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## Surgical Treatment Of Obliterating Arteriosclerosis

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### ABSTRACT

In the literature review, according to publications of recent years, the state of surgical treatment of obliterating atherosclerosis does not meet the requirements of the time. Currently, all research is aimed at improving the early diagnosis of the disease and their timely treatment by improving the quality and efficiency of surgical intervention.

However, despite a large number of works devoted to diagnosis and prognosis of treatment, there are still many unresolved issues. The accumulated experience indicates the need to standardize the preoperative examination of patients in order to predict the outcome of treatment.

One of the important aspects of this problem is the development of modern tactics and approaches to surgical treatment. Along with them, it is necessary to evaluate the results of treatment, analyze the quality and determine the effectiveness of traditional operations in modern angiosurgery. It should be noted that today there are a considerable number of new methods of treating atherosclerosis obliterans for early and effective diagnosis, prevention and therapy of the disease.

However, some issues are insufficiently studied or contradictory and require further research.

### KEYWORDS

Obliterating atherosclerosis, causes, diagnosis, surgical treatment.

Conflict of interest. The authors declare no conflicts of interest.

Financing. The study was not sponsored.

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For citation: Zayniddin Norman coals. Surgical treatment of obliterating atherosclerosis.

## INTRODUCTION

Atherosclerosis as a systemic disease affects the arteries of all regions of the body. However, it is most commonly found in the aorta, coronary, and iliac arteries. One of the most important works was epidemiological research. According to the data, according to Bogulovsky J. et al. In patients with dominant lower limb ischemia syndrome, CA lesion was observed in 25-50%, renal arteries - 10%, and lesion of the branches of the aortic arch in 25-30% of cases. At the same time, the assessment of the state of all arterial basins was carried out according to the angiographic examination data. Patients with combined lesions of several arterial pools are the most difficult category of patients, both in terms of the choice of an adequate method of surgical treatment and in relation to the results of therapeutic tactics [1] This pathology acquires social significance due to the progressive course of atherosclerotic lesions of the vascular pools and their frequent outcome in strokes causing severe disability and vascular dementia. In the domestic literature, there are isolated works on the use of spiral CT for the diagnosis of occlusive lesions of the brachiocephalic arteries and there is no information on the assessment of the importance of the main morphological substrates of atherosclerotic plaques for the prognosis of ischemic changes in the brain in the immediate and late postoperative period.

Peripheral artery disease (PAD) affects 0.5-6.9% of the population. The aortoiliac segment

is involved in the occlusive process in more than half of patients with PAD (52.8%) and the prognosis in these patients is worse than in infrainguinal lesions [2]. Progression of the occlusive process with the onset of critical limb ischemia occurs in 15-20% of cases [3] According to Verhaeghe R. (1998), the prevalence of asymptomatic peripheral arterial disease is 3-4 times higher than intermittent claudication. Pathology of the infrarenal aorta occupies one of the central places in modern angiology and is represented mainly by two forms: occlusive lesions and aneurysms. The defeat of the aorto-femoral segment occurs in more than half of cases [2]. The revealed hemodynamically significant stenosis of the aorta and iliac arteries in 52.8% of patients with PAD showed that the prognosis in these patients is worse than in those with infrainguinal lesions. The incidence of occlusive peripheral arterial disease (PAD) is difficult to establish, since the disease is asymptomatic for a long time. There are several population studies - Framingham, Basel, Edinburgh, etc., in which the frequency of intermittent claudication - the first symptom of limb ischemia - was established by a survey or clinical study [5] The prevalence of the disease was 0.5-6.9%, and in the group of men over 60 years old - 7.5%. On the basis of clinical data and physical research methods, with occlusive lesions of the aorto-iliac zone and the artery of the lower extremities, concomitant lesions of the branches of the

aortic arch were found in 14-30.4% of cases [6,7].

The diagnostic value of modern methods of medical imaging in the diagnosis of occlusive lesions of the brachiocephalic arteries in patients with atherosclerosis of the abdominal aorta and its branches has not been sufficiently studied, in comparison with conventional ones.

patients with atherosclerosis of the abdominal aorta and its branches, in comparison with conventional non-invasive research methods and radiopaque angiography recognized as the "gold standard". In particular, the issues of the relationship between the degree of carotid artery stenosis and the "territory" of focal ischemic lesions of the brain remain poorly understood and have not found wide application in the practice of vascular surgery.

The main non-invasive method for diagnosing carotid artery pathology today is duplex ultrasound scanning (USDS) with Doppler sonography, however, it has some limitations in its application and does not always provide accurate diagnostic data on carotid artery stenosis [8-13]. So, with the help of ultrasound Doppler ultrasound, it is rather difficult to differentiate critical stenosis from complete occlusion of the vessel. The limiting factors for the use of this method are plaque calcification, great depth of vessels, or their tortuosity. All this can affect the accuracy of the study [14]. To improve visualization of atherosclerotic plaque and assess the degree of stenosis of the carotid arteries, it is advisable to use contrast agents.

The echogenicity of carotid plaques, as shown by the results of color Doppler studies, can be used as a marker of their vulnerability [15]. For the diagnosis and prognosis of stroke, it is customary to assess the degree of stenosis of

the carotid artery; however, the features of the morphology of the plaque should also be taken into account [16]. For a long time, it was believed that ulceration of an atherosclerotic plaque is the main cause of stroke development in ICA diseases [17]. Meanwhile, it is assumed that inflammatory changes and processes of neovascularization of the plaque lead to its rupture [18, 19].

Damage to the atherosclerotic plaque is associated with the appearance of microembolic signals (MES), which are detected during transcranial Doppler studies in patients with a history of stroke or transient ischemic attack [20]. MES are found in 43% of patients with symptoms of ICA stenosis and in 10% of patients in whom stenosis is asymptomatic [21].

