



Assessment of C-Reactive Protein and Erythrocyte Sedimentation Rate in Different Phases of Human Life,

KEYWORDS

C-reactive protein, ESR

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ABSTRACT *Background:* C-reactive protein is a sensitive marker of inflammation and a useful marker of many systemic diseases. ESR also plays important role in diagnosis of inflammatory conditions and prognosis of non-inflammatory conditions.

The aim of the present study is to determine the normal values of CRP and ESR at various age groups, and to find out correlation between ESR and CRP at various age groups in healthy individuals

INTRODUCTION

C reactive protein is the most responsive of acute phase protein with increased levels, usually appearing after 6-10 hrs of inflammation or injury. CRP test has a unique value in medicine, reflecting the presence & intensity of inflammation¹. Although an elevation in CRP is not a diagnostic sign of any one condition. Statins lower CRP values, suggesting that some of their protective effects may be mediated through suppression of inflammation or cytokines. Some data suggests that lipid lowering agents, ACE inhibitors, antidiabetic agents, anti inflammatory agents & anti platelet agents, vitamin E & α -adreno receptors and antagonists lower serum levels of CRP, while vitamin C, oral estrogen & hydrochlorothiazide do not effect CRP levels². Sensitive CRP assay may become a new risk assessment factor for identifying disorders like acute coronary disease³. There is a possibility that CRP may contribute to pathogenesis of atherosclerosis, and the fact that it increases ischemic myocardial injury. This may spur for getting superfluous & specific drugs to inhibit C-reactive protein levels⁵. CRP levels were also independently predictive of fewer years of successful aging, but none of these factors substantially attenuated the effect of age itself⁶. CRP, a marker for systemic inflammation, predicts the risk of myocardial infarction & stroke. Reduction of 1st myocardial infarction associated with the use of aspirin, appears to be directly related to the levels of CRP¹.

The ESR is a simple & non-specific test that is often used as an indicator of active diseases or inflammation⁷. The ESR has also been found to be of chemical significance in the follow & prognosis of non-inflammatory conditions such as prostate cancer, coronary artery disease & stroke. The ESR is important in the diagnosis of inflammatory conditions & prognosis of non-inflammatory conditions⁸. In children, serum CRP appears to be useful than the conventionally used parameters, WBC count or ESR.

MATERIALS & METHODS:

This study was conducted at dept. of Physiology, ASHRAM Medical College, Eluru, Andhra Pradesh & shadan institute of medical sciences, Hyderabad, between 1-75 years of healthy individuals. The study groups comprised adolescents, young children, students, employees, daily waged workers, retired individuals. The study groups include

Group I 10-15 (n=30), Group II 25-30 years (n=30); Group III 40-45 years (n=30), Group IV 55-60 years (n=30) and Group V 70-75 (n=30). SPAN diagnostic ltd latex slide test kit was used to find out CRP levels. Westergren's method was used to find out ESR values. International committee for standardization in hematology recommends the use of the wetergren's method. Blood was drawn before 9'o clock morning. Our study has certain limitations as some of the important factors that might unfound the association including race, dietary magnesium, nutrition, total calorie intake etc were not taken into consideration.

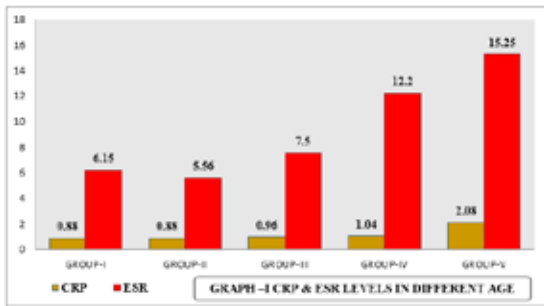
Statistical analysis was done by using Microsoft excel 2010. ANOVA method is used to analyze data. Ethical committee permission was taken. The results of this study were expressed as mean \pm standard deviation. P-value <0.005 was considered statistically significant

RESULTS:

The mean value of ESR was significantly higher in Group III, IV and V as compared with Group I & II. The mean value of CRP was also significantly higher in Group IV and V as compare with Group I, II & III. There was a positive correlation between age and both the parameters (CRP & ESR). Our study investigated the serum levels of CRP and ESR in different age groups. As the age advances, it was found that CRP and ESR levels increased. The CRP & ESR levels are higher in Group-V individuals than any other group. The higher CRP and ESR levels in older individuals may be due to sub acute infection & inflammation without any clinical symptoms. The RBC, WBC, Platelets, Haemoglobin (HB) tests were performed to consider him as healthy individual.

