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MORPHOMETRIC INDICATORS OF THE HISTOLOGICAL STRUCTURES OF THE SPLEEN OF WHITE RATS IN IRON MICROELEMENTOSIS EVALUATION

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Abstract:
The article presents data on changes in the structural and functional state of the spleen of white rats with alimentary iron deficiency depending on age periods. The results showed that in alimentary iron deficiency, an increase in the relative area of connective tissue elements in this organ, a decrease in the morphometric parameters of lymphoid tissue, the number of lymphoid cells, and the level of expression of immunohistochemical markers were revealed. These changes mean a decrease in the immune response and a weakening of the body's defense capabilities. Morphofunctional changes in the spleen in alimentary iron deficiency manifest differently depending on the age periods of white rats, which contributes to a deeper understanding of the influence of alimentary factors on immune homeostasis.

Keywords: Alimentary iron deficiency, spleen, white rat, morphometric parameters, lymphoid tissue, immunohistochemistry, morphofunctional changes.

Introduction

The actuality. The immune system of the body provides protection and adaptation to the effects of the different factors. Immunokompetent members in maintaining the body's immunological gomeostaz plays an important role in experimental and clinical conditions [1].

Struktur Immunogenezning members immunomorfologiyada study of structures is relevant to them and changes the mechanism of the effect of the various factors and the study of these lines morfofunktsional member plays an important role. Going beyond this limit cases of congenital and gained undergone rise to the level of immune

deficiency, as well as modern high-precision technologies in using a new to be discovered for the study of the immune system associated with the limits and capabilities.

The spleen is one of the most complicated structure of the peripheral members of the immune system. A sufficient level of information about the structure of the spleen and one is not a contradiction to its structure, were conducted in laboratory animals for the study of different kinds of, mainly, to get the information later be associated with the human ekstrapolyasiya [4, 6, 8, 9, 10,11]

The balance of chemical elements in the human body is a necessary condition for the preservation of his health [3]. Also, the amount of micronutrients in the body's regulatory system, including tissue and immune system activity involved in keeping all the gomeostaz limfoid is important [2].

Iron (fe) is an essential element for all living cells, because in many metabolic processes, including dna synthesis and transkripsiya, is involved in the transportation of oxygen [7].

Iron is a part of the active transferrinning lymphocytes. Iron shortage is very common among the population mikroelementoz this produces various pathological processes in the body [5].

The purpose of the research and experimental white rats of different age in the period alimentar iron yetishmovchiligida talog'ining immunogistokimyoviy consists of the evaluation of morphological features.

Check materials and methods research was conducted in male rats without seed units 80 white. The rules of ethics on the use of animals in experimentation, Xelsinki the requirements of the congress will follow. Rats were kept in viva simple conditions. Experience in the laboratory of the animal's age, sex, weight, nutrition were kept correspond to the conditions in the environment. Two indicators to determine the structure of the spleen morfofunktsinal a group of animals was established. I group - normative (n=40); group ii – iron reach of rats given diet (n=40). For modeling a shortage of micronutrients German “Spezialfutter ALTROMIN gmbh & co. KG” prepared by the firm led to the use of a special feed. Special series no. feed 36/2024 have been provided with an official certificate. 2 sticks per day to rats in the control group were given the usual feed. Without special body weight in feed per day due to the experience of the group 2 sticks of 20 g, were used during the 24 weeks.

The experimental and control groups was removed from the experiment the rats under anesthesia without the white seed was dekapitatsiya and air. Divorced opened the abdominal cavity were separated. The part of the spleen in 10% formalin in fiksatsiya neytrallash am and after being washed in running water for 2-4 hours, which increased in concentration and spirtlar xloroform suvsizlantirildi, the wax block was prepared in accordance with generally accepted methods. Mkm wax blocks 4-6 thick cut down gematoksilin – eozin and van for your business, the method was painted. The spleen of drug structure struktur okulyar-check mikrometr morfometrik was using. The thickness

of the capsule of the spleen gate field, the diameter of trabekula, as well as limfoid follikul in germinativ the center of the diameter, the relative area of the white pulp (compared to the total area of the incision), the width of periarterial limfatik coupling feature of this joint was measured. Each of the five histological measurements in the view area of the incision was carried out. View of the area were selected on a random basis. The white pulp of the spleen structure struktur morfofunktsional follikulyar koeffitsent descriptive of condition (FC), germinativ follikulyar index (gf) and koeffitsent limfoid (LK) were determined as indicators (2). This was carried out on the basis of the following formula:

FC=(SOP×DLF)/200, here SOP – white pulp of the area relative

DLF – limfatik follikul in diameter, 200 – optional koeffitsent

Of gf=(dg I/DLF)×100 here, dg I – germinativ the center,the diameter of

DLF – limfatik follikul in diameter, 100 - optional koeffitsent

v) LK=DLF/LPALM here DLF – limfatik follikul in diameter, LPALM – width periarterial limfatik this joint coupling feature

In order to study the structure of the cells of the spleen limfoid, NOVELLA NLCD Model-

307 (China) using a microscope, pitches immersiya under structural qismalarida of the white pulp (periarterial limfatik this joint coupling feature germinativ center, the mantiya and marginal area)on the number of cells was counted. Okulyar installed to count the number of cells was carried out using a microscope to morfometrik November. Immunogistokimyoviy drugs (3-4 lived in mkm thick) Ben MarkXT Ventana (Switzerland) avtosteynerida was prepared. Cd3 gistotopografiyasini learn and process of the K-sensitive, 67, 1:100 diluted at a ratio of poliklonal antitanalar (Ventana, switzerland) were used in the case of roofing adhesive histological oynachalarida items (Ventana, Switzerland) was carried out. Immunohistokimyoviy antitanalar reactions was conducted according to manufacturer's protocol. The result of the reaction were assessed by counting cells stained positive 10x100 see enlarged ten times and results are expressed in percent was in the area.

Geese gusto obtained during the research and mathematical data processing sitomorfometrik Pentium IV personal computer with microsoft office Excel "7,0" practical directly through the software package was carried out.

The statistical processing of the survey data Strelkov (1986) were used without statement, parametrik variatsion was done using statistical methods. The significance of the difference in value compared Styudent t-were assessed using the criteria. Differences of $p \leq 0.05$ statistical significance is that it has a value of up to.

Results and Analysis

White rats in the control group consists of the outer side is covered with a capsule of connective tissue from talog'i. Trabekulalar from the capsule into the member there. Among Trabekulalar parenximasi spleen is located. Parenximasi member consists of

red and white pulp. Sinusoidal capillaries in the red pulp of the spleen and the strip. Many of the white pulp and periarterial limfoid follikul limfoid muftasi was founded.

The thickness of the capsule of rats 6 monthly gate field talog'i healthy 11,86±0,27 was to mkm. The average diameter of the proximal part Trabekulaning - 23,87±0,24 mkm to the distal part, while in average - 21,78±0,17 mkm is equal to. Check Morfometrik according to the results of, respectively, an average of the relative area of the white pulp and red - 71,39±0,42% and 22,18±0,71% is equal to. The red and white pulp in a ratio of 1:3,2 to make up. The connective tissue elements of the area relative to average - 6,42±0,17% accounted for. The width of the area of the white pulp of the spleen periarterial 88,76±1,14 mkm, limfoid follikul 422,46 diameter±11,14 mkm, the diameter of the reproduction center 137,24±3,32 determines that it is equal to mkm. Follikulyar koeffitsent 468,51 to limfoid koeffitsent while 4,75 equal.

The average thickness of the capsule -12,16 the field of laboratory animals talog'i monthly gate 9±0,14 is equal to. The average diameter of the proximal part Trabekulaning - 25,76±0,32 mkm to the distal part, while in average - 24,46±0,12 arranged to mkm (fig.1). The relative area of the white pulp and red respectively an average of the member - 72,81±0,64 % and 20,12±0,54 % is equal to. The red and white pulp in a ratio of 1:3,6 had. The connective tissue elements of the area relative to average - 7,06±0,14% accounted for (as compared to the total area of the spleen incision).

