

C-Reactive Protein as a Biomarker in Chronic Obstructive Pulmonary Disease Patients: A Mini Review

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ABSTRACT- Chronic obstructive pulmonary disease (COPD) is a major cause of morbidity and mortality worldwide. It is a complex chronic inflammatory disease of the lungs primarily characterized by the presence of progressive airflow limitation, involving several types of inflammatory cells and a variety of inflammatory mediators. C-reactive Protein (CRP) is one of the most studied inflammatory biomarkers in the COPD. Study-related biomarkers in COPD will be useful in aiding the diagnosis, determining the pathogenesis, and progression of the disease as well as in assessing the efficacy of treatment.

Key-words- Chronic obstructive pulmonary disease, C-reactive Protein, Inflammatory mediator, WHO

INTRODUCTION

The Chronic Obstructive Pulmonary Disease (COPD) is preventable and treatable disease characterized by persistent airflow limitation, usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases ^[1]. Projections from WHO ^[2] predict that by 2020 this disorder will rank as the fifth most prevalent disease and third most common cause of death. Forced expiratory volume in one second measured by spirometry is the most widely accepted measure of disease severity of COPD.

Symptoms and Risk factors in patients with COPD- Breathlessness, cough and/or sputum production are the most important respiratory symptoms associated with this disease. Smoking, second hand smoke, genetic, occupational as well as environmental factors are the various risk factors associated with this disease. COPD is more common in smokers and ex-smokers than in non-smokers. The indoor air pollution resulting from biomass exposure is also an important risk factor for COPD especially in developing countries. WHO suggested that 36% of mortality from lower respiratory disease is also related to indoor smoke exposure. Exposure to various dust, chemicals, vapors, and fumes in the workplace is a factor for many people with COPD.

A recent study on Car spray paint sprayers showed that subjects who were exposed to car painting vapors the pulmonary function markers were significantly decreased compared with unexposed subject ^[3]. In another study in Bell metal workers-exposed subjects had reduced pulmonary capacity ^[4].

CRP as a marker of inflammation in COPD-

COPD is a complex chronic inflammatory disease of the lungs involving several types of inflammatory cells and a variety of inflammatory mediators. CRP is one of the most studied inflammatory biomarkers in COPD. It is an acute phase protein secreted by liver in response to infection, inflammation, or tissue damage ^[5]. It is a marker of systemic inflammation and associated with increased risk and disease specific causes of mortality. A study by Man *et al.* ^[6] were shown that COPD patients in the lowest CRP quartile had the highest risk of all cause mortality, cancer deaths, and cardiovascular events and they suggested that CRP could be a marker of outcome in COPD. COPD patients having a history of biomass exposure also have higher CRP levels compared to control. Higher levels of CRP have also been observed in patients with COPD during exacerbations ^[7].

CRP level was the strong and independent predictor of COPD outcomes represented by hospitalization and death. Serums CRP level more than 3mg/l has also been associated with increased risk of hospitalization and death ^[8]. Serum CRP levels were found to be a significant predictor of all cause mortality ^[9]. In study by pinto plata, significantly higher level of CRP in COPD patients has been observed in comparison to smoking and non smoking control groups ^[10]. In another study higher levels of CRP were found in current smokers in comparison to non smokers or ex-smokers ^[11]. High levels of mmp9 and

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crp were associated with rapid decline of FEV1 in COPD which suggest that these biomarkers were good candidates as predictors of rapid decline of FEV1 in COPD patients^[12]. The recent study found CRP level to be higher in bacterial infections, especially when *H. influenzae* and *S. pneumoniae* were isolated. CRP values 100 mg/L were associated with a fourfold increased risk of hospital admission^[13]. In a multivariate study, CRP levels in stable COPD patients were best correlated with PaO₂ and 6 minute walk distance (6MWD)^[14]. The increase in CRP levels with the progression of the disease reflects the severity of the disease and therefore measuring CRP levels at baseline and after anti-inflammatory therapy will also prove beneficial for proper management of the disease. Smoking cessation may also provide additional benefit in disease management of COPD in Indian population.

CONCLUSIONS

We concluded in this study, CRP estimation should be a routine investigation for the COPD patients. It can serve as a good biomarker in COPD patients as measuring levels at baseline will be helpful in assessing severity and determining the progression of disease. Measuring CRP levels will also be helpful in determining the efficacy of treatment. We suggested that further large cohort and interventional studies on inflammatory markers may provide the basis for the future effective treatment for this global burden.

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