Treatment of patients with parodontitis by antihomotoxic pharmacotherapy with Traumeel S

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Summary

Parodontitis (periodontitis) may be viewed as an infectious disease with a number of specific characteristics. Pathogens of the subgingival microbiota can interact with host tissues even without direct tissue penetration.
Patients with mild or moderately severe periodontitis were treated with antihomotoxic therapy with Traumeel S, traditional therapy and using complex-therapy (Traumeel S + traditional therapy).
Saliva as a biological liquid of the human organism may be a reflection of the metabolic state. Salivary indexes (parameters) may be very informative and are of clinico-diagnostical value in patients with oral tissues inflammation.
The concentrations of creatinine, urea, proline and hydroxyproline, thiocyanate-ions (SCN^-), chloride-ions (Cl^-), and activity of alkaline phosphatase have been determined in the saliva of patients with periodontitis during special complex therapy. The results suggest that complex therapy with Traumeel S may be a more effective therapy than the traditional one in patients with periodontitis.

Key words: periodontitis, saliva, antihomotoxic pharmacotherapy, alkaline phosphatase.

Introduction

Parodontitis (periodontitis) is an infectious disease with a number of specific characteristics. Inflammation of periodontium is a current problem in dental practice. From this point of view, usage of new methods and more effective therapeutic medicines for periodontitis treatment deserves special attention. The harmful etiological factors and bacterial dental plaque are activators of periodontal inflammation. Periodontal diseases are probably the most common chronic inflammatory disorders in adults and may lead to tooth loss in the absence of appropriate treatment. The progression of periodontitis is episodic, with active and inactive phases of tissue destruction. This reflects the opposing actions of the bacterial challenge and the host immune response. Patients' health status and metabolic state, defines the relapse frequency and activity of chronic periodontitis form.

Analysis of epidemiological investigations carried out by Prof. Gh. Nicolau at the Therapeutical Dentistry Department of the "Nicolae Testemitanu" State University of Medicine and Pharmacy (*Gh. Nicolau, N. Carcea,* 1999) has demonstrated that periodontitis stroked the most active part of Moldova's population. Search of the newest and most effective drugs for periodontitis treatment of at the early stage of the disease and preventive therapeutic methods in order to stop progression to chronic forms of the disease has special value in modern dental practice.

One of the preparations, which can be recommended for solving the problem, is an antihomotoxic Traumeel S drug, kindly placed at our disposal by the representative of "Heel" company in the Republic of Moldova ("Heel" GmbH, Baden-Baden, Germany). Usage of this antihomotoxic preparation was based on its composition, properties, action mechanism and possibili-

ty to use Traumeel S ointment for oral application [1, 2]. Effiency of Traumeel S is assessed in patients with various maxillofacial inflammations: periodontitis, aphthous stomatitis, herpes labialis, and painful syndrome after dental canal filling [1, 2].

In periodontitis, inflammation is an activating factor of peroxide oxydation of lipids in periodontal tissues. Intensification of peroxide oxidation in the region of inflammatory infiltration is a result of complex interaction between periodontopathogens and the host's immune response. Two important and interrelated factors are involved in the pathophysiological progression of periodontal diseases, i.e. the activation of immune system and the production of oxygen radicals and their related metabolites. Increased production of oxygen radicals may contribute to oxidative stress, which triggers metabolic disturbances of antioxidant systems, protein, lipid, carbohydrate and water-mineral metabolism [3].

Saliva as a biological liquid of the human organism may be a reflection of the metabolic state [4, 5]. Salivary indexes (parameters) may be very informative and play clinico-diagnostical value in patients with inflammation of oral tissues, periodontitis.

The purpose of this investigation is a comparative examination of seven salivary parameters in patients with periodontitis treatment by traditional methods and by using antihomotoxic preparation, the above-mentioned Traumeel S ointment.

Materials and methods

Twenty-two patients (20-47 years old) with slight or medium-severe periodontitis and twenty-one healthy patients (control group) were examined. Patients were divided into the following groups: 1 - healthy patients (control group); 2 - patients treated by traditional therapy (10); 3 - patients treated with complex therapy: additionally to basic therapy, they received the antihomotoxic preparation, Traumeel S ointment (12). Traumeel S ointment was applied once a day during 10-15 days before the end of therapeutical treatment course. The following traditional preparations were used: Metrogil-dents ointment, Laevomecolum, Lincomycin ointment, Methazil, etc. [6].

Saliva (mouth liquid) was collected in the morning, before breakfast and centrifuged at 600 g during 10 min. Centrifuged of saliva were used for examinations using SP "Humalyzer 2000" (Germany). The following parameters were determined in saliva: urea [7], creatinine [8], proline and hydroxyproline [9], chloride-ions (Cl^-) [10], thiocyanate ions (SCN^-) [11], protein [12], and the activity of alkaline phosphatase [13]. All solutions needed for the examination were prepared using deionized water. The salivary parameters were examined four times during treatment: before the therapy process, on the 3^{rd} or 4^{th} day of the treatment, on the 7^{th} day and 14^{th} day of therapeutical course (end of treatment). The results received were calculated with the use of the statistical Student's method. Spirmen's method of nonparametric correlation was used for examination of interrelations between salivary parameters [14].

