Effects of acupuncture on declined cerebral blood flow, impaired mitochondrial respiratory function and oxidative stress in multi-infarct dementia rats.

Abstract
Brain energy disorders and oxidative stress due to chronic hypoperfusion were considered to be the major risk factors in the pathogenesis of dementia. In previous studies, we have demonstrated that acupuncture treatment improved cognitive function of VaD patients and multi-infarct dementia (MID) rats. Acupuncture therapy also increased the activities of glycometabolic enzymes in the brain. But it is not clear whether acupuncture treatment compensates neuronal energy deficit after cerebral ischemic through enhancing the activities of glucose metabolic enzymes and preserving mitochondrial function, and whether acupuncture neuroprotective effect is associated with activations of mitochondrial antioxidative defense system. So, the effect of acupuncture therapy on cognitive function, cerebral blood flow (CBF), mitochondrial respiratory function and oxidative stress in the brain of MID rats was investigated in this study. The results showed that acupuncture treatment significantly improved cognitive abilities and increased regional CBF of MID rats. Acupuncture elevated the activities of total SOD, CuZnSOD and MnSOD, decreased the level of malondialdehyde (MDA) and superoxide anion, regulated the ratio of reduced glutathione (GSH) and oxidized glutathione (GSSG) in mitochondria, and raised the level of the respiratory control index (RCI) and P/O ratio and the activities of mitochondrial respiratory enzymes of MID rats. These results indicated that acupuncture treatment improved cognitive function of MID rats; and this improvement might be due to increased CBF, which ameliorated mitochondrial dysfunction induced by ischemia and endogenous oxidative stress system of brain.