

CAN CONTINUOUS HIGH-EFFICIENCY HEMODIAFILTRATION DECREASE FIBROBLAST GROWTH FACTOR 23 LEVELS IN DIALYSIS PATIENTS ?

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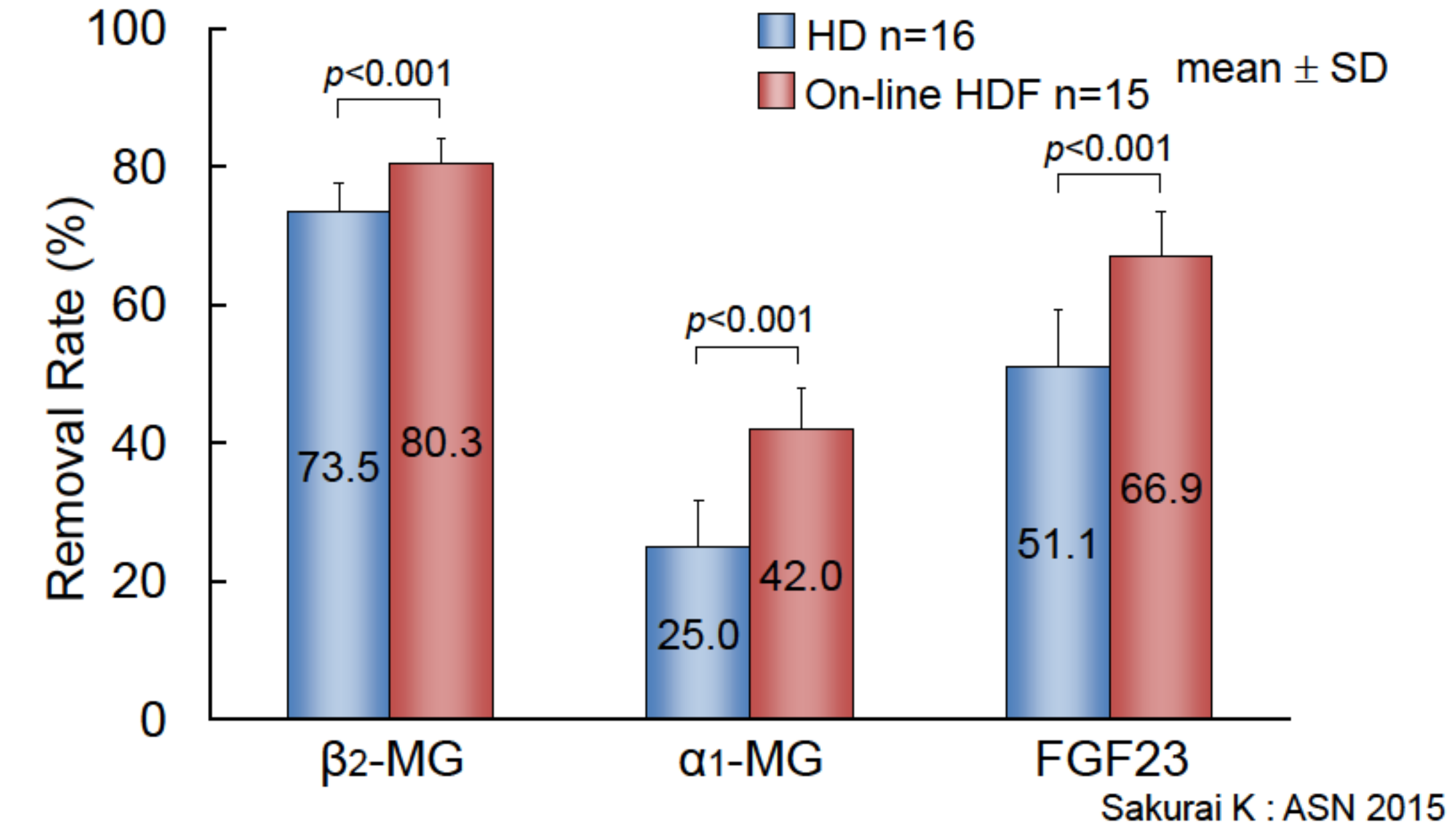
Introduction and Aims

A high serum level of fibroblast growth factor (FGF) 23 is reportedly associated with increased cardiovascular events in dialysis patients. Moreover, Faul found that FGF23 itself acts on the myocardium, causing the hypertrophy of myocardial cells¹⁾.

