

# Research Progress on Traditional Chinese Medicine Classification and Treatment of Diabetic Gastroparesis

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**Abstract:** Diabetic Gastroparesis (DGP), a common chronic complication of diabetes, is primarily characterized by impaired gastric motility and delayed gastric emptying. Symptoms include nausea, vomiting, bloating, loss of appetite, early satiety, and upper abdominal pain. With the increasing prevalence of diabetes, the incidence of DGP is also on the rise. However, there is currently no standardized mechanism of action, syndrome differentiation, or effective treatment methods for DGP, posing significant challenges for clinicians. This paper, based on the classification and treatment methods of DGP in (TCM), comprehensively analyzes and differentiates syndromes, categorizing DGP into syndromes such as Spleen Deficiency and Stomach Weakness, Deficiency of Both Stomach Qi and Yin, Spleen Yang Deficiency, Liver Qi Attacking the Spleen, Phlegm-Dampness Obstruction, and Blood Stasis Obstruction. It provides a detailed discussion on the etiology, pathogenesis, and corresponding treatment prescriptions for each syndrome. The aim is to offer more precise and personalized treatment strategies for patients with different symptoms of gastroparesis, thereby improving their quality of life and advancing the progress of TCM treatment for DGP.

**Keywords:** Diabetic Gastroparesis, Traditional Chinese Medicine Classification, Syndrome Differentiation and Treatment, Traditional Chinese Medicine Treatment.

## 1. Ancient Chinese Medical Understanding of Diabetic Gastroparesis

The term "Xiaohe" (wasting-thirst) first appeared in the ancient Chinese medical text *Su Wen: Qi Bing Lun* (Basic Questions: Discussion of Strange Diseases): "Pi Dan... This results from excessive consumption of rich and sweet foods. The fat causes internal heat, and the sweetness causes fullness in the center, resulting in upward surging Qi, transforming into Xiaohe." Over time, Xiaohe leads to various diseases, one of which is DGP. While ancient texts did not explicitly name diabetes or DGP, in *Qian Jin Yi Fang: Volume 16* (Supplement to the Essential Prescriptions Worth a Thousand Gold), it is noted: "Food does not digest, food intake leads to fullness, frequent urination occurs, and Wei Bi (gastric obstruction) happens... Bi means obstruction, fatigue." This describes a condition where undigested food stagnates in the middle burner, unable to descend to the small intestine, causing obstruction. The weakening of spleen and stomach Qi reduces their function in digestion, aligning with the modern concept of "gastroparesis". Ming Dynasty physician Sun Yikui mentioned in his work *Chi Shui Xuan Zhu* (Pearl of Red Water): "Urinating more than twenty times a day, with sweet taste, reduced food intake, and severe fatigue." "Not being able to eat results in abdominal fullness and distension," describing symptoms of decreased appetite and bloating in diabetic patients, which is an early understanding of DGP [2]. In modern times, TCM has developed a more comprehensive understanding of DGP. The Qing Dynasty physician Huang Yuan-yu's theory of "Yi Qi Zhou Liu" (Circulation of One Qi) centers on the ascension and descent of middle Qi. According to this theory, the pathogenesis of DGP involves the dysregulation of Qi in the middle burner, leading to impaired spleen and stomach function. Xiaohe is often due to overconsumption of rich and sweet foods, weakening the

spleen and stomach. This results in the inability of middle Qi to ascend or descend properly, disrupting digestion, accumulating dampness into phlegm, which further hinders spleen and stomach function, causing fullness and distension. Additionally, liver Qi stagnation and kidney water deficiency can also obstruct spleen and stomach function [3].

