

Registered Cardiovascular Invasive Specialist (RCIS) Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

SAMPLE

- 1. What happens to the afterload when accurate timing of an IABP is achieved?**
 - A. It increases**
 - B. It decreases**
 - C. It stabilizes**
 - D. It remains unaffected**
- 2. Which factor does NOT contribute to an increased risk of stroke?**
 - A. A Fib**
 - B. Hypertension**
 - C. Regular physical activity**
 - D. A Flutter**
- 3. Increasing the rate of rise on the power injector has what effect?**
 - A. Increases the risk of injury to the LV**
 - B. Decreases the catheter whip**
 - C. Increases the amount of contrast needed**
 - D. Has no effect on contrast volume**
- 4. Which heart condition is characterized by ST segment elevation in specific leads?**
 - A. Anterior wall MI**
 - B. Inferior wall MI**
 - C. Lateral wall MI**
 - D. Posterior wall MI**
- 5. What is one common side effect associated with ACE inhibitors?**
 - A. Nausea**
 - B. Dry cough**
 - C. Dizziness**
 - D. Fatigue**

- 6. What most significantly affects stroke volume?**
- A. Afterload**
 - B. Contractility**
 - C. Preload**
 - D. Heart rate**
- 7. What is the effect of using a power injector at a higher rate of rise?**
- A. Increased catheter whip**
 - B. Increased risk of contrast-induced nephropathy**
 - C. Improved visualization during angiography**
 - D. Decreased likelihood of vascular injury**
- 8. In chronic COPD patients, what typically drives the urge to breathe?**
- A. Increased oxygen levels**
 - B. Decreased oxygen saturation**
 - C. Normal carbon dioxide levels**
 - D. Overactive reflexes**
- 9. What type of balloon is often used specifically for calcified lesions?**
- A. Standard balloon**
 - B. Cutting balloon**
 - C. Pressure balloon**
 - D. Intra-aortic balloon**
- 10. How is systemic vascular resistance (SVR) calculated?**
- A. $\text{Mean arterial pressure} - \text{Right atrial pressure} / \text{Cardiac output}$**
 - B. $\text{Pulmonary artery pressure} - \text{Central venous pressure} / \text{Cardiac output}$**
 - C. $\text{Mean pulmonary arterial pressure} - \text{Mean left atrial pressure} / \text{Heart rate}$**
 - D. $\text{Mean arterial pressure} - \text{Mean right atrial pressure} / \text{Cardiac output}$**

Answers

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1. B
2. C
3. B
4. A
5. B
6. C
7. D
8. B
9. B
10. D

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Explanations

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1. What happens to the afterload when accurate timing of an IABP is achieved?

- A. It increases**
- B. It decreases**
- C. It stabilizes**
- D. It remains unaffected**

When the timing of an Intra-Aortic Balloon Pump (IABP) is accurately achieved, the afterload of the heart decreases. This reduction occurs because the IABP inflates during diastole (when the heart is filling) and deflates just before systole (when the heart pumps). The inflation of the balloon provides a volume displacement that reduces the systemic vascular resistance against which the heart has to pump during systole. This decrease in resistance effectively lowers afterload, allowing the left ventricle to pump more efficiently with less myocardial oxygen consumption. Reducing afterload is beneficial in various cardiac conditions, particularly in cases of heart failure or acute coronary syndrome, where workload on the heart is increased. It aids in improving cardiac output and can relieve symptoms in patients undergoing treatment. Understanding this principle is essential for effective management and optimization of hemodynamics in patients receiving IABP therapy.

2. Which factor does NOT contribute to an increased risk of stroke?

- A. A Fib**
- B. Hypertension**
- C. Regular physical activity**
- D. A Flutter**

Regular physical activity is associated with a reduced risk of stroke rather than an increased risk. Engaging in consistent physical activity has numerous cardiovascular benefits, including improved blood circulation, maintained healthy blood pressure levels, and reduced body weight—all of which contribute to better overall heart health. Conversely, conditions like Atrial Fibrillation (A Fib) and Atrial Flutter (A Flutter) both increase the risk of stroke by promoting the formation of blood clots in the heart. Hypertension, or high blood pressure, is another significant risk factor for stroke, as it can lead to damage of the blood vessels over time, increasing susceptibility to strokes. Thus, while A Fib, hypertension, and A Flutter each heighten the likelihood of stroke occurrence, regular physical activity serves as a protective factor.

