STABILITY OF FIBROBLAST GROWTH FACTOR-23 (FGF-23) LEVELS IN SERUM AND PLASMA

Matthew Damasiewicz1,2, Kevin Polkinghorne1,2, P. Kerr1,2, Ron Tudball3, George Streitberg3, James CG Doery2,3, Zhong X Lu2,3

1 Department of Nephrology, Monash Health, Melbourne, Australia; 2 Monash University, Melbourne, Australia; 3 Monash Pathology, Monash Health, Melbourne, Australia

Zhong.lu@monashhealth.org

INTRODUCTION

• Fibroblast growth factor 23 (FGF-23) is a newly characterized regulator of phosphate and mineral metabolism
• FGF-23 levels are inversely related to renal function and in cross-sectional studies have been shown to increase with declining renal function
• FGF-23 levels rise early in CKD and the rise precedes that of phosphate or parathyroid hormone
• FGF-23 has also been associated with both progression of CKD and mortality in dialysis patients as well as cardiovascular outcomes in CKD
• FGF-23 is currently being investigated as a potential marker of CKD-MBD, and as a therapeutic target for the various treatment modalities
• However despite great interest to include FGF-23 as a biomarker in clinical research and daily practice many questions remain unanswered
• Small studies have shown that FGF-23 degrades variably but rapidly in both plasma and serum, and that the addition of protease inhibitors may delay this process
• Furthermore small studies in health and early CKD have demonstrated large inter- and intra-individual variability in serum and plasma FGF-23
• The optimal collection methods for FGF-23 in advanced CKD remain unclear
• Furthermore little is known about intra-individual variability in this cohort.

AIMS

• To assess and contrast the stability of FGF-23 in stable haemodialysis patients in serum, EDTA plasma and EDTA plasma with added protease-inhibitor

METHODS

• Pre and post-dialysis blood samples were collected weekly from 23 chronic haemodialysis patients into three different tubes: plain, EDTA, and EDTA 4ml tubes with 80 μl of protease inhibitor (Sigma, MO, USA)
• Fresenius FX80 dialyzers were used for all patients, with a dialysis time of 4-5 hours
• Blood samples were collected, centrifuged and stored at -70°C until analysis
• Serum intact FGF-23 was measured using C-terminal FGF-23 ELISA (Immutopics, CA, USA)
• Results were log-transformed before analysis using repeated measures ANOVA.

RESULTS

• Median FGF-23 for weeks 1-3 were:
  - serum were 632, 746, 864 RU/ml
  - plasma 1736, 1940, 2083 RU/ml
  - Plasma + inhibitor 1734, 1947, 1962 RU/ml
• This represents a median change of 6.2% (serum), 9.9% (plasma) and 10.7% (plasma+inhibitor) over the 3-week period
• There was no significant difference between FGF-23 levels within each of the the serum (p=0.19), plasma (p=0.62) and plasma + inhibitor (p=0.55) groups.
• FGF-23 levels were significantly lower in serum versus plasma (p<0.001) and plasma + inhibitor (p<0.001)
• Significantly there was no difference between FGF-23 levels in plasma versus plasma+inhibitor (p=0.54)

CONCLUSION

• FGF-23 did not differ significantly in over a short period of time period in stable haemodialysis patients.
• FGF-23 is more stable in EDTA plasma than serum, however in contrast to previous studies the addition of a protease inhibitor to EDTA plasma may not be necessary in this cohort.

Figure 1: Median FGF-23 values week 1-3; A – serum, B- plasma, C – plasma + protease inhibitor