

## Original Research Article

# Study of microalbuminuria in patients of rheumatoid arthritis and its correlation with erythrocyte sedimentation rate, C - reactive protein and rheumatoid factor

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### ABSTRACT

**Background:** Subclinical renal dysfunction and microalbuminuria are common in rheumatoid arthritis patients particularly with long standing disease and with severe disease activity. Despite the degree of interest shown in detection of microalbuminuria and its prognostic implications, the determinants of elevated urinary albumin excretion have not been studied well. This study was done to assess the subclinical renal involvement in Rheumatoid Arthritis (RA) patients.

**Methods:** This cross-sectional study involving 50 patients attending attending the out-patient departments of Swaroop Rani Nehru Hospital, MLN Medical College, Prayagraj, U.P diagnosed with RA by modified ACR criteria (2010).

**Results:** The mean age of the cases was 41.96 years (SD 10.80), of them 74% were females and 26% were males. MA was found in 15 patients (30%), of them. In MA positive group, mean ESR was  $69.46 \pm 27.14$ , and CRP positive patients were 13 (86%), RA Factor positive patients were 12 (80%) and as compared to  $31.28 \pm 5.03$ , 11 (32%), 14 (40%) respectively in MA negative group ( $p < 0.05$  in all cases). Microalbuminuria was significantly correlated with ESR, CRP and RA factor ( $p$  value  $< 0.05$ ).

**Conclusions:** Presence of microalbuminuria indicates severe disease activity and long-standing rheumatoid arthritis. Microalbuminuria was found to be significantly correlated with disease activity in rheumatoid arthritis as assessed by ESR, CRP, RA Factor and anti CCP.

**Keywords:** C- reactive protein, Erythrocyte sedimentation rate, Rheumatoid arthritis, Urine micralbuminuria

### INTRODUCTION

Rheumatoid arthritis is a long-term autoimmune disorder that primarily affects joints.<sup>1</sup> It typically results in warm, swollen, and painful joints. Most commonly, the wrists and hands are involved, with the same joints typically involved on both sides of the body. Microalbuminuria is defined as urinary albumin excretion between 30 and 300 mg/24 hour for timed 24 hours urine collections and between 20 and 200 mg/L for random samples.<sup>2</sup> In patients with RA there is a high prevalence of renal impairment, with evidence of reduced glomerular

filtration and tubular function and renal disease is impairment presumed to be a frequent cause of death in RA.<sup>3-7</sup> Aim and objectives was to study microalbuminuria in patient of rheumatoid arthritis and to Study the correlation of microalbuminuria with rheumatoid factor (RF) and inflammatory markers ESR, CRP in patient of Rheumatoid Arthritis.

### METHODS

This cross-sectional study was performed on patients attending the out-patient departments of Swaroop Rani

Nehru Hospital, MLN Medical College, Prayagraj, U.P India between January 2018 to May 2019.

**Inclusion criteria**

After clinical evaluation and laboratory investigations, 50 patients aged more than 18 yrs, satisfying the modified American college of Rheumatology Association criteria (2010) for RA were included in the study.

**Exclusion criteria**

Those patients having hypertension, diabetes mellitus, previous history suggestive of renal disease and age group less than 18 years were excluded from the study.

**Study procedure**

A systemic examination of all joints was done for tenderness, swelling and range of active movements

possible at the joint. Hemoglobin estimation, total leucocyte count, differential counts, serum urea, serum creatinine, 24-hour urinary protein and blood sugar estimation was done in all the patients. ESR was obtained by Wintrobe method. A qualitative test for Rheumatoid factor (RF) and CRP was performed. Spot urine sample was tested for microalbuminuria.

**Statistical methods**

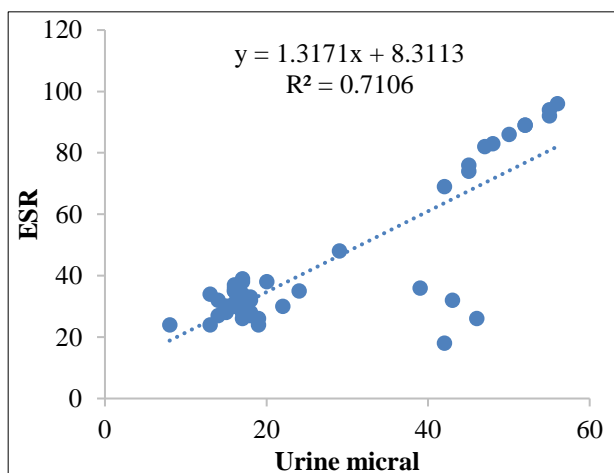
The statistical tools were employed to analyze the results are Chi square test, Student t test, Pearson correlation coefficient.

**RESULTS**

In this study, the mean age of the population was 41.96±10.80 years. Among the participants, there were 37 females (74%) and 13 males (26%), with a female to male ratio of 2.84:1 (Table 1).

