COMPARATIVE ANALYSIS OF ENDOVASCULAR INTERVENTION IN PATIENTS WITH CRITICAL LOWER LIMB ISCHEMIA IN DIABETIC FOOT SYNDROME

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Introduction

Currently, due to the achievements of reconstructive surgery of occlusive lesions of the arteries, successful revascularization of the extremities has become possible in 60-70% of patients [3,4]. However, the timing of vascular shunts functioning directly depends on the initial degree of chronic limb ischemia, as well as on the state of the peripheral arterial bed [5,6,7]. In more than 70% of cases in patients with critical ischemia, amputation of the lower extremities is preceded by a foot ulcer and other complications. The methods of surgical and conservative treatment of purulent-necrotic complications of diabetic foot syndrome used in modern treatment practice do not always allow to achieve stabilization of the process, they are quite expensive and often difficult to perform [8,9,10].

The aim of this study was to improve the results of treatment of patients with critical lower limb ischemia with diabetic foot syndrome by a differential treatment approach taking into account endovascular interventions.

Materials and methods of research.

The work is based on the data of examination and treatment of 113 patients with critical lower limb ischemia with severe diabetic foot syndrome (IV-V according to Wagner, 1979) who received inpatient treatment at the clinical base of the Bukhara State Medical Institute of the Bukhara Multidisciplinary Regional Medical Center for the period 2010-2022. In accordance with the objectives of the study, all patients were conditionally divided into 2 groups: in comparison group I, 66 (58.4%) patients with critical lower limb ischemia with diabetic foot syndrome who underwent the traditional method of treatment: surgical treatment, excluding angiographic examination and endovascular intervention. Of the 66 patients in the comparison group, 44 (66.6%) underwent amputation at the shin level according to the method developed at the A.V. Vishnevsky Scientific Medical Research Center for Surgery, 14 (21.2%) patients underwent atypical foot resection, finger amputation was performed in 6 (9%) patients, 2 (3%) patients had limited with necrectomy of the affected lower limb. It should be noted that all patients received inpatient treatment from 2010 to 2019, in the period before the introduction of angiographic studies in our clinic. The main group consisted of 47 (41.6%) patients with critical lower limb ischemia with diabetic foot syndrome who underwent surgical treatment: taking into account angiographic examination using endovascular intervention.

Taking into account the peculiarities of angiographic examination, localization and degree of vascular lesion of the lower extremities, the following types of endovascular minimally invasive placements were determined: balloon angioplasty (vascular delatation), stenting of stenosed vessels, reconalization of occlusive vessels. Among all patients, there was a multilevel lesion of the arterial system of the limb with occlusive stenotic lesion, including femoral (general, superficial and deep), popliteal, and lower leg arteries (anterior and posterior tibial, interosseous). Based on the clinical examination, further treatment tactics were determined, depending on vascularization.

Results and their Discussions

When determining the tactics of surgical treatment of patients of the I control group, they were guided mainly by the severity of the purulent necrotic process, using the Wagner classification. When assessing purulent-necrotic limb lesions in patients of the control group, it was revealed: most cases of patients were with lesions of the I finger 7 (10.6%), I-II fingers 6 (9.1%), sole 12 (18.2%), Foot 14 (21.2%) and lower leg 7 (10.6%). In the remaining 39.4% of patients, lesions of II 4 (6.1%), III 7 (10.6%), IV 5 (7.5%), V 4 (6.1%) fingers of the limb were observed. Preparation for the operation began with an assessment of metabolic and electrolyte disorders and their correction. Diabetic history revealed that among 66 patients of the comparison group, diabetes mellitus in 7 (10.6%) was detected for the first time. In most patients, the duration of diabetes mellitus before admission ranged from 4 to 10 years. The following criteria for assessing the condition of patients were indicators of general intoxication of the body. On the first day of treatment, the patients' body temperature averaged 39.1 ±0.04 0C. The content of blood leukocytes was on average 11.1±0.14·109/l. The volume of the average molecules averaged 0.308±0.006 units. Similarly, there was an increase in the indicators of LII and ESR to 3.9±0.06 and 54.1±0.93, respectively. Elevated levels of MSM, L, LII, as well as ESR, indicated pronounced endotoxicosis in this category of patients. By the seventh day of treatment, the examined patients of the comparison group with GNPS maintained a slight subfebrility (37.0 ±0.030 S). At the same time, according to the indicators of intoxication of the body: L, MSM, LII and ESR of the blood, their further decrease was noted, that is, there was a tendency towards normalization – 7,7±0,08, 0,121±0,002, 1,4±0,02, 17,3±0,34 accordingly.

