Plasma Cystatin C Versus Plasma Creatinine in Critically Ill Patients with Acute Kidney Injury Secondary to Rhabdomyolysis: A Prospective Study

Stefan Weston, DO, Jesse Woodall, DO, Kavi Dayaram, DO, R. Eric Heidel, PhD, and Ross Nesbit, MD

Department of Medicine, University of Tennessee Graduate School of Medicine, Knoxville, TN

Introduction

- Plasma cystatin C (pCysC) is a surrogate marker for plasma creatinine (pCr) in the measurement of renal function.
- The clinical utility of pCysC has not been evaluated in the setting of rhabdomyolysis, a disease process where measurement of estimated glomerular filtration rate (eGFR) with pCr may be inaccurate
- We compared the eGFR from both biomarkers in critically ill patients with acute kidney injury secondary to rhabdomyolysis to determine if there was a significant difference in calculated renal function

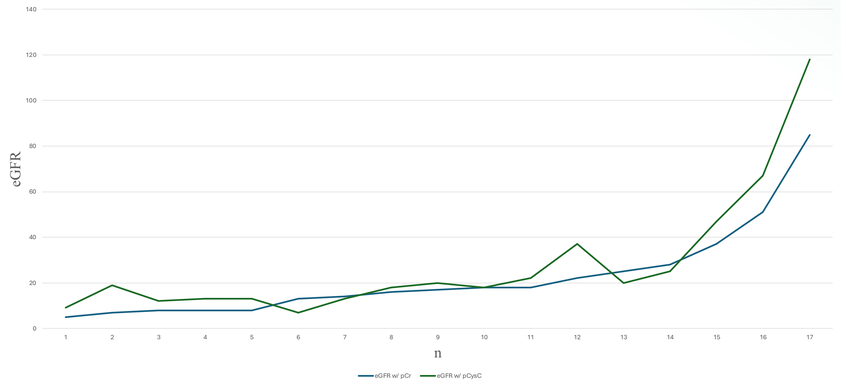
Methodology

- pCr and pCysC were measured in patients with creatinine kinase (CK) levels concerning for rhabdomyolysis.
- A cut-off value for CK elevation >1,000 units/L was used to screen for eligible patients
- The eGFR based on the pCr and pCysC was calculated using the 2009 CKD-EPI Creatinine and 2012 CKD-EPI Cystatin C equations, respectively
- Wilcoxon signed-rank test were used to test for significant difference in eGFR values between pCr and pCysC
- Mixed-effects ANOVA was used to compare groups on change in eGFR
- Analyses were performed using SPSS Ver. 29, and significance was assumed at a p-value <0.05

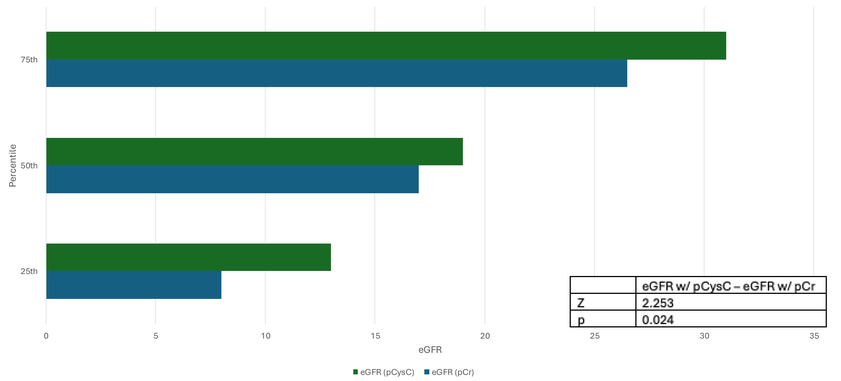
Results

Table 1. *Epidemiology*

Variable	Male	Female
n	12	5
Age	52.5 ± 20.1	61.4 ± 19.4
BMI	27.3 ± 6.8	22.1 ± 0.8
Race		
Caucasian	11	4
African American	0	1
Hispanic	1	0



Graph 1. *Comparison of eGFR with pCysC vs eGFR with pCr*



Graph 2. *Wilcoxon signed-rank test for eGFR with pCysC vs eGFR with pCr*

Discussion

- In rhabdomyolysis, the breakdown of muscle tissue releases large amounts of creatinine, which complicates the assessment of renal function
- Muscle breakdown may result in inaccurate measurement of the eGFR using standard creatinine-based equations as these equations assume a steady state of creatinine production and clearance
- Cystatin C is uninfluenced by muscle mass or breakdown

Conclusion

- There is a significant difference in eGFR between pCr and pCysC in the setting of rhabdomyolysis
- Our findings are consistent with a case study performed by *Yap et al*
- To the best of our knowledge, this is the first prospective study to demonstrate a statistically significant difference in eGFR using pCysC versus pCr in patients with acute kidney injury in the setting of rhabdomyolysis
- pCysC may provide a more accurate representation of renal function in the setting of rhabdomyolysis

References

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