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Innovative Method of Phototherapy Using Essential Silicon Tonic in Patients with Atopic Dermatitis

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Abstract

The article presents the results of a comparative study of the effectiveness of innovative photodynamic therapy using the essential tonic "HYDRORAY" in 78 patients with atopic dermatitis, taking into account the clinical form and age of patients. In the group of patients with AtD who received an innovative method of photodynamic therapy in combination with an essential tonic, the SCORAD index decreased by 2.6, 3.2 and 2.6 times compared to treatment, which contributed to skin regeneration, smoothing and moisturizing the skin in the lesions. Clinical observation of patients with AD who received an innovative method of therapy showed an increase in therapeutic efficacy, expressed by clinical recovery in 73.1% of cases, and a significant improvement in 23.1%.

Keywords: Atopic Dermatitis, Physiotherapy, Phototherapy, Siliceous Tonic, Scora, Swarm, Staphylococcus

Introduction

The development of new treatments for allergic skin diseases is a priority area of practical dermatology. Recently, there has been an increase in the incidence of atopic dermatitis with severe severity. In the treatment of allergic skin diseases, much attention is paid to physiotherapy procedures. Among them, photodynamic therapy (PDT) occupies a significant place in dermatological practice, which is a modern method of treatment consisting in the introduction of a photoactive dye (photosensitizer) into biological tissue. [1-4] According to the instructions, the photosensitizer (FS) is delivered to pathogenic cells, where, under the influence of light, it causes a photochemical reaction with the release of singlet oxygen, which destroys pathogenic cells. [2, 3]. PDT uses dyes that effectively absorb light in the wavelength range of 600-700 nm. This range falls within the so-called "therapeutic window", in which biological tissues are most transparent, due to the low absorption of blood in this spectral region. It is known that the main role in PDT is played by the so-called singlet or active oxygen, which is formed in the molecules of lipids and proteins of cell membranes and intracellular organelles when they are exposed to a quantum of light [5-10]. In this case, singlet oxygen breaks atomic bonds with other atoms in the molecule and begins to move forward, moving over a distance of 50 Å in 1 microsecond [2, 3].

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Recently, medical science has been particularly interested in semiconductor nanocrystals, especially silicon, because they possess new physico-chemical properties that are promising

for numerous applications. [4] Studies have proved that silicon nanocrystals (si) dispersed in water were used to photosensitize the process of active oxygen generation.
The aim of our research was to develop an innovative approach to photodynamic therapy using the essential siliceous tonic "HYDRORAY" in patients with atopic dermatitis.

Materials and Methods

137 patients with atopic dermatitis aged from 4 to 52 years were under observation. Among them, 84 were female and 54 were male. By age under 11 years - 17, 12-18 years – 32, 19-30 years – 39, 31-40 years – 22, 41-50 years – 14 and over 51 years – 13 patients, respectively. All patients underwent clinical (SCORAD index), microbiological and statistical studies. To assess the severity of diseases in patients with atopic dermatitis, software diagnostics were used (DGU 17865 "Software diagnostics of the severity of atopic dermatitis in children"; DGU 17814 "Software diagnostics of the severity of atopic dermatitis in adults"), considering the assessment of the index and prescription of the disease, hereditary factor and seasonality of the disease. Microbiological studies were characterized by bacterioscopic and cultural studies of skin flakes from lesions in patients with allergodermatoses. For cultural studies, 5% blood agar, Endo, Kligler media, and salt agar with the addition of manitol were used, and incubation was performed in a thermostat at 36.8 degrees Celsius.

LED phototherapy was prescribed using the essential photosensitizer tonic "Hydroray" in patients with atopic dermatitis. HYDRORAY is an organic essential siliceous tonic for external use. The active ingredient is silicon dioxide of natural origin SO2 – 0.72%, which is necessary for the body to form and maintain the structure of the skin and mucous membranes, connective tissue of the body. The tonic was sprayed before the start of LED therapy.

633 nm LED phototherapy was prescribed considering the age of the patients: for adults, 633 nm LED phototherapy of combined color (red + blue) was prescribed using the essential tonic "Hydroray" for 20 minutes (for adults, for course No. 10) and for children, LED phototherapy of combined color (red + blue) using a tonic within 10 minutes (for course No. 5-7).

