

Research Progress of Traditional Chinese Medicine in the Treatment of Liver Cirrhosis Ascites

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Abstract: China is one of the world's leading countries in liver disease. Whether it is viral hepatitis in the past or fatty liver disease today, these chronic liver diseases will develop into a pathological state characterized by chronic liver inflammation, diffuse fibrosis, pseudolobules, regenerative nodules, etc., namely cirrhosis. When liver cirrhosis develops into the decompensated stage, ascites will appear, which is also the prominent clinical manifestation of most liver diseases progressing to the end stage. Western medicine treatment of cirrhosis ascites is mainly based on symptomatic treatments such as diuresis and abdominal puncture, but these symptomatic treatments have not been able to effectively control its progress. A large number of clinical practices of traditional Chinese medicine in the treatment of liver cirrhosis ascites have shown that traditional Chinese medicine has unique advantages in treating liver cirrhosis ascites, improving the quality of life of patients, and controlling the progress of liver cirrhosis ascites.

1. Etiology and pathogenesis

In traditional Chinese medicine (TCM), cirrhotic ascites is called "bloating". TCM believes that the main pathological factors leading to distension are qi, blood and water. It is believed that these three factors interact with each other and gather together in the abdomen, thus forming distension. Its basic pathogenesis is that the liver, spleen and kidney are damaged, and qi stagnation, blood stasis and water are stopped in the abdomen. According to the development and clinical manifestations of the disease, Chinese medicine divides the swelling into three stages, the early stage, the middle stage and the late stage, and divides these three stages into deficiency and excess. In the early stage, it was mainly characterized by pathogenic factors and excess, while in the middle and late stages, it was mainly characterized by deficiency and excess. In clinical practice, different doctors have different emphasis on the pathogenesis of bulging. The following is a summary of the main views of doctors.

1.1. Liver stagnation, spleen deficiency and dampness stop

Cirrhosis ascites is mainly characterized by deficiency and excess, with deficiency and excess. Youbo Guan believed that the pathogenesis of distension was rooted in the interaction of the

deficiency of qi, liver stagnation and blood stagnation, and loss of transportation in the central region. The accumulation of dampness and heat and blood stasis also aggravated the development of the disease. In some severe cases, substantial damage to the liver, spleen and kidney further leads to dysfunction of the three organs. In addition, the pathological process of tricoke gasification disorder, qi and blood dysfunction, and water stagnation and accumulation as water should not be ignored. In view of the pathogenesis of cirrhotic ascites, Qi Zhang proposed that the prominent feature of ascites is the mixture of deficiency and excess. In terms of pathological mechanism, liver depression, spleen deficiency and damp-heat resistance play a role together. Dampness and heat are stored in the middle jiao, which accumulates and damages the qi and blood of zangfu organs for a long time, resulting in the loss of spleen movement. This makes it difficult for water and damp to smoothly descend, thus remaining in the abdominal cavity and gradually developing into a pathological state of ascites [1]. Zhisui Ou et al. 's research showed that spleen deficiency or liver disease spreading to the spleen led to the abnormality of spleen transportation and chemical function, and the damage of dike function, resulting in the failure of wet water to discharge normally, gradually flooding water pathogens, and then developing into ascites [2]. Ruilin Gu, on the other hand, believed that the formation of ascites was closely related to spleen deficiency. The dereliction of spleen and soil may lead to the retention of water and dampness, and then form ascites. In addition, spleen deficiency may cause the dysfunction of transportation and metabolism, leading to the disorder of rising and falling, and even the pathological phenomenon of biochemical deficiency, muscle malnutrition, and systemic blood disorder [3]

1.2. Dampness, turbidity and condensation

According to the research results of Xu Yunsheng et al. , the main cause of cirrhosis ascites can be attributed to the role of dampness. Among them, external dampness is one of the six factors, and feeling external dampness can be regarded as one of the causes. Internal dampness is caused by spleen dysfunction, the formation of endogenous dampness, and the interaction of double dampness and dampness, which jointly promote the occurrence of swelling lesions [4]. However, Diangui Li and his collaborators focused on the dual roles of turbidum-toxic and pathogenic qi in the process of liver cirrhosis, which was not only the pathological product, but also the causative factor [5]. The development of cirrhosis ascites is the result of invasion and the weakness of vital qi. A deeper observation shows that the interaction between external dampness and internal dampness, as well as the dual nature of turbiditism, poison and evil qi, play an important role in the pathogenesis of cirrhotic ascites. The theory of dampness put forward by Yunsheng Xu et al. provides a new perspective for us to analyze the pathogenesis of cirrhotic ascites. In contrast, Diangui Li et al. 's view of turbidity and toxin emphasized the endogenous pathological basis of cirrhotic ascites. The collision and fusion of these two views will undoubtedly help us to understand and explain the causative mechanism of this complex disease, cirrhosis and ascites, more comprehensively.