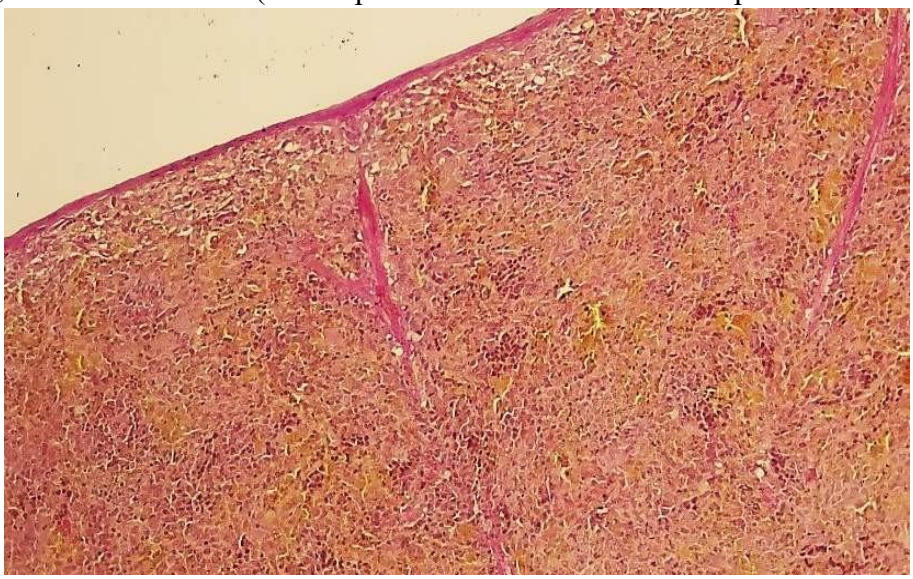

Figure 1. Spleen of a 9-month-old white rat in the control group. Painted according to the Van Gieson method. Ok. 10 x volume. 10. 1-spleen capsule, 2-trabecula.

The average width of periarterial area of the spleen - 83,94±1,22 mkm, limfoid follikul 416,14 diameter±9,21 mkm, the diameter of the reproduction center 129,12±2,82 was to mkm. Follikulyar koeffitsent 418,63 to limfoid koeffitsent while 4,95 equal.

Healthy white talog'ida of rats t-lymphocytes cd3 age 6 and 9, respectively, representing period ekspresiyasi level markyori monthly 31,56±1,18% and 25,46±1,02 % accounted

for. Ki-67 level corresponding to the period of the age of markyori ekspresiyasi without 9,86±0,64% and 6,14±0,46% equals determines that.

6 monthly in the amount of white pulp when analyzing the structure struktur limfositlar talog'i of laboratory animals, reproduction in the center of the average - 120,32±1,22 units, periarterial the average in the area - 102,18±1,24, mantiya in the field of average - 133,48±1,34 units, the average marginal area - 100,17±1,16 units, respectively. 9 month age period increased in rats while the average white in the center - 114,64±1,16 units, periarterial the average in the area

- 93,24±1,14 units, mantiya in the field of average - 126,63±1,18 units, the average marginal area - 92,96±1,12 aniklash than that is on the picture.2).