Occlusive diseases and aneurysms of the infrarenal aorta and iliac arteries occupy one of the central places in modern angiosurgery. This is due to both the high prevalence of this pathology and the poor prognosis. The progression of the occlusive process with the emergence of critical limb ischemia occurs in 15-20% of cases. In contrast to obliterating diseases, the prevalence of abdominal aortic aneurysms can be estimated more accurately - according to the results of pathological studies [22].

But even in the absence of critical ischemia, the presence of an obliterating disease increases the risk of death by 2-4 times. An asymptomatic decrease in ABI is a reliable predictor of cardiovascular accidents. This is due to the development of atherosclerotic changes in the vessels of other basins, primarily coronary and cerebrovascular [23].

With atherosclerotic lesions of the abdominal aorta and arteries of the lower extremities, combined lesions of the brachiocephalic

branches are observed quite often. In a number of reports, the frequency of such combinations reaches 50-60% [24].

To date, there are basically three techniques in minimally invasive surgery of the aorto-iliac segment - “total” video laparoscopy, laparoscopically assisted surgery, and mini-access.

There is also an opinion that a mini-access should be considered an incision that allows manipulation in a wound only in an apodactyl manner, i.e. without introduction of the surgeon's hand into the wound, “remotely” [25,26].

It is recognized that endovideosurgical techniques are characterized by increased complexity. This leads to an increase in the duration of the operation, a high access conversion rate, which reaches 30%. Special instrumentation is required; the surgeon is required to have high manual skills in endosurgery [27].

The role of multiple associated lesions in surgical treatment is increasing. Reconstruction of one of the vascular basins can lead to serious complications from other vascular basins in case of their stenosing lesion. So, mortality is noted after reconstructive vascular surgery on the lower limbs without coronary artery disease - 0.5% and with coronary artery disease - 2.4% in patients.

Patients with obliterating disease after amputation are poorly rehabilitated. Even in the United States, only 32-42% of patients after amputation are able to use prostheses, only 21-29% move outside the home, and their three-year survival rate is 55% [28]. Russian data are even more pessimistic - 68% of patients die after amputation within 2 years.

According to different authors, significant differences in the frequency of BCA lesions detection in patients with atherosclerosis of the abdominal aorta and lower limb arteries can be explained by a number of factors: 1) studies were carried out by non-invasive methods (USDG, DS) and aorto-angiography; 2) when assessing the hemodynamic significance of BCA lesions, various criteria were used from more than 50% to 75% of narrowing of the artery of interest. In the group of patients with multifocal atherosclerosis, a combination of atherosclerotic stenotic lesions of BCA and abdominal aortic aneurysms occupies a special place [29].

Abdominal aortic aneurysms (AAA) are detected in 5-6% of men over the age of 64 [30] and in 1% of women in the same age group [31]. The risk of aneurysm rupture reaches 32.5% per year with a diameter of 7 cm [32]. Thus, 75% of patients with symptomatic aneurysms die within a year. A ruptured aneurysm is responsible for about 16,000 deaths per year in the United States [33]. This leads to high surgical activity in diseases of the infrarenal aorta. Aortic index - the number of operations on the aorta per 100 thousand population is 19.9 in Europe [34], in Russia - 8.2 (about 4000 reconstructions in Leriche syndrome and about 2000 in infrarenal aortic aneurysm) [35].

Therefore, only those minimally invasive interventions that are able to fully provide the pathophysiological essence of the operation become the method of choice. On the contrary, in cases where mini-stupas, for one reason or another, do not allow to adequately perform all stages of the operation and require a revision of the classical principles, the intervention has not yet gone beyond the framework of a clinical experiment. In this

regard, it is necessary to consider the fundamental aspect of minimally invasive surgery - the issue of the expediency of using a specific mini-accessible operation. When analyzing the feasibility of using a minimally invasive technique, it is necessary to note two blocks of questions:

1. Is it possible to radically perform a standard surgical technique through a mini-access, is the approved operation technology and its pathophysiological essence not violated? Is the modification of the operation safe?
2. Does the proposed method have advantages (medical and / or economic) over standard access? The first set of questions can be characterized as the reproducibility of a mini-accessible operation, and the second - as its efficiency.

Reproducibility (feasibility) of manipulation, i.e. compliance with the technology of the operation according to classical principles should always be soberly and impartially assessed. Minimally invasive surgery is based on good "open" skills and must retain all the fundamentals [36].

The desire to reduce the surgical trauma, to make the surgical manipulation as "comfortable" as possible for the patient, led to the emergence of minimally invasive surgical techniques in the mid-90s of the 20th century. They have emerged as an alternative to traditional aorto-femoral reconstructions using wide trans- or retroperitoneal access and endovascular procedures [37].

### CONCLUSION

Thus, the use of modern approaches and the development of tactics, methods of treatment of obliterating vessels, and their complications

are one of the urgent problems of vascular surgery that requires an early solution. Due to the inconsistency of the results of surgical treatment, it is necessary to pay special attention to diagnosis, optimization of the choice and tactics of treatment of patients. Our experience in the treatment of OA shows the need for the operative use of modern medical methods and technologies that allow for a more accurate diagnosis and prediction of the effectiveness of the results of the outcome of surgical treatment of patients. To do this, it is necessary to develop an algorithm for diagnosis and surgical treatment, as well as scientific and practical recommendations for the timely prevention of complications of OA of blood vessels. The urgency of solving this problem is predetermined by the lack of a comprehensive a diagnostic approach to identify asymptomatic lesions of the branches of the aortic arch, ischemic cerebral infarctions and their influence on the results of surgical treatment.

The authors declare no conflicts of interest.

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