

Research Progress in Modified Gegen Qinlian Decoction for the Treatment of Ulcerative Colitis

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Abstract: Ulcerative colitis is a common chronic inflammatory bowel disease with insidious onset and recurrent episodes. Although Western medicine can maintain clinical remission, it still fails to meet patients' therapeutic expectations. Gegen Qinlian Decoction improves intestinal mucosal barrier function and attenuates systemic and tissue inflammatory responses with remarkable clinical efficacy. This article reviews the research progress of modified Gegen Qinlian Decoction in the treatment of ulcerative colitis, aiming to provide a theoretical basis for the clinical diagnosis and treatment of ulcerative colitis.

Keywords: Gegen Qinlian Decoction; traditional Chinese medicine; ulcerative colitis; research progress

1. Introduction

Ulcerative colitis (UC) is an intractable digestive disorder with unclear pathogenesis[1]. It is mainly associated with autoimmunity and heredity, and is frequently induced by infection and improper diet, manifesting as a chronic inflammatory condition[2]. In China, the incidence and prevalence of UC are rising continuously. Clinical manifestations include recurrent abdominal pain, tenesmus, diarrhea, mucopurulent bloody stools, and systemic symptoms of varying severity such as fatigue, anorexia, and fever. Extraintestinal manifestations may involve the skin, mucous membranes, joints, eyes, liver, and gallbladder[3]. Current mainstream treatments for UC include 5-aminosalicylic acid preparations, glucocorticoids, and immunosuppressive agents. Despite certain therapeutic effects, these regimens are limited by high recurrence after drug withdrawal, severe adverse effects with long-term use, and high costs of novel formulations[4].

In traditional Chinese medicine (TCM), UC is categorized as "dysentery", "chronic dysentery", "intermittent dysentery", or "intestinal wind". The disease is located in the intestines and is related to the liver, lung, kidney, and other zang-fu organs. Qin Shumin et al.[5] reported that large intestine dampness-heat syndrome is the most prevalent pattern in UC, especially in the active stage. Modified Gegen Qinlian Decoction upregulates anti-inflammatory cytokines and downregulates pro-inflammatory cytokines to exert anti-inflammatory effects, thereby effectively alleviating bloody stools, abdominal pain, diarrhea, and other clinical symptoms[6].

2. Overview of Gegen Qinlian Decoction

Gegen Qinlian Decoction originates from Article 34 of Treatise on Febrile Diseases. It is a classic formula for resolving both exterior and interior disorders[7]. As the monarch herb, *Puerariae Lobatae Radix* (Gegen) is pungent, sweet, and cool, acting on the spleen and stomach meridians to relieve exterior syndrome, reduce fever, elevate clear yang, and arrest diarrhea[8]. *Coptidis Rhizoma* (Huanglian) and *Scutellariae Radix* (Huangqin), as minister herbs, clear heat, dry dampness, strengthen the intestines, and stop diarrhea[9]. *Glycyrrhizae Radix et Rhizoma* (Gancao), as the assistant and guide herb, harmonizes the middle energizer and all ingredients[10].

Originally indicated for heat-associated diarrhea, Gegen Qinlian Decoction has been widely applied to digestive diseases, metabolic disorders, cardiovascular diseases, and upper gastrointestinal infections with favorable efficacy and mild adverse reactions[11]. At present, it is mainly used for digestive diseases, especially infectious diarrhea, irritable bowel syndrome, ulcerative colitis, and rotavirus diarrhea[12]. Gegen Qinlian Decoction significantly alleviates clinical symptoms in UC patients with high safety and satisfactory efficacy, deserving clinical promotion[13].

3. Clinical Research Progress of Gegen Qinlian Decoction

3.1 Effects on Clinical Efficacy in UC Patients

Modified Gegen Qinlian Decoction effectively relieves mucopurulent bloody stools, abdominal pain, diarrhea, and shortens symptom duration. A Meta-analysis by Fu Jie et al.[14] demonstrated that Gegen Qinlian Decoction combined

with Western medicine was superior in reducing symptom scores of diarrhea, abdominal pain, bloody stools, tenesmus, and anal burning, particularly in relieving abdominal pain and bloody stools. Zhao Minglu et al.[15] found that combination therapy achieved better symptom relief, reduced inflammatory cytokine secretion, inhibited inflammatory activity in UC, and improved patients' quality of life. Zhong Ye et al. [16]reported that the total effective rate of Gegen Qinlian Decoction combined with mesalazine was 93.55%, significantly higher than 80.65% in the mesalazine-alone control group ($P<0.05$). Zhao Cuili et al. [17]showed that retention enema with Baiji combined with Gegen Qinlian Decoction was more effective than oral sulfasalazine in acute UC attacks. Wang Zhimin et al.[18] confirmed that modified Gegen Qinlian Decoction retention enema delivered drugs directly to the lesion, producing rapid effects, low adverse reactions, and high cure rates.

