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THE EFFECT OF POLAREN ON THE MORPHOMETRIC PARAMETERS OF THE KIDNEYS IN CHRONIC ALCOHOL INTOXICATION

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ПОЛАРЕННИНГ СУРУНКАЛИ АЛКОГОЛ ЗАҲАРЛАНИШИДА БУЙРАК МОРФОМЕТРИК КЎРСАТКИЧЛАРИГА ТАЪСИРИ

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ВЛИЯНИЕ ПОЛАРЕНА НА МОРФОМЕТРИЧЕСКИЕ ПОКАЗАТЕЛИ ПОЧЕК ПРИ ХРОНИЧЕСКОЙ АЛКОГОЛЬНОЙ ИНТОКСИКАЦИИ

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Резюме. *Мақолада сурункали алкоголизмдаги буйрак нефрониниг морфометрик кўрсаткичларига таъсири ва овқатга фаол қўшимча сироп поларен билан коррекция қилиш натижаларининг қиёсий таҳлили келтирилган. Овқатга биологик фаол қўшимча сироп поларен билан коррекция қилинган эксперимент гуруҳидаги каламушларда морфологик параметрлари назоратга яқин бўлиб, бу "поларен"нинг детоксикация қобилиятини аниқлашга имкон беради. Шу билан бирга, бу гуруҳдаги каламушлар морфометрик кўрсаткичлари назоратга яқинлашади, аммо асл ҳолатига қайтмайди.*

Калит сўзлар: *алкогол, буйраклар, поларен, буйрак паренхимаси, капсула қалинлиги, пўстлоқ моддаси, мағиз моддаси.*

Abstract. *The article presents a comparative analysis of morphometric parameters of renal nephron in chronic alcoholism and correction with biologically active food additive polarena syrup. In the group of animals, when corrected with a biologically active food additive polaren, the morphological parameters of the animals are close to the control ones, which makes it possible to identify the detoxification abilities of polaren. At the same time, morphometric indicators are approaching the control ones, but on a limited scale. Keywords: alcohol, kidneys, polaren, renal parenchyma, capsule thickness, cortical substance, medulla.*

Key words: *alcohol, kidneys, polaren, kidney parenchyma, capsule thickness, cortical substance, brain matter.*

Introduction. At the present stage, the study of the mechanisms of the influence of alcohol on the human body, as well as the likelihood of irreversible changes in the functioning of the human body with regular consumption of large doses of alcoholic beverages is a popular topic of scientific research. In this regard, the study of the problem of the influence of alcohol on the human body is very relevant today. The progress of civilization should be associated with the spiritual self-improvement of people, with the rejection of the absolutization of material values and the revival of harmony between man and nature in the spirit of the best achievements of the people. The imbalance in human relations with nature is the root cause of all diseases of civilization. Modern civilization is characterized by a significant increase in the number of diseases, which are based on the perverted inclinations of the individual. These include tobacco smoking, alcoholism, drug addiction, substance abuse, AIDS, hepatitis and others [9, 11,12,13,14].

Alcohol, one of the many factors that can disrupt kidney function, can disrupt their work as a result of acute or chronic use. Excessive alcohol consumption can have a profound negative impact on the kidneys and their function of maintaining fluid, electrolyte and acid-base balance in the body, making people who drink alcohol vulnerable to a variety of kidney-related health problems. However, despite the clinical importance of alcohol's effects on the kidneys, relatively few studies have been conducted re-

cently aimed at characterizing them or clarifying their pathophysiology. It is hoped that future research will focus on this important subject area. [4,7,8,10,15]

Materials and methods. In the experimental study, white laboratory rats (of both sexes) were used, in the number of 264 individuals at various periods of postnatal ontogenesis (in newborns, 1, 3, 6 and 12 months of age) based on the division of age periods (Zapadnyuk, 1983) to identify the dynamics of changes in the morphometric parameters of the structural elements of the kidney of rats in postnatal development.