Results and discussion

Twenty-two patients with acute periodontitis and twenty-one healthy subjects participated in the investigation during 10-15 days of treatment. In an infectious disease of the oral cavity tissues, as periodontitis, many antibacterial preparations are used. Saliva also contains substances with bacteriostatic properties. For example, lactoperoxidase (LP) catalyzes the thiocyanate (SCN^-) oxydation in presence of hydrogen peroxide (H_2O_2), produces hypothiocyanite ($OSCN^-$) with bacteriostatic properties. This system (LP-H_2O_2-SCN^- ions) is more effective than the action of H_2O_2 as an inhibitor of bacteria [15].

One of our tasks was the examination of SCN^- ions content in patients' saliva during the therapeutical course. The results obtained are presented in *Table 1*. As we can see in the table, SCN^- ions concentration in the saliva before the treat-ment was 36.7% per liter, and per g of protein - 29.5% in the control group. In 3-4 days after the starting of the therapy the SCN^- ions concentration increased and reached 172.6% in comparison with the initial level (per g of protein).

In a week, the traditional therapy course increased the thiocyanate content in the saliva of the patients, previously being 115.8% per liter and 94.8% per g of protein; these results did not differ much compared to healthy subjects. Complex therapy did not have similar effect on the 7^{th} day of treatment.

Table 1. The content of creatinine, urea, proline, hydroxyproline, thiocyanate ions, chloride ions in the saliva of patients with periodontitis during treatment

Groups		Creatinine	Urea	Imino acids	SCN^- ions	Cl^- ions
Healthy	a)	0.528	14.61	18.37	1.626	96.51
	b)	0.703	21.05	36.24	1.367	158.23
Before	a)	0.425*	30.12*	41.93*	0.564*	59.46*
treatment	b)	0.284*	13.81*	26.35*	0.312*	43.02*
Traditional	a)	0.198*	13.84	43.68*	1.817	41.13*
(7^{th} day)	b)	0.267*	18.36	52.73*	1.295	39.89*
Complex	a)	0.226*	16.72	48.04*	0.581*	62.14*
(7^{th} day)	b)	0.1038	16.97	33.11*	0.432*	49.81*

The content of creatinine (mmol), urea (mmol), imino acids, proline and hydroxyproline (mcmol), SCN^- ions (mmol), Cl^- ions (mmol): a) per liter of saliva; b) per g of protein. *Traditional* - traditional therapy; *Complex* - complex therapy. Symbol * statistical difference ($P < 0.05$).

The determination of Cl^- ions showed that its concentration was 62.2% per liter of saliva and 26.96% per g of protein in comparison with the control group. During the treatment course, the concentration of Cl^- ions increased insignificantly, both in traditional therapy and complex therapy by using Traumeel S antihomotoxic preparation.

It is well known that oxidation of thiocyanate (SCN^-) to antibacterial product hypothiocyanite ($OSCN^-$) depends on H_2O_2 concentration and may increase considerably at optimal Cl^- ions concentration, which are used as a donor of myeloperoxidase of saliva [16]. Analysis of correlative interrelations between SCN^- and Cl^- ions has demonstrated that in patients with periodontitis this relation was disturbed ($r = +0.385$; $P > 0.05$). The therapy course recovered this relation ($r = +0.991$; $P < 0.001$).

Before the therapy, urea content in patients' saliva was 205.7% per liter of saliva and based to g of protein, 65.8% *(Table 1)* in comparison with healthy subjects. Such difference, between the urea content in saliva according to two different calculations (per liter and per g of protein) may be explained by a high level of salivary protein (155.85%) in the patients with periodontitis at the first examination. But already in 3-4 days of therapeutic course urea concentration decreased and was similar to urea content in the saliva of the control group before the therapy was finished.

Increasing of urea concentration in saliva of patients with periodontitis was due to the host periodontal tissues proteolysis activation as a result of inflammation, and its production in the saliva by pathogenic microflora. However, already at the starting period of treatment (3-4 days) and in the following period, urea concentration was in proportion with its content in the saliva of the healthy group. This bacteriostatic effect was conditioned by preparations.

Determination of creatinine concentration in the saliva of the patients at the first examination showed a decrease to 79.9% per liter and according to g of protein - 40.2%. One week after starting therapy, salivary creatinine concentration remained low *(Table 1)*. Dynamics of creatinine content in saliva of patients with periodontitis reflected the metabolic processes of periodontal tissues.

Syntheses of creatinine and urea production are interrelated processes. Urea production (ornitine cycle) and synthesis of creatinine have such common intermediates, as arginine and ornitine. Changes of urea and creatinine concentrations in the saliva of patients with periodontitis had similar dynamics.

