The use of radon baths in the rehabilitation of patients with osteochondrosis

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Abstract. – OBJECTIVE: One of the most common methods of rehabilitation for this disease is balneotherapy. Radon therapy is one of the types of balneotherapy based on radon radiation (Rn) for therapeutic, prophylactic, and rehabilitation purposes. A significant number of authors report a positive effect of radon baths on the condition of patients with osteochondrosis. Some authors report the absence of a real therapeutic effect when using radon therapy. The work aimed at investigating the therapeutic efficacy of radon baths in patients suffering from osteochondrosis.

PATIENTS AND METHODS: We examined 40 patients with osteochondrosis of various parts of the spine with radicular syndrome. The patients were randomly divided into two groups of 20 people with an equal number of men and women. The study group received a course of balneotherapy using radon water (general baths at a temperature of 34-36°C, duration 10-15 minutes, every other day, No. 10). The control group received balneotherapy using ordinary tap water in the same regimen to decrease placebo effects.

RESULTS: Decreased pain and movement difficulties were observed only in the study group. These changes refer only to the spine but not to the joints of the extremities.

CONCLUSIONS: Our studies have shown that using radon baths helps to reduce pain and increase the mobility of the spine in patients with osteochondrosis. These data substantiate the prospects for further research of this technique in the complex rehabilitation of osteochondrosis.

Key Words: Osteochondrosis, Radon, Rehabilitation.

Introduction

According to the International Classification of Diseases, osteochondrosis is included in the group of diseases of the musculoskeletal system, mainly the spine1,2.

One of the most common rehabilitation methods for this disease is balneotherapy, using a variety of mineral waters (MW)3. A special place is occupied by radon waters, which serve as the basis for using various variants of radon therapy (RT)4. Radon therapy is one of the types of balneotherapy based on radon radiation (Rn) for therapeutic, prophylactic, and rehabilitation purposes5. According to the type of radiation used, RT refers to α-therapy. Low-dose radiation therapy has beneficial effects on patients suffering from chronic painful diseases of the musculoskeletal system6. Although the alpha radiation which results from radon decay has high ionization energy, it has a minimum penetration depth. Thus, it can be used to affect the whole body. This treatment method is beneficial and valuable for patients suffering from multiple pains in the joints and back. A significant number of authors report a positive effect of radon baths on the condition of patients with osteochondrosis7. At the same time, some authors declare the absence of a real therapeutic effect when using radon therapy8.

The work aimed to investigate the therapeutic efficacy of radon baths in patients suffering from osteochondrosis.

Patients and Methods

We examined 40 patients with osteochondrosis of various parts of the spine with radicular syndrome. All patients were on sanatorium treatment in the sanatorium “Radon”, Khmelnik (Vinnytsa region, Ukraine). The vast majority of patients were women (80%). The mean age was 50.2±10.95. After the initial examination, the patients were randomly divided into two groups of 20 people with an equal number of men and women – the study group and the control group.

Inclusion criteria for study participation: osteochondrosis of various sections of the spine; the duration of the disease of at least three years.
Exclusion criteria for study participation: mental illness, bleeding, circulatory disorders II B-III stages, malignant and benign tumors. Additional criteria for women were adrenal adenoma, adenocarcinoma of the uterus after extirpation, uterine fibroids, and fibrocystic mastopathy.

Both groups received a standard sanatorium treatment course, which included:
- magnetotherapy, lasting from 5 to 20 minutes daily, 10-12 sessions;
- ultrasonic therapy paravertebral, lasting 10-15 minutes daily, course -8-10 procedures.

The study group also received a balneotherapy course using radon water (general baths at a temperature of 34-36°C, duration 10-15 minutes, every other day, No. 10).

The control group received balneotherapy using ordinary tap water in the same regimen to decrease placebo effects. The whole course of treatment was 21 days. The study used radon mineral water from well No. 604-e of the Ostrovny site of the Khmelnitsky deposit, Vinnitsa region.

The radon concentration in this MW is 484-674 Bq/dm³, which allows it to be qualified as a natural healing very slightly radon mineral water9.

**Statistical Analysis**

Statistical processing of the obtained data was carried out using the XLSTAT 2021 program. To assess the significance of differences between the samples, the \( \phi^* \) - criterion, Fisher’s angular transformation, was used. The differences \( p<0.05 \) were considered significant.

**Ethics Statements**

The study was a prospective, explorative and observational trial. This trial was performed in accordance with the Declaration of Helsinki; it was approved by the Commission on Bioethics of the Ukrainian Research Institute of Medical Rehabilitation and Resort Therapy of the Ministry of Health of Ukraine No. 20 of 01.09.2015. Before inclusion in the study, all patients provided written informed consent.

**Results**

The most frequent complaints of patients in both groups were:
- moderate pain in the spine (80.0 ± 8.9)%;
- pain in the legs (55.0 ± 11.1)%;
- minor pain in the joints (20-25 ± 7.3)%;
- slight restriction of movement in the spine (60.0±10.9)%.

The course of treatment was followed by the occurrence of changes (Table I). Reliable positive changes in symptoms were: decreased pain and movement difficulties were observed only in the study group. Significantly, these changes refer only to the spine but not to the joints of the extremities.

**Discussion**

The registered selectivity of the effectiveness of radon baths can be explained by an improvement in blood circulation and a decrease in muscle spasms in the areas where the spinal nerves exit. As shown by the works of some authors, radon baths have a pronounced anti-inflammatory and analgesic effect10. In addition, under the influence of radon, the threshold of pain sensiti-
ity increases, including a decrease in conductivity in unmyelinated nerve fibers, which reduces pain sensitivity and reduces pathological impulses from the affected organ. The results of our study confirm the above statements.

Our study has several limitations. The main ones are the small sample size and the chosen mode of carrying out the procedures. Changing these parameters will provide additional information about the effects of radon baths on osteochondrosis.

Conclusions

Our study has shown that using radon baths helps to reduce pain and increase the mobility of the spine in patients with osteochondrosis. These data substantiate the prospects for further research of this technique in the complex rehabilitation of osteochondrosis.

Conflict of Interest

The authors declare that they have no conflict of interest to declare.

Authors’ Contribution

The work was done at the request of the Radon Sanatorium, Khmelnyk, Ukraine. All authors contributed equally to the writing of the article.

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References