DOI: https://doi.org/10.53350/pjmhs22162327

ORIGINAL ARTICLE

Correlation of serum TSH levels with serum ferritin levels in children of β thalassemia major presenting at tertiary care hospital

FAGHIA SHOAIB[1], RABIA SAEED[2], SARA KHAN[3], AYESHA SIDDIQA[4], SIBGHA BASHIR[5], SHOAIB SAFDAR[6]
[1]*Assistant Professor, Shahida Islam Medical College and Teaching Hospital Lodhran*
[2]*Assistant Professor, CMH Institute of Medical Sciences Bahawalpur*
[3]*Assistant Professor, CMH Medical College Bahawalpur*
[4]*Assistant Professor Pathology, PIMS Islamabad*
[5]*Assistant Professor, Department of Pathology, Shahida Islam Medical & Dental College Lodhran*
[6]*Assistant Professor, Department of Pulmonology, Shahida Islam Medical and Dental College Lodhran*
Correspondence to: Dr. Faghia Shoaib, Email: faghiashoaib@hotmail.com, Cell: 03336723677

ABSTRACT

Objective: To study the correlation of serum TSH levels with serum ferritin levels in children of β thalassemia major presenting at tertiary care hospital.

Material and methods:

Between April 2020 and October 2020 total 88 patients of β thalassemia major having age 5-15 years either male or female were selected from Department of Pathology, Sheikh Zaid Hospital, Rahim Yar Khan. Correlation of between ferritin and TSH levels was studies.

Results:

Mean age was 8.02 ± 2.792 years, mean TSH level was 3.9564 ± 2.38263 µIU/ml, mean ferritin level was 3282.84 ± 1782.013 ng/dl and mean duration of blood transfusion was 3.23 ± 1.328 years. (Table 1) Out of 88 patients, 67 (76%) were males and 21 (24%) were females. TSH levels was negatively correlated with ferritin levels which was not significant (r = -0.073, P= 0.496).

Conclusion:

In this study negative correlation was detected between ferritin and TSH levels. Difference of mean ferritin and TSH level among both gender, age group was detected.

Key words: β thalassemia, TSH, ferritin, haemoglobin

INTRODUCTION

Thalassemia are a group of diseases marked by a decrease in the rate of synthesis of 1 or >1 types of normal haemoglobin polypeptide chains caused by a genetic mutation. The quantity of Hb-A in the red cells decreases in β thalassemia due to insufficient b chain synthesis.[1,2]

Thalassemia major children required multiple blood transfusions. Iron overdose can develop from frequent blood transfusions, which can lead to endocrine malfunction.[3-5] The heart, thyroid, gonad, and pituitary glands, among other vital organs, can accumulate iron. One of the endocrinopathies is hypothyroidism. Subclinical hypothyroidism is defined as TSH levels that are just slightly raised but free T4 levels remain within acceptable limits. TSH levels are increased in primary hypothyroidism, whereas T4 levels are lowered (low). T4 levels are low and TSH is low in secondary or central hypothyroidism.[5,6]

MATERIAL AND METHODS

Between April 2020 and October 2020 total 88 patients of β thalassemia major coming for scheduled blood transfusion having age 5-15 years either male or female were selected from Department of Pathology, Sheikh Zaid Hospital, Rahim Yar Khan.

Children with bone marrow transplant, children on radio or chemo therapy, children taking medication for thyroid disease were excluded.

Ethical review committee approved the study.

Blood sample of all the selected children was taken and send to laboratory for serum TSH and serum Ferritin levels. Findings were noted on pre-designed proforma along with demographic profile of the patients.

Data was analyzed in SPSS version 20. Serum TSH and serum Ferritin and age was presented in form of mean and SD. Gender of the children was presented as frequency. Pearson correlation was used to detect the correlation between Ferritin and TSH levels. T test was used to detect difference of mean TSH and mean ferritin among gender, age groups and duration of blood transfusion groups. P value 0.05 was taken as significant.

