EVALUATION OF DENS THERAPY (DENAS or DiaDENS devices) EFFICIENCY IN PATIENTS WITH SPINE FRACTURES IN THE PRESENCE OF OSTEOPOROSIS

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Osteoporosis (OP) - is a systemic disease of the skeleton, which is characterised by microarchitectonics bone tissue disorder that causes an increase of bone fragility and high risk of their fractures. Spine fractures are typical for osteoporosis, these fractures are widespread and, according to Russian data research, reaches from 7.2 to 12 % in men and from 7 to 16 % in women [1,2].

Patients with spine fractures have chronic pain syndrome and functional limitations, which causes quality of life decrease,the possibility of becoming disabled, and makes them continuously appeal for medical help.

Dynamic electroneurostimulation (DENS) is one of the alternatives to drag treatment of pain.That is because impulses of alternating current effects biologically active points and zones, triggers neuro humoral reactions, and anesthetic and anti-inflammatory effects which are the result of those reactions [3]. However, for the 30 years of TENS existence (transcutaneous electroneurostimulation - term that is being used in foreign literature) little convincing data was received about its efficiency, because randomization conditions are often not fulfilled, andthere are not enough placebo-controlled researches. In some placebo-controlled research unambiguous confirmation of anesthetic effect of transcutaneous electrostimulation was not received in patients who had pain in a lower part of the back [4].

In some patients with osteoporotic spine fractures, there are some indications in a literature that electrostimulation could reduce pain, but there is no evidences of its efficiency [5].

An evaluation of dynamic electroneurostimulation (DENS) impact on back pain and quality of life of patients with osteoporotic spine fractures was the purpose of this research.

Women over 50 years old with osteoporotic spine fractures, and chronic back pain which were confirmed with X-ray,were included in the research. All the patients signed an agreement.
Patients with repeated osteoporosis and spine fractures of different etiology, patients with individual intolerance to electric current, patients with implanted heart pacemaker, and patients with neoformations of any kind in the places of electrodes application were not included into research.

33 women with osteoporotic spine fractures (from 1 to 11 vertebra for some persons) and chronic back pain were randomly placed into 2 groups: main group consisted out of 17 people, control group included 16 people.

Patients of the main group were treated with the DiaDENS-PC apparatus. An application was carried out in the area of thoracic or lumbar spine at the place of maximal pain with the help of remote zonal electrode DENS-applicator. A procedure was started with the stimulation in "Therapy" mode at 10 Hz frequency with 5 minutes of duration; right after that 77 Hz frequency was set up and the application was continued during the next 15 minutes. Minimal level of intensity was set up so the patient would not have any sensations. General time of the procedure was 20 minutes, procedures were accomplished daily or every other day during 10 days.

An imitation of DENS-effect was created in a control group with the help of the DiaDENS-PC apparatus - placebo. A remote zonal electrode DENS-applicator was fixed on the back in the place of maximal pain for 20 minutes, the same way as the first time. Herewith, a notice "10 Hz Therapy" was seen on the screen of DiaDENS-PC apparatus - placebo during 5 minutes, a notice "77 Hz Therapy" was seen on the screen during 15 minutes (by analogy with DiaDENS-PC apparatus that was used for patients of the main group).However, the medical effect was not realized. Based on their sensations, patients of both groups could not understand, if an application took place or it was an imitation of such application. A doctor that examined patients before the first session and after the course was over, did not know which group - main or control one - patient belonged to, consequently, he could not voluntarily or not affect the results.

Level of DENS efficiency in treatment of pain syndrome and quality of life change were evaluated with the help of QUALEFFO-41 questioning and VAS (visual-analog scale) of pain that were filled in by patients themselves every time they visited the clinic. Scale of pain consisted of 100 divisions, where 0 points indicated absolute pain absence, 100 points indicated maximal pain. Functional indices were evaluated by means of spine mobility measuring (Otto's test, Shober's test, spine rotation) and walking test (to get up from the chair, walk 3 meters, to come back and sit down measuring time in seconds).

Patients of both groups continued to receive basic therapy of osteoporosis and concomitant diseases without the changes during all the period of the research.

Statistical processing was accomplished with non parametric tests assistance (Wilkokson's test, Mann-Whitney test, Fisher's test). The main and the control group initially were comparable in age and all other criteria that were studied.
According to VAS back pain of patients of the main group reduced from 57.5 to 38.5 points; $p = 0.003$. An uncertain pain reduction from 63.2 to 56.2 points was observed in the control group.

A reliable pain syndrome reduction (from 3.45 to 3.19; $p = 0.02$) and physical abilities improvement, especially homework (from 2.55 to 2.28; $p = 0.01$) and mobility (from 2.38 to 2.15; $p = 0.001$), were received in patients of the main group when having QUALEFFO-41 evaluation.

There were no reliable changes on stated indices in the control group.
There were no difference between the main and the placebo group when evaluating everyday activity, general level of health and state of mind.

92 % of patients of the main group and 46 % of patients of the control group ($p = 0.02$) stated the pain reduction in the thorax when evaluating the pain dynamic. 69 % of patients of the main group and 36 % of patients of the placebo group noticed the pain reduction in the lumbar region, however, statistically significant differences between the groups were not achieved.

Mobility of the spine measuring did not demonstrate any reliable differences neither in main, nor in control group. Walking test demonstrated time reduction both in the main and in the control group.

Number of fybromyalgia points (painful points on the body) decreased after the treatment in all the patients, but the differences are not reliable for the control group, and they are reliable for the basic group (7.58-6.29; $p = 0.03$).
Thus, the research confirmed that dynamic electroneurostimulation reduces the pain and improves the quality of life of patients with osteoporotic spine fractures, and it could be included in a complex program of treatment of such patients. It is necessary to continue the research increasing an amount of sampling.

Sources

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