ORIGINAL ARTICLE

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Intratumoral Effects of Continuous Endurance Training and High Intensity Interval Training on Genes Expression of miR-21 and bcl-2 in Breast Cancer Bearing Female mice

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Abstract

Introduction: Apoptosis and tumor growth are inhibited by intratumoral miR-21 via upregulation of bcl-2. Hence, the aim of the present study was determine the effects of continuous endurance training (ET) and high intensity interval training (HIIT) on intratumoral miR-21 and bcl-2 of breast cancer bearing female mice.

Methods: Eighteen female BALB/c mice after inducing breast cancer through MC4-L2 cell lines injection were randomly divided into three groups (n=6) including control, continuous endurance training (ET) and high intensity interval training (HIIT). Then, both experimental groups including ET (75 min/day, constant running speed corresponding to 60–65%) and HIIT (six intervals for 3 min and 20 seconds, 85-90% V̇O2 peak, 90 second of active rest at 30-35% V̇O2 peak separating intervals) performed exercise protocols at 15% inclination, five days a week for ten weeks. Tumor volume was measured and recorded by caliper every week. miR-21 and bcl-2 gene expression were determined by qReal-time PCR. Statistic data values also were measured by One-way ANOVA.

Results: The results of the present study showed that miR-21 gene expression was significantly reduced in both experimental groups compared to control group ($p \leq 0.001$). While, bcl-2 gene expression had no significant change in comparison with control group ($p \geq 0.05$). There was also observed a significant reduction in tumor volume of two experimental groups in comparison with control group. It should be noted that tumor volume reduction in HIIT was larger than ET.

Conclusion: HIIT is possibly more effective than ET in attenuating cancer cells progression via its intratumoral effects.

Keywords: High Intensity Interval Training, Continuous Endurance Training, miR-21, bcl-2, Breast Cancer.