FIBROBLAST GROWTH FACTOR 23 AND INTACT PARATHORMONE IN POST TRANSPLANT PERIOD ON LONGITUDINAL FOLLOW UP

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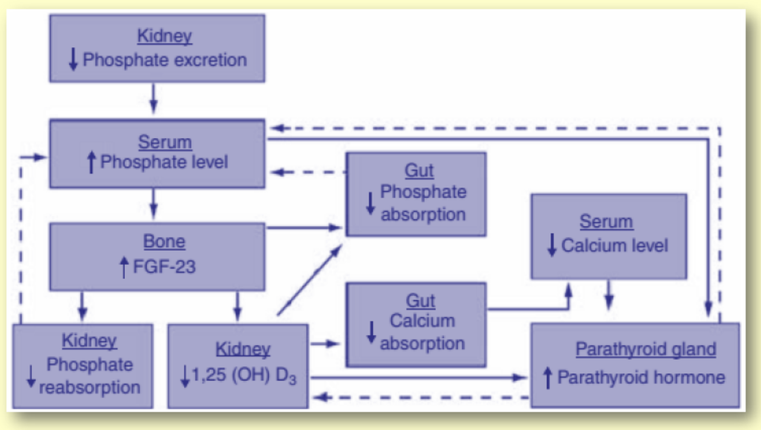
Introduction:

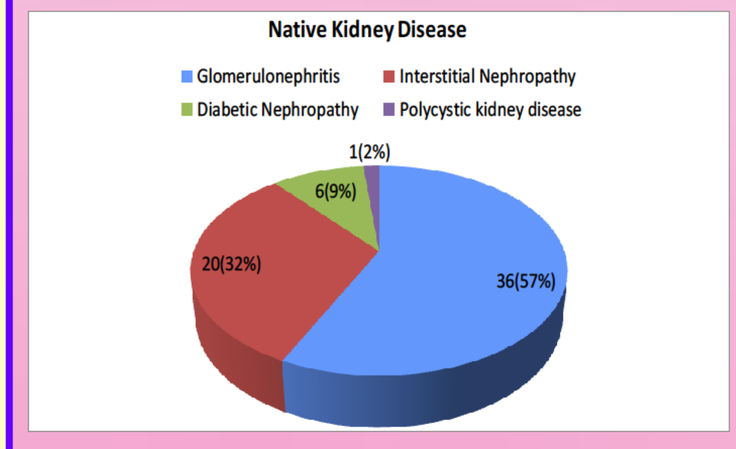
- Fibroblast growth factor 23 (FGF23) and iPTH (intact parathyroid hormone) are involved in phosphate- calcium metabolism and progression of chronic kidney disease.
- Mineral bone metabolic disorder may persist in post renal transplantation period.
- Earlier studies suggested that elevated iPTH levels were considered to be the cause of post-transplant hypophosphatemia. *Rosenbaum RW et al. Kidney International 1981 19 568–578*
- However FGF23 might be contributing factor to early post-transplant hypophosphatemia . *Bhan I et al. Kidney Int 2006 70: 1486 –1494*



- Increased levels of FGF23 causes inappropriate phosphate wasting and low calcitriol levels , contributing to an increase in PTH secretion following renal transplantation, despite normal allograft function. *Gutierrez O et al JASN . 16 7 2205–2215*
- However, there is paucity of data on serial changes in these parameters in post renal transplant period.

Aim:

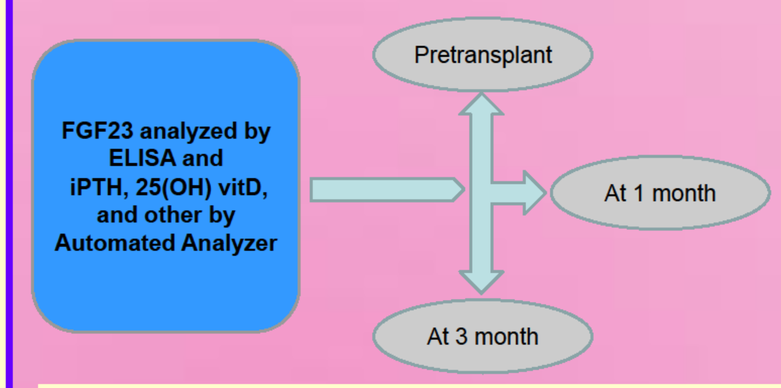
This prospective study was aimed to analyze FGF 23 pre and post transplant along with other variables involved in calcium- phosphate metabolism.



