Estimation of Some Immunological and Biochemical in the Patients with Systemic Lupus Erythematosus in Males and Females in Baghdad

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Abstract

Background: Systemic lupus erythematosus (SLE) is the prototypic multisystem autoimmune disease caused by the mistakenly in the body immune system that attacks healthy tissue in many parts of the body. Autoimmune thyroiditis (AT) is an organic-specific disease associated with production of a variety of antibodies such as antinuclear antibodies, anti-double stranded DNA, anti-Ro antibodies and anti-cardiolipin antibodies.

Methods: the study consist of 90 subjects from the both sexes were registered in this study.. The subjects have been divided in to three groups, group one and group two represent the patient groups that include, (30 SLE patients without taking steroid drugs group one (3male-27female) and 30 SLE patients with taking steroid drugs group two (2male-28female) with age range (16-57)years and thirty healthy subjects regards as a control (5male-25female)). Various clinical and laboratory parameters of SLE were measured for each groups. Also thyroid function tests were measured, which included free T3, free T4 and TSH. Antimicrosomal was measured for all groups were estimated by VIDAS method.

Results: the results showed thyroid disorders were common (23.33%%) in lupus patients. Hypothyroidism was the commonest (13.33%) abnormality in SLE patients then hyperthyroidism (1.66%). At the same time, the results showed significance decreasing ($p<0.01$) in level of FT3 in (G1 and G2) when compared with the control group. Also, the results showed high significant decrease ($p<0.01$) in level of FT4 in (G2) comparison with both groups (G1) and control group. But, The results showed no significant differences ($P<0.01$) in level of TSH comparison with other studies groups included in the study. Further antiTPO a significant increasing ($p<0.01$) in (G1) comparison with both groups (G2) and control group. Then this study revealed a significance increasing of ESR, hsCRP, anti dsDNA, and ANA in both patients groups rather than control group.

Keywords: *SLE, ESR, hsCRP, ANA, anti dsDNA, FT3, FT4, TSH, antiTPO, VIDAS.*

Introduction

Autoimmune disorders can be broken down into organ-specific and systemic diseases[(1)]. Autoimmune thyroid disease (AITD) is a well-known, organ-specific autoimmune disorder that is associated with many non-specific autoimmune diseases such as rheumatoid arthritis, Sjögren's syndrome, and SLE[(2)]. AITD represents a group of pathologies characterized by thyroid gland dysfunction due to a loss of immunological tolerance with the presence of cellular and humoral immune response, infiltration of auto-reactive T cells and B cells, production of autoantibodies directed against antigens from the gland and, subsequently, the development of clinical manifestations[(3,4)]. Because it is a group of autoimmune diseases (AD) clustered together,

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the clinical heterogeneity is diverse and varies among these diseases, it can be classified according to whether a state of hypothyroidism (i.e., Hashimoto's thyroiditis) or hyperthyroidism [i.e., Graves' disease (GD)][5]. These disorders derive from the diverse relationships between environmental and genetic factors[6] and are distinguished by reactivity to auto-thyroid antigens expressed as distinctive autoimmune inflammatory or antireceptor diseases[7,8].

Systemic Lupus Erythematosus (SLE) is characterized by disturbances in the immune response and autoantibody production that lead to the multi-system organ damage and dysfunction [9]. The disease is nine times more often observed in women than in men, especially in women at child-bearing years (15 – 35 years), and is also more common in those of non-European descent[10]. Candidate environmental risk factors include UV light exposure, Epstein–Barr virus (EBV) infection, endogenous retroviral sequences and multiple drugs.

The association of thyroid disorders with systemic lupus erythematosus (SLE) has been confirmed[11]. Disease activity indexes of SLE disease activity have been described by: SLEDAI. The SLEDAI is a global index that was developed in Toronto in 1986 and described in detail by Bombardier and collaborators in 1992 [12]. The SLEDAI appears sensitive to

change in disease activity over time [13]

Subjects and Methods

The study consisted of 60 patients (30 patients of SLE without taking steroid drugs and 30 patients of SLE with taking steroid drugs) and 30 healthy controls. Their age range was (16-57)years; the sample collected from the Baghdad teaching Hospital/ Medical city Iraq. Blood samples were collected at (8:30am), by taking 5ml of venous blood from each patients and healthy human. Five ml of blood was taken by using (5ml) disposable syringe. Two ml of blood transferred to sodium citrate tubes to measured Erythrocyte Sedimentation Rate (ESR), three ml transferred into gel Tubes allowed to clot at room temperature for 30 minutes, the sample was centrifuged at 2500rpm (rotation per minute) for 5 minutes and the serum removed and deposited at (-20°C) immediately before analyzed the biochemical markers and immunological (FT3, FT4, TSH, anti TPO, and hsCRP) measured by vitek immunodiagnostic assay system (VIDAS). ANA and anti dsDNA measured by enzyme-linked immune sorbent assay (ELISA) based on biotin double antibody sandwich technology.

