

Theoretical analysis of traditional Chinese medicine and treatment thinking about bone marrow suppression after chemotherapy

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Abstract: Traditional Chinese medicine is effective in treating bone marrow suppression. This paper discusses the etiology and pathology of bone marrow suppression from liver, spleen and kidney according to the basic theory of traditional Chinese medicine. That is to say, drug evil invades the body, which easily leads to liver without blood, spleen without metaplasia, deficiency of kidney qi, deficiency of qi, blood, yin and yang. The main treatment methods are nourishing blood and liver, invigorating spleen and kidney, regulating qi, blood, yin and Yang, activating blood circulation and removing blood stasis, tonifying qi and warming Yang, supplementing qi and nourishing Yin, clearing heat and detoxifying. Traditional Chinese medicine has remarkable curative effect in treating bone marrow suppression after chemotherapy. This paper briefly reviews the treatment of bone marrow suppression after chemotherapy by traditional Chinese medicine.

1. Introduction

Chemotherapy, as one of the main means of treating malignant tumor in modern medicine, has no obvious specificity. Systemic medication will inevitably damage normal cells while killing cancer cells, which will lead to a series of adverse reactions, among which bone marrow suppression is one of the most common adverse reactions. Bone marrow suppression refers to the injury of hematopoietic cells in bone marrow caused by radiotherapy and chemotherapy, which leads to the decrease of peripheral blood cells, mainly manifested by the decrease of white blood cells, red blood cells and platelets, among which the decrease of white blood cells is the most common. When patients have myelosuppression, their immunity decreases, which is easy to be complicated with infection, even anemia and bleeding, and even serious cases can lead to death ^[1]. Bone marrow suppression is an important reason that patients can't get enough foot treatment after chemotherapy. The main treatment methods of western medicine ^[2]: hematopoietic colony-stimulating factors, such as recombinant human granulocyte colony-stimulating factor and recombinant macrophage colony-stimulating factor, are mainly used to rapidly increase the level of leukocytes. Oral leukopenia drugs, such as vitamin

B4 tablets, shark liver alcohol, etc. Hematopoietic stem cell transplantation. Component transfusion, transfusion of concentrated white blood cells and platelets. Or other measures. However, western medicine alone has a good curative effect on myelosuppression, but it is expensive, unstable and prone to a variety of adverse reactions. Such as: fever, arthralgia, hepatitis, allergy, rash, etc. Traditional Chinese medicine has the advantages of stable effect and less adverse reactions in the treatment of chemotherapy-induced myelosuppression. This paper discusses the treatment of bone marrow suppression after chemotherapy with traditional Chinese medicine, and the specific contents are as follows:

2. Etiology and pathogenesis

There is no clear record of myelosuppression in traditional Chinese medicine, but it can be classified into the category of "asthenia and blood disease" according to its clinical manifestations such as sallow or pale complexion, dizziness, weakness in waist and knees, poor appetite, bleeding and susceptibility to infection. Traditional Chinese medicine thinks that chemotherapy drugs are mostly products that attack cancer and poison, and when they attack cancer and poison, they also destroy the balance of yin and yang of internal organs, resulting in qi deficiency, qi stagnation and blood stasis, with the most obvious damage to liver, spleen and kidney. Liver stores blood, which has the functions of storing blood, regulating blood volume and preventing bleeding. "Su Wen · Ling LAN Mi Dian Lun" said: "the spleen and stomach, Cang Li of the official, five taste Yan." 《Jingyue Quanshu says: "blood is the essence of water and valley, which comes from the source and is biochemical in the spleen." The spleen and stomach are the acquired foundation, the source of Qi and blood biochemistry, the material basis of blood formation, and the essence of water and grain comes from the spleen and stomach. Kidney is the origin of congenital, kidney stores essence, blood is transformed by essence, kidney dominates bone and generates marrow, bone marrow is transformed from essence and Qi in kidney, so if kidney qi is sufficient, bone marrow is firm, and Qi and blood are all from ^[3]. Both cancer cells and normal cells were killed by chemotherapy drugs. Therefore, the liver, spleen and kidney are damaged by chemotherapy, which easily leads to liver not storing blood, spleen not metaplasia, kidney qi deficiency, and finally blood biochemical deficiency. The location of the disease is in the bone marrow, the key is in the liver, spleen and kidney, and the pathological factor is the combination of toxin and blood stasis ^[4].

3. Common syndrome types

3.1 Insufficient liver blood

Medicine evil damages the body, causing liver blood deficiency. When it is blood, the hair is sparse. If blood deficiency can't nourish the hair, the hair is dry and easy to fall off. As a result, the liver does not contain blood, the blood does not follow the normal channels and overflows the veins, which leads to bleeding of the orifices and skin mucosa.

3.2 Weak spleen and stomach

Chemotherapeutic drugs are absorbed and transported from mouth to mouth through spleen and stomach, so the greater the damage to spleen and stomach. Chemotherapeutic drugs are mostly products with big pungent and hot heat, which damage the spleen and stomach, cause disorder of qi activity in middle energizer, and abnormal rise and fall of the spleen and stomach, mainly manifested as nausea and vomiting and poor appetite. The spleen and stomach are the sea of water and valley, the source of Qi and blood biochemistry. If the spleen and stomach are damaged, the Qi and blood

biochemistry is insufficient, just as the middle Jiao receives Qi and takes juice, and changes red, which is called blood. Therefore, if the spleen and stomach are weak, the Qi and blood are insufficient ^[5].

3.3 Spleen and kidney deficiency

Spleen and stomach transport Shui Gu subtly, transforming qi and blood, which is the foundation of the day after tomorrow. Kidney stores essence, essence and blood are homologous, kidney governs bone and marrow, kidney governs yang, warms viscera, and promotes the normal function of viscera, which is the innate foundation. The normal function of spleen and stomach transportation and transformation needs the warmth of kidney yang, while the kidney needs the nourishment of qi and blood of spleen and stomach transformation. Due to the deficiency of spleen and kidney caused by chemotherapy drugs, Qi deficiency, biochemical weakness and kidney yang deficiency are manifested as sallow complexion, mental malaise, dizziness, fatigue, anorexia, chilly, weak waist and knees, cold limbs, loose stool, etc ^[6].

3.4 Deficiency of Qi and Blood

While healthy qi exists, evil cannot be done. Most tumor patients belong to the syndrome of deficiency of origin and standard, deficiency of vital qi, and the combination of toxin and blood stasis ^[7]. At this time, if chemotherapy drugs are used to attack the poison with poison, the more vital qi will be weakened, and the patient will show the phenomenon of deficiency of both qi and blood. Pale complexion, shortness of breath, fatