Effectiveness of Endovascular Intervention in the Treatment of Patients With Critical Ischemia of the Lower Limbs on the Background of Diabetic Heel Syndrome

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ABSTRACT

The research work is based on the data of 47 patients with severe damage of severe diabetic heel syndrome (according to Wagner (1979) IV-V degree) who were examined and treated from 2019 to 2022 in the clinical base of Bukhara State Medical Institute of Bukhara Regional Multidisciplinary Medical Center.

Keywords: Sugar diabetes, diabetic foot, purulent wound, angiography, angioplasty, recanalization, stornirovaniya, sewage.

Dolzarbligi. In the last decades of the 20th century and the beginning of the 21st century, specialists in the treatment of patients with diabetes (QD) focused on the diabetic heel syndrome (DTS), which is a critical ischemia of the lower limbs, and its complications "combine pathological processes of the microcirculation, peripheral nervous system, bone and joint apparatus of the heel, which is a direct result of ulcerative necrotic processes and gangrene of the heel." refers to the threat or development of dementia. According to some epidemiological studies, the frequency of peripheral artery disease (PAD) in diabetic patients ranges from 10 to 40%, and in the presence of heel defects, it reaches 50%. In the Russian Federation, critical ischemia of the lower limbs (PMKI) is diagnosed in 1.5 million people. Vascular atherosclerosis is the cause of chronic lower limb ischemia (PMSI) in 80-90% of cases. The high frequency of this pathology is observed especially in people over 60 years old.

Globally, according to studies, the prevalence of type 2 diabetes among individuals over 35 years of age is 7.9%. Complications of diabetes are an important medical and socio-economic problem due to the increase in the number of patients with type 2 diabetes among young people. DTS takes the leading place in the list of late complications of diabetes, leading to early disability and death. Unsatisfactory results of amputations of the lower limbs at the level of the upper third of the calf due to critical ischemia on the background of diabetes determine the relevance and social importance of studying the prevention of early postoperative complications in lower limb amputations, which indicates the need to optimize the tactics of surgical treatment of these patients.

Today, in our country, in the field of health care, large-scale targeted measures have been implemented to fundamentally improve the quality of medical care provided to the population and to significantly expand its types. In the five-priority development strategy of the Republic of Uzbekistan in 2017-2021, the tasks of developing and improving the system of providing medical and social assistance to low-income categories of the population to ensure their full life are set. In this regard, in particular, positive results have been achieved in improving the quality of surgical treatment of patients with QD with critical ischemia of the lower limbs. At the same time, scientifically based results are required to evaluate the effectiveness of new methods of surgical treatment of DTS in critical ischemia of the lower limbs, which creates an important problem for specialists in this field in order to improve the medical care system. Unsatisfactory results of amputation of the lower limbs due to critical ischemia on the background of diabetes determine the relevance and social importance of studying the prevention of early complications after surgery in the amputation of the lower limbs, which indicates the need to optimize the tactics of surgical treatment of these patients.

The purpose of the scientific work is to study the effectiveness of endovascular intervention in the treatment of patients with critical ischemia of the lower limbs against the background of diabetic foot syndrome.

Material and inspection methods.

The research work is the clinical base of the Bukhara State Medical Institute of the Bukhara Regional Multidisciplinary Medical Center Based on data from 47 patients with severe diabetic foot syndrome (Wagner (1979) grade IV-V) who were treated as an inpatient in 2019 to 2022.

47 patients with critical ischemia of the lower extremities in diabetic heel syndrome were treated surgically, taking into account angiographic examination with the help of endovascular intervention. Surgical tactics were determined taking into account the results of angiographic examinations. Based on the results of the X-ray contrast angiographic examination, the level and depth of damage to the vessels of the lower limbs, as well as the depth of the purulent-necrotic damage process, methods of minimally invasive endovascular intervention are determined for each individual patient.

Wagner (1979) classifications were used to determine the purulent-necrotic processes of the examined patients (Table 1).

Table 1

Wagner 1979. classification

Grade	Definition	Description
0	Risk for compensation	No wound defect, but dry skin, dry calluses, toe joint and/or heel deformity
1	Walk on the surface	Complete destruction of the skin
2	A deep wound	Skin, subcutaneous fat, tendons, wound defect, but bone is not damaged
3	Abscess	A wound defect that damages the skin, subcutaneous fat layer, tendons, bones
4	Limited gangrene	Necrosis at the level of the toes or heel
5	Gangrene over a large area	Heel necrosis with signs of systemic inflammation

Taking into account the characteristics of angiographic examination, the anatomical localization and degree of damage to the vessels of the lower limbs, the following types of endovascular miniinvasive interventions are defined: balloon angioplasty (dilatation of vessels), stenting of stenosed vessels, recanalization of occlusive vessels.

