Study of Some Hematological and Biochemical Parameters in Children with Thalassemia in City of Karbala

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Abstract

This research including the study of some hematological and biochemical changes in children suffering thalassemia in the province of Karbala.

To achieve this aim 50 samples was arranged in two groups first group include 40 patient with thalassemia male and female attending Imam Hussein medical city and second group include 10 healthy children as control.

The results appear decrease in concentration of packed cell volume (PCV), Red Blood cell count and Hb. Also the results appear decrease in biochemical parameters represented by (GOT) and (GPT). While there is increase in WBC count in patients as compared with control. The result also shown that thalassemia mostly occurs in male than in female.

Keywords: *Thalassemia, Packed Cell Volum(PCV), Glutamate oxaloacetate Transaminase(GOT), Glutamate Pyruvate Transaminase(GPT)*

Introduction

Thalassemia is a group of inherited autosomal recessive blood disorders that originated in the Mediterranean region. In thalassemia the genetic defect, which could be either mutation or deletion, results in reduced rate of synthesis or no synthesis of one of the globin chains that make up hemoglobin. [1]

Abnormalities in hemoglobin, resulting from the deficiency or complete absence of one or more of the globin chains, give rise to the thalassemia. Patients with thalassemia suffer from varying degrees of anemia, that is, a shortage of red blood cells. [2, 3]

Classification of thalassemia: The two main types are called Alpha and Beta thalassemia, depending on which part of globin chain is produced in reduced amounts. Normally, alpha globin chain is made by four genes (two from each parent), two on each strand of chromosome 16. The alpha thalassemia are caused by a decrease in production of alpha globins chains due to deletion or mutation of one or more of the four alpha globins genes located on chromosome 16. [4]

Unlike the deletion that constitute most of the alpha thalassemia syndromes ,beta thalassemia are caused by mutation on chromosome 11 that affect all aspect of beta globin production : transcription ,translation , and the stability of the beta globin production. There are more than 200 of mutation within the beta globin gene found worldwide to produce beta thalassemia [1] .Beta thalassemia includes the following two forms:

A- Major Thalassemia (Cooley's anemia): The child born with major thalassemia has two genes for beta thalassemia and abnormal beta-chain. Inherit the defect gene from both parents. A person who is infected with this type showing clear symptoms of the disease since childhood [5].

B- Minor Thalassemia The individual with minor thalassemia has only one copy of the beta thalassemia gene (together with one perfectly normal beta-chain gene) occurs when received the faulty gene from only one parent. The Person have symptoms of simple anemia and be able to transmit the disease to his sons [6].

Material ad methods:

The study included 40 patients suffering from thalassemia and 10 healthy children as control attending Al-Hussein medical city. Venous blood samples (5ml) are obtained from all patients and controls. 2ml was collected in EDTA tube and the remaining 3ml collected in plain tubes for serum collection.

Determination of hematological parameters:

Hemoglobin (Hb), red blood cells, white blood cells and Packed Cells Volume (PCV) were measured by complete blood count (CBC) apparatus.

Measurement of the enzyme GOT & GPT:

GOT& GPT enzymes were measured by using the colorimetric method depending on the kit of kind (Syrbio).

Results

Table (1) show the range and mean ± SD for some hematological changes for patients with thalassemia as comparison with healthy children.

Pcv %		**Hb g/dl**		**RBCs 106/ul**		**WBCs 103/ul**	
children patients	children Healthy	children patients	children Healthy	children patients	Children Healthy	children patients	Children Healthy
(24.79-31.86)	(43.69-44.46)	(7.24-9.63)	(12.11-13.56)	(3.12-3.96)	(4.54 -4.79)	(3.6-14)	(4.1-10.1)
27.48 ±2.17	44.03±0.28	8.30 ± 0.78	12.59 ±0.57	3.60 ±0.26	4.63 ±0.08	7.24 ±3.80	5.78 ±2.18

Table (2) show the range and the mean ± SD for some biochemical changes for patients with Thalassemia as comparison with healthy children and

GOT Unit/ml		**GPT Unit/ml**	
children patients	**children Healthy**	**children patients**	**Children Healthy**
(12.18-18.31)	(23.4-53.4)	(14.14-22.7)	(50-57.6)
14.38 ±1.54	32.11 ±10.27	16.92 ±.2.10	54.52 ±2.19