Exclusion criteria: The patients who are under Chemotherapy, The patients who already has thyrotoxic, and patients with vasculitis disease were excluded from the current study.

Statistical Analysis

The program Statistical Analysis System- SAS (2012) was used to detect the effect of difference factors in the parameters of the study. The least significant difference – LSD test (Variation Analysis-ANOVA) has been used to make significant comparisons between means. The chi-square method was used to greatly equate the proportion (probability 0.05 and 0.01). Estimation of coefficient of association between parameters of variance in this analysis.

Results

The mean age of patients in G1 was (31.06 ± 8.92) years while a slightly decrease with the G2 patients (30.23 ± 10.25) years, and the mean age of control group was (30.69 ± 9.54) years with P-Value equal to 0.944.The difference was not significant ($p>0.05$) when compared among the groups as shown in table (1). In the same table, according to the gender distribution of patients, there was a higher incidence in female (90, 93.33 %) than male (10, 6.66%) in G1 and G2 respectively.

Table (1): The demographic data of patients with systemic lupus erythematosus SLE.

Variables	**Control N=30**	**SLE without taking steroid drugs G1 N=30**	**SLE with taking steroid drugs G2 N=30**	**P-value**
Age (year) (mean± SD)	30.69 ± 9.54	31.06 ± 8.92	30.23 ± 10.25	0.944NS
Gender				
Male	5(16.66%)	3(10%)	2(6.66%)	
Female	25(83.33%)	27(90%)	28(93.33%)	

Table (2) shown FT3 values, Mean ± SD of patients groups, G1, G2, and control group were [(4.33 ± 1.19),(2.90 ± 1.06), and (4.97 ± 0.57)] pmol/l with P-Value equal to 0.0001.The difference was high significant decrease ($p<0.01$) in level of FT3 comparison with other studies groups. FT4 [(15.33 ± 3.76),(11.22 ± 2.55), and (15.29 ± 2.51)] pmol/l with P-Value equal to 0.0001. The results showed a high significant decrease ($p<0.01$) in level of FT4 in G2 compared with both groups G1 and control group. TSH [(3.01 ± 1.77),(2.38 ± 1.82), and (2.11 ± 1.08)] IU/ml. The results showed no significant differences ($P<0.01$) in level of TSH comparison with other studies groups, and antiTPO [(3.97 ± 2.23),(2.33 ± 1.96), and (1.44 ± 1.32)]IU/ml. The results showed a significant increased ($p<0.01$) in level of anti-TPO in G1comparison with both groups G2 and control group, respectively.

Table (2): Thyroid function test values and antiTPO in patients with Systemic lupus erythematosus (SLE).

Laboratory variables	**(mean ± SD)**			
	Control group N= 30	**SLE without taking steroid drugs G1 (N=30)**	**SLE with taking steroid drugs G2 (N=30)**	**P-value**
T3 (pmol/l)	4.97 ± 0.57a	4.33 ± 1.19b	2.90±1.06c	0.0001**
T4 (pmol/l)	15.29±2.51a	15.33 ± 3.76a	11.22±2.55b	0.0001**
TSH (IU/ml)	2.11 ± 1.08a	3.01 ± 1.77a	2.38 ± 1.82a	0.0919NS
Anti-TPO (IU/ml)	1.44 ± 1.32b	3.97 ± 2.23a	2.33 ± 1.96b	0.0001**
** ($P<0.01$), NS: Non-Significant.				

The results are shown in the table (3) the distribution of the patients with SLE according to results of the thyroid function test. These subgroups are; hypothyroidism group, 8(13.33%) patients. Hyperthyroidism group, 1(1.66%). Hashimoto's disease (HD) group, 3(5%). Subclinical hypothyroidism group, 2(3.33%).

Table (3): Results Thyroid function test in subgroups of patients with SLE.

