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Elevated FGF23-levels in Dialysis Patients treated with Aluminum based Phosphate binders

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Background

Elevated levels of FGF23 are surrogate parameters of cardiovascular mortality in patients with end stage renal disease (ESRD). Aim of this study was, to investigate factors influencing FGF23 in patients treated with long nocturnal HD (LNHD) or standard HD (SHD).

Methods

The prospective study design included 69 maintenance HD patients of the same dialysis center. 25 patients were treated with LNHD and 44 on SHD, matched for age, gender, dialysis vintage.

Patients were studied twice: At study entry (A) and after one year of follow-up (B). At both time points, blood was drawn during dialysis, centrifuged and serum frozen until analysis. FGF23 was measured using a second generation C-terminal ELISA (Immutopics). Demographic data and medication history were obtained from the medical records.

Results

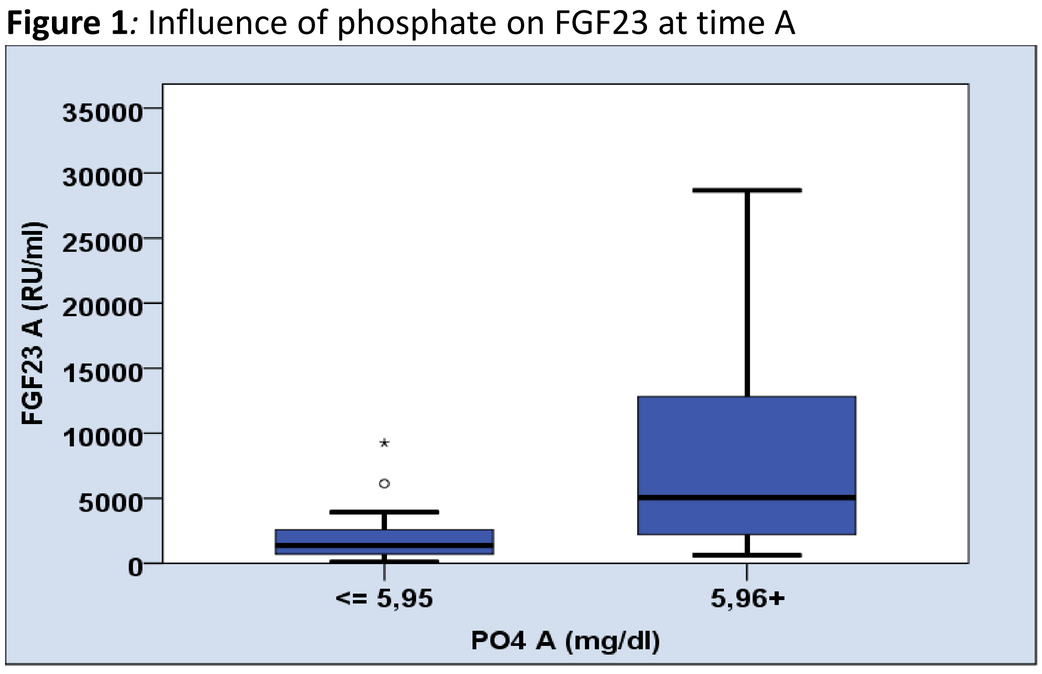
Using univariate analysis, age, gender and treatment with calcium analogs did not have a significant effect on FGF23. However, patients with serum phosphate concentrations (PO4) > 5,96 mg/dl exhibited higher FGF23 levels (5065,32 RU/ml vs. 1368,97 RU/ml.; p< 0.001). Patients treated with vitamin D analogs (VitD) were shown to have lower FGF23 levels (2161,26 RU/ml vs. 6958,62 RU/ml.; p=0.020). Interestingly seven patients taking aluminum salts had significantly higher FGF23 levels (8848,33 RU/ml vs. 2209,45 RU/ml.; p= 0,013).

A potential interaction of these parameters was analyzed with stepwise multivariate analysis. PO4 (p= 0.040), VitD (p= 0,040) and aluminum salts (p= 0.007) were confirmed to have a statistical significant impact on FGF23.

