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A STUDY ON NEUTROPHIL-LYMPHOCYTE RATIO & PLATELET-LYMPHOCYTE RATIO WITH DISEASE SEVERITY IN STABLE AND EXACERBATION OF COPD

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ABSTRACT

BACKGROUND: COPD is a chronic inflammatory disease of lung with high mortality and morbidity rate. Complete blood count parameters provide inflammatory markers, namely neutrophil to lymphocyte ratio (NLR) and platelet to lymphocyte ratio (PLR). Objective of the study was to compare NLR & PLR in stable COPD and AECOPD.

METHODS: This study was carried out on COPD patients attending Department of Respiratory Medicine during july 2018 to june 2019. 35 stable COPD patients and 35 acute exacerbation cases were enrolled. Routine blood investigation, NLR and PLR were assessed.

RESULTS: Both NLR (6.389±3.071) and PLR (221.6±92.52) were significantly higher in AECOPD group compared to stable COPD group.

CONCLUSION: Both NLR and PLR are simple parameters that could be used as cost-effective marker of inflammation in AECOPD.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a progressive disease characterised by poorly reversible airflow limitation associated with an abnormal inflammatory response of lungs to noxious particles or gases, especially in people exposed to fumes and smoke[1]. It has been considered that systemic inflammation is associated with the COPD phenotype; however, the prevalence of systemic inflammation in COPD appears to vary depending on the markers [2]. Acute exacerbation of chronic obstructive pulmonary disease (AECOPD) is a leading cause of hospitalizations and the major cost driver in COPD[3]. Correctly assessing the severity of AECOPD and providing proper treatment has important clinical significance and socioeconomic benefit.

MATERIALS AND METHODS

The present study consisted of 70 consecutive patients of either sex, aged between 40 to 80 years with clinically stable COPD and acute exacerbation of COPD who attended the out-patient department of Respiratory Medicine IRD, SMS Medical College, Jaipur from July 2018 to June 2019. 35 stable COPD and 35 acute exacerbation of COPD were included in the study.

Patients were excluded based on the following criteria: (i) Patients having disease mimicking COPD (ii) Myocardial infarction within previous 3 months, Collagen vascular diseases, Malignant diseases. Hepatitis, thyroid diseases, autoimmune diseases, or any acute infection, Pregnant women (iii) Any subjects who could not perform spirometry or treated with systemic steroids within previous 8 weeks (iv) Receiving systemic corticosteroids, antibiotics, or immunosuppressive treatment (v) Withdrawal of consent.

All the patients were diagnosed according to GOLD 2018[4] criteria; Patients were considered to have AECOPD if they met Anthonisen's[5] criteria.

LABORATORY METHODS

Routine blood investigation, chest x-ray and spirometry of all the cases were done.

To define NLR and PLR, CBC with automated differential counts, including neutrophils and lymphocytes, were made on admission. While the upper limit of neutrophils count for normal range was set at $8x10^9$/l, the lower limit of lymphocyte count for the normal range was set at $0.9x10^9$/l.

NLR was calculated as the ratio of neutrophils to lymphocytes, both of which were obtained from the same automated blood samples for the study. PLR was calculated as the ratio of platelets to lymphocytes.

Statistical Analysis

All statistical analyses were performed using SPSS version 16. The association between two quantitative variables was evaluated using Pearson's correlation coefficient. The results were expressed as means and standard deviation for quantitative variables and as frequencies and percentages for categorical findings. To compare means of two independent groups, student's t test was used, while non-parametric data were analyzed with Mann-Whitney U test.

RESULTS

Our study showed that patients with stable disease had a mean age of 60.06±7.054 years and patients with AECOPD had a mean age of 65.86±10.96 years and the comparison of mean value of age groups was statistical significant. majority of the cases in both groups were males.

In our study in both stable and AECOPD groups mostly of the cases were in GOLD category C i.e 15 (50%) Table-1

Table 1: GOLD ABCD classification for stable and exacerbated COPD patients.

