Research Article

The Effect of acute exercise on changes Liver enzymes (ALT·ALP·AST) in Non-athletes middle-aged women with hypertension

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ABSTRACT
Purpose of this study was to investigate The Effect of acute exercise on changes Liver enzymes (ALT·ALP·AST) in Non-athletes middle-aged women with hypertension. The study population included non-athletic women ages 45 to 55 years old with high blood pressure and high cholesterol in two groups of 8 people who were in the aerobic exercise group and control group, respectively. Participant’s non-random sampling were selected purposefully and voluntarily consent form after filling participated in the research. In order to investigate the effect of acute exercise on changes of enzymes AST, ALT, ALP, sampling in three stages (before and six hours after the exercise activities immediately after the exercise) were each 5 cc of blood in the vein of anti-cubital arm and was kept in tubes containing EDTA anticoagulant and samples sent to the laboratory immediately. Using the Shapiro-Wilk test, normal distribution data were analyzed in two groups in pretest. In order to analyze the results of descriptive statistics for within group comparison analysis of variance with repeated measures at different times of the Bonferroni correction was used. To compare two groups using independent t-test. All statistical calculations were performed using SPSS version 21 software. The results showed that the changes AST, ALT, ALP, between control and experimental groups different sampling procedures after an aerobic exercise there is no significant difference (P≤ 0/795), (P≤ 0/483), (P≤ 0/656). According to the results of this study can be tailored and women to do aerobic activity with respect pushed under the relevant experts.

Key Words: Acute exercise, Liver enzymes, middle-aged women, hypertension

INTRODUCTION:
Many nations have considered the phenomenon of the 21st century, the rapid growth of the elderly population. More than half (59%) of the elderly population is currently living in developing countries is estimated that by 2030 the rate to reach 71% (1). Along with increasing age, the ability to decrease activity in daily life (2). Decreased activity, increased food intake and decreased mobility corresponding fat reserves increase with increasing age, the body fat percentage, lean body mass decreases, while at the same time. This is largely a result of aging is related to reduced physical activity (3). Including the problems of aging, various diseases that cause morbidity and mortality are. Among these diseases, cardiovascular diseases, especially coronary problems are important. The most important cause of coronary artery disease
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atherosclerosis. Pathologic changes of atherosclerosis begins during childhood and later in life stages occur (4). In fact, pathogenic changes with increasing age atherosclerosis progresses and eventually leads to disability and mortality in old age (5). In patients with coronary artery disease and hypertension in patients border, the effects of exercise on blood pressure may be more effective (6). Exercise is a valid non-drug methods for non-patients, heart disease and high blood pressure patients for the treatment, recovery and prevention of cardiovascular disease (9 -7). Regular aerobic exercise in middle age can increase maximal oxygen uptake, cardiac output, capillary diffusion, surface area and activity of the enzyme citrate synthase muscle fibers (10). Although the benefits of exercise are well known, but increased the risk of death for people with pathological context is seen in a place exercise (11). Skeletal muscle damage in healthy individuals after high intensity exercise are well established and could be the consequences of free radicals produced after exercise. When the muscle damage, enzymes such as aspartate aminotransferase, alanine aminotransferase, lactate dehydrogenase, with all the muscle fibers in the blood increases (12). AST and ALT are also abundant in the liver, AST in other tissues such as the heart, kidney, skeletal muscle and red blood cells there is plenty ALT concentration is low in skeletal muscle (13). In fact, increased ALT and AST levels indicate muscle and liver enzymes entry into the circulation (13-16). So, the concentrations of these enzymes can cause muscle injury. Alkaline phosphate, an enzyme that metabolites such as lipids and amino acids for aerobic energy production in the cell membrane pass. Increased alkaline phosphatase after exercise may indicate increased activity of hepatic gluconeogenesis, lipid peroxidation and possibly increased bone turnover caused by the intensity and duration of physical activity (17). Studies on the effect of exercise on liver function are limited areas. More muscle damage in extreme sports activities such as football and periodic reviews. Under normal circumstances AST and ALT are abundant in cells such as liver cells. But when the liver is injured, these enzymes are released into the bloodstream. These two enzymes are most sensitive and most functional liver enzymes AST and ALT naturally in a variety of tissues including liver, heart, muscle and brain. These enzymes in injury time in each of these tissues into the bloodstream. For example, concentrations of serum and muscle damage in heart attacks increases. Plasma liver enzyme activity, influenced by the duration, intensity, type and mode of exercise training changes (19). Since studies Effect of acute exercise session liver enzymes few studies have been done or not done, the aim of this study the effects of exercise and sports acute liver enzymes in this study.

Research methodology

The study population included non-athletic women ages 45 to 55 years old with high blood pressure and high cholesterol in two groups of 8 people who were in the aerobic exercise group and control group, respectively. Participants non-random sampling were selected purposefully and voluntarily consent form after filling participated in the research. Sample of public health, cardiovascular disease, and use of medications such as aspirin, heart stimulant medications, kidney disease, orthopedic complications, organ failure and motor abilities were evaluated. Then the test subjects were primarily based on medical records of sport to ensure the ability to perform aerobic exercise protocol were tested. Participants also based on weight, percent of body fat and total cholesterol were similar in all groups. In order to investigate the effect of acute exercise on changes of enzymes AST, ALT, ALP, sampling in three stages (before and six hours after the exercise activities immediately after the exercise) were each 5 cc of blood in the vein of anti-cubital arm and was kept in tubes containing EDTA anticoagulant and samples sent to the laboratory immediately.
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Using the Shapiro-Wilk test, normal distribution data were analyzed in two groups in pretest. In order to analyze the results of descriptive statistics for within group comparison analysis of variance with repeated measures at different times of the Bonferroni correction was used. To compare two groups using independent t-test. All statistical calculations were performed using SPSS version 21 software.

