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WHEELCHAIR HALF MARATHON RACE INCREASES NATURAL KILLER CELL ACTIVITY IN PERSONS WITH CERVICAL SPINAL CORD INJURY

Banno M, Nakamura T, Furusawa K, Ogawa T, Sasaki Y, Kouda K, Kawasaki T, Tajima F.

Department of Rehabilitation Medicine, Wakayama Medical University, Wakayama, Japan.

Objective: Moderate exercise increases Natural killer cell activity (NKCA), while prolonged exercise initially increases and finally decreases NKCA to below pre-exercise levels in healthy humans. We reported that individuals with cervical spinal cord injury (CSCI) showed no increase in NKCA in response to 20-min arm exercise at 60% VO₂max. However, it remained unknown whether the lack of response was associated with the duration or the intensity of exercise. The purpose of the present experiment was to examine the exercise-induced NKCA response in CSCI athletes with dysfunctional sympathetic nervous system during the wheelchair half marathon race.

Methods: The present study compared the effects of the 29th Oita international wheelchair marathon race on NK cell count, NKCA and hormonal parameters in 6 subjects with CSCI and 7 control subjects with spinal cord injury between T4 and L1 (SCI), before, immediately after and 2 hours after recovery. The race day was cloudy weather, the temperature was about 18.3 degree, and the humidity was about 72.5 percent.

Results: NK cell counts increased at both time points after the race in SCI, but not in CSCI, compared with before the race. NKCA increased immediately in both groups of subjects after the race, and then returned to the pre-race level at 2 hours after the race. Plasma cortisol did not change in both groups throughout the study. Plasma adrenaline increased sharply in SCI after the race, then returned to the pre-race level at 2 hours after the race, whereas no change was observed in CSCI throughout the study.

Conclusion: The wheelchair half marathon race increased NKCA in CSCI persons despite the stable concentration of plasma adrenaline and constant number of NK cells. The CSCI athletes completed the wheelchair half marathon race in about 80 to 110 minutes. Such prolonged physical activity significantly increased NKCA even in CSCI. We consider the exercise protocol followed in our previous study was probably too short to increase NKCA in CSCI.