

## THE INCIDENCE OF ELEVATED C-REACTIVE PROTEIN IN PATIENTS WITH RHEUMATIC AND INFECTIOUS DISEASES

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C - reactive protein (CRP) is an important diagnostic tool for rheumatic and infectious diseases. The study was conducted on 60 patients with infectious and 60 patients rheumatic diseases conducted at the Clinic for heart disease and rheumatism and the Clinic for Infectious Diseases University Clinical Center of Sarajevo (UCCS). It is a retrospective study, which is based on the observation and analysis of relevant variables. Criteria for inclusion in the study were patients who were suffering from rheumatic and infectious diseases, all ages and ages, and elevated levels of C-reactive protein in the laboratory. Criteria for exclusion from the study were other diseases with elevated CRP levels, which are not infectious and rheumatic occurrences and patients who did not have the laboratory analysis of the value of CRP. Analyzing CRP in rheumatic disease in 40 (67%) patients found elevated CRP, while in 20 (33%) patients determined normal value of CRP. Analyzing C-reactive protein in infectious diseases should be noted that 50 (83%) patients elevated CRP, while in 10 (17%) patients appeared normal CRP levels. The most common rheumatic disease in this study is RA, while leading gastroenteritis disease in infectious diseases. Mean CRP in patients with rheumatic diseases is 19.55 mg / l, while in infectious diseases was 79.55 mg / l. we show the most rheumatic diseases with elevated CRP, Rheumatic arthritis (RA) is dominant with 24 patients. In infectious diseases with elevated CRP Pneumonia bacterial and salmonellosis is dominate 10 patients.

**Keywords:** C-reactive protein, rheumatic and infectious diseases**INTRODUCTION**

CRP is the prototype of acute phase proteins, and it was discovered in 1930 in the serum of patients with pneumonia. Given that it appears at the beginning of the infection and disappears with the resolution of infection there is a question what is the importance of this protein in the body's defense. C-reactive protein is made up of five identical, non-glikosilide, polypeptide subunits that form the polymer which molecular weight is 115 000 - 140 000 daltons. This protein may have a small amount of carbohydrates, and during electrophoresis moves from slow  $\gamma$  to medium  $\beta$  position. Normally, its level in plasma is below 8 mg/L (1). It is assumed that the main role of this protein is to identify potentially toxic autogenous substances that are released from damaged tissues and their attachment so detoxification or removal from circulation can be done(2).

Amplitude of CRP response depends directly on the degree of tissue damage, the type of inflammatory stimulation and the type of tissue or organ that is affected by pathological processes.

CRP response is significantly more pronounced in bacterial than viral infections,

which may be important in the differential diagnosis of obscure febrile conditions. A positive CRP test provides information about the existence of inflammatory processes in the body, including the cancer, connective tissue disease, myocardial infarction, inflammatory bowel disease, tuberculosis, lupus erimatodes, pneumococcal pneumonia, rheumatoid arthritis, rheumatic fever. There is very high increase of C-reactive protein, and the degree of elevation is usually related to the severity of the infection. In most infectious diseases concentration range of C-reactive protein reflect disease activity and may provide useful information in monitoring such condition. In case of occurrence of an acute exacerbation of chronic disease or condition CRP increases rapidly and reaches high concentrations (more than 200 mg / l) in 48 hours, and decreases rapidly if the therapy was successful (3).

Given the often overlapping these diseases CRP analysis is emerging as a problem in defining the final diagnosis and defining etiology. Referential values of C-reactive protein levels did not differ for men and women, or in relation to age, and vary from lab to lab from 0 to 1.0 mg /L or less than a 10 (ten) (1).

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The authors declare no competing interests.

The aim of the study was to determine the total number of patients hospitalized at the Clinic for heart disease and rheumatism, with rheumatic diseases who have elevated CRP and a number of patients with elevated CRP hospitalized at the Clinic for Infectious Diseases, the most common rheumatic and infectious diseases with an elevated value of C-reactive protein, and values of CRP in these diseases.

**SUBJECTS AND METHODS**

The study was conducted on 60 patients with infectious diseases and 60 patients with rheumatic diseases conducted at the Clinic for heart disease and rheumatism and the Clinic for Infectious Diseases UCCS. It is a retrospective study, which is based on the observation and analysis of relevant variables. Patients who were included in the study were selected by random sampling method. Working with respondents

was conducted in accordance with the rules and principles of the Ethics Committee of the Medical Faculty in Sarajevo.

