Research Article

Studying of certain immunological parameters in the Province of Babylon for systemic lupus erythematosus

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ABSTRACT

Background: Systemic lupus erythematosus (SLE) is a chronic systemic autoimmune disease with a variable clinical presentation. SLE can affect all organs, and the involvement of major organs can be life threatening. Lupus can affect many parts of the body, including the joints, skin, heart, kidneys, lungs, blood vessels, and brain. The exact pathological mechanisms of SLE remain elusive, and the etiology of SLE is known to be multifactorial. **Methodology:** The investigation subjects consisted of 30 sick people suffering from SLE collected randomly from the Merjan Teaching Hospital (28 female and 2 male patients) as a patients group of SLE with average age (10–50 years), the investigation of control group would include 15 apparently healthy patients including (6 female and 9 male patients) with average age (20–50 years), this group complemented the group of patients. **Results:** Patients with SLE were divided by age into groups. The age group (11–20) was the first age group, the infection rate was 13.4%, while the second age group (21–30) the infection rate was 26.6%, the third age group (31–40) the infection rate was 46.6%, was the highest, and the fourth age group (41–50) the infection rate was 13.4%. Results of study groups distribution by sex showed that the rate of infection in females was relatively higher than males 93.3% and 6.7%, respectively. Moreover, the overall duration of SLE was 73.3% of sick people who suffer from SLE who suffering from the disease for lesser than 5 years as a total duration. About 53.4% of patients who suffer from SLE were complained from rash of different body parts. Results of antinuclear antibody test (ANA test), show (80%) of patients are positive result, while (20%) of patients have a negative result. While the results of C-reactive protein concentration measurement showed an increase in the concentration of the age groups. Immunoglobulin distribution of SLE patients revealed the highest average immunoglobulin G of sick people who suffer from SLE (1203.05 ± 5.08) mg/dl, while the lowest average immunoglobulin A (125.9 ± 4.35) was mg/dL. The average immunoglobulin M was among patients (45.6 ± 4.25) mg/dL. **Conclusion:** Systemic Lupus Erythematosus disease is more common among females than males, In this study patients with SLE disease have elevated levels of ANA and CRP. and we have shown the differential expression of IgG, IgM, and IgA in SLE patients.

KEY WORDS: Antinuclear antibody test, C-reactive protein, Immunoglobulin, Systemic lupus erythematosus

INTRODUCTION

Systemic lupus erythematosus (SLE) is a progressive multi-system involving autoimmune disease that mainly affects young women. It is a difficult illness for diagnosing, treating, and handling. Several causes of this disease, including genetic susceptibility, effects on the environment, and disruptions in both adaptive and innate immunity, have been postulated.[1] The first scientific publication that mentions these skin lesions emerged in the 1800s, first by Cazenave in 1838,[2] and 7 years later Von Herba described the malar rash over the face and nose and introduced the butterfly metaphor that is typical of SLE.[3] SLE is categorized by chronic cell (B) hyperactivation and the production of autoantibodies that target self-DNA and nucleoproteins.[4-6] This process leads to the creation of pathogenic immune multiplexes and widespread activation of complement; the consequence is multisystem inflammation of connective tissue.[7] The SLE's diagnosis could be stimulating, especially in sick people presenting with symptoms from only one organ or with ill-defined systemic complaints. A classification scoring system has been developed that includes the most commonly observed clinical and serological disease manifestations.[8] The American College of Rheumatology (ACR) has developed this method of clinical studies classification, and not as a diagnostic tool, but is still widely utilized by clinicians as an aid in establishing the SLE's diagnosis.

