AMCA Electrocardiogram (EKG) Practice Exam (Sample)

Study Guide

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Questions

1. What does a long PR interval on an EKG suggest?

A. Normal electrical conduction

B. Atrioventricular block

C. Increased myocardial oxygen demand

D. Ventricular hypertrophy

2. What is the term for the point where the QRS complex meets the ST segment?

A. R point

B. J point

C. QRS transition

D. T junction

3. When a technician suspects a patient is experiencing an ischemic event, which part of the EKG tracing is critical for examination?

A. QT interval

B. P wave

C. ST segment

D. PR interval

4. Which electrical activity occurs just before the ventricles contract?

A. Atrial depolarization

B. Ventricular repolarization

C. QRS complex

D. PR interval

5. Lead III in the EKG measures from which electrodes?

A. RA to LA

B. RA to LL

C. LA to LL

D. RL to LL

6. What is the main function of the aorta in the circulatory system?

A. To carry deoxygenated blood to the lungs

B. To distribute oxygenated blood to the body

C. To return blood to the heart

D. To regulate blood pressure

7. When preparing a patient with fragile skin for telemetry monitoring, which measure should an EKG technician take?

A. Increase pressure when abrading the skin

B. Use adhesive tape on the skin

C. Decrease pressure when abrading it

D. Keep the skin completely dry

8. What happens during depolarization in cardiac cells?

A. Negatively charged ions move out of the cell

B. Positively charged ions move inside the cell

C. The heart muscle relaxes completely

D. Coronary arteries begin to fill

9. What occurs when electrical impulses come from multiple foci in the atrium?

A. Atrial flutter

B. Atrial fibrillation

C. Ventricular tachycardia

D. Sinus rhythm

10. Which of the following types of waves are used when calculating heart rate using the 300 method?

A. R waves

B. P waves

C. T waves

D. QRS complexes

Answers

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

Explanations

1. What does a long PR interval on an EKG suggest?

A. Normal electrical conduction

B. Atrioventricular block

C. Increased myocardial oxygen demand

D. Ventricular hypertrophy

A long PR interval on an EKG is indicative of a delay in the electrical conduction from the atria to the ventricles, which is known as an atrioventricular (AV) block. The PR interval represents the time taken for the electrical impulse to travel through the atria and the conduction system that leads to the ventricles. In cases where the PR interval exceeds the normal range (typically greater than 200 milliseconds), it signifies that there is a prolonged conduction time, which can occur in various degrees of AV block. This can be important in clinical settings as it can hint at underlying cardiac conditions or the potential for more serious arrhythmias. Normal electrical conduction is characterized by a PR interval within the standard range, while increased myocardial oxygen demand relates to conditions such as ischemia, and ventricular hypertrophy is associated with an enlarged heart muscle but is not specifically reflected by changes in the PR interval. Thus, recognizing a long PR interval is crucial for identifying atrioventricular block and managing patient care effectively.

2. What is the term for the point where the QRS complex meets the ST segment?

A. R point

B. J point

C. QRS transition

D. T junction

The term for the point where the QRS complex meets the ST segment is known as the J point. This is an important feature in an electrocardiogram (EKG) because it represents the junction between the end of ventricular depolarization, indicated by the QRS complex, and the beginning of ventricular repolarization, marked by the ST segment. This point is critical for assessing various cardiac conditions, including ischemia and the overall health of the myocardium. Understanding the J point is vital for EKG interpretation because deviations from the normal position of the J point can reflect underlying pathological changes. For instance, elevation or depression of the J point can indicate conditions such as acute myocardial infarction or other forms of heart strain.

3. When a technician suspects a patient is experiencing an ischemic event, which part of the EKG tracing is critical for examination?

A. QT interval

B. P wave

C. ST segment

D. PR interval

The ST segment is critical for examination when a technician suspects a patient is experiencing an ischemic event. This is due to the fact that ischemia, which occurs when blood flow to a part of the heart is reduced or obstructed, can lead to specific changes in the ST segment of the EKG tracing. During an ischemic event, you may see ST segment elevation or ST segment depression. These changes indicate that the heart muscle is not receiving enough oxygen, which is a key sign of myocardial ischemia or even a myocardial infarction. The ST segment's assessment is crucial in emergency situations because timely identification of ischemia can lead to prompt medical intervention, which can be life-saving. Other parts of the EKG, such as the QT interval, P wave, or PR interval, do not specifically indicate ischemic changes and are therefore less critical in the context of diagnosing an ischemic event.

4. Which electrical activity occurs just before the ventricles contract?

A. Atrial depolarization

B. Ventricular repolarization

C. QRS complex

D. PR interval

The electrical activity that occurs just before the ventricles contract is reflected in the QRS complex. This is a crucial part of the cardiac cycle. The QRS complex represents the depolarization of the ventricles, which triggers their contraction. To clarify the options: atrial depolarization actually occurs earlier in the cardiac cycle and is represented by the P wave of the EKG. Ventricular repolarization is indicated by the T wave and takes place after the ventricles contract. The PR interval is the time from the beginning of atrial depolarization to the beginning of ventricular depolarization, which includes the time the electrical impulse takes to travel through the AV node and into the ventricles. Thus, the correct understanding of the timeline of electrical activity in the heart indicates that the QRS complex marks the moment just prior to ventricular contraction.

