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A review of the use of natural compounds in the treatment of ulcerative colitis

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Abstract

Ulcerative colitis (UC) is a chronic, resistant, and nonspecific illness that affects the rectum and whole colon. Dysregulation of the mucosal immune response to the indigenous bacterial flora, as well as genetic and environmental variables, are most likely to blame for the etiology. To decrease inflammation or minimize symptoms, a variety of drugs are employed. Outside of the limits of orthodox Western medicine, herbal medicine encompasses a wide range of practices and therapies.

Traditional Chinese treatments, including as aloe vera gel, wheat grass juice, Boswellia serrata, and bovine colostrum enemas, have minimal controlled evidence of benefit in the treatment of UC. Herbal medications may be safer than synthetic treatments, despite the fact that they are not without danger. Herbal medicine's potential advantages might be attributed to its high patient acceptability, effectiveness, relative safety, and inexpensive cost. Patients all around the world appear to have embraced herbal therapy in a big manner, and the usefulness of herbal medication in the treatment of UC has been proven in hundreds of scientific trials. Herbal medicine research is inconclusive, complicated, and perplexing, and it is undoubtedly connected with both hazards and benefits. More controlled clinical trials on the efficacy of herbal medicine techniques in the treatment of UC are needed, as well as improved legislation to ensure their quality and safety.

Keywords: Herbal Medicine, Inflammatory Bowel Disease, Therapy, Ulcerative Colitis.

Introduction

In humans, inflammatory bowel diseases are known in two forms: ulcerative colitis and Crohn's disease (1). This disease is also mentioned in traditional medicine books as Zuhair. Ulcerative colitis is an inflammatory, recurrent and chronic disease whose exact cause has not been determined. In each age range (usually 15 to 39 years) and both males and females are identified. Factors such as genetics, environment and microbiome are the determining factors in ulcerative colitis and And can involve the mouth to the rectum. Therefore, the observed manifestations are varied according to the location of gastrointestinal involvement (2). Intestinal homeostasis is lost following the uninterrupted activity of the immune system and the improper regulation of neutrophil activity (3). Due to the industrialization of countries, the prevalence of this disease has increased significantly And according to the nutrition and lifestyle of people and their living conditions and climate, this rate is increasing (4). In Crohn's disease, the most common symptoms were abdominal pain, diarrhea, watery and loose stools, joint pain, fatigue, frequent bowel movements, nausea, abdominal cramps, fatigue, weakness, loss of appetite, rectal bleeding, low energy, weight loss, respectively. Fever, fecal incontinence and skin rash (5). But the most important symptoms in colitis are recurrent abdominal pain, bloody stools, and diarrhea and fever (6, 7). In the mild stage of the disease, mild diarrhea (less than 4 times a day), mild cramping pain and intermittent bleeding from the rectum with mucus outflow, and in the moderate stage of the disease bloody stools, anemia, abdominal pain, brief fever and recurrent diarrhea. Severe stage of fever above 40 degrees, weight loss, severe anemia and severe diarrhea have been reported (8). The infectious agents of inflammation that cause the common symptoms of the disease, such as Salmonella, Shigella, Yersinia, Campylobacter, Aeromonas, E. coli, and amoebae, should be considered first. Factors such as anal fissures, hemorrhoids, diverticula, and polyps should also be considered in connection with rectal bleeding (9). By precisely identifying the affected area in the body, the best treatment method can be adopted. On the other hand, differentiating ulcerative colitis and Crohn's disease are helpful in choosing the treatment method and surgical treatments. In some cases, it is not possible to differentiate between the two diseases, so it is called intermediate colitis. Colonoscopy can be a useful diagnostic route, and if this method is not successful, barium enema and imaging of the upper extremities can be used, although biopsy can confirm the diagnosis (10).

Endoscopy is another diagnostic option. CT scan also shows thickening of the intestinal wall, and finally, to confirm the diagnosis, a colon biopsy is performed, which shows glandular analysis and mucin depletion in goblet cells.

The inflammatory pathway in colitis includes a decrease in anti-inflammatory proteins and cytokines and the production of proinflammatory proteins such as IL-6, IL-1B and TNF-α, leading to increased production of Myeloperoxidase (MPO), inducible nitric oxide synthase and cyclooxygenase (cox-2) And ultimately increases oxidative stress, inflammation, decreases antioxidants, and then increases cell inflammation and the penetration of immune cells, especially neutrophils, and leads to damage to cell lining and disruption of the colon barrier (11).

