



Discussion on the Effect of Intestinal Flora Dysbiosis and Pyroptosis on Ascites Due to Liver Cirrhosis Based on the Theory of "Yang Transforming Qi, Yin Shaping"

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Abstract: Ascites due to cirrhosis is a serious complication of chronic liver disease progressing to the decompensated stage, which belongs to the category of "distention" in traditional Chinese medicine. It has the characteristics of high morbidity, high recurrence rate and high mortality, and its clinical treatment faces many limitations. Dysbiosis of intestinal flora and abnormal activation of pyroptosis have been proved to be important microscopic mechanisms of the pathogenesis of cirrhosis ascites in recent years. Both of them promote the disease progression through the gut liver axis and inflammation mediated pathways. Based on the theory of "Yang dissolves Qi and Yin forms" in Huangdi Neijing, it is believed that "insufficient Yang dissolves Qi and excessive Yin forms" is the core pathogenesis of liver cirrhosis ascites. Qi loss caused by deficiency of Yang Qi in liver, spleen and kidney is the root cause of the disease. Phlegm, blood stasis, water and moisture condensation and accumulation of pathological products at the microscopic level are the symptoms of the disease. Yin Yang disharmony and endogenous pathogens and toxins are the key links of disease progression. This paper deeply discusses the internal relationship between the theory of "Yang transforming Qi, Yin shaping" and the imbalance of intestinal flora and pyroptosis, combines the macro thinking of traditional Chinese medicine with modern micro mechanism, takes "Warming Yang transforming Qi, removing blood stasis and dispersing nodules" as the treatment principle, and provides new ideas for the prevention and treatment of cirrhosis ascites by regulating the balance of intestinal flora and inhibiting abnormal pyroptosis.

Keywords: cirrhosis ascites; Yang turns into gas and Yin forms; dysbiosis of intestinal flora; pyroptosis

1. Introduction

Ascites due to cirrhosis is a hallmark complication of decompensated cirrhosis. Around 50% of patients with cirrhosis worldwide will have ascites during the course of the disease, with a 1-year mortality rate of about 20% and a 5-year mortality rate of 44%[1]. Its pathogenesis is complex. Modern medicine believes that cirrhotic ascites is closely related to portal hypertension, renin angiotensin aldosterone system imbalance and so on. Diuresis, albumin supplementation, and control of complications are the main clinical treatments, but some patients are prone to diuretic resistance, electrolyte disorders and other problems, and the curative effect is limited [2].

Ascites due to liver cirrhosis belongs to the categories of "distention" and "single abdominal distension" in traditional Chinese medicine. Traditional Chinese medicine has the advantages of multi-target, overall conditioning and less adverse reactions in the treatment of this disease. Doctors of past dynasties have accumulated rich experience in diagnosis and treatment [3]. It has been widely used in the pathogenesis interpretation and treatment guidance of a variety of chronic difficult diseases [4]. In recent years, studies have found that Dysbiosis of intestinal flora affects the progression of ascites due to cirrhosis through dysfunction of the gut liver axis, and pyroptosis mediated inflammatory injury is an important mechanism of hepatocyte necrosis and aggravation of liver fibrosis, which play a key role in the occurrence and development of the disease [5][6]. The micro mechanism of modern medicine is highly consistent with the theory of "Yang transforming Qi, Yin shaping" in pathological essence [7].

2. Theoretical connotation of "Yang turns into gas and Yin forms"

The theory of "Yang transforming Qi and Yin shaping" is derived from the "Suwen · Yin and Yang should be like a big theory", the original contains "Yin static Yang manic, Yang Health Yin long, Yang kill Yin storage. "Yin shaping" reflects the condensing characteristics of Yin Qi, which is static and condensing, and can condense the invisible Qi into tangible bodies such as blood essence, body fluid, viscera and tissues, providing a material basis for life activities [8].

3. The key to the pathogenesis of ascites due to cirrhosis is that "Yang is not enough to dissipate Qi, and Yin is too much to be formed"

3.1 Deficiency of Yang transforming Qi - the cause of disease

Liver cirrhosis mostly develops from chronic hepatitis, and the course of disease is long. The liver loses its ability to relax, the Qi machine is stagnant, and then the Spleen Yang is damaged; The deficiency of Spleen Yang leads to the loss of circulation and metabolism, and the subtle biochemistry of water and grain is passive, which can also involve the kidney yang, and eventually lead to the deficiency of both liver, spleen and Kidney Yang Qi, forming a progressive injury of "liver yang deficiency → spleen yang deficiency → kidney yang deficiency" [9].

3.2 Excessive Yin formation - the sign of disease

According to Ding Ganren's medical record, "where Yang Qi does not reach, it is the place where turbid Yin condenses." Yang Qi deficiency will warm and weaken the driving force. Tangible substances such as blood essence and body fluid cannot disperse, but accumulate and condense, forming Yin pathogens such as dampness, turbidity and blood stasis, which is the pathological process of excessive "Yin formation" [10].

3.3 Disharmony of yin and Yang, endogenous pathogen and toxin - an important link in disease progression

"Everything has negative Yin and holds Yang, and the balance of yin and Yang is the foundation of body health." Distention is caused by deficiency of Yang Qi in liver, spleen and kidney, imbalance of yin and Yang, decline of body defense function, and easy to cause endogenous evil and toxin. Here, "evil and toxin" not only includes dampness toxin and Blood Stasis Toxin in traditional Chinese medicine theory, but also corresponds to endotoxin and inflammatory factors produced by intestinal flora imbalance in modern medicine [11].

4. The mechanism of intestinal flora Dysbiosis and pyroptosis in the pathogenesis of cirrhosis ascites

4.1 Dysbiosis of intestinal flora: the core link of gut liver axis disorder

As the "second genome" of the human body, the intestinal flora forms a close bidirectional regulatory relationship with the liver through the gut liver axis, and its balance is essential for liver function [12]. In liver cirrhosis, deficiency of Yang Qi in liver, spleen and kidney leads to changes in the intestinal micro ecological environment, a significant reduction in the number of beneficial bacteria, excessive proliferation of pathogenic bacteria *Escherichia coli* and *Klebsiella pneumoniae*, and decreased diversity and structural imbalance of intestinal flora [13].

4.2 Pyroptosis: mechanism of inflammation mediated hepatocyte injury

Pyroptosis is a programmed cell death mediated by inflammasomes, which is characterized by cell swelling and rupture and release of a large number of inflammatory factors, and is closely related to the occurrence and development of liver diseases [14].

5. Conclusion

Ascites due to cirrhosis, as a serious complication of chronic liver disease, has complex pathogenesis and difficult treatment. Integrated traditional Chinese and Western medicine treatment is an important development direction at present. Dysbiosis of intestinal flora and abnormal activation of pyroptosis are the key microscopic mechanisms of the pathogenesis of ascites due to liver cirrhosis. Both of them promote disease progression through the gut liver axis and inflammation mediated pathways. As the core paradigm of traditional Chinese medicine to analyze the pathological relationship between "function and body", the theory of "Yang transforming Qi and Yin shaping" is highly consistent with the micro mechanism of intestinal flora imbalance and pyroptosis - "Yang transforming Qi" is not as good as that of liver, spleen and Kidney Yang Qi deficiency, intestinal flora imbalance, and cell pyroptosis dysregulation, "Yin shaping" is excessive, which corresponds to the accumulation of dampness, turbidity and blood stasis, ascites formation, and liver fibrosis progression.

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