

Role of High-intensity Resistance Exercise in Vascular Inflammation in Recreationally Trained Men

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ABSTRACT

Soluble intracellular adhesion molecule-1 (sICAM-1) and soluble vascular cell adhesion molecule-1 (sVCAM-1) are known as vascular inflammatory markers and play a key role in the development of atherosclerosis. Although low to moderate intensity exercise may positively influence inflammatory markers, the role of high-intensity resistance exercise in sICAM-1 and sVCAM-1 has not been fully examined. The current study examined the effects of resistance exercise at different intensities (low vs. high) on acute responses of sICAM-1 and sVCAM-1. In a randomized, cross-over design, 10 recreationally trained (resistance-trained 3 to 6 days per week for at least one year) college-aged men performed a single bout of lower body resistance exercise, consisting of the leg press and unilateral knee extension exercises, at two different intensities (low intensity: 50% of 1-RM and high intensity: 80% of 1-RM). The volume of two intensities of exercise was similar. Overnight fasting blood samples were collected at baseline and 3-hr, 24-hr, and 48-hr post exercise (PE) for each exercise intensity to determine sICAM-1 and sVCAM-1. A 2 X 4 ANOVA with repeated measures was used to examine the mean differences in intensities and time on sICAM-1 and sVCAM-1, and the Least Significant Difference (LSD) tests were conducted as post hoc tests. If a significant interaction was found, the follow-up simple effects test was conducted. A p -value $< .05$ was set for the statistical significance. Low-intensity resistance exercise did not significantly alter sICAM-1; however, during the high-intensity resistance exercise trial, sICAM-1 at 48-hr PE (364.85 ± 34.40 ng/ml) significantly ($p = .037$) decreased by 14.27% from 3-hr PE (425.60 ± 36.71 ng/ml). Following low-intensity resistance exercise, sVCAM-1 significantly ($p = .001$) increased by 27.6 % at 24-hr PE ($p = .001$) and remained elevated up to 48-hr PE ($p = .001$). In addition, sVCAM-1 at 24-hr PE (715.70 ± 38.14 ng/ml) and 48-hr PE (716.32 ± 34.79 ng/ml) for the low-intensity resistance exercise trial were significantly higher ($p = .003$ and $p = .002$, respectively) than the same time points of the high-intensity resistance exercise trial (24-hr PE: 532.57 ± 38.14 ng/ml and 48-hr PE: 533.18 ± 34.79 ng/ml). Thus, the current study suggests that high-intensity resistance exercise can also be an effective method to improve cardiovascular health since it reduced vascular inflammatory markers by decreasing sICAM-1 without altering sVCAM-1.