Summary

Diabetic nephropathy is a significant complication in diabetic patients, and it is becoming the most common cause of end stage renal disease. Early detection of diabetic nephropathy has an important value in the prevention of end stage renal disease in patients with type 1 diabetes; the first clinical sign is microalbuminuria.

Albuminuria is therefore used as an early marker of renal injury because it often precedes a decline in renal function. However, it cannot distinguish different types of proteinuric kidney disease and has a limited ability to predict disease progression and determine therapeutic efficacy.

There is an unmet need for highly sensitive biomarkers for the detection of diabetic nephropathy. Currently this disease is not recognized early enough because of inadequate diagnostic methods, which increases the chances that early nephropathy and microalbuminuria will progress toward end stage renal disease.

The aim of this study was to evaluate the level of serum cystatin C as an early predictor for diabetic nephropathy in
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children and adolescent with type 1 diabetes and albumin creatinine ratio (ACR), to be correlated with renal function.

The present work is case control study including eighty five type 1 diabetic patients, recruited from Diabetic Endocrine Metabolic Pediatric Unit (DEMPU), Children Hospital, Cairo University, sex distribution was 44.4% males (40 patients) and 55.6% females (45 patients), mean age was 12.69 ± 4.83 years, while the average duration of diabetes was 6.51 ± 4.61 years.

In the present study, the patients with type 1 diabetes were divided into two groups according to urinary albumin creatinine ratio; microalbuminuric patients A/C ratio (30-300 mg/g) were assigned as Group 1 (case) including 45 patients with sex distribution of 44.4% males (20 patients) and 55.6% females (25 patients) with mean age of 14.10 ± 3.42 years. While normoalbuminuric patients A/C ratio (< 30 mg/g) were assigned as Group 2 (control) including 40 patients with sex distribution of 50% males (20 patients) and 50% females (20 patients) with mean age of 12.69 ± 3.00 years. Both groups were age and sex matched.

Our study revealed significant increase of serum cystatin c among microalbuminuric group (0.88±0.24 mg/l) in comparison to normoalbuminuric group (0.65± 0.13 mg/l).
The relation between degree of albuminuria & serum cystatin C is demonstrated by the significant positive correlation between serum cystatin C and Alb/Cr ratio (p<0.0001) (r=0.763). Also, significant negative correlation between serum cystatin C and eGFR, (p=0.048) (r= -0.296) was observed.

This study revealed better diagnostic accuracy of serum cystatin C than serum creatinine in detecting microalbuminuria in diabetic patients using receiver operator characteristic (ROC) curves. The area under the curves (AUC) was 0.806 for serum cystatin C and 0.477 for serum creatinine.

The AUC was significantly higher for serum cystatin C P-value < 0.0001, but not for serum creatinine P-value = 0.715. The sensitivity and specificity of cystatin C were 86.7% and 55%, respectively.

These results means that serum cystatin C can be used as an early marker of diabetic nephropathy and further studies are needed to determine other factors that can affect serum cystatin C and its accuracy.