

## Acupuncture mechanisms on lower digestive function

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Acupuncture has been used for treating functional gastrointestinal (GI) disorders, including irritable bowel syndrome (IBS), constipation and diarrhea, and its clinical benefits have been reported. In recent years, numerous studies have demonstrated the mechanisms of acupuncture on gastric functions, such as secretion, motility and emptying. Despite the well-established mechanisms of acupuncture on gastric functions, the precise mechanisms of acupuncture on colonic motor functions have scarcely been investigated. I reported the latest findings concerning the effects of acupuncture on colonic motility and transit.

Cholecystokinin (CCK) is known as a brain-gut peptide which induces gall bladder contraction, intestinal and colonic motility, and regulates food intake. In 2002, our colleague demonstrated that electroacupuncture (EA) (100Hz) at ST-36 (Zusanli) significantly released central CCK, resulting in an increase of colonic myoelectric activity via CCK-A receptors.

Recently, we investigated the hypothesis that EA at ST-36 stimulates colonic motility and transit via a parasympathetic pathway in conscious rats. We also studied c-Fos expression in response to EA at ST-36 in the Barrington's nucleus of the pons. EA (10Hz) significantly increased distal colonic motility. In contrast, EA had no stimulatory effects in the proximal colon. EA also significantly accelerated colonic transit. The stimulatory effect of EA on colonic motility and transit was abolished by the pretreatment with atropine. EA-induced acceleration of colonic transit was also abolished by the pelvic nerve denervation. The number of c-Fos immunopositive cells at the Barrington's nucleus significantly increased in response to EA. In conclusion, EA at ST-36 stimulates distal colonic motility and accelerates colonic transit via sacral parasympathetic efferent pathway (pelvic nerve). Barrington's nucleus plays an important role in mediating EA-induced distal colonic motility in conscious rats.

Psychological stress plays a major role in functional GI disorders, especially IBS. Experimental studies demonstrated that colonic motility and transit are stimulated by stress in rodent. We investigated whether EA at ST-36 improves restraint stress-induced alteration of colonic motor responses in conscious rats. Restraint stress significantly accelerated colonic transit. EA reduced stress-induced acceleration of colonic transit. IC-injection of CRF accelerated colonic transit. EA significantly improved CRF-induced acceleration of colonic transit. The inhibitory effect of EA on stress-induced acceleration of colonic transit was not affected by guanethidine. In summary, the inhibitory effect of EA on stress-induced acceleration of colonic transit is independent of the sympathetic pathway.

Verification of this neural pathway may contribute to understanding the beneficial mechanisms of acupuncture on functional bowel diseases.

**Key Words:** electroacupuncture, colonic motility, colonic transit, pelvic nerve, stress