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Level of human Kidney Injury Molecule-1 (KIM-1) as an early marker for diabetic nephropathy in Egyptian type-2 diabetic patients

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Background: Human Kidney Injury Molecule-1 (KIM-1) is produced in the affected segments of the proximal renal tubule whenever there is a pathophysiological state resulting in dedifferentiation of the epithelium. The kidney injury molecule-1 is a type-1 transmembrane glycoprotein (339 aa). KIM-1 ectodomain is cleaved and shed in a metalloproteinase-dependent fashion. The soluble KIM-1 protein that appears in the urine of humans is about 90 KDa. All forms of chronic kidney disease, including diabetes are associated with tubulo-interstitial injury.

Aim: The current study was performed try to assess use of urinary KIM-1/Creatinine ratio as a sensitive diagnostic tool for renal injury in the urine of patients with type-2 diabetic Egyptian patients.

Methods: Eighty (80) subjects were subjected to clinical examination included and subdivided as 20 apparently healthy control volunteers (group-1) and 60 diabetic patients which were divided into 3 subgroups (Group-2, Group-3 and Group-4) of 20 patients each: According to ACR: (ACR<30 mg/g, 30-299 mg/g and ≥300 mg/g respectively). All were subjected to laboratory investigations which included: Morning mid-stream urine sample for: (1) Complete urine analysis, (2) quantitative measurement of urinary albumin, (3) urinary creatinine, (4) calculation of urinary albumin to creatinine ratio, (5) measurement of KIM-1 (ELISA), and (6) calculation of KIM-1 to creatinine ratio.

Results: Urinary KIM-1 levels were increased with the progression of nephropathy. Urinary KIM-1 levels were independent risk factor of eGFR and albuminuria in diabetic patients. Urinary KIM-1/Cr ratio was more sensitive than KIM-1. There was no correlation between urinary KIM-1/Cr ratio and GFR in all studied groups.

Conclusion: Urinary KIM-1/Cr ratio is a sensitive, noninvasive diagnostic tool for kidney affection in type-2 diabetic Egyptian patients that seem to predict renal injury in early period independent of albuminuria. Due to lack of correlation, both KIM-1/Cr and Alb/Cr ratios are required to be calculated for type-2 diabetic patients.

Recommendations: The use of KIM-1/Cr ratio as a diagnostic tool for kidney affection by measuring it in urine of type-2 diabetic patients at risk of chronic kidney disease.

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