TASHKENT MEDICAL ACADEMY

100 TMA ANNIVERSARY

Journal of Educational and Scientific Medicine

Issue 1 (2) | 2023

OAK.uz

Supreme Attestation Commission at the Cabinet Ministers of the Republic of Uzbekistan

Google Scholar

ISSN: 2181-3175

Journal of Education & Scientific Medicine

ISSN 2181-3175

Tashkent Medical Academy

Research Article

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Experimental Toxic Myocarditis When Exposed to Pesticides

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ABSTRACT

Background. Very often one of the etiological causes of heart disease is the toxic factor. Currently, different chemical products are used in agriculture for the treatment of grape, vegetable and especially cotton fields. Most chemical compounds such as pesticides have adverse effects on the body. At the present time, more than 1000 kinds of pesticides are being used worldwide and every ear their number is increasing.

Methods. Research has scientifically substantiated the results of inspections conducted on 205 white laboratory rats during early postnatal ontogenesis. In the complex morphological studies, which include in its membership general histologic, histochemical techniques organometal, morphometry, scanning electron microscopy, transmission electron microscopy, ECG heart and mathematical modelling and forecasting toxic myocarditis it was used.

Conclusion. The maximum increase in length, width and anteroposterior heart size observed from birth to 6th day and changes its location craniocaudal direction. From the moment of birth until 21 days of age, the ratio of the relative weight of the heart to the body weight is reduced from 1.75% to 1.1%. The toxic effects of pesticides on the heart of rats demonstrated specific pathological morphological changes, that is, there was disorganization of fibrous structures in the wall of arterioles and capillaries, proliferation owns connective cells and protein dystrophy muscle fibers of the myocardium, and loosening discomplexation of myofibrils violation of the nuclear-cytoplasmic ratio.

Key words: rat heart, postnatal ontogenesis, cardiomyocytes, fibrous structure atria and ventricles.

INTRODUCTION

Very often one of the etiological causes of heart disease is the toxic factor. Currently, different chemical products are used in agriculture for the treatment of grapes, vegetables and especially cotton fields. Most chemical compounds such as pesticides have adverse effects on the body [1,3,4].

At the present time, more than 1000 kinds of pesticides are being used worldwide and every ear their number is increasing. It is well known that prolonged exposure to even small doses of pesticides on the body increases the frequency and enhances diseases of the cardiovascular system, and myocarditis of various etiologies.

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Therefore, of great interest is the study of pesticide effects on humans and animals, on the cardiovascular system. Significant relevance is acquired by the problem of pesticide influence on growing young organisms [5,6,8].

Heart variability is not only a general biological interest but has a curtain significance in the disclosure of physiological processes developing therein, depending on the environmental conditions.

According to the World Health Organization (WHO), cardiovascular system diseases often lead to disability of the able-bodied population, and it takes a leading place in the structure of causes of death around the world. Annually 17,5 million people die from cardiovascular system diseases which consist approximately 29% of all death cases.

If in Europe cardiovascular system pathology dies 4 million people that this index in the USA is 37,3%, in Russia 57%, and in India 60%. Therefore, today in the world medicine has paid special attention to diagnosing and developing modern treatment systems for cardiovascular system diseases.

Every ear in the Republic of Uzbekistan, 8000 people are registered with the state of myocardial infarction, and 60% of them die in the pre-hospital stage. According to statistics, the mortality from cardiovascular diseases in Uzbekistan is 58% of the total mortality and in 20-50% of cases, we observe sudden death cases. It is a very important prophylactic measure [2,7,9,10].

Worldwide to achieve high efficacy in agriculture it is important to carry out oriented studies use of pesticides, which have different chemical compounds. That special attention is paid to the following: the development of prevention of the negative influence of pesticides on the human body; study of the deepening of the course of cardiovascular diseases, myocarditis on different causes and acceleration of their repeated case, when pesticides are used a long time in small amounts; detailed study of the influence of synthetic pyrethroid-kinks and herbicide cotoran into an organism, i.e. to the cardiovascular system of human and animals; the essence of physiological processes and changeability of the influence of periods and herbicides to the heart; the especially negative influence of pesticides, entered through mothers milk into the organism of the baby, and making of mathematic modelling of the early diagnostics of toxic myocarditis.

