ASSOCIATIONS OF FGF-23 AND KLOTHO SERUM LEVELS WITH CARDIOVASCULAR RISK IN CHRONIC KIDNEY DISEASE PATIENTS

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OBJECTIVES: **was to identify the role of serum FGF-23 and Klotho as cardiovascular risk markers in CKD stage 1- 5D.**

METHODS: **The main group consisted of 130 CKD patients (67m / 63f, 20-65 yrs, average age 41 ± 6,7 years) Control group: 30 healthy volunteers matched by age and sex. All patients were observed in dynamic within 1 year. ELISA was used for serum FGF-23 and Klotho.**

***RESULTS*: Dynamic of serum Klotho and FGF-23, when compared to serum phosphate and PTH, resulted in its changed already from stage 3A of CKD whereas PTH and phosphorus - only from stage 4-5 (Fig.1).**

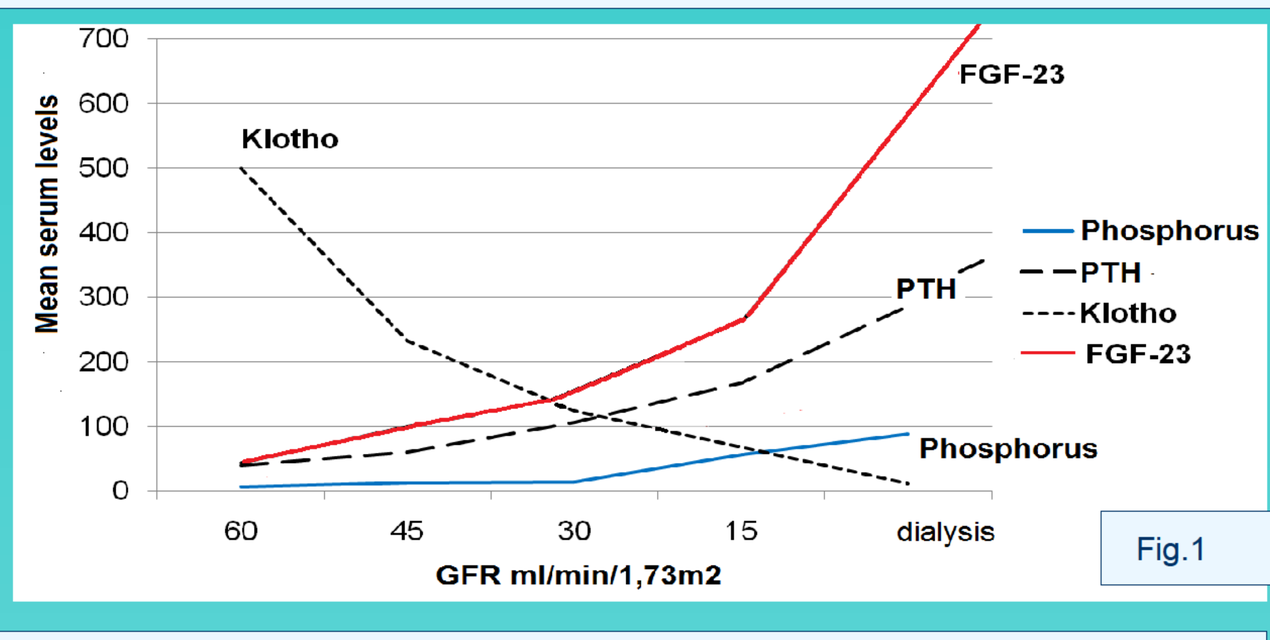


Fig.1

We found also a negative relation between serum Klotho levels and pulse wave velocity (PVW) [r=- 0,647;p<0,01].

Between increased level of FGF-23 and PWV a positive correlation was found (Fig.2).