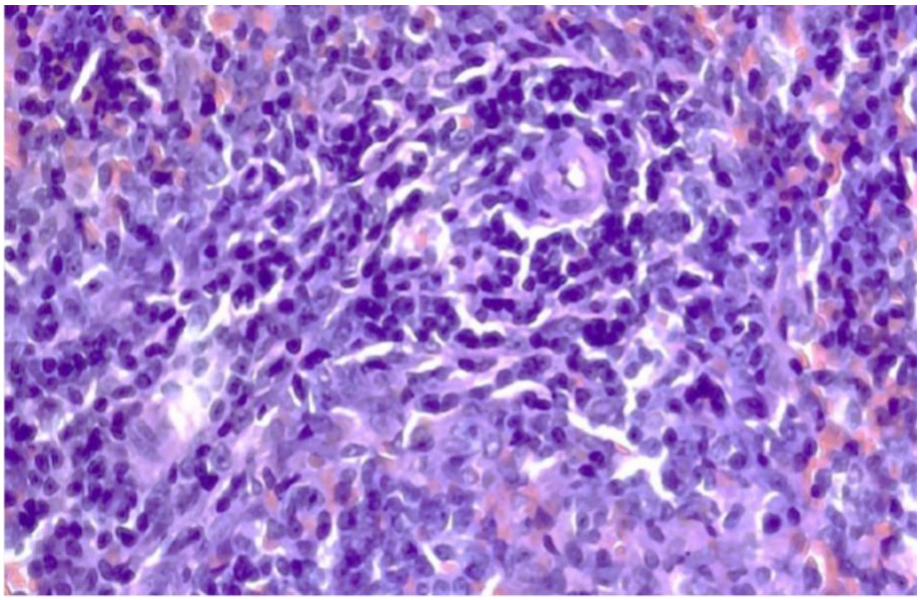

Fig.2. Spleen of a 9-month-old white rat in the control group. Stained with hematoxylin - eosin. Ok. 10 x volume. 40. 1-lymphocytes, 2-blood vessel

I am modeling in the group of rats without the white gate iron deficiency breed of white rats in the control group, the thickness of the capsule talog'i the field in comparison with 6-month age period of 4.2% and 9 respectively in the month age period 3,9 percent. The diameter of the proximal and distal part of the age of trabekulaning both times were determined to be due to the period without increased to 1,02. 2.5 percent white pulp of the area relative 6-month age period, 9-month age period, while 4.2% were observed to decrease. The width of this joint coupling feature of the monthly period in periarterial limfatik young 1,03 6 times, 9 times monthly in the period yosin 1,05 reduced. Follikul limfatik corresponding to the period for both age without 1,04 times, respectively, and to decrease the diameter of the center germinativ 1,02 1,03 times were determined.

Structures determines the functional state of the spleen in young limfoid follikulyar koeffitsent 1,06 times the monthly period 6, 9 1,08 young-month period in the times, reflecting the condition of the immune response determines the level of the reproduction

center gumoral germinativ-folliklyar young fit without changes in the period of the index sezilarsiz aniqlsndi. The ratio of t and b fields in size without becoming detected, indicating increased to age limfoid koeffitsent 1,01 times during this shortage of iron in the spleen T-and the negative effects of immune lavobni hulayraviy means that the sphere would be reduced. White seed of the white pulp of rats for 6 months without talog'i germinativ center, periarterial limfatik this joint coupling feature, and the number of lymphocytes in the marginal areas mantiya the breed you're white rats in the control group respectively, in comparison with 2,4%, 3,9%, 4,0% and 5.3%, 9 month age period and fit while in case of 2,6%, by 6.8%, 4,7 and content by 6.7% respectively.

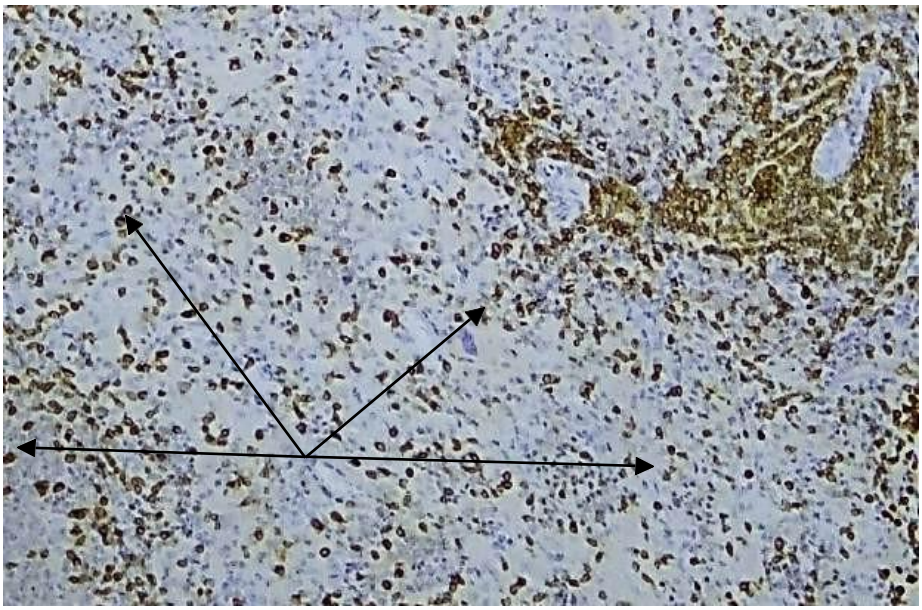

Fig.3. Spleen of a 6-month-old white rat in the group of alimentary Fe deficiency. Immunohistochemical reaction with a specific antibody to the CD3 marker. Ok. 10. Ob. 10. 1 - CD3-positive cells. The degree of expression is 28.54%.

