

Maximal Oxygen Consumption Predicts Skeletal and Heart Muscle Biomarkers Changes after a Full Distance Ironman

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Strenuous exercise like marathon or triathlon leads to disturbances of several biomarkers, not at least markers of skeletal and heart muscle damage. Different predictors of biomarker changes, e.g. sex, age and training experience have been discussed in the literature with contradictory results. To our best knowledge, maximal oxygen consumption (VO_2max) has not been investigated in this setting. **PURPOSE:** To evaluate predictors of biomarker changes in an Ironman triathlon. **METHODS:** In 39 non-elite athletes (10 female, 29 male; age 41.1 ± 9.7 , range 24-70 years) who had performed a 20 m shuttle run test to predict VO_2max , biomarkers (cardiac troponin T (cTnT; reference < 14 ng/L), creatine kinase (CK; ref. < 1.9 $\mu\text{kat/L}$), myoglobin (MG; ref. < 72 $\mu\text{g/L}$), and N-terminal prohormone of brain natriuretic peptide (NT-proBNP; ref. < 300 ng/L) were measured by standard laboratory methods 7 days before, directly after, and day 1, and 6 after the race. **RESULTS:** VO_2max was on average 49.9 ± 6.4 $\text{O}_2\text{ml/kg/minute}$ (range 36.5-63.9). Three biomarkers measured directly after the race were predicted by VO_2max : CK (53 ± 50 $\mu\text{kat/L}$; $R = -0.44$; $p = 0.005$), MG (2137 ± 2614 $\mu\text{g/L}$; $R = -0.31$; $p = 0.056$) and NT-proBNP (772 ± 2614 ng/L; $R = -0.35$; $p = 0.027$). cTnT (75 ± 89) was not significantly predicted by VO_2max but cTnT leakage was, in contrast to the other biomarkers, higher with higher VO_2max ($R = 0.10$; $p = 0.55$) and return to normal appeared to be faster with higher VO_2max . **CONCLUSION:** Earlier research into predictors of biomarker changes after strenuous exercise has found contradictory results concerning age, sex and training experience. In the present Kalmar IronWoMan study VO_2max was found to be a good predictor of biomarker changes with higher VO_2max values being correlated to lower values for CK, NTproBNP and MG.