For comparative evaluation, the patients were divided into 2 groups: I – the main group of 78 patients with hypertension who received an innovative method (LED phototherapy with a combination of essential tonic) and II – the control group (59 patients) who received standard therapy using physiotherapy procedures (UFO therapy).

The results of the study were subjected to statistical processing on a personal computer using the Microsoft Office Excel-2010 software package, including the use of built-in statistical processing functions.

Results

According to the clinical form, 32 patients were diagnosed with erythematous-squamous form, exudative – 17, erythematous-squamous form with lichenization – 31, pruriginous – 28, lichenoid – 29, respectively.

The results of the program diagnosis of the severity of blood pressure in patients showed that among 137 patients, mild severity was diagnosed in 27 (19.7%), moderate severity in 68 (49.6%) and severe severity in 42 (30.6%) patients.

The clinical assessment of external therapy was assessed based on the general status, skin pathology, and microbiological research data. As a result, the main criteria for the effectiveness of therapy were: the onset of complete or incomplete clinical remission of the skin-pathological process, a decrease in the SCORAD index, a SWARM, normalization of skin pH and microbiological negativity in the lesion of the skin-pathological process and a decrease in the number of relapses.

Table 1: Comparative characteristics of the SCORAD index in patients with atopic dermatitis who received physiotherapy procedures taking into account the program appointment (M+m)

Groups		light degree	the average degree	Severe degree
I- group (main)n=78	before treatment	51,7+ 0,5	67,9+1,3	81,2+ 0,7
	after treatment	19,4+0,9* **	21,3+0,9* **	31,1+1,1* **
II- group n=59	before treatment	53,1+ 0,19	69,2+1,2	83,4+ 0,9
	after treatment	28,7+0,7*	34,3+ 1,4*	37,8+ 0,9*

Note: * is an indicator of credibility in relation to treatment; ** is an indicator of credibility in relation to the I – group. (P <0,05)

As follows from the table, in patients with AtD who received an innovative method of photodynamic therapy in combination with HYDRORAY tonic, the SCORAD index decreased by 2.6, 3.2 and 2.6 times compared to before treatment. (P<0.05). However, compared with the control group, the innovative method was 43.5% higher on average than after treatment. The results obtained were statistically significant (P <0.05).

Table 2: Comparative assessment of the SWARM index against the background of innovative phototherapy. (points)

Indicator	Основная группа n=78			The control group n=59		
	before treatment	On the 5th day of therapy	On the 10 th day of therapy	before treatment	On the 5th day of therapy	On the 10 th day of therapy
POEM (балл)	22,8+0,7	5,8+0,1*×	1,8+0,1*×	23,4+0,4	10,9+0,5*	5,3+0,2*

Note: * is an indicator of confidence in relation to the indicators before treatment. (P <0.05) × is an indicator of confidence in relation to the indicators of the control group after treatment (P <0,05).

The use of combined LED phototherapy with the use of essential tonic "HYDRORAY" in patients with hypertension significantly reduced the itching symptom, promoted skin regeneration, smoothing and moisturizing the skin in the lesions.

The results of microbiological studies of the skin in patients with hypertension against the background of combined use of essential tonic showed a pronounced negation of the degree of colonization of opportunistic pathogenic microorganism's staphylococcus spp. In the lesions by 3.4 times compared to before treatment. Whereas in the group of patients receiving standard therapy, the degree of colonization of the staphylococcal flora decreased by 1.7 times compared with the indicators before treatment.

Clinical observation of patients with AD who received the innovative therapy method showed an increase in therapeutic efficacy, expressed by clinical recovery in 73.1% of cases, a significant improvement in 23.1% (18) and the number of relapses was noted in 3.8% (3) cases, which was 1.5 times higher than in control individuals. (P<0.05). (Table 3)

Table 3: Long-term results of therapeutic efficacy of LED therapy in the complex of essential silicon tonic in patients with AtD

	Clinical recovery	significant improvement	relapses	side effects
I- group (main)n=78	73,1% (57)	23,1 % (18)	3,8% (3)	-
II- group n=59	45,7% (27)	35,6% (21)	18,6% (11)	-

Thus, considering the high clinical effectiveness, it can be stated that an innovative method of combined phototherapy using the essential siliceous tonic "HYDRORAY" in patients with atopic dermatitis has been widely introduced into dermatological practice.

Conclusion

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