INHALATION THERAPY BY RADON FROM TSKHALTUBO REGION IN CLINICAL AND BIOCHEMICAL STUDIES IN PATIENTS WITH PERIODONTITIS

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Periodontal inflammatory diseases in the maxillofacial region are of quite high prevalence, and is one of the most difficult pathologies. According to WHO, functional disorders of the jawbone system are caused by missing teeth due to periodontal diseases more often than by complicated forms of caries.

In many countries, in-depth study of periodontal diseases has greatly enriched the knowledge about this problem - a number of etiological factors have been identified, specific causes of the development mechanism have been identified, diagnostic clinical-laboratory signs have been clarified, and a large number of rational methods of treatment have been developed. Nevertheless, it is still important today to look for new ways and means of treating periodontal tissue inflammatory diseases, especially those that are non-invasive or mini-invasive [1].

Consequently, the main purpose of this study is the radon therapy by inhalations of radiation-containing water of Tskaltubo (inhalation of small doses of radon by hormesis) during complex treatment of chronic inflammatory processes of mild and moderate severity. Subsequently, the uses of mineral radon-containing water both independently and by incorporating into the complex treatment and establishing a causal link between them.

Material and methods. 132 patients aged 20-40 with different severity forms of periodontitis undergoing the observation were divided into three groups: group I (43 patients) received a complex treatment of periodontitis, depending on the severity of the disease.

Group II (47 patients) received a complex treatment together with the rinses with Tskaltubo water, while group III (42 patients) received a complex treatment together with the inhalation and the rinses with Tskaltubo water (in the morning and evening for 10 days). 43 patients were united into the control group with no pathological changes in periodontal tissue; general and local risk factors for the disease were identified.

We used commonly known indexes to assess periodontal tissue condition. Specifically, to assess the degree of severity of gingivitis we used the papillary-marginal-alveolar index (PMA); to study the extent and intensity of periodontal tissue damage - the CPI TN index, which was used to determine bleeding from gums, the presence of supragingival and subgingival stones, the presence of periodontal pockets and their depth, thus determining the severity of periodontitis. We used X-ray examination to confirm the diagnosis and evaluate the processes in the alveolar process.

We have developed the treatment methods: the patients of group I underwent 10-minute inhalations with radon water for 10 days. The patients of group II -radon inhalation and rinses in the morning and evening, and the control group underwent the treatment with plain water vapor and water rinses at the same temperature.

The study plan was drawn up, with the written consent of the head of the institution and the patient, which was later the scientific research based on [12]. To determine lactate dehydrogenase, the Immuno-ferment analyzer ELAIZA and a set of kits were used. To determine a-amylase, the Immuno-ferment analyzer ELAIZA and a set of kits were used. A quantitative assessment of the mean calculation, the average deviation between groups, a student was compared before and after treatment - a pair of students and ANOVA analysis using qualitative indicators - Comparison between groups was carried out in Fisher’s exact test. Mathematical calculations were performed using the IBM SPSS v22.0 software package.

Results and discussion. We have studied the effectiveness of radon inhalation and rinses in the complex treatment scheme.

The clinical studies have shown that LDG change occurstoogether with a decrease in the amylase activity that is given in Table. Perhaps, on the one hand, this occurs due to the increase in microflora of pathogenic bacteria provoking inflammatory processes in periodontal tissue and, on the other hand, during the periodontal tissue destruction, the a release of those enzymes into the liquid of the oral cavity occurs, that are involved in the preservation of osteoclasts and osteoblasts of the teeth structure. It is important to note that statistically increases LDG, which is observed from the moment of infection of periodontal tissue, the high activity of which is determined in oral cavity fluid of the patients with the 1st degree severity of the periodontitis. Changes in patients with the 1st degree severity are not very alarming, though a tendency in enzymes increase is noted. It reaches the peak in patients with the 2nd degree severity. The change in these enzymes in patients with mild severity has increased by 1,63 times compared to the control group. While moderate severity of periodontitis increased by 1.74 times [2,14].

The table 1 shows that the reduction of amylase activity should be dependent on the damage of salivary secreted cells, which is probably due to the increased number of microorganisms. In patients with 1st degree severity it decreases by 1,14 times, and in patients with moderate severity amylase activity reduces by 1.85 times. It is well known that anaerobic processes, initiated by bacterial cells, cause increase in lactic acids in the oral cavity fluid, lactate in its turn is a weak acid and enhances the oral cavity with hydrogen atoms, what then increases PH acidity and causes amylase reduction. Since it is known that amylase enzyme works only in a neutral area or in alkalai area (PH=6,7-7,1). Amylase hypo-enzyme is noted together with the amount of lactates in case of moderate severity of periodontitis [5,6].