The purpose of the study is the evaluation microscopic and morphometric changes in the various layers of the walls of the atria and ventricles of the heart during early postnatal ontogenesis under the influence of pesticides which have passed through the mother's milk.

MATERIAL AND METHODS

Research has scientifically substantiated the results of inspections conducted on 205 white laboratory rats during early postnatal ontogenesis. The experiments were conducted in accordance with the "European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes" (Strasbourg, 1985).

Animals were divided into 3 groups. In the first group after the birth of infant rats, mothers introduced pesticide cotoran daily dose of 1/100 LD50 intragastrically through a catheter. In the second group in the same way female rats were administered kinks pesticide in dose maximum allowable level 5, and the infant rats were anaesthetized in the above age periods. In the control group of female rats daily in the morning on an empty stomach, depending on the period, distilled water was administered in an amount of 1 ml. As a probe for the female rats used subclavian catheters №1.

Rats were anaesthetized by Rausch-narcosis at 1, 6, 11, 16, and 21 days after birth. In the complex morphological studies, which include in its membership general histologic, histochemical techniques organometal, morphometry, scanning electron microscopy, transmission electron microscopy, ECG heart and mathematical modelling and forecasting toxic myocarditis it was used.

After removal from the thorax the made measurements of length, width and thickness of rat heart. To determine the linear dimensions were used caliper with 0.05 mm scale. Heart length measured from the tip to the outermost part of the base of the heart. Heart width defined as the distance between the protruding portions at atrioventricular sulci from left to right.

The thickness of the heart - the distance between the most prominent parts on the level of atrioventricular sulci from front to back. Heart shape is determined visually. To determine the mass and weight of the rat hearts were used electronic scales.

Histological sections of 8-10 microns thick, made with the help of a microtome, were stained with hematoxylin and eosin by standard methods. Collagen fibers in the connective tissue shell of the walls of the heart revealed by pikrofuksin by the method of Van Gieson, elastic fibers by the method of Weigert and reticular fibers by Foote modification N.A. Yurina.

For scanning electron microscopy infarction size pieces 1,5x1,5 mm are fixed in 2.5% glutar aldehyde solution, with pre fixing osmium tetroxide in phosphate buffer, dehydrated in alcohol-acetone, and dried by the critical point in the apparatus NSR-2. Deposition of gold

held in the apparatus of IB-2 and examined in electron microscope JEOL JSM-6010LV and Hitachi-S405 with photographing the monitor screen using the latest Canon digital camera.

Received the results of the research data were subjected to statistical processing on a computer Pentium - IV using the software Microsoft Office Excel-2012 package with statistical processing functions. The micrographs obtained drugs on the microscope 11 and Mikromed-3 with photo and video consoles Tucsen Camera TCA-5.0C China.

RESULTS

A significant increase in the thickness of the left and right endocardial atrium was observed in all development times (1-, 6-, 11-, 16-, and 21st day) and ranged from 8% (in the right atrium at the 16th day) to 29% (left atrial on day 6). Results of the study of myocardial thickness showed that the growth rate of myocardial thickness in all study periods increased rapidly from 13% to 29%. Especially on the 6th day by 25% in the top and bottom of the left ventricle by 24% and the top and bottom of the right ventricle. A significant increase in the thickness of the myocardium of the left and right atrium was observed all the time (1-, 6-, 11-, 16-, 21st day), and ranged from 12% (in the right atrium at the 6th and 16th day) to 22% (in the left atrium at 11- and 21st day). The growth rate of the thickness of the epicardium of the left and right ventricles showed that the thickness of the epicardium at all times compared to previous periods increased slightly, ranging from 8.2% to 11.5%. These figures in the left and right atrium are from 9% to 18%.

