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Original Research Article

Improvement of surgical treatment of patients with critical ischemia of the lower extremities

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ABSTRACT

Background: The choice of tactics of surgical treatment in patients with lesions of the femoral-popliteal-tibial segment with the CILE is the actual problem, which is far from being solved. Aim of the study was to found improved treatment of patients with critical ischemia of the lower extremities by improving the surgical approach.
Methods: 79 patients with critical ischemia of the lower extremities with lesions of the carotid and coronary arteries were observed and surveyed. To determine the tactics of treatment of these patients, we used non-invasive methods of imaging vessels, and only with probable therapeutic purposes used the contrasting of the vessels.
Results: The used treatment allowed reducing the number of complications to a minimum. Among observable patients, in one case was determined acute myocardial infarction. 19 (24%) patients with stenosis and CILE managed to achieve regress of clinical manifestations of lower limb ischemia with medical therapy. In 12 (63.1%) patients were completed the installation of long catheter for intra-arterial catheter therapy, after that we performed carotid endarterectomy. Of these, 9 (47.3%) patients at 7 days underwent reconstructive operations on arteries of the lower extremities. In 5 (26.3%) patients after carotid endarterectomy, endovascular interventions implemented at ALE.
Conclusions: The suggested diagnostic low and stages of surgical interventions significantly increase the detection of associated lesions of other arterial basins and expands the indications for surgical treatment with the use of combined interventions.

Keywords: Critical limb ischemia, Multifocal atherosclerosis, Staged intervention

INTRODUCTION

Today, thanks to surgical technology an opportunity for the treatment of peripheral vascular disease. However, despite the high level of development of modern medicine, in patients with critical limb ischemia (CLI), there is a high complication rate of surgical interventions and amputations performed.[1-3]

The results of the surgical restoration of blood flow at the CILE is determined mainly by the condition of the distal arterial bed.[4,5] The defeat of the arterial bed of the lower leg adversely affects the results of surgical treatment. Complications of the CILE observed in 2/3 times more often, amputation of a limb in the early stages is 50-65% of patients, relapse of critical ischemia in the first year after the operation, develops in 80-95% of patients.[6-7]

The majority of patients are treated in a specialized hospital for help, when clinical symptoms of the disease are strongly expressed, that is, there are already medium and severe stages of the disease. Unfortunately, surgical treatment of these patients is often impossible to conduct because of many reasons, the main ones are the lack of

satisfactory distal arterial bed of the lower leg and foot and severe comorbidities.[8,9]

The choice of tactics of surgical treatment in patients with lesions of the femoral-popliteal-tibial segment with the CILE is the actual problem, which is far from being solved. The most effective and are a justified active approach to the treatment of chronic ischemia using surgical methods to restore blood supply to the lower extremities, the use of vascular prostheses of the new generation, the advanced techniques of bypass grafting and endarterectomy.[10]

The greatest number of complications at different times after the interventions on the major arteries of the lower extremities, often requiring re-operation, constitute the thrombosis of vascular grafts and anastomoses, which are manifested by the recurrence of lower limb ischemia and jeopardize not only the viability of the operated limb but the patient's life. Re-reconstructive operations on arteries are accompanied by significant technical challenges and risks associated with the need to work in conditions of scar tissue and changed the topography of organs. Every year an increasing number of patients requiring re-reconstructive operations on arteries of the lower extremities (ALE).[9,11]

Thus, the above demonstrates the need to identify errors in surgical tactics of treatment of patients with CLI by a detailed analysis of the causes of thrombosis, performing amputations and the development of acute insufficiency of cerebral circulation (AICC), myocardial infarction in the postoperative period.

The purpose of the work was to found improved treatment of patients with critical ischemia of the lower extremities by improving the surgical approach.

