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Serum C-Reactive Protein to Albumin Ratio in Egyptian Rheumatoid Arthritis Patients and its Relation to Disease Activity, Physical Function and Psychological Status

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Abstract

Background: Rheumatoid arthritis (RA) is an autoimmune disease that involves small peripheral joints in a bilateral and symmetric pattern. In RA, joint destruction and/or physical disabilities are associated with a reduced quality of life (QOL) and premature death. C-reactive protein (CRP) is an acute phase reactant, which is mainly synthesized by the liver. Its synthesis is induced by pro-inflammatory cytokines. On the other hand, albumin breakdown is enhanced in the inflammatory states, leading to reduced albumin concentrations. The CRP/Albumin ratio (CRP/Alb-R) is an indicator of the degree and activity of several inflammatory conditions and is believed to be superior to CRP or albumin alone in monitoring inflammation.

Aim of Study: To investigate CRP/Alb-R in RA patients and its association with disease activity (DA), physical state, and psychological state.

Subjects and Methods: This case-control study enrolled 71 RA cases and 71 matched healthy subjects. The clinical and serological markers of disease activity were recorded, and DA score-28 CRP (DAS-28 CRP) was calculated to determine DA in cases with RA. The CRP/Alb-R underwent calculation and was compared among both groups. The functional state was assessed using the Health Assessment Questionnaire Disability Index (HAQ-DI). Anxiety and depression levels underwent assessment with the Hospital Anxiety and Depression Scale (HADS) questionnaire.

Results: RA cases had significantly higher CRP/Alb-R than controls ($p<0.001$). CRP/Alb-R had a significant correlation with clinical parameters and serological markers of DA as well as the DAS28 in RA cases. The ROC curve analysis demonstrated a significant ability of the CRP/Alb-R to discriminate active and inactive RA patients based on DAS28-CRP with an area under curve (AUC) = 0.842, stronger than CRP or serum albumin alone. CRP/Alb-R had a significant correlation with HAQ-DI score, HADS-Depression score and HADS-Anxiety score among RA cases ($p<0.001$, $p=0.042$ and $p=0.032$, respectively). In the linear regression analysis, CRP/Alb-R was found to be the strongest determinant that can predict the DAS28-CRP and DAS28-ESR compared to CRP or serum albumin alone.

Conclusion: RA cases had significantly higher CRP/Alb-R compared to healthy controls. CRP/Alb-R can be a promising marker for assessment of RA activity, effect of RA on functional state and psychological affection in RA patients. CRP/Alb-R was superior to CRP or albumin alone in discriminating active and inactive RA cases and in prediction of RA activity.

Key Words: *CRP/albumin ratio – Disease activity score 28 – Hospital Anxiety and Depression Scale – Health Assessment Questionnaire.*

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Introduction

RA is an autoimmune disease, characterized by involvement of small peripheral joints in a bilateral and symmetric pattern. In RA, there is an association of joint destruction and/or physical disabilities with a reduced quality of life (QOL) and premature death **[1].** The past two decades have witnessed many paradigmatic advances that led to an improved understanding of the pathogenetic process of RA and, hence, promoted the development of novel therapies with improved therapeutic outcomes **[2].** Early institution of disease-modifying antirheumatic drugs (DMARDs) formed the basis of "treat 2 to-target approach" for rheumatoid arthritis which is based on appropriate monitoring of DA and changing the treatment if the therapeutic target is not achieved **[3].**

For the past years, DAS28 has been extensively utilized for evaluation of DA and therapeutic responses in RA **[4].** However, DAS28 has a complex formula and requires a calculator or computer for calculating this score. Therefore, there is an ongoing effort to identify new rapidly and easily administered biomarkers to facilitate the continuous monitoring of disease activity over time.

C-reactive protein (CRP) is an acute phase reactant, which is mainly synthesized by the liver. Its synthesis is induced by pro-inflammatory cytokines, particularly interleukin (IL)-6 [5]. On the other hand, albumin breakdown is enhanced in the inflammatory states, leading to reduced albumin concentrations regardless of the nutritional status [6]. Circulating CRP and albumin are frequently utilized for monitoring the DA of systemic inflammatory diseases [7].

