KINETICS OF CARDIAC TROPNIN T RELEASE DURING PROLONGED STRENUIUS EXERCISE.

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Introduction: An increase in cardiac troponin T (cTnT) following prolonged exercise has been well documented. At rest, in the normal healthy population, circulating cTnT has been shown to be below the 0.01 µg·L⁻¹ detection limit of the assay employed. Therefore, any increase above the detection limit has been suggested to demonstrate cardiac damage. Previous studies have focused on pre- to post-exercise increases in cTnT only; consequently, the kinetics of cTnT release during prolonged exercise remains to be identified.

Method: Nine trained males (Mean ± SD, age 27 ± 5 years, VO₂max 56.2 ± 6.2 ml·kg·min⁻¹) performed 4 hours of ergometer rowing at 10-20% below the workload associated with their lactate threshold. Serum cTnT was measured from venous blood obtained from a catheter situated between the superior vena cava and right atrium. Blood was obtained pre-, at 30 min intervals during, and post-exercise. Serum content of cTnT was determined using the third generation TROP T STAT (Roche Diagnostics, Lewes, Sussex) assay by electrochemiluminescence (ECLIA) immunoassay technology. Alterations in cTnT pre-, during and post-exercise were analysed using a repeated measures one-way analysis of variance.

Results: Pre-exercise cTnT was detectable (>0.01 µg·L⁻¹) in all participants (0.017 ± 0.002 µg·L⁻¹). Serum cTnT increased at 60 min of exercise (0.019 ± 0.004 µg·L⁻¹) and continued to increase throughout ergometer rowing (120 min, 0.021 ± 0.005 µg·L⁻¹; 180 min, 0.025 ± 0.009 µg·L⁻¹) to the end of exercise (0.031 ± 0.012 µg·L⁻¹), although this was not significant (P>0.05). Following exercise, cTnT was elevated above the 0.05 µg·L⁻¹ cut-off limit for diagnosis of acute myocardial infarction in one participant.

Conclusion: Pre-exercise cTnT was unusually elevated above 0.01 µg·L⁻¹ in all participants and may be attributed to the central origin of the venous blood samples obtained (right atrium). The elevated cTnT at rest potentially demonstrates a continuous turn-over of cTnT. Serum cTnT continued to increase during 4-hours of ergometer rowing and was elevated as early as 60 min into the exercise bout. These data suggest that cTnT maybe released via a physiological mechanism, and may not indicate actual cardiac damage. Future studies should aim to investigate the origin and mechanisms of cTnT release during exercise.

Keywords: Rowing, Myocardium, Cardiac