S.NO	VARIABLE	GROUP-I	GROUP-II	GROUP-III	GROUP-IV	GROUP-V	p VALUE
1	AGE	12.2	26.83	42.63	57.96	73.4	---
2	BMI	28.3	27.32	24.32	24.97	24.80	---
3	RBC	4.96	4.95	4.84	4.87	5.05	0.043
4	WBC	6377.31	6228	6319	7537	10037.15	<0.005
5	PLATELETS	2.59	2.58	2.56	2.67	2.29	0.065
6	HB	13.7	13.8	14.4	13.2	12.87	<0.005
7	CRP	0.88	0.88	0.96	1.04	2.08	<0.005
8	ESR	6.15	5.56	7.5	12.2	15.25	<0.005

TABLE -1 COMPLETE ANALYSIS



DISCUSSION

CRP levels have been used chemically to gauge the presence & extent of inflammation, as well to evaluate the effectiveness of anti-inflammatory therapy mainly in RA diseases⁹. According to Hokama & Nakamura, serum CRP level appears progressively & increases with age¹⁰. There is an increased level of serum CRP levels have been found in virtually all diseases associated with active inflammation or tissue destruction such as RA diseases. Acute infections like post myocardial infarction or surgery, advanced & wide spread malignancy & chronic infections causes elevated CRP levels & they serve as a large specific indicator for the presence of one of the processes or rather than as an indication of a specific pathology. Higher CRP levels found in healthy individuals of old age may be possible due to sub acute infection or inflammation without presenting clinical symptoms. Some studies reported that body mass index & current smoking status have been associated with higher CRP levels¹¹. Also alcohol consumption is associated with a decreased probability of elevated CRP supporting an anti inflammatory mechanism by which a moderate use might protect against cardiovascular death¹². Blood markers of inflammation are strongly associated with chronic diseases in the older populations & inflammation has been implicated in pathology of several cardiovascular diseases. Evidence also supports that exercise has anti inflammatory effects. Individuals who are physically active on a regular basis have a reduction in the levels of bio markers that are used to assess systemic inflammation. Higher levels of habitual physical activity are associated with low levels of CRP¹³. Low grade inflammation & elevation of CRP has been associated with obesity, high blood pressure & diabetes. There was a decreased serum magnesium levels have been documented in people with obesity in those who also having elevated CRP levels. Individuals with intake of magnesium below the recommended daily allowance are most likely to have elevated CRP, which may contribute to cardiovascular diseases¹⁴. Increasing age, smoking, symptoms of chronic bronchitis, helicobacter pylori & clamydia, pneumonia infections & basal metabolic index were associated with raised levels of CRP. CRP levels were associated with raised serum fibrinogen, sialic acid, total cholesterol, triglycerides & glucose & apolipoprotein B values. CRP levels were negatively associated with HDL cholesterol. Among the older age individuals many environmental life style risk factors for cardiovascular diseases are associated with raised CRP levels¹⁵. CRP functions as atherosclerotic factor as well as powerful risk marker. Normal ESR values increase with age^{2,15}. The probability of disease at any age increases with increased ESR & becomes more significant when the ESR exceeds 50 mm per hour. Age alone has only a marginal effect if any, on the ESR. They are often tests rather than ESR & CRP to measure the acute phase responses like plasma viscosity, cytokines like interleukin-1, interleukin-6, tumor necrotic factor, serum amyloid A, 1-antitrypsin. But these tests have their own limi-

tations¹⁶. Many studies indicate increased CRP levels may indicate cardiovascular disease & may associate cognitive dysfunction between demented & non-demented patients¹⁷.

CONCLUSION

Our study investigated the serum levels of CRP & ESR in different age groups. As the age advances, it was found that CRP & ESR levels increase. Our study has certain limitations as some of the important factors that might unfound the association including race, dietary magnesium, nutrition, exercise, total calorie intake, drug intake etc, were not taken into consideration. We observed increased CRP & ESR levels in older individuals may be due to sub acute infection or inflammation without any clinical symptoms.

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