

## MYOCARDIAL STRESS AFTER ULTRA-ENDURANCE RUNNING IN EXTREME HEAT

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The effects of prolonged exercise on cardiac muscle integrity and function are still more controversial and less well investigated than skeletal muscle damage. The Badwater Ultra, a 216 km race through Death Valley, CA, USA, might serve as an excellent model to further research cardiac muscle integrity and function under the conditions of prolonged exercise in temperatures up to 54°C. **PURPOSE:** To investigate possible negative effects of prolonged, exhaustive exercise in extreme heat on the heart based on creatine kinase MB (CKMB) and cardiac troponin (cTnT) reflecting myocardial damage and nt-pro-brain natriuretic peptide (nt-proBNP) indicating cardiac dysfunction in experienced ultra-endurance runners. **METHODS:** Venous blood samples were obtained from eight highly-trained male endurance athletes (median (P25 / P75 percentile): 54.5 (44.0 / 59.25) yrs, 176 (170 / 181) cm, 74.8 (69.8 / 80.9) kg) before and after termination of the race. Creatine kinase (CK), CKMB, cTnT and nt-proBNP were measured. **RESULTS:** Six runners finished the race within the time limit of 60 hours. One runner dropped out after approx. 194 km (57 h) and the other after approx. 85 km (16 h). Due to the exercise both, CK (136 (97.25 / 215.25) vs. 2868 (531.0 / 6883.5) U/L) and CKMB (11.5 (10.0 / 12.75) vs. 66.0 (22.75 / 109.5) U/L) showed a clear increase ( $p = 0.012$ ). The percentage of CKMB on total CK was unsuspicious (3.0 (1.7 / 5.2) %) and cTnT remained below detectable level, whereas the nt-proBNP showed a significant increase (17.49 (12.39 / 30.48) vs. 317.95 (79.23 / 339.35) ng/L,  $p = 0.012$ ) after the run. **CONCLUSIONS:** Since cTnT remained unchanged following the ultra-endurance exercise in extreme heat the clear increase in CK and CKMB seems to be mainly attributed to skeletal muscle damage. However, the rise in nt-proBNP may reflect a temporary, reversible left ventricular dysfunction.

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