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Research Article

Correlation between thyroid-stimulating hormone (TSH) in Middle-aged with major beta-thalassemia.

Mohammed Mahdi AL-Zubaidi[1], Khiaria Jaber Tutli Alkhtaua[2] & Halah Khalid Ibrahim Al-Sammarraie[3]

[1]-Forensic DNA Research and Training Center/ AL- Nahrain University..
[2]- Ibn Al- Baladi Hospital / Baghdad Health Office /Al Rusafa/ Ministry of Health.

Corresponding author: * **Mohammed Mahdi AL-Zubaidi**
Mobile Number: ***123** **Email:** molecular_fdna@yahoo.com

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Abstract:

One of the most common endocrine glands problems in cases of beta-thalassemia major are hypothyroidism, and the objective of this study is to assess the status of thyroid hormone stimulating (TSH) has thalassemia major patients,Thalassemia is an autosomal genetic disease leading to anemia and remains one of the major health problems in Southeast Asia and other parts of the world where malaria is or has been endemic, Beta-thalassemia major is a common inherited hematological disorder in Asia..Samples were collected from Iraqi individuals who attended to the to Thalassemia Center in Ibn Al- Baladi Hospital. Approximately 5 ml of human blood (Healthy and Patients) was collected from each individuals and transfer red into sterilized test tubes. TSH group contains ready to use reagents that have been previously distributed in sealed strips. All steps have been made automatically by testing the immune system diagnostic testing tool (VIDAS) instrument. Fifteen patients control (29 females and 21 males) in this study. The median age was 30-28 years.and 151 patients.number of sample there use in this study were (51 B- thalassaemia, 50Hb anima and 50 control).all sample tested by Serum ferritin levels were obtained through automated quantitative test for use vidase.

The limits for normal ferritin levels 138-321 in man and 27.15-102 ng/ul in woman. 51 cases of B- thalassaemia, the mean serum ferritin levels in cases of B- thalassaemia were 9542 + 782 ng/ml while were Serum Ferritin Levels in control sample 138+323in male and 28-108ng/ml in female. Then conducted this test on patients Hbaneima Where Levels of Serum Ferritin in this patients was 1+80 ng/ml. Age of all patients in this study were 3day-9year .the patients of B- thalassaemia were 1-6 year and p-value was(0.236951)while the age of patient Hbaneima was 1-5 year and p-value was (0.112275).

And some of the thyroid gland parameters in patients in the ranges of abnormal compared with controls, except for some cases that have levels (TSH) are normal. Exacerbation of thyroid function was observed in 60% of thalassemia patients who studied in middle age.

Keywords:

B- thalassaemia, Hbaneima, Serum Ferritin and vidase ..

INTRODUCTION

The thalassemia disorders are a heterogeneous group of inherited anemias characterized by defects in the synthesis of one or more globin chain subunits of the hemoglobin (1,2).

Thalassemia major genetic disorder of hemoglobin, leading to anemia, chronic hemolytic (3). But endocrine complications are becoming more and more frequent when the long-term survivors and greatly affect the quality of life (4).

It has been reported to the spread of genes Thalassemia all over the world at a rate of 3% rate. However, the prevalence rate of genes in thalassemia areas ranging from 2.5 to 15%, which includes the Mediterranean coast, Arabian, Peninsula, Turkey, Iran, India and South East Asia (5-6).

The most common cause of this disorder is a disease of the thyroid gland autoimmune, and there are many genetic factors and environmental factors that can cause the disease (7). The most common symptoms of hypothyroidism are: enlargement of the thyroid gland, the patient may start feeling tired as well as the skin, hair and nails slower growth and getting thicker. In some cases where tissue deficiency hypothyroidism appears under the skin, there is the appearance of puffy puffy known as myxedema, and often it is particularly clear about the face and eyes (8).

It has been well documented cases of hypothyroidism in major thalassemia patients requiring frequent blood transfusions and frequent. This has recently been discussed in detail in the literature (9, 10).

