

Effect of magnetic feild with 100 μ T density on rat bone resorption

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Abstract

Background&Objective: Electromagnetic fields are present everywhere in our environment with various intensities, so, investigation about their effects on living organism is very important. The aim of this experiment study to investigate the effect of magnetic field on bone resorption, PTH and calcitonin concentration and their correlations.

Materials&Methods: In this experimental research, 30 Sprague-Dawley male rats were divided into 3 groups. Test group animals, were exposed to magnetic field (100 μ T, 50 Hz), 4 hours per day for a period of 42 days. Experimental condition for control-1 group was the same as test group, except that, they were not exposed. Animals of control-2 group were killed at the first day of experiment (day 0). Total left femoral bone calcium and phosphorus content and its fracture energy was measured at days 28 and 42 in control-1 and test group and on day 0 in control-2 group. However, serum calcium, phosphorus, PTH and calcitonin concentration were measured on day 0, the first day of exposure, and thereafter once per two weeks.

Results: Total bone calcium content in test group was significantly lower than control-1 and 2 groups, and bone fracture energy showed a slightly decrease. On the other hand, serum calcium and phosphorus concentration increased significantly on 28th and 42nd days compared to day 0. There was a decrement in serum PTH concentration and increment in serum calcitonin concentration during the exposure period.

Conclusion: Our results suggested that magnetic field could have a direct effect on bone resorption, and observed changes in PTH and calcitonin were in good correlation with serum calcium and phosphorus concentrations (negative feed back) and these changes also prevent further increase in bone resorption.

Key Words: Magnetic field- Bone- PTH- Calcitonin- Calcium