

Efficiency Assessment of Balneo-Mud Therapy at Nonspecific Low Back Pains

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Abstract: Nonspecific low back pains (NLBP) are wide spread and are among the main reasons of temporary disability. Natural factors of the "Kluchi" health resort are successfully used in rehabilitation of the sick with NLBP over the extended period. There were examined 55 patients with NLBP before and after the balneo-mud-therapy. Twenty-two people among them got a basic course of therapy combined with the magnet-laser therapy. After the treatment, the pain intensity definitely decreased, as well as the degree of anxiety, depression and the evidence of vegetative disturbances, indicators of life qualities improved, more significantly in the second group. The shortcut 14-day long course of balneo-mud-therapy with the magnet-laser therapy, included to the therapeutic complex, is the most efficient for the patients with NLBP.

Key words: NLBP • A balneo-mud-therapy • A magnet-laser therapy

INTRODUCTION

The development and updating of non-drug technologies, aimed at the recovery of functional activity of patients with low back pains (NLBP), is an urgent task of modern medicine [1]. Health resort treatment takes one of the leading places in the system of rehabilitation procedures. Affecting the key links of pathogenesis of vertebrogenic diseases by means of its variety of therapeutic factors, it has not only the direct curative effect, but also the secondary prophylactic effect, preventing the backsets of the disease [2, 3].

Nonspecific low back pains (NLBP) is one of the important and hardest medical-social problems. The prevalence rate of chronic back pain of Russian adult population is 48.2%-56.7% without significant differences between men and women and the annual disease incidence is 5%. More frequently active working people aged 35-55 years suffer from back pains; it results in prominent financial loss and expenditures on diagnostics, treatment and rehabilitation and, consequently, significant expenses on health protection, as well as negative impact on national economy [4, 5].

Vertebrogenic nonspecific back pains are conditioned by excitation of receptors of fibrous ring, muscular-arthrous structure of spine and nonciceptive activation of sinuvertebral Lushke nerve. They refer to the reflectory pain syndromes with nonciceptive formation mechanism of algia syndrome [6]. The syndromes of lumbodynia and lumbar ischialgia are the most frequent among them; they can be connected equally both with degenerative changes of intervertebral discs and with spondylarthrosis of facet joints. The vertebrogenic radiculopathy syndrome is revealed in 4-10% of cases [5]. In 25-30% of cases, the back pain repullulates throughout the year or becomes chronic [7].

A modern theory of pain sense formation is fully applied to the back pain problem. The international association of pain study (IASP) defines the pain as "sensor and emotional feeling, conditioned by current or potential damage of tissue, or described in the terms of such damage" [4, 7]. A long pain stimulation results in the breaking of antinociceptive systems of the organism [7, 8]. The experimental and clinical observations testify about the important role of serotonergic system in the activity of antinociceptive system and central regulation of pain

sensitivity [6, 9]. The fact was proved, that the serotonin content in plasma of peripheral blood can be considered as an indicator, reflecting the state of central serotonergic structures [9]. The reduction of its content results in weakening of analgesic end-point, decrease of pain limits and greater number of pain syndromes development [7, 10].

One of the main tasks of low back pain therapy is the maximum full pain management. As a rule, it is achieved by a complex of measures, aimed at suppression of different links of nonceptive and activation of antinociceptive systems of organism [7, 11, 12]. In particular, to cure the vertebrogenic pathology at the "Kluchi" health resort of the Perm Kray, low-mineralized hydrogen-sulfide water and silt sulfide mud are used. Besides, in modern conditions of the health resort, both the standard 21-day length balneo-mud-therapy course and the shortcut 14-day length therapy course are applied. One of the physiotherapeutic methods, applied in complex of sanatorium-resort therapy, is the magnet-laser therapy, having a great stimulating effect on blood circulation, membrane cellular metabolism and activation of neurohumoral factors.

Study Objective: The study of impact of balneo-mud factors of the "Kluchi" health resort and magnet-laser therapy on pain, psychovegetative status and life quality of patients with NLBP.

Materials and Methods of Study: There were examined 55 people with chronic NLBP, stayed at the "Kluchi" health resort of the Perm Kray. There were 39 women and 16 men aged from 28 to 66 years (the average age is $48,2 \pm 8,8$ years) among them. The criteria of inclusion to the study was the low back pain, continued more than 12 weeks with vertebrogenic reason, confirmed by radiological diagnostic methods. The reflectory syndromes of lumbodinia and lumbar ischialgia prevailed in the structure of objective neuropathological syndromes of chronic dorsopathy. As per the International Classification of Diseases and reasons, connected with them, as a result of re-examination, 5 people had a spondylopathy, 30 people had a deforming dorsopathy and in 20 cases there was an intervertebral disk degeneration.

