



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.03

TPI 2020; 9(3): 52-55

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Received: 13-01-2020

Accepted: 15-02-2020

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## Complex treatment of generalized periodontitis in patients with chronic rheumatic heart disease

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### Abstract

The results of treatment of pathogenetic basic therapy for the complex treatment of generalized periodontitis in patients with chronic rheumatic heart disease (CRHD) are presented. The treatment of generalized periodontitis was performed in 63 patients with CRHD was carried out by complex treatment protocol (standard protocol and photodynamic therapy PDT). There was a significant improvement in the condition of tooth-retaining in patients treated according to the treatment regimen by clinical criteria and indices of paraclinical index assessments of periodontal tissues after immediate and long-term observation. The advantages of using the basic therapy regimen using PDT for generalized periodontitis in patients with CHRC have been established.

**Keywords:** Complex treatment, generalized periodontitis, chronic rheumatic heart disease

### Introduction

An analysis of the literature data allows us to conclude that the insufficient effectiveness and safety of the applied medical treatment of chronic periodontitis, the resistance of periodontopathogenic microorganisms to various methods of exposure to them, the great medical and social significance of the consequences of the disease indicate the need to search for new effective treatment methods [1-5].

Periodontal care for chronic rheumatic heart disease (CRHD) is a significant problem for clinical dentistry [6, 7]. Patients with CRHD are at risk for developing transient bacteremia [8], which restricts the indications to a number of manipulations, and the expansion of pharmacotherapy does not prevent adverse reactions. The preferred direction of non-drug control of the microbial factor is the method of photodynamic therapy (PDT) [9]. The use of PDT allows to affects the different links of pathogenesis of periodontal lesions, provides the complexity and locality of periodontal measures without complications in patients with CRHD [10].

PDT is a method of elimination of inflammatory changes and elimination parodontopathogenic microflora, which selectively destroys inflammatory tissues and microbial cells in the area of application due to the combined action of laser radiation and photosensitizer [11].

**Aim of the study:** improving the effectiveness of treatment of patients with generalized periodontitis with concomitant chronic rheumatic heart disease.

### Materials and Methods

Complex treatment of periodontal diseases was carried out in 63 patients with CRHD. Patients were divided depending on the applied basic therapy into two groups: main (32 patients) and control (31 patients). The mean age was  $44.27 \pm 1.18$ . The groups were comparable by personal and diagnostic structure. Complex treatment of generalized periodontitis (GP) of initial-I and II stage of severity in patients was carried out at the stage of remission of CRHD.

The common set of measures with the use of common antiseptics was used at the local dental treatment of periodontal diseases in patients of the main group in the course of elimination of local stimuli. In addition, photoactivated disinfection of periodontal pockets was carried out using the photodynamic system "HELBO" at irradiation in low power and multiple procedures depending on periodontal status.

Treatment of patients in the control group was carried out according to conventional schemes using antiseptic agents, the same as in the main group.

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The effectiveness of complex treatment of periodontal diseases in the studied groups was evaluated by clinical criteria: "normalization", "improvement" and "no change". In the long term: 6, 12-18 months the objective index estimates and Rtg control were determined.

The statistical processing of the results was performed for the mean values by the Student's t-test, for the relative values by the Fisher's angular transformation ( $\phi$ ), by the statistical method of variance series using the Mann-Whitney test. The results are presented as  $M \pm m$ , where  $M$  is the sample mean,  $m$  is the error of the mean. The changes were considered statistically significant at  $p < 0.05$ .

## Results and Discussion

The immediate results of complex treatment of persons with

CRHD with generalized periodontitis of initial-I and II degrees of severity depending on the applied treatment are presented in Table 1. Evaluation of treatment results according to clinical criteria showed that the percentage of patients in whom the periodontal condition normalized was significantly higher among the patients of the main group than in patients in the control group (84.38% versus 58.06%,  $p < 0.05$ ). Improvements in periodontal status (a significant decrease in clinical manifestations of inflammation) were observed in three patients in the main group (9.38%) and in nine patients in the control group (29.03%). Clinical characteristics of the periodontal did not change in two patients (6.25%) of the main group and four patients (14.28%) of the control group.

**Table 1:** Immediate results of complex treatment of patients on generalized periodontitis

Observation groups	Number of patients	Effectiveness of complex treatment		
		Normalization	Improvement	No change
Main group	32	27 (84,38 %)	3 (9,38 %)	2 (6,25 %)
Control group	31	18 (58,06 %)	9 (29,03 %)	4 (12,90 %)
Significance in difference (p)		<0,05	>0,05	>0,05

In patients of the main group to eliminate the effects of inflammation (disappearance of symptoms of symptomatic gingivitis, discontinuation of exudation and granulation from periodontal pockets), it was necessary to carry out on average 2-3 treatment procedures for generalized periodontitis of initial-I stage and 4-5 procedures for generalized periodontitis

of II stage. In the control group, treatment was longer (on average over 5-6 visits for patients with I stage of generalized periodontitis and more than six visits for patients with generalized periodontitis of II stage.

