

Determination of CD4 Parameter in Thalassemia Patients.

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Abstract

To determine the level of CD4 in thalassemia patients. Thalassemia is blood disorder types characterized by low levels or missing normal globin chains in the normal red blood cell protein hemoglobin. Material and method: include cross sectional study were collected from (180) sample, (120) patients suffering from thalassemia and (60) health as control from both gender, age between (20-49) years who attended to the Medical city and Al-Karama teaching hospital in Baghdad province and Al-Kut hospital for maternity and children in Wasit province during the period from the beginning of January 2022 to the end of April 2022. Result: show CD4 statistically significantly in patients group ($P < 0.001$) compare with control group. Conclusion: our finding show that the level of CD4 elevated in thalassemia patients groups.

Keywords: CD4, Thalassemia Major, Thalassemia minor.

1. Introduction

Blood disorder types characterized by low levels or missing normal globin chains in the normal red blood cell protein hemoglobin are now characterized as thalassemia. There are four types of globin chains present, named alpha (α) beta (β) gamma (γ) and delta (δ). Depending on which chain of production is disturbed, the thalassaemias are termed as α -, β -, γ -, δ -, $\delta\beta$ -, or $\epsilon\gamma\delta\beta$ -thalassaemias. Mostly inherited as a recessive trait, the most common types are α - and β -thalassaemias, that result from the deficiency of α - or β -globin proteins that are necessary for the production of normal hemoglobin molecule (HbA, $\alpha_2\beta_2$) in an adult human [1].

The pathogenic hemoglobin protein also indicates the cells and organ types before and after birth in which it is originated [2]. Based on the affected globin chain, the thalassaemias are arranged into alpha (α) or beta (β) types.

Systemic immune activation as well as the continuous decline of a functional CD4+ T cell response are main contributors to disease progression [3]. Today, CD4 T cell counting is still considered an essential disease-specific test for health care facilities with clinical laboratories and is included in the "First-ever WHO list of essential diagnostic tests designed for the detection, diagnosis and monitoring of priority diseases such as HIV, tuberculosis, malaria, hepatitis B and C, human papillomavirus and syphilis" [4].

The WHO prequalification of in vitro diagnostics assessment includes an independent analytical performance evaluation of CD4 counting instruments, in particular of those meant for use in resource-limited settings [5].

The immune alterations in thalassemia major are related to both the innate and adoptive immune system. Decreased CD4+/CD8+ ratio, impaired neutrophil and macrophages phagocytosis and chemotaxis and compromised natural killer cell function have been reported [6]. Several researches have demonstrated cytokine disturbance in thalassemia major. Meanwhile some features of immune system aging have been

reported in these patients. Mean value of IFN γ has been found significantly higher in thalassemia compared to control in some studies, but lower in others [7].

2. Materials and Methods

In this study, venous blood samples were collected from (180), (60) From healthy (control) and (120) patients suffering from β -thalassemia major (54) males and (66) females with their ages ranging between (20-49) years who attended to the Medical city and Al-Karama teaching hospitals in Baghdad province and Al-Kut hospital for maternity and children in Wasit province during the period from the beginning of January 2022 to the end of April 2022.

The Control group in this study used to measurement of cut-off and normal range as control negatives.

The blood samples were put in plane tubed and left to clot, then centrifuged at 3,000 rpm for 10 minutes to obtain serum and kept at -20 oC until use.

Patients in this study were divided into three groups

(30) Patients frequently dialyzed without filter (Thalassemia major).

(30) Patients frequently dialyzed with filter (Thalassemia major).

(60) Patients unfrequently dialyzed (Thalassemia minor).

Type of study: Crosse-sectional study.

Inclusion criteria: patients (different ages of woman & Men) with Thalassemia.

Exclusion criteria: any other diseases.

Immunological parameter

1. CD4

Kit was provided from manufactured company (Cusabio USA) & ELISA test using according to manufactured company & according to procedure of leaflet & statistical study was provine in the study.