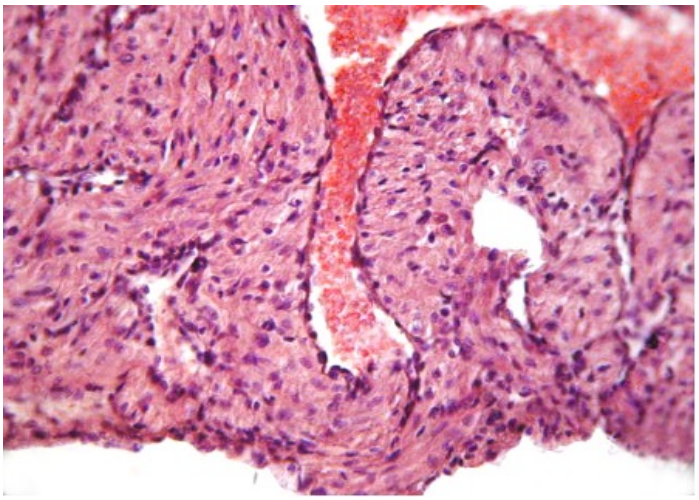
In the dynamics of early postnatal ontogenesis check in intact rats' histological structure of the structural elements of the cardiac atria and ventricle layers showed a definite pattern of development and differentiation. In the early stages of the study (at the 6th and 11th day) structural elements of all layers of the heart wall remain undifferentiated, especially better observed in the myocardium where cellular elements predominate over the myofibrils. Later check on the 21-day structural elements of all layers of the heart wall become their true morphological and functional features and fully formed.

The left and right ventricles distinguish subendocardial, subepicardial and intermediate layers. Subendocardial layer of the myocardium is more differentiated than the other layers, and consists of parallel beams of cardiac histocyte, running parallel to the endothelium. Subepicardial myocardial layer has a loose structure and has bundle form, cardiomyocyte it arranged randomly and are larger. In individual cardiomyocyte myofibrils thicker in others - a vague and vacuolated (Fig 3a.). The intramural layer of left ventricular myocardial muscle cells is arranged perpendicular to the subendocardial layer. The interventricular septum myocardium heart denser, thicker form cardiomyocyte parallel beams. Around cardiac histocytes and around the vessels are arranged bundles of collagen and elastin fibers. Reticular fibers are arranged between the cardiomyocyte as a dark brown fibrous structure that envelop the individual muscle bundles, forming large loop (Figure 3b.), And around the vessels in the epicardium – small loop network.

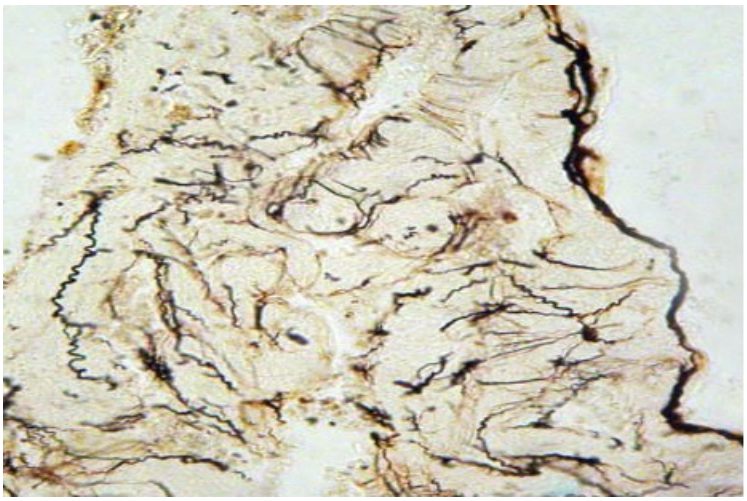
The intramural myocardial layer is presented in parallel reaching myofibrils which significantly prevail over the nuclear structures. The subepicardial layer compared to other layers composed of thin and cut transversely cardiac histocytes, between which the arterial and venous vessels. This venous sinus has different shapes and sizes, and some of them form large, elongated blood lakes. In the histochemical method checking by Van Gieson in the walls of arteries, arterioles revealed large bundles of collagen fibres (Figure 3c.), And in the walls of the veins and in the stroma of the myocardium - tender and broken collagen fibres. Especially it thickens the subendothelial inner elastic membrane, which is represented by a thick winding material of uneven thickness and deep purple color (Fig. 3d). The muscular and adventitial layers of artery walls elastic type of elastic fibers are small, and they are presented in the form of bluish shadow structures.

Arterioles rat heart is characterized by a thin inner layer, a distinct middle, and outer layers. The inner layer consists of arterioles located close to each other nuclei of endothelial cells. A well-developed middle membrane consists of a circularly directed bundle of muscle fibers. They form two layers. The inner diameter of the arterioles newborn rats' controls group averages 11,7±0,6 m. Up to 6 days, there is the greatest pace of growth arteriolar diameter and is 40%, and in the subsequent age groups, the growth rate of the inner diameter of the arterioles is slight.

