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The Effect of One Season Vigorous Activity on the Rate of Carbonyl Protein in Blood Plasma in Active Women

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Abstract:

Introduction: *One of the indirect ways to measure Oxidative Stress is using Carbonyl protein as an indicator for the proteins oxidation. The purpose of this research was the study of the effect of a vigorous athletic activity session on the rate of Carbonyl Protein in blood Plasma in active women.*

Methodology: *In the present study, a group of 20 female badminton players from Fars province with the mean and standard deviation of the age (21.2±2.1) and weight (52.7±3.6) was chosen. Then, athletics were randomly divided into two tentative groups (n=10) and control group (n=10). The rate of Carbonyl protein of blood was measured 24 hours after and before the study. For searching the changes among the groups ANOVA REPEATED MEASURED was used. A meaningful level for all of the analysis processes was attended (P<0.05).*

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Results: *Analysis on the tentative group showed that there is a meaningful difference between the rate of Carbonyl protein in pre test and post test 1 that is (p=0.010) and post tests 1 and 2 (p=0.013) but there isn't any meaningful difference in the processes of pre test and post test 2 (p>0.05) and also there isn't any significant difference between three level of the test in control group.*

Conclusion: *Noticing the finding of the present research, a hard athletic activity session causes a significant increase in the rate of Plasma Carbonyl Protein as a stress variant in blood plasma of active women and in 24 hours it returns to its previous level.*

Key words: Carbonyl Protein, Athletic activity, active girls, oxidative stress

Introduction:

Implementation of physical activity and increase of Oxygen use cause the molecular disposal and diverse species of Oxygen in body. Species of active Oxygen such as free Radicals are attributed to molecules derivate from usual Oxygen which are active or easily change into active species. Production of active Oxygen species causes to create stress that hampers the balance of antioxidant in body and have destroyer effect on cells. Although athletic activity increases the possibility of harmful free radicals creation with increase of pressure, on the other hand, it decreases free radicals with infusion of Oxidative Enzyme (1). In recent years, this kind of oxidative stress has been dedicated noticeable attention and more than 300 researches have been published in this topic (16).

The first research was published by Dillard and his colleagues (1978) and they reported that after 60 minute exercise of bicycling, peroxide lipid will increase (12). According to these objectives, it is clear that hard exercise and enough time increase the formation of active Oxygen species that potentially is a factor for unbalanced creation between oxidative and anti oxidative system levels (16). Amount of oxidative and also the period for increase of oxidative

biomarker stresses are diverse in studies and possibly it depends on the kind of intensity, volume and period of activity, athletic activity instruction, the state of nutrition, tissue under the test, the period of gathering samples, measures and used evaluations. However, hard exercise changeably increases oxidative stresses, this kind of athletic stimulate are necessary that innate anti oxidative defense change and adjust. It seems that production of free Oxygen species is a necessary signal for these kinds of compatibles. These compatibles safe keep the cells against later increase of ROS (16). Body activity is inseparable part of human life that its extensive range is from everyday usual activities to hard athletic activities. The increase of metabolism and production of free radicals are examples of clear biologic changes created during this body activity (3). One of the indirect ways for measuring the oxidative stress is using oxidation of Protein and Carbonyl protein (15). Related responses to proteins can create basic changes so that causes the lack of structural and catalic function (17). Different searches showed that in response to body activity, CP will change (11, 6, and 3). Several studies showed no changes in protein (9, 8). As a whole, studies on the effect of different activities provide this understanding, activities like workout on stationary bicycle, running on Treadmill (10),dynamic resistance training (19,21), eccentric exercise (21,13), sprint running (19,22,24).

Method:

In this research a group of 20 female badminton players in Fars province in 2010, after filling out testimonial and questionnaire by them and their parents were chosen. Then they were randomly grouped in two groups of control and cardio vascular diseases, hypertensions, diabetes, joint and muscle - skeletal disease; there were 10 girls in each group.

The points that researcher paid attention to were the

following:

1. Going to bed and sleeping until 11 o'clock as maximum.
2. Eating standard breakfast on the test day, containing two slices of bread as large as a palm, cheese as much as match box, 20 grams butter, 20 grams jam and a glass of tea.
3. Not having any activity three days before and 24 hours after blood sampling.

