

Study of hsCRP in Patients with Acute Exacerbation of COPD

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Abstract:

Aim: To study the levels of hsCRP in patients with acute exacerbation of COPD as compared to healthy volunteers.

Methods: This was a single centre case control cross-sectional observational study design including 50 cases and 50 controls. COPD patients more than 40 years of age, having acute exacerbation and presenting to SS Hospital, Varanasi were included in the study after screening. Proper history and physical examination was done and CBC, LFT, RFT, ABG, hsCRP, Spirometry, ECG, ECHO was performed and data was collected and recorded for analysis.

Results: 43 patients had an increased level of hsCRP as compared to control in which only 7 patients had an increased level of hsCRP. **Conclusion:** Inflammatory markers like hsCRP rises during acute exacerbations of COPD. 90 % of patients had increased level of hsCRP in our study and statistically it was found significant.

Keywords: Chronic obstructive pulmonary disease, exacerbation, inflammatory biomarker, lung function.

Introduction:

It is well known that in patients with COPD, systemic inflammation in addition to local airway inflammation depending on the severity of COPD, contribute to pulmonary and extra-pulmonary complications of the disease such as pulmonary function impairment, exercise intolerance (even regardless of lung function impairment level), disease exacerbation, hypoxemia, muscle atrophy, activity confinement, cachexia, and osteoporosis (1–4). Systemic inflammation can be determined with markers of inflammation such as CRP, interleukins (IL), and TNF α . Among these markers, hs-CRP is as an important one and is a widely accepted biomarker related to the airflow obstruction (1). This acute phase reactant is secreted by the liver in the setting of infection, inflammation or tissue damage. The level of this inflammatory marker increases during exacerbations and decreases in patients receiving inhaled corticosteroids, and thus appears to reflect disease activity (5).

Aim: To study the levels of hsCRP in patients with acute exacerbation of COPD as compared to healthy volunteers.

Methods: Approval of the ethical committee was obtained in May 2017. This study was done from June 2017 to April 2019. COPD patients more than 40 years of age, having acute exacerbation and presenting

to SS Hospital were screened and those meeting the inclusion and exclusion criteria were selected for the study.

Table 1: Inclusion criteria:

COPD patients with:	
	Post Bronchodilator FEV ₁ /FVC <70%
	Post-bronchodilator reversibility <200ml and < 12%
	Indian population
	Aged >40years.

Table 2: Exclusion Criteria:

Domiciliary oxygen therapy
Hypertension
Diabetes mellitus
Inflammatory diseases
Hemodynamically unstable patients
Coagulopathies
Renal diseases
Liver diseases
Malignancies
Long term steroids use
Anticoagulant and antiplatelet medication use
Drug abuse
Alcoholics
Active smokers
Pregnancy

Control group: Adult aged >40 years among indian population and hemodynamically stable.

Study Design: A single center case control cross-sectional observational study design including 50 cases and 50 controls (healthy volunteers) was done.

Data Analysis: Data was analyzed using Trial version of SPSS 20 utilizing ANOVA, Student t-test, chi-square, Mann-Whitney test.

Table 3 : Base line characteristic of controls (healthy volunteers) and cases (COPD patients) .

Variables	Group I (control)	Group II (cases)	P-value
Age in years	60.68±7.78	60.82±8.68	0.933

