

REVIEW

Clinical application of acupuncture and Chinese materia medica in the treatment of gastrointestinal dysfunction under the mode of traditional Chinese medicine

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ABSTRACT

In China, Chinese materia medica and acupuncture have been applied as effective methods for the treatment of gastrointestinal dysfunction for several thousand years. In fact, traditional Chinese medicine (TCM), especially acupuncture, has been gradually accepted by practitioners and patients all over the world. However, due to lack of systematic and comprehensive review articles, the effects of acupuncture and Chinese materia medica under the TCM mode have not been clearly elaborated. Therefore, in this review, we discussed the potential clinical value of acupuncture and Chinese materia medica in the treatment of gastrointestinal dysfunction under the TCM model. Articles published in the past 10 years were searched with "acupuncture," "gastrointestinal dysfunction," "gastrointestinal disorders," and other relevant keywords. In the following review, the author expounded the effects of TCM on gastrointestinal function and its potential value from the perspective of acupuncture for gastrointestinal dysfunction, Chinese materia medica for gastrointestinal dysfunction, and the combination of acupuncture and Chinese materia medica.

Key words: acupuncture, Chinese materia medica, dachengqi decoction, traditional Chinese medicine mode, gastrointestinal dysfunction, clinical application

INTRODUCTION

Gastrointestinal (GI) diseases are a major burden to society with high morbidity rates. Gastrointestinal disorders were reported as the most common GI symptom in the United States in 2012, with 15.9 million clinical visits including 8.9 million visits for gastroesophageal reflux, in the 10 years from 2002 to 2012, hospitalizations and mortality from clostridium interslice infections doubled. Acute pancreatitis is the most common cause of hospitalization, with a reported


total cost of 32.4 billion USD for outpatient endoscopy.^[1] A multinational large-scale epidemiological survey showed that 40% of the respondents suffered from functional gastrointestinal diseases, which would directly affect the quality of life of the respondents and increase the burden on families and medical insurance.^[2] To reduce this burden, it is necessary to provide an economical method for treating gastrointestinal diseases. Therefore, more and more attention has been paid to the efficacy and related mechanisms of traditional Chinese medicine (TCM) including prescriptions of

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Chinese medicinal herbs and acupuncture in the treatment of gastrointestinal diseases. As an alternative therapy, acupuncture can regulate the motility function of the gastrointestinal tract,^[3] gastrointestinal visceral pain,^[4] relieving irritable bowel syndrome,^[5,6] etc. According to studies, Chinese patent medicine has the effect of regulating gastrointestinal movement,^[7] and has a good inhibitory effect on the inflammatory response *in vivo*.^[8]

Acupuncture and Chinese materia medica are integral parts of TCM, and their application history in China can be traced back to several thousand years from Inner Canon of Yellow Emperor. It has been systematically expounded in the Inner Canon of the Yellow Emperor. In the syndrome differentiation mode of TCM, acupuncture is a method of balancing Yin and Yang, and promoting harmonious flow of Qi throughout the body. Chinese materia medica can strengthen the spleen and replenish Qi, regulate Qi movement, and unblock the Qi of the viscera. Therefore, acupuncture and Chinese materia medica are widely used in the treatment of gastrointestinal diseases in China, and also have many applied to gastrointestinal dysfunction. In this paper, we discussed three aspects including acupuncture application, Chinese materia medica application and combined application of acupuncture and Chinese materia medica under the mode of TCM, in order to explore its clinical application potentials in gastrointestinal dysfunction.

ACUPUNCTURE IMPROVES GASTROINTESTINAL MOTILITY FUNCTION

Guided by TCM theory, acupuncture therapy has the functions of strengthening anti-pathogenic Qi

Eliminating pathogenic factors, balancing Yin and Yang and promoting circulation of the meridians and collaterals. In China, acupuncture and moxibustion have been applied to gastrointestinal dysfunction for several thousand years. In the treatment, acupoints in the Stomach Meridian of Foot Yangming and Large Intestine Meridian of Hand Yangming are selected. The acupoints include Zusanli (ST36), Shangjuxu (ST37), Neiguan (PC6) and so on. ST36 is the Lower He-sea point of the Stomach Meridian of Foot Yangming, with the functions of invigorating the spleen, harmonizing the stomach, and regulating ascending or descending of Qi. It is an important acupoint to regulate gastrointestinal function. ST37 is the Lower He-sea point of the Large Intestine Meridian of Hand Yangming, with the functions of regulating Qi, harmonizing the stomach, unblocking and descending Qi in the Fu organs and promoting gastrointestinal peristalsis. PC 6 is the Luo-Connecting point to the Sanjiao Meridian of Hand

