

Application of Herbal Formulations in Combined Therapy of Chronic Generalized Periodontitis in Patients with Syringomyelia

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Abstract

The herbal formulation of creeping alfalfa (*Medicago sativa*), which has a wide spectrum of pharmacological activity, was used in patients with syringomyelia with the purpose to increase the effectiveness of combined therapy of chronic generalized periodontitis in acute stage. All patients under observation (108 people), suffering from syringomyelia for 20 years or more, were divided into two groups of different genders aged from 40 to 65 years. The patients of the first group (52 people) underwent anti-inflammatory therapy according to the traditional method, and those ones of the second group (56 patients) in addition to the traditional anti-inflammatory therapy got alfalfa (*Medicago sativa*) in the form of local applications and per os. Evaluation of the treatment results in patients was carried out according to the analysis of the periodontal clinical status, immunological parameters of the oral fluid, parameters of antioxidant protection of the oral fluid and the blood supply state of periodontal tissues. The study results showed that the combined therapy of acute chronic generalized periodontitis in patients with syringomyelia using herbal formulation of alfalfa (*Medicago sativa*) per os and locally contributed to the relief of acute inflammation in a shorter period of time, prevention of complications, normalization of Ig, API and SBI, immunological parameters of oral fluid and lipid oxidation, as well as improvement of blood supply of periodontal tissues.

Keywords: chronic generalized periodontitis; syringomyelia; alfalfa; tissue immunity; blood supply of periodontal tissues.

INTRODUCTION

Chronic generalized periodontitis (CGP) is a widespread periodontal disease in humans. Diseases of organs and systems play an important role in its development, along with local factors (microbial, dentoalveolar abnormalities, substandard fillings and dental protheses) [1; 2; 3; 4; 5; 6].

Currently, a large number of drugs are available for the treatment of CGP. However, their use does not always lead to the desired effect. The disease is often exacerbated and the pathological process is further compounded. This is primarily due to the limited pharmacological activity of drugs and the standard approach to treatment without taking into consideration concomitant diseases and their pathogenesis.

Syringomyelia is one of the most common diseases of the nervous system in central Russia including in the Republic of Bashkortostan (RB). Its prevalence is everywhere with incidence rate on average of 8-9 cases per 100,000 population in the world, and it reaches up to 125 incidences per 100,000 population in some regions of the RB. With this regard, syringomyelia assumes the significance of regional pathology in the RB [7].

A wide clinical and paraclinical study of syringomyelia in recent years makes it possible to consider it as pathology of the whole human body with dysfunction of not only the brain structures, but also of the majority of extraneural systems. In this regard, the violations in the metabolism of free amino acids, electrolyte metabolism in the form of deficiency of sodium, calcium, magnesium, zinc and copper in the blood, and abnormalities in the humoral and cellular components of immune system, etc. should be noted [8; 9].

It is known that the so-called small abnormalities including abnormalities of the dentoalveolar system, which also cause the development of periodontitis, often take place in syringomyelia. In connection with this, we conducted focused researches of the condition of periodontal tissues in patients suffering from syringomyelia. As a result, it was revealed that each examined patient had a localized or generalized form of chronic periodontitis.

Thus, the incidence rate of CGP in patients with syringomyelia, on the one side, and the large polymorphism of the revealed abnormalities in all components of homeostasis with this nervous disease, on the other side, require an individual approach to the treatment of CGP including drugs that have a wide

spectrum of pharmacological activity. This is the herbal formulation of creeping alfalfa (*Medicago sativa*). It contains flavonoids, all types of free amino acids, vitamins A, B, C, D, E and K, carotene, proteins, as well as macro- and microelements (potassium, calcium, magnesium, sodium, iron, zinc, copper, etc.); it has anti-inflammatory, antibacterial, immunomodulating and antioxidant effects [10].

Purpose of the study is to evaluate the effectiveness of herbal formulation of creeping alfalfa in the combined therapy of acute CGP in patients with syringomyelia.

MATERIAL AND METHODS

108 patients of different genders aged 40 to 65 years with moderate and severe CGP in acute form and suffering from syringomyelia for 20 years or longer, as well as 30 practically healthy individuals with intact periodontium (control group) were under observation. All patients were divided in two groups depending on the treatment. The patients in Group I (a control group of 52 patients including 26 patients with moderate and severe CGP with in each of the subgroups) underwent anti-inflammatory therapy according to the traditional method, which included antibiotics, sulfonamides, antihistamines, vitamins as well as bathing of periodontal pockets with 0.05% solution of chlorhexidine bigluconate. All patients also underwent removal of supra- and subgingival dental plaques. The period of treatment was decided individually and depended on the relief of the signs of acute inflammation. Treatment of the patients in Group II (an experimental group of 56 patients including 28 patients with moderate and severe CGP in each of the subgroups) differed from the patients in Group I in that the treatment included creeping alfalfa (*Medicago sativa*) per os in a dosage of 2 g of dry substance per day, and locally with 3% aqueous solution in the form of daily applications (passive diffusion method) lasting 20 minutes for 10 days. Evaluation of the results of treatment of patients in Group I and Group II was carried out according to the clinical manifestations, immunological parameters (IgA, IgG and SIgA) of the oral fluid (OF), OF antioxidant protection parameters (malonic dialdehyde [MDA] and superoxide dismutase [SOD]), as well as blood supply of periodontal tissues. The examinations were carried out before the treatment, on the 7th and 14th day from the beginning of the treatment course and at 3, 6, 9 and 12 months after the treatment.

