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THE DYNAMICS OF PHAGOCYTOSIS INDICES IN PATIENTS WITH PYODERMIAS DURING COMPREHENSIVE TREATMENT

Key words: *pyodermias, phagocytosis, probiotic, immunotropic and laser therapies.*

Abstract*. An analysis of the evolution of phagocytosis indices in patients with pyodermisa while using different therapies has been conducted. It was established that the use of immunotropic drug "Immunomax", probiotic "Enterogermina" and combined low intensive laser therapy (percutaneous laser irradiation of blood, external laser therapy) helps to normalize the studied indices of phagocytosis.*

Introduction

Pyoderma is a group of acute or chronic skin diseases caused by pyogenic cocci (staphylococci, streptococci etc.) which constitute about 30% of the skin pathology in Ukraine[2, 3]. Pyoderma, in recent years, tends to have more severe clinical course with widespread skin lesions, formation of resistance to drugs of etiotropic treatment, leading to their chronic course, decrease or loss of patient's capacity and social activity, which defines the important medical and social significance of the problem and justifies the relevance of improving the treatment of these patients [7, 11].

According to recent studies, the development of pyoderma is due to the combined effect of endogenous and exogenous factors, among which endocrine diseases are significant as well as disorders of metabolic processes, reduced systemic immunity and phagocytic ability of mononuclear phagocytes and granulocytes at various stages of phagocytosis of pyogenic cocci, which contribute to more severe clinical course and frequent relapse of chronic pyoderma [5, 9, 10]. It has been also established that the intestinal microflora plays an important role in the formation of homeostasis and immune response; it has been found a relationship between the condition of the large intestine biocenosis, indices of systemic immunity and phagocytosis and nature of clinical manifestations of pyoderma justifying differentiated administration of probiotics and immunotropic drugs in the comprehensive therapy [4].

According to modern standards, treatment of pyoderma is carried out in a differentiated way - in acute superficial pyoderma patients are only prescribed an external antibacterial and anti-inflammatory therapy, but in case of deep and chronic forms, comprehensive treatment which includes systemic antibacterial, immunotropic, anti-inflammatory and other therapies is used [1].

Reduced effectiveness of treatment of pyoderma nowadays is often associated with formation of resistance to drugs, in this regard, in recent years, alternative non-drug treatments, including laser therapy become more popular in dermatology, as it was proven, that low laser radiation causes anti-inflammatory effect, improves microcirculation, metabolic and reparative processes, causes an antibacterial effect, stimulates general and local immune protection factors, without causing side effects and complications [6, 12].

The purpose of the study

To determine the evolution of phagocytosis indices in patients with pyoderma under different treatments - standard and comprehensive, using probiotics, immunotropic drugs and combined laser therapy.

Material and methods

77 patients with pyoderma aged from 18 to 69 years old, including 48 male and 29 women were involved in the study.

The criteria for inclusion in the study were the following: patient's age - 18 years or more; clinical manifestations of primary forms of pyoderma; the presence of deep or superficial chronic pyoderma; absence of chronic physical illness or exacerbation at the time of the examination.

According to the nature of clinical manifestations 47 (61.0%) patients were diagnosed with staphyloderma, of which 29 with deep chronic forms (furunculosis) and 18 with superficial forms of chronicity (sycosis vulgaris, chronic folliculitis); 17 (22.1%) revealed streptoderma, of which 10 - deep form (ecthyma vulgaris) and 7 with superficial recurrent streptoderma (impetigo); 13 (16.9%) patients with deep and chronic forms of mixed pyoderma (impetigo vulgaris, ulcers and ulcer-vegetating

pyoderma). The control group included 35 healthy individuals (donors) of the same age.

To assess the state of phagocytosis in patients with acne vulgaris, we determined phagocytic activity (PA) and phagocytic index (PI) of polymorphonuclear leukocytes, nitro blue tetrazolium recovery test (NBT test spontaneous) and NBT-test pyrogenal stimulated by known methods [8].

Statistical analysis of the results of research was carried out by the methods of statistical analysis using software (Excel, Statistica 6.0), the difference of averages was considered probable at $p < 0.05$.

Discussion

Before treatment, patients with pyoderma had probable decrease in PI (by 29,9%, $p < 0,001$) with the downward trend of PA (by 7,52%, $p > 0,05$), characterizing the initial stages of phagocytic process, as well as likely reduction of spontaneous NBT-test (by 23,6%, $p < 0,01$) and stimulated NBT test (by 21,5%, $p < 0,001$), which represent the final stage of the process of phagocytosis. At the same time, patients with pyoderma had concomitant dysbiosis of the large intestine cavity of IV degree and interdependence between changes of parameters of systemic immunity and phagocytosis, the degree of intestinal dysbiosis and severity of clinical course of pyoderma was established, justifying the administration of probiotics and immunotropic therapy for these patients.

