World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-16, November 2022
ISSN: 2749-3644

THE EFFECT OF VAGOTOMY ON THE MICROCIRCULATORY BED OF THE INTESTINE

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Article history:

Received: September 4th 2022
Accepted: October 4th 2022
Published: November 8th 2022

Abstract:

The paper presents an analysis of the results of experiments performed in animals (109 dogs - 4 series) with the aim of the effect of various types of vagotomyin on the hemomicrocirculatory bed and the lymphatic system of the small intestine in the next 3-7 days and 1-3-6 and 12 months after surgery.

To assess the state of the lymphatic and blood vessels of the small intestine wall, the method of "biological" injection, interstitial injection of Gerota's blue mass and bichrome vascular infusion, as well as histological and histochemical research methods.It has been established that the development of morphological and functional changes in the blood vessels occurs simultaneously with various types of vagotomy, and the recovery period is significantly different. Morphofunctional changes are eliminated faster and more completely after selective proximal vagotomy (one month), and in animals that underwent stem and combined vagotomy, the period of elimination of congestion and morphological transformations of the vessel wall lasts up to three months. The revealed changes in the blood vessels and lymphatics of the small intestine after vagotomy can be taken into account when planning the management of the postoperative period, and especially for the purpose of correcting infusion therapy and choosing a diet.

Keywords: Vagus nerve , stomach , peripheral heart

INTRODUCTION. Recently, the number of patients with gastric and duodenal ulcers has increased significantly, especially in economically developed countries. From conservative treatment, ulcer healing occurs in 70-75% of patients, and 25-30% of patients with a long recurrent course of the pathological process need surgical intervention.

In our country and abroad, at one time, operations on the vagus nerve were widespread, which are used in patients with localization of ulcers in the duodenum, and with gastric ulcer, the operation of choice is its resection. If we take into account that with peptic ulcer disease, the process is localized in the duodenum in 80-85% of patients, and according to our material in 98% of peptic ulcer patients living in the Fergana Valley, then the specific weight of vagotomy among other methods of surgical treatment of peptic ulcer disease becomes clear.

The advantage of this operation over resections is to preserve the reservoir and other functions of the stomach, passage of food through the duodenum, etc. The widespread introduction of vagotomy into clinical practice was facilitated by its better outcomes than after resection in the immediate and long-term periods after surgery.

A number of scientists have made a great contribution to the development and implementation of vagotomy with organ-preserving and organ-sparing operations. /2.3.5.6.12.21.23/

Paying tribute to vagotomy in a persistent decrease in acidity, as the primary factor in the treatment of peptic ulcer disease, many authors /6.18.19/ nevertheless noted that this operation gives a significant percentage of non-healing and recurrence of ulcers. The main reason for this lies in the insufficient completeness of vagotomy and inadequate drainage of gastric contents. The widespread use of various variants of vagotomy in duodenal ulcer has revealed a number of other pathological conditions, called "post-vagotomy syndrome".

Attempts to study the complications and undesirable consequences of vagotomy have led many researchers to the need to conduct experiments in order to clarify the essence of pathological processes occurring in the denervated organ.

In search of the causes of the negative consequences of vagotomy, experimenters, clinicians conduct studies of the nature of gastric secretion, functional features of the pylorus and cardia, the intensity of bile secretion, motor evacuation activity of the gastrointestinal tract. In the pathogenesis of post-

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Volume-16, November 2022
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vagotomy disorders, disorders of the arterial and venous systems and the microcirculatory bed as a whole are detected, changes in innervation and activity of the extrahepatic bile ducts, pancreas (8.)

Bilateral subdiaphragmatic vagotomy in dogs leads to the development of a complex of structural and functional disorders, which manifest themselves in the form of inflammation, dystrophic and vasomotor rearrangements in the mucous membrane of the stomach and intestines.

There is a disorder of all the main functions of the small intestine - suction, secretory and evacuation (9). It is associated with thickening and shortening of the villi, indicating mucosal atrophy (10).