1.3. Yin deficiency is associated with fire

Zhu Danxi put forward the theory of "xiang-fire" in his "Gezhi Yu Lun", and believed that xiang-fire "is located in the two parts of liver and kidney", "people cannot live without this fire", "its constant movement, all xiang-fire is also", "the Yin of liver and kidney is related to xiang-fire, and people are related to heaven". Normal Xiang fire belongs to the category of less fire. As the internal vitality of the human body, it dominates the functions of growth, development and reproduction under the regulation of Tian and Gu. In this case, xiang-fire shows its stable "normality", that is, the normal local thermal energy circulation in the body. The abnormal phase fire represents the "variation" of phase fire, which is the abnormal local fire phenomenon in the human body and belongs to the

pathological phase fire performance. Under this theoretical framework, Professor Yang Zhen further divided the pathological phase fire of liver disease into "six types of phase fire". These types include stagnation heat phase fire, blood heat phase fire, stasis heat phase fire, dampness heat phase fire, Yin deficiency phase fire, and deficiency of phase fire. According to the different stages of the development of abnormal phase fire, this classification system is helpful for the treatment of diseases. According to this theory, the pathological changes caused by abnormal phase fire gradually progress from the stagnation of heat in the qi component to the stagnation of heat in the blood component, and then further evolve into damp-heat, stasis heat, and finally Yin deficiency and deficiency damage. This theory provides a series of detailed explanations for the pathological mechanism of abnormal phase fire. The fire of Yin deficiency phase belongs to the later stage of the six types of phase fire, which originates from the development of qi component stagnation and gradually extends to the blood component, and then presents the clinical manifestations of fire of Yin deficiency phase. According to Professor YANG Zhen, under the influence of yin-deficiency phase fire, the bulging lesions are mostly caused by Yin deficiency of liver and kidney. In this case, xiang-fire impetuosity, strong fire and evil fire endogenous, not only consumes body fluid, but also leads to Yin deficiency and blood stasis, and then induces water retention. When blood flow is not free, water is formed, and blood stasis further causes water stagnation, so that the pathogens such as phlegm, dampness, and stasis are blocked in the three-jiao qi machine, leading to water stagnation in the abdomen, and eventually evolved into bloating symptoms [6]. This pathogenesis is not only the main cause of the disease, but also the core link of the generation of related syndromes.

1.4. Phlegm congests qi stagnation and blood stasis

Huihe Yin proposed that cirrhosis ascites can be divided into two stages, namely the qi drum stage and the water drum stage. In the early stage of hepatitis, the disease is caused by blood stasis. If the disease is not treated in time or improperly, the lesion may change from blood stasis to qi stagnation, and the clinical symptom is usually abdominal distension, which is the qi drum stage. If the treatment opportunity is missed, qi stagnation will further develop into water stagnation, resulting in swelling phenomenon, that is, water drum stage [7]. In the view of Jinghua Li, the dual role of phlegm and blood stasis in cirrhotic ascites was highlighted. Phlegm and blood stasis is not only the pathological product of the disease, but also one of its pathogenic factors. The disease is mainly caused by qi stagnation, phlegm and blood stasis, and the damage of liver, spleen and kidney function, leading to the disorder of qi and blood regulation [8]. On the other hand, Chizhi Zhang's research pointed out that the pathological process of cirrhosis ascites showed a process from qi stagnation and phlegm and coagulation, to blood blocking collateralization, phlegm and blood stasis intermingling, and finally forming water dampness internal stagnation [9]. In the early stage, various factors lead to stagnation of liver qi and stagnation of qi and phlegm, or the formation of phlegm dampness due to the loss of spleen movement, or the condensation of damp and turbidity into phlegm. In the middle stage, phlegm and blood stasis block collaterals, forming clumps and accumulation; In the late stage, phlegm and blood stasis intermingled with each other, or transformed into each other, and eventually developed into swelling. Phlegm turbidity existed throughout the whole course of the disease [10].

2. Treatment principles and methods

2.1. Promote blood and promote water

The blood is not good for water, so the blood should be good for water, as "but to remove the blood stasis, the phlegm and water self-elimination" elaborated, the removal of blood stasis in the body can make the water excretion smooth, and then make the body water no longer retained, reduce the

symptoms of swelling. Professor Youbo Guan emphasizes that in the treatment of swelling, we should focus on activating blood and promoting qi circulation and dissolving phlegm dampness to promote fluid excretion [11]. Yonghong Fan and other scholars believe that the therapeutic principle of promoting blood circulation, removing blood stasis and promoting water should run through the whole process of the treatment of cirrhotic ascites. In the clinical observation of 67 patients with liver cirrhosis ascites, they used the modified Gexia Zhuyu decoction to treat, and achieved a total effective rate of 76.12%. On the other hand, Baoping Zheng et al analyzed 91 kinds of prescriptions for the treatment of liver cirrhosis ascites by using the traditional Chinese medicine inheritance auxiliary platform, and found that the rules of medication were mainly to promote blood circulation and qi circulation, promote water infiltration and dampness. In addition, based on data mining, Jie Sun and Xingliang Gao also analyzed the famous and veteran TCM doctors and the published literatures on the treatment of liver cirrhosis ascites in the past 5 years. The results showed that the drugs for promoting blood circulation and removing blood stasis and promoting water were used frequently in the treatment of liver cirrhosis ascites, ranking among the top three. By studying Professor Chunjun Xu 's experience in the diagnosis and treatment of liver cirrhosis ascites, it was found that he commonly used Zeeland, which has the properties of activating blood and promoting water.

