Effects of acupuncture on the brain hemodynamics

ABSTRACT

Acupuncture therapy has been applied to various psychiatric diseases and chronic pain since acupuncture stimulation might affect brain activity. From this point of view, we investigated the effects of acupuncture on autonomic nervous system and brain hemodynamics in human subjects using ECGs, EEGs and near-infrared spectroscopy (NIRS). Our previous studies reported that changes in parasympathetic nervous activity were correlated with number of de-qì sensations during acupuncture manipulation. Furthermore, these autonomic changes were correlated with EEG spectral changes. These results are consistent with the suggestion that autonomic changes induced by needle manipulation inducing specific de-qì sensations might be mediated through the central nervous system, especially through the forebrain as shown in EEG changes, and are beneficial to relieve chronic pain by inhibiting sympathetic nervous activity. The NIRS results indicated that acupuncture stimulation with de-qì sensation significantly decreased activity in the supplementary motor complex (SMC) and dorsomedial prefrontal cortex (DMPFC). Based on these results, we review that hyperactivity in the SMC is associated with dystonia and chronic pain, and that in the DMPFC is associated with various psychiatric diseases with socio-emotional disturbances such as schizophrenia, attention deficit hyperactive disorder, etc. These findings along with the previous studies suggest that acupuncture with de-qì sensation might be effective to treat the various diseases in which hyperactivity in the SMA and DMPFC is suspected of playing a role.