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STRUCTURE OF SURGICAL INTERVENTION AT OBLITERATING ATHEROSCLEROSIS OF LOWER EXTREMITIES AND ASPECTS OF REHABILITATION OF PATIENTS WITH THIS PATHOLOGY

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Abstracts

The Relevance of the Topic*.** In most economically developed countries cardiovascular diseases occupy a leading position among the causes of morbidity, disability, and mortality. Mortality from diseases of the cardiovascular system prevails over mortality from all malignant neoplasms taken together, and, 25% of those who died of cardiovascular diseases are people of working age. Atherosclerosis (aterosclerosis) is a chronic disease, characterized by lipoid infiltration of the inner shell of the arteries of the elastic and mixed types with subsequent development of connective tissue in their wall, and clinically manifested by general and local disorders of blood circulation. Obliterating atherosclerosis is a type of atherosclerosis, characterized by a sharp narrowing or complete closure of the arterial lumen. As a rule, it is observed in the arteries of the lower extremities, heart, kidneys and the external sections of the brain blood vessels. ***The purpose of the study – to establish the structure of surgical interventions in the obliterating atherosclerosis of the lower extremities and to identify the main aspects that should be addressed for the rehabilitation of patients with this pathology. ***Methods of research –*** analysis and synthesis of scientific sources, analysis of medical records. The analysis of 59 medical records of patients after surgical interventions with obliterating atherosclerosis of the lower extremities has been performed. The structure of interventions and their complications for ten months of 2017 have been analysed. The exclusion criterion is patients with obliterative atherosclerosis of the lower extremities with diabetes. ***Results of the Research.*** Such patients need rehabilitation interventions, depending on the stage of the disease, on the type of surgical intervention in the early postoperative period and in ambulatory surveillance. Particular attention is needed for patients after amputation of phalanges of toes, the support part foot and amputations above the knee. After all, amputation of the lower extremities significantly disturbs the body's static, the center of gravity moves toward the retained limb. As a result, the slope of the pelvis, which leads to curvature of the spine and an increase in the load on the retained limb occurs, as well as the atrophy of the muscles of the box. The quality of life of patients significantly decreases. ***Conclusions.*** According to the results of the study it has been found out the percentage of women with this disease is lower than that of men, but it is significant, which does not completely coincide with previous studies, and obviously, it is necessary to investigate the causes of the growth of the disease in women. It has been found out that almost a quarter of patients with this diagnosis got into the surgery department at the stage of destructive changes with distinctive ulcers in the distal parts of the limbs and fingers, which led to their amputation.

Key words: obliterating atherosclerosis of the lower extremities, rehabilitation.

Наталія Голод. Структура оперативних утручань при облітеруючому атеросклерозі нижніх кінцівок та аспекти реабілітації хворих із цією патологією. ***Актуальність.*** Захворювання серцево-судинної системи в більшості економічно розвинених країн займають лідируючі позиції серед причин захворюваності, інвалідизації та смертності. Смертність від захворювань серцево-судинної системи переважає над смертністю від усіх злоякісних новоутворень, разом узятих, причому, 25 % померлих від серцево-судинних захворювань – це люди працездатного віку. Атеросклероз (atherosclerosis) – хронічна хвороба, яка характеризується ліпоїдною інфільтрацією внутрішньої оболонки артерій еластичного й змішаного типів із наступним розвитком у їх стінці сполучної тканини та клінічно проявляється загальними й місцевими розладами кровообігу. Атеросклероз облітеруючий – різновид атеросклерозу, що характеризується різким звуженням або повним закриттям просвіту