Levels of immunoglobulins were determined by the single radial immunodiffusion technique in agar gel according to Mancini using monotypic conventional antisera to human IgA, IgM, IgG and SIgA. The immunoglobulin levels were calculated in g/L.

The activity of SOD was studied by the degree of inhibition of the nitroblue tetrazolium reduction in the presence of NADR at a wavelength of 540 nm. MDA in the OF was determined with thiobarbituric acid.

The condition of the blood supply of periodontal tissues was evaluated by the ultrasound dopplerography (USDG). For this purpose, the domestic Minimax-Doppler-K equipment (SP Minimax LLC, St. Petersburg) was used.

The results of the study were subjected to statistical processing on a personal computer using the program "Excell 2000" MS Program Package added by XLSTAT-Pro and calculating Student's t-test. The difference $p < 0.05$ was considered to be significant.

RESULTS AND DISCUSSION

The examinations showed that the combined treatment of acute CGP with using formulations containing creeping alfalfa (*Medicago sativa*) per os and locally in the form of applications in patients with syringomyelia was more effective compared with the traditional anti-inflammatory treatment.

When comparing the results of treatment in patients of two groups, the positive dynamics of immunological, biochemical parameters were noted in the patients of Group II already on the

7th day of the study. In the same period of the study, relief of inflammation was observed in 97.5% of cases. Levels of Ig and API in CGP of all degrees of severity no longer differed from those ones in individuals with intact periodontium ($p > 0.05$). The SBI in moderate CGP was 40.1 ± 2.1 seconds, and it was 35.6 ± 1.5 sec in severe CGP.

In 67.95% of the Group I patients, acute signs of inflammation were managed on the 14th day of the study, and in 32.05% of the Group I patients they were managed only on the 18th day. Significant positive dynamics of IG, API and SBI were also noted on the 14th day.

The level of IgA in the OF in the Group II patients was close to that ones of healthy individuals on the 14th day, while in the patients of Group I only a tendency to decrease was observed during the same period of time (Table 1-4).

Similar changes were observed in examination of IgG in the OF, the level of which in patients of Group II with moderate CGP before treatment was 0.46 ± 0.02 g/L, and with a severe CGP - 0.51 ± 0.01 g/L, and on the 14th day it decreased to 0.34 ± 0.001 g/L and 0.37 ± 0.02 g/L, respectively. At the same time, in the Group I patients, IgG levels in patients with CGP of all severity degrees insignificantly differed from those ones before treatment on the 7th and 14th days (Table 1-4).

In the Group II patients with CGP of all severity degrees treated with creeping alfalfa (*Medicago sativa*), the SIgA level in the OF changed in a similar manner as IgA and IgG, and in the Group I patients the changes were insignificant (Table 1-4).

Table 1. Immunological and biochemical parameters of the OF in the Group I patients with moderate CGP in acute form.

Indicators	Healthy periodontium	Before treatment	From the beginning of the treatment course to:		
			the 14th day	at 3 months	at 9 months
IgA (g/L)	0.18±0.01	0.09±0.001	0.12±0.001	0.10±0.001	0.09±0.001
IgM (g/L)	-	-	-	-	-
IgG (g/L)	0.28±0.01	0.46±0.02	0.41±0.001	0.43±0.001	0.45±0.001
SIgA (g/L)	0.26±0.01	0.09±0.001	0.14±0.001	0.13±0.001	0.10±0.001
SOD (IU)	6.17±0.03	3.31±0.01	3.51±0.01	3.39±0.001	3.30±0.01
MDA (µMol/L)	0.591±0.05	3.46±0.01	2.41±0.07	3.11±0.02	3.45±0.02

Note: * The difference compared to that value before treatment was significant.

Table 2. Immunological and biochemical parameters of the OF in the Group II patients with moderate CGP in acute form.

Indicators	Healthy periodontium	Before treatment	From the beginning of the treatment course to:		
			the 14th day	at 3 months	at 9 months
IgA (g/L)	0.18±0.01	0.09±0.01	0.15±0.001*	0.17±0.001*	0.17±0.001*
IgM (g/L)	-	-	-	-	-
IgG (g/L)	0.28±0.01	0.46±0.02	0.34±0.001*	0.30±0.001*	0.30±0.001*
SIgA (g/L)	0.26±0.01	0.09±0.001	0.22±0.001*	0.24±0.001*	0.24±0.001*
SOD (IU)	6.17±0.03	3.32±0.01	5.73±0.02*	5.78±0.001*	5.64±0.005*
MDA (µMol/L)	0.591±0.05	3.47±0.02	0.79±0.001*	0.78±0.003*	0.73±0.001*

Note: * The difference compared to that value before treatment was significant.

