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EXPERIMENTAL SUBSTANTIATION OF EFFICIENCY OF LOCAL LYMPHATIC THERAPY AT SHARP IMPASSABILITY OF INTESTINES

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Abstract
Frequency OF SHARP IMPASSABILITY OF INTESTINES makes 9 % of all sharp diseases of bodies of a belly cavity. Thus death rate, according to various authors, up to 25 %. Considering that in processes of reduction in the intoxication of an organism the leading part belongs to lymphatic system, we have decided to study opportunities of local lymphatic therapy in experimental model OF SHARP IMPASSABILITY OF INTESTINES. For realization of an object in view series of experiments on 27 not purebred dogs in weight from 12 up to 15 kg are lead.

Experimental animals were distributed by us according to the types of experiments into several groups: in the first group of animals (5 dogs), we studied the morphology of the lymphatic system of the loops of the small intestine in the norm; in the second group (12 dogs), we studied the degree of changes in the lymphatic system of the small intestine in ABO; in the third group (10 dogs), the effectiveness of regional lymphatic therapy in ABO was studied.

In the course of the experiment, when modeling acute intestinal obstruction, irreversible processes develop in the wall of the jejunum, similar to an acute violation of the mesenteric circulation. Violation of vascularization and lymphatic circulation of the intestinal wall led to necrotic changes in the latter, perverting its function. Comparison of models of groups 2 and 3 of experimental animals (48 hours) convincingly demonstrates an increase in lymphatic collectors during treatment by more than 2 times. In addition, under the conditions of lymphostimulation, stabilization occurs, and then at a later time (24-48 hours) revival of the mitotic activity of the cells of the germinal centers of the lymph nodules. model of acute small bowel obstruction stabilizes the functions of GLMCR and lymphoid tissue, allowing you to restore tissue and immune homeostasis

Frequency OF SHARP IMPASSABILITY OF INTESTINES makes 9 % of all sharp diseases of bodies of a belly cavity. Thus death rate, according to various authors, up to 25 %. Considering that in processes of reduction in the intoxication of an organism the leading part belongs to lymphatic system, we have decided to study opportunities of local lymphatic therapy in experimental model OF SHARP IMPASSABILITY OF INTESTINES. For realization of an object in view series of experiments on 27 not purebred dogs in weight from 12 up to 15 kg are lead.

Experimental animals have been distributed by us by kinds of experiences on some groups: in the first group animal (5 dogs) studied morphology of lymphatic system of loops of a thin gut in norm; in the second group (12 dogs) studied a degree of changes of lymphatic system of a

thin gut at SHARP IMPASSABILITY OF INTESTINES; in the third group (10 dogs) studied efficiency of carrying out of local lymphatic therapy at SHARP IMPASSABILITY OF INTESTINES.

During experiment at modeling sharp intestinal impassability in a wall of a lean gut the irreversible processes similar to sharp infringement blood circulation of intestines develop. Infringement of a feed of a wall of a gut have led некрозу to last, perverting its function. Comparison of models 2 and 3 groups experimental animal (48 hours) convincingly shows increase in lymphatic collectors at a background of treatment more than in 2 time. Besides in conditions of carrying out of lymphatic therapy there is a stabilization, and then in later terms (24-48 hours) revival of activity of cells the centers of lymph nodes. Thus, the lead series of experiences on dogs allow to conclude, that application of elements of stimulation of a lymph with regional lymphatic therapy on a background of model OF SHARP IMPASSABILITY OF INTESTINES stabilizes functions of a wall of intestines, allowing to restore fabric and an immune homeostasis

Acute intestinal obstruction has long earned the reputation of a very severe disease, difficult to diagnose and unfavorable in terms of outcomes (1,3,6). The frequency of AIO is 9% of all acute diseases of the abdominal organs. In this case, mortality reaches, according to various authors, up to 25% (1,6,8,9).

The nasoenteric decompression applied both during the operation and in the early postoperative period allowed a number of authors to significantly reduce the degree of endogenous intoxication (EI), which is the cause of such a high mortality (7,9). At the same time, as studies by a number of authors have shown, in the group of patients with an initially high degree of intoxication, despite the same standard set of therapeutic measures, improvements were rarely observed (2,4,5,10).

In order to further reduce the degree of EI, a number of authors supplemented the complex treatment of AIO with extracorporeal detoxification methods, and at the same time achieved good results (1,2,6,7). However, according to others, the methods he uses are not always feasible in patients with AKI.