артерій. Він спостерігається, зазвичай, в артеріях нижніх кінцівок, серця, нирок і екстракраніальних відділах судин головного мозку. ***Мета дослідження*** – установити структуру оперативних утручань при облітеруючому атеросклерозі нижніх кінцівок та виявити головні аспекти, на які має бути спрямована реабілітація хворих із цією патологією. ***Методи дослідження*** – аналіз та синтез наукових джерел, аналіз медичних карт. Проведено аналіз 59 медичних карт хворих після оперативних втручань при облітеруючому атеросклерозі нижніх кінцівок. Проаналізовано структуру утручань і їх ускладнень протягом десяти місяців 2017 р. Критерій виключення – хворі з облітеруючим атеросклерозом нижніх кінцівок із цукровим діабетом. ***Результати дослідження.*** Такі хворі потребують реабілітаційного втручання залежно від стадії захворювання, типу оперативного втручання вже в ранньому післяопераційному періоді та в амбулаторних умовах. Особливої уваги потребують хворі після ампутації фаланг пальців, опорної частини стопи та ампутацій вище коліна. Адже при ампутації нижніх кінцівок значно порушується статика тіла, центр тяжіння переміщується в бік збереженої кінцівки. Як наслідок, нахил таза, що призводить до викривлення хребта й збільшення навантаження на збережену кінцівку, відбувається атрофія м'язів кукси. Значно знижується якість життя пацієнтів. ***Висновки.*** За результатами дослідження встановлено, що відсоток жінок із цим захворюванням є меншим, порівняно з чоловіками, проте він значний, що не зовсім збігається з попередніми дослідженнями та, очевидно, потребує вивчення причин росту цього захворювання серед жінок. Також установлено, що майже чверть пацієнтів із цим діагнозом поступили в хірургічне відділення в стадії деструктивних змін із характерними виразками в дистальних відділах кінцівки й пальцях, що призвело до їх ампутації.

Ключові слова: облітеруючий атеросклероз нижніх кінцівок, реабілітація.

Наталия Голод. Структура оперативных вмешательств при облитерирующем атеросклерозе нижних конечностей и аспекты реабилитации больных с данной патологией. ***Актуальность.*** Заболевания сердечно- сосудистой системы в большинстве экономически развитых стран занимают лидирующие позиции среди причин заболеваемости, инвалидизации и смертности. Смертность от заболеваний сердечно-сосудистой системы преобладает над смертностью от всех злокачественных новообразований, вместе взятых, причем, 25 % умерших от сердечно- сосудистых заболеваний – это люди трудоспособного возраста. Атеросклероз (atherosclerosis) – хроническая болезнь, которая характеризуется липоидный инфильтрацией внутренней оболочки артерий эластичного и смешанного типов с последующим развитием в их стенке соединительной ткани и клинически проявляется общими и местными расстройствами кровообращения. Атеросклероз облитерирующий – разновидность атеросклероза, характеризующаяся резким сужением или полным закрытием просвета артерий. Он наблюдается, как правило, в артериях нижних конечностей, сердца, почек и экстракраниальных отделах сосудов головного мозга. ***Цель исследования*** – установить структуру оперативных вмешательств при облитерирующем атеросклерозе нижних конечностей и выявить основные аспекты, на которые должна быть направлена реабилитация больных с данной патологией. ***Методы исследования*** – анализ и синтез научных источников, анализ медицинских карт. Проведен анализ 59 медицинских карт больных после оперативных вмешательств при облитерирующем атеросклерозе нижних конечностей. Проанализирована структура вмешательств и их осложнений в течение десяти месяцев 2017 г. Критерий исключения – больные с облитерирующим атеросклерозом нижних конечностей с сахарным диабетом. ***Результаты исследования.*** Такие больные нуждаются вреабилитационном вмешательстве в зависимости от стадии заболевания, типа оперативного вмешательства уже в раннем послеоперационном периоде и в амбулаторных условиях. Особого внимания требуют больные после ампутации фаланг пальцев, опорной части стопы и ампутаций выше колена, ведь при ампутации нижних конечностей значительно нарушается статика тела, центр тяжести перемещается в сторону сохранившейся конечности. Как следствие, наклон таза, что приводит к искривлению позвоночника и увеличения нагрузки на сохранившуюся конечность, происходит атрофия мышц культи. Значительно снижается качество жизни пациентов. ***Выводы.*** По результатам исследования установлено, что процент женщин с данным заболеванием является меньшим по сравнению с мужчинами, однако он значителен, что не совсем совпадает с предыдущими исследованиями и, очевидно, требует изучения причин роста данного заболевания среди женщин. Также установлено, что почти четверть пациентов с данным диагнозом поступили в хирургическое отделение в стадии деструктивных изменений с характерными язвами в дистальных отделах конечности и пальцах, что привело к ампутации.