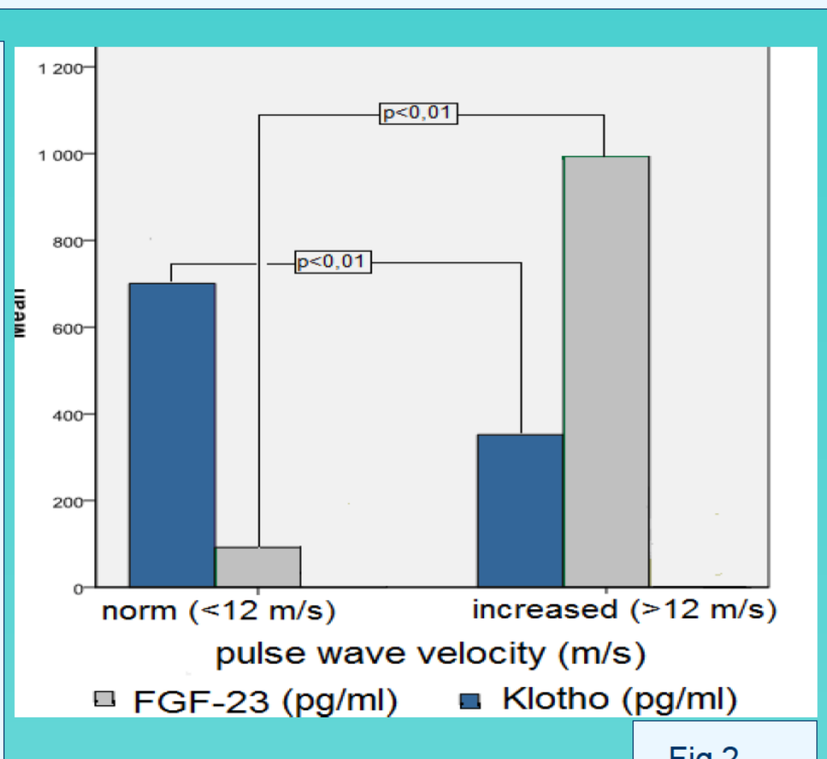


Fig.2

A significant negative relation between serum Klotho levels and the degree of heart calcification [r=- 0,612;p<0,01] assessed by semiquantitative scale was obtained. Between FGF-23 serum levels and the degree of calcification positive correlation was found [r=0,498; p<0,05] (Fig.3).

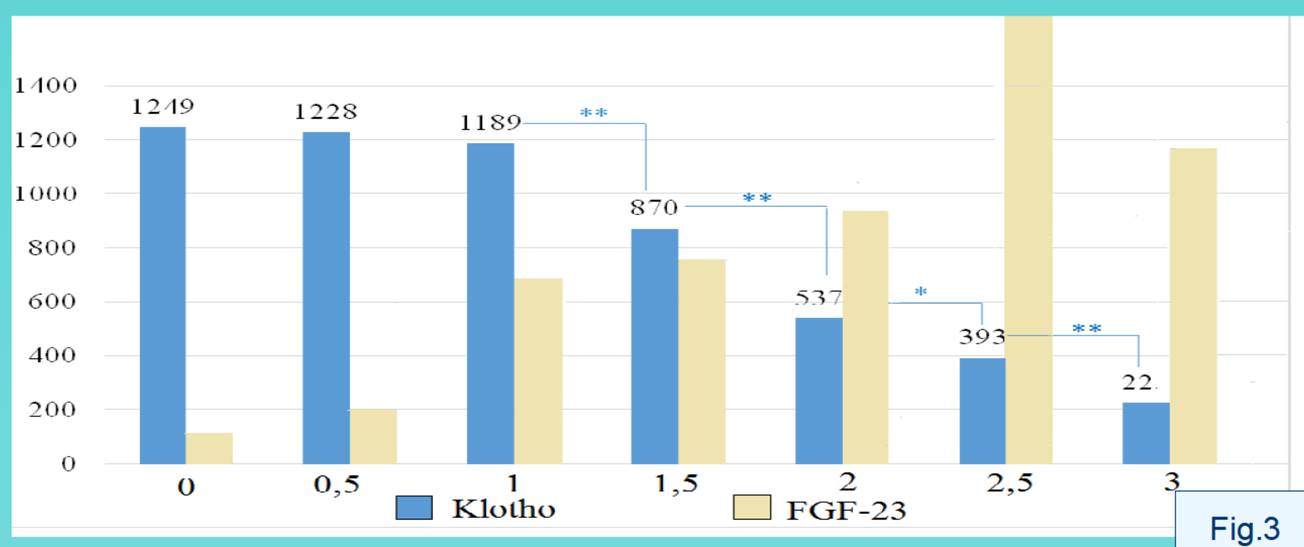


Fig.3

Among the studied factors FGF-23 serum levels were strongly correlated with the myocardial remodeling (Fig.4).