A complex of examination included the classical assessment of clinical-neurological status, the pain syndrome assessment based on the visual analogue scale (VAS), the PainDETECT scale, the Mac Gill pain enquirer,

the Osvestrovsky enquirer of life activity disturbance (OELAD) at low back pain, the monitoring of psychovegetative indicators (the Beck scale, HADS, the enquirer of Spilberger-Khanin for reactive and train anxiety, the "Enquirer" and the "Scheme" to reveal the degree of vegetative changes). The method of enzyme multiplied immunoassay with the assay kit Serotonin ELISA was used to determine the serum serotonin. All the sick were subject to general clinical, laboratory and instrumental examination aimed at verification of diagnosis and exclusion of related somatic pathology.

Based on the treatment method, the sick were divided into two groups, juxtaposed in age, sex and vertebrogenic pathology. The first group included 33 patients, subject to balneo-mud therapy during 14 days (general hydrogen-sulfide baths in concentration equal to 50-120 mg/l with temperature 36°C and 8-10 minutes length, in total, 7 procedures every other day, silt sulfide mud to the lumbar area and feet of temperature 38 - 40°C and 10-15 minutes length, #.7 every other day, massage #.8 and therapeutic exercises every day). The second group included 22 patients, subject to the basic balneo-mud therapy during 14 days, combined with magnet-laser therapy to the lumbar spine. The apparatus "MILTA-F-8-01" was used paravertebral to the lumbosacral area, as well as scanning. The frequency is 50 Hz, the procedure length is 5 minutes for each area and the course is 8 procedures. As a control, there were examined 20 practically health people, not suffering from chronic pains, depression and anxiety, similar in age and sex. There were 14 women (70%) and 6 men (30%) among them, aged from 24 to 59 years (the average age was $46,2 \pm 8,9$ years).

All the sick passed these examination methods before and after the treatment at the "Kluchi" health resort. The statistical data processing was carried out on IBM PC by means of integrated package for the statistical analysis "Statistica v.6" (descriptive statistics, nonparametric methods).

The Results and Their Discussion: As of the primary survey of patients with NLBP, they had pains of moderate intensity, as per VAS. As per the PainDETECT scale, the average mark was $9,04 \pm 4,22$ points, what signifies about the unlikelihood of neuropathic pain component (negative result). As per Mac Gill pain enquirer, the number of selected terms based on the index of selected scale before the treatment was $5,75 \pm 2,6$, based on the affective scale index it was $4,1 \pm 2,97$. The sum of order numbers of descriptors in subclasses based on the ranges of sensor

Table 1: The indicators of pain, life quality and psychovegetative status of the patients with NLBP.

| Indicators | Control group | | Patients with NLBP. | |
|--|---------------|------------|---------------------|--------------|
| | n | M±σ | n | M±σ |
| Pain intensity as per VAS when left to stand, mm | 20 | - | 55 | 52,6±1,4 |
| Reduction of life quality (OELAD), % | 20 | 12,6±6,2 | 55 | 23,6±13,7* |
| BECK, points | 20 | 4,2±1,9 | 55 | 10,8±6,1 * |
| HADS, depression, points | 20 | 3,05±1,9 | 55 | 7,5±3,5 * |
| HADS, anxiety, points | 20 | 4,85±2,5 | 55 | 10,24±3,6 ** |
| State anxiety, points | 20 | 32,6±2,96 | 55 | 44,6±4,9 * |
| Trait anxiety, points | 20 | 40,4±6,77 | 55 | 50±5,5 * |
| SVD, enquirer, points | 20 | 28,2±2,2 | 55 | 38,0±16,1 * |
| SVD, scheme, points | 20 | 32,0±3,9 | 55 | 38,3±14,6 * |
| Serotonin of blood serum, ng/ml | 20 | 252,1±28,7 | 55 | 154,4±44,7* |

* - certainty of results p<0,05,** - p<0,01

Table 2: The results of the sick treatment in study groups

| Indicators | Before treatment | After treatment | |
|--|------------------|-----------------------|-----------------------|
| | | 1 st group | 2 nd group |
| Pain intensity as per VAS when left to stand, mm | 52,6±14,1 | 32,3±13,6* | 27,4±16,2* |
| DN 4, points | 2,87±1,36 | 2,07±1,5 | 1,5±1,36* |
| PainDETECT scale, points | 10,92±5,33 | 6,53±3,4* | 3,45±2,9* |
| State anxiety, points | 44,6±4,9 | 38,8±6,32 | 39,9±8,02 |
| Trait anxiety, points | 50,58±5,5 | 49,74±6,2 | 49,4±4,7 |
| Beck depression scale, points | 10,8±6,1 | 6,7±3,6* | 4,2±2,9* |
| Dysautonomia-scheme, points | 38,3±14,6 | 22,7±10,7* | 13,4±7,4* |
| Dysautonomia - enquirer, points | 38,04±16,1 | 23,7±10,5* | 15,3±9,4* |
| HADS, depression, points | 7,5±3,5 | 4,2±2,1* | 3,1±2,28* |
| HADS, anxiety, points | 10,24±3,6 | 6,5±2,3* | 4,7±1,6* |
| Life quality, % | 23,6±13,7 | 17,5±10,3 | 10,4±7,9* |
| Serotonin of blood serum, ng/ml | 154,4±44,7 | 170,9±41,8 | 193,2±35,9* |

* - the results are true relatively the group before treatment (p<0,05).

and affective scales was equal in average to 20.14±5.75. The pain intensity based on the range of evaluative scale was equal in average to 3±0.7 points, characterizing the pain as excruciating.

