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Status of Renal Function in Rheumatoid Arthritis Patients

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Abstract: *Objective*: The aim of the present study was to assess the status of renal function in rheumatoid arthritis patients. *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 serum creatinine, eGFR, serum urea, BMI, RA factor and anti-citrullinated protein antibody (ACPA). The results were compared statistically between two groups. *Results*: Serum creatinine (mg/dl) (mean ± SD) level was significantly higher ($p < 0.032$) in RA (0.85 ± 0.17) than normal individuals (0.78 ± 0.15). Level of eGFR (ml/min/1.73m^2) (mean ± SD) level was significantly lower ($p < 0.042$) in RA (84.5 ± 20.3) than normal individuals (92.7 ± 19.5). Serum urea (mg/dl) (mean ± SD) level was significantly higher ($p < 0.011$) in RA (33.12 ± 9.46) than normal individuals (28.51 ± 8.28). RA factor (IU/ml) and anti-citrullinated protein antibody (ACPA, U/ml) (mean ± SD) level was significantly higher ($p < 0.001$) in RA (37.4 ± 13.6 and 23.5 ± 8.3 respectively) than normal individual (11.7 ± 3.25 and 7.3 ± 1.65 respectively). The BMI (kg/m²) (mean ± SD) was significantly higher ($p < 0.0001$) in RA (28.5 ± 4.8) than normal individuals (21.1 ± 3.7). *Conclusion*: Serum creatinine is positively correlated to RA factor and ACPA in both groups and eGFR is negatively correlated to RA factor and ACPA in both groups. Routine screening of renal function may be beneficial for rheumatoid arthritis patients to prevent renal complications.

Keywords: Rheumatoid Arthritis, Renal Function, Anti-Citrullinated Protein Antibody, S. Creatinine

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 auto-antibodies 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]. Autoimmune diseases such as rheumatoid arthritis are often characterized by the presence of auto-antibodies. Rheumatoid factor (RF) is not specific for rheumatoid arthritis (RA) and may be present in patients with other diseases, such as hepatitis C, and in healthy older persons. Anti-citrullinated protein antibody (ACPA) is more specific for rheumatoid arthritis and may play a role in disease pathogenesis. Approximately 50-80 %

of persons with rheumatoid arthritis have rheumatoid factor (RF), anti-citrullinated protein antibody (ACPA), or both [3]. Rheumatoid arthritis is a chronic disease affecting 0.5% of the world population [4]. Rheumatic disease preferentially affect joints and soft tissues, but the inflammatory process regularly involves solid organs, including the kidney [5], where both glomerular and tubular damages are involved in RA. Renal disease in rheumatoid arthritis however is usually asymptomatic and is detected only on laboratory investigations [6]. Blood tests for serum creatinine and blood urea nitrogen (BUN) are widely accepted parameters to assess the renal functions and the simplest way to monitor kidney function. These substances are normal metabolic waste products that are excreted by the kidneys. These are good indicators of a normal functioning of the kidney and increase of the substances in the serum are indications of kidney dysfunction [7]. The aim of these tests is to assessment of kidney function in chronic disease [8]. 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 serum creatinine, eGFR, serum urea, BMI, RA factor and ACPA. 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 assess the status of renal function in rheumatoid arthritis patients. The study was approved by the institutional ethical committee. The interviews were held directly in the corridor just outside the Outpatient Department.

3. Result

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 (n=50)	Group B (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 $p < 0.05$
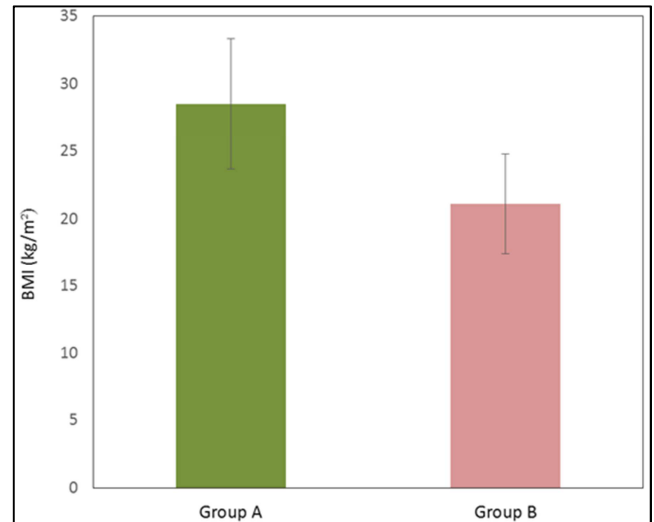Values with in parenthesis denote (%)

