

“Comparison of C-Reactive Protein in Chronic Obstructive Pulmonary Disease and During Acute Exacerbation”

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Abstract:

Introduction:- Persistent reduction in FEV1 (Forced Expiratory Volume in first second) is one of the most typical finding in COPD along with airflow limitation. Patients with airflow obstruction due to COPD have reduced ratio of FEV1/FVC. Chronic inflammation in pulmonary tissues is also associated with systemic effect which is evident from the association between pulmonary compartment and peripheral tissues leading to the concept of COPD as a systemic inflammatory disease. Components of the systemic inflammation such as cytokines, inflammatory markers like C- reactive protein (CRP) are potential markers that can be used in the diagnosis and prognosis of chronic obstructive pulmonary disease

Aim:- To Compare the CRP levels in stable COPD patients and in patients with acute exacerbation of COPD(AECOPD).

Materials And Methods:- Study design-cross sectional study

Source of data: 100 outpatients & inpatients diagnosed as COPD in pulmonology and medicine departments at Tertiary Care Hospital, were enrolled in the study

Results:- The mean CRP in AECOPD is 5.486 and in stable COPD is 2.182 which is statistically significant there by suggesting that CRP can be used as a marker of severity

Keywords: Chronic obstructive pulmonary disease, c reactive protein

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I. Introduction

The diagnosis of COPD depend largely on the exposure to noxious stimuli like tobacco smoke and abnormal lung function tests. Persistent reduction in FEV1 (Forced Expiratory Volume in first second) is one of the most typical finding in COPD along with airflow limitation. Patients with airflow obstruction due to COPD have reduced ratio of FEV1/FVC. COPD staging on the basis of FEV1 alone classifies only the functional impairment. The chronic exposure to noxious stimuli and toxic substances produces an abnormal inflammatory response in the airways which is progressive and irreversible.

Chronic inflammation in pulmonary tissues is also associated with systemic effect which is evident from the association between pulmonary compartment and peripheral tissues leading to the concept of COPD as a systemic inflammatory disease. Components of the systemic inflammation such as cytokines, inflammatory markers like C- reactive protein (CRP) are potential markers that can be used in the diagnosis and prognosis of chronic obstructive pulmonary disease. Presently CRP can be used as an additional test for the diagnosis and also the severity. CRP is used as a marker of systemic inflammation response. This study was outlined to determine the CRP levels in COPD and during acute exacerbation of the disease.

II. Aims & Objectives

1. To Compare the CRP levels in stable COPD patients and in patients with acute exacerbation of COPD

III. Materials And Methods

The study was conducted in the Tertiary care Hospital, during the period of July 2015 to June 2016.

1.1 Study Design:

The study was one year cross sectional study on stable COPD patients and with acute exacerbation of COPD

1.2 Source Of Data:

The 100 outpatients & inpatients diagnosed as COPD in pulmonology and medicine departments at Tertiary Care Hospital, were enrolled in the study.

1.3 Sample Size:

A sample size of 100 patients were included in the study.

1.4 Selection Criteria:

1. Already diagnosed patients of COPD by pulmonary function test.
2. Patients admitted for acute exacerbation of COPD.

1.5 Exclusion Criteria:

1. Patients with tuberculosis, asthma, obstructive sleep apnea, bronchiectasis, interstitial lung disease, cardiac illness, and systemic illnesses like SLE, rheumatoid arthritis were excluded.
2. Pregnant and lactating women.

1.6 Study Procedure

1. Thorough physical examination of the patient included both general and systemic examination which included height, weight, BMI, FEV1/FVC, CRP which was measured by LASER nephelometry (reference range 0- 3 mg/ L) and various other basic investigations were also done to exclude the co- morbidities.
2. CRP value were measured and compared between the age, sex, BMI, MRC dyspnea scale, number of exacerbations in the previous year, FEV1% as given by GOLD staging.
3. The statistical evaluation was done by using student unpaired T test, ANOVA and Kruskal Wallis test using the SPSS software version 22.0.

