

Comparative analysis of methods for the evaluation of renal function in patients with diabetes mellitus type 1 at different stages of chronic kidney disease

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Abstract

Diabetes mellitus (DM) is a leading cause of chronic kidney disease (CKD) and a major source of morbidity and mortality in patients with established CKD.

The aim was to analyze the efficiency of various methods of examination to update the degree of diabetic nephropathy and to determine the optimal to predict the decline in renal function in patients with DM 1.

Methods

Table 1. Characteristics of patients	
	total N=50
Age, yrs	40,1±11,7
Male/female, n	17/33
BMI, kg/m ²	25,9±5,0
Duration of DM1, yrs	22,3±8,1
Age at DM 1 onset, yrs	21,6±13,2
CKD stages 1, 2, 3, n	22, 18, 10

GFR was estimated using Cockcroft-Gault and MDRD formulas. Urinary protein excretion in the morning and daily urine samples, urine albumin/creatinine ratio (ACR), endogenous creatinine clearance, serum creatinine levels were measured. Nonparametrics statistical methods were used.

Results

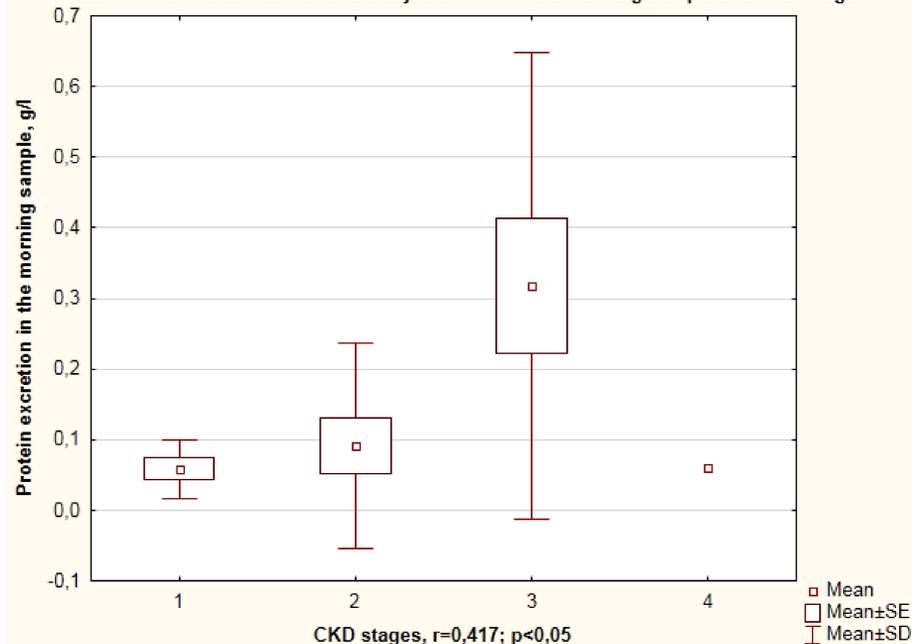
✓Reliable differences were revealed in protein excretion in the morning urine sample ($p=0,047$)

✓No differences have been received between the level of urinary albumin excretion and ACR ($p=0,227$; $p=0,331$ resp.)

✓No significant differences in the urinary protein excretion in the daily sample have been identified ($p=0,258$)

✓Reliable differences in GFR were found using endogenous creatinine clearance measurement ($p=0,00001$)

Table 3. Correlation between urinary excretion in the morning sample and CKD stage



✓Urinary protein excretion in the morning sample correlates with GFR ($r=0,393$; $p<0,05$), serum creatinine level ($r=0,470$; $p<0,05$), eGFR ($r=-0,398$)

✓At the same time urinary daily protein excretion correlates only with serum creatinine level ($r=0,527$; $p<0,05$)

✓ACR correlates with the age at DM 1 onset ($r=-0,334$; $p<0,05$)

Conclusion

Urinary protein excretion in the morning sample which is rather cheap, simple and convenient for patients in compare with such reliable and accurate methods as the evaluation of daily urinary protein excretion, ACR and endogenous creatinine clearance can be an efficient method of predicting decline in renal function in patients with DM 1 at CKD stages 1-3.

Table 2. Correlation between urinary protein excretion in the morning sample and urinary daily protein excretion

