

Exploration of the Treatment Approach for Colon Cancer from the Perspective of Liver to Large Intestine Communication

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Abstract: Colon cancer is a kind of malignant tumor whose etiology and pathogenesis are still unclear. Chinese medicine has gradually understood and perfected the theory of "the liver is connected to the large intestine" under the guidance of the overall concept from the meridians, the five elements, the internal organs and the pathology, and has found that the process of occurrence, development and metastasis of colon cancer is closely related to the liver by combining with the theory of the "gut-liver axis" and modern anatomy. Combined with modern anatomy and the theory of "intestinal-liver axis", it was found that the occurrence, development and metastasis of colon cancer had a close relationship with the liver. On this basis, starting from the principle of "to calm the liver is the mainstay of colorectal diseases", the physiological function of the colon could be restored by dredging the liver and relieving depression, regulating the qi to pass through the bowels and the blood to carry out the blood circulation to achieve the treatment of colon cancer and prevention of colorectal cancer with the treatment of the liver. To achieve the effect of treating colon cancer and preventing liver metastasis of colon cancer.

Keywords: Liver-colon communication, Colon cancer, Bowel-liver axis, Liver metastasis.

1. Introduction

Colon cancer is a malignant tumor of the digestive system, the incidence and death rates of colon cancer in China remain high and show a rising trend year by year. According to the global cancer statistics in 2022, the number of new cases of colon cancer in China is 517,100, which is the second largest malignant tumor, the mortality rate is the fourth largest, the disease lacks specific performance in the early stage, and the proportion of patients with advanced stage in the first diagnosed patients is higher, which poses a serious threat to the patient's life and health. The disease lacks specific manifestations in the early stage, and the proportion of patients with advanced stage is high at the initial diagnosis, which poses a serious threat to patients' lives and health [1]. The current Western medical treatment is often based on surgery and chemotherapy, which is effective, but the complications caused by the follow-up greatly reduce the quality of survival of patients, and there is a certain risk of recurrence and metastasis. Under the guidance of the holistic view of Chinese medicine, "the liver is connected with the large intestine" has been proposed, perspectives on the treatment of colon cancer from the perspective of the liver provide a new theoretical and practical basis for treating colon cancer by Chinese medicine.

2. Understanding of Colon Cancer in Chinese Medicine

The name "colon cancer" has not been recorded in ancient Chinese medical books, but according to its characteristics and clinical manifestations, modern research has classified it into the category of "intestinal qin", "intestinal accumulation", "intestinal knot" and "accumulation". Insufficiency of positive qi is the foundation of all diseases, and it is mentioned in the Required Readings for Medical Professionals that

"positive qi is insufficient and evil qi entrenches", spleen and stomach are the foundation of the acquired constitution and the source of qi and blood biochemistry, and if the spleen qi is healthy, then it will be sufficient and not easy to be attacked by evil qi; on the contrary, if the spleen loses its healthy movement and qi and blood are insufficient, then all kinds of diseases will start to emerge. According to Chinese medicine, colon cancer is caused by the lack of positive qi, coupled with uncontrolled diet and emotional disorders, which disorders of qi movement, spleen and stomach out of order, and over time, phlegm turbidity, blood stasis and evil poisons gather in the large intestine to form lumps [2], in which "Dysfunction of qi" is the central link for the eventual formation of lumps. The liver is the main regulator of qi, therefore, many medical doctors suggest that the treatment of colon cancer should pay attention to "the liver".

3. "Liver and Large Intestine Connection" Chinese Medicine Theory

The large intestine meridian is connected to the lungs, and the liver meridian branches up to the lungs, and the qi and blood of the two meridians run through the lungs and connect. Hand taiyang, hand shaoyang, foot shaoyang, foot yangming, four meridians will always be in the zong vein, and foot shaoyang bile and foot jueyin liver are the external and internal meridian, both of the five elements are wood like draws to like, hand yangming colon meridian through the bile meridian communicate with liver meridian [3]. The miraculous Pivot-Meridian Separation records that "the positive.....of the hand Shao Yang goes out through the throat and behind the ears", and the liver meridian which goes through the throat and up into the stubborn glands, both of them communicate with this meridian through the meridian Bei in the throat [4]. Ming Dynasty - Li Ting in the "Introduction to Medicine" put forward the "viscera and internal organs connected theory" which thinks the liver and the large intestine are connected.