Considering that the lymphatic system plays an important role in the processes of detoxification of the body, we decided to study the possibilities of regional lymphotherapy in an experimental model of OTIO.

To achieve this goal, a series of experiments were carried out on 27 outbred dogs (males) weighing from 12 to 15 kg.

Experimental animals were distributed by us according to the types of experiments into several groups: in the first group of animals (5 dogs), we studied the morphology of the lymphatic system of the loops of the small intestine in the norm; in the second group (12 dogs), we studied the degree of changes in the lymphatic system of the small intestine in ABO; in the third group (10 dogs), the effectiveness of regional lymphatic therapy in ABO was studied.

The lymphatic system of the small intestine was studied by two methods:

1) intravital detection of the lymphatic vessels of the small intestine by the method of biological injection according to B.V. Ognev.

2) post-mortem detection of lymphatic vessels by interstitial injection of a dye into the lymphatic bed of the small intestine

The model of acute mechanical small bowel obstruction in animals of the 2nd group was carried out by ligation of 1-2 sections of the small intestine. As a result, the blood supply and the passage of food masses were interrupted.

The operation was performed under intravenous anesthesia (hexenal 1.0 after premedication with droperidol 3.0 and fentanyl 2.0 intramuscularly). 6 hours after the operation, relaparotomy was performed under general anesthesia and, later, after 12, 24 and 48 hours, the development of necrotic changes in the wall of the small intestine was observed.

In the 3rd group of animals against the background of the ABCI model, 6 hours after the start of the experiment, lymphatic therapy was performed through the mesentery of the small intestine in the form of lymphostimulation and lymphotropic administration of antibiotics. Lidaza 64 units, heparin 5000 units, dalargin 1 mg dissolved in 100 ml of 0.25% novocaine solution were used as lymphostimulants. After lymphostimulation, a lymphotropic antibiotic (gentamicin 80 mg) was administered in a single dose. The introduction of drugs was carried out 1 time per day.

All prepared preparations were fixed in 10% neutral buffered formalin and 2.5% glutaraldehyde prepared in 199 medium or Hanks medium.

One part of the preparations of the wall of the jejunum and lymph nodes, further, was subjected to dehydration, embedded in paraffin, and sections were made with a thickness of 5 μm. They were stained with hematoxylin and eosin.

The other one, after fixation in 2.5% glutaraldehyde and later in 1% solution of osmium tetroxide, was passed through a battery of alcohols of increasing strength and acetone. They were embedded in Epon-812 and semi-thin sections 1 μm thick were obtained on an LKB-8800 ultratome. They were stained with toluidine blue.

Histological preparations were analyzed and photographed under an MBI-15K light microscope using Mikrat-300 film.

to objectify and standardize the obtained data. Thus, the volume density of the hemolymphatic microcirculatory bed (HLMCR) of the wall of the jejunum and lymph nodes of the mesentery of the small intestine was determined stereoplanimetrically using a square-nodal grid under standard conditions at a magnification of 118. The index of mitotic activity of the lymph nodes of the jejunum wall and lymph nodes of the mesentery of the small intestine was studied by random histological preparations. Mitotic activity aimed at assessing the immunocytopoietic function of lymphoid tissue is calculated as the ratio of the sum of all detected figures of mitoses of lymphoid elements in the germinal centers of lymphatic nodules to the total number of germinal centers in a given section.

The results of experimental studies of the lymphatic system of the small intestine are normal

In intact 5 dogs, the analysis of histological preparations showed that the wall of the jejunum as a typical hollow organ has a characteristic relief and is represented by a mucous membrane, which includes the intestinal epithelium, villi and crypts, the lamina propria of the mucous membrane with well-developed, especially in the villi, lymphatic capillaries and muscular plate. An accumulation of lymphoid tissue in the form of lymphatic nodules was found in it,

above the dome of which “chains” are visible, from villi tending to penetrate into the loose connective tissue.

Individual lymph nodules extend into the intestinal mucosa, the submucosa that contains an abundance of blood microvessels. The muscular layer is represented by smooth myocytes, going circularly and longitudinally. The last expressed serous membrane.

Vascularization and lymphatic circulation are represented by all elements of the hemolymph microcirculatory bed (arterioles, capillaries, venules, lymphatic capillaries). At the same time, the volumetric density of blood-bearing microvessels was 34.12±0.3, and lymphatic, respectively, 17.81±0.01.

