Effect of Interval Training on the Expression of Mesenchymal Biomarker Vimentin and Tumor Volume in Mice with Breast Cancer

Gholamian S1, Attarzadeh Hosseini R2*, Rashidlamir A2, Aghaalianjad H3

1 Ph.D. Student in Exercise physiology (Biochemistry and Metabolism), Faculty of Sports Sciences, Ferdowsi University of Mashhad, Mashhad, Iran
2 Faculty of Sports Sciences, Ferdowsi University of Mashhad, Mashhad, Iran
3 Faculty of Humanities, Tarbiat Modares University, Tehran, Iran

Abstract

Introduction: Many deaths from cancer are due to metastases, a process which involves the epithelial-mesenchymal transition (EMT). On the other hand, regular exercise plays an important role in inhibiting the progression of breast cancer. Therefore, the purpose of this study was to investigate the influence of interval training on the expression of VIM, the gene encoding for EMT biomarker vimentin, and tumor volume in mice with breast cancer.

Methods: Thirty-two female BALB/c mice were randomly divided into four groups: Exercise-Tumor-Exercise (ETE), Rest-Tumor-Rest (RTR), Rest-Tumor-Exercise (RTE), and Exercise-Tumor-Rest (ETR). Interval training was performed six weeks before and four weeks after the induction of 4T1 mammary carcinoma. The real-time PCR method was used to evaluate the expression of vimentin. Data were analyzed with one-way ANOVA followed by post hoc methods, considering a P value of < 0.05 significant.

Results: Tumor tissue VIM expression in the ETE group decreased significantly (P < 0.001, F = 270.85). Also, a significant decrease in tumor volume was observed in both RTE and ETE groups compared to the control group (RTR) (F = 23.81, P < 0.001).

Conclusion: Based on the results of this study, a period of interval training (before and after tumor) may decrease tumor growth and the expression of VIM. This kind of exercise can, in addition to the preventive role, may play a role in the treatment of breast cancer.

Keywords: Breast Cancer, Mesenchymal Biomarker, Vimentin, Interval Training, Tumor Volume