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Cystatin C as a marker of GFR in type 2 diabetic nephropathy

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Objectives: Diabetes is the most common cause of CKD worldwide. Evidence suggests that serum cystatin C is superior than serum creatinine for detecting early decline in renal function in diabetic nephropathy. This study examined the adequacy of the cystatin C as a marker of GFR for the assessment of nephropathy in the Nepalese patients with type 2 diabetes.

Methods: 101 patients diagnosed with type 2 diabetes, were categorized into different stages of nephropathy based on urine protein to creatinine ratio (PCR). Serum cystatin C level was measured using latex turbidimetry (Giesse diagnostic), reference level 0.59-1.03mg/L. Serum creatinine was measured using modified Jaffe method with the reference level male (80-115µmol/L) and female (53-97µmol/L). Analytes were measured in Biotecnica 1500 chemistry auto-analyzer. GFR was estimated using MDRD equation and cystatin C based CKD-EPI (2012) equation. SPSS ver.20, t-test, one-way ANOVA, Pearson's correlation and ROC were used for data analysis and interpretation.

Results: Cystatin C was elevated in 49 patients and serum creatinine was elevated in 38 patients out of 101 patients. Cystatin C level increased significantly with the progression of nephropathy ($p < 0.01$). The mean serum cystatin C level in different stages of nephropathy were 0.78± 0.21mg/L (PCR<15mg/mmol), 0.95± 0.33mg/L (PCR 15-50mg/mmol) 0.78± 0.21mg/L (PCR 50mg/mmol).The AUC was marginally better for serum cystatin C [(0.959) 95% CI: 0.925-0.993] than serum creatinine [(0.952)95% CI: 0.915-0.989] to detect eGFR <60ml/min/1.73m^2($p < 0.001$). To detect eGFR <90ml/min/1.73m^2 AUC for cystatin C was 0.82 (95% CI:0.734-0.906) and for serum creatinine was 0.88 (95% CI: 0.806-0.954) ($p < 0.001$). The best cut off value of serum cystatin C to detect eGFR < 60ml/min/1.73m^{2}and <90 ml/min/1.73m^{2}was 0.993mg/L (sensitivity 92%, specificity 82%) and 0.775 mg/L (sensitivity 76%, specificity 84%) respectively.

Conclusions: Serum cystatin C is useful alternative or adjunct to creatinine for assessment of renal function in type 2 diabetic nephropathy