In order to optimize the treatment of deep and chronic pyoderma, in consideration of found changes in systemic immunity indices of these patients, phagocytosis and intestinal biocoenosis, we developed a complex therapeutic method, which suggests the administration of immunotropic drug "Immunomax", probiotic "Enterogermina" and combined laser therapy - percutaneous laser irradiation of blood (PLIB) and differentiated (depending on the clinical manifestations of pyoderma) external laser therapy - laser photochemotherapy (1% solution of methylene blue as photosensitizer) and laser photophoresis (with antibiotic ointment "BACTROBAN") along the traditional therapy.

To determine the effectiveness of the developed method of combined therapy of pyoderma the registered patients were divided into 3 groups, using randomization method and the people in groups were similar in age, sex distribution and clinical forms of pyoderma: the first one was comparative and included 24 patients who received standard systemic therapy, including immunotropic drug "Immunomax" (200 IU / m on the 1st -3rd and 8th -10th days) and topical treatment (aniline dyes, antibacterial ointment); the second comparative group consisted of 27 people, who were additionally administered probiotic "Enterogermina" (1 capsule three times a day for 14 days) and the third group (basic) numbered 26 patients who were administered a comprehensive treatment that included immunotropic drug "Immunomax", probiotic "Enterogermina" and combined laser therapy: 1) percutaneous laser blood irradiation (10 min, once every other day, the course with 8-10 procedures, 2) differentiated external laser therapy: on the pustular elements - laser photochemotherapy with 1 % solution of methylene blue and on the erosive and ulcerative elements - laser with antibiotic ointment photophoresis "BACTROBAN" (daily sessions for 4-6 min to 1 field for the total exposure - 20-25 min per course of 10-15 procedures). For the procedure of laser therapy we used low intensity semiconductor laser device SM-2 PL "Gurza" with a wavelength of 0.65 microns and laser power of 10 mW.

The evaluation of results of different treatments for pyoderma was conducted based on the analysis of the evolution of clinical and laboratory indices of blood including those of phagocytosis, that are shown in the table.

According to the results of the conducted studies (Table), patients of the 1st comparative group, as the result of application of standard therapy with immunotropic drug, were likely to increase their PI by 24.1% ($p < 0.05$), NBT-test of spontaneous and stimulated (by 13.6% and 17.2% respectively, $p < 0.01$), but preserving significant difference of PA and stimulated NBT-test with those of the control group (a decrease by 27.3%, $p < 0.001$ and 18.4%, $p < 0.01$ respectively).

Patients with pyoderma in the second comparative group due to the use of standard therapy, immunotropic medication and a probiotic experienced, at the end of treatment, probable growth of PA rates by 29.3% ($p < 0.01$), NBT-test of spontaneous and stimulated (by15, 4% and 13.8%, $p<0.05$ respectively), but without their probable difference from those of patients of the first comparative group with preserving significant difference of PA and stimulated NBT-test with the same parameters in control group (a decrease by 22.4%, $p < 0.05$ and 15.4%, $p < 0.01$respectively).

However, patients with pyoderma in the core group who received combined therapy that included imunomotropic drug, a probiotic and laser therapy, experienced probable increase in PA and PI (by 36,9%, $p<0,001$ and 11,4%, $p<0.05$ respectively) and spontaneous NBT-test (by 25,7%, $p<0,05$) as well as stimulated NBT test (by 28,4%, $p<0,001$) with the approximation of most of them, except NBT-test stimulated, to the values of those in the control group.

Analysis of the studied parameters of phago-

Table

Dynamics of phagocytosis indices in patients with pyoderma after different therapies (M ± m)