It is known, that the pain syndrome significantly influences on life quality. As per Osvestrovsky enquirer, the average value of life quality of patients before the treatment was reduced by 23.6±13.7%, what is definitely (p<0.05) higher, than in the control group (Table 1).

During psychometric study before the treatment, it was revealed the definite increase of depression, anxiety level and the degree of vegetative disturbances as compared to the control group. As per the Beck depression scale, a neurotic depression level was revealed in the majority of patients (35 people). As per this scale, 9 people did not have the depression. The hospital scale (HADS) proved the presence of subclinical expresses depression on 13 patients, clinical expressed one had 6 people, the average point was 7.5±3.5 (p<0.05). The subscale HADS "Anxiety" showed the presence of

subclinical expressed anxiety in 16 examined, the clinical expressed one had 6 people. The average point is 10.24±3.6, what is definitely higher than in the control group. As per the Spilberger-Khanin enquirer, the average value of the state anxiety was 44.6±4.9 points (p<0.05) and the trait anxiety - 50±5.5 points (p<0.05). The degree of vegetative deadaptation in average in the group was 38.0±16.1 points as per the "Enquirer..." and 38.3±14.6 points as per the "Scheme...", what definitely differs them from the representative of the control group. Before the treatment, the serotonin concentration in blood serum of the sick of both groups was lowered (in average, 154.4±44.7 ng/ml, what is definitely lower than in the control group - 252.1±28.7 ng/ml, p=0.000). This fact testifies about the incompetence of endogenous analgetic systems of the patients with chronic low back pains (Table 1).

After the rehabilitation course with therapeutic factors of the "Kluchi" health resort, in both groups it was observed a significant reduction of muscle morbidity in

palpation, disappearance of subjective symptoms of lumbar discomfort, increase of movement volume in the spine with regard to the indices before treatment. A significant decrease of pain syndrome intensity as per VAS when left to stand was recorded in the second study group (27.4 ± 1.6 mm ($p^{KS} < 0.01$)). The patients of the second group had a significant increase of life quality ($10.4 \pm 7.9\%$) with regards to the first one ($p^{M-W}_{1-2} = 0.024$) (Table 2). The average point as per PainDETECT scale after the treatment constituted 5.2 ± 3.9 ($p^{KS} < 0.05$) in all groups. Immediately after the course of balneo-mud treatment, there were significant changes in emotional state of the sick and in the character of vegetative regulation, associated with it. The emotional background as per the Beck scale increased greatly in the second group of examined. As per the Spilberger-Khanin test, the average value of patients' state anxiety decreased significantly after the balneo-mud treatment with natural factors combined with magnet-laser therapy. Vegetative deadaptation of the sick decreased significantly in both groups after the treatment, both as per the "Enquirer..." and the "Scheme..." (Table 2).

CONCLUSION

Serotonin metabolic imbalance is an important biochemical factor of formation and support of chronic pain syndromes, comorbide, as a rule, with development of emotional and vegetative disturbances, which support a pain dominant in over-segmental structures of CNS. Despite the existence of different viewpoints at the close connection of chronic pain and depression, the most acceptable ones are the views about general neurochemical mechanisms of these phenomena. The presence of chronic pain syndrome in the sick with NLBP results in deterioration of serotonergic cerebral system in conditions of its high antinociceptive activity, what manifests itself in reduction of serotonin qualitative content in humoral peripheral link and can serve as a marker of pain intensity.

Balneo-mud therapy courses at the "Kluchi" health resort have a direct therapeutic impact on compensator-adaptive and vegetative-trophic processes of the sick with nonspecific NLBP, revealed in reduction of the pain syndrome level, optimization of indicators of vertebro-neurological and psychovegetative status, improvement of life quality of the sick. A comparative analysis of therapeutic efficiency of NLBP treatment at the "Kluchi" health resort showed, that the 14-day course of balneo-mud therapy including the magnet-laser therapy

has a major impact, than the traditional basic two weeks therapy. The application of magnet-laser therapy alongside with the basic treatment promotes the sanogenetic activation phenomenon of the cerebral analgetic structures and antinociceptive system, accompanied by the densification of serotonin neurotransmitter in peripheral blood.

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