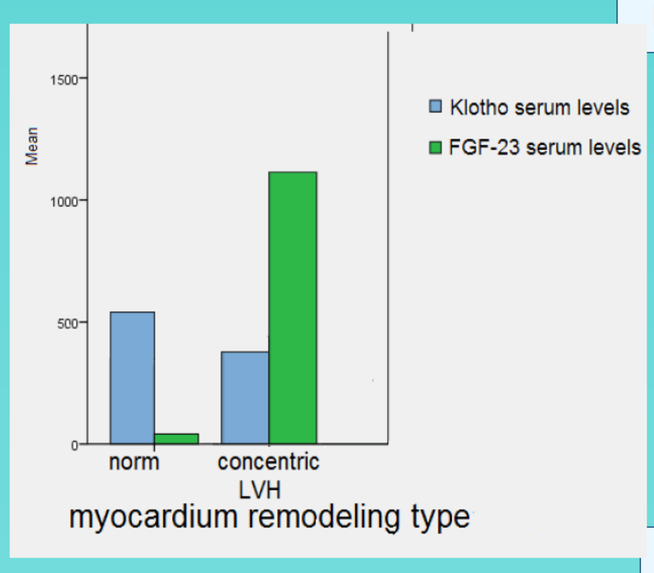


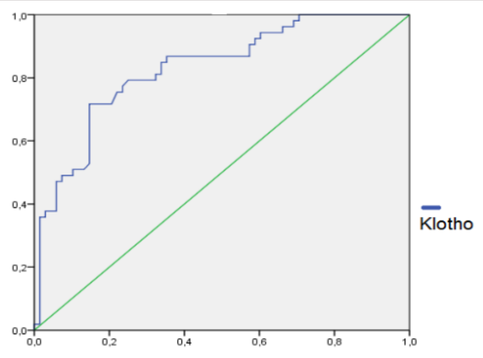
Fig.4

According to the multiple regression analysis, left ventricular mass index was higher in patients with higher serum FGF-23, phosphate, central systolic blood pressure (BP) and pulse wave velocity (PWV). According to the ROC-analysis, the value of serum FGF-23 above 412 pg / ml, testified Left Ventricular Hypertrophy with 80% sensitivity and 76% specificity (Fig.5).

According to the ROC–analysis, the values of serum Klotho below 487 pg/ml testified the PWV increasing with 80% sensitivity and 75% specificity (Fig.6)

Klotho- marker of cardiovascular protection in CKD patients

ROC-analysis



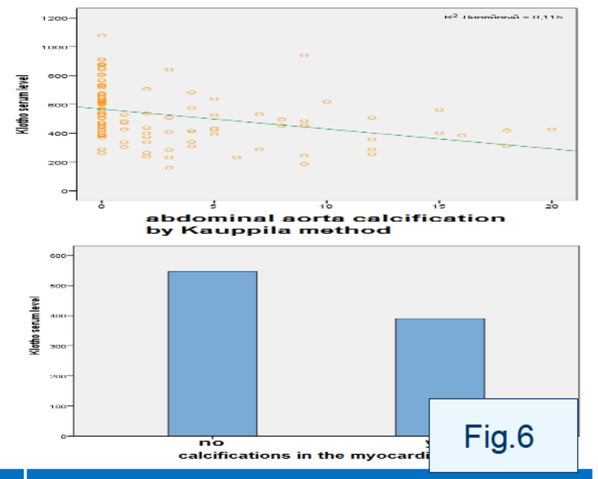


Fig.6

	AUC-area under the curve	The sensitivity / specificity
Klotho	0,83	<487 pg/ml – 80 %/ 75%

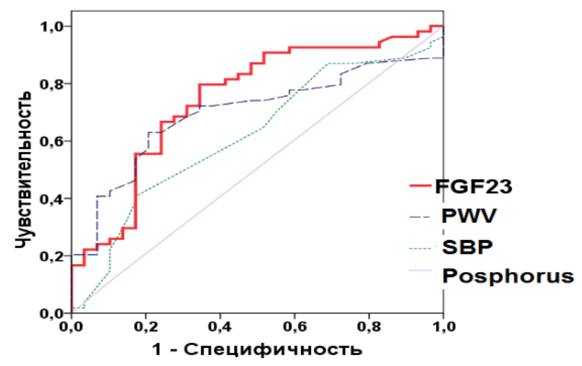
FGF-23 - marker of cardiac damage in CKD

Multiple regression analysis

LVMMI =18,4 x FGF-23 + 12,4 x P + 0,35 x SBP+ 64,3 x PWV – 7,52

(R^2= 0,36; F=36,9;p< 0,001)

ROC-analysis



	AUC-area under the curve	The sensitivity / specificity
FGF-23	0,76	>412pg/ml – 80 %/ 76%

Fig.5

CONCLUSION: **Besides the important role of FGF-23, Klotho in mineral metabolism in CKD their pleiotropic effects associated with cardiovascular complications are becoming more apparent. Based on the obtained results, serum FGF-23 and Klotho should be considered as early markers of cardiovascular risk in patients with CKD.**

REFERENCE: **. Kidney Disease: Improving Global Outcomes (KDIGO) CKD-MBD Work Group. KDIGO clinical practice guideline for the diagnosis, evolution, prevention, and treatment of chronic kidney disease-mineral and bone disorder (CKD-MBD). *Kidney Int.* 2009; 76 (Suppl.113): 1-130.**

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