Keywords: COPD - exacerbations  Inflammation  Lung function testing

Title: Increasing oxidative stress and inflammation in patients with exacerbated chronic obstructive pulmonary disease (COPD) and their association with lung function

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Body: Oxidative stress and chronic inflammation are the milestones in pathogenesis of COPD. It is assumed that their increase is associated with a worse lung function and frequent exacerbations. Our aim was to assess changes in antioxidant enzymes superoxide-dismutase (SOD) and glutathione-peroxidase (GPx) activities and inflammatory markers in patients with exacerbated COPD, stable COPD and healthy controls and their association with airway obstruction. We performed a cross-sectional study among 244 participants (mean age 60.5±9.5 years) divided into 3 groups: 76 were with exacerbated COPD (group 1), 65 were with stable COPD (group 2) and 103 were matched healthy subjects (group 3). We performed a questionnaire to define pack years, spirometry and biochemical tests. Oxidative stress was measured by erythrocyte activities of SOD and GPx. Compared to the control group, patients from group 1 had significantly lower SOD and GPx activities (p<0.0001), with an increasing trend between groups. ESR and CRP activities were significantly higher in patients with exacerbated COPD (p<0.0001). The inflammatory markers correlated positively with pack years (r=0.15, p<0.05 for ESR and r=0.242, p<0.0001 for CRP) and negatively with FEV1 % (r=-0.427, p<0.0001 for ESR and r= -0.259, p<0.0001 for CRP). Using multiple linear regression we found that SOD and GPx were significantly influenced by FEV1 % (β=0.187, p<0.05 and β=0.219, p<0.0001 resp.). The present study suggests that there is an increased oxidative stress and inflammation in patients with COPD in exacerbation and there is a relationship with the severity of the disease.