Conclusion

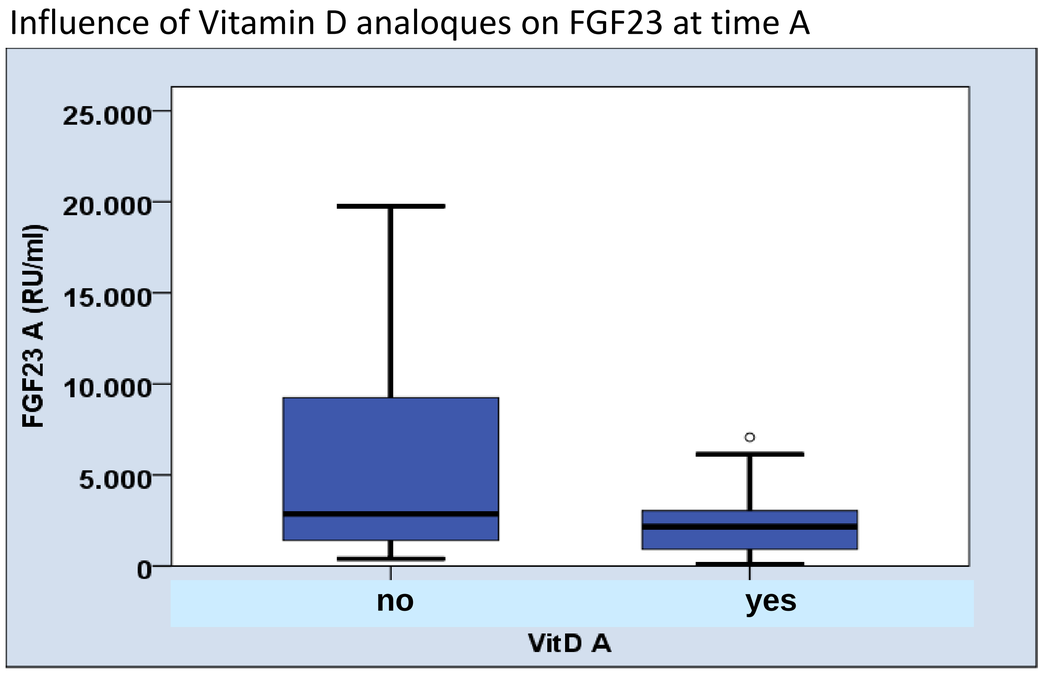
Aluminum salts, which have known affinity to bone, may act as a potential stimulator of FGF23 release. Further studies are needed to reevaluate this interesting observation with respect to potential causality of aluminum salts on FGF23 release.

Figure 1*:* Influence of phosphate on FGF23 at time A



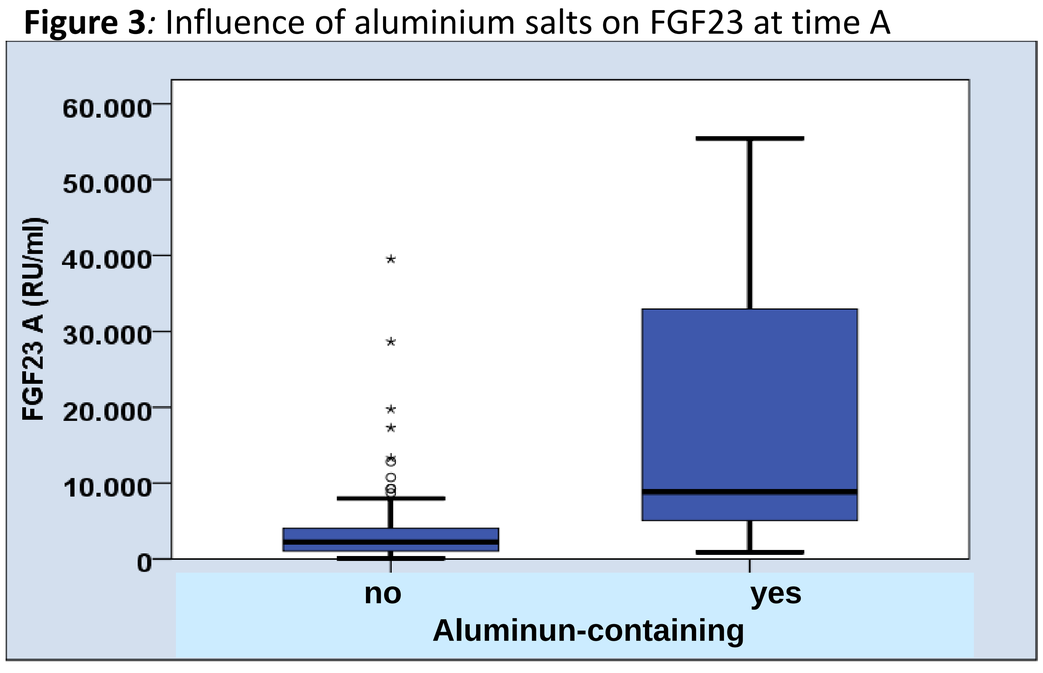
FG23 levels at different phosphate levels (p< 0,001).

Figure 2*:*
Influence of Vitamin D analoques on FGF23 at time A



FG23 levels with Vit A analoques (p = 0.020).

Figure 3*:* Influence of aluminium salts on FGF23 at time A



FGF23 levels in regard of patients treated (yes) or not treated (no) with aluminium containing phosphate binders (p = 0.013)

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