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Complex Treatment of Purular-Necrotic Foot Lesions in Patients with Diabetes Mellitus

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Abstract: The clinical picture of purulent-necrotic lesions of the foot (PNF) in patients with diabetes mellitus (DM) is characterized by an atypical course. This is due to high bacterial contamination, the tendency of pus to spread throughout the surrounding tissues and tendon sheaths and their more frequent generalization [2,3,7]. Taking into account the predominance of microflora in the wound that is insensitive or not sensitive to antibiotics, and the increased frequency of inoculation of non-clostridial anaerobic infection [1,5,6], the search for new methods of treating purulent wounds continues.

Keywords: diabetes mellitus, diabetic foot, purulent-necrotic lesions.

Introduction.

The relevance of the problem of local drug therapy for HNPS in patients with diabetes is due to the low effectiveness of traditional means of treating the purulent process, the main disadvantage of which is that they affect only individual components of the wound process [4].

The purpose of the study is to increase the effectiveness of treatment of diabetic foot complications using methods and means that affect all links in the pathogenesis of the purulent process in wounds and the development of endogenous intoxication in this severe category of patients.

Material and research methods.

We analyzed the results of treatment of 102 patients with HNPS who developed a purulent-necrotic process. Newly diagnosed diabetes before 10 years was present in 14.7% of patients, more than 10 years – in 28.1%, more than 15 years – in 27.7%, more than 20 years – in 29.5% of patients. Mild severity - in 19.5%, moderate severity - in 38.3%, severe severity - in 40.1%, insulin dependent - in 20.9%, non-insulin dependent - in 81.2% of patients. Almost 23.9% of patients did not receive any treatment for diabetes at all, 27.6% were treated irregularly, and 47.5% were treated regularly. This circumstance could not but affect the increase in the proportion of patients with decompensated forms of diabetes among all patients. Due to the lack of a positive result from treatment, 56.4% of patients were transferred from other medical institutions to attempt limb preservation. The age of the patients ranged from 28 to 79 years. Men made up 63.4%, women 36.6%. In 73.4% of patients, concomitant diseases were identified, the leading place among which was occupied by the pathology of the cardiovascular system; diseases of the liver and lungs were often observed. Often it was these diseases that determined the severity of the condition of the patients we observed and were the cause of their death.

During bacteriological examination, in 86% of cases, aerobic-anaerobic associations were identified, most often including obligate anaerobic non-spore-forming bacteria (Peptococcus Spp., Peptoctreptococcus Spp., Bakteroides Fragilis, Prevatella melaninogenica), facultative anaerobic (Staph. Epidermidis, Staph. aureus), anaerobic microorganisms (Pseudomonas aeruginosa). It should be emphasized the high frequency of isolation of Pseudomonas aeruginosa, which is likely due to long-term treatment of many patients in other hospitals.

The greatest sensitivity was noted to the following antibiotics: gentamicin, ceftriaxone, kanamycin, macrofoam, nolitsin, ofloxacin.

Surgical treatment for NPS consisted of economical, gentle methods of surgical treatment and sanitation of the lesion, aimed at maximizing the preservation of the supporting function of the foot. The operations were carried out differentially, depending on the nature of the pathological process. When gangrene began, an attempt was made at conservative treatment, and every opportunity was used to convert it to dryness. In case of failure and with a tendency for the process to progress in the proximal direction, the limb was amputated. In the case of purulent-necrotic changes in the area of the toes, if necessary, after preliminary preparation, the foot was amputated or the toe was exarticulated, depending on the volume of the lesion.

The results obtained and their discussion.

In patients with diabetic foot, due to a pronounced disorder of the microcirculatory system, increasing microthrombosis prevents the full impact of drugs introduced into the general bloodstream on the area of pathology. Based on this, in order to create a sufficient concentration of antibiotics in the interested parts of the body and in the lymphatic vessels, which are the main route of spread of microbes from the primary focus, without abandoning traditional antibiotic therapy, we only changed the place and method of their administration and used it lymphotropically. The manipulation was carried out for 7-8 days, 2 times a day.

Considering that the majority of patients with complicated diabetic foot, elderly and senile people with severe concomitant pathology, used the enterosorption (ES) method to detoxify the body as a simple, publicly available, non-invasive method, at the same time as a simple, publicly available, non-invasive, yet highly effective way to combat endogenous intoxication. Polyphepan was used as a sorbent at a daily dosage of 1.0 g/kg body weight for 8-9 days.

