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Clinical Application of Banxia Xiexin Decoction in Digestive System Diseases

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Abstract: ***Banxia Xiexin Decoction (hereinafter referred to as BXD), is a classic Chinese medicine prescription, the whole prescription group of medicines is strict and concise, reflecting the essence of xin opening bitter lowering, calming cold and heat, tonifying and purgating. The spleen and stomach are the main organs of the human digestive system, which are located in the middle of the focal point and are mainly responsible for the operation of the whole body qi machinery and the biochemistry of Qi and blood. Banxia Xiexin Decoction total Yin and Yang deficiency and fullness, with the spleen and stomach physiological characteristics coincide, widely used in all kinds of digestive system diseases, such as: chronic gastritis, functional dyspepsia, reflux esophagitis, ulcerative colitis and so on. In this paper, the results of modern experimental studies on BXD and the experience of various doctors in treating digestive diseases with Banxia Xiexin Decoction in recent years are reviewed.***

Keywords: Banxia Xiexin decoction, Digestive diseases, Clinical application, Famous doctors' experience, Pharmacological research.

1. Introduction

The spleen and stomach, located in the upper abdominal cavity beneath the diaphragm, both reside in the middle energizer. Connected by a membrane and intricately linked through meridians and blood vessels, they form an exterior-interior paired relationship. Together, they constitute the digestive system within traditional Chinese medicine theory. The visceral manifestation system in traditional Chinese medicine (TCM) differs fundamentally from the modern medical anatomical system. Its classification is not confined to fixed anatomical structures or mechanical measurements but instead emphasizes the synergistic functional effects arising from mutual coordination among zang-fu organs, guided by the holistic concept [1]. It is thus a broad, functional concept rather than a narrowly anatomical one. From the perspective of traditional Chinese medicine, the proper functioning of the digestive system primarily relies on the physiological synergy between the spleen and stomach, encompassing the harmonious ascent and descent of qi movement, coordinated transportation and transformation of food and nutrients, and equilibrium between Yin-moisture and Yang-dryness. When dysfunctional coordination occurs in the internal visceral manifestations of the spleen and stomach, the external signs may manifest as: Disorders of qi movement, Stagnation of reception and transportation, Imbalance of dryness and dampness. Banxia Xiexin Decoction (Pinellia Heart-Draining Decoction), a renowned formula in traditional Chinese medicine, was first documented in the Treatise on Cold Damage and Miscellaneous Diseases by Medical Sage Zhang Zhongjing. Banxia Xiexin Decoction employs the therapeutic principles of pungent-opening and bitter-descending, simultaneously tonifying and purging, to harmonize cold and heat, supplement deficiency and drain excess. By synergistically harmonizing yang and yin, it restores the pivotal function of spleen-stomach qi movement, thereby resolving the syndrome of epigastric fullness. Guided by the principle of "upholding orthodox principles while innovating," generations of physicians have extensively applied Banxia Xiexin Decoction as a foundational formula for cold-heat complex syndrome to various digestive system disorders through syndrome differentiation and treatment in continuous clinical exploration, achieving remarkable efficacy.