Among the multifaceted studies in the literature, there is little information about the study of the microcirculatory bed. Available studies indicate that vagotomy causes a violation of the functions of the microcirculatory bed mainly from the venous vessels in the form of stagnation and increased permeability of blood capillaries, which leads to edema. Depending on the type of vagotomy, microcirculatory disorders occur in the stomach and other organs.

Studying microcirculation after vagotomy, the authors pay absolutely insufficient attention to the lymphatic system, meanwhile it is known that microcirculation and homeostasis in organs and tissues are provided by joint actions of the vascular and lymphatic systems. Therefore, only a simultaneous study of the state of blood and lymphatic vessels will fully characterize the state of microcirculation and clarify the pathogenesis of changes occurring after parasympathetic denervation of the stomach.

The lymphatic system, having a multifaceted function, plays a very important role in the vital activity of organs and the body as a whole, in the processes of metabolism.

Blood flow to organs and tissues is carried out by the arterial system, and the outflow of fluids is provided by two drainage systems - venous and lymphatic. These three systems equally determine the homeostasis of the body and the state of microcirculation (4.17).

Even B.V.Ognev and his students (1967) found that blood and lymphatic vessels are part of the so-called "peripheral heart", between which there is a connection at the level of venous vessels and lymphatic collectors. Therefore, hemodynamics depends on the function of the lymphatic system and, conversely, shifts in lymph formation and lymph flow rate affect the cardiovascular system. Further studies of this issue by domestic and foreign authors have convinced that the lymphatic system is no less than the circulatory system, and in pathology, in particular in inflammation, sometimes determines to a greater extent the state of the microcirculatory bed, the course and outcome of treatment of the disease. Meanwhile, a careful analysis of the literature data shows that despite the increased interest in the lymphatic system, it continues to be a less studied branch of medicine, especially with regard to surgical pathology, the impact of surgical interventions. The above fully applies to surgical interventions on the stomach, in particular vagotomy, widely undertaken in the treatment of peptic ulcer disease in clinics and city hospitals.

Based on the above, the effect of vagotomy on the hemo- and lymphocirculatory bed is of interest, which was the purpose of our research. For our study, we chose the small intestine, which is crucial in digestion, it is in it that the greatest disorders (diarrhea, etc.) are observed in connection with vagotomy.

Material and methods of research. The research was conducted on an experimental model of the most widely implemented types of vagotomy in clinical practice. The following types of vagotomy were performed on 113 dogs under morphine - hexenal anesthesia in conditions of compliance with asepsis: bilateral subdiaphragmatic stem, selective- proximal and combined (anterior SPV and posterior stem). In addition, the microcirculatory bed was studied normally in 6 control dogs. Injection and histological methods were used to study the blood and lymphatic bed.

The study of enlightened preparations from different layers revealed that, along with the general expansion, there is a significant restructuring in the morphology of lymphatic vessels. On the wall of capillaries and vessels, a large number of lateral finger-like outgrowths and varicose dilatations of the walls are found on a larger or smaller extent, an increase in the number and size of anastomoses. These changes noted on the part of intra–organ and non-organ vessels lead, on the one hand, to an abundance of vascular pattern with sometimes loss of its orientation, and, on the other, to vascular deformation with a violation of the external shape of lymphatic vessels.

In the long term after vagotomy, morphological rearrangement of lymphatic vessels prevails over functional extensions.

To study the lymphatic vessels of the small intestine during the life of animals, the method of biological injection according to B.V.Ognev with pre-feeding of dogs was used. After the expiration of the experiment, the animals were slaughtered by an overdose of a narcotic substance, the lymphatic system was detected by interstitial injection with a blue mass of Gerot.