1 month sexually mature infantile (the period of the appearance of secondary sexual characteristics)

3 month sexually mature juvenile (capable of reproduction) 6 month reproductive young animal (active reproduction)

12 months reproductive mature (extinction period)

All laboratory animals were divided into 3 groups: - control group - laboratory animals weighing 250-300 g contained only in the general vivarium standard diet, which were injected intragastrically through a probe with 1 ml of distilled water once a day for 30 days at 2, 5 and 11 months of age of rats (n=30). - experimental group - laboratory animals weighing 250-300g was subjected to forced chronic alcohol intoxication in the first half of the day by injecting into the stomach with a special metal probe a 10% aqueous ethanol solution at a dose of 10 ml / kg of weight (Abel, 1984, Henderson, 1995) daily,

A) for 3-month-olds starting from the age of 2 (61 days) months,

B) for 6-month-olds from the age of 5 months (151 days)

C) for 12-month-olds from the age of 11 months (331 days);

- comparison group - laboratory animals who, after forced chronic alcohol intoxication by injection into the stomach with a special metal probe in the afternoon, received: biologically active food additive polaren syrup at the rate of 10 ml / kg of weight.

A) for 3-month-olds starting from the age of 2 (61 days) months,

B) for 6-month-olds from the age of 5 months (151 days)

C) for 12-month-olds from the age of 11 months (331 days);

Experimental animals were kept under normal conditions. Feeding of animals of both experimental and control groups was the same. The experiments were carried out in accordance with the rules of humane treatment of animals, which are regulated by the "Rules for carrying out work using experimental animals" approved by the Ethics Committee of the Bukhara Medical Institute named after Abu Ali ibn Sina (No. 18 of 16.01.2018), and were also based on the provisions of the Helsinki Declaration of the World Medical Association of 1964, amended in 1975, 1983,1989, 2000, 2002, 2004, 2008, 2013 years.

After 30 days of forced chronic alcohol intoxication, laboratory animals were humanely killed, then autopsies were performed. During the killing and autopsy of laboratory animals, the rules of biological safety and ethical principles of working with laboratory animals were observed [2].

Animals were weighed. The baby rats were removed from the experiment by decapitation under light ether anesthesia. The kidneys were weighed, their absolute and relative mass were calculated. The organ samples were fixed in 10% neutral formalin. After fixation, the material was passed through alcohols of increasing concentration and poured into paraffin.

Transverse-median paraffin sections of the kidney with a thickness of 3-5 microns were stained with hematoxylin and eosin, Van ginzon. Morphometry of renal corpuscles was performed using an eyepiece micrometer DN-107T/ Model NLCD-307B (Novel, China).

For the pathomorphological analysis of the structural components of the kidneys in rats (control, experimental and correction group), the following parameters were determined on paraffin sections:

- The thickness of the kidney capsule at the levels of the upper, lower poles and gates of the kidneys in microns.;
- • The diameter of the glomerulus, the thickness of the Shumlyansky -Bowman capsule, the width of the lumen of the proximal, distal and collecting tubules in microns were studied.
- The parameters of the microvessels of the kidneys were determined: the inner diameter, wall thickness of the arc, interlobular artery, as well as the same parameters of the microvessels of the nephron of the adducting and diverting arterioles.
- Revealed the nuclear-cytoplasmic ratio of epithelial cells in the proximal and distal tubules of the kidneys in a mesh mounted in an eyepiece consisting of 100 nodal points.

Results and discussions. It is known that among the organs that ensure the preservation of the relative constancy of the internal environment, the kidneys play the most significant role in detoxification of the body. Removal of the end products of metabolism from the body (glomerular filtration, reabsorption, active secretion) is carried out by highly specialized structural and functional units of the kidney - nephrons.

The growth rate of the thickness of the kidney capsule of rats from the newborn period to 12 months of age in the upper and lower poles is 1.6 at the gate 1.5 times. The thickness of the cortical substance in the upper pole of the kidneys is 1.3, at the gate 1.6 and at the lower pole 1.8 times. The growth rate of

brain matter by the age of 12 months in the upper pole and the gate of the kidneys is 1.2, in the lower pole 1.4 times in relation to the newborn age.