2. Formula Mechanism Analysis of Banxia Xiexin Decoction

Banxia (Pinellia) serves as the sovereign herb in this formula. Throughout the Treatise on Cold Damage, Zhang Zhongjing frequently utilizes Pinellia (Banxia) in his formulas for its efficacy in directing stomach qi downward to arrest vomiting. Simultaneously, its acrid dispersing nature resolves epigastric fullness, serving as the sovereign herb that governs the entire formula [2]. The minister herbs are Dried Ginger (Ganjiang), Scutellaria (Huangqin), and Coptis (Huanglian). Dried Ginger (Ganjiang) is pungent and hot in nature. The raw form expels cold pathogens and releases the exterior, while the processed (baked) form warms stomach-cold and secures the middle energizer... When combined with Ginseng (Renshen), it warms the stomach." Thus, pairing with Dried Ginger (Ganjiang) enhances Pinellia's (Banxia) capacity to warm the middle energizer and dissipate cold, gently resolving epigastric fullness and stagnation caused by deficiency-cold. Coptis (Huanglian) and Scutellaria (Huangqin) are bitter in flavor and cold in nature. As stated in the Treatise on Cold Damage with Detailed Analysis: "Bitter herbs drain heat from the heart and diaphragm." When paired, their efficacy in draining heat-type epigastric fullness (pǐ) doubles. Their bitter flavor also directs rebellious stomach qi downward, while Coptis additionally strengthens the intestines to halt diarrhea. Ginseng (Renshen), Jujube (Dazao), and Licorice (Gancao) serve as assistant and courier herbs. All three belong to the sweet flavor category (Sweet flavor, SP-004), which tonifies deficiency and relieves urgency, thereby regulating spleen-stomach weakness. They mitigate the bitter-cold nature of Scutellaria (Huangqin) and Coptis (Huanglian) to prevent damage to middle yang, while harmonizing the pungent-dispersing properties of Ginger (Ganjiang) and Pinellia (Banxia), thereby protecting spleen-stomach yin. The formula employs concise and precise herb selection with rigorous compatibility. It restores the physiological

ascending-descending movement of qi in the middle energizer through pungent-opening and bitter-descending actions, harmonizes spleen-stomach yin-yang balance by balancing cold and warm properties, reinforces the core to address deficiency-excess pathology. Each component interlinks seamlessly, reactivating the spleen-stomach qi dynamic [3].

3. Modern Medical Research Analysis of Pinellia Heart-Draining Decoction

BXD can be applied to various digestive system diseases, fundamentally due to the unique pharmacological actions of bioactive constituents in its component herbs. Pharmacological studies have confirmed through various extraction methods that Pinellia ternata (Banxia) contains multiple bioactive compounds including alkaloids, polysaccharides (PTPS), flavonoids, amino acids, and β-sitosterol. Specifically: Pinellia ternata polysaccharides induce cancer cell apoptosis and enhance anti-tumor immunity by upregulating CD4+ levels, Alkaloids suppress lipopolysaccharide (LPS)-induced activation of inflammatory factors (e.g., TNF-α, IL-6) and inhibit the vomiting center in the CNS to exert anti-emetic effects, Pinellia protein demonstrates significant antibacterial activity in vitro [4]. Dried ginger contains volatile oils, diarylheptanoids, and characteristic gingerols. Diarylheptanoids exhibit anti-emetic and anti-tumor activities, while gingerols exert antioxidant effects by blocking and scavenging free radicals [5]. The primary components in Coptis chinensis are coptis alkaloids and berberine. Berberine can improve glycolipid metabolic disorders by elevating gastrointestinal hormone levels that regulate glycolipid metabolism, and induce death in HepG2 cells through anti-tumor mechanisms [6]. The primary active constituents in Scutellaria baicalensis are flavonoid compounds such as baicalin and baicalein. Notably, baicalin modulates inflammatory responses by regulating intestinal microbiota composition [7]. Jujube contains abundant nutrients including jujube polysaccharides (JPS), proteins, and amino acids. Studies have confirmed that jujube polysaccharides promote lymphocyte proliferation to enhance immune function and exert anti-tumor effects [8]. The primary bioactive constituents of ginseng are ginsenosides and ginseng polysaccharides. Ginsenosides enhance immune function and exert anti-tumor effects, while ginseng polysaccharides modulate beneficial gut microbiota and protect intestinal mucosa. Additionally, ginsenosides reduce serum interleukin-6 (IL-6) levels to exert anti-inflammatory effects [9]. The primary active constituents in honey-fried licorice (Zhigancao) are triterpenoid saponins, flavonoids, and polysaccharides. Glycyrrhizic acid exhibits anti-inflammatory and hepatoprotective effects, flavonoids exert anti-tumor activity by promoting cellular autophagy, and liquiritin demonstrates superior antidepressant properties [10].