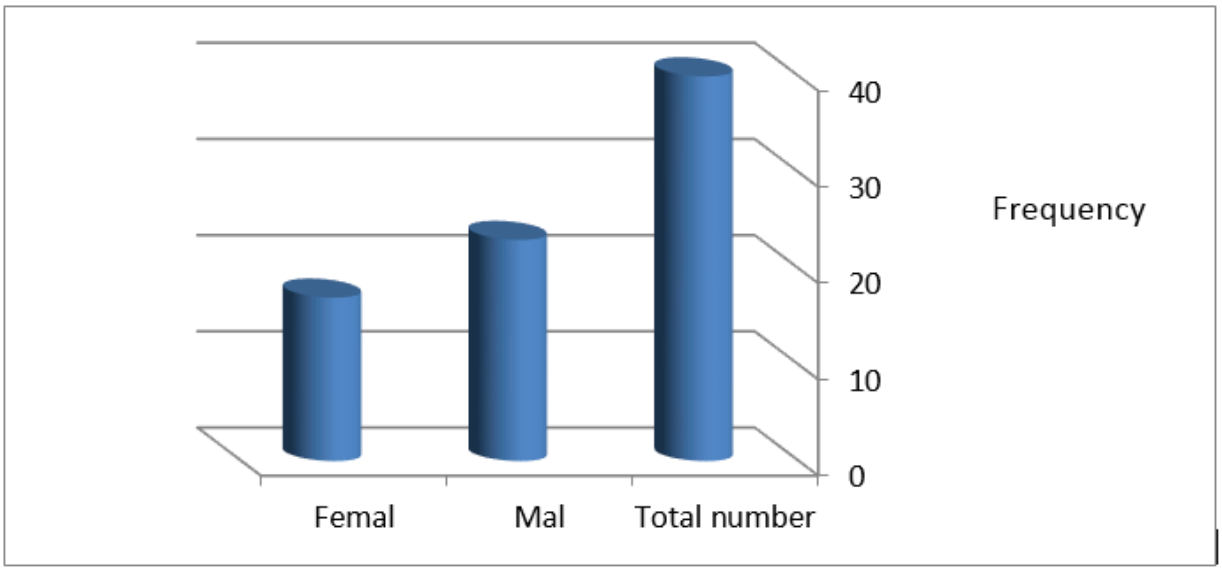

Figure (1) The relationship between sex and Frequency Thalassemia

Discussion

the results obtained from our study indicates as show in Table (1) to decrease the rate of both the packed cell volume and the concentration of hemoglobin and the number of red blood cells in the infected children compared to healthy children The reason that the rate of the packed volume of the cells depends mainly on the number, size and shape of RBC and on the range blood viscosity and his easing [7] as well as the reason for the lack of red blood cells, where the age of pellet of red blood normal 120 days. when dissolved, and eat up by the reticule-endothelial system [8] but when you get a pathological case such as thalassemia the bone marrow is unable to compensate for lack RBCS so hold a total of red blood cells as quickly break it, so the numbers of red blood cells remain diminish so lead to this characteristic pallor and yellowing (jaundice)of the skin clearly [9].

The decline in the level of hemoglobin in patients as compared to control due to the rapid decay of red blood cells, and therefore decrease the amount of processed hemoglobin body [10].

The results obtained also indicate as shown in Table (1) to increases in rate of total white blood cell in the affected kids , Maybe the reason is due to the high crash blood cells inside and outside the bone marrow, causing a severe decrease of partial pressure of oxygen and this is a motivating factor for the production of the hormone Erythropoietin kidney This hormone stimulates the bone marrow to increase hematopoietic formation through the conversion of undifferentiated cells into differentiated cells in a tissue bone marrow including white blood cells [11] Moreover, the start of some liver cells and some of the spleen cells configured centers to generate cells blood [12].

Through the results as shown in Table (2) note down some of the biochemical changes in the serum of patients with thalassemia both enzymatic GOT, GPT, compared with healthy children if both spreads enzymes in many tissues of the human body[13] , that the reasons for the low effectiveness of the enzymes from the normal level of healthy people this may be due to the amount of iron found in the serum of patients, which are deposited in these organs, which results in breaking down some of the fat cells of these organs [14] .

The result show the relationship between the incidence of disease, thalassemia and sex Figure (1) is observed that the number of infected males more than females and as the genes responsible for the production of the common Peptides strings in build hemoglobin located on chromosomes 11 and 16 [15] and not found in chromosomes x, y not found correlation between sex and the infection .

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Alsafwa university college and all experiments were carried out in accordance with approved guidelines.

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