

Examining certain blood parameters of sporters of national boxing team before and after the match

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ABSTRACT

Research group of this study consists of total 10 boxers who are actively involved in Turkish big male national boxing team and with average age of 22.40 age/years. Blood samples were taken twice from boxers constituting the research group before and after the match after the camp program of eight weeks applied for research group. Data and laboratory results are utilized as covariant. Relative changes in the data obtained are analyzed by SAS package program and by utilizing PROC MEANS procedure. Significance level of changes observed is specified by Paired t test that adds significance at the level of $P < 0.05$. Statistically significant increase is observed in the glucose levels of boxers as one of the blood parameters before and after the match ($P = 0.0014$). Decrease in the insulin levels is determined before and after the match, however it is not found statistically significant ($P = 0.1059$). It is observed that cortisol levels have increased before and after the match, however it is not considered statistically meaningful ($P = 0.0534$). Decrease in the urea levels is determined before and after the match, however the difference is not found statistically significant. ($P = 0.5837$). Differences in the creatine levels before and after the match are found to be insignificant ($P = 0.0815$). According to the results of the research, important changes in all blood parameters of sporters of national boxing team are observed before and after the match, however statistically significant difference is observed only in glucose parameter. Thus, it can be stated that our application caused significant changes only in the glucose parameter among the parameters we examined.

Keywords: Boxer, exercise, Glucose, Match, blood.

INTRODUCTION

Scientific methods should be introduced to sports for the development and international success of sporters of elite level in the national team camps. Zorba et al 1999 Superior performances of today's sporters are described as the whole of various physiological, psychological and biomechanical factors for the performance to be at the highest level [1]. The relationship between the body structure and its functions has been a research subject in the studies related with sports. Besides physiological, psychological and tactical factors body position and structure have an extensive importance in the determination of performance [2]. It is known that there are changes in blood parameters in line with the intensity, duration and type of the exercise. Changes may be observed in the blood values during and after an intense exercise because of differences such as exercise status of the individual, environmental conditions and nutrition. Besides the researches informing positive improvements in the blood biochemistry as a result of acute exercise, there are also studies suggesting changes by long-duration exercises rather than acute exercises [3]. It is considered that these changes are tied to the intensity, duration, frequency of the exercises, and physical, physiological and conditioning status of the subjects participating in the study [4,5]. It is established by the studies realized that regular exercises have a positive effect on all body systems, and prevent formation of health problems [6,7,8,9]. Exercises bring along wide range of positive adaptations such as muscular force, reaction time, neuromuscular coordination, balance, body composition, mitochondrial increase, aerobic-anaerobic capacities [10].

Acute exercises may have potential side effects besides its benefits to health [11]. It is aimed to examine blood parameters of sporters of national boxing team before and after the match who have to make exercises continuously.

MATERIALS AND METHODS

In this study, total 10 big male boxers from Turkish National Boxing Team having average 22.40 age/year constitute the material of the research. Information stating that this research shall be realized in line with the ethic rules is notified to the Presidency of Ethical Committee of Adıyaman University Medicine Faculty and Approval of Ethical Committee is obtained. Blood samples of boxers before and after the match are taken from front for arm vein by 10 cc injectors to gel biochemical tubes, and after a period of ten minutes of waiting period, they were centrifuged by means of Hettich trade mark Universal 320 model. After eluting the serums of blood samples taken by centrifuging at 4000 revolutions for 5 minutes, they were taken into eppendorf tubes, and they were preserved in the Hettich freezer at -80 °C in the laboratory of Fırat University Faculty of Veterinary Science Department of Animal Nutrition until the time of analysis. Serum insulin and cortisol samples are determined by means of Siemens trade mark Immulite 2000XPI direct chemiluminescence closed system method. Glucose, urea and creatine are determined by means of Siemens trade mark 1800 adviya nephelometry closed system method.

Data obtained before match and laboratory results are utilized as covariant. Relative changes in the data obtained at the end of match are analyzed by SAS package program and by utilizing PROC MEANS procedure [12]. Significance level of changes observed is specified by *Paired t* test that adds significance at the level of $P < 0.05$.

RESULTS

Table 1: Age, weight, height and BMI values of boxers (n=10)

Age (Years)	Weight (kg)	Height (cm)	BMI (kg/cm ²)
Men ± SD	Men ± SD	Men ± SD	Men ± SD
22,40 ± 2,84	66,10 ± 16,62	173,70 ± 8,19	20,89 ± 4,57

Table 2: Blood levels of sporters (n=10)

Parameter	Before match Men ± SD	After match Men ± SD	P
Glucose (mg/dl)	153,25±5,51	210,38±5,16	0,0014
Insulin (ulU/ml)	13,39±3,33	5,40±2,53	0,1059
Cortisol (ug/dl)	22,08±2,45	26,97±2,03	0,0534
Urea (mg/dl)	41,13±3,22	38,38±3,02	0,5837
Creatine (mg/dl)	1,25±0,46	1,49±0,52	0,0815

- : $P > 0.05$ *: $P < 0.05$

When the blood parameters of boxers are examined before and after the match, certain differences were observed. Accordingly, Glucose value was 153,25±30,42 mg/dl before the match and 210,38±26,68 mg/dl after the match, thus change in the glucose level of research group is found statistically significant ($P=0,0014$), ($P < 0,05$; Table 2).

It is seen that insulin measurement was 13,39±3,33 ulU/ml before the match, and 5,40±2,53 ulU/ml after the match; thus difference in the insulin level is found to be statistically insignificant ($P=0,1059$), ($P < 0,05$; Table 2).

When the cortisol measurements are reviewed, the value was 22,08±2,45 ug/dl before the match, and 26,97±2,03 ug/dl after the match; thus difference in cortisol measurements before and after the match is considered to be statistically insignificant ($P=0,0534$), ($P < 0,05$; Table 2).