A lifetime study of the lymphodynamics of the "biological" injection pathways made it possible to establish in control animals the most intense contrast of the lymphatic vessels of the jejunum and its

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mesentery after 2-2.5 hours from the moment of feeding, after another 0.5-1h. The lymphatic vessels of the initial parts of the ileum are filled with chylus. The lymphatic vessels of the small intestine acquire a white color due to the content of a large amount of fat in the lymph at the height of digestion (Fig. 1.). At the same time, the contrast of the lymphatic vessels of the ileum gradually decreases in the terminal direction. On the most terminal (1-2) loops of the small intestine, lymphatic vessels are poorly detected, and in some animals they do not contain white chyletic fluid at all and therefore are not traced.

Fig. 1 "Biological injection of lymphatic vessels of the small intestine".

The study of enlightened preparations of the lymphatic system of the small intestine normally showed that, starting from the free and ending with the mesenteric edge, all layers of the wall of the small intestine have their own network of lymphatic capillaries, whose sizes range from 0.2 to 10.0 microns, and sometimes reach up to 20.0 microns. The contours of the capillaries are smooth, clear. When several capillaries merge, vessels of the 1st order are formed, the size of which reaches 33.0 microns.

Discussion of the results obtained. The results of our studies show that after vagotomy there are significant shifts in the microcirculatory bed, which from the side of the blood vessels manifest themselves in the form of venous stagnation with the expansion and tortuosity of the capillaries. The permeability of the vascular wall increases, as a result of which the amount of interstitial fluid increases, swelling of the intestinal wall is observed. Relaparotomy in the first 3-7 days after vagotomy shows accumulation of serous hemorrhagic fluid in the abdominal cavity. The amount of fluid depended on the type of vagotomy: after SPV, 300 to 400 ml was formed, TV and combined vagotomy up to 700 ml. the venous vessels of the abdominal cavity, including the intestine, were full-blooded, stagnant and dilated, their walls were tense.

Similar information about microcirculation disorders on the part of some abdominal organs was obtained by Yu.K.Yeletsky, O.M.Zorina (1979), who studied the effect of vagotomy in an experiment.

The study of histological preparations prepared from the wall of the small intestine showed that in the near future after vagotomy, there is vascular fullness, swelling of the mucous membrane and submucosal base, moderate secretion in most of the goblet cells and infiltration of its own mucosal layer by cellular elements (lymphocytes, eosinophils, plasma cells). These changes also indicate microcirculatory disorders in the venous link of microvessels. On this basis, swelling of the intestinal wall occurs, free fluid accumulates in the abdominal cavity.

According to S.U.Dzhumabaev (1969), M.Ibragimov (1983), with venous stagnation, interstitial edema, there is an increase in LMI production by 2-3 times. The reorganization we found in the lymphatic system of the small intestine in the form of dilation of lymphatic capillaries and vessels, the occurrence of a large number of lateral protrusions, anastomosing vessels and outgrowths of various shapes is compensatory in nature and is aimed at draining edematous interstitial fluid and lymph intensively formed in the intestinal walls. These changes from the hemomicrocirculatory and lymphatic bed are most pronounced in the first 3-7 days after surgery. Additional anastomoses and varicose protrusions of the walls are formed on venous microvessels.

On the walls of lymphatic capillaries and vessels, multiple lateral outgrowths, protrusions of one, sometimes two walls of vessels are revealed, as a result of the proliferation of the network of lymphatic vessels in all layers of the intestinal wall becomes abundant. The diameter of lymphatic capillaries and vessels in all layers increases 2-4 times or more against the norm.

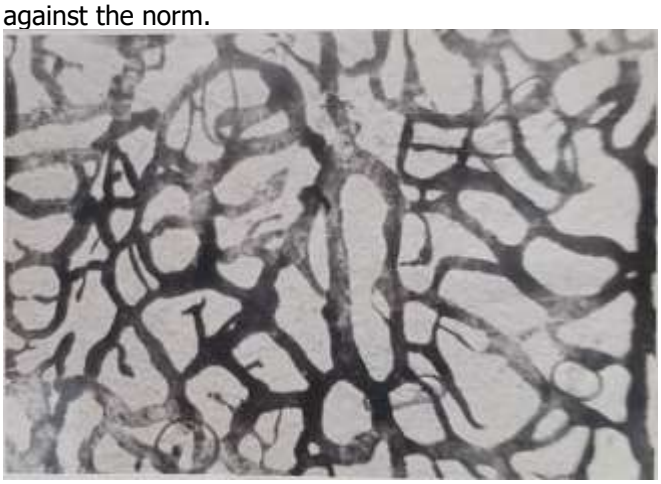

Fig.2 Lymphatic vessels of the serous layer.