Therefore, the survival rate of dialysis patients could be improved by lowering the serum FGF23 levels. We previously reported that pre-dilution on-line hemodiafiltration (HDF) enables more efficient reduction of FGF23 than hemodialysis with super high-flux dialyzer (HD).

The present study was undertaken to analyze the changes over time of the serum FGF23 levels in patients undergoing high-efficiency HDF continuously for one year. And we also observed the changes in soluble α -Klotho levels.

Solute removal performance in HD and HDF



Methods

This study involved 13 stable patients who had received HDF for one year. At the time of performing HDF, we set conditions with the aim of achieving removal rates of 80% and 40% for β 2-microglobulin (β 2-MG) and α 1-microglobulin (α 1-MG), respectively. FGF23 and phosphorus levels were measured.

We also studied changes in soluble α -Klotho in 13 patients.

Measurement of FGF23 : FGF23 ELISA Kit Kainos (Full Length)

Measurement of Soluble α -Klotho : Human Soluble α -Klotho Assay Kit IBL

[Patients]

M/F : 10/3

Age : 58.8 \pm 8.7 yrs

Dialysis Vintage : 12.0 \pm 8.4 yrs

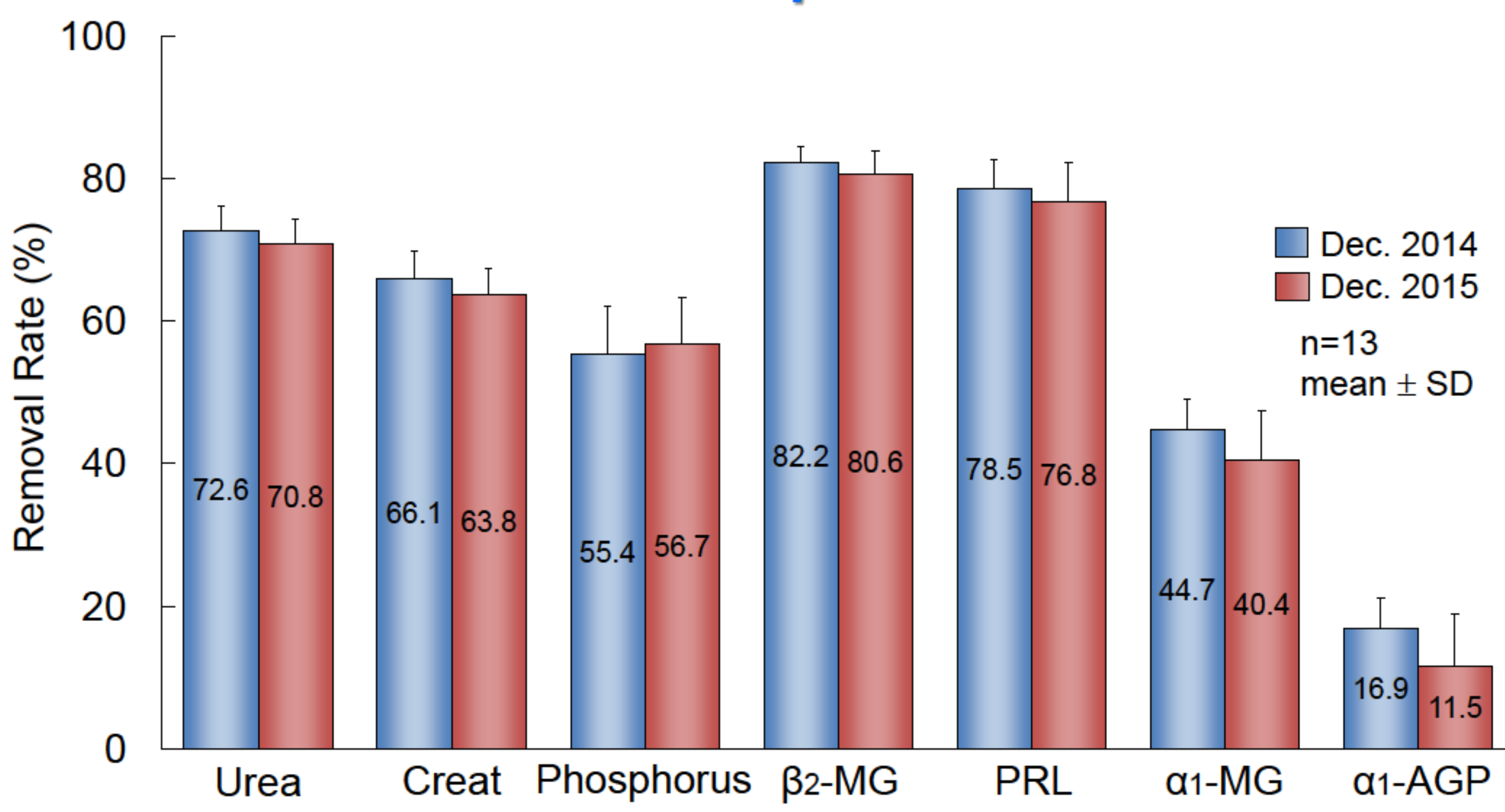
Cause of ESRD : CGN 4 DMN 3 PKD 1 Other 5