It is impossible not to agree with the data of E.Ch. Mikhalchuk, Ya.R. Matsyuk (2005), where the author notes the intensive growth of morphometric parameters of the kidneys is normally observed up to 3 months of age, which is confirmed by a progressive increase in kidney mass, the width of the cortical substance.

The highest rate of increase in the thickness of the kidney capsule in the upper pole was observed at 3 months of age by 13.0%, at the kidney gate by 12.1% and at the lower pole by 13.7% at 1 month of age. The rate of increase in the thickness of the cortical substance of the kidneys in the upper pole of the kidneys is (11.3%) at the gate of the kidneys (18.4%) in the lower pole (23.2%). In the cerebral layer of the kidneys, the highest growth rate was observed in the upper (7.5%) and lower pole (15.6%) by 1 month of age, at the gate of the kidneys (11.5%) at 3 months of age. According to V.M.Shcherbakov (2016), the maximum morphological changes were observed in the proximal tubules of the kidneys, the minimum — in the structures of the renal corpuscles. Morphological changes appear early in the distal tubules of the nephron, and with prolonged alcoholemia — first in the renal corpuscles and subsequently in the proximal renal tubules. According to Kurzin L.M. (2012), the dynamics of morphological changes of the kidneys in the aging process of the body was studied. Stable involutive morphological parameters of human kidneys with quantitative characteristics have been identified. The author justified the principles of selection of quantitative indicators of kidneys, promising in terms of expert determination of biological age.

Morphometric parameters of the kidneys of the experimental group when comparing the results with the control group, the greatest increase in the thickness of the kidney capsule is noticeable at the lower pole at 3 months of age by 27.9% at the upper pole by 22.2% and the smallest at the kidney gate by 18.8%.

The greatest increase in the thickness of the cortical layer was observed in the lower pole of the kidneys by 15.8% and a slight increase at the gate of the kidneys by 6.4%. In the cerebral layer of the kidneys, the greatest increase was noted in the upper by 9.6%, during puberty by 3 months of age, in the lower pole by 21.2% at 6 months at the gate of the kidneys by 12.9%. At the 12-month age of postnatal development, the thickness of the capsule at the kidney gate increased by 16.2%, the thickness of the cortical substance in the upper pole of the kidneys and the medulla in the lower pole by 18.1%. When exposed to ethyl alcohol, the morphometric parameters of the kidney parenchyma change both in the cortical and medulla area (V.V. Sheludko 2013).

During the experiment, the effectiveness of the use of the biological active additive pollarena for the correction of disorders occurring in the kidney as a result of exposure to ethanol was investigated.