The treatment of choice for colitis is based on immunosuppressive and anti-inflammatory drugs. Among the drugs used in mild to severe levels of the disease can be a family of aminosalicylates such as sulfalazine (12), pentase (13), asacol (14), balsalazide (15) and budesonide (16) from the category of corticosteroids and azathioprine, mercaptopurine (17), Methotrexate (18), cyclosporine A (19), infliximab, sertolizumab, adalimumab (20). Significant side effects of these drugs include hepatitis, pancreatitis, diabetes mellitus, hypertension, hyperlipidemia, osteoporosis, and hemolytic anemia, among many others (12). Unfortunately, the insufficient effectiveness of these drugs and their numerous side effects is a major challenge in the treatment path.

In recent years, herbal medications have been utilised to treat UC and have been shown successful in clinical settings. In this review, we survey the current knowledge of the herbal therapy or traditional Iran and Chinese medicine (TCM) for the treatment of patients with UC, and discuss recent progress in their role in disease prevention.

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Herbal medicine

The word "herb" comes from the Latin word herba, which means "grass," and has been used to refer to plants whose leaves, stalks, or fruits are used as food, for medicines, or for their scent or flavor. Herbal medicine refers to folk and traditional medicinal practice based on the use of plants and plant extracts for the treatment of medical conditions. The use of herbs to treat diseases is almost universal among native people. At the close of the 20th century, a number of traditions came to dominate the use of herbal therapy in the West. One of the most popular TCM methods is herbal medicine. According to estimates, 28.9% of US individuals routinely utilise one or more TCM therapies, with herbal items accounting for between 9.6% and 12.1% of those treatments (21). Recent studies have shown that between 20 and 26 percent of individuals utilise TCM treatments for their GI symptoms, however those with functional GI problems and those with chronic GI issues are more likely to do so (22).

In the West as well as several Asian nations like China , India and Iran, individuals with IBD frequently use alternative medicine, notably in the form of herbal treatments (23). Despite the fact that there are just a few controlled studies addressing the efficacy or safety of these natural products, it appears that usage is constantly rising. Aloe vera gel, wheat grass juice, Boswellia serrata, and bovine colostrum enemas are a few TCM treatments that have so far received minimal controlled research demonstrating their effectiveness in the treatment of UC (24). TCM, which is widely used in Chinese and Iranian clinics and hospitals alongside Western medicine, has traditionally been thought of as the most effective of the numerous therapeutic modalities.

While only abstracts are accessible in English, there are many accounts regarding the treatment of UC using herbal treatments in the Chinese and Iranian literature. It was observed that the majority of respondents who use herbal remedies think "natural" equals with "safe," and over 30% of patients said that such preparations cannot hurt anyone. Herbs are weak natural medications made up of a wide variety of compounds, and as a result, their effects can be unexpected. Only a small number of products have undergone testing to determine their quality, side effects, or risk for cross-contamination by biological and chemical contaminants in the locations in which they are produced, transported, or marketed (24).

TCM is now utilized extensively in the treatment of UC in Eastern Asian nations. According to Langmead et al, herbal therapies for IBD include slippery elm, fenugreek, devil's claw, Mexican yam, tormentil, and Wei tong ning (a TCM) (25).

Novel medications in the treatment of IBD include slippery elm, fenugreek, devil's claw, tormentil, and Wei tong ning. Chen et colleagues revealed that 118 UC patients were treated with TCM integration and 86 UC patients were treated with prednisone as controls. The treatment outcomes were examined and compared after two 40-day therapy sessions. As a consequence, 39 patients were cured, 60 cases improved, and 19 cases failed, yielding an overall efficacy rate of 84 percent in the TCM-treated group. In the prednisone-treated group, however, 15 instances were cured, 37 cases improved, and 34 cases failed, for a total efficacy rate of 60.5 percent (P 0.01).

These findings demonstrate that the integrated TCM way of treating UC is better to basic Western medications such as prednisone, and that it is both safe and successful in sustaining UC remission (26). Here are some effective herbs in the treatment of inflammatory bowel disease.

Aloe vera

Aloe vera is a tropical plant that has been utilized in traditional medicine all over the world. It has been researched for its ability to alleviate UC. Aloe vera gel is a mucilaginous aqueous extract of Aloe barbadensis Miller's leaf pulp. Aloe vera juice contains anti-inflammatory properties and has been utilized by certain clinicians to treat UC patients. It was the most often utilized herbal treatment (27). A double-blind, randomized experiment was carried out to investigate the efficacy and safety of aloe vera gel in the treatment of mild-to-moderate active UC. For four weeks, thirty patients received 100 mL of oral aloe vera gel and fourteen patients received 100 mL of a placebo. Clinical remission, improvement, and response occurred in 9 (30%), 11 (37%), and 14 patients, respectively (47 percent), respectively, in aloe vera-treated patients compared to 1 (7%), 1 (7%), and 2 (14%), respectively, in controls. Despite the short sample size, the number of patients who reacted to aloe vera was greater than those who received a placebo. The figures, however, are comparable to placebo responses in previous trials, and the placebo response rate is quite low. Aloe vera's specific methods of action are unknown. In vitro investigations on human colonic mucosa revealed that aloe vera gel inhibited prostaglandin E2 and IL-8 release, implying a role in antibacterial and anti-inflammatory responses (25).