4. Analytical Review of Banxia Xiexin Decoction in Gastrointestinal Disorders

4.1 Chronic Gastritis

Chronic gastritis is a common digestive disorder characterized by chronic inflammation of the gastric mucosa. Traditional Chinese Medicine (TCM) does not include “chronic gastritis” as a distinct disease name. Instead, it is primarily classified under categories such as “stomach pain” (wei tong), “fullness/distension” (pi man), and “gastric upset” (cao za) based on its principal clinical presentations [11]. In treating Cold-Heat Complex Syndrome of chronic gastritis, Master Physician Zhang Zhiyuan emphasizes increasing the dosage of Coptidis Rhizoma in the foundational formula BXD. This strategy aims to transcend the original formula’s limitation of addressing “epigastric fullness” and achieve enhanced effects in checking upward counterflow to arrest vomiting, consolidating the intestines to check diarrhea, and relieving distension and fullness [12]. Professor Wang Jiehong posits that patients with Chronic Atrophic Gastritis predominantly exhibit Qi-Yin Deficiency as the root cause and Damp-Heat Accumulation as the secondary manifestation. In clinical practice, she employs BXD to regulate deficiency-excess complexes [13]. Professor Tang Xudong posits that the pathogenesis of chronic gastritis involves spleen-stomach qi deficiency as the root cause, with phlegm-turbidity, blood stasis, and damp-heat as secondary pathogenic factors. This pattern manifests as a cold-heat complex syndrome due to pathogen stagnation transforming into heat. Thus, he employs BXD as the foundational formula to harmonize cold and heat, resolve stagnation, and restore the normal qi movement of the spleen-stomach [14]. Eradicating Helicobacter pylori (HP) is a critical intervention in treating chronic gastritis. Researchers Chen Yue et al. conducted a group-controlled study involving 110 chronic gastritis patients with HP infection, which demonstrated that combining BXD with standard triple therapy significantly improved the effective bacterial eradication rate to 96.36%, compared to 80.00% with triple therapy alone [15]. Zhang Yanhong conducted a study involving 82 chronic gastritis patients randomly divided into two groups. The observation group received BXD plus modification combined with conventional Western therapy, while the control group received Western therapy alone. Results demonstrated that the observation group exhibited significantly higher levels of serum gastrointestinal hormones (GAS and MTL) and superior gastrointestinal function improvement compared to the control group. Additionally, the incidence of adverse reactions in the observation group (9.76%) was markedly lower than that in the control group (26.83%), indicating enhanced safety [16]. Sun Hongzhong et al. conducted a randomized controlled trial involving 106 chronic gastritis patients divided by random number table method. Results demonstrated that the observation group receiving modified BXD combined with conventional Western therapy significantly outperformed the control group (Western therapy alone) in alleviating gastric mucosal edema, congestion, and erosion severity [17].

4.2 Functional Dyspepsia

Functional Dyspepsia (FD) is a functional gastrointestinal disorder triggered by multifactorial interactions including genetic predisposition, dietary factors, psychological stress, and abnormal gastric acid secretion. Its core clinical manifestations encompass early satiety, postprandial fullness, epigastric pain, with or without epigastric burning sensation [18]. Professor Hu Ke posits that the core pathogenesis of FD lies in the imbalance of qi movement at the middle jiao and stagnation of qi, blood, and body fluids. Therefore, in clinical

practice, he employs the acrid and bitter medicinal properties of BXD to simultaneously regulate ascending and descending qi, unblock qi movement, and restore the physiological functions of the spleen-stomach. Additionally, he emphasizes the coordination of the liver's ascending and lung's descending movement, applying syndrome-differentiated methods to soothe the liver and disperse lung qi based on clinical manifestations [19]. Professor Li Yongcheng posits that the core pathogenesis of FD lies in the disharmony between liver and spleen systems, leading to dysfunction in transportation and reception. His therapeutic strategy emphasizes simultaneously regulating liver-spleen dynamics and harmonizing cold-heat/deficiency-excess patterns. The treatment protocol is anchored in BXD, augmented with Green Tangerine Peel and Aged Tangerine Peel to rectify liver qi and dry spleen dampness—achieving dual regulation of liver and spleen. Additionally, Medicated Leaven and Areca Nut are combined with White Atractylodes and Poria to promote food digestion, fortify the spleen, and harmonize deficiency-excess conditions [20]. Professor Wei Wei posits that the pathogenesis of Functional Dyspepsia stems from internal injury of the spleen-stomach and stagnation of qi movement. The therapeutic principle emphasizes acrid-dispersing and bitter-descending methods, using Banxia Xiexin Decoction as the foundational formula [21].