[Observation period]

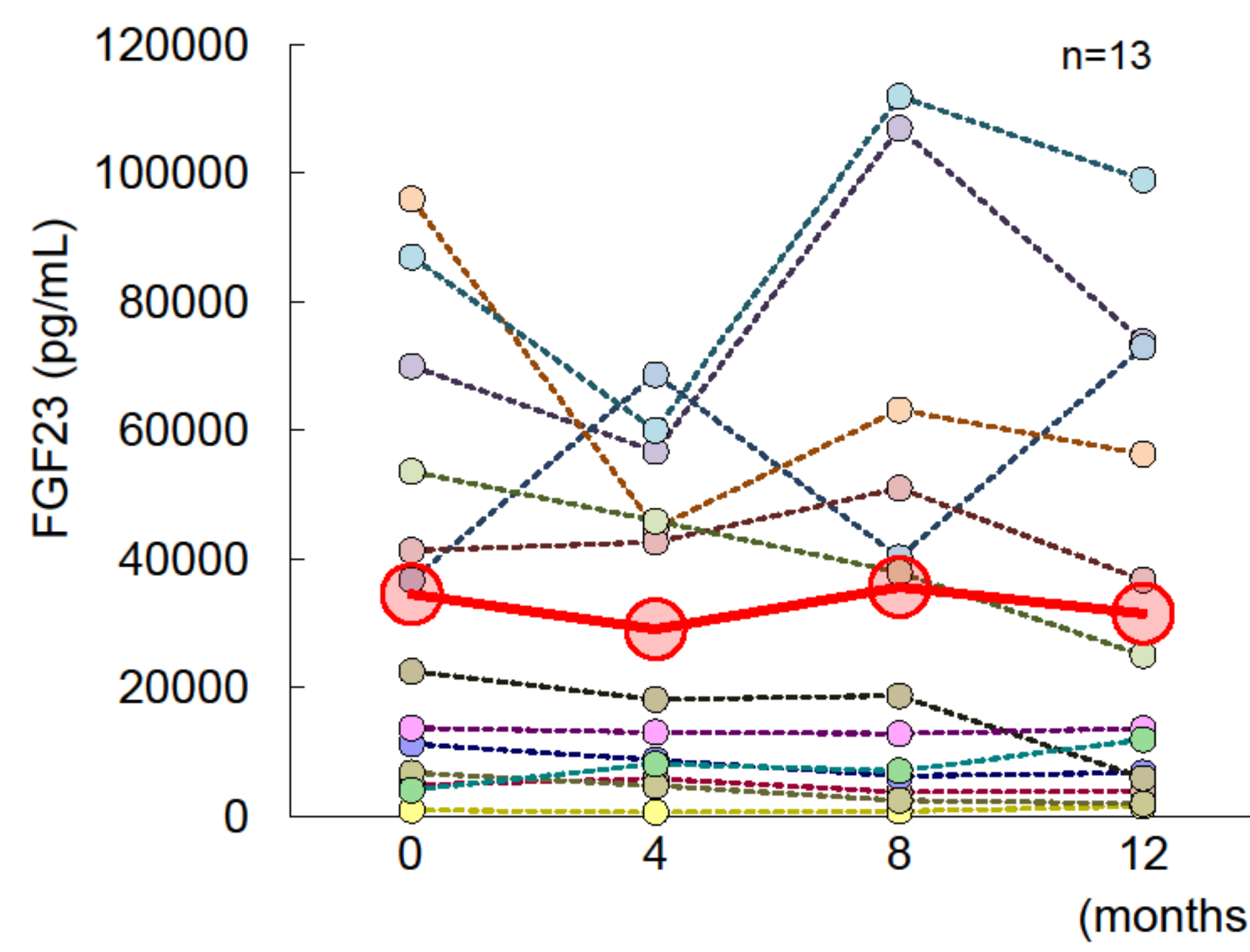
Dec. 2014 – Dec. 2015

Results

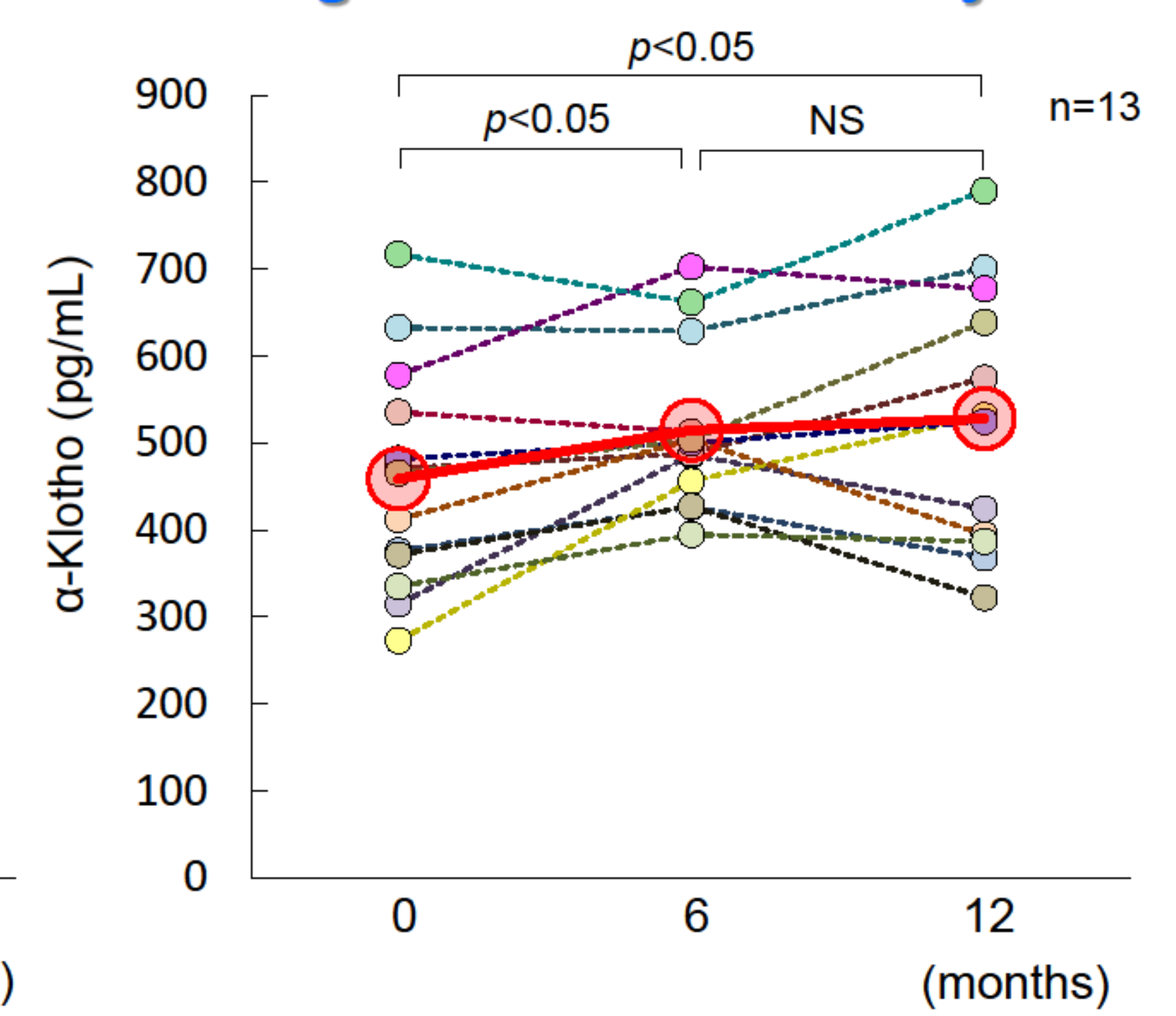
Solute removal performance



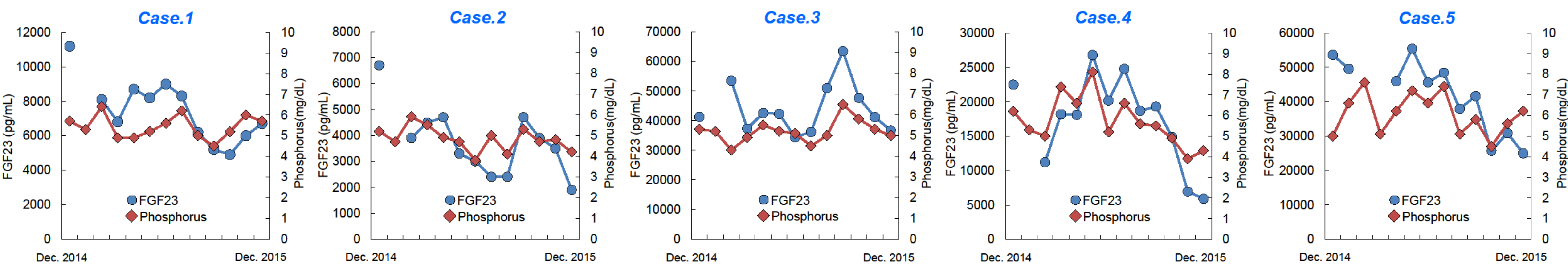
Change in FGF23 for 1 year



Change in alpha-Klotho for 1 year



Time-course of pre-dialysis levels of FGF23 and phosphorus in 5 patients



Discussion

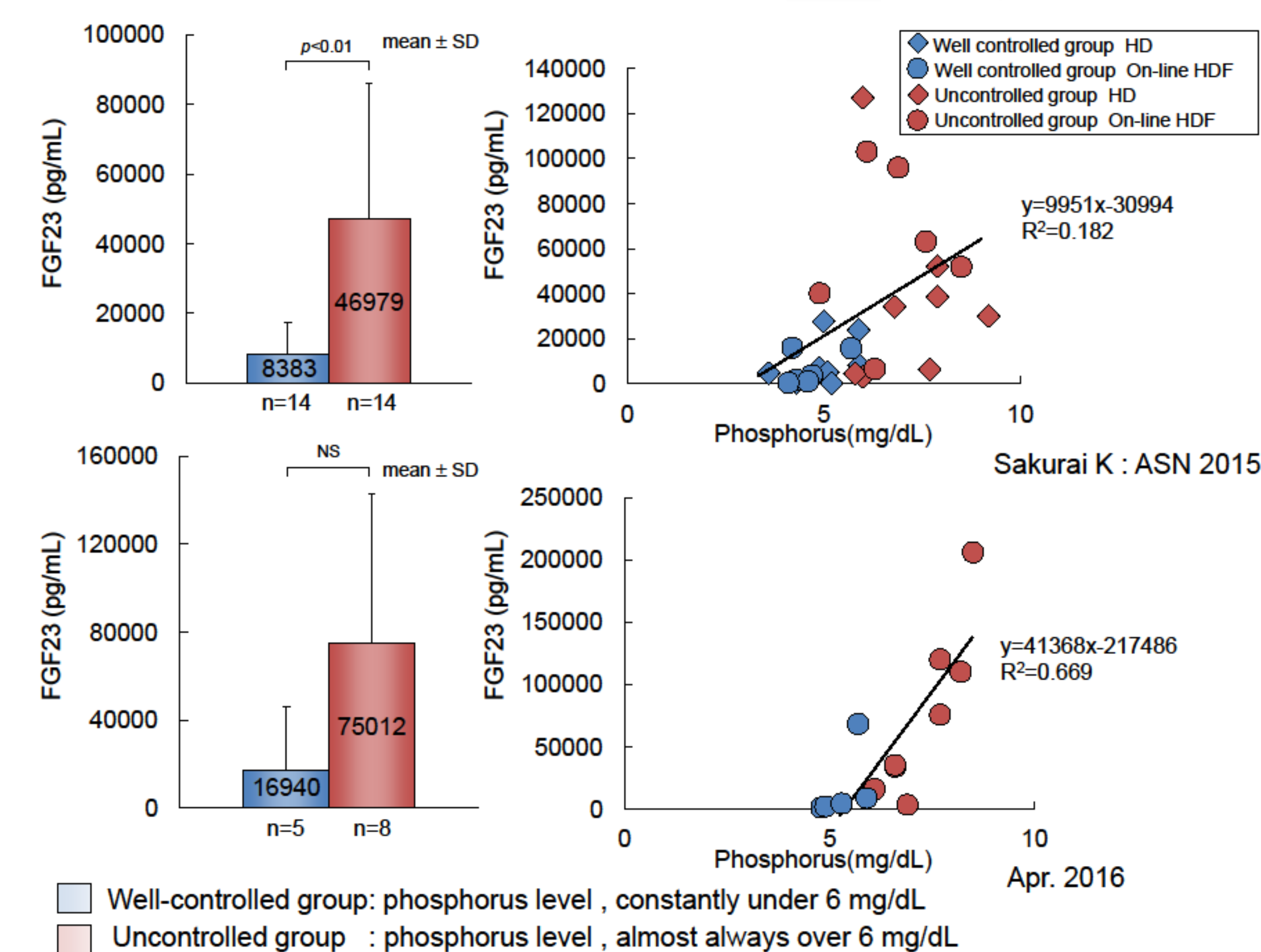
