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INTRAVENOUS LASER BLOOD IRRADIATION IN THE COMPLEX TREATMENT OF PATIENTS WITH CUTANEOUS LEISHMANIASIS

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Abstract

This article highlights the therapeutic effects of low-intensity laser radiation in the complex treatment of patients with cutaneous leishmaniasis. The article summarizes the studies on its corrective effect on immunological and biochemical disorders, which increases the insufficient effectiveness of drug therapy. It provides information about the methods and techniques used for low-intensity laser irradiation, which can improve the effectiveness of traditional treatment of cutaneous leishmaniasis.

Keywords: VLOK, cutaneous leishmaniasis, cytokine.

抽象的

本文重点介绍了低强度激光辐射在皮肤利什曼病患者综合治疗中的治疗效果。文章总结了其对增加药物治疗效果不足的免疫和生化障碍的矫正作用的研究。它提供了有关用于低强度激光照射的方法和技术的信息。这些方法和技术可以提高皮肤利什曼病传统治疗的有效性。

关键词：VLOK, 皮肤利什曼病, 细胞因子。

INTRODUCTION

Relevance. Cutaneous leishmaniasis is the most common form of infection that leads to the development of skin papules or nodules [1].

Cutaneous leishmaniasis (yearling, Pandin ulcer, Old World cutaneous leishmaniasis, New World cutaneous leishmaniasis, Sahara chancre, Biskra bud, eastern ulcer, uglevik, Sart disease, Ashgabat

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ulcer) is an endemic vector-borne disease of tropical and subtropical climates, characterized by limited skin lesions with subsequent ulceration and scarring. The disease is caused by protozoa of the genus *Leishmania*. Pathogens enter the human body when bitten by its vectors - blood-sucking mosquitoes *Phlebotomus papatasi*, *sergenti*. The disease is seasonal in nature. Most often, patients are registered from May to October, then there is a decrease in the incidence rate, and in winter there are isolated cases [2, 3].

Cutaneous leishmaniasis: This form of the disease is widespread in Central Asia (Turkmenistan, Uzbekistan), the Caucasus, Afghanistan, the Middle East, and Africa.

The causative agent of cutaneous leishmaniasis was first identified in 1898 in Tashkent by P. F. Barovsky (O. I. Kellina).

To confirm the diagnosis of cutaneous leishmaniasis, smears-prints or skin scraping from the edges of the ulcer are taken. When coloring the studied material according to Romanovsky-Giemsa, extracellular and intracellular *L. tropica* (Borovsky's body) is detected, localized in large quantities, mainly in macrophages [4].

At the same time, there are no standards for the treatment of this disease in our country. Professor V. L. Yakimov wrote in 1913 that there is no definite treatment for cutaneous leishmaniasis [5].

Physical therapy includes the use of cryotherapy, curettage, radiofrequency therapy, and a CO₂ laser [6]. Various studies have also documented the sensitivity of leishmania to temperature changes. The mechanism of action of hyperthermia is not fully understood, but its effect on the reproduction of amastigotes in macrophages is noted. An increase in

temperature above 42 °C blocks the formation of DNA and RNA; cellular respiration and glycolysis are inhibited; hypoxia develops and the stability of the plasma membrane increases. A drop in temperature below 0 °C is also detrimental to leishmania [7].

To date, drug prevention of leishmaniasis has not been developed. One of the important problems in dermatology is the search for effective, low-toxic agents and methods of treatment of cutaneous leishmaniasis, since the drugs used have cardio-, hepatotoxicity. According to the WHO, due to the relative toxicity and the need for long-term administration, none of the drugs used for the treatment of cutaneous leishmaniasis meets the requirements of practical health care [8].

In recent years, the attention of many researchers has been attracted by the possibility of using laser systems in various areas of medicine [9].

Among the methods of pathogenetic therapy, in recent years, physical methods and, in particular, laser radiation have attracted increasing attention of researchers [10].

Recently, VLOK is increasingly used in programs of detoxification therapy of acute diseases in combination with other methods, increasing their therapeutic effectiveness and safety. When conducting Laser therapy of various diseases at the level of the whole body, the following therapeutic effects are most often manifested: anti-inflammatory, anesthetic, decongestant, regenerative, immunocorrective, antibacterial, reducing excessive lipoperoxidation, ischemia, tissue hypoxia, normalization and stimulation of regenerative processes, etc. [11, 12, 13].

