

Acute Renal Responses to Moderate-Intensity Aerobic Exercise with Non-traditional markers of Renal Health and Function in Healthy Individuals: A Pilot Study

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ABSTRACT

Aerobic exercise elicits a multitude of physiological improvements in both healthy and diseased populations. However, acute changes in renal function with aerobic exercise remain difficult to quantify by traditional marker serum creatinine (sCr) to estimate glomerular filtration rate (eGFR). Recently, novel biomarkers cystatin C (CyC) and urine epidermal growth factor (uEGF) have been introduced as more reliable markers of renal health and function to be used in conjunction with sCr to assess changes in renal health and function in mid-spectrum CKD. Potentially, greater changes in novel markers of renal health and function similar to mid-spectrum CKD can be observed in healthy individuals.

PURPOSE: To determine if an acute bout of moderate-intensity aerobic exercise can transiently alter novel markers of renal health and function in healthy individuals. **METHODS:** Thirty-nine participants (n = 18 men; n = 21 women; age 32.5 ± 12.6 yr; height 171.1 ± 11.4 cm; weight 78.7 ± 15.6 kg; BMI 27.1 ± 5.8) completed a single acute bout of moderate-intensity (50-65% HRR) aerobic exercise. Blood and urine samples were collected pre-exercise and 15 minutes post-exercise by the same technician under standardized conditions and stored at -60 °C until project completion. Serum creatinine (sCr), urine creatinine (uCr), urine epidermal growth factor (uEGF), uEGF/uCr ratio (uEGFR), cystatin C (CyC) and eGFR - modification of diet in renal disease (MDRD) and the CKD-EPI- responses were analyzed using a paired sample *t*-test. **RESULTS:** Relative to pre-exercise measures: sCr ($p = 0.38$), uEGF ($p = 0.35$), and uEGFR ($p = 0.09$) remained unchanged, whereas, uCr ($p = 0.045$) and CyC ($p = 0.00$) significantly changed post-exercise. There was a difference in uEGF pre- to post-exercise, but the standard deviation was large, likely preventing this from being significant. In contrasts MDRD ($p = 0.04$) significantly increased while CKD-EPI ($p = 0.22$) had no significant changes. **CONCLUSION:** Acute changes in traditional and novel biomarkers of renal health and function in healthy individuals remain unclear after an acute bout of moderate-intensity aerobic exercise. Further investigation focused on sampling time and exercise intensity is needed to solidify the current understanding of renal health and function.