Cerebral Blood Flow Effects of Pain and Acupuncture

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Seven patients with chronic pain and five healthy controls participated in a study that aimed to measure the cerebral blood flow changes associated with the analgesic effect of acupuncture inpatients with chronic pain. All single-photon emission computed tomography (SPECT) scans were acquired with a uniform protocol. The patient group was injected with the radioisotope hexamethyl propyleneamine oxime (HMPAO) while experiencing their usual level of pain. A baseline scan was acquired approximately 20 minutes after administration of the HMPAO. Afterwards, the patients were treated with acupuncture with needles placed in points specifically selected to relieve pain. When the pain improved, as determined by a 10-digit score for pain assessment, the patients were re-injected with HMPAO and imaged twenty minutes later for the acupuncture scan. The reference group also had a baseline and acupuncture scan, although the acupuncture itself was performed using a standardized set of needle points.

The reference group participants were found to have significant increases in the thalamic and prefrontal cortex activity on the acupuncture scan compared to the baseline. The baseline scans of the pain patients showed significant asymmetric uptake in the thalami compared to controls. This asymmetry reversed or normalized after the acupuncture therapy. Significant correlations were observed between the change of activity in the prefrontal cortex and ipsilateral sensorimotor area. The results from these cases show that HMPAO-SPECT is capable of detecting changes in cerebral blood flow associated with pain and that acupuncture analgesia is associated with changes in the activity of the frontal lobes, brain stem, and thalami.