Thyroid function subgroups	SLE (N=60)	
	No.	%
Hypothyroidism	8	13.33
Hyperthyroidism	1	1.66
Hashimoto's disease (HD)	3	5
Subclinical hypothyroidism	2	3.33

Table (4) shows the results of screening and Inflammation markers in both (G1 and G2 and control) groups. The results showed a high significant increase ($p<0.01$) in level of ESR, hsCRP, ANA, and dsDNA compared with other studies groups.

Table (4): Comparison between difference groups in screening and Inflammation markers

Laboratory variables (mean ± SD)	Control group N=30	SLE without taking steroid drugs G1 (N=30)	SLE with taking steroid drugs G2 (N=30)	P-value
ESR (mm/h)	8.88 ±0.33b	32.27±25.53a	23.80±15.26a	0.0001**
hsCRP (mg/L)	0.564±0.25c	3.51 ± 3.50a	2.17 ± 1.25b	0.0001**
ANA (IU/ml)	0.629±0.26c	2.93 ± 1.46a	2.06 ± 1.36b	0.0001**
dsDNA (IU/ml)	8.88 ± 0.33c	32.27±25.53a	23.80±15.26b	0.0001**
** (P<0.01).				

Discussion

The present work was conducted to study the thyroid dysfunction in SLE patients. sixty patients from Iraqi individuals who attended to Baghdad teaching Hospital/ Medical city Iraq known to have SLE were included in the study, their ages ranged between 16 and 57 years and the mean age were (31.06 ± 8.92, and 30.23±10.25)year in G1 and G2 respectively.

Most (91.67%) of the patients are females. As regard sex, SLE is an autoimmune disease affecting primarily women[14]. Our finding is consistent with Franco et al.[15]; they noticed that women were 91.8% and men8.2%. Also, Khanfir et al.[16] showed that women were 90.3% and men were 9.7%, with an average age at SLE onset of approximately 30.66 years. Further, Ong et al.[17] found that females were 94.2% among SLE patients' diagnosed with in age between 15to 74year.

In the current study, we illustrated that the mean values of acute phase reactants were high; ESR at 1st hour and CRP. ESR and CRP become high leveler in the autoimmune disease than malignancy or infection and rheumatoid arthritis SLE patients revealed high ESR and CRP, but ESR increase in infection and lupus, therefore it a non-specific marker for differentiating between the diseases.[18].

The results in this study show SLE patients that taking steroid drugs have more thyroid diseases when compared with the SLE patients without taking steroid drugs due to the effect taking steroid drugs, the glucocorticoid inhibits the enzyme T4 5'-deiodinas, which regulates the extra thyroidal production of T3 from T4[19].

In this study, we reported distribution of the patients with SLE according to their thyroid dysfunction and thyroid function test results, 23.33% of SLE patients had abnormal thyroid function. Our result regarding thyroid dysfunction is agree with Zakeri and Sandooghi[20]; they showed that24.1% prevalence of thyroid disorders. Our result was lower than El-Aziz1 et al[21] they showed that 33.3% prevalence of thyroid disorders.

Our patients in the thyroid dysfunction group were hypothyroidism group, 8(13.33%) patients. Hyperthyroidism group, 1(1.66%). Hashimoto's disease (HD) group, 3(5%). Subclinical hypothyroidism group, 2(3.33%). The occurrence of hypothyroidism is common in SLE, a large body of data has support this[1]. Our results were comparable to El-Aziz1 et al[21]. they observed that in their SLE group; were 10.0% subclincal hypo-thyroidisim, 6.6% biochemical hypothyroidisim, 10.0% euthyroid sick syndrome, 3.3% subclincal hyperthyroidisim, and 3.3% biochemical hyperthyroidisim. Also, Chan et al.[22] noticed that 4.3% of their SLE patients had clinical hypothyroidism. Mader et al.[23] as well, cleared that 11.6% of their SLE patients had clinical hypothyroid compared to 1.9% in the control group. Variable results were reported in many studies; Hypothyroidism and hyperthyroidism prevalence ranged from 3.9% to 39% and 0.0% to 10.9%, respectively. [24,25,26,27].

Conclusion and Recommendation

Thyroid disorders are common in patients suffering from SLE. The most common form is hypothyrodism. Patients with SLE should be assessed for thyroid disorder by testing for early detection of thyroid abnormalities FT3, FT4, TSH and anti TPO Ab. For supporting and clarifying the association between SLE and thyroid disorders in Iraqi, further studies on a large number of patients are required.

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