Physical Training in People with Obesity has a Positive Effect on Inflammatory Biomarkers

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Abstract

Background and Objective: Obesity is a chronic disease that affects millions of people around the world. It is estimated that approximately 1.9 billion adults are overweight, while 609 million are considered obese. This situation constitutes a serious public health problem and a significant risk factor for the development of type 2 diabetes, cardiovascular diseases and other comorbidities. The NLRP3 inflammasome consists of a protein "platform" composed of the NLRP3 member of the NOD-like receptor family (sensor), an apoptosis-related protein containing a caspase-activating domain – ASC (adapter) and procaspase-1 (effector). The NLRP3 complex, when active, leads to the activation of caspase 1, which converts pro-IL-1β and pro-IL-18 into the cytokines IL-1β and IL-18 that trigger the inflammatory process. NLRP3 dysregulation is associated with pathogenesis of some diseases, including obesity. While it is known that physical exercise provides benefits for obesity, little is known about the effects of high-intensity interval training (HIIT) in individuals with obesity, concerning the inflamassome NLRP3. In this sense, the present study aims to investigate possible changes induced by HIIT on the inflamassome NLRP3 in individuals with obesity.

Methods: Prospective study, in the format of a randomized and controlled clinical trial, with sedentary subjects with obesity (n=52), divided into trained and control groups. The chronic effect of eight weeks of HIIT (three times per week) on the NLRP3 inflammasome expression was evaluated by Flow Cytometry. Comparisons between time points T0 and T1 in each group were performed using the Wilcoxon test and comparisons between the two groups were performed using the Kruskal Wallis test.

Results: After eight weeks of HIIT, there was a reduction in triglycerides (p=0.009), with no differences in total cholesterol, LDL-C, HDL-C, non-HDL-C and glucose (p=0.309, p=0.666, p=0.088, p=0.351, and p=0.280, respectively). After comparison between the two groups, there were differences in total cholesterol, LDL-C and non-HDL-C (p=0.005, p=0.031, and p=0.017, respectively) with no differences in triglycerides, HDL-C and glucose (p=0.190, p=0.680, and p=0.153, respectively). In addition, there was an increase in the expression of NLRP3 in the control group after two months (p=0.028), without difference in the trained group (p=0.866). After comparisons between the two groups, no difference was found to NLRP3 (p=0.698).

Conclusion: These results suggest that in the obesity context, HIIT was able to maintain the expression of the inflammasome NLRP3 unchanged for two months, unlike the control group (untrained), in which an increase in the expression of the NLRP3 inflammasome was found.

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Keywords

Obesity; training; inflammation; inflamassome NLRP3.