2.2. Lift the pot and remove the lid

Lifting the pot and uncapping includes three aspects: Xuanfei, purging the lung and tonifying the lung, corresponding to promoting water, removing water and running water respectively. Ming Chen's research emphasizes that Mahuang decoction has the effect of diverting yingwei and activating lung qi, which represents that the Lianju-Jiugai decoction can be used to treat a variety of water-fluid metabolic diseases, such as adverse urination, edema, and enuresis [12]. Gaofeng Chen and other scholars pointed out that lung loss is the key pathogenesis of refractory liver cirrhosis ascites. They used the empirical formula Xuanfei-Lishui Decoction to treat patients with refractory ascites, and obtained definite curative effect. The basic ingredients of this prescription include platycodon grandiflorum, Qianhu, Perilla leaf and bitter almond [13]. Changjian Yin often chooses to use lungxuan herbs, such as cicatricum cicatricum, platycodonum, and Luroot, to treat liver cirrhosis accompanied by massive ascites. These studies provide empirical support for the important role of the lung in the regulation of water and fluid metabolism [14].

Many patients with cirrhotic ascites have to rely on oral diuretics for long periods of time or even relieve ascites pressure by regular ascites drainage. However, this practice may lead to both qi deficiency and Yin deficiency in the long run, thereby hindering the normal circulation of fluid and causing the disease to gradually develop into refractory ascites. The pathological characteristics of this disease are a mixture of deficiency and excess. Simply using the treatment methods of promoting water or eliminating evil qi by promoting urine discharge will usually further deplete qi and blood and damage Yin and fluid, resulting in poor treatment effect. It is stated in the Chapter on the Generation of Five Zang of Plain Questions that "all qi belong to the lung". The lung is regarded as the master of the whole qi apparatus. Therefore, we can start from the point of nourishing-lung qi and maintain the normal operation of the whole body by supplementing lung qi. Sufficient lung qi helps to promote the metabolism of water and fluid, so that the qi machine is vigorous, so as to promote the smooth circulation of water and fluid. In clinical practice, Astragalus membranaceus, Codonopsis rhizoma, Atractylodes rhizoma, Poria cocos and other drugs can be selected in the preliminary selection of drugs, combined with Fangji-Huangqi decoction, Fangji-Fuling decoction and other prescriptions with the effect of tonifying qi and promoting water. Chunjun Xu proposed that the treatment of liver cirrhosis and ascites should emphasize on the basis of toning deficiency and at the same time expelling pathogenic qi. He often used drugs such as Astragalus membranaceus, Fructus

chinensis and Rhizoma radix in combination. He paid attention to the use of astragalus membranaceus to supplement qi and blood and promote the metabolism of water and fluid, and also used angelica sinensis to fill qi, generate blood and benefit water [15]. Wenliang Lv emphasized the treatment strategy of astragalus membranaceus [16], and believed that the initial dosage of astragalus membranaceus should be 60 grams, and it should be combined with planteola, pettifolia, etc. At the same time, both specimen treatment and treatment can be taken into account, and other drugs such as vinegar and onyx sinensis, Jiao hawthorn and mirabilite can also be added to soften the firm and disperse the accumulation. These studies provide important suggestions for the selection and compatibility of drugs for the treatment of cirrhotic ascites.

2.3. Nourish Yin and promote water

Professor Yang Zhen believes that Yin deficiency and fire exuberance are the important pathogenesis of cirrhotic ascites. In the treatment of ascites, many doctors often adopt the methods of invigorating spleen and promoting water, promoting qi and promoting water, and promoting blood circulation and promoting water. However, there are few discussions on the treatment of nourishing Yin and promoting water. For the treatment of yin-deficiency cirrhosis ascites, the disease is manifested as yin-deficiency syndrome. Therefore, in the treatment, we should focus on the use of drugs with the effect of nourishing Yin. However, if too much emphasis is placed on nourishing Yin, it may promote the retention of water and dampness, and if too much emphasis is placed on promoting water, it may further damage Yin fluid, leading to contradictions in the treatment. Old Yang proposed that for the deficiency of liver Yin, positive drugs can be used to treat it, because the liver stores blood in the viscera, if the liver depression is too long, the internal heat may be generated, thus harming liver Yin. The phase fire in the liver actually hurts the Yin fluid. This pathological phase fire will not only injure itself, but also affect the Yin fluid of other zangfu organs. From the perspective of the development process of the disease, xiang-fire may mainly damage the liver Yin, damage the spleen Yin, and lower damage the kidney Yin, etc. In the case of insufficient Yin fluid for a long time, blood will accumulate, water will be retained, and eventually the symptoms of ascites swelling will be formed. In clinical practice, Sancai Jialing Yin (including Sancai decoction, Sanjia Fumai decoction and Zhuling decoction) is commonly used for the treatment of Yin deficiency and fire type ascites. This therapy aims to increase the body fluid, dredging congestion, and promoting the excretion of fluid, so as to achieve the regulation of fluid metabolism, avoid damage to Yin fluid, nourish Yin fluid, and reduce the retention of dampness. This treatment strategy aims to both benefit water and nourishing Yin, which provides useful guidance for the treatment of ascites in liver cirrhosis with Yin deficiency.

