The effectiveness of the use of polypeptide drugs and their effect on the metabolic parameters of oral fluid in patients with generalized periodontitis in depending on blood type

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Abstract

The article presents the results of treatment of 157 patients with generalized periodontitis depending on blood type using polypeptide drugs. The concentration of total protein, C – reactive protein, IgG, TRACP, BSALP, albumin, amylase, lipase, Ca, Fe was determined in the oral fluid. The treatment allowed to reduce the content of total protein, C – reactive protein, TRACP in the oral fluid with increasing levels of calcium, Fe, BSALP, in relation to the relevant data before treatment. And also, polypeptide drugs helped to increase the level of albumin in representatives of 0 (I) and A (II) blood type in the oral fluid; contributed to a decrease: glucose, IgG with increasing activity, amylase and lipase in carriers of B (III) and AB (IV) blood type in the oral fluid, in relation to the values before treatment. The dynamics of indicators of oral fluid metabolism with the help of polypeptide drugs, convincingly proves the effectiveness of their use in the treatment of generalized periodontitis in patients with different blood type.

Keywords

generalized periodontitis, polypeptide drugs, oral fluid, blood type

Introduction

Treatment and rehabilitation of patients with inflammatory diseases of periodontal tissues is one of the most difficult problems in modern dentistry, which is reflected in the huge number of proposed tools and methods, which are not always effective. Currently, dentists have come to understand that in the treatment of inflammatory diseases of periodontal tissues it is necessary to use methods aimed at restoring local tissue homeostasis and the entire pathogenetic mechanism of this pathology (Dankevych-Kharchyshyn et al. 2019). Along with the use of modern methods of therapeutic treatment of affected systems, it is necessary to use

methods of integrated polysystemic correction at the cell-molecular level. This is due to the fact that any chronic disease is the final stage of a long pathophysiological process in the body, when the mechanisms of cellular alteration are initiated and mediated by redox reactions, impaired transport-trophic functions and cytokine regulation with the development of immunepathological processes (Cekici et al. 2014).

Numerous data have been obtained that allow us to conclude that human oral fluid is a unique substance that reflects disorders in the human body at the submolecular level (De Lima et al. 2016). Particular attention is paid to the study of prospects for the analysis of oral fluid for diagnostic purposes, due to a number of reasons: collection of oral fluid is simple and convenient in non-clinical conditions, painless, and virtually eliminates the risk of infection of medical personnel, and the content of some molecules of mixed saliva reflects their concentration in the blood. Analysing the literature, it can be noted that oral fluid presents great potential for its use in basic research (Bandrivskaia et al. 2014). The presence of correlations between the parameters of oral fluid metabolism and blood parameters suggests that oral fluid is included in the functional systems of the body and may respond to changes in its parameters in different physiological and pathological conditions (Demkovych et al. 2021a).

A great interest is the group affiliation of patients' blood as a springboard for diagnostic and therapeutic measures in the complex treatment of periodontal diseases, where blood is a special ecosystem and metabolic organ that regulates immune protection and nonspecific resistance, trophic and detoxification (Al-Askar et al. 2021). However, existing treatments for generalized periodontitis not only do not provide effective results in this direction, but also do not take into account the high frequency of relationships between periodontal tissue disease and blood type in patients.

Objective. To evaluate the effectiveness of polypeptide drugs using in depending of blood type for the treatment of patients with generalized periodontitis.

Materials and methods

Treatment of patients with generalized periodontitis with polypeptide drugs was performed in 157 patients (main group): with 0 (I) blood type – 48 patients; with A (II) blood type – 43 patients; with B (III) blood type – 35 patients and with AB (IV) blood type – 31 patients. The appointment of polypeptide drugs was carried out depending on the blood type of patients and the degree of generalized periodontitis (Drucker 2020). Considering the data obtained in our previous studies (Bandrivsky et al. 2019), changes in metabolic parameters in oral fluid were of the same type for representatives of 0 (I) and A (II) blood type and B (III) and AB (IV) with

varying severity of periodontitis. Therefore, the treatment was the same, but differed in the dose and frequency of polypeptide preparations for representatives of 0 (I) and A (II) blood types and B (III) and AB (IV). The control group of patients consisted of 133 people who were treated for generalized periodontitis according to conventional methods (Plessas 2014).

