The Effect of One Bout High Intensity Interval Training On Liver Enzymes Level in Elite Soccer Players

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Abstract
The purpose this study was to evaluate the responses of liver enzymes (SGPT, SGOT, ALK.PHO) to One Bout High Intensity Interval Training in Elite Soccer Players Therefore, twenty deaf soccer player men with no history of cardio respiratory disease, nonsmokers and don’t receive any medication were selected as participants. Height, weight and BMI one week before the study began were measured in participants. Participants were randomly divided into two groups: Intervention and control. A resting blood sample was taken before and immediately following the one bout high intensity exercise training. Data were analyzed using by t-test. The level of significance was ≤ 0.05. The results showed that the significant increase in plasma concentration of SGOT (P=0.006), ALK.PHO(0.001) whereas there wasn’t any significant increase in SGPT serum concentration (P=0.262). In conclusion, this study suggests that one bout high intensity interval training can the SGOT, ALK.PHO and can’t changes SGPT in elite soccer players increased.

KEYWORDS: SGPT=ALT, SGOT=AST, ALK.PHO; HIT; Soccer Players

1. Introduction
Liver Enzymes
The liver is the main organ for conversion of one chemical species to another and this interconversion is the main route for preparing drugs for excretion from the body. The metabolism of drugs can lead to the formation of chemically reactive intermediates that may play a significant role in the induction of hepatic injury. It is important that potentially hepatotoxic effects of new drugs are recognized early during drug development. Therefore, in Phase I clinical trials, monitoring of liver function parameters is mandatory. The occurrence of asymptomatic elevations in liver function tests is a problem during all phases of drug development. An asymptomatic elevation of, for example, liver transaminases during
clinical trials could be drug related, but other factors, such as exercise and diet, may also have had this effect. It has long been known that physical exercise results in transient elevations of liver function tests. Subjects studied in Phase I clinical trials are often young healthy volunteers who in their normal life perform some kind of recreational exercise, and during outpatient trials the volunteers usually continue with their normal life, including exercise. We have observed that healthy subjects performing intensive weightlifting during clinical trials may exhibit altered liver function tests [elevations of aspartate aminotransferase (AST) and alanine aminotransferase (ALT)], but the influence of weightlifting on clinical chemistry parameters is poorly described. There is no consensus on what forms of exercise can cause changes in clinical chemistry parameters, which parameters may be affected, or to what extent (1,2). Several studies have described enzyme elevations in response to running, whereas only a few have dealt with the effects of weightlifting. The effects of muscular exercise on clinical chemistry parameters may also vary depending on gender and on the fitness level of the individual. However, no study to our knowledge has examined the possible effect of weightlifting on clinical chemistry parameters, commonly used to evaluate liver function, and the duration of such an effect. The first step in detecting liver damage is a simple blood test that indicates the presence of liver enzymes. Under normal circumstances, these enzymes within the cells of the liver, but when the liver is injured, these enzymes are released into the circulation (15,8).

The most sensitive and widely used liver enzymes are the aminotransferases. The enzymes are aspartate aminotransferase AST or SGOT and alanine aminotransferase ALT or SGPT. The liver enzymes are generally in the liver cells and when the liver is damaged the liver cells transfer these enzymes into the blood; the increase of the enzymes levels in the blood is a sign of liver damage. The aminotransferases result in catalyzing chemical reactions in cells in which the amino group is transferred from a donor molecule to a recipient molecule. That is why it is called aminotransferase. Medical terms can sometimes be confusing, especially with these enzymes. Another name for aminotransferase is transaminase. The enzyme aspartate aminotransferase (AST) also called serum transaminases Amynaz agzalvastyk (SGOT) and alanine aminotransferase (ALT) is also known as serum glutamic pyruvic transaminase (SGPT).