Material and Methods:

Table 1.Patients demographics and concomitant treatment

Characteristics	
Male/Female	58 /5
Mean Age (years)	35.65±11.79 (9-61)
Height (cm)	162.05±11.27
Weight (kg)	55±9.63
Body mass index (kg/m^2)	20.85±2.46
Dialysis duration (months)	9.83±7.58
Smoker (%)	7.9
Alcoholic (%)	6.3
Blood related Transplant	41 (65%)
Immune suppression agents (%)	
steroids	100
calcineurin inhibitor	
Tacrolimus	60 (95.2%)
Cyclosporine A	3 (4.8%)
mycophenolate mofetil	100
induction therapy	
Basiliximab	47 (74.6%)
ATG	6 (9.5%)
Phosphate binder (%)	
calcium based	45 (71.4%)
non-calcium based	18 (28.6%)



Statistical analysis

Data- mean±standard deviation
Comparisons between groups – **Friedman test** (data in non-normal distribution), **Wilcoxan test** (two groups, non-normal distribution), **Independent sample T-test** (two groups, normal distribution)
Normality was assessed using the **Kolgomorov–Smirnov test**.
Correlations between different parameters **Pearson correlation**
Association between dependent and independent variables- **Linear regression analysis (backward stepwise)**
Analysis on SPSS software ver. 17.0 (SPSS, Chicago, IL)

Results:

Table 2.Biochemical parameters

variable	pre-Tx	after 1 month	after 3 months	Friedman Test (p)
iPTH (pg/ml)	350.44±235.16	112.3±84.38*	87.77±65.92*†	0.001
FGF23 (pg/ml)	1367.4±807.24	84.15±80.62*	46.92±33.58*	0.001
25(OH) Vit D (ng/ml)	27.29±12.35	23.54±9.56*	27.22±7.6†	0.002
eGFR (ml/min)	9.58±4.01	81.02±48.64*	84.86±64.9*	0.001
phosphate (mg/dl)	6.42±2.12	2.92±0.85*	3.19±0.71*††	0.001
creatinine (mg/dl)	7.49±1.93	1.19±0.25*	1.2±0.25*	0.001
hemoglobin (gm/dl)	9.54±1.79	11.14±1.61*	13.38±2.06*†	0.001
BUN (mg/dl)	53.54±22.51	23.26±9.14*	19.64±7.91*†	0.001
uric acid ()	6.76±1.99	4.33±1.32*	4.21±1.2*	0.001
calcium (mg/dl)	8.62±0.82	9.24±0.5*	9.45±0.51*††	0.001
albumin (g/dl)	4.06±0.5	4.24±1.03	4.23±0.88	0.188
alkaline phosphatase (U/l)	182.02±97.75	99.86±50.27*	83.22±48.34*††	0.001

* P<0.01, * * <0.05 versus pre Tx; † P<0.01, †† P<0.05 versus 1 month

Figure 1 I iPTH , FGF23 and 25(OH) Vit D level pre , 1 month and 3 month after Tx.

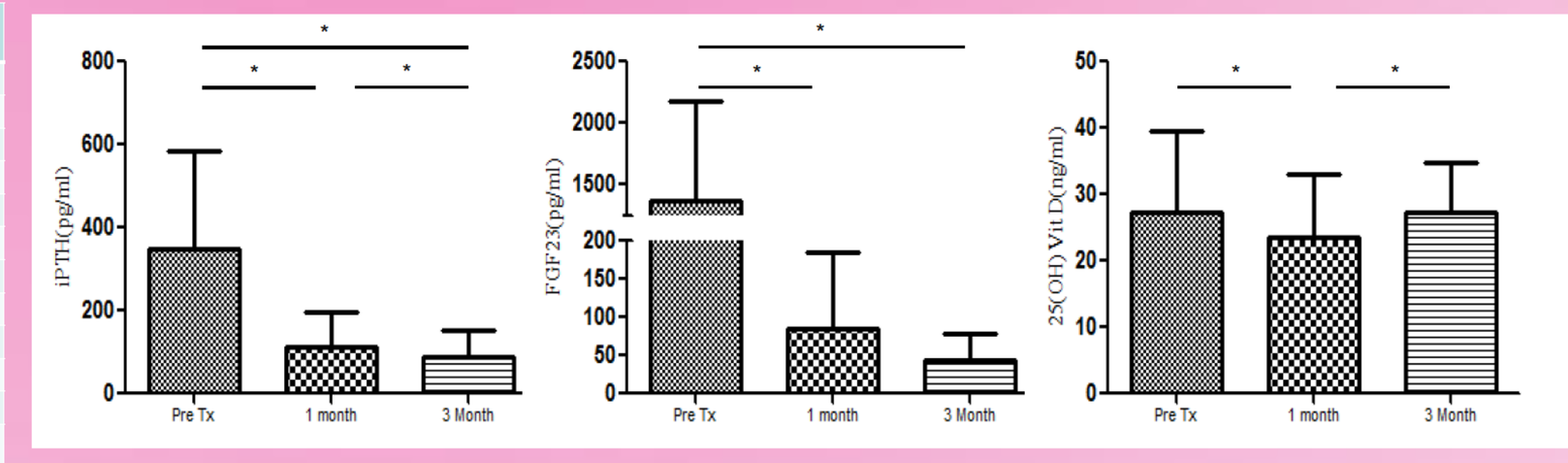


Table I Difference between Hypo and Normo-phosphatamic group at 1 and 3 month after Tx