Thus, patients with 0 (I) and A (II) blood type and generalized periodontitis of I degree were prescribing mummy balm (Vivax Dent, Russia) – irrigation in periodontal pockets for 7 days; gel with peptide complex and "Neovitin" (Vivax Dent, Russia) – gingival applications for 7 days; Revimite (NPCRIZ, Russia) – 1 teaspoon (10 g) during meals 2 times a day for 14 days; Whereas, patients with B (III) and AB (IV) blood type and generalized periodontitis of I degree were prescribed mummy balm (Vivax Dent, Russia) – irrigation in periodontal pockets for 5 days; gel with peptide complex and "Neovitin" (Vivax Dent, Russia) – gingival applications for 5 days; Revimite (NPCRIZ, Russia) – 1 teaspoon (10 g) during meals once a day for 10 days.

Patients with generalized periodontitis of II degree with 0 (I) and A (II) blood type were prescribed mummy balm (Vivax Dent, Russia) – instillation into periodontal pockets for 10 days; gel with peptide complex and "Neovitin" (Vivax Dent, Russia) – gingival applications for 10 days; Tsinsil – T (NPCRIZ, Russia) – 1 tablet 2 times a day with meals (chewing) for 14 days; Olekap (NPCRIZ, Russia) – 1 capsule 2 times a day for 7 days; Cartalax (NPCRIZ, Russia) – 2 capsules per day with meals 2 times a day for 14 days. Patients with B (III) and AB (IV) blood type and generalized periodontitis of II degree were prescribed mummy balm (Vivax Dent, Russia) – instillation in periodontal pockets for 7 days; gel with peptide complex and "Neovitin" (Vivax Dent, Russia) – gingival applications for 7 days; Tsinsil – T (NPCRIZ, Russia) – 1 tablet 2 times a day with meals (chewing) for 10 days; Olekap (NPCRIZ, Russia) – 1 capsule 2 times a day for 14 days; Cartalax (NPCRIZ, Russia) – 2 capsules per day with meals 2 times a day for 14 days.

Patients with 0 (I) and A (II) blood type with grade III generalized periodontitis were prescribed mummy balm (Vivax Dent, Russia) – instillation in periodontal pockets for 10 days; peptide complex with Neovitin (Vivax Dent, Russia) – gingival applications for 10 days; Olekap (NPCRIZ, Russia) – 1 capsule 2 times a day with meals for 7 days; Tsinsil – T (NPCRIZ, Russia) – 1 tablet 2 times a day with meals (chewing) for 14 days; Cartalax (NPCRIZ, Russia) – 2 capsules 2 times a day with meals for 14 days; Ensil (NPCRIZ, Russia) – 1 capsule 3 times a day with meals for 14 days. Patients with B (III) and AB (IV) blood type and generalized periodontitis III degree were prescribed mummy balm (Vivax Dent, Russia) – instillation into periodontal pockets for 10 days; peptide complex with Neovitin (Vivax Dent, Russia) – gingival applications for 10 days; Olekap (NPCRIZ, Russia) – 1 capsule 2 times a day with meals for 10 days; Tsinsil – T (NPCRIZ, Russia) – 1 tablet 2 times a day with meals (chewing) – for 21 days; Cartalax

(NPCRIZ, Russia) – 2 capsules 2 times a day with meals for 14 days; Ensil (NPCRIZ, Russia) – 1 capsule 3 times a day with meals for 14 days.

Concentrations of total protein, albumin, amylase, lipase, calcium, and Fe were determined in the oral fluid. The concentration of total protein was determined (Lahdentausta et al. 2018) at the end point in the formation of a coloured complex with copper ions in an alkaline medium. The albumin content (Demkovych et al. 2021b) was determined by the endpoint in the formation of a stained complex with broleccresol green in an alkaline medium.

