EFFECTS OF SUPINE FLOATING ON CARDIAC AUTONOMIC NERVOUS SYSTEM MODULATION IN ELDERLY FEMALE

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Relaxation (horizontal immersion) in the water has performed in hydrotherapy and aqua exercise. But there were little report about physiological characteristics during supine floating (horizontal immersion). The purpose of this study was to make clear the effects of supine floating on heart rate, blood pressure and cardiac autonomic nervous system modulation in elderly females. Six females served as subjects. Descriptive data (means ± SD) are as follows: age 62.8 ± 9.2 years, height 156.1 ± 2.6 cm, body weight 61.8 ± 4.8 kg and body fat 33.4 ± 4.3%. All subjects gave informed consent before participating. All subjects wore only a swimming suit during the experiment. They rested on a cot for 15 minutes. The final 5 minutes of rest (BASE; baseline period) were followed by supine floating for 15 minutes. The subjects performed supine floating at 30 (WT30) and 35 (WT35) degrees Celsius at random. Experiments were performed from 1 p.m. to 5 p.m. All subjects were instructed to breathe gently in time with a metronome signal set at 15 breathes/min (0.25 Hz). An electrocardiogram (ECG, CM5) was recorded during BASE followed by supine floating for 15 minutes. Heart rate was derived by calculating the number of R waves of ECG. Blood pressure was measured at the end of the BASE, during 5, 10 and 15 minutes of supine floating. Analysis of heart rate variability (HRV) was performed off-line on a personal computer. Cardiac autonomic nervous system modulation was estimated with the power spectrum analysis of heart rate variability (HRV) by using the Fast Fourier Transformation (FFT). The areas of the two frequency components of HRV were measured by integrating low frequency (LF; 0.04-0.15 Hz) and high frequency (HF; 0.15-0.40 Hz). HF and the ratio of LF to HF (LF/HF) were used as an indicator of cardiac vagal modulation and sympathetic-vagal balance, respectively. Those values were showed logarithmically (logHF and logLF/HF). Heart rate during WT30 decreased significantly compared with BASE value (p < 0.05). There were no significant differences during WT35 compared with BASE value. Systolic blood pressure during WT30 was significantly higher than WT35. LogHF during WT30 and WT35 increased significantly compared with the BASE value (p < 0.05). There were no significant differences during WT30 and WT35 compared with BASE value. These data indicate that cardiac vagal modulation is enhanced. It is concluded that changes occurred in cardiac vagal modulation induced by water temperature and hydrostatic pressure during supine floating (horizontal immersion) in elderly female.

Keywords: Water, Female, Heart Rate Variability