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THE INFLUENCE OF FOOTBALL IN SOME THYROID FUNCTIONS AND THE LEVEL OF A NUMBER OF BLOOD AND BIOCHEMICAL PARAMETERS OF A GROUP OF PLAYERS

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Abstract

This research was designed to study the change in the concentrations of thyroid hormones and a number of blood measures during physical training of football players, who number (40) samples, and their ages range between (20-40) years. Samples are divided into weight categories depending on the values of body mass index (BMI). They were also divided into two categories, the first group (20-29) years and the second group (30-39) years. The results of the study showed the high concentration of thyroxine (T4) significantly ($P<0.05$) after the match or physical training compared to the results before the match, while did not appear a significant change in (T3) concentration after the game compared to the results before the game, the blood tests indicated good levels in the amount of hemoglobin among players compared to natural proportions. It is concluded from this study that the hormone (T4) changes its concentration after conducting physical training.

Keywords: football, thyroid, biochemical.

Introduction

Sports training is the most important scientific means that has an impact on the body's systems, including the circulatory, respiratory, digestive, and hormonal systems, as the functional variables that occur within the body are the result of sports training [(1)]. Therefore, conducting training leads to physiological and morphological changes to the body's systems, and for this reason, the functional work of the different body systems differs positively or negatively during training or after physical effort than at rest. A functional adaptation of the heart and blood circulation occurs, represented by the continuous supply of the muscles participating in the physical effort with a large amount of oxygen, with a relative balance in the metabolic processes and energy production [(2)]. Metabolism is represented by all the complex chemical processes that occur in the body in the presence of oxygen, where oxygen is used in the analysis of nutrients and the production of energy. Muscle glycogen and blood glucose are very important substances in the formation of the energy compound ATP during muscle contraction. Therefore, muscle fatigue is often accompanied by a deficiency in muscle glycogen or blood glucose. Also, the deficiency of any of the two compounds leads to a

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deficiency in pyruvic acid, which affects the formation of the enzyme acetyl CoA, and thus negatively affects the oxidation processes of free acids and amino acids [3].

Thyroid gland: Thyroid gland is a small gland, butterfly-like reddish-brown color located in the neck with its wings spread out in front of the trachea, it consists of two parts, linking by a bridge which is of the gland tissue itself called the isthmus, and the cystic cells in it are special cells that secrete thyroid hormones. The thyroid gland enters its secretions directly into the blood without the need for special channels for transmission, and therefore it is called the endocrine gland [4]. Despite its small size, it represents a power plant, that is, it controls the functions of the whole body. One of its most important functions is the regulation and preservation of body weight, the amount of fatty substances, body temperature, intelligence ability, the psychological and emotional state of the individual and regulate children growth [5].

The thyroid gland secretes hormones whose concentrations change in the case of physical effort, which is an emergency in relation to the body's natural functions, as it requires an increase in the performance of the body's functions so that the muscles continue to work as it is in the endocrine devices where the hormonal system, along with the nervous system, regulates the electrical activity rates for cells and the different body tissues [2]. As the thyroid gland is stimulated by training to release a higher concentration of thyroxine hormone, which controls heart contractions and increases cardiac payment under the effect of training, it also stimulates metabolic stages and increases cells taking glucose and degradation of glycogen [6].

Thyroid hormones: Thyroid hormones are very important to the human body, as the thyroid gland is one of the vital organs that respond to exercise, and therefore it is one of the working organs during physical effort. Hormones are naturally produced organic substances that have regulatory effects on metabolism in the organism, as they are needed in very small quantities, and their effect appears far from the place where they were formed. It has a miraculous ability to control the activity of the body, so it acts as a chemical stimulant for all organs of the body [7].

Thyroxine (T4): Thyroxine is one of the thyroid hormones that is made in the follicular cells and contains four molecules of iodine. Thyroxine is the main hormone in terms of its quantity. It has an important role in the bodies of mammals. It works to increase the activity of metabolic processes in all cells of the body, which leads to increased growth and differentiation of cells. It also helps in the use of carbohydrates by cells, and thyroxine cooperates with the anti-stagnation hormone (ADH) in preserving water [8].

