Hemorheological Approach for Early Detection of Diabetic Nephropathy

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Objective: Recently, hemorheologic alterations or changes in blood viscosity have been suggested to play a role in the pathogenesis of diabetic microvascular complications. Some even proposed that hemorheological alterations precede the development of microangiopathy. We measured various hemorheologic parameters in type 2 diabetes patients with different stages of chronic kidney disease (CKD) and assessed its possible role as an early marker of diabetic nephropathy.

Study Design and Methods: One hundred-five patients with diabetes were divided into four groups according to the glomerular filtration rate (GFR). Hemorheologic parameters, including erythrocyte deformability and fibrinogen/elongation index (EI), aggregation index were measured using microfluidic hemorheometer. Various metabolic parameters were assessed from fasting blood samples and urine albumin/creatinine ratio was calculated from first morning voided urine.

Results: Erythrocyte deformability was significantly lower in patients with CKD stage 2 compared to healthy controls (0.314 ± 0.006 vs. 0.320 ± 0.002, p<0.05). Aggregation index, fibrinogen, the erythrocyte sedimentation rate, and albumin/creatinine ratio inversely correlated with GFR (p=0.05). Fibrinogen/El at 3 Pa significantly differed between CKD stage 2 patients and healthy controls (p=0.05), whereas the albumin/creatinine ratio significantly differed between CKD stage 3 patients and healthy controls (p=0.005).

Conclusion: EI, aggregation index, and fibrinogen/El at 3 Pa are sensitive parameters for detecting erythrocyte alterations in early diabetic nephropathy. These markers may be used as screening tools for diabetic nephropathy, as they develop earlier and are faster to detect than the albumin/creatinine ratio.

Cardiovascular Risk Rates in Metabolic Syndrome and Atherosclerotic Marker Serum Matrix Metalloproteinase-9 Levels

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Introduction: Metabolic syndrome (MS) is associated with increased cardiovascular risk. There are a lot of study that is releated with the correlation between metabolic syndrome and low grade inflammation. We have attempted to compare Framingham Risk Score (FRS) that calculates cardiovascular risk rates and Matrix Metalloproteinase-9 levels that is an atherosclerotic proinflammatory marker, on metabolic syndrome's between other healthes.

Method: We included 86 patients that contains 51 MS and 35 healthes to this study.In both groups,age,Length,weight,BMI,Zwaist circumference,familial hearth disease and HT on family was registered. Framingham risk score (FRS) was calculated. Insulin,glucose, HOMA-IR, total cholesterol, LDL, HDL, Triglyceride levels saved.Blood samples for MMP-9 levels were taken and stored at -80 °C. MMP-9 levels measured by the way of solid phase platinium ELISA (BIOSOURCE).

Results: This case contained 86 patients, 51 of them is MS (HbA1c 7.7%) and the others are called as control group (HbA1c 7.0%). Ages of patients were changed between 20-55 years and the mean age is 38.52±10.02. FRS of MS patients were calculated statistically high compared to control group (p=0.017). MMP-9 levels of MS patients were calculated statistically high compared to control group (p=0.001). In both groups, there is no statistically significant relationship between MMP-9 levels and FRS (p=0.05).

Conclusion: MMP-9 changes between the groups of MS young aged of 20-55 and health group may show us early atherosclerosis. At the group of high MMP-9 levels, even age related cardiovascular hearth disease risks are lower, risk was statistically calculated high compared to the other healthy populations. This situation is important in order to control risk factors as MS at early ages.

Glycosylated Hemoglobin as a Predictor of Immediate Postoperative Complications

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Background: It is unknown if values of glycosylated hemoglobin (HbA1c) could predict complications in the immediate postoperative period in diabetic patients.

Objective: To compare the incidence of immediate postoperative complications in diabetic patients with controlled (GC) vs. uncontrolled (GUC) HbA1c.

Methods: Prospective cohort of type 2 diabetic patients, divided in 2 groups: GC (HbA1c < 7%) and GUC (HbA1c > 7%), followed for 30 days after major elective surgery, through 2012-2013. Considered complications were: readmissions, infections, cardiovascular events, stroke, and mortality.

Results: 163 patients were enrolled: 75.5% (123) for GC and 24.5% (40) for GUC. Mean age was 66 years (SD:10) for GC, and 62 years (SD:13) for GUC. 54% and 60% were male for GC and GUC respectively. For GC, main surgeries were: urologic (23.6%), traumatologic (21.9%) and biliary (11.4%); for GUC main surgeries were: traumatologic (25%), urologic (22.5%) and bariatric (17.5%). Variables with no statistically significant differences between groups were: gender (p=0.48), age (p=0.08), Charlson co-morbidity score (p=0.69), BMI (p=0.33), current smoker (p=0.05) or ex-smoker (p=0.18), physical activity (p=0.97), hypertension (p=0.09), dyslipidemia (p=0.34), chronic renal failure (p=0.96), neoplasms (p=0.7), diabetic nephropathy (p=0.84), retinopathy (p=0.08), neuropathy (p=0.22) or peripheral vascular disease (p=0.82). Statistically significant difference was found for coronary disease, 31% vs. 15% (p=0.049), for GC and GUC respectively. The incidence for immediate postoperative complications in GC was 11.4% (14): 9 infections, 8 were readmitted and one cardiovascular event. In GUC complication incidence was 17.5% (7): 4 infections, 1 readmission, 1 stroke and 2 deaths. Crude HR control for complications was 0.65% (95%CI,0.26–1.6, p=0.35).

Discussion: Although we did not find a significant incidence of postoperative complications between controlled and uncontrolled groups, the uncontrolled group had more postoperative complications and survival curves were different, although without statistical significance.