Boswellia serrata

Boswellia, commonly known as Indian frankincense, is an ayurvedic herb produced from the plant's resin that has long been used to treat UC. The primary ingredient of Boswellia, boswellic acid, is assumed to contribute to the majority of herbal pharmacologic actions. In vitro and animal investigations have revealed that boswellic acid can specifically inhibit 5-lipoxygenase, resulting in anti-inflammatory and antiarthritic benefits (28). Because the inflammatory process in IBD is related with enhanced leukotriene activity, the effects of Boswellia in the treatment of UC have proved to be beneficial. Furthermore, it has been discovered to directly reduce intestinal motility by a mechanism involving L-type Ca2+ channels. In rats, Boswellia has been shown to diminish chemically induced edema and inflammation in the colon. Other research suggests that it has cytotoxic characteristics (29). Gupta et al treated 30 patients with chronic UC with Boswellia gum preparation (900 mg daily divided into 3 doses for 6 weeks) and sulfasalazine (3 gm daily divided into 3 doses for 6 weeks). They concluded that Boswellia was a successful treatment with low adverse effects since 14 of the 20 patients treated achieved remission, and 18 of the 20 patients improved in one or more measures. In the sulfasalazine group, 4 out of 10 went into remission, and 6 out of 10 improved in one or more of the following characteristics (30). In animal models of inflammation It has been demonstrated to be beneficial in the treatment of Crohn's disease, ulcerative colitis, and ileitis (31).

Rice

Rice plant with scientific name Oryza sativa L. It belongs to the Gramineae family, whose seeds are considered as an important food source worldwide (32). Rice grain is rich in bioactive components such as phenolics, flavonoids and sterol derivatives, which, with the fragile antioxidant properties of chains, cleanse some reactive species And by suppressing lipid peroxidation, they activate other antioxidants such as tocopherol. Phenolic components are also connected to Pre-oxidant metals such as iron and copper are made from It prevents free radicals and As well as the expression of genes related to Suppress proinflammatory factors. Recent studies show Given that rice with its antioxidant and anti inflammatory properties, to Prevention of cellular damage due to oxidative stress And reduces the risk of chronic diseases. This property has been found to be stronger in brown rice than in white rice (33). Brown rice reduces the severity of dss(Dextran Sulfate Sodium)-induced colitis in mice by having strong anti-inflammatory potentials.

These mechanisms include: Decreased expression of colonic inos, which may somewhat balance the intestinal microbial population,Increase the number of treg And adjust the treg / th1 ratio.

Also, the presence of other components such as GABA(Gamma-Aminobutyric Acid), Oryzanol, p-coumaric and tocotrirnol ferolic in this food helps its anti-inflammatory function (34).

Barhang

Barhang plant belongs to the Plantaginaceae family and has two types, small and large.The large type has broad, ovate leaves with the scientific name Plantago major L. And its minor type belongs to another species commonly known as Plantago lanceolate L. It has broad and long leaves (32).

One of the important constituents of plantain leaf leaves, The glycosides are okobin, saponin and mucilage. The seed of this plant Gluten-containing, Plantose holozide, Succinic acid, Plant nucleic acid, adenine, ocubin and choline, tannins, Coumarins such as ascoltin, flavonoids including apigenin and The salts are zinc and potassium (35). Studies have shown that Secondary metabolites such as alkaloids, polysaccharides, saponins and terpenes, and in particular phenolic compounds, restorative effects Show wounds (36). Triterpenes including The compounds are in the leaves and seeds of the leaf (37). Are selective PGF2a inhibitors that exert their anti-ulcer properties by protecting the mucosa against stomach acid. They do. The extracts of the studied plants were able to count the number of wounds and Reduce total acidity and increase wound healing (38). Methanolic extract of barhand leaf at a dose of 400 mg / kg showed the mean index of ethanol and aspirin-induced gastric ulcer in rats Has significantly reduced. This effect is less powerful The seed of the plant has also been seen. Also ethanolic extract of turmeric leaf can inhibit the growth of Helicobacter pylori in vitro Has also shown itself. Barhang can be used as one of the medicinal plants with It has anti-ulcerative properties (36).

Broad Beans

The bean plant with the scientific name of Vicia faba is a plant of the Fabaceae family that has therapeutic effects in addition to oral consumption. It is one of the effective plants in the treatment of diarrhea in traditional Iranian medicine. Possible effective mechanisms in this field :Reduce electrolyte secretion, stimulate water absorption, inhibit Intestinal movements, antispasmodic effects, and delayed transit

They know intestines (39). Due to the increase in oxidative stress When diarrhea occurs, the presence of tannins, polyphenols and antioxidants in beans that inhibit oxidative stress Justifies its use in the treatment of diarrhea.