Figure 1. *Bar diagram showing BMI of study subjects.*

Figure 1 shows BMI of study subjects. BMI was significantly higher in Group A (28.5 ±4.8) than Group B (21.1±3.7).

Table 2 shows RA factor and ACPA level of the study subjects. Mean ± SD of RA factor and ACPA levels were significantly (<0.05) higher in Group A than Group B.

Table 2. *Outcomes variable of study subjects in two groups (N=100).*

| Parameter | Groups | | p value |
	Group An=50 (mean ± SD)	Group Bn=50 (mean ± SD)	
RA factor (IU/ml)	37.4± 13.6	11.7 ± 3.25	<0.001
Anti CCP (U/ml)	23.5 ± 8.3	7.3 ± 1.65	<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 3 shows levels of serum urea, serum creatinine and eGFR of study subjects. Levels of serum urea and serum creatinine were significantly higher in patients of Group A than Group B and level of eGFR was significantly lower in

patients of Group A than Group B.

Table 3. Renal functions of study subjects in two groups (N=100).

Parameters	Groups		p value
	Group A (n=50) (mean ± SD)	Group B (n=50) (mean ± SD)	
Serum Urea (mg/dl)	3.12 ± 9.46	28.51 ± 8.28	<0.011
Serum Creatinine (mg/dl)	0.85± 0.17	0.78± 0.15	< 0.032
eGFR (ml/min/1.73 m²)	84.5± 20.3	92.7 ± 19.5	< 0.042

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

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 [9]. 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 [10]. In both studies BMI was found significantly high in RA patients. According to this study, mean ± SD of ACCP (U/ml) was 23.5 ±8.3 and 7.3 ± 1.65 respectively in group A and group B and mean ± SD of RA factor (IU/ml) was 37.4 ±13.6 and 11.7 ± 3.25 respectively in group A and group B. Both the levels of serum ACCP and RA factor were significantly higher (p < 0.001) in group A than that of group B. These findings are consistent with an observational cross sectional study done by Karim (2016) in which, out of 65 rheumatoid arthritis patients, 80 % patients were anti-CCP positive and 73.3% patients were rheumatoid factor positive. They concluded rheumatoid factor (RF) positivity is associated with RA disease and also indicated that anti-CCP antibodies may be a potential prognostic indicator [11]. Another prospective cohort study was carried out by Kastbom et al. (2004) at Linkoping University Hospital, Sweden and they observed the diagnostic sensitivity of anti-CCP antibodies was 64% and the proportion of positive tests increased with the number of fulfilled classification criteria according to the American College of Rheumatology and they concluded anti-CCP antibody and RF positivity is related with early RA. In this study mean ± SD of serum urea (mg/dl) was 33.12±9.46 and 28.51 ± 8.28 respectively in group A and group B and mean ± SD of serum creatinine (mg/dl) was 0.85 ±0.17 and 0.78 ± 0.15 respectively in group A and group B [12]. Mean ± SD of serum urea and creatinine were significantly higher

in RA patients than that of normal healthy individuals and these findings are consistent with a study that was conducted by Ansari (2016) on 100 RA patients at the Department of Biochemistry, Govt. Medical College, Jalaun, Orai which showing the concentration of serum urea and creatinine were significantly higher (p<0.01) in untreated RA patients than in healthy control. From the above observations, he concluded that raised levels of serum urea and serum creatinine are associated with rheumatoid arthritis and with variety of kidney disorders which is in agreement with this current study [13]. In the current study, mean value of eGFR (ml/min/1.73m²) in group A and group B were 85.5 ± 15.3 and 11.6 ± 4.25 respectively. Level of eGFR was significantly (<0.05) lower in RA patients than that of normal healthy individuals, which is consistent with a study that was conducted by Hill et all. (2009) at the Rheumatology clinic, Gartnavel General Hospital, Glasgow, on 351 patients who were attended their clinic during the 4-week audit period showing that those patients had an eGFR< 60 ml/min by using 4-variable MDRD formula and had significant proteinuria. They concluded that their mean value of eGFR was significantly (<0.05) lower in RA patients than that of normal healthy individuals [14].