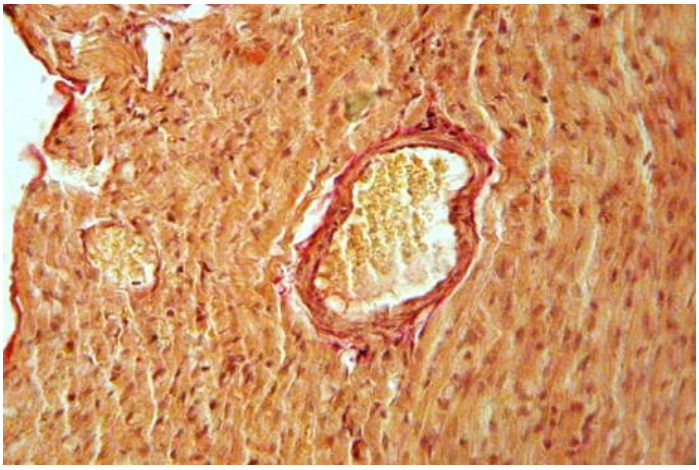
Capillaries have a diameter of on average 4.7±0.6 microns. The inner layer is composed of the capillary walls of endothelial cells, the middle layer - of the basement membrane and the external elastic membrane. Mainly found in the capillaries of the myocardium reveals in the sub epicardial layer. The subendocardial layer of blood vessels is rare. The wall consists of venular endothelial cells, which are located at a great distance from each other. The muscular layer venules are underdeveloped. Thickness venules average 16,7±1,2 microns.



a) Cardiomyocytes different shapes and staining power. Colour: hematoxylin eosin.



b) Small loop wale network of reticular fibers of the myocardium. Colour: by Foote.



c) Collagen fibers in the vascular wall. Colour: Van Gieson.

g) Elastic fibers in the vascular wall. Colour: by Weigert.

Figure 3. Histology and histochemistry of rat's heart myocardium is in norm

The results of morphometric studies in rats ventricular in breastfeeding showed that in the initial period of the experiment, the thickness of the walls of all the departments was less as compared with the control group. It is established that a pronounced lag ventricular wall thickness was observed on the 11th day: it was less of a benchmark to 31%. The smallest changes were found on day 21, whereas the figures experimental group were below 4% to 19% compared with the control group. Comparison of the left thickness and the right atrium to the control group showed that in all experimental periods, endocardium and myocardium thickness was less than the benchmark of 6% to 23%. The difference data of the left and the right atrium is not established. The thickness of an epicardium benchmark is less than 2% to 11.5%.

Morphometric results of inspections of different diameter blood vessels of the heart wall of rats during feeding breast milk under the influence of cotoran have shown that since the 6th day a decrease in the internal diameter of arterial vessels contracted. At 6 days of age artery diameter is on average 49.8±4.3 microns, which is less than the reference index by 12.3% at 11 days of age - 52.5±5.6 microns, which is lower than normal by 8 8%, in 16 days - 56.7±6.3 microns, which is also less than the

rate of 11.2% in 21 days - 61,3±7,3 microns, which is less than the norm of 7.6 %. It may be noted that with age, the diameter of the artery of the heart is increased but compared with the norm revealed some of its backlogs. At different times the research dynamics of changes in arteriolar diameter is just a trend: the study of the figure in all terms retained decrease compared with the control group.

Born from the poisoned Cotoran and kinmiks in female rats during early postnatal ontogenesis the microscopic tests have shown that pathological changes in the structural elements of the heart are manifested in the form of oedemadyes circulator processes, dystrophic degenerative -and-destructive inflammation.

Initially pathomorphological changes in vessels exposed microcirculatory system, then the venous vessels and at the end of the experiment (day 21) changes encompassed the artery. The small blood vessels of the heart revealed hyperemia, stasis and diapedetic haemorrhage, accompanied by perivascular edema, swelling and disorganization of connective tissue stroma.

Dyscirculatory violations extended to venous vessels in the form of enhancement and hyperemia, development of perivascular edema and haemorrhage diapedetic, which are the result of the toxic effects of pesticides, as a result of developing dys circulation of microcirculatory vessel toxic venous plethora and increased vascular permeability. Increased microvascular permeability and venous vessel level was accompanied by the release of the liquid portion of the blood through the wall of the vessel to the surrounding connective tissue (Fig. 4a).

