Predictive Role of Fibroblast Growth Factor-23 in Continuous Veno-Venous Hemofiltration

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INTRODUCTION

Fibroblast Growth Factor (FGF)-23 is a bone derived regulator of phosphate homeostasis that is elevated in chronic kidney disease and associated with poor long term outcomes[1-2]. Emerging evidence suggests FGF-23 levels are elevated in acute kidney injury (AKI) and may be associated with adverse clinical outcomes[4-5]. By collecting corresponding effluent and plasma samples during multiple time points in the course of CVVH, we found FGF-23 is cleared during CVVH with a sieving coefficient of 0.27 (±0.08). We sought to measure and compare effluent FGF-23 levels at CVVH initiation between 1-yr survivors and non-survivors.

OBJECTIVE

To measure and compare effluent FGF-23 levels at CVVH initiation between 1yr survivors and non-survivors.

Hypothesis: compared to one year survivors, non-survivors will have higher FGF-23 at time of CVVH initiation.

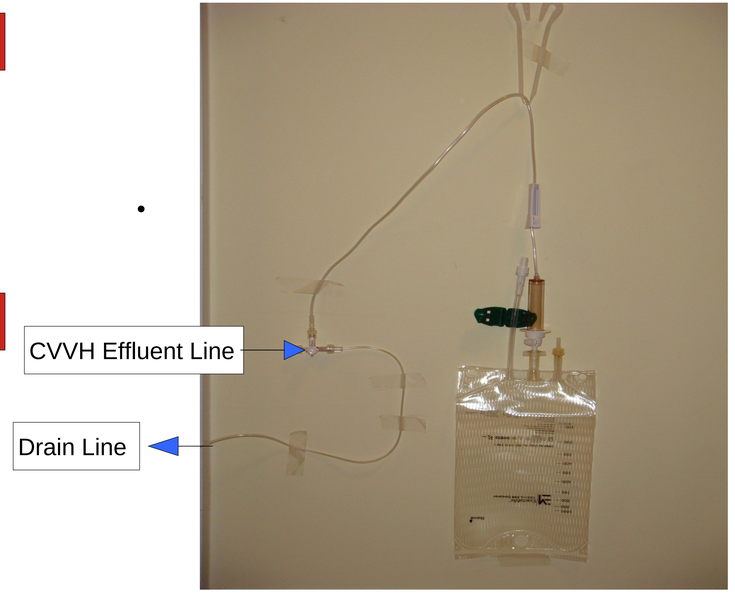
METHODS

- Prospective observational study.
- CVVH was applied using biocompatible polyether sulphone membranes (Hemofilter size:1.6 m^2), pre-dilution mode using bicarbonate or citrate replacement solution at 1600-3000 ml/hr.
- Blood flow ranged between 200-250 ml/min.

METHODS

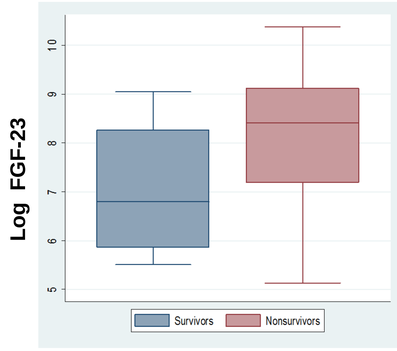
- Data collection included demographics, clinical history, labs, medications including sodium phosphate infusions, CVVH prescription with flowsheet details, patient outcomes
- C-terminal FGF-23 levels was measured in CVVH effluent samples collected using a partial effluent collection device that continuously sampled 1% of total effluent volume from 30 oligo-anuric patients with severe AKI.

Partial effluent collection system



RESULTS

	Survivors	Non-Survivors	P-Value
Baseline Characteristics	N = 9	N = 21	
Age (years)	63.5 (±12.2)	60.7 (±10.6)	0.5
Gender (males, %)	67	70	
Weight (kg)	92.8 (± 18.8)	91.7 (± 20.3)	0.9
CKD (Defⁿ: GFR<60) (%)	37	35	
Cause of AKI (ATN, %)	66	65	
CVVH Parameters			
Dose (ml/kg/hr)	21.15 (± 6)	23.6 (± 5.7)	0.1
Duration (days)	7.3 (± 3.9)	7.7 (± 5)	0.8
Laboratory			
Creatinine (mg/dl)	3.66 (± 1.4)	3.68 (± 1.2)	0.9
Phosphorus (mg/dl)	5.3 (± 1.8)	6.49 (± 1.7)	0.13



- Median FGF-23 levels in survivors: 895.6 RU/ml (IQR: 354.3- 3876.6)
- Median FGF-23 levels in non-survivors: 4518.33 (IQR: 1326.7 -9163.7)
- Log FGF-23 levels significantly lower in survivors (p=0.02)

CONCLUSION

FGF-23 is a 26-kD protein with key role in maintenance of normophosphatemia. Emerging evidence suggests that FGF-23 may have direct pathogenic effects and causal role in the pathogenesis of LVH[3]. We found that FGF-23 levels at CVVH initiation are significantly higher in non survivors as compared to survivors and that FGF-23 is cleared during CVVH. Our pilot studies suggest that FGF-23 could have a role as a biomarker of poor outcomes in severe AKI. Future studies will need to clarify FGF-23's role in AKI as a biomarker or mediator of disease outcomes and whether therapies aimed at reducing FGF-23 levels may be beneficial.