3. Commonly used prescription rules

For cirrhosis ascites, Chinese herbal medicines should follow the “three reasons” (according to the person, the time and the place), and combine with the modern pathologic mechanism (such as portal hypertension, RAAS activation) to select the medicine precisely. Clinical recommendation is to use Wu Ling San/Shisheng Spleen Drink as the basis, adjusted in stages according to “early activation of blood, mid-term strengthening of the spleen, late warming of yang”, and combined with external treatment to break through the bottleneck of diuretic resistance.

3.1. Composition and pharmacological mechanism of core drugs

The core drugs are mainly used to treat the symptoms, diuresis and seepage of dampness, to strengthen the spleen and enhance qi in order to consolidate the root, to activate blood circulation and

remove blood stasis in order to regulate the liver, and to warm the yang and tonify the kidney in order to restore the reverse. Water-inducing and dampness-permeating drugs are mainly based on *Poria cocos*, *Poria cocos* and *Zedoaria japonica*; *Poria cocos* (15-30g): it contains *Poria cocos* polysaccharides and triterpenoids, which can enhance glomerular filtration rate, promote the excretion of sodium and water, and at the same time, protect the function of hepatocyte mitochondria; *Zelenol* (10-20g): *Zelenol* reduces the osmotic pressure of ascites by inhibiting the reabsorption of water in renal tubules, and its lipid-lowering effect can alleviate the disorders of lipid metabolism in liver cirrhosis; *Poria* (10-15g): *Poria* polysaccharides regulate the expression of aquaporin AQP-1, and synergize with *Poria* to enhance the effect of diuretics, which is suitable for intractable ascites. *Astragalus* and *Atractylodes macrocephala* are the main together with qi-fixing drugs; *Astragalus* (30-60g): *Astragaloside* inhibits the TGF- β 1/Smad pathway and attenuates hepatic fibrosis, meanwhile, it raises plasma albumin level and improves colloid osmotic pressure. *Atractylodes macrocephala* (15-30g): *atractylodes lactone* promotes intestinal mucosal repair, reduces intestinal endotoxin absorption, and decreases the risk of portal hypertension. *Salvia miltiorrhiza* and *Radix Paeoniae alba* mainly play the roles of activating blood circulation, removing blood stasis and regulating the liver in giving cirrhosis ascites; *Salvia miltiorrhiza* (20-30g): *tanshinone IIA* inhibits hepatic stellate cell activation, reduces hepatic venous pressure gradient (HVPG), and improves intrahepatic microcirculation. *Paeonia lactiflora* (15-20g): *paeoniflorin* inhibits platelet aggregation, relieves portal vein thrombosis, and its antioxidant effect reduces lipid peroxidation injury of hepatocytes. In the advanced stage of cirrhotic ascites, most of them develop spleen and kidney yang deficiency, and mainly use *epimedium* and *cinnamon* to warm the spleen and kidneys; *epimedium* (Prepared, 6-15g): the metabolite of aconite, *desmethyl aconite*, activates β -receptors, enhances myocardial contraction, and improves renal perfusion; *cinnamon* (3-6g): *cinnamic aldehyde* promotes visceral vasodilatation through the TRPV1 channel to alleviate ascites-associated abdominal distension.

3.2. In-depth Analysis of Classical Formulas

Wu Ling San (*Poria*, *Zedoaria*, *Atractylodes macrocephala*, etc.) has the effects of warming yang, strengthening the spleen, inducing diuresis and seeping dampness, and is the basic formula for treating water-stopping syndrome of spleen deficiency. Evidence shows that the association rule “*Huangqi wuling san*” formed by combining it with *Huangqi* has a confidence level of >0.96, which makes it a high-frequency core combination [16]. The synergistic effect of *Fangji Huangqi Tang* and *Poria Tang* (*Fangji*, *Astragali*, *Poria*, etc.) can benefit qi, strengthen the spleen, and diuretic and seepage of dampness, and the total effective rate of clinical treatment of 28 patients was 679%, and it can reduce the recurrence rate of ascites [17]. *Solid spleen powder* (dried ginger, *atractylodes macrocephala*, *Houpu*, etc.) works by regulating the intestinal flora and protecting the gastrointestinal mucosa. The anti-inflammatory and antibacterial effects of dried ginger components can improve intestinal microecology and reduce the pathological basis of ascites formation [18]. Addition of *Chi Shi Lip Yu Yu Liang Tang* (*Chi Shi Lip*, *Yu Yu Liang*, etc.) targets spleen and kidney yang deficiency, and combined with entecavir treatment can increase the overall effective rate to 88.46%, significantly reducing LDH and GLU levels in ascites as well as portal vein pressure [19]. The self-proposed formula for activating blood and resolving fetishes (*danshen*, *turtle shell*, etc.) together with the formula for strengthening the spleen and expelling water treated 82 patients with an overall effective rate of 91.5%, and its mechanism was related to anti-hepatic fibrosis and improvement of microcirculation [20]. Famous empirical formulas such as *Cangniu* and *Fangji Huangqi Tang* (*Cangzhu*, *Niuji*, *Fangji*, etc.) combined with Western medicine can significantly reduce the TCM symptom score and decrease the recurrence rate of ascites by more than 30% compared with that of