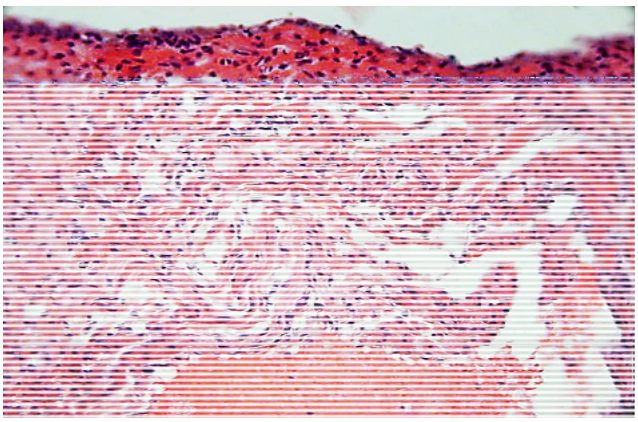


Fig. 4a. 6 day experience. Loosening infarction due to interstitial edema. Colour: hematoxylin eosin.

As a result, amorphous material with the redistribution of glycosaminoglycans, hyperacidity and hydrophilic fabrics change the quality and quantity of tissue fluid, which leads to the development of a disruption of cellular and fibrous structures vascular and stromal tissue, and this is manifested in the form of mucoid and fibrinoid swelling of fibrous structures. Specifically, these changes in the heart first cover vessel wall and perivascular connective tissue. Fibrinoid swelling of the fibrous structures is accompanied by the emergence of alterative changes, which develop in front of inflammatory and hyperplastic processes.

In our study, the inflammatory process peaked in the 16th day of the study, appearing perivascular and interstitial lympho histiocytic infiltrate (Fig. 4b).

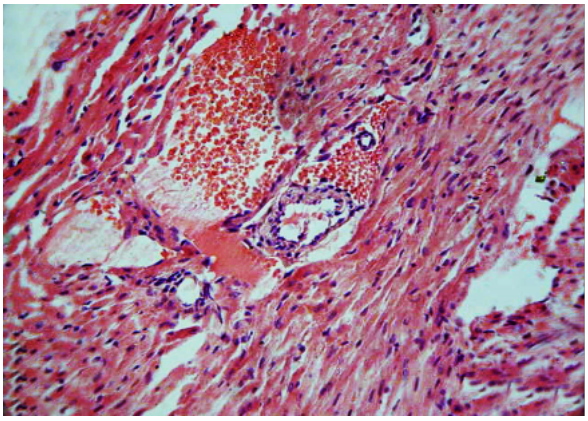


Fig. 4b. 16 days. Expansion of sinusoids, inflammatory infiltrate around the arteries and interstitial. Colour: hematoxylin eosin.

The appearance of proliferative tissue infiltration shows the development of chronic inflammation, which is an autoimmune nature. It is known that cell proliferation lymphohistiocytic primarily associated with the development of hyperplastic proliferation processes as originally granulation and connective tissue and then leads to a thickening of the vascular-stromal interstitial stroma that is detected by the histochemical method of Van Gieson (Fig. 4c).

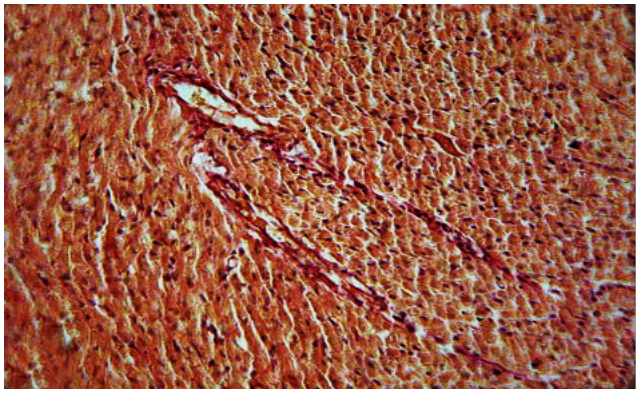


Fig. 4c. 21 days. Perivascular and interstitial sclerosis. Colour: by Van Gieson. X: 10x20

This fixed vacuum decay and reticular fibers intramuscular interstitial, and vascular wall observed uneven thickening (Fig. 4d).