## 2. Modern Research on Diabetic Gastroparesis

Current research on the mechanisms of DGP has not yet reached a unified standard. It is believed to be associated with several factors, including: (1) damage to interstitial cells of Cajal (ICCs), (2) disruption of gastrointestinal hormone secretion, (3) diabetic microvascular complications, and (4) gastric smooth muscle pathology [4]. Clinically, patients with DGP commonly present with symptoms such as epigastric discomfort, nausea, vomiting, belching, bloating, and loss of appetite. The primary treatment approaches in Western medicine involve controlling blood glucose levels and using prokinetic agents [5]. Metoclopramide is a representative prokinetic agent and has been the mainstay treatment for DGP patients since its approval by the U.S. Food and Drug Administration in 1980 [6]. Research indicates that metoclopramide helps alleviate vomiting by inhibiting the chemoreceptor trigger zone in the medulla. However, recent reports have highlighted adverse effects such as extrapyramidal reactions, including convulsions, limb tremors, and facial and ocular distortions [7]. Domperidone, while not causing extrapyramidal adverse effects, is associated with the risk of developing tolerance with long-term use and potential arrhythmias [8]. Additionally, other treatments may include antiemetic drugs, acid suppressants, and antibiotics. For severe cases, treatment goals are to improve gastric motility, shorten gastric emptying time, and minimize gastrointestinal side effects of medications. Although serotonin receptor

agonists such as mosapride and cisapride can promote gastric emptying, they are prone to causing arrhythmias. Prokinetic agents like azithromycin and erythromycin, when used long-term, can lead to secondary bacterial infections [9]. Furthermore, growth hormone agonists may accelerate gastric emptying, but their efficacy and safety require further research.

### 3. Classification of Diabetic Gastroparesis

Currently, there is no unified classification system for Diabetic DGP. Different physicians have varying perspectives on its classification, which is closely related to the organs and meridians involved, particularly the spleen, stomach, and liver. The spleen and stomach are central to the middle burner, acting as a hub for the ascending and descending Qi movement. Over time, with prolonged Xiaoke (wasting-thirst), obstruction in the meridians of the spleen and stomach can prevent the clear Qi from ascending and the turbid Qi from descending, leading to abnormal gastric motility and resulting in gastroparesis. The pathogenesis can be classified into deficiencies and excesses, with deficiencies mainly involving spleen deficiency, weak stomach, deficiency of both stomach Qi and Yin, and spleen Yang deficiency. Excessive conditions include Qi stagnation, phlegm-damp accumulation, damp-heat, and blood stasis obstructing the spleen and stomach.

#### 3.1 Spleen Deficiency and Weak Stomach Type

In individuals with a generally weak constitution or those affected by pathological factors such as Qi stagnation or phlegm-damp accumulation, there may be abnormal Qi movement in the middle burner, leading to the spleen's inability to properly transform and transport substances. According to Su Wen: Jing Mai Bie Lun (Basic Questions: Discussion of Meridians and Collaterals), "Fluids enter the stomach, where they interact with vital Qi and ascend to the spleen. The spleen Qi disperses the essence upwards to the lungs and regulates the water pathways, descending to the bladder. The essence of water is distributed, and the five pathways function concurrently." Li Dong-yuan described in Pi Wei Lun (Treatise on the Spleen and Stomach) that "vomiting, belching, and regurgitation are all associated with spleen and stomach weakness, which may be due to invasion by cold or heat, or damage from food and drink, leading to Qi counterflow and difficulty in digestion." When the spleen fails to effectively transform and transport, fluid distribution is impaired, resulting in symptoms such as nausea, bloating, discomfort in the stomach, reduced appetite, fatigue, loose stools, a pale tongue with a white coating, and a submerged, thin pulse. Clinical treatment often involves methods to strengthen the spleen and benefit the stomach [10]. Common prescriptions include Si Jun Zi Tang (Four Gentlemen Decoction) [11], Liu Jun Zi Tang (Six Gentlemen Decoction), Bu Zhong Yi Qi Tang (Tonify the Middle and Augment the Qi Decoction), Huang Qi Jian Zhong Tang (Astragalus Decoction for Strengthening the Middle), Si Jun Xiao Pi Tang (Four Gentlemen Decoction to Relieve Distention), Xiang Sha Liu Jun Zi Tang (Aromatic and Smooth Six Gentlemen Decoction), and Ren Shen Shu Di Tang (Ginseng and Atractylodes Decoction), with modifications to tonify Qi, strengthen the spleen, and harmonize the stomach. Liang

