Effect of Football Practices on Certain Blood Values of Athletes

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ABSTRACT

In this study, it is aimed to determine the effect of 10 days match program of football players on RBC (Erythrocyte), WBC (Leucocyte), PLT (Trombosit), HGB (Hemoglobin) blood values. Research is performed on 18 healthy male footballer subjects. All subjects participated in match program for total of 7 days, 90 minutes on one day within the framework of a 10 days match program. Blood samples were taken from all subjects in resting position before starting to the match program and 2 hours after the end of the last match. RBC (Erythrocyte), WBC (Leucocyte), PLT (Trombosit), HGB (Hemoglobin) levels were specified in the blood samples received. At the end of the application, RBC (Erythrocyte) levels of the group was higher than the pretest values which were the 1st measurement (p<0.05). There is no statistically important difference in the WBC (Leucocyte) values of the footballers at the end of matches (p>0.05). Posttest measurements of HGB (Hemoglobin) levels were higher than the pretest measurements, and the difference in between was statistically significant (p<0.05). In a similar way, PLT (Trombosit) values obtained at the end of match program were higher than the pretest measurement values taken before beginning to the match program, and the difference in between is important (p<0.05). As a result of this study, it can be stated that match program of 10 days has caused significant alterations in complete blood values of RBC (Erythrocyte), PLT (Trombosit), and HGB (Hemoglobin) values of footballers.

Key words: Football, Blood, Training, Hematoloji, Erythrocyte.

Introduction

Physical activity is an important function of living systems. It influences a large number of systems, and also hematologic and biochemical parameters. Besides many other effective factors, hematologic and biochemical levels play an important role on the management of physiological reaction such as accommodation to exercises, adaptation of cardiovascular activities and physical and physiological balance [1,2].

Changes may be observed in the hematologic and biochemical parameters depending on the type, intensity and duration of the exercises. Differences can be observed in the hematologic and biochemical values during and after intense exercise because of variables such as practice status of the individual, gender, age, environmental conditions and nutrition. Hematologic changes are noted in the athletes depending on the long-term exercises [3,4].

Characteristically, there is a decrease in the HB and HCT values of athletes for whom intense exercise program is applied, and this situation is considered as sporter anemia [5,6]. Blood functions as a carrier instrument for the distribution of hormones and transport of oxygen (O2) to the tissues, and enables exchange of messages between the distant organs in order for ordinary cells to continue their functions, and for body defense. Besides, blood has a role in the regulation of body heat, achievement of acid-base balance and regulation of osmotic balance [7].

Plasma is the yellowish, transparent, slightly viscous fluid part floating on the top of the centrifuge tube, precipitated part at the bottom involves shaped elements of blood. Erythrocytes are red blood cells that bind O2 to hemoglobin (Hb) they contain. Erythrocyte ratio in a unit of blood gives us the hematocrit (Hct) value. Normal Hct value is 40-50% for men and 35-45% for women. White, yellowish cover on the erythrocytes are constituted by leucocytes inside the centrifuge tube. Leucocytes form a thin invisible layer at the in the uppermost section [7].

It is reported that acute submaximal exercises significantly increase erythrocyte, hematocrit,
hemoglobin, leucocyte and trombosit numbers in comparison to the values before exercising, and that these increases are related with the plasma loss caused by exercising, and it is asserted that short term exercises performed until getting tired increase the leucocyte numbers, and that this event may not be explained only by hemo-concentration mechanism, and that metabolic changes observed during exercise may be related with the hematologic changes. Erythrocyte production is accelerated by stimulating release of erythropoietin in order to compensate the situations where affinity of hemoglobin to oxygen has increased. For this reason, polycythemia (increase in the number of erythrocyte) is observed [8,9]. In a study performed by Akar et al. [10], it is revealed that acute submaximal exercise has increased numbers of erythrocyte, hematocrit (Hct), hemoglobin (Hb), leucocyte and trombosit in comparison to the values before exercises, and it is concluded that these increases are connected with the plasma loss resulting from exercises. It is asserted that short term exercises performed until getting tired increase the leucocytic parameters, and that this event may not be explained only by hemo-concentration mechanism, and metabolic changes observed during exercise may be related with the hematologic changes [11].

Material and Method

Subjects:

18 healthy male athletes whose ages are between 18 and 24 have participated in this study voluntarily. Medical evaluation of all subjects is made and it is determined whether or not there is any adverse state that shall prevent their participation. Research is performed by means of pretest and posttest model.

All subjects have participated in match program for total of 7 days, 90 minutes on one day within the framework of a 10 days match program. Blood samples were taken from all subjects in resting position before starting to the match program and 2 hours after the end of the last match. Glucose and insulin levels are determined in the blood samples received.