We previously reported that high-efficiency HDF allowed about 65% reduction rate of FGF23. We additionally reported that the removal rate was about 25% higher for FGF23 (MW: 32kDa) than for α 1-MG (MW: 33kDa) with both HD and HDF. On the basis of these previous findings, we estimated that the FGF23 distribution area was smaller than the α 1-MG distribution area, and that continuation of high-efficiency HDF can lower the serum FGF23 levels.

In the present study, however, there was no marked tendency towards decrease of the serum FGF23 levels following continuation of high-efficiency HDF for one year. This could be attributable to the multi-compartment distribution of FGF23.

In about a half of all the cases, the changes in the serum phosphorus levels were associated with changes in the serum FGF23 levels.

The increase of the serum soluble α -Klotho levels observed in this study may reflect the favorable influence of highly efficient removal of middle- and large-molecular-weight solutes acting as uremic toxins.

Association between FGF23 and phosphorus levels in two groups



Conclusions

FGF23 levels showed no clear decreasing trend after continuous high-efficiency HDF for one year. In over half of our patients, changes in phosphorus levels were associated with those in FGF23 levels. High-efficiency HDF may not be a determinant factor of FGF23 levels in dialysis patients.

Reference

1. Faul C, et al: FGF23 induces left ventricular hypertrophy. JCI.2011;121:4393-408