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Comparison of Biochemical Parameter of Rheumatoid Arthritis Patients and Healthy Individuals

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Abstract

Objective: The aim of the present study was to compare the biochemical parameter of Rheumatoid arthritis patients and healthy individuals.

Methods: A cross sectional study was conducted in the Department of Biochemistry, Dhaka Medical College, Dhaka from July 2016 to June 2017. According to selection criteria one hundred subjects were selected with the age ranging from 20-60 years and equally divided into two groups. Group-A fifty diagnosed case of rheumatoid arthritis patients attending in the OPD of Arthritis Care and Research Centre and SLE Clinic, Department of Medicine, Dhaka Medical College Hospital and Group-B fifty apparently healthy individuals. The study parameters were BMI, CRP, ESR, urinalysis and blood pressure. The results were compared statistically between two groups.

Results: BMI was significantly higher in Group A (28.5 ±4.8) than Group B (21.1 ± 3.7) but there were no significant difference of systolic blood pressure and diastolic blood pressure in-between two groups. Mean ± SD of ESR, CRP levels were significantly (<0.05) higher in Group A than Group B. Frequency of proteinuria and hematuria in Group A, 18% were urinary protein positive and 14% were hematuria positive

Conclusion: BMI is significantly higher in rheumatoid arthritis patients. ESR and CRP levels were significantly higher in rheumatoid arthritis patients. Proteinuria and hematuria is present in some rheumatoid arthritis patients, so renal function status should be checked regularly.

Keywords: Rheumatoid Arthritis, ESR, CRP

1. Introduction

Rheumatoid arthritis (RA) is a chronic inflammatory disease characterized by joint swelling, joint tenderness and destruction of synovial joints, leading to severe disability and the presence of autoantibodies can precede the clinical manifestation of rheumatoid arthritis (RA) by many years [1]. It is the most common autoimmune inflammatory arthritis in adults and has a significant negative impact on the ability to perform daily activities, including work and household tasks and health related quality of life [2]. The spectrum of clinical manifestations of RA is broad and encompasses clinical presentations that range from mild, self-limited arthritis to severe erosive polyarthritis, which may lead to progressive joint damage, functional disability and extra-articular manifestations of rheumatoid arthritis [3], it affects mainly women in middle and old age, which have an impact on millions of the world [4]. Rheumatoid arthritis affects about 1% of the world's population with relatively low variation in incidence among countries. When matched for age, 2-3 times more women are affected with RA than men. The prevalence of RA increases with age in both sexes and is greatest in patients aged 40-70 years. Heritability analysis and genetic markers suggest a genetic link to RA [5]. Rheumatic disease and kidney disease are both common in general population. Urinalysis is another initial step in evaluation of renal disorders. A complete urinalysis includes the following:

- Inspection for appearance, color and odor: Appearance normally transparent, color is the most obvious of urine attributes and observation of color is an integral part of urinalysis.
- Measurement of pH, specific gravity, protein and RBC by dipstick reagents.

- Microscopic analysis for casts, crystals, and cells (urine sediment) and bacteria although standard parts of many dipstick tests, no longer play significant roles in evaluation of renal disorders [6]. The prevalence of chronic kidney disease associated with rheumatoid arthritis (RA) is increasing in Bangladesh. Markers of renal function tests help to predict the events of renal involvement in the patients of rheumatoid arthritis and early intervention may reduce the risk of occurrence of chronic kidney disease.

2. Materials & method

A cross sectional study was conducted in the Department of Biochemistry, Dhaka Medical College, Dhaka from July 2016 to June 2017. According to selection criteria one hundred subjects were selected with the age ranging from 20-60 years and equally divided into two groups. Group-A fifty diagnosed case of rheumatoid arthritis patients attending in the OPD of Arthritis Care and Research Centre and SLE Clinic, Department of Medicine, Dhaka Medical College Hospital and Group-B fifty apparently healthy individuals. The study parameters were CRP, ESR, urinalysis, BMI and blood pressure. The results were compared statistically between two groups. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to compare the biochemical parameter of Rheumatoid arthritis patients and healthy individuals. The study was approved by the institutional ethical committee. The interviews were held directly in the corridor just outside the Outpatient Department.

3. Results

Table 1 shows age and gender distribution of study subjects and there were no significant differences between Group A and Group B in terms of age and gender reflecting homogeneity of the groups.

Table 1: Distribution of study subjects (N=100) according to age and gender in two groups

		Groups	p value
	Group A	**Group B**	
	(n=50)	**(n=50)**	
Age (in years) mean ± SD	42.25 ± 9.37	39.63 ± 8.65	0.719[a]
Gender			
Male	17 (34.0)	20 (40.0)	0.722[b]
Female	23 (66.0)	30 (60.0)	

Group A = Rheumatoid arthritis patients
Group B = Apparently healthy individuals
a=Unpaired student's 't' test was done to measure level of significance
b= Chi-square test was done to measure level of significance
Level of significance $p < 0.05$
Values with in parenthesis denote (%)

Table 2 shows BMI and blood pressure of study subjects. BMI was significantly higher in Group A than Group B but there were no significant difference of SBP and DBP in-between two groups.