PTH levels At 1 month	Elevated (>65 pg/ml) N=40 (63.5%)	Normal N=23 (36.5%)	P-value
FGF23(pg/ml)	104.43±85.02	44.09±25.50	<0.001
inorganic Phosphorous(mg/dl)	3.42±0.81	2.63±0.75	<0.001
At 3 month	N=27 (42.9%)	N=36 (57.1%)	
FGF23	52.15±48.24	42.99±15.23	NS
inorganic Phosphorous	2.81±0.57	3.48±0.68	<0.001

Figure I Pearson correlation between FGF23 and iPTH with different parameters before Tx.

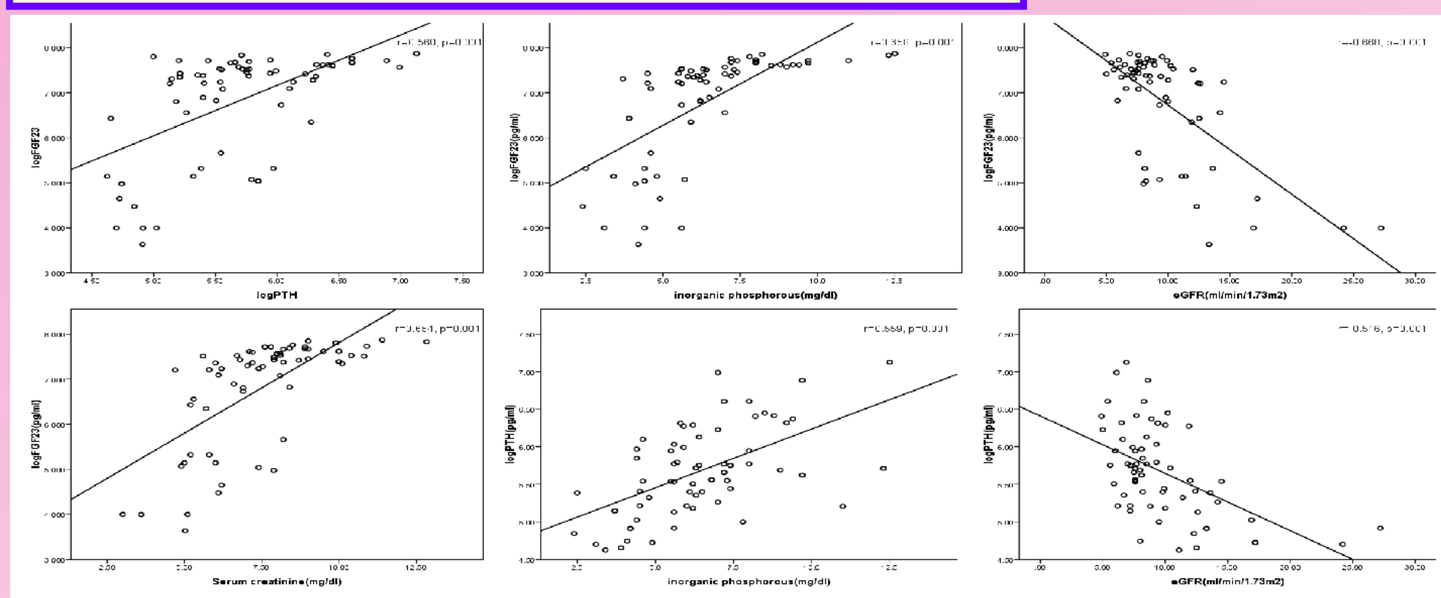


Table 4 I Factors associated with serum iP (linear regression model constructed by backward stepwise modeling procedure) in models that features FGF23, iPTH or eGFR and iP at pre and early period of Tx.

Variables	Dependent variable: inorganic phosphorous at 1 month Regression coefficient (95% CI)	P	r^2
With Pre Tx			
FGF23	-0.001 (-0.001 to 0.000)	0.012	
iPTH	-0.001 (-0.002 to 0.000)	0.053	
iP	0.124 (-0.029 to 0.277)	0.111	
Whole model		0.003	21%
With 1 month Tx			
FGF23	-0.005 (-0.008 to -0.002)	0.002	
iPTH	-0.002 (-0.004 to 0.001)	0.182	
eGFR	-0.009 (-0.018 to 0.000)	0.044	
Whole model		0.001	54%

Conclusions:

- ✓ In early post transplant period ,levels of FGF23 normalize more rapidly than that of iPTH.
- ✓ Patients with higher levels of serum iP in pre-transplant period were more likely to have hypophosphatemia after transplantation.
- ✓ The FGF23 is better predictor of serum iP levels compared to that of iPTH in early post transplantation period.

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