Wei-jian and colleagues favor heat-clearing and damp - dispelling methods combined with spleen-strengthening and Qi-boosting techniques, using Chai Hu Jian Wei Tang (Bupleurum Decoction to Strengthen the Stomach) containing Chai Hu (Bupleurum), Huang Qin (Scutellaria), Ban Xia (Pinellia), Cang Zhu (Atractylodes), Hou Po (Magnolia Bark), Bai Zhu (Atractylodes), Chen Pi (Tangerine Peel), and Gan Cao (Licorice) to treat 74 patients with spleen and stomach deficiency-type DGP. Compared to the Western medicine control group, this treatment significantly alleviated clinical symptoms, reduced gastrointestinal discomfort, improved blood glucose stability, and achieved a higher gastric emptying rate, thus alleviating symptoms of gastrointestinal obstruction ( $P < 0.05$ ) [12].

#### 3.2 Stomach Qi and Yin Deficiency Type

With prolonged Xiaoke (wasting-thirst), the depletion of Qi and Yin leads to insufficient stomach Yin, reducing the stomach's ability to digest and transform food and fluids. This results in stagnation in the middle burner, presenting as symptoms such as abdominal distention, lack of appetite, dry mouth, constipation, a red tongue with scanty saliva, a thin yellow coating, and a fine, rapid pulse. Li Yongcui wrote in his work Zheng Zhi Hui Bu (Supplement to the Collection of Patterns and Treatments) that "Yin deficiency causes vomiting, not only affecting the stomach but indicating a general lack of Yin leading to vomiting." Stomach Yin deficiency results in insufficient fluid nourishment, and the inability of stomach Qi to descend can also lead to vomiting. Clinical treatment often involves methods to nourish the stomach Yin. Common prescriptions include Yi Wei Tang (Benefit the Stomach Decoction), Yi Qi Yang Yin and Wei Fang (Benefit Qi and Nourish Yin Stomach Formula), and Yi Qi Yang Yin Tang (Benefit Qi and Nourish Yin Decoction), with modifications to nourish the stomach Yin. The Menghe School of Medicine places great emphasis on regulating the spleen and stomach, nourishing Yin, and harmonizing the stomach, often using herbs such as Nan Bei Sha Shen (North and South Ginseng), Shi Hu (Dendrobium), and Mai Dong (Ophiopogon) which are acidic in nature to nourish Yin. They also use Fo Shou (Buddha's Hand) and Lv Mei Hua (Green Plum Blossom) to smooth Qi flow. The Fei School commonly uses self-formulated prescriptions such as Feng Yuan Yin for treating upper digestive disorders, Qu Fan Yang Wei Tang for middle digestive disorders, and Wu Long Tang (Gui Ban, Sheng Di, Tian Dong, Nan Sha Shen, Nu Zhen Zi, Shan Yao, He Fen, Fu Ling, Ze Xie, Che Qian, and Ouyang's Decoction) for lower digestive disorders [13].

#### 3.3 Spleen Yang Deficiency Type

Academician Tong Xiaolin suggests that while diabetes is often associated with Yin deficiency and dryness-heat, prolonged diabetes can also deplete Yang. The gradual weakening of Yang Qi, due to a constitutionally weak body, excessive consumption of cold foods and drinks, or overthinking that damages the spleen, can lead to Spleen Yang deficiency. This deficiency results in improper warming and difficulty in the stomach's ability to digest food, manifesting as symptoms such as abdominal distention and early satiety [14]. Jin Kui Yao Lue (Synopsis of the Golden Chamber) states: "The inability to digest grains is due to the