We used medical records of hospitalized patients suffering from the disease. Criteria for inclusion in the study: Patients who are suffering from rheumatic and infectious diseases, all ages; Elevated levels of C-reactive protein in the laboratory. Criteria for exclusion from the study: Other diseases with elevated CRP levels, which are not infectious and rheumatic occurrences; Patients who did not have the laboratory analysis of the value of CRP; C-reactive protein was analyzed from laboratory parameters. All these searches were performed at the UCCS.

Of laboratory parameters analyzed C-reactive protein. All the above tests were performed at the Infectious Disease Clinic UCCS, and the Clinic for heart disease and rheumatism UCCS.

**RESULTS**

**Table 1.** Distribution of patients by sex, age and diseases

60 patients with rheumatic diseases	Female	48	Age 20-40 years	Age 40-65 years	Age 65 plus years
	Male	12	10	17	33
60 patients with infectious diseases	Female	28	Age 20-40 years	Age 40-65 years	Age 65 plus years
	Male	32	9	22	29

Exploring the age of rheumatic patients, the most of them were over 65 years old (33 respondents). Second group are patients between 40-65 years of age (17 patients-). In third place is a group of patients (10) between 20-40 years. Exploring the age patients with infectious diseases, the most of them are werw over 65 years old (29 respondents). Second group are patients between 40-65 years (22 patients). In third place is a group of patients (9) between 20-40 years (27%)(Table 1).

**CRP value in patients with rheumatic diseases**



**Figure 1.** The value of CRP observed in patients with rheumatic diseases

In 40 (67%) patients elevated CRP was found, while in 20 (33%) patients normal value of CRP was determined (Figure 1).

**Table 2.** Shows the value of CRP observed in patients with infectious diseases

	CRP in patients with infectious diseases	%
The normal value 10 mg /Ll	10	17
Elevated levels over 10 mg /Ll	50	83
Total	60	100

It is significant that, in 50 (83%) patients CRP is elevated, while in 10 (17%) patients CRP level normal (Table 2).

**Table 3.** The average value of CRP in rheumatic and infectious diseases

	%
Average CRP in patients with rheumatic diseases	19.55 mg/l
Average CRP in patients with infectious diseases	79.55 mg/l

In observed patients, it was 19.55 mg/L in rheumatic diseases, and 79.55 mg/Ll in infectious disease (Table 3).

**Table 4.** Distribution of patients according to level of CRP and diseases

Rheumatic diseases and infectious diseases with elevated CRP	Female	Male	Total
1. Arthritis rheumatoides	21	3	24
2. Osteoarthritis	3	1	4
3. Other rheumatic diseases	18	4	12
4. Pneumonia Bacterial	6	4	10
5. Salmonellosis	6	4	10
6. Other infect. Bacterial diseases	5	0	5

In infectious diseases with elevated CRP Pneumonia bacterial and salmonellosis is dominant (10 patients) (Table 4).

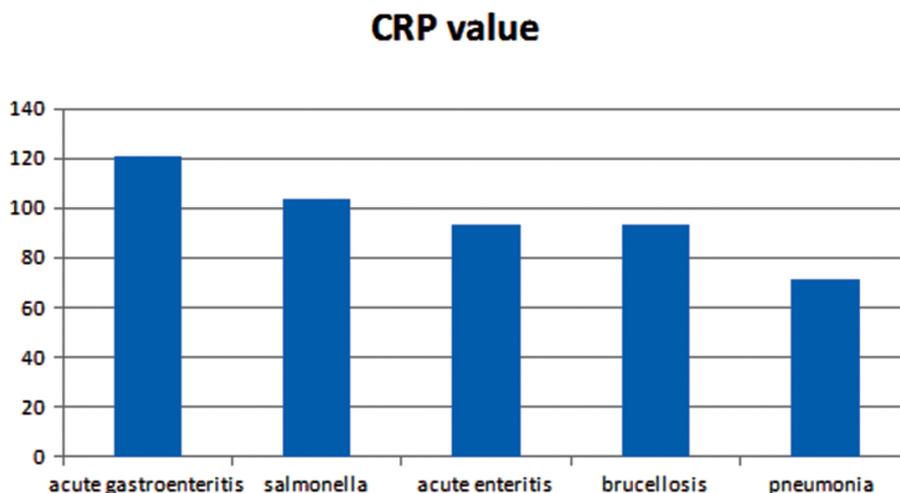


Figure 2. The average CRP in different diseases

The average was found in patients with acute gastroenteritis 120.74 mg /L, followed by salmonella with 103.35 mg/L, acute enteritis with 93.26 mg/L, brucellosis with 93.13 mg/L, and pneumonia with 71.56 mg/L (Figure 2).