The activity of α-amylase was determined by enzymatic colorimetric method (Kheirmand Parizi et al. 2019). Lipase activity was studied by kinetic colorimetric method. Calcium concentration was studied colorimetrically in alkaline medium. The content of Fe in the serum was determined without deproteinization with FerroZain dye, the concentration of which is proportional to the concentration of Fe in the sample (Leite et al. 2019). The research was performed on an automatic biochemical analyser "Hitachi-902", "Untegra 800" from "Roche" (Japan), using a commercial set of reagents "Roche" (Germany). The concentration of C – reactive protein in biological fluids was quantified by immunoturbodimetric method (Ersin et al. 2018). The concentration of immunoglobulin G in oral fluid was determined by immunoturbodimetric method (Demkovych et al. 2021c). Tartrate-resistant acid phosphatase (TRACP) activity was determined by enzyme-linked immunosorbent assay using the Bone TRAP Assay kit. Bone enzyme activity (BSALP) was determined by solid-phase enzymelinked immunosorbent assay (López-Lacomba et al. 2017) using standard Phyllisit-Diagnostic kits, Ukraine. Statistical calculation of the obtained results was performed using the application programs "Statistica 8.0" (StatSoft, USA) and the package of statistical functions of the program "Microsoft Excel 2010" (Orlov 2015).

Results

As a result of our proposed pharmacotherapy containing a complex of polypeptide mediators, in patients with generalized periodontitis with 0 (I) blood type of the main group 1 month after treatment (Table 1) investigated a significant decrease in oral fluid C-reactive protein by 65,29%, $p < 0,01$, $p_1 < 0,01$ and TRACP – by 4,67%, $p < 0,05$, $p_1 < 0,05$, in relation to data before treatment. In the control group, with identical blood group, patients with generalized periodontitis, where traditional treatment measures were used to cure the disease, in this period of observations there was a decrease in oral fluid content of C-reactive protein by 30,0%, $p < 0,01$, relative to data before treatment.

Table 1.
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Dynamics of values of protein, mineral, bone metabolism in the oral fluid of patients with generalized periodontitis with 0 (I) blood type, in different treatment periods.

Indicators	Before treatment	Terms of treatment		
		1 month after treatment	6 months after treatment	1 year after treatment
Total protein, g/l	2,13±0,15	1,95±0,13	1,36±0,11°*	1,40±0,11°*
	2,15±0,15	2,08±0,14	1,93±0,13	2,19±0,14
C-reactive protein, g/k	1,21±0,09	0,42±0,06°*	0,50±0,06°*	0,63±0,07°*
	1,20±0,09	0,84±0,07°	1,48±0,08°°	1,73±0,10°
Albumin, g/l	0,31±0,03	0,36±0,03	0,42±0,04°°	0,45±0,04°°*
	0,32±0,03	0,32±0,03	0,35±0,03	0,30±0,03
Ca, mmol/l	0,71±0,15	1,05±0,20	1,25±0,20°°**	1,37±0,22°°**
	0,72±0,20	0,75±0,21	0,70±0,18	0,67±0,28
Fe, mmol/l	0,51±0,04	0,59±0,04	0,66±0,04°°**	0,72±0,05°*
	0,50±0,04	0,50±0,04	0,50±0,04	0,44±0,03
TRACP, ng/ml	3,44±0,05	3,30±0,04°°**	3,06±0,03°*	2,82±0,03°*
	3,45±0,05	3,45±0,05	3,54±0,05	3,60±0,06°°
BSALP, ng/ml	2,31±0,06	2,42±0,06	2,94±0,06°*	3,08±0,07°*
	2,31±0,06	2,39±0,06	2,10±0,05	2,00±0,04

Notes:

ab= values of indicators in patients of the main group values of indicators in patients of the control group ��= values of indicators in patients of the main group values of indicators in patients of the control group ;

°p<0,01, °°p<0,05 – significant difference in the values of parameters in patients of the main group in relation to the data before treatment;

*p_1<0,01, **p_1<0,05 – significant difference in the values of parameters in patients of the control group in relation to the data before treatment.

Six months after treatment in patients with generalized periodontitis of the main group with 0 (I) blood group, a significant improvement in the data of all analysed parameters in the oral fluid was investigated. Thus, we found a probable decrease in concentrations: total protein – by 36,15%, C-reactive protein – by 58,68%, TRACP activity – by 11,05%, p<0,01, p_1<0,01 against

the background of increasing in the oral fluid albumin content – by 35,48%, $p_1<0,05$, calcium – by 76.05%, Fe – by 29,41%, $p<0,05$, $p_1<0,05$, BSALP activity – by 27,27%, $p<0,01$, $p_1<0,01$. In the control group, after 6 months of follow-up, the values of the analysed indicators of oral fluid metabolism did not differ statistically significantly from the data before treatment, $p>0,05$. At the same time, the content of C-reactive protein in the oral fluid of the subjects exceeded the data before treatment by 23,3%, $p<0.05$.