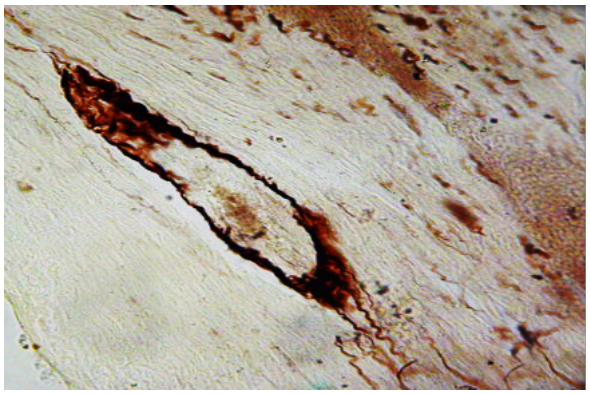


Fig. 4d. For 21 days. Loosening and decay reticular fibers interstitial myocardial thickening in the wall of blood vessels. Colour: by Foote.

Figure 4. Morphological changes of the myocardium of rats under the influence of cotoran

The above-mentioned changes in the vascular stromal tissue of the heart leads to metabolic disorders in the parenchymal cells or cardiac hystiocyte.

Morphologically these disorders in cardiomiocyte, were manifested in the form of protein hyaline droplet and vacuolar degeneration, which in our observations often localized in the perivascular areas and subendocardial layer of the myocardium.

The study of morphometric data of the left and right atria and ventricles of the experimental groups revealed decrease in all parts of the heart wall under kinmiks. It is established that a pronounced lag thickness of the ventricular wall is observed on the 11th day: it was less from control index to 60%. The biggest change was subjected the myocardium of the left ventricle. Particularly, these changes detected in the bottom of the ventricles. Along with this, under the action kinmiks thickness of endocardium of the right ventricle and the left at the top and bottom is less than 20% to 35% compared with the control group. A comparison of the left and right atrium thickness with the control group showed that the most pronounced growth lag the walls of the heart in rats at exposure with kinmiks detected in animals in the 16-day experiment. The thickness of the myocardium of the left and the right atrium reduced by 23-29%. In all experimental periods of atrial endocardial thickness was less than the control index of 6% - 19%. The thickness of an epicardium less than control index 2% - 11.5%.The results of microscopic examination of the infant rat's heart during lactation under the effect of kinmiks to female rats shown that, as in the exposure of cotoran in this series of experiments pathomorphological changes in structural heart cells also manifested as edema-dyscirculatory, dystrophic, degenerative and inflammatory-destructive phenomena, but unlike the previous series, these processes were expressed more strong.

In this group of the study of dyscirculatory violations extended to venous vessels in the form of enhancement and hyperemia, development of perivascular edema and diapedetic hemorrhage, which are the result of the toxic effects of pesticides, because of the developing decirculation of microcirculatory vessel, toxic venous plethora and the increase of vascular permeability.

Fibrinoid swelling of the fibrous structures is accompanied by the emergence of alterative changes, against to others develops inflammatory and hyperplastic process. The appearance in the tissues of the proliferative infiltrate suggests a chronic autoimmune inflammatory nature. It is known that cell proliferation of lymphohistiocytic primarily accompanied by the development of hyperplastic proliferation processes as originally granulated, then connective tissue, and then led to thickening of vascular-stromal interstitial stroma.

Obtained morphological data about violation of cardiomyocyte contractile function of the mitochondrial damage in violation of energy and metabolic processes that lead to necrobiosis, changes in micro vessels with violation of the transport function of the endothelium and other components of the vascular wall.

Studies to identify the impact of pesticides on myocardial ultrastructure with preliminary study of half-sections slices with the use of scanning microscopy and transmission electron microscopy showed that the character of myocardial changes in rats exposed to cotoran or kinmiks through the mother's milk is almost the same.

In the early stages (6-11 day) recorded strong changes expressed by ultrastructural changes in cardiomyocyte myofibrils, which reveal a violation of the contractile function of these cells. It leads to violations of the three-dimensional structure of the muscle fibers of the myocardium.

DISCUSSION

Numerous clinical, experimental, and hygienic studies indicate that pesticides are chemical agents that have a cardiotoxic effect and can affect the prevalence and structure of cardiovascular morbidity [5, 12, 14]. The results of a microscopic examination of the heart of rat pups during lactation

when mothers were exposed to both Kinmiks and Cotoran showed that pathomorphological changes in the structural elements of the heart manifested themselves in the form of edematous-dyscirculatory, dystrophic-degenerative and inflammatory-destructive phenomena, they were less pronounced and appeared locally.

