Effect of 100-km ultramarathon on N-terminal pro-B-type natriuretic peptide variation

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Introduction: The change in N-terminal pro-B-type natriuretic peptide (NT-proBNP) levels follows strenuous endurance exercise-imposed paradox. Our previous reports showed significant body weight (BW) loss with dehydration was common in ultramarathon runners. The aim of this study is to investigate whether the dehydration and renin-angiotensin-aldosterone system activation possibly contribute to exercise-induced NT-proBNP release.

Methods: Twenty-six participants who finished a 100-km ultramarathon in Taiwan were enrolled. For each participant, blood samples and spot urine samples were collected one week before the race, as well as immediately and 24 hours after the finish. Body weight change was recorded to monitor the hydration status.

Results: Prolonged endurance exercise led to a substantial increase in NT-pro-BNP. Compared to pre-race values, NT-pro-BNP levels significantly increased immediately after the race (24.3 ± 20.2 to 402.9 ± 305.9 pg/mL, p < 0.05) and maintained the lasting high levels till 24 hours after the race finished (143.7 ± 126.1 pg/mL, p < 0.05). The fractional excretion of sodium values were all below 1% in three different time points. The 100-km ultramarathon resulted in significant BW loss, and elevated of renin and aldosterone levels. However, only 24 hours after the race, there was a positive significantly relationship between NT-proBNP and aldosterone levels, but negative significantly relationship between NT-proBNP and BW increase during the recovery phase.

Conclusions: Results of this study showed the mechanism of NT-proBNP release immediate following the race were multifaceted. However, during the recovery phase, rehydration might lead to the decrease of NT-proBNP in the volume depletion state.