Although SLE's medical conditions involve environmental factors, SLE's environmental candidate causes include ultraviolet light, demethylating

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medications, and viral or viral-like infectious or endogenous viruses. The most noticeable environmental problem which can worsen SLE is sunshine. Ultraviolet light is one of the major environmental impacts associated with SLE production and flare-ups.[8] Hormonal factors: In women, particularly in the fertile period, the disease is much more prevalent than in men. The flares risk was elevated with the utilizing of sex hormones as contraception and hormone replacement therapy and in medical cases, including the increasing in the abortion and puerperium. Hypoandrogenism was identified in people with SLE, and sometimes androgen therapy is prescribed to treat such SLE symptoms. In addition, as 90% of sick people are female, and the development of the disease increases during gestation, a function for women hormones was suggested.[9] Immunologic disorder the exact process, and the different mechanisms that lead to SLE are not fully understood. Type I interferons (IFNs) (a group of cytokines) were proposed to have a key role based on the observation that treatment with IFN can result in diseases of autoimmune, involving a lupus-like-syndrome.[10]

Objectives of this Study

This investigation was prepared to identify some immunological alterations related to SLE by focusing on the following:

1. Study the connection between these parameters (sex and age) and the SLE patients and the control groups
2. Study the relationship between the immunological parameters (immunoglobulin M [IgM], IgG, and IgA) and the SLE patients and the control groups.

EXPERIMENTAL SECTION

Inhabitants of Investigation

The investigation subjects consisted of randomly selected 30 people who suffering from SLE from the Merjan Teaching Hospital (28 female and 2 male patients) as a sample of SLE patients with average age group (10–50 years), the experimental group research featured 15 perfectly healthy patients comprising (six female and nine male patients) with average age group (20–50 years), this controlling group corresponding with the patient's group.

Inclusion Criteria

Depending on the 1982 modified SLE identification criteria included patients with malar rash, renal disorder, oral ulcers, discoid rash, facial redness, serositis, arthritis, neurological disorder, hematological disorder, immunological disorder, and antinuclear antibody (ANA). The suggested categorization is depending on 11 parameters.

A state should be seen to be SLE to identify patients in clinical investigations if there are four or more of the 11 parameters are presented, systematically or concurrently, during any observation interval taken from.[11] This system was developed by the ACR.

The Systemic Lupus International Collaborating Clinics published 2012 criteria that are currently used to diagnose SLE that mentioned in literature review.[12]

Data Collection

Questionnaire

The patient questionnaire and case sheets contained duration of illness, occupation, age, gender, residence, family history, signs and symptoms, color epidermal, smoking habit, and laboratory test.

Specimens of Blood

The study collected approximately 5 ml of venous blood from every subject. In relation to hemoglobin measuring, the blood was separated into two sections: One part approximately 2 ml) was obtained into ethylenediaminetetraacetic acid involving tubes which could be utilized to determine the total number of white blood cells. The final blood part was divided at 3000 rpm for the quarter by centrifugation. The remain sera were stored in a frozen at −20°C until assaying immunological parameters.

Estimation of C-reactive Protein (CRP)

The protein of C-reactive level was estimated for SLE patients and healthy as per the manufacturer's instructions.

Estimation of ANA

The level of ANA was estimated for SLE patients and healthy as per the manufacturer's instructions.

Quantitative Estimation of Serum Immunoglobulins

Single radial immunodiffusion or Mancini method has been to measure the level of IgA, IgM, and IgG according to manufacturer's instructions.

Statistical Analysis

All statistical analysis was performed by using SPSS 17 version. Data were expressed as (average ± standard deviation.). The normality of the distribution of all variables was assessed by the student's ANOVA test and Pearson correlation analyses that have been used to determine the significant difference between the groups.

RESULTS

The study included sick people with SLE. The sick people number was 30 with ages ranging from 10 to 50 years. Patients with SLE were divided by age into groups as shown in Table 1. The age group (11–20)

was the first age group, the disease rate was 13.4%, while the second age group (21–30) the disease rate was 26.6%, the third age group (31–40) the disease rate was 46.6%, was the highest, and the fourth age group (41–50) the infection rate was 13.4%.