Initially, the CRP/albumin ratio was utilized as a new predictor for identifying the criticallyill patient [8]. Later, it is found that high CRP/Alb-R could predict poor prognosis in subjects with cancers [9]. Furthermore, CRP/Alb-R could serve as a marker for assessing the DA in subjects with Takayasu arteritis (TA) [10] and in IBD patients [11].

The CRP/Alb-R is an indicator of the degree and activity of several inflammatory conditions [12,13] and is believed to be superior to CRP or albumin alone in monitoring inflammation [14].

Though numerous studies reported a correlation of CRP/Alb-R with several inflammatory disorders, studies pertaining to the correlation between CRP/Alb-R and disease activity in RA cases are scanty.

Aim of work:

This research evaluated CRP/Alb-R in RA cases and its correlation with DA, physical status, and psychological status.

Subjects and Methods

Study design:

RA cases were recruited from the Outpatient Clinics, Rheumatology and Rehabilitation Department, Faculty of Medicine, Mansoura University Hospitals within the period between July 2021 and July 2022. Seventy one consecutive subjects diagnosed with RA based on the ACR/EULAR 2010 criteria [15] were enrolled in our study. In addition, 71 age- and sex-matched healthy subjects was included and served as controls. Before participation, the aims and procedures of the study were explained in detail to all participants and a written consent was taken from each participant. The study procedures were approved from the local Institutional Research Board (IRB) (MS.21.06.1554).

Exclusion criteria:

Subjects with other chronic inflammatory or autoimmune diseases, renal insufficiency, infections, active hepatitis and chronic hepatic diseases, malignant tumors and malignant hematologic diseases, pregnant and lactating females were excluded from the study. Participants with malnutrition (BMI <18.5 kg/m^2 or unintentional losing of weight (>10% over indefinite amount of time, or >5% in the previous 90 days) [16] were also excluded.

Clinical assessment:

A detailed history was taken from all participants, and thorough examination was performed. Personal data (age and sex), duration of RA, morning stiffness's duration, tender (TJC) and swollen joint count (SJC) were recorded for all RA cases. Pain was evaluated with visual analog scale (VAS) [17].

DAS28 CRP was used to assess the DA [18]. The HAQ-DI questionnaire was used to evaluate patient's functional capacity to undertake daily activities in the home, at work, or during leisure time [19].

Assessment of psychological status:

All participants were instructed to answer the HADS questionnaire to detect and evaluate the grading of anxiety and depression levels. HADS is a scale formed of 14 items (anxiety and depression subscales; 7 items each). Each item is score from 0 to 3. Anxiety or depression is diagnosed if the subscales score >8 [20]. The HADS tool was translated from English to Arabic. The Arabic version of HADS is a valid and reliable psychological assessment tool [21].

Laboratory investigation:

Five cm of peripheral venous blood were obtained from all participants divided into two tubes: 2cm to assess ESR; 3cm in plain tube incubated 30 minutes then centrifuged at 4000 rpm. Then serum is collected for assay of CRP, RF, anti-CCP and albumin. The erythrocyte sedimentation rate (ESR) according to Westergren method [22]. Serum CRP levels was estimated by commercially available immunenephelometric method (kit from Tianjin Biotechnology Co, Ltd) which measures particles' agglutination through quantification of the scattered light [23]. The test is positive if CRP level is >6.0mg/l. Rheumatoid factor (RF) was measured using the rate nephelometry technique (kit from Tianjin Biotechnology Co, Ltd) in accordance to manufacturer's guidelines. Test is +ve if serum level of RF is >20IU/ml [24]. Levels of anti-CCP antibodies were estimated with enzyme-linked immunosorbent assays in accordance to manufacturer's guidelines (Toscana biomarkers, Siena, Italy kits). Test is +ve if serum anti-CCP is >20IU/ml [25]. Serum albumin level was determined by modified Bromocresol green assay on Cobas c702/8000 (Roche diagnostics, Germany) [26]. A normal serum

albumin range is 3.5 to 5.5g/dL. After determination of the CRP serum level and serum albumin level, CRP/Alb-R underwent calculation by dividing CRP value by albumin value. Liver and kidney function tests were also performed.