There is a general belief that the thyroid malfunction shows the frequency ranges between 13-60% in these patients after 10 years of age, regardless of the difference in the prevalence rate, to a large extent as in the form of hypothyroidism under clinical (11).The frequency of hypothyroidism in thalassemia patients ranges from 6 to 30% between different countries depending on pigmentation regimens (12). The primary hypothyroidism that may affect thalassemia patients from the second decade of age is mainly due to gland infiltration by iron overload, and autoimmune thyroiditis is absent (13).

Central hypothyroidism caused by decreased secretion of the thyrotropin-stimulating hormone (TSH) from the anterior pituitary or decreased secretion of the hormone thyrotropin (TRH) from the hypothalamus is less common, and the thyroid seems to fail before the thyroid axis, which is less sensitive from the axis of the gonads to damage caused by iron (14).

MATERIAL AND METHODS

Sample collection:

A total of 100 samples were collected from Iraqi individuals who attended to the Thalassemia Center in Ibn Al- Baladi Hospital in Baghdad during the period from April2014 to January 2015. Samples included 50 healthy individuals' controls (20 females and 30 males) and 50 samples beta-thalassemia patients (29 females and 21 males).

Approximately 5 ml of human blood was collected from each individuals and transfer red into sterilized test tubes and allowed for 30 min. To clot at room temperature, sample was centrifuged for 5 min. At 2500 rpm (rotation per minute) and the serum was separated and stored at (-20C) for investigation thyroid stimulating hormone TSH.

Measurement of thyroid stimulating hormone (TSH) by enzyme-linked fluorescent test (ELFA) (15), the assay principle combines the method of competing with the immune enzyme assay with the final fluorescent discovery.

The solid phase receptacles (SPR) serve as a solid phase and pipe coupling for the assay. The TSH series is ready to use reagents previously distributed in sealed strips, all the scanning steps were performed automatically by the Vitek Immunological Diagnostic System (VIDAS) tool. The reaction medium was in and out of the SPR several times, then the sample was transferred to wells containing TSH antigens labeled with alkaline phosphatase (accompanying).

Competition occurs between the antigen present in the sample and the labeled antigen for the specific anti-TSH antibodies (sheep) coated on the interior if the SPR. Unbound components were eliminated during washing steps. The normal range of serum TSH concentration was defined as 0.4-6.2(mu/l) both in males and females (16).

RESULTS

A total of 50 samples belonged to patients suffering from samples beta-thalassemia patients (thyroid disorders), and 50 others were considered as healthy individuals. Thyroid disorder was found to be more abundant in females (29,58%) than in males (21 , 52%) as shown in table (1) .The average age was 2-30 years in a case and 10-30 years in the control group. Although the average value of the concentration of serum.

TSH in the thalassemia patients B were higher than natural persons, but the difference was not statistically significant (P = <0.001) (Table 2). The concentrations of TSH higher than the normal range in 60% of patients with B-thalassemia .

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Table 1 : Distribution of healthy and thyroid disorder patients according to gender .

Gender	control (50)		Patients Group (50)					
			Hypothyroid		Hyperthyroid		Total	
	No.	%	No.	%	No.	%	N o.	%
Females	20	40	15	30	14	28	49	49
Males	30	60	7	14	14	28	51	51

Table 2: Mean values of TSH

TSH value	Patients (50)	control (50)	Normal Range	Mean	Std. Deviation	95% Confidence Interval of the Difference		P-value
						Lower	Upper	
>0.05	3	0	0.25-6.16*µIU/ml*	12.74	18.77	7.41	18.08	Significantly different (P < 0.001).
0.5-5	19	49						
5-10	10	1						
10-,20	9	0						
<20	9	0						

It can be observed from table (3) that opportunity of beta-thalassemia patients (thyroid disorders) was increased with the age. Highest occurrence of beta-thalassemia patients (thyroid disorders) were recorded in the ages between (16-20)years with a total number of 50.

