THE CHANGE IN LATENT TIME OF THE H WAVE DURING RECOVERY EXAMINATION AFTER ARM CRANK EXERCISE.

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The sthenia of the autonomic nerves system had an influence on the activity of motor nervous system. It also indicates that it changed to the recruitment threshold of a motor unit in voluntary movement. From these, a hypothesis can be formulated that if the acceleration of the autonomic nerves system after voluntary movements has an influence on activity of spinal cord α-motoneuron, the latent time and the threshold of H wave would be changed. The purpose of this study was to investigate effect of the change in latent time of the H wave during recovery examination after arm crank exercise.

Seven males volunteered to participate in this study. After the H-reflex of the medial gastrocnemius (MG) was elicited at time of rest, subjects performed 60%peakVO2 arm crank exercise for 10 minutes. After exercise, subjects were kept lying in the prone position, and H-reflex (MG) was measured immediately post exercise and recovery time. We compared relatively evaluated latent time by the use of the value that deducted the latent time of positive peak of M wave to the latent time of positive peak of H wave. Cardiac autonomic nervous system activity was calculated using MemCalc. The frequency domain was divided into two parts: high frequency (HF; 0.15-0.40Hz) and low frequency (LF; 0.04-0.15Hz). Cardiac autonomic nervous system activity was transformed into logarithmic values to obtain a statistically normal distribution. Log HF was an index of cardiac parasympathetic nervous system activity.

The latent time of H wave of immediately post exercise was -0.38±0.25 ms and significantly shortened as compared to the latent time of H wave of pre exercise (p<0.05). These results suggest that the MU of fast muscle system is recruited remarkably immediately post exercise. The latent time of H wave, which was shortened immediately post exercise (0min) with recovery time returned to the pre exercise level of the latent time of H wave (ANOVA; p<0.05). It is considered that the recruitment threshold of the MU changes because the latent time of H wave returned to the previous value. The ∆log HF of immediately post exercise was significantly inhibited as compared to pre exercise (p<0.05). The ∆log HF also returned to pre exercise value with time progress of recovery (ANOVA; p<0.05). The increases on the ∆log HF in each stage on this study showed statistically-meaningful equilateral correlation in recovery process of the latent time of H wave (r=0.48, p<0.05). These suggests that movement of cardiac parasympathetic nervous system activity could associate of the autonomic nerves system after exercise has an influence on excitability in a spinal cord α-motoneuron pool, it could effect a change on latency of H wave.

Keywords: Motor Units, Autonomic Nervous System, Neuromuscular System

The latency of H wave depended on change of cardiac parasympathetic nervous system activity. This suggests that autonomic nervous system activity has a meaningful influence on the threshold of motoneuron of the spinal cord. Keywords: Motor Units, Autonomic Nervous System, Neuromuscular System