CLINICAL RESULTS IN THE TREATMENT OF PATIENTS WITH DIABETIC POLYNEUROPATHY WITH SIMULTANEOUS APPLICATION OF LOW-FREQUENCY MAGNETIC FIELD AND MINERAL WATER

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Abstract

The influence of magnetic field on the velocity of free ions of solution, which is in a state of dissociation is the basic phenomena in magnetotherapy. The magnetic field increase the value of ion's velocity and change the direction of ion's velocity. Therefore the permanent or the low frequency magnetic field potentiates the movement of ions of all liquids in live tissues (first of all ions of the blood), movement of ions of mineral water and diffusion of ions from mineral water through the skin of human body.

On the base of above mentioned phenomena and properties of permanent and low frequency magnetic field a new method for therapy of diabetic polyneuropathy has been created using simultaneous application of magneto-therapy and hydrotherapy

1. INTRODUCTION

The magnetic field stimulates or inhibits the release of neurotransmitters, substances that transmit nerve impulses. This determines the management of the pain.

Second, it influences the central and autonomic nervous system, regulating the function of its two parts. It harmonizes and inhibits pathological foci and nerve transmitting voltage to make the voluntary and involuntary functions and movements in the body.

The magnetic field acts to eliminate cholesterol from the blood, creating a constant pulse wave in blood vessels. There is a very good effect in functional disorders of the central, peripheral and autonomic nervous systems.

The most common complication of diabetes mellitus /DM/ - diabetic neuropathy /DN/ is described in the mid nineteenth century /1864/ by Marshal de Calvi, as later on this problem are exclusively devoted a lot of research and publications, such as distal type polyneuropathy /DPN/ with excitement and waste sensory, reflex, motor symptoms and vegetative-trophic events.

Treatment of DPN is a subject to various medical and non-medical professionals, where the role of physicians in physical medicine and rehabilitation is leading. In the medical literature there are numerous scientific publications, monographs and dissertations dedicated to the physical treatment of DPN with natural and preformed physical factors. Our opinion is that the patients with DPN are sent too late, or not at all for physical therapy. On the other hand the very diagnosis of this complication of DM is diagnosed too late and is not paying enough attention to the complaints of the patients.

This clinical study describes the results of the simultaneous application of low-frequency magnetic field and water treatment in the cases of diabetic polyneuropathy.

2. OBJECTIVES AND TASKS

1. Research and optimization of the parameters of low-frequency magnetic fields with concomitant water treatment in order to achieve the best therapeutic effect in patients with diabetic polyneuropathy.

2. Development and application of new methods of treatment with low-frequency electromagnetic fields, alone and in combination with mineral water in:

- Diseases of the endocrine system
- Metabolic diseases
- Diseases of the central and peripheral nervous system

3. SYSTEM FOR THERAPY

As a result of cooperation between SHR "St. Mina" - Varshets and Department of Telecommunications at the Technical University of Sofia was modified an electric bath for the simultaneous application of low-frequency magnetic field and hydrotherapy (Fig.1).

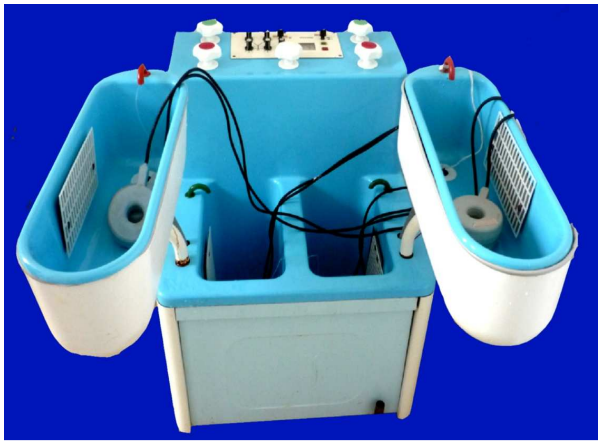

Fig.1. System for therapy of polyneuropathy using simultaneously application of magneto-therapy and hydrotherapy

The system has 4 separated bathtub, two for the hands and two for the legs. The bathtub are full with mineral water. There are two inductors in every bathtub. The inductors are encapsulated. Every pair of inductors are connected to the relevant output of apparatus for magneto-therapy. On Fig.2 can be seen apparatus for magneto-therapy with 8 inductors. This apparatus is a part of the system.

The apparatus for magneto-therapy provides low frequency pulsed magnetic field. During the procedure the adaptation of human body to the parameters of external pulsed magnetic field should be avoided. Because of that the frequency of magnetic pulses and their amplitudes should be variable. A microprocessor's system is implemented in apparatus for magneto-therapy. An appropriate software packages are used for the microprocessor's system.