GOLD Criteria	Stable COPD (N=35)	AECOPD (N=35)	Total
GOLD A	5 (55.55%)	4 (44.44%)	9 (12.85%)
GOLD B	10 (58.82%)	7 (41.18%)	17 (24.28%)
GOLD C	15 (50.0%)	15 (50.0%)	30 (42.85%)
GOLD D	5 (35.72%)	9 (64.28%)	14 (20.0%)
Total	35 (50.0%)	35 (50.0%)	70 (100%)

Patients having stable COPD had a mean value of FEV1% predicted 48.66±18.63 (range: 23.0-85.0) and patient with AECOPD 43.60±18.99 (range: 17.0-84.0), comparison of mean was statistical non significant (P=0.2647) Table 2.

Table 2: Comparison between Stable COPD & AECOPD regarding FEV1% predicted

FEV1% Predicted	Stable COPD (N=35)	AECOPD (N=35)	P-value
Mean	48.66	43.60	0.2647
SD	18.63	18.99	
Range	23.00-85.00	17.00-84.00	
Median	47.00	38.00	

The Patients with stable COPD disease had a mean value of pack years of smoking 21.66±11.74 yrs (range: 0.00-43.0 yrs) and patient with AECOPD a mean value of pack years of smoking 30.77±16.64 yrs (range: 0.00-58.0 yrs), comparison of mean was statistical significant (P=0.0101).

The mean value of inflammatory markers such as, neutrophils lymphocyte ratio and platelet lymphocyte ratio were 4.263±1.900 & 132.6±28.59 respectively in stable COPD group and 6.389±3.071 & 221.6±92.52 respectively in AECOPD group. The comparison of mean value of NLR & PLR was statistical significant(P=0.0009 & P<0.0001 respectively) in between groups Table 3.

Table-3: Marker of inflammation in admitted patients with stable and exacerbated COPD

Markers	Stable COPD (N=35)	AECOPD (N=35)	P-value
NLR	4.263±1.900	6.389±3.071	0.0009
PLR	132.6±28.59	221.6±92.52	<0.0001

DISCUSSION

Our study reported that, most of the stable COPD and AECOPD patients, 15 (42.85%) were in category C, i.e 15 (42.85%). Similar to a retrospective study done by TAYLAN et al[6]. who reported 43% in GOLD stage cat.C.

Our study showed that patients having stable COPD had a mean value of FEV_1% predicted was 48.66±18.63 (range: 23.0-85.0) and AECOPD a mean value of FEV_1% predicted was 43.60±18.99 (range: 17.0-84.0). The results of one study from the northern part of Sweden showed that according to the GOLD criteria 57% had mild, 37% moderate, 5% severe, and 1% very severe forms of the disease. In the Spanish epidemiological study by Penna et al[7].38.1 had mild, 39.7 moderate and 22% severe forms of COPD.

The present study observed that the patients of stable COPD had a mean value of pack years of smoking as 21.66±11.74 yrs (range: 0.00-43.0 yrs) and AECOPD had a mean value of pack years of smoking 30.77±16.64 yrs (range: 0.00-58.0 yrs), comparison of mean was statistical significant (P=0.0101). Fletcher[8,9]. revealed that in susceptible smokers (comparable with the host factors), tobacco smoking is strongly related to chronic bronchitis and airflow obstruction, and that these were two different diseases. Smoking is recognized as the cause of COPD in the vast majority of patients.

Our study showed that the patients having stable COPD with a mean age of 60.06±7.054 years and patient having AECOPD with a mean age of 65.86±10.96 years. Which was compatible with Ercan Kurtipek et al[10]. who reported stable COPD group had a mean age of 66.65±10.17 years and AECOPD group had a mean age of 62.67±9.41 years.

Our study showed mean NLR levels were significantly higher in AECOPD group compared to patients with stable COPD (p=0.0009) which was comparable to study by LEE et al[11]. Similarly IN et al[12]. reported higher NLR values in COPD patients when compared to healthy controls, whereas AECOPD patients had significantly higher NLR values when compared to patients with stable COPD.

The mean PLR levels were in our study also significantly higher in AECOPD compared to stable COPD (p<0.0001) which was comparable to studies by Kalemci S et al[13]. and Ercan Kurtipek et al[10].

CONCLUSION:

Both NLR and PLR are readily available and simple parameters that could also be used as a cost-effective marker of inflammation in AECOPD.

FINANCIAL SUPPORT AND SPONSORSHIP

Nil

CONFLICTS OF INTEREST

There are no conflicts of interest.

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