Statistical analysis:

SPSS for Windows V 20.0 (SPSS, Chicago, IL) was utilized to conduct the statistical analysis. All continuous data were tested for normality of distribution. Variables with normally distributed continuous data were described as means ± SDs while variables with abnormally distributed continuous data were described as medians and interquartile ranges (IQRs). Numbers and percents were utilized to convey categorical data. Comparisons between two variables with normal distribution continuous data were made using the Student's *t*-test while Mann-Whitney U test was used for comparison between two variables of continuous data with abnormal distribution. Variables with categorical data underwent comparison with Chi-square test. The correlation test was utilized to test the relationship between variables containing continuous data. The confidence interval (CI) 95% of the mean difference of CRP/Alb-R between RA and controls was calculated. Receiver operating characteristic curve (ROC curve) analysis was utilized to test and compare the ability of the CRP/Alb-R, CRP and albumin to discriminate active and inactive RA cases. A significance of a result was set at $p<0.05$.

Results

Demographic data, laboratory findings and psychological scores were compared between both groups and demonstrated in Table (1). In addition, the RA-related features of RA cases were shown in Table (1). Our study included 71 RA patients, 61 (85.9%) females and 10 (14.1%) males. The study also included 71 control volunteers, 57 (80.3%) women and 14 (19.7%) men. The mean age of RA cases was 44.9±11.5 years versus 43.6±11.9 years for controls. Both study groups were age- and sex-matched (Table 1).

RA patients had significantly higher ESR and CRP values than controls ($p<0.001$). Conversely, RA cases had significantly lower albumin values than controls ($p=0.048$). The CRP/Alb-R in RA cases was in the range of 3.1 to 5.6 (mean = 4.5±0.9) while in controls ranged from 0.9 to 3.6 with a mean of 1.9±0.7. This difference was significant (CI 95% of mean difference, 2.33 to 2.87, $p<0.001$) (Table 1).

Table (1): Comparison of the demographic characteristics, laboratory findings and psychological scores between RA group and control group and demonstration of RA related features in RA group.

	RA Group	Control Group	*p*
Age (years) (mean ± SD)	44.9±11.5	43.6±11.9	0.519
Females (n, %)	61, 85.9%	57, 80.3%	0.370
Clinical findings:			
Disease duration (years)	16.6±8.1		
Duration of morning stiffness (minutes)	133.1±65.1		
TJC	15.9±7.2		
SJC	14.2±5.1		
VAS-pain score (mm)	48.9±12.3		
Medications:			
MTX	35 (49.3%)		
HCQ	46 (64.8%)		
Leflunomide	33 (46.5%)		
Sulfasalazine	19 (26.8%)		
Glucocorticoids	18 (25.3%)		
Anti-TNF-α treatment	6 (8.5%)		
Laboratory findings:			
ESR ^{1st} hour (mm)	64.6±28.6	19.2±3.7	<0.001
CRP (mg/l)	18.1±4.6	7.4±2.8	<0.001
Serum albumin (gm/dl)	3.9±0.4	4.1±0.6	0.048
CRP/Alb-R	4.5±0.9	1.9±0.7	<0.001
RF Titer (IU/ml)			
- Median (IQR)	42.0 (112.0)		
- +ve cases	58, 81.7%		
Anti-CCP Titer (U/ml)			
- Median (IQR)	128.0 (202.0)		
- +ve cases	50, 70.4%		
Disease activity:			
DAS28-ESR	3.5±1.3		
DAS28-CRP	2.9±0.9		
Funational capacity and psychological scores:			
HAQ-DI	2.0±0.6		
Depression score [median (IQR)]	8.0 (8.0)	3.0 (5.0)	<0.001
Anxiety score [median (IQR)]	7.0 (6.0)	4.0 (7.0)	<0.001

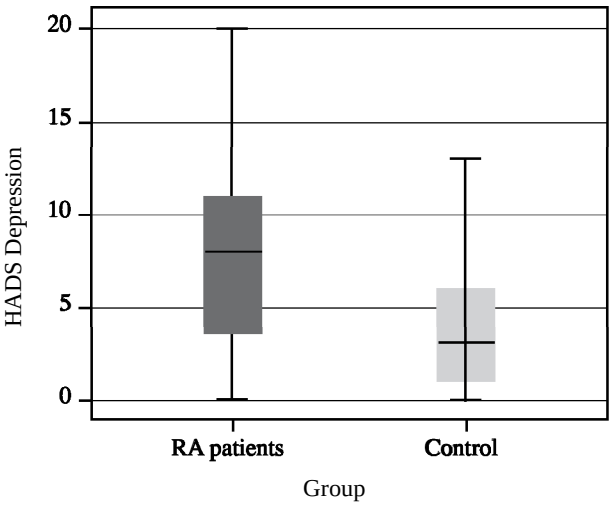

Fig. (1): Comparison of the level of HADS Depression score between the RA group and control group.

