

# Ultrafiltration Volume and Fibroblast Growth Factor 23: a Possible Link Between Volume Homeostasis and Phosphate Metabolism in Hemodialysis Patients.

Jelmer K. Humalda, Solmaz Assa, Gerjan Navis, Casper F.M. Franssen, Martin H. de Borst, for NiGrAm.  
Department of Internal Medicine, Division of Nephrology, University Medical Center Groningen, Groningen, the Netherlands

## INTRODUCTION

- Fibroblast Growth Factor 23 (FGF23) is associated with increased risk of heart failure and mortality in CKD
- FGF23 correlates with volume markers in transplant recipients<sup>1</sup>
- A recent study linked FGF23 with sodium/volume homeostasis<sup>2</sup>
- In hemodialysis (HD), a large ultrafiltration volume is associated with an increased risk of heart failure and mortality<sup>3</sup>

## AIMS

1. Are circulating FGF23 levels and ultrafiltration volume related in a cohort of stable HD patients?

## METHODS

Post-hoc analysis on a prospective cohort study in 109 HD patients. Blood samples drawn at 0 hours of the first, standard four-hour HD session of the week. Measurements: plasma C-terminal FGF23 (ELISA). We used linear regression to assess the association between ultrafiltration volume and FGF23. (Ln)-transformation was applied when appropriate.

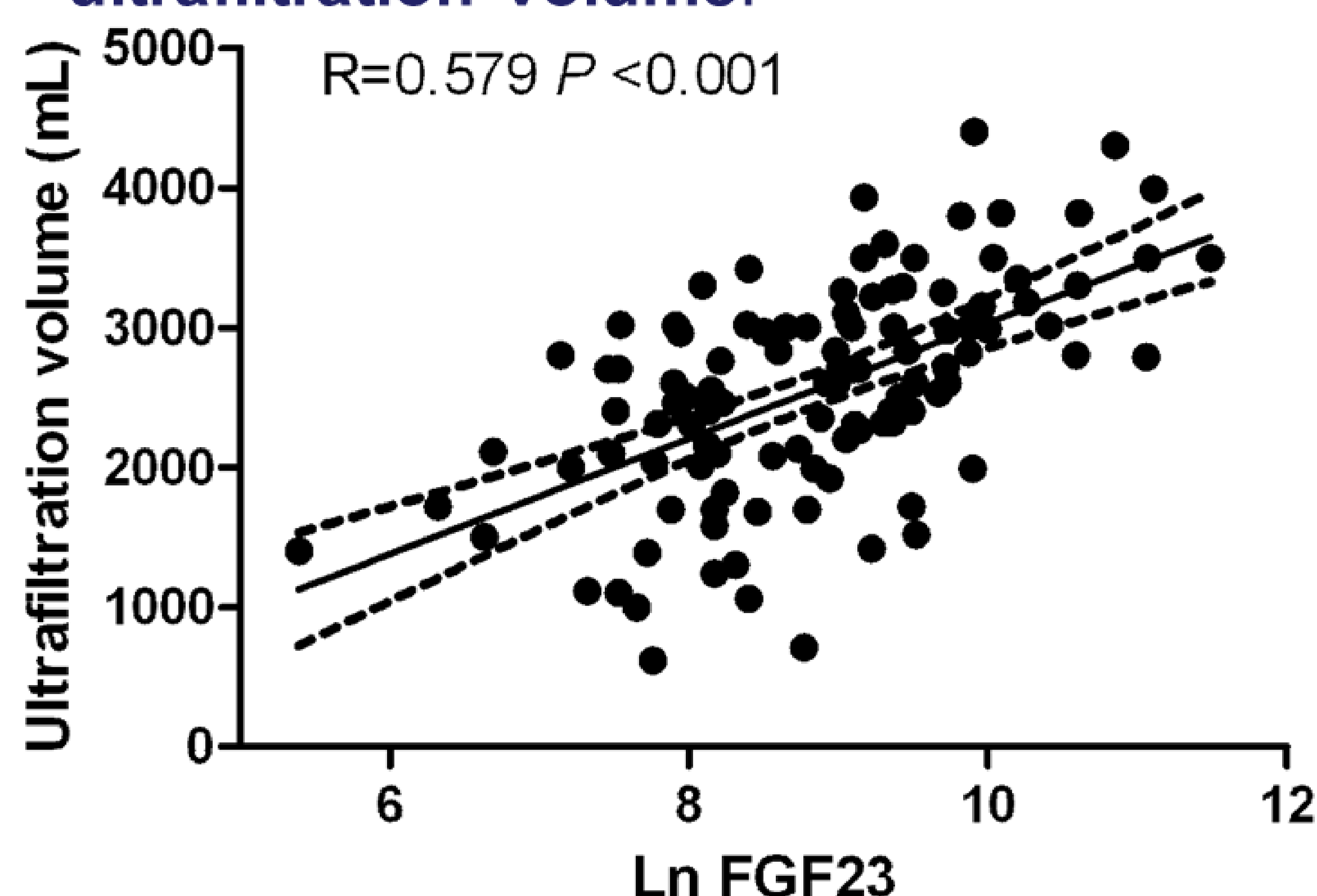
## RESULTS

Table 1. Baseline characteristics of the cohort

Parameter	Value
Patients (n)	109
Age (years)	66 [51-75]
Gender, male (%)	71 (65.1%)
Dialysis vintage, months	25.4 [8.5-52.5]
FGF23, RU/mL	7627 [3300-13514]
Phosphate, mmol/L	1.70 ± 0.54
Calcium, mmol/L	2.31 ± 0.16
Copeptin	142 [91-245]
Residual Renal Function ≥1 mL/min, %	35 (32.1%)
Residual Diuresis ≥ 200 mL/d, %	39 (35.8%)
Ultrafiltration Volume, (mL)	2553 ± 777

Data presented as mean ± SD, median [1st-3rd quartile] or number (percentage), where appropriate

Figure 1: FGF23 strongly correlates with ultrafiltration volume.



