URINARY C PEPTIDE/ CREATININE RATIO AND ITS RELATION TO INSULIN RESISTANCE AND VASCULAR COMPLICATIONS IN TYPE 2 DIABETES

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Introduction

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance (IR) which leads overtime to hyperglycemia and progressive beta cell dysfunction. IR is a potent risk factor for vascular complications of diabetes including macro and microvascular complications, which contribute significantly to morbidity and mortality. Urinary c peptide, a byproduct of insulin secretion, serves as a reliable biomarker for beta cell function due to its stability in urine and it is easy to collect. When normalized to creatine levels, the urinary c peptide creatinine ratio (UCPCR) provides a simple, noninvasive measure of endogenous insulin secretion. Close correlations between serum C-peptide, and UCPCR have been shown. And since, high serum C-peptide concentration is a strong indicator of metabolic syndrome and IR, this suggests that UCPCR could be a promising marker for assessing IR.

Aim of the Work

The aim of the present study was to assess urinary c peptide / creatinine ratio in patients with T2DM and its relation to insulin resistance and vascular complications.

Subjects and Methods

This cross-sectional study included 90 patients with type 2 diabetes mellitus (T2DM) recruited from the Diabetes Outpatient Clinic of Alexandria Main University Hospital. After obtaining informed consent, participants underwent thorough evaluations, including history-taking for demographic and clinical data, anthropometric measurements (weight, height, BMI, waist circumference), and blood pressure assessment. Ankle-brachial index (ABI) was calculated using Doppler, while neurological assessments were conducted to diagnose diabetic neuropathy. Fundus examination identified diabetic retinopathy. Laboratory investigations included fasting plasma glucose, fasting insulin, serum creatinine, HbA1c, and urinary albumin-to-creatinine ratio. Insulin resistance was assessed using the HOMA-IR. Urinary C-peptide-to-creatinine ratio (UCPCR) was measured from a spot urine sample.

Results

Table 1: Correlation between UCPCR with different parameters (n = 90)

FBS	**0.289***	**0.006***
HOMA-IR	0.375*	<0.001*
HbA1c	0.294*	0.005*

r_s: Spearman coefficient
*: Statistically significant at $p \leq 0.05$.

Table 2: Relation between UCPCR and vascular complications (n = 90)

	No.	Urinary c peptide / Creatinine ratio		U	p
		Mean ± SD.	Median (Min. – Max.)		
PVD					
No	46	0.35 ± 0.26	0.25 (0.11–1.15)	920.50	0.460
Yes	44	0.28 ± 0.18	0.23 (0.03–0.92)		
DN					
No	73	0.33 ± 0.24	0.25 (0.03 –1.15)	541.00	0.412
Yes	17	0.26 ± 0.14	0.21 (0.13–0.64)		
DKD					
No	60	0.31 ± 0.22	0.24 (0.03–1.15)	864.50	0.761
Yes	30	0.33 ± 0.25	0.22 (0.09–0.95)		
Retinopathy					
No	63	0.32 ± 0.22	0.25 (0.03–1.15)	717.50	0.241
Yes	27	0.30 ± 0.24	0.21 (0.09–0.95)		

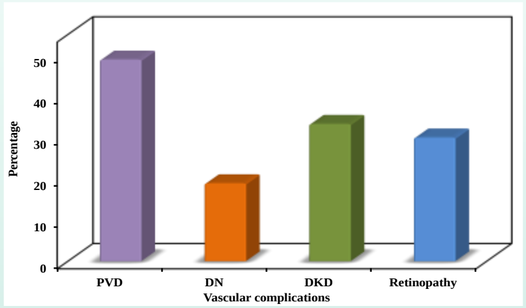

Figure1: Distribution of the studied cases according to vascular complications

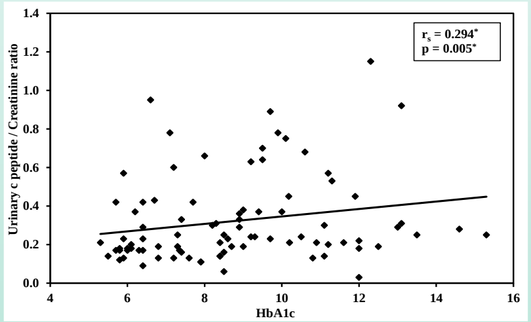

Figure2: Correlation between UCPCR with HbA1c (n = 90)

Conclusion

UCPCR is a promising marker which demonstrated to have a high sensitivity and specificity in assessing IR. It could be a surrogate marker for IR.