Table 2: Baseline parameters of study subjects in two groups (N=100)

	Groups		
Parameters	**Group A (n=50) (mean ± SD)**	**Group B (n=50) (mean ± SD)**	**p value**
BMI (kg/m^2)	28.5 ±4.8	21.1 ± 3.7	**< 0.0001**
Systolic BP (mm of Hg)	121.8 ± 17.5	120.5 ± 15.3	0.69
Diastolic BP (mm of Hg)	80.5 ± 14.5	79.8 ± 13.6	0.80

Unpaired student's t' test was done to measure level of significance.
Level of significance $p < 0.05$
Values are expressed as mean ± SD

Table 3 shows ESR, CRP level of the study subjects. Mean ± SD of ESR, CRP levels were significantly (<0.05) higher in Group A than Group B.

Table 3: Outcomes variable of study subjects in two groups (N=100)

Parameter	**Groups**		**p value**
	Group A n=50 (mean ± SD)	**Group B n=50 (mean ± SD)**	
ESR (mm in 1st hr)	47.5 ± 15.3	11.6 ± 4.25	<0.001
CRP (mg/dl)	24.1 ± 8.7	1.3 ± 0.28	<0.001

Unpaired student's 't' test was done to measure level of significance.
Level of significance $p < 0.05$
Values are expressed as mean ± SD

Table 4 shows frequency of proteinuria and hematuria in Group A, of them18% were urinary protein positive and 14% were hematuria positive.

Table 4: Frequency of proteinuria and hematuria in group A (n=50)

Parameters	**Group A**		
	Positive	**Negative**	**Total**
	n (%)	n (%)	
Proteinuria	9 (18%)	41(82%)	50
Hematuria	7 (14%)	43(86%)	50

4. Discussion

According to this study, mean± SD value of BMI in group A and group B were 28.5 ± 4.8 and 21.1 ± 3.7 kg/m² respectively. Mean BMI was significantly higher in RA patients than that of normal healthy individuals. This result is similar to some previous studies done by Mirpourian *et al*. (2014) on 106 study subjects where the aim was to find out the association between obesity and RA disease and they found a possible role for higher BMI in RA patients [7] and a cross sectional study was done by Ayhan *et al*. (2016) to assess the body mass index in patients with rheumatoid arthritis (RA) and associations with disease outcome. In this study 1038 patients with rheumatoid arthritis were selected for study subjects. They concluded that according to the

body mass index (BMI), 70% of the patients were overweight (n=362, 34.9%) or obese (n=364, 35.1%) and obesity is more common in patients with RA than general population [8]. In both studies BMI was found significantly high in RA patients. In the current study, mean value of ESR was 47.5± 15.3 and 11.6 ± 4.25 mm in 1st hour respectively in group A and group Band mean value of CRP was 24.1± 8.7 and 1.3± 0.28 mg/dl respectively in group A and group B. Mean ESR and CRP levels were significantly higher in RA patients than that of normal healthy individuals. These findings are consistent with a retrospective study done by Bitik *et al*. (2015) on 112 patients in general study population, where 47 had a previous RD and 65 had no previous history of RD. In these 65 patients, the most common etiology of nonspecific elevations in ESR and CRP levels were RD (52.3%) in new onset. They concluded significant higher ESR and CRP level were observed in patients with RA than control [9]. Present study shows mean CRP level was significantly higher ($p < 0.001$) in group A than group B. This finding is consistent with a prospective control study which was done by Spasovski and Sotirova (2014) to evaluate the correlation of CRP with activity and severity of RA. In this study 60 RA patients were selected for study subjects. They found elevated CRP level in RA patients and concluded that high values of CRP are indicative of active inflammation in RA and it can be used as most useful marker in the prospective follow-up of RA patients [10]. In this current study frequency of proteinuria and hematuria were 18% and 14% respectively in Group A. These findings are consistent with a prospective observational study conducted by Karie *et al*. (2008) at the rheumatology department of Pitie-Salpetriere Hospital, Paris, France from 18 April to 31 July 2006, on 129 patients which showing 99 (76.7%) patients had available data for urinary dipsticks. Among these patients, proteinuria was detected in 16 (16.2%) and hematuria in 17 (17.2%) [11] and another prospective study was conducted by Anders and Vielhauer (2011), on 235 renal disease patients with early RA, in which proteinuria and elevated serum creatinine were detected during a 42-month observation period [12]. Pathan and Joshi (2004) found that a retrospective Japanese study was done among the patients of RA, where development of isolated proteinuria and renal failure (in terms of rise in creatinine) was detected. Similarly, another study was conducted by Gois *et al*. (2017) where 53 patients (34 female and 19 male) and the mean age of the patients was 53.81 ± 15.91 years (range 16-87 years), all patients had proteinuria, however only 14 (26.4%) had hematuria [12].

5. Conclusion

BMI is significantly higher in rheumatoid arthritis patients. ESR and CRP levels were significantly higher in rheumatoid arthritis patients. Proteinuria and hematuria is present in some rheumatoid arthritis patients, so renal function status should be checked regularly.

6. Acknowledgements

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7. Conflict of Interest

Authors declare no conflict of Interest.

8. References

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