One year after treatment in patients with generalized periodontitis with 0 (I) blood type of the main group, as a result of our proposed treatment with polypeptide drugs, there was a positive dynamics of the analysed metabolic parameters of oral fluid, which was characterized by a significant decrease in levels of total protein by 34,27%, C-reactive protein – by 47,93%, TRACP activity – by 18,02%, $p<0,01$, with increasing levels: albumin – by 45,16%, $p_1<0.01$, calcium – by 92,96%, $p_1<0.05$, Fe – 41,17%, $p<0,05$, BSALP activity – 33,33%, $p<0,01$, $p_1<0,01$, in relation to data before treatment. At the same time, in patients with generalized periodontitis of the control group, where traditional treatment measures were used to treat the disease, the values of the analysed parameters were equal to the data before treatment, $p>0,05$.

At the same time, in this group there was a significant increase in the concentration of Creactive protein in the oral fluid, which exceeded the data before treatment by 44,17%, $p<0,01$.

When using our proposed treatment complex containing polypeptide drugs of local and general action for the treatment of generalized periodontitis in patients with A (II) blood type, was positive changes in the values of individual indicators of oral fluid metabolism (Table 2) in different treatment periods.

Table 2.
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Dynamics of values of protein, mineral, bone metabolism in the oral fluid of patients with generalized periodontitis with A (II) blood type, in different treatment periods.

Indicators	Before treatment	Terms of treatment		
		1 month after treatment	6 months after treatment	1 year after treatment
Total protein, g/l	2,59±0,30	1,80±0,26	1,45±0,24°°	1,54±0,26°°**
	2,60±0,30	1,78±0,28	1,63±0,29°°	2,32±0,28
C-reactive protein, g/k	1,47±0,17	0,68±0,14°	0,60±0,13°*	0,72±0,14°*
	1,46±0,17	0,73±0,16	1,28±0,16	1,48±0,17

Albumin, g/l	1,24±0,06	1,30±0,07	1,92±0,08°*	1,94±0,07°*
	1,25±0,06	1,25±0,06	1,16±0,05	1,18±0,07
Ca, mmol/l	0,68±0,07	1,08±0,07**°	1,10±0,08°	1,16±0,09°*
	0,67±0,07	0,82±0,08	0,94±0,06	0,54±0,05
Fe, mmol/l	0,54±0,05	0,68±0,05	0,94±0,06°*	1,03±0,06°*
	0,54±0,05	0,60±0,05	0,68±0,05	0,42±0,04°°
TRACP, ng/ml	3,37±0,07	3,17±0,07°°	2,93±0,06°*	2,88±0,05°*
	3,38±0,07	3,31±0,07	3,24±0,07	3,40±0,08
BSALP, ng/ml	2,40±0,05	2,68±0,06**°	2,89±0,07°*	3,09±0,08°*
	2,40±0,05	2,57±0,05	2,40±0,05	2,25±0,04

Notes:

ab= values of indicators in patients of the main group values of indicators in patients of the control group ◆◆= values of indicators in patients of the main group values of indicators in patients of the control group ;

°$p<0,01$, °°$p<0,05$ – significant difference in the values of parameters in patients of the main group in relation to the data before treatment;

*$p_1<0,01$, **$p_1<0,05$ – significant difference in the values of parameters in patients of the control group in relation to the data before treatment.

Thus, 1 month after treatment, in patients of the main group of the study was determined by a probable decrease in the content of C-reactive protein by 53,74%, with an increase a calcium by 58,82%, relative to baseline, $p<0,01$, $p_1<0,05$. It was noted that during this period of research in the main group significantly improved the values of bone metabolism of oral fluid, which was characterized by a decrease in TRACP activity by 5,94%, $p<0,05$, $p_1<0,05$, with increasing BSALP activity – by 11,67%, $p<0,01$, $p_1<0,05$, relative to pre-treatment data. The remaining values of oral fluid metabolism, although had a positive dynamic, but did not differ statistically significantly from the reference data, $p>0,05$. In the control group of patients with generalized periodontitis, 1 month after treatment, the values of the parameters of oral fluid metabolism did not change and were equal to the data before treatment, $p>0,05$.

