

INFLUENCE OF PULSED SHORT WAVES ON BONE REMINERALIZATION IN PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME TYPE I

DOGARU, Gabriela^{1,2}; STANESCU, Ioana¹

¹*Spitalul Clinic de Recuperare Cluj-Napoca, Romania*
²*”Iuliu Hatieganu” University of Medicine and Pharmacy*

Introduction

Introduction: Complex regional pain syndrome type I or algoneurodystrophy (AND) includes a series of complex osteoarticular and vasomotor disorders of the upper and lower limbs. In addition to drug therapy, physical kinetic rehabilitation therapy may increase the quality of life of these patients and reduce sequelae. Pulsed short waves are considered to provide the most adequate energy for the favorable influence of the pathophysiological substrate of AND. The local application (on the affected area) of the treatment is justified by the local action of pulsed short waves, which induce microshocks in the crystalline bone structures (particularly collagen), with the production of negative electrical charges that will result in an increased osteoblast activity and the storage of calcium salts in the bone. Also, a possible role in the energy metabolism of osteoblasts is not excluded.

Objectives: To determine the effect of the local application of pulsed short waves on bone metabolism by measuring the biochemical markers of bone formation turnover, i.e. alkaline phosphatase and osteocalcin, in patients with AND.

Material and method: The study included 40 patients aged between 23-74 years, with post-traumatic AND stages 1 and 2. The study, a prospective longitudinal analysis in a representative sample, was carried out at the Clinical Rehabilitation Hospital, in the period September 2009 – November 2011. Treatment was performed using the Diapulse device. In the same treatment session, all patients were exposed to lumbar irradiation (for the adrenal gland), in doses of 4/400 impulses/sec for 10 minutes, followed by the exposure of the affected area to 6/600 impulses/sec for 10 minutes. There was a single treatment session per day, with a total number of 10 treatment sessions.

Throughout the duration of the treatment with Diapulse, the patients received no other drug therapy or physical-kinetic therapy. Blood was taken from each patient before and after treatment, for the determination of the biochemical markers of bone formation turnover. Of the 40 patients included in the study, after the determination of bone mineral density, 12 patients (30%) were diagnosed with osteoporosis, 6 patients with osteopenia (15%), in 1 patient who was

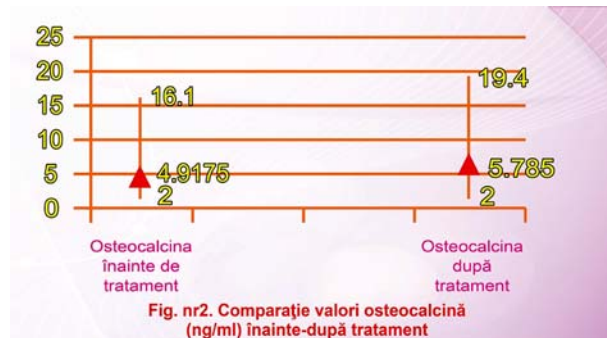
overweight (105 kg) the determination could not be performed, and 21 patients (52.5%) had normal bone mineral density values. Of the 12 patients with osteoporosis, only one had been under antiosteoporotic treatment for 3 months. Given the absence of treatment for osteoporosis, it can be concluded that the biochemical markers of bone formation



Conclusions: Pulsed short waves (Diapulse) probably stimulate osteocalcin synthesis in osteoblasts. There was an influence of pulsed short waves on bone metabolism, following the determination of the biochemical markers of bone formation turnover, with a role in bone remineralization.

turnover, alkaline phosphatase and osteocalcin, were not influenced.

Results: The mean alkaline phosphatase and osteocalcin values after 10 days of treatment with pulsed short waves were statistically significantly higher than the mean values before treatment ($p < 0.05$), while ranging within normal limits.



REFERENCES

1. Pol L – Cercetari clinico-experimentale asupra efectelor biologice si terapeutice ale undelor scurte pulsatile (Diapulse). Teza de doctorat. U.M.F. “Iuliu Hatieganu”, Cluj-Napoca, 1985
2. Dogaru Gabriela, Craciun C., Catoi C., Toader S., Pop L. – Histological changes in organs and tissues of adrenal glands of rats undergoing pulsed short wave treatment. Annals of RSCB 2009; XIV (2): 73-79;
3. Dogaru Gabriela; Craciun C., Toader S., Pop L. – Structural and ultrastructural changes in the adrenal glands of rats undergoing pulsed short wave treatment. Annals of RSCB 2009; XIV (2): 80 -86;
4. Comoroson S., Pana I., Pop L., Craciun C., Cirlea A.M., Paslaru L., - The influence of pulsed high peak power electromagnetic energy (Diapulse) treatment on posttraumatic algoneurodistrophies. Rev Poum. Physiol. 1991; 28 (3-4): 77-81