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CLINICAL STUDY

Comparative effect of electroacupuncture and moxibustion on the expression of substance P and vasoactive intestinal peptide in patients with irritable bowel syndrome

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Abstract

OBJECTIVE: To compare the impacts of electroacupuncture (EA) and moxibustion (Mox) on the primary gastrointestinal symptoms and the expressions of colonic mucosa-associated neuropeptide substance P (SP) and vasoactive intestinal peptide (VIP) in patients with either diarrhea-predominant or constipation-predominant irritable bowel syndrome (IBS-D and IBS-C, respectively).

METHODS: Eighty-five IBS patients were randomly allocated to the EA and Mox groups. Zusanli (ST 36) and Shangjuxu (ST 37) were selected as acupoints for electroacupuncture or warm moxibustion treatment once a day for 14 consecutive days. Before and after the treatment sessions, a Visual Analog Pain Scale and the Bristol Stool Form Scale were used to evaluate gastrointestinal symptoms. There were four dropout cases, leaving 81 participants (41 with IBS-D and 40 with IBS-C) who volunteered to undergo colonoscopy before and after the treatment sessions. During colonoscopy, sigmoid mucosa were collected to detect SP and VIP expression using immunohistochemistry assay.

RESULTS: Both EA and Mox treatments were effective at relieving abdominal pain in IBS-D and IBS-C patients. However, Mox was more effective at reducing diarrhea in IBS-D patients, whereas EA was more effective at improving constipation in IBS-C patients. EA and Mox treatments both down-regulated the abnormally increased SP and VIP expression in the colonic mucosa, with no significant difference shown between the two treatments.

CONCLUSION: Both EA and Mox treatments are effective at ameliorating gastrointestinal symptoms by reducing SP and VIP expression in the colonic mucosa of IBS patients.

Key words: Irritable bowel syndrome; Electroacupuncture; Moxibustion; Substance P; Vasoactive intestinal peptide

INTRODUCTION

Irritable bowel syndrome (IBS) is the most common disorder presented to gastroenterologists, with a prevalence of up to 10%-20% in the UK and USA[1,2] and a prevalence of 5%-10% in most Asian countries.[3,4] The incidence of IBS increases with global economic growth. The most common IBS presenting symptoms are abdominal pain associated with altered bowel habits (diarrhea or constipation). Although the exact mechanism of IBS gastrointestinal symptoms has not been elucidated, visceral hypersensitivity and gastrointestinal motility disorders are the main pathological causes.[5] There is also evidence that IBS involves altered gut motility. Several brain-gut peptides, such as substance P (SP) and vasoactive intestinal peptide (VIP), are involved in the regulation of gastrointestinal motor and sensory functions. SP and VIP are important brain-gut peptides that are widely distributed in the central nervous system, gastrointestinal tract, and immune organs. These brain-gut peptides can affect gastrointestinal movements through nervous, endocrine, immune, and other means and may be involved in abdominal pain or discomfort, abnormal defecation, and other visceral hypersensitivity reactions.[6,7] Abnormal levels of SP and/or VIP have been demonstrated in patients with IBS with diarrhea (IBS-D) and IBS with constipation (IBS-C).[8]

Sandler *et al* [9] revealed that abdominal pain was the symptom most likely to result in IBS patients seeking a medical consultation. The therapeutic options currently available are limited and their lack of efficacy is often disappointing. In recent years, the stimulation of certain acupoints or areas with electroacupuncture (EA) or moxibustion (Mox) has appealed to some scholars and a number of clinical[10-14] and experimental[15-19] studies have demonstrated its effectiveness, especially for curing abdominal pain or discomfort, abnormal defecation, and other gastrointestinal symptoms induced by visceral hypersensitivity. Our previous studies found that SP and SP receptors expression were greater in rats with IBS than in normal rats, indicating that SP and SP receptors are closely related to the development of IBS. EA at Zusanli (ST 36) and Shangjuxu (ST 37) can decrease the number of mast cells and the expression of SP and SP receptors in the colon.[19] In this study, we investigated whether EA and/or Mox in IBS-D and IBS-C patients affected abdominal pain or discomfort, abnormal defecation and other gastrointestinal symptoms, the expression of SP in the colonic mucosa, and the expression of VIP. We compared differences in curative capacity between the two therapies in the hope of providing reliable evidence for the clinical treatment of IBS-D and IBS-C.

MATERIALS AND METHODS

Participants

This research was approved by the Chinese Clinical Trial Register Center (registration number: ChiCTR-TRC-11001349). All subjects were outpatients of the Department of Gastroenterology in Jinhua Hospital of Zhejiang University from October 2011 to September 2012. All patients gave informed consent and the trial was approved by the Ethics Committee of Yueyang Chinese and Western Medicine Integrated Hospital affiliated to Shanghai University of Traditional Chinese Medicine.

We adopted a simple randomized design using the SNOSE (sequentially numbered, opaque sealed envelopes) method. We used a random number table and the numbers generated were written on individual cards and enclosed sequentially in envelopes. Then, the order of each generated number was written on the envelopes and assigned to each eligible patient in order. The random number on the enclosed cards determined the group allocation for each patient: odd numbers denoted the EA group and even numbers denoted the Mox group. The same randomization method was applied separately to IBS-D and IBS-C patients.

We assessed the eligibility of the initial 85 IBS patients according to the Rome Ⅲ diagnostic criteria.[20] Participants with intestinal organic diseases; combined heart, liver, and kidney disease; mental illness; and pregnant or lactating women with diarrhea were excluded . Of the remaining patients, 43 patients aged 18 to 65 years with IBS-D were randomly allocated to the EA treatment group (n = 21) or the Mox treatment group (n = 22). Forty-two patients aged 18 to 65 years with IBS-C were randomly allocated to the EA treatment group (n = 21) or the Mox treatment group (n = 21). After signing an informed consent form that was approved by the ethics committee, all IBS-D and IBS-C patients provided information about their main digestive tract symptoms, including abdominal pain, abdominal distention, and diarrhea or constipation. 3 mm^3 of sigmoid or ileocecal mucosa (selected according to the area in which the patient experienced abdominal pain or discomfort) was removed via painless colonoscopy before and after treatment. Sigmoid mucosa was collected from 10 healthy volunteers for comparison. The mucosa was placed in 10% formaldehyde solution for analysis. All healthy volunteers were examined for enucleated colonic polyps and intestinal organic diseases and had experienced no change in bowel habits or excrement character.

Treatment methods

As patients entered the clinic, they were randomly allo-