the Western medicine-only group [17].

4. External treatment of traditional Chinese medicine

The mechanism of action of external treatment of Chinese medicine in the treatment of cirrhosis ascites mainly includes direct action of drugs on the skin, regulation of meridians and qi and blood, promotion of local blood circulation, and improvement of tissue metabolism.

4.1. Umbilical cord therapy

Umbilical cord compress therapy achieves therapeutic effect by directly applying drugs to the umbilicus, utilizing the characteristics of umbilicus with thin skin, abundant blood vessels and developed pores, and delivering the drug ingredients to the whole body through blood circulation and lymphatic circulation. This method can reduce the burden of the liver in metabolizing drugs and enhance the efficacy of drugs [21]. Specific mechanisms include: absorption of drug absorption, the active ingredients in the Chinese medicine dressing are absorbed through the skin, enter the blood circulation, and directly act on the pathological process of cirrhosis ascites; regulation of immune function, the ingredients in the Chinese medicine dressing can regulate the body's immune function and enhance the body's ability to resist disease; improvement of microcirculation, the ingredients in the Chinese medicine dressing can improve local microcirculation, promote the discharge of metabolic waste, and Improve microcirculation, the ingredients in Chinese medicine dressing can improve local microcirculation, promote the discharge of metabolic wastes and alleviate ascites; regulate endocrine, the ingredients in Chinese medicine dressing can regulate the endocrine system, improve the hormone level, thus alleviating the symptoms of ascites.

A number of studies have shown that the total effective rate of umbilical cord therapy combined with western medicine in the treatment of ascites in cirrhosis is significantly higher than that of western medicine alone. For example, one study showed that the total effective rate of umbilical cord therapy combined with western medicine treatment was 86.7%, while the total effective rate of western medicine treatment alone was 68.3% [22]. Umbilical cord therapy can significantly improve the clinical symptoms of patients, such as abdominal distension and abdominal pain. For example, a study showed that the umbilical cord therapy combined with western medicine treatment group was better than the control group in improving the clinical symptoms of patients and the time to relieve abdominal distension. Umbilical cord therapy can significantly improve liver function indicators, such as serum alanine aminotransferase (ALT) and serum aminotransferase (AST). For example, a study showed that serum ALT and AST levels decreased significantly in the navel compressing therapy combined with herbal enema treatment group. Umbilical cord therapy can improve renal function indicators, such as blood urea nitrogen (BUN), creatinine (Cr) and so on. For example, a study showed that renin, angiotensin II, aldosterone, and atrial natriuretic peptide levels decreased significantly in the umbilical cord therapy combined with herbal enema treatment group [23].

4.2. Acupuncture Point Patching

Acupuncture point patch achieves the effect of dredging meridians and regulating yin and yang through the transdermal absorption of drugs and acupoint stimulation. By stimulating specific acupoints, acupoint therapy can promote the increase of urine volume, thus helping to discharge excess water and reduce the degree of ascites. For example, studies have shown that patients with cirrhotic ascites of the water-stopping type with spleen and kidney yang deficiency who were treated with traditional Chinese medicine combined with acupoint patch therapy showed a significant increase in 24-hour urine output, a decrease in abdominal circumference, a reduction in body weight,

and a shallower depth of ascites. Acupressure therapy can improve liver function indicators, such as alanine aminotransferase (ALT), aspartate aminotransferase (AST), and total bilirubin (TBIL). The improvement of these indicators reflects the recovery of liver function and helps to reduce ascites caused by cirrhosis. Through acupoint therapy, liver fibrosis-related indicators, such as type IV collagen (IV-C IV) and hyaluronic acid (HA), can be reduced. The reduction of these indicators indicates a reduction in the degree of hepatic fibrosis, thus helping to control the formation of ascites. Acupressure therapy may reduce ascites by modulating the immune system and reducing the inflammatory response. For example, studies have found that acupressure therapy reduces serum endothelin-1 (ET-1) and nitric oxide (NO) levels, factors that are strongly associated with vascular permeability and inflammatory responses [24]. Acupressure therapy has the effect of activating blood circulation and removing blood stasis, which can improve blood circulation and reduce blood stagnation, thus helping to reduce ascites. For example, a study on the treatment of ascites in liver cirrhosis by acupoint application with the method of promoting blood circulation and water retention showed that this method can effectively improve the clinical symptoms and abdominal ultrasound findings of patients [25]. Acupuncture point patch therapy utilizes the transdermal absorption technology of traditional Chinese medicine to apply drugs directly to body surface acupoints, which are transmitted to the body through the meridian system to exert systemic therapeutic effects. This method is not only simple and easy to implement, but also avoids the gastrointestinal absorption obstacles of oral medication, improving the therapeutic effect [26].

