

Risk of Incident Rheumatoid Arthritis Related to Anemia and Associated with CRP

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Abstract

Background and Objective: Rheumatoid arthritis (RA) is a chronic systemic inflammatory an autoimmune disease characterized by the articular and extra-articular manifestation as weight loss, fatigue, malaise, and anemia. This study aimed to find the prevalence of metabolic syndrome in its correlation with the disease activity among patients with RA in Al-Najaf province and to determine the associated risk factors this study including 75 Subjects was 50 suffering from rheumatoid arthritis and 25 subjects were healthy. Full blood count, erythrocyte sedimentation rate platelet count was determined using standard hematologic method. The result in this study exhibits there is significant decrease in (hematological characteristic) RBC number, while increase in WBC number spatially neutrophil, platelet, glucose and ESR in patients with arthritis in comparison with control. This result indicated that no significant difference ($P>0.05$) in the mean hematological characteristic RBC number, WBC number spatially neutrophil, platelet when compared with between Positive and negative C –reactive protein in patient with arthritis. The results revealed a significant increase ($P<0.05$) in mean of ESR of patients with positive C –reactive protein in compared with negative C –reactive protein in patient with arthritis.

Conclusions: Rheumatoid arthritis patients have a variety of abnormalities in hematologic characterize. RA disease can be linked with anemia of chronic inflammation, leukocytosis, and thrombocytosis. Also, in our study, we concluded that little evidence found between disease activity and anemia. ESR and C-reactive protein related to the activity of RA disease.

Keywords: *Rheumatoid arthritis, anemia, ESR and C-reactive protein.*

Introduction

Rheumatoid arthritis (RA) is a common immunity and inflammatory disease the studies on RA is focused on the earliest stages of the disease and has provided strong evidence that clinical signs and symptoms may be preceded by a preclinical phase during that evidence of systemic autoimmunity may be present.⁽¹⁾ This disease was developed in a series of phases. The first of these phases is suggested with the presence of risk of genetic and environmental factors. In the second phase, autoimmunities such as autoantibodies and autoreactive cells were detected in the blood; also, the study predicted that the mucosal sites are the initiation site for developing that autoimmunity. So, this autoimmunity measured in the blood by serologic or another testing inpatient that characterized by an expansion of inflammation,

autoimmunity, and symptoms. Finally, inflammatory arthritis that clinically detectable classified as RA.⁽²⁾

RA is an autoimmune disease so that the immune system inpatient starts attacking itself and causes chronic inflammation when directed against the joints that lead to the releases cytokines, chemokines, complement proteins, growth factors and, matrix metalloproteinases among others. These factors not only remain the activation of the synovial cells while also induce from of new immune cells. These immune cells can destroy the extracellular matrix of cartilage and bone, causes joint deformation.⁽³⁾

The diagnosis of RA is not constantly clear to estimation, and patients are occasionally suffering from the symptoms of disease several years before they are

diagnosed. The classification of RA requires that patients fulfill several criteria. These were already shown in 1987 and have recently been revised and explained by the American College of Rheumatology and European League Against Rheumatism, in the 2010 Rheumatoid arthritis classification criteria.⁽⁴⁾

Materials and Method

This study was conducted in the Al-Sader teaching hospital in ALNajaf, Serum specimens were collected from patient with rheumatoid arthritis in addition to control group.

Study Design: The samples tested were (75) samples which divided to control group were (25) samples were and (50) rheumatoid arthritis begin from the(1 to 45) years, the age of rheumatoid arthritis patients.

Collection of Blood Sample: Blood samples were drawn from vein by sterilized syringes with 5 milliliters. The sample put in the labeled tube. Blood was left at room temperature for 10 minutes for clotting, centrifuged 6000 rpm for 15 minutes, and then serum was separated and freezing at -80 °C until time for performed the laboratory analysis for study.

C-reactive protein (CRP) and serological test rheumatoid factor (RF):

Rheumatoid factor latex serological test and C – reactive protein were measured by agglutination test

Erythrocyte sedimentation rate (ESR): The Westergreen method was used as described by (Cheebrough,2004). When anticoagulated blood is left to stand undisturbed for 1 hour the red cells sediment gradually to the bottom of the tube leaving clear plasma on top and the distance occupied by the supernatant plasma is determined.

Assessment of Complete Blood Count (CBC): Complete blood count was conducted on anticoagulant blood utilizing Mythic™ eighteen (Ringelsn co., Turk) in Haematology Laboratory.

Statistical Analysis: The data were statistically analyzed through SPSS package (SPSS, Version 23) at significant $P < 0.05$. t-test was used for comparison between two groups while multivariate ANOVA has been used for the comparison among subdivided groups in the measured parameters.

RESULT:

Hematological Characteristics of study subject: In this study, a total of 75 cases consisting of 50 patients with Rheumatoid arthritis and control 25 were examined. As shown in table (1), The patients had ages ranging between 1 to 55 years. As illustrated in same table, there is significant decrease in (hematological characteristic) RBC number, while increase in WBC number spatially neutrophil, platelet, glucose and ESR in patients with arthritis in comparison with control.

Table 1: Comparison of the hematological characteristics between patients with Rheumatoid arthritis and control groups

Hematological characteristics	Mean ± SE	
	Patient N=50	Control N=25
RBC($10^{12}/L$)	3.44±0.064*	4.6911±.12525
Hb(g/dl)	11.77±0.167	12.7947±.40656
WBC($10^9/L$)	7.3658±.38571*	4.47±0.099
Neutrophil($10^9/L$)	4.7558±.40894*	2.39±0.075
Lymphocyte($10^9/L$)	2.0058±.11620	1.98±0.074
Platelet($10^3/UL$)	294.0526±16.82877 *	152.54±0.45
ESR(mm\hr)	40.12±6.63757 *	12.45±0.340

Comparison of the clinical characteristics between Positive and negative C–reactive protein of study subject: Figures (1, 2, 3 and 4), explained

the general characteristics of the studied groups when compared between Positive and negative C –reactive protein in patient with arthritis. This figure indicated

that no significant difference ($P > 0.05$) in the mean (hematological characteristic) RBC number, WBC number, neutrophil, platelet when compared with between Positive and negative C-reactive protein in patient with arthritis. The results revealed a significant increase ($P < 0.05$) in mean of ESR of patients with positive C-reactive protein in compared with negative C-reactive protein in patient with arthritis.

Table 2: serological test of patient

Serological test	Positive test	Negative test
Rheumatoid factor latex	100%	0%
C-reactive protein	42.85%	57.15

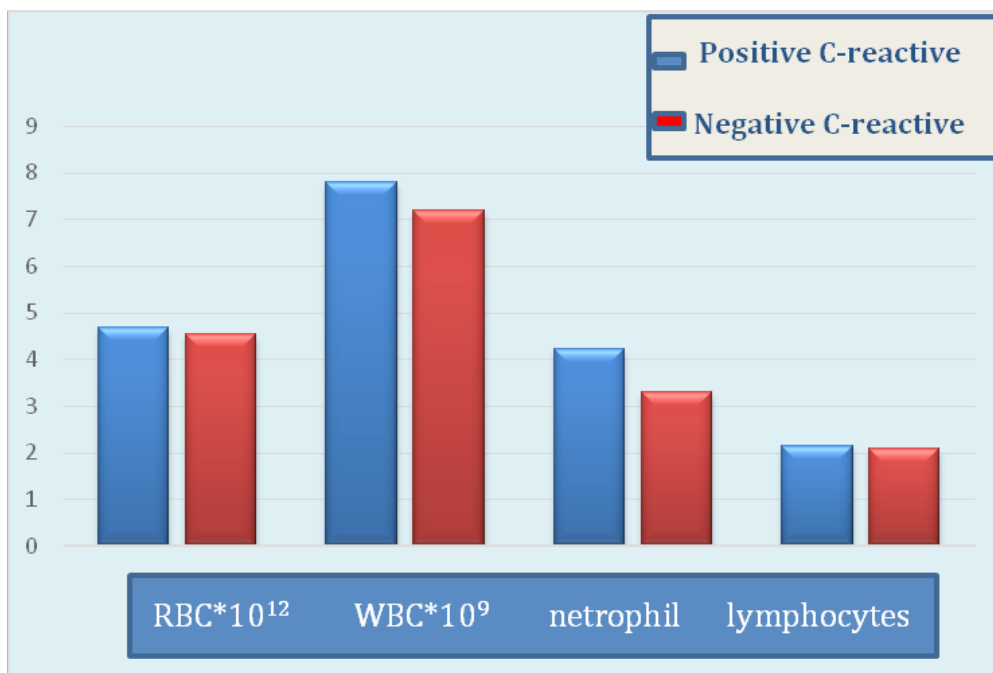


Figure 1: Comparison of the hematological characteristics between patients with positive and negative C-reactive protein

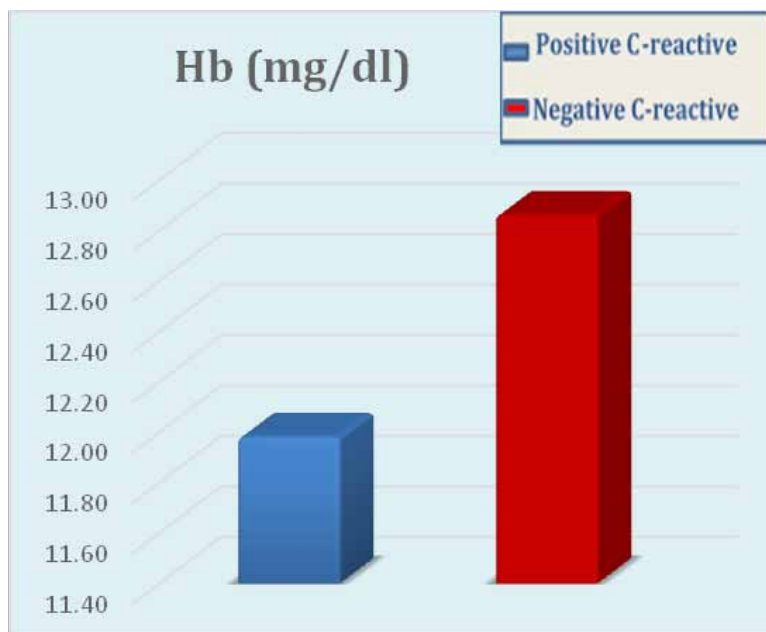


Figure 2: Comparison of the Hb between patients with positive and negative C-reactive protein

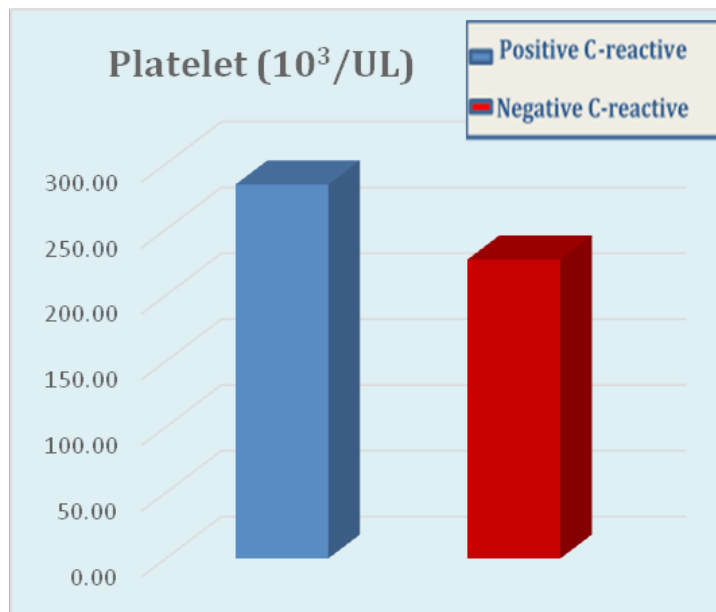


Figure 3: Comparison of the Platelet between patients with positive and negative C –reactive protein

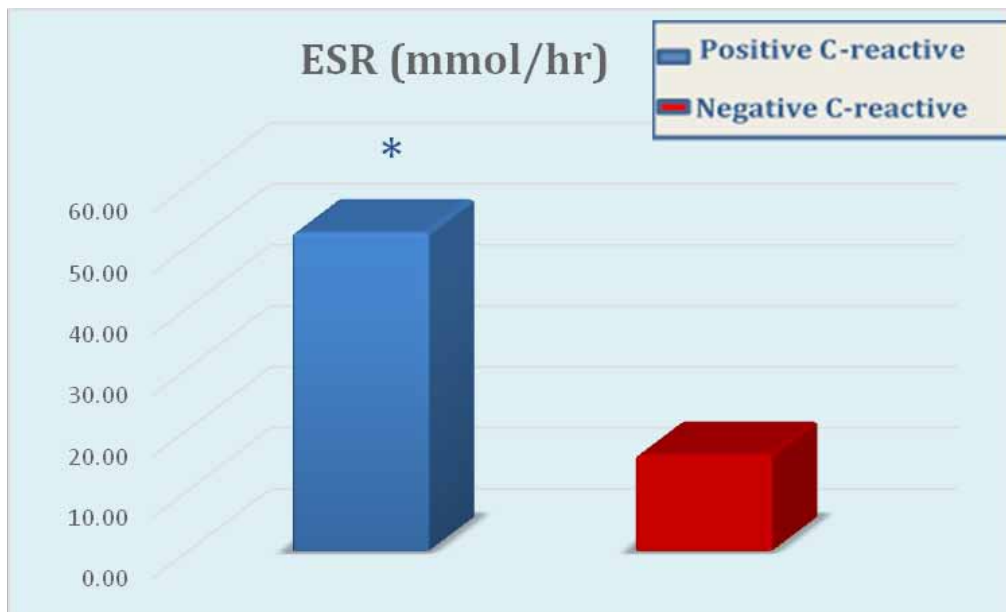


Figure 4: Comparison of the ESR between patients with positive and negative C –reactive protein

Discussion

The result of current study showed there is significant decrease in RBC number while there is non the significant decrease in Hb mg/dl in patients with arthritis in comparison with control. The most common risk that developed in rheumatoid arthritis was Anemia which becomes less due to the newer drugs in many countries.⁽⁵⁾ Another study suggested that rheumatologic disorders patients with hematologic abnormalities suffering from anemia of chronic disease which asymptomatic, and also

iron deficiency anemia.^(6,7) Though, Anemia in RA is a type of chronic disease that is often careless in clinical practice.⁽⁵⁾ The study of Talukdar *et al.* (2017) was predicted that Hb is lower in patients with high activity of RA disease.⁽⁸⁾

The result of current study showed there is significant increase in (hematological characteristic) WBC number spatially neutrophil, platelet, and ESR in patients with arthritis in comparison with control. The current study

agreement with result of Ismail *et al.* (2020) study⁽⁹⁾ which revealed that RA patients had significantly higher in the count of WBCs, Neut. cells, ESR, RF, CRP and Creatinine in comparison with HCs while levels of HDL and Hb were slightly lower in patients with RA than in the HCs.

This results supported the previous observations which speculate that the white cell counts, lymphocytes percentages, and thrombocytes have a significant rise in RA patients contrasted with controls subjects. Cascão *et al.*,⁽¹⁰⁾ corresponded with current investigations in that the white blood cell assumes an essential role in the RA initiation. Truth be told, polymorph nuclear leukocytes are the abundant leukocytes in the patient's synovial fluid, then in the early stage of disease, the polymorph nuclear leukocytes indicate altogether bring down apoptosis levels⁽¹¹⁾

While other study suggested that Anaemia was common at RA diagnosis with neutropenia and lymphopenia. This study also developed a concept that the lymphopenia and anemia linked with elevated the risk of infection in RA patient.⁽¹²⁾

Our outcomes additionally uncovered thrombocyte levels increased related to all patients suffering from inflammation of the rheumatoid joint. Gasparyan *et al.*,⁽¹³⁾ have suggested that in RA the thrombocytosis and thrombocytes-inferred proteins inside the synovia and synovial liquid. Also, Dakhil *et al.*,⁽¹⁴⁾ explain an increase in platelets as firmly identified with fiery markers, and suppose the main part in the pathogenesis of RA disease.

The result of present study showed that 42.85% of subject study with positive C-reactive protein (CRP) and 58.15 of subject with negative C-reactive protein. In some disease with acute infections and inflammatory process C-reactive protein (CRP) produced by the liver. In this study, the level of CRP elevated with a simultaneous raise of ESR⁽¹⁵⁾. The cytokines synthesis in inflammation, particularly interleukin-1, elevate the production of CRP and decline serum albumin and transferrin synthesis.⁽¹⁶⁾ Rheumatoid arthritis (RA) is a systemic inflammatory disorder in which raised C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) suggest active disease.⁽¹⁷⁾⁽¹⁸⁾

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

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