Therefore, we can conclude that the study of the clinical-biochemical processes in the oral cavity has determined the changes in the entire biochemical spectrum of the oral cavity of the patients of study group with mild and moderate severity of periodontitis, while 10 days’ radon inhalation and rinses with radon-containing water causes a decrease of LDG in oral cavity. It should be noted that the reduction was not developing in the same way, for example, in patients with mild severity it decreased by 1,29 times, and with moderate severity – by 1,16 times in study group. The difference is statistically significant (P<0,01).

The table 1 shows that in control group the inhalations and rinses with plain water did not change LDC concentration in the oral cavity of healthy patients. It is known from the literature that all the above biochemical changes return to the initial condition if the oral cavity PH is weak or acidic and thus it increases the calcium mineralization and carbohydrate metabolism, resulting in reduction of oxidative processes in the oral cavity fluid and restoring the fermentation spectrum [7,11].
Table 1. The effect of rinses with water of Tskaltubo on enzymatic characteristics of oral cavity

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Mild severity</th>
<th>Moderate severity</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before treatment</td>
<td>After rinses</td>
<td>Before treatment</td>
</tr>
<tr>
<td>LDG un/l</td>
<td>308,20±31,16</td>
<td>257,06±11,45</td>
<td>353,2±21,01</td>
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<td>P&lt;0,05</td>
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<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
</tr>
<tr>
<td>Alkaline phosphatase un/l</td>
<td>17,71±0,68</td>
<td>14,70±11,23</td>
<td>26,00±1,24</td>
</tr>
<tr>
<td>P&lt;0,05</td>
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<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
</tr>
<tr>
<td>α - amylase un/l</td>
<td>55,12±6,12</td>
<td>62,12±19,12</td>
<td>35,00±2,22</td>
</tr>
<tr>
<td>P&lt;0,05</td>
<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
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Fig. 1. The effect of rinses with water of Tskaltubo on enzymatic characteristics of oral cavity

Fig. 2. The effect of rinses with water of Tskaltubo on enzymatic characteristics of oral cavity

Table 2. Comparison of complex treatments with of Tskaltubo Water (Water Inhalation and of rinses water of Tskaltubo) with regard to Oral Enzymatic Characteristics

<table>
<thead>
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<th>Indicator</th>
<th>Mild severity</th>
<th>Moderate severity</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDG un/l</td>
<td>338,29±30,16</td>
<td>271,06±10,45</td>
<td>347,3±22,01</td>
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<td>P&lt;0,05</td>
<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
</tr>
<tr>
<td>Alkaline phosphatase un/l</td>
<td>16,72±0,68</td>
<td>14,43±10,23</td>
<td>26,00±1,24</td>
</tr>
<tr>
<td>P&lt;0,05</td>
<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
</tr>
<tr>
<td>α - amylase un/l</td>
<td>55,12±5,12</td>
<td>82,21±18,12</td>
<td>38,00±2,21</td>
</tr>
<tr>
<td>P&lt;0,05</td>
<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
<td>P&gt;0,05</td>
</tr>
</tbody>
</table>

Fig. 3. The effect of rinses with water of Tskaltubo on enzymatic characteristics of oral cavity

Fig. 4. Comparison of complex treatments with of Tskaltubo Water (Water Inhalation and of rinses water of Tskaltubo) with regard to Oral Enzymatic Characteristics
It should be noted, that a 10-day radon inhalation and rinses in the standard treatment scheme causes LDG statistical decrease by 1,2 times P<0,05 in patients with moderate severity [7]. From the data obtained, it can be concluded that radon inhalation and rinsing are very effective, with periodontitis with mild to moderate severity, resulting in the reduction of mineralization and acidity of the tissues of the oral cavity. The Table 1, and Fig. 1 gives a range of enzymatic spectrum in complex treatment of periodontitis with water of Tskaltubo.

As shown in the presented data, after the complex treatment and rinses with water of Tskaltubo, the concentration of a-amylase (Fig. 3) in saliva increases in the saliva in cases of theperiodontitis of mild and moderate severity and does not change in the control group of patients. Concentration of lactate hydrogenases increases in cases of moderate forms of periodontitis, while concentration of alkaline phosphatase - only in cases of periodontitis of mild severity (Fig. 2). Therefore, usage of Tskaltubo water as a rinse in the complex treatment improves saline mineral and enzymatic composition. Complex treatment and comparing.

It is known, lactate hydrogenase is an indicator of anaerobic processes and, on the other hand, in the oral cavity tissues it defines the oxidative processes, and alkaline phosphatase change shows us the damage of the mucous membrane of oral cavity, which determines the amylase change and the oral cavity PH, as well as the development of different forms of severity of periodontitis Figs. 4,5,6. In our case, the treatment with Tskaltubo water as an antioxidant medicine levels all these processes. Here are the following conclusions:

The inhalations and oral rinse with water of Tskaltubo obviously leads to the enhancement of biochemical processes of the oral fluid of the patients with various severity of periodontitis which is reflected in a-amylase increase and decrease in alkaline phosphatase, which occurs together with lactate dehydrogenase slight change. Neutral and small value of PH is noted. PH (ph=6,8-7,2) in patients with various levels of periodontitis.