Fig. 2. Apparatus for magneto-therapy with encapsulated inductors

4. MATERIALS AND METHODS

The study includes 60 patients with diabetic polyneuropathy (40 men and 20 women), treated with a new system for magneto therapy and mineral water. This system has four separate small tubs for separated hydrotherapy of the limbs. On both sides of the feet and ankles and on both sides of the wrists of the hands are placed two sealed magnetic inductors. We use a special apparatus for magneto therapy that provides simultaneous excitation of magnetic field in all eight inducers. The magnetic field has variable parameters in order to avoid adaptation and provides opportunities for longer course of treatment if necessary.

The patients with DPN who in the period of 2014-2015 conducted a treatment in the SHR "St. Mina" were treated only with combination of magnetic therapy and mineral water. They were aged 45-70, the average age of 55, 20 of them were with DM-first type and 40 - second type. The diagnosis of all patients was confirmed by EMG, held in advance. Patients were tested before and after completion of the treatment. In the clinical picture dominated sensory "plus" and "minus" signs: acroparesthesy, pain, changes in surface, deep and complex sensitivity, impaired statics and dropped reflex symptoms /Achilles and knee reflexes/.

With this message, we set the goal to present our experience with the application of a new method in the treatment of patients with DPN.

5. METHODS USED FOR OBJECTIFICATION

For the objectification of the results of the study we have applied the original method of Assoc.Prof. D-r Zivko Kolev, MD, PhD

1. Study of the pain in the lower limbs:

A/ By Visual analogue scale / 0-20 /

B/ By Dolorimetry, which was held in two points: in the middle of the tibial bone and the 1st metatarsal bone.

2. Quantification of the vibrational perception - vibroestheziometry by the graduated tuning fork of Rydel Saifer /Germany/ on the same places as with that of dolometry. The vibrational sense is conducted by the rear colons of the spinal cord and reduction or loss of it is considered to be one of the first symptoms of DPN.

3. Study of the static of the patient through „Sensitized Romberg's symptom" that shows impairment in the deep sensation. The patient is standing upright, folded one food over the other with stretched hands in supination with eyes closed. We recorded the onset of the ataxia during stay of the patient in this position for 60 seconds.

4. Examination of Achilles and knee reflexes.

6. RESULTS

We tracked changes in patients with diabetic polyneuropathy after 10 procedures with magnetic field and mineral water of upper and lower limbs.

Conducted a 10-day treatment of the patients with magnetic field and mineral water therapy showed improvement of their condition. We recorded three groups of symptoms after their treatment:

FIRST GROUP, in which patients are impacted best. These are sensory plus and minus signs /pain, paresthesia, hypoalgesia/.

At the beginning patients showed severe pain /13.5/, which fell to 5.2.

The reduction of pain reported by dolorimeter showed a better response to the points of the first metatarsal.

The hypoalgesy is significantly more pronounced in the distal surveyed points and its improvement is better as compared with the points of both tibial bones.

SECOND GROUP of symptoms presents the research of statics / sensitized symptom of Romberg / - improvement here is less - ataxia occurs at a later stage of 60 sec. straight posture.

THIRD PARTY symptoms / the study of the Achilles and knee reflexes /. In 37 of the patients are found changes in Achilles reflexes, and in 23 in the knee. The conducted treatment has led to minimal improvement in theirs status.

Medical reporting results were based on subjective status of the patients and objective data. The therapeutic effect was expressed with significant reduction of the pain, improvement of the sensitivity, increased skin temperature and volume of movement and stabilization of the coordination and the gait.

7. DISCUSSION

Our observations indicate that combined treatment with low frequency magnetic field and mineral water is particularly effective when there is a prevalence of autonomic disorders. From the analysis of the clinical results, the authors revealed the therapeutic advantages of simultaneous application of low-frequency magnetic fields and mineral water. Inpatient treatment and rehabilitation, especially in the early stages of the disease, is essential and important for the favorable outcome of the suffering.

8. CONCLUSION

1. As a result of treatment with the combine therapy with magnetic field and mineral water of patients with DPN, clinical symptoms and quality of life improved significantly.

2. We obtained the best results with the presented sensatory impairments, slightly were influenced impaired statics and reflexes.

3. Combined therapy with magnetic field and mineral water has its place in the treatment of patients with DPN and should be used in our physiotherapy practice.

4. Diabetic neuropathy is a common disorder in clinical practice, which requires timely and comprehensive physiotherapy and rehabilitation.

5. Simultaneous application of low-frequency pulsed magnetic field with varying parameters and mineral water provides encouraging results in the treatment of diabetic polyneuropathy.

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