Dong Jingchang believes that "the liver and large intestine" are the six meridians that open and close the pivotal theory derived from the movement of qi, the essence of the viscera and internal organs qi and communication. Spiritual Pivot - Gen Jie: "The sun is open, Yangming is closed, the Shaoyang is the pivot.....Taiyin is open, jueyin is closed, the Shaoyin is the pivot." Yangming and jueyin in the theory of opening and closing the pivot are all closing, the two meridians' essence can be transmitted to each other through the qi function. The two work together to complete the body's gasification function.

Zhu Danxi's "Ge Zhi Yu Lun - Theory of Excess Yang and Yin Insufficiency," says, "The liver is also the one who is responsible for catharsis." The liver is the master of catharsis, regulates the qi of the whole body, has the functions of regulating emotions and moods, assisting the spleen to rise and the stomach to fall, and maintaining the operation of the blood and the transmission of fluids and other functions. The lifting and lowering of the qi of the whole body depend on the normal catharsis of liver qi, to achieve the passage without stagnation, and dispersal without depression [5]. The Suwen-Linglan secret canon theory of the large intestine: "The official of the Road, changes out." Its main physiological function is the conduction of dross. The liver promotes and assists the elevation and movement of the spleen and stomach, the spleen rises and the stomach falls in an orderly manner, the clear qi rises and the turbid qi falls, and at the same time, the anus opens and closes under the action of the liver's catharsis, and the draft of the body are excreted through the conduction of the large intestine. The five viscera are characterized as "storage without excretion, full but not solid", so it needs the corresponding viscera to discharge the turbid qi. The gallbladder is the extraordinary Fu-organ, also has the characteristic of "storage without excretion", and cannot excrete the turbid qi for the liver, but is attached to the leaves of the liver to avoid the private dirt of the stomach. Su wen - differentiation of the five viscera recorded the large intestine which has "discharge without storage, subject to five viscera turbid qi" characteristics, that the large intestine conduct draff also has the function of excretion of five viscera turbid qi. Chen Yingjie et al [6] proposed on this basis that "the liver sends internal organs to the large intestine", that the liver through the large intestine drains turbid qi to ensure its normal physiological function and the liver's catharsis assists in the large intestine conduction, the two complement each other.

The liver is wood, the main development; the large intestine is gold, the main purging and descending. Gold can restrain wood, to prevent the rise of wood qi, and the purging and descending of gold qi need to wood qi rise and development of the system, the two mutual control and mutual use, mutual opposite and mutual achievement. The Spiritual Pivot - benshu" says: "The large intestine and the small intestine belong to the stomach." Indicates that the large intestine is also part of the channel for the transport of food and drink, with some of the characteristics of the spleen and stomach, so the large intestine is both earthy, with twofold attributes, in the restraint of wood qi and at the same time subject to the restraint of wood qi, and has a close relationship with the liver [7]. "The earth can only be developed under the catharsis of

the wood." The large intestine is regulated by the liver, and the opening and closing of the anus are normal, plus the nature of Jin's purging and descending, so that the draft in the intestine and the turbid qi of the liver can be discharged out of the body.

4. "Liver and Large Intestine Connection" Western Medicine Theory

The liver and the large intestine originate from the foregut, and intestinal lymphocytes are derived from the developing liver. Marshall [9] first proposed the "gut-liver axis" theory in 1998, which suggests that there exists a bidirectional relationship between the liver and the large intestine as well as the intestinal microorganisms, whereby, on the one hand, the mature liver secretes bile to the intestine through the bile duct system to participate in substance metabolism and to regulate the composition of intestinal microorganisms. On the one hand, the mature liver secretes bile into the intestine through the bile duct system to participate in the metabolism of substances and regulate the composition of intestinal microorganisms, and on the other hand, intestinal metabolites can be transported to the liver through the portal vein system and affect liver function [10]. In pathological conditions, damage to the intestinal barrier may lead to microbial translocation and metabolic toxins from the intestinal tract being absorbed by the portal vein and entering the liver, causing a systemic inflammatory response, which in turn exacerbates damage to the intestinal mucosa, forming a vicious circle. The portal venous system provides blood returned from the intestine to the liver and makes up 75% to 80% of the blood in the liver. The functions of the liver and the large intestine interact and influence each other through the portal venous system and the biliary system. Nowadays, the theory of the "intestinal-liver axis" is generally recognized by academics, and many intestinal diseases are related to the "intestinal-liver axis", and the intestinal-liver interactions have become a new way of thinking for the treatment of colon cancer.

