

ORIGINAL RESEARCH

Evaluation of Iron, Ferritin, TIBC and LDH Levels in Hypothyroid Patients: A Cross-Sectional Analysis in Rohilkhand Region

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ABSTRACT

Background: The present study was conducted for assessing Iron, ferritin, TIBC and LDH levels in hypothyroid patients in Rohilkhand Region. **Materials & Methods:** A total of 100 hypothyroid patients were enrolled. Complete demographic and clinical details of all the patients were obtained. A Performa was made and complete medical and family history of all the patients was recorded separately. Another set of 100 age and gender matched healthy controls were also enrolled. Blood samples were obtained and Thyroid Profile, Iron, TIBC, LDH and Ferritin levels were evaluated among both healthy controls and hypothyroid patients. **Results:** Mean iron levels among patients of hypothyroid group and control group was 97.23 mcg/dL and 55.3 mcg/dL respectively. Mean ferritin levels among patients of hypothyroid group and control group were 105.1 ng/ml and 29.7 ng/ml respectively. Mean TIBC levels among patients of hypothyroid group and control group was 301.9 mcg/dL and 454.2 mcg/dL respectively. Mean LDH among patients of hypothyroid group and control group was 297.3 U/L and 498.3 U/L respectively. While comparing the results statistically between hypothyroid group and control group, significant results were obtained. **Conclusion:** Thyroid is affected with alteration in iron profile status along with LDH levels.

Key words: Hypothyroid, Iron, Ferritin.

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INTRODUCTION

Hypothyroidism is one of the most common diseases worldwide, and levothyroxine is the usual medication prescribed to manage it. Hypothyroidism occurs when the thyroid gland, located in the neck, does not produce enough thyroid hormone for the body's requirements. This can result in heart disease, infertility, and poor brain development in children.¹ The full implications of hypothyroidism in the population are not completely appreciated or defined. Hypothyroidism affects up to 5% of the population according to European prevalence estimates, while as many as 5% of the population may have undiagnosed thyroid failure. Of patients who are treated, up to one-third are not receiving adequate treatment.^{3, 4} The brain is a major target organ for thyroid hormones, and adult-onset hypothyroidism can have significant effects on neuropsychiatric function. On the other hand, patients with mild hypothyroidism may attribute unrelated symptoms to their thyroid condition. This can lead to overtreatment or use of nonstandard

thyroid hormone preparations, with attendant risks.⁵ Hence; the present study was conducted for assessing Iron, ferritin, TIBC and LDH levels in hypothyroid patients in Rohilkhand Region.

MATERIALS & METHODS

The present study was conducted in the Department of Biochemistry, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh (India) for assessing Iron, ferritin, TIBC and LDH levels in hypothyroid patients, a cross-sectional study in Rohilkhand Region. A total of 100 hypothyroid patients were enrolled. Study duration was April 2022 to March 2023. Complete demographic and clinical details of all the patients were obtained. A Performa was made and complete medical and family history of all the patients was recorded separately. Another set of 100 age and gender matched healthy controls were also enrolled. Blood samples were obtained and Thyroid Profile, Iron & TIBC (using ERBA Chem 5x via ferrozine/magnesium carbonate method), LDH (using

ERBA Chem 5x via modified IFCC method) and Ferritin levels (ELISA method) were evaluated among both healthy controls and hypothyroid patients. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

RESULTS

Mean age of the patients of the hypothyroid group and control group was 35.6 years and 37.3 years respectively. Majority of the patients of both the study groups were males and were of urban residence. Mean

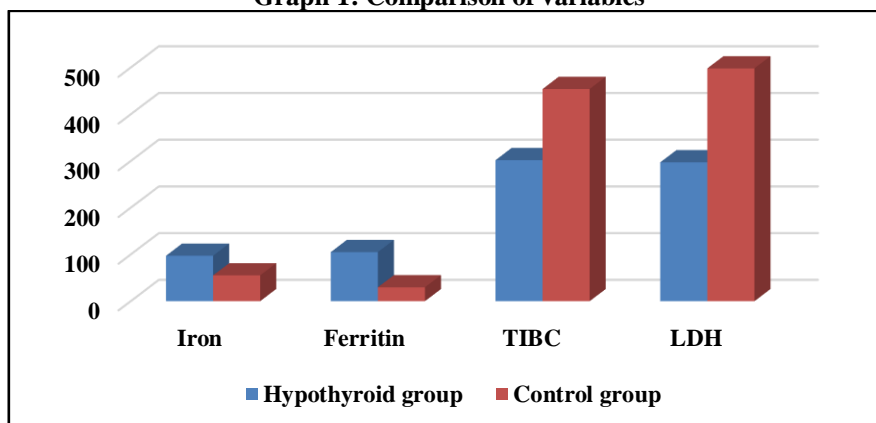
iron levels among patients of hypothyroid group and control group were 97.23 mcg/dL and 55.3 mcg/dL respectively. Mean ferritin levels among patients of hypothyroid group and control group were 105.1 ng/ml and 29.7 ng/ml respectively. Mean TIBC levels among patients of hypothyroid group and control group was 301.9 mcg/dL and 454.2 mcg/dL respectively. Mean LDH among patients of hypothyroid group and control group was 297.3 U/L and 498.3 U/L respectively. While comparing the results statistically between hypothyroid group and control group, significant results were obtained.

Table 1: Comparison of variables

Variable	Hypothyroid group	Control group	p- value
Iron	97.23	55.3	0.001*
Ferritin	105.1	29.7	0.025*
TIBC	301.9	454.2	0.003*
LDH	297.3	498.3	0.004*

*: Significant

Graph 1: Comparison of variables



DISCUSSION

Hypothyroidism affects between 4% and 10% of the population, and the prevalence of subclinical hypothyroidism is reported to be as high as 10% in various studies. Hypothyroidism is diagnosed when low levels of the thyroid hormones result in elevated levels of thyroid-stimulating hormone (TSH), whereas subclinical hypothyroidism is diagnosed when TSH levels are elevated above the upper limit of the assay reference range with normal thyroid hormone levels. Thyroid hormones play an important role in the normal function of heart and vascular physiology, and hypothyroidism produces profound cardiovascular effects. Of recent clinical interest is the effect of subclinical hypothyroidism on cardiovascular disease and whether or not it should be treated.⁶⁻¹⁰ Mean age of the patients of the hypothyroid group and control group was 35.6 years and 37.3 years respectively. Mean iron levels among patients of hypothyroid group and control group were 97.23 mcg/dL and 55.3 mcg/dL respectively. Mean ferritin levels among patients of hypothyroid group and control group were 105.1 ng/ml and 29.7 ng/ml respectively. Mean TIBC

levels among patients of hypothyroid group and control group was 301.9 mcg/dL and 454.2 mcg/dL respectively. Mean LDH among patients of hypothyroid group and control group was 297.3 U/L and 498.3 U/L respectively. While comparing the results statistically between hypothyroid group and control group, significant results were obtained. In a similar study conducted by Prasad V D et al, authors assessed the changes of serum ferritin, Iron, TIBC and LDH levels which may affect the thyroid functions in hypothyroid patients. Serum Thyroid profile, Ferritin levels were estimated in 50 age and sex matched controls and patients of hypothyroidism. Serum Iron, TIBC and LDH levels were estimated and the results were correlated statistically. Serum ferritin levels were found to be significantly decreased in patients with hypothyroidism compared to normal subjects ($p < 0.001$) and TIBC levels were significantly increased. Hypothyroidism is associated with low serum ferritin levels. The estimation of serum ferritin may help in understanding the etiopathogenesis, diagnosis, and monitoring of hypothyroid patients.¹⁰ McGrowder DA et al determined the

activities of serum creatine kinase (CK) and lactate dehydrogenase (LDH) in thyroid disorders, and to evaluate the relationship between CK, LDH and FT4, and TSH levels. In their retrospective study, thyroid function tests, serum CK and LDH activities were obtained from the medical records of newly diagnosed hyperthyroid and hypothyroid patients attending the Endocrinology Clinic at the University Hospital of the West Indies from 2005- 2009. Elevation of CK activity was found in 5 patients (28%, 5/18) with overt hypothyroidism and in 12 patients (24.0%, 12/50) with subclinical hypothyroidism. The mean CK activity in subclinical hypothyroid patients was 179.80 ± 125.68 U/L compared with 389.901 ± 381.20 U/L in overt hypothyroid patients. The elevation of LDH activity was found in 6 patients (33.3%, 6/18) with overt hypothyroidism and in 37 patients (74.0%, 37/50) with subclinical hypothyroidism. In the hypothyroid patients, a positive correlation was found between CK activity and TSH ($r = 0.292$, $P = 0.015$), and a negative correlation between CK activity and FT4 ($r = - 0.325$, $P = 0.007$); and between FT4 and TSH ($r = - 0.371$, $P = 0.002$). The significant elevation in serum CK and LDH activities indicates that these can be used as parameters for screening hypothyroid patients but not hyperthyroid patients.¹¹

CONCLUSION

Thyroid is affected with alteration in iron profile status along with LDH levels.

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