METHODS

For the period from 2014 to 2015 in the vascular surgery, Department of the 2nd clinic of Tashkent medical Academy hospital treatment was 79 patients (58 men and 21 women) with a CILE. The algorithm of examination included general clinical examination methods. There were carried out neurological status examination; examination by a cardiologist with the assessment of the reserve capacity of the heart before and after surgical treatment; EchoCS, stress-EchoCS, transcranial Dopplerography, ultrasonic Dopplerography with the definition of regional systolic pressure and calculation of ankle-brachial index (ABI), transcutaneous oximetry, duplex scanning, magnetic resonance tomographic angiography, MSCT and contrast angiography.

The reason for the CILE in all patients was atherosclerosis, in 8 patients with atherosclerosis combined with pathological tortuosity of carotid arteries (CA). All patients had a lesion of two or more basins. The criterion for inclusion in the study was the presence of critical ischemia in patients with high risk of complications (ischaemic heart disease - coronary heart disease, arterial hypertension, diabetes mellitus, hemodynamically significant stenosis, myocardial and brain infarction).

Depending on the stage of ischemia of the lower extremities according to the classification of A.V. Pokrovski patients were distributed as follows: ischemia of the III degree - 40, ischemia IV degree - 39. In 31 patients' revealed stenosis of the iliac artery with occlusion of the femoral artery, 29 patients had occlusion of the superficial femoral and popliteal arteries with stenosis of a mouth of a deep femoral artery. 19 patients had hemodynamically significant stenoses in the femoral, popliteal and tibial arteries. All patients with CLI, the ABI was below 0.3 mmHg. The article all complained of pain at rest.

Table 1: Patient data related diseases with CILE.

Total number of patients	79	100%
Re-treatment of patients	15	19%
Asymptomatic CCI	11	14%
Transient ischemic attack	13	16.45%
Dyscirculatory encephalopathy	22	27.85%
Ischemic stroke	27	34.2%
Coronary artery disease	47	59.5%
IHD + CLI without hitting CA	14	17.7%

Hundred percent of patients diagnosed with cardiovascular disease. The 65 patients had a hemodynamically significant stenosis. Depending on the degree of chronic cerebrovascular insufficiency (CCI) according to the classification of A.V. Pokrovski patients was as follows: asymptomatic CCI was observed in 11 of them, transient ischemic attack - have 13, dyscirculatory encephalopathy - 22; 19 patients history suffered an ischemic stroke, and 8 of them stroke again. In 47 (72.3%) of these patients revealed coronary artery disease. Ischemic heart disease was also in 14 (17.7%) patients with CLI without hitting the CA. Out of 61 (100%) patients with coronary artery disease, exertional angina of FS II was observed in 37 (60.6 percent), FS III - in 12 (19.6 percent). 12 (19.6%) patients had unstable angina. In 8 (13.1%) patients suffered from one to three myocardial infarctions.

RESULTS

In 19 (24%) patients with stenosis with CILE managed to achieve regress of clinical manifestations of lower limb ischemia with medical therapy, 12 (63.1%) patients completed the installation of a long catheter for intra-arterial catheter therapy, after which we performed carotid endarterectomy. Of these, 9 (47.3%) patients at 7 days underwent reconstructive operations on arteries of

the lower extremities. In 5 (26.3%) patients after carotid endarterectomy, endovascular interventions implemented at ALE. 1 (1.2%) patient produced by the high amputation of a limb due to a progression of ischemia. In 1 (1.2%) patient developed an acute myocardial infarction with fatal outcome.

The simultaneous choice of tactics was based on the inability of the relief of CILE and percutaneous interventions or their ineffectiveness. Simultaneous operations were performed in 4 (5%) patients with stenosis with CILE. No complications were observed.

In 19 (24%) patients with lesions of the CA and CILE the first stage of the performed endovascular intervention about CILE, 5 (6.3%) of them produced a hybrid intervention. 1 (1.2%) patient underwent high amputation with fatal outcome, 1 (1.3%) - amputation according to Sharpe.

