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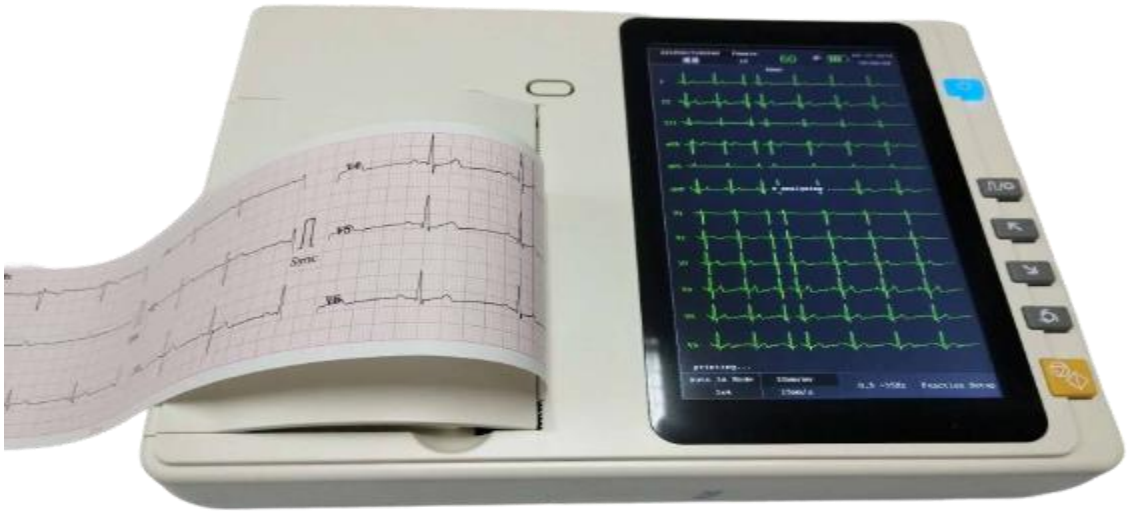
Experiment No.8

Electrocardiogram (ECG)

Electrocardiogram (ECG) machine is one of the most basic and quick procedures for assessing the heart. Electrodes (tiny, skin-sticking plastic patches) are applied to specific areas of the chest, arms, and legs. Lead wires connect the electrodes to an ECG machine. is then recording of the heart's electrical activity. And a graph of voltage versus time of the electrical activity of the heart using electrodes placed on the skin. These electrodes detect the small electrical changes that are a consequence of cardiac muscle depolarization followed by repolarization during each cardiac cycle (heartbeat).



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➢ Surface Electrodes

Surface electrodes are placed on the skin or mucosa and do not penetrate the surface. They typically consist of a metal or conductive polymer disc with a diameter of 5–30 mm, which is attached to the skin above the observed muscle using adhesives. In a conventional 12-lead ECG, ten electrodes are placed on the patient's limbs and on the surface of the chest. It consists of two types:

1- Limb leads

The limb leads and augmented limb leads (Wilson's central terminal is used as the negative pole for the latter in this representation)

EKG leads.

Leads I, II and III are called the limb leads. The electrodes that form these signals are located on the limbs – one on each arm and one on the left leg. The limb leads form the points of what is known as Einthoven's triangle.

Lead I is the voltage between the (positive) left arm (LA) electrode and right arm (RA) electrode:

