

# Correlation of systemic inflammation and oxidative stress with chronic obstructive pulmonar disease and its comorbidities

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## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory disease, primarily affecting the airways.

There is an increasing evidence that correlates the presence of a systemic inflammatory component to the comorbidities associated to COPD.

Recent studies demonstrated that an oxidant/antioxidant imbalance (oxidative stress) is an important systemic alteration associated to COPD.

The mechanisms of systemic inflammation and oxidative stress in COPD and their relationship to its comorbidities are unclear.

## AIM OF THIS STUDY

The aim of this study was to evaluate oxidative stress and inflammatory biomarkers in COPD and its comorbidities.

## STUDY POPULATION

### Controls

The control group consisted of healthy volunteers (mean age 41,60 ± 12,31 years). They were non-smokers with no history of lung disease. They were not taking any medication.

### Patients

We study patients with COPD (mean age 71,30±7,68 years). COPD was defined according to the criteria of the Global Initiative for Chronic Obstructive Lung Disease (GOLD). The patients were clinically stable. C-reactive protein (CRP), a marker of inflammation and malonyldialdehyde (MDA), a marker of oxidative stress, were evaluated in blood of COPD patients and subgroups of COPD with hypertension, cardiac heart failure (CHF), ischaemic heart disease (IHD), diabetes and dyslipidemia.

All participants were informed about the nature and purpose of the study and gave their consent.

### Clinical and physiological characteristics of COPD group:

COPD group	Values
Clinical and physiological parameters	
Age, years	71,30±7,68
Smoking history: yes/no, n	15/5
GOLD stage: I/II/IV, n	2/4/14
FVC, % predicted	78,495±5,193
FEV <sub>1</sub> , % predicted	58,726±5,156
FEV <sub>1</sub> /FVC, % predicted	59,716±3,699
paO <sub>2</sub> , mmHg	66,700±8,979

## METHODS

A biomarker of oxidative stress, malondialdehyde (MDA) and a marker of systemic inflammation, C-reactive protein (CRP) levels were evaluated in blood samples.

### Marker of systemic inflammation

Circulating inflammatory mediator was assessed by the measurement of C-reactive protein (CRP) levels, a marker of systemic inflammation. CRP levels were measured by chemiluminescent immunoassay. The levels of CRP were expressed in mg/L.

### Biomarker of oxidative stress

A biomarker of systemic oxidative stress as been assessed through the quantification of the levels of a lipid peroxidation derived product, malondialdehyde (MDA). MDA concentrations were measured spectrophotometrically in terms of thiobarbituric acid reactive substances. The results are expressed in nmol/mL.