Ключевые слова: облитерирующий атеросклероз нижних конечностей, реабилитация.

Introduction. Cardiovascular diseases in most economically developed countries are among the leading causes of illnesses, disability, and mortality. Mortality from diseases of the cardiovascular system prevails over mortality from all malignant neoplasms taken together, and, 25% of those who died of cardiovascular diseases are people of working age. Atherosclerosis (aterosclerosis) is a chronic disease, characterized by lipoid infiltration of the inner shell of the arteries of the elastic and mixed types with subsequent development of connective tissue in their wall, and clinically manifested by general and local disorders of

blood circulation. Obliterating atherosclerosis is a type of atherosclerosis, characterized by a sharp narrowing or complete closure of the arterial lumen. As a rule, it is observed in the arteries of the lower extremities, heart, kidneys and the external sections of the brain blood vessels [4].

The leg pain, which occurs when walking and disappears when resting, is evidence of the symptom of stenosis and occlusion of the arteries of legs or bifurcation of the aorta which is called 'intermittent lameness. Localization, intensity and nature of pain indicate the degree of blood circulation disorders, the degree of ischemia as well as the pace of the disease development. With acute occlusion of the arterial trunk, the pain is particularly intense. Thus, the authors P.Ya.Chumak, A.Ya.Kuznetsov, M.O Rudy, O. P.Kovalev noted that muscle weakness and paresis (feeling numbness, tingling, goosebumps) can be symptoms of a disruption of the blood circulation. They increase at the moment of functional loading.

At present, many rehabilitation programs for patients with intermittent lameness have been developed in the United States and Europe, however, the issue of rehabilitation of patients after surgical interventions at obliterating atherosclerosis of lower extremities remains open and complicated, since patients have many concomitant diseases and require a variety of physiotherapy as well as ergotherapeutic intervention.

The purpose of the study: to establish the structure of surgical interventions at the obliterating atherosclerosis of the lower extremities and to identify the main aspects that should be addressed for the rehabilitation of patients with this pathology.

The methods of the research: analysis and synthesis of scientific sources, analysis of medical records. The analysis of 59 medical records of patients after surgical interventions with obliterating atherosclerosis of the lower extremities has been performed. The structure of interventions and their complications for ten months of 2017 have been analysed. The exclusion criterion is patients with obliterative atherosclerosis of the lower extremities with diabetes.

The research was conducted on the basis of the Ivano-Frankivsk City Hospital No. 1, at the surgery department.

Results of the research. The main symptoms of obliterating atherosclerosis of the lower extremities are: pain or feeling of tiredness in the muscles of the legs when walking (usually in the calves muscles); this symptom is one of the earliest signs of atherosclerosis of the vessels of legs (intermittent lameness); unusual feeling of cold and numbness in the foot, which increases with physical activity (walking, climbing the stairs); the difference in skin temperature between the limbs (the suffering leg is colder than the healthy one); pain in the leg when resting, which deprives the patient of sleep; the presence of a wound that does not heal, or a trophic ulcer, usually located in the foot or the lower third of the shin; darkening of the skin, often in the form of dark brown or black necrosis of the fingers of the foot (gangrene); shrinkage of the area, covered with hair, pallor and dry skin, deformation of the nail plate, hyperkeratosis. [1; 4; 9].