5. Conclusion

This study documents that renal disorders are common in rheumatoid arthritis patients in Bangladesh. Early screening of a patient with RA for renal diseases and aggressive management of positive cases might reduce the burden of chronic kidney disease in study subjects. It can be concluded that screening for renal disorders may prove to be useful in early risk assessment and prevention of renal complications in rheumatoid arthritis patients in Bangladesh.

Conflict of Interest

Authors declare no conflict of Interest.

Acknowledgements

References

[1]   Aletaha, D., Neogi, T., Silman, A. J., Funovits, J. and Felson, D. T. (2010) Arthritis & rheumatism, An Official Journal of the American College of Rheumatology, 62 (9), pp. 2569-2581.

[2]   Singh, J. A., Saag, K. G., JR, S. L. B., AKI, E. A., Bannuru, R. R. (2015) 2015 American college of rheumatology guideline for the treatment of rheumatoid arthritis, Arthritis Care & Research, 4 (2), pp. 1-25.

[3]   Wasserman, A. M. (2011) Diagnosis and management of rheumatoid arthritis, Am Fam Physician, 84 (11), pp. 1245-1252.

[4]   Charpin, C., Arnoux, F., Martin, M., Toussirot, E. and Lambert, N. (2013) New autoantibodies in early rheumatoid arthritis, Arthritis Research and Therapy,15 (4), pp. 1-9.

[5]   Anders, H. J. and Vielhauer, V. (2011) Renal co-morbidity in patients with rheumatic diseases, Arthritis Research and Therapy, 13, pp. 222-225.

[6]   Pathan, E. and Joshi, V. R. (2004) Rheumatoid arthritis and the kidney, JAPI, 52, pp. 488-494.

[7]   Anderson, W. (1996) Kidneys in Anderson's Pathology diseases, 5th edition (CV Mosby Company), St Louise BatlomorePhiladephia Toronto, pp. 610-621.

[8]   Hackenmueller, S. (2013) Laboratory evaluation of kidney function, pp. 53-55. [online]. Available at: https://www.arup.utah.edu> media >051313 kidney [Accessed 8 August, 2016].

[9]   Mirpourian, M., Salesi, M., Abdolahi, H., Farajzadegan, Z. and Karimzadeh, H. (2014) The association of body mass index with disease activity and clinical response to combination therapy in patients with rheumatoid arthritis, Journal of Research in Medical Sciences, 19, pp. 509-514.

[10] Ayhan, F. F., Ataman, S., Rezvani, A., Paker, N. and Tastekin, N. (2016) Obesity associated with active, but preserved joints in rheumatoid arthritis: results from our national registry, Arch Rheumatol, 31 (3), pp. 272-280.

[11] Karim, M. R. (2016) Correlation of anti-CCP antibodies with RA disease activity, pp. 6-35. [online].

[12] Kastbom, A., Strandberg, G., Lindroos, A. and Skogh, T. (2004) Anti-CCP antibody test predicts the disease course during 3 years in early rheumatoid arthritis (the Swedish TIRA project), Ann Rheum Dis, 63, pp. 1085-1089.

[13] Ansari, S. K. (2016) NSAIDs and renal function in rheumatoid arthritis, Journal of Medical Science And Clinical Research, 4 (02), pp. 9412-9416.

[14] Hill, A. J., Thomson, R. J., Hunter, J. A. and Traynor, J. P. (2009) the prevalence of chronic kidney disease in rheumatology outpatients, Scottish Medical Journal, 54 (2), pp. 9-12.