

Original Research Article

HIGH-SENSITIVITY CRP AS A SEVERITY MARKER AMONG COPD PATIENTS

Anagha S¹, Prashanth M²¹Senior Resident, Department of Anaesthesia, Mahabodhi Medical College, Gaya, Bihar, India.²Assistant Professor, General Medicine, Chikmagalur Institute of Medical Sciences, Karnataka, India.

Received : 15/07/2025
 Received in revised form : 25/08/2025
 Accepted : 08/09/2025

Corresponding Author:

Dr. Prashanth M,
 Assistant Professor, General Medicine,
 Chikmagalur Institute of Medical
 Sciences, Karnataka, India.

DOI: 10.70034/ijmedph.2025.3.638

Source of Support: Nil,
 Conflict of Interest: None declared

Int J Med Pub Health
 2025; 15 (3); 3497-3499

ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is one of the main causes of morbidity and mortality worldwide, which is a growing health care problem expected to worsen with age. It is a progressive disease of respiratory tract characterized by limitation of airflow. Additional risk factors include habit of smoking, air pollution, occupational exposure (coal dust, silica, asbestos), low birth weight, recurrent infections and many more. CRP is a marker of inflammation and in COPD, is a marker of poor lung function, reduced exercise capacity and decreased quality of life.

Materials and Methods: 50 patients diagnosed with COPD were included in our study who were selected by simple random sampling technique and we used hospital based cross-sectional study design. Blood investigations like complete blood count, random blood sugar levels and high specific CRP levels were measured, spirometry and PFT were conducted. Later the findings were recorded and the data was analyzed using appropriate statistical tests.

Results: Chronic cough, breathlessness and wheeze were major symptoms and 53% were in stage III and stage IV according to COPD staging. 79% of them had hs-CRP levels more than 3mg/dl and chest x-ray findings suggested that 28% had both chronic bronchitis and emphysema. Hs-CRP levels was significantly higher among smokers, alcoholics, longer smoking duration, progressive COPD stages. LFT were significantly deranged among patients with elevated hs-CRP levels.

Conclusion: High specific CRP levels could be considered as a significant marker of severity in COPD patients, with hs-CRP levels being significantly higher among COPD patients who had a habit of smoking, alcohol consumption, increased duration of smoking and with progression of COPD staging.

Keywords: Hs-CRP, COPD, Chronic bronchitis.

INTRODUCTION

Chronic obstructive pulmonary disease is a growing health care problem, main cause of morbidity and mortality worldwide, expected to worsen with age and with increase in use of tobacco products.^[1] According to American thoracic society chronic obstructive pulmonary disease is a progressive, partially reversible disease of respiratory tract featured by limitation of airflow which takes place as a result of chronic bronchitis or emphysema.^[2] Smoking is one of the main risk factors for chronic obstructive pulmonary disease, other risk factors include air pollution, occupational exposure of coal

dust, silica and asbestos, low birth weight and recurrent infections.^[3]

C- reactive protein is a marker of inflammation associated with an increased risk of myocardial infraction, stroke, unstable angina and sudden coronary death.^[4,5] It is a homo-pentameric acute inflammatory protein, discovered by Tillett and Francis in the year 1930 which exhibits elevated levels during inflammatory condition.^[6,7] In chronic obstructive pulmonary disease the increased C- reactive level is associated with poor lung function, reduced exercise capacity and decreased quality of life as well as being a significant predictor of all cause of mortality.^[8-11] Our aim was to assess hs-CRP

levels as a marker in chronic obstructive pulmonary disease.

MATERIALS AND METHODS

We used a cross-sectional study design tool for our study and based on sample calculation, 50 patients diagnosed with COPD were included in our study who were selected by simple random sampling technique. Patients attending the OPD of Medicine department in Chikkamagalur Institute of Medical Sciences were enrolled based upon inclusion and exclusion criteria. Once enrolled written informed consent was obtained and a detailed history was obtained. Blood investigations like complete blood count, random blood sugar levels and high specific CRP levels were measured, spirometry and PFT were conducted. Later the findings were recorded and the data was analyzed using appropriate statistical tests.

RESULTS

The mean age of our patients was 58.21 ± 7.98 years with 66% males and 44% females. 41% of them had smoking history and mean duration of smoking among them was 12.56 ± 11.21 years. Chronic cough, cough with expectoration, breathlessness and wheeze were the most common presenting complaints. According to COPD staging, 53% were in stage III and stage IV (Graph 1). 79% of them had elevated hs-CRP and mean CRP finding was 4.22 ± 1.76 mg/L

(Graph 2). Chest x-ray findings revealed that 28% of them had chronic bronchitis & emphysema, 33% had emphysema and 18% had chronic bronchitis. The lung function test parameters were recorded (Table 1). It was observed that history of smoking, longer duration of smoking, as COPD stage advanced there was a significant increase in Hs-CRP levels.