Different methods are used to diagnose obliterative atherosclerosis of the lower extremities. The overview can reveal symptoms of trophic disorders of the tissues. By means of palpation, it is possible to detect changes in the temperature of different parts of the body and compare it with symmetrical areas, as well as to detect and compare the pulsation of arteries on symmetrical areas. Auscultation allows calculating the shoulder-shin index. The following functional tests are also applied: Opel (1911). Samuels (1929), Panchenko (1937), Goldflam (1985), Moshkovych, Shamova, Sittenko (1907, 1949, 1953), 'White Spot' test. Modern functional methods of research are also applied, namely, reovasography, ultrasound dopplerography, angiography, oscillography, thermometry (-grafy) of the skin, computer tomography, which are used to clarify the clinical diagnosis, the degree and the nature of vascular lesions, evaluation of the treatment effectiveness, and others. [4; 6].

Today foreign and domestic specialists for classification of the stages of obliterating atherosclerosis of the lower extremities use the classification by R.Fontain et.all. (1968):

I - leg pain appears only after prolonged (more than 1000 m) walking;

IIA - pains arise after walking the distance in the range of 200-1000 m;

IIB - painless walking on less than 200 m;

IIIA - occurrence of 'pains at rest', appearing in a horizontal position;

IIIB - frequent 'pains at rest', which force to lower the leg more 3-4 times per night;

IV A- the appearance of necrotic changes of the fingers of the foot;

IV B- gangrene of feet or legs. [2; 3; 6].

Also, according to the affected area, atherosclerosis is divided into the following forms:

Lerish syndrome (occlusion of the terminal department of the aorta and the iliac arteries); occlusion of the femoral artery, occlusion of the popliteal artery; Takayasi syndrome (occlusion of the arteries of the aorta arch); occlusion of mesenteric arteries; occlusion of the renal arteries; atherosclerosis of the brain arteries. [4; 5].

By the level of occlusion, the atherosclerosis of the lower extremities is divided into aortic bifurcation (Lerish syndrome); idiopathic-femoral segment; hip-popliteal segment; popliteal-spine segment (distal) (See Fig. 1).

It is believed that atherosclerosis is a disease, caused by a number of endogenous and exogenous factors that contribute to its clinical manifestations and progression.

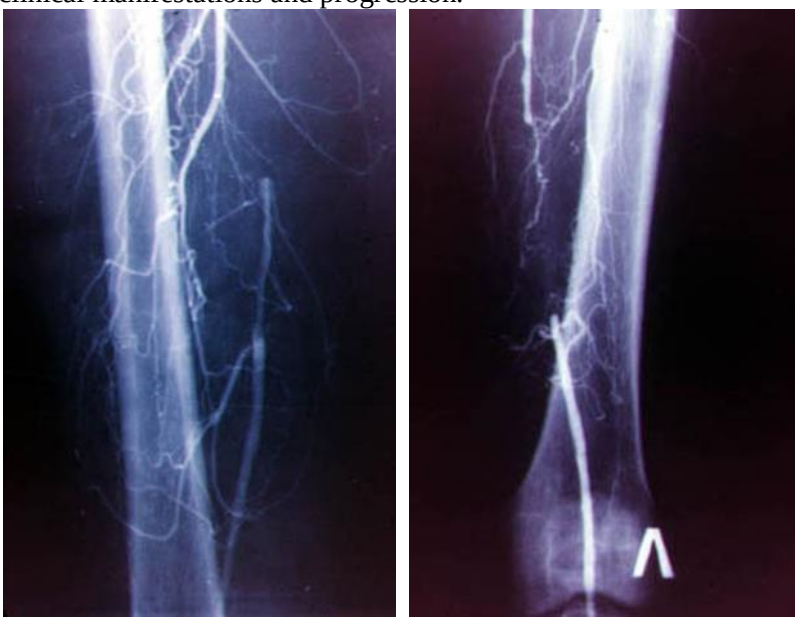

Fig. 1. *Angiogram. Variants of atherosclerotic lesion of the femoral artery.*

According to the analysis of sources [1; 4; 6], at present it is believed that the following main factors lead to the development of atherosclerosis:

- Smoking;
- Male gender (in most cases);
- Hypercholesterolemia, hyperlipidemia;
- Increased arterial pressure (regardless of the cause of its growth);
- Hormonal factor (hypothyroidism, diabetes mellitus);
- Social factors (emotional strain, stress);
- Obesity, excess body weight;
- Low physical activity;
- Genetic, hereditary factors.

