

Role of high sensitive C–reactive protein in asthma patients

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Abstract: Asthma is a clinical condition characterized by inflammation of the airways and C-reactive protein is a marker for inflammation, infection, tissue damage and host defence mechanism by complement pathway. Impaired respiratory functions are associated with disturbance in immune response in the lung. This immune response is characterized by the secretion of some inflammatory cytokines such as C-reactive protein and IL-6. The case-control study was conducted in the department of Biochemistry, People's College of Medical Science & Research Centre Bhopal (M.P.). Total 200 subjects were selected for the study. The level of hs-CRP was measured using the nephelometric method. The mean value of serum high sensitive C-reactive protein was 4.74 ± 2.24 in asthmatic cases and 2.53 ± 1.31 in control group and p-value is ≤ 0.0001 which shows that serum hs-CRP was highly significant in asthmatic cases in comparison to the control group. It has been shown that serum level of hs-CRP in asthmatic patients were elevated compared with healthy controls and statistically highly significant difference was found. The overall finding shows that the High sensitive C-reactive protein is a marker for inflammation in asthma.

Keywords: Asthma, Inflammation, hs-CRP, Immunity

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I. Introduction

Asthma is a clinical condition characterized by inflammation of the airways and C-reactive protein is a marker for inflammation, infection, tissue damage and host defence mechanism by complement pathway [1]. Infiltrations of the airway walls by mast cells, T-lymphocytes and eosinophils are involved in the inflammatory process [2, 3]. Impaired respiratory functions are associated with disturbance in immune response in the lung. This immune response is characterized by the secretion of some inflammatory cytokines such as C-reactive protein and IL-6 [4].

Assessment of serum hs-CRP levels has suggested the involvement of low-grade systemic inflammation in several disorders such as cardiovascular disease and diabetes mellitus [5, 6, 7, 8]. First it was separated by the serum of patient with acute inflammation. The C-reactive protein is precipitated by the somatic C-polysaccharide antigen of streptococcus pneumonia [9].

II. Materials And Methods

The case-control study was conducted in the department of Biochemistry, People's College of Medical Science & Research Centre Bhopal (M.P.). Total 200 subjects were selected for the study in which 100 asthmatic patients and 100 healthy subjects. The asthma diagnosis was established according to the Global Initiative for Asthma (GINA) guidelines. This study was approved by the institutional ethics committee and informed consent was obtained from all subjects.

The inclusion criteria was patients having physician diagnosed asthma; patients who were not treated with any asthma therapy prior to the study; patients who were not on anti-histaminic, short and long-acting beta agonists; patients without any other lung disorder that could cause systemic inflammation other than asthma. The exclusion criteria had patients with upper or lower respiratory tract infection, trauma, collagen vascular disease, malignancy, smokers, alcoholics, pregnancy and lactation.

The blood samples were collected and stored at -20°C after serum separation. The level of hs-CRP was measured using the nephelometric method.

Data were tabulated in Microsoft excel and perform analysis which is expressed as mean \pm SD. The statistical significance of differences between the means in the two groups was evaluated by using an unpaired T-test. p-value of <0.001 and $p < 0.05$ considered highly significant and significant respectively.

III. Results

Of the 200 subjects, 67 were males and 133 were females. Results are shown in terms of mean±SD, p-value and 95% confidence interval (Table1). The mean value of serum high sensitive C-reactive protein was 4.74±2.24 in asthmatic cases and 2.53±1.31 in control group and p-value is ≤0.0001 which shows that serum hs-CRP was highly significant in asthmatic cases in comparison to the control group.

