Abstract

The aim of this randomized cross-over experimental study was to evaluate specific effects of manual acupuncture on central and vegetative nerve system activity measured by quantitative EEG (qEEG) and heart rate variability (HRV). 20 healthy volunteers were monitored simultaneously using a qEEG system and a 12 channel ECG recorder. After 10 minutes baseline measurements, verum acupuncture (VA) at LI 4 or placebo acupuncture (PA) at a sham point was applied (stimulation after 5 min). A significant increase of the EEG power spectrum was found after stimulation in VA compared to PA in the occipital area. The qEEG data showed a differential effect in fast and slow EEG frequencies. Needle stimulation in VA increased alpha1 frequency significantly (p<0.03) and the ratio alpha1 / theta was shifted to the benefit of alpha1 over all electrodes. The HRV parameters showed a significant increase of the LF/HF-ratio during the first minute of stimulation in VA (p<0.02) indicating an initial increase of sympathetic activation. However, a short-term increase of HF power (p<0.05) in the minute after stimulation suggests delayed vagal activation. Subjective acupuncture effects concerning pain sensation and DeQi feeling during stimulation were more pronounced in VA. These findings are consistent with the theory that acupuncture at LI4 induces a relaxation effect. Furthermore, LI4 stimulation leads to specific changes in alpha EEG frequency and in HRV parameters. A close linear relationship between LF or HF and alpha EEG band pointed to a specific modulation of cerebral function by vegetative effects during VA compared to placebo.

Keywords: acupuncture, LI4, placebo, ECG, heart rate variability, quantitative EEG