TITLE

New biomarkers in kidney donors, in patients with chronic kidney disease, and in a healthy control population

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OBJECTIVES

Background: 27% of kidney transplantations in Norway are from living donors(1). Concern is raised about increased mortality and increased risk for developing ESRD in kidney donors (2).

Aim: To evaluate the serum levels of the new biomarkers neutrophil gelatinase-associated lipocalcin (NGAL), soluble Klotho (sKlotho) and fibroblast growth factor 23 (FGF23) in kidney donors with normal kidney function, in healthy controls and in patients with CKD stages 3-5.

METHODS

Cross-sectional, observational single-center study including 40 kidney donors with an estimated glomerular filtration rate (eGFR) ≥ 60ml/min/1.73m2, 22 CKD stage 3 patients (eGFR 30-59 ml/min/1.73m2), 18 patients with CKD stage 4 (eGFR 15-29 ml/min/1.73m2), 20 patients with CKD stage 5 (eGFR < 15 ml/min/1.73m2) and 35 healthy controls, Table 1.

Serum NGAL, sKlotho and FGF23 were measured by commercially available ELISA kits from Bio-Porto Diagnostics, Gentofte, DK, Immuno-Biological laboratories (IBL), Fujioka, Japan and Kainos Laboratories Inc., Tokyo, Japan respectively.

Group:	Control	Donor	CKD stage 3	CKD stage 4	CKD stage 5	P-value
	n=35	n=40	n=22	n=18	n=20	
NGAL (ng/ml)	97.6±18.3	110.6±31.7	209.2±67.5	459.5±111.3	1012.6±374.1	.000
FGF23 (pg/ml)	51.8 (25.9-90)	62.1 (6.6-112)	97.5 (44-308)	337.0 (139-11000)	806.0 (121-16100)	.000
sKlotho (pg/ml)	736.7± 170	660.8±191	628.7±153	478.4±123	415.1±149.3	.000
25 (OH) VitD (nM)	58.67±25.2	77.73±17.5	44.01±19.4	53.55±22.5	59.65±29.5	.000
eGFR (ml/min)	99.0±13.1	73.6±13.1	43.7±9.8	19.1±5.8	7.3±2.6	.000
Creatinine (umol/L)	73.1±12.6	91.8±16.5	141.0±28.1	280.1±84.2	621.2±203.6	.000

RESULTS

NGAL was higher in donors compared to healthy controls (110.6 ng/ml ± 31.7 vs 97.6 ng/ml ± 18.3 p<0,05), and increased significantly with declining kidney function, Table 1.

FGF23 levels were non-significantly higher in donors compared to controls, and increased significantly with declining kidney function.

sKlotho levels were significantly lower in CKD stages 4 and 5 compared to controls but no difference was revealed between controls and kidney donors.

There was no significant difference in levels of calcium, phosphate, PTH or FePO4 between donors and controls.

CONCLUSIONS

Kidney donors have significantly higher levels of NGAL than healthy controls. This may reflect a partial renal loss-of-function in kidney donors compared with a healthy control group. Renal hyperfiltration as a consequence of the nefrectomy, may induce cellular stress.

NGAL could be a valuable marker for predicting donors at risk of developing CKD and premature mortality.

References

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