



## Evaluation of Serum CRP and Serum Uric Acid Levels in Rheumatoid Arthritis

### KEYWORDS

Rheumatoid Arthritis, CRP & Uric acid.

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**ABSTRACT** **Objective:** The aim of our study was to quantify Sr. CRP and Sr. Uric acid in patients of Rheumatoid arthritis and to compare it with normal individuals of both sexes. **Study Design:** A hospital based cross sectional study was conducted on patients attending the Out patient Department of Orthopaedics of SGRRIMHS for a period of 7 months from May 2015 to Nov 2015. A total no. of 102 patients (76 F +26 M) and 80 control cases (58 F + 22 M) in the age group 20 -60 yrs were selected randomly for the study. Exclusion criteria was age less than 20 yrs and more than 60 yrs, any previous history of Diabetes Mellitus, Tuberculosis, Hypertension and cardiovascular disease. **Methodology:** All the 182 subjects, both 102 cases (76F +26M) and 80 controls (58F +22M) in the age group 20-60yrs were selected and they underwent a biochemical analysis of RA factor, Sr CRP and Sr Uric acid. Sr. Uric acid was estimated by fully automated dry chemistry analyzer by Uricase/Peroxidase method(8), Sr. CRP was measured by Noncompetitive Immune assay(9) and RA factor by turbidimetric method (10) respectively. **Result:** The RA factor in females suffering from Rheumatoid Arthritis was much higher ( $47.78 \pm 22.50 \pm 2.58$  units/ml) as compared to normal females ( $6.69 \pm 2.55 \pm 0.34$  units/ml) and slightly higher as compared to Rheumatoid Arthritic males. The CRP in Rheumatoid Arthritic females was much higher ( $20.12 \pm 11.58 \pm 1.75$  mg/dl) as compared to normal females ( $5.82 \pm 2.83 \pm 0.39$  mg/dl). The RA factor in Rheumatoid Arthritic males was again higher ( $46.86 \pm 31.25 \pm 6.13$  units/ml) than normal males ( $7.58 \pm 3.14 \pm 0.68$  units/ml). Similarly Sr. CRP was also found to be higher in Rheumatoid Arthritic males ( $32.62 \pm 24.95 \pm 5.73$  mg/dl) as compared to normal males ( $5.73 \pm 2.54 \pm 0.6$  mg/dl). No significant correlation was found in the values of Uric acid for both males and females.

### Introduction:

Rheumatoid Arthritis is the most common auto immune inflammatory arthritis affecting approx 1% of the population. This systemic disease is marked by chronic inflammation that predominantly affects the synovial membrane of diarthrodial joints. Its etiology is unknown, but it is presumed to be an immunological disease with contributing genetic(1) and environmental factors(2). Evidence suggests that Rheumatoid Arthritis develops in 3 phases: an asymptomatic period of genetic risk, a preclinical period in which Rheumatoid Arthritis related antibodies can be detected and a clinical phase with acute signs and symptoms of inflammatory arthritis(3).

Initially the diagnosis of Rheumatoid Arthritis was mostly based on clinical manifestations. However it is often difficult to diagnose Rheumatoid Arthritis in very early phases of the disease and in many cases irreversible damage has occurred by the time diagnosis was confirmed. Therefore, laboratory tests which are sensitive and specific early in the disease course are desirable to allow earlier diagnosis and intervention such as Rheumatoid factor Serum, CRP, Serum Uric acid etc.

Rheumatoid factor consists of antibodies directed against the Fc region of human IgG(4). They are the hallmark of Rheumatoid Arthritis and can be detected in 60-80% of Rheumatoid Arthritis patients. The sensitivity for Rheumatoid Factor in Rheumatoid Arthritis varies from 19-53% and the variation in specificity is from 91.7% 98.6% (5).

Rheumatoid Factor assay is widely used for diagnosis and prognosis of Rheumatoid Arthritis. Serum CRP is one of the most responsive acute phase serum reactants produced by hepatocytes in response to a wide range of

stimuli(6). CRP rises dramatically in response to infection, inflammation and injury. It is widely used as part of diagnostic work up, to monitor disease status and to monitor treatment results.

The Conc of Sr. CRP varies from 3mg/dl to 10mg/dl in healthy individuals (7). A positive Sr. CRP may be an indicator of Rheumatoid Arthritis, Rheumatic fever, Cancer, Lupus, TB etc. In addition, serum CRP determination is widely available, easy to perform and of low cost, making it the preferred biomarker of disease activity.

Uric acid is an end product of the metabolism of purine nucleotides that are the principal constituents of cellular energy store such as ATP and components of DNA and RNA. Recent studies have shown that hyperuricaemia is associated with hypertension, systemic inflammation and cardiovascular disease mediated by endothelial dysfunction and pathologic vascular remodeling. Our aim was to identify efficient biomarkers to aid in diagnosis of Rheumatoid Arthritis and emerging predictive markers of prognosis to assist clinicians and help them in making initial treatment choices.

### Material & Method:

A hospital based cross sectional study was conducted on patients attending the Out Patient Department of Orthopaedics of SGRR&IMHS, for a period of 7 months (from May 2015-Nov 2015).

A total no. of 102 pts (76F & 26 M) and 80 control (58 F & 22M) in the age group 20-60yrs were selected randomly for the study. Exclusion criteria was age less than 20 yrs and more than 60 yrs, Previous history of Diabetes Mellitus, Tuberculosis, hypertension and Cardiovascular diseases etc.