### CRP VALUE

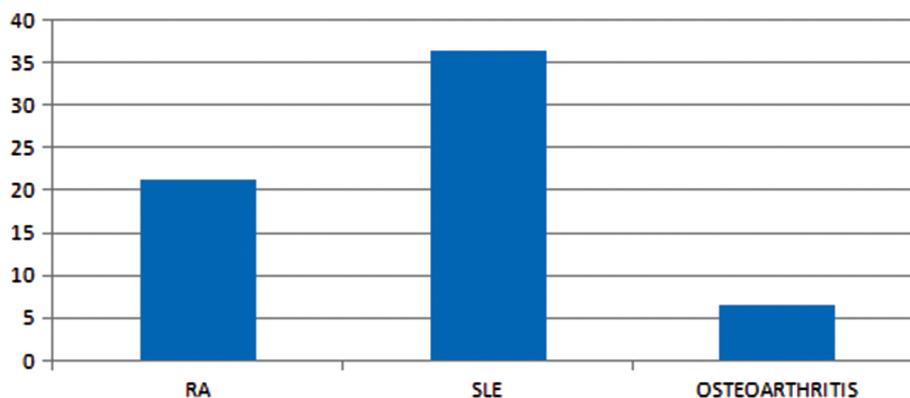


Figure 2. Distribution of patients with rheumatoid disease according to value of CRP

If we consider the elevated CRP values in rheumatic diseases, we can see that rheumatoid arthritis with 24 patients had the highest average CRP with 21.28 mg/L, 3 patients with SLE had CRP level was 36.43 mg / l. Osteoarthritis is a rheumatic disease with the lowest CRP in our study (6.62 mg/L)(Figure 3).

### DISCUSSION

In an analysis the age of rheumatic patients, the most of them were over 65 years old (33 respondents). Second group are patients between 40-65 years of age (17 patients). In third place is a group of patients (10) between 20-40 years. Exploring the age patients with infectious diseases, the most of them were over 65 years old ( 29 respondents). Second group are patients between 40-65 years (22 patients). In third place is a group of patients (9) between 20-40 years (27%).

According to the study Dr.G. Liuzzo and associates in the research on 188 patients, there was greater representation of women in relation to the male gender (120:68). The results given in this study overlap with the results of our study in relation to gender representation. In addition, there is no statistically significant difference of CRP level in relation to age. CRP was elevated in 67% of patients with rheumatic illnesses, and in 83% of patients with infectious diseases. In , Hanson LO Lindquist study of 1,000 patients, 85% had elevated CRP (8). Mean CRP in patients with rheumatic diseases is 19.55 mg/L, and mean CRP in patients with infectious diseases was 79.55 mg/L.

CRP test is important to distinguish between viral and bacterial infections. Namely, a viral infection accompanied by increased sedimentation and elevated white blood cell count, CRP remains in the lower limits

of the value than if it is a bacterial infection, when its titer increases.

In addition to the discovery of the acute inflammatory response, assessment of CRP is useful in assessing disease progression and therapeutic efficacy.

In a study conducted by Jelena Niksic and Radek Tatjana from School of Medicine in Belgrade in the period from January 2004th until January 2006th on in 190 patients with infectious and non-infections diseases, the result is an evidence of a significant increase of CRP in infectious and non-infectious inflammatory diseases with significantly higher values in infections (>60 mg/L) (9). Based on the results from there study we can say that they almost coincide with the results of our study.

Of rheumatic diseases in this study the most numerous with 24 RA patients with elevated CRP, and from infectious diseases gastroenteritis acuta with 14 patients. Egyptian study by Fathi NA et al., also had similar results when it comes to the value of CRP in patients with rheumatoid arthritis (10). Study from Niš Clinical Center in Niš, by authors Nastasijević-Borovac Desa et al., on a sample of 47 patients with pneumonia found CRP value 79.04 mg/L (11). Based on the results of the study, we can say that the results coincide with the results of our study where the value of CRP in patients with pneumonia 71.56 mg/L.

## CONCLUSION

Leading to set goals based on the results obtained, we came to the following conclusions: Of the 120 patients studied, 44 (36.7%) patients were male and 76 (63.3%) females. Since then the clinic for heart disease and rheumatism were 48 women and 12 men, and the Clinic for Infectious Diseases 28 patients were female and 32 are male; Analyzing CRP in rheumatic disease in 40 (67%) patients found elevated CRP, while in 20 (33%) patients determined normal value of CRP; Analyzing C-reactive protein in infectious diseases should be noted that 50 (83%) patients elevated CRP, while in 10 (17%) patients appeared normal CRP levels; The most common rheumatic disease in this study is RA, while leading gastroenteritis disease in infectious diseases; Mean CRP in patients with rheumatic diseases is 19:55 mg/L, while in infectious diseases was 79.55 mg/L.

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