Level 6 monthly period of white rats in the experimental group talog'ida cd3 markyori ekspresiyasi young 3,0% (fig.3) and 9 monthly in the period of young 4,3%, ki-67 level corresponding to the period of the age of markyori ekspresiyasi without 3,2% and 2.1% of the reduction will determine by.

Conclusion. In the spleen of white outbred rats with a simulated alimentary iron deficiency, an increase in the thickness of the capsule and trabecula, a significant reduction in the area of the white pulp, and a decrease in the diameter of the periarterial lymphoid clutch, lymphoid follicles, and germinal centers were observed. A decrease in the level of expression of the follicular and lymphoid coefficients, the number of lymphocytes in the components of the white pulp, as well as markers CD3 and Ki-67, indicates a decrease in the immunological reactivity of the organ associated with T-cell activity. This creates an important scientific basis for assessing the age-specific

dynamics of immunomorphology of the spleen and a deeper understanding of immune changes arising from iron deficiency.

References

1. V Babichev.N. Sistem neyroendokrinnoy of organizasiya I funktsionirovanie // problem in a matter of endokrinolog. – 2013; 59 (1). – S. 62-69.
2. Gorchakova O.V., Kolmogorov, Yu.P., V Gorchakov.N. Ontogenez I neither characteristic mikroelementnaya brijeechnix limfouzlov raznix etapax pos fitoterapii handle // v medisina of micronutrients 16(1), 2015. S.- 22-27.
3. Grishina T. R., Satarina T. E. A Kalacheva. G., Gromova O. A. Shilyaev R. R., Zolotova E. A. I podrostkov further element status molodix lyudey, projivayutshix oblast Ivanovskoy na territorii // Vestnik Ivanovskoy medisinskoy akadem matter. 2012. T. 17, № 1. S. 15-19.
4. V Zaytsev.B. Fedorovskaya N.. S Jeleznov L.M. Osobennosti struktur morfometricheskie of selezenki cheloveka // vestnik medisinskix texnologiy novix – 2018 – T. 25, № 3 – S. 153-159.
5. A Kojin. A. Vladimirsky B. M. Mikroelementozi pathological disease risk ekologicheskoy cheloveka v // 2013.09 Medisinskaya ecology Ecology cheloveka. S. – 56-64.
6. Makalish, T.P. Neither the body morfofunktsionalnie osobennosti selezenki pride vozdeystvii razlichnogo genesis faktorov [Text] / T.P. Makalish // Tavricheskiy medical - biologicheskiy vestnik. – 2013. – T. 16, no. 61. – S. 265-269.
7. Aly SS, Fayed HM, Ismail AM, Hakeem GL. Assessment of lymphocyte subsets in peripheral blood of children with iron deficiency anemia. BMC Pediatrics. 2018;18(1):49.https://doi.org/10.1186/s12887-018-0990-5.
8. The ces, m. f. Normal structure, function and Histology of the spleen / Ces m. f. // Toxicologic Pathology. – 2006. – No. 34. – P. 455-465. provinces: 10.1080/01926230600867743.
9. Silva, j. s., Andrade, a. c., c. c. santa to Low CXCL13 expression in splenic germinal center lymphoid tissue atrophy and disruption that can several visceral // pl ipsos one. 2012. Voles. 7, № 1. E-29103 location. Pp. 1-5.
10. Microanatomy of human spleen steiniger b. s.: why mice do not suffice // Immunology. 2015. Voles. 145, no. 3. P. 334-346. provinces: 10.1111/imm.12469.
11. By Turdiev M. R., Teshayev Sh.J. Morphometric assessment of function in the spleen aspect of immunomorphology of the white rat clonal ages // the american journal of medicine and medical science. – 2019. -9(12) – P. 523-526.