MATERIALS AND METHODS

The experiment involved 40 patients. In patients with a wound diameter of at least 5 cm, the number of wounds is one or more, there is a swollen and purulent mass around the wound, all examination by the method of Romanovsky Giemsa and Barovsky's little body were found under a microscope.

15 patients underwent traditional therapy, 25 patients underwent traditional therapy in combination with ILBI therapy.

Among the patients, 18 (40%) were women and 22 (60%) were men.

9 (22.5%) at the age of 20-30, 14 (35%) at the age of 30-40, 10 (25%) at the age of 40-50, 7 (17.5%) at the age of 50 and older.

Intravenous laser therapy was performed with the Matrix - VLOK device, alternating radiating heads: VLOK with a wavelength of 0.63 microns and a radiation power at the end of the light guide of 1.5-2.0 mV, for 15 minutes in a continuous radiation mode. The course of intravenous laser blood irradiation was 10 days without a break for the weekend.

RESULT AND DISCUSSIONS

To assess the state of cytokine parameters in patients with cutaneous leishmaniasis, we studied the indicators of anti-inflammatory cytokine IL-4 and pro-inflammatory cytokines IL-8 and TNF- α , as well as gamma-interferons. In this pathology, these cytokines undergo more changes than other cytokines, and the quantitative determination of their level is of great importance in assessing the immune status of the body.

Cytokine indicators	Control group No.15	Patients with cutaneous leishmaniasis No. 40
IL-4 (pg/ml)	1,54±0,11	1,55±0,12
IL-8 (pg/ml)	92,13±2,31	93,23±1,87
FNO- α (pg/ml)	32,05±2,55	31,29±2,18
γ -Interferon (pg/ml)	21,35±0,66	15,73±1,36

IL-4 (pg/ml)	1,86±0,13	1.55±0.26 *
IL-8 (pg/ml)	52,06±0,88	92,43±3,14 * *
FNO- α (pg/ml)	14,25±0,55	32,31±3,08 * *
γ -Interferon (pg/ml)	21,35±0,66	15,73±1,36 * *

The results of the study showed that in the blood serum of patients of the general group with cutaneous leishmaniasis before the start of treatment, there was a significant increase in the level of IL-8 and TNF- α compared to the control group (p0,001), and on average they were 92.43±3.14 pg/ml and 32.31±3.08 pg/ml, respectively, with 52.06±0.88 pg/ml and 14.25±0.55 pg/ml, respectively, in the control group. On the contrary, patients in this group showed a significant decrease in the concentration of anti-inflammatory cytokine IL-4 (1.55±0.26 pg / ml) in relation to the rate of the control group (1,86±0,13 ng/ml) (P0,05).

15 patients received standard treatment. Another 25 patients received intravenous laser therapy in combination with conventional therapy for 10 days. The blood was tested with IFA for cytokines on the first day and on the day of completion of the patients' treatment.

Comparative analysis of the effect of the therapy on cytokine levels in patients with cutaneous leishmaniasis. (M±m).

Cytokine indicators	Traditional therapy No. 15	Complex therapy with VLOK No. 25
IL-4 (pg/ml)	1,54±0,11	1,55±0,12
	1,72±0,20	1,92±0,14
IL-8 (pg/ml)	92,13±2,31	93,23±1,87
	86,53±2,05	82,16±2,01
FNO- α (pg/ml)	32,05±2,55	31,29±2,18
	29,11±2,04	23,05±2,35

γ -Interferon (pg/ml)	15,98±1,26	14,93±1,18
	17,73±1,23	18,04±1,26

In patients of this group, the level of IL-4 significantly increased after treatment ($p < 0.01$), and the content of gamma-interferon contributed to an increase (0.05) compared to the data before treatment. However, they did not reach the control value.

The data obtained indicate that the developed method of treatment of patients with cutaneous leishmaniasis, in comparison with the traditional method of treatment, more significantly contributes to the restoration of the detected violations in cytokine parameters.

CONCLUSION

Thus, in patients with cutaneous leishmaniasis therapy with intravenous laser blood irradiation, side effects were not observed and they were well tolerated. Changes in cytokines in patients indicate a faster wound healing, an accelerated transition to the stage of scarring, an accelerated process of death of leishmaniasis. It has been shown that ILBI therapy is effective as a painless treatment in both clinical and pathogenetic treatment of patients. The treatment was carried out in a hospital and under the supervision of a physician.

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