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Hormonal Assessment for Patients with Systemic Lupus Erythematosus Disease in Babylon Province

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Abstract

Systemic lupus erythematosus (SLE) is a chronic systemic autoimmune disease with variable clinical presentation. SLE can affect all organs and the involvement of major organs can be life threatening. This study aimed to determine the relationship of Epidermal Growth Factor (EGF) and Cortisol hormone on SLE Disease. This study was carried out on (70) study sample, (36) were patients and (34) control. SLE disease had significant association between study groups and sex of patients with SEE disease were 16 times more likely to be female. There were significant mean differences of Epidermal growth factor and Cortisol Hormones by study groups.
Key words: Systemic Lupus Erythematosus Disease (SLE), Iraq, Cortisol hormone on SLE Disease.

Introduction

Systemic lupus erythematosus (SLE) is a chronic systemic autoimmune disease with variable clinical presentation. SLE can affect all organs and the involvement of major organs can be life threatening. The exact pathological mechanisms of SLE remain elusive, and the etiology of SLE is known to be multifactorial [1].

No single clinical laboratory test is currently useful as an indicator of clinical disease activity. Attempts to establish markers have led to studies exploring titers of antibodies to double-stranded DNA (anti-ds DNA)[2] .Levels of complement, erythrocyte sedimentation rate(ESR), chemokine[3] and complement deposition on red blood cells[4]. One approach to identify markers of disease activity is to investigate expression levels of genes thought to be involved in the pathogenesis or manifestation of SLE. The variable expression of cytokines determined by these genes is thought to contribute to SLE itself, as well as to the heterogeneityof SLE[5]. Malarrash, discoidrash, photosensitivity, alopecia,oral,nasalulcers, polyarthralgia myalgia, polyarthritis, pleurisy/pericarditis and peritonitis, leukopenia, thrombocytopenia, hemolytic anemia, hematuria, proteinuria, azotemia, psychosis/seizures, peripheral/ cranial neuropathies are the classic features of disease. Other organ involvements are including cardiovascular, pulmonary, ophthalmic, gastrointestinal, and so on[6] .

The disease is much more prevalent in women than in men, especially in the fertile age[7]. The risk of flares after use of sex hormones as contraceptives or hormone-replacement therapy, as well as in physiological conditions such as pregnancy and perperium is increased. Hypoandrogenism has been described in men with SLE, and androgen therapy is sometimes recommended for the treatment of some SLE manifestations[8] .

Materials and Methods

A hospital-based case-control study design was carried out on (36) patients with SLE disease and (34) control group seen at Rheumatology outpatient clinic in Merjan Teaching Hospital in Babylon - Iraq , have been collected between October 20 14- May 2015,all patients and control were from the same ethnic group (Arabic). About three milliliters of venous blood were collected from each subject in the study. The blood was collected into gel tube and was separated by centrifugation at 3000 rpm for 15 mm. The remaining sera stored frozen at -20 °C until hormonal assayed. The EGF and cortisol hormone levels were estimated by ELISA test using Elabscience kit for EGF and for Accu-Bind IUSA kit cortisol. The statistical analysis performed using qi-square and independent t-test at ($p \leq .05$).

Results

1: Distribution of Study Groups by Socio-Demographic Characteristics

The overall mean of age of patient and control groups were (29.08±10.63) and (30.20±11.36) years old, respectively. Table (1) shows the distribution of study groups by socio-demographic characteristics. There was significant association between study groups and sex of patients with SLE disease was 16 times more likely to be female, ($p \leq 0.001$).

Table 1: Distribution of study groups by socio-demographic characteristics

Variable	Study group		X^2	P values	Oddes Ratio (95% C.I.)
	Control No (%)	SLE Patients No (%)			
Age group 10-29 years** 30-49 years 50-69 years	 17 (50.0) 15 (44.1) 2(5.9)	 23 (63.9) 12 (33.3) 1(2.8)	 1.094 0.618	 0.296 0.432	 1.69(0.63-4.53) 2.71(0.23-32.34)
Sex Female Male	 16(47.1) 18(52.9)	 33(91.7) 3(8.3)	16.569	<0.001*	12.37(3.17-48.23)
Occupational status Employed Non-emjyed	 9(26.5) 25(73.5)	 10(27.8) 26(72.2)	0.015	0.902	0.94(0.332.69)

*($p \leq .001$), **reference group

2: Distribution of Study Groups by BMI

The distribution of study groups by BMI. There was no significant association between study groups and BMI, ($p \leq .05$) as shows in table (2).