**Table 1: Baseline characteristics of the cases.**

| Study parameters                            | Microalbuminuria |                | p value |
|---|------------------|----------------|---------|
|   | Absent (n=35)    | Present (n=15) |         |
| Age in years, Mean±SD                       | 41.34±11.38      | 43.4±9.53      | 0.981   |
| Sex, Male: female                           | 8: 27            | 5: 10          | 0.438   |
| Mean Duration of symptoms (months), Mean±SD | 14.37±8.11       | 21±8.09        | <0.05   |
| Morning stiffness >60 min (n)               | 23 (65%)         | 10 (66%)       | 0.327   |
| Joint deformities (n)                       | 2                | 1              | 0.636   |
| No. of joints involved Mean±SD              | 11±5.16          | 8.53±6.654     | 0.16    |
| ESR, Mean±SD                                | 31.28±5.03       | 69.46±27.14    | <0.05   |
| CRP positive (n)                            | 11 (32%)         | 13 (86%)       | <0.05   |
| RAF positive(n)                             | 14 (40%)         | 12 (80%)       | <0.05   |
| DAS28, Mean±SD                              | 3.25±0.51        | 4.54±1.06      | <0.05   |
| Anti- CCP, Mean±SD                          | 7.54±2.42        | 27.25±2.58     | <0.05   |



**Figure 1: Correlation between microalbuminuria and ESR.**

**Table 2: Association of ESR with microalbuminuria.**

| ESR (mm/h) | Micral negative (n=35) | Micral positive (n=15) | Statistical significance     |
|------------|------------------------|------------------------|------------------------------|
| 11-20      | 1                      | 1                      | $\chi^2 = 30.39$<br>p < 0.05 |
| 21-30      | 19                     | 1                      |                              |
| 31-40      | 14                     | 2                      |                              |
| >40        | 1                      | 11                     |                              |

Out of 15 patients having microalbuminuria, 11 patients were found to have ESR>40mm/hr (Table 2). There was strong positive correlation between microalbuminuria and ESR with R2 value 0.7106 which was statistically significant (p <0.05) (Figure 1). 13 patients (86.66%) were found to be CRP positive (Table 3). 12 (80%) were found to be RA factor positive. Microalbuminuria was

significantly associated with RA factor ( $p < 0.05$ ) (Table 4).

Out of 35 patients having negative microalbuminuria, 19 patients were found to have ESR 21-30 mm/hr and only 1 patient had ESR  $> 40$  mm/hr (Table 2). 24 patients (68.57%) were CRP negative (Table 3). 21 (60%) were RA factor negative while 14 (40%) patient were RA factor positive (Table 4).

**Table 3: Association of CRP with microalbuminuria.**

| CRP     | Microalbuminuria |              | Statistical significance |
|---------|------------------|--------------|--------------------------|
|         | Absent (35)      | Present (15) |                          |
| CRP +VE | 11 (31.4%)       | 13 (86.66%)  | $\chi^2 = 12.85$         |
| CRP -VE | 24 (68.57%)      | 2 (13.33)    | $p < 0.05$               |

**Table 4: Association of RA factor with microalbuminuria.**

| RA Factor | Microalbuminuria |              | Statistical significance |
|-----------|------------------|--------------|--------------------------|
|           | Absent (35)      | Present (15) |                          |
| RF +VE    | 14 (40%)         | 12 (80%)     | $\chi^2 = 6.73$          |
| RF -VE    | 21 (60%)         | 3 (20%)      | $p < 0.05$               |

## DISCUSSION

The present study confirms the occurrence of pathological albuminuria in several RA patients without any history suggestive of renal dysfunction, diabetes or hypertension. The reversible subclinical stage of renal disease may stay unnoticed for a long duration, and it's necessary to detect it at the earliest.

The prevalence of microalbuminuria in rheumatoid arthritis was found to be 30% in our study. This was similar to the findings obtained in other studies including Pederson L M et al and Ganesan et al.<sup>8,9</sup> According to Pederson L M et al the prevalence of microalbuminuria in Rheumatoid Arthritis was 27.7%.<sup>8</sup> Ganesan et al observed the prevalence of microalbuminuria to be 31.70%.<sup>9</sup> In the study done by Monica Verma et al the relative occurrence of microalbuminuria in rheumatoid arthritis patients was 26%. Sihvonen et al saw that microalbuminuria was present in 34 out of 600 rheumatoid arthritis patients.<sup>10,11</sup>

In our study, it was found that there was strong positive correlation between microalbuminuria and ESR. Results in our study showed that MA increases with increasing ESR levels. According to Monica Verma et al statistically significant relationship observed between MA and ESR ( $p < 0.001$ ).<sup>10</sup> Pederson L M et al observed no statistically significant association between ESR and MA in patients with rheumatoid arthritis, even though elevated ESR levels were observed among RA patients having microalbuminuria.<sup>8</sup> This could be partly due to the reason that some patients with normal urine albumin levels showed elevated ESR levels for causes other than rheumatoid arthritis.

In this study, significantly elevated levels of CRP were observed in patients having MA ( $p < 0.05$ ). As elevated ESR and CRP are markers of severe disease, microalbuminuria also suggests a severe disease. Pederson L M et al study also got similar results, they observed that CRP was significantly associated with urine albumin creatinine ratio (UACR).<sup>8</sup> Statistically significant relationship between MA and CRP was also noted by Ganesan et al and Monika Verma et al.<sup>9,10</sup>

In this study, a statistically significant association was observed between RA factor and microalbuminuria ( $p < 0.05$ ). Similar results were also obtained by Ganesan et al microalbuminuria was significantly associated with RA factor ( $p < 0.001$ ).<sup>9</sup> These results suggest that microalbuminuria is significantly associated with disease activity in rheumatoid arthritis patients.

## CONCLUSION

Microalbuminuria is seen frequently in patients with rheumatoid arthritis about one third of the patients having rheumatoid arthritis were seen to have microalbuminuria. Presence of Microalbuminuria indicates severe disease activity and long-standing rheumatoid arthritis. Microalbuminuria was found to be significantly correlated with disease activity in rheumatoid arthritis as assessed by ESR, CRP, RA factor. We think that in most of the patients having microalbuminuria in RA, renal involvement is reversible, and the chances of developing end stage renal disease is scarce if timely intervention done.

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