Infection appears in both sexes; there has been an important relationship between groups of investigation and patients' gender with illness of SLE, which is more possible to be womanly ($1 \times 10^{-3} \geq P$). The rate of infection in females was relatively higher than males 93.3% and 6.7%, respectively [Table 2]. The total period of SLE was 73.3% for people with SLE who have been suffering from the condition for <5 years. About 53.4% of patients with SLE have been reported of various body parts with a rash [Table 3]. Table 4 demonstrates the patients of SLE's distribution ANA. SLE patients have positive results for ANA.

Table 1: Investigation groups' distribution by socio-demographic features

Group of age	No. patient	%
20–11	4	13.40
30–21	8	26.60
40–31	14	46.60
50–41	4	13.40
Total	30	100

Table 2: Investigation groups' distribution by sex

Sex	Patient (%)	Control (%)
Women	28 (93.3)	6 (40)
Men	2 (6.7)	9 (60)
Total	30 (100)	15 (100)

Table 3: Patients of SLE's distribution by the previous medical data

Item	Value	%
SLE period		
<5 years	22	73.3
≥5 years	8	26.7
Total	30	100
Signs and symptoms		
Rash	16	53.4
Edema	8	26.6
Arthritis	6	20
Total	30	100

SLE: Systemic lupus erythematosus

Table 4: Patients of SLE's distribution by antinuclear antibodies

Item (ANA)	Value (%)
Positive	24 (80)
Negative	6 (20)
Total	30 (100)

ANA: Antinuclear antibody, SLE: Systemic lupus erythematosus

The results of the measurement of the concentration of the CRP showed an increase in the concentration of the age group, as shown in Figure 1, and the result was positive for all ages and did not show the control because it is negative in healthy people. Figure 2 shows the patients of SLE's distribution by immunoglobulin. The average IgG has the greatest among sick people who suffer SLE (1203.05 ± 5.08) mg/dl was significantly affected ($P < 0.05$), while the average IgA has the highest 125.9 ± 4.35 mg/dL. The average IgM is among patients 45.6 ± 4.25 mg/dL.

DISCUSSION

Table 1 demonstrates that important variations were separated into categories of sick people who suffer from SLE by gender. About 46.6% of the third age range has been the strongest over other groups. Researches have also shown that this disease happens to female in 90% of instances with an incidence peak during the years of childbirth 15–44 years of age, proposing that hormonal variables can trigger the onset of the disease and flares, particularly in postmenopausal and prepubertal cases.[13,14] Table 2 indicates that there are substantial variations among males and females ($P \leq 0.001$) among patients with SLE, 93.3% between females and 6.7% among males. The findings of this analysis are consistent with other comparisons with other researches[13,15,16] that demonstrated 90% of patients of SLE are women. The explanation for woman has high accident could be attributed to: (1) The estrogen's role as well as

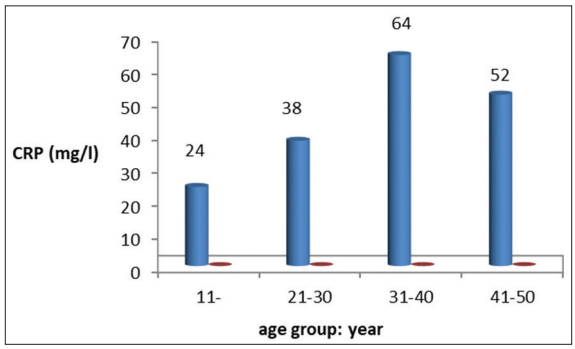

Figure 1: C-reactive protein patients of systemic lupus erythematosus's distribution