5. Lead III in the EKG measures from which electrodes?

A. RA to LA

B. RA to LL

C. LA to LL

D. RL to LL

Lead III in an electrocardiogram (EKG) is derived from the difference in electrical potential between the left arm and the left leg. It specifically measures the voltage between the electrodes placed on these two locations—hence the involvement of the left arm (LA) and left leg (LL). This lead is significant because it helps in visualizing the heart's electrical activity as it travels from the upper parts of the heart (where the left arm electrode is placed) down towards the lower parts (where the left leg electrode is located). By capturing this information, Lead III contributes to the overall assessment of the heart's rhythm and can be particularly useful in identifying issues related to the inferior region of the heart. The other options involve combinations of electrodes that do not align with the configuration for Lead III, making the correct identification of electrode pairs essential for accurate heart monitoring.

6. What is the main function of the aorta in the circulatory system?

A. To carry deoxygenated blood to the lungs

B. To distribute oxygenated blood to the body

C. To return blood to the heart

D. To regulate blood pressure

The aorta plays a crucial role in the circulatory system by being the main artery responsible for distributing oxygenated blood from the heart to the rest of the body. Once blood is pumped out of the left ventricle of the heart, it enters the aorta, which branches out into smaller arteries that deliver oxygen-rich blood to various tissues and organs. This distribution is vital for providing the cells with the oxygen and nutrients they require for metabolism and function. The aorta's function is vital for maintaining systemic circulation, ensuring that all body parts receive adequate blood supply. Additionally, it helps maintain a pressure gradient that facilitates blood flow throughout the body, contributing to the overall efficiency of the circulatory system. Understanding this main function underscores the importance of the aorta in ensuring proper cardiovascular performance and overall health.

7. When preparing a patient with fragile skin for telemetry monitoring, which measure should an EKG technician take?

A. Increase pressure when abrading the skin

B. Use adhesive tape on the skin

C. Decrease pressure when abrading it

D. Keep the skin completely dry

When preparing a patient with fragile skin for telemetry monitoring, reducing the pressure when abrading the skin is important because it minimizes the risk of causing further trauma or irritation to the delicate skin. Patients with fragile skin may already have compromised integrity, making them susceptible to injury. By applying less pressure, the technician ensures a gentler approach, reducing the likelihood of skin tears, abrasions, or blisters that could affect the patient's comfort and overall well-being. Managing skin integrity is crucial in telemetry monitoring, as proper electrode placement and adherence are necessary for accurate readings. This gentle preparation helps prevent additional issues while still allowing effective monitoring, aligning with best practices for patients at higher risk for skin complications.

8. What happens during depolarization in cardiac cells?

A. Negatively charged ions move out of the cell

B. Positively charged ions move inside the cell

C. The heart muscle relaxes completely

D. Coronary arteries begin to fill

During depolarization in cardiac cells, there is a significant shift in the electrical state of the cell membrane. This process is primarily characterized by the influx of positively charged ions, particularly sodium (Na+) and in some cases calcium (Ca2+), into the cells. As these positively charged ions enter, they cause the inside of the cell to become more positive relative to the outside, leading to a change from a resting potential to an active potential. This change is crucial for the initiation and propagation of electrical signals in the heart, which ultimately coordinate muscle contractions. Understanding this process is vital because depolarization triggers the contraction of cardiac muscle cells, leading to heartbeats and consequently the overall function of the heart. It's an essential mechanism that ensures the heart pumps efficiently, making the comprehension of ion movements during depolarization fundamental for those studying EKGs and cardiac physiology.

9. What occurs when electrical impulses come from multiple foci in the atrium?

A. Atrial flutter

B. Atrial fibrillation

C. Ventricular tachycardia

D. Sinus rhythm

When electrical impulses originate from multiple foci in the atrium, it results in atrial fibrillation. This arrhythmia is characterized by a rapid and irregular heartbeat due to the chaotic electrical activity within the atria. Unlike atrial flutter, which typically involves a single focus creating a distinct reentrant circuit, atrial fibrillation features multiple ectopic atrial foci firing at variable rates, leading to an uncoordinated atrial contraction. This contributes to the quivering of the atria rather than an effective contraction, increasing the risk of blood clots and stroke due to stagnant blood flow. The other options do not reflect the same underlying mechanism. Ventricular tachycardia pertains to rapid impulses originating in the ventricles rather than the atria. Sinus rhythm represents a normal heartbeat originating from the natural pacemaker of the heart, the sinoatrial node, where impulses are organized and consistent, unlike the disorganized impulses seen in atrial fibrillation. Atrial flutter also tends to maintain a relatively organized rhythm compared to the chaotic impulses seen in atrial fibrillation.

10. Which of the following types of waves are used when calculating heart rate using the 300 method?

A. R waves

B. P waves

C. T waves

D. QRS complexes

In the context of calculating heart rate using the 300 method on an electrocardiogram (ECG), R waves are the critical components used in this calculation. The 300 method is based on the fact that in a standard 6-second strip of an ECG, you can accurately determine heart rate by counting the number of R waves present and then using a simple formula to extrapolate the rate over the full minute. The rationale behind choosing R waves specifically is that these waves represent the peak of ventricular depolarization, which is a key event in the cardiac cycle associated with the heart's pumping action. This makes them both identifiable and significant for assessing the heart rate accurately. In a typical ECG, the R wave is the tallest wave of the QRS complex, making it easily detectable for counting purposes. Using P waves, T waves, or QRS complexes in general would not provide accurate results for heart rate calculation, as these components represent different phases of the cardiac cycle and may not align consistently for rate determination. Thus, R waves stand out as the most appropriate choice for this method.