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ANALYSIS OF RESEARCH RESULTS: REACTIVE CHANGES IN THE NERVOUS STRUCTURES OF THE LIVER IN MAMMALIAN ANIMALS WITH DIFFERENT FEEDING PATTERNS IN EXPERIMENTAL CHOLESTASIS

Shodiyarova D.S.,
Boykuziev Kh. Kh.,
Ortikova Y. O.
Samarkand State Medical University, Samarkand, Uzbekistan

Abstract
The article analyzes the results of scientific research devoted to the study of reactive changes in the nervous structures of the liver in mammals with different types of nutrition. 10 mature rabbits and 10 dogs were used for the experiment. The experiment was carried out by ligating the common bile duct of animals. The material after slaughtering is fixed in 12% neutral formalin. Histological sections were impregnated using the Bilshovsky-Gross and Karnovsky-Roots method. Adrenergic nerve structures were revealed by incubation of cryostatic sections in a 2% solution of glyoxylic acid according to the method of VNShchvalev and NIZhuchkova (1979) and described under a lumensense microscope LUMAM-I2.

Keywords: Type of nutrition, mammalian liver, changes in nervous structures in cholestasis syndrome.

TADQIQOT NATIJALARI TAHLILI: OZUQA TURI HAR XIL BO`LGAN SUT EMIZUVChI HAYVONLAR JIGARI NERV TIZIMINING EKSPERIMENTAL XOLESTAZ HOLATIDAGI REAKTIV O`ZGARIShLARI

Shodiyarova D.S., Boyquziev X.X., Ortikova Yu.O.
Samarqand davlat tibbiyot universiteti, Samarqand, O`zbekiston

Ushbu maqolada ozuqa turi har xil bo`lgan sut emizuvchi hayvonlar jigari nerv tizimining eksperimental xolestaz holatidagi morfologik o`zgarishlari o`rganilgan ilmiy adabiyotlar tahlil qilingan. Tadqiqot uchun etuk yoshdagi o`txo`r sut emizuvchi hayvonlar jigari (quyonlar) 10 ta va go`shtxo`r sut emizuvchilar jigari (itlar) 10 ta olinib o`rganildi. Xolestaz sindromi hayvonlarda umumiy o`t yo`li bog`lab qo`yish usulida madellashtirildi. Olingan material 12 % li neytral formalinda qotirildi. Gistologik kesmalar Bilvshovskiy-Gross va Karnovskiy-Ruts usullarida imegregnasiya qilindi. Adrenergik nerv tolalari esa V.N.Shvalev va N.I.Juchkova (1979) usulida

glioksil kislotasining 2 % li eritmasida ishlov berib, LYuMAM-I2 lyumenissent mikroskopida o`rganildi. Tadqiqot natijalari tahlili shuni ko`rsatadiki, ozuqa turi har xil bo`lgan sut emizuvchi hayvonlar jigari nerv tizimi eksperimental xolestaz holatida o`ziga xos turli darajadagi destruktiv va morfometrik o`zgarishlar aniqlandi.

Kalit so'zlar: Ozuqa turi, sut emizuvchilar jigari, nerf tizimining xolestaz holatidagi o'zgarishlar

АНАЛИЗ РЕЗУЛЬТАТОВ ИССЛЕДОВАНИЕ: РЕАКТИВНЫЕ ИЗМЕНЕНИЕ НЕРВНЫХ СТРУКТУР ПЕЧЕНИ У МЛЕКОПИТАЮЩИХ ЖИВОТНЫХ С РАЗЛИЧНЫМ ХАРАКТЕРОМ ПИТАНИИ ПРИ ЭКСПЕРИМЕНТАЛЬНОМ ХОЛЕСТАЗЕ

Шодиярова Д.С., Бойкузиев Х.Х., Ортикова Ю.О.
Самаркандский государственный медицинский университет, Самарканд, Узбекистан

В статье проведен анализ результатов научных исследований посвященной изучение реактивных изменений нервных структур печени у млекопитающих с различным характером питании. Для эксперимента использован 10 половозрелых кроликов и 10 собак. Эксперемент проведен путем перевязки общего жёлчного протока животных. Материал после забоя фиксирован в 12 % нейтральном формалине. Гистологические срези импрегнирован по методу Бильшовского-Гросса и Карновского-Рутса. Адренергические нервные структуры выявлены путем инкубации креостатных срезов в 2 % растворе глиоксиловой кислоты по методу В.Н.Щвалева и Н.И.Жучковой (1979) и описан под люменисцентным микроскопом ЛЮМАМ-И2. Анализ результатов исследование показал, что нервных структурах печени у млекопитающих с различным характером питании при экспериментальном холестазе отмечается реактивные изменение различной степине которые имеет харктерные морфологические и морфометрические особенности.

