Oxidative stress and antioxidant status in elderly diabetes mellitus and glucose intolerance patients

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Abstract

Increased oxidative stress and impaired anti-oxidant defense have been suggested as contributory factors for initiation and progression of complications in diabetes mellitus. Aging itself has been shown to be along with increased oxidative stress and lower anti-oxidant defense. We aimed at investigating oxidative stress and anti-oxidant enzymes in 61 elderly subjects. Fifteen healthy individuals (group 1, mean age 72.2 ± 5.13), 13 glucose intolerant patients (group 2, mean age 71.7 ± 4.9), 19 patients with type 2 diabetes mellitus (T2DM) without any complication (group 3, mean age 70.0 ± 6.0), and 14 patients with T2DM with at least one complication (group 4, mean age 69.8 ± 4.7) were included in the study. Whilst plasma levels for malondialdehyde (MDAP) and erythrocyte malondialdehyde (MDAE) were measured as markers of oxidative stress, activity of erythrocyte superoxide dismutase (SOD), glutathion peroxidase (GSH-Px), and catalase (CAT) were taken as markers of oxidative defense system. MDAP level was significantly elevated in group 4 (P = 0.001). MDAE was elevated in patients with T2DM, particularly in group 4, however, the difference between the groups was of borderline significance (P = 0.07). Whilst CAT was elevated in groups 3 and 4 compared to control subjects (P = 0.025 and 0.002, respectively), no difference was found for SOD between the groups. GSH-Px activity was found to be increased in groups 2, 3 and 4, it did not reach statistical significance (P = 0.106). There were significant correlations between CAT and MDAE (P < 0.0001, r = 0.56) and MDAP (P = 0.016, r = 0.306). These results suggest that there was an increased oxidative stress in elderly diabetics, however, this is not due to reduced erythrocyte antioxidant defense potential but, rather, increased free radical production possibly due to hyperglycemia. Keywords: Diabetes mellitus, Elderly, Impaired glucose tolerance, Oxidative stress