cold in the stomach... Deficiency injures the spleen, and if the spleen is injured, digestion is impaired. Thus, patients may vomit undigested food after breakfast in the evening and after dinner in the morning, indicating that food from the previous night is not digested." Therefore, patients with Spleen Yang deficiency may also experience increased frequency of vomiting with undigested food. Clinical treatment often involves methods to warm and support Spleen Yang. Common prescriptions include Huang Qi Jian Zhong Tang (Astragalus Decoction for Strengthening the Middle), Fu Zi Li Zhong Tang (Aconite Decoction for Regulating the Middle), and Si Ni San (Frigid Extremities Powder) [15], with modifications to warm Yang, dispel cold, and reduce nausea. Academician Tong Xiaolin frequently uses a combination of Gan Jiang (Dried Ginger), Wu Zhu Yu (Evodia Fruit), and Rou Dou Kou (Nutmeg) to treat Spleen Yang deficiency-type DGP [16].

### 3.4 Liver Qi Stagnation with Spleen Dysfunction Type

The relationship between the spleen, stomach, liver, and kidneys is closely intertwined. The liver (Wood) supports the transformation and transportation functions of the spleen (Earth), while the spleen (Earth) nourishes the liver (Wood) and facilitates its drainage. Bian Zheng Lu (Record of Differentiation and Treatment) states: "If a person vomits immediately after eating, it is due to the Liver Wood impairing the Stomach Earth... The treatment should focus on calming the liver rather than merely stopping the vomiting; Xiao Yao San (Free and Easy Wanderer Decoction) is used for this purpose." Xue Zheng Lun (Treatise on Blood Syndromes) notes: "When food enters the stomach, the Qi of Liver Wood disperses, and the water and grains are transformed." Clinical treatment often involves methods to soothe the liver and strengthen the spleen. Director Pei Ruixia and Bai Xiaolin recommend a modified version of Zhi Shi Xiao Chai Hu Tang (Bitter Orange and Minor Bupleurum Decoction) to stimulate the middle burner Qi and soothe the liver [17]. Zhang Xi-chun suggests that Liver Qi stagnation leading to Wood overacting on Earth impairs the spleen and stomach's ability to regulate Qi, resulting in a feeling of fullness and shortness of breath. Therefore, Pei Spleen and Soothe Liver Decoction with modifications is used [18]. Professor Lv Renhe, a renowned TCM expert, has proposed the use of Fo Xiang San (Frankincense Powder) for its significant improvement in gastric emptying rates in DGP rats. Its efficacy is comparable to the standard drug, Domperidone, with high-dose Fo Xiang San showing superior efficacy in enhancing small intestinal motility compared to medium, low doses, and the control group, thereby normalizing gastrointestinal motility and lowering blood glucose levels in DGP rats [19]. Professor Zhang Lan asserts that DGP should be treated from the perspective of the liver, with Liver Qi soothing as a primary method. Different patterns are treated with modifications of Da Chai Hu Tang (Major Bupleurum Decoction), Xiao Chai Hu Tang (Minor Bupleurum Decoction) combined with Si Jun Zi Tang (Four Gentlemen Decoction), and Xue Fu Zhu Yu Tang (Blood Mansion Decoction to Drive Out Stasis) [20]. Qiu Jianghui found that the modified Si Jun Si Ni Tang (Four Gentlemen Decoction and Four Extremities Powder) was more effective than using Western medicine alone in treating patients with Liver Qi stagnation and Spleen deficiency-type DGP [21].