3. Result

In table [1], the ANOVA test indicated that the overall CD4 mean level was statistically significantly different in the

studied groups ($P < 0.001$). Patients frequently dialyzed without filter have the higher mean value of CD4 ($16.5 \pm SD (7.4-24.5)$), and both dialyzed with filter and unfrequently dialyzed groups have lower mean level of CD4 ($9.4 \pm SD (3.5-16.5)$ and $8.0 \pm SD (1.05-15.7)$ (respectively). The post hoc pairwise comparison revealed that the mean value of CD4 in patients frequently dialyzed without filter was statistically significantly higher than in both groups of patients dialyzed frequently with filter and dialyzed unfrequently ($P < 0.001$), but there is no mean difference in frequently dialyzed with filter group in comparison to unfrequently dialyzed group ($P 0.150$).

Table 1:- Compare between Freq.without Filter,Freq.with Filter,Unfreq,in CD4 test.

Markers	Groups	n	Mean±SD* (range)	ANOVA	Post hoc**
CD4	F1 Freq. without filter	30	16.5±4.6 (7.4-24.5)	F=56.56 Sig.<0.001	F1 vs F2 P<0.001
	F2 Freq. with filter	30	9.4±3.2 (3.5-16.5)		F1 vs U P <0.001
	U Unfrequently	60	8.0±3.2 (1.05-15.7)		F2 vs U P 0.150
* Standard Deviation. ** Post hoc multiple comparison, Games-Howell Test *** Kruskal-Wallis U F1: Frequent without filter, F2: Frequent					

In table (2), in our study, samples taken from (20-49) years, age groups are divided to three groups, The first group Include (20-29) age, 18(60) for frequent blood transfusion with filter, 12(40) for frequent without filter and 24(40) for unfrequently. Second group Include (30-39) age, 12(40) for frequent blood transfusion with filter, 16 (53) for frequent without filter and 31(52) for unfrequently. Third group Include (40-49) age, (0) for frequent blood transfusion with filter, 2 (7) for frequent without filter, and 5(8) for unfrequently.

Table 2:- Comparison between three groups according to age.

Demographics	Dialysis status			Total n=120 (100%)	
	Freq. with filter (n=30)	Freq. without filter (n=30)	Unfrequently (n=60)		
Age	20-29	18 (60)*	12 (40)	24 (40)	54
Group	30-39	12 (40)	16 (53)	31 (52)	59
(years)	40-49	0	2 (7)	5 (8)	7
Mean±SD of age		28.2±4.4	31.0±5.6	30.9±6.4	30.3±5.8
* Frequency (%)					

4. Discussion

In my objective, we measure the level of CD4 in patients with thalassemia.

In {table1 }showed a very high increase in CD4 levels in patients with thalassemia major (without using filter during blood transfusion), while show a small increase in

CD4 levels in patients with thalassemia major (using filter during blood transfusion),,There is a not significant increase in CD4 levels in patients with thalassemia minorThis occur due to Many abnormalities of the immune system have been show in thalassemia major patients receiving multiple blood transfusions, although the relationship of these abnormalities with the increased incidence of infections remains doubtful. one of the major complications of regular blood transfusions, particularly in patients who are chronically disease alloimmunization. Alloimmunization also can lead to lifethreatening hemolytic transfusion reaction of thalassemia patient [8]. This is in agreement with Weili et al., found CD4 increase in thalassemia patient when compare with heath control groups [9]. This present study compatible with Jin et al., observed CD4 levels highly in thalassemia patient [10], They hypothesized that blood transfusion could cause T effector cell expansion as well as a counter-regulatory reaction. T regulators are enlarged to reduce the risk of effector cells causing collateral damage [11]. Our study disagreement with showed no significant in the CD4 levels in thalassemia patient [9]. In another study weili et al., showed disagreement with a current study in the CD4 levels in thalassemia patient due to compare with sickle cell disease [12].

5. Conclusion

In this study CD4 expression is higher in thalassemia major than healthy control. This finding is attributed to multiple antigenic stimuli during blood transfusion. T regulator have a role in tolerance to blood transfusion like that in tolerance organ transplantation.

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