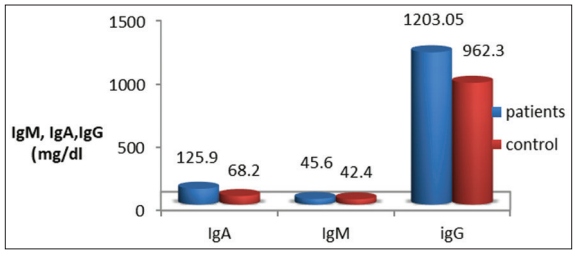

Figure 2: Immunoglobulin A, immunoglobulin M, immunoglobulin G distribution of systemic lupus erythematosus patients

other gonadal hormones in modifying the function of immune cells. (2) X chromosome gene dose impact, which is the existence of both X chromosomes in the woman compared to single X chromosome in the man. The disparity in the prevalence of SLE between women and men exists between the ages of 21 and 40, as women experience their greatest exposing to estrogen due to increasing the activity of the disease during pregnancy; a function for women hormones was suggested.[13,14] According to workplace and cultural factors, females and males might also have various environmental conditions during their lives.[17]

The overall duration of SLE was (73.3%) of SLE patients suffered from the disease for less than five years duration and about About 26.7% of patients more than 5 years. SLE patients suffering from many of the diagnostic symptoms, these symptoms vary from one person to other as possible that the person's immunity, age, the psychological state of the patient, and other possible reasons and the further most popular symptoms in patients are rash, edema, and arthritis, Table 3 showed the frequency of these symptoms (53.4%) of SLE patients suffering from rash of different body parts, while 26.6% and 20% have edema and arthritis, respectively. Our results compatible with the study conducted by Metawie *et al*.[14] showed that the rash represents the highest proportion.

Tables 3 and 4 showed the results of the ANA test. As the positive result of this test represents 80% of patients, while 20% of patients have a negative result. ANA test evaluates the volume and pattern of blood antibodies against the body (reaction of autoimmune) if more antibodies are found in the blood, the result is positive. SLE characterized by the presence of ANA in patients.[18,19] The testing of the antibody has a significant function for patient evaluation; nevertheless, must not be utilized alone to identify SLE, the test of ANA has become the furthermost frequently utilized SLE screening test. SLE diagnosis is produced in sick people who encounter four of the eleven requirements stated by the ACR, a couple of which is the existence of antibodies (ANA and either antibody to DNA antigen [anti-DNA]), so positive magnitudes on tests of antibody could constitute half of the SLE diagnosis criteria.[20] The primary assessment of the presumed disease of autoimmune sometimes involves a test of ANA, which is positive in 95% of SLE patients. (3) The test of ANA seems to have a false-negative ratio of just 5%; however, the particularity is low due to several healthy patients as well as those with neoplasm, severe liver disease, or effective infection can also have a positive test. As a result, of a positive, ANA test result could also be utilized as evidence of the diagnosis (4-6) and is 95% SLE resistant.[21] CRP levels correlate significantly with clinical serological indices of SLE disease activity. In the current results, the age groups that showed a positive result. The highest concentration was recorded in the 31–40-year age group at 64 mg/l. The lowest increase in the concentration level in the age group of 11–20 years was 24 mg/l compared to control groups that showed no increase in protein level, and the results were negative for all age groups. The increase CRP in patients maybe indicates the type of immune response as the increased secretion of the response of the organs resulting from the migration of white blood cells to target tissues, which require the help of dissolved proteins, including the CRP and cytokines. The assessment suggested that the marked elevation of CRP in an SLE patient suggests infection.[22,23] The level of immunoglobulins in the current investigation is as great as 1203.05 and 45.6 in IgG and IgM, respectively. This finding shows that in SLE patients IgG and IgM are lower than in healthy patients. The rate of IgG is elevated in patients of SLE this could be attributable to body immunity response to this infection, whereas the level of IgM is substantially lower compared with control which rises in the IgM level might be correlated with patients' immunological state and the severity of SLE, patient's immunological condition if any other chronic disease or illness impacts the immune response. This outcome was compatible with reference.[24]

CONCLUSION

Systemic Lupus Erythematosus disease is more common among females than males, In this study Patients with SLE disease have elevated levels of ANA and CRP. And we have shown the differential expression of IgG, IgM, and IgA in SLE patients.

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