

Study of Relationship between Serum Ferritin Level and Thyroid Disorders

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ABSTRACT

Background: Endocrine disorders are the majority common endocrinopathies. Thyroid hormone levels can influence the serum Ferritin level (Iron storage Protein) particularly in females.

Materials & Methods: 25 patients of clinically established patients of thyroid abnormality attending outpatient departments, P. B. M. hospital Bikaner (Rajasthan) were compare with 25 healthy subjects of either sex in Department of Biochemistry, S. P. Medical College, Bikaner for thyroid function tests and serum ferritin. Serum T₃, Serum T₄, Serum TSH and Serum Ferritin were calculated by ELISA techniques.

Results: Serum T₃, Serum T₄ and Serum TSH of hypothyroid patients show a highly significant ($p < 0.001$) relationship with healthy control subjects. Serum ferritin showed a significant ($p < 0.05$) relationship for hypothyroid patients whereas a highly significant relationship ($p < 0.001$) for hyperthyroids was find.

Conclusion: Estimation of serum ferritin is trouble-free and sensitive and it can be used to avoid chronic complications of thyroid disorders.

Keywords: ELISA, Ferritin, Hypothyroid, Hyperthyroids.

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INTRODUCTION

Thyroid is the major endocrine gland of body is associated with different metabolic functions by secreting thyroid hormones. Thyroid dysfunction, more ordinary in females, may begin in in uterus, infancy, babyhood, during pregnancy and in adult life. They have thoughtful influence on the female child's growth and puberty, menstrual cycles. The chief disorders of thyroid dysfunctions are hypothyroidism and hyperthyroidism.¹ Ferritin is an iron protein complex, created from this intracellular acceptor apoferritin. It's an iron storage protein, mobilize in response to stimulus such as dietary changes, blood loss or pregnancy. Serum ferritin is sensitive to thyroid status particularly in women. Elevated ferritin levels had been seen in patients with hyperthyroidism² whereas these levels decreased after thyroid functions return to normal.³ Iron deficiency was linked with high prevalence of goitre in Iranian School children.⁴ Thus this study was intended to establish the helpfulness of serum ferritin level estimation in patients of thyroid disorder patients.

MATERIALS AND METHODS

The current study was conducted on 17 clinically recognized patients of hypothyroidism and 08 patients of hyperthyroidism

attending Out Patient Departments, P.B.M. hospital Bikaner (Rajasthan). The results were compare with age harmonized 25 healthy control subjects of either sex. Following investigation were perform in all the subjects included in this study:

1. Serum T₃, Serum T₄ and Serum TSH by ELISA technique.
2. Serum Ferritin by ELISA

RESULTS

17 patients of hypothyroidism (6 males and 11 females) and 8 patients of hyperthyroidism (3 males and 5 females) and 25 healthy control subjects (6 males and 19 females) were measured for thyroid function tests and serum ferritin level.

The mean values for serum T₃, serum T₄ and serum TSH were $0.5 \pm 0.22 \text{ ng/mL}$, $2.58 \pm 1.24 \mu\text{g/mL}$ and $17.60 \pm 12.74 \mu\text{IU/mL}$ in hypothyroid patients and $3.7 \pm 1.50 \text{ ng/mL}$, $15.98 \pm 4.78 \mu\text{g/mL}$ and $0.16 \pm 0.74 \mu\text{IU/}$ in hyperthyroid patients while $1.07 \pm 0.31 \text{ ng/mL}$, $7.59 \pm 2.37 \mu\text{g/mL}$ and $2.04 \pm 1.30 \mu\text{IU/mL}$ in healthy subjects correspondingly.

The mean ferritin levels for hypothyroids, hyperthyroides and healthy controls were $29.94 \pm 20.66 \text{ ng/mL}$, $205.75 \pm 96.32 \text{ ng/mL}$ and $93.72 \pm 50.66 \text{ ng/mL}$ respectively.

Table 1: Distribution of the subjects studied in relation to sex

Sr. No.	Groups Studied	Male	Females	Total
1	Healthy Controls	6	19	25
2	Hypothyroid Patients	6	11	17
3	Hyperthyroid Patients	3	5	8
	Total	15	35	50

Table 2: Mean Serum Ferritin of the subjects studies

Sr.No.	Groups studied	Serum Ferritin (Men \pm S.D.) [Range]
1	Healthy Controls (25)	93.72 \pm 50.66 [19.0-205.0]
2	Hypothyroid Patients (17)	29.94 \pm 20.66 [7.0-65.0]
3	Hyperthyroid Patients (8)	205.75 \pm 96.32 [100.30-406.0]

Table 3: Statistical analysis of Serum Ferritin among the groups studied

Sr.No.	Group Compared	t-value	P-value
1	Healthy controls v/s Hypothyroids	2.26	P < 0.05 (S)
2	Healthy controls v/s Hyperthyroids	5.64	P < 0.001 (HS)

DISCUSSION AND CONCLUSION

A significant relationship was seen in serum ferritin levels when hypothyroid subjects ($p < 0.05$) were compared with the healthy controls. Hyperthyroid patients show a highly significant ($p < 0.001$) relationship when compare with the healthy control subjects.

Deshpande UR et al (1992) observed that the mean serum ferritin levels were $99.45 \pm 33.302 \mu\text{g/mL}$ and $4.49 \pm 10.2 \mu\text{g/mL}$ in healthy males and females correspondingly. They showed that levels of serum ferritin were slightly inferior in hypothyroids while levels were significantly higher in hyperthyroid subjects.⁵ Henry Volzke et al (2006) observed that there was no relationship between thyroid functions and serum ferritin levels.⁶

In this study, a highly significant correlation was seen when serum T_3 of hypothyroid subjects was compared with healthy subjects. The outcome of this study were concordant with Coulombe et al (1976)⁷ and Geola et al (1980)⁸. Serum T_4 of hypothyroids also showed a highly significant correlation ship with healthy subjects. Similar results were also report by Pykalisto et al (1976)⁹ and Mehta et al (1999).¹⁰ Similar results were observed for serum TSH and the results were in harmony with the studies of Komiya et al (1984)¹¹ and De Bruin TWA (1993).¹² Estimation of serum ferritin is trouble-free, trustworthy, economic and sensitive and it can be used in prevention of chronic complication of thyroid disorders.

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