Table 2: Distribution of study groups by BMI

Variable	Study group		X^2	P values	Odes Ratio (95% C.I.)
	Control No (%)	SLE Patients No (%)			
BMI			3.380	0.337	2.31(0.16-4.22)
Underweight <18.5 kg/rn2	0(0.0)	3(8.3)			
Normal weight 18.5-24.9 kg/rn2	14(41.2)	15(41.7)			
Overweight 25-29.9kg/rn2	14(41.2)	14(38.9)			
Obese ≥3Oka/m^2	6(17.6)	4(11.1)			

*($p \leq .05$), BMI: Body Mass Index

The distribution of SLE patients by residence, (55.6%) of SLE patients was from rural areas and (60.6%) of control were from urban area (figure 1).

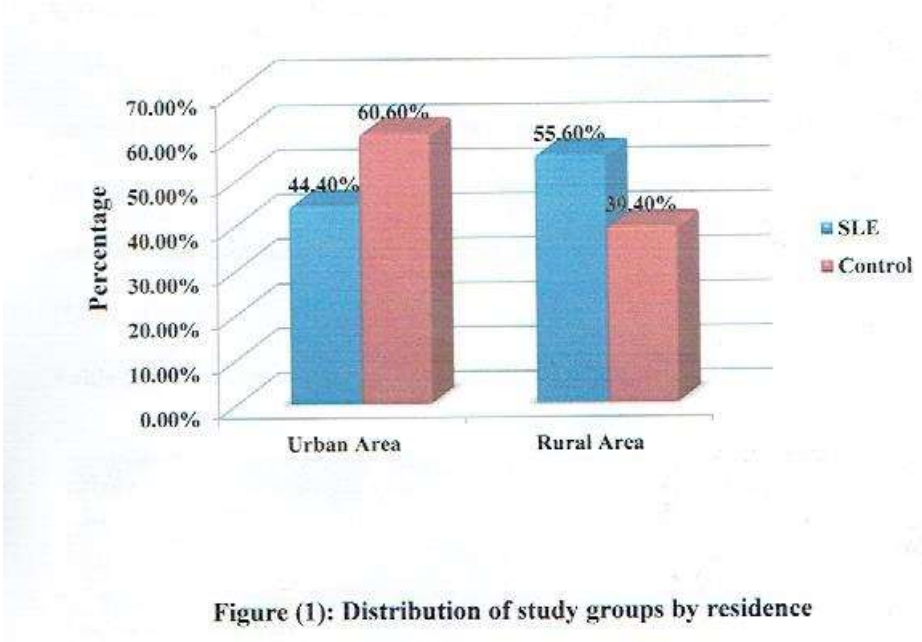

Figure (1): Distribution of study groups by residence

The distribution of SLE patients by consanguinity, (77.8%) of SLE patients were relatives and (40.6%) of control were non-relative (figure2).

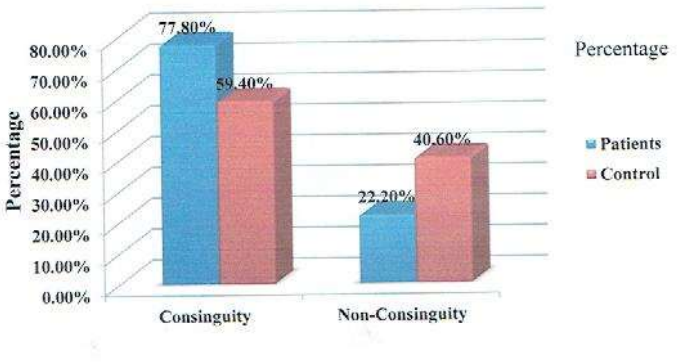

Figure (2): distribution of SLE patients by consanguinity

3: Distribution of SLE Patients by Medical History

The overall mean duration of SEE was (5.60±4.41) years, (61.1%) of SEE patients suffered from the disease for less than five years duration. The overall mean BMI was (29.98±5.38) kg/rn2, (41.7%) of SEE patients have normal weight. (52.8%) of SLE patients were complained from flushing face and redness of different body parts (Table 3).