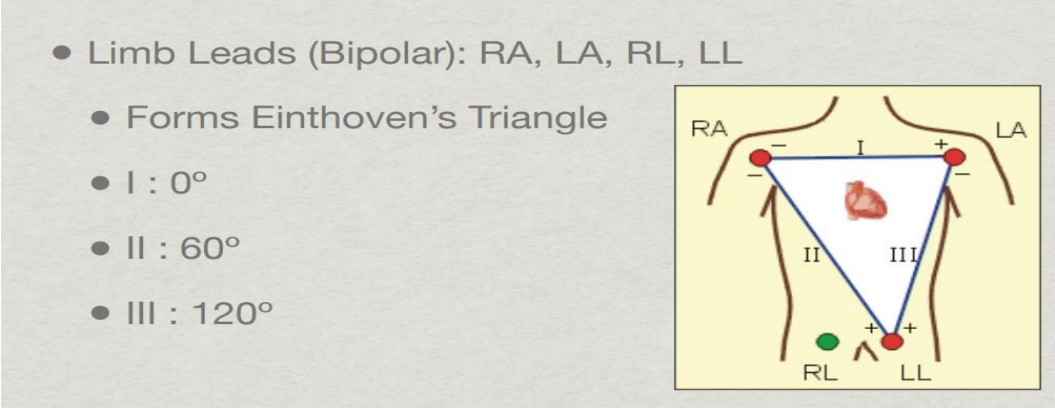
I = LA - RA

Lead II is the voltage between the (positive) left leg (LL) electrode and the right arm (RA) electrode:

II = LL - RA

Lead III is the voltage between the (positive) left leg (LL) electrode and the left arm (LA) electrode:

III = LL – LA



2- Chest electrodes

Consists of six monopolar electrodes placed on the rib cage (V1-V6) and through these electrodes a signal is taken ECG. A gel is placed between the electrode and the skin to reduce the noise in the ECG signal.

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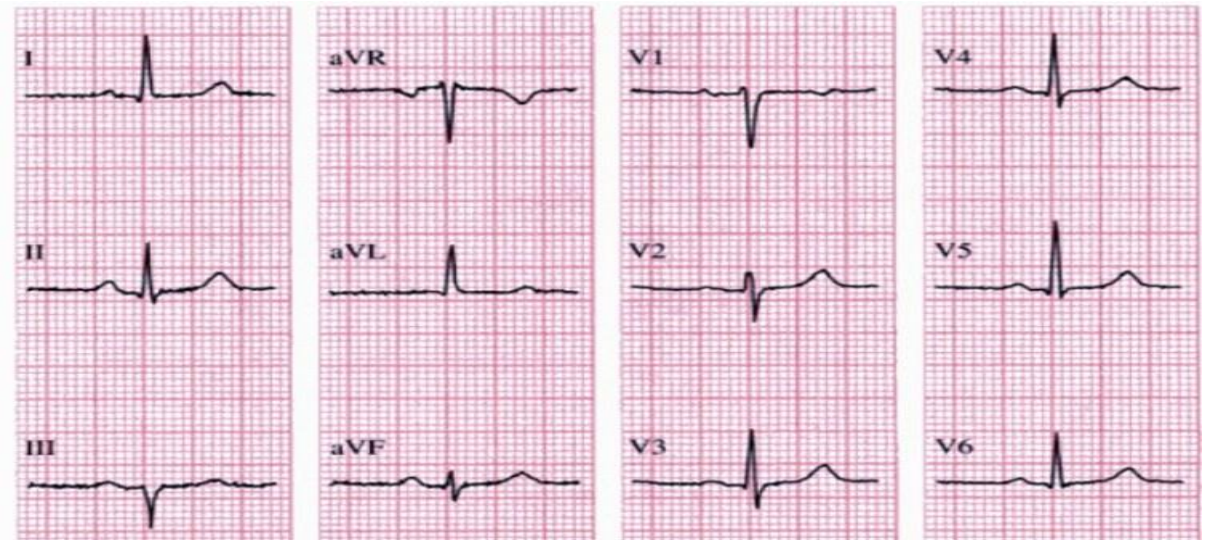
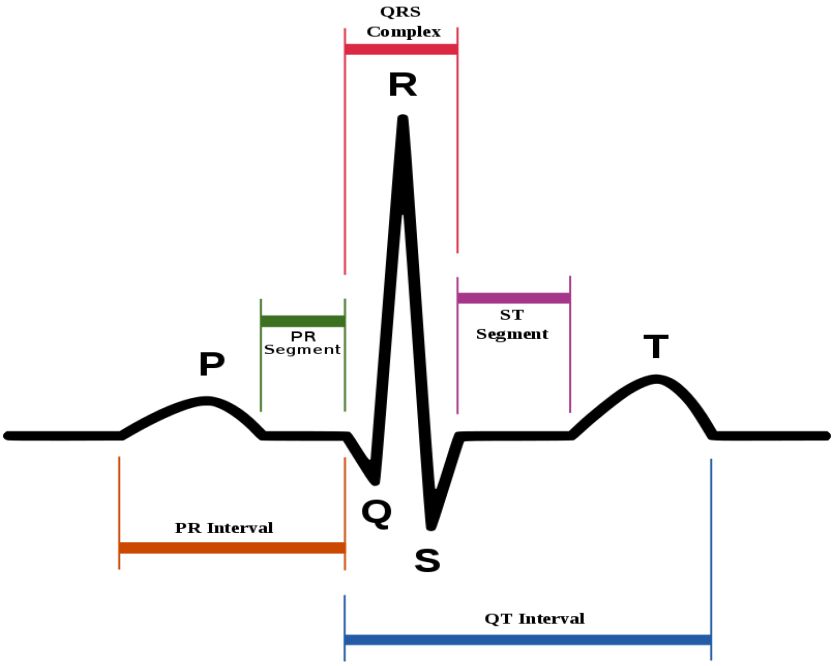
The six precordial leads are presented in their orderly sequence (V1 through V6), but the six frontal-plane leads are typically presented in the groups in which they were historically developed (I, II, and III; then aVR, aVL, and aVF). Note that lead aVR is inverted to -aVR to provide the same long-axis ori entation as lead II. The orderly sequence of frontal-plane leads followed by the trans verse-plane leads provides a panoramic display of cardiac electrical activity pro ceeding from left (aVL) to right (III), and then from right (V1) to left (V6)



