



AL-Mustaqbal University College

Medical laboratory Techniques

Department

Clinical Biochemistry

Lecture (11)

(Symptoms, Causes and Diagnose of Cardiac disease)



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How the heart works

The heart is a pump, which is a fist-sized muscle organ located slightly to the left of the center of the chest.

The heart is divided into two sides, the left and the right. The goal of this separation is to ensure that the oxygen-rich blood does not mix with the oxygen-free blood. The oxygen-free blood is blue in color, and it returns to the heart after it has circulated in the body.

The right side of the heart consists of the right atrium and the right ventricle. It receives blood from the lungs and pumps it to them, through the pulmonary arteries.

The lungs refresh the blood and replenish it with new oxygen. As a result, it changes color and becomes red. The oxygen-rich blood passes from here (from the right side) to the left side of the heart, which also consists of the left atrium and the left ventricle. From there (from the left side) the blood is pumped into the body, through the aorta, to supply the various tissues of the body with oxygen and various nutrients.

The four valves in the heart are responsible for proper blood flow. They all function like gates into a fence. Valves only open in one direction and only when depressed. Each valve opens and closes once in every single heartbeat, or about once every second, at rest.

There are two conditions of the heart:

1. **Systolic**: In this condition, the left and right ventricles contract, pumping blood into the blood vessels and through them to the lungs and the rest of the body. The right ventricle contracts just before the left ventricle.

2. **Diastolic**: The left and right ventricles dilate (relax) and fill with blood coming from the right and left atria. And then the cycle begins again.

Heart disease may affect any of the heart functions and any parts of the heart, and the most common heart disease is (Coronary syndrome) in its various forms and manifestations.

When does heart disease occur?

When there is a process of hardening (accumulation of a layer of mixture of calcium and fats) inside the coronary blood vessels, or when there is a constriction in these blood vessels, it is possible that a narrowing of their stomachs may occur, which impedes the delivery of blood to the myocardium.

Any damage to the heart muscle or its ability to contract would cause a temporary or permanent decline in the ability of the heart to contract.

When the heart's ability to contract is impaired, there is a decrease in blood flow to vital organs in the body. This process of narrowing of the blood vessels causes angina pectoris, and if there is permanent damage to the heart muscle, then myocardial infarction occurs.

An explanation about the heart

There are four valves in the heart, each of which may be damaged and malfunction.

Basic heart valve disorders are classified into **two groups**:

- Heart valve stenosis: It affects the ability to pump blood and move it between the different parts (chambers) of the heart, which requires more pressure in pumping blood in order to reach the normal level that the heart normally pumps.
- Heart valve widening:- blood flow continues even when the heart valve is supposed to block blood flow, completely.

Symptoms of cardiovascular disease (CVD)

Cardiovascular disease is caused by narrowing, blockage, or hardening of blood vessels, which causes the heart, brain, or other parts of the body not to receive enough blood.

Symptoms of cardiovascular disease include:

- ❖ Chest pain (angina pectoris)
- ❖ Shortness of breath (dyspnea)
- ❖ Pain, numbness, weakness or a cold feeling in the legs and arms, if the blood vessels in them get narrowed.

Heart disease symptoms caused by arrhythmia (arrhythmia)

An arrhythmia is an irregular heartbeat. Arrhythmias may involve the heart beating at a higher rate than normal, less than normal or irregularly.

Heart disease symptoms associated with rhythm of the heart include:

- ❖ Flutter (twitching) in the chest
- ❖ Tachycardia (rapid heart rate)
- ❖ Bradycardia (slow heartbeat)
- ❖ pain in chest
- ❖ Shortness of breath
- ❖ Dizziness
- ❖ Fainting or a state close to syncope.

Heart disease symptoms caused by a heart defect

A severe congenital defect in the heart can usually be detected within hours, days, weeks or months after birth. Symptoms of heart disease defects include:

Light gray or blue skin (cyanosis)

Swelling in the abdomen, legs or around the eyes

Shortness of breath while eating, which causes insufficient weight gain.

Heart disease symptoms caused by cardiomyopathy

Cardiomyopathy means that the heart muscle becomes thicker and stiffer. Sometimes, in the early stages of cardiomyopathy, there are no symptoms at all.

As the disease gets worse and worse, its symptoms may **include**:

- ❖ Shortness of breath when exerting any effort, or even time to rest
- ❖ Swollen legs, ankles and feet
- ❖ Swelling (expansion) in the abdomen due to fluid accumulation
- ❖ Tired
- ❖ Heart rhythm disorder - speed, palpitations or fluttering
- ❖ Dizziness and fainting.

Heart disease risk factors

Risk factors that lead to heart disease include:

- Smoking
- Malnutrition
- High blood pressure

- Excessive cholesterol in the blood
- Diabetes
- Obesity
- Lack of physical activity
- Constant tension

Heart disease complications:-

One of the most common complications of heart disease is **congestive heart failure**.

Other complications associated with heart disease include:

- Heart attack
- brain attack
- Aneurysm - a local aneurysm of the walls of blood vessels
- Peripheral arterial disease
- Sudden cardiac arrest.

Tests to diagnose heart disease include:

- ✓ Blood tests.
- ✓ Electrocardiogram (Electrocardiogram - E.K.G).
- ✓ Holter Heart Monitor.
- ✓ Echocardiography.
- ✓ Cardiac catheterization.
- ✓ Heart biopsy.
- ✓ Computerized tomography (CT) scan.
- ✓ Magnetic resonance imaging (MRI).