IV. Results

The patients involved in the study were more than 25 years out of which majority of the patients were more than 50 years both in stable COPD and acute exacerbation of COPD. Out of 100 patients involved in the study, 90% were male; there by showing male preponderance in COPD. In our study the duration of COPD correlates well with the severity of the disease as explained by progressive dyspnea and GOLD staging. Patients with higher body mass index (BMI) had a significantly higher value of CRP. There is no significant difference between CRP values in smokers and non smokers, however the study does not mention the present smoking status. In the group with AECOPD the patients fall under GOLD 2 to 4, in stable COPD they fall under GOLD 1& 2 thus AECOPD is more common in severe disease as classified by GOLD. The number of exacerbations in the previous year is one of the best predictors in the assessment of disease severity. In the patients with acute exacerbation of COPD the most common presentation is grade 3 to 4 breathlessness by MRC Dyspnea Scale. The mean CRP in AECOPD is 5.486 and in stable COPD is 2.182 which is statistically significant there by suggesting that CRP can be used as a marker of severity. The CRP values are the maximum in GOLD stage 4, Grade 4 Dypnea, in patients with maximum number exacerbations in the previous year and greater duration of disease there by establishing that CRP can be used as an indirect marker in assessing the severity and prognosis of the disease.

GOLD	MEAN CRP	MRC	MEAN CRP
1	1.447	0	.700
2	4.105	1	1.229
3	6.205	2	3.727
4	11.900	3	5.416
P VALUE	0.016	4	10.875
SIGNIFICANCE	SIGNIFICANT	P VALUE	0.002
		SIGNIFICANCE	SIGNIFICANT

TYPE OF COPD	MEAN CRP
AECOPD	5.486
STABLE	2.182
P VALUE	0.001
SIGNIFICANCE	SIGNIFICANT

V. Discussion

In our study various parameters like Age, Sex, BMI, number of exacerbations in the previous year, GOLD staging, MRC grading, smoking status were compared with the mean CRP in the two groups. **Agarwal et al(1)**, established that CRP is associated with various clinical parameters that help in prediction of clinical outcome of the disease. The mean CRP values measured from COPD and in acute exacerbation of COPD study groups have found that the CRP levels are significantly higher in patient groups with acute exacerbation of COPD.

Bircan et al(2) , suggested that there exists a direct relationship between COPD exacerbations and CRP The major feature recognised from our study is that CRP levels were found in increased numbers with severe stages of the disease as classified by GOLD criteria , there was a significant increase in mean CRP levels from GOLD stage 1 to GOLD stage 4 In various previous studies like

Alavi et al(3) , which suggested that CRP can be used as an adjuvant marker in assessing the disease severity in patients with COPD and the mean patient age groups in these studies was 65.19 years. Most of the patients in our study are above the age of 50 years with 90% of them being males , there was no significant difference in CRP values between males and females

Halvani et al(3), suggested that there are no significant difference of CRP values in smokers and non smokers . In our study there is no significant difference in mean CRP values between smokers and non smokers , However in our study the effect of smoking cessation on the disease process and CRP was not studied

De torres et al(5) , showed that there is correlation of CRP and FEV1% in the patients of COPD .

Plato et al , showed that there are increased levels of CRP in the patients of COPD especially with severe to very severe disease . In our study with the increase in BMI the CRP values are increased there by establishing a positive correlation . In our study breathlessness was assessed by MRC grade, most patients in stable disease were in grade 1 and 2 , whereas in those with exacerbation most patients are in MRC grade 3 & 4 . According to GOLD staging of our patients , majority of the patients with stable COPD fall in GOLD stage 1 where as in patients with acute exacerbation most of the patients fall under stage 3 and stage 4 , thus indicating that GOLD stage is a reliable predictor of disease exacerbation and severity .The mean CRP was calculated in both the groups with the CRP in AECOPD group being significantly higher than in the COPD group ,And also in patients with severe disease the values of CRP is high indicating that CRP can be used an prognostic marker .also in patients with high CRP the number of exacerbations in the previous year are more suggesting that it can be used in predicting future morbidity and mortality .

VI. Conclusion

This study was conducted to establish C- reactive protein (CRP) as an indirect marker of disease severity and future morbidity in COPD . The results from this study has shown that, the patients with AECOPD, those with more frequent exacerbations, with more severe dyspnea , and moderate to very severe GOLD stages have statistically significant elevated values of CRP, thereby establishing CRP as an indirect marker of disease severity and prognosis .

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