

ORIGINAL RESEARCH

Assessment of C-reactive protein (high sensitivity) in cases of allergic rhinitis: A cross sectional study

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ABSTRACT

Background & Objectives: Allergic rhinitis is a prevalent chronic respiratory disease. C-reactive protein (CRP) serves as a marker for inflammation and infection. Previous research has demonstrated a positive correlation between elevated CRP levels in allergic rhinitis and asthma. This study aimed to assess high sensitivity CRP levels in cases of allergic rhinitis and in healthy controls.

Materials and Methods: The study included 60 male and female subjects between the ages of 18 and 40 years. Among them, 30 males and females diagnosed with allergic rhinitis, attending the Ear, Nose, and Throat Outpatient Department of a tertiary care hospital in Central India were selected as cases. Additionally, 30 healthy male and female individuals were chosen as controls, following careful adherence to inclusion and exclusion criteria. CRP levels were measured using a latex-enhanced turbidimetric immunoassay (CRP kit).

Results: The study revealed significantly higher CRP levels in cases of allergic rhinitis when compared to the controls ($P < 0.05$).

Conclusion: The findings of this study indicate that allergic rhinitis cases have increased CRP concentrations compared to the controls. The observed elevation in CRP levels can be attributed to airway inflammation associated with allergic rhinitis.

Keywords: C-Reactive Protein, Rhinitis, Inflammation, India.

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Introduction

Allergic rhinitis is a symptomatic condition affecting the nose, characterized by an immune response mediated by immunoglobulin E upon exposure to allergens. The inflammation of nasal airways in allergic rhinitis results from irritation of the mucosa caused by allergens such as dust, pollen, food, and mites. This disorder accounts for over half of all allergy cases in India, impacting approximately one-sixth of the population worldwide. The disease imposes a significant burden on medical expenses and quality of life. Allergic rhinitis not only affects physical health but also has adverse effects on

cognitive functions, learning abilities, and decision-making, particularly among young individuals [1].

Comorbidities associated with allergic rhinitis include sinusitis and conjunctivitis, and there is a strong link with asthma. Symptoms of allergic rhinitis encompass rhinorrhea (thin nasal mucus discharge), nasal obstruction, nasal itching, and sneezing. Notably, around 40% of patients with allergic rhinitis also experience asthma, and 80% of asthmatic patients suffer from persistent nasal symptoms [2, 3].

The inflammation seen in respiratory allergic diseases, including allergic rhinitis, may extend from the upper to the lower respiratory tract. To assess this inflammation, C-reactive protein (CRP) serves as a well-known inflammatory marker. CRP is typically measured to evaluate systemic inflammation in conditions like pneumonia and cardiovascular disease. Recently, the immune turbidimetric method using latex particles has been employed to measure very low CRP concentrations, allowing CRP concentration to be utilized as a prognostic marker for chronic inflammation in patients with conditions like cardiovascular disease, diabetes mellitus, asthma, and allergic rhinitis [4, 5].

Chronic airway inflammation is a key feature of allergic rhinitis, with various cell types, including mast cells, eosinophils, and T-lymphocytes, playing vital roles in the process. Environmental allergens can trigger inflammation in sensitive individuals, leading to symptoms of allergic rhinitis such as nasal congestion, rhinorrhea, sneezing, and nasal itching [6-8]. As CRP is an inflammatory marker, this study aimed to investigate whether determining CRP concentration can be a valuable marker of inflammation in adults with allergic rhinitis, considering the significant inflammatory component involved in this respiratory allergic disease.

Materials & Methods

The study was conducted at a tertiary care medical college in Central India. The research involved 60

male and female participants aged between 18 and 40 years. Among them, 30 males and females diagnosed with allergic rhinitis, attending the Ear, Nose, and Throat Outpatient Department of the college were selected as cases. Additionally, 30 healthy male and female individuals were chosen as controls, following careful adherence to inclusion and exclusion criteria. Patients with diagnoses of coronary artery disease, diabetes mellitus, liver disease, renal failure, tuberculosis, carcinoma, and critical illnesses were excluded from the study. Pregnant women, alcoholics, smokers, and tobacco chewers were also excluded from the study.

Approximately 2 ml of blood samples were collected in plain vials for CRP estimation. The samples were centrifuged, and the serum was separated and immediately stored at 0°C until further analysis. CRP was quantitatively measured using a turbidimetric immunoassay. The normal levels of CRP were defined as < 3 mg/L [9]. For statistical analysis, SPSS Software Version 19.0 was used.

Results

The value of CRP was found to be increased in allergic rhinitis cases as compared to the controls in both the genders [Tables 1 and 2]. As evaluated by the unpaired “t”-test, the difference between these two groups was statistically significant.

Table 1: CRP values in allergic rhinitis patients (males)

Parameter	Cases	Controls	t statistic	P value
C-reactive protein (mg%)(Mean ± SD)	8.5 ± 3.0	1.8 ± 2.2	8.92	< 0.05

Table 2: CRP values in allergic rhinitis patients (females)

Parameter	Cases	Controls	t statistic	P value
C-reactive protein (mg%)(Mean ± SD)	9.3 ± 3.0	1.8 ± 0.7	10.51	<0.05

Discussion

The most prevalent allergic disease globally is allergic rhinitis, affecting approximately 10-25% of the population. This condition constitutes a significant burden on the healthcare system, accounting for 55% of all allergies [10, 11].

Numerous studies have shown that CRP levels increase in cases of acute respiratory conditions [2]. In our study, the value of CRP was found to be significantly increased in allergic rhinitis cases as compared to the controls in both the genders. Our findings of increased CRP concentrations in AR

cases are consistent with studies by Jousilahti et al. [3], Galez et al. [12], and Pellizzaro and Heuertz [13].

CRP is a well-known inflammatory marker and an acute-phase reactant. Elevated CRP levels are observed in response to tissue injury, infection, and inflammation [14]. In AR cases, the inflammation of the respiratory airways leads to increased CRP levels. Our study demonstrates a significant increase in CRP concentrations in both male and female AR cases, which is supported by Kony et al. [15] and Galez et al. [12].

Kony et al. [15] investigated the association between lung function and CRP and found lower forced expiratory volume in 1 second in subjects with high CRP levels. They concluded that increased CRP concentrations are strongly linked to impaired lung function in AR cases. Takemura et al. [6] studied CRP in AR cases and asthma and observed significantly increased serum CRP levels in both conditions, directly related to airflow obstruction and airway inflammation. Olafsdottir et al. [16] also noticed elevated CRP levels in asthma, allergic rhinitis, and respiratory impairment. Thus, high sensitivity CRP serves as a reliable marker of inflammation.

CRP is a sensitive marker of inflammation, capable of detecting inflammation in both upper and lower airways. However, in our study, we only estimated CRP values for acute rhinitis, and future research should extend the investigation to other airway disorders.

Conclusion

The findings of our study reveal that the concentration of CRP was higher in cases of allergic rhinitis compared to the control group. This increase in CRP levels can be attributed to the presence of airway inflammation in allergic rhinitis. The inflammatory response in the respiratory airways contributes to the elevation of CRP, as it is a sensitive marker of inflammation. These results highlight the association between allergic rhinitis and increased CRP levels, indicating the presence of an inflammatory process in the airways of individuals affected by this condition.

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