3. Increasing the rate of rise on the power injector has what effect?

- A. Increases the risk of injury to the LV**
- B. Decreases the catheter whip**
- C. Increases the amount of contrast needed**
- D. Has no effect on contrast volume**

Increasing the rate of rise on the power injector refers to the speed at which contrast media is delivered into the bloodstream during medical imaging procedures. When this rate is increased, it can lead to a reduction in the catheter whip. The term "catheter whip" describes the motion of the catheter caused by the force of the contrast agent as it is injected. A higher rate of rise means that the contrast is being pushed through the catheter more quickly, which creates a more consistent flow and can stabilize the catheter position within the vascular system. This stabilization is particularly important in vascular imaging, as it minimizes unnecessary movement that could disrupt the catheter's placement or cause discomfort to the patient. While it might seem logical that increasing the rate of rise could cause more injury or increase the volume of contrast needed, the reduction in catheter whip actually serves to enhance procedural efficiency and safety by maintaining catheter stability. Therefore, the relationship between the rate of rise and the effects on catheter whip is crucial for ensuring successful imaging outcomes.

4. Which heart condition is characterized by ST segment elevation in specific leads?

- A. Anterior wall MI**
- B. Inferior wall MI**
- C. Lateral wall MI**
- D. Posterior wall MI**

ST segment elevation on an ECG indicates that there is an issue with the heart's blood supply, often associated with a myocardial infarction (MI). Anterior wall myocardial infarction specifically is characterized by ST segment elevation in leads V1 through V4. These leads represent the anterior part of the heart, which is primarily supplied by the left anterior descending artery. In cases of an inferior wall MI, the ST segment elevation is typically observed in leads II, III, and aVF, reflecting a different area of heart muscle that is affected. Lateral wall MI generally shows elevation in leads I, aVL, V5, and V6, indicating involvement of the lateral left ventricle. Posterior wall MI can produce ST segment changes in the inferior leads as well but is identified through specific criteria that also may involve reciprocal changes. Understanding these specific lead transitions is essential for diagnosing the exact location of myocardial ischemia and guiding appropriate treatment interventions. Hence, anterior wall MI is particularly noted for its clear characteristic of ST segment elevation in the leads that monitor the frontal plane of the heart, leading to its identification as the correct answer in this scenario.

5. What is one common side effect associated with ACE inhibitors?

- A. Nausea
- B. Dry cough**
- C. Dizziness
- D. Fatigue

One common side effect associated with ACE inhibitors is a dry cough. This phenomenon occurs due to the accumulation of bradykinin, a peptide that is normally broken down by angiotensin-converting enzyme (ACE). When ACE is inhibited by medication, bradykinin levels can increase. Elevated bradykinin may lead to increased sensitivity in the respiratory tract, resulting in a persistent cough in some patients. It's important to note that while nausea, dizziness, and fatigue can occur with various medications, they are not as commonly associated with ACE inhibitors as the dry cough. This unique side effect is noteworthy and can sometimes necessitate a switch to a different class of medication if it becomes bothersome to the patient. Understanding this side effect helps clinicians manage patient expectations and ensure appropriate follow-up care.

6. What most significantly affects stroke volume?

- A. Afterload
- B. Contractility
- C. Preload**
- D. Heart rate

Stroke volume, which is the amount of blood ejected by the heart with each contraction, is significantly affected by preload. Preload refers to the initial stretching of the cardiac muscle fibers before contraction, influenced primarily by the volume of blood returning to the heart during diastole. An increase in preload typically results in a greater stretch of the ventricular walls, allowing for a more forceful contraction due to the Frank-Starling mechanism. This relationship means that as preload increases, so does stroke volume, up to a certain point. While other factors like afterload, contractility, and heart rate also play important roles in determining stroke volume, they do so in different contexts. Afterload refers to the resistance the heart must overcome to eject blood; increased afterload can reduce stroke volume if the heart cannot compensate effectively. Contractility refers to the intrinsic strength of the heart's contractions; higher contractility enhances stroke volume but is not the baseline measure before contraction like preload is. Heart rate influences overall cardiac output (the product of stroke volume and heart rate), but it does not directly change stroke volume per beat in the same foundational way that preload does. Therefore, preload is the most significant factor affecting stroke volume.