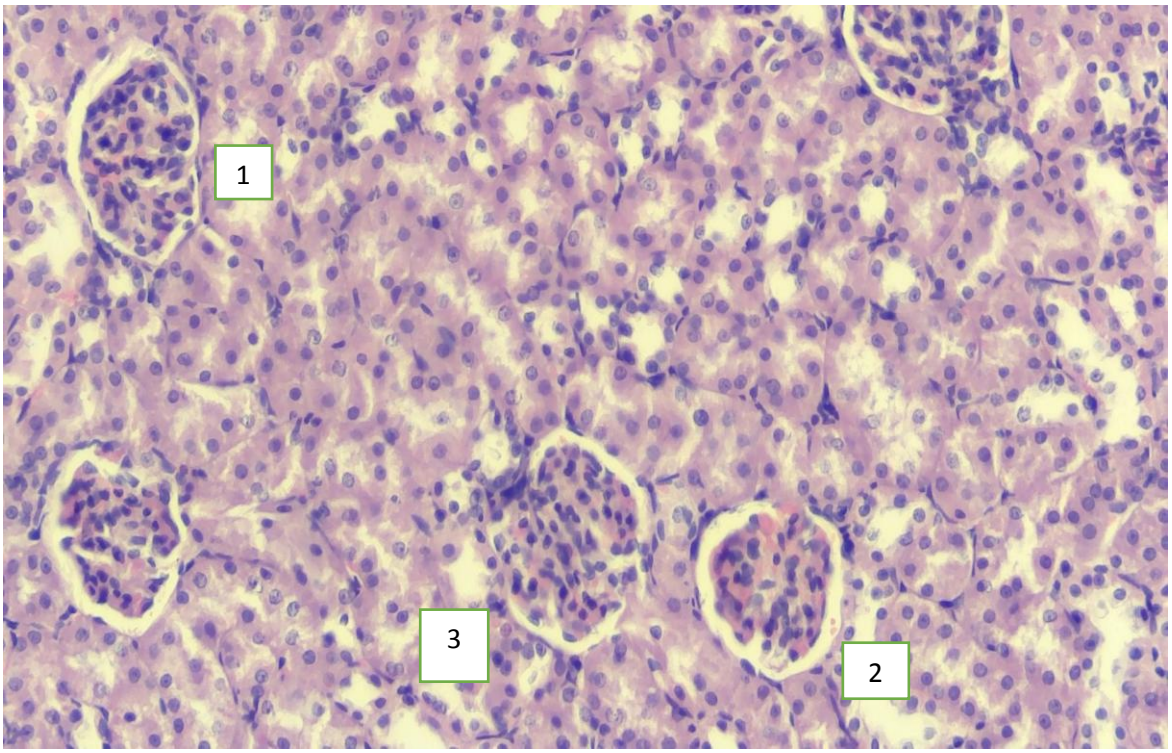
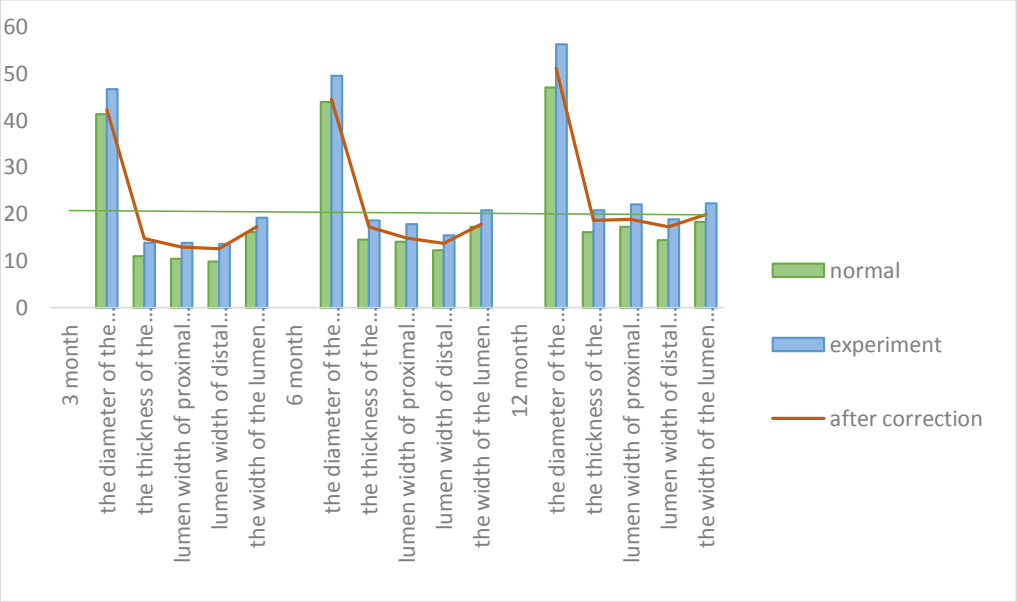


Fig.1. The structure of kidney nephrons in rats of a 12-month-old rat of the experimental group. 1- the kidney capsule, 2- the outer leaf of the capsule, 3- the renal body. Staining with hematoxylin – eosin. Approx. 10 x 20 vol



At 3 months of age, the greatest decrease in the thickness of the capsule by 11.3% and the thickness of the cortical substance by 10.4% was observed in the lower pole of the kidneys in relation to the experiment, and the thickness of the medulla was noticeable in the upper pole by 10.2% compared to the gate and the lower pole of the organ.