Putting it in short words SGOT = AST and SGPT = ALT (3,4,20). (SGOT) AST is naturally in a variety of tissues including liver, heart, muscle, kidney and brain. Each of these enzymes in the time of damage to each of these tissues enters into the blood. For example, the serum’s density increases during muscle problems and heart attacks. Despite of AST the bulk of ALT (SGPT) is naturally found in the liver. Even though it cannot be that this enzyme are exclusively located in the liver but the liver is where most deviation of this enzyme is located. As a result of liver damage these enzymes enter the bloodstream, so relatively these enzymes are specific indicator of liver status. Normal levels of (SGOT) AST are 5 to 40 units per liter of serum (the liquid part of blood) and normal amount of ALT (SGPT) is 7 to 65 units per liter of serum.

AST (SGOT) and ALT (SGPT) are sensitive indicators of different types of liver disease, but above-normal levels of these liver enzymes should not be automatically equated with liver damage. They may or may not be signs of liver problems. AST and ALT levels depends on the interpretation of all clinical signs. So the best thing is that these cases should be evaluated by a doctor. Precise levels of these enzymes are not exactly related to the liver injury. Thus, the exact levels of AST (SGOT) and ALT (SGPT) cannot determine the degree of liver disease or predict the future. For example, patients with acute viral hepatitis A may develop very high AST and ALT levels (sometimes thousands of units per liter), but most patients with viral hepatitis A recover fully without residual disease. Unlike hepatitis A virus, patients with
chronic hepatitis C infection normally have only a minor increase in the level of ALT and AST. It is very important for the testing of AST (SGOT) and ALT (SGPT) to be performed over time, tillit can be determined that the increase of the serum levels are stagnant or decreased(22,10,5). For example, patients with chronic hepatitis C for enzyme should be tested and monitored periodically. Any response to the treatment will decrease the liver enzyme to the level of natural or near natural level. Inflected patients that after the end of their program their disease reoccurs again usually show the abnormal liver enzymes(12,9,16).

Other liver enzymes
Despite of AST and ALT enzyme, other enzymes including alkaline phosphatase, 5¢-nucleotidase and gamma trans-peptidases (GGT), which are often used to evaluated for liver disease. A lot of attention has been limited to AST and ALT enzymes, because theses liver enzymes in the collagen to each other and are very important. These two enzymes are located in the main categories of liver enzymes.

<table>
<thead>
<tr>
<th>Explanation</th>
<th>Normal</th>
<th>Test</th>
</tr>
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<tbody>
<tr>
<td>In liver diseases, kidney diseases, pancreatitis, its alcohol levels rises. Also, its rate increase in many inflammatory diseases.</td>
<td>&lt;35 IU/Lit</td>
<td>SGPT (ALT)</td>
</tr>
<tr>
<td>In heart diseases, pancreatitis, liver diseases, muscle diseases, alcohol consumption and physical injury, its rate goes up. Also, its rate increases in many inflammatory diseases.</td>
<td>&lt;35 IU/Lit</td>
<td>SGOT (AST)</td>
</tr>
<tr>
<td>It rises in Bone growth, malignancies, healing fractures, Paget's diseases, liver diseases, heart failure, pregnancy, parathyroid glands, and many other diseases.</td>
<td>30-130 IU/Lit</td>
<td>AL.PHO Alkaline phosphatase</td>
</tr>
</tbody>
</table>

Alkaline Phosphatase
Alkaline Phosphates are applied to those groups of Phosphates which are active in pH alkalin(9-10.5). It is found in different tissues in which each tissue has its own special ISO Enzyme. Alkaline phosphate results in Hyrvlyz phenyl phosphate and converts it to phenol Vyvn phosphate. In a two way reaction PNP is converted to PNK + P by ALK.PHO in pH = 10.5. (19,21)

The ISO enzymes of these enzymes are located in bone, intestine and placenta. The determination of enzyme activity in these
tissues ISO can determine the origin of the lesion. This enzyme exists in membrane, and it seems that in practice it is involved in cellular membrane conversion.

