Medicon Medical Sciences
Volume 2 Issue 2 February 2022
Research Article

Correlation between C-Reactive Protein and Prostate Specific Antigene

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Received: January 22, 2022; **Published:** February 01, 2022

Summary

Objective: The overall objective of the study was to evaluate the relationship between C-reactive protein (CRP) and prostate specific antigen (PSA).

Material and Methods: This is a cross-sectional and descriptive study that took place from April 2019 to September 2019 in the Biomedical Analysis Laboratory (SPACE-LABM). The CRP was determined by the agglutination technique on 85 samples of which 30 were PSA negative and 55 PSA positive.

Results: In PSA (-) subjects, we have 5 cases of positive CRP for a frequency of 17%. In PSA (+) subjects, we have 34 cases of positive CRP for a frequency of 62%. PSA (+) subjects are more likely to have a CRP (+) than PSA (-) subjects. There is a positive correlation (r = 0.38) between CRP and PSA.

Conclusion: At the end of our study, we observed a positive correlation between CRP and PSA in patients with positive PSA.

Keywords: Prostate Specific Antigen (PSA); C Reactive Protein (CRP); correlation; prostatitis

Introduction

The C-reactive protein (CRP) assay is one of the tests most regularly requested by clinicians in the biological diagnosis of inflammatory syndromes. C-reactive protein (CRP) is a protein that appears in the blood when there is inflammation in the body [1]. It was discovered (~1930) in the acute phase of pneumococcal infection because it reacts with the C-polysaccharide of the pneumococcus, hence its name "C-reactive protein".

It is a glycoprotein that reflects acute inflammation [2]. The CRP level increases rapidly within a few hours after the onset of inflammation and fluctuates accordingly as the inflammation progresses. As such, it is a reliable biomarker in the early stages of an inflammatory response [1]. Its dosage is also of interest in post-operative and neonatal pathology.

The CRP does not cross the placenta, which makes it possible to differentiate between inflammation of maternal origin and inflammation specific to the child. A protein synthesized by liver cells, its role is to mobilize the body's immune defenses by activating the complement pathway [2].

Studies have shown that inflammation may be associated with prostate cancer. C-reactive protein is a general marker of inflammation and has been associated with prostate cancer, e.g. high CRP is a marker of poor prognosis [3].

The prostate is a gland that makes a protein called prostate specific antigen, more often abbreviated to PSA (Prostate Specific Antigen). All men have PSA made by the prostate gland in their blood. PSA is a marker of prostate activity: it indicates that the prostate is functioning [4]. A PSA value may be temporarily elevated due to inflammation of the prostate (prostatitis) [4].

General objective

Evaluate the relationship between C-reactive protein and prostate specific antigen.

Specific objectives

To measure C-reactive Protein in men at least thirty (30) years of age with high levels of prostate specific antigen.
Measuring C-reactive Protein in men with prostate antigen levels specific is normal.
Linking C-reactive protein and prostate antigen levels specific.

Materials and Methods

Study population

Work has been performed in patients who are fifty years old (50 years) and have high PSA levels.

Samples

Sera fresh or stored at 20°C for at least one month, showing complete freezing.

Study Methods

This work has been carried out in a number of stages, the main ones being:

- Contact the Laboratories that perform the PSA assay by the method ELISA;
- Collection of PSA samples;
- Realization of the CRP on these samples;

Sampling

The collection and handling of PSA samples was conducted from June 1 to September 30, 2016, and involved 55 high PSA and 30 negative PSA samples.

Analytical phase

Qualitative Test

Place successively on the card:

- 1 drop of positive control
- 1 drop of negative control
- 1 drop (50 µI) of test serum.
- Place 1 drop of antiCRP Latex next to each deposit and homogenize well.
- Mix the 2 drops with a stirrer and spread them out.
- Print a rotational movement on the map
- Observe the possible appearance of agglutination within 3 minutes.

Reading

Negative reaction

The suspension remains homogeneous.

Positive reaction

Clear agglutination in 2 minutes.

The sensitivity of the CRP LATEX test is 6 mg/l. Sera giving a positive reaction have a concentration of more than 6 mg/l CRP.

Semi-Quantitative Test

Prepare a series of dilutions of the test serum in 8.5 g/l NaCI solution. Repeat the test for each dilution in the same way as for the qualitative test and look for the last dilution still giving agglutination. The concentration of the serum tested in CRP is estimated by multiplying the titer obtained by the sensitivity threshold of the test 6mg/l.

Interpretation

Normal adult rate = 6 mg/l.

The CRP concentration increases in acute inflammatory diseases and malignant tumors. Continuous monitoring of patients with high CRP concentrations provides a good indication of the therapeutic response of these patients.

Data Analysis

The data from the manipulations were entered using Microsoft Excel, corrected and entered into the database. Then analyzed using STATA v11.0 and Sigmaplot analysis statistical software 2010. Microsoft Excel software was used to generate the tables and figures. The exact Fisher's test was used to establish a link between the level of C-reactive protein and prostate specific antigen. At the 5% probability level, it was concluded that the proportions differed significantly.

Results

The sample size for this study is 85. A control group of 30 PSA negative and a second group of 55 PSA positive samples.