RESULTS

Mean age of children was 8.02 ± 2.792 years, mean ferritin, mean TSH levels were 3282.84 ± 1782.013 ng/dl, 3.9564 ± 2.38263 µIU/ml and mean duration of blood transfusion was 3.23 ± 1.328 years. (Table 1) Out of 88 patients, 67 (76%) were males and 21 (24%) were females. (Fig. 1)

5-10 and 11-15 years age groups were created. There were 70 (80%) children in age group 5-10 years while while 18 (20%) children in age group 11-15 years. (Fig. 2)

Table 2 showing correlation of serum TSH levels with serum ferritin levels. After applying Pearson correlation test, negative correlation was detected between ferritin and TSH levels which was not significant (r = -0.073, P= 0.496).

Table 1: Mean and SD of different variables

Variable	Mean	SD
Age (Years)	8.02	2.792
TSH (µIU/ml)	3.9564	2.38263
Ferritin (ng/dl)	3282.84	1782.013
Duration of blood transfusion (Years)	3.23	1.328

In male patients means serum TSH was 4.027 ± 2.342 µIU/ml and in females was 3.731 ± 2.552 µIU/ml. Difference was not significant (P = 0.621). In 5-10 years age group, mean TSH 3.754 ± 2.109 µIU/ml and in11-15 years age group, mean TSH was 4.743 ± 3.188 µIU/ml. Difference of mean serum TSH levels between groups was not significant (P = 0.117). Two groups (1-3 years and 4-5 years) of duration of blood transfusion were created. In 1-3 years group, mean TSH level was 3.819 ± 2.145 µIU/ml. In 4-5 years group, mean TSH level was 4.391 ± 3.041 µIU/ml. Difference was not significant (P = 0.340) (Table 3) In male patients, mean serum ferritin level was 3386.12 ± 1822.412 ng/dl and in females was 2953.33 ± 1644.412 ng/dl. Difference of mean ferritin level between male and female patients was not significant (P = 0.334). In 5-10 years age group, mean serum ferritin level was 3386.23 ± 1827.029 ng/dl. In age group 11-15 years, mean serum ferritin level was 2880.78 ± 1577.271 ng/dl. Difference of mean serum ferritin level between both age groups was not significant (P = 0.286). In 1-3 years duration of blood transfusion,

mean serum ferritin level was 3362.58 ± 1747.249 ng/dl. In 4-5 years duration of blood transfusion group, mean serum ferritin level was 3028.43 ± 1910.490 ng/dl. Difference was not significant (P = 0.457) (Table 4)

