## Original Article

# Correlation between some immunological parameters and clinical presentation in RA patients

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## Summary:

***Background:*** *Complement (C) & CRP in patients with Rheumatoid arthritis (RA)'could be trigger disease activity.*
***Aim:*** *To study the correlation between C, CRP, IgM,, IgG, IgA & some clinical presentation in RA patients.*
***Methods:*** *Latex agglutination test(AG) & single radial immunoassay(SRIA) were used to asses CRP, IgMJgGJgA,,* C, *in 74 patients with RA.*
*Results: IgA & IgG were significantly increased, while the mean ofC3, C4 were slightly elevated in RA patients .*
***Conclusion:*** *There* is correlation between *IgG and IgM with joint deformity and joint swelling respectively, while C3 was showed statistically significant P<0.01 with joint stiffness, joint swelling and Rheumatoid nodule, where as CRP was statistically significant P<0.01withjoint swelling.. Key words : RA.C.CRP, IgM, IgG, IgA, SRI A, AG.*

## Introduction:

Rheumatoid arthritis (RA) is one of the mysterious autoimmune diseases which is still unresolved characterized by inflammation of synovial membrane, principally affecting peripheral joints in a symmetric fashion, commonly leads to cartilage destruction, bone erosion and joint deformities; extra-articular manifestations such as vasculitis and subcutaneous nodules can also occur, hence it's course is quite variable (1 -3).

The pathogenesis of RA is incompletely understood ,although there is evidence that cytokines such as tumor necrosis factor a & interleukin-1 are involved (4). Furthermore, there is substantial evidence that the complement system(C) is also involved in the pathogenesis of RA(5-9),Increased level of C products in the serum & synovial fluid of RA patients (7,8) and correlate with disease activity(9).There are many factors that trigger complement activation in RA patients ,one of these may be C-reactive protein(CRP), since this acute phase protein can activate C.

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## Patients & Methods

Patients: Seventy four patients (19 male, 55 female) with RA who met the American College of Rheumatology (ACR)1987revised criteria (10) attending the rheumatology consultation clinic or admitted to Baghdad Teaching Hospital in a period between November 2001 and February 2002 . Fifty patients clinically diagnosed with SLE according to ACR criteria 1997 for classification of SLE (11), thirty healthy individuals chosen from blood bank donors, who have no history or clinical evidence of RA or any chronic disease as a control groups .They were age and sex matched.

## Laboratory investigation:

Serum C3&C4 complement components & IgM, IgG, IgA were measured using the single radial immunoassay method, and results were expressed in mg / dl ,while CRP was detected by latex agglutination test and results were expressed in mg / L .

## Results

From 74 RA patients studied , the ratio male to female was 1:2.9 with mean age 42.1±11.Syr (range 18-67 )as shown in table 1&2.

**Table 1: Age distribution of studied groups.**

| | RA | | SLE | | Healthy control | |
|---|---|---|---|---|---|---|
| Age in years | N | % | N | % | N | % |
| <20 | 1 | 1.4 | 4 | 8.0 | 2 | 6.7" |
| 20-29 | 9 | 12.2 | 18 | 36.0 | 6 | 20.0 |
| 30-39 | 23 | 31.0 | 17 | 34.0 | 13 | 43.3 |
| 40-49 | 19 | 25.7 | 10 | 20.0 | 7 | 23.3 |
| 50-59 | 16 | 21.6 | 1 | 2.0 | 2 | 6.7 |
| 60+ | 6 | 8.1 | | | | |
| Total | 74 | 100.0 | 50 | 100.0 | 30 | 100.0 |
| Range | 18-67 | | 9-59 | | 18-56 | |
| Mean | 42.1 | | 30.6 | | 33.8 | |
| . SD | 11.3 | | 10.1 | | 9.4 | |
| P (ANOVA) < 0.001 | | | | | | |

**Table 2: Distribution of the studied groups by gender.**

| | RA | | SLE | | Healthy control | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Gender | | | | | | |
| Female | 55 | 74.3 | 44 | 88 | 23 | 76.7 |
| Male | 19 | 25.7 | 6 | 12 | 7 | 23.3 |
| Total | 74 | 100 | 50 | 100 | 30 | 100 |

Total Igs concentration level-s of IgA & IgG were significantly increased compared to healthy control (pO.OOl ,0.006 ) respectively while there was no difference in comparison to SLE patients, where as IgM level was normal in all studied groups as shown in table 3.

**Table 3 The difference in mean serum Immunoglobulin concentration (mg/d!) between studied groups.**

| | Serum Igs (mg/dl) | RA (n=74) | SLE (n=50) | Healthy control (n=30) | P(ANOVA) |
|---|---|---|---|---|---|
| * | Serum IgA | | | | <0.001 |
| | Range | 62.3-633.3 . | 48-633.3 | 90-540 | |
| | Mean | 350.9 | 358.3 | 208.8 | |
| | SD | 129.3 | 174.7 | 105.9 | |
| | | | | | |
| * | Serum IgG | | | | 0.006 |
| | Range | 643.7-2965.9 | 295.9-3042.3 | 700-1614.6 | |
| | Mean | 1462.8 | 1481 | 1114.5 | |
| | SD | 515.9 | 728.2 | 282.9 | |
| | | | | | |
| * | Serum IgM | | | | .0.43WSJ |
| | Range | 48.1-277.3 | 40.8-277.3 | 93.2-205.2 | |
| | Mean | 151.6 | 140.5 | 146.1 | |
| | SD | 48.9 | 49.9 | 33.1 | |

* Normal range of Igs
IgA: 90-540 mg/dl
IgG: 700-1620 mg/dl
IgM: 50-250 mg/dl

The mean of C3, C4 were slightly elevated in RA patients as shown in table 4 in comparison with healthy control, it was significantly difference higher PO.OOl in comparison to SLE patients group. .

