

Evaluation of oxidative stress markers in diabetes mellitus

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Background : Diabetes mellitus is a heterogeneous disease characterized by impaired synthesis and/or secretion of insulin from pancreas, as well as by resistance of the peripheral tissues to the hormone activity. Oxidative stress is a medical term for the damage to animal or plant cells caused by reactive oxygen species. It is defined as an imbalance between pro-oxidants and anti-oxidants. It occurs in a cellular system when the production of free radical moieties exceeds the antioxidant capacity of that system . If cellular antioxidants do not remove free radicals, radicals attack and damage proteins, lipids, and nucleic acids. Oxidative stress - induced cell injury has been reported to have a role in the pathogenesis of a number of diseases, including cancer, atherosclerosis, diabetes mellitus, epilepsy, radiation damage, cellular aging, reperfusion damage, and inflammatory diseases. Oxidative tissue and organ damage play roles in DM and its complications . Hyperglycemia can cause oxidative stress particularly by evidence that several biochemical pathways activated during hyperglycemia can increase the production of free radicals. Antioxidants are molecules or compounds that act as free radical scavengers. Most antioxidants are electron donors and react with the free radicals to form innocuous end products such as water. These antioxidants bind and inactivate the free radicals. Thus, antioxidants protect against oxidative stress and prevent damage to cells . To protect the cells and organ systems of the body against reactive oxygen species, humans have evolved a highly sophisticated and complex antioxidant protection system.

Method : Reduced glutathione (GSH) and malondialdehyde (MDA) used as markers for oxidative stress status. The study was conducted to verify the oxidative stress status in diabetes mellitus (DM). To achieve this aim, 80 diabetic patients and 46 healthy subjects (control group) were subjected to the study.

Results: showed significant decrease of reduced glutathione (GSH) and significant increase malondialdehyde (MDA) levels in diabetic patients when compared with those of the control group and the extent of oxidative stress status changes was higher in type II when compared with type I diabetic patients. The linear regression analysis demonstrated significant negative correlation for GSH and significant positive correlation for MDA values with age of diabetic patients. The results demonstrated significant decrease in GSH values and significant increase in MDA levels in complicated patients when compared to those of non complicated diabetic patients.

Conclusion: The results indicate that diabetes mellitus(in both types) is associated with oxidative stress by decreasing GSH levels and increasing MDA levels.