



EFFECTS OF ACUTE EXERCISE ON SOME BIOCHEMICAL PARAMETERS OF WOMENⁱ

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Abstract:

In the study, it was aimed to investigate the changes in some biochemical parameters (urea, AST, ALT, glucose, creatinine and TSH) of women with acute exercise. 50 women aged 19-48 years participated in the study as volunteers. Urea, AST, ALT, glucose, creatinine and TSH levels were analyzed in blood samples taken before exercise and at the end of an acute exercise session. SPSS package program and Paired Samples t test were used for the comparison of pre and post test results of the obtained data. When the results were evaluated, while there was a statistically significant difference between the pre-test and post-test values of the study group in urea, AST and ALT levels ($p < 0,05$), it was determined that Glucose, creatinine and TSH levels were not significantly different ($p > 0,05$). In conclusion, it can be said that acute swimming exercises applied to women are causing a significant change in liver enzymes (AST, ALT) and urea levels and these changes may be considered beneficial for the health status of the individual.

Keywords: acute exercise, health, liver enzymes, urea

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1. Introduction

Sport has become a major social event today. It continues to develop as an important sector with plans made in accordance with scientific principles. However, it can be considered as a way to acquire the habit of exercising regularly, which is important for health. (Kiyici 2006) Physical activity is an important function of living systems. Exercise affects many systems as well as biochemical parameters (Öztürk 2009). The effect of exercise on biochemical parameters has become an ongoing research area. It is also known that there are changes in biochemical levels depending on the type, severity and duration of the exercise (Çakmakçı 2008). Regular exercises can be defined as long periods of repetitive exercise, while acute exercises can be defined as one-time exercises. Regular exercises in the middle level have opposite effects to acute exercises in the higher intensity. A term taken from toxicology, "hormesis" means that a substance is beneficial when it is in a low dose, or harmful when in high doses or concentrations and this term is also used to describe the effect of exercise. (Belviranlı 2009)

Urea is the most abundant waste product that should be thrown out by the kidneys. Urea and uric acid concentrations are related to max VO₂, percentage of body fat and anaerobic power, urea and uric acid levels will limit performance as a criterion to determine fatigue (Öztürk 2009).

AST and ALT are enzymes that function in the liver parenchyma cells and only in blood cells. These enzymes, which mean liver function tests, can be used to treat liver diseases; some substances (medications) are toxic in the liver, resulting in extreme muscular difficulties resulting in deliberate degenerative changes in blood concentration (Öztürk 2009).

TSH is an important pituitary hormone that regulates thyroid gland functions, and TSH levels are a reliable index of biological activity of thyroid hormone (Pancar et al 2017, Cinar et al 2017).

In the light of this information in the literature, we aimed to investigate changes in some biochemical parameters (urea, AST, ALT, glucose, creatinine and TSH) of women with acute exercise.

2. Materials and methods

2.1 Participants and Exercise

Fifty sedentary women with an average age of 33.6 and no health problems participated in the study voluntarily. In this study, pre-test, post-test model was applied. A 60-minute acute exercise program was applied to the study group, including a 10-minute

warm-up, 40-minute back swimming, and 10-minute cooling exercises. Venous blood samples were taken twice before and after swimming exercise program.

2.2 Evaluation of Blood Samples

Plasma samples were separated by centrifugation at 3000 rpm at 10 minutes. The desired parameters were measured in the laboratory from the plasmas. The analysis of Urea, AST, ALT, glucose, creatinine and TSH were done through the Enzymatic Colometric method by using the BT3000 biochemistry auto analyzer.

2.3 Statistical Analysis

In the analysis of the obtained data, SPSS 22.0 package program was used. The Paired samples t test was used to determine the differences between the pre-test and post-test values of the study group.