4.3. Warm acupuncture and moxibustion

Warm acupuncture and moxibustion have shown remarkable effects in the treatment of cirrhosis ascites through the mechanisms of regulating water and fluid metabolism, improving portal vein blood flow, and reducing inflammatory response, etc. The specific mechanism of action of warm acupuncture and moxibustion in the treatment of cirrhosis ascites involves many aspects, mainly including the regulation of immune function, the improvement of portal vein hemodynamics, the promotion of ascites absorption, and the balance of yin and Yang, qi and blood. Patients with liver cirrhosis are often accompanied by decreased immune function, which is related to intestinal microecological changes and dysbiosis. By stimulating specific acupoints, warm acupuncture can regulate the patient's immune system and improve immune function, thus indirectly alleviating the formation and aggravation of ascites.

The formation of ascites in liver cirrhosis is closely related to portal hypertension. By stimulating acupuncture points, warm acupuncture can regulate the hemodynamics of the portal vein system and reduce portal vein pressure, thus reducing the generation of ascites. In addition, warm acupuncture may further assist diuresis by improving liver function indicators (e.g., serum albumin levels). By stimulating specific acupoints, warm acupuncture can promote local blood circulation and accelerate the absorption of ascites. For example, in one study, after warm acupuncture and moxibustion combined with herbal umbilical cord compresses were used to treat patients with cirrhotic ascites, the depth of the dark area of ascites was significantly reduced in the observation group, suggesting that warm acupuncture and moxibustion may improve symptoms by promoting the absorption of ascites [27]. Chinese medicine theory suggests that the occurrence of ascites in liver cirrhosis is related to the dysfunction of the liver, spleen and kidney. By regulating the meridians and acupoints, warm acupuncture and moxibustion can balance yin and yang, qi and blood, and improve systemic diseases. For example, when warm acupuncture and moxibustion is combined with traditional Chinese medicine to treat patients with cirrhotic ascites, it can significantly improve patients' TCM symptoms (e.g., abdominal distension and fatigue) and improve their quality of life [28]. As a safe and effective external TCM treatment, warm acupuncture and moxibustion has fewer side effects and is easily

accepted by patients. In combination therapy, warm acupuncture and moxibustion can reduce the recurrence rate and complication rate, thus improving the overall efficacy.

4.4. Chinese medicine enema

Traditional Chinese medicine enema can significantly improve the liver function indexes of patients with cirrhotic ascites. For example, enema treatment with Liver Cleansing and Intestinal Relief Formula can significantly increase the white globule ratio (ALB/G) and improve direct bilirubin (DBil) and urea (Urea) levels [29]. In addition, the combination of spiked Gan Sui minced umbilical cord compresses and Chinese herbal enema treatment also showed an increase in albumin and a significant decrease in renin, angiotensin II, aldosterone, and atrial natriuretic peptide levels [23]. Chinese herbal enema effectively reduces the symptoms of ascites by promoting the absorption of ascites and reducing its production. Herbal enema can reduce the levels of inflammatory factors in ascites, such as white blood cells (WBC), neutrophils (NEUT) and procalcitoninogen (PCT). For example, after microwave irradiation combined with Chinese herbal medicine high retention enema treatment, the levels of WBC, NEUT and PCT in patients' ascites were lower than those before treatment [30]. Traditional Chinese medicine enema can effectively reduce endotoxin levels, thus alleviating endotoxin-related symptoms [31]. Herbal enemas enhance the body's anti-infection ability by regulating the immune function. For example, the immune indicators such as WBC and PMN levels of patients improved after enemas of clear bowel soup combined with western medicine [32]. Chinese herbal enemas can improve drug bioavailability by directly absorbing drugs through the intestines and avoiding hepatic first-pass effects.

