# COMPARISON OF TWO ASSAYS OF FIBROBLAST GROWTH FACTOR 23 IN RELATION TO RANGES OF ESTIMATED GLOMERULAR FILTRATION RATE (eGFR) IN ELDERY POPULATION

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## OBJECTIVES

The analytical equivalence between intact fibroblasts growth factor (iFGF23) and C-terminal FGF23 (cFGF23) assays is expected. However, the majority of studies demonstrated striking lack of strong association between these measures. Previously we have demonstrated that the increase in plasma cFGF23 was slightly preceding the increase of iFGF23 concentration with the impairment of kidney excretory function. However we did not analyze the regression association between both assays.

Table 1. Study group characteristics, mean±SD or median (interquartile range).

| | | |
|---|---|---|
| Age | [years] | 78.9 ± 8.6 |
| Body mass index | [kg/m$^2$] | 28.2 ± 5.0 |
| Obesity | [n,%] | 1160 (32.4%) |
| Hypertension | [n,%] | 2767 (73.5%) |
| Diabetes | [n,%] | 874 (23.4%) |
| Chronic kidney disease* | [n,%] | 1723 (45.6%) |
| Serum albumin | [g/L] | 42.57 ± 3.47 |
| Serum creatinine | [mg/dL] | 0.90 (0.31) |
| Serum urea | [mg/dL] | 40.10 (16.80) |
| Urinary albumin/creatinine ratio (ACR) | [mg/g] | 5.13 (14.43) |
| Estimated glomerular filtration rate | [ml/min/1.73m$^2$l | 65.8 ± 18.3 |
| Serum calcium | [mg/dL] | 9.40 ± 0.60 |
| Serum phosphorus | [mg/dL] | 3.33 ± 0.51 |
| Serum 25-(OH)-$D_3$ | [ng/mL] | 39.1 ± 22.5 |
| Intact parathormone | [pg/mL] | 41.0 (24.0) |
| Plasma iFGF23 | [pg/mL] | 8.08 (5.52) |
| Plasma cFGF23 | [RU/mL] | 51.15 (36.51) |

Table 2. Results of the Deming regression between log10(iFGF-23) and log10(cFGF-23) comparison in CKD stages.

| Group | Slope (β = 1) (± 95% CI) | t | p | Intercept (β = 0) (± 95% CI) | t | p | R (± 95% CI) |
|---|---|---|---|---|---|---|---|
| All N = 4200 | 1.138 (1.035 – 1.243) | 1.89 | 0.06 | 0.657 (0.562 – 0.752) | 13.56 | < 0.001 | 0.403 (0.377 – 0.428) |
| eGFR ≥90 ml/min/1.73m$^2$ N = 432 | 1.161 (0.569 – 2.159) | 0.45 | 0.65 | 0.608 (-0.262 – 2.159) | 1.73 | 0.084 | 0.231 (0.140 – 0.319) |
| eGFR 60 - 90 ml/min/1.73m$^2$ N = 2410 | 1.045 (0.897 – 1.183) | 0.61 | 0.54 | 0.724 (0.598 – 0.854) | 11.11 | < 0.001 | 0.348 (0.312 –0.383) |
| eGRF 45 - 59 ml/min/1.73m$^2$ N = 929 | 1.093 (0.917 – 1.296) | 1.01 | 0.31 | 0.734 (0.546 – 0.894) | 8.32 | < 0.001 | 0.435 (0.381 – 0.486) |
| eGRF 30 - 44 ml/min/1.73m$^2$ N = 354 | 1.050 (0.784 – 1.539) | 0.306 | 0.76 | 0.788 (0.285 – 1.071) | 4.01 | < 0.001 | 0.436 (0.347 –0.516) |
| eGRF 15 - 29 ml/min/1.73m$^2$ N = 79 | 1.124 (0.833 – 1.624) | 0.655 | 0.51 | 0.728 (0.123 – 1.063) | 3.25 | < 0.01 | 0.563 (0.391 – 0.697) |

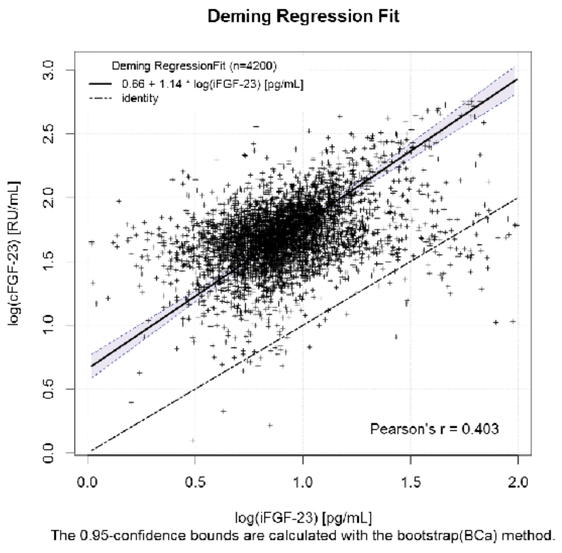
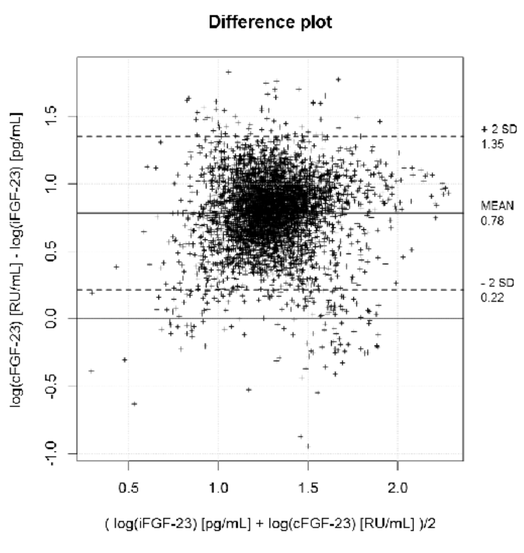



