

ASSESSMENT OF THYROID FUNCTION IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS AND ITS CLINICAL CORRELATION

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Abstract

Background: Systemic lupus erythematosus (SLE) is a chronic inflammatory autoimmune disease of unknown etiology which affects multiple organs in the body. The study was conducted with the objectives of studying the prevalence of thyroid dysfunction and to measure free T3, T4 and TSH levels in patients with SLE in Chennai, Tamil Nadu, India. **Materials and Methods:** The study was hospital based cross sectional observational study design, conducted at the conducted at Madras medical College and Rajiv Gandhi Government Hospital, Chennai over a period of six months from February 2020 to July 2020. Patients admitted in Department of Rheumatology who were diagnosed to have systemic lupus erythematosus were included in the study. Pretested pre-validated questionnaire was used for data collection. Data was collected from 100 study participants. **Result:** The mean (SD) age among the study participants was found to be 27.38 (4.14) years. Most of the participants were in the age group of 20-30 years, 45 (45%). Among 100 patients of SLE, 8 (8%) patients were found to have overt hypothyroidism (TSH > 10), 17 (17%) patients have subclinical hypothyroidism (TSH between 5-10) and 75 (75%) patients were in euthyroid state (TSH < 5). Weight gain was the most common clinical feature observed in 20% of study participants followed by cold intolerance and weight loss in 13% each. **Conclusion:** SLE was more commonly seen in females of childbearing age group in their third decade of life. The clinical features did not differ significantly with thyroid dysfunction and therefore it is difficult to clinically detect the presence of thyroid dysfunction among patients with SLE.

INTRODUCTION

Systemic lupus erythematosus (SLE) is a chronic inflammatory autoimmune disease of unknown etiology which affects multiple organs in the body. SLE has varying presentations from mild disease to life threatening conditions characterized by relapsing and remitting course with multisystem involvement having variable prognosis.^[1] It mainly affects the women of childbearing age group and the ratio of 10 to 15:1 (female: male), mainly due to estrogen which modulates the lymphocyte activation. Genetic susceptibility with environmental factors promotes immune system activation and damages the organ that contributes to clinical manifestation, morbidity and occasionally mortality.^[2]

The prevalence of disease is more common in Asian, African American, and Hispanic population which is three to four folds higher when compared to white populations. It is rare in African blacks. The prevalence rate of SLE ranges from 20-240 per

1, 00,000 persons. The susceptible genes and environmental factors lead to abnormal immune system activation which includes decreased activation thresholds in adaptive immunity cells such as mature B lymphocytes and T lymphocytes, impaired clearance of apoptotic cells and immune complexes, innate immunity system activation, defective regulation of B cells, CD4, CD8 and myeloid suppressor cells.^[3]

Due to this immune deregulation, there is increased production of interleukin 17 and 10, interferon 1 and 2, tumor necrosis factor alpha (TNF alpha), B cell maturation and cytokine B lymphocytes. There is decreased production of Interleukin 2 and Transforming growth factor beta (TGF beta), all these factors contribute to autoantibody production and complement activation leads to release of inflammatory cytokines, oxidants and vaso-active products which leads to target tissue damage in multiple organs.^[4]

There is an accelerated progression of atherosclerosis in patients with SLE due to chronic inflammation which promotes inflammatory mediators and cytokine release which leads to vascular and endothelial dysfunction causes decreased compliance of the blood vessels and promotes atheromatous plaque formation. The presence of thyroid dysfunction among SLE patients further aggravates this condition.^[5]

There is paucity of research regarding the assessment of thyroid functions with systemic lupus erythematosus and its clinical correlation especially in developing countries like India. So, we have designed this study with the objectives of studying the prevalence of thyroid dysfunction and to measure free T3, T4 and TSH levels in patients with SLE in Chennai, Tamil Nadu, India.

MATERIALS AND METHODS

Study Setting

The study was hospital based cross sectional observational study design, conducted at the conducted at Madras medical College and Rajiv Gandhi Government Hospital, Chennai over a period of six months from February 2020 to July 2020.

Study Population

Patients admitted in Department of Rheumatology, Madras Medical College and Rajiv Gandhi Government General Hospital who were diagnosed to have systemic lupus erythematosus were included in the study. Patients with known cases of hypothyroidism, hyperthyroidism, SLE patients with thyroid disorders on treatment, rheumatoid arthritis, mixed connective tissue disorders and other autoimmune disorders were excluded from the study. The data was collected from a total of 100 patients.

Study Methodology

Pretested pre-validated proforma was used for data collection from eligible patients. Simple random sampling was used as the sampling technique. The study participants were subjected to detailed history taking and clinical examination. The following investigations were done.

- Haemogram
- ESR
- LFT
- RFT with electrolytes
- Urine routine
- Lipid profile
- Electrocardiogram
- Chest X-ray
- ANA
- Anti ds-DNA
- Free T3, T4, TSH
- USG Neck

Thyroid Function tests

The thyroid function test was done by a single vein puncture and the blood sample is collected for

assessing thyroid function by measuring FT3, FT4 and TSH levels using radioimmunoassay method. The most accurate test to diagnose hypothyroidism and hyperthyroidism is serum TSH levels since it is the first hormone to be affected in the thyroid gland failure. It usually depends upon the thyroid hormone level in the serum, so it is better to assess the TSH level along with T4 and T3. FT4 is the physiological active form and the last hormone to be affected in thyroid disorder is T3.