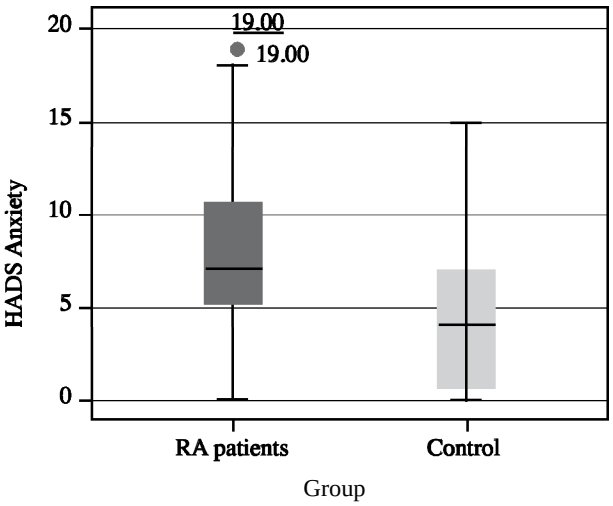

Fig. (2): Comparison of the level of HADS Anxiety score between the RA group and control group.

Table (1) and Fig. (1) shows that the median HADS depression was significantly higher in RA cases [8.0 (IQR=8.0)] than in controls [3.0 (IQR=5.0)] with $p<0.001$). Table (1) and Fig. (2) demonstrates that the median HADS anxiety was significantly higher in RA cases [7.0 (IQR=6.0)] than in controls [4.0 (IQR=7.0)] with $p<0.001$.

CRP/Alb-R demonstrated a significant relationship with clinical parameters of diseases activity which include morning stiffness's duration ($p=0.015$), TJC ($p=0.023$), SJC ($p=0.010$) and VAS-pain score ($p=0.017$) as well as laboratory biomarkers of disease activity including ERS ($p=0.005$), CRP ($p=0.002$), while inversely correlated with a serum albumin concentration ($p=0.017$) (Table 2). CRP/Alb-R also had a significant association with DAS28-ESR ($p=0.038$) and DAS28-CRP ($p=0.018$) (Table 2, Figs. 3,4). CRP/Alb-R also showed significant correlation with HAQDI score, HADS depression and HADS anxiety ($p<0.001$, $p=0.042$ and $p=0.032$, respectively) (Table 2, Figs. 5-7).

ROC curve analysis indicated a significant ability of the CRP/Alb-R in discriminating active and inactive RA cases based on DAS28-CRP with an area under curve (AUC) = 0.842. On the other hand, CRP and serum albumin were inferior to CRP/Alb-R for ability to discriminate active and inactive RA cases (AUC = 0.816 versus AUC = 0.520) (Fig. 8).

In contrast, CRP/Alb-R did not differ significantly between RA females and males or between RA cases on MTX, HCQ, leflunomide, sulfasalazine, biologics or glucocorticoids compared to patients not taking the drugs. Similarly, insignificant differences existed between cases with –ve RF and those with +RF and between cases with –ve anti-CCP and those with +ve anti-CCP in terms of CRP/Alb-R (Table 3).

The linear regression analysis demonstrated that CRP/Alb-R is the strongest determinant that can predict the DAS28-CRP ($p=0.017$) and DAS28-ESR ($p=0.023$) compared with CRP or serum albumin alone (Table 4).

