MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Experiments from Sub-orbital to Orbital Platforms (3)

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EFFECTS OF GRAVITY ON ULNAR NERVE LATENCY OF ACTIVATION. PRELIMINARY RESULTS OF AN IN-VIVO STUDY

Abstract

Nerve conduction is very important variable in the physiology of the nervous system. Is therefore essential, to understand the response of the human peripheral nervous system exposed to altered gravity conditions to analyse different aspects of the nerve conduction. A previous in vitro study demonstrated that microgravity conditions influence the interval between a stimulus and a response. To discover whether nerve latency is influenced by the gravity in vivo, we measured the latency of activation along the motor component of ulnar nerve during three different gravity conditions (0g, 1g and 1.8g) The setting of the experiment was an ESA airbus A-300 O G performing parabolic flights. To fulfil our scientific goal we used an evoked EMG coupled with an accelerometer which stimulated the ulnar nerve in two different sites: elbow and wrist, in three healthy male adults. The data set were acquired in each phase of the parabolic flight and were analysed using the ANOVA test. Our results evidenced that the latency of activation changes with the gravity conditions. In detail, during the wrist stimulation was measured a statistically significant longer latency of activation in 0 g condition in all the three subjects. The data obtained from the elbow stimulation in 0g also showed a statistically significant longer latency time in two out of three subjects. In the third subject the latency was longer in 2 g conditions. The data presented demonstrate that the latency of activation is gravity influenced; this is in agreement with previous in-vitro studies. The microgravity phase shows a statistically significant longer latency of activation which is consistent with both sites of stimulation. However the elbow stimulation in one subject showed a shorter latency compared with the 2g measurement. This difference could be explained by technical difficulties during the data acquisition. Further experiments with a larger number of subjects and other parameters to measure (e.g. velocity of conduction, amplitude, temporal dispersion) are needed to confirm our results and to elaborate a physiological explanation of the observed phenomenon. In prospective also sensory nerves should be considered in similar studies.