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The Effect Of Prealbumin On Liver In Rheumatoid Arthritis In Iraqi Patients

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Abstract

Rheumatiod arthritis (RA) is a long-term autoimmune disorder that represent by many symptoms like swollen and painful joints, as well as other organ may be affected like liver and other overlapping pathological and clinical manifestations. As a result, this disease can shows a great clinical challenges and many questions about diagnostic criteria for liver diseases .The present study was designed to investigate if the prealbumin effect in the liver progression in rheumatoid arthritis patients , so this study was accomplished in the department of Biology, Al-Rasheed University College, comprising of n= 80 subjects known rheumatoid arthritis patients with an age range 30 - 60 years and healthy controls n=80 with age range 30 - 60 years attending the Baghdad Teaching Hospital (Educational Laboratory), Al-Kindy Teaching Hospitaland Al-Imamian Al- Kadhimyain Medical City in Baghdad with disease duration was 6.5 ± 1.4 years. In this study somechemistry measurements included the (CBC) and the levels of CRP protein and prealbumin were estimated to investigate their correlation with liver abnormalities in RA patients. The mean (± S.D.) serum CRP level in the control group was found to be 7.60 ± 24.61 while it expressed higher levels in RA patients 25.05± 51.19 and the mean (± S.D.) serum prealbumin level in the controls was found to be 210.3 ± 51.2 whereas in RA patients, its level was found to be 168.2 ± 50.6 .This study suggested that c-reactive protein (CRP) could be a good inflammatory markers that were reported to have a fatal value for the valuation of systemic inflammatory disease and the serum prealbumin (PA) concentration might be a more sensitive indicator in assessing liver abnormalities in rheumatoid arthritis patients.The present study was aimed to find the influence of prealbumin protein on liver sufficiency in rheumatoid arthritis patients.

Keywords: Rheumatoid arthritis (RA), c-reative protein (CRP) , prealbumin (PA), comblete blood count (CBC).

1. Introduction

Rheumatoid arthritis is an autoimmune disease and is considered a chronic and systemic disease that could affect several joints in the body, especially the lining of synovial joints [1],Beside the joints, this disease affects many organs and systems. Since the target organ in the first degree is the liver because it is the largest lymphoid organs and consider the primary line of defense in mucosal immunology in the body and could get rid of toxic drugs and toxic substances inside the body [2]. As an RA is a systemic autoimmune disease, its characterized by a number of exhibits, some of these clinical manifestations rarely include spontaneous hepatic damage in patients complicated by extra-articular features and high titers of rheumatoid factor or mild inflammatory arthritis. The necrotizing hepatic arteritis with violation and spontaneous liver damage that may also develop abnormal liver function [3], so many tests are often seen in patients with inflammatory arthritis and some of these tests to the liver because of its critical role of the liver in modify the immune response in autoimmune and chronic inflammatory diseases [4].The C-reactive protein (CRP) is one of the most reactants acute-phase serum sunthesize by the liver, sincevarious proinflammatory cytokines were produces from the CRP whichare derived either from monocyte and/or macrophages, this protein is produced by hepatocytes in response to proinflammatory cytokines in certain Interleukein-6 (IL-6) and it indicatelots of different in disease performance associated with damage of the joint [5] . The prealbumin is a protein synthesized by the liver, the level of which is related to protein metabolism, can reflect the body's nutrition and liver function, associated with the inflammatory response in the body and widely used in clinical field [4], also the Prealbumin could beimportantindex of malnutrition which is considered necessary in handling the patients undergo surgical procedure and badutritional in patients subjected to surgery, also the impairment is increaseindifferent organ role and the immunological system of the stewardcould be effected also[6]. It can also portend infectious complications after gastric process and the prediction of patients in the medical department [7]. The CPR and serum (PA) consider the two strong version inflammatory markers for progression the disease activity in RA patients. [8]

2. Materials and Methods

A total of 80 samples rheumatoid arthritis patients with gender (40 females and 40 males) and age (30-60 year) were collected for research at the following hospitals: Baghdad Teaching Hospital (Educational Laboratory), Al-Kindy Teaching Hospital, Al-Imamian Al-Kadhimyain Medical City in Baghdad. Patients with systemic diseases, such as diabetes mellitus, hypertension, chronic renal failure, cancer, acute or chronic infection and pregnancy were excluded and for the purpose of comparisons 80 healthy control subject in respect to age (30- 60year) and gender (40 female and 40 males) were included for this study .

2.1 Collecting of blood samples

The blood samples were obtained from the vein about 5 ml from each patient and control : 2ml for the assessment of the CBC included the determination of the hemoglobin (Hb) concentration (gm/dl), white blood cells (WBC) count, platelets count, neutrophils (N) and lymphocytes and 3 ml were placed in a tube free of any preservative material for the purpose of separating the blood and getting the serum . After blood clotting the tubes put in the centrifuge for 3 minutes at 3000 RPM, then withdrew serum and neglected the deposit and kept it at a temperature of -20 ˚C to estimate the prealbumin and c-reactive protein levels.

2.1.1 Methods

The blood was drawn from the participants and was subjected to CBC analysis using automated hematology analyzer**.** The rheumatoid factor was investigated by Elisa kit from biosource: A dilutions of serum were prepared in PBS containing 0.1% BSA as indicated in Preparation of Samples section above. An aliquot (100 µL) of human unknown sample and 1X RF Positive, or 1X RF Negative were added to Coated Plate. Then the samples were incubated at room temperature for one hour. The well were washed three times with (250 µL) 1X Wash Buffer with thorough aspiration between each wash . An aliquot (100 µ L) of the diluted Anti-Human RF IgM antibody were added to each well and incubate at room

temperature for 1 hour , then the well were washed three times .An aliquot (100 µL) of the diluted Secondary Antibody- HRP Conjugate were adeed to each well and Incubated at roomtemperature for one hour and repeated the washed to the wells for three times ,then (100 µL) of Substrate Solution were added , finally (100 µL) of Stop Solution were added into each well, and the absorbance were recorded by using spectrophotometer at 450 nm as the primary wave length.The CRP were prepared using Elisa kit from cell from biolabs by adding (100 µL) of human CRP of the samples to the plate and both were incubated for 2 hours at 37ºC for or 4ºC overnight. The wells were washed three times with (250µL) washing buffer per well with thorough aspiration between each wash. Each CRP unknown sample, standard and blank should be assayed in duplicate. An aliquot (100 µL) of the C-reactive protien antibody were added to all the wells. Then the well were washed three times, then an aliquot (100 µL) of the Conjugatewere added to each well and incubate at room temperature for 1 hour , the wells for three times were washed .An aliquot (100µL) of Substrate Solution was added to each well and finally (100 µL) of Stop Solution was added into each well and the absorbance of all the plate wells were recordedat 450 nm using spectrophotometer. The prealbumin were investigated by using Elisa kit from biosource,for one hour , the buffer and the sample are incubated and conjugate with PA-HRP in plate . the wells were washed five time and then incubated with substrate , the product of the reaction form ablue colored complex . Finally , a stop solution is added which then turn the solution yellow and stop the reaction ,by using spectrophotometer ,the intensity is measured and standared curve is plotted .

2.1.2 Statistical Analysis

The data collected was analyzed using Excel 2020. The statistical data was analyzed by student's t-test to compare the significance between rheumatoid arthritis and non-rheumatoid arthritis which are control groups. The data were expressed as mean and standard deviation (mean ± SD). P values of less than 0.05 (P≤0. 05) was considered as statistically significant.

3. Results and Discussion

The mean (± S.D.) of age was 60.10 + 11.22 in control and 65.15 + 9.48 in rheumatoid arthritis patients with no significant differences and the rheumatoid arthritis factor in patients were 51±34.2 wheres in controls were 22± 11.5 with significant differences , and the mean (± S.D.) of hemoglobin in patients was 14.6 ± 1.5 and in controls 10.8 ± 1.5 , with significant differences ,the mean (±S.D.) of (WBC) in patients was 10.2 ± 1.8wheres in controls were 8.1 ± 5.9with significant differences and the mean (± S.D.) of neutrophils in patients was 66.8 ± 12.8 and in controls were 60.2 ± 4.7 with significant differences while the mean (± S.D.) of lymphocyte was 30.8 ± 11 in patients and in controls was 22.2 ± 7.9 with significant differnces and the mean (± S.D.) of plateles was 270.9 ± 50.6 in patients while in controls were 222.1 ± 45.0 with significant diffences as shows in (Table 1).

Table 1. The mean and SD values of Age , RF factor and the CBC paramrter (hemoglobin ,WBC,neutrophils,lymphocyte and plaletes)

parameters	Rheumatiod arthritis patients (80)	Controls (80)	p-value
Age	60.10 + 11.22	65.15 + 9.48	0.16
Duration of disease	6.5 ± 1.4		
Rf (mg/dl)	51±34.2	22± 11.5	<0.00
Hemoglobin (g/dl)	14.6 ± 1.5	10.8 ± 1.5	<0.00
WBCs (10^3/mm^3)	10.2 ± 1.8	8.1 ± 5.9	<0.00
Neutrophils (%)	66.8 ± 12.8	60.2 ± 4.7	<0.00
	30.8 ± 11	22.2 ± 7.9	<0.00

Lymphocytes (%)	270.9 ± 50.6	222.1 ± 45.0	<0.00
Platelets (10^3/mm^3)			

*p value less than ≤ (0.05) was considered statistically significant

Also the mean (± S.D.) serum CRP level in the control group was found to be 7.60 ± 24.61 whereas expressed higher levels in RA patients 25.05± 51.19 and the mean (± S.D.) serum prealbumin level in the controls was found to be 210.3 ± 51.2 whereas in RA patients, its level was found to be lower 168.2 ± 50.6 (Table 2) (Figure 1).

Table 2. The mean and SD values of c-reactive protein and prealbumin

Parameters	Rheumatiod arthritis patients n=(80)	Controls n=(80)	**P value**
C-reactive protein mg/dl	25.05±51.19	7.60±24.61	<0.00*
Prealbumin mg/dl	168.2 ± 50.6	210.3±51.2	<0.00*

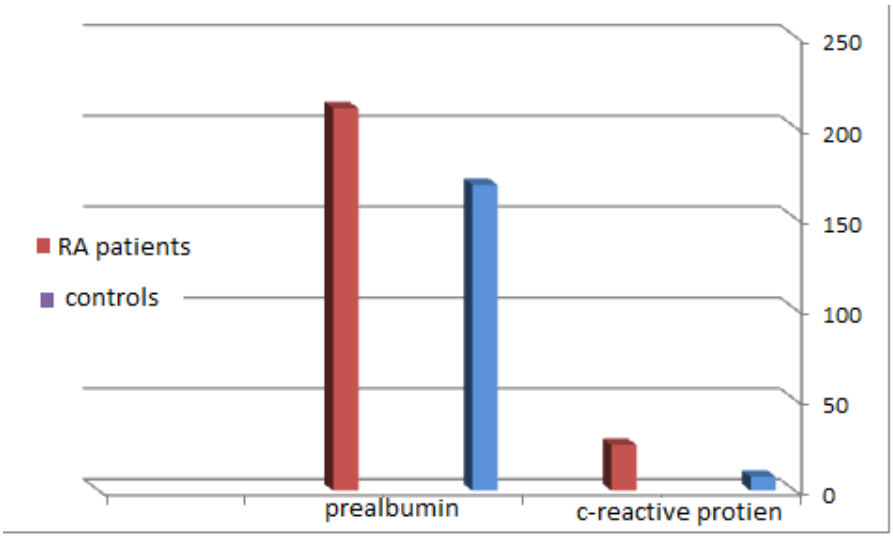

Figure2. shows the means of prealbumin and c-reactive protein in RA patients and controls

Since thePatients with RA are more susceptible to an associated autoimmune liver disease, a wide variety of rheumatic diseases affect the liver and its existence, significance, role and could causes a hepatic pathology varies [9] . nearly all the prealbumin serum is made in theliver, so, thegradeof the serum is affected by the liver state, as its mention that the level of prealbumin maybe lower in patients with liver diseases [4] , thus in this study the “p value” for the prealbumin shows significant differences between healthy and rheumatoid arthritis patients reveals the lower in prealbumin levelmay indicate the deficiencyin the function of the liver function [3] . The lack of several nutritional agents have been shown to occur in rheumatoid arthritis and some of these agent include folic acid,' vitamin D, and vitamin A deficiency [10] that may related to the change in the plasma concentration of the nutritional protein which are effected by many factor like inflammation ,autoimmune or otherwise [11], the prealbumin considered as a good sign of the present nutritional status because its life consist of two days which reflect a very short life and is not affected by hydration, so itssuggested that the badmalnutrition could lead to liver damage.The prealbumin level decrease than 170 mg/dL was a sign of bad nutrition [12]. The prealbumin levelscould be

change according to liver rolesince all the serum prealbumin is produce in the liver , so the prealbumin level could be lowered in patients with acute or chronic liver diseases [13] . Also the present study shows that the levels of C-reactive protein were significantly high in the patients compared to controls with significant differnces, this higher values of CRP consider as a signal of active inflammation in RA patients and the increase in CRP during inflammation is the result of an increase in the number of cells producing CRP as well as an increase in CRP secretion rate [12] because the RF is reflected by higher complete blood count (CBC) data which is routinely available to clinical test and includes the concentrations of neutrophils, monocytes, and platelets that are closely related to the inflammation status of patients in rheumatoid arthritis [14] in contrast the CRP play important role in increase inflammation in rheumatoid arthritis disease since its stimulates the monocyte cells [15] , thus the combination of CRP and pealbumin could be a useful marker in diagnose the development of liver damage in rheumatoid arthritis patients [5] .

4. Conclusions

It is important for the rheumatoid patients to be aware and noticed the dysfunction of the liver not only as a result of pharmacotherapy but also as a progress disorder associated with rheumatic disease.In addition, the prealbumin determination is widely available, and easy to perform, being animportant sign of disease activity and serve as a vital role in the progress of liver damage so it is necessary to check the prealbumin levels for RF patients to decrease the incidence of liver insufficiency also the CRP as indicator for inflammation and could avoids unnecessary diagnostic checks

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