Determination of Hematologic Parameters (Erythrocyte and its Indexes, Hemoglobin, Hematocrit, Leucocyte and its Indexes, Trombosit and its Indexes):

Blood samples of 2 millimeters taken from subjects to tubes with EDTA were processed by utilizing CELL –DYN-3500 R trade mark automatic blood count device.

Statistics:

Statistics were prepared by means of SPSS package program. Independent t-test was applied to analyze the data. P<0.05 value is considered as statistically significant.

Findings:

The effect of match program of 10 days is determined on the RBC (Erythrocyte), WBC (Leucocyte), PLT (Trombosit), HGB (Hemoglobin) blood values of athletes.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>1st Measurement</th>
<th>2nd Measurement</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC (Leucocyte) (K/ul)</td>
<td>6.22±0.77a</td>
<td>6.24±0.82a</td>
<td>0.0572</td>
</tr>
<tr>
<td>RBC (Erythrocyte) (106/ul)</td>
<td>5.22±0.81a</td>
<td>5.47±0.71b</td>
<td>0.0412</td>
</tr>
<tr>
<td>PLT (10e3/ul) (Trombosit)</td>
<td>242.21±27.98a</td>
<td>268.62±27.07b</td>
<td>0.000</td>
</tr>
<tr>
<td>HGB (g/dl) (Hemoglobin)</td>
<td>6.30±0.84a</td>
<td>6.25±0.85a</td>
<td>0.0722</td>
</tr>
</tbody>
</table>

a,b; Differences in the Measurements Having Different Letters in the Same Column are Important (p<0.05).

RBC (Erythrocyte) levels increased in comparison to the pretest values which are the 1st measurements (p<0.05). There is no statistically significant difference in the WBC (Leucocyte) values (P>0.05). The difference between the measurements of PLT (Trombosit) values is also important (P<0.05). Change between the measurements of HGB (Hemoglobin) levels is statistically meaningful (p<0.05).

Results and Discussion

There is no statistically significant difference between the WBC (Leucocyte) values of footballers at the end of the match program (p>0.05). In a study performed by Akar et al. [10], it is reported that acute submaximal exercises significantly increase the numbers of erythrocyte, hematocrit (Hct), hemoglobin (Hb), leucocyte and trombosit in comparison to the values before exercising. In another study, it is stated that acute swimming and running exercises did not cause a significant change in the hematologic parameters of rats [12]. Different results are obtained in researches in which WBC (Leucocyte) levels of groups that are performing exercises and practices are examined. It is expressed that these changes are correlated with intensity of the exercises [3,4].

RBC (Erythrocyte) levels of the experimental group have increased at the end of the application in
comparison to the pretest values that are the 1st measurements (p<0.05). It is reported that erythrocytary and leucocytic parameters of female children doing volleyball and athletics sports are higher than the children who are not doing any sports [2]. Similarly, the difference between the measurements of PLT (Trombosit) values at the end of the match program is significant (p<0.05). In a study performed on the subject with taekwondo athletes, it is reported that PLT (Trombosit) levels of experimental group have increased at the end of the match program in comparison to their pretest measurements [13]. Henry et al. [14] and Navas and Cordova [15] have also found difference in the PLT (Trombosit) levels in comparison to the values before practice. Posttest measurements of HGB (Hemoglobin) were higher than the pretest measurements at the end of the application, and the difference in between was statistically significant (p<0.05). Similarly, Gallagher et al. [16] have found statistically significant (p<0.05) increases in the HGB levels of normal group and group with supplementary diet as a result of the aerobic exercises applied to adults between ages 18 and 29 for 8 weeks. It is indicated that acute swimming exercises have increased erythrocyte, hib and hct values 17% in rats [17]. Dissimilarly, it is reported that swimming exercise has increased lipid peroxidation, in other words caused cellular injury in rats [18]. Besides the important effects of exercise on carbohydrate, protein and lipid metabolisms, it may be asserted that it may have effects on the physical performance by playing a critical role on the cell division, growth, maturing and on the functioning of a wide range of enzymes [19]. Büyükyazızı and Turgay [20] have investigated chronic effects of prevalent interval practices on the male athletes, and have found statistically important (p<0.05) increase in the HGB levels after chronic exercises performed for 8 weeks.

According to the results of the study, it can be stated that match program of 10 days has caused important alterations in the PBD (erythrocyte), PLT (Trombosit), HGB (Hemoglobin) complete blood values of football players.

References

magnesium deficiency on exercise capacity in rats, Magnesium Res., 2: 136.
