

# **Improving the effectiveness of therapeutic measures for generalized periodontitis in patients with hypertension**

## **Abstract**

The program of standard therapeutic measures in 45 patients with **Generalized Chronic Periodontitis (GCP)** and background hypertension, group I(a), included hirudotherapy, for comparison, the effectiveness of traditional treatment was evaluated in 40 patients, group I(b), who refused to use medical leeches. In the second comparison group (35 patients), patients with GCP, but normal blood pressure, also received only a set of traditional methods of treatment. The inclusion of hirudotherapy in the program of therapeutic measures **in patients with GCP and hypertension** makes it possible to optimize the onset of a persistent therapeutic effect, lengthen the period of remission of the pathological process in periodontal disease and significantly improves the quality of life of patients.

**Key words:** *generalized chronic periodontitis , hypertension, hirudotherapy, medical leeches*

## **Introduction**

At the present stage of cardiology development, a comprehensive approach to the treatment of hypertension is being implemented, which is based on drug therapy [1-3]. Despite the fact that the main successes in the treatment of hypertension are associated with pharmacotherapy, it is not always possible to achieve high treatment efficiency. In the last decade, non-drug treatment methods have been increasingly used for hypertension: magnetotherapy, physiotherapy, balneotherapy, etc [4-6]. An important component of the complex therapy of hypertension is an adequate correction of hemorheological and microcirculatory disorders characteristic of the disease in the tissues of the entire body [7]. Most

researchers have established a more severe course of pathological processes in the tissues of the dental system with background vascular dystonia [8,9].

Unfortunately, the use of a standard arsenal of tools in modern clinical dentistry in the presence of background disorders of systemic hemodynamics cannot achieve complete rehabilitation of the pathological process in periodontitis [10-12]. The problems of effective and pathogenetically justified therapy of generalized chronic periodontitis (GCP) of hypertonia today remain not completely solved [13-16].

The emerging trend in clinical dentistry in recent years is the use of herbal preparations [17-20]. Clinicians over the past decade have also turned to the use of an undeservedly forgotten effective folk method -hirudotherapy [21,22]. All of the above served as the basis for the inclusion of hirudotherapy in the complex of standard methods of therapy for generalized chronic periodontitis .

**The aim of the study** was to evaluate the effectiveness of hirudotherapy in combination with standard methods of treatment of generalized chronic periodontitis in patients with hypertension.

### **Materials and Methods**

The study included middle-aged patients - 35-44 years old. Hirudotherapy was included in the comprehensive program of standard therapeutic measures in 45 patients with a chronic course of the inflammatory process in periodontal disease and background hypertension (group I(a)). For comparison, the effectiveness of traditional treatment was evaluated in 40 patients with GCP on the background of hypertension (group I(b)) who refused to use medical leeches. In the second comparison group (35 patients), patients with CGP, but normal blood pressure, also received only a set of standard traditional methods of treatment.

Patients of both groups were prescribed comprehensive dental treatment, including traditional GCP therapy (removal of dental deposits, anti-inflammatory and antiseptic agents, closed curettage, splinting, etc.). Medical leeches grown in artificial conditions by the company "Girud I.N.", Balakovo, Saratov

region, Russia, were used in the work. Leeches from a jar of water were deposited in a warm glass tube and its open end was applied to the inflamed vestibular surface of the alveolar processes of the jaws. The leeches sucked the blood for 30 to 35 minutes. After the procedure, the leech was revitalized - it was dipped in ethyl alcohol. After the procedure, the patient rinses the oral cavity with a solution of hydrogen peroxide (0.5%). It was recommended to abstain from eating for at least 3 hours. During the first application, one leech was used, for the second and subsequent procedures - two. The course of treatment was 10 sessions conducted in one day.

To assess the condition of periodontal tissues before and after treatment, the Schiller-Pisarev test was used, as well as indices: papillary-marginal-alveolar index (I.A. Barannikova, 1990), periodontal index (I.S. Ivanov, 1998), communal periodontal index [21-24].

All the information obtained during the study was statistically processed in MS Excel and Statistica programs.

In addition, the PMA index, the Russell periodontal index, etc. are used to assess the condition of patients. The same group includes hygienic indices (Fedorov-Volodkina, Green-Vermillion, Ramfjord, etc.). Irreversible indices characterize the severity of such symptoms of periodontal diseases as bone resorption of the alveolar process, gum atrophy. It is used to assess gum inflammation. The index is considered the most convenient both for epidemiological study and for individual studies in clinical practice. The assessment of the condition of the gums is carried out in the area of all teeth. The Schiller-Pisarev test is a lifetime staining of gum glycogen, the amount of which increases with inflammation. With the help of this test, the presence and prevalence of inflammation are determined.