Pomegranate

Plant Punica granatum L. from Lythraceae family And because of the content of substances such as flavonoids and terpenes, properties It has anti-inflammatory and antioxidant properties that can be used as a treatment Supplements or alternatives are used in ulcerative colitis. Pomegranate flower ethanolic extract reduces macroscopic changes and Tissue, myeloperoxidase activity, histamine accumulation and peroxidation Lipid is in the colon (40).

Pomegranate with an oxidative stress mechanism, which plays an important role in the pathophysiology of colitis, has also been able to show its positive effect (41).

In north, west, east, south and central Iran, 28 plants are traditionally used to treat diarrhea. In Table 1, the Persian and scientific names and families of Iran's anti-diarrheal plants, their used parts, and the regions used in the treatment of ulcerative colitis are listed.

Table 1: *Persian and scientific name and family of anti diarrheal plants of Iran, their used parts, and the regions where they are used in treatment of colitis ulcerative.*

Scientific name	Family	Persian name	Used part
Rhus coriaria L.	Anacardiaceae	Somagh	Fruit
Satureja hortensis	Labiatae	Marzeh	Flowering shoots
Achillea eriophora	Asteraceae	Boumadaran jonoubi	Leaves and flowering shoots
Descurainia sophia	Brasicaceae	Khakeshir	seeds
Fumaria parviflora	Fumariaceae	Shah tareh	Leaves and branches
Amaranthus paniculatus L	Amaranthaceae	Tajkhorous	Flowers and leaves
phoneix dactylifera L	Arecaceae	Khorma	Fruit
Elaeagnus angustifolia L.	Elaeagnaceae	Senjed	Fruit
Rumex pulcher L.	Polygonaceae	Torshak	Root
Plantago psyllium L	Plantaginaceae	Esfarzeh	Leaves and seeds
Lonicera nummulariifolia Jaub. & Spach.	Caprifoliaceae	Pile akhor	Leaves and flowers
Cuminum cyminum L.	Apiaceae	Zireye sabz	Seeds
Rhamnus protrata	Rhamnaceae	Siahtangers	Fruit
Cornus mas L.	Cornaceae	Zoghal akhte	Fruit
Salix aegyptiaca L	Salicaceae	Bidmeshk	Flowering shoots
Allium cepa L.	Alliaceae	Piaz	Bulb
Punica granatum L	Punicaceae	Anar	Flowers
Thymus daenensis celak	Lamiaceae	Avishan	Leaves and flowering shoots
Achillea eriophora DC	Asteraceae	Bouzhana	Leaves
Agrimonia eupatoria L	Rosaceae	Ghafez	Flowering shoots
Geum urbanum L.	Rosaceae	Alafe mobarak	Rhizome and root
Urtica dioica L.	Urticaceae	Gazaneh	Leaves
Foeniculum vulgare Mill	Apiaceae	Razianeh	seedss
Bunuim persicum	Apiaceae	Zireye kouhi	Fruit
Quercus brantii Lindl.	Fagaceae	Balout	Leaves and fruit
Ocimum basilicum L	Lamiaceae	Reyhan	Aerial parts
Viola tricolor L	Violaceae	Banafsheh	Flowers and whole plant
Cydonia blonga Mill	Rosaceae	Beh	Fruit

Conclusion

UC is a chronic medical illness that may need people taking medicine for the rest of their lives in order to avoid recurrence, lower their risk of colon cancer, and enhance their quality of life. Although nonadherence affects patients at all phases of UC, individuals in symptomatic remission are most vulnerable, taking less than 70% of their prescription medicine (42,43,44).

Herbal remedies and chronic gastrointestinal problems, including UC The herbs stated above offer a rudimentary model of what is often used by UC patients in various places throughout the world. Physicians should address this type of treatment directly with their patients and provide evidence-based information about its usage. Simultaneously, major clinical double-blind trials evaluating the most widely used alternative medicines are required.

These herbal remedies have frequently been examined in their traditional setting and proven to be effective in innovative and intriguing ways, opening up new pathways for the treatment of pathologic diseases. Most herbal remedies are subjected to the same degree of scrutiny as pharmaceutical drugs, and there are good instances of successful biochemical, animal model, and human-controlled studies in the literature.

As a result, the production, marketing, and prescription of herbal medications has reached an all-time high and is anticipated to rise further. Many herbal remedies have been shown to be beneficial as therapeutic agents in the treatment of illness and disease. Thus, herbal therapy is one of the world's great medical systems, with a continuous tradition reaching back to the third century BC.

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