Figure 1. Model of Deming regression between log10(iFGF-23) and log10(cFGF-23) comparison. Shaded area depicts ± 95% of confidence interval for regression model.
Dashed line represents the identity line.




| | Mean | UCL | LCL |
|---|---|---|---|
| Value | 0.78 | 1.35 | 0.22 |
| – 95% CI | 0.77 | 1.33 | 0.21 |
| + 95% CI | 0.79 | 1.36 | 0.24 |

Figure 2. Bland-Altman plot for log10(iFGF-23) and log10(cFGF-23) comparison.

## METHODS

We have compared plasma concentrations of iFGF23 and cFGF23 in 3780 elderly subjects aged 65 years and older.

## AIM

The aim of this study was to compare two FGF23 assays in relation to ranges of estimated glomerular filtration rate (eGFR) in elderly population.

## RESULTS

Estimated slope of the Deming regression analysis did not differ significantly from 1 in the whole group as well as in each of and between the CKD stages. In Bland-Altman analysis, in the whole group, only 22 (0.5%) observation were below lower confidence limit and 60 (1.4%) above upper confidence limit. In each of the CKD stages, for the Bland-Altman plots, the slopes of the linear regression between differences and means were below 0.1 and were statistically insignificant, proving the evidence that there is no clear tendency for the largest mean differences to depend on the mean values.

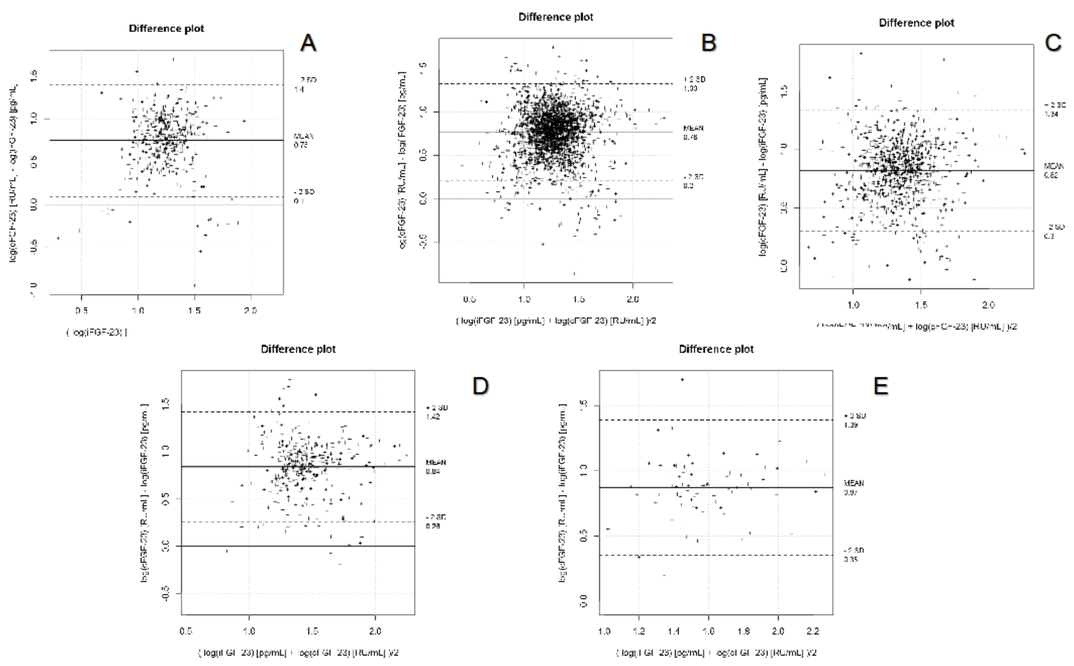



Figure 3. Bland-Altman plot for log10(iFGF-23) and log10(cFGF-23) comparison in subjects with eGFR ≥90 ml/min/1.73m$^2$ – G1 (A); 60 - 89 ml/min/1.73m$^2$ – G2 (B), 59 - 45 ml/min/1.73m$^2$ – G3a (C), and 30 - 44 ml/min/1.73m$^2$ – G3b (D) and 15 - 29 ml/min/1.73m$^2$ – G4 stages of CKD (E).

## OBJECTIVES

Our study demonstrates mostly calibration differences in the detection of iFGF23 and cFGF23 with kits developed by Immunotopic. In addition our results suggest the stable cleavage/degradation rate of iFGF23 in the modest to severe chronic kidney disease.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