Collagen is a widespread fibrial protein of the human organism [17]. One of the characteristics of collagen is the high content of imino acids, proline and hydroxyproline, which make its primary structure. From this point of view, determination of proline and hydroxyproline in saliva of patients with periodontitis may be of interest and has a clinico-diagnostical meaning.

Determination of proline and hydroxyproline in the saliva of the patients *(Table 1)* before treatment showed high content per liter (228.5%) of saliva and low content (72.6%) per g of protein.

This difference was due to the high content of salivary protein, as a result of inflammation of periodontal tissues. In a week, the complex therapy decreased salivary imino acids contents relatively to g of protein (91.7%; $P > 0.05$); that did not differ from the healthy group. Nevertheless, the calculation of imino acids contents per liter of patient's saliva treated both with complex and traditional therapy, showed a high level of imino acids.

Activation of proteolytic processes by action of pathogenic bacteria proteases and inflammation, activation of lysosome enzymes of the periodontal tissues [18], increased proline and hydroxyproline excretion in saliva, which was shown as the result of our examination.

Alkaline phosphatase exists in all tissues of the human organism. There is a high level of enzymic activity in bones, liver, kidneys. Changes in alkaline phosphatase activity may be informative in periodontitis. The results of our investigation of alkaline phosphatase are presented in *Figure 1*. The first examination of patients showed the elevation of alkaline phosphatase specific activity in the saliva to 183.8% in comparison with healthy subjects. Notwithstanding the therapeutic course in the saliva of the patients, alkaline phosphatase activity continued to elevate on the 3rd-4th days to 318.9%.

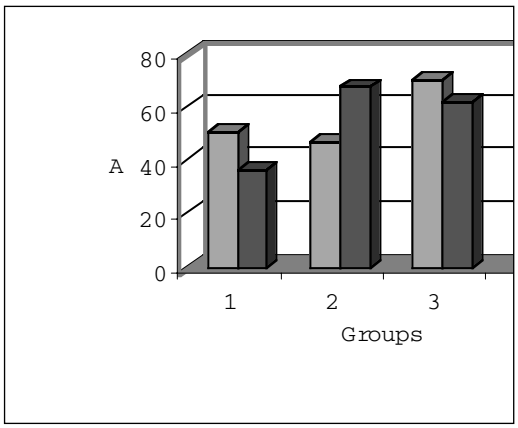

Figure 1. Activity of alkaline phosphatase in patients with periodontitis

A - activity of alkaline phosphatase: IU/l of saliva (first column) and IU/g of protein (second column); Groups: 1 - healthy subjects; 2 - patients before treatment (1st day); 3 - patients, treated traditionally (7th day); 4 - patients, treated with complex therapy (Traumeel S) (7th day)

Complex therapy decreased alkaline phosphatase activity to norm on the 7th day, but the course of traditional therapy did not give such positive effect. Traditional therapy decreased enzyme activity later than the complex therapeutic course.

During inflammation and destruction of periodontal tissues, the metabolic relations of certain parameters may be disturbed. To evaluate the violation degree of the interrelation between some salivary parameters, a correlation analysis with the usage of Spirmen's nonparametric method was conducted [14]. For this purpose the following pairs of salivary parameters were analyzed: urea-creatinine, urea-(proline + hydroxyproline), alkaline phosphatase-(proline + hydroxyproline). The analysis of the relation between urea and creatinine content in the saliva of the healthy subjects revealed strong metabolic interrelation ($r = +0.861$; $P < 0.001$), the same being noticed during treatment.

The correlation between imino acids and urea in the saliva of healthy group subjects demonstrated functional connection ($r = +0.429$; $P < 0.05$). In patients with periodontitis before treatment, the metabolic relation was disturbed ($r = +0.452$; $P > 0.05$). Complex therapy course by Traumeel S restored it on the 7th day of the treatment ($r = +0.737$; $P < 0.01$).

Between imino acids (proline and hydroxyproline) content and alkaline phosphatase activity in the saliva of healthy people there was strong metabolic relation with high reliable level ($r = +0.783$; $P < 0.001$). Inflammation of periodontal tissues broke this interrelation ($r = +0.800$; $P < 0.01$).

Similar situation took place in our analysis of metabolic interrelation between Ca^{2+} ions and inorganic phosphate concentrations in the saliva of the patients with periodontitis: in the beginning of the disease their metabolic relation was disturbed ($r = +0.600$; $P > 0.05$), after the treatment, the imbalance was restored ($r = +0.985$; $P < 0.001$) [18].

Conclusion

Such inflammation process, accompanying parodontitis, led to the essential metabolic imbalance between salivary parameters (indexes): contents of urea, creatinine, proline, hydroxyproline, thiocyanate-ions, chloride-ions, and activity of alkaline phosphatase. Complex therapy, which included both traditional and antiho-

motoxic therapy (Traumeel S ointment) was more effective than the traditional alone. This fact was confirmed by the dynamics of salivary biochemical indexes, the more effective improvement of patient's health status, the reduction of periodontal inflammation period and treatment course duration.

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