Of particular interest was the study of cells of the lymphopoietic row of lymphatic nodules, where the index of mitotic activity of blasts in their germinal centers was calculated. In control animals it was 15.73±0.25.

From the obtained data, it is obvious that in the norm in experimental animals all physiological processes are well provided with morphological structures, and this allows maintaining the constancy of the internal environment, and most importantly, immune homeostasis. Regional lymph nodes of the mesentery of the small intestine on histological sections had a general structural plan with a pronounced cortical and medulla. Lymph nodules were at different stages of their development, most with well contoured germinal centers and mostly with a "crown" of small active lymphocytes.

Results of experimental studies of the lymphatic system of the small intestine with a model of acute small bowel obstruction

In the course of the experiment, when modeling acute intestinal obstruction, irreversible processes develop in the wall of the jejunum, similar to an acute violation of the mesenteric circulation. Violation of vascularization and lymphatic circulation of the intestinal wall led to necrotic changes in the latter, perverting its function. So already after 6 hours from the onset of the disease, edema of the loose connective tissue of the mucosa and submucosa, changes in the structure of the lymph nodes, an abundant lymphocytic reaction with infiltration of the intestinal wall with neutrophils, macrophages and lymphocytes were observed.

A slight increase in the volumetric density of the GLMCR elements was noted - respectively, the circulatory link up to 40.31 ± 0.1, the lymphatic link up to 22.07 ± 0.05. In relation to the control results, these data are not reliable ($P>0.05$).

Interpreting this phenomenon, we can assume that an increase in the volume of microvessels, first of all, occurs due to the plethora of the venular section of the microcirculatory bed and lymph stasis in the plexuses of the lymphatic vessels of the submucosal base. The result of this is the deterioration of the drainage activity of the tissues of the intestinal wall.

However, the data of the index of mitotic activity of lymphoid elements showed an increase (in relation to the norm $P>0.05$) in the number of areas in the germinal centers of lymphatic nodules. This fact indicates a direct antigenic attack by tissue decay products as a result of developing endotoxicosis generated by ischemia. Lymphoid tissue is in a state of tension, trying to compensate for tissue homeostasis by increasing the number of young lymphocytes involved in immunological reactions. In the dynamics of the subsequent development of the

process after 12 and, especially, 24 and 48 hours, necrotic changes capture the entire thickness of the wall of the jejunum. At first, partial necrosis of the epithelium of the villi is noticed, and then complete, leading to irreversible changes. The connective tissue that makes up its own plate of the mucous membrane and the submucosa is also subjected to destructive processes. Swelling of tissues increases markedly. The volume density of GLMCR decreases, reaching 20.11 ± 0.05 in the circulatory link by 48 hours, and 15.14 ± 0.13 in the lymphatic link. This reduces the nutrition and drainage of tissues by more than 40%. These data are reliable in relation to the control ones ($P<0.05$).

The lymphoid apparatus of the intestinal wall also undergoes a sharp change. By 48 hours, IMA decreases by more than 3 times, amounting to 4.43±0.05 ($P<0.05$). Violation of nutrition processes, rheological properties of blood and lymph, lymphatic circulation and immune defense inevitably leads to complete necrosis of the intestinal area. The development of acute intestinal obstruction directly puts forward the trigger mechanism of the process - a violation of blood and lymph circulation. It is known that during any acute pathological process, an unresolved microcirculatory shock necessarily ends with an irreversible change in the morphological structure of tissues and their functions.

During the study, there was a characteristic parallelism of changes in the intestinal wall and regional lymph nodes. And these phenomena are natural, because in the course of an inflammatory reaction, factors of aggression (cellular detritus, toxic products, microorganisms) cannot bypass such powerful lymphatic collectors as the lymph nodes of the root of the mesentery of the small intestine. Semi-thin sections clearly show cell masses, lymph clots in the afferent lymphatic vessels and marginal sinus, which ultimately block the lymphatic circulation system in the lymph node. Already in the early (6-12 hours) reactive stages of development of acute intestinal obstruction, edema of the parenchyma of the lymph node is noted, reaching its maximum after 1 and 2 days from the moment of modeling the disease. Morphometric indicators state that as edema develops, the volumetric density of the sinuses decreases. In the dynamics from 6 to 48 hours, the volume of the latter falls by more than 50% compared with the control data ($P<0.05$).

