ORIGINAL ARTICLE

Blood Eosinophilia in Acute Exacerbation Patients with Chronic Obstructive Pulmonary Disease

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ABSTRACT

Aim: To determine the frequency of blood eosinophilia in chronic obstructive pulmonary disease patients with acute exacerbation.
Study design: Prospective/Observational
Place and duration of study: Department of Medicine, M. Islam Medical & Dental College Gujranwala from 1st January 2020 to 30th June 2020.
Methodology: One hundred and fifty patients with both genders were enrolled in this study. Patients detailed demographics age, sex, body mass index were recorded after taking written consent. Patients with age between 25-70 years were included in this study. Blood eosinophil count was measured by a standardized method
Results: Eighty two (54.7%) patients were males and 68(45.3%) were females. Mean age of the patients were 57.54±9.68 years and mean BMI 26.34±4.47 kg/m^2. Sixty eight (45.33%) patients were from the age group 50-65 years of age. Thirty eight (25.33%) patients from all of these cases diagnosed blood eosinophilia in which 24 (63.16%) were males and 14 (36.84%) were females.
Conclusion: 25.33% had blood eosinophilia in which most of the chronic obstructive pulmonary disease patients with acute exacerbation were males.
Keywords: Chronic obstructive pulmonary disease (COPD), Blood eosinophilia, Acute exacerbation

INTRODUCTION

Chronic obstructive pulmonary disease is a typical obstructive airway disease with an airflow limit that is steadily exacerbated, not entirely reversible (with FEV1/FVC less than 0.7 and FEV1 <80% expected for the post bronchodilator).[1,2] Chronic obstructive pulmonary disease is one of the main causes of death and 1 global morbidity. About 210 million people have COPD in the world. More than 3 million people worldwide have died of COPD in 2012, according to the WHO factsheet (6% of all deaths).[3] The overall COPD prevalence in these countries is 3.6% and approximately 6.9 million people[4] are suffering from COPD symptoms in Pakistan, according to BREATHE Research, which was carried out in 10 countries including Pakistan. The clinical COPD syndrome involves many phenotypes, including an eosinophilic inflammation subgroup of patients.[5]

A large number of COPD patients have been noted for their prevalence of eosinophilia and a proxy for EOS and their clinical properties. Eosinophilic inflammation has been established in the past rather than as a COPD characteristic,[6] but it has been recognized that eosinophilic airway inflammation occurs in a significant number of COPD patients, even after patients with any asthma traits, for instance ß-agonist reversibility, bronchial hyperresponse, atrophy or a childhood history of asthma, have so far been carefully removed.[5,6]

Hasegawa et al[5] reported that blood eosinophilia was CoT 300/µL and alternative cutoff levels CoT 2% were used, 40% of the 4 patients with elevated eosinophil counts. Blood eosinophilia was found in 10% of COPD patients. Chronic obstructive pulmonary disease patients persistently with a >2% eosinophilic count have a lower symptom, better functions and a higher FEV1 standard of living, and lower SGRQ and mMRC scores 6.8% but the higher level of AECOPD re-admittance during one year of follow-up 5.7% was observed. Chronic obstructive pulmonary disease patients with eosinophilia have a greater reaction in corticosteroid treatment so eosinophilic inflammation of the airways in COPD can be used in clinical stability and aggravation as a predictive biomarker for corticosteroid reaction.[7]

Clinical rehabilitation can be increased and aggravation rates can be substantially reduced by eosinophil titrating of corticosteroid therapy. Once COPD has been exacerbed, sputum and blood numbers are similarly increased to improve clinical recovery and exacerbation rates by the use of the blood eosinophils as a surrogate marker for respiratory eosinophilias in the treatment of COPD, for direct oral corticosteroid therapeutic treatment.

