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## TREATMENT OF CRITICAL ISCHEMIA OF THE LEGS

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**Abstract**

a severe pathological condition that develops as a result of acute arterial circulatory disorders , which is associated with a high risk of amputation and disability. This disease often develops against the background of atherosclerosis and is manifested in patients by pain at rest, trophic ulcers and gangrene. The aim of the study is to assess the clinical effectiveness of modern conservative, endovascular and surgical methods in the treatment of critical lower limb ischemia. During the study, a comprehensive treatment approach was used in patients diagnosed with critical ischemia, and the results of treatment were analyzed. The results obtained showed that revascularization methods, in particular endovascular interventions (angioplasty and stenting) and surgical bypass operations, are highly effective in restoring blood flow. Also, complex treatment in combination with drug therapy helps to reduce pain syndrome, accelerate the healing of trophic ulcers and reduce the risk of amputation. This approach is an effective and promising direction in the treatment of critical lower limb ischemia .

**Keywords**

critical ischemia, lower extremities, atherosclerosis, revascularization, angioplasty, stenting, bypass surgery, trophic ulcer.

**Entrance**

a severe clinical condition characterized by a sharp disruption of arterial blood circulation , which often manifests itself as a terminal stage of **Peripheral Artery Disease . This pathology leads to oxygen deficiency (hypoxia)** and metabolic disorders in the tissues as a result of a sharp decrease in arterial blood flow. Clinically, critical ischemia is characterized by the presence of pain in patients even at rest , the development of long-term non-healing trophic ulcers and gangrene. This increases not only the medical, but also the socio-economic significance of the disease.

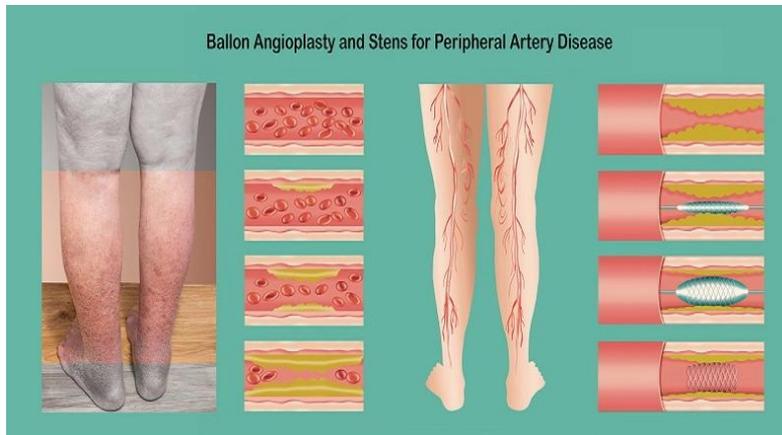
According to epidemiological data , critical ischemia occurs mainly in elderly patients and its main etiological factor is atherosclerosis. As a result of the formation of atherosclerotic plaques in the arteries, the vascular lumen narrows or completely closes, which sharply reduces the blood supply to distal tissues. Also, risk factors such as diabetes mellitus, arterial hypertension, dyslipidemia and smoking play an important role in the development of the disease. Especially in patients with diabetes mellitus, critical ischemia progresses faster and more severely against the background of micro- and macroangiopathy.

Critical ischemia is associated with a high risk of amputation , and in untreated cases, a large proportion of patients may require lower limb amputation within 6–12 months. Therefore, early detection of this disease and the use of effective treatment methods are one of the urgent



problems of modern medicine. In recent years, significant progress has been made in the treatment of this pathology, in particular, the development of minimally invasive endovascular technologies has significantly improved treatment outcomes.

Modern treatment approaches include complex management of critical ischemia. This involves the combined use of drug therapy (antithrombotic, lipid-lowering and vasodilator drugs), endovascular interventions (balloon angioplasty, stenting) and open surgical methods (bypass surgery). In recent years, endovascular methods have become especially widespread, which are characterized by minimal invasiveness, short rehabilitation period and low complication rate.



However, in some clinical situations, a single treatment method may not be sufficient. For example, in cases of widespread or multilevel arterial damage, combined (hybrid) approaches - that is, the combined use of endovascular and open surgical methods - are highly effective. In addition, local treatment and infection control are also important in patients with trophic ulcers.

Thus, critical lower limb ischemia is a high-risk and multifactorial disease with a complex pathogenesis, the treatment of which requires a comprehensive and individual approach. In modern medicine, the combination of various methods for the effective treatment of this disease, in particular, the widespread use of revascularization methods, is of great importance. Therefore, the study of the clinical effectiveness of modern methods in the treatment of critical ischemia and their implementation in practice is one of the current scientific directions.

### Materials and methods

was conducted as a **prospective clinical observational study** aimed at evaluating the effectiveness of modern treatment methods in patients with critical lower limb ischemia. During the study, patients were dynamically monitored preoperatively and postoperatively and evaluated based on clinical, instrumental and laboratory parameters.

was to determine the effectiveness of revascularization methods, that is, to study the effect on the degree of restoration of arterial blood flow, regression of clinical symptoms, and the risk of amputation.

### Number of patients and their description

included **50 patients** diagnosed with critical ischemia. The patients' ages ranged from **45 to 80 years**, with a mean age of **62 ± 7.5 years**.

- Men — **32 (64%)**



- Women — **18 (36%)**

In the majority of patients, atherosclerosis was identified as the main etiological factor, and in some, angiopathy associated with diabetes mellitus was also observed.

