
Relationship of Cellular Adhesion Molecules and Stress Hormones in Obese Males Following Exercise

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ABSTRACT

The development of atherosclerosis is associated with a steady accumulation of inflammatory molecules. Exercise-induced hormones such as cortisol and catecholamines (epinephrine and norepinephrine) may play a role in endothelial inflammation. **METHODS:** Fifteen obese (BMI > 30 kg/m²) sedentary (less than 2 days per week of physical activity) male volunteers, the ages between 18 and 30, participated in the study. The participants performed a single bout of cycling exercise (average energy expenditure ~ 300 kcal) at two different intensities in random order [low-intensity: 50% of maximal heart rate and high-intensity: 80% of maximal heart rate]. Overnight fasting blood samples were collected at baseline, immediate post-exercise (IPE), 1-hr PE, and 24-hr PE for each intensity of exercise to determine the responses of soluble cell adhesion molecules [intercellular adhesion molecule-1 (sICAM-1), vascular cell adhesion molecule-1 (sVCAM-1), and E-selectin (sE-selectin)] and exercise-induced stress hormones. Data were analyzed by an analysis of variance with repeated measures along with the Bonferroni multiple comparisons. The linear regression analysis was used to examine the interaction between exercise-induced hormones and vascular inflammation markers ($p < .05$). **RESULTS:** There exhibited no significant change in sICAM-1, sVCAM-1, E or NE, while sE-selectin at 1-hr PE (10.25 ± 1.07 ng/mL) significantly decreased ($p = .045$) from baseline (12.22 ± 1.39 ng/mL). COR at IPE (262.12 ± 31.09 ng/ml) was significantly higher ($p = .001$) than 1-hr PE (189.35 ± 31.11 ng/ml) during high-intensity exercise. In contrast, COR at IPE (187.52 ± 31.09 ng/ml, $p = .009$) and 1-hr PE (156.24 ± 31.11 ng/ml, $p = .001$) were significantly lower than baseline (259.75 ± 23.07 ng/ml) during low-intensity exercise. COR and sICAM-1 had a negative relationship at 1-hr PE during low-intensity exercise ($r^2 = .34$, $p = .02$), whereas COR and sVCAM-1 had a positive relationship at IPE during high-intensity exercise ($r^2 = .36$, $p = .02$). **CONCLUSION:** sE-selectin was favorably reduced following exercise, and changes in cortisol were exercise-intensity dependent. Although sICAM-1 and sVCAM-1 did not significantly change following exercise, a significant interaction between cortisol and these cell adhesion molecules suggests that cortisol is one of the responsible exercise-induced hormones that may be associated with cell adhesion molecule metabolism.