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Inflammatory markers and oxidative stress parameters in type-2 diabetic patients with kidney dysfunction: A study in north Indian population

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Aim: The aim of the present study was to ascertain the potential role of oxidative stress parameters and inflammatory markers in diabetes and related chronic kidney disease (CKD) among north Indian diabetic patients.

Design & Methods: Indicative parameters and changes in antioxidant defense system were measured in the serum of healthy subjects (group-1), diabetic patients without CKD (group-2) and with CKD (group-3). Serum levels of malondialdehyde (MDA) and nitric oxide (NO), superoxide dismutase (SOD), catalase (CAT) and glutathione reductase (GR) content were estimated in all individuals. Inflammatory cytokines i.e. IL-6 and TNF-alpha were also evaluated in all three groups.

Results: Malondialdehyde, protein carbonyl and nitric oxide were elevated in type-2 diabetic patients as compared to healthy control subjects. Group-2 having a significantly higher value than group-1 ($p \leq 0.05$). Total thiols content were found to be significantly decreased in diabetic patients with CKD. Activity of antioxidant enzymes, superoxide dismutase, catalase and glutathione reductase showed a significant suppression in type-2 diabetic patients with or without CKD as compared to healthy subjects. Nevertheless, the levels of pro-inflammatory cytokines IL-6 and TNF-α were significantly up-regulated ($p \leq 0.05$) as compared to healthy subjects.

Conclusion: Determination of antioxidant defense parameters and inflammatory markers contributes to understand the relation between oxidative stress and inflammation on the development and prevention of chronic kidney disease in Indian diabetic patients. These results indicated that oxidative stress is increased and antioxidant defenses were compromised in both type-2 diabetic patients without complications and with CKD. These derangements are of a higher magnitude in patients of type-2 diabetic patients with CKD.

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