Initially, the vessels of the microvasculature were subjected to pathomorphological changes [2,3], then the venous vessels, and, finally, the changes covered the arteries. At the same time, plethora, stasis and diapedesis hemorrhages were detected in the small vessels of the heart, which were accompanied by perivascular edema, swelling and disorganization of the connective tissue stroma [5,6].

According to the data of other authors [9, 10, 12], at the beginning of the experiment, dyscirculatory phenomena spread to the venous vessels in the form of their expansion and plethora, the development of perivascular edema and diapedesis hemorrhage, which are the result of the toxic effect of the pesticide, developing because of dyscirculation of the microcirculatory bed, toxic venous plethora and increased vascular permeability. An increase in the permeability of microvessels and vessels of the venous link was accompanied by the release of the liquid part of the blood into the vessel wall and the surrounding connective tissue. Subsequently, the quality and quantity of tissue fluid change with the redistribution of glycosaminoglycans, increased acidity and hydrophilicity of the tissue, which leads to the development of disorganization of both cellular and fibrous structures of the vascular-stromal tissue and manifests itself in the form of mucoid and fibrinoid swelling of fibrous structures. On microscopic examination, these disorganizational changes were manifested by edema, myxomatosis, and connective tissue fibrinoid. In the heart, the walls of blood vessels and perivascular connective tissue were initially subjected to these changes. Fibrinoid swelling of fibrous structures is accompanied by the appearance of alterative changes, against which an inflammatory and hyperplastic process develops [6, 9, 12].

In our observations, the inflammatory process reached its maximum by the 16th day of the study, manifesting itself as a perivascular and interstitial lymphohistiocytic infiltrate. The appearance of a proliferative infiltrate in the tissues indicates the development of chronic inflammation, which is of an autoimmune nature. It is known that the proliferation of lymphohistiocytic cells is often accompanied by the development of hyperplastic processes in the form of proliferation of initially granulation and then connective tissue and leads to thickening of the vascular-stromal interstitial stroma [4, 9].

CONCLUSION

The maximum increase in length, width and anteroposterior heart size observed from birth to 6th day and changes its location cranio-caudal direction. From the moment of birth until 21 days of age, the ratio of the relative weight of the heart to the body weight is reduced from 1.75% to 1.1%. There is a relationship between the coefficient of comparative changes in heart mass and body, as well as changes in heart shape and development of the chest.

Revealed the presence of specific patterns in the histological structure, comparative perfection of the structural elements of the atrial wall and ventricular dynamics control rats in early postnatal ontogenesis. The toxic effects of pesticides on the heart of rats demonstrated specific pathological morphological changes, that is, there was disorganization of fibrous structures in the wall of arterioles and capillaries, proliferation own connective cells and protein dystrophy muscle fibers of the myocardium, and loosening discomplexation of myofibrils violation of the nuclear-cytoplasmic ratio. It is proved that in the control infant rats, depending on their age periods, there are morphometric and histo topografic peculiarities particularly in the structural elements of all layers of the wall of the atria and ventricles of the heart.

However, it is proved and morphometric parameters significant reduction in atrial wall layers and ventricles in experimental animals as compared to controls. It was revealed that the cotoran and kinmiks, affecting the ultrastructural elements of the heart, lead to a change rate in myofibrils, violation of energy and metabolic processes that lead to necrobiosis in the mitochondria, disruption of the transport function of the endothelium and the inner layers of the walls of small blood vessels, resulting in the observed development of intracellular and intermediate tumor tissue.

Changes in ECG were characterized by the emergence of a variety of disorders of rhythm and conduction of the heart. In the later stages of the experiment in the myocardium were observed changes in the form of necrosis. Necrosis was reflected in the QRS complex.

Mathematical modeling, created to predict toxic myocarditis heart based on morphometric data, the coefficient β - the ratio of stroma and parenchyma infarction and mutual relations Scaled clinical symptoms

to diagnose and determine the extent of myocardial diseases.

Ethical clearance - All experimental studies were reviewed, discussed, and approved by the bioethical committee of the Ministry of Health of the Republic of Uzbeki- stan and fully complied with the terms of the 1986 Council of Europe Convention for the Protection of Animals.