The condition of tooth-retaining tissue in long-term observation by clinical criteria is presented in Table 2.

**Table 2:** The effectiveness of complex treatment of patients with generalized periodontitis in the long term

Observation groups	6 months after treatment				12-18 months after treatment			
	Number of patients	Persistent remission	No change	Progression	Number of patients	Persistent remission	No change	Progression
Main group	29	22 (75,86%)	5 (17,24 %)	2 (6,90 %)	26	16 (61,54 %)	7 (26,92 %)	3 (11,54 %)
Control group	27	11 (40,74 %)	10 (37,04%)	6 (22,22 %)	26	6 (23,08 %)	12 (46,15 %)	8 (30,77 %)
Significance in difference (P)		<0,05	>0,05	>0,05		<0,05	>0,05	>0,05

Thus, a comparison of the dynamics of periodontium in patients of both groups after 6 months of treatment (Table 2) revealed that a greater percentage of patients with persistent remission was registered in the main group than in the control group (75.86% versus 40.74%,  $p < 0.05$ ).

Observations of patients after 12-18 months after treatment (Table 2) showed a decrease in the percentage of patients with clinical criteria "persistent remission" in both groups. However, among patients in the main group, the percentage of patients with persistent remission was significantly higher in

2.67 times than in the control group (61.54% versus 23.08%,  $p < 0.05$ ).

The effectiveness of complex treatment of generalized periodontitis in the studied groups is objectified by the hygienic status and periodontal tissue condition estimation by the parameters of the periodontal index (PI).

Immediately after the complex treatment of generalized periodontitis a high level of hygiene was observed in patients of both groups as evidenced by index of hygiene Green-Vermillion (Table 3).

**Table 3:** Dynamics of index of hygiene Green-Vermillion (OHI-S) in patients of studied groups before and after treatment

Terms and groups of observation	Generalized periodontitis of initial-I stage		Generalized periodontitis of II stage	
	Number of obsrv.	OHI-S, points	Number of obsrv.	OHI-S, points
<b>Before treatment</b>				
main group	12	1,60±0,21 ( $P_1 < 0,05$ )	20	2,13±0,15 ( $P_1 < 0,05$ )
control group	13	2,19±0,22	18	2,65±0,24
<b>After treatment</b>				
main group	12	0,75±0,09 ( $P_2 > 0,05$ ; $P_3 < 0,05$ )	20	1,16±0,13 ( $P_2 > 0,05$ ; $P_3 < 0,05$ )
control group	13	0,82±0,12	18	1,24±0,09
<b>6 month after treatment</b>				
main group	11	1,12±0,08 ( $P_4 > 0,05$ )	18	1,31±0,16 ( $P_4 < 0,05$ )
control group	11	1,15±0,11	16	1,34±0,13
<b>12-18 month after treatment</b>				
main group	10	1,42±0,12 ( $P_5 > 0,05$ )	16	1,73±0,17 ( $P_5 > 0,05$ )
control group	11	1,54±0,14	15	1,81±0,22