It should be noted that in the first 3-7 days after vagotomy, the absorption of fats in the small intestine

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Available Online at: https://www.scholarexpress.net
Volume-16, November 2022
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slows down. Filling of lymphatic vessels is observed after 4-9 hours instead of 2.0-2.5 hours normally.

Slowing down the absorption of fats in the small intestine occurs due to a violation of the motor evacuation activity of the stomach and intestines, a decrease in the digesting activity of gastric juice. This is facilitated by hemolymphocirculatory disorders, in which the intestinal lymphatic system is mobilized to drain increased interstitial fluid and increase lymph production. At the same time, the other-the absorption of food products, the function of the intestine weakens.

The delayed evacuation of food through the gastrointestinal tract is explained by such a factor as an operational injury associated with vagotomy. It is well known that any laparotomy, even relatively minor, associated with a conventional appendectomy, causes temporary paresis of the gastrointestinal tract, expressed in different patients to varying degrees. Such an extensive and traumatic operation as vagotomy is all the more capable of causing paresis lasting several days.

Consequently, in slowing down the progress of food through the gastrointestinal tract in delayed digestion, in addition to vagal denervation, surgical trauma is important. Therefore, vagotomy, which is always performed under modern endotracheal anesthesia, should be combined with the use of local anesthesia and novocaine blockade of the shockogenic zones, which are the small omentum, especially its part composed of the hepatic-gastric ligament. The most traumatic moment of the operation is associated with the isolation and traction of the abdominal esophagus. Novocaine anesthesia of this part of the operation will undoubtedly improve the postoperative course.

In the fight against intestinal paresis, it is advisable to inject 0.25% warm novocaine solution into the root of the mesentery of the transverse colon, which also belongs to a number of shockogenic zones.

Another important cause of digestive disorders is a decrease in the digesting activity of the juice of the vagus-denervated stomach.

According to a number of authors (6.15.18.19.), adequately performed vagotomy reduces the acidity and digesting activity of gastric juice by an average of 62.8 – 85.4%. Such a reduction is safe from the point of view of relapse. On the other hand, this decrease in the acid-producing and pepsin-forming functions of the stomach negatively affects the process of digestion of food. The latter enters the duodenum in an insufficiently treated state with gastric juice, it is still unsuitable for absorption in the intestine.

Under the influence of enzymes of the pancreas and bile in the duodenum, food is further prepared for digestion and absorption. Only in the loops of the small intestine, food, in particular fat, is suitable for absorption into the lymphatic vessels. Therefore, there is a terminal shift of digestion when fat absorption does not occur in the duodenum, and it begins in the jejunum and ileum of the small intestine. As a result of the displacement of fat absorption after vagotomy, in contrast to control experiments, occurs in the most terminal loops of the ileum.

Microcirculatory disorders, which we noted in the small intestine in the first days after vagotomy, play a certain role in slowing down the absorption of fat. With venous stagnation, edema of the intestinal walls, the lymphatic system is mobilized and works with a heavy load in terms of transport of edematous interstitial fluid and lymph intensively formed in the intestinal wall, to a lesser extent it is occupied with digestion and transport of proteins and fats absorbed into the lymphatic vessels. These are the factors that, from our point of view, disrupt digestion after vagotomy.

