

Study of Serum Ferritin in Thyroid disorders

Gupta R.*, Mathur R., Gurjar M.

Department of Biochemistry, Dr. S. N. Medical College, Jodhpur, India.

Correspondence Address: * Ms. Gupta Ritu, Department of Biochemistry, Dr. S. N. Medical College, Jodhpur, India.

Abstract

Endocrine disorders are the most common endocrinopathies. Thyroid hormone levels can affect the serum Ferritin level (Iron storage Protein) especially in females. 25 patients of clinically established patients of thyroid abnormality attending Out Patient Departments, MDM hospital Jodhpur (Rajasthan) were compared with 25 healthy subjects of either sex in Department of Biochemistry, Dr S. N. Medical College, Jodhpur for thyroid function tests and serum ferritin. Serum T₃, Serum T₄, Serum TSH and Serum Ferritin were measured by ELISA techniques. Serum T₃, Serum T₄ and Serum TSH of hypothyroid patients showed a highly significant ($p < 0.001$) relationship with healthy control subjects. Serum ferritin showed a significant ($p < 0.05$) relationship for hypothyroid patients while a highly significant relationship ($p < 0.001$) for hyperthyroids was observed. Estimation of serum ferritin is simple and sensitive and it can be used to prevent chronic complications of thyroid disorders.

Keywords: ELISA, Ferritin, Hypothyroid, Hyperthyroids

Introduction

Thyroid is the largest endocrine gland of body is associated with various metabolic functions by secreting thyroid hormones. Thyroid dysfunction, more common in females, may begin in inutero, infancy, childhood, during pregnancy and in adult life. They have profound influence on the girl child's growth and puberty, menstrual cycles. The main disorders of thyroid dysfunctions are hypothyroidism and hyperthyroidism.¹ Ferritin is an iron protein complex, formed from this intracellular acceptor apoferritin. It's an iron storage protein, mobilized in response to stimuli such as dietary changes, blood loss or pregnancy. Serum ferritin is sensitive to thyroid status especially in women.

Elevated ferritin levels had been observed in patients with hyperthyroidism² whereas these levels decreased after thyroid functions returned to normal.³ Iron deficiency was associated with high prevalence of goitre in Iranian School children.⁴

Thus this study was designed to establish the usefulness of serum ferritin level estimation in patients of thyroid disorder patients.

Materials and methods

The present study was conducted on 17 clinically established patients of hypothyroidism and 08 patients of hyperthyroidism attending Out Patient Departments, MDM hospital Jodhpur (Rajasthan). The results were compared with

age matched 25 healthy control subjects of either sex. Following investigation were performed in all the subjects included in this study:

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

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

Sr. No	Groups studied	Males	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 studied

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

Results

17 patients suffering from 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 studied for thyroid function tests and serum ferritin level.

The mean values for serum T₃, serum T₄ and serum TSH were 0.5±0.22ng/mL, 2.58±1.24µg/mL and 17.60±12.74µIU/mL in hypothyroid patients and 3.7±1.50 ng/mL, 15.98±4.78µg/mL and 0.16±0.74µIU/ in hyperthyroid patients while 1.07±0.31ng/mL, 7.59±2.37µg/mL and 2.04±1.30µIU/mL in healthy subjects respectively.

The mean ferritin levels for hypothyroids, hyperthyroides and healthy controls were 29.94±20.66 ng/mL, 205.75±96.32 ng/mL and 93.72±50.66 ng/mL respectively.

Discussion and conclusion

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

Deshpande UR *et al* (1992) observed that the mean serum ferritin levels were 99.45±33.302µg/mL and 4.49±10.2µg/mL in healthy males and females respectively. They showed that levels of serum ferritin were slightly lower in hypothyroids while levels were significantly higher in hyperthyroid subjects.⁵

Henry Volzke *et al* (2006) observed that there was no association between thyroid functions and serum ferritin levels.⁶

In this study, a highly significant correlation was observed when serum T₃ of hypothyroid subjects was compared with healthy subjects. The results of this study were concordant with Coulmbe *et al* (1976)⁷ and Geola *et al* (1980)⁸.

Serum T₄ of hypothyroids also showed a highly significant correlation with

healthy subjects. Similar results were also reported by Pykalisto *et al* (1976)⁹ and Mehta *et al* (1999).¹⁰

Similar results were observed for serum TSH and the results were in accordance with the studies of Komiya *et al* (1984)¹¹ and De Bruin TWA (1993).¹²

Estimation of serum ferritin is simple, reliable, economic and sensitive and it can be used in prevention of chronic complications of thyroid disorders.

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