Six months after treatment, patients with generalized periodontitis of the main group with A (II) blood group were determinate for a significant decrease in the values of protein metabolism of oral fluid in relation to data before treatment: total protein – by 40,54%, $p<0,05$, $p_1<0,05$, C-reactive protein – by 59,18%, $p<0,01$, with increasing albumin levels – by 56,45%, $p_1<0,01$. At

the same time, we studied the improvement of mineral metabolism of oral fluid, which was characterized by an increase in calcium and Fe levels relative to baseline by 61,76%, $p_1 > 0,05$ and 74,07%, $p < 0,01$, $p_1 < 0,01$, respectively. At this time, the study in patients of the main group were determined by further improvement of markers of bone metabolism of oral fluid, which was due to a decrease in oral fluid TRACP activity – by 13,06% with increasing BSALP activity – by 20,42%, $p < 0,01$, $p_1 < 0,05$, for reference data. In the control group, 6 months after treatment, a probable decrease in the concentration of total protein in the oral fluid were determined – by 55,38%, $p < 0,05$, relative to the data before treatment. In this case, the remaining analyzed parameters of oral fluid in patients of the control group was equal to the data before treatment, $p > 0,05$.

Twelve months after treatment in patients with generalized periodontitis with A (II) blood type of the main group, the preservation of positive dynamics of the values of all analysed parameters of oral fluid metabolism was observed. Thus, in this period of research in the main group decreased the concentration of protein metabolism products: total protein – by 36,68%, $p < 0,05$, $p_1 < 0,05$, C-reactive protein – by 51,0%, with increase in albumin content – by 24,19%, $p < 0.01$, relative to before treatment data $p_1 < 0,01$. The improvement of mineral metabolism of oral fluid was accompanied by an increase in concentrations of calcium – by 70,59% and Fe – by 90,74%, $p < 0,01$, $p_1 < 0,01$, relative to baseline. At the same time, we found in the oral fluid of the main group a decrease in the level of TRACP activity – by 14,55% against the background of increasing BSALP activity – by 28,75%, relative to reference data, $p < 0,01$, $p1 < 0.01$. In subjects of the control group, 1 year after treatment, the values of the analysed parameters of oral fluid were equal to the data before treatment, $p > 0,05$. At the same time, was determinate a significant decrease in the concentration of Fe in the oral fluid (by 6,25%), relative to the data before treatment, $p < 0,05$.

A study indicators of oral fluid metabolism, in patients with generalized periodontitis with B (III) blood type, showed (Table 3) that when using our treatment regimen containing polypeptides of general and local action, 1 month after treatment in the patients of main group in the oral fluid significantly increased the level of calcium – by 34,25% relative to the data before treatment, $p < 0,05$, $p_1 > 0,05$. At the same time, there was an improvement in the values of markers of bone metabolism in oral fluid, which was characterized by a probable decrease in TRACP activity – by 9,10%, $p < 0,01$, $p_1 < 0,05$. In the control group, where traditional treatment measures were used to treat generalized periodontitis, 1 month after treatment, was observed an increase in calcium in oral fluid – by 13,33% compared to baseline, $p < 0,05$. At the same time, in this period of observations, the values of the remaining studied parameters were equal to the data before treatment in both study groups, $p > 0,05$.

Table 3.

Dynamics of values of protein, mineral, bone metabolism in the oral fluid of patients with generalized periodontitis with B (III) blood type, in different treatment periods.