In parallel with the above indicators, we studied clinical and biochemical tests when evaluating the effectiveness of the therapy. The study of the blood sugar level showed that by the time of admission to the clinic, on average, it was 13.8 ± 2.3 mmol/ l. So, in our study, the following unsatisfactory results were observed; suppuration of a postoperative wound in 5 (7.5%) patients of which resulted in forced reamputation of the lower leg in 3 (4.5%) cases, in one case 1.5% performed high amputation at the hip level. In four cases (6.1%), a fatal outcome. Of these, two patients, despite the complex detoxification and symptomatic treatment, had the development of multiple organ failure, which was the cause of death on the 12th-13th day. One patient on the 3rd day had a fatal outcome due to acute myocardial infarction. In one patient, the cause of death was acute pulmonary embolism. All these patients were in senile age from 60 years. The average bed days of group I patients was 14±2.5.

Thus, the analysis of the results of the study of patients in the comparison group showed that in severe forms of critical lower limb ischemia, the use of the amputation method used at the shin level is the optimal method of surgery, but has a number of disadvantages in the form of complications that require improved methods of diagnosis and treatment. It is known that minimally invasive methods of diagnosis and surgical intervention with the use of modern technologies of angiographic methods of diagnosis and treatment is a priority direction of solving this problem. We decided to improve the methods of treatment by applying a differential approach of endovascular interventions, taking into account the degree of damage to various levels of the vessels of the foot.

All of the above became the basis for the development of a new treatment approach that contributes to improving the results of treatment by reducing the number of limb amputations and postoperative complications with low-traumatic operations. The II main group included 47 patients with diabetic foot with critical ischemia of the lower extremities. In determining the tactics of surgical treatment of patients of the II main group, in contrast to the control group of patients, endovascular X-ray contrast

diagnostics of the vessels of the lower leg and foot was performed. At the same time, anotomy of the vessels of the lower leg and foot and their lumen at different levels of the foot were studied.

When assessing purulent-necrotic limb lesions in patients of the control group, the following were revealed: lesions of the I finger 10 (21.2%), I-II fingers 5 (10.6%), sole 6 (12.7%), foot 17 (36.1%), foot and lower leg 9 (19.1%). Dynamics of changes in intoxication indicators in The comparison group of patients was as follows: on the first day of treatment, the body temperature of the patients averaged 39.1 ± 0.04 0C. The content of blood leukocytes was on average 11.1±0.14·109/l. The volume of the average molecules averaged 0.308±0.006 units. Similarly, there was an increase in the indicators of LII and ESR to 3.9±0.06 and 54.1±0.93, respectively. Elevated levels of MSM, L, LII, as well as ESR, indicated pronounced endotoxicosis in this category of patients.

By the seventh day of treatment, the examined patients of the comparison group with GNPS maintained a slight subfebrility (37.0 ±0.030 S). At the same time, according to the indicators of intoxication of the body: L, MSM, LII and ESR of the blood, their further decrease was noted, that is, there was a tendency towards normalization – 7,7±0,08, 0,121±0,002, 1,4±0,02, 17,3±0,34 accordingly. The study of the blood sugar level showed that by the time of admission to the clinic, on average, it was 12.7 ± 2.1 mmol/l. Against the background of complex conservative and surgical treatment, the elimination of a purulent-necrotic focus, carried out in the postoperative period, contributed to a decrease in blood sugar levels in patients of the second group to the upper limit of the norm by 6-7 days of treatment.

The use of angioendovascular diagnostics and the differential approach of endovascular surgery with the separation of the foot vessels into 3 levels depending on the size changed the indicators for the better after surgical complications and research results compared to the control group It should be noted that out of 47 examined patients of group II, amputation at the level of the lower leg was performed in 6 (12.8%) patients. In these patients, the main causes of amputation of the lower leg were severe (V degree according to Wagner) lesions of the tissues of the lower leg and foot before admission to the clinic. A fatal outcome was noted in one patient who was admitted late in the disease with a V degree of Wagner lesion, at an old age (67 years).

Conclusion

The results of the study showed that in the treatment of patients with SDS with critical lower limb ischemia, the use of a differential approach of surgical tactics, taking into account X-ray endovascular diagnostics, contributes to improving the results of treatment of this category of patients. At the same time, amputation at the shin level is reduced from 66.6% to 12.8%, high amputation from 1.5% to zero, foot amputation from 21.2% to 19.1%, reamputation 4.5% to zero. Suppuration of the postoperative stump from 7.5% to 2.1%. Due to the reduction of large traumatic operations, which in most cases lead to disability, the number of low-traumatic finger amputation operations increased to 34% and 31.9% of patients were treated with necrectomy. The average duration of bed days decreased from14±2.5 to 8±1.8 days. The mortality rate is from 6.1% to 2.1%. All this testifies to the sufficiently high economic efficiency of our proposed methods of differential approach for the treatment of patients with diabetic foot syndrome with critical limb ischemia with vascular lesions of the lower leg and foot by a differential approach taking into account the level of vascular lesions of the foot and the size of the vascular lumen.

List of Literature

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