#### Entry criteria:

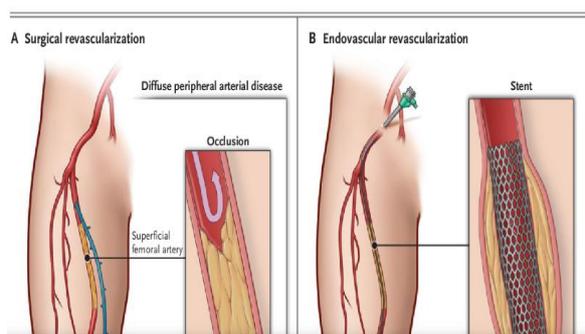
- Presence of pain at rest
- trophic ulcers or foci of necrosis
- a sharp decrease in arterial blood flow during instrumental examinations

#### Exclusion criteria:

- acute thrombosis
- severe heart failure
- general contraindications to surgery

#### Diagnostic methods

All patients underwent the following comprehensive examinations:



- **Clinical examination** - pain level, trophic changes, skin condition were assessed
- **Doppler ultrasound** — determines the velocity and level of arterial blood flow
- **Angiography** — assesses the degree of stenosis and occlusion in the arteries
- **Laboratory tests** — blood tests, coagulogram, lipid profile

Based on these examinations, individual treatment tactics were selected for patients.

#### Endovascular treatment methods

In some patients, less invasive methods were used:

- **Balloon angioplasty** — a narrowed artery segment is widened
- **Stenting** — a stent is placed to stabilize blood flow

The procedures were performed under X-ray guidance and local anesthesia. These techniques were aimed at rapidly restoring arterial blood flow and improving tissue perfusion.

#### Surgical treatment methods

The following surgical methods were used in severe and multi-level lesions:

- **Bypass surgery** — blood flow is restored artificially



- **Endarterectomy** — removal of atherosclerotic plaques inside the artery

These operations were performed under general or regional anesthesia and were selected based on the individual condition of the patients.

### Conservative treatment

All patients were prescribed complex drug therapy:

- antithrombotic drugs
- statins
- vasodilators
- painkillers

Local treatment methods were also used in patients with trophic ulcers .

### Statistical analysis

The results were statistically processed and expressed as mean values (  $M \pm m$  ). Differences between groups were assessed at the level of  $p < 0.05$  .

The analysis revealed the effectiveness of various treatment methods, the frequency of complications , and the impact on clinical outcomes.

### Results

In this study, **50 patients with critical lower limb ischemia** were treated with modern treatment methods and clinical outcomes were comprehensively evaluated. The results confirmed the high effectiveness of revascularization methods.

severe clinical signs of the disease before surgery . In particular, **pain at rest** was noted in 100% of patients , **trophic ulcers in 72% of patients** , **necrotic changes in 38% of patients** . In addition, most patients had a feeling of coldness in the legs, discoloration , and a sharp decrease in walking distance.

After treatment, significant positive dynamics were observed in the clinical condition of patients. As a result of endovascular and surgical revascularization, arterial blood flow was restored and tissue perfusion improved. **Within 10–14 days after surgery, 85% of patients experienced a sharp decrease in pain syndrome , and 70% experienced complete disappearance.**

was also positive . During the observation:

- **Wound epithelialization began in 60% of patients within 1 month**
- **At 3 months , 78% of patients had complete healing of their wounds.**

Instrumental examinations, in particular angiography and Doppler examinations, confirmed the effectiveness of revascularization. Patients:



- **Blood flow was fully restored in 88%**
- **Partial improvement was observed in 10%**
- **Only in 2% of cases was there no sufficient effect?**

Postoperative complications were rare and mostly mild. Some patients experienced hematoma, swelling, or transient pain. Serious complications (thrombosis or infection) were almost never reported.

Amputation rates also decreased significantly. During the study:

- **only 6% of patients** required minor amputation
- **no cases of major amputations were observed**

is relatively short, and most patients:

- **Started walking within 2–3 days**
- **Returned to daily activities within 7–10 days**

Thus, the results obtained showed that modern revascularization methods in the treatment of critical ischemia of the lower extremities have high clinical effectiveness, allowing to reduce pain, heal wounds and significantly reduce the risk of amputation.

### Conclusion

The results of the study showed the high clinical effectiveness of modern approaches in the treatment of critical lower limb ischemia. In particular, it was found that complex treatment - that is, conservative drug therapy, endovascular interventions (angioplasty, stenting), and, if necessary, the use of open surgical methods - is of great importance in restoring arterial blood flow and improving tissue perfusion.

During the study, it was observed that revascularization methods significantly reduce pain at rest in patients, accelerate the healing of trophic ulcers, and improve the overall clinical condition. In particular, endovascular methods were characterized by minimal invasiveness, low trauma, and a short rehabilitation period, which proved to be convenient for widespread use.

Another important advantage of this approach is the significant reduction in the risk of amputation as a result of comprehensive treatment. This not only improves the quality of life of patients, but also plays an important role in maintaining their social activity.

Thus, the most effective strategy for the treatment of critical lower limb ischemia is complex therapy, selected on the basis of an individual approach. Widespread implementation of modern revascularization methods, early diagnosis and timely treatment of patients will help reduce amputation rates and improve treatment outcomes.

justify the need for widespread use of modern approaches in the treatment of patients with critical ischemia and indicate the importance of continuing scientific research in this area in the future.



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