In the group of animals, with the correction of the biologically active food additive polaren, the morphological parameters of the animals are close to the control ones, which makes it possible to identify the detoxification abilities of polaren.

At the same time, morphometric indicators approach the control ones, but on a limited scale. A more noticeable decrease in the thickness of the capsule by 11.3%, the cortical substance by 10.4% and the thickness of the medulla by 13.6% was found at 6 months of age compared with the experiment. By the age of 12 months, the capsule thickness decreases by 16.3% at the kidney gate by 21.3% and at the lower pole by 12.6%.

The study of the structure of the components of the nephron showed that the growth rate of the diameter of the glomerulus and the thickness of the Shumlyansky-Bowman capsule increases 1.8 and 2.3 times, respectively. The growth rate of the lumen width of the primary and secondary convoluted tubules increases from 2.2 to 2.6 times, respectively. And the growth rate of the proximal convoluted and collecting tubules of the kidneys of rats by 12 months of age increases 1.9 times in relation to newborn rats.

During the period of postnatal ontogenesis, the width of the lumens of the proximal, distal convoluted tubules increases, and the highest growth rate is 26.0% at 6 months of age compared to 3 months of age. The greatest rate of increase in the width of the lumen of the collecting tubules is revealed by 3 months of age by 26.9% compared to 1 month of age. The greatest growth rates of the diameter of the glomerulus by 3 months of age by 21.3% and the thickness of the Shumlyansky-Bowman capsule by 6 months of age by 24.6% relative to the applicant age. In our opinion, the greatest increase in the Shumlyansky-Bowman capsule and the lumen of the proximal, distal convoluted tubules is associated with the transition of rats to puberty. The experimental data obtained by us show that the micro anatomical parameters of the renal nephron increase in rats exposed to chronic ethanol intoxication in all age groups.

Comparative characteristics of changes in rat kidney nephron (Table 2)

The main changes in morphometric indicators are observed in 12 months of postnatal development of rats, the greatest increase in the diameter of the glomerulus, the thickness of the Shumlyansky-Bowman capsule and the collecting tubules of the kidneys is 19.8%, 29.1% and 25.9%, respectively.

Anatomical and functional features of nephrons can be assumed to reduce a number of morphofunctional capabilities of animal kidneys: as well as an increase in the diameter of the glomerulus, proximal and distal tubules of the nephron and a decrease in the filtration capacity of the kidneys, changes in the tubular apparatus (Antonova V.M., 2017). We believe that as a result of a violation of the filtration process, reabsorption, secretion, the damaged organ is unable to perform its function and this leads to a violation of the excretory function of the kidneys.

Conclusion. The data obtained allow us to conclude that chronic ethanol intoxication leads to a noticeable increase in the morphometric parameters of parts of the kidney nephron.At 12 months of age, the greatest deviation in the diameter of the glomerulus (19.8%), the thickness of the Shumlyansky-Bowman capsule (29.1%) and the collecting tubules (25.9%) occurs during the

experiment.The use of pollaren syrup slightly reduces the dilated lumen of the tubules, selectively affecting the morphometric parameters of the glomerulus and the nephron capsule.

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ВЛИЯНИЕ ПОЛАРЕНА НА МОРФОМЕТРИЧЕСКИЕ ПОКАЗАТЕЛИ ПОЧЕК ПРИ ХРОНИЧЕСКОЙ АЛКОГОЛЬНОЙ ИНТОКСИКАЦИИ

Хамроев И.С.

Резюме. *В статье представлен сравнительный анализ морфометрических показателей нефрона почек при хроническом алкоголизме и коррекции биологически активной добавкой к пище сиропом поларена. В группе животных при коррекции биологически активной добавкой к пище поларен морфологические параметры животных близки к контрольным, что позволяет выявить детоксикационные способности "поларена". В то же время морфометрические показатели приближаются к контрольным, но в ограниченном масштабе.*

Ключевые слова: *алкоголь, почки, поларен, почечная паренхима, толщина капсулы, корковое вещество, мозговое вещество.*