Ключевые слова: Тип питании, печень млекопитающих, изменение нервных структур при синдроме холестаза.

The importance of the nervous system in controlling and coordinating the activities of the body's internal organs is very important. In the scientific literature, the creation of the neuron theory, the autonomic nervous system, their structural composition, intramural nerve tangles, the structure of adrenergic and cholinergic nerve fibers and

their morphofunctional changes under various experimental effects are described.[1,2,3,9,11,12,14,18]. In recent years, the literature describing the stages of prenatal and postnatal development of the vegetative nervous system and the processes of its formation has been published [4,5,6,7,8,15,16,17]. Among the digestive organs, the liver has a very complex structure and performs various functions. Therefore, the study of the mechanism and morphological bases of the nervous control of liver activity is of particular interest to researchers [10,13,19,20]. However, in the course of such complex biochemical processes in the liver, the specific structure and morphology of the control system, especially the changes or adaptations to various external and internal influences, cannot be considered sufficient. Therefore, we aimed to study the morphology of the nervous system of the liver of mammals fed different types of food in the state of experimental cholestasis.

Goals and Objectives:

Study of the morphology of the nervous system of the liver of mammals with different types of food in the state of experimental cholestasis.

Study Object and Methods:

For our study, 10 rabbits and 10 dogs of mature age were taken and cholestasis syndrome was modeled in them. Cholestasis syndrome in experimental animals was modeled by the method of ligation of the common bile duct. Observation was carried out in short term (5 days) and long term (20 days). The material obtained from the animals was frozen in 12% formalin. For the study of nerve elements, histological sections were impregnated in a silver nitrate salt solution using the Bilshovsky-Gross and Karnovsky-Rutz methods. Adrenergic nerve fibers were processed in a 2% solution of glyoxylic acid by the method of V.N.shchvalev and N.I.Juchkova, and studied under a LUMAM-I2 fluorescent microscope. The obtained data were analyzed and appropriate conclusions were drawn.

Analysis of Research Results:

2.2. Morphology of the nervous system of the liver of rabbits in the state of experimental cholestasis.

In the case of experimental cholestasis, a number of morphological changes can be observed in the nervous system of the liver of rabbits. Including: significant changes appear in the adrenergic nervous system of the liver of rabbits in the near term of experimental exposure. This consists of changes such as a decrease in the level of radiation in adrenergic nerve fibers, the appearance of parts with different levels of

radiation in individual nerve fibers, a decrease in the density of adrenergic nerve fibers in the liver capsule and parenchyma. In the near term (5 days) of experimental cholestasis, in Glisson's capsule of rabbit liver, in the large bundles of adrenergic nerve fibers located along the wall of large blood vessels, individual fibers with unclear borders and low level of radiation or clear borders with high levels of radiation can be seen. sometimes,

The density of location of adrenergic nerve fibers in the capsule of the liver of rabbits is slightly reduced in the near term of experimental cholestasis compared to that of control rabbits, that is, this indicator is equal to 13.60±1.40 in experimental rabbits, and 15.6±2.40 in control rabbits (in one field of view of the microscope).

In the near term of the experiment, the density of adrenergic nerve fibers in the parenchyma of the liver of rabbits is on average 2.42±0.34, while in control rabbits it is 3.15±0.41.

In the short term of experimental cholestasis, the appearance of fibers or individual parts with different levels of radiation is the result of the distribution of mediators in adrenergic nerve fibers, i.e., fluorogenic amines in different amounts. This depends on the functional state of the organism or the activity of the immune system.

Many destructive changes can also be observed in the cholinergic nervous system of the liver of rabbits during the short term (5 days) of experimental cholestasis.

These changes are manifested in a decrease in the level of detection of cholinergic nerve fibers, a different distribution of mediators in the fibers, and similar morphological appearance. The appearance of such a state can be explained as a consequence of the decrease in the sensitivity of cholinergic nerve fibers to acetylcholinesterase as a result of the experimental effect. Cholinergic nerve fibers with high acetylcholinesterase activity stain very well and the fibers appear sharp. In the fibers with low activity of acetylcholine esterase, the staining is slow, the border of the fibers is not clearly visible, and as a result, fibers with varying degrees of staining appear. Cholinergic nerve fibers are scattered along the blood vessels of the liver capsule in the form of large bundles. These tufts do not form a type around the blood vessels.

These are definitely the nerve endings in the liver capsule, that is, the receptors. In the near term (5 days) of the experiment, the density of cholinergic nerve fibers in the capsule of the liver of rabbits slightly decreases compared to that of the control rabbits, i.e., this indicator is 15.44±1.20 in the experimental rabbits, and 19.64±2.12 in the control rabbits. In the near term of the experiment (5 days), we see that the density of cholinergic nerve fibers in the liver parenchyma of rabbits is 4.36±0.34, while in control rabbits, this indicator is 6.45±0.71.