**Table 4: Serum complement component concentration (mg/dl) levels in studied groups.**

| | Serum complement cone, (mg/dl) | RA (n=74) | SLE (n=50) | Healthy control (n=30) | P (ANOVA) |
|---|---|---|---|---|---|
| * | Serum C3 | | | | <0.001 |
| | Range | 35-260 | ' 22.5-220 | 94.8-250 | |
| | Mean | 144.5 | 96.6 | 146.6 | |
| | SD | 43.8 | 47.4 | 44.8 | |
| | | | | | |
| it | Serum C4 | | | | <0.001 |
| | Range | 8.3-84.9 | 2.5-70 | 20-72 | |
| | Mean | 32.6 | 19.5 | 33.1 | |
| | SD | 15.4 | 14.4 | 12.1 | |

- **Normal range C3: 84-250 mg/dl C4: 20-72 mg/dl**

Table 5 was showed that the mean of CRP levels was significantly higher than in control groups pO.OOl.

**Table 5: The difference in the mean of parameters between RA patients & control group.**

| | Parameters | RA (n=74) | SLE (n=50) | Healthy control (n=30) | P (ANOVA) |
|---|---|---|---|---|---|
| C reactive protein (mg/L) | | | | | <0.001 |
| Range | | 5-96 | • 5-12 | 5-5 | |
| Mean | | 17.6 ±18.4 | 6.4±2.5 | 5.0 | |

*** Normal range CRP> 6 mg/L**

Comparing the presence or absence of certain clinical criteria with positivity rate of different parameters as clearly seen in table 6 was showed statistically significant P<0.05 of IgG and IgM with joint deformity and joint swelling respectively, while C3 was showed statistically significant PO.01 with joint stiffness, joint swelling and Rheumatoid nodule, where as CRP was statistically significant PO.01 with joint swelling while others such as IgA and C4 was showed with no statistically significant with any one of these clinical criteria

**Table 6: Correlation between different parameters with certain clinical criteria..**

| | Parameters | | | | | |
|---|---|---|---|---|---|---|
| Clinical criteria | IgA | JgG | IgM | C3 | C4 | CRP |
| Joint stiffness | Io.ll3 | 0.05 | 0.142 | 0.298 ** | 3.158 | 0.102 |
| Joint swelling | 0.183 | 0.09 | 0.245 * | 0.313 ** | 0.077 | 0.385** |
| Joint deformity | 0.101 | 0.242 * | 0.017 | 0.162 | 0.019 | 0.15 • |
| Rheumatoid nodule | 0.121 | 0.164 | 0.183 | 0.302 ** | 0.14 | 0.128 |
| Joint effusion | 0.199 | 0.105 | 0.101 | 0.086 | 0.063 | 0.079 • |

*** correlation significant at the 0.05 level ** correlation significant at the 0.01 level**

## Discussion:

In this study 19 patients were male while 55were female with ratio 1:2.9 which is comparable to other Iraqi study 1:2.7 reported-by Ubaid ( 12 ) and Constantine *1:3.4* abroad ( 13 ) this is generally accepted to be related to sex hormones eg. Estrogen . Our data show that patients with RA have elevated levels of IgA&JgG were similar to other study (14), possible explanation of the above data propose that high level of IgG related to denaturation of IgG during initiation phase, while IgA concentration is proportionally associated with it's consumption in the synovium may be due to alternative pathway complement activation which confirmed by increased level of C3 in the patients sera.

This explain the correlation between C3 complement component level and certain clinical features such as joint stiffness, joint swelling, and rheumatoid nodules which might be related to C. activation and increased opsonization of immune complexes by phagocytosis which is due to cellular infiltration in the synovium by the action of anaphylatoxins complement component resulting in fluid accumulation and hence swelling and stiffness, on the other hand cellular infiltration in extra-articular areas may be lead to nodules formation, these finding supported by Abbink,( 15 ) which showed that there was a good contribution between C. component action and damage in arthritis. Hence it is very logic to see in this study as well as abroad studies ( 16, 17 ), that increased level of serum complement components C3 & C4 were evidently noticed.

Assessment Of serum concentration of CRP has been advocated as a objective measure of disease activity in RA patients , so elevated level were found to be correlated with joint swelling, this may be due to byproduct C. activation which is again a possible reason for swelling of the joint, this is quite accord with abroad studies (17, 18). In conclusion, we found evidence of complement activation C3 in RA patients & also CRP this acute phase protein should be considered an inflammation mediation in this disease.

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