Among all the causes of digestive disorders, we assign a leading role to vagal denervation. Such types of vagotomy as TV and KV (combined anterior selective proximal and posterior truncular) cause deeper disorders from the side of blood and lymph formation and intestinal absorption activity. They lead to denervation not only of the stomach, but also of other abdominal organs, including the intestines. Motor-evacuation activity, activity of digestive enzymes are reduced both from the stomach and small intestine. There are other situations after SPV when the innervation of the antrum of the stomach and its ability to ensure the rhythmic movement of food masses from the stomach into the duodenum is preserved. The intestine with SPV, from the point of view of vagal denervation, remains intact, the violation of contractility in the early stages is temporary. They are mainly associated with surgical trauma, microcirculatory disorders leading to lymphostasis, intestinal edema and the appearance of effusion in the abdominal cavity. Therefore, morphofunctional disorders of the vascular and lymphatic systems and digestive disorders after SPV are eliminated faster than after TV and KV.

When characterizing the effect of vagotomy on hemo- and lymphocirculatory shifts coming from the abdominal organs, it should be evaluated differently.

The works of G.D.Knyazev, A.Mehmanov (1984), devoted to the study of the effect of vagotomy on the morphofunctional state of the stomach, testify that physical, chemical or other effects on any segment of the autonomic nervous system have a twofold reaction: direct, extending into the innervation zone of that nerve and indirect, extending to the entire nervous system regardless of the place of application

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Available Online at: https://www.scholarexpress.net
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of the effect. If the direct reaction is more severe, prolonged, then the indirect one differs in its shorter duration. A decrease in the motor evacuation activity of the stomach and the digesting activity of its juice after TV and KV is regarded as a direct reaction of blood and lymphatic vessels to complete and partial denervation of organs. This is how the results of our research should be interpreted. The venous stagnation noted by us at the microvessel level, interstitial edema and dilation of the lymphatic vessels of the small intestine is explained by vagal denervation. It is known that vagal innervation of the small intestine is carried out mainly by the right vagus nerve and indirectly through the solar plexus. With TV and HF, the right (posterior) vagus is dissected and this causes a violation of innervation by the specified nerve.

The situation is different with SPV, after which vagal denervation of only the body, the bottom and the cardia of the stomach is achieved, the main trunks of both vagus nerves, anterior and posterior and gastric nerves Latarge with terminal branches innervating the pyloroantrum are not damaged, vagal innervation of the small intestine does not suffer. Nevertheless, as our research materials show, in the first days after SPV, microcirculatory disorders from the small intestine take place. This is defined as a reflected reaction to the effect exerted surgically by dissecting the gastric branches during SPV. The reverse development of functional and structural disorders on the part of the circulatory and lymphatic system at a later date after SPV occurs not only faster, but also more completely. By the end of the week after SPV, microcirculatory disorders are eliminated, morphological changes in microvessels decrease within one month, whereas after TV and KV, the recovery period lasts 3 months or more, and even during these periods a number of structural disorders continue to persist (Fig. 3.)

Fig. 3 Lateral outgrowths in lymphatic vessels

Thus, our experimental studies have shown that the restoration of microcirculatory disorders and structural changes in the blood and lymphatic vessels of the small intestine occurs differently with different types of vagotomy.

A faster recovery occurs after SPV, and in animals that underwent TV and KV, the period of elimination of stagnant phenomena in the intestinal wall, the expansion of microvessels lasts 3 months.

If the development of morphofunctional changes in the first days after vagotomy from the side of blood and lymphatic vessels occurs simultaneously, then the recovery period has features. Faster and more complete morphofunctional changes are eliminated from the circulatory system. Lymphatic vessels continue to retain to a large extent lateral outgrowths, anastomosing branches. This indicates that in the long-term period of vagotomy, despite the clinical and morphological restoration of microcirculatory disorders, increased lymph circulation and functional overload of the lymphatic system continues. On this basis, we can say that compensation of microcirculatory processes is provided after vagotomy mainly by the lymphatic system. In all periods of vagotomy, the lymphatic system exhibits greater plasticity and compensatory ability than the circulatory system.

From the point of view of postoperative shifts on the part of blood and lymph circulation in the intestine, CIIB, which is less than TV and KV, should be considered the most advantageous of all types of vagotomy.-causes microcirculatory disorders.