In adults, the enzymes in the serum have hepatic source. The measurement if this enzyme is very important in liver disease, biliary, and bone. This enzyme requires magnesium ions for its activity. The serum sample without the hemolysis or the Heparinized plasma should be removed at the first opportunity.

Normal amount in adults is 60 to 250 IU / L, and in people under 15 years of age is 150 to 850 IU / L.

**Physiological changes in alkaline phosphatase**

ALP activity levels in children might be tripled compared to adults which shows the high activity of osteoplasty in the bone marrow which is related to bone growth.

In the second and third trimester of pregnancy the placental alkaline phosphatase may result in increase of enzyme levels in plasma.

Dairy consumption can lead to free the alkaline phosphate ISO Enzyme from the intestinal cells that has entered the blood through this way and has been the cause of the false temporary increase of the liver enzyme activities in plasma (20,6,11).

**Pathological changes of plasma alkaline phosphatase**

1. In the CARCINOMA disease of bone, liver, the activity of plasma alkaline Phosphatase increases.
3. Liver disease, colstase: This increases of enzymes in plasma in two. On one hand it increases the documentary of liver ALP; on the other hand, it results in the blood secretary.
4. Carcinoma.
5. In phosphatase and some diseases such as liver necrosis and the amount of this enzyme is reduced in Poverty.

**Gamma-glutamyl transferase**

This enzyme is a Pytdaz and Hyrvlyzes the Pytydha to amino acids or smaller molecules. This enzyme was previously known as Trans Pytydaz but today it is known as Gamma glutamyl transferase.

**2. Materials and Methods**

The semi-experimental method has been used for this research. In the year of 1390 it was the national soccer team of deaf players whom in preparation camp to prepare for participating in the Asian Games in South Korea. Twenty four players who got to the final stage of national’s team camp with the full coordination of Iranian deaf federation staff and team instructors were selected to participate as a specimen. Of this number, with the explanation and information related to the HIIT, twenty people declared their readiness to participate in research. After taking consent, the twenty people were accidentally divided into the experimental group (n=10) and the control (n=10). A week before the execution of a meeting of alternating sports activities, they were familiarized with the test methods. A week before the execution of RAST test the Anthropometric specifications were measured, which included height, weight and the index of physical mass (Table 1).

In the morning of the test, the players were gathered in a restaurant of the national team camp at 7:30, and after having a standard breakfast including 200grams of wheat bread, 50grams of herbal butter, 50grams of jellies and tea. After one and a half hours of rest hours at 9:30am the experimental group did two phases of RAST activity which is 15 minutes warm ups with slow running and stretching movements and 4 minutes of rest in between.

Two blood samples were taken while the players were seated in the amount of 10cc from the vein on the antagonists (anti Kvybytal) before and
immediately after the practical Protocol exercise. Blood samples were immediately poured in the tubes containing diamine tetraacetic acid Atlyn anticoagulant (EDTA). Then with the speed of 1000 to 2000 rounds per minute for 10 minutes in temperature of four degrees centigrade centrifuge machine (the Opendorf machine Made in Germany) was used. SGPT, SGOT, ALK.PHO using specific ELISA kits, made in Germany by Bendermed company (respectively, with a sensitivity of 0.92 pg/ml, 0.3 pg/ml and 0.13 pg/ml) by ELISA Elisa Stat Fax 2100 machine were measured). Statistical data collected were analyzed with the help of the SPSS16 software. To determine the normality of the Test Data the KS test and to study the congruence variance Lons test was used. Considering the fact that the results of these tests showed natural result for distribution of data, the parametric examination was used. Then for indicating the difference within group, the paired t-test and for indicating the difference between groups the independent t-test was used. All statistical tests were signified with the level set at $P \leq 0.05$.