	Asthmatic cases (n=100) Mean±SD	Control Group (n=100) Mean±SD	P-Value	CI 95%
Sex (M/F)	31/69	36/64		
Age (years)	46.57±15.81	41.23±16.41	0.02	0.85 9.83
hs-CRP	4.74±2.24	2.53±1.31	≤0.0001	1.71 2.73

Table I. Characteristics of the study subjects

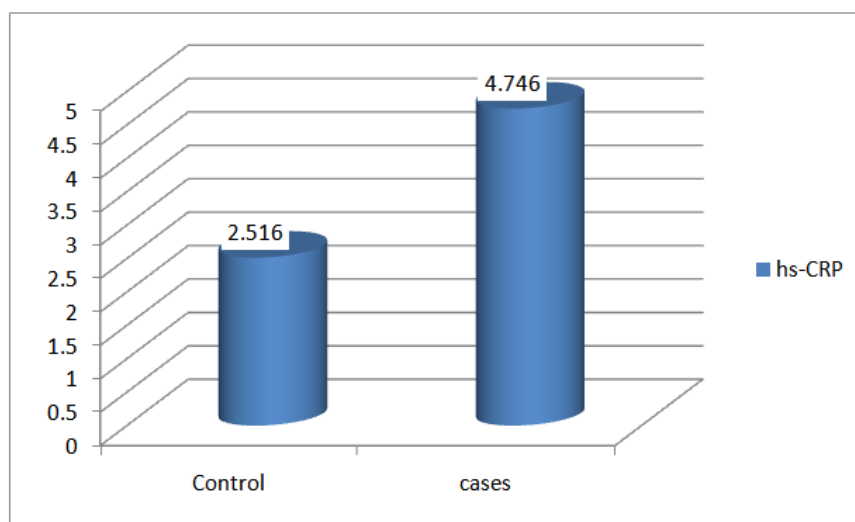


Figure I: Compare hs-CRP level between asthmatic cases & Control group

IV. Discussion

It has been shown that serum level of hs-CRP in asthmatic patients were elevated compared with healthy controls and statistically highly significant difference was found. Several studies have suggested that systemic inflammation and local inflammation occur in asthmatic patients and CRP is a sensitive marker for inflammation [6, 10-16]. In recent years, researchers use serum hs-CRP level for measuring systemic inflammation in asthma [17, 18].

Here some researches shows the importance of using hs-CRP marker for inflammation in asthma, Kony et al, in the population based study has shown associations of increased levels of serum hs-CRP with a high frequency of airway hyper-responsiveness and low forced expiratory volume in 1 second (FEV1) [19]. They found that systemic inflammation can be associated with respiratory impairment [19]. Savykoski et al. explained that serum hs-CRP levels were significantly higher in patients with mild to moderate asthma than in healthy controls [20]. Olafsdottir et al. found that raised serum levels of hs-CRP are associated with respiratory symptoms in asthmatic patients [21]. Takemura et al. demonstrate that in patients with steroid native asthma, serum level of hs-CRP were increased compared with healthy volunteers and correlated negatively with indices of pulmonary function and positively with number of sputum eosinophils [17]. Shaaban et al. in a population based study reported that increases in serum CRP concentration over time are associated with a significant decline in pulmonary function, consistent with the hypothesis that low-grade systemic inflammation is associated with pulmonary impairment [22].

There are so many factors which can affect the serum level of hs-CRP in asthmatic patients. It is a strong predictor of cardiovascular events such as myocardial infarction, ischaemic stroke and peripheral vascular diseases [23, 24]. Along with CVD, hs-CRP level increases in diabetes mellitus, smoking and obesity which may be due to adipocyte-derived interleukin-6 [23, 25, 26, 27]. Aging also increases serum hs-CRP [27]. The exact function of CRP in humans is unclear. It involves in inflammatory as well as innate immunity processes. It binds with variety of ligands such as damaged cell membrane, apoptotic cells, fibronectin etc with the highest affinity for phosphocholine residues and activates the classical component pathway and also regulates the alternative complement pathway [15, 28-30].

V. Conclusion

The overall finding shows that the High sensitive C-reactive protein is a marker for inflammation in asthma which shows the airway obstruction and provide diagnostic tool for monitoring the inflammation in asthmatic patients.

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