However, there is no evidence in scientific sources that exactly each of these factors alone leads to the development of the disease.

Surgical treatment is indicated for all patients with severe limb ischemia, the factor that determines the operability of individuals with severe ischemia is the state of vascular outflow, that is, distally the location of the occlusion. The vascular reconstruction is indicated for all patients, in which, according to angiography, the basal ways of outflow (superficial or deep thoracic artery) have been preserved in the aorta-iliac localization of the occlusion, or at least in one of the arteries of the shin with total lesions of the femoropopliteal and peripheral arterial segments. The defeat of the main outflow segments to a significant extent is a contraindication for vascular reconstruction. In determining the indications for the operation, along with local signs of operability, special attention is paid to the general condition of patients, the nature of the accompanying diseases, which determine the degree of surgery risk and are a general indicator of patients` operability [1; 4].

The restoration of the main blood flow during occlusal lesions of the abdominal aorta and major arteries is achieved by means of the main types of operations that have been widely used in surgical practice, such as:

1. Different types of endarterectomy, intimmetromectomy.
2. Bypass surgery of the occlusion segment of the artery.
3. Resection and replacement of the obliterable segment of the artery (prosthetics).

If segmental occlusion of arteries in patients does not exceed 7-9 cm, endarterectomy is indicated. The operation consists in removing the altered intima together with the atherosclerotic plaque and thrombus. It is performed by either open (longitudinal arteriotomy over the obliterated section of the artery) or closed (transverse arteriotomy) method.

Each of these methods has its advantages and disadvantages. Endarterectomy is rarely used since the occlusion process usually affects the vessels to a large extent. In such cases, bypass surgery or resection of the affected artery area is carried out with the replacement of its plastic material [4].

In occlusive lesions of the aorto-iliac segment, operations of bypass grafting by aloprosthesis or resection of the affected area of the vessel with its subsequent prosthetics are more widely used. Currently, for arterial plastics, two types of vascular grafts are used, mainly, autovein and synthetic prostheses (lavsan, fluorlon-lavsan, dacron, and teflon) [1; 4].

At an atherosclerotic lesion of the abdominal aorta and iliac arteries, aortic-femoral shunting with the usage of a synthetic transplant or resection in the bifurcation area of the aorta with prosthetics are performed. At obliteration of the artery in the femoral-popliteal segment, femoral-popliteal or femoral-tibial shunting by a segment of a large subcutaneous vein is performed. Preference is given to autoveins, because, as domestic experts note, synthetic dentures are throbbing soon after the operation [1; 4].

The ideal method for revascularization of the limb with accompanying occlusions of the aorto-iliac and femoral-popliteal segments is the double reconstruction of both segments. If it is impossible to perform reconstructive surgery in patients with severe limb ischemia, surgery on the sympathetic nervous system and adrenal glands is indicated. Despite the fact that the results of lumbar sympathectomy in patients with III and IV stages of the disease are worse than in patients with stage II, practically all patients are shown lumbar sympathectomy as an alternative to amputation. The effectiveness of this operation is higher when atherosclerotic lesions are mainly localized in the lower extremities, when young patients are ill, at the I and II stages of the disease and when carrying out reconstructive operations at the same time. After sympathectomy, a paresis of the arteries of the limb occurs, peripheral angiospasm is eliminated, and the development of collateral circulation is stimulated [2; 4].

