ORIGINAL ARTICLE

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Effect of Six Weeks of Endurance Training on Tumor Volume and Muscle Myostatin Levels in Female Mice with Breast Cancer: Implications for Cachexia

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Abstract

Introduction: Cachexia is one of the main cancer-related complications. Changes in levels of cachexia-related factors such as myostatin play an important role in accelerating or muscle wasting. The aim of present study was to investigate the effect of six weeks of endurance training on myostatin levels in female mice with breast cancer.

Methods: Twenty-four female BALB/c mice, aged 6-8 weeks, were assigned to three groups of 8 mice each: a healthy control, tumor control, and an endurance training + tumor group. The endurance training program was performed for six weeks, five sessions per week, at 14-18 m/min on a rodent treadmill. Forty-eight hours after the last exercise session, gastrocnemius muscle tissue was removed and myostatin levels were determined with ELISA method. Tumor volume was measured with a digital caliper.

Results: Results indicated significant decreases in myostatin levels in the training + tumor group when compared with the tumor control group ($p < 0.001$). However, myostatin levels in the control group were significantly low compared with the tumor control and training + tumor groups ($p < 0.05$). Moreover, significant increases in the gastrocnemius muscle weight ($p = 0.015$) and decreases in tumor volume ($p < 0.001$) were observed in the training + tumor group.

Conclusion: It seems that decreased myostatin levels due to endurance training have an important role in the prevention of muscle wasting. According to our findings, endurance training, in addition to suppressing tumor growth, can be considered an effective strategy for combating muscle loss in cancer patients.

Keywords: Cachexia, Tumor, Myostatin, Endurance Training