For local treatment of purulent wounds, taking into account the extensiveness of the purulent-necrotic process and the presence of pronounced infiltration of surrounding tissues, application sorption (AS) with polyphepane was used. If a non-clostridial anaerobic infection and antibiotic-resistant microflora were detected, a 0.1% sodium hypochlorite solution was used to wash the wound. These methods of efferent therapy were used in stage 1 of the wound process until the wound was completely cleansed of pus and necrotic tissue.

The inclusion of RLAT and the proposed efferent methods of therapy in the complex of treatment measures in 87 patients with diabetes with purulent-necrotic lesions of the foot had a positive effect on the course of the disease. The detoxification effect was clinically manifested from the very first days from the start of treatment. Along with the improvement in general condition, thirst was quickly eliminated, appetite and sleep improved. Normalization of body temperature, relief of pain, elimination of tachycardia and shortness of breath occurred within 2-3 days. The effective effect on the purulent focus and the pronounced detoxification effect with this treatment contributed to the early compensation of carbohydrate metabolism, which occurred on days 5.6 + 0.8. Subsequently, the course of the disease was stable and it became possible to manage diabetes.

Immediately after opening the abscess and before the start of treatment, severe acidosis was observed in the wound in patients with HNPS, reaching a pH of 5.0 - 5.2. This contributed to the expansion of the area of tissue damage and maintained the activity of the infectious process. When using AS polyphepane and sodium hypochlorite topically, from the first days there was a pronounced tendency towards alkalization of the wound environment, which normalized on the 5th day and amounted to pH 7.28 + 0.15.

Upon admission, microbial contamination of tissues was 108 - 109 Lg CFU/g. Microbial contamination after surgical intervention and local use of AS polyphepan and sodium hypochlorite, already on days 3-4 fell below the critical level and amounted to 2.60 + 0.10 Lg CFU/g. In subsequent periods of observation, a single growth of microorganisms was noted, which indicates an uncomplicated course of the wound process.

Such a rapid decrease in bacterial contamination of wound tissue occurs, in all likelihood, due to early alkalization of the wound environment because an alkaline environment is detrimental to many microorganisms, in particular staphylococcus.

The dynamics of the wound process are of interest. At the same time, already on the 2-3rd day of treatment, relief of pain and swelling, a decrease in tissue infiltration around the wound, and the amount of purulent discharge were noted. On days 5.6 + 1.4, the wound was usually cleared of necrotic tissue. A pronounced necrolytic effect was observed; dead tissue rose above the bottom and edges of the wound and was easily removed. On days 7.1 + 1.2, juicy, granular, easily bleeding granulations appeared. The size of the pockets and the total area of the wound noticeably decreased.

A clear and important indicator of the effectiveness of treatment should be considered preservation of the limb, reduction in the level of amputation, provision of support function, and restoration of function of the preserved limb.

The use of polyphepan and sodium hypochlorite in the complex treatment of RLAT, ES and AS, aimed primarily at stopping the purulent-inflammatory process, converting wet gangrene into dry, which was observed in 11 patients, and compensation of carbohydrate metabolism allowed maintaining the supporting function of the limb in 86% of patients . Amputations at the hip level were performed in 11 (10.7%) patients, at the shin level - in 4 (3.92%), at the foot level - in 16 (15.7%), finger exarticulations were performed in 28 (27, 5%), necroectomy in 34 (33.2%) patients. The mortality rate was 3.92% (4 patients died). The average length of stay of patients in the hospital was 16.7 + 1.3 days. Conclusions. The data obtained indicate that the inclusion of the proposed efferent methods of therapy in the complex of therapeutic measures in patients with complicated diabetic foot quickly stops the purulent process, prevents its generalization, and creates favorable conditions for the occurrence of reparative processes. It makes it possible, along with a reduction in treatment time, to reduce the number of complications in the form of gangrene, reduce the level and number of amputations, as well as the percentage of disability, which is important not only from a practical, but also from a social point of view. These methods of efferent therapy successfully complement each other, because influence various mechanisms of a complex multi-link wound process during HNSPS in patients with diabetes. Reducing the frequency of high amputations is a determining factor in prolonging the life of one of the most severe categories of patients with diabetes.

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