The fructose tolerance test and its relationship with inflammation, lipid metabolism, blood pressure and organ damage in patients with chronic kidney disease and metabolic syndrome in comparison to healthy controls.

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INTRODUCTION

Excesive consumption of added sugars such as high-fructose corn syrup (HFCS) in diet increases the risk for cardiovascular diseases, the metabolic syndrome, type 2 diabetes, dyslipidemia, fatty liver and chronic kidney disease (CKD). Fructose overload contributes to uric acid (UA) generation and commencement of an oxidative stress, inflammation and organ damage. The rise in the UA concentration has been proposed to be one of the mechanism by which fructose may increase the risk for hypertension and CKD progression. The aim of the study was assessment of lipid disorders, inflammatory state markers, changes in blood pressure, organ damage indices and UA changes during fructose tolerance test (FTT) in chronic kidney disease (CKD) patients stage 3, metabolic syndrome patients (according to ATP III criteria) in compare to control group.

PATIENTS AND METHODS

We evaluated 36 patients - BMI>30 and metabolic syndrome,14 patients-CKD stage 3. Control group consisted of 25 healthy volunteers. FTT - oral intake of fructose in dose 1g/kg/body weight and blood assessment of UA at 0, 30, 60, 120 minute of test was performed in each patient. Morning blood samples were collected for: creatinine, uric acid, sodium, glucose, insulin, triglycerides, HDL and LDL cholesterol, calcium, phosphorus, hsCRP , MCP-1, EPO, TNF-α, TGF-β, iNOS, eNOS. 24-hr urine collection for: sodium, calcium, phosphorus, creatinine, uric acid, NAG, albumin was performed. The day before urine collection and blood sampling an ABPM, an anthropometric measurements of BMI, and waist circumference, and ultrasound examinarion of IMT (intima media thickness), renal doppler ultrasound (RI, PI, AccT) were done.

RESULTS

There were no statistically signifficant differencies in ΔUA values in 0,30,60,120 minute of FTT in analyzed groups. The absolute increase in UA was highest in CKD, obesity group in compare to control. There were no statistically significant relationship between ΔUA at 60minute of FTT and blood pressure, CRP, glucose, total cholesterol, albuminuria, BMI, waist circumference, iNOS, eNOS, MCP-1, TGF-β, TNF-α in investigated groups. There were statistically significant positive relationship between ΔUA at 60minute of FTT and RI (r-0,34; p-0,052) PI(r-0,34;p-0,051) in patients with BMI>30 and metabolic syndrome (Tab. 1).

Tab.1.Linear correlation for ΔUA 60- UA0 with selected parameters.

	CKD		BMI>30		CONTROL	
	ΔUA 60-ΔUA0	p	ΔUA60-ΔUA0	p	ΔUA60-ΔUA0	p
BMI [kg/m]	-0,39	0,172	-0,36	0,032	0,21	0,326
Weight [kg]	-0,48	0,086	0,31	0,067	-0,32	0,125
TG[mg/dl]	-0,45	0,103	-0,35	0,033	-0,26	0,208
eGFR[ml/min]	0,12	0,676	-0,01	0,969	-0,21	0,308
IMT[mm]	0,04	0,902	-0,17	0,341	-0,05	0,811
RI	-0,07	0,835	0,34	0,052	0,07	0,747
PI	-0,03	0,927	0,34	0,051	-0,07	0,747

IMT- intima media thickness, RI –resistance index, PI –pulsatility index, TG -triglicerydes

CONCLUSIONS:

An increase in UA related with fructose load may influence increase in intrarenal resistance independently of eGFR changes

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