Table 3 :Distribution beta thalassemia (thyroid disorders)and control proup according to age.

Age group (year)	Number of patients	percentage	controls	percentage
>2	0	0	4	8%
2-4	3	6%	7	14%
4-8	4	8%	9	18%
8-12	4	8%	6	12%
12-16	5	10%	9	18%
16,-20	20	40%	9	18%
20-24	5	10%	1	2%
24-28	3	6%	2	4%
<28	6	12%	3	6%
Total	50	100%	50	100%

Table 4 : value of TSH ,T4 AND T3

	TSH	T4	T3
1	3.74	100.3	2.03
2	5.4	77.28	1.65
3	5.55		
4	1.62	98.38	3.2
5	2.43	100.2	2.3
6	60	18.64	1.16
7	8.2	95.6	5.01
8	7.88	104.6	2.18
9	16.3	86.44	1.95
10	7.03	77.08	1.88
11	7.9	60.23	1.07
12	12.5	73.2	2.06
13	15.3	73.2	2.02

14	41.1	67.44	1.64
15	6.16	104.6	2.48
16	5.32	108.8	2.28
17	4.47	79.3	1.77
18	23.11	105	1.3
19	1.2	111	2.87
20	12.16	73.2	2.06
21	4.47	63.02	1.03
22	8.95	102.41	1.67
23	>60.	48.71	2.01
25	1.48	75.11	2.01
26	1.65	75	1.95
27	0.56	101.79	1.53
28	16.33	73.2	2.66
29	3.35	99.4	1.85
30	>60	55.5	1.31
31	19.79	113.8	2.25
32	1.16	88.2	2.02
33	5.51	79.01	1.71
34	8.95	73.21	2.05
35	11.6	86.14	1.94
36	12.16	73.2	2.01
37	1.2	61.33	1.34
38	3.51	120.88	19.05
39	1.19	76.88	1.49
40	4.47	98.59	1.98
41	6.16	99.19	2.22
42	3.37	148.1	0.78
43	2.24		
44	36.4	41.54	0.7
45	>60	98.59	1.31
46	<0.05	179.59	2.58
47	6.08	102.41	1.65
48	12.91	105	19.31
49	<0.05	117.9	1.3
50	60	57.4	1.61
51	60	63.01	2.06
52	60	7.83	<0.4

METHODS

samples were collected from Iraqi individuals who attended to the to Thalassemia Center in Ibn Al- Baladi Hospital .Approximately 5 ml of human blood(Healthy and Patients) was collected from each individuals and transfer red into sterilized test tubes .TSH group contains ready to use reagents that have been previously distributed in sealed strips. All steps have been made automatically by testing the immune system diagnostic testing tool (VIDAS) instrument.

DISCUSSION

Thalassemia is one of the most important genetic diseases and thyroid dysfunction which is well documented in these patients. Iron overload of tissue is the most important complication of beta thalassemia and is a major subject of management (18). After nearly one year of blood transfusions, iron begins to accumulate in the tissues of parenchymal, where it may lead to significant toxicity compared with endothelial cells (19,20)

In this study was aimed to investigate the possible association between TSH in B-thalassemia major patients. Hypothyroidism symptoms are not typical (fatigue, cold intolerance, weight gain).criteria for the diagnosis of subclinical hypothyroidism (SH)was an elevated basal TSH concentration(>5TSH uIU/ml) or an increase of the TSH levels.

Results

Fifteen patients control (29 females and 21 males) in this study. The median age was 30-28 years. Some of the thyroid gland parameters in patients in the ranges of abnormal compared with controls, except for some cases that have levels (TSH) are normal.

CONCLUSION

Exacerbation of thyroid function was observed in 60% of thalassemia patients who studied in middle age.

References

1- Michael R.Hemoglobinopathies, Chapter 462 in: Richard E, Behrman R ,Kliegman R(eds).(2007). Nelson textbook of pediatrics, 18th ed. Philadelphia WB saunders , co ; 2033-2037.

