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A study of some physiological and hormonal criterion in males infected thalassemia

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ABSTRACT

The current study was conducted in the Department of Biological Sciences / Faculty of Science / University of Al- Qadisiyah and in collaboration with the Genetic Diseases of the blood center in the city of Diwaniya for the period from (1/12/2017) until 1/6/2018, 30 male samples were taken and aged between 20 and 45 years were divided into two groups The first included 20 samples of males with thalassemia the second group consisted of (10) samples non-infected male representing the control group. (5ml) was withdrawn for the purpose of examining blood parameters and level (Ferritin) as well as measuring the level of male sex hormones Lh and Fsh for both the patient group and control. The results showed a significant decrease of $p < 0.05$ for all blood and hormone parameters for the group of patients compared with the control group, with a significant increase in the level of iron stock for patients compared to control group.

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INTRODUCTION

Thalassemia is a genetic disease Thalassemia, refers to a number of changes in which the manufacturing ratio of one or more quaternary haemoglobin chains. This, in turn, leads to total or partial inhibition of haemoglobin production, resulting in the collapse of red blood cells shortly after or even their predecessors. This may occur in the bone marrow or even red blood cells circulating in the circulatory system (Olivieri *et al.,* 1999). Haemoglobin consists of four protein chains:

Two of them are alpha-type, and two are beta-type and based on the location of the genetic defect, thalassemia was divided into two types.

Alpha-Thalassemia: Genetic disorders include alpha sequences of haemoglobin, including what is dangerous, possibly causing the fetus to die in the mother's womb before or shortly after birth.

Beta-thalassemia: Beta-thalassemia includes a genetic disorder in the beta-series of haemoglobin, which is less dangerous except for the type "thalassemia beta major".

Blood transfusions are one of the most important processes necessary for the continuation of the patient's life. However, continuous blood transport causes the accumulation of iron in the important organs, this, in turn, leads to a deficiency in the pituitary gland responsible for the secretion of male sex hormones such as testosterone (FSH) and LH which is controlled by the effect of the hormone Gonadotropin-releasing hormone hypothalamus (GnRH) from the hypothalamus (Rund *et al.,* 2005).

Other side effects of blood transfusion include accumulation of iron, which causes an increase in the production of free radicals, which leads to the occurrence of oxidative stress, which works on oxidation of fat in the cell membranes and organs, resulting in deterioration of cell functions and thus decomposition of red blood cells or free radicals produced by programmed death Thus increasing the effectiveness of oxidative stress.

The accumulation of iron affects the hypothalamus, pituitary and male and female reproductive organs and this has an indirect effect on the liver and pancreas and works to undermine the metabolic processes of hormones and antioxidants alike, hence the importance of oxidative stress, which is an important mechanism in the development of some diseases, Thalassemia major beta type (Hallan *et al.,* 2009).

Thalassemia patients suffer from problems related to puberty and sexual maturity. This condition is called hypogonadism. This condition is due to a defect in the sex hormones responsible for the development of secondary sexual characteristics.

The results of the present study showed a significant decrease in P <0.05 in all blood parameters studied for the patient sample compared with control. The results of the hormonal study also showed for a significant decrease in the level of both FSH and LH males infected with thalassemia compared to the control group.

The biochemical tests of the two fractions confirmed a significant increase in P <0.05 for the group of patients compared to control.

The results of the present study conclude that male thalassemia had a significant effect on public health and sexual health through low levels of male sex hormones and the effect of infection on some blood parameters.

MATERIALS AND METHODS

The samples were collected from the thalassemia centre in Diwaniyah by withdrawing 5 ml in tubes free of the gel tube and left at room temperature for 20 minutes for coagulation and then placed in the centrifuge at 3000 rpm for ten minutes. Take the separated serum and transfer it to the Eppendorf tube and then keep these samples in continuous freezing under 20 ° C until use. The tests physiological blood standards and iron stores (Alfrtien) have been obtained directly from periodic checkups which are pre-blood transfusion processes to patients, and the results were taken directly from the Department of Hematology and Department of biochemical tests (Biochemical).

As for hormonal tests, the concentration of testosterone, FSH and Lh was evaluated using the ELISA device and according to the kit manufactured by (Human, Germany)

Statistical Analysis

The results of the study were analyzed using the statistical program Prism (SAS Institute, Inc., USA). The data were analyzed using the T-Test test and the Chi-square test for this purpose was applied at the probability level of (0.01p) (Mehta, 1993).