Researchers Jin Yuqiu et al. randomly assigned 60 FD-modeled rats into experimental groups and administered targeted medications for 28 days. Analysis of serum specimens demonstrated that Banxia Xiexin Decoction intervention suppresses the expression of myosin light-chain kinase (MYLK) in duodenal cells and activates the PGE2-cAMP signaling pathway, thereby promoting symptom alleviation and disease resolution in functional dyspepsia [22]. Researchers Shen Tianhua et al. randomly divided 40 FD-modeled rats into four groups and administered targeted drug interventions for two weeks. Comparative analysis of plasma specimens revealed that in the model group treated with Banxia Xiexin Decoction, the levels of plasma Substance P (SP) and gastric antrum tissue Calcitonin Gene-Related Peptide (CGRP) were significantly lower than those in other control groups. This demonstrates that BXD potentially treats FD by enhancing gastric motility and reducing gastrointestinal sensitivity [23]. Wang Hongbo et al. conducted a randomized controlled trial involving 97 FD patients with liver depression-spleen deficiency pattern. The study compared the efficacy of mosapride monotherapy versus mosapride combined with modified Banxia Xiexin Decoction. Results demonstrated that the combination therapy group achieved superior outcomes: significant reduction in plasma gastrin (GAS) and cholecystokinin (CCK) levels, alongside elevated motilin (MTL) levels. This synergistic effect enhances gastrointestinal motility and reduces gastric emptying time, thereby optimizing therapeutic efficacy [24].

4.3 Reflux Esophagitis

Reflux Esophagitis (RE) refers to a pathological condition characterized by the reflux of upper gastrointestinal contents into the esophagus, leading to impairment of esophageal mucosal integrity and inflammatory changes. Clinically, it manifests with symptoms such as acid regurgitation, heartburn, and retrosternal burning sensation. Endoscopic examination typically reveals erosions or ulcerations of the esophageal mucosa. In Traditional Chinese Medicine (TCM), this disease falls under the diagnostic categories of "Belching" and "Sour Regurgitation", based on its primary clinical manifestations. Distinguished TCM expert Professor Lin Tiandong posits that the pathogenesis of Reflux Esophagitis (RE) involves impaired liver dispersion leading to qi stagnation transforming into heat, combined with spleen deficiency inducing qi stagnation and fluid retention. These pathological factors culminate in dampness-heat intermingling, which ascends rebelliously with stomach qi, manifesting as acid regurgitation [25]. Distinguished TCM expert Professor Wang Qingguo posits that the pathogenesis of Reflux Esophagitis hinges on disordered qi movement in the spleen-stomach axis, characterized by intermingled cold and heat in the middle energizer, with the core manifestation being spleen cold coupled with stomach heat [26]. Professor Zhou Zhenghua posits that the core pathogenesis of Reflux Esophagitis lies in abnormal ascension of spleen qi and descent of stomach qi, while transverse counterflow of liver qi leading to stomach qi rebellion serves as a critical triggering factor [27]. In a clinical study of 150 RE patients conducted by Ruan Shengren, patients were divided into two groups. The treatment group received modified BXD combined with Cisapride as baseline therapy, while the control group received Cisapride monotherapy. After 4 weeks of intervention, endoscopic reevaluation demonstrated that: The integrated therapy group (BXD + Cisapride) showed superior comprehensive efficacy, Safety profile was significantly better compared to conventional Western monotherapy [28]. Furthermore, a controlled study by Liu Xiaoni et al. on 100 RE rat models demonstrated that Banxia Xiexin Decoction alleviates corrosion of the esophageal mucosa by gastric acid and bile acids through elevating pH in the lower esophagus. Simultaneously, BXD promotes secretion of calcitonin gene-related peptide (CGRP) —a neuropeptide regulating gastrointestinal mucosal blood flow—thereby enhancing the protection of esophageal mucosal integrity [29].

