Comparison of Contraction Parameters in Diabetic Aorta Exposed to 5 Hz or 15 Hz Frequency Pulsed Magnetic field

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I. Ocal[I], F. Çiçek[II], I. Günay[III]

[I]Cukurova University, Adana, Turkey, [II]Cukurova University, Medical Faculty, Biopyhsics Department 01350 Balcali, Adana, Turkey, [III]Cukurova University, Medical Faculty, Biophysics Department 01350 Balcali, Adana, Turkey

Diabetes Mellitus (DM) is an autoimmune disease which is increasingly common in the population without sex difference. Literature were shown that low frequency pulsed magnetic field (PMF) applications induced angiogenesis and affected signal transduction, cellular processes, and specific genes expressions. The aim of our study was to compare the effects of 5 Hz or 15 Hz frequency pulsed magnetic field (5-PMF or 15-PMF) on contraction parameters of diabetic rat aorta rings.

In this study, rats were divided into four groups; Control (C), control-sham (SC), diabetes (D), diabetes-sham (SD). C and D groups were exposed to 15-PMF or 5-PMF system for eight weeks, 1 hour per day, 5 days a week. Subsequently, the SC and SD groups were also exposed to a non-current magnetic field for eight weeks, 1 hour per day, 5 days a week.

Blood glucose levels and weights of rats were measured once a week for eight weeks. At the end of the eight weeks, rats were blood from their hearts and were measured the levels of insulin, IL-6, IL-2, TNF-α and TGF-beta 1, then the aorta rings were isolated and contraction-relaxation parameters of aorta rings were measured.

In consideration of our data, there was no weight loss and blood glucose levels decreased in group C that was exposed to 15-PMF or 5-PMF for eight weeks. In group D, the weight loss rate and blood glucose levels caused by diabetes decreased *($p>0.05$)*. Also, the contraction forces of the aorta rings of the rats in the D groups affected by 15-PMF decreased, the percent rate of relaxation increased. Also, relaxation duration increased while the contraction duration decreased *($p<0.05$)*.

15-PMF applications may have beneficial effects on the biomechanical parameters of rat aorta preparations, that PMFs can be used for juvenile diabetic therapy, considering the intensity, frequency and exposure duration of PMF. Further research is needed to clarify the action mechanism of PMF and to confirm the clinical usability of PMF.