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MATERIALS AND METHODS

This prospective study was conducted at Department of Medicine, M. Islam Medical & Dental College Gujranwala from 1st January 2020 to 30th June 2020. A total of 150 patients with age ranges between 20-75 years were enrolled. Patients detailed demographics age, body mass index and sex were recorded and those patients who had asthma, any other pulmonary disease and those not agreed were excluded. 5 ml blood sample was taken from each patient's and sent to laboratory. Medonic hematology analyzer was used to measure the blood eosinophilia among the patients of COPD admitted with acute exacerbation. Eosinophilia was defined as Peripheral blood eosinophil count ≥2% or peripheral blood eosinophil count ≥300 cells/microliters. Complete data was analyzed by SPSS 24.

RESULTS

There were 82(54.7%) male patients and 68(45.3%) female patients. Mean age of the patients were 57.54±9.68 years and mean body mass index (BMI) 26.34±4.47 kg/m^2. Most of the patients 68 (45.33%) were from the age ranges between 50-65 years (Table 1). Thirty eight (25.33%) had eosinophilia in which majority of the patients 24 (63.15%) were males and female patients were 14 (36.84%) while 112 (74.67%) patients had negative blood eosinophilia with count <300cells/µL (Table 2).

Table 1: Baseline detailed demographics of all the patients

Variable	No.	%
Gender		
Male	82	54.7
Female	68	45.3
Age (years)		
<50	34	22.67
50-65	68	45.33
65-75	48	32.0
BMI (kg/m^2)	26.34±4.47	

Table 2: Frequency of eosinophilia among COPD patients according to gender (n=150)

Gender	Yes (>2% or >300 cells/µL)	No (≤2% or ≤300 cell/µL)
Male	24 (63.15%)	58 (51.78%)
Female	14 (36.85%)	54 (48.22%)
Total	38 (25.33%)	112 (74.67%)

DISCUSSION

Chronic obstructive pulmonary disease's clinical condition involves multiple phenotypes and a group of five eosinophilic inflammatory patients. A heterogeneous disorder with complex clinical features and pathophysiological characteristics is chronic obstructive lung disease. During an exacerbation of COPD, systemic corticosteroid treatment can be driven by blood eosinophil counts which result in reduced total exposure to systemic corticosteroids without having 10 adverse effects on the outcome of the treatment. Various research groups from the lowest of 9% to 6.12% as high as 37.4% registered the prevalence of blood eosinophilia.[8,9]

In this study total 150 patients were enrolled admitted with acute exacerbation of COPD, 25.33% patients of blood eosinophil was observed and these results showed resemblance to the previous studies conducted by Bafadhel[8] and Hasegawa et al.[10] This large spectrum of blood eosinophilia prevalence can be multifactorial, due to various cut-off values of the eosinophil count, various exclusion requirements and parallel or previous use of drugs eosinophil counting (i.e., corticosteroids, aminophylline and population variations, COPD different stages).

Chronic obstructive pulmonary disease decreases exacerbation rates and reduces the side effects of 6.14% therapy to boost clinical recurrence through the avoidance of its excessive use[11]. Chronic obstructive pulmonary disease exacerbations provide a stronger short-term prognosis for elevated blood Eosinophil patients with no increased risk of further exacerbating. Eosinophilic aggravations also have a lower mortality of 13.2%. Jabarkhil et al[12] presented this new study in 2020. In previous some studies the prevalence of blood eosinophilia was calculated lower as compared to our studies.[13-17]

In our study out 38 patients mostly were males 63.16% and the frequency of females were slightly lower 36.84% and these were comparable to the studies conducted by Ahmed et al[18]. A higher APACHE II score and worse arterial gas on admission were observed in the non-eosinophilic community of the COPD exacerbation. Additionally, the use of NIMV in non-eosinopholic groups was higher, NIMV failure rate was higher, ICU persisted longer, septic shock and resistant pathogens were substantially higher and, in spite of comparable steroids and antibiotic use, ICU mortality grew. The clinical recovery will be increased, hospital admission will be decreased, and disease progression will be changed if the medication targets normalizing the sputum or blood eosinophils.

CONCLUSION

25.33% had blood eosinophilia in which most of the chronic obstructive pulmonary disease patients with acute exacerbation were males and frequency of blood eosinophilia was found one quarter of chronic obstructive pulmonary disease patients.

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