5. Summary

As mentioned above, TCM has made significant progress in the treatment of liver cirrhosis and ascites, which makes up for the deficiency of western medicine and highlights the advantages of TCM in this field. However, despite this, there are still a series of problems and deficiencies in the treatment of liver cirrhosis ascites with traditional Chinese medicine. Among them, there are still a series of problems and deficiencies, such as the lack of the application of randomized controlled and double-blind scientific research methods, the lack of in-depth multi-factor and multi-level statistical analysis in the application of various therapies, the report of TCM treatment is mostly limited to the clinical observation of unilateral or empirical prescriptions, and the clinical classification and the use of TCM standards need to be further unified. In addition, there are many reports on the treatment of TCM, but most of them are empirical medication. The Chinese medicine is complex in flavor, and the active ingredients may interact with each other. Therefore, it is necessary to conduct animal experiments to clarify the application of drugs. At present, the application of traditional Chinese medicine is mostly integrated with western medicine. Although western medicine treatment can produce rapid results, traditional Chinese medicine shows significant advantages in terms of quality of life and prognosis in the long run. Therefore, we should fully understand the characteristics and advantages of traditional Chinese medicine in the treatment of liver cirrhosis ascites, actively improve its existing shortcomings, and explore the organic combination of traditional Chinese medicine and western medicine to open up broader prospects for the treatment of liver cirrhosis ascites. Continuous efforts are needed to further improve the clinical application and efficacy of traditional Chinese medicine in the treatment of cirrhosis ascites.

References

[1] Yang Pan, Yanjie Wang, Qi Zhang. Zhang Qi's Experience in Treating Ascites Due to Liver Cirrhosis [J]. *Journal of*

Traditional Chinese Medicine, 2011, 52(05): 380-381.

[2] Zhisui Ou, You-hang Liu, Hanbin Yang. Liver and spleen correlation theory application in the treatment of cirrhosis ascites [J]. *Lishizhen Medicine and Materia Medica Research*, 2011, 22 (9) : 2272-2273.

[3] Weimin Gu, Ruilin Gu make a diagnosis and give treatment of cirrhosis ascites experience [J]. *Clinical Journal of Traditional Chinese Medicine*, 2004 (02) : 163-164.

[4] Yunsheng Xu, Xiaoyin Chen, Qinhe Yang. Shallow understanding of traditional Chinese medicine treatment of liver cirrhosis [J]. *Journal of Sichuan of Traditional Chinese Medicine*, 2003(01):23-24.

[5] Diangui Li, Gang Li, Jinli Liu et al. Li Diangui's experience in treating liver cirrhosis based on "turbidimetric poison" [J]. *Shaanxi Journal of Traditional Chinese Medicine*, 2006(11):1394-1395.

[6] Lei Shi, Jianmei Hao, Chao Yuan et al. Professor YANG Zhen's Clinical Experience in Treating Ascites Due to Liver Cirrhosis with Yin Deficiency and Minister Fire Type by Minister Fire Theory [J]. *Journal of Shaanxi university of Chinese medicine*, 2021, 44 (3): 26-30.

[7] Bo Mu. Hepatic abdominal distension needs to soothe the liver and open the lung qi and unclog the Sanjiao: treatment of Huihe Yin hepatic ascites [J]. *Chinese Community Doctors*, 2006(20):38.

[8] Liwei Cai, Jinghua Li. Clinical experience in the treatment of liver cirrhosis with ascites [J]. *Chinese Community Doctors (Med Pro)*, 2012, 14(06):236-237.

[9] Liangbin Cheng. Professor Zhang Chizhi's experience in treating liver cirrhosis from phlegm [J]. *Chinese Journal of Integrated Traditional and Western Medicine on Liver Diseases*, 2011, 21(02):108-109.

[10] Qingwu Xu, Jiachang Guan, ZongDe Meng et al. Research progress of traditional Chinese medicine in the treatment of liver cirrhosis ascites [J]. *Hebei Journal of Traditional Chinese Medicine*, 2015, 37(11):1752-1754.

[11] Ming Chen. Who said Ephedra but solve the table, lifting the pot to uncover the first side [J]. *Global Traditional Chinese Medicine*, 2017, 10(05):555-557.

[12] Gaofeng Chen, Hongkuan Chen, Daguang Wang. Clinical observation of Xuanfei-Lishui decoction in the treatment of refractory ascites [J]. *Guangming Journal of Chinese Medicine*, 2019, 34(16):2475-2476.

[13] Ying Cui, Yong Zhang, Di Song. Professor YIN Changjian Treat Proven Cases of Edema Using Xuanfei Lishui [J]. *Clinical Journal of Traditional Chinese Medicine*, 2016, 28 (4) : 496-498.

[14] Jie Li, Chunhui Xu. Experience in using a combination of Huangqi, Niuniuzi, and Fangji to treat ascites caused by liver cirrhosis [J]. *Journal of Traditional Chinese Medicine*, 2014, 55(02):164-165.

[15] Lingzi Hu, Mingkun Liu, Wenliang Lv, et al. Professor Lv Wenliang's Experience in Treating Chronic Liver Disease with Astragalus [J]. *Jilin Journal of Chinese Medicine*, 2019, 33(02) 6:154-157.

[16] Baoping Zhen, Limin Han, Haihua Liu et al. Composition Principles of Prescriptions for Ascites Due to Cirrhosis [J]. *Liaoning Journal of Traditional Chinese Medicine*, 2018, 45(2):233-236.

[17] Yu Liao, Lin An. Therapeutic Effect of Cangniufangji Huangqi Decoction Assisted Basic Treatment of Western Medicine on Hepatitis B Virus Cirrhosis Ascites [J]. *Genomics and Applied Biology*, 2017, 36(6):2343-2348.