### Statistical analysis

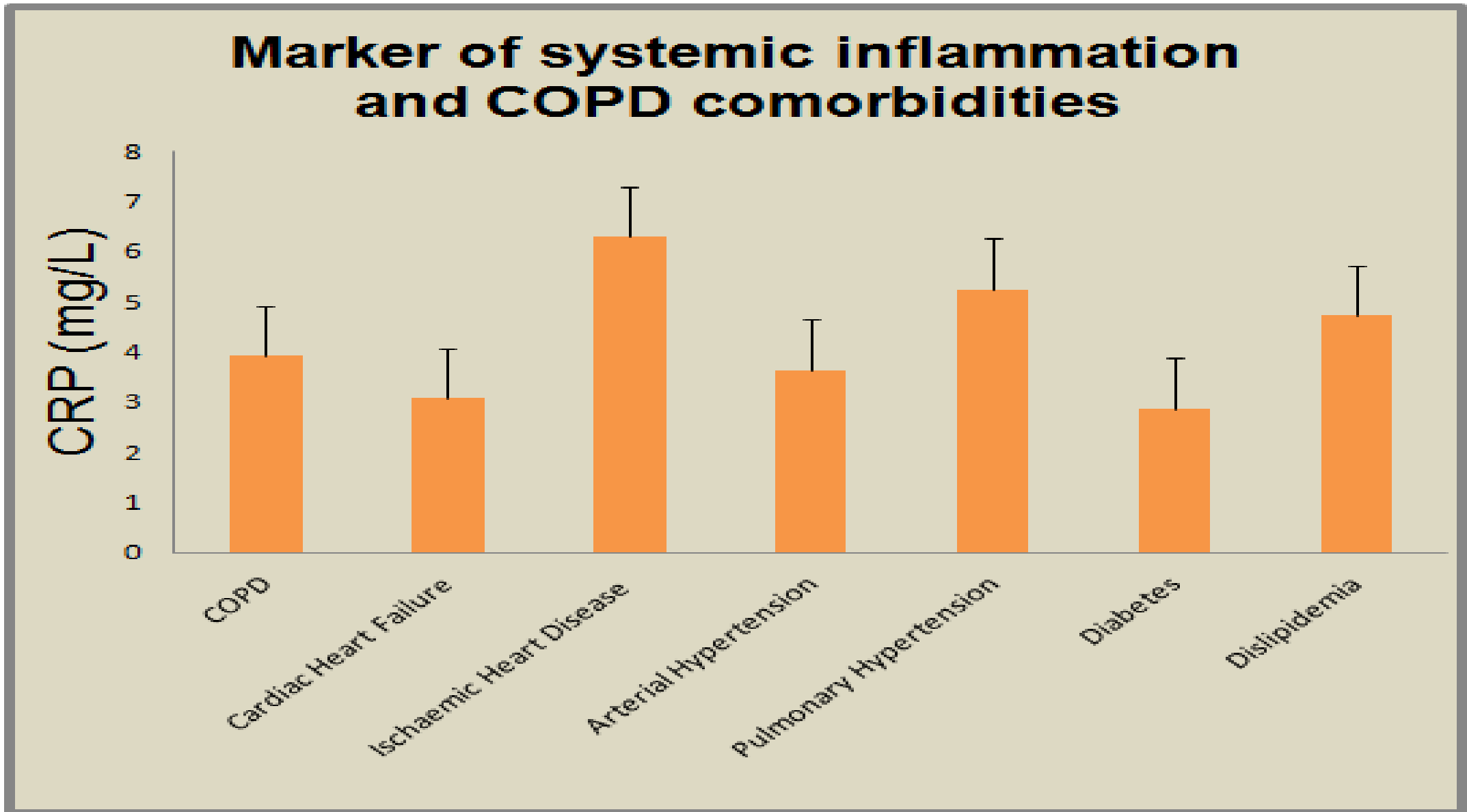
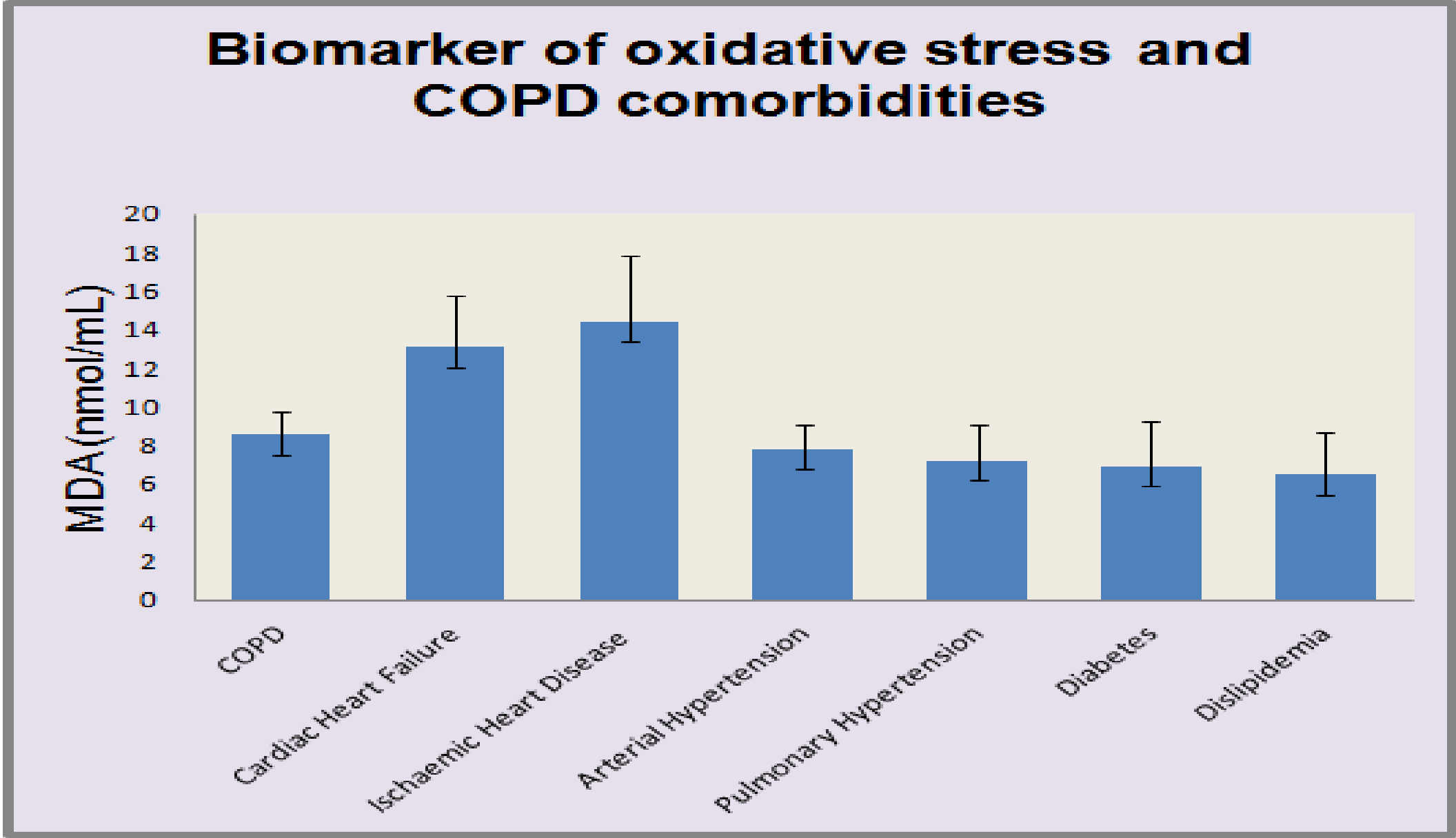
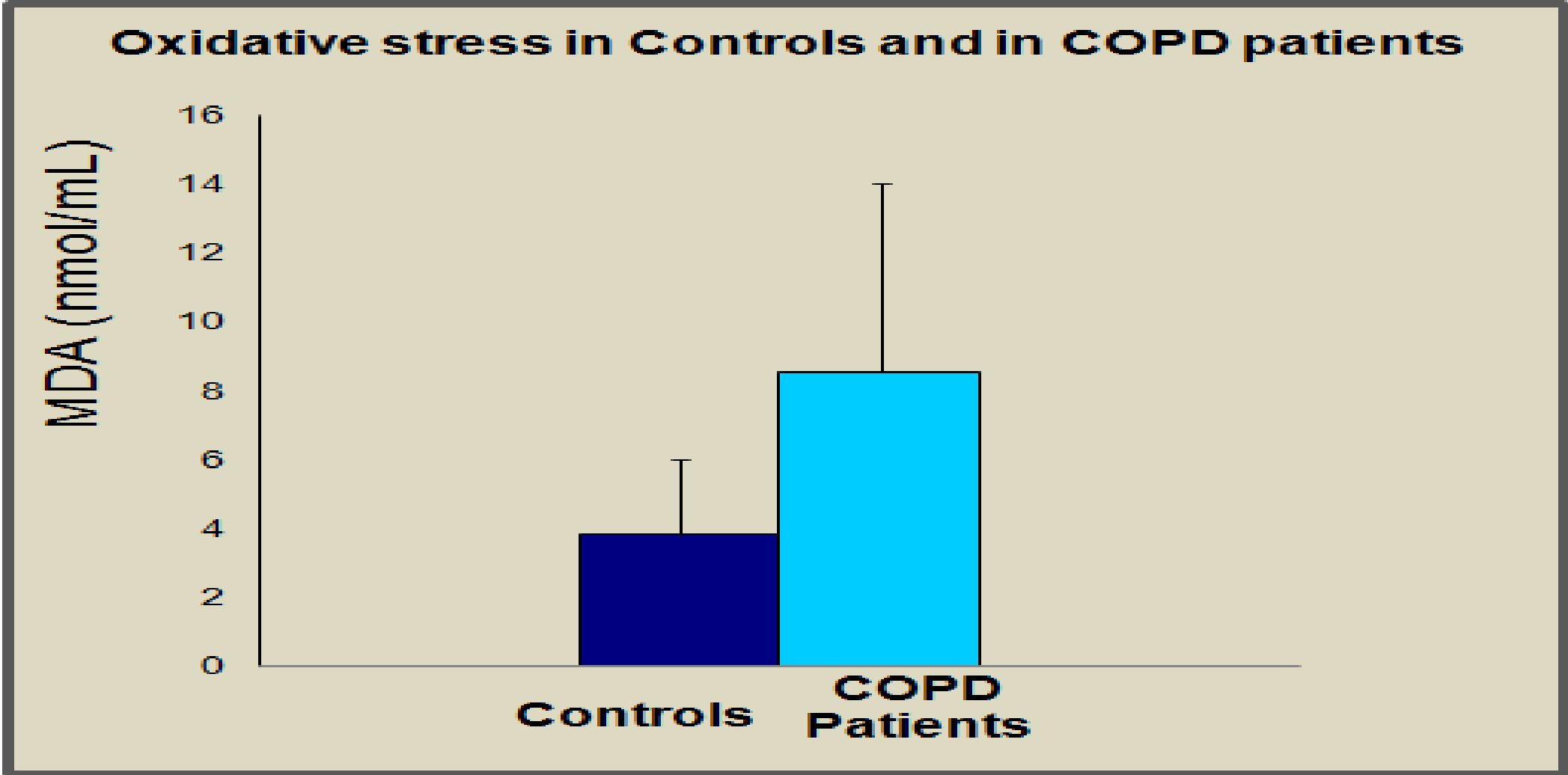
Data are present as mean ± standard deviation of the mean. The Mann-Whitney U-test was used to analyse differences between controls and COPD group. Student t-test was used for comparison of means.

## RESULTS

❖ MDA levels were significantly higher (p< 0,001) in patients with COPD than in controls.

❖The highest values of MDA and CRP were associated to the subgroup of COPD patients with IHD.

❖A significant increase in oxidative stress was observed in patients with combined COPD and cardiovascular disease when compared with other subgroups of COPD.



## CONCLUSIONS

Increased oxidative stress may be an important mechanism linking COPD inflammation and comorbid disease, namely cardiovascular events.



1<sup>ST</sup> INTERNATIONAL WORKSHOP  
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