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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.
- Depolarization** is the movement of negative charges generated by pacemaker cells throughout the heart; they are the beginning of the heart's contraction.
- 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 resting membrane potential.
- When the membrane potential changes, it is called depolarization.
- Depolarization is an inward flow of ions into a cell, producing a wave of electrical activity across the heart.
- Repolarization is the outward flow of ions out of a cell, returning the membrane potential to the level of the resting membrane potential.
- Repolarization is followed by a reversal of the flow of ions across the cell membrane called repolarization.
- On the restoration of negative polarity inside the cell, the contraction of the cardiac muscle begins.
- Contraction of the cardiac muscle begins during the relaxation phase of cardiac muscle, which is also detected by electrodes placed on the heart.

Conduction Pathway

- The path of conduction begins in the **sinoatrial (SA) node**, which is located in the right atrium. The SA node is the pacemaker of the heart because it has the fastest intrinsic rate.
- These cells have the fastest firing rate.
- Conduction then moves to the **atrioventricular (AV) node**, located in the lower part of the heart, just above the heart.
- These cells have the slowest firing rate.
- Conduction then moves to the **left and right bundle branches**, which are located in the heart muscle.
- The main function of the AV node is to delay the electrical signal so that the atria have time to contract and relax before 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 **left and right bundle branches** are the pacemaker cells that can transmit at a rate of 40-400 bpm.
- These cells connect 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 penetrate the ventricular muscle.
- These fibers have pacemaker cells that have an intrinsic pace of 20-40 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 placed in 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 toward 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 positive electrode is placed on the right upper chest, just below the clavicle; the negative electrode is placed below the left clavicle.
- This creates the reflection, or ECG's complete, in the upright.
- Lead I acquires 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 below the right clavicle.
- Lead II is the most useful lead for detecting a myocardial infarction because it measures the ventricular wall.
- Lead II acquires information on the inferior wall of the heart.

Lead III Monitoring

- The positive electrode is placed on the left side of the chest below the clavicle; the negative electrode is placed on the right side of the chest below the clavicle.
- The positive electrode is placed on the left side of the chest below the clavicle; the negative electrode is placed on the left side but below the clavicle.
- Lead III acquires information on the anterior wall of the heart.

Lead aVR Monitoring

- It is a modified chest lead.
- 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 below the clavicle.
- Lead aVR acquires information on the anterior wall of the heart.

12-Lead EKG

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

Augmented Leads

- These are three augmented leads, which are created by making one electrode positive for the other negative, for example:
- Lead aVR is created by making the left arm positive and the other leads negative.
- Lead aVF is created by making the right arm positive and the other leads negative.
- Lead aVR is created by making the left arm positive and the other leads negative.
- The anterior part of the heart is covered in leads V1, V2, V3, and V4.
- The posterior part of the heart is covered in leads V5, V6, and aVF.
- The left lateral side of the heart is covered in leads V5, V6, and V7.
- The right and posterior part of the heart is covered in leads V1, V2, V3, and V4.

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 25 bpm 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 has an amplitude of 10 mm high, which equals 0.1 millivolt.
- One small square, which is equal to five small squares, has one high and one low.

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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.

Book Information

Series: Quick Study: Academic

Pamphlet: 6 pages

Publisher: QuickStudy; 1 Fol Lam edition (May 31, 2012)

Language: English

ISBN-10: 1423218620

ISBN-13: 978-1423218623

Product Dimensions: 8.5 x 11 x 0.1 inches

Shipping Weight: 3.2 ounces (View shipping rates and policies)

Average Customer Review: 4.7 out of 5 stars 78 customer reviews

Best Sellers Rank: #26,167 in Books (See Top 100 in Books) #15 in Books > Medical Books > Medicine > Internal Medicine > Pathology > Diseases > Cardiovascular #15 in Books > Medical Books > Allied Health Professions > Medical Technology #18 in Books > Medical Books > Medicine > Internal Medicine > Cardiology

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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