3. Results

Table 1: Pre-Post Test Results of Participant's Biochemical Parameters

| Biochemical Parameters | Pre Test | | Post Test | | <i>p</i> |
|------------------------|----------|-------------|-----------|-------------|----------|
| | <i>X</i> | <i>S.d.</i> | <i>X</i> | <i>S.d.</i> | |
| Urea (mg/dl) | 20,98 | 7,58 | 23,16 | 7,15 | 0,002* |
| AST (u/l) | 17,28 | 8,18 | 19,74 | 4,18 | 0,014* |
| ALT (u/l) | 17,46 | 11,19 | 19,68 | 9,05 | 0,008* |
| Glucose (mg/dl) | 101,06 | 19,82 | 101,08 | 29,31 | 0,99 |
| Creatinine (mg/dl) | 0,69 | 0,12 | 0,67 | 0,08 | 0,09 |
| TSH (mU/L) | 1,93 | 0,93 | 1,73 | 0,66 | 0,08 |

* There is a significant difference between pre-test and post-test.

In the table, when pre- and post-test levels of urea, AST, ALT, Glucose, Creatinine and TSH parameters are examined It was determined that the level of urea was $20,98 \pm 7,58$ before exercise and $23,16 \pm 7,15$ after exercise and these averages were statistically significant ($p < 0,05$). AST level was $17,28 \pm 8,18$ before exercise and $19,74 \pm 4,18$ after exercise and these averages were statistically significant ($p < 0,05$). ALT level was $17,46 \pm 11,19$ before exercise and $19,68 \pm 9,05$ after exercise and these averages were statistically significant ($p < 0,05$). The glucose level was 101.06 ± 19.82 before exercise, 101.08 ± 29.31 after exercise, creatinine level was 0.69 ± 0.12 before exercise, 0.67 ± 0.08 after exercise, TSH levels were $1,93 \pm 0,93$ before exercise and $1,73 \pm 0,66$ after exercise and these averages were not statistically significant ($p > 0,05$).

4. Discussion and Conclusion

ALT and AST enzyme activities are routine biochemical markers used to assess liver damage. (Prat 2000) The effects of acute or long-term different types of exercise on biochemical parameters have been investigated by many researchers (Tran 1985). When a total of participated 50 volunteer women's biochemical changes after acute swimming exercise were examined, there was a statistically significant increase in Urea, AST and ALT levels. It is known that the intensity and duration of exercise increases the ALT and AST levels in general (Rosmarin et al 1993). It can be said that; the significant increase in these parameters is due to the fact that intensive training may cause an increase in blood urea levels by affecting protein metabolism, the increase in oxygen uptake and metabolic rate during training can also be effective.

Koçyiğit et al. (2011) reported that in a study of acute exercise in football and basketballs and the effects of vitamin C on liver enzymes and plasma lipid levels, although there was no statistically significant difference in urea levels in the group without vitamin C supplementation, AST and ALT levels were statistically significant after acute exercise. Mendoça et al. (2008) reported that there were statistically significant differences in the levels of AST and ALT in their study on triathlon athletes. Kaynar (2014) reported that the wrestlers who formed the sample group had an increase in AST and ALT values. Mena et al. (1996) reported that in their study the professional racing cyclists who formed the sample group had increased levels of AST and ALT after the race. The results of these studies in the literature are similar to our study. On the athletes, glucose values increased with exercise but decreased to normal levels with resting (Cinar et al 2008, Temur et al 2017).

When a total of participated 50 volunteer women's biochemical changes after acute swimming exercise were examined, glucose, creatinine and TSH levels were not statistically significant. Polat et al. (2017) also reported that in their study with zinc and Q10 supplementation with exercise there were significant differences in TSH levels. Ciloğlu et al. (2005) reported that there was an increase in TSH levels due to the increase in the severity of training.

As a conclusion, it can be said that research findings suggest that acute exercise causes changes in liver enzymes and urea levels and this change may have positive results for human. In addition, biochemical changes that may occur with long-term regular exercise can be said to be useful indicators for human health.

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