Negative-pressure wound therapy of purulent wounds in patients with diabetic foot syndrome

Oleg Shumkov, Mikhail Smagin, Rustam Khapaev
Research Institute of Clinical and
Experimental Lymphology Branch ICG SB RAS
Novosibirsk, Russia

The comprehensive surgical treatment in patients with complicated diabetic foot syndrome aims to reach wound repararive stage and consists of three main components: revascularization of the affected limb (endovascular or open bypass surgery), optimal wound debridement and plastic foot reconstruction after blood flow restoration. Tissue detritus, devitalized tissues and fibrinous deposits hinder adequate and staged wound healing in patients with diabetes. Wound healing in a patient with diabetes mellitus is not possible without adequate debridement. Therefore, the quality of the performed necrectomy becomes one of the factors determining a positive treatment outcome. The generally accepted recommendation for surgical treatment of wounds is the mechanical removal of non-viable tissues up to anatomically intact structures with preservation of granulation tissue. Negative pressure wound therapy is considered less traumatic, more effective and modern method in comparison with surgical wound debridement. NEGATIVE pressure wound therapy (NPWT) is increasingly used in patients with diabetic foot, both in treating wounds caused by ulceration, and in healing surgical wounds following bone resection. The aim of this work was to assess the clinical effectiveness of the use of the «Pico» vacuum dressing in the complex treatment of patients with purulent-necrotic complications of the diabetic foot syndrome. Material and research methods. In the clinic of the Research Institute of Clinical and Experimental Lymphology SB RAMS, from 2018 to 2019, 24 patients with diabetic foot syndrome (DFS) aged 36 to 78 years were treated (on average 61.4 ± 5.3 years). Of these, 49% were men and 51% were women. Patients with type 2 diabetes (95%) prevailed. All patients were hospitalized as planned. The severity of the destruction of the tissues of the foot according to the classification of Wagner P.M. (1979) in most cases (71%) corresponded to 2-3 stages.

The nature of level of damage to the arteries of the lower extremities

Types of Operations	The number of operations in groups	
	Comparison group (n=16)	*Main group (n=8)*
Iliac artery	2	1
Femoral artery	5	2
Popliteal artery	3	1
Tibial arteries	6	4

The long-term results of treatment of patients with critical lower limb ischemia

Types of Operations	The number of operations in groups	
	Comparison group (n=16)	*Main group (n=8)*
Full cross	8	5
Restenosis	5	2
Reocclusion	3	1

The dynamics of the main clinical indicators (M±m)

Indicators	Comparison group (n=16)	Main group (n=8)
Relief of pain, day	6,8±2,3	4,1±1,2
The duration of the febrile period, day	4,8±1,5	4,0±1,2
Reducing the severity of perifocal edema and erythema, day	7,2±1,8	4,2±1,5*
Duration of foot wound healing, day	28,2±2,5	21,4±4,7*
Duration of inpatient treatment, days	33,5±1,0	26,1±3,3*

Note: * - significance of differences (p <0.05).

The nature of operations for purulent necrotic lesion of the foot

Types of Operations	The number of operations in groups	
	Comparison group (n=16)	*Main group (n=8)*
Necrectomy	2	2
Necrectomy + amputation of toes	8	3
Necrectomy + amputation / exarticulation of the toes + resection of the metatarsal bones	4	2
Plastic reconstruction of the foot	2	1

Distribution of patient by the number of necrectomy/vacuum dressing

Number of necrectomies / vacuum dressings	The number of patients in groups, persons (%)	
	Comparison group (n=16)	*Main group (n=8)*
1	2 (12,5%)	4 (50%)*
2	8 (50%)	3 (37,5%)*
3	2 (12,5%)	1 (12,5%)*
4	3 (18,75%)	0 (0,0%)*
5	1 (6,25%)	0 (0,0%)

Note: * - significance of differences (p<0.05).

Conclusion:

1. The complex treatment of patients with diabetic foot ulcer, preferably in highly specialized clinics, owning the whole spectrum of modern diagnostic and therapeutic technologies.

2. The vacuum method for treating purulent wounds of the foot in patients with diabetes mellitus in 39% of cases allows for complete wound cleansing in one procedure, helping to reduce the healing time and reduce the duration of hospitalization. Endovascular interventions in the arteries of the lower extremities in patients with diabetes mellitus are an effective, minimally invasive method for the treatment of critical lower limb ischemia.

3. Given the severity of the general condition of such patients, the presence of concomitant diseases, percutaneous transluminal balloon angioplasty can be considered as an operation of choice and performed to save the limb.

4. The increase in the percentage of successful completion of endovascular angioplasty in patients with diabetes is promoted by the use of subintimal recanalization technique.

5. We recommend the use of Pico vacuum dressings for superficial trophic ulcers located on the dorsum of the foot, plantar surface of the foot, heel area.