In all patients, active surgical intervention (amputation of toes, heel, and foot)

was performed according to specific instructions on the 4-5th day of treatment after restoration of blood flow in blood vessels by X-ray endovascular method. This made it possible to drastically reduce the number of large-scale amputations in time.

Analysis of inspection results.

Taking into account the results of angiographic diagnosis, a method of endovascular miniinvasive surgical intervention was determined to eliminate the blood flow of the damaged vessel. In doing so, we took into account the anatomy of the calf and heel veins and their space at different levels of the foot. To differentiate the approach of endovascular surgical interventions, we divided leg veins into three levels, taking into account the size of the vessels.

Level I - high level. From the middle segment of the femoral artery to the subclavian artery. The diameter of the vessels is 4.0-4.5 mm

Level II – middle level. (small calf, anterior and posterior large calf artery). The diameter of the vessels is 2.5-3.0 mm.

Level III - distal level. The diameter of the vessels is 1.5-2.0 mm. (arcuate, dorsal arteries, medial and lateral arteries of the ankle) (Figure 4.1)

Wagner's classification was also used to assess the severity of purulent necrotic process in this group of patients (see Chapter II).

Most of the patients suffered from IV-V degree leg damage (according to Wagner). Treatment of patients with purulent-necrotic lesions of the legs was provided with the participation of a group of specialists: a purulent department surgeon, vascular surgeon and angiographer, endocrinologist, therapist, anesthesiologist-reanimatologist.

The results of our study showed that in the treatment of patients with DTS with critical ischemia of the lower limbs, the use of a differential approach of surgical tactics, taking into account X-ray endovascular diagnosis, helps to improve the results of treatment of this category of patients. In this case, lower leg amputation will decrease from 66.6% to 12.8%, upper amputation from 1.5% to zero, heel amputation from 21.2% to 19.1%, and reamputation from 4.5% to zero. Postoperative suppuration rate decreased from 7.5% to 2.1%. Due to the reduction of large traumatic operations, which in many cases lead to disability, the number of less traumatic finger amputation operations increased to 34% and was limited to necrectomy in 31.9% of patients. The average length of bed days decreased from 14±2.5 days to 8±1.8 days. The death rate decreased from 6.1% to 2.1%. All these are the results of patients with diabetic heel syndrome and indicate the sufficiently high economic efficiency of the differential approach methods recommended by us in the treatment of critical ischemia of the lower limbs in vascular injuries of the heel, taking into account the degree of damage to the heel vessels and the size of the vascular space.

All of the above made it possible to recommend surgical treatment using angiographic examination, balloon angioplasty and endovascular intervention using minimally invasive methods of stenting, taking into account the 3 levels of the volume of heel vessels. In this case, stenting was used in 4-4.5 mm level I lesions of leg veins, after recanalization and balloon dilatation performed in this area, in stenoses of 50% or more that remain, to eliminate complications such as intimal dissection. Recanalization, primary predilatation, and postdilatation using a sirolimus-coated balloon are effective in cases of II-level lesions of the heel vessels with a size of 2.5-3.0 mm (the distal part of the subtalar artery, and the anterior and posterior large calf arteries of the calf, as well as the area of the medial artery). It is considered more optimal to use balloon angioplasty in stenoses in the occlusion of III-level vessels of the heel (arcuate, posterior, paw arteries) up to 1.5 mm in size. It allowed us to recommend this method developed by us as a modern new treatment method with clinical and economic efficiency for wide use in clinical practice. The urgency of studying the problem of treatment of occlusive diseases of the arteries of the lower limbs in diabetes was justified by the prevalence of this pathology in the world, which occupies one of the leading places in the structure of the disease,

as well as by the constant loss of working capacity, disability and death.

Conclusion

1. In the severe degree of critical ischemia of the legs against the background of the diabetic heel syndrome, conditionally 3 According to the guidelines, performing radical operations after 4-5 days of endovascular interventions, according to the instructions, helps to reduce amputation in the lower leg from 66.6% to 12.8%, amputation in the hip area from 1.5% to zero, heel amputation from 21.2% to 19.1%, re-amputation from 4.5% to zero.

2. The use of endovascular diagnostics and the selection of mini-invasive surgical interventions: taking into account the size of the damaged vessels of the heel, balloon angioplasty, stenting and additional dilatation using a sirolimus drug-coated balloon, performing radical operations after 4-5 days according to the instructions, with a severe level of critical ischemia of the lower limbs on the background of DTS

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