In the long (20 days) period of experimental cholestasis, the destructive changes of adrenergic nerve fibers in the liver of rabbits deepen.

This situation manifests itself in the form of destructive changes, such as a sharp increase or decrease in the level of light emission in individual fibers, an increase in the density of adrenergic nerve fibers, the appearance of vascular expansions in individual fibers, or the resulting division of the broken parts of some fibers (a state of fragmentation).

In the long term (20 days) of experimental cholestasis, the density of adrenergic nerve fibers in the liver capsule of rabbits is on average 18.4±1.72 and that of control rabbits is 15.60-2.40. In the liver parenchyma of rabbits, this indicator is equal to 3.96±0.53 or in control rabbits, it is 3.15±0.41.

In the long term (20 days) of the experiment, it is possible to see the deepening of many morphological changes in the cholinergic nervous system of the liver of rabbits. These changes are manifested in the form of non-uniform distribution of acetylcholinesterase in nerve fibers, varicose expansions or breaks (parts of degeneration) in individual fibers. In the long term of the experiment, the density of cholinergic nerve fibers in the liver capsule of rabbits is 18.56±1.24. In the liver parenchyma, this index is 6.64±0.84. The increase in the density of cholinergic nerve fibers in the long term of the experiment is the result of an increase in the degree of identification of fibers due to an increase in the activity of acetylcholinesterase.

Thus, morphological and morphometric changes in the liver of rabbits deepen in the course of experimental exposure. If during the short term (5 days) of the experimental cholestasis, morphological changes such as swelling, destructive changes in the walls of blood vessels and bile ducts, necrobiosis, granular necrosis, and granular protein dystrophy occur in the tissues, while in the long term of the experiment, along with the above-mentioned changes, the increase in fibrotic tissues occurs. observed. Condensation of blood and bile fluid is observed in the liver of experimental animals, that is, in the portal and bile production system. Hepatic veins, thickening of bile ducts, The increase of intercellular connective tissue and the formation of collagen fibers within the cells and other similar morphological changes indicate that the signs of cirrhosis appear in the liver of rabbits during the long (20 days) period of experimental cholestasis. This indicates the need for immediate treatment of patients with cholestasis and prevention of this condition.

2.4 Morphology of dog liver nervous system in experimental cholestasis.

Cholestasis causes several morphological changes in the liver nervous system of dogs. In particular, we can see specific changes in the adrenergic nervous system. Such

changes are manifested in adrenergic nerve fibers in the form of fibers with a sharp difference in the level of light emission or the appearance of separate parts, in the case of varicose expansions or disconnection (separation into fragments) in separate nerve fibers, and other similar changes.

In the large bundles of adrenergic nerve fibers located along the wall of large blood vessels in the capsule of the liver of dogs, it is possible to meet separate fibers or individual parts with a clearly defined border or a sharp difference in radiation levels. Such a situation means that the distribution of mediators (fluorogenic amines) in adrenergic nerve fibers is not the same. In some cases, fibers branching from large bundles towards the vascular wall or capsular tissue terminate by forming dilations near the vascular wall or in the capsule wall. In these expansions, we can see that the radiation level is several times higher than in the pre-terminal fibers.

In the short term of experimental cholestasis, the density of adrenergic nerve fibers in the liver capsule of dogs decreases, that is, it is equal to 11.42±0.64. This indicator is equal to 1.55±0.12 in the liver parenchyma of dogs. The appearance of such morphological and morphometric changes is a reaction of the organism as a result of activation of the immune-adaptive system in relation to the experimental effect.

A number of morphological changes can also be seen in the cholinergic nervous system of the liver of dogs in the short term of the experimental exposure. For example, fibers with high activity of acetylcholinesterase stain well and have clear borders and a dark brown color. As a result, large bundles of cholinergic nerve fibers contain fibers with different levels of staining. Large bundles of cholinergic nerve fibers are located in the liver capsule along the wall of large blood vessels or in the capsule wall separately from blood vessels. The bundles of cholinergic nerve fibers do not form a net around the blood vessels. From these large bundles, the fibers that separate into the vascular wall or the capsule wall divide into two (dichotomously) and end up forming different-shaped expansions. Some of these extensions are flat plate-like, some are sausage-shaped and have varying degrees of coloring. These structures are nerve endings in the liver capsule, that is, receptors. In the short term (5 days) of experimental cholestasis, the density of cholinergic nerve fibers in the liver capsule of dogs is equal to 13.36±0.47, and this indicator is equal to 2.28±0.33 in the liver parenchyma of dogs.