Consent for publication - The study is valid, and recog- nition by the organization is not required. The author agrees to open publication

Availability of data and material - Available

Competing interests - No

Financing – No

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How to Cite: *Akhmedova S. M, Usmanov R. D., Mirsharopov U. M., Pulatov Kh. Kh., Sagdullaeva M. K., Nisanbayeva A. U. Experimental Toxic Myocarditis When Exposed to Pesticides // JESM 2023. Volume 2, Issue 1, P. 75-84*

PESTISIDLAR TA'SIRIDA TAJRIBAVIY TOKSIK MIOKARDIT

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Abstrakt

Dolzarbligi. Bugungi kunda yurak kasalliklarining etiologik sabablaridan biri bu toksik omil hisoblanadi. Hozirgi vaqtda qishloq xo'jaligida turli xil kimyoviy mahsulotlar qo'llaniladi. Hozirgi vaqtda butun dunyoda 1000 dan ortiq turdagi pestisidlar qo'llanilmoqda va ularning soni har yili ortib bormoqda.

Tadqiqot usullari. Erta postnatal ontogenez davridagi 205 oq laborator kalamushlarida o'tkazilgan tekshirish natijalari bilan ilmiy asoslangan. Umumiy gistologik, organometriya, morfometriya, skanerli elektron mikroskopiya, transmissiya elektron mikroskopiya, yurakning EKG kabi kompleks morfologik tadqiqotlarda foydalanilgan.

Natijalar. Yurak mikrotomirlarining tuzilishi va topografiyasining o'ziga xos xususiyati ularning kardiomiotsitlar orasida tarqalishi va kardiomiotsitlarning biriktiruvchi to'qima tolalarida xam kuzatildi.

Xulosa. Yurakning uzunligi, kengligi va oldingi-orqa o'lchamini maksimal o'sishining eng yuqori ko'rsatkichi 6-kunda kuzatildi va uning joylashuvi kranio-kaudal yo'nalishda o'zgardi. Pestitsidlarning kalamushlarning yuragiga toksik ta'siri o'ziga xos patologik morfologik o'zgarishlarni ko'rsatdi, ya'ni arteriolalar va kapillyarlar devoridagi tolali tuzilmalarning dizorganizatsiyasi, miokardning biriktiruvchi hujayralari va mushak tolalari oqsil distrofiyasining ko'payishi va miokardning shishi, miyofibrillarning yadro-sitoplazmatik nisbatining buzilishi kabi o'zgarishlar bilan namoyon bo'ldi.

Kalit so'zlar: yurak, erta postnatal ontogenez, kardiomiositlar, bo'lmacha va qorinchalarning tolali tuzilishi.

ЭКСПЕРИМЕНТАЛЬНЫЙ ТОКСИЧЕСКИЙ МИОКАРДИТ ПРИ ВОЗДЕЙСТВИИ ПЕСТИЦИДОВ

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Абстракт

Актуальность. Очень часто одной из этиологических причин заболеваний сердца является токсический фактор. В настоящее время различные химические препараты используются в сельском хозяйстве. В настоящее время в мире используется более 1000 видов пестицидов и с каждым годом их количество увеличивается.

Методы. Исследования научно обоснованы результатами обследований, проведенных на 205 белых лабораторных крысах в раннем постнатальном онтогенезе. В комплексе морфологических исследований, включающих в свой состав общегистологические, гистохимические методы, органометрию, морфометрию, сканирующую электронную микроскопию, просвечивающую электронную микроскопию, ЭКГ сердца.

Полученные результаты. Структурные изменения происходят за счет роста организма. Особенностью строения и топографии микрососудов сердца является их распределение по ходу кардиомиоцитов и связь с волокнистыми соедини-тельнотканными структурами кардиомиоцитов.

Заключение. Токсическое действие пестицидов на сердце крыс проявлялось специфическими патологическими морфологическими изменениями, а именно дезорганизацией волокнистых структур в стенке артериол и капилляров, пролиферацией собственных соединительнотканных и белковых дистрофий мышечных волокон миокарда, разрыхлением дискомплексов.

Ключевые слова: сердце крысы, постнатальный онтогенез, кардиомиоциты, фиброзная структура предсердий и желудочков.