### 3.5 Phlegm-Damp Obstruction Type

Li Dongyuan wrote in Lan Shi Mi Cang (Secret Treasure of the Orchid Room): "When there is excess dampness in the spleen, it leads to abdominal fullness and food stagnation... there are also cases where individuals with excessive damp-heat internally cause abdominal distention" [22]. Zhu Shen-yu believes that this condition, resulting from long-term diabetes, may be exacerbated by emotional distress or prolonged medication use, which damages the spleen and stomach, disrupting the transformation and transportation functions of the middle burner and leading to irregular Qi movement. The spleen Qi cannot rise, and the stomach Qi cannot descend, resulting in the manifestation of this disease. Dan Xi Xin Fa (Heart Method of Dan Xi) states: "When phlegm and fluid cannot be transformed, it results in a sensation of fullness." Abnormal spleen and stomach function leads to the accumulation of fluids in the middle burner, which transforms into phlegm and dampness over time. Professor Cai Gan suggests that prolonged diabetes depletes Qi and Yin, weakens the spleen and stomach, and impairs their function, leading to the accumulation of damp-heat. Patients often present with abdominal fullness and discomfort, chest tightness, dizziness, body heaviness, lack of thirst, difficult urination, a large tongue with teeth marks on the edges, a white and thick greasy coating, and a moist, weak, or slippery pulse [23]. Therefore, clinical treatment often involves methods to resolve phlegm and transform dampness. Common prescriptions include San Zi Yang Qin Tang (Three Seed Decoction for Nourishing the Elder), Si Jun Zi Tang (Four Gentlemen Decoction) with modifications, and Ling Gui Zhu Gan Tang (Poria, Cinnamon, Atractylodes, and Licorice Decoction) with modifications [24].

### 3.6 Blood Stasis Obstruction Type

Prolonged diabetes can lead to poor circulation of Qi and blood, resulting in obstruction of the meridians and causing symptoms such as stabbing pain in the epigastrium. Xue Zheng Lun (Treatise on Blood Syndromes) states: "When blood stasis is present internally, it causes thirst. This is because blood and Qi are fundamentally interconnected; when there is blood stasis, Qi cannot circulate properly, and thus cannot carry fluids upward, leading to thirst. This is called 'blood thirst,' and thirst will cease once the blood stasis is resolved" [25]. Therefore, treatments often involve prescriptions that activate blood circulation and resolve stasis, such as Xue Fu Zhu Yu Tang (Blood Mansion Decoction to Drive Out Stasis) with modifications.

## 4. Non-Pharmacological Treatments for Diabetic Gastroparesis

### 4.1 Acupuncture Therapy

#### 4.1.1 Needle Acupuncture Treatment

In recent years, with the continuous advancement of clinical and experimental research, acupuncture has made significant progress in the treatment of DGP. As a TCM therapy, acupuncture has a positive regulatory effect on gastrointestinal motility and blood glucose levels, with few adverse reactions. Wang Rui and colleagues identified

through data mining that the core acupuncture points for treating DGP are Zhongwan, Liangmen, Zusanli, and Sanyinjiao [26]. Experimental studies have shown that Professor Lao Jinxiong's method of acupuncture for nurturing the origin and heart can significantly improve symptoms such as abdominal distention, nausea, and early satiety caused by delayed gastric emptying in DGP patients. The selected acupuncture points include Pishu, Weishu, Xinshu, Tianshu, Zhongwan, Zusanli, Hegu, Taichong, and Baihui [27]. Ren Zhixin and others used the method of acupuncture for regulating the stomach and unblocking the bowel, with needle insertion at Taichong, Neiguan, Fenglong, Gongsun, and Zhongwan to promote gastrointestinal motility, accelerate gastric emptying, activate the gastrointestinal hormone regulation system, and adjust the levels of gastrointestinal-related factors [28].

#### 4.1.2 Moxibustion Therapy

**Ginger Moxibustion:** Ginger moxibustion is a common external application in TCM. As noted in Medical Entry (Yi Xue Ru Men), "When medicine cannot reach, and acupuncture cannot address, moxibustion must be applied." Clinically, ginger moxibustion is often performed at points such as Zhongwan, Zusanli, and Neiguan. Research has shown that stimulation of Zusanli can enhance gastrointestinal motility and improve gastrointestinal sensitivity. Ginger promotes digestive secretion and protects the gastric mucosa. Ginger moxibustion can significantly improve clinical outcomes in DGP patients, alleviating symptoms such as abdominal distention, belching, and changes in stool characteristics, and reducing the recurrence rate of the disease [29]. **Zhi Yang Ba Zhen Points:** The Zhi Yang Ba Zhen points, created by Li Zhongyu, can improve symptoms such as abdominal pain, distention, nausea, vomiting, and fatigue [30]. **Heat Sensitivity Moxibustion:** Heat sensitivity moxibustion is a characteristic technique in TCM that uses the warmth of moxibustion to gently stimulate acupoints and activate their effects [31]. Studies have found that combining heat sensitivity moxibustion with herbal heat packs can accelerate the disappearance of symptoms, improve gastric motility parameters, and correct gastrointestinal hormone disorders [32]. Huang Yan and colleagues discovered that the application of Wu Zhu Yu (*Evodia rutaecarpa*) heat packs could relieve gastric cramps, reduce symptoms of acid reflux, belching, anorexia, nausea, vomiting, and early satiety, and alleviate upper abdominal pain, allowing patients to better manage their diet and medication for optimal blood glucose control [33].