It should be noted that Tskaltubo mineral water has a large debit and is considered as a chloride-hydrocarbonate-sulfate-magnesium-calcium-sodium water. It is characterized by stability and does not change with time. Micro elements are also found in water: iodine, bromine, magnesium, lithium, zinc, strontium, copper, are of small amount but during the inhalation their significance increases. Consequently, the uniqueness of Tskaltubo water and the mechanism of radon effect is relevant and requires considerable study [1,8].

REFERENCES

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The study of clinical and biochemical processes in the oral cavity determined changes in the entire biochemical spectrum of the oral cavity in 132 patients aged 20-40 years with various forms of periodontitis. Similar follow-ups were divided into three groups in the main group with mild to moderate severity of periodontitis with a 10-day intake of radon, 43 patients were united into the control group with no pathological changes in periodontal tissue however. Inhalation and rinsing with radon-containing water causes a decrease in LDH levels in the oral cavity. In patients with mild severity it decreased by 1.29 times, and with moderate severity - by 1.16 times in the main group.

The difference is statistically significant (p<0.01). which leads to a decrease in oxidative processes in the oral fluid and the restoration of the fermentation spectrum. As it is known, lactate hydrogenase is an indicator of anaerobic processes and, amylase change and the oral cavity PH, as well as the development of different forms of severity of periodontitis. In our case, the treatment with Tskaltubo water as an antioxidant medicine levels all these processes. Only in case of rinses with water of Tskaltubo, these changes are less pronounced, and in case of both inhalation and rinses they are more pronounced.

Keywords: Radon inhalation and periodontitis, patients.

SUMMARY

INHALATION THERAPY BY RADON FROM TSKHALTUBO REGION IN CLINICAL AND BIOCHEMICAL STUDIES IN PATIENTS WITH PERIODONTITIS

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VASCULAR AGE AND CARDIO-ANKLE VASCULAR INDEX IN PATIENTS WITH UNCONTROLLED ARTERIAL HYPERTENSION

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Age is a non-modifiable risk factor for cardiovascular diseases [1], which is used in various algorithms, such as the Framingham risk score and the Systematic Coronary Risk Evaluation (SCORE), to estimate cardiovascular risk. It is known that at the same age the health status of different patients can differ dramatically and the age does not often reflect the real risk of cardiovascular (CV) events. The term “vascular age” (VA) was introduced in order to assess the severity of pathological processes in the arterial wall. It represents the age of an “ideal” patient with the same level of cardiovascular risk as the subject, provided that he has no modifiable risk factors [2]. VA is a new calculated indicator of CV events and it can be higher than the real age, lower or can correspond to it [3]. Arterial stiffness as an integral indicator of cardiovascular risk is most commonly used to estimate vascular aging [4]. As a result of involutive processes in large arteries there occurs some reduction in elastin content and some increase in collagen content, calcification, hyperplasia and hypertrophy of smooth muscle cells [5], which results in the increase of the rigidity of arteries, and, accordingly, in the increase in VA [6]. According to scientists, arterial hypertension (AH) accelerates the processes of elastin degradation and collagen accumulation, also increases arterial stiffness of the arterial wall accelerating vascular aging [7]. According to the WHO, every fourth man and every fifth woman in the world suffers from AH [8] and the mainstrategic aim of health care is to prevent CV events and vascular aging by effective antihypertensive therapy and achieving target blood pressure (BP). Despite the wide range of drugs, less than 50% of patients in the Russian Federation receive effective antihypertensive therapy and achieve target BP [9]. The aim of our study was to investigate the arterial stiffness, VA in patients with uncontrolled and controlled course of hypertension, as well as to study the relationship between the age, VA of patients and markers of hypertension-mediated organ damage (HMOD).

Material and methods. Using the continuous sampling method we put in our study 140 patients, including 80 patients with controlled course of hypertension (CH) and 30 patients with uncontrolled course of hypertension (UH). 30 patients made up the control group.

The inclusion criteria were: age of patients from 40 to 70, with verified diagnosis of essential AH and written informed consent for participation in the study. The exclusion criteria were: patient’s refusal for further participation in the study, secondary hypertension, congestive heart failure NYHA class II-IV, atrial fibrillation, diabetes mellitus, chronic kidney disease with a decrease in glomerular filtration rate (GFR <60 ml / min / 1.73 m²; according to the formula CKD-EPI), stenosis of common carotid artery (CCA) more than 50% by duplex ultrasound, acute inflammatory diseases and/or exacerbations of chronic inflammatory diseases of the endocrine, respiratory, uri-