5. Liver is Associated with the Etiology and Pathogenesis of Colon Cancer

YIzong Jinjian says: "Cancer is a disease of qi, and the symptomatic is a hematoma; all diseases start from qi, and the qi gathers and then the blood coagulates." The liver's catharsis can keep the whole body's qi open and unobstructed. Under normal circumstances, qi is popular in the whole body under the action of the liver's excretion, and it keeps on moving to promote the physiological functions of the human body. The liver's catharsis disorder causes qi dysregulation, viscera, meridians, blood, fluid and other functional disorders, and metabolic disorders, thereby forming stagnant qi, blood stasis, phlegm condensation, and more liver loss of excretion. In clinical practice, multiple factors often intersect and are interlinked, cyclically exacerbated, and ultimately lead to poor qi, a variety of pathological products long-term accumulation in the intestinal tract, and then develop into this disease. Therefore, from the analysis of etiology and pathogenesis, it can be seen that the malfunction of liver physiology is the key factor for the occurrence of colon cancer.

6. Liver Associated with Clinical Manifestations of Colon Cancer

Most patients have no obvious symptoms in the early stage of colon cancer, but with the gradual development of the disease, there will be changes in defecation habits, changes in stool characteristics (thinning, bloody stool, mucus stool, etc.), abdominal pain or abdominal discomfort, abdominal mass, symptoms related to intestinal obstruction, as well as anemia, emaciation, fatigue, low-grade fever, and other systemic symptoms [11]. In Western medicine, the colon is divided into "left half" and "right half" with the splenic flexure as the boundary, and the left half of the colon is connected to the rectum, which has a narrow intestinal lumen and the stools are already shaped, and cancerous lesions in the left half are more likely to cause obstruction and change of the shape of the stools, and the ulceration of the cancerous lesions is prone to bloody stools; the right half of the colon is connected to the small intestine, which has a larger intestinal lumen and is prone to blood stools. The right half of colon is connected to the small intestine, the intestinal lumen is larger, and the stool is not yet formed, so the tumor has more space for growth. Therefore, there is no obvious specific performance in the early stage of right half colon cancer, and only abdominal pain and diarrhea can be seen. Chinese medicine believes that colon cancer is mainly located in the spleen and the large intestine from a holistic viewpoint, and has a close relationship with the liver. In the early stage, when liver qi is not well dispersed, there are no obvious symptoms or occasional minor discomfort such as abdominal swelling, abdominal pain, insomnia etc. In the progressive stage, when the liver loses detachment and excretion, the spleen and stomach are out of balance, abnormal conduction in the large intestine will lead to diarrhea or constipation; when the function of the liver and spleen is out of balance, blood will flow outside the veins, then there will be bloody stools; the large intestine is the master of fluids, and fluids are absorbed and transmitted abnormally, resulting in the formation of pathological products that can be discharged from the intestines in the form of mucus stools; the metabolic disorders of qi, blood, fluid and phlegm are out of balance, phlegm, blood stasis and evil poisons will be aggregated into tumors. In the late stage, the function of the spleen and stomach in transporting and transforming gradually declines, and there is a lack of source of qi and blood biochemistry; in the long run, there may be anemia, emaciation, fatigue, low fever and other signs of deficiency and fatigue.