- TSH level is elevated in hypothyroidism and decreased in hyperthyroidism.
- FT3 and FT4 level decreased in hypothyroidism and increased in hyperthyroidism.
- Normal FT4 -0.7-1.7ng/dl
- Normal FT3 - 0.2-0.5ng/dl
- Normal TSH - 0.4-4.2mU/L

Statistical Analysis

The data collection sheet included patient's demographic information, clinical features, examination findings, and laboratory investigation. Statistical analysis was carried out using SPSS software version 21. Descriptive statistics were described in terms of percentages. Inferential statistics were done using Chi-square and Fischer's test. P value of less than 0.05 was statistically significant.

Ethical Issues

The study was approved by the institutional ethical committee (IEC) before data collection. Informed written consent was obtained from the study participants before administering questionnaire and performing clinical examination.

RESULTS

The data was collected from a total of 100 patients. All the study participants agreed to take part in the study and the response rate was 100%. The mean (SD) age among the study participants was found to be 27.38 (4.14) years. Most of the participants were in the age group of 20-30 years, 45 (45%). The minimum and maximum ages were found to be 15 and 48 years respectively.

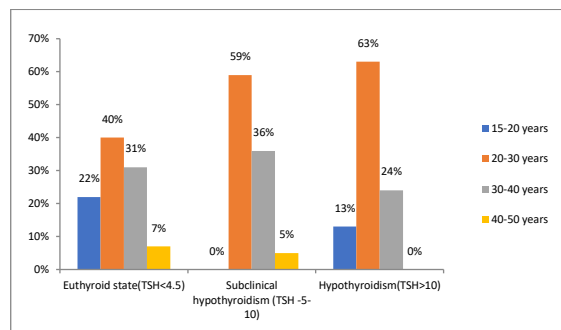


Figure 1: Distribution of study participants according to age and thyroid hormone status

Among 100 patients of SLE, 8 (8%) patients were found to have overt hypothyroidism (TSH > 10), 17

(17%) patients have subclinical hypothyroidism (TSH between 5-10) and 75 (75%) patients were in euthyroid state (TSH < 5). The distribution of thyroid hormone status according to age is given in Figure 1.

Table 1: Distribution of clinical features in study participants according to thyroid hormone status

Clinical features	Thyroid hormone status			P value
	Euthyroid state (<4.5)	Subclinical hypothyroidism (TSH 5-10)	Hypothyroidism (>10)	
Weight gain	80.0%	10.0%	10.0%	0.929
Weight loss	92.3%	0.0%	7.7%	0.208
Heat intolerance	100.0%	0.0%	0.0%	0.712
Cold intolerance	84.6%	0.0%	15.4%	0.531
Palpitation	87.5%	0.0%	12.5%	0.391
Tremor	100.0%	0.0%	0.0%	0.597
Skin changes	80.0%	0.0%	20.0%	0.769
Menstrual disturbances	90.9%	0.0%	9.1%	0.281
Gastro intestinal tract	77.8%	0.0%	22.2%	0.519
Psychiatric manifestation	85.7%	0.0%	14.3%	0.072
Dyslipidemia	66.7%	16.7%	16.7%	0.378

Among 100 study participants, weight gain was seen in 20 patients, weight loss in 13, heat intolerance in 2, cold intolerance in 13, palpitation in 8, tremors in 3, skin changes in 5, menstrual disturbances in 11, gastrointestinal tract changes in 9, and psychiatric changes in 7, and dyslipidemia in 12 participants. Chest X ray was found to be normal in 97 study participants. The clinical features present in the study participants according to their thyroid hormone status is given in table 1.

DISCUSSION

The study was conducted in patients with SLE to know the prevalence of thyroid dysfunction. In 100 study participants with SLE, the majority of cases of subclinical and clinical hypothyroidism were found to be in the age group of 20–30-year individuals. In this study, about 25 patients were found to have thyroid dysfunction. Most of the patients of SLE with thyroid dysfunction were clinically asymptomatic. The results were comparable to the results obtained by Zakeri et al.^[2] and Byron MA et al.^[6]

In this study, it was observed that the prevalence of subclinical hypothyroidism was slightly higher at 17%, followed by clinical hypothyroidism at 8%. No subclinical and clinical hyperthyroidism cases were found. The occurrence of weight gain was observed mainly in patients of SLE with euthyroid state and clinical hypothyroidism. The incidence of weight loss in our study was present equally among the patients of SLE with euthyroid and clinical hypothyroidism. It was not found in patients of subclinical hypothyroidism. Similar results were observed in a study conducted by Magaro M et al.^[7] There were no statistically significant correlations between the presence of heat intolerance and cold intolerance with thyroid dysfunction in patients with SLE. Tremor was noted only in a few cases of euthyroid and not observed in patients with thyroid dysfunction. Skin manifestations were present in a few cases of clinical hypothyroidism, and it was not correlating significantly in patients with thyroid dysfunction. The presence of menstrual disturbances

was distributed equally in patients of SLE with euthyroid state and clinical hypothyroidism. Most of the patients with clinical hypothyroidism were found to have GIT disturbances, mainly diarrhea and constipation. Among the patients of SLE with thyroid dysfunction the psychiatric manifestations are commonly present in clinical hypothyroidism. These findings were comparable to the results obtained by Mader R et al.^[8]

The study is not without limitations. The cross-sectional study design allowed us only to find the association between SLE and thyroid dysfunction and causation could not be found. The sample size was also small. The study must be conducted among a large sample of patients in multiple centers to validate the study findings.

CONCLUSION

SLE was more commonly seen in females of childbearing age group in their third decade of life. The clinical features did not differ significantly with thyroid dysfunction and therefore it is difficult to clinically detect the presence of thyroid dysfunction among patients with SLE.

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