



Original Research Article

A high-sensitivity C-reactive protein in assessing severity of asthma: A case control study

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ABSTRACT

Introduction: Asthma is often believed to be a disorder localized to the lungs, current evidence indicates that it may represent a component of systemic airway disease involving the entire respiratory tract. Despite significant improvements in the diagnosis and management of asthma over the past decade, as well as the availability of comprehensive and widely-accepted national and international clinical practice guidelines for the disease.

Materials and Methods: This is prospective and descriptive study patients were derived among patients with asthma presented for follow -up examination in outpatient Department of pulmonary Medicine of Government Hospital. The patients were on maintenance treatment including inhaled corticosteroids and bronchodilators according to the guideline treatment of asthma.

Result: In our present study, a total of 65 patients were included out of which 36(55.3%) were males. In our study, most of the patients were 51-70 years i.e., 36 out of 65(55.4%), followed by 31-50. The mean hsCRP in case group patients are 3.62 ± 0.84 and in control group patients 0.83 ± 0.15 . Pulmonary lung function test using Spirometer was done in all the patients (case & control). The FEV1 values are compared against hsCRP values. Statistical significance is assessed using Spearman's correlation. Case group patients showing highly significant negative correlation of hsCRP with FEV1.

Conclusions : The results of this study indicate increased serum hsCRP concentration in asthma compared to controls. Increased serum hs-CRP correlates positively with severity of asthma and thus can be considered as a tool in predicting asthma status.

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1. Introduction

Asthma is characterized with constant inflammatory disease of airway system. Persistent inflammation is related with hyper responsiveness in airway & it is an exaggerated airway-narrowing response to certain triggers, for example, allergens, infections and exercise that prompts repetitive experiences of breathlessness, wheezing, chest tightness as well as coughing that may vary over the time and in intensity. Manifestation events are connected with widespread, obstruction of flow of air inside the lungs that is normally reversible either precipitously or with proper asthma treatment, for example, an effective bronchodilator.¹

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Asthma is an associative with T partner cell type-2 (Th2) invulnerable reactions, which are commonplace of other atopic conditions. Asthma triggers may comprise easily affected (e.g., house dust contamination, creature dander, shape, cockroach build-up and dusts) and non-hypersensitive (e.g., viral sicknesses, cold air, tobacco smoke) boosts, which produce a course of occasions prompting ongoing aviation route aggravation. Raised degrees of Th2 cells in the aviation route framework discharge explicit cytokines, including interleukin (IL)- 4, IL-5, IL-9 and IL-13 and advance eosinophilic disturbance and immunoglobulin E (IgE) creation. IgE creation consequently triggers the arrival of incendiary go between like leukotrienes and histamine cause bronchospasm (withdrawal of the smooth muscle in the aviation routes),

expanded mucous emission, edema and which lead to the trademark signs of asthma.^{2–5}

Spirometry gauges wind stream boundaries like the constrained fundamental limit (FVC, the more volume of air that can be inhaled out) and the constrained expiratory volume in 1s (FEV1). Lung volumes are not assessed with spirometry, and rather need full pneumonic capacity test. The extent of FEV1/FVC gives a proportion of wind stream check. In everyone, the FEV1/FVC extent is by and large more than 0.75–0.80 in grown-ups and 0.90 in kids. Any reaches not exactly these suggest wind current impediment and backing a finding of asthma.^{6,7} Besides, the suppression of inflammation with appropriate management is connected with decrease of serum hs-CRP level.^{8,9} These perceptions give a rational to serum hs-CRP to be considered as a method for findings in systemic inflammation, response to treatment just as for assessing asthma status.

2. Materials and Methods

This is prospective and descriptive study patients were derived among patients with asthma presented for follow-up examination in outpatient Department of Pulmonary Medicine of Government Medical College and Hospital, Nizamabad, India from October 2020 to March 2021. After approval of IEC study was initiated and patients consent were also obtained. The patients were on maintenance treatment including inhaled corticosteroids and bronchodilators according to the guideline treatment of asthma.¹⁰

All eligible patients were included except those with COPD, bronchiectasis, pulmonary infection, connective tissue diseases, vasculitis, coexistent acute or chronic localized or systemic infection or inflammatory conditions at respiratory or musculoskeletal, gastrointestinal, urinary tract and gastrointestinal systems as well as patients with malignancies and history of inflammatory disease.

The subjects of the control group were selected among the healthy personals of the same hospital that had not asthma. Similar exclusion criteria were also applied to the control group.

Diagnosis of asthma was confirmed based on clinical features and pulmonary function test. All patients received standard treatment to achieve control. The level of control of asthma was determined using ACT.

Serum CRP was measured by ELISA method according to the manufacturer's instruction using a high sensitive CRP kit which serum levels less than 1 mg/L were considered normal.