**Findings**

In this section, the individual parameters are listed according to their classification (Table 1) and the findings of both groups for separate charts is presented. The results showed that the changes aspartate aminotransferase (AST) between control and experimental groups different sampling procedures after an aerobic exercise there is no significant difference (P ≤ 0.795). It was also found changes in alanine aminotransferase (ALT) between the two groups during sampling after practice there is no significant difference (P ≤ 0.483). It was shown that the changes in alkaline phosphatase (ALP), in various stages of sampling, following an aerobic exercise between the experimental and control groups there was no significant difference (P ≤ 0.656).

**Table 1. Descriptive data subjects**

<table>
<thead>
<tr>
<th>Index</th>
<th>Group</th>
<th>N</th>
<th>Mean± SD</th>
<th>Mean± SD</th>
<th>Mean± SD</th>
<th>Mean± SD</th>
<th>Mean± SD</th>
</tr>
</thead>
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<tr>
<td>(BMI)</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>9</td>
<td>25.71 ±1.99</td>
<td>70.62 ±3.29</td>
<td>166±4.20</td>
<td>49.22 ±2.90</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>24.50 ±1.34</td>
<td>67.57 ± 4.07</td>
<td>167.50 ±6.49</td>
<td>48.88 ±2.57</td>
<td>9</td>
</tr>
</tbody>
</table>

In Figures 1, 2 and 3, levels of liver enzymes AST, ALT and ALP measured at different stages of the exercise, immediately after exercise and 6 hours after the activity has been shown. Analysis of variance with repeated measures related to the activity of enzymes AST, ALT and ALP shows that principle effect the measure is not significant.

**Figure 1.** AST levels before, immediately and 6 hours after the exercise
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DISCUSSION

One of the measured amount of muscle damage and cellular, to determine the amount of intracellular enzymes into extracellular space is the case, confirmation of damage to cell membranes causing soreness after the exit of intracellular enzymes in particular. Local damage to small areas of hair, immediately after vigorous physical activity is visible. The harm that comes with muscle soreness is, in 24 to 72 hours after eccentric exercise, tear setae, fluid plates Z, tear Sarcolemma, flat bar A and I move organelles intracellular, increasing the density of mitochondria and the amount of protein scaffolds and cell setae can clearly be seen with a special biopsy methods (20). Cytosolic proteins in muscle fiber damage by increasing the blood circulation after the workout. These proteins are enzymes such as CK (CK) Lacate dehydrogenase (LDH) and are Aspartate. All these proteins are normally unable to cross the plasma membrane, so the presence of this protein and amino acids represents a significant change in blood circulation in the muscle fibril structure and sensitive membrane (21). Therefore, trauma or injury is significantly increased muscle proteins.
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and muscle and collagen production analysis of other substances in the blood or urine. A number of interfaces also affect the process of cell damage and repair. These interfaces include: calcium, lysosomes, muscle fibril proteins - the cell scaffold and free radicals linked to nitrogen and oxygen (Wilmore Castile, 1378) (22). The results showed that exercise on levels of liver enzymes AST, ALT and ALP had no significant effect. Matsou and et al with the results based on no increase in liver enzymes after exercise is consistent. While Fallon and colleagues observed a significant increase in the level of liver enzymes. It seems kind of training, recovery time and intensity on the release of these enzymes is effective. Margaritis and et al (1999) on the three heroes were investigating, with the pre-exercise muscle damage index calculated enzymes changes until four days later, no significant changes were observed in these two enzymes. The results showed that the levels of the enzymes LDH and CPK on the first day, there are significant differences between training and control groups (p=0.005; p=0.015).

Many researchers found that after exercise, muscle contractions cause damage to muscle fibers, connective tissue and cell membranes, causing the increase in LDH and CPK levels up (23). In some previous studies of serum AST activity index and other body fluids (cerebrospinal fluid, and joint fluid), to evaluate the feasibility destruction of tissue (for example myocardial infarction and hepatitis) has been used (24). The increase of CPK and LDH as an indicator to assess the damage muscle cells are used after exercise (25, 26).

On the other hand, studies have shown, intense and prolonged exercise without proper recovery time caused damage to muscle fibers during contraction, skeletal muscles and connective tissues are internal division. And with an inflammatory response, infiltration of macrophages, enzymes and cell cytosome muscle fibers, CK and LDH and AST release is accompanied, CK and LDH and AST mobile release will be followed by pain, stiffness and spasm of the muscle fibers appear and biochemical changes (27-29).

The risk of muscle damage may be caused by the sarcomere is irreversible stretch (30). According to keeping pace with the increase in trained group is justified. In addition, there is the hypothesis that the presence of estrogen (due to sexual maturity) may contribute to the protection of muscle tissue membranes (31). However, increased AST and CK, especially during exercise and recovery stages, reflecting the leakage of protein through the membrane and possibly other substances muscle. In addition, factors such as age, sex, fitness, seasons and exercise is associated with increased volatility of these enzymes (32).

Other potential method of measuring the indicators mentioned. The paradox of the studies conducted in recent years a definitive statement about the development of cell injury casts doubt it. Because in many studies with nature the same activities have reported contradictory results. For example, after the Iron Man Triathlon (34,33), race 10 km (35), racing in the Alps (36), have reported an increased, but other research activities with the nature of match-three children (37), and professional cycling road (38), mountain Marathon (39) and treadmill endurance activities (40), reported a significant increase in the values of this index. According to the results of this study can be tailored and women to do aerobic activity with respect pushed under the relevant experts.

REFERENCES
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