

Background:

Chronic obstructive pulmonary disease (COPD) is an important and growing cause of morbidity and mortality[1]. The WHO estimates that COPD will be the third leading cause of death by 2020. Acute exacerbation of COPD (AECOPD) is one of the leading causes of hospitalization in developed countries and affects health-related quality of life and prognosis. Recurrent exacerbations are associated with an accelerated decline in lung function that is the hallmark of COPD.

Red cells distribution width (RDW) is a routine laboratory parameter examined with the complete blood count test; it is a quantitative measure of anisocytosis and indicates the heterogeneity in the size of circulating erythrocytes. RDW is typically elevated in conditions of ineffective red cell production (such as iron deficiency, B12 or folate deficiency, and hemoglobinopathies), increased red cell destruction (such as hemolysis), or after blood transfusion. Oxidative stress was also shown to be associated with RDW. In the last few years, there have been numerous studies consistently confirming the independent association between RDW and mortality across a broad spectrum of CVD patient populations, including patients with heart failure, with established coronary artery disease (CAD), with pulmonary hypertension, with acute pulmonary embolism, and with acute myocardial infarction. It is also associated with mortality and unfavorable prognosis in patients with venous thromboembolism, cancer, diabetes, community-acquired pneumonia, liver and kidney failure, connective tissue diseases. Furthermore in recent years, several studies showed that increased RDW is associated with disease severity and long term mortality in COPD patients.

Methods:

The objective of this study is to evaluate the role of RDW in COPD. Retrospective analysis was performed by using medical records of pts hospitalized for COPD exacerbation from January to December 2016. We evaluated 45 consecutive pts, 28 were males, 21 in GOLD stage 4. The control group was of 20 healthy subjects matched for age and sex. All demographic, health behavior related factors [age, sex, BMI (body mass index), smoking history, total number of pack-years of smoking and alcohol intake], medical conditions [hypertension, diabetes mellitus, cardiovascular disease (heart failure, coronary artery disease, stroke, or arrhythmia)], electrocardiography, echocardiographic and biochemical data, and treatment modalities, re-admission to emergency units and/or hospitalizations were recorded.

Statistical analysis: Student's test with Bonferroni's correction was used to compare medians. Linear regression for correlations between RCDW and clinical parameters and Spearman's test were used.

RDW is reported as coefficient of variation (in percent) of red blood cell volume. The normal range for RDW in our laboratory is 11.5 to 14.5%.

Results:

RDW was significantly higher in COPD pts vs controls ($p < 0.001$), and was positively associated with CRP ($r = 0.375$, $p < 0.01$), CAT Score ($R^2 = 0.658$, $sy.x = 2.226$; $P < 0.01$; Fig 1), number of exacerbations ($R^2 = 0.289$; $sy.x = 0.86$; $p = 0.002$; Fig 2), and GOLD score ($r = 0.30$; $p = 0.05$). In ROC curve, the area under the curve of RDW for the identification of frequent exacerbator was 0.730 (95% confidence interval, 0.62-0.84; $p = 0.0001$).

Conclusions:

In conclusion, we demonstrated that elevated RDW levels in patients with COPD was associated with an increased risk for exacerbations and symptoms (measured with clinical score as CAT-COPD Assessment Test).

Our findings suggest that RDW might be a potential biomarker in COPD and could be a useful, inexpensive and a prognostic factor in COPD patients.

