

THE CARDIOVASCULAR SYSTEM

Scientific supervisor: Asatullayev Rustamjon Baxtiyarovich

Student: Malika Atamurodova

Abstract: *This article, examines the cardiovascular system, focusing on the anatomy and physiology of the heart. The blood flow through the heart is described and the regulatory mechanisms of the heart are identified and discussed. The cardiac conduction system is examined, outlining the normal sequence of events in the cardiac cycle. In addition, a brief overview of some common cardiac disorders is provided.*

Key words: *Heart, aorta, valves, pericardium, ventricles, systole, diastole, murmurs, electrocardiogram*

The cardiovascular system can be thought of as the transport system of the body. This system has three main components: the heart, the blood vessel and the blood itself. The heart is the system's pump and the blood vessels are like the delivery routes. Blood can be thought of as a fluid which contains the oxygen and nutrients the body needs and carries the wastes which need to be removed. The following information describes the structure and function of the heart and the cardiovascular system as a whole.

the same time, the body dumps waste products like carbon dioxide, back into the blood, so they can be removed. The main function of the cardiovascular system is therefore to maintain blood flow to all parts of the body, to allow it to survive. Veins deliver used blood from the body back to the heart. Blood in the veins is low in oxygen (as it has been taken out by the body) and high in carbon dioxide (as the body has unloaded it back into the blood). All the veins drain into the superior and inferior vena cava which then drain into the right atrium. The right atrium pumps blood into the right ventricle. Then the right ventricle pumps blood to the pulmonary trunk, through the pulmonary arteries and into the lungs. In the lungs the blood picks up oxygen that we breathe in and gets rid of carbon dioxide, which we breathe out. The blood is becomes rich in oxygen which the body can use. From the lungs, blood drains into the left atrium and is then pumped into the left ventricle. The left ventricle then pumps this oxygen-rich blood out into the aorta which then distributes it to the rest of the body through other arteries. The main arteries which branch off the aorta and take blood to specific parts of the body are:

Carotid arteries, which take blood to the neck and head

Coronary arteries, which provide blood supply to the heart itself

Hepatic artery, which takes blood to the liver with branches going to the stomach

Mesenteric artery, which takes blood to the intestines

Renal arteries, which takes blood to the kidneys

Femoral arteries, which take blood to the legs

What is the Cardiac Cycle?

The cardiac cycle is the sequence of events that occurs in one complete beat of the heart. The pumping phase of the cycle, also known as systole, occurs when heart muscle contracts. The filling phase, which is known as diastole, occurs when heart muscle relaxes. At the beginning of the cardiac cycle, both atria and ventricles are in diastole. During this time, all the chambers of the heart are relaxed and receive blood. The atrioventricular valves are open. Atrial systole follows this phase. During atrial systole, the left and right atria contract at the same time and push blood into the left and right ventricles, respectively. The next phase is ventricular systole. During ventricular systole, the left and right ventricles contract at the same time and pump blood into the aorta and pulmonary trunk, respectively. In ventricular systole, the atria are relaxed and receive blood. The atrioventricular valves close immediately after ventricular systole begins to stop blood going back into the atria. However, the semilunar valves are open during this phase to allow the blood to flow into the aorta and pulmonary trunk. Following this phase, the ventricles relax that is ventricular diastole occurs. The semilunar valves close to stop the blood from flowing back into the ventricles from the aorta and pulmonary trunk. The atria and ventricles once again are in diastole together and the cycle begins again.

The Electrocardiogram

The heart has an inbuilt rhythm of contraction and relaxation. A small group of heart muscle cells called the pacemaker help achieve this. The pacemaker generates an electrical impulse which spreads over the atria, making them contract. This impulse then spreads to the ventricles, causing them to contract. The electrical changes that spread through the heart can be detected at the surface of the body by an instrument called the electrocardiograph.

Electrodes are placed in a number of positions over the chest and the electrical changes are recorded on moving graph paper as an electrocardiogram (ECG).

Effects of Aging on the Heart in Men and Women

As a part of the normal aging process a number of changes occur to the cardiovascular system.

Our heart rate slows down because the time between heartbeats increases as we age. This is one of the main reasons why the heart is unable to pump out more blood during exercise when we become old.

The amount of blood the heart pumps each minute can change as we age. It decreases slightly in older women. However, it does not change in healthy older men who have no heart disease. The reason for the difference between the sexes is not fully understood.

As we age, our blood pressure falls much more on standing from the sitting position compared to when we are younger. This phenomenon is known as postural hypotension. This explains why elderly people are more likely to feel dizzy or to fall when they stand up quickly from a resting position.

Components of the Heartbeat

The adult heart beats around 70 to 80 times a minute at rest. When you listen to your heart with a stethoscope you can hear your heart beat. The sound is usually described as “lubb-dupp”. The “lubb” also known as the first heart sound, is caused by the closure of the

atrioventricular valves. The “dupp” sound is due to the closure of the semilunar valves when the ventricles relax (at the beginning of ventricular diastole). Abnormal heart sounds are known as murmurs. Murmurs may indicate a problem with the heart valves, but many types of murmur are no cause for concern. (For more information see: (see Valvular Heart Disease)

REFERENCES:

1. Beers, M. (editor-in-chief) “Aging and the Cardiovascular System”[online], The Merck Manual of Geriatrics. Merck & Co. Inc. 2006. Available at URL: <http://www.merck.com/mrkshared/mmg/search.jsp> (last accessed: 30/6/06)
2. Guyton, A and Hall, J. (editors) Textbook of medical physiology. Philadelphia, W. B. Saunders, 2000.
3. Johnson, L. (editor) Essential medical physiology. Philadelphia, Lippincott-Raven, 1998.
4. Saladin, K. Anatomy & physiology: the unity of form and function. Boston, McGraw-Hill, 2001.
5. Talley, N and O’Connor, S. Clinical examination: a guide to physical diagnosis. Sydney, MacLennan & Petty, 2001.