Cross Sectional Study of the Correlation between ESR,RBCS and WBCs with Disease Duration in Iraqi Patients with Systemic Lupus Erythematosus Disease (SLE)

Ahmed Tawfeq[1], Abeer Fauzi Al-Rubaye[2], Manar Mohammad Hasan AL-Murshidi[2]

[1]M.Sc. Student, [2]Assist. Prof. Dr., College of Science for Women, University of Babylon, Iraq

Abstract

Systemic lupus Erythrematosus disease (SLE), is an autoimmune multisystemic disease, and is associated with the considerable morbidity. The hematological abnormalities might be the initial indicator. Disease duration may have an impact on the hematological parameters.

Method: This research has been conducted in the Renal Transplant Center, Medical City, Baghdad/Iraq. Total of 50 female patients, aged 31.15±9.11 years and 40 femals aged 35.10±10.92 as controls. Total counts of RBCs, WBCs, and ESR has been valued by automated hematology analyzer.

Results: Results of ESR has been showen a significant increase ($p<0.001$) in patients with SLE as compaired with the control group. And a significant decrease in RBCs, WBCs counts ($p<0.001$) in SLE patients when compared with those of control. Correlation analysis for RBCs and WBCs has been showen a significant negative correlation with the duration of disease in patients with SLE, and positive correlation has been found between ESR and the duration of disease.

Conclusion: RBCs and WBCs has been changed in SLE patients, and they were related to the duration of disease.

Keywords: *ESR, RBCS, WBCs, Systemic lupus Erythematosus disease.*

Introduction

Systemic lupus erythematosus (SLE), is an autoimmune disease where cells and organs undergoing damages and initially mediated by a tissue-binding autoantibodies. These antibodies were form an immune complexes that mieght contributed to the formation of all the clinical and laboratory signs(1).

Corresponding Author:
Dr. Abeer Fauzi Al-Rubaye
Assist. Prof., College of Science for Women, University of Babylon, Iraq
e-mail: abeerbio15@gmail.com;
manarbio2@gmail.com

All tissues and cells in the body were could be involved in SLE. Involved systems were muscular, hematological, cutaneous,skeletal, renal,vascular, nervous, gastrointestinal, pulmonary and ocular. The hematological manifestations were more frequent once because blood and the blood vessels together were contain a various numbers of antigens than any other organs in the body(2). These principal hematological abnormalities were include leukopenia and anemia. The causes of these abnormalities in SLE patients may be due to the presence of chronic inflammation(6), autoantibodies(3), immunosuppressive drugs and the marrow suppression(4).

The majority of patients were present with hematological abnormalities as an initial manifestation. The duration of disease may have an impact on their hematological parameters. White blood cells and

red blood corpuscles counts parameters are an ideal biomarkers which were easily measured and they were sensitive to changes during disease activity.

The previous studies were reported an association among leucopenia and anemia, with the duration of disease[4-8] but facts was not adequate in Iraq to establish that association. Therefore, the current study has been designed to discern the relationship between WBCs, RBCs and ESR with the duration of disease in patients with SLE[5].

Method

This research has been conducted in the Renal Transplant Center, Medical City, Baghdad/Iraq. Total of 50 female patients who fulfilled the American College of Rheumatology (ACR) criteria[9], aged 31.15±9.11 years and were selected from the same center, and 40 age matched femals (35.10±10.92) as controls . Total counts of RBCs, WBCs, and ESR has been valued by automated hematology analyzer., the duration of disease>5 years were considered in this study.

Patients having history of renal diseases, liver diseases (other than SLE), ankylosing spondylitis, rheumatoid arthritis, psoriasis and malignant disease inflammatory bowel disease,, history of taking anticoagulant,biological or chemotherapy and recent history of blood transfusions were excluded from this study. 3.6 ml of blood was collected from all subjects. Total count of RBCs, WBCs and ESR were estimated by using an Automated Hematology Analyzer, (Sysmex XT-2000).Data were expressed as mean and standard error (mean ± SE). Unpaired Student's 't' test, and Pearson's correlation coefficient, (r) test were performed as an applicable. *p* value <0.05, was accepted as level of significancy. The statistical analyses has been performed by using the computer based statistical program SPSS .

Results

Age, BMI and blood pressure(Systolic and Diastolic BP) of all subjects in study and control groups. They were almost similar and statistically has no significant differences among them (Table 1).

Table 1: General characteristics of the Controls and SLE patients (N=90)

Parameters	Control (n=50)	SLE Patients (n=40)
Age (years)	31.15±9.11	35.10±10.92
BMI (kg/m2)	20.34±1.27	21.91±1.45
Systolic BP (mmHg)	122.30±12.50	123.60±13.25
Diastolic BP (mmHg)	79.67±8.90	81.67±9.13
Duration of disease(months)	-	28.97±16.85
Data were displayed as mean ± SE. Statistical analysis was done by Unpaired Student's 't' test. SLE= Systemic lupus erythematosus, BMI= Body mass index, BP= blood pressure		

In the present study, the mean RBCs,WBCs counts were significantly (p<0.001) lower, and the mean ESR was significantly (*p*<0.001) higher in SLE patients than that of controls (Table 2.)

Table 2: RBCs,WBCs counts and ESR of the Controls and SLE patients (N=90)

Parameters	Control (n=30)	SLE Patients (n=30)
ESR (mm/h)	9.47±3.31	47.60±14.14
RBC count (x 106/µl)	4.22±0.51	3.40±0.94***
WBC count (×103/ µl)	8.35±1.85	5.90±3.11***
Data were displayed as mean ± SE. Statistical analysis was done by Unpaired Student's 't' test. SLE= Systemic lupus erythematosus,RBCs,red blood corpuscles.WBCs,white blood cells,ESR,erythrocyte sedimentation rate.		

Correlation analysis has been showen a positive correlation among, RBCs, WBCs and ESR with the duration of disease among patients with SLE, and these were statistically significant except that of ESR (Figures 1, 2, 3).

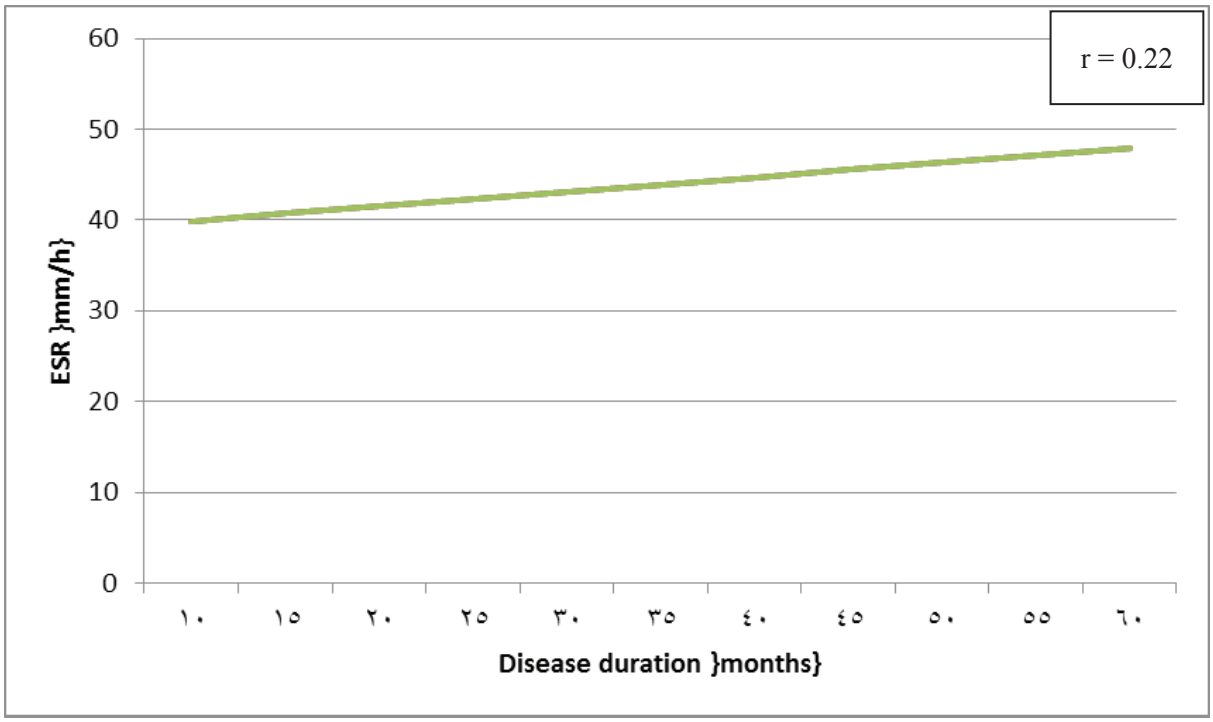

Figure 1: Correlation between ESR and the disease duration in SLE patients presenting the positive correlation. ESR, Erythrocyte sedimentation rate.

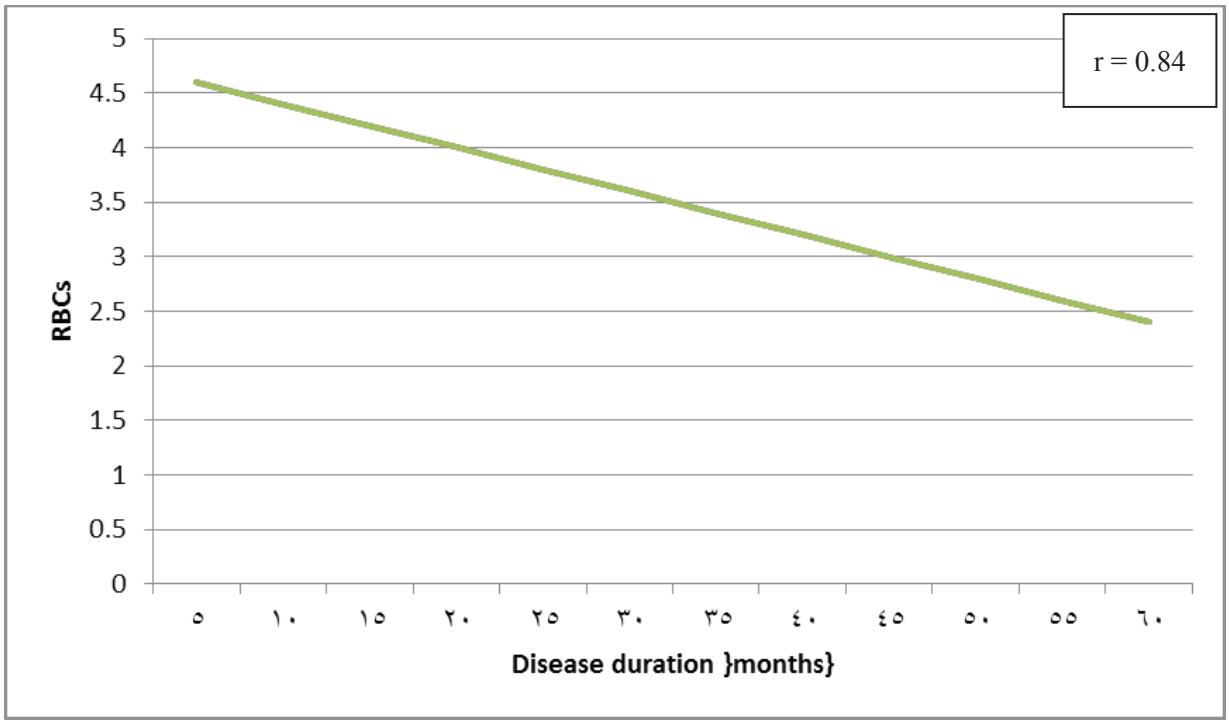

Figure 2: Correlation between RBCs count (x 106/µl) with the disease duration in SLE patients presenting the negative correlation. RBCs, Red blood cells.

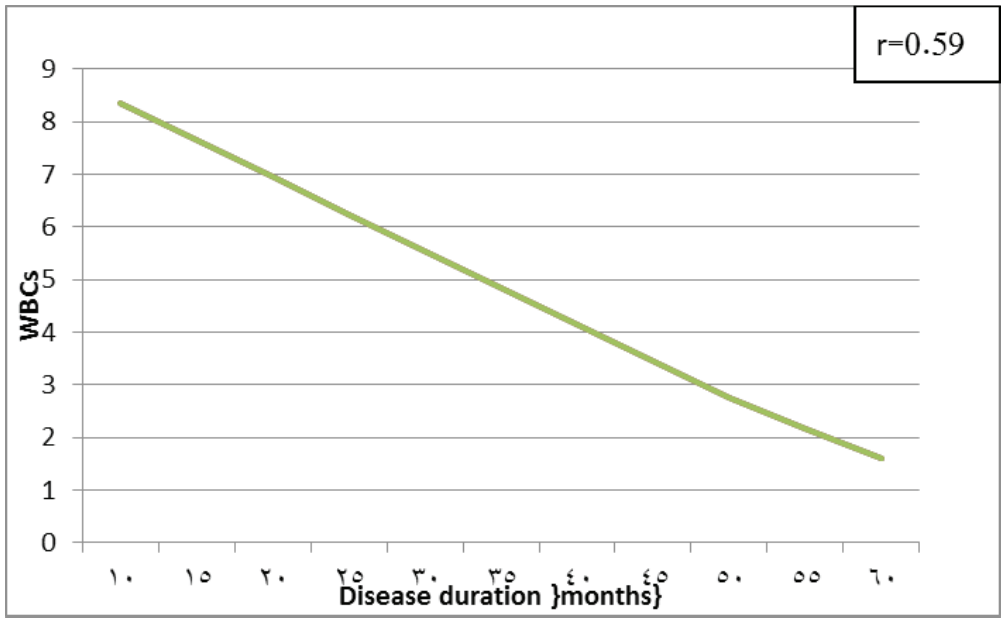

Figure 3: Correlation between WBCs count (×103/ µl) with the disease duration in SLE patients presenting the negative correlation. WBCs, White blood cells.

Discussion

In the present study, the ESR level was significantly higher, and RBCs, WBCs counts were significantly lower in patients with SLE patients if compared with controls. These findings were matched with the observations of some groups of authors[6-7].

Quite the reverse, Kanfir *et al*. and Hassan has been found no significant changes in WBCs counts in SLE patients[8]. This disagreement might have occurred due to the demographic variations and the different methodology thatbareused in those studies. Correlation analysis of RBCs and WBCs with the disease duration in patients with SLE has been showen a significant negative correlation. Some researchers were found the same significant negative correlation between the RBCs count with the duration of disease, but there was noassociation was found with the other hematological factors[9-15]. Though the explanation of these changes in RBCs and WBCs counts and ESR levels of SLE patients was not known, but the literature reviews suggests that the increased ESR level maybe due to the chronic inflammatory response with the polyclonal increase in immunoglobulins[10].Some studies were reported that the genetic andthe environmental factors mieght contributed to the development of SLE. The interactions between the susceptible genes and the environmental factors results in an abnormal activation of the immune cells, Tand B lymphocytes, and the ineffective regulatory CD4+ and CD8+ T cells[11]. Therefore, the sustained auto antibodies were formed in SLE[13].These excess productions of the auto antibodies were cause an activation of the natural killers (NK) cells. These cells were binded with the antibody coated target cells and origins alysis of the target cells. Hematopoietic system is a very much vulnerable target to these effects. Thus the autoantibodies mieghtcauses a destruction of the circulating bloods cells and resulting incytopenia[7-19-20]

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science for Women and all experiments were carried out in accordance with approved guidelines.

References

1. Mehat P. Pharmaceutical outcomes research to better understand medication non-adherence inpatients with systemic lupus erythematosus [Thesis]. [Columbia]: University of British Columbia. 2014.

2. Sasidharan PK, Bindiya M, Sajeeth-Kumar KG. Systemic lupus erythematosus- ahematological problem. J Blood DisordTransfus.2013;4 (6): 1-4.

3. Njoroge JW.Haematological parameters in systemic lupus erythematosus patients at Kenyatta national hospital, Nairobi [Thesis]. [Kenya]: University of Nairobi. 2016.

4. Fayyaz A, Igoe A, Kurien BT, Danda D, James JA, Stafford HA, Scofield RH. Hematological manifestations of lupus. Lupus sci Med.2015;2: 1-18.

5. Agrawal SR, Tiewsoh I, Rajput A, Jain A. A cross sectional hospital based study of clinical and immunological profile of systemic lupus erythematosus patients from central rural India. Indian J Allergy Asthma Immunol.2013;27 (1): 33-7

6. Safak S, Uslu AU, Serdal K, Turker T, Soner S, Lutf A. Association between mean platelet volume levels and inûammation in SLE patients presented with arthritis. Afr Health Sci.2014; 14 (4): 919- 24.

7. Mittal S, Ararwal P, Wakhulu A, Kumar A, Mehrotra R, Mittal S. Anemia in systemic lupus erythematosus based on iron studies and soluble transferrin receptor levels. J Clin Diagn Res.2016;10 (6): 8-11.

8. Hassan Z. Evaluation of complete blood count in Sudanees patients with systemic lupus erythomatosus (SLE) in Khartoum state[Thesis]. [Sudan]: Sudan University of Science and Technology.2015.

9. Longo F, Hauser J. Harrison'sprinciples of internal medicine. 18th ed. United States of America: McGraw-Hill companies. 2012; 1-16.

10. Al-Arfaj AS, Khalil N. Clinical and immunological manifestations in 624 SLE patients in Saudi Arabia. Lupus. 2009; 18: 465-73.

11. Saba A, IsraaA,ManarM. The Effectiveness of P53 Polymorphism in Susceptibility to Human Papillomavirus and Molluscum contagiosum Infections. J Pure Appl Microbiol, 2019;13(2).

12. Kumar V, Abbas A, Fausto N. Robins and Cotran pathologic basic of disease. 7th ed. China: Elsevier Saunders. 2015;194-230.

13. Hamza K, Bashir Z. Hematological profile of Sudanese patients with systemic lupus erythematosus. Clin Med J. 2016; 2 (4): 40-5.

14. G Stojan, H Fang, L Magder M. Petri.Erythrocyte sedimentation rate is a predictor of renal and overallSLE disease activity**.** Lupus. 2013; 22(8):

15. Ismiana F, Amaylia O, Mohammad G, LaniyatiH. Overview of Anemia among Systemic Lupus Erythematosus Patients in Reproductive Age Women based on Reticulocyte Hemoglobin Equivalent (RET-He) Level and Reticulocyte Count. Indonesian Journal of Rheumatology. 2017; 9 (2).

16. Servet Y, Ahmet Y, Nevzat G, Burak U, Suleyman S. Hematological Indices May Be Useful in the Diagnosis of Systemic Lupus Erythematosus and in Determining Disease Activity in Behçet's Disease. Med Princ Pract. 2016;25:510–516.