With significant dystrophic changes in the tissues of the distal parts of the extremities with gangrene and extensive necrosis with severe pain syndrome, lymphangitis and inguinal lymphadenitis, the simultaneous execution of lumbar sympathectomy and intraarterial infusion of medications into one of the branches of the femoral or external iliac artery are indicated. Intraarterial infusion of medications allows to remove the pain syndrome, peripheral angiospasm, improves microcirculation and rheological properties of blood, reduces inflammation and swelling of tissues. [4: 5].

Large necrosectomy, exarticulation of the fingers or economical amputations on the foot or leg, or higher are carried out in approximately 50% of cases with patients who have gangrenous ulcerative-necrotic changes in tissue of distal parts of the extremity along with the performance of reconstructive surgery, the intervention on the sympathetic nervous system and adrenal glands or prolonged intraarterial infusion. Limb amputation at the level of the thigh is indicated with high occlusion of the major arteries, as well as significant, irreversible changes in the tissues of the distal limb parts. The general and local conservative treatment is pursued with a successful restoration operation and the presence of pulsed blood flow along the arteries of the legs and feet. During the postoperative period, the following complications may occur: thrombosis of auto- or allograft, requiring repeated extreme surgical intervention; bleeding from an operated wound: primary (in the first 3 days), secondary (after 5 days), eroded; hematuria (indicates the overdose of anticoagulants) [2; 4].

According to our research, conducted at the surgery department of the Ivano-Frankivsk Central City Hospital, the majority of patients with this diagnosis are men. The gender structure of patients, undergoing surgical interventions for atherosclerosis of the lower extremities, is shown in Figure 2.

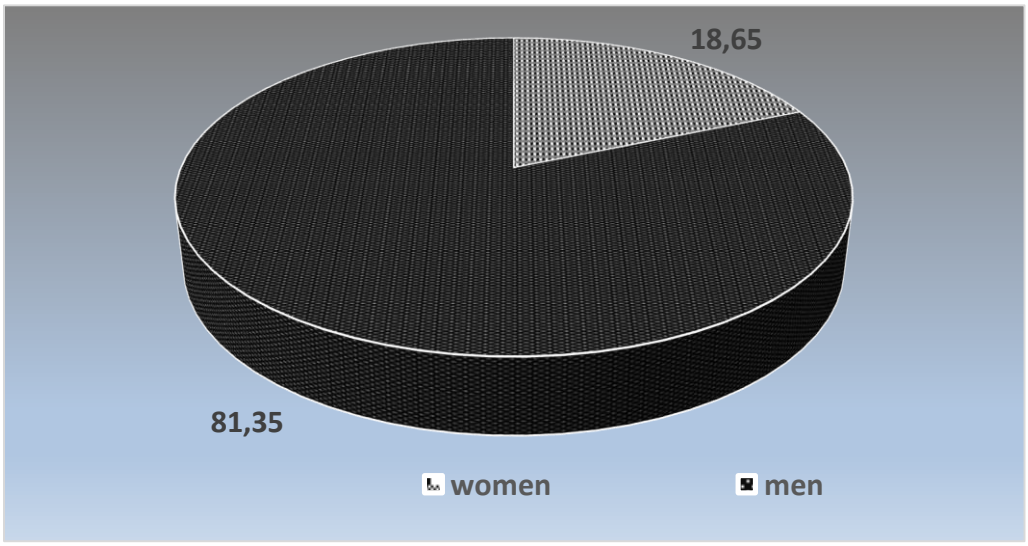

Fig. 2. *Gender structure of patients (%)*

The great problem of treatment and rehabilitation of these patients is that patients with this diagnosis usually come into hospital in the stage of destructive changes with characteristic ulcers in the distal parts of the extremities and fingers. The edges and bottom of these ulcers are 'stale', covered with dirty-gray bloom; there is no granulation, while inflammatory infiltration appears around. There is a swelling of the foot and shin. Pain in the foot and fingers becomes permanent and unbearable. A dry or wet gangrene of fingers and feet develops. In order to preserve the untapped part of the foot, in such cases, amputation of the fingers or parts of the foot is performed, and sometimes higher amputations are performed.