3.2 Effects on Colonoscopic Outcomes in UC Patients

Colonoscopy combined with mucosal biopsy is the gold standard for UC diagnosis, allowing direct visualization of colonic mucosal pathological changes and healing. Li Jing et al. [19]demonstrated that Gegen Qinlian Decoction markedly alleviated colonic hyperemia and edema, repaired intestinal mucosal injury, and promoted ulcer healing in UC mouse models. Zheng Chenxi et al.[20] found that Gegen Qinlian Decoction significantly upregulated occludin expression with regular arrangement, effectively alleviating DSS-induced intestinal mucosal barrier damage. Li Yalan et al. [21]reported that Gegen Qinlian Decoction restored the expression of occludin and ZO-1 proteins, enhanced transcellular and paracellular transport, repaired the intestinal mucosal epithelial barrier, prevented pathogenic microbial invasion, and improved intestinal epithelial cell function.

3.3 Effects on Inflammatory Cytokine Levels in UC Patients

Inflammation persists throughout the course of UC. Mucosal injury in UC is characterized by upregulated antigen-presenting cells and pro-inflammatory cytokines and downregulated anti-inflammatory cytokines[22]. Therefore, attenuating tissue inflammation is a key therapeutic target. Gao Hangting et al. [23]showed that TCM and its active components reduce inflammatory cytokine release, inflammatory cell infiltration, and mucosal inflammation in UC lesions. Hu Yingnan et al.[24] suggested that Gegen Qinlian Decoction may act by suppressing pro-inflammatory cytokines including TNF- α , IL-6, IL-1 β , IL-17, and IL-18, and enhancing anti-inflammatory cytokines such as TGF- β , IL-4, and IL-10 to maintain immune homeostasis. Zhang Ning et al.[25] found that modified Gegen Qinlian Decoction decreased levels of IL-2, IL-6, TNF- α , IFN- γ , and CRP and increased levels of IL-4, IL-10, and IL-13, confirming its anti-inflammatory mechanism via cytokine regulation.

3.4 Effects on Intestinal Flora in UC Patients

A dense microbial community colonizes the intestinal mucosa, forming a physical barrier and exerting metabolic, immune, and protective functions. UC progression is closely linked to intestinal dysbiosis. UC patients show reduced beneficial bacteria such as Lactobacillus and Bifidobacterium and increased pathogenic bacteria such as Enterococcus[26], disrupting the intestinal bacterial biofilm barrier and damaging the mucosa. Li Ziyi et al.[27] found that Gegen Qinlian Decoction combined with probiotics alleviated inflammation and dysbiosis in DSS-induced UC mice, repairing mucosal injury and restoring barrier function. Fan Yufeng et al. [28]reported that mesalazine enteric-coated tablets combined with Gegen Qinlian Decoction significantly increased Lactobacillus and Bifidobacterium counts compared with mesalazine alone, indicating that modified Gegen Qinlian Decoction improves intestinal flora in mild-to-moderate UC and promotes intestinal functional recovery. Overall, Gegen Qinlian Decoction safely improves clinical symptoms and regulates intestinal flora without increasing adverse events.

4. Summary and Prospect

UC is an intractable digestive disease characterized by a prolonged course and high recurrence, causing severe suffering. TCM therapy for UC features mild adverse reactions and favorable efficacy. Gegen Qinlian Decoction is often used in combination with other TCM formulas or Western medicines and significantly improves UC symptoms. Its mechanisms may involve regulating intestinal flora, attenuating intestinal inflammation, and modulating autoimmunity. However, several issues require further investigation: (1) the etiology of UC remains unclear and needs deeper exploration to support precise treatment; (2) the active components of single herbs in Gegen Qinlian Decoction require further identification; (3) the dose — effect and time — effect relationships of Gegen Qinlian Decoction in UC should be accurately defined to improve clinical efficacy and promote the internationalization of TCM.

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