7. What is the effect of using a power injector at a higher rate of rise?

- A. Increased catheter whip**
- B. Increased risk of contrast-induced nephropathy**
- C. Improved visualization during angiography**
- D. Decreased likelihood of vascular injury**

Using a power injector at a higher rate of rise can indeed lead to improved visualization during angiography. When the injector delivers contrast at a rapid rate, it enhances the flow dynamics within the blood vessels, which can result in more uniform and timely distribution of contrast material. This improved opacification allows for clearer images and better delineation of vascular structures, aiding in the diagnostic process. Rapid injection rates can help achieve optimal filling of the vascular space, ensuring that the contrast agent reaches its intended area more efficiently. This enhanced visualization is crucial for accurately assessing conditions such as blockages, aneurysms, or malformations during angiographic procedures. The other options, while they touch upon important considerations in angiography and catheter use, do not directly connect to the benefits of using a power injector at a higher rate of rise in terms of image quality and clarity during diagnostics.

8. In chronic COPD patients, what typically drives the urge to breathe?

- A. Increased oxygen levels**
- B. Decreased oxygen saturation**
- C. Normal carbon dioxide levels**
- D. Overactive reflexes**

In chronic COPD patients, the urge to breathe is typically driven by decreased oxygen saturation. As the disease progresses, the ability of the lungs to oxygenate the blood effectively diminishes, leading to lower oxygen levels (hypoxemia) in the body. This low oxygen level is a critical signal for the brain to initiate the breathing process, as the body seeks to restore adequate oxygenation. In contrast, increased oxygen levels would not typically stimulate the urge to breathe; instead, it would create a sense of well-being and reduce the respiratory drive. Normal carbon dioxide levels also do not drive the urge to breathe in chronic COPD patients, as their condition often leads to elevated carbon dioxide levels, which the body may adapt to over time. Overactive reflexes can occur in some respiratory conditions, but they are not the primary factor driving the urge to breathe in the context of chronic COPD. Thus, decreased oxygen saturation plays the essential role in signaling the need for increased respiratory effort in these patients.

9. What type of balloon is often used specifically for calcified lesions?

- A. Standard balloon**
- B. Cutting balloon**
- C. Pressure balloon**
- D. Intra-aortic balloon**

The cutting balloon is specifically designed to treat calcified lesions due to its unique structure and function. It is fitted with multiple blade-like projections that allow it to incise the tissue surrounding the plaque. This action facilitates the dilation of the vessel by effectively cutting through the calcification, which is often resistant to standard balloon angioplasty techniques. The cutting balloon can help to create a more favorable environment for subsequent balloon inflation and stenting, which improves the chances of a successful procedure with less risk of complications such as dissection or inadequate expansion. Standard balloons may not provide sufficient force or specificity to effectively manage calcifications, while pressure balloons are not a recognized category for treating such lesions. Intra-aortic balloons are mainly used for hemodynamic support rather than directly addressing vessel lesions.

10. How is systemic vascular resistance (SVR) calculated?

- A. Mean arterial pressure - Right atrial pressure / Cardiac output**
- B. Pulmonary artery pressure - Central venous pressure / Cardiac output**
- C. Mean pulmonary arterial pressure - Mean left atrial pressure / Heart rate**
- D. Mean arterial pressure - Mean right atrial pressure / Cardiac output**

The correct method for calculating systemic vascular resistance (SVR) involves determining how much the systemic circulation resists blood flow. The formula used is mean arterial pressure minus right atrial pressure, divided by cardiac output. This is expressed mathematically as: $SVR = (\text{Mean Arterial Pressure} - \text{Right Atrial Pressure}) / \text{Cardiac Output}$. This calculation helps to understand the load against which the heart must work to pump blood, indicating the vascular tone and the level of resistance in the systemic arterial system. While other options involve various pressure measurements, they do not align with the established formula for SVR. The incorrect options either refer to pressures that are related to pulmonary circulation or other parameters that do not pertain to systemic resistance directly, such as heart rate. Thus, the distinction of using systemic rather than pulmonary vessel pressures is crucial in accurately assessing systemic vascular resistance.