A selected activity was using Wingate bicycle - warming for 5 minutes, stretching and flexibility activity for 5 minutes and using bicycle for 15 minutes. (for using Wingate bicycle the whole weigh of any person multiplied to 0.072 until the certain pressure could be obtained.) Blood sampling was done in three periods (before the test, immediately after the test and 24 hours after the test) and at 8 o'clock A.M. On the test day, in order to be sure from equality of the level of water in body, half an hour before blood sampling 250 millimeter water was delivered to the participants that drink it gently. All participants with observing these recommended points got ready for this research. On the test day, after 10 minutes calm rest, both control and experience groups were taken blood. After the warming program that consisted in warming for 5 minutes, flexibility and stretching activities for 5 minutes and using bicycle for 15 minutes, the experience group performed Wingate test and immediately after the test, another blood sample was just taken from experience group. At the same time with performing the Wingate test, heart beats of participants were measured by stethoscope Polar F5. The samples were transmitted to laboratory in Shiraz (Medicine Sciences College of Shiraz) for establishing the amount of Carbonyl protein. The day after the test, another blood samples from both control and experience groups were taken. For studying the inner group changes repeated measure ANOVA was used. A significant

level was noticed for all analysis (P<0.05).

Results:

Mean and standard deviation for the certain age were 21.7± 2.1 and weigh was 52.7± 3.6. The results showed that there was a significant difference in the level of Carbonyl protein in pretest and post test 1 in experience group (p=0.010) and post tests 1 and 2 (p=0.013). However there isn't any significant difference in the processes of pre test and post test 2 (p>0.05) and there isn't any significant difference in three phases of the test in control group (fig. 1)

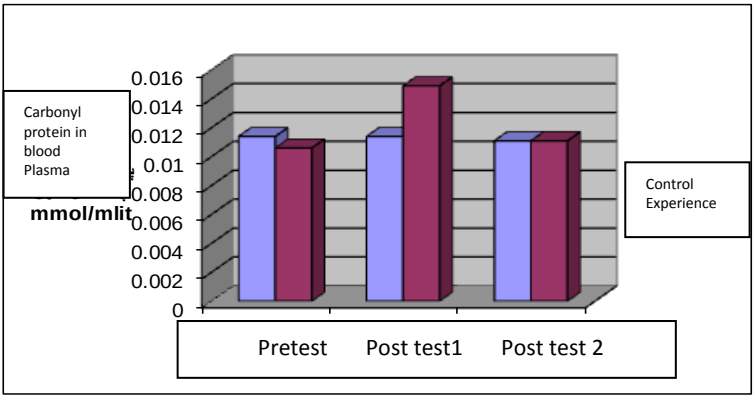

Figure 1 - Diagram of carbonyl protein changes in the blood plasma (mmol / milt) in both experimental and control groups

post-test 2	post-test 1	pre-test	Group	Variable
/0111±0/0183 0	/0149±0/0420 0	/0106±0/0124 0	Experimental	Plasma protein carbonyl levels (mmol ml)
/0111±0/0146 0	--------	/0114±0/0199 0	Control	

Table 1 - Mean and standard deviation of repeated measurements of subjects' protein carbonyl blood plasma

Discussions:

According to the findings of this research, one session caused a significant increase in the level of Carbonyl protein in blood Plasma of active women. The results of the present research about the effect of athletic activities on Carbonyl protein are in accordance with Bloomer and his colleagues (2007) and Schiz and colleagues (1997), Lovlin and his colleagues (1987).

It can be concluded from the present research that performing one-session Wingate bicycling causes the increase of Carbonyl protein of Plasma in active women. On the other hand, Bloomer and his colleagues (2006) and Baker and his colleagues (2004) studied the effect of activity on athletics in a research and there weren't seen any changes in carbonyl protein in plasma (8, 9). In the present research, a significant increase was found in the level of carbonyl protein in blood plasma in active women. From the survey of this study, it can be said that an activity session depending on its intensity and period can be caused by the vigorous differences of oxidative damage. But regular exercises cause a kind of adjustment in anti oxidative systems and relief that this issue causes the increase of resistance toward the oxidative stress. As a result, it seems that vigorous, period and kind of exercise have different effects on creating oxidative damages and also activity of anti oxidation system (4). One of the results of vigorous and long physical exercises is cell damage (20). It results in creating active oxygen more than usual that has a deep effect on lots of skeleton-muscles processes. These effects include the transmission of action potentials, and stimulate contraction synapses, accumulation of mitochondrial proteins and receptors (23, 14, and 5). From the findings of the present research, it can be said that regarding the importance of balance between oxidative and anti oxidative in body, although athletic activities increase the oxidative pressure, there is a possibility of creating harmful free radicals, on the other hand decreasing free

radicals with creating anti oxidative enzyme.

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