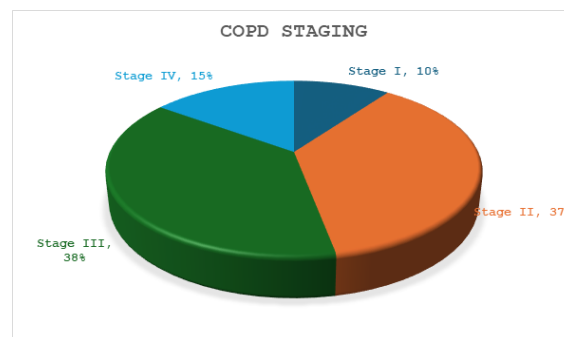


Figure 1: COPD staging

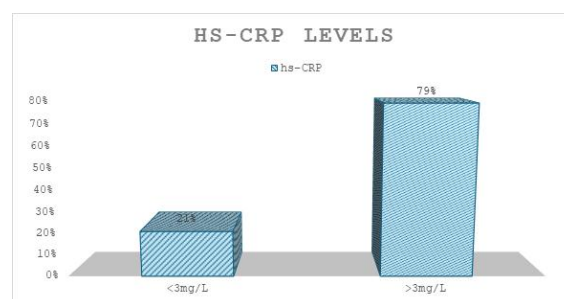


Figure 2: Hs-CRP levels

Table 1: Lung function test parameters

Sl. No	Lung function test	Mean	SD
01	FEV 1	1.721	0.445
02	FVC	2.356	0.728
03	FEV1/FVC	55.21	8.05
04	FEV% of PV	60.23	14.40

Table 2: Association between Hs-CRP and lung function test

Sl. No	Parameters	Hs CRP (<3mg/L)	Hs CRP (>3mg/L)	p value
01	FEV1	2.2006 $\pm$ 0.5716	1.5084 $\pm$ 0.5724	0.0001 *
02	FVC	3.4933 $\pm$ 0.7644	2.8122 $\pm$ 0.8378	0.0020 *

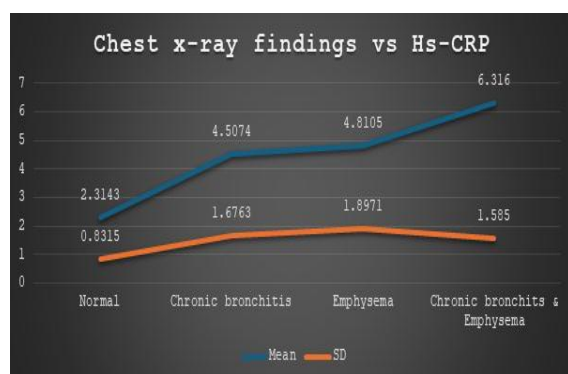


Figure 3: Chest x-ray findings and Hs-CRP

DISCUSSION

Singh V, et al., conducted a study on electrocardiographic characteristics of patients with

chronic obstructive pulmonary disease and its correlation with disease severity a total of 100 patients with COPD were included in the study. All the subjects underwent pulmonary function test and electrocardiography. According to the study COPD was more common in male in 5th and 7th decade of life with history of more than 20 packs years, the ECG changes increases as severity and duration of disease increases. The study also concluded that ECG is useful bedside test in assessing the severity of COPD.^[12] R.L. Agarwal, et al., on diagnostic values of electrocardiogram in chronic obstructive pulmonary disease, the study included a total of 60 patients. All subjects with respiratory diseased were evaluated electrocardiographically along with other investigations. The study concluded that diagnostic values of ECG among patients with respiratory problems suggested that COPD patients should be

screened electrocardiographically in addition to other investigations.^[13]

SA Alavi et al., conducted a study on Hs CRP in patients with acute exacerbation of chronic obstructive pulmonary disease the study included a total of 160 patients all the patients were evaluated for pulmonary function test, arterial blood gas analysis and HsCRP. The study concluded that role of HSCRP as a simple auxiliary marker in staging and determining the prognosis of COPD for early management.^[14] Aksu F, et al., on C-reactive protein levels are raised in stable chronic obstructive pulmonary disease patients independent of smoking behaviour and biomass exposure. The aim of the study was to evaluate the relationship between serum C-reactive protein level in chronic obstructive pulmonary disease considering the impact of smoking. The study concluded that systemic inflammation is inherent to COPD independent of ever smoking status and correlates with disease severity concomitant systemic hypertension and pulmonary hypertension.^[11]

Gupta P, et al., conducted a study on electrocardiographic changes in emphysema. According to the study the 12 -lead ECG is extremely valuable to clinicians in diagnosing chronic obstructive pulmonary disease.^[15] Vikram et al., on cardiovascular complications in chronic obstructive pulmonary disease with reference to 2D echocardiography findings. The study included 50 subjects with signs and symptoms of COPD. The study concluded that echocardiography is more sensitive than electrocardiography in detecting pulmonary arterial hypertension and right ventricular dysfunction in COPD.^[16]

CONCLUSION

High specific CRP levels could be considered as a significant marker of severity in COPD patients. It was seen that Hs-CRP levels were significantly higher among COPD patients who had a habit of smoking, alcohol consumption, also Hs-CRP levels significantly increased with increase in duration of smoking and with progression of COPD staging. Hs-CRP levels were significantly higher among patients with chronic bronchitis and emphysema combined, followed by emphysema and chronic bronchitis. Lung function test represented by FEV1 and FVC were significantly deranged with increased Hs-CRP.

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