I Lateral	aVR	V1 Septal	V4 Anterior
II Inferior	aVL Lateral	V2 Septal	V5 Lateral
III Inferior	aVF Inferior	V3 Anterior	V6 Lateral

There are three main components to an ECG: the P wave, which represents depolarization of the atria; the QRS complex, which represents depolarization of the ventricles; and the T wave, which represents repolarization of the ventricles.



What Does an Electrocardiogram Actually Measure?

The ECG recording plots voltage on its vertical axis against time on its horizontal axis. Measurements along the horizontal axis indicate the overall heart rate and regularity, and also the time intervals required for electrical activation to move from one part of the heart to another. Measurements along the vertical axis indicate the voltage measured on the body surface. This voltage represents the "summation" of the electrical activation of all of the cardiac cells. Some abnormalities can be detected by measure ments on a single ECG recording, but others become apparent only by observing se rial recordings over time.

What Medical Problems Can Be Diagnosed with an Electrocardiogram?

Many cardiac abnormalities can be detected by ECG interpretation, including enlargement of heart muscle, electrical conduction blocks, insufficient blood flow, and death of heart muscle due to a blood clot. The ECG can even identify which of the heart's coronary arteries contains this clot when it is still only threatening to destroy a region of heart muscle. The ECG is also the primary method for identifying problems with heart rate and regularity. In addition to its value for understanding cardiac problems, the ECG can be used to diagnose medical conditions throughout the body. For example, the ECG can reveal abnormal levels of ions in the blood, such as potassium and calcium, and abnormal function of glands such as the thyroid. It can also detect potentially dangerous levels of certain drugs. All of this information can be determined by the careful observations of an experienced electrocardiographer.

Discussion:

Q1\ define Electrocardiography

Q2\What is the work of the electrodes in ECG ?

Q3\How many electrode does the contain ECG?

Q4\There are three main components to an ECG.mention

Q5\Who are the people who have been tested ECG ?

Q7\What is aVF in ECG?