Table (3): Distribution of SLE Patients by Medical History

Variable	Frequency (%)
Duration of SLE	
< 5 years	22(61.1%)
≥5 years	14(38.9%)
Total	36(100.0%)
Signs and symptoms	
Flushing face and redness	19(52.8 %)
Edema	10(27.8%)
Generalized pain	7(19.4%)
Total	36(100.0%)

4: Distribution of SLE Patients by Response, Renal and CNS Involvement and ANA

The Distribution of SLE Patients by Response, Renal and CNS Involvement and ANA. (58.3%), (58.3%), (63.9%) and (61.1%) of SLE patients have good response, no renal and CNS involvement and positive ANA, respectively table (4).

Table (4): Distribution of SLE Patients by Response, Renal and CNS Involvement and ANA

Variable	Frequency(%)
Response G P M Total	 21(58.3%) 8(22.2%) 7(19.5%) 36(100.0%)
Renal involvement Yes No Total	 15(41.7 %) 21(58.3%) 36(100.0%)
CNS involvement Yes No Total	 13(36.1%) 23(63.9%) 36(100.0%)
ANA Positive Negative Total	 22 (61.1%) 14(38.9%) 36 (100.0%)

G: Good; P: Poor; M: Medium ; CNS: Central Nerves system; ANA: antinuclear antibodies

5: Mean Differences of EGF and Cortisol by Study Groups

The mean differences of EGF and cortisol by study groups. There was significant mean difference of EGF by study groups, ($p \leq 0.05$) table (5).

Table (5): Mean Differences of EGF and Cortisol by Study Groups

Variable	Study groups		t-test	P values
	SLE Mean ± SD	Control Mean ± SD		
Epidermal growth factor (pg/ml)	261.64 ± 36.71	198.48 ± 38.67	7.059	<0.001*
Cortisol (nmol / dL)	79.79± 20.40	90.74± 30.75	1.773	0.081

6: Mean Differences of EGF and Cortisol by SLE Patients by Socio- Demographic Characteristics

The mean differences of EGF and cortisol by SLE Patients by Socio Demographic Characteristics. There were no significant mean differences of EGF and cortisol SLE Patients by Socio-Demographic Characteristics,($p \leq .05$) table (6):

Table (6): Mean Differences of EGF and Cortisol of SLE Patients by Socio Demographic Characteristics

Variable	Hormones	
	EGF Mean ± SD	Cortisol Mean ± SD
Age group		
10-29 years	259.70±37.09	77.18±15.65
30-49 years	267.23±38.05	81.72±26.30
50-69 years	239.03±0.00	116.72±0.0
ANOVE	0.348	1.983
P value	0.709	0.154
Sex		
Male	256.41±29.56	76.17±6.74
Female	262.12±37.64	80.12±21.24
t-test value	0.254	0.317
P value	0.801	0.753
Occupational status		
Employed	243.41±31.56	75.89±31.56
Non-Employed	268.65±36.66	81.29±23.15
t-test value	1.918	0.706
P value	0.064	0.485
Residence		
Urban area	252.11±26.44	82.43±19.31
Rural area	269.27±42.34	77.68±21.48
t-test value	1.414	0.688
P value	0.164	0.496
Marital status		
Married	263.30±36.31	75.68±14.50
Single	260.81±37.65	81.85±22.79
t-test value	0.189	0.853
P value	0.851	0.400
Consanguinity		
Yes	252.83±39.09	81.16±21.52
No	257.48±28.63	74.99±16.13
t-test value	0.3 59	0.750
P value	0.722	0.458

7: Mean Differences of EGF and Cortisol by SLE Patients by Medical History

The mean differences of EGF and cortisol of SLE Patients by medical history. There was significant mean difference of cortisol by sign and symptoms, ($p \leq .05$) table (7).