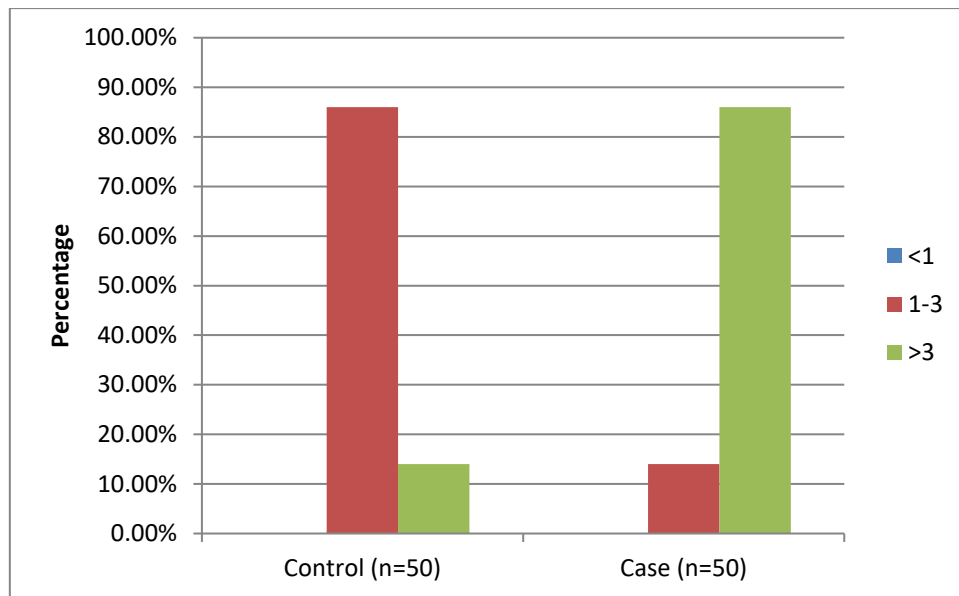
Sex			
Male	46.0% (n=23)	36.0% (n=18)	0.309
Female	54.0% (n=27)	64.0% (n=32)	0.309
BMI in kg/m²			
<18.5	14.0% (n=7)	2.0% (n=1)	0.051
18.5-24.9	80.0% (n=40)	80.0% (n=40)	
25-29.9	6.0% (n=3)	16.0% (n=8)	
>30	0.0% (n=0)	2.0% (n=1)	
FEV1/FVC			
<70%	0.0% (n=0)	100.0% (n=50)	
>70%	100.0% (n=50)	0.0% (n=0)	
FEV1			
>80%(GOLD 1)	100.0% (n=100)	0.0% (n=0)	0.000
>50-80%(GOLD 2)	0.0% (n=0)	32.0% (n=16)	
>30-50%(GOLD 3)	0.0% (n=0)	46.0% (n=23)	
<30% (GOLD 4)	0.0% (n=0)	22.0% (n=11)	
mMRC grading			
0	84.0% (n=42)	0.0% (n=0)	0.000
1	12.0% (n=6)	0.0% (n=0)	
2	4.0% (n=2)	14.0% (n=7)	
3	0.0% (n=0)	30.0% (n=15)	
4	0.0% (n=0)	56.0% (n=28)	
CAT Score			
0-40	1.52±1.86	25.84±6.58	0.000

Observation:

Table 4 :hsCRP

hsCRP (mg/l)	Control (n=50)		Case (n=50)		Total	
	N	%	N	%	N	%
<1	0	0.0%	0	0.0%	0	0.0%
1-3	43	86.0%	7	14.0%	50	50.0%
>3	7	14.0%	43	86.0%	50	50.0%
Total	50	100.0%	50	100.0%	100	100.0%

$\chi^2=64.412, p=0.000$



Conclusion:

43 patients had an increased level of hsCRP as compared to control in which only 7 patients had an increased level of hsCRP. Thus it is clear from the table that maximum cases of acute exacerbations of COPD had an increased level of hsCRP. Statistically significant difference was seen among the groups.

Result: 90 % of patients in our study with acute exacerbation of COPD had an increased levels of hsCRP and statistically it was found significant.

Discussion: The high sensitive C-reactive protein (hsCRP) is easily checked in blood. Studies have shown that inpatients with stable COPD, hsCRP levels are directly associated with age, weight, dyspnea and quality of life. The fact that an elevated level of hsCRP in COPD may be predictive of mortality adds evidence to the hypothesis that a low-grade systemic inflammation drives the disorder. This is in accordance with the systemic effects observed: malnutrition, muscle wasting, osteoporosis, cardiovascular disease, type 2 diabetes mellitus, anemia and depression (6).

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