Summarizing the results of our experimental studies, it should be said that: vagotomy, regardless of the way it is performed, causes significant microcirculatory disorders in the coming days after surgery. Venous congestion, swelling of the intestinal wall, accumulation of free fluid in the abdominal cavity. Clinical observations.

These microcirculatory shifts, as shown by our clinical observations conducted on 305 patients with duodenal ulcer who underwent vagotomy, have a characteristic clinic and can be diagnosed by the usual methods used in hospitals. Of the total number of patients, 162 underwent dynamic fibroendoscopic monitoring of the state of the stomach in the near and long term after vagotomy. It was found that in the first 7-10 days there is a large amount of fluid in the stomach cavity. A liquid having a slightly acidic reaction contains a lot of mucus. This is also confirmed by nasogastric probing, used in all patients operated on the stomach. In the first postoperative days, with 3-4 single aspiration, stagnant contents were removed from the stomach within 2 liters or more, often having a significant admixture of bile, indicating stasis in the intestine, in particular in the duodenum, with duodenal reflux.

Ascites, edema of the stomach wall and intestines with an increase in its contents, noted in the experiment, duodenal reflux with an increase in abdominal fluid in

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Available Online at: https://www.scholarexpress.net
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the stomach, diagnosed fibroendoscopically and radioscopically in all patients who underwent vagotomy, have a single genesis. They are explained by microcirculatory disorders occurring from the side of the wall of the gastrointestinal tract and the serous cover of the abdominal cavity.

Microcirculatory shifts are one of the main causes of post-vagotomy disorders observed in the near and partly in the long-term periods after vagotomy. The occurrence of gastric contents, duodenostasis are of indisputable importance in aggravating motor-evacuation disorders of the denervated stomach after vagotomy. They not only enhance the signs of gastroplegia, but also prolong the recovery period. Microcirculatory disorders in the intestinal wall contribute to the development of diarrhea, characteristic of vagogomy, osebenno stem, observed to one degree or another in almost all patients in the near term after surgery.

In the long term, diarrhea, as a serious consequence of vagotomy, is often noted, causes significant disorders of digestion and nutrition of patients, bloating, decreased ability to work sometimes for a long time. Due to a violation of the absorption of fat in the intestine in the composition of food received by patients during the first week after vagotomy surgery, the number of products containing fat should be limited.

The described microcirculatory shifts require their correction, which will be important for the outcomes of surgical treatment of vagotomy peptic ulcer.

In conditions of impaired blood flow from the stomach and intestines, stagnation in venous microvessels, increased permeability of blood capillaries with tissue edema, the effect on venous vessels is ineffective in terms of normalization of microcirculation, they are in a state of decompensation. It is more reasonable and expedient to strengthen the function of another drainage system - lymphatic vessels. The lower efficiency of the effect on venous vessels in edema conditions is explained by compression of venous microvessels by edematous tissue with a noticeable decrease in the drainage potential of the veins. The lymphatic capillaries, due to the presence of an "anchor" device, do not subside with edema and even inflammatory infiltration, on the contrary, as interstitial edema increases, the "anchor" device stretches, causing the gaping of the lymphatic capillaries to increase the draining properties of the lymphatic system. Based on the premise of the literature data and our experimental studies, we have developed and applied a method of stimulating regional influence. Through the round ligament of the liver and the root of the mesentery of the small intestine near the annular ligament, catheterized in 19 dogs, after completion of vagotomy. Lymphostimulation through a catheter of 0.25%-100 novocaine and trypsin (or chymotrypsin) caused the elimination of microcirculatory disorders and edema of the intestinal wall, which was confirmed by morphological studies.