Functionally, this affects the migration of lymphocytes, which is significantly reduced, which means that the number of cells recirculating in biological fluids also decreases in direct proportion. The potency of interrelation of immunocompetent cells of an organism decreases. The loss of immune homeostasis can be objectively reflected by demonstrating the IMA of lymph nodules, which, like the lymph nodules of the intestinal wall in the reactive phase (6 hours), increase somewhat, reaching up to 18.17±0.01 ($P<0.05$), as a result of exposure to antigens during the development of necrosis and endotoxicosis. Then the IMA rapidly drops to 30% ($P<0.05$) by 48 hours from the start of the experiment in relation to the control.

The results of experimental studies of the lymphatic system of the small intestine with a model of acute small bowel obstruction against the background of regional lymphotropic therapy

In recent years, special attention has been paid to the regulation of altered functions of the lymphatic system, including circulatory disorders in the intestinal wall in acute intestinal obstruction, occlusion, thrombosis of mesenteric vessels (R.T. Panchenkov et al., 1986). It is here that the issues of possible correction of this pathology with the help of lymphatic therapy come to the fore. And it was in connection with this that we made an attempt to determine the morphological criteria for the expediency of this type of therapy based on the anatomical prerequisites for the structure and function of the lymphatic system.

A review of histological preparations of the jejunal wall of a model of acute intestinal obstruction against the background of lymphotherapy showed that after regional lymphatic therapy with elements of stimulation of lymphocirculation, the incipient process stabilizes at its early, reactive stages. In the course of the study, by 12 hours from the beginning of the experiment, a sharp expansion of the lymphatic capillaries of the villi of the jejunal wall, an abundance of "chains" of lymphocytes behind the contour of its wall in the lamina propria of the mucosa attracts attention.

The total density of GLMCR in relation to the control data is even slightly increased in digital terms, respectively, blood microvessels 39.17±0.03; lymphatic - 19.53±0.05 ($P>0.05$). This fact testifies to compensation of the process due to the undertaken lymphostimulation.

In the future (24-48 hours), GLMCR stabilizes at numbers close to normal, but the lymphatic vessels continue to be dilated and their density in the intestinal wall exceeds the norm (24.61±0.05; $P<0.05$).

In all likelihood, this occurs due to increased drainage activity not only of the lymphatic capillaries, but also of the reservoir-like lymphatic vessels of the submucosa.

Comparison of models of groups 2 and 3 of experimental animals (48 hours) convincingly demonstrates an increase in lymphatic collectors during treatment by more than 2 times. In addition, under conditions of lymphostimulation, stabilization occurs, and then at a later date (24-48 hours) revival of the mitotic activity of the cells of the germinal centers of the lymphatic nodules.

IMA in the dynamics from 12 to 48 hours during the experiment even exceeds the control results, and in comparison with the 2nd group of animals, they increase their potency by more than 3 times. Of course, such a fact favorably affects the immune functions of the lymphoid apparatus of the intestine, allows you to resist the elements of tissue destruction, the occurrence of endotoxicosis.

It is no coincidence that most lymphologists believe that in order to interrupt the process of inflammation, it is necessary to carry out direct local lymphostimulating measures at the early stages of its development.

Under conditions of lymphostimulating therapy in combination with antibiotics, improvements in the morphological parameters of the lymph nodes of the mesentery of the small intestine are also noticeable. On histological preparations, already 1 day after the start of the experiment, it is noticeable that the adducting lymphatic vessels, marginal cortical and cerebral sinuses are

free from elements of cellular detritus of lymphocytes, which creates certain conditions for the possibility of lymphocyte migration through the wall of the sinuses.

The density of the sinuses under conditions of lymphostimulation in the dynamics of the experiment (12, 24, 48 hours) increases, amounting to 38.71 ± 0.03 in digital terms, which is again higher than the initial data and significantly higher in comparison with the 2nd group of animals, by more than 60% .

Thus, a series of experiments on dogs allows us to conclude that the use of lymphostimulation elements with regional lymphotropic therapy against the background of a model of acute small bowel obstruction stabilizes the functions of GLMCR and lymphoid tissue, allowing restoration of tissue and immune homeostasis.

CONCLUSIONS

With OKN, persistent disorders develop in the microcirculation system, especially in its lymphatic part.

Depending on the time since the onset of AIO, disturbances in the lymphatic system of the small intestine wall begin to prevail, which leads to the development of necrotic processes.

The use of regional lymphatic therapy leads to an improvement in the function of GLMC and lymphoid tissue, which leads to the restoration of tissue and immune hemostasis.

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