Open interventions on the ALE when combined lesions of the SA and the CILE was done in cases where the alternative to the intervention was high amputation of a limb. An important condition for implementation of such interventions has a high tolerance of brain to ischemia, asymptomatic CCI, uncomplicated plaque SA and the absence of hemodynamically significant stenosis of CA on one side. Open interventions at the CILE first stage was performed in 11 (13.9%) patients. All operations on the lower extremities were performed under spinal anesthesia and lower occlusive disease of the ligaments. In 1 (1.2%) of these patients due to the progression of ischemia high amputation of the affected limb.

For patients with coronary artery disease important criteria is influencing the choice of treatment strategy. Coronary reserve which was expressed by decrease in stroke volume less than 50 ml/min ejection fraction of the left ventricle less than 45%, increased end-diastolic volume of the left ventricle, the presence of segmental violations who testified to the violation of the pumping function of the myocardium, cardiac threatening complications in intra - and postoperative period according to EchoCS. Given this, patients were shown with coronary angiography diabetic purpose. In 6 (7.5%) patients with lesions of the coronary arteries (CA) and ALE the first stage produced stenting KA, the second stage - reconstruction of the ALE. In 2 (2.5%) of patients produced by open intervention on the ALE in connection with hemodynamically non-significant lesions upon coronary angiography. In 4 (5%) of the patients underwent palliative intervention (thoracoscopic sympathectomy).

The effectiveness of the interventions was determined on the basis of lack of acute or new focal changes of the brain, myocardium and improve blood flow in the lower extremities. Among observable patients, only one developed an acute myocardial infarction. When assessing the regression of lower limb ischemia, the ABI considered the source, the figure was 0.27±0.04, on the 3rd and 4th day after surgery on the ALE increased to 0.53±0.3 ($p < 0.05$).

DISCUSSION

According to the results of our study, in patients with CLI in a case of combined lesions of SA and KA at high risk of developing acute focal complications of the brain and myocardium. In the presence of peripheral arterial disease, the risk of myocardial infarction increases by 20-60%, and the probability of death from CHD increases 2-6 times. In 40% also increases the risk of stroke.[11] In patients with severe lesions of the ALE with the CILE in the risk of myocardial infarction and stroke is significantly higher than in patients with a moderately severe form of the disease. Myocardial infarction and stroke are the main causes of death in patients with CLI. Annual mortality among patients with CLI is 25% and among those who suffered amputation, and 45%.[12]

As you know, conservative treatment ineffective CILE even with the use of modern genetic engineering drugs. It is not always possible to reduce the intensity of pain at rest without the use of narcotic analgesics, to increase the distance of pain-free walking, to achieve granulation coating ulcers and increasing indices of regional systolic blood pressure and ABI. At the same time, the use of peripheral vasodilators in an attempt to stop the CILE may aggravate the circulatory disorders of the heart.[13,14]

Thus, in patients with CLI in a case of combined lesions of CA and KA is expedient for the prevention of acute focal disorders of the brain and myocardium. To obtain satisfactory results it is necessary to apply differentiated surgical tactics, the choice of which is determined only after a careful study of the local hemodynamics and the assessment of the compensatory abilities of the affected remote basins. Thus, it is necessary to try either medication or minimally invasive ways to stop the CILE with the primary prevention of ischemic cerebral infarction and myocardial.

CONCLUSION

Tactics of treatment of patients with CLI should depend on lesions of other arterial basins. The priority when choosing a method of surgical interventions should be given to endovascular intervention due to the low operational risk and hybrid operations that enable you to perform the optimum correction of the two blocks of destruction. We need a comprehensive approach to diagnosis and treatment of this severe category of patients. This allows you to determine the best surgical approach to each patient individually.

The suggested diagnostic low and stages of surgical interventions significantly increase the detection of associated lesions of other arterial basins and expands the

indications for surgical treatment with the use of combined interventions.

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