All the subjects both cases and controls underwent a biochemical analysis of Serum RA factor, Serum CRP and Serum Uric acid.

All these investigations were carried out by fully automated dry chemistry analyzer Serum Uric acid was estimated by Uricase/Peroxidase method (7) , Serum CRP was measured by Noncompetitive Immunerate assay (8) and Serum RA factor by turbidimetric method (9) .

**RESULT:**

A total no of 102 cases (76 F + 26 M) and 80 controls (58 F + 22 M) in the age group 20 -60 yrs were included in the study and assayed for Serum uric acid, Serum CRP and Serum RA factor.

The RA factor in Rheumatoid Arthritic females was much higher ( $47.78 \pm 22.50 \pm 2.58$  units/ml) as compared to normal females ( $6.69 \pm 2.55 \pm 0.34$  units/ml) and slightly higher as compared to Rheumatoid Arthritic males.

The Serum CRP in Rheumatoid Arthritic females was again found to be higher ( $20.12 \pm 11.52 \pm 1.75$  mg/dl) as compared to normal females (  $5.82 \pm 2.83 \pm 0.39$  mg/dl). No Significant correlation was found in the values of uric acid for both males and females.

The RA factor in Rheumatoid Arthritic males was again higher ( $46.86 \pm 31.25 \pm 6.13$  units/ml), Similarly Sr. CRP was also found to be higher in Rheumatoid Arthritic males ( $32.62 \pm 24.95 \pm 5.73$  mg/dl) as compared to normal males ( $5.73 \pm 2.54 \pm 0.6$  mg/dl). No significant correlation was found in the values of uric acid for both males and females. These observations were tabulated in table 1 and 2 and depicted graphically in Fig. 1 and 2.

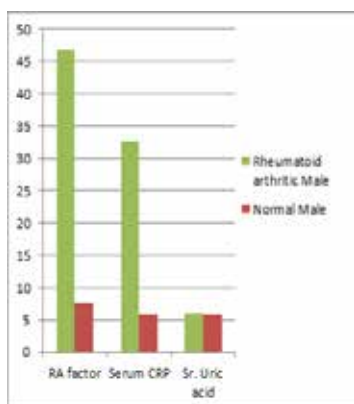
**Table: 1**

	Normal Male	Rheumatoid Arthritic Male
RA factor	$7.58 \pm 3.14 \pm 0.68$ IU/ml	$46.86 \pm 31.25 \pm 6.13$ IU/ml
Sr. CRP	$5.73 \pm 2.54 \pm 0.6$ mg/dl	$32.62 \pm 24.95 \pm 5.73$ mg/dl
Sr. Uric Acid	$5.83 \pm 1.60 \pm 0.43$ mg/dl	$6.02 \pm 1.41 \pm 0.33$ mg/dl

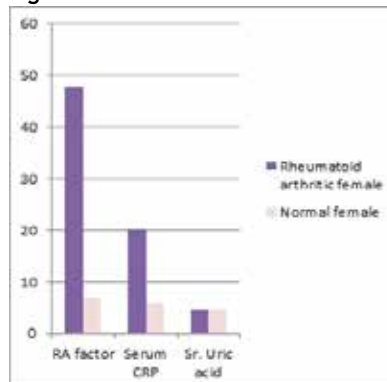
**Table: 2**

	Normal Female	Rheumatoid Arthritic female
RA factor	$6.69 \pm 2.55 \pm 0.34$ IU/ml	$47.78 \pm 22.50 \pm 2.58$ IU/ml
Sr. CRP	$5.82 \pm 2.83 \pm 0.39$ mg/dl	$20.12 \pm 11.58 \pm 1.75$ mg/dl
Sr. Uric Acid	$4.42 \pm 1.12 \pm 0.18$ mg/dl	$4.61 \pm 1.09 \pm 0.17$ mg/dl

**Fig:1**



**Fig:2**



**Discussion:**

In our cross sectional study we report that systemic inflammation (Serum CRP) is an independent and strong determinant of endothelial dysfunction & microvascular circulation in patients with Rheumatoid Arthritis. It is a sensitive marker of systemic inflammation. The source of circulating CRP has been thought to be the hepatocyte (10). However, it has been recently reported that human vascular cells produce CRP in response to inflammatory cytokines (11).

It has also been observed that uric acid induces changes in vascular proliferation and function mediated by denovo production of CRP in human vascular cells (12).

Serum CRP level was most closely correlated with the activity of the disease in Rheumatoid Arthritis patients. Previous investigators have also reported positive correlation between CRP levels and disease activity in Rheumatoid Arthritis patients (13-14).

Rheumatoid Arthritis affects between 0.5 and 1% of adults in the developed world, with between 5-50 per 100,00 people newly developing the condition each year (15). Onset is uncommon under the age of 15 and from then on the incidence rises with age until the age of 80. Women are affected 3-5 times as often as men (16). The age at which the disease most commonly starts in women is between 40-50 years and somewhat later for men.

**Conclusion:**

We conclude that Serum CRP is a useful biomarker of Microvascular function. There is no cure for Rheumatoid Arthritis but treatments can improve symptoms and decrease the progress of the disease. Regular exercise is recommended as both safe and useful to maintain muscle strength and overall physical function.

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