[18] Mengyu Dou, Zihan Wang, Shihao Wang, et al. Exploring the mechanism of action and efficacy of Shi-Pi-San in the treatment of ascites in cirrhosis based on intestinal microbiota [J]. *Microenvironment & Microecology Research*, 2023, 5(2):1-9.

[19] Xia Gan, Xinfang Zhao, Hong Lin, et al. Effect and Efficacy Analysis of Modified Chishizhi Yuyuliang Tang in Patients with Cirrhosis Ascites (Spleen-Kidney-Yang Deficiency) [J]. *Chinese Journal of Experimental Traditional Medical Formulae*, 2016, 22(6):172-176.

[20] Lin Cheng. Treatment of ascites in liver cirrhosis by activating blood circulation and resolving stasis, strengthening spleen and expelling water [J]. *GUANGMING JOURNAL OF CHINESE MEDICINE*, 2009, 24(7):1268-1269.

[21] Xinyan Cao, Fenping Li, Cunyan Liu, Peng Han, Zhengwei Wang, Miaoqing Ye, Yinghui Tang. Research Progress on the Treatment of Ascites in Liver Cirrhosis with Traditional Chinese Medicine. *International Journal of Frontiers in Medicine* (2023), Vol. 5, Issue 11: 30-38.

[22] Guangdong Yang, Zhiyuan Gao, Weimin Li, Xiangjiang Xu. The Clinical Study on Treatment of Ascites Due to Qi Deficiency and Blood Stasis Type of Cirrhosis with Traditional Chinese Medicine [J]. *Chinese Journal of Integrated Traditional and Western Medicine on Liver Diseases*, 2019, 29(6):513-515.

[23] Yanjie Li, Dewen Mao, Xuexia Huang, et al. Clinical study on the treatment of ascites in liver cirrhosis with the addition of Gansui powder applied to the umbilicus combined with traditional Chinese medicine enema [J]. *Guangxi Journal of Traditional Chinese Medicine*, 2015, 38(2):9-11.

[24] Liqun Zhang, Kexian Wang. Clinical efficacy and effect on serum type IV collagen, hyaluronic acid and other indexes in the treatment of ascites in cirrhosis with water-stopping type of spleen and kidney yang deficiency by combining Chinese medicine internal administration with acupoint application [J]. *Chinese Journal of Integrative Medicine and Digestion*, 2024(7):594-598.

[25] Yuqing Zhu. Tongluo liquefaction method of acupoint patch for the treatment of cirrhosis ascites in 60 cases [J]. *GUANGMING JOURNAL OF CHINESE MEDICINE*, 2014(8):1700-1701.

- [26] Xueying Sun, Randomized placebo-controlled clinical study of “Compound water distension patch” acupoint patch combined with western medicine for the treatment of ascites in liver cirrhosis. *The First Hospital of Qiqihar City, Heilongjiang Province*, 2019-10-10.
- [27] Lu Zi, Yi Xu, Yu Wang, et al. Effects of Lishui Ruangan decoction, umbilical application of traditional Chinese medicine combined with warm acupuncture on liver function, urine volume and portal hemodynamics in patients with hepatitis B and ascites[J]. *Chinese Journal of Integrated Traditional and Western Medicine on Liver Diseases*, 2021, 31(1):40-43.
- [28] Xiaoxing Geng. Clinical efficacy study on the treatment of hepatitis B cirrhosis recalcitrant ascites (cold-dampness trapped spleen type) by adding flavor ling gui fubing tang combined with warm acupuncture[D]. *Henan University of Traditional Chinese Medicine*, 2020.
- [29] Wenjun Xu, Xiuhui Li, Chunyan Gou, et al. Clinical observation on 40 cases of ascites in liver cirrhosis treated by enema with liver-cleansing and bowel-relieving formula[J]. *Beijing Journal of Traditional Chinese Medicine*, 2013, 32(07):522-524.
- [30] Guoqiang Shi, Dongmei Tu, Hehao Wu, et al. Clinical study of microwave irradiation combined with high retention enema of traditional Chinese medicine in the treatment of cirrhotic ascites with spontaneous bacterial peritonitis[J]. *Journal of Minimally Invasive Medicine*, 2021, 16(05):717-719.
- [31] Tong GD, Zhou DQ, He JS, Zhang L, Chen ZF, Xiao CL, Peng LS. Clinical research on navel application of Shehuang Paste combined with Chinese herbal colon dialysis in treatment of refractory cirrhotic ascites complicated with azotemia. *World J Gastroenterol* 2006; 12(48): 7798-7804.
- [32] Lei Xun, Ran Xu, Yingjun Tian, et al. Randomized Controlled Study of Qingchang Decoction Enema combined with Western Medicine on Liver Cirrhosis Spontaneous Bacterial Peritonitis[J]. *Journal of Practical Traditional Chinese Internal Medicine*, 2016, 30(05):84-86.