Thyroxine is involved in fat metabolism and increasing the size of the heart muscle, so it helps the body to cope with the requirements of sports activity when performance continues for a long time, and the hormone increases or decreases its concentration during physical activity due to the ratio between the speed of its use and the speed of its excretion [9].

Hormone triiodothyronine (T3): It is a hormone secreted by the thyroid gland and consists by binding of neurozine monoiodine with neurozine diiodine, it is found in the blood with a smaller amount of thyroxine, but more effective, as its effectiveness is three or four times the effectiveness of thyroxine, and most of (T4) is converted to (T3) in some tissues such as the liver and lungs, and the function of (T3) is somewhat similar to the function of (T4), but differs in speed and intensity of action [10]. The element iodine is important in the functioning of the thyroid gland, as it participates in the production of hormones (T3) and (T4), so the concentration of iodine inside the gland is up to (25) times more than what is in the plasma and stores hormones

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(T3) and (T4) inside the cavities of the thyroid gland and all the steps of the formation of thyroid hormones are activated by the hormone (TSH) [11].

Thyroid-Stimulating Hormone TSH: The TSH hormone is secreted from the anterior lobe of the pituitary gland and controls the functioning of the thyroid gland, where this hormone stimulates the growth and development of the gland and activates the gland cells to synthesize iodine from the blood and increase its concentration and stimulates the gland to secrete its hormones in the blood so it has an effect on all processes related to the secretion of hormone (T4), storage and release in the blood. The secretion of TSH is related to the secretion of T4 and its concentration in the blood, where they have a feedback relationship [12].

Hemoglobin: It is a complex protein structure that gives the red color to its constituent red blood cells and consists of the Globin protein responsible for the red color of hemoglobin and the heme substance consisting of iron, which combines with four molecules of oxygen and forms a compound called (oxyhemoglobin), an anxious compound that separates as soon as oxygen reaches its place and binds with carbon dioxide and an anxious compound called (carboxyhemoglobin) separates as soon as CO_2 reaches its place [13]. Heme contains iron, which is converted into a pigment secreted by the liver with bile and stored in the bile vesicles as a result of the breakdown of red blood cells, iron is stored in the liver or spleen, and therefore heme is the most important and most effective part of the hemoglobin pigment [14].

Since hemoglobin is the only medium for transporting O_2 and CO_2, it has an important role during sports activity because the body needs metabolic processes as a result of sports activity, and if the rate of hemoglobin in the blood decreases, this affects the level of physical performance and weakens the ability of the athlete due to the lack of oxygen supply to the muscles, which leads to an increased burden on the heart muscle through a high heart rate [15]. The normal ratio of hemoglobin weight to blood in adults is about (14-15%), equivalent to (700-740) grams, and the average concentration of hemoglobin in the blood (150 grams per 100 milliliters). In men, the percentage of hemoglobin is (12-18 %) grams, in women (11-16 %) grams, and its percentage increases in newborns, where it is (16-19 %) grams [16].

Materials and Methods

The research included (40) men of football players in Al-Alam town in March 2020, the ages of individuals ranged between (20-40) years. They were divided into weight categories based on the values of Body Mass Index (BMI), according to what was stated in the WHO report (WHO) about the classification of obesity.

Sample collection and laboratory tests: Blood samples were obtained from the brachial vein, with a volume of (10) ml, before going to the game, and after the game was conducted for an hour, the same volume was drawn again. A part of the drawn blood, amounting to (2) ml, was placed in tubes containing EDTA, an anticoagulant, for the purpose of conducting blood tests, while the remaining part, about (8) ml, was placed at a temperature of (37°) C until it was separated for the purpose of conducting biochemical tests.

Biochemical tests: The concentration of the hormone (T4) was estimated using the ready-made kit of the Wiesbaden Company, German, as well as the concentration of the hormone (T3) using the ready-made kit of the same company (Wiesbaden).

