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Study of Some Biochemical Parameters of Blood in Thalassemia Major Patients in Thi Qar Governorate

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Abstract:

This study was conducted in order to determine some of the changes that thalassemia can cause on some of the physiological and biochemical characteristics of the blood. (60) samples were selected and divided into three groups, the first represents control and includes (20) samples from healthy people, the second includes (20) samples and represents the group of people with thalassemia with spleen, and the third group includes (20) samples and represents the group of people with thalassemia who have had their spleen removed. The results of the current study showed a significant decrease ($P < 0.05$) in the levels of both hemoglobin and compacted cell volume in the second and third affected groups compared to the control group, while the results did not show any significant differences ($P < 0.05$) between the three groups in the rates of both Cholesterol, protein and glucose.

Keywords: Thalassemia, Biochemical parameters

Introduction :

Thalassemia is a disease of inherited blood disorders characterized by low hemoglobin levels in the blood and defective erythrocyte synthesis, resulting in severe anemia. Thalassemia is divided into two types: alpha and beta [1]. The most prevalent form is beta, which is a frequent condition in underdeveloped countries throughout Asia, Africa, and the Middle East, hence the name Mediterranean anemia [2].

Beta Thalassemia It's divided into three categories: major, intermediate, and minor. The severity of the manifestations and the type of deficiency are used to classify the defects. The most severe form of thalassemia is type beta major, which has an early onset in (the first two

years of life) and necessitates lifelong blood transfusions [3].

The main symptoms of thalassemia are pallor accompanied by dark skin with protrusion in the bones of the forehead and upper jaw, weakness in the structure with enlargement of the spleen and liver, feeling tired and exhausted, and less effort and loss of appetite and verylow hemoglobin less than 9gm/dL of blood. People with thalassemia, especially the major ones, because they are more prevalent and common, need lifelong treatment, which includes periodic blood transfusions for the disease to maintain a higher level of hemoglobin in order for oxygen to reach the parts of the body. Forthe excess of iron and prevents its deposition in the patient's body, there are other treatment methods, which is the removal of the spleen, which always occurs when there is a severe shortage of red blood cells or platelets as a result of their destruction in the spleen, and some patients need to transfuse quantities of blood that are one and a half more than the quantity Sufficient and accordingly[4], the spleen will enlarge, which will become a heavy burden on the child, or the spleen may become They are not important for the basic blood components, which leads to a severe deficiency in all blood components [5].As confirmed by previous studies, Qari and Wali Y.The defect in all beta-globin chains in Beta Thalassemia affects Hb production within RBCs, which consequently leads to a lower oxygen-carrying capacity. This abnormality results in microcytic hypochromic anemia and low MCV of the RBCs. [6]. Thalassemia is a genetic disease prevalent in our country, especially beta-thalassemia major, which included all affected samples in the subject of our current study. It was planned to conduct this study in our governorate by studying the following life indicators:

(1) Studying the effect of Thalassemia on some functional blood parameters.

(2) Studying the effect of Thalassemia on some biochemical parameters.

Materials and Method:

40 patients suffering from Thalassemia major were studied at the Thiqar center-for hereditary blood diseases. .Blood samples were collected from the blood laboratories reviews of the mentioned hospital and were conducted during this study. (1) A total of 60 cases of follow-up, with ages ranging between (1-15) years, distributed into three groups as follows:

The control group: It included (20) samples of healthy people.

Splenectomy of patients with thalassemia major: - It included (20) samples of the patients.

Group of patients with thalassemia major who have not had their spleen removed: - It included (20) samples of the patients.

Result:

Changes in the functional parameters of blood. The results of the current study recorded a significant decrease (P < 0.05) with respect to the concentration rates of both hemoglobin and the volume of compacted cells, as shown in Table -1- when comparing the two injury groups with the control group, but when comparing them with each other. there are no significant differences (< 0.05).

Changes in some biochemical parameters in the blood: Table -2- shows the effect of thalassemia on some of the biochemical characteristics of the blood. The results showed that there were no significant differences (P < 0.05) with respect to the levels of sugar, protein and cholesterol when comparing the three groups with each other.

Table – 1 - shows the provoke of thalassemia on some aspects of the physiological blood picture

Group	Hb 100 g/m	PCV %
Control	12.51±1.018[a]	34.67 ± 4.618[a]
A Group with Beta Thalassemia " Grand Spleen "	7.5 ± 0.63[b]	24.4 ± 2.3[b]
A Group of Patients with Beta Thalassemia " Major Resected Spleen "	6.8± 0.67[b]	23.7 ± 2.8[b]

The numbers represent averages + standard error Different letters indicate a significant difference (<0.05) between the groups

Table 2 - shows the effect of Thalassemia on some Biochemical Parameters of the blood

Group	Protein g\L	Glucose mmol\L	Cholesterol mmol\L
Control	78.4 ± 3.07[a]	5.18 ± 0. 28[a]	4.07 ± 0. 19[a]
A group with Beta Thalassemia. "grand spleen "	82.5 ± 4.6 [a]	6.54 ± 0.36[a]	4.08 ± 0.26[a]
A group of patients with Beta Thalassemia Major " resected spleen "	78.98 ± 3.8[a]	5.89 ± 0.41[a]	4.0 ± 0.3[a]

The numbers represent the averages + standard error. The similar letters indicate that there is no significant difference (P < 0.05) between the groups.

Conclusion:

As a result of thalassemia disease and the occurrence of breakage in blood cells, anemia occurs in patients. Therefore, it is recommended that all patients with thalassemia major undergo examination, follow-up, and adherence to Deferoxamine(Desferal)® treatment, with a commitment to blood transfusion.

Discussion:

It is also not possible to conduct a red blood cell count and a white blood cell count, due to the breakdown and dissolution of the red blood cell walls and the release of corpuscular hemoglobin [7]. Also, the nucleus of white blood cells is intensely nucleated and spread so that it is difficult to count them, but we can expect intuitively a severe shortage of red blood cells, due to the inability of the bone marrow to produce them [8]. This goes to the liver and spleen as a result, and the rapid breakdown of red blood cells is the main cause of severe deficiency, the main problem of the disease, as it is characterized by the body's inability to form red blood cells that transport food and oxygen to different parts of the body properly as a result of a defect and deficiency in the formation of hemoglobin[9], which plays the main role is in the low levels of hemoglobin levels in the affected, and accordingly, the compacted cells will decrease and we can expect an increase in the number of white blood cells, especially in the second affected group who has had the spleen removed, where the body becomes exposed to various infections and accordingly, the white blood cells increase as a result of the increase in infections of the patient[10].

The results showed that there were no differences with respect to the levels of sugar, protein and cholesterol when comparing the three groups with each other. This is due to the regularity of the patients with the recommendations of the specialist doctor and the accurate treatment [11], by daily injection of Desferal and blood transfusion, in addition to the constant health awareness of this disease and the establishment of a special unit in the hospital that deals with the matters of the patients, their treatment and ways of organizing it. The patients from whom samples were taken suffer from tachycardia and psychological introversion. Severe fatigue, most of them have had the spleen removed due to its enlargement as a result of beta thalassemia major. The disease affects both males and females [12], young and old, and of all blood types. It does not affect one group without the other. we conclude that prevention is the only solution to our salvation from this complex disease, [13] and every person who wants to marry must take tests for this disease and know whether he has this trait or not, in order to have healthy children [14].

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