EXERCISE INTENSITY INFLUENCE ON OXIDATIVE STRESS, FOR THE SAME TOTAL OXYGEN CONSUMPTION

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Introduction

The aim of this study was to infer the relationship between the oxidative stress caused by physical exercise duration vs. intensity, maintaining the total volume of oxygen consumption. In order to do so, we hypothesised that there are no significant differences in blood lipid peroxidation induced by different intensities of exercise for the same total oxygen consumption.

Methods

Our sample was constituted by twelve trained subjects (N=12), and the study procedures was divided into three distinctive phases: (1) the evaluation of individual VO₂ max, in order to determinate the consumption of oxygen between 55-60% and between 75-80% of VO₂ max; (2) determine the oxidative damage induced by exercise performed between 55-60% for 20 minutes; (3) determine the oxidative damage induced by exercise performed between 75-80% of maximum VO₂ for 15 minutes. Before, immediately after, and an hour later, blood samples were collected to later evaluation of the lipid peroxidation, by TBARS concentration¹. One-way analyse of variance (ANOVA) was used to compare TBARS concentration values in different moments of the 2nd and 3rd phase, with a multiple comparison a posteriori by Bonferroni. A t-test for independent samples was performed in order to examine possible differences between TBARS concentration in the 2nd and 3rd phase. Significance level was established at 5%.

Results/ Conclusions

Our results revealed a significant increase (p<0.05) in TBARS concentration between rest values and immediately after exercise (316.4±115.4 nmol.L⁻¹ and 612.2±230.6 nmol.L⁻¹ at 55-60%; and 423.1±114.1 nmol.L⁻¹ and 1083.3±177.4 nmol.L⁻¹ at 75-80%) and one hour later (316.4±115.4 nmol.L⁻¹ and 685.9±107.9 at 55-60%; 423.1±114.1 nmol.L⁻¹ and, 919.9±239.7 nmol.L⁻¹ at 75-80%) either after exercise at 55-60% and exercise at 75-80%. However, when comparing the results exercise performed at different intensities TBARS concentrations were significantly higher immediately after the most intense exercise (75-80%).

The results achieved in this study show that for the same volume of total oxygen consumption, exercises of higher intensity induces elevated oxidative damage, as it was clearly shown by the superior TBARS concentration.

References


Keywords: Oxygen Consumption, Oxidative Stress, Biochemistry of Exercise