Shaoyang, with the functions of promoting Qi movement, circulating the Middle Qi, spreading Qi to the Upper Jiao and Middle Jiao and regulating gastrointestinal function. The combination of these acupoints can regulate Qi movement, balance Yin and Yang, and promote the recovery of gastrointestinal function. The most commonly used acupoints in clinical practice also include Zusanli (ST36), Shangjuxu (ST37), Tianshu (ST25), Sanyinjiao (SP6), Neiguan (PC6), HuatuoJiaji, etc.^[9] Some studies have found that acupuncture at HuatuoJiaji points has a good therapeutic effect on gastrointestinal dysfunction in sepsis. The acute physiology and chronic health status score (APACHE II) of the patients in the treatment group was significantly improved, and bowel sounds were increased. Intra-abdominal pressure and gastric residual volume were significantly reduced.^[10] Electroacupuncture at Zusanli (ST36) and Shangjuxu (ST37) could also effectively inhibit intestinal inflammation and improve intestinal function.^[11] Acupuncture can regulate different types of gastrointestinal motility, and M2/3 receptor knockout can significantly inhibit Shangjuxu (ST37)-induced gastric motility and colonic motility. Additionally, $\beta 1/2$ receptor knockout can change ST25-induced inhibition of gastric motility, but cannot significantly alter ST25-induced enhancement of colonic motility.^[12] Preoperative electroacupuncture at Neiguan (PC6), Zusanli (ST36) and Shangjuxu (ST37) administered within 24 h before surgery can prevent the occurrence of postoperative gastrointestinal dysfunction.^[13] And acupuncture at Neiguan (PC6), Zusanli (ST36) and Shangjuxu (ST37) one day before surgery can improve postoperative gastrointestinal function and shorten hospital stay in patients with vascular surgery.^[14] It was found that acupuncture at meridian points was significantly better than that at non-meridian points in improving postoperative gastrointestinal dysfunction.^[15] In the elderly with severe pneumonia and gastrointestinal dysfunction, acupuncture can effectively relieve gastrointestinal symptoms, reduce the patient's intra-abdominal pressure and gastric residual volume. It may be related to acupuncture's improving gastrointestinal hormone secretion levels and gastrointestinal mucosa barrier function.^[16] The recovery of gastrointestinal function after gynecological surgery is crucial, and a meta-analysis found that electroacupuncture may be a promising strategy for the prevention and treatment of gastrointestinal dysfunction after gynecological surgery, including shortening time to first flatus (TFF), time to first defecation (TFD), time to bowel sounds recovery (TBS), regulating motilin (MTL), and reducing postoperative nausea and vomiting (PONV) within 24 h after surgery.^[17]

ORAL ADMINISTRATION OF CHINESE MATERIA MEDICA IMPROVES GASTROINTESTINAL DYSFUNCTION

There are 20 types of classic Chinese medicine prescriptions used for digestive diseases in Chinese materia medica, such as Sini Powder, BuzhongYiqi Decoction, ShaoyaoGancao Decoction, *etc.* About 11 of them have the function of promoting gastrointestinal motility, while the rest can inhibit the gastrointestinal motility.^[18] On the one hand, the Chinese medicine formulas can regulate gastrointestinal motility, and on the other hand, they can improve the secretion of gastrointestinal related hormones. Studies have confirmed that the administration of Chinese herbal medicines to the umbilicus is a safe and effective way to treat gastrointestinal dysfunction.^[19] Changweishu, a Chinese patent medicine, has a protective effect on patients with gastrointestinal dysfunction in sepsis, and its mechanisms is the improvement of intestinal mechanical barrier damage, the reduction of intestinal mucosal permeability and the inhibition of the level of inflammatory factors.^[20] Dachengqi Decoction is also a commonly used prescription for gastrointestinal dysfunction. Studies have found that Dachengqi Decoction is composed of Radix Astragali seuHedysari, Radix Angelicae Sinensis, Magnolia, Cortex Magnoliae Officinalis, Pericarpium Citri Reticulatae, Semen Persicae, Radix Paeoniae Rubra, *etc.* This decoction can effectively relieve the symptoms of postoperative gastrointestinal dysfunction and improve the quality of life of patients.^[21] which may be related to its ability of enhancing gastrointestinal motility function.^[22,23] When Dachengqi Decoction combined with conventional therapy is used to treat gastrointestinal dysfunction of patients receiving mechanical ventilation in acute lung injury/acute respiratory distress syndrome (ALI/ARDS), the incidence of symptoms and signs of gastrointestinal dysfunction, such as stress ulcer bleeding, toxic intestinal paralysis, abdominal distension, diarrhea and others was significantly reduced.^[24] Yunnan Baiyao can effectively improve children's gastrointestinal dysfunction, shorten the course of treatment, and enhance the therapeutic effect.^[25] Transdermal administration is also a relatively new way of applying Chinese medicine prescription. Transdermal administration of Dachengqi Decoction through low-frequency ultrasonic waves and electric pulses can effectively shorten the recovery time of intestinal motility after laparoscopy and accelerate TFF after gastrointestinal surgery.^[26] The adding of Changweishu to routine western medicine treatment such as meropenem, norepinephrine, glutamine glue and Bifidobacterium lactis tablets can improve the gastrointestinal function of patients with sepsis and gastrointestinal dysfunction, reduce the morbidity and mortality of multiple organ dysfunction syndrome (MODS) and improve patient outcomes.^[27] External application of Tongfu Powder to the umbilicus has significant advantages over mosapride in TFF and recovery of bowel sounds, and can relieve the symptoms of gastrointestinal dysfunction in patients with acute