### **Results and Discussion**

The results of the studies showed that the inclusion of hirudotherapy in the complex of standard methods of treatment was more effective compared to therapy when medical leeches were not used.

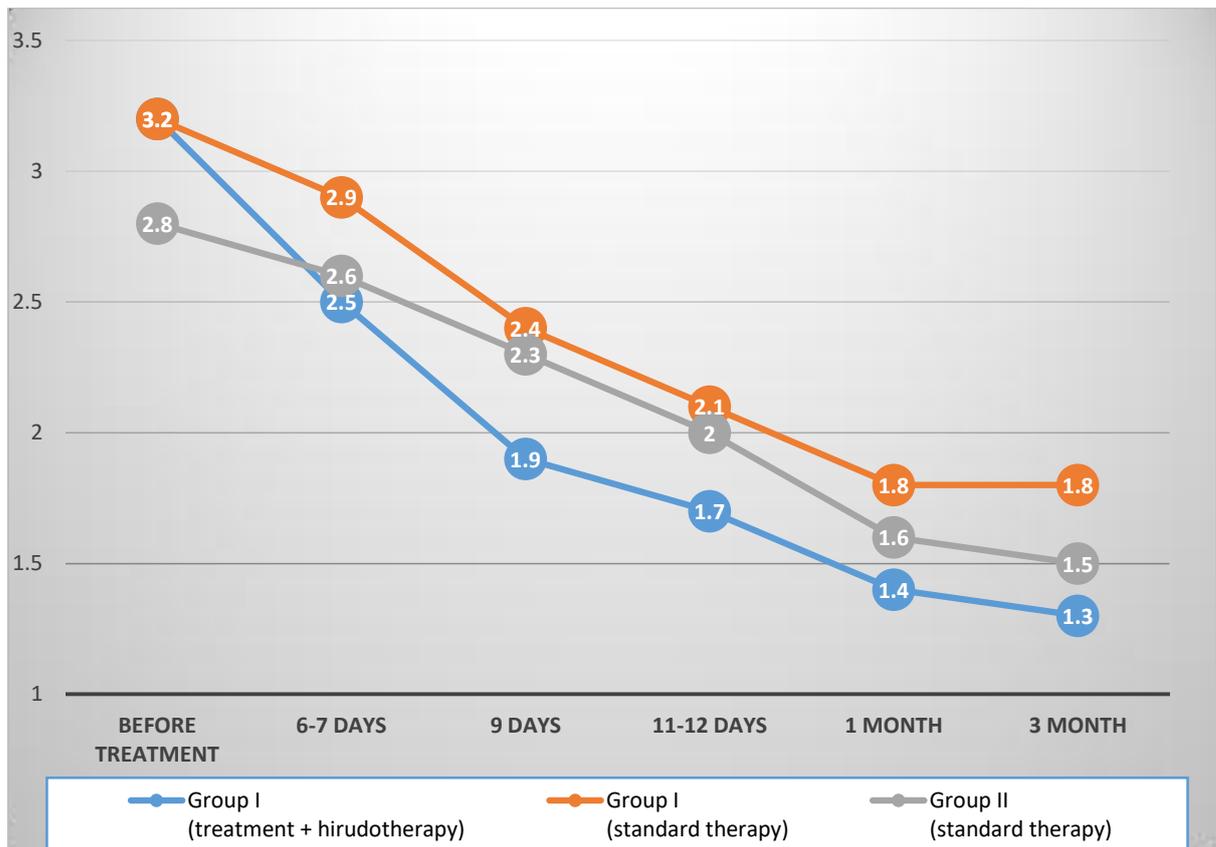
The appointment of hirudotherapy in patients of group I(a) was accompanied in almost all by an improvement in the general condition the very next day after the first session of application of a medical leech. On the second and third days, the **bleeding has stopped** and hyperemia in the inflammatory process significantly decreased, unpleasant sensations, burning sensation and pain in the gum area disappeared, bad breath disappeared. On day 7, in 91.1% of patients, the Schiller-Pisarev test confirmed the absence of manifestations of the inflammatory process. The absence of separable from the dentoalveolar pockets and a clear tendency to their sclerosis were noted. The pathological mobility of the teeth was no longer determined.

In patients of group I(b), with GCP and background hypertension, who underwent a complex of traditional standard therapy, the results obtained differed significantly from patients with hirudotherapy and from the results of treatment of patients of group II. Positive dynamics in the clinic of GCP in patients of group I(b) was revealed only on the 11th-12th day of treatment, while against the background of improvement in general condition, cessation of pain and bleeding gums, burning and itching in 57.5% of patients, 52.5% retained separate areas of inflammation, confirmed by the Schiller-Pisarev test. 40.0% retained serous discharge from periodontal pockets. Pathological mobility of teeth was not noted[21].