Indicators	Before treatment	Terms of treatment		
		1 month after treatment	6 months after treatment	1 year after treatment
C-reactive protein, (g/l)	0,74±0,18	0,61±0,17	0,40±0,08°°**	0,36±0,08°*
	0,73±0,18	0,68±0,18	0,64±0,08	0,69±0,07
IgG, (g/l)	0,37±0,05	0,34±0,04	0,27±0,04	0,21±0,03°°**
	0,37±0,05	0,36±0,05	0,35±0,05	0,37±0,06
Amylase, (U/l)	50,34±10,50	55,89±10,75	65,10±15,00	86,14±14,15°°**
	51,20±18,15	53,72±19,20	50,06±17,13	43,00±12,73
Glucose, (mmol/l)	0,68±0,04	0,60±0,13	0,36±0,05**	0,24±0,05°°**
	0,68±0,14	0,66±0,14	0,59±0,04	0,61±0,14
Lipase, (U/l)	5,50±0,40	5,95±0,36	6,15±0,36*	6,66±0,32°°*
	5,50±0,40	5,28±0,39	5,07±0,37	5,47±0,38
Ca, (g/l)	0,73±0,03	0,98±0,04°°	1,20±0,05°*	1,39±0,06°*
	0,75±0,03	0,85±0,04°°	0,82±0,04	0,75±0,03°°
Fe, (g/l)	0,58±0,04	0,65±0,04	0,65±0,05**	0,72±0,05°**
	0,59±0,04	0,60±0,04	0,53±0,03	0,46±0,04°°
TRACP, (ng/ml)	3,41±0,06	3,10±0,05°**	2,96±0,04°*	2,78±0,03°*
	3,40±0,06	3,27±0,06	3,63±0,05°°	3,74±0,06°
BSALP, (ng/ml)	2,24±0,07	2,36±0,07	2,48±0,08°°	2,60±0,09°*
	2,23±0,07	2,30±0,08	2,28±0,07	2,19±0,06

Notes:

ab= values of indicators in patients of the main group values of indicators in patients of the control group ��= values of indicators in patients of the main group values of indicators in patients of the control group ;

°p<0,01, °°p<0,05 – significant difference in the values of parameters in patients of the main group in relation to the data before treatment;

Six months after treatment in the patients of main group with B (III) blood type, there was a significant improvement in the values of the studied parameters of oral fluid. At the same time, the improvement of protein metabolism of oral fluid was characterized by a decrease in the content of oral fluid: C-reactive protein – by 45,95%, $p < 0,05$, $p_1 < 0,05$, and IgG – by 27,03%, p, $p_1 > 0,05$; of carbohydrate metabolism: increase in amylase activity – by 29,32%, p, $p_1 > 0,05$; of mineral metabolism: increasing the concentration of calcium – by 64,38%, $p < 0,01$, $p_1 < 0,01$; of bone metabolism: a decrease in TRACP activity – by 13,20%, $p < 0,01$, $p_1 < 0,01$, with an increase in BSALP activity – by 10,71%, $p < 0,05$, $p_1 > 0,05$, in relation to data to treatment. The level of lipase activity in oral fluid increased – by 11,82% relative to pretreatment data, $p > 0,05$, $p_1 < 0,01$. In patients of the control group, 6 months after treatment, the value of the studied parameters of oral fluid was equal to data before treatment, $p > 0,05$. It was noted, that in the patients of control group at this period of the study probably increased the activity of TRACP in oral fluid, which was 6,76%, above the reference values, $p < 0,05$.

After 1 year of follow-up, in the patients of main group with B (III) blood type remained positive dynamics of the values of the analysed parameters of oral fluid metabolism. We observed that the level of C-reactive protein was – 51,35%, $p < 0,05$, IgG – 43,24%, $p < 0,01$, $p_1 < 0,01$, below baseline. At the same time, the activity of amylase in the oral fluid of the patients of this group was – 71,11%, $p < 0.05$, $p_1 < 0.01$, higher than before treatment. It was noteworthy that the activity of lipase increased by 21,09%, $p < 0,05$, and was significantly higher than in the control group, $p_1 < 0,01$. At the same time, the glucose level decreased by 64,71%, p, $p_1 < 0,05$, increased in calcium levels – by 90,41%, $p < 0,01$, $p_1 < 0,01$, Fe – by 24,14%, $p_1 < 0,01$, $p_1 < 0,05$ and BSALP – by 16,07%, with a decreased in TRACP activity – by 18,48%, $p < 0,01$, $p_1 < 0,01$, in relation to treatment data. In patients of the control group of this study period, the parameters of mineral metabolism probably deteriorated, which was characterized by a decreased in calcium levels – by 11,77% and Fe – by 22,03%, $p < 0,05$, relative to baseline. At the same time, patients in the control group showed an increase in the level of TRACP activity in oral fluid – by 10,0%, $p < 0,01$, relative to pre-treatment data. The values of the remaining studied parameters of oral fluid metabolism were equal to the reference data, $p > 0,05$.