After analyzing the structure of patients who underwent surgical interventions for atherosclerosis of the lower extremities, it was found out that a significant percentage of patients had an amputation of phalanges, and a smaller percentage underwent amputation of the part of the foot (See Fig. 3).

Consequently, according to the analysis of the results of the study, it is clear that the percentage of women with this disease is less than that of men, but it is significant, which does not exactly coincide with the previous studies and obviously the causes of the growth of this disease among women need to be studied.

It was also found out that nearly a quarter of patients with this diagnosis entered the surgery department at the stage of destructive changes with characteristic ulcers in the distal extremities parts and fingers that led to their amputation.

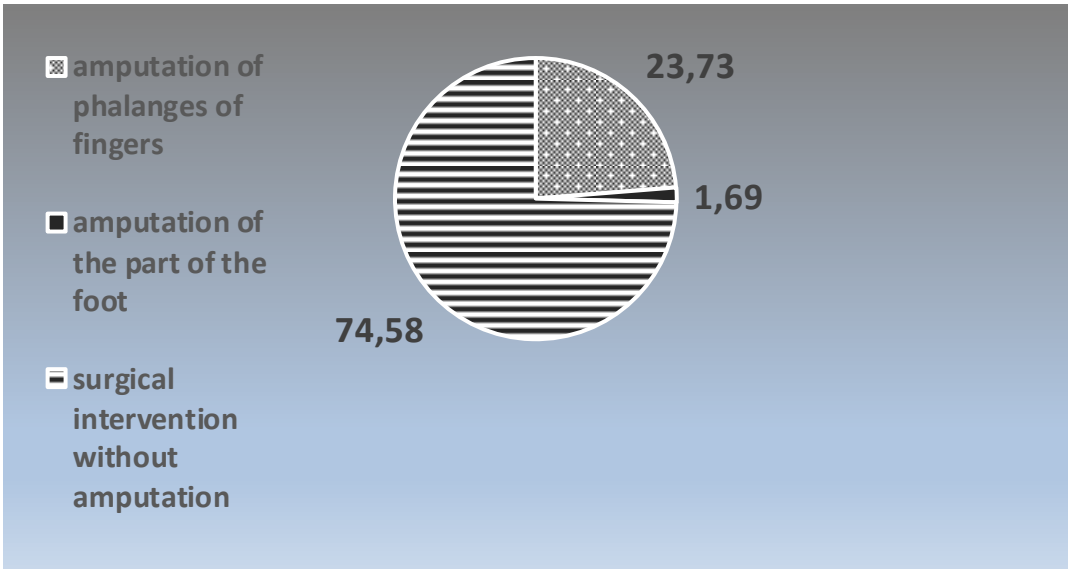

Figure 3. *Structure of surgical interventions (%)*

Discussion. The current health care system has rather low percentage of patients with this pathology who received rehabilitation care. After leaving the hospital, patients are subjected to clinical observation for a long time. This observation is usually of a formal nature. As a rule, for the prevention of exacerbation, the decision of the Medical Advisory Commission of the clinics provides restrictions on work, which does not lead to a decline in qualifications. People of manual labour are transferred to perform light work, and if this leads to a reduction their qualification, a disability of the group III is provided for the period of retraining.

In Phase II of the disease, only people of mental labor can work. People of unskilled physical work are assigned the disability of the group III. The disability of the group II is given to patients with one amputation (thighs, shins) and with a lesion in Phase II of the disease – with another limb. In Phase III of the disease, all are recognized as invalids of the group III, if necessary, they need to downscale the manufacturing activity. Frequent exacerbations of the disease provide the basis for the disability of the group II. In Phase IV of the disease, the group II is provided, and with the defeat of both legs, the disability of the group I is assigned [4]. However, these patients do not receive ergotherapeutic assistance, which could bring them back into society.