Indices, measurement units		Patients with pyoderma (n=77)			Control group (n=35)
		1st group (n_1=24)	2nd group (n_2=27)	3rd group (n_3=26)	
Phagocytic activity, %	Before treatment	55,5± 1,86	54,2±2,16 $p_{1-2}>0,05$	56,1±2,34 $p_{1-3}>0,05$; $p_{2-3}>0,05$	62,9± 4,28
	After treatment	58,3± 1,48	57,7±0,986 $p_{1-2}>0,05$	62,5±1,95 $p_{1-3}>0,05$; $p_{2-3}>0,05$	
P (before/after treatment)		P>0,05	P>0,05	P<0,05	
Phagocytic index	Before treatment	4,03± 0,316***	4,13±0,324*** $p_{1-2}>0,05$	4,38±0,308*** $p_{1-3}>0,05$; $p_{2-3}>0,05$	6,88± 0,540
	After treatment	5,00± 0,208**	5,34±0,213* $p_{1-2}>0,01$	6,00±0,206 $p_{1-3}<0,001$;$p_{2-3}<0,05$	
P (before/after treatment)		P<0,05	P<0,01	P<0,001	
spontaneous NBT-test	Before treatment	9,95± 0,221*	10,4±1,01* $p_{1-2}>0,05$	10,1±0,579* $p_{1-3}>0,05$; $p_{2-3}>0,05$	12,5± 0,850
	After treatment	11,3± 0,204	12,0±0,75 $p_{1-2}>0,05$	12,7±0,828 $p_{1-3}>0,05$; $p_{2-3}>0,05$	
P (before/after treatment)		P<0,01	P<0,05	P<0,05	
stimulated NBT test	Before treatment	20,4± 0,972***	21,8±1,09*** $p_{1-2}>0,05$	20,8±0,792*** $p_{1-3}>0,05$; $p_{2-3}>0,05$	29,3± 0,723
	After treatment	23,9± 0,732***	24,8±0,837*** $p_{1-2}>0,05$	26,7±0,650* $p_{1-3}<0,01$; $p_{2-3}>0,05$	
P (before/after treatment)		P<0,01	P<0,05	P<0,001	

Notes: 1. * – The degree of probability of the indices deference relative to control group of patients:
* – p<0,05; ** – p<0,01; *** – p<0,001.
2. p_{1-2}, p_{1-3}, p_{2-4} – probability of the indices deference in patients of different groups.
3. P – probability of the indices deference in the groups of patients before and after the treatment.

cytosis at the end of treatment also showed a significant increase in patients of the core group compared with those of patients in comparison groups. Thus, the rate of PA at the end of end of treatment in patients of the main group was significantly higher both relative to indices of the patients in the 1st comparison group (by 20,0%, p <0,001), and to the second comparative group (12,4%, p <0.05) while stimulated NBT test, relative to the 1st comparative group (by 11,7%, p <0,01). The obtained better results on the evolution of the phagocytosis indices in patients of the main group could be related both to direct stimulating effect of immunotropic drug and laser therapy, including PLIB on phagocytic blood cells, and by a decrease of microbial intestinal load on macrophages and granulocytes as a result of normalizing probiotic action on concomitant dysbiotic disturbances of the large intestine in such patients.

Conclusion

Using combined therapy with the inclusion of imunomotropic drug "Immunomax", probiotic "Enterogermina" and combined laser therapy for patients with deep and chronic forms of pyoderma, occurring against the background of a sluggish process of phagocytosis and concomittant intestinal dysbiosis leads to normalization of the leading indices of phagocytosis (PI, PA, NBT tests both spontaneous and stimulated), and enhances their phagocytic activity both during capture and formation of bactericidal activity and in the final stages of phagocytosis, justifying the feasibility of a combined use of immunotropic drugs and probiotics as well as

laser therapy in the treatment of chronic and deep pyoderma.

Prospects for further research

In the future we are going to determine and analyse the dynamics of other homeostasis indices in a combined treatment of patients, suffering from pyoderma by using immunotropic drugs, probiotics and laser therapy together.

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ДИНАМІКА ПОКАЗНИКІВ ФАГОЦИТОЗУ У ХВОРИХ НА ПІОДЕРМІЇ У ПРОЦЕСІ КОМПЛЕКСНОГО ЛІКУВАННЯ

М.О. Дашко

Резюме. Проведено аналіз динаміки показників фагоцитозу у хворих на піодермії при застосуванні різних методів лікування. Встановлено, що застосування у комплексному лікуванні піодермій імунотропного препарату "Імуномакс", пробіотика "Ентерожерміна" та комбінованої низькоінтенсивної лазерної терапії (черезшкірне лазерне опромінення крові, зовнішня лазерна терапія) сприяє нормалізації досліджуваних показників фагоцитозу.

Ключові слова: піодермії, фагоцитоз, пробіотик, імунотропна та лазерна терапія.

ДИНАМИКА ПОКАЗАТЕЛЕЙ ФАГОЦИТОЗА У БОЛЬНЫХ ПИОДЕРМИЯМИ В ПРОЦЕССЕ КОМПЛЕКСНОГО ЛЕЧЕНИЯ

М.О. Дашко

Резюме. Проведен анализ динамики показателей фагоцитоза у больных пиодермиями при применении различных методов лечения. Установлено, что применение в комплексном лечении пиодермий иммунотропного препарата "Иммуномакс", пробиотика "Энтерожермина" и комбинированной низкоинтенсивной лазерной терапии (чрескожное лазерное облучение крови, наружная лазерная терапия) способствует нормализации исследуемых показателей фагоцитоза.

Ключевые слова: пиодермии, фагоцитоз, пробиотик, иммунотропная и лазерная терапия.

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