	<100	*100-500*	*>500*	*TOTAL*
PSA	18	1	2	21
CRP	23(56%)	6(86%)	6(86%)	34
TOTAL	41	7	7	55

Table 1: Distribution of CRP according to PSA(+) values.

Table 1 shows the distribution of CRP according to PSA(+) values. On note 23 cases of CRP (+) among the 41 cases of PSA (+) < 100, i.e. a proportion of 56 %. Out of 7 cases of PSA between 100 and 500, 6 have a positive CRP, i.e. 86%. Out of 7 cases of PSA greater than 500, 5 have a positive CRP, i.e. 71%. A total of 34 cases of PSA have a positive CRP. That is to say, 62% of positive PCR and 38% of negative PCR schematized in the graph below.

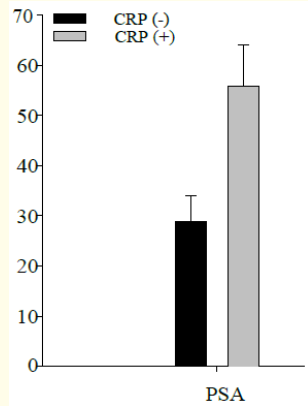

Figure 1: Change in PSA Rate as a Function of CRP Positivity.

PSA positive patients were separated into 2 groups of negative CRP (-) and positive CRP (+). The mean PSA value was then determined within the two groups. The results are presented as Mean ± Standard Error on Mean (SEM) (**p< 0.005).

	<100	*100-500*	*>500*	*TOTAL*
PSA	<6	25 (83)	21 (38%)	46
CRP	≥6	5 (17%)	34 (62%)	39
TOTAL		30	55	85

Table 2: Change in CRP in PSA (-) and PSA (+) PSA (-) subjects.

Table 2 shows the variation in CRP in PSA(-) and PSA(+) subjects. In PSA(-) subjects, we have 5 cases of positive CRP. This represents a frequency of 17%. In PSA(+) subjects, we have 34 positive CRP cases. That is a frequency of 62%. It can therefore be deduced that PSA(+) subjects are more exposed to CRP(+) than PSA(-) subjects. There are a significant relationship between CRP and PSA (P< 5%).

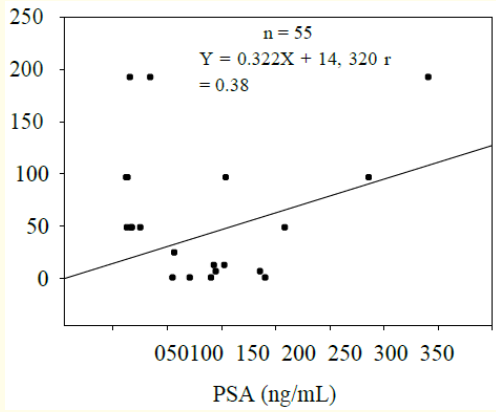

Figure 2: Correlation between PSA and CRP.

PSA values were correlated with CRP values. There is a low quality positive correlation between the two groups of data (r = 0.38).

Discussion

Prostate specific antigen (PSA) is a protein produced by the prostate gland that can signal the presence of prostate cancer or inflammation in the bloodstream at higher than normal levels. The overall objective of this study was to evaluate the relationship between C-reactive protein and PSA. The frequency of elevated CRP was greater in PSA (+) subjects than in PSA (-) subjects. The present study shows that there is a significant relationship between CRP and PSA. Several other studies have found a significant association between CRP and PSA [5]. Indeed, inflammation of the prostate is a recognized etiology for the development of prostate cancer. Inflammation may contribute to carcinogenesis through several mechanisms including the development of cytokines and growth factors that promote the growth of tumor cells [3]. Chronic inflammation in the form of stromal and epithelial lymphocyte and histiocyte infiltrates is very common in the peripheral area of the prostate where most cancers arise [3].

There is evidence that serum levels of C-reactive protein may have predictive value and serve as a marker of prognostic disorders. CRP is a protein that is expressed in significant amounts in patients with acute inflammation. The question often asked is whether CRP can be used for a diagnosis of prostate cancer. In a study published in 2008, using clinical trial data, (Beer *et al* 2008) reported that, "elevated plasma CRP levels are a good indicator of low survival and lower likelihood of response to treatment in prostate cancer patients. Recent research by (Prins *et al*, 2008) sought to confirm this result in an independent data set. They were able to use these data to study the relationship between CRP level, alkaline phosphatase level, hemoglobin level, patient age and PSA level to survival. The results of their analysis showed the following: Three different markers were independently associated with overall patient follow-up: serum CRP concentration, hemoglobin level and alkaline phosphatase level were associated with a reduction of 10 percent probability of follow-up compared to the median of the overall follow-up. In a very different study, (McArdle et al, 2008) investigated the relevance of CRP levels in patients with confined organ disease at the time of diagnosis of the risk of death by prostate cancer. Their study was based on a group of 98 men who met the relevant diagnostic criteria and for whom clinical stage, tumor grade, serum PSA levels and C-reactive protein levels at diagnosis were all recorded. On analysis, patient age, C-reactive protein levels were all significant predictors of overall treatment survival.

Conclusion

At the end of our study on the relationship between CRP and PSA, we observed a positive but low quality correlation between CRP and PSA in PSA positive patients. It can therefore be concluded that PSA-positive patients have an elevated CRP.

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