2- Borgna-Pignatti C, Rugolotto S, De Stefano P, Zhao H, Cappellini MD(2004). Del Vecchio GC, et al. Survival and complications in patients with Haematologica;89(10):1187-93.

3-Telfer PT, Warburton F, Christou S, Hadjigavriel M, Sitarou M, Kolnagou A. (2009).Improved survival in thalassemia major patients on switching, from desferrioxamine to combined chelation therapy with desferrioxamine and deferiprone.Haematologica, Vol. 94(12), pp. 1777-8.

4-De Sanctis V, Roos M, Gasser T,Fortini M, Raiola G, Galati MC.(2006).Italian Working Group on Endocrine Complications in Non-Endocrine Diseases.Impact of long-term iron chelation therapy on growth and endocrine functions in thalassaemia. J PediatrEndocrinolMetab, Vol.19, pp. 471-80.

5. Haghshenas M, Zamani J. Talasemia(2007). 1st ed. Shiraz: Shiraz University of Medical Sciences publication; pp: 1-2. [In persion].

6. Srivatsa A, Arivatsa A. (2005).Assessment of adrenal endocrine function in Asian thalassemics. *Indian Pediatr*;42(1):31–5.

7-William, S. and Messer J. (2000).Thyroid hormones.*Endocrinology &Metabolism*.11(4):123-128.

8-Boelaert, K. and Franklyn A. (2005).Thyroid hormone in health and disease. *J. of Endo.*187:1-15.

9- Malik S, Syed S, Ahmed N. (2009).Complications in transfusion-dependent patients with betathalassemia major: a review. *Pak J Med Sci*;25(4):678-82.

10. Shamshirsaz AA, Bekheirnia MR, Kamgar M, et al.(2003) Metabolic and endocrinologic complications in beta-thalassemia major: a multicenter study in Tehran. *BMC Endocr Disord*;3(1):23-34.

11. Malik SA, Syed S, Ahmed N. (2010).Frequency of hypothyroidism in patients of beta-thalassemia. *Pak I Med Assoc*;60(1):17-29.

12-De Sanctis V, Eleftheriou A, Malaventura C. (2004) Prevalence of endocrine complications and short stature in patients with thalassaemia major: a multicenter study by the Thalassaemia International Federation (TIF). PediatrEndocrinol Rev, Suppl 2, pp. 249-55.

13-Delvecchio, M.; Cavallo, L. (2010). Growth and endocrine function in thalassemia major in childhood and adolescence. J. Endocrinol. Invest, Vol.33, pp. 61-68.

14-Landau H, Matoth I, Landau-Cordova Z, Goldfarb A, Rachmilewitz EA, Glaser B. (1993). Cross-sectional and longitudinal study of the pituitary-thyroid axis in patients with thalassaemia major, ClinEndocrinol (Oxf), Vol.38(1), pp. 55-61.

15-Wondeisford, F.E., Magner, J.A. and Weintraub, B.D.(1996).Chemistry and biosynthesis of thyrotropin in brave man .7th ed. Philadelphia Lippincott-Raven. 190-207.

17-Botella-Carretero JI, Alvarez-Blasco F, Sancho J, Escobar-Morreale HF.(2006).. Effects of thyroid hormones on serum levels of adipokines as studied in patients with differentiated thyroid carcinoma during thyroxine withdrawal. Thyroid.16(4):397-402.

18. Agarwal MB.(2009). Advances in management of Thalassemia. Indian J pediatr; 76: 177-84.

19. Hershko C.(2002).Role of iron chelation therapy in thalassemia major. Turk J Haematol.19: 121-6.

20. Hoffbrand A, Cohen A, Hershko C. Role .(2003).of deferiprone in chelation therapy for transfusional iron overload. Blood .102: 17-24.

* Forensic DNA Research and Training Center/ AL-Nahrain University.(corresponding author)/ molecular_fdna@yahoo.com