

СЕКЦІЯ XXV. ФІЗИЧНА КУЛЬТУРА, СПОРТ ТА ФІЗИЧНА ТЕРАПІЯ

PHYSIOTHERAPEUTIC REHABILITATION OF DIABETES PATIENTS WITH VASCULAR DISORDERS OF THE LOWER EXTREMITIES

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Diabetes mellitus is the most common endocrine pathology among people of working age. In our time, WHO defined diabetes mellitus as an epidemic of a special non-infectious disease, which is rapidly spreading in highly industrialized countries, which leads to long-term loss of working capacity and early death of patients. It occupies the main place in the structure of not only endocrine diseases, but also diseases of non-endocrine origin (third place after cardiovascular and oncological pathology). According to the forecasts of the International Diabetes Federation, by 2035, 592 million people will suffer from diabetes in the world.

Complications of diabetes mellitus are widespread in medical practice, it is much more difficult to deal with them than with diabetes itself. One of these complications is diabetic foot syndrome. In diabetes mellitus, the organs that bear the greatest functional load are primarily affected. The foot performs a number of important functions: support, spring, accommodation, thrust. Complete or partial loss of one of these functions leads to overloading of the foot, damage to soft tissues and bone-joint apparatus. During life, 8-15% of patients with diabetes mellitus develop trophic foot ulcers, further development of the disease can be complicated by gangrene of the limb. It is known that mortality from "high" amputations is 45-50%, and every second patient after a "high" amputation dies within 5 years. Diabetic foot syndrome is one of the most severe chronic complications of diabetes mellitus. This syndrome combines pathological changes in the nervous system, arterial, venous and microcirculatory bed. Approximately 15% of diabetic patients experience diabetic foot syndrome during their lifetime, which is the most common cause of hospitalization for diabetic patients.

Diabetic foot syndrome is defined as an infection, ulcer and/or tissue destruction of

the foot associated with neurological disorders or a decrease in the main blood flow of varying severity in patients with diabetes mellitus.

Treatment of diabetic angiopathy of the lower extremities in patients with diabetes is one of the urgent problems of endocrinology and angiosurgery. Its treatment is aimed at compensation of diabetes, correction of disorders of metabolism, microcirculation, rheological properties of blood, tone of microvessels, transcapillary exchange, permeability of cell membranes, stimulation of immune processes, restoration of main blood circulation.

An important place in the comprehensive treatment of diabetes is occupied by physiotherapy methods, the use of which contributes to increasing the effectiveness of treatment, maintaining stable compensation of the disease, preventing the development and progression of complications, primarily diabetic angiopathy. Undoubtedly, a significant role in the rehabilitation treatment of diabetes patients belongs to the sanatorium-resort stage, during which, in addition to the generally accepted methods of treating diabetes (diet, medication methods), the influence of natural and preformed physical factors is used. The main tasks of physical methods of treatment of diabetes mellitus and diabetic angioneuropathy of the lower extremities are improvement of general and regional blood circulation, microcirculation, increase of tissue oxygenation, improvement of collateral blood circulation and regression of trophic disorders. Physiotherapy is used at various stages of diabetic angiopathy (preclinical, functional, organic).

The goal of laser therapy is to normalize the functional state of the vascular system, improve the rheological properties of blood, restore bioelectric activity, and reduce the tone of peripheral arteries. The main importance is low-energy laser radiation, because it has a direct and indirect effect on various links of the pathogenesis of damage to the blood vessels of the lower extremities in diabetes. Its action is based on activation of cellular enzymes, strengthening of energy exchange and synthesis processes in cells. This leads to a reduction in the phenomena of asthenia, pain and paresthesia in the lower limbs, and an increase in tolerance to physical exertion. According to capillaroscopy, after exposure to low-energy laser radiation, the number of functioning capillaries increases, pericapillary edema decreases, and trunk blood circulation improves. Laser radiation has the ability to cause conformational changes in the membrane apparatus of the cell, reduces the aggregation properties of platelets, erythrocytes, increased fibrinolytic activity of blood, improves and accelerates blood circulation in small vessels, causes other effects that affect the pathogenetic links of the development of diabetic angiopathy. It has been proven that the action of laser radiation has an immunocorrective, anti-inflammatory, anti-edematous, analgesic, desensitizing effect, improves microcirculation and tissue trophism. Enzyme activation strengthens bioenergetic and biosynthetic processes in cells, increases the activity of the antioxidant system. As a result of the biostimulating effect, the functional activity of blood cells, components of cellular and humoral immunity increases, the affinity of hemoglobin for oxygen increases, blood aggregation properties decrease and fibrinolysis is activated, blood circulation and tissue oxygenation, nervous excitability, as well as microcirculation and neurovascular trophicity improve.