During studying the dynamics of the values of oral fluid parameters in patients with generalized periodontitis with AB (IV) blood type (Table 4), as a result of the using treatment complex which contained polypeptides drugs, 1 month after treatment, was observe a decreased in the oral fluid: IgG – by 25,00%, $p < 0,05$, TRACP – by 7,31%, $p < 0,01$, $p_1 > 0,05$, and increase the level of BSALP activity – by 10,82%, $p < 0,01$, $p_1 < 0,05$. At the same time, the values of the remaining

studied parameters of oral fluid metabolism, although had a positive dynamic, but the obtained data did not differ statistically significantly from baseline values, p>0,05. At the same time, after 1 month of observations, in the control group, where traditional methods were used for curation of generalized periodontitis, the values of the parameters studied were changing and equal to the data before treatment p>0,05.

Table 4.
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Dynamics of values of protein, mineral, bone metabolism in the oral fluid of patients with generalized periodontitis with AB (IV) blood type p, in different treatment periods.

Indicators	Before treatment	Terms of treatment		
		1 month after treatment	6 months after treatment	1 year after treatment
C-reactive protein, (g/l)	0,61±0,08	0,53±0,07	0,45±0,06	0,37±0,05°°*
	0,60±0,08	0,55±0,07	0,60±0,07	0,69±0,08
IgG, (g/l)	0,28±0,02	0,21±0,02°°**	0,14±0,009°*	0,12±0,008°*
	0,28±0,02	0,28±0,02	0,31±0,05	0,33±0,05
Amylase, (U/L)	52,65±8,65	62,76±8,70	73,87±8,82	82,86±8,83°°**
	53,00±8,70	53,00±8,70	50,24±8,63	50,18±8,63
Glucose, (mmol/l)	0,62±0,04	0,56±0,02	0,40±0,02°°**	0,38±0,03°°**
	0,62±0,04	0,58±0,04	0,53±0,05	0,58±0,06
Lipase, (U/l)	6,91±0,80	7,22±0,74	7,48±0,68	8,00±0,68**
	6,91±0,80	7,12±0,88	6,86±0,88	6,42±0,53
Ca, (g/l)	0,79±0,04	1,35±0,04	1,58±0,05°*	1,69±0,06°*
	0,79±0,04	0,90±0,04	0,86±0,05	0,77±0,04
Fe, (g/l)	0,62±0,03	0,68±0,04	0,70±0,05	0,73±0,04°°*
	0,62±0,03	0,65±0,04	0,59±0,04	0,44±0,03
TRACP (ng/ml)	3,42±0,06	3,17±0,05°	2,92±0,04°*	2,67±0,03°*
	3,43±0,06	3,31±0,06	3,52±0,07	3,80±0,08°
BSALP, (ng/ml)	2,31±0,05	2,56±0,05°**	2,85±0,06°*	3,10±0,07°*
	2,30±0,05	2,39±0,05	2,30±0,05	2,21±0,04

Notes:

ab= values of indicators in patients of the main group values of indicators in patients of the control group ��= values of indicators in patients of the main group values of indicators in patients of the control group ;

°$p<0,01$, °°$p<0,05$ – significant difference in the values of parameters in patients of the main group in relation to the data before treatment;

*$p_1<0,01$, **$p_1<0,05$ – significant difference in the values of parameters in patients of the control group in relation to the data before treatment.

Six months after treatment in the patients' main group with AB (IV) blood type was determined to significantly improve a number of studied values of the parameters of oral metabolism. Thus, we found a probable decrease in the concentration of IgG – by 50,00%, $p<0,01$, $p_1<0,01$, glucose level – by 35,48%, $p<0,05$, $p_1<0,05$, TRACP content – by 14,52%, $p<0,01$, $p_1<0,01$, and increase in levels of amylase oral fluid – by 40,30%, $p>0,05$, calcium – by 100%, BSALP activity – by 23,38%, $p<0,01$, $p_1<0,01$. At the same time, in the patients control group, in this period of research, the values of the parameters of oral fluid metabolism were equal to data before treatment, $p>0,05$.