Table 3. Immunological and biochemical parameters of the OF in the Group I patients with severe CGP in acute form.

Indicators	Healthy periodontium	Before treatment	From the beginning of the treatment course to:		
			the 14th day	at 3 months	at 9 months
IgA (g/L)	0.18±0.01	0.06±0.01	0.09±0.01	0.07±0.01	0.06±0.01
IgM (g/L)	-	-	-	-	-
IgG (g/L)	0.28±0.01	0.51±0.01	0.43±0.01	0.48±0.01	0.49±0.001
SIgA (g/L)	0.26±0.01	0.07±0.001	0.10±0.01	0.11±0.01	0.08±0.01
SOD (IU)	6.17±0.03	2.45±0.26	3.05±0.002	2.65±0.04	2.51±0.01
MDA (µMol/L)	0.591±0.05	5.44±0.11	4.51±0.07	5.26±0.03	5.35±0.02

Note: * The difference compared to that value before treatment was significant.

Table 4. Immunological and biochemical parameters of the of in the Group II patients with severe CGP in acute form.

Indicators	Healthy periodontium	Before treatment	From the beginning of the treatment course to:		
			the 14th day	at 3 months	at 9 months
IgA (g/L)	0.18±0.01	0.06±0.01	0.14±0.02*	0.14±0.01*	0.13±0.001*
IgM (g/L)	-	-	-	-	-
IgG (g/L)	0.28±0.01	0.51±0.01	0.37±0.02*	0.35±0.001*	0.36±0.001*
SIgA (g/L)	0.26±0.01	0.07±0.001	0.20±0.02*	0.18±0.01*	0.18±0.001*
SOD (IU)	6.17±0.03	2.48±0.29	5.60±0.02*	5.52±0.003*	5.42±0.007*
MDA (μMol/L)	0.591±0.05	5.64±0.17	0.87±0.02*	0.80±0.003*	0.81±0.001*

Note: * The difference compared to that value before treatment was significant.

On the 7th day from the start of the treatment course, the patients of Group II showed positive dynamics in the parameters of lipid peroxidation. At the same time, the MDA level gradually decreased, and the activity of SOD increased, and the complete normalization of antioxidant protection of the oral cavity was observed already on the 14th day of the study. And in the patients of Group I, even at the completion of the treatment course, the levels of MDA and SOD significantly differed from those ones of individuals with intact periodontium, as well as from those ones of the Group II patients (see Table 1-4).

The study of patients of both groups in the long term showed that persistent clinical results, stable parameters of immunological and biochemical studies were preserved in patients of Group II up to 12 months, and in patients of Group I - up to 3 months.

The combined treatment of acute CGP including herbal formulation of creeping alfalfa (*Medicago sativa*) positively affected the state of blood supply of periodontal tissues. Significant improvement in USDG parameters as compared to pretreatment parameters was observed on the 14th day from the start of the treatment course of both moderate and severe CGP (in moderate CGP, Qas = 0.690 ± 0.001 cm/sec, Qam = 0.630 ± 0.005 cm/sec, Pi = 2.220 ± 0.004 and Ri = 0.790 ± 0.001; in severe CGP, Qas = 0.512 ± 0.001 cm/sec, Qam = 0.464 ± 0.001 cm/sec, Pi = 1.888 ± 0.017 and Ri = 0.825 ± 0.001). At 3 months, after the completion of the treatment course, blood supply of periodontal tissues slightly differed from that one of healthy periodontium and remained stable until 9 months after the completion of the treatment course. At 12 months of the study, a slight decrease in Qas and Qam was observed (in moderate CGP, Qas = 0.675 ± 0.001 cm/sec and Qam = 0.625 ± 0.001 cm/s; in severe CGP, Qas = 0.508 ± 0.001 cm/sec and Qam = 0.460 ± 0.001 cm/s), decrease in Pi and an increase in Ri as compared with those parameters at 9 months after the completion of the treatment course (in moderate CGP, Pi = 2.201 ± 0.004 and Ri = 0.820 ± 0.001; in severe CGP, Pi = 0.801 ± 0.017 and Ri = 0.830 ± 0.001; p > 0.05). As a result of the treatment, USDG parameters in the patients of Group I changed insignificantly, and negative dynamics were observed at 3 months.

CONCLUSIONS

Thus, in patients suffering from syringomyelia for 20 years or longer, the combined treatment of acute CGP with using herbal formulation of creeping alfalfa (*Medicago sativa*) per os daily in amount of 2.0 g of dry substance for 10 days, as well as locally with 3% aqueous solution in the form of application contributes to the relief of acute inflammation, prevention of complications, normalization of Ig, API and SBI levels, normalization of immunological parameters of the OF and state of lipid peroxidation, as well as to improvement of blood supply of periodontal tissues in a shorter period of time.

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