In the long term (20 days) of the experiment, the changes in the adrenergic nerve fibers of the liver of dogs become even more complicated. In adrenergic nerve fibers, large bundles or fibers with different levels of radiation appear in the perivascular meshes. The location density of adrenergic nerve fibers increases, that is, the degree of detection is high. We see the formation of varicose veins in large bundles of

adrenergic nerve fibers, perivascular networks, or individual fibers separated from these large bundles, or in some cases, destructive changes such as the breaking of fibers (separation into fragments). the location density is equal to 18.35±0.42, and this indicator is equal to 3.46±0.35 in the liver parenchyma of dogs,

During the long (20 days) period of experimental cholestasis, significant morphological changes are also observed in the cholinergic nervous system of the liver of dogs. These changes are manifested in the form of destructive changes, such as non-staining of cholinergic nerve fibers, i.e. distribution of mediators in them to a different degree, the appearance of individual fibers with varicose veins in large bundles, or the formation of broken parts (necrosis) in individual fibers.

In the long term of the experiment, the density of cholinergic nerve fibers in the liver of dogs is equal to 14.26±0.15 and in the parenchyma, this indicator is equal to 2.85±0.22.

In other words, the activity of acetylcholinesterase in cholinergic nerve fibers increases in the long term of the experiment, and as a result, the degree of detection of fibers also increases. This indicates an increase in the density of cholinergic nerve fibers.

The location density of adrenergic and cholinergic nerve fibers in the state of experimental cholestasis of the liver of lactating animals with different types of food.

Table #1.

	Experimental animals	Rabbits		Dogs	
		capsule	parenchyma	capsule	parenchyma
Adrenergic nerve fibers	Control animals	15.6±2.40	3.15±0.41	13.38±1.12	1.56±0.18
	Cholestasis 5 days	13.60±1.40	2.42±0.34	11.42±0.64	1.55±0.12
	Cholestasis 20 days	18.4±1.72	3.96±0.53	18.35±0.42	3.46±0.35
Cholinergic nerve fibers	Control animals	19.64±2.12	6.45±0.71	15.10±0.34	2.85±0.14
	Cholestasis 5 days	15.44±1.20	4.36±0.34	13.36±0.47	2.28±0.33
	Cholestasis 20 days	18.56±1.24	6.64±0.84	14.26±0.15	2.85±0.22

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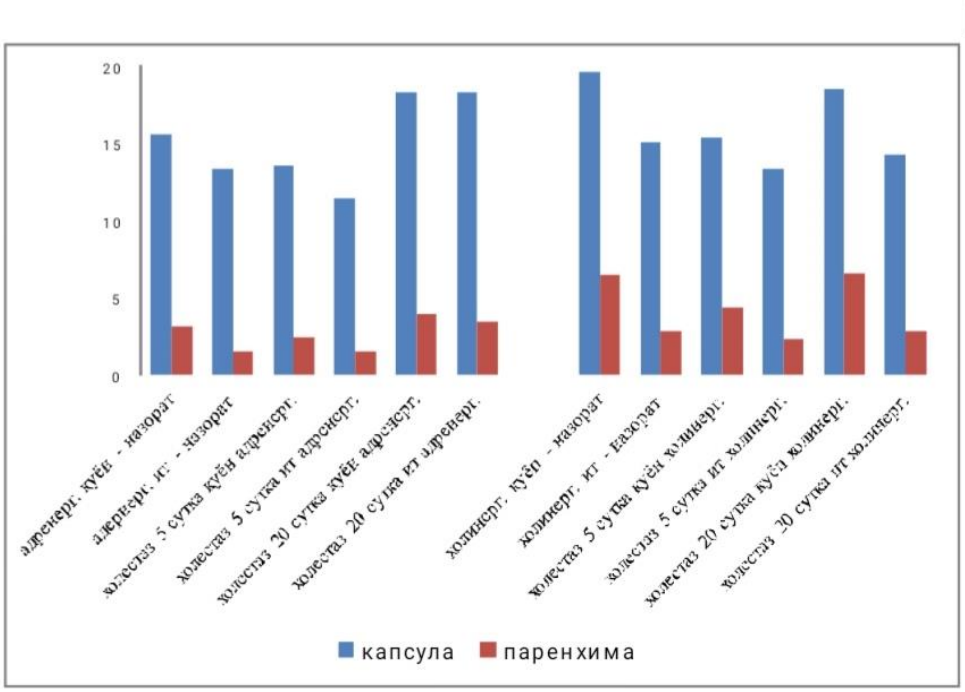
Histogram of the location density of adrenergic and cholinergic nerve fibers in the state of experimental cholestasis of the liver of lactating animals with different types of food.

Histogram #1.



Summary

Thus, the data obtained during the study of preparations prepared from the liver of experimental animals in the state of experimental cholestasis, that is, pathological changes in the general structure of the liver or in the nervous system at various levels, show the need to treat patients in this state and implement measures to prevent the state of cholestasis. In this regard, based on the results of this research, the necessary proposals and recommendations have been made and their implementation is planned.

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