Laser therapy for diabetes is carried out using various methods of exposure (monotherapy) and their combinations, which significantly increases the effectiveness of therapy. To achieve a therapeutic effect, it is possible to implement various methods of laser therapy: non-contact, contact, contact compression. In practice, the following methods of laser therapy can be used: percutaneous, intravenous, hydrolaser shower with different diapa zones of action: red, infrared, ultraviolet. There are the following methods of using

low-energy laser radiation for the treatment of vascular diseases of the lower extremities: – irradiation of biologically active areas of the limb (laserpuncture); – irradiation of ischemic limb segments with a scanning beam; – irradiation of the projection of blood vessels (arteries, veins); – irradiation of the calf muscles.

Magnetolaserotherapy affects the metabolic parameters of type 2 diabetes, contributing to a decrease in glycemia, a decrease in the degree of hyperlipidemia, and an improvement in microcirculation indicators. After magnetolaser therapy, along with clinical improvement, capillary blood circulation improves, its reserve capabilities increase, and peripheral blood circulation normalizes. The clinical effect of magneto-laser therapy on peripheral blood circulation and microcirculation is carried out through several mechanisms, such as increasing the metabolism of smooth muscle myocytes in the vascular wall, increasing its tone in atony, restoring the contractile ability of the endothelial cells of both the arterial and venous walls, and the development of collaterals. Intimate mechanisms of magnetolaser radiation are associated with the final photobiological effect (photosensitization) in the form of a structural and functional rearrangement of cell membranes as a result of changes in their energy activity and conformation of liquid crystal structures of the cell, redox enzymes containing copper, catalase, cytochrome complex, peroxide radicals, of some photosynthetic pigments, activation of bioenergetic processes, increase in ATP synthesis, which helps to reduce hypoxia and increase the sensitivity of cells and tissues to insulin, increasing its metabolic activity.

To solve these issues in the complex of treatment programs, we conducted combined physiotherapy with a combination of magneto-laser therapy and electrophoresis of "Bishophite of Poltava". Under the influence of magneto-laser therapy, vascular tone decreased and microcirculation in the distal parts of the lower extremities improved, phagocytosis and regeneration processes were stimulated, metabolic processes improved, and anti-inflammatory and immunostimulating effects occurred. "Bishofit Poltava" contains an aqueous solution of natural chloride-magnesium, iodine-bromine mineral with a significant amount of microelements. The total mineralization reaches 340-400 g/l. The presence of Mg^{++} provides an antispastic and vasodilating effect.

A total of 28 diabetic patients with vascular disorders of the lower extremities and the presence of trophic ulcers of the 1st finger and foot were treated. The treatment was carried out according to this method. With the help of the MILTA-F-8-01 device, a magneto-laser effect (frequency 50 Hz, power of light guides 60 mW) was applied to the projection of inguinal vascular bundles for a period of 2 minutes on each site. After that, they performed electrophoresis with "Bishofit Poltavskiyi" (prepared for electrogel for physiotherapy) on areas of the lower legs from both poles for 15 minutes. A total of 10 treatment sessions were conducted. Irradiation of trophic ulcers and zones of 4 metatarsal-phalangeal bioactive points was also carried out for 3-4 minutes each.

According to the results of treatment, almost all patients noted an improvement in well-being, a decrease in pain in the lower limbs, the disappearance of temporary cramps and a feeling of "coldness" in the legs and feet. Healing of trophic ulcers was achieved during 2-4 sessions of physiotherapeutic treatment with an interval of 2 weeks. At the same time, the control measurement of rheovasography noted an increase in the rheographic index by an average of 11%.

Thus, the use of combined physiotherapy with a combination of magneto-laser therapy and electrophoresis of "Bischofite Poltava" in the complex treatment of diabetes patients with vascular disorders of the lower extremities allows not only to eliminate the negative

feelings of patients, to improve the quality of impaired blood flow, but also to achieve conservative healing of trophic ulcers.

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