2.1. Statistical analysis

In statistical analysis, the serum hs-CRP was compared between patients and controls Parametric and non-parametric. Mann-Whitney U tests were utilized for

correlation of factors with or without typical conveyance individually. The chi square test with computation of chances proportion (OR) and 95% certainty span (95% CI) was utilized for affiliation and Spearman test was utilized for assurance of connection.

3. Results

In our present study, a total of 65 patients were included out of which 36 (55.3%) were males and 29 (44.6%) were females in case group (Table 1).

In Table 2, in our study, most of the patients were 51-70 years i.e., 36 out of 65 (55.4%), followed by 31-50 years, i.e., 19 out of 65 (29.2%) in case group.

In Table 3, the mean hsCRP in case group patients are 3.62 ± 0.84 and in control group patients 0.83 ± 0.15 .

In Table 5, pulmonary function test using Spirometer was done in all the patients (case and control). The FEV1 values are compared against hsCRP values. Statistical significance is assessed using Spearmann's correlation. Case group patients showing highly significant negative correlation of hsCRP with FEV1.

4. Discussion

In asthma, the meaning of aviation route framework irritation has been perceived. Other than the aviation route aggravation, fundamental irritation may likewise exist in asthma. The relevance of high affectability measures for hs-CRP, which is known to be a delicate marker of second rate foundational aggravation, has not been totally gathered in asthma. Studies have attempted to favor the usage of hs-CRP as a proxy marker of aviation route irritation in bronchial asthma. The discoveries by Raita Y et al.¹¹ cross-sectional uncovered the serum hs-CRP levels in steroid-unsophisticated and steroid-breathing in grown-up non-smoker patients with asthma and solid controls. Late examinations have shown expanded degrees of hs-CRP both in asthma and intensifications of COPD and it was even perceived in the consistent articulation of COPD.¹²

The connection between hs-CRP levels and the seriousness of asthma has been showed up in two past examinations.¹³ There was a positive association just inside extreme asthmatic patients in the examination by Corlateanu An et al.,¹⁴. Considering the previous examinations, the connection between levels of hs-CRP and the seriousness of asthma shows that CRP is a proinflammatory specialist.¹⁵ Severity of asthma associates positively with the asthmatic aggravation.¹⁶ Significant differentiations in hs-CRP levels between subjects with serious asthma and controls without respiratory manifestations have as of late appeared in one examination.¹⁷ Interestingly, Takemura et al., hs-CRP levels were simply disposed in steroid-innocent patients diverged from controls.¹⁸ Also, serum hs-CRP levels in moderate asthmatic cases were altogether higher than in gentle ones

Table 1: Distribution of gender

Gender	Case		Control	
	No. of patients	Percentage	No. of patients	Percentage
Male	36	55.3	38	58.4
Female	29	44.6	27	41.5
Total	65	100	65	100

Table 2: Distribution of different age groups of patients

Age	Case		Control	
	No. of patients	Percentage	No. of patients	Percentage
18-30 years	3	4.6	4	6.1
31-50 years	19	29.2	17	26.1
51-70 years	36	55.4	39	60.0
>71 years	7	10.8	5	7.6
Total	65	100	65	100

Table 3: Distribution of hsCRP of between two groups of patients

hsCRP	Case (n=65)	Control (n=65)
	Mean ±SD	Mean ±SD
	3.62±0.84	0.83±0.15

Table 4: Distribution of Pulmonary lung function (FEV1) between two groups of patients

FEV1%	Case (n=65)	Control (n=65)
	Mean ±SD	Mean ±SD
	61.38±5.39	81.64±6.32
FVC	72.48±6.34	93.23±9.16

Table 5: Comparison of Pulmonary function and hsCRP using Spearman correlation

FEV1%	Case (n=65)	
	R	p-value
	-0.474	0.0001

in our investigation.

A huge contrast was settled between asthmatic subjects and controls similar to PFT. In any case, no critical distinction PFT and the degrees of hs-CRP of the asthmatic patients in our examination; like the previous reports by Qian et al. Clashing, there was positive association between the levels of PFT and hs-CRP according to the reports by Takemura et al.¹⁹

Critical connections were found between inclined CRP levels and respiratory side effects like wheeze, attacks of shortness of breath after exertion and night-time cough in two examinations.²⁰ The last investigation likewise reasoned that non- allergic asthma specifically is strongly connected with higher CRP levels, while hypersensitive asthma is not.²¹ Additionally, another examination showed that non-atopic asthma is immovably associated with higher hs-CRP levels, however negatively vulnerable asthma isn't.²² We didn't determinate any connection between hs-CRP and respiratory signs (p>0.05).

5. Conclusions

The results of this study indicated increased serum hsCRP concentration in asthma compared to controls. Increased serum hs-CRP correlates positively with severity of asthma and thus can be considered as a tool in predicting asthma status.

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8. Conflict of Interest

The authors declare they have no conflict of interest.

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