

THE EFFECT OF ACUTE GFR DECLINE ON SCLEROSTIN, KLOTHO, FGF-23 AND BONE METABOLISM

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OBJECTIVES

Mineral metabolism disturbances occur early in the course of renal failure. A role of new players such as: sclerostin (SCL), klotho (sKL) and fibroblast growth factor-23 (FGF-23) in development and progression of CKD-MBD are extensively studied. Data on the behavior of above molecules during the acute GFR decline are lacking. This may be important in acquiring knowledge about effects of nephrectomy on the development of mineral and bone metabolism disturbances in patients undergoing such procedures due to urological indications or kidney donation. The aim was to evaluate the impact of acute GFR decline on serum levels of the above bone metabolism markers.

METHODS

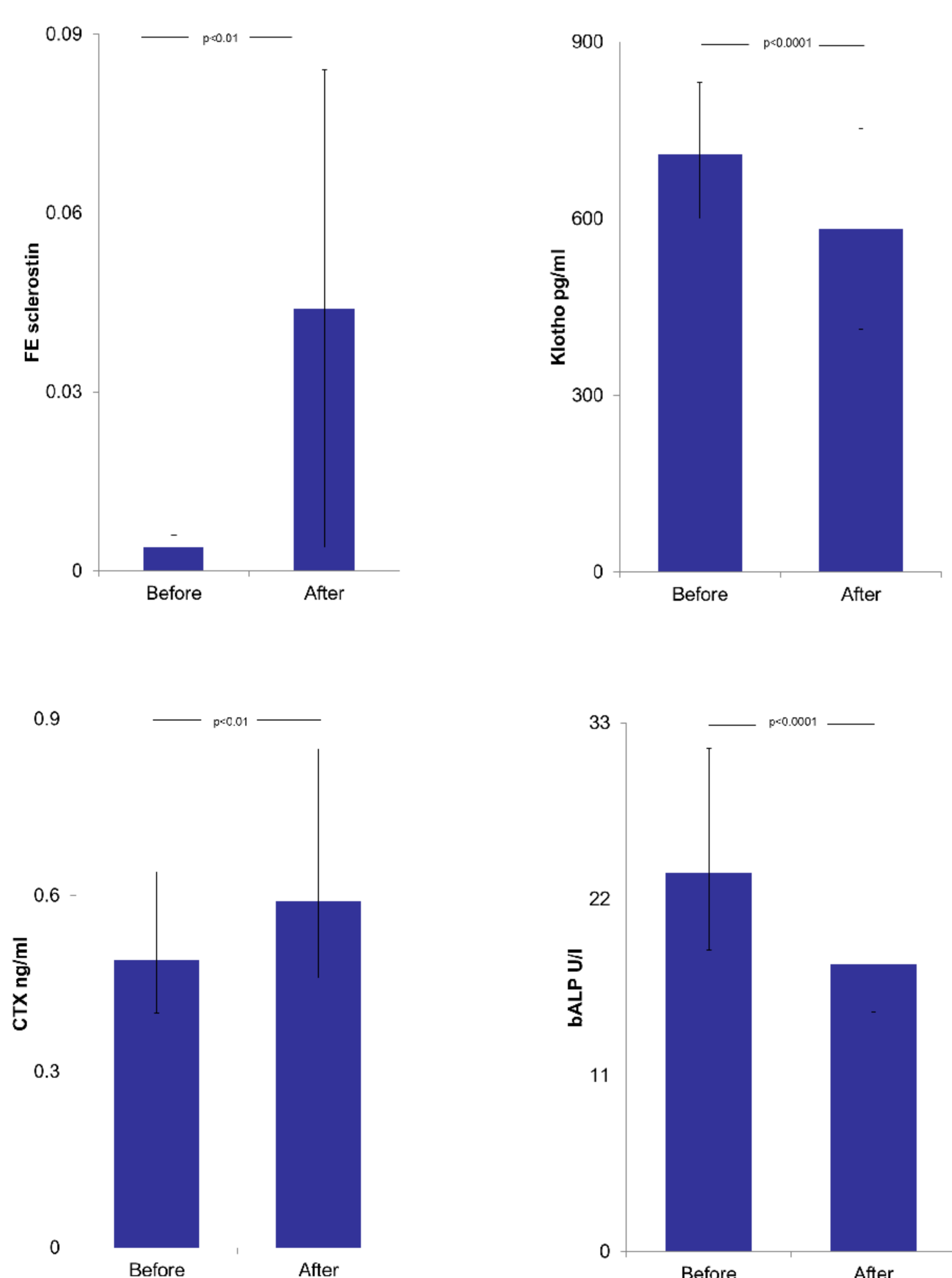
Prospective, single-centre observational study in patients undergoing nephrectomy due to urological indications.

Baseline characteristics of the patients (n=29)

Variable	Value
age, y	63.0±11.6
sex (male/female)	15/14
nephrectomy (partial/radical)	8/21
eGFR (CKD-EPI), ml/min/1.73 m ²	87.3±19.2

RESULTS

Twenty-nine patients were studied. After surgery, eGFR significantly declined. Simultaneously bone resorption increased (β -crosslaps, CTX) and bone formation decreased (bone specific alkaline phosphatase, bALP). After nephrectomy, renal excretion of SCL increased, while its serum level remained intact. Nephrectomy significantly decreased sKL level and did not change c-FGF-23 concentration. The magnitude of bone loss (Δ CTX) was negatively associated with changes in sKL concentration and positively with Δ SCL.



Variable	Before nephrectomy	After nephrectomy	p value
blood			
eGFR(CKD-EPI),ml/min/1.73 m ²	87.3±19.2	69.8±24.7	p<0.0001
serum calcium, mmol/l	2.31±0.11	2.17±0.15	p<0.0001
serum phosphate, mmol/l	1.14±0.2	0.97±0.24	p<0.01
iPTH, pg/ml	29.7 (19.7-34.8)	27.7 (19.5-35.2)	p=0.6
soluble Klotho, pg/ml	709.8 (599.9-831.2)	583.0 (411.7-752.6)	p<0.0001
c-FGF-23, RU/ml	70.5 (49.8-103.3)	77.1 (60.5-109.1)	p=0.9
sclerostin, ng/ml	0.69 (0.53-0.83)	0.65 (0.51-0.86)	p=0.4
CTX, ng/ml	0.49 (0.4-0.64)	0.59 (0.46-0.85)	p<0.01
bALP, U/l	23.6 (18.8-31.4)	17.9 (15.0-22.0)	p<0.0001
urine			
FEsclerostin	0.004±0.002	0.044±0.04	p<0.01
FE _{Ca}	0.01 (0.0-0.01)	0.01 (0.01-0.01)	p<0.05
FE _{PO4}	0.12 (0.09-0.16)	0.15 (0.13-0.23)	p=0.8
TmPO ₄ /eGFR, mmol/l	1.07 (0.84-1.35)	0.8 (0.64-0.93)	p<0.01

