KSN 2020
FULLY VIRTUAL MEETING

Abstract Type : Poster
Abstract Submission No. : PO-1141

Haematological Indices and Biochemical Parameters as Early Predictors of Type 2 Diabetes Mellitus Nephropathy

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Objectives: This study aims to investigate various haematological and biochemical parameters and their correlation with diabetic nephropathy. We tried to assess utility of platelet indices, circulating serum Total Sialic Acid (TSA) and high sensitivity C-reactive protein (hs-CRP) as markers for early detection/presence of diabetic nephropathy.

Methods: For platelet count and indices, blood was collected and analyzed in automated blood cell counter. Glycosylated haemoglobin in whole blood, hs-CRP and lipid profile was measured using Biosystems A-25 and Vitalab SELECTRA-E analyzer. Serum TSA and oxidative stress were analyzed using computerized Shimadzu UV-VIS spectrophotometer.

Results: MPV, PDW and P-LCR were significantly higher in T2DMN as compared to T2DM or controls. An increase in glycosylated haemoglobin, circulating serum TSA and hs-CRP were found as an early manifestation of diabetic renal disease. Glycosylated haemoglobin correlated with markers of inflammation (TSA and hs-CRP). Presence of dyslipidemia showed strong positive correlation of triglycerides, VLDL and to some extent LDL with blood glucose levels, glycosylated haemoglobin and hs-CRP. Increased oxidative stress, as evident by significantly increased levels of malondialdehyde (MDA), positively correlated with hyperglycemia (glycosylated haemoglobin), development of microvascular complications (microalbuminuria) and markers of inflammation. Furthermore, decreased antioxidant levels i.e. super oxide dismutase and vitamin C levels exhibited robust positive correlation with development of diabetic nephropathy.

Conclusions: Platelet indices are altered between diabetics and controls as well as between diabetics with and without nephropathy. Discriminant analysis using PDW and MPV could classify majority of patients with T2DMN. This study also postulates the efficacy of TSA to be at par with hs-CRP which is an established marker for early detection of diabetic complications like nephropathy. Oxidative stress analysis highlights decrease in antioxidants and an indirect evidence of increase in oxidative stress which depletes the antioxidants during diabetic nephropathy. This emphasizes the role of exogenous antioxidants in prevention & delay of complications in diabetics.