Table (2): Correlation of the CRP/Alb-R with the age and clinical findings of RA patients.

	r	*p*
Age	0.094	0.436
Disease duration	0.025	0.834
Duration of morning stiffness	0.288	0.015
TJC	0.269	0.023
SJC	0.302	0.010
VAS-pain score	0.283	0.017
ESR	0.335	0.005
CRP	0.361	0.002
Serum albumin level	–0.282	0.017
RF Titer	0.171	0.153
Anti-CCP Titer	0.021	0.859
HAQ-DI score	0.611	<0.001
DAS28-ESR	0.247	0.038
DAS28-CRP	0.281	0.018
HADS depression	0.242	0.042
HADS anxiety	0.255	0.032

Table (3): Relationship of the CRP/Alb-R with gender, drug intake, RF positivity and anti-CCP titer in RA patients.

	CRP/Alb-R (Mean ± SD)		*p*
Sex	Females: 4.5±0.7	Males: 4.5±0.8	0.995
Drug intake:			
Methotrexate	No: 4.5±0.8	Yes: 4.5±0.7	0.812
Hydroxychloroquine	No: 4.6±0.7	Yes: 4.5±0.8	0.518
Leflunomide	No: 4.6±0.7	Yes: 4.5±0.8	0.522
Sulfasalazine	No: 4.5±0.7	Yes: 4.4±0.9	0.570
Biologics	No: 4.5±0.7	Yes: 4.3±0.7	0.537
Glucocorticoids	No: 4.5±0.7	Yes: 4.7±0.7	0.338
Autoantibodies:			
RF	–ve: 4.48±0.8	+ve: 4.53±0.7	0.941
Anti-CCP	–ve: 4.38±0.8	+ve: 4.51±0.7	0.577

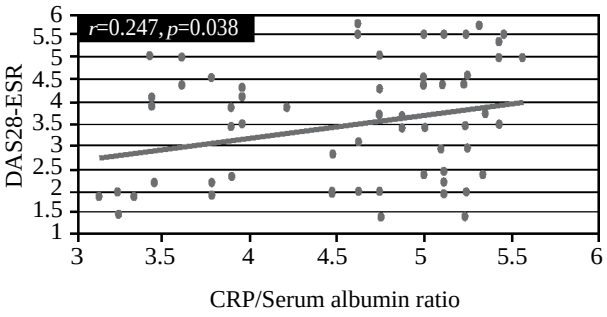

Fig. (3): Correlation between the CRP/Alb-R and the DAS28-ESR in RA patients.

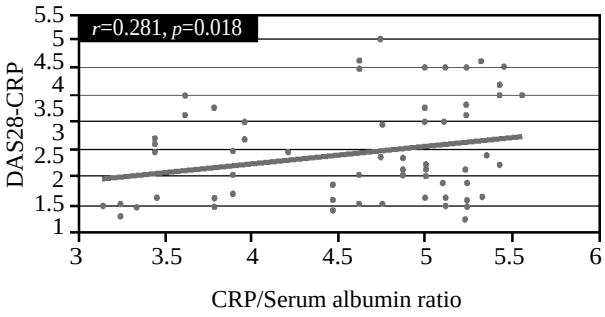

Fig. (4): Correlation between the CRP/Alb-R and the DAS28-CRP in RA patients.

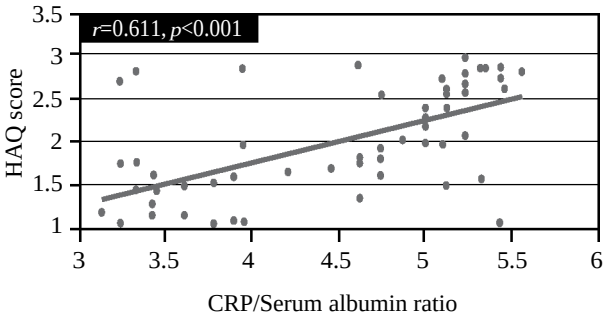

Fig. (5): Correlation between the CRP/Alb-R and the HAQ-DI score in RA patients.

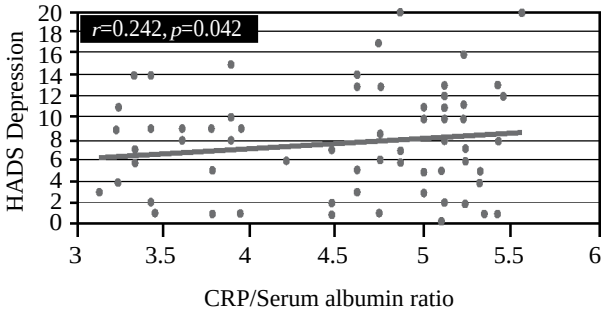

Fig. (6): Correlation between the CRP/Alb-R and the HADS depression score in RA patients.

