

## Relationship of Oxidative Stress to Elevated Homocysteine and DNA Damage in Coronary Artery Disease Patients

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**Abstract :** Objective: Biochemical, environmental, physical and genetic factors have a strong effect on the development of coronary disease (CAD). Plasma homocysteine (Hcy) level and DNA damage play a pivotal role in its development and progression. The aim of this study was to investigate the predictive strength of an oxidative stress, clinical biomarkers and total antioxidant status (TAS) in CAD patients to find the correlation of homocysteine, TOS and oxidative DNA damage with other clinical parameters. Methods: Sixty confirmed patients with CAD and 60 healthy individuals as control were included in this study. Different clinical and laboratory parameters were studied in blood samples obtained from patients and control subjects using commercially available biochemical kits and statistical software Results: As compared to healthy individuals, CAD patients had significantly higher concentrations of indices of oxidative stress: homocysteine ( $P=0.0001$ ), total oxidative stress (TOS) ( $P=0.0001$ ), serum cholesterol ( $P=0.04$ ), low density lipoprotein cholesterol (LDL) ( $P=0.01$ ), high density lipoprotein-cholesterol (HDL) ( $P=0.0001$ ), and malondialdehyde (MDA) ( $P=0.001$ ) than those of healthy individuals. Plasma homocysteine level and oxidative DNA damage were positively correlated with cholesterol, triglycerides, systolic blood pressure, urea, total protein and albumin ( $P$  values= 0.05). Both Hcy and oxidative DNA damage were negatively correlated with TAS and proteins. Conclusion: Coronary artery disease patients had a significant increase in homocysteine level and DNA damage due to increased oxidative stress. In conclusion, our study shows a significantly increase in lipid peroxidation, TOS, homocysteine and DNA damage in the erythrocytes of patients with CAD. A significant decrease level of HDL-C and TAS was observed only in CAD patients. Therefore these biomarkers may be useful diagnosis of patients with CAD and play an important role in the pathogenesis of CAD.

**Keywords :** antioxidants, coronary artery disease, DNA damage, homocysteine, oxidative stress, malondialdehyde, 8-Hydroxy-2'-deoxyguanosine

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