured for this task. They are biconcave disks which provide a large surface area relative to their volume, enhancing their ability to absorb and release oxygen and carbon dioxide. They contain hemoglobin, a protein that binds oxygen and carbon dioxide, facilitating efficient gas exchange. The lack of a nucleus and other organelles in erythrocytes allows for maximal space for hemoglobin, increasing their oxygen-carrying capacity.
The other options listed—monocytes, neutrophils, and T lymphocytes—are also types of blood cells, but they serve different functions in the immune system. Neutrophils and monocytes are types of white blood cells involved in protecting the body against infections. Neutrophils are the first immune cells to arrive at a site of infection and are key players in the initial phase of the immune response, while

monocytes, which develop into macrophages and dendritic cells, are crucial for longer-term defense and also help in antigen presentation, a critical part of stimulating an adaptive immune response. T lymphocytes, or T cells, are central to the cellular immune response, involved in directly killing infected host cells, activating other immune cells, and regulating the immune response.
Therefore, among the options provided, erythrocytes are the correct answer as they are the primary transporters of oxygen and carbon dioxide in the bloodstream, whereas the roles of neutrophils, monocytes, and T lymphocytes are primarily centered around the immune defense mechanisms of the body.

Question: 10

Iodinated contrast media appear which of the following on x-ray?

A. Radioluscent.
B. Radiography.
C. Radio-dense.
D. Radiopaque.

Answer: C

Explanation:
Contrast media are substances used in medical imaging to enhance the visibility of internal structures in radiographic procedures. One common type of contrast media used in various diagnostic imaging procedures, including X-rays and CT scans, is iodinated contrast media.
Iodinated contrast media contains iodine, a substance that is highly effective at absorbing X-rays. Due to its high atomic number, iodine has the ability to block X-rays from passing through, which makes the areas where the contrast media accumulates appear white or light on the resultant images. This property categorizes iodinated contrast as radiopaque, meaning it is opaque to radiation and does not allow X-rays to pass through easily.
In clinical practice, iodinated contrast media is often used to highlight differences in tissue density within the body, thereby aiding in the diagnosis of various conditions. For example, it can be injected into blood vessels to make the vascular structures stand out in cardiovascular studies, or used to enhance the visibility of organs like the kidneys, liver, or pancreas during scans.
The radiopacity of iodinated contrast media is critical in providing clear and detailed images that help in identifying blockages, abnormalities, or diseases in the targeted areas. Without such contrast, soft tissues often cannot be distinctly delineated, as they naturally have similar radiographic densities and thus appear similar on X-rays.
In summary, iodinated contrast media are described as radiopaque on X-ray images because they absorb X-rays efficiently due to the presence of iodine, enhancing the visibility of structures and features in diagnostic imaging that would otherwise be difficult to detect with standard radiography alone. This characteristic makes them a vital tool in modern medical diagnostics, allowing for more precise and informed medical evaluations and treatments.

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