It is established that urea value was 41,13±3,22 mg/dl before the match, and 38,38±3,02 mg/dl after the match; and the change in the urea measurements is not found statistically significant ($P=0,5837$), ($P < 0,05$; Table 2).

When the creatine measurements are taken into consideration, it is seen that value before the match was 1,25±0,46 mg/dl, and 1,49±0,52 mg/dl after the match; and the difference is statistically found insignificant ($P=0,0815$), ($P < 0,05$; Table 2).

DISCUSSION AND CONCLUSION

Average age of boxers is determined as 22.40 age/years in our research in which blood parameters of sporters of Turkish national boxing team are examined before and after international matches. When we review similar studies in the literature, average age of Turkish national boxing team is determined as 21.65 ages/year [13]. Turkish national boxing team as 20.77, Ukrainian national boxing team as 20.35 ages/year [14]. Azerbaijan national boxing team as 22.66 age/years [15]. Georgia national boxing team as 24.88 age/years [16]. These results show parallelism with our findings. Sevım et al 1993 state that especially boxers of elite level is between ages 20 and 30, optimal success period is 21-25 age/years, and that maturity and high level stage is between ages 26 and 28.

Average height of the boxers participated in our research is determined as 173.70 cm When we review similar studies in the literature, average height of Turkish national boxing team is determined as 174.40 cm (Pala et al, 2011), Turkish national boxing team as 177.46 cm, Ukrainian national boxing team as 178.07 cm (Çınar et al, 2009), Azerbaijan national boxing team as 163.30 cm (Beyleroğlu, 1998) and Georgia national boxing team as 180.11 cm [16].

One of the most efficient criteria determining the performance in sports is the body weight [17]. Average body weight of the boxer group participated in our research is determined as 66.10 kg When we review similar studies in the literature, average weight of Turkish national boxing team is determined as 67.94 kg (Pala et al, 2011); Turkish national boxing team as 71.91 kg, Ukrainian national boxing team as 72.72 kg (Çınar et al, 2009). Georgia national boxing team as 70.73 kg [16]. We can say that these different results take its source from heavy weight sporters being not so heavy and other sporters maintaining their own weights.

When we examine body-mass index, it is determined as 20.89 kg/cm². When we review similar studies in the literature; When we examine body-mass index, it is determined as 20.89 kg/cm² Body-Mass Indexes of Turkish national boxing team is specified as 22.11 kg/cm² (Pala et al, 2011); Turkish national boxing team as 22.83 kg/cm², Ukrainian national boxing team as 21.66 kg/cm² (Çınar et al, 2009), Elite handball players as 21.68 kg/cm² and basketball players as 20.10 kg/cm² in the researches of [18]. tennis players as 22.30 kg/cm² [19]. In a similar way, when we compare BMI measurements realized for elite sporters with the findings of our study, it is seen that results support our findings.

Oxidation of glucose increases several times together with exercising. In this case when the blood glucose level decreases, glucagon hormone secreted and blood glucose level is increased. As the exercises continue, glucose utilization of the muscles may increase 7 to 20 times in line with the severity and duration; and blood glucose starts to be an important energy source. While blood glucose level does not change a lot during gentle exercises, it may increase in the rate of 15-20% during heavy exercises [20]. A significant increase is observed in the glucose levels of boxers as before and after the matches. When we investigate studies in the literature it is determined that glucose level of elite female taekwondo competitors increased before and after the exercise [21]; male sporters playing football in the youth squad after aerobic and anaerobic exercises [22]; amateur football and basketball players before and after exercises [23]; professional male sporters playing football after intermediate and heavy exercises [24]; elite male beach handball players before and after matches [25]; boxers before and after the camp (Pala et al, 2012). These results support our findings.

Decrease is observed in the insulin level values of the boxers before and after the match, however this decrease is not found to be significant. When we investigate studies in the literature; decrease is determined in the insulin levels of boxers before and after the camp [26]; amateur football and basketball players before and after the exercises (Koçyiğit et al, 2011).

There are changes in the insulin secretion during the exercise, because glucose level in the blood changes [27]. In his study, Pruett, (1970) has stated that blood glucose concentration decreases less in the first 10 minutes of exercising, however it is higher than the initial level at the end of the exercising that lasted more than 10 minutes, but plasma insulin concentration continuously decreased [28]. Since duration of boxer's match is less than 10 minutes, this determination supports our findings.

It is specified that cortisol levels of boxers increased before and after the match, however this increase is not found significant statistically. When we investigate studies in the literature; (Kuter et al, 1995) have reported that cortisol levels of basketball players increased before and after exercising [29]. In another study realized on volleyball players, (Reilly et al, 1990) have determined that cortisol level has increased in long duration volleyball match continued for 60-180 minutes and in short duration game with high intensity [30]. These results support our findings.

Decrease is observed in the urea levels of the boxers before and after the match, however it is not found significant statistically. When we investigate studies in the literature; it is determined that there is no significant difference between the urea values of amateur football and basketball players before and after exercising (Koçyiğit et al, 2011); before and after training [31]; before and after training [32]; boxers before and after the camp (Pala et al, 2012). These results show parallelism with our findings.

It is observed that creatine levels of boxers have increased before and after the match, however this increase is not found statistically important. When we investigate studies in the literature; it is determined that there is no significant difference between creatine levels before and after training (Koç et al, 2007); creatine level of boxers before and after the camp (Pala et al, 2012). These results show parallelism with our findings.

As a **conclusion**; important changes in all blood parameters of sporters of national boxing team are observed before and after the match, however statistically significant difference is observed only in glucose parameter. Thus, it can be stated that our application caused significant changes only in the glucose parameter among the parameters we examined.

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