

HUMAN GENETICS & GENETIC DISEASES

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Oxidative stress and genetic damage in patients with hypercholesterolemia**Monika Monu and Gursatej Gandhi**
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Statement of the Problem: Genetic and environmental factors are important contenders for predisposition to hypercholesterolemia. The inflammatory response and atherogenic effects of the high levels of low density lipoproteins (LDL-C) may produce substantial quantities of reactive oxygen species (ROS), thereby resulting in an oxidative stress. This oxidative stress along with prolonged medication can induce genetic damage by oxidizing the biomolecules.

Methodology: To investigate the state of genetic damage and oxidative stress in patients with hypercholesterolemia, some circulating biomarkers were determined in a case-control study. Patients (n=50; 20-40 years) from local hospitals and age, sex and socio-economic status matched healthy controls from general population (n=50; 20-40 years) formed the study group under informed consent after approval of the study by the Institutional Ethical Clearance Committee. Venous blood samples were used for serum separation and levels of TAC (Total Antioxidant Capacity) and TOS (Total Oxidant Status) were determined using standard protocols available in literature. DNA damage was investigated in peripheral blood leukocytes of the subjects using single cell gel electrophoresis (SCGE)/comet assay.

Findings: The results on statistical analysis revealed that TOS levels were significantly higher ($p=0.032$) in patients (5.423 ± 0.961 $\mu\text{mol H}_2\text{O}_2$ equivalent/l) as compared to that in controls (3.073 ± 0.449 $\mu\text{mol H}_2\text{O}_2$ equivalent/l) with TAC levels significantly decreased ($p=0.000$) in patients (0.558 ± 0.063 mmol Trolox equivalent/l) while 1.611 ± 0.376 mmol Trolox equivalent/l in controls. A significant increase in damage frequency (94.750 ± 4.896 ; $p=0.050$), damage index (144.228 ± 107.862 ; $p=0.001$) and percent DNA in tail (44.850 ± 0.898 ; $p=0.000$) were observed in patients. Correlation analysis revealed a significant positive association of LDL-C with damage index ($p=0.050$) and TOS ($p=0.000$) and of HDL-C with TAC ($p=0.001$).

Conclusion: High LDL-C levels induce oxidative stress and genetic damage in the patients and thus requires management so as to reduce the risk for certain malignancies, cardiovascular and hepatocellular diseases.

Biography

Monika Monu is currently pursuing her PhD in Human Genetics. She is passionate in improving the health and wellbeing. Her research findings create new pathways for managing hypercholesterolemia and aware mankind about risks of cardiovascular diseases in order to manage them at the very first stage.

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