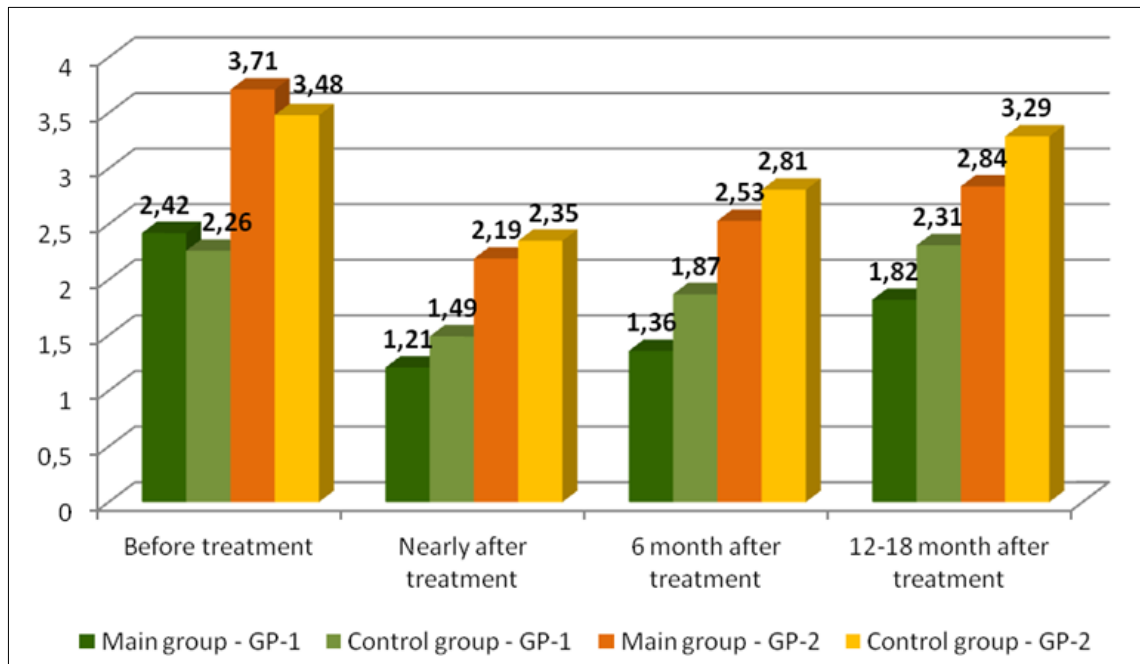
Notes. Significance in difference: P1 - before treatment between the main and comparison group; P2 - after treatment between the main and comparison group; P3 - before and after treatment in patients of the main group; P4 - before and after 6 months of treatment in patients in the main group; P5 - before and after 12-18 months of treatment in patients in the main group.

At repeated examination after 6 months, there was a decrease in digital assessments of oral hygiene in patients of both groups, compared with the period immediately after treatment. There was no significant difference between the OHI-S parameters of the main group patients among patients with generalized periodontitis of II stage. No significant difference in the hygienic status indicators was found among

patients with initial-I stage of generalized periodontitis after six month of observation.

After 12-18 months of PDT treatment, there was no significant ( $p>0.05$ ) decrease in OHI-S indexes compared to pre-treatment level (by 11.25% among initial-I stage of generalized periodontitis and by 18.78% among patients with generalized periodontitis of II degree). In the control group, the decrease in OHI-S index was less expressed in both patients with initial-I stage and patients with II stage of generalized periodontitis.

The effectiveness of different treatments is objectified by the dynamics of the periodontal index (PI) in studied groups (Figure 1).



**Fig 1:** Dynamics of periodontal index (PI) in studied groups before and after treatment

According to the clinical examination, immediately after the complex treatment in patients with initial-I stage of generalized periodontitis, the level of PI was significantly decreased ( $p<0.001$ ) in both the main group (from  $2.42 \pm 0.18$  to  $1.21 \pm 0.09$  points) and the control group (from  $2.26 \pm 0.12$  to  $1.49 \pm 0.08$  points). The same dynamic of PI levels was observed in patients with II grade II of generalized periodontitis.

Repeated examination after 6 months of after treatment revealed a significant ( $p<0.05$ ) increase in PI level compared with the period immediately after treatment among subjects with initial-I stage of generalized periodontitis in the main group up to  $1.36 \pm 0.09$ , and in the control group - up to  $1.87 \pm 0.11$  points. However, compared to PI levels before treatment, after 6 months the PI values in both groups were significantly ( $p<0.05$ ) lower.

According to the above mentioned data by digital values of PI levels of patients with II stage of generalized periodontitis within six months the state of periodontal tissues showed more stable results of the treatment and stability of the achieved results of the therapy than in the control group.

Compared with digital values of PI levels before treatment after 12-18 months of treatment, a significant decrease in PI levels was observed only in the main group.

Among patients in the control group suffering from initial I stage of generalized periodontitis after 12-18 months after treatment, PI values increased non-significantly by 6.63% (from  $2.26 \pm 0.13$  to  $2.41 \pm 0.08$  points,  $p>0.05$ ) in comparison with those before treatment). Among the patients of the control groups suffering from II stage of generalized periodontitis, the PI indexes decreased significantly by 5.23% (from  $3.48 \pm 0.17$  to  $3.29 \pm 0.07$ ,  $p>0.05$ ).

Thus, through 12-18 months the probability of differences in PI indexes compared to pre-treatment data confirmed the stability of remission only in patients of the main group in which the developed PDT treatment was applied.

## Conclusions

1. Dynamics of the clinical condition of tooth-retaining tissue and paraclinical objective estimations, including the level of hygienic status after treatment and long-term observation showed the benefits of the treatment scheme in patients with periodontitis associated with CRHD compared with the results of traditional treatment for generalized periodontitis.
2. Comparison of treatment outcomes in the main and control groups clearly demonstrated the benefits of basic treatment with application of photodynamic therapy, its safety and higher efficiency.

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