In patients of the second group with normal blood pressure, whose treatment was also carried out according to the traditional standard program, without the use of hirudotherapy, positive dynamics in clinical manifestations of the disease in 62.8% of patients was noted after 9-10 days. At the same time, patients noted an improvement in well-being, cessation of itching, burning, soreness and bleeding in the gum area, almost complete disappearance of hyperemia and swelling of the mucous membrane. However, some representatives of the group – 37.1% in the gingival margin retained areas of inflammation, decreased, but not completely disappeared serous discharge from periodontal pockets. The Schiller-Pisarev test also remained positive in 28.6% of group II patients.

Thus, the relief of inflammatory phenomena in periodontal disease in most patients of group I(a) with background GB with the inclusion of hirudotherapy in the complex of standard treatment methods occurred much earlier, as indicated by the indicators of papillary-marginal-alveolar index, periodontal index, communal periodontal index (Figure 1), significantly different from the initial values already on 6-7 days after the start of therapeutic measures with the use of medical leeches.

A similar positive dynamics of laboratory parameters (the level of phosphorus in the blood serum increased by 0.04 mmol/l, and in the elderly - by 0.06 mmol/l. In younger and older patients of the comparison group, the level of phosphorus in the blood serum increased by 0.05 mmol/l), indicating a decrease in inflammatory phenomena in periodontal disease in patients of group I(b) with hypertension, who did not undergo hirudotherapy, was recorded only after 11-12 days. However, the indicators of the activity of the pathological process (bleeding) significantly exceeded similar values of patients of both group I(a) with hirudotherapy and the second group (patients with GCP, but with normal blood pressure), which indicated a significant contribution of hemodynamic disorders in background hypertension to the nature of blood supply to periodontal tissues, manifested by deterioration of metabolic processes and a more torpid course of the disease to therapy [25,26].



**Figure 1** - Dynamics of PI indicators in patients with GCP in the course of therapy

Evaluation of the effectiveness of various treatment options for patients with GCP was carried out in the catamnesis, 6 and 12 months after the course of treatment. When examining patients of group I(a) with background hypertension treated with hirudotherapy, complete **weakening** the disease (**patients were under observation for 14 days**) after 6 months was maintained in 43 patients (95.5%), after 12 months - in 35 (77.7%). Of the 40 patients in the Ib group whose complex of therapeutic measures did not include hirudotherapy, remission during GCP persisted in 19 patients (47.5%) after 6 months, and in 16 patients (40.0%) after 12 months. In the second group - with GCP, but normal blood pressure, after 6 months, indicators of inflammatory process activity were absent in 22 patients (62.8%), after 12 months, 19 patients (54.2%) remained in clinical remission.

According to the data obtained, complete clinical remission persisted after 6 and 12 months in the vast majority of patients of group Ia with GB with the use of

hirudotherapy in complex treatment, whereas in representatives of group I(b), without hirudotherapy, remission was observed in less than half of the patients.

Based on the studies carried out, remission was revealed in the vast majority of patients of group I(a) with hypertension when using hirudotherapy as part of a complex treatment. Measurements of the pocket probing depth (0.3 mm), the level of clinical attachment and reliable estimates of the bleeding index (with a decrease in the Hb level by  $\geq 5$  g / dL or Ht by  $\geq 15\%$ ) were carried out.

In the studies, the authors also cite that hypertension and periodontitis are among the most common infectious diseases worldwide. Scientists have studied and systematized the available data on the relationship between hypertension and periodontitis and the potential underlying mechanisms. We demonstrate that hypertension and periodontitis are concomitant diseases, and their relationship remains significant even when considering other factors. Age and periodontitis activity change the relationship, and key mechanisms include inflammation and oxidative stress, leading to deterioration of vascular function and structure. On the other hand, hemodynamic changes associated with hypertension can lead to remodeling of periodontal bones and vessels, which supports local inflammation. Only a few studies evaluate the effect of periodontitis treatment on blood pressure (BP). The results confirm that the assessment of the periodontal condition and specific treatment (if necessary) can improve blood pressure control. Individual and population cardiovascular effects of treatment of periodontal pathology should be evaluated during a comprehensive cardiovascular examination [27].

Thus, the results of the work indicate the high efficiency of the use of hirudotherapy in the complex of traditional methods of rehabilitation of patients with generalized chronic periodontitis and background hypertension. The relief of the chronic inflammatory process in periodontal was characterized by a significant improvement and had a more persistent and prolonged character.

## **Conclusion**

The inclusion of hirudotherapy in the program of therapeutic measures in

patients with generalized chronic periodontitis and background hypertension made it possible to optimize the onset of a persistent therapeutic effect, lengthen the period of remission of the pathological process in periodontitis and significantly improve the quality of life of patients. These results allow us to recommend the widespread use of the method in clinical dentistry.

#### **COMPETING INTERESTS DISCLAIMER:**

**Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.**

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