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Aim :→

To analyse the ECG [Electrocardiogram] of PQRST waves.

Reference :→

Agarwals R.N. Anatomy Physiology and health education. C.B.S publishers and Distributors pvt ltd., New Delhi 1st edition 2012 Page No - 395 to 447.

Marya R.K. Fundamentals of Human physiology AIIBS Publishers, India medical Publishers First edition 2013, Second edition 2019, Page No - 134-163.

Requirement :-

ECG chart paper.

Theory :-

The electrical activity within the heart generates small electric current that can be detected by attaching electrodes to the surface of body. The recording of these electrical activities of heart is called electrocardiogram.

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Electrocardiograph is the instrument used to record the electrical activity of the heart and this technique is called electrocardiogram.

This technique is discovered by Dutch Physiologist. Willem einthoven, who is known as father of E.C.G.

ECG Machine.

This instruments amplifies the electrical signals from the heart and records them on a moving strip of paper. The making (lines) on this paper are called ECG grid.

Electrodes connect the surface of the body with the body E.C.G. Machine and record the E.C.G by amplifying the heart's electrical activity.

Normal E.C.G.

The E.C.G shows a series of positive and negative waves which occur during each heart beats. These waves have been named P, Q, R, S, and T waves.

P-wave -

It is the first wave in ECG and is a small upward deflection on the E.C.G.

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This wave arises when the impulse from the S.A. node spread throughout both the atria.

The P wave represents atrial depolarization or contraction of the atrial muscle.

Duration of P-wave is not more than 0.1 sec.

QRS Complex:

This second wave continues as a large, upright, triangular wave and end as a downward wave.

Q wave is due to the depolarization of the basal portion of the interventricular septum.

R wave is due to the depolarization of the apical portion of the intraventricular septum ventricular muscle.

S wave is due to depolarization of the basal portion of ventricular muscles.

The ventricles start contracting shortly after the QRS complex begins.

The normal duration of QRS complex ranges from 0.08 to 0.12 sec.

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T-Wave :-

It represents the relaxation of the ventricular repolarization.

This wave is a dome-shaped upward deflection and it occurs just before the ventricles start relaxing.

ECG analysis also involves the examination of the time spans b/w. which are called intervals and segments of ECG include.

The various intervals and segments of ECG P-Q interval.-

It is the interval b/w the beginning of P-wave and the onset of the Q wave.

The lengthening of P-Q interval signifies caronaryartery disease or rheumatic fever.

Q-T interval

It is the interval between the start of the QRS complex and the end of T-wave; that is it is the time from the beginning of ventricular depolarization till the end of ventricular repolarization.

S-T segment:

It is the time interval b/w the end of S-wave and the start of T wave.

The elevation of the S-T segment indicates myocardial infection and its depressions indicates myocardial ischaemia.

Significance of E.C.G.

It is very important technique to determine the following.

(i) Abnormalities in the conduction pathway.
(ii) Enlargement of the heart.
(iii) Damage of the heart.

The size of ECG ware can also indicates abnormality.

(i) Large P wave indicates atrial enlargement.
(ii) Large Q wave indicates atrial myocardial infection.
(iii) Large R wave indicates ventricular enlargement.

Cardiac:

The study of heart is called cardiology.
Two types of heart is mainly found.
A) Myogenic heart. B) Neurogenic heart.

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→ It is main pumping origin.
→ It is originated from mesoderm
→ It is located in thoracic cavity.

→ Slightly tilted toward left.
→ Weight - in male - 280 - 340 gm
- in female - 230 - 280 gm.

* Double walled membrane is found around the heart known as pericardium.

Function of Pericardial fluid :-

→ Protect heart from mechanical injuries and shocks

→ Protect from collapse of membranes.

→ It allow free movement of heart.

→ Provide moisture to the heart.

* Heart having four chambered upper two chamber left and right atrium, lower two chamber left and right ventricular.

Trach Cardia
→ Heart beat become more than normal.
→ During Excercise
→ High temp rise

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Brady Cardia

→ Heart beat become less than normal.

→ During rest

→ ~~High~~ low temp.

Cardiac cycle:

The cardiac events that occurs from the beginning of one heartbeat to the begining of the next are called the cardiac cycle.

→ Each cycle is initiated by spontaneous generation of an action potential in the sinus node.

• Diastole : Period of relaxation - heart fills with blood.

• Systole :- Period of contraction - heart pumps the blood.

→ Normal average HR 75 bpm. during each cardiac cycle is 60/75 = 0.8 sec.

Atrial cycle:

Atrial systole - 0.1 sec
Atrial diastole - 0.7 sec
} → 0.8 sec

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Ventricular systole - 0.3 sec
Ventricular Diastole 0.5 sec → 0.8 sec

Joint cardiac Diastole - 0.4 sec.

* Cardiac output = Stroke volume × Heart Rate
70 × 72 = 5040 litre.

The value of cardiac output is almost 5 lit.

Result :-

The electrocardiogram (ECG) waves PQRST was studied with the help of ECG chat.

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