The effect of low frequency pulsing electromagnetic field in treatment of patients with knee joint osteoarthritis

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INTRODUCTION

From the old Egyptians period, across the late fifties and early sixties (studies of I.Yasuda, E. Fukada, C.A.L. Basset and W.J. Erdman), to now a days, magnetic field became very effective procedure in treating of persons with diverse diseases and pathologic conditions1,2,3,4,5, 6,7,8,10. By using pulsing electromagnetic field, could be noticed significant results, especially in rheumatology14, orthopaedics and traumatology12,16,17,18. The important effects of this procedure can be found in treatment of patients with the locomotor system diseases11,13,14.

OBJECTIVE

The goal of this research is the objective evaluation of the therapeutic effect of low frequency pulsing electromagnetic field (LFEMF), in comparison with the effect of the other physical procedure-Interference currents (IFC) and medicamentous therapy, in treating of patients with knee joint osteoarthritis.

MATERIAL AND METHODS

This study was made as experimental, randomized, controlled clinical trial, opened type. The examination included 60 patients (40 females and 20 males) with osteoarthritis of the knee joint. All patients were divided into three groups. The first group of 20 persons, composed of patients treated with medicamentous therapy (Diklofenak of 100 mg, 2 tablets per day). The second group consisted of 20 patients treated by LFEMF and the third group consisted of 20 patients treated by IFC. All procedures were implemented during 10 days. All of patients had also the same duration therapeutic exercise. As observing parameter was used: Lattinen test for the evaluation of the pain sensitivity, before and after therapy. For the statistical analysis of the acquired data, was used Student’s t-test.

After therapy the pain was considerably reduced in each group, but this effect was the most significant in the II group of the examinees, treated by LFEMF (p< 0.001), than the effects in other groups of patients: I group (p< 0.05) and III group (p< 0.01). According to the results of this study it can be concluded that LFEMF is very effective therapeutic procedure in treatment of patients with knee joint osteoarthritis.

Key words: electromagnetic field; knee; osteoarthritis
sisted of 20 patients treated by LFPEMF, procedure parameters: magnetic induction B=10 mT; frequency f=50 Hz and length t=30 minutes and the III (third) group consisted of 20 patients treated by IFC, variable frequency (1-100 Hz.), length=15 minutes.

All procedures were implemented during 10 days. All of patients had also the same duration therapeutic exercises.

Observing parameter

As observing parameter was used Lattinen test for the evaluation of the pain sensitivity, before and after therapy (A. Pain intensity; B. Pain frequency; C. Using analgetics; D. Disability cause of pain and E. Sleeping quality, with single scores from 0 to 4 points and maximal Lattinen test score value of 20 points).

Statistical analysis

For the comparative evaluation between groups, according to the basic bioantropometric characteristics (age and gender) of the examinees, were implemented Student’s t-test and chi-square (X²) test, for age distribution, as well as chi squared analysis of contingency tables, for gender distribution. For the statistical analysis of the acquired data and the evaluation of statistical importance of observing parameter middle values differences, before and after therapy, was used Student’s t-test for each group of patients.

RESULTS

Lattinen test score middle values before therapy are shown in Table 1.

After therapy, the pain intensity was considerably reduced in each group of patients, but this effect was the most significant in the II group of the examinees treated by LFPEMF (p< 0.001), than the effects in other groups of patients: I group (p< 0.05) and III group (p< 0.01) (Table 2). These results show excellent therapeutic possibilities of LFPEMF in comparison with other physical procedure (IFC) and medicamentous therapy.

DISCUSSION

During LFPEMF therapy all of patients felt fine, without unwanted effects.

Lattinen test results after therapy, show important pain intensity reduction, in each group of patients. This reduction, was statistically the most important in the II group, treated by low frequency electromagnetic field. These results are similar with the results of Fary R.E. 9 and Kon E. 12, who treated persons with osteoarthritis of the knee. The results of this research show excellent therapeutic effects of low frequency pulsing electromagnetic field and are in accordance with the results of the other authors’s investigations and trials (Markov M.S., Montanari G., Akai M., Hadad J.B., David T.H.)4,7,8,11,14.

This study, as the original examination, proves more significant difference of pain reduction in the II group of examinees treated by LFPEMF, in comparison with patients treated using other physical procedure and medicamentous therapy.

CONCLUSION

After low frequency pulsing electromagnetic field and IFC treatment, as well as medicamentous therapy, the pain intensity was considerably reduced in each group of examinees, but this reduction, was the most significant in the II group, treated by low frequency electromagnetic field.

This examination show more significant therapeutic effects of low frequency electromagnetic field in comparison with the effects of Interference currents and medicamentous therapy - Diklofenak tabl., in treating of patients with osteoarthritis of the knee joint.

According to the results of this study, it can be concluded that low frequency electromagnetic field is very effective therapeutic procedure in treatment of patients with knee joint osteoarthritis.

REZIME

Impulsno elektromagnetno polje predstavlja efikasnu proceduru u lečenju osoba sa različitim oboljenjima i patološkim stanjima, posebno u oblastima reumatologije, ortopedije i traumatologije. Cilj ovog istraživanja je utvrđivanje terapijskog efekta niskofrekventnog pulsirajućeg elektromagentnog polja (NFPEMP) u tretmanu pacijenata sa osteoartritisom zgloba kolena, u poređenju sa dejstvom druge fizičke procedure, odnosno interferentnih struja (IFS) i medicamentozne terapije.
The examination was made at: Orthopaedics an traumatology depart-