pancreatitis.^[28] While acupoint application of WentongLiqi prescription can promote the recovery of bowel sounds after appendix surgery.^[29]

COMBINED USE OF ACUPUNCTURE AND CHINESE MATERIA MEDICA

It is believed in TCM that when a medicine is not effective, acupuncture will be the appropriate therapy. That is to say, the curative effect that Chinese materia medicine cannot achieve can be supplemented by acupuncture. Therefore, in the treatment of gastrointestinal dysfunction, the combined use of acupuncture and Chinese materia medicine has a good effect. Some studies have found that the combined use of acupuncture and BanxiaXiexin Decoction has a good effect on gastrointestinal dysfunction induced by sepsis. It can significantly relieve the clinical symptoms of patients, such as flatulence and gastrin secretion levels, and significantly improve the quality of life of patients.^[30] Acupuncture can promote the recovery of gastrointestinal function in patients with severe pneumonia since it can significantly improve intra-abdominal pressure, bowel sounds, and gastric retention.^[31] Combining FuzhengLiqi mixture and acupuncture can significantly shorten defecation interval and gastrointestinal transit time, increase serum motilin (MTL) level, and reduce constipation symptoms and accompanying symptoms in patients with functional constipation. After combined application, the long-term efficacy is significantly improved, and the safety is also guaranteed.^[32] The combination of acupuncture and medicine in the treatment of chronic atrophic gastritis with spleen and stomach deficiency is more effective than medicine alone.^[33] Warming needle moxa at Tianshu (ST25) and Dachangshu (BL25) combined with Chinese patent medicine in the treatment of irritable bowel syndrome due to liver Qi stagnation and spleen deficiency has significant advantages in reducing the degree and frequency of abdominal pain, abdominal distension, vexation, insomnia, anxiety and suspiciousness, and loose stools.^[2]

SUMMARY AND PROSPECT

Gastrointestinal dysfunction is manifested by many gastrointestinal symptoms, such as bloating and diarrhea. TCM holds that the normal and coordinated functions of the spleen, stomach, kidney and liver are key to the body's digestion and absorption. According to research, Chinese medicine prescriptions of dispersing the stagnated liver Qi, reinforcing Qi and regulating the flow of Qi can promote gastrointestinal motility, such as XiangshaLiujunzi Decoction, Chaihu-Shugan-San and Xiaoyao Powder. Chinese medicine prescriptions for invigorating the spleen and relieving diarrhea have the effect of inhibiting gastrointestinal motility, such as

Poria^[34]. The application of acupuncture and Chinese materia medica in TCM follows the principle of giving treatment based on syndrome differentiation. According to the close relationship between functional GI diseases and the functions of the four zang organs including the spleen, stomach, kidney and liver, different conditions of spleen, kidney Yang and stomach deficiency and liver Qi stagnation are analyzed in the treatment of GI diseases. The application of invigorating the spleen, reinforcing Qi, warming Yang and dispersing the stagnated liver Qi can significantly enhance the curative effect without adverse reactions. Different treatment methods are used for different types of syndrome. For Qi deficiency of spleen and stomach, the method of reinforcing spleen and Qi is used as in BuzhongYiqi Decoction. For liver Qi stagnation, we adopt the method of dispersing the stagnated liver Qi as in Chaihu-Shugan-San. Acupuncture also follows similar principles, such as tonifying for deficiency syndrome and reducing excess syndrome. The difference is that acupuncture achieves this curative effect through inserting needles along different meridians or at specific acupoints. Acupuncture has unique advantages in regulating gastrointestinal motility function and inhibiting inflammatory response, and can effectively relieve the symptoms related to gastrointestinal dysfunction in patients. The combined use of acupuncture and Chinese materia medica has also been proved to have a good effect on gastrointestinal dysfunction. It is also very important to explore more acupuncture-medicine treatments for gastrointestinal dysfunction. Therefore, acupuncture and Chinese materia medica under the mode of TCM has a certain value in improving gastrointestinal dysfunction and are worthy of further clinical research.

DECLARATION

Author contributions

Zhao J: Conceptualization, Writing—Original draft preparation, Writing—Reviewing and Editing. Feng C: Conceptualization, Supervision. Rong P: Supervision, Project administration.

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