Treatment in Ukraine for such patients depends on the localization of lesions and the degree of limb ischemia. At the initial stages of circulatory disturbances, conservative treatment of the extremities is indicated. It is conducted 2-3 times a year, the course lasts 1-2 months. Vasodilators, antispasmodics, acting on cholinergic systems, are prescribed, as well as ganglion blocking agents, which are drugs that improve the rheological properties of blood and microcirculation. Anti-sclerotic drugs, that reduce the absorption of cholesterol, are also applied [1; 2; 4].

In convalescent hospitals of Ukraine physiotherapeutic treatment (referring to the use of natural and reorganized factors) is aimed at improving blood circulation, eliminating hypoxia in tissues, preventing the progression of the disease and normalizing the functional state of the central nervous system, namely, baro- and laser therapy, hyperbaric oxygenation. Among balneoprocedures different baths are often used (oxygen, radon, iodine-bromine, hydrogen sulfide, oxygen-radon, marine), as well as mud and ozocerite applications, impulse currents, UHF, electrophoresis of medications, microwave therapy, magnetotherapy. Exercise therapy is also used: walking, curative gymnastics, swimming in the pool (30-32 ° C), sports games and exercises, swimming and swimming in the sea (24-26 ° C). Massages in the back, lumbar area and segmental massage are carried out [4].

However, in the modern domestic health care system, there is no secondary prevention of this disease, and the importance of preventive measures aimed at eliminating the causes of the disease and preventing further complications are underestimated. There is no evaluation of the effectiveness of rehabilitation services provided, as a rule, all rehabilitation is limited to certain procedures.

An analysis of foreign sources has shown that abroad a great deal of attention is paid to increasing motor activity by applying aerobic loads to this group of patients. This, in turn, increases the duration and distance of stroke, and as a result, improves the lives of such patients and significantly reduces the percentage of patients with progression of obliterative atherosclerosis of the lower extremities. Also, rehabilitation measures are being developed to refuse patients from harmful habits, to correct a diet, aimed at normalizing body weight and lowering cholesterol level in the blood [6].

Such patients need rehabilitation interventions, depending on the phases of the disease, on the type of surgical intervention in the early postoperative period and in ambulatory surveillance. Patients after amputation of phalanges of toes, the support part foot and amputations above the knee need particular attention. After all, amputation of the lower extremities significantly disturbs the body's static, the center of gravity moves toward the retained limb. As a result, the slope of the pelvis, which leads to curvature of the spine and an increase in the load on the retained limb occurs, as well as the atrophy of the muscles of the box. The patients` quality of life significantly decreases.

Conclusions and prospecs of further researches. More than 5000 surgical interventions are performed annually in our country. They are aimed at restoring blood circulation in the abdominal basin of the aorta and lower extremities arteries in patients with atherosclerosis of the lower extremities vessels. The situation is complicated by the fact that the majority of patients with obliterative atherosclerosis call for help in later phases when occlusions take 'multistory' character and the risk of limb loss is very high.

Modern domestic surgical treatment of patients with chronic critical ischemia of the lower extremities is at a high level, however, the effectiveness of performing such operations depends on many factors: from the

phase of the disease, localization, and length of the occlusion, the degree of limb ischemia, concomitant diseases. However, in Ukraine, there are still very high rates of primary amputations of the lower extremities. Perhaps the reason for this is the almost complete lack of qualified and timely rehabilitation care for such patients, as well as the lack of educational and preventive work aimed at preventing the disease.

At present, rehab programs with an individual multidisciplinary approach aimed at restoring activities, as well as the programs that take into account risk factors, concomitant pathology and, above all, the causes of the disease have not been developed. Thus, in connection with an increase in the number of patients with atherosclerotic occlusions of the arteries of the thigh and legs and the dismal results of their treatment, we see the prospect of further researches in the development of rehabilitation measures for patients after surgical interventions and in theprevention of further complications from the main and concomitant diseases, as well as in improving the quality of life of this category of patients.

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