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Title: Increased oxidative stress in patients with chronic obstructive pulmonary disease (COPD) and metabolic syndrome (MetS)

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Body: Introduction: Oxidative stress defined as increased burden of oxidants and/or depletion of antioxidants is one of the key pathogenetic mechanisms of both COPD and MetS. Aim: The aim of the present study was to investigate the levels of antioxidant enzymes superoxide-dismutase (SOD) and glutathione-peroxidase (GPx) among COPD patients presenting MetS compared to control subjects with MetS and their association with the components of the syndrome. Methods: We performed a cross-sectional study with 244 participants (mean age 60.5 ± 9.5 years) divided into 2 groups: 141 COPD patients and 103 matched controls. MetS was defined according to the IDF criteria and BMI was calculated. We measured the erythrocyte levels of SOD and GPx. Results: Among COPD patients 41.8 % presented 3 or more features of the MetS vs. 39% in the control group. The levels of antioxidant enzymes were significantly lower in patients with COPD presenting MetS (GPx 37.1 ± 6.1 U/gHb; SOD 1203.3 ± 149.5 U/gHb) compared to those without MetS (GPx 38.1 ± 7.8 U/gHb; SOD 1210.2 ± 175.5 U/gHb) and the control subjects (GPx 40.4 ± 9.1 U/gHb; SOD 1264.5 ± 157.4 U/gHb) (p < 0.05). Using multiple linear regression analysis we found that there was a significant negative association between the antioxidant enzymes and both WC ($\beta = -0.257$, p = 0.001 for GPx and $\beta = -0.355$, p < 0.0001 for SOD) and BMI ($\beta = -0.177$, p = 0.023 for GPx and $\beta = -0.171$, p = 0.029 for SOD). Conclusion: The present study suggests an increased oxidative stress in patients with COPD presenting MetS, which is associated with the degree of abdominal and overall obesity.