In the clinic, the method of stimulation of lymphatic drainage through the round ligament of the liver was used in 60 patients, mesentery of the small intestine was used in 5 patients who underwent vagotomy for peptic ulcer disease. The operation was completed by stitching a mesentery catheter in the form of a microirrigator between the serous sheets, the free end of which was removed from the abdominal cavity through a special small incision of the anterior abdominal wall to the right or left of the laparotomy incision. Observation of these patients showed that daily stimulation of lymphatic drainage very quickly restores the motor-evacuation activity of the stomach. There was no need for aspiration from the stomach in the postoperative period, dyspeptic signs were not observed, control nasogastric aspiration, performed 2 times a day, detected no more than 150-250 ml of fluid per day. From the second day .after surgery, all patients had clearly enhanced intestinal peristalsis, independent discharge of gases. Diarrhea when using lymphatic drainage stimulation either did not occur, and if it was still observed in individual patients, it had a mild form: liquid or semi-liquid stools were observed 2-3 times a day for 1-2 days.

Such a favorable course of the postoperative period allowed early feeding of patients, expansion of the diet and active management of the postoperative period with early getting up and walking. Ultimately, the use of lymphatic drainage stimulation in combination with other traditional methods of postoperative treatment made it possible to reduce the stay of patients in the hospital for 2-3 days. The duration of lymphostimulation was 3-5 days, it was stopped after complete restoration of the function of the stomach and intestines, usually on the day of the first independent stool after surgery.

Our experience of using various methods of vagotomy in patients with peptic ulcer disease has allowed us to develop indications for the use of lymphatic drainage stimulation: They are determined primarily by pathomorphological changes established during surgery and the type of vagotomy. Lymphatic drainage stimulation should be used in all patients who have undergone stem and combined vagotomy. In all other methods of vagotomy, in particular after selective proximal vagotomy, stimulation is indicated if there is pyloris stenosis, especially in the stage of sub- and decompensation with gastric dilation, when vagotomy is combined with gastric drainage surgery. Stimulation of lymphatic drainage is also indicated for callous ulcers and ulcers penetrating into the hepatic-

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Available Online at: https://www.scholarexpress.net
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duodenal ligament, into the head of the pancreas and other organs.

The purpose of stimulation during stem vagotomy is to normalize the activity of the vagus-denervated small intestine and other abdominal organs.

With stenosis and an enlarged stomach, the contractility of the stomach wall is significantly reduced and vagotomy in any form, including selective proximal, can dramatically inhibit the motor evacuation activity of the stomach. Therefore, the timely use of methods -stimulation of lymphatic drainage in the postoperative period contributes to the prevention or rapid elimination of signs of gastroplegia. With callous and penetrating ulcers having the phenomena of perifocal inflammatory infiltration of the wall of the duodenum and the organ into which the penetration occurred, lymphatic therapy improves microcirculation. In this category of patients, it is advisable to use stimulation of lymphatic drainage through a circular ligament in combination with indirect endolymphatic antibiotic therapy.

Stimulation of lymphatic drainage through the mesentery of the small intestine is most appropriate after stem vagotomy and in patients after types of vagotomy, when an increase in mesenteric lymph nodes is detected, as well as concomitant chronic colitis, which, according to many authors, is quite common in ulcerative pathology. With an increase in the number and dilution of lymphocorrectors injected into the mesentery root, they spread into the mesentery of the transverse colon and its retroperitoneal space, where lymph nodes lie, providing lymph outflow from the colon. Conclusions:

Experimental studies have shown that after vagotomy, significant shifts occur in the microcirculatory bed, which manifest themselves in the form of venous stasis, resulting in lymphostasis * intestinal edema, accumulation of free fluid in the abdominal cavity. These changes were more pronounced after TV and KV

2. The method of regional lymphosgimulation in the early postoperative period in experimental animals contributed to the elimination of microcirculatory disorders and edema of the intestinal wall, which were confirmed by morphological studies.

3. Stimulation of lymphatic drainage in the early postoperative period in patients after SPV, TV, and KV is a very effective method in the prevention and treatment of complications such as gastrostasis and diarrhea.

4. Regional lymphatic therapy should be widely used in the complex treatment of early microcirculatory disorders resulting from vagotomy, which can improve the results of surgical treatment of peptic ulcer disease.

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