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Diabetes mellitus and metabolic syndrome

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TOTAL ANTIOXIDANT CAPACITY, SUPEROXIDE DISMUTASE AND CATALASE IN DIABETIC POLYNEUROPATHY

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Background. Oxidative stress resulting from enhanced free-radical formation and/or a defect in antioxidant defenses has been implicated in the pathogenesis of experimental diabetic polyneuropathy (DP). The antioxidant capacity is always decreased in diabetic patients, but it seems necessary to measure all the components to ascertain the reasons. The aim of this study was to determine the plasma total antioxidant capacity (TAC) and changes in the activities of superoxide dismutase (SOD) and catalase (CAT) in patients with diabetic polyneuropathy.
Methods. We evaluatedTAC, SOD, CAT in samples obtained from 30 DP patients and 30 healthy sex and age matched subjects as control group. Laboratory analyses involved fasting blood glucose and glycated hemoglobin (HbA1c) levels. The activities of SOD and CAT were determined by standard spectrophotometric Methods. Total antioxidant status was measured using Randox kit.
Results. Serum glucose and HbA1c levels were significantly higher in DP patients versus the control group ($p<0.001$). The TAC was significantly depleted in the diabetic group than healthy donors ($p<0.001$). Average SOD and CAT activity were significantly lower in patients with DP than control group ($p<0.01$). There was significant negative correlation between the TAC and serum glucose level, TAC and HbA1c ($p<0.001$), but not between TAC and duration of diabetes. Significant correlation in the case of SOD and CAT was not marked.
Conclusions. Examinationof the data from diabetesand total antioxidant status, SOD and CAT strongly implicateshyperglycemia-induced oxidative stress in DP.We conclude that striving for superior antioxidative therapiesremains essential for prevention of neuropathy in diabeticpatients.

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MULTIPLEX DETERMINATION OF ANALYTES RELATED TO METABOLIC SYNDROME AFTER WEIGHT LOSS WITH EVIDENCE BIOCHIP ARRAYS

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Background. Variations in the levels of adiponectin, C-peptide, CRP, cystatin C, ferritin, IL-1α, IL-6, insulin, leptin, PAI-1, resistin, TNFα have been associated to metabolic dysfunctions. Biochip array technology enables their multiplex determination from a single sample, at a single point in time. This generates a patient's profile, which provides more information than single analyte determination. The aim of this study was to determine these analytes in plasma of obese subjects following weight loss.
Methods. Plasma samples from obese subjects (n=12, average IBM>30kg/m^2) were analysed. For weight reduction, 5 subjects followed dietary restriction and 7 subjects underwent bariatric surgery. Two different biochip arrays were used for the multiplex determination. Simultaneous chemiluminescent immunoassays applied to the Evidence Investigator analyser were used. Statistical significance between groups was calculated using the paired Student's t-test (two tailed).
Results. Following dietary restriction, significant reductions were observed in plasma insulin and CRP levels($p=0.045$ and 0.030 respectively). C-peptide, IL-6, leptin and TNFα exhibited moderate but no statistically significant reduction. A marginal increase was observed in PAI-1 and resistin. Adiponectin and IL-1α remained unchanged. Following bariatric surgery, a highly significant reduction was observed in plasma leptin($p=0.005$) and a significant increase was observed in plasma adiponectin($p=0.014$). C-peptide and PAI-1 were reduced and IL-1α, resistin and TNFα increased but did not reach statistical significance. No significant changes were detected in CRP, IL-6 and insulin levels.
Conclusions. This multi-analytical approach using biochip arrays shows differences between the groups undergoing weight loss and represents a valuable analytical tool in research settings.