<table>
<thead>
<tr>
<th>Subjects/N</th>
<th>Age/years</th>
<th>Height/cm</th>
<th>Weight/kg</th>
<th>BMI(kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention group</strong></td>
<td>10</td>
<td>25.75 ± 3.99</td>
<td>177.25 ± 5.06</td>
<td>69.62 ± 7.74</td>
</tr>
<tr>
<td><strong>Control group</strong></td>
<td>10</td>
<td>24.62 ± 4.03</td>
<td>176.62 ± 6.69</td>
<td>70.37 ± 6.36</td>
</tr>
</tbody>
</table>

### 3. Results

In Figure 1, 2, the paired t-test results for variable research are shown. The results of this test showed that after a session of intense intermittent exercise ($P = 0.006$) SGOT and ($P = 0.0001$) ALK.PHO had meaningful increase. This is while conversional SGPT ($P = 0.262$) did not have a meaningful change Figure3.
Figure 1. Pre and Post-Test Changes of ALK.PHO(mean±SD)
Figure 2. Pre and Post-Test Changes of SGOT (mean±SD)
4. Discussion:
The aim of this present study is to show the effect of a HIIT session on the deaf men's national soccer team players on liver enzyme indicators. Referring to the table 2 it can be seen that the response of the players after a HIIT session leads to a meaningful increase in ALK.PHO and SGOT and the lack of change in SGPT. Considering the research results in the past and comparing it with the present research it seems that the increase in ALK.PHO and SGOT a session of intense intermittent exercise is to some extent like the results of researches of Legat and colleagues (2010), Rabson and colleagues (2009), Bishop and colleagues perilous (2002), Anderson and colleagues (2010) which all show the increase of ALK.PHO and SGOT after a session of intense intermittent exercise (1, 3, 8, 22). Legat and his colleagues (2010) compared the results of ALK.PHO and SGOT and the recipient isoforms after the intense intermittent exercise and moderate exercise. These researchers came to a conclusion the increase of ALK.PHO and SGOT in the HIIT activity is to some extend much more than the increase of ALK.PHO and SGOT in intermediate sport activity(8). Robson and colleagues (2009) examined the rate of change in ALK.PHO in an intense periodic activity engaged with perseverance athletes. For this purpose 8 healthy fortitude sportsmen (23±2 years of age) were chosen and from the second and third week , in addition to their regular diligence sports they were given a supplementary program including the intense intermittent activity. Observations suggest an increase in ALK.PHO and SGOT.
plasma and the creatine activity Knyaz following the intense exercise (22). The result of the recent readings in regards to the meaningful increase of ALK.PHO and SGOT with the results of the Kraft and colleagues (2009) research is not the same(9). Kraft and colleagues (2009) studied the effects of carbohydrate intake during endurance exercise on ALK.PHO, SGOT and SGPT in response to intense intermittent exercise. For this purpose, three groups of healthy fortitude men were chosen; for each group one intense intermittent running and a carbohydrate diet was determined for six weeks. After intense exercise the density of ALK.PHO and SGOT levels increased in all three groups before and after exercise; the intensity of this increase, decreased during the activity and this decrease was similar in all three groups. Also, the density of SGPT before and after exercise did not have any increase; the data showed a decrease in the amount of ALK.PHO independent of carbohydrate consumed during (9). Most likely, the conflicting result of the above studies with the recent research is due to different types of exercise protocol, subjects are likely to have use supplements such as carbohydrates. In this research, SGPT and SGOT level is less studied. In the mentioned research, the amount of SGPT and SGOT has been less examined. While in this experiment at the same time of measuring the amount of ALK.PHO, quantities of SGOT has also been evaluation and showed, the average of SGPT after a period of intense alternating sports activities does not have a meaningful difference with its average before the HIIT (Figure 2). Contrary to the findings of this study, Anderson and colleagues (2009) reported a meaningful increased in SGOT after a 90-minute football game report (1). Considering the results from this recent research it can be said that since there was a meaningful increase in ALK.PHO and SGOT and the SGPT was not changed comparing to the past studies, one session of short term intense intermittent exercise does not affect the liver cells and does not result in making and increasing the secretary of liver enzymes SGPT.

REFERENCES