After 1 year of research in patients of the main group, where for the treatment of generalized periodontitis was used polypeptide drugs, observed the preservation of positive dynamics of the studied parameters of oral fluid metabolism. At the same time, was observed a decreasing in the oral fluid content of C-reactive protein – by 39,34%, $p<0,05$, IgG – by 57,14%, $p<0,01$, $p_1<0,01$, glucose – by 38,71%, $p<0,05$, TRACP – by 21,93%, $p<0,01$, $p1<0,01$, in relation to treatment data. At the same period of research was determined an increase in amylase activity – by 57,38%, $p<0,05$, calcium levels – by 113%, $p<0,01$, Fe – by 17,74%, $p<0,05$ and activity BSALP – by 34,20%, $p<0,01$, $p_1<0,01$, relative to the corresponding baseline values. In this period of research, in the control group patients, the values of the analysed indicators of oral fluid metabolism did not differ statistically significantly from the data before treatment, $p>0.05$.

Discussion

Changes in the activity of salivary enzymes are the result of various diseases. Thus, in inflammatory and in dystrophic – inflammatory lesions of periodontal tissues there is a decrease in lysozyme, protease inhibitors, increased activity of proteolytic enzymes, proteinases (their activity correlates with the severity of the inflammatory process), alkaline and acid phosphatases; dental caries is characterized by activation of glycolysis enzymes and aerobic breakdown of carbohydrates with the formation of large amounts of organic acids

(Zabolotny et al. 2016). The activity of α-amylase in saliva increases in diabetes mellitus, peptic ulcer of the stomach and duodenum, chronic pancreatitis; the content of acid phosphatase increases in epidemic hepatitis (Cardoso et al. 2018).

Immune analysis of saliva is highly informative in the diagnosis of herpetic eczema type I. Some scientists (Li et al. 2018) recommend the use of sIgA studies in the oral cavity to diagnose influenza virus. In catarrhal gingivitis, there is a significant correlation between the level of specific IgG in oral fluid and serum. In this disease, the concentration of tissue plasminogen activator increases in the oral fluid, which intensively breaks down not only fibrin but also the secretory component sIgA, thereby reducing local resistance (Redman et al. 2016). It has been established that in people with chronic pain the content of total protein decreases, both in blood plasma and in mixed saliva.

One of the most sensitive to pathogenic factors is the immune system. Various violations of its normal activity accompany the widest range of internal and dental pathology. Not only the development but also the course and consequences of diseases depend on the state of the body's immune reactivity. According to many clinical immunologists, in modern medicine there are obvious prerequisites for the revision of tactical schemes for the treatment of pathology with impaired immune function. It is necessary to correct and prevent immunological imbalance, which can be manifested as a deficiency of certain parts of the immune system, and hyperergic reactions of the body to foreign agents, autoimmune processes (Muniz et al. 2018).

The search for alternative treatments for inflammatory periodontal tissue disease has led dentists to use antioxidants in periodontology (Chen 2017). However, in most cases, the tactics of prescribing antioxidants are empirical rather than scientifically sound. In the treatment of periodontal diseases there are still no effective and safe approaches to the use of drugs that provide prevention and treatment of pathological processes caused by free radicals.

Our proposed therapy which contained polypeptides drugs was more effective than traditional treatment regimen, and improves the metabolic properties of oral fluid, which are responsible for the induction and development of dystrophic – inflammatory processes in periodontal tissues.

Thus, the use of polypeptide drugs of general and local action in patients with different blood groups, allowed to reduce in the oral fluid content of total protein content by 35,48%, C – reactive protein – by 47,41%, TRACP – by 18,25%, with an increase in calcium – by 91,79%, Fe – by 20,95%, BSALP – by 27,64%, in relation to the relevant data before treatment, p, $p_1<0,05$; 0,01. Curation of generalized periodontitis with polypeptide drugs contributed to a decrease in

the oral fluid: glucose – by 51,71%, IgG – by 50,19%; with an increase activity in the oral fluid: amylase – by 64,25% and lipase – by 18,40% in carriers of B (III) and AB (IV) blood type, in relation to the values before treatment, p, p_1<0,05; 0,01. Our therapy in the treatment of generalized periodontitis contributed to an increase in the level of albumin in the oral fluid in representatives of 0 (I) and A (II) blood type by 34,68%, p, p_1<0,05.

Normalization of prognostic – significant for a particular blood type biochemical, immunological parameters of oral fluid in patients with generalized periodontitis prove the prospects of polypeptide drugs in the treatment of generalized periodontal tissue lesions.

Conclusion

Thus, the dynamics of indicators of oral fluid metabolism with the help of polypeptide drugs of general and local action, convincingly proves the effectiveness of their use in the treatment of generalized periodontitis in patients with different blood type.

Acknowledgements

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