4.4 Ulcerative Colitis

Ulcerative colitis (UC) is a chronic inflammatory disease of the colon, primarily characterized by abdominal pain, diarrhea, bloody or purulent stools with red and white discharge, and tenesmus. In traditional Chinese medicine, it falls under the category of "chronic dysentery." Professor Zhou Jianhua posits that the core pathogenesis of UC lies in damp-heat internal accumulation, disordered qi movement, and cold-heat complex. By employing BXD with its simultaneous use of acrid and bitter herbs, the formula promotes the ascent of clear yang and descent of turbid yin, thereby achieving spontaneous resolution of diarrhea and dysentery [30]. Professor Wang Xixing analyzed that the pathogenesis of UC is characterized by spleen deficiency and stomach heat, with coexistence of deficiency and excess. Therefore, BXD is employed to harmonize cold and heat, restoring the balance of gastrointestinal function [31]. Professor Qin Jiatai, a nationally renowned TCM master, summarizes the pathogenesis of UC as primarily involving "spleen-yang deficiency leading to intermingled phlegm-dampness-heat accumulation in the large intestine, compounded by earth deficiency with wood over-restriction [32]. Zhang Liangkun et al. conducted a 14-day controlled intervention by gavage

administration of BXD filtrate and mesalazine solution in 20 UC mouse models. Results demonstrated that both the BXD intervention group and the Western drug group (mesalazine) restored anti-inflammatory factor levels and exerted positive regulatory effects on gut microbiota ecology [33]. Experimental studies by Li Shiji et al. also demonstrated that BXD suppresses the activation of inflammatory signaling pathways such as MyD88/TLR/NF-κB, thereby reducing levels of matrix metalloproteinase components (MMP1, MMP2) that induce mucosal degradation and ulcer formation, ultimately exerting anti-inflammatory effects and protecting the intestinal mucosa [34]. Through a 7-day experimental observation of graded-dose gavage administration of BXD in UC rat models, Mu Yongxu et al. extracted post-treatment serum and intestinal tissue specimens for analysis. The study concluded that BXD alleviates UC by suppressing the overexpression of pro-inflammatory cytokines Tumor Necrosis Factor-alpha (TNF-α) and Interleukin-6 (IL-6), and inhibiting the Phosphatidylinositol 3-Kinase/Protein Kinase B (PI3K/Akt) signaling pathway, thereby reducing excessive autophagy in intestinal mucosal cells [35].

5. Conclusion

The theoretical system of Traditional Chinese Medicine emphasizes that “harmony enables functional coordination” — the digestive, respiratory, and circulatory systems must perform their respective functions to ensure coordinated operation and achieve health and longevity. However, when invaded by the six pathogenic factors (exogenous evils) or afflicted by internal injury from the seven emotions, diseases are likely to arise. The spleen and stomach of the Middle Jiao constitute the core of the TCM digestive system. They not only receive and transport food but also serve as the acquired foundation for generating qi and blood, functioning as the pivotal hub for regulating qi activity in the human body. Should internal and external pathogenic factors induce stagnation of qi movement, an imbalance of dryness-dampness may arise, leading to internal generation of blood stasis and insufficient production of qi and blood. BXD employs both cold and hot herbs to harmonize yin-yang, and combines pungent-bitter flavors to unblock qi ascension-descension. By restoring the physiological functions of the spleen-stomach system and coordinating organ activities, BXD epitomizes the therapeutic principle of “treating different diseases with the same method” based on precise pathogenesis analysis. Renowned as the “Premier Formula for Spleen-Stomach Disorders” due to its broad applicability and superior efficacy in treating gastrointestinal diseases, it has garnered extensive attention. Some modern pharmacological studies have explored its chemical components and action pathways, revealing potential mechanisms for its exceptional efficacy. However, current research still exhibits significant limitations. Our understanding of this formula remains incomplete, with many mechanisms and adverse reactions yet to be clarified. Further in-depth exploration by successive generations of researchers is essential to expand BXD’s therapeutic scope and advance the essence of traditional Chinese medicine.

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