Table (7): Mean Differences of EGF and Cortisol of SLE Patients by Medical History

Variable	Hormones	
	EGF Mean ± SD	Cortisol Mean ± SD
Duration of SLE		
<5 years	256.86±31.66	80.55±21.71
≥5yeam	269.15±43.70	78.59±18.88
t-test value	0.978	0.278
P value	0.335	0.783
BMI		
Underweight < 18.5 kg/rn^2	218.31±1634	80.15±11.87
Normal weight 18.5-24.9 kg/rn^2	257.05±28.55	78.26±23.11
Overweight 25.0-29.9 kg/rn^2	260.29±23.83	84.19±21.27
Obese≥:30kg/rn^2	2.494	0.538
ANOVA	0.078	0.660
P value		
Signs and symptoms		
Flushing face and redness	259.14±3 1.92	87.76±23.46
Edema	271.02±49.47	71.03±11.39
Generalized pain	255.04±30.26	70.68±12.48
ANOVA	0.469	3.510
p value	0.630	0.041*

*(p ≤0.05)

Discussion

Systemic Lupus Erythematosus is a systemic disease characterized by immunologic abnormalities with pathologic changes mediated by tissue-binding autoantibodies and immune complexes. It affects a number of organs and systems and clinical manifestation are heterogeneous. Ninety percent of patients at diagnosis are women of childbearing years, people of all genders, ages, and ethnic groups are susceptible. Interaction between susceptibility genes and environmental factors and hormonal factors result in abnormal immune responses, which underlies the Pathogenesis of the disease by [9]

In this study the total number of SLE patients was 36. 33 (91.7%) of patient was female and 3 (8.3%) was male, while the number of control group was 34 16 (47.1%) was female and 18 (52.9%) was male.

Table (1) showed that there were significant differences between female and male ($p < 0.001$) in patient with SLE and the female to male ratio was 12.37. The result of this study agree with other studies that conducted by [10][11][12],[13],[14][15]that showed 90% of SLE patients was female . The reason for the high incident of SLE in female may be due to the role of estrogen and other gonadal hormones in the alteration of immune cell function and gene dose effect of the- X chromosome that is the presence of two X chromosomes in the female as opposed to the one X chromosome present in males .The X chromosome carries immunological related genes, which can mutate and contribute to the onset of SLE. As supported by the increased prevalence of SLE among men with Klinefilter syndrome. The Y chromosome has no identified mutations associated with autoimmune disease [16][14][15][18]

In this study the mean age group was (29.08±1063) for patient with SLE and (30.20±11.36) for control group. Table (1) showed the age group of SLE patients and control that was divided into three from 10-29 years was 23 (63.9%) , 30-49 years was 12 (33.3%) and 50-69 years was 1 (2.8%) for the SLE patients , while the age of control group was 10-29 yearsnl7 (50.0%), 30-49 years was 15 (44.1%) and 50-69 years 2 (5.9%).

The results of the current study showed that the first group of age for SLE patients (10-29) years more than other groups other studies also showed the same of our results because this diseases affects women in 90% of the cases with a peak of incidence during childbearing years (15-44 years of age) thus suggesting that hormonal factors may trigger the disease onset and flares especially in pre-pubertal and post-menopausal by [7][14][[17][18] That suggest that the difference in the occurrence of SLE between female and male occurs between age 15 and 45, when women experience their highest exposure to estrogen, because the disease activity increases during pregnancy, a role for female hormones has been proposed. Lower levels of androgens, higher levels of estrogen and hyperprolactinemia beside this may be the male hormone, androgen, may have a protective function in lupus.