Figures 2 & 3. Relation of FGF23 and ultrafiltration volume appears to be independent from serum phosphate levels.

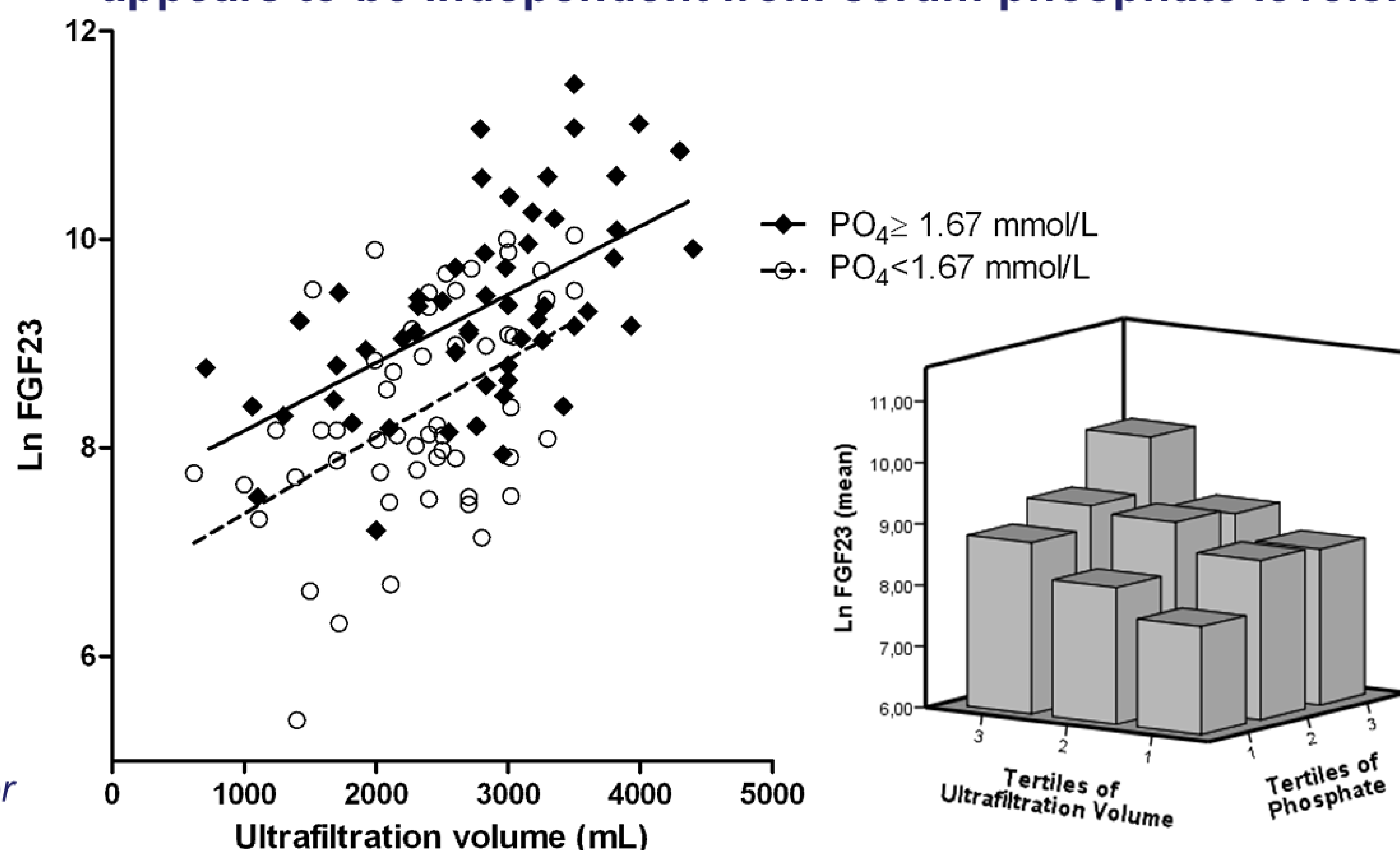


Table 2: Determinants of Ln FGF23 in multivariate regression analysis

Covariate	St. β	P-value	R <sup>2</sup>
Calcium	0.225	0.001	52%
Phosphate	0.439	<0.001	
Ultrafiltration Volume	0.391	<0.001	

Age, gender, dialysis vintage, Kt/V, systolic and diastolic blood pressure, residual renal function and diuresis did not contribute to the model.

## CONCLUSIONS

In a cohort of stable HD patients, FGF23 is associated with ultrafiltration volume independent of serum phosphate and calcium levels. Possibly, exaggerated sympathetic nerve activation stimulates FGF23 release from bone<sup>4</sup> in patients with more pronounced volume overload. The connection between deranged volume status and phosphate homeostasis requires further mechanistic studies.

## REFERENCES:

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- 3) Flythe JE. Clin J Am Soc Nephrol. 2013;8(7):1151-1161.
- 4) Kawai M. J Biol Chem. 2014;289(3):1457-1466.