FGF-23 BLOOD LEVELS PREDICT PERITONEAL DAILY PHOSPHATE REMOVAL IN PATIENTS ON PERITONEAL DIALYSIS

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INTRODUCTION AND AIMS

Fibroblast growth factor (FGF)-23 rises early in patients with chronic kidney disease (CKD) in response to oral phosphate (Pi) load and attenuates hyperphosphatemia by reducing tubular Pi reabsorption.

Peritoneal Pi transport may contribute to improve Pi handling in patients on peritoneal dialysis (PD).

Given that the vascular tissues are endowed with FGF receptors, we hypothesized that FGF-23 may be involved in peritoneal membrane Pi transport.

METHODS

Sixty-seven adult patients (male 37, mean age 47 years, mean time on PD 8.8 months, range 1 to 72 months, 95.5% on continuous ambulatory PD [CAPD], 4.5% on automatic PD [APD]) were evaluated in a cross-sectional study (ST1). A subgroup of 23 patients (100% on CAPD), mean time on PD 11.5 months, was also reassessed 12 months after the first evaluation (ST2). Peritoneal daily Pi removal (PDPiR) was calculated from 24-hour peritoneal effluent. Intact FGF-23 blood levels were assessed by ELISA (Immutopics, Inc., San Clemente, CA).

RESULTS

In ST1, FGF-23 serum levels positively correlated with serum Pi (r=0.517, p<0.001), serum creatinine (r=0.416, p<0.001), PDPiR (r=0.451, p<0.001) and negatively correlated with age (r=-0.337, p<0.007), residual renal function, RRF (r=-0.294, p<0.02) and C-reactive protein (r=-0.264, p<0.04). *(Table 1)*

In a multiple linear regression analysis, the FGF-23 levels are a direct predictor of PDPiR (β=0.336, p=0.018) independent of serum Pi levels, RRF and iPTH. *(Table 2)*

In ST2, a significant decrease in RRF was observed during the 12 months follow-up period (p<0.001) without changes in either FGF-23 or Pi plasma levels.

FGF-23 serum levels were positively correlated with PDPiR on both the 1st (r=0.44, p=0.02) and the 2nd (r=0.779, p<0.001) evaluation periods.

	R	p
Serum Pi	0.517	<0.001
Serum Creatinine	0.416	<0.001
PDPiR	0.451	<0.001
Age	-0.337	<0.007
Residual Renal Function	-0.294	<0.02
C-reactive protein	-0.264	<0.04

Table 1. Linear correlation analysis between FGF-23 and other parameters. For each correlation Spearman coeficient and respective p value are showed.

Variables	B	P	95,0% Confidence Interval for B	
			Lower Bound	Upper Bound
Intact FGF23 serum levels	0,336	0,018	0,059	0,613
Serum Phosphate	0,087	0,004	0,029	0,0145
PTH	-0,0002	0,141	-0,0005	0,00006
Residual renal function	-0,044	0,005	-0,074	-0,014

Table 2. Multivariate linear regression analysis - Predictors of Peritoneal daily phosphate removal.

RESULTS

FGF-23 blood levels are closely associated with peritoneal daily phosphate removal in patients on PD. This effect occur independent of serum Pi, iPTH and RRF. In line with the known effect of FGF-23 in renal tubules Pi transport, our findings suggest that FGF-23 may be involved in the regulation of Pi transport in the peritoneal membrane.

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M) Dialysis. M2) Peritoneal dialysis.
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DOI: 10.3252/pso.eu.51era.2014
Poster presented at:
PosterSessionOnline.com