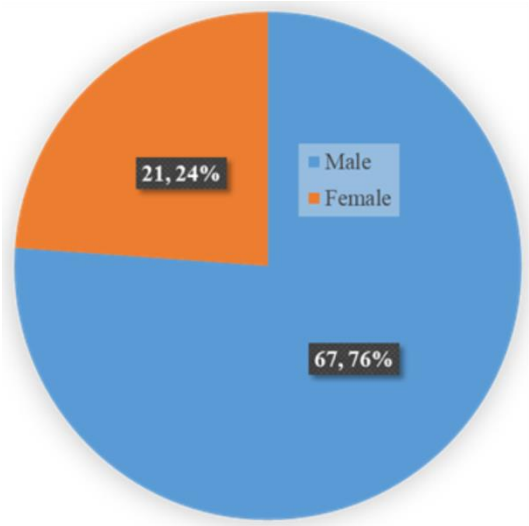

Fig. 1: Division of children according to gender

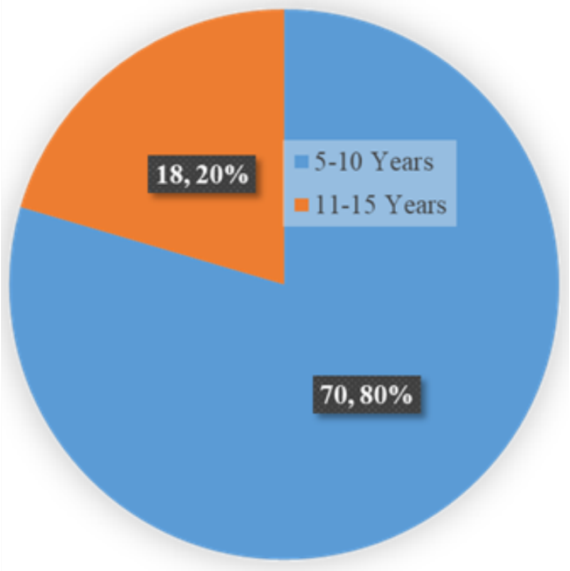

Fig. 2: Division of children according to age

Table 2: Correlation between ferritin and TSH levels

	TSH (µIU/ml)	
	Pearson correlation (r)	P-value
serum ferritin (ng/dl)	-0.073	0.496

Table 3: Comparison of mean TSH with different variables

Variables	Mean (µIU/ml)	Std. Deviation	P Value
Gender			
Male	4.027	2.342	0.621
Female	3.731	2.552	
Age group			
5-10	3.754	2.109	0.117
11-15	4.743	3.188	
duration of blood transfusion			
1-3 Years	3.819	2.145	0.340
4-5 Years	4.391	3.041	

Table 4: Comparison of mean serum ferritin level with different variables

Variables	Mean (ng/dl)	Std. Deviation	P Value
Gender			
Male	3386.12	1822.412	0.334
Female	2953.33	1644.412	
Age group			
5-10	3386.23	1827.029	0.286
11-15	2880.78	1577.271	
Duration of blood transfusion			
1-3	3362.58	1747.249	0.457
4-5	3028.43	1910.490	

DISCUSSION

The purpose of this study was to detect correlation of serum TSH with serum Ferritin in patients of β thalassemia major.

Mean age was 8.02 ± 2.792 years, mean TSH level was 3.9564 ± 2.38263 µIU/ml, mean ferritin level was 3282.84 ± 1782.013 ng/dl and mean duration of blood transfusion was 3.23 ± 1.328 years. After applying Pearson correlation test, negative correlation was detected between serum TSH and serum Ferritin levels which was not significant (r = -0.073, P= 0.496).

In one study by Rehim et al[7] reported mean age as 8.73±2.569 years, mean ferritin as 3087.64±1.625ng/dl, mean TSH as 3.8085±2.281 µIU/ml and mean duration of blood transfusion as 7.88±2.622 years and correlation between ferritin levels and TSH levels was negative.

In study of Kundu et al,[8] mean age of β thalassemia major was 6.98±2.98 years, Serum Ferritin was 2903.10±772.26 ng/ml, mean TSH 7.15±8.92 µIU/ml which is also comparable with our study.

In another study,[9] out of 500 patients, 47% patients were males and 53% patients were females. Mean age was 9.04 years, mean ferritin level was 2995.78 ± 802.53 ng/dl and mean TSH was 5.07 ± 2.52 µIU/ml. In our study, 67 (76%) were males and 21 (24%) were females.

In study of Farooq MS et al[10] negative correlation was detected between TSH and ferritin levels.

Solanki et al[11] found mean ferritin as 2927.40±783.39 ng/dl and mean TSH as 7.14±9.04 µIU/ml. They also found no correlation of TSH levels with Ferritin levels.

In study of Malik et al[12] mean age as 7.6 ± 2.5 years which is in consistent with our study.

Positive correlation (r=0.34, p=0.014) between ferritin and TSH levels was detected by Garadah TS et al[13] in their study.

Correlation between ferritin and TSH levels was detected by Eshragi et al[4] in their study.

In present study, in male patients, means serum TSH was 4.027 ± 2.342 µIU/ml and in females was 3.731 ± 2.552 µIU/ml. Difference was not significant (P = 0.621). In male patients, mean serum ferritin level was 3386.12 ± 1822.412 ng/dl and in females was 2953.33 ± 1644.412 ng/dl. Difference of mean serum ferritin level between male and female patients was not significant (P = 0.334).