The results of the current study showed that there were no significant association between study groups and occupational status , body mass index (13M1) and residence(p 0.05).The overall mean BMI was (29.98±5.38) kg/rn2, (41.7%) of SLE patients have normal weight, (8.3%) was underweight, and (38.9%) (11.1%) were overweight and obese respectively, obese respectively. The mean duration of SLE patients was (5.60±4.41) years (61.1%) of SLE patients suffered from the disease for less than five years, While 31% of patients more than five years. This agree with the study conducted by [19]

The current study is concerned with SLE disease that dealing with hormonal, endocrine and genetic variation among patients with SEE. So in this thesis highlighted the hormones and its association and correlation with patients with SLE. The results that focus on epidermal growth factor (EGF) levels in SEE disease are controversial. The present study showed that the differences of EGF between patient and control. EGF level was increased significantly among patients with SLE compared to control (26 1.64±36.71 and 198.48±36.67 pg/ml) respectively, especially in females which had higher levels than males, and both had higher levels compared to its level in the control group (262.12±37.64 and 256. 41±29.56 pg/mi). The EGF level was elevated along with the increasing duration of the disease, but it was insignificant ($P \leq .05$). This elevation in the hormone level may be due to part of body defense mechanism to reduce the tissue damage caused by SLE. Autoantibody. Responses to EGFR hold the potential of fulfilling a pathogenic role in autoimmune disease. [20] Differences in autoantibody effects on various cell types Thus, no firm conclusions can be made at this stage about the precise functional consequences of the autoantibodies in Sclerosis (S Sc) and SLE. Availability of homogeneous and renewable recombinant autoantibodies, however, can be anticipated to help delineate the role of the autoantibodies in future studies. Systemic Sclerosis is characterized by extensive fibrosis of skin and visceral organs.

Also the present study agrees with study conducted by [21] the EGF level was significantly increased in patients with Behcet Disease in Iraqi population. Behcet's disease is also autoimmune disease and a multi-systemic vascular disorder characterized by oral and genital ulcers, as well as cutaneous, ocular, arthritic, vascular, central nervous system and gastrointestinal involvement. It usually affects young adults, and its pathological origin is unknown [22]

The SLE disease is a multi-systemic disorder. EGF elevation may be used as well in the treatment of patients with SLE that may be associated with sever symptoms and affecting vital organs such as eyes , CNS and Renal involvement .This hormone not used by itself in the treatment but can be used as a helper to control the damage in target organs . This kind of use known as bio-nanotechnology, which is a new interdisciplinary research area in cancer treatment amalgamating the disciplines of biology, physics, chemistry, engineering and medicine.

Present study showed that there is a decrease of the value cortisol hormone level among patients with SLE in comparison to the control group (79.79± 20.40 90.74± 30.75) respectively. This decrease of the hormone level was insignificant (p0.08 1) and this is also shown by the study conducted by [23] which found that in chronic inflammatory diseases, cortisol is reduced relative to the degree of systemic inflammation, as exemplified in African trypanosomiasis, Sjogrens syndrome, and (SLE). This is particularly the case when the disease persists over ,ong period of time (over weeks). This also agree with study conducted by [24] which found that the levels of cortisol hormone among patients with SLE was much lower than control group, low serum cortisol in chronic inflammatory disease are thought to be caused by increased renal excretion of steroid hormones, increased conversion or conjugation to downstream hormones such as cortisone or oestrogens and androstene and inadequate adrenal production or secretion of these hormones. This variation in the hormone levels may lead to autoimmunity because it had been suggested that autoimmune disease develop when endocrine changes caused by various stresses together with some regulatory defects affect autoreactive cell and exceed the critical threshold leading to autoimmunity by [25]This variation in the hormone levels may be attributed to ethnic and environmental factors. However, ethnic, genetic and environmental factors may be a major role in hormone variation.

Conclusion

Hormonal assessment for patients with SLE disease of valuable information's in patients can be helpful in determining the activity of the disease.

CONFLICT OF INTERESTS.

There are non-conflicts of interest.

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الخلاصة

الذئبة الحمامية مرض المناعة الذاتية النظامية المزمن مع اعراض سريريه متغيره ويمكن ان يؤثر على جميع اعضاء الجسم ويهدد الحياة. هدفت الدراسة الى تحديد العلاقة بين عامل نمو البشرة وهرمون الكورتزول عند مرضى الذئبة الحمامية وقد اجريت الدراسة على 70 عينه شملت 36 مريضا و34 شخصا يمثلون مجموعه السيطرة واثبت الدراسة وجود فروقات ذات دلاله احصائية لعامل نمو البشة والكورتزول بين مجموعات الدراسة

الكلمات الدالة :مرض داء الذئبة الحمامية,العراق ,هرومون نمو البشرة