



Vascular of the Heart of Rats Under the Influence of Pesticides

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ABSTRACT

The analysis of morphological and morphometric changes under the influence of pesticides on off spring of rats in the early postnatal ontogenesis passed through the mother's milk was made. Under the influence of pesticides, wall thickness of atrium and ventricles of all ages is reduced as compared with the control group. There is a reactive change in the vessels in the form of expansion and plethora, development of perivascular edema and diapedetic hemorrhage. In our opinion, this leads to disruption of the functional activity of the myocardium, eventually to the emergence of degenerative disorders in many organs and systems.

Keywords:

rat heart, postnatal ontogenesis, pesticides, vessels of the heart.

Diseases of the cardiovascular system are now a major cause of disability and mortality of the adult population in many countries around the world. They are now the major cause of disability and mortality of the adult population in many countries around the world. Rat heart and human heart are anatomically similar, despite the differences in size and frequency of contractions (1,5). Therefore, when studying the effect of the impact of environmental factors on the heart (3,4) and the creation of models of diseases of the cardiovascular system are widely used rat.

Morphology of rat heart problems remain unresolved and controversial (2). Analysis of domestic and foreign scientific literature shows that little explored is the question of the age of anatomy, morphometric parameters of the various walls of the rat heart, in the age aspect in the experiment.

Very often one of the etiological causes of heart disease is a toxic factor. Humans and animals are constantly feeling the effects of various physical, chemical and biological factors. Most of the chemical compounds,

particularly pesticides have adverse effects on the organism. The chemicals used for plant protection, in most cases, are toxic to humans and warm-blooded animals. They can penetrate into their body through the respiratory tract, skin, gastrointestinal tract, accumulate in specific organs of the body (liver, kidney, lung, heart). The need to examine the heart, especially its importance to the body and the risk of pathological conditions in violation of its function. However, on the changes in the offspring under the influence of the mother's body with pesticides during lactation is not. Not carried out a study on the structure of the rat heart at different ages, while these changes are closely related to the toxic effects of pesticides. Despite a deep and versatile study organ interest in its morphology unabated. However, it should be noted that in the literature we have not seen evidence of the impact kotoran and kinmiks on the structure of the heart of the animals. Also there is no information about no changes in the offspring under the influence of the mother's body with pesticides during lactation. Not carried out a

study on the structure of the rat heart at different ages, while these changes are closely related to the toxic effects of pesticides. Despite a deep and versatile study organ interest in its morphology unabated.

The aim of our research is to study the reactive changes of the heart vessels of rats under the influence of pesticides have passed through the mother's milk.

Materials and methods. The material for the study were 280 rat heart preparations which were divided into 2 groups 1) a control group - in the newborn, 6, 11, 16, 22-day ages; 2) experimental group - 6, 11, 16, 22-day.

All animals were kept under the same conditions of the vivarium. Rats as a control and the experimental group received the same one daily diet. Female rats in the experimental group, postpartum daily intragastric gavage was administered on an empty stomach kinmiks 5% solution in a dose of 1/100 LD₅₀, which was 0.33 mg per 1 ml of distilled water (200 g. Animal weight). The second experimental group was administered at a dose of 1/100 LD₅₀ kotoran that was 3,03mg 200 g weight of the animal per 1 ml of distilled water. Upon expiration of the experiment, the control and experimental group rats were sacrificed under ether anesthesia at 6,11,16 and 22 th days.

Number of rats in the control group and the experimental group was similar. Control group animals were daily intragastrically fasting was administered distilled water in an amount of 1 ml.

Results and discussion. Blood vessels of the rat heart presented arterioles, capillaries, venules and sinusoids. In the muscle layer of the ventricular wall of rat heart there are arterial and venous vessels of all sizes. Arteries and arterioles in the wall of the left ventricle of the heart are mainly determined by the front and rear and it is noted that the arteries penetrate to the intramural layers of the myocardium. In the subepicardial layer of the ventricular myocardium there are sinusoids of different diameters. They are oval and elongated form, the wall is represented by a single layer of flattened endothelial cells.

In the myocardium, the blood vessels are directed along the beams of cardiomyocytes. Around cardiomyocytes and vessels arranged bundles of collagen and elastic fibers. Arranged in parallel muscle fibers and capillaries in the myocardium, may create conditions for equal pressure on the capillary wall and prevents it being pinched at systole. There is not significant difference of intraorgan vessels in diameter in the walls of the left and right ventricles.

Arterioles are characterized by a thin inner shell, a distinct middle and outer shells. Arteriole's inner layer contains rounded shape nuclei of endothelial cells, they are at a small distance from each other. A well-defined middle layer consists of a circular directed beams of muscle fibers. They form two layers. The outer layer is formed by loose fibrous tissue, there are adventitial cells in it. Inner diameter of arterioles newborn rats in the control group on average $11,7 \pm 0,6$ micrometer. To 6 days there is the greatest rate of growth in the diameter of the arterioles and is 40%, in the following age groups, the rate of growth of the internal diameter of arterioles insignificant.

Capillaries have a diameter in average $4,7 \pm 0,6$ micrometer. Myocardial capillaries consist of 1 layer. Mainly myocardial capillaries are found in the subepicardial layer. In the subendocardial layer you can rarely find blood vessels.

The wall of the venules is represented by endothelial cells, which are located at a great distance from each other. Muscle layer of venules is underdeveloped. Venules thickness ranges from an average $16,7 \pm 1,2$ micrometer. In the walls of the left ventricle you can see sinusoids. Sinusoidal wall in the structure does not differ from the capillaries. According to a diameter, sinusoids exceed capillaries and reach 35-42 micrometer. Sinusoids are often oval or round forms.

In the experimental group at the effects of kotoran, observed changes in the veins and capillaries. An increase in their diameter occurs, which is related, apparently in violation of the circulation and swelling phenomena of venous vessels of the heart at the level toxic

effects of the pesticide. These changes make formed elements go out into the surrounding tissue. When exposed kinmiks observed similar changes in the blood vessels, but they are more pronounced. Enlarging of venous sinuses as compared to control is more 6 days of age is 13.2% by day 11 of 28.7% on day 16 to 17.6% by day 21 at 8.6%. The diameter of the venulosis also higher than the control group ranged from 5% to 9%. The diameter of the capillaries remained expanded by 30.7%. In arterioles occur seal vessel walls, increasing their lumen to 20-37%. With effect of kinmiks similar changes occur in the blood vessels, but more pronounced changes. In the small blood vessels of the heart revealed hyperemia, stasis and diapedetic hemorrhage, accompanied by perivascular edema, swelling and disorganization of connective tissue of stroma. Reactive changes extend to the venous vessels in the form of expansion and plethora of them, with the development of perivascular edema and diapedetic hemorrhage which are the result of the toxic effects of pesticides, developing as a result of violation of the circulation of the microvasculature, toxic venous plethora and increase vascular permeability. Increased permeability of microvascular venous vessels accompanied by going out liquid part of the blood.

Thus, the analysis of our data shows that in the period of lactation when exposed mothers pesticides, marked changes in the blood system. This in turn leads to disruption of the functional activity of the myocardium. Eventually rise to hematotropic disorders in many organs and systems.

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