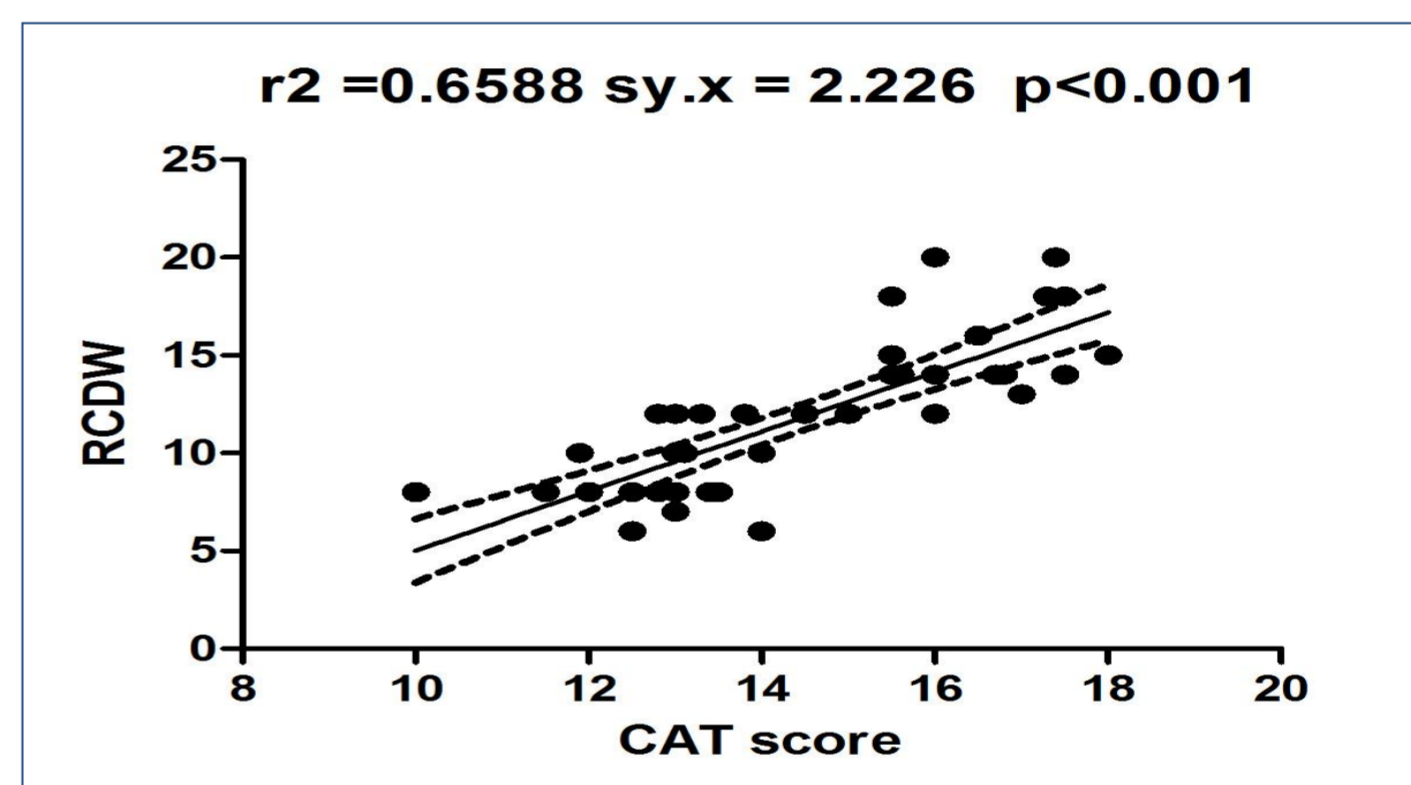


Figure 1. Linear regression for correlations between RCDW and CAT score

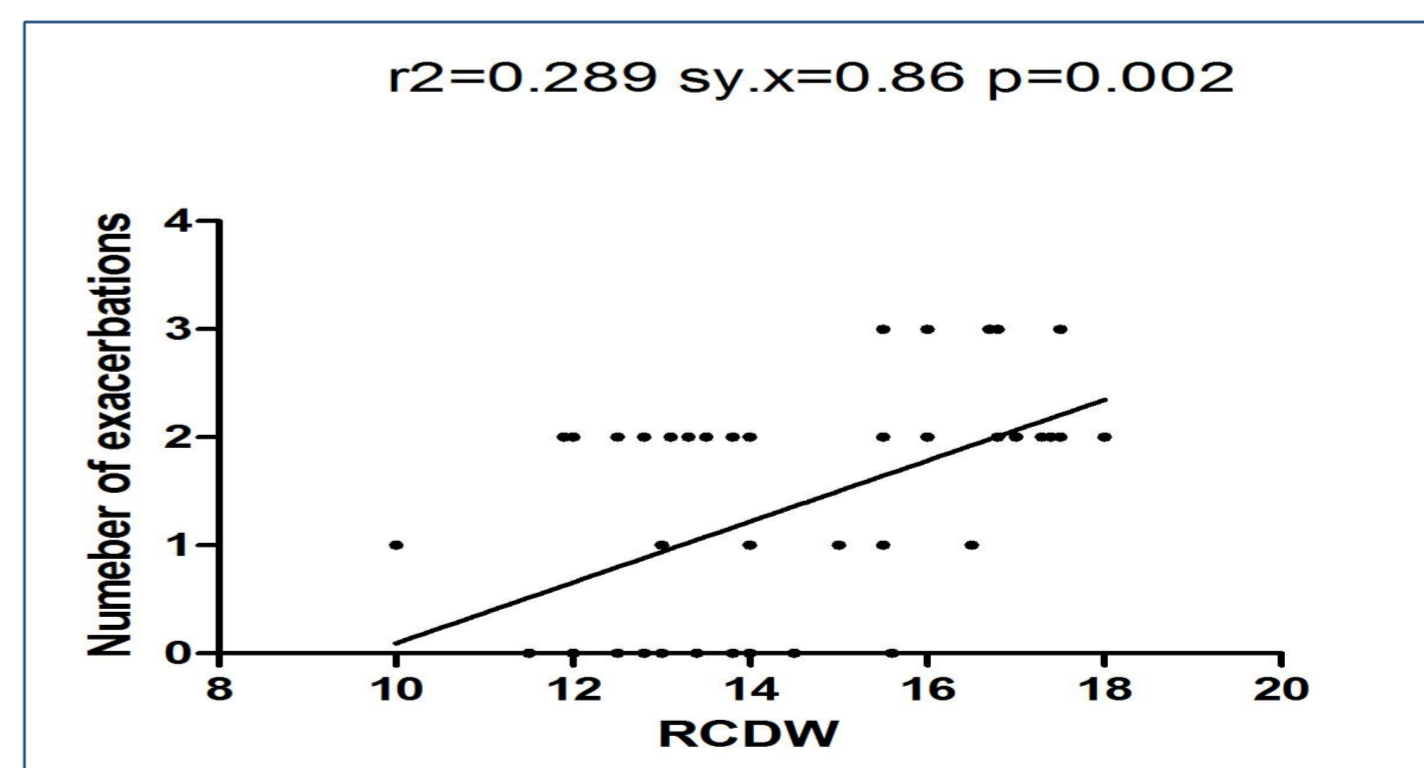


Figure 2: Linear regression for correlations between RCDW and number of exacerbations

Acknowledgements:

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