Farooq MS et al[10] reported mean TSH levels in male children as 3.67± 0.69 µIU/ml while in female children as 4.73± 1.20 µIU/ml.

Irshaid et al[14] found mean ferritin levels in male children as 2699 ± 858 ng/dl while in female children as 2412 ± 750 ng/dl.

CONCLUSION

In this study negative correlation was detected between ferritin and TSH levels. Difference of mean ferritin and TSH level among both gender, age group was detected.

REFERENCES

1. Malik SA, Syed S, Ahmed N. Frequency of hypothyroidism in patients of beta-thalassaemia. J Pak Med Assoc. 2010;60(1):17-20.
2. Merchant RH, Shirodkar A, Ahmed J. Evaluation of growth, puberty and endocrine dysfunctions in relation to iron overload in multi

transfused Indian thalassemia patients. Indian J Pediatr. 2011;78(6):679-83.
3. Kurtoglu AU, Kurtoglu E, Temizkan AK. Effect of iron overload on endocrinopathies in patients with beta-thalassaemia major and intermedia. Endokrynol Pol. 2012;63(4):260-3.
4. Eshragi P, Tamaddoni A, Zarifi K, Mohammadhasani A, Aminzadeh M. Thyroid function in major thalassemia patients: Is it related to height and chelation therapy? Caspian J Intern Med. 2011;2(1):189-93.
5. Abdel-Razek AR, Abdel-Salam A, El-Sonbaty MM, Youness ER. Study of thyroid function in Egyptian children with beta-thalassemia major and beta-thalassemia intermedia. J Egypt Public Health Assoc. 2013;88(3):148-52.
6. Garadah TS, Mahdi NA, Jaradat AM, Hasan ZA, Nagalla DS. Thyroid function status and echocardiographic abnormalities in patients with Beta thalassemia major in Bahrain. Clin Med Insights Cardiol. 2013;7:21-7.
7. Rehim MH, Mustafa S, Rizvi SK. Correlation between serum TSH and serum ferritin in patients of beta thalassemia major. Pak J Med Health Sci. 2017 Jan 1;11(1):266-9.
8. Kundu D, Ray D, Ghosh S, Chowdhury DG, Dutta S, Dhar A. Relation of elevated serum ferritin levels to hypothyroidism in children with beta-thalassemia major. Int J Med Res Rev 2016;4(12):2120-2124.doi:10.17511 /ijmrr. 2016.i12.07.
9. Ghosh S, Chakrabarti D. Estimation of serum ferritin and TSH levels in thalassemia patients undergoing iron chelation therapy. Bangladesh Journal of Medical Science. 2021 Jan 1;20(1):130-5.
10. Farooq MS, Asif M, Shaheen B, Manzoor Z. Serum Ferritin Level in Thalassemic Patients of 10-15 Years and its Relationship with Thyroid Function Tests. Med. Forum. 2014;25(11):40-44.
11. Solanki US, Bhargava AK, Adole PS. Assessment of thyroid function in multi-transfused children of β thalassemia major with iron overload. WJPPS. 2014 Jun 10;3(8):2177-83.
12. Malik SA, Syed S, Ahmed N. Frequency of hypothyroidism in patients of beta-thalassaemia. J Pak Med Assoc. 2010;60(1):17–20.
13. Garadah TS, Mahdi NA, Jaradat AM, Hasan ZA, Nagalla DS. Thyroid function status and echocardiographic abnormalities in patients with Beta thalassemia major in Bahrain. Clin Med Insights Cardiol. 2013;7:21-7.
14. Irshaid F, Mansi K. Status of thyroid function and iron overload in adolescents and young adults with beta-thalassemia major treated with deferoxamine in jordan. InProceedings of World Academy of Science, Engineering and Technology 2009 Oct 21 (Vol. 58, pp. 658-663).