**Zhuang Medicine Approach:** According to Zhuang medicine, DGP is caused by the weakness of the digestive tract and obstruction of the epigastric area due to toxic pathogens. The treatment focuses on strengthening Qi and detoxifying. Zhuang medicine uses line-point moxibustion at points such as Zhongwan, Weishu, Zusanli, Neiguan, Dazhui, Tianshu, and Pishu [34].

#### 4.2 Acupoint Plaster Therapy

Traditional acupoint plaster therapy can sometimes cause skin damage or allergic reactions in diabetic patients. Therefore, Wu Hongxia and colleagues have designed a new type of

acupoint plaster. Experimental studies have confirmed that this new acupoint plaster, containing ingredients such as clove, persimmon calyx, *Coptis chinensis*, *Evodia rutaecarpa*, *Pinellia ternata*, and bitter orange, applied to points like Shenque, Tianshu, Shangwan, Zhongwan, and Xiawan, can deliver the medicinal properties through the meridians to the gastrointestinal tract. This method helps to strengthen the spleen and stomach, dissolve blood stasis and resolve stagnation, and regulate Qi and relieve pain [35].

#### 4.3 Silkworm Sand External Heating Method

The silkworm sand external heating method involves roasting silkworm sand with yellow wine in a 1:2 ratio, then adding coarse salt in a 5:1 ratio. The mixture is packed into an external heating bag and heated in a microwave (50 ~ 60°C). The patient lies supine, and the heating bag is placed on acupoints such as Zhongwan, Shenque, and Guanyuan. The bag is pressed and heated twice, with a clockwise massage around Shenque and the abdomen. Zhang Hong and colleagues conducted clinical trials and found that the silkworm sand external heating method significantly improved patients' GCSI scores, TCM symptom scores, gastric emptying rate, as well as FBG and 2hPBG levels, and also enhanced sleep quality [36].

### 5. Conclusion

DGP is a common digestive system complication of diabetes, which has garnered widespread attention since it was first proposed in the last century. As the prevalence of diabetes continues to rise, the pathogenesis of gastroparesis, one of the complications of diabetic neuropathy, has not yet reached a unified standard. Most viewpoints suggest that it is related to factors such as damage to interstitial cells of Cajal (ICCs), gastrointestinal hormone secretion disorders, diabetic microvascular complications, and gastric smooth muscle pathology. Western medicine commonly uses prokinetic agents, antiemetics, gastric acid inhibitors, and antibiotics for treatment. However, Western treatments face issues such as poor long-term efficacy, dependency risks, multiple side effects, and symptomatic relief without addressing the root cause. In contrast, TCM offers several advantages for treating diabetic gastroparesis, including fewer side effects, the ability to stabilize blood sugar fluctuations, and diverse therapeutic approaches, thereby providing effective treatment options for improving the quality of life for DGP patients. Nevertheless, there is insufficient basic research on diabetic gastroparesis, a lack of standardized diagnostic criteria, and limited laboratory research on the pathophysiological mechanisms and drug mechanisms of DGP [37]. Therefore, future efforts should focus on strengthening clinical research and innovation in this area, leveraging the strengths of TCM, and promoting classical Chinese medicine. Additionally, adhering to the principle of "preventing disease before it occurs," we should implement preventative measures in the treatment of DGP, paying attention to managing patients' blood sugar levels while safeguarding their spleen and stomach health.

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