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Ekg / Ecgs (Quick Study: Academic)

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Quick Study Academic

EKGs / ECGs

Basics

- The abbreviation EKG comes from the German word elektrokardiogramm. Both EKG and ECG can be used to describe the same test.
- An EKG is a recording of the heart's electrical activity; this activity is produced by cardiac cells.
- There are two basic types of cardiac cells: specialized cells and specialized cells.
- Myocardial cells** are the working muscles of the heart and comprise the majority of heart tissue. They form the thicker inner layer of the heart wall.
- Pacemaker cells** are the conduction system of the heart. They do not contract themselves, so they contract when they receive an electrical impulse from another cell.
- Pacemaker cells** generate small negative depolarized cells; they do not contract themselves, so they contract when they receive an electrical impulse from another cell.
- Conduction system** is the network of fibers that conduct electrical impulses throughout the heart. They are the backbone of the heart.
- In cardiac cells resting, the inside of the cell is negatively charged when compared to the outside of the cell, the charge inside the cell is called the **membrane potential**.
- When a cardiac cell is stimulated, the membrane potential changes. This change is called **depolarization**.
- Depolarization is an inward flow of positive ions into the cell, producing a wave of electrical activity across the heart.
- Contraction of the heart muscle is the result of depolarization. When depolarization reaches the **cardiac muscle**, the contraction of negative polarity results in the **cardiac contraction**.
- Depolarization is followed by a reversal of the flow of ions across the cell membrane called **repolarization**.
- Repolarization is the restoration of negative polarity inside the cell.
- Contraction of the heart muscle is the result of the **excitation phase** of cardiac muscle, which is also detected by electrodes placed on the heart.

Conduction Pathway

- The path of conduction begins in the **sinus node**, located in the upper right corner of the atria. The sinus node is a group of cardiac pacemaker cells located in the SA node.
- These cells have the fastest firing rate.
- They generate an electrical impulse that travels through the atria to the **atrioventricular node** (AV node).
- The AV node is located in the bottom, thick, right atrium.
- The main function of the AV node is to delay the electrical signal as it passes through the atria to contract and moves on to the ventricles.
- The signal is then transmitted through the **bundle of His**, located in the upper part of the septum that separates the ventricles.
- The bundle of His is a group of cardiac pacemaker cells that can transmit at a rate of 40-60 bpm.
- This area connects the AV node with the right and left bundle branches—an area called the **AV junction**.
- The right bundle branch sends messages to the right ventricle; the left bundle branch sends messages to the left ventricle.
- The right and left bundle branches divide into smaller branches and connect to the **Purkinje fibers**, which generate the final contraction of the heart.
- These fibers have pacemaker cells that have an intrinsic pace of 30-60 bpm.

Electrocardiogram

- An EKG is recorded by electrode leads adhesive pads that are placed on the skin of the body from different angles.
- Lead I is a view of the heart from a posterior angle.
- Lead III can be used with three electrodes to lead I, lead II, and lead III.
- Leads II, III, and aVF are placed on the left side of the chest.
- The electrodes are often colored black, white, and red.
- One electrode is positive, the second is negative, and the third is the "ground" which monitors electrical activity from three other sources.
- When electricity flows from the positive electrode, the pattern on the graph will be upright.
- Consequently, when electricity flows away from the positive electrode, the pattern will deflect downward.

Lead I Monitoring

- The positive electrode is placed on the left upper chest, just below the clavicle; the negative electrode is placed below the right clavicle.
- The lead I electrode is placed on the left side of the chest.
- This leads to the detection of depolarization across the heart.
- Lead I assesses information on the lateral wall of the heart.

Lead II Monitoring

- The positive electrode is placed on the left side of the chest below the pectoral muscle; the negative electrode is placed on the left side but below the clavicle.
- Lead II assesses information on the inferior wall of the heart.

Lead III Monitoring

- Lead III is a modified lead II.
- The negative electrode is on the left side of the chest below the clavicle; the positive electrode is on the right side of the chest in the axilla.
- Lead III assesses information on the anterior wall of the heart.

Lead aVF Monitoring

- Lead aVF is a modified lead III.
- The negative electrode is on the left side of the chest below the clavicle; the positive electrode is on the right side of the chest in the axilla.
- Lead aVF assesses information on the septal wall of the heart.

12-Lead EKG

- Provides many angles of the heart because it utilizes 12 leads.
- Leads I, II, III, aVF, aVR, V1, V2, V3, V4, V5, and V6.
- One electrode is placed on each arm and each leg.
- One precentral electrode (V5-V6) are placed on the chest horizontally.

Augmented Electrodes

- These are three augmented lead leads, which are created by making one electrode positive in the other negative, for example:
- Lead aVR is created by making the left arm positive and the other leads negative.
- Lead aVR is created by making the right arm positive and the other leads negative.
- The anterior part of the heart is viewed in leads V1, V2, and V3.
- The lateral part of the heart is viewed in leads V4, V5, and V6.
- The left lateral side of the heart is viewed in leads I, aVL, V5, and V6.
- The right and anterior part of the heart is viewed in leads II, aVF, and V3.

EKG Paper

- In order to store waveforms, it is necessary to understand EKG graph paper.
- The graph paper is made out of small and large squares.
- Each small square represents approx. 0.02 second.
- There are 50 small squares in a large square; each large square represents 0.20 second.
- The large square is equal to one second.
- The standard sine wave of an EKG is 0.08-0.10 mm per second.
- The vertical lines on EKG paper measure the voltage or amplitude, which is the strength of the electrical current.
- A strong current will have a greater deflection than a weaker current.
- The standard sine wave amplitude is 1 mm high, which equals 0.1 millivolt.
- One millivolt is equal to five small squares, or one high and eight small squares, which is equal to five small squares, or one high and eight small squares.

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Synopsis

The newest edition to BarCharts' line of medical guides is an essential companion for anyone studying EKGs/ECGs or working in the medical field. This guide features an introduction to EKGs and how they work and also includes detailed sections covering the main types of arrhythmias, such as sinus rhythms, atrial rhythms, junctional rhythms, ventricular rhythms, and heart blocks. Helpful illustrations, along with the rate, rhythm, P wave, PR interval, and QRS complex, of each rhythm covered are also included to help with identification.

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Customer Reviews

A good reference.

Great study guide!

Perfect for school

I used this to practice over my EKG basics before I took my certification exam and passed with flying colors...

Nice review of the heart and explanation of the EKG waves and rhythms. Helpful reference for

medical personnel and students.

Great chart

Great for quick study!

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