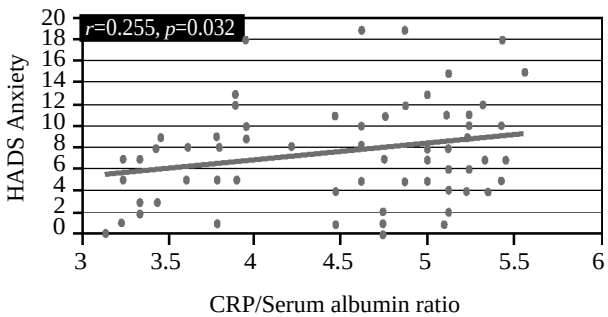

Fig. (7): Correlation between the CRP/Alb-R and the HADS anxiety score in RA patients.

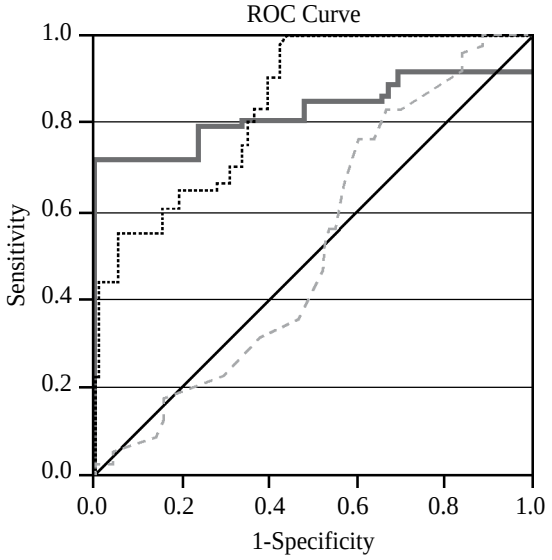

Fig. (8): ROC curve analysis for the ability of the CRP/Alb-R, CRP and serum albumin to discriminate between active and inactive RA patients based on DAS28-CRP. The AUC for CRP/Alb-R=0.842, for CRP=0.816 and for serum albumin=0.520.

Table (4): Linear regression analysis to identify association of CRP, serum albumin and CRP/Alb-R with the DAS2-CRP and DAS28-ESR.

	Unstandardized coefficients		Standardized coefficients		Significance
	B	Std. Error	Beta	*t*	
DAS2-CRP:					
(Constant)	0.157	2.192		0.072	0.014
CRP	0.014	0.006	0.270	2.330	0.023
Serum albumin	–0.150	0.456	–0.041	–0.328	0.744
CRP/Alb-R	0.677	0.277	0.330	2.443	0.017
DAS28-ESR:					
(Constant)	–2.251	0.382		–5.889	0.009
CRP	0.003	0.001	0.115	2.044	0.045
Serum albumin	–0.035	0.027	–0.072	–1.295	0.200
CRP/Alb-R	1.584	0.096	0.887	16.575	0.023

Discussion

Our study revealed that (a) RA cases had a significantly higher CRP/Alb-R than in controls; (b) CRP/Alb-R had a significant correlation with clinical and serological parameters of RA activity as well as DAS28 in RA cases; (c) ROC curve analysis revealed a significant ability of the CRP/Alb-R in discriminating active and inactive RA cases with an AUC=0.842, stronger than CRP or serum albumin alone; (d) CRP/Alb-R had a significant correlation with HAQ-DI, HADS-Depression and HADS-Anxiety scores in RA cases; and (e) The linear regression analysis demonstrated that CRP/Alb-R is more superior determinant that can predict the DAS28-CRP and DAS28-ESR than CRP or albumin alone.

In our investigations, RA cases had significantly higher ESR and CRP concentration than control group, as well as lower albumin levels. These observations are quite consistent with any inflammatory condition **[27]** including RA, due to enhanced release of the proinflammatory cytokines **[28].** However, the performance of these markers is influenced by many factors. Currently, the CRP/Alb-R emerged as a more useful laboratory biomarker of inflammation, hence, in our study we compared CRP/Alb-R level between RA patients and healthy subjects to explore its usefulness in identifying RA activity.

The results of our study demonstrated that RA cases had a significantly higher CRP/Alb-R compared to the matched controls. In agreement with the findings of our study, many prior studies reported that CRP/Alb-R was higher in RA cases than controls **[7,29,30]**. In addition, Elsabagh et al., revealed that the median CRP/Alb-R in RA cases was significantly higher than controls **[31].** Afifi et al., also found a marked increase of CRP/Alb-R among RA patients in comparison to the controls **[32].**

In support of the benefit of the CRP/Alb-R as a new laboratory indicator of the inflammatory state in autoimmune diseases, it was reported that individuals with TA had a significantly higher CRP/Alb-R than controls and was also higher in cases with active TA than those in remissions *[10]*.

In addition, it is found that CRP/Alb-R was higher in cases with axial spondyloarthritis than control group *[33]*.

Our study revealed that CRP/Alb-R had a significant correlation with clinical and serological markers of RA activity as well as the DAS28 in RA cases. In agreement with our findings, a positive relationship between CRP/Alb-R and CRP, ESR and DAS 28 had been reported by many studies *[7,14,29,30,32]*. In addition, Elsabagh et al investigated the ability of CRP/Alb-R in predicting DA in RA cases and found a significant association between DA and CRP/Alb-R *[31]*. Also, in agreement with the findings of this study, it had been found that CRP/Alb-R was significantly higher in RA cases with moderate-high disease activity than cases with low DA or in remissions *[14,32]*. Yang et al., concluded that CRP/Alb-R is a simple inflammatory parameter that is useful in monitoring RA activity. These findings are congruent to our findings *[7]*. Sunar and Ataman found a weak association between CRP/Alb-R and DAS 28-ESR among RA cases; however, they concluded that CRP/Alb-R can serve as a biomarker in disease activity, among other biomarkers *[34]*.

In our study the ROC curve analysis revealed a significant ability of the CRP/Alb-R in discriminating active and inactive RA cases (AUC=0.842). CRP/Alb-R was superior to CRP (AUC=0.816) and albumin (AUC=0.520). In the study by Elsabagh et al., ROC curve analysis showed that CRP/Alb-R was a fair parameter for discriminating disease activity in RA cases (AUC=0.78) *[31]*. Afifi et al., also performed ROC curve analysis and found that CRP/Alb-R can differentiate active and inactive RA patients (AUC of 0.789) *[32]*. In addition, the regression analysis in our study revealed that CRP/Alb-R showed the strongest association with DAS28-ESR and DAS28-CRP and this association was superior to CRP or albumin alone.

Gathering these findings together indicates that CRP/Alb-R can be utilized to assess DA in RA cases. Interestingly, in confirmation with the association of CRP/Alb-R with RA activity Afifi et al., observed that CRP/Alb-R is significantly higher in cases with positive power doppler signals compared to cases without *[32]*.

The CRP/Alb-R is a simple assessment marker that has a positive correlation with RA activity scores. CRP production is induced by IL-6, while the synthesis of albumin is inhibited by TNF and IL-6 *[35]*. Previous reports demonstrated that TNF and IL-6 could initiate and maintain the inflammatory response in RA *[36]*, which might explain the association of high CRP/Alb-R with inflammation and disease activity of RA.

Few studies evaluated the association between CRP/Alb-R and the severity of the underlying inflammation. It had been reported that CRP/Alb-R had a significant relationship with clinical and serological biomarkers of DA in psoriatic arthritis disease *[37]*, active uveitis *[38]*, TA patients *[10]* and axial spondyloarthritis *[33]*. In cases complaining of Ankylosing Spondylitis, ROC curve analysis revealed that CRP/Alb-R yielded a strong capability in discriminating between the active group and inactive group *[33]*.

Our study explored the association of RF and anti-CCP with CRP/Alb-R and found no association between CRP/Alb-R and the RF and ACPA levels. Our results showed that CRP/Alb-R showed an insignificant difference between cases with –ve RF and patients with +RF. Similarly, CRP/Alb-R did not significantly differ between –ve anti-CCP and +ve anti-CCP cases. This is consistent with these studies *[7,14,32]*. In the study by Balevi Batur and Levendoğlu et al, an insignificant difference existed between conventional DMARD and bDMARD users as regards the CRP/Alb-R *[14]*.

Our findings revealed that RA cases had significantly higher HADS-Depression and HADS Anxiety scores than controls. In agreement with our findings, previous studies found that HADS Depression and HADS-anxiety were much higher among RA cases than healthy subjects *[39-42]*. Our results also found a significant relationship between CRP/Alb-R and HAQ-DI score, HADS-Depression score and HADS-Anxiety score in the RA cases. In harmony with our results, Onder et al., found that CRP/Alb-R was correlated with HAQ scores *[29]*. It has been found that more than 20% of RA cases suffer from mood disorders. The degree of underlying inflammatory process, indicated by disease activity, is significantly correlated with mood symptoms in RA cases *[43,44]*. Sunar and Ataman suggested disease activity has certain impact on physical performance and QOL in RA cases, and hence, a relationship between CRP/Alb-R and psychological impairment and diminished functional capacity of RA patients is reasonable *[34]*. However, several previous studies did not observe any correlation between CRP/

Alb-R and HAQ-DI and RA quality of life **[7,14]** which may be raised from the suppressive effect of anti-inflammatory treatments.

Our study had few limitations: (1) The sample size was small; (2) This study was a single center study; (3) The correlation between CRP/Alb-R and important inflammatory markers in RA (e.g. TNF-α and IL-6) was not examined. Another limitation was that we did not investigate the correlation between CRP/Alb-R and other indices of DA in RA like CDAI and SDAI.

Conclusion:

RA cases had significantly higher CRP/Alb-R than controls. CRP/Alb-R has a significant correlation with DA, HAQ-DI score, HADS-Depression score and HADS-Anxiety score in the RA patients. CRP/Alb-R was superior that CRP or albumin alone in discriminating active and inactive RA cases and in prediction of RA activity.

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قياس نسبة البروتين التفاعلي سى إلى الألبومين في الدم لدى مرضى التهاب المفاصل الروماتويدى المصريين وعلاقتها بنشاط المرض والوظيفة الجسدية والحالة النفسية

نظرة عامة: التهاب المفاصل الروماتويدى (RA) هو أحد أمراض المناعة الذاتية التى تشمل المفاصل الطرفية الصغيرة فى نمط ثنائى ومتماثل. فى التهاب المفاصل الروماتويدى، يرتبط تدمير المفاصل والإعاقات الجسدية بانخفاض نوعية الحياة (QOL) والوفاة المبكرة. بروتين سى التفاعلى (CRP) هو أحد المواد المتفاعلة فى المرحلة الحادة، والذى يتم تصنيعه بشكل رئيسى عن طريق الكبد. يتم تصنيعه بواسطة السيتوكينات المؤيدة للالتهابات. من ناحية أخرى، يحدث انخفاض فى تركيزات الألبومين فى الحالات الالتهابية. تعد نسبة البروتين التفاعلى سى إلى الألبومين مؤشرًا لدرجة ونشاط العديد من الحالات الالتهابية ويُعتقد أنها تتفوق على البروتين التفاعلى سى أو الألبومين وحده فى مراقبة الالتهاب.

الهدف من الدراسة: تقييم العلاقة بين نسبة البروتين التفاعلى سى إلى الألبومين بنشاط المرض (DA) والحالة الجسدية، والحالة النفسية لدى مرضى التهاب المفاصل الروماتويدى.

المواد والطرق: تم مشاركة ٧١ حالة من حالات التهاب المفاصل الروماتويدى و ٧١ من الأشخاص الأصحاء المتطابقين. تم تسجيل العلامات السريرية والمصلية لنشاط المرض، وتم حساب درجة نشاط المرض داس- (CRP 28-DAS) 28 لتحديد نشاط المرض فى حالات التهاب المفاصل الروماتويدى. تم حساب نسبة البروتين التفاعلى سى إلى الألبومين وتمت مقارنته بين المجموعتين. تم تقييم الحالة الوظيفية باستخدام مؤشر الإعاقة فى استبيان التقييم الصحى (HAQ–DI). خضعت مستويات القلق والاكتئاب للتقييم من خلال استبيان مقياس القلق والاكتئاب فى المستشفى (HADS).