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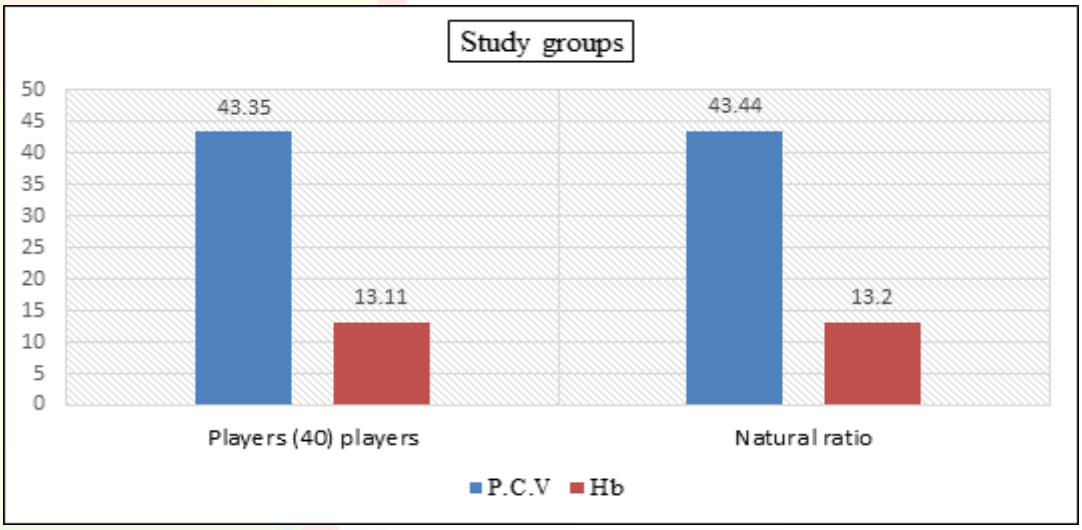
Blood tests: Packed cell volume (PCV) was measured and the amount of hemoglobin (Hb) in the blood of the players was determined [17].

Statistical analysis: The results were analyzed according to Fisher Test (F-Test) and tested statistical differences between the mathematical averages using the Duncan's Multiple Range at the level of possibility ($P<0.05$) [18].

Results and discussion

Table (1) showed that there are no moral differences in the percentage of packed blood cells and the amount of hemoglobin in football players compared to the normal ratio at a significant level $P< 0.05$. They were at the rate of (43.35 ± 4.86), (43.44 ± 4.92), respectively, and the quantity of hemoglobin (13.11 ± 1.46), (13.20 ± 1.55), respectively.



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It is noted when estimating the percentage of packed blood cells for football players, the absence of moral differences compared to the natural percentage, and this is due to the fact that the players have high physical fitness and eat good foods in order to preserve the blood level in the body and that organized exercises help increase the rate of red blood cell production and thus. Its efficiency is increasing in carrying oxygen [2]. Anemia is an obstacle to physical performance because the muscles do not get enough blood and thus oxygen due to a lack of its transportation, and therefore the player rushes to conduct the necessary tests for anemia and treat this imbalance by eating a healthy, balanced food that contains nutrients, especially iron, so some animal organs must be eaten such as liver, kidneys, egg yolks, fish, vegetables, and natural black honey for their richness in iron, as anemia will lead to the athlete facing great difficulty in physical competition with a healthy athlete [13].

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Table (2) showed a significant increase in the concentration of (T4) hormone after the match compared to its concentration before the match at a significant level ($P < 0.05$). They were at a rate of (0.23 ± 1.39), (0.435 ± 1.645), respectively. The table also showed that there were no significant differences in the concentration of (T3) hormone before the match compared with its concentration after the match at a significant level ($P<0.05$). It was at a rate of (0.31 ± 1.268) and (0.242 ± 1.165), respectively.

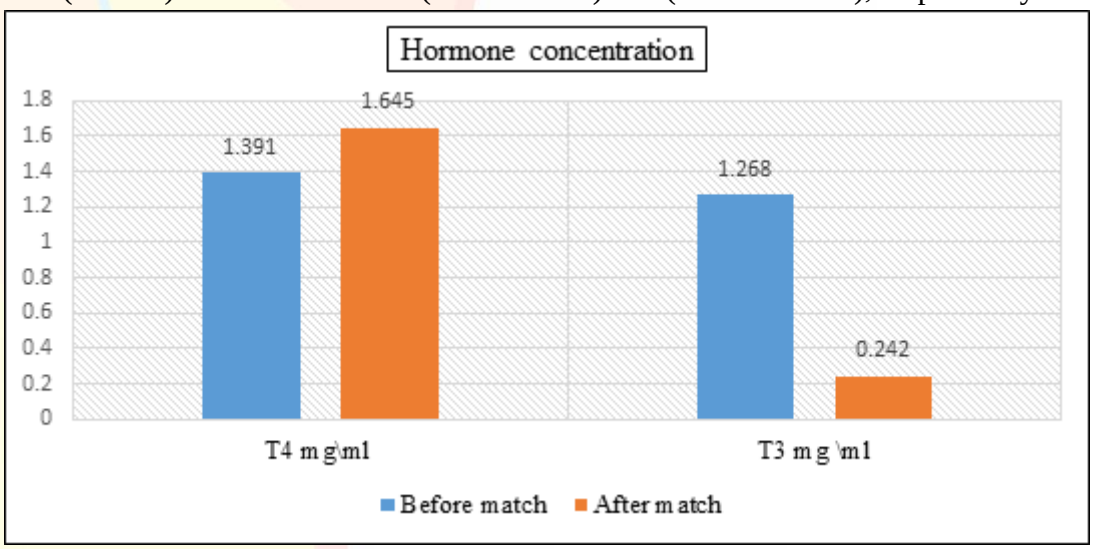

Figure 2: showed that The concentration of thyroxine hormone (T4) and triiodothyronine hormone (T3) in football players before and after the match.

When estimating the concentration of the (T4) hormone before and after the match, it is noted that there is a significant increase in the concentration of the hormone after the match compared to its concentration before the match, as this is due to the fact that the hormone responds for physical effort, it rises as a result of the body's need to increase the rate of metabolic processes and the need to increase oxygen consumption required by energy production to perform physical effort due to the increase in heart rate and increase in blood circulation. The study agrees with the study of the researcher [19] [20] in that thyroxine works to regulate the function of the various body systems during physical effort, so the body needs a high hormone during physical training because it works to increase the speed of metabolism and metabolism and increase oxygen consumption and the speed of blood flow to nourish tissues with energy and oxygen and increase heart rate, and this is what the researcher pointed out [21].

Schweizer and Steegborn [22] agrees with us that thyroxine rises during physical training and this height causes an increase in the metabolism rate through its effect on mitochondria of all brain cells which stimulates the use of oxygen without increasing the amount of the phosphorous (ADP) compound to convert them to (ATP), where the phosphorylation is separated from oxidation operations and raised by the ability to consume oxygen.

It is noted when estimating the concentration of the hormone (T3) that there are no significant differences in the hormone concentrations before and after the match with football players, and the reason is that the work of the gland is normal and that the sample members do not complain of a defect in the work of

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the gland, so the secretion of the hormone is made in the blood naturally (23) and the ratio of (T3) in the blood is less than the ratio of (T4), but (T3) is more effective, and therefore a large percentage of (T4) turns into (T3) [10].

The researcher [20] disagrees with us that the concentration of the hormone (T3) increases after the match in response to the physical effort performed by the player, and the high concentration of the hormone is proportional to the nature of that effort and its duration, and the reason for the increase is due to the increase in the percentage of metabolic processes, which leads to an increased need for oxygen to fill the shortage and complete the energy production processes, and the researcher agrees with him [24].

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