RESULTS AND DISCUSSION

Measurement levels of Physiological blood standards

Table (1) indicates a significant decrease (P <0.05) for all blood parameters studied for the patient sample compared to the control group. The results indicate that red blood cells in people with thalassemia are inefficient because they have a defect in the haemoglobin chains. Either they are free of beta-haemoglobin or a container on the beta chain, but incomplete information and usually occur in the formation of erythropoiesis in the bone marrow (α), compared with beta (β). The increase of alpha-type chains leads to the production of bad red blood cells and therefore the ratio of haemoglobin decreases.

(Sundraraman *et al.,* 2007) that the imbalance of haemoglobin chains leads to shortening in the age of red blood cells in the normal state that red blood cells die within 120 days after their formation either in the case of thalassemia, it dies less than 120 days and this leads to a defect in the function of bone marrow Because of its inability to deal with excess cells and therefore inefficiency in the production of natural proportion and therefore the occurrence of deformity of bones due to increased processes of red blood cells Erythropois and also the occurrence of fragility in the bone as a result of the depletion of the components of the bone in the processes of the productivity of duplicate cells (Kim *et al.,* 2007).

The accumulation of alpha chains leads to changes in the red cell membrane and thus causing damage

Table 1: The level of MCHC, MCH, MCV, RBC, Hb for the control group compared to the patient group

Group	Hb (g/dl) Mean± SE	RBC (10^6cell /ml) Mean± SE	MCV (fl) Mean± SE	MCH (pg) Mean± SE	MCHC(g/dl) Mean ± SE
Control	10.78±0.11	4.86± 0.6	78.32 ± 45	25.8±0.12	23.34± 0.29
Patients	6. 58± 0.25	2.20± 0.09	67.35± 0.71	17.7± 0.28	23.64.±0.37

Table 2: The effect of Thalassemia on the level of HH (and FSH)

Group	FSH(UI/ml) Mean ± SE	LH(UI/ml) Mean ± SE
Control	35.3±2.56	43.26±6.62
Patients	7.34±1.43	9.66±2.42

to cells in general and may also be due to the accumulation of free radicals, which plays a large role in cell breakdown and thus peripheral hemolysis.

Measuring the level of sex hormones

The results showed a significant decrease in the level of LH (FSH) in the group of patients compared to the control group who increased the values of these hormones as mentioned in Table (2).

This decline in the level of male hormones may be due to increased iron level due to the breakdown of blood cells or because of the continuous transport of blood, which lead to the accumulation of iron or may return to the mechanism of programmed death Or may be due to programmed death mechanisms and associated with the decomposition of cells and thus accumulate iron on reproductive tissues and this accumulation inhibits the production of sex hormones in the early stages. (England *et al.,* 1973).

Iron has two paths that work on them, The first path directly through the influence of sub-hypothalamic hypothalamic. This will stimulate oxidative stress, which plays a major role in the influence of puberty and sexual maturity and infertility and that this effect extends to the liver and pancreas and thus affect the metabolic activities of hormones and antioxidants either the second track on which the ironworks Through the direct effect on the pituitary gland where directly related to the pituitary, resulting in atrophy in the size of pituitary and inefficient performance (Buttarell *et al.,* 2008).

Iron inventory level (Ferritin)

The results showed a significant increase ($P < 0.05$) in the group of patients compared to the control group as shown in Table (3).

Table 3: The effect of thalassemia on the level of certain

Group	Ferritin Mean ng/ml ± SE
Control	198.9 ±15.98
Patients	6453.3± 34.8

Blood transfusions are considered to preserve the patient's life as well as maintain the level of haemoglobin at the normal level. However, the level of haemoglobin is still below the normal level. This is confirmed by the current study, which makes the patient feel tired and continuous slenderness and thus carries out blood transfusion every 10 days. An excess of the iron level is stored in the form of two beds and the proportion increases when the appropriate treatments are not used (Haidar *et al.,* 2011).

The increase in the amount of iron has an effect on stimulating the process of oxidation of fat and thus a rise in the level of oxidizing factors and reduce the levels of antioxidants that have a significant role in regulating the functions of cells and therefore affect the overall health in general and sexual in particular (Lazarte *et al.,* 2017).

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