7. Liver is Associated with Distant Metastasis of Colon Cancer

The most frequent target organ for distant metastasis of colon cancer is the liver, and about 50 % of colon cancer patients will have liver metastasis in the process of colon and liver cancer development [12]. Some scholars believe that malignant tumor metastasis often follows the principle of promotion, restriction, over-restriction and reverse restriction. Liver metastasis of colon cancer is a manifestation of over-restriction and reverse restriction; The liver has a close relationship with the qi and chemistry of internal organs of the large intestine. In the pathological state, the liver can not promote the discharge of cancer toxins and pathological

products from the intestinal cavity when it is full of cancer toxins and pathological products, which in turn aggravates the malfunction of the liver and creates conditions for the metastasis of the cancer toxins. The whole body's qi and blood need to communicate with each other through the meridians, and the meridians are an important pathway for liver metastasis [13]. The Book of Tu Shubian says: "The liver is the basis for blood condensation." The liver and large intestine meridians are closely connected, colon cancer toxins can flow to the liver through meridians, the liver is the main collector of blood, so blood is rich and has the function of coagulation, if the liver loses excretion, the liver blood does not run well, and bloodline will be slow in a long time, and slow bloodline in the liver is conducive to the cancer toxin to stay in the liver, which will gradually form the dystrophy of the ribs. Modern anatomical and physiological findings show that the veins of the right semicolon return most of the blood to the liver through the superior mesenteric artery, while the venous blood of the left semicolon first passes through the inferior mesenteric vein to the splenic vein, and then enters the liver through the portal vein [14]. Ma Mengyu [15] and others also showed experimentally that the imbalance of the internal environment caused by liver qi stagnation builds up the β -AR signaling pathway, which enables various neurotransmitters and immunosuppressive factors to interact with tumor cells, thus creating a liver environment conducive to tumor invasion and metastasis. Modern medicine explains the high incidence of liver metastasis of colon cancer by the influence of colon blood flow eventually returning to the liver and liver qi stagnation on the organism, which is similar to the Chinese medicine "blood returning to the liver" and "liver loss of excretion".

8. Treatment of Colon Cancer from the Perspective of the Liver

The treatment of large intestine disease should focus on restoring its normal physiological function, Tang Rongchuan proposed that "the treatment of large intestine should calm the liver, harmonizes blood and moistens intestines", liver qi excretion methodical, medium lifting and lowering of whole body qi movements, liver blood sufficiency, qi and blood running smoothly, the large intestine can be normal transport, descending and conduction. The large intestine is smooth, and the dregs of the body and the turbid Qi of the liver are excreted in a way that cancerous toxins are not easy to commit against the liver. In the clinic, some doctors treat colon cancer and prevent liver metastasis by dredging the liver and relieving depression, regulating qi and blood circulation in the bowels, and blood circulation and blood stasis, all of which reflect the therapeutic idea of "treating the liver".

9. Divert the Liver Relieve Depression, and Regulate the Qi of the Spleen and Stomach

Qing Dynasty - Huang Yuan Yu "Sisheng Xinyuan" puts forward: "The origin of every disease is due to the depression of wood qi", wood depression and congestion of soil, liver loss of detachment causes spleen loss of healthy transport, large intestine conduction malfunction, stagnation of qi, stasis of blood, phlegm condensation and agglomeration to form lumps, the clinical treatment should be sparing the "wood" to

smooth the "earth" qi to restore the normal physiological function of the large intestine. Professor Liu Songjiang [16] from the overall concept of Chinese medicine believes that the role of the liver in the development of colon cancer should be valued, and the commonly used clinical drugs are: Bupleurum chinense, Yujin, tangerine kernel, lychee kernel, etc. to soothe the liver and regulate vital energy to prevent metastasis of the tumor. Professor Yang Yufei [17] believes that liver depression is a factor regulating the progress of the disease, if the liver qi is organized and the qi, and blood are running smoothly, there is no place for the cancerous toxin to be transmitted. Therefore, when the disease is in transition, it is often appropriate to match with Bupleurum, Citrus aurantium, Radix Paeonia lactiflora and Yujin to relieve the liver of depression, so that the medicine will be more effective, and the progression of the disease can be prevented or slowed down. Modern research has found that Chai Shao Jie Yu Tang can be used to regulate the emotions of postoperative colon cancer patients with liver depression and spleen deficiency, reduce the concentration of TNF- α , which improves the immune function of the patients, and inhibit the recurrence of postoperative colon cancer [18].

10. Regulate Qi and Pass Through the Bowels, Drain Turbidity and Eliminate Accumulation

Tang Rongchuan "Xue Zhenglun" recorded: "The reason why the large intestine can transmit, all rely on the qi." The liver governs the main body of the qi, and regulating the liver can restore the role of the large intestine, on the one hand, "The liver uses the large intestine as its internal organs", the large intestine transmission and chemical division can be the liver's turbid qi discharge, the liver qi drainage is normal, the qi elevation and lowering of the order, the body of qi, blood and fluid metabolism is normal, then it is not easy to produce intermediate pathological products congestion of the intestines and bowels; On the other hand, the six internal organs are "to pass for the descending", which will help the large intestine to pass the qi to discharge dross and pathological products. For example, Professor Zhou Daihan [19] believes that the mechanism of colorectal cancer and "congestion" related, when the qi through the bowels, remove blood stasis and detoxification. Professor Du Huaitang [20] believed that the disorder of qi and toxicity is the core pathogenesis of colorectal cancer, and Da Chaihu Tang is the agent of "regulating qi and regulating bowels", and when clinically applied, ginseng, licorice and Houpu were added to regulate qi and regulate bowels and at the same time assisting in supporting the correctness of the patient's body, which has good clinical efficacy. Tumor patients with insufficient positive qi should not be treated too harshly, and the drugs should be selected reasonably according to the patient's physical condition, or used together with the drugs to support positive qi.

11. Harmonizing Blood and Removing Blood Stasis, Preventing Diseases and Changes at the Same Time

According to traditional Chinese medicine, the liver is the main reservoir of blood, and colon cancer patients with

insufficient qi and blood and slow blood flow in the liver are conducive to the retention of cancerous toxins, which provides a suitable environment for proliferation and metastasis. The addition of medicines for Harmonising blood and removing blood stasis, tonifying the insufficient blood of the liver, transforming the stagnant waste blood, and facilitating blood flow, will help the stasis of toxins to dissipate, make it difficult for cancer to survive, and reduce the chances of metastasis. Professor Liu Zhiming [21] took the formula meaning of Danggui Buxue tang and Danggui Shaoyao Tang in the clinic, commonly used Angelica sinensis and Paeonia lactiflora to nourish the blood and camping, With Astragalus to benefit the qi and blood, to make the yang born and yin grow, and qi flourish and blood be born. At the same time, tonify without stagnation, and tonify without stagnation and stagnation. Professor Wang Ruiping [22] believed that blood stasis and cancer toxin are the main pathological factors of advanced colorectal cancer, and the addition of stasis-eliminating and detoxicating products according to the patient's physical condition in clinical medicine can help to improve the therapeutic efficacy. In the past, western medical treatment often used drugs to regulate tumor angiogenesis, but recent studies have found that the inhibition of tumor angiogenesis can only achieve good feedback in the initial period, after which there will be serious drug resistance problems, and even promote the metastasis of tumor cells [23]. Modern pharmacological studies have found that the blood of patients with advanced intestinal cancer is hypercoagulable, which is in line with the neuropathological changes of blood stasis in traditional Chinese medicine, and some of the drugs for activating blood circulation and removing blood stasis have the effects of inhibiting tumor angiogenesis, improving tumor microcirculation, inhibiting the expression of oncogenes, inhibiting the killing of tumor cells, inducing the differentiation of tumor cells, inducing the death of tumor cells, and reversing the tumor's drug resistance [24-26].

12. Conclusion

From the perspective of the overall principle of Chinese medicine, the etiology, clinical manifestations, recurrence and metastasis of colon cancer are closely related to the liver, and modern medicine also explains the connection between the liver and colon through the "intestinal-liver axis". The relationship between the liver and the colon should be emphasized in clinical practice, to restore the physiological function of the colon and reduce the metastatic rate of colon cancer. In this paper, we have described the superficial connection between the liver and the large intestine, and there is a lack of support for the differences and connections between the two in molecular genetics and other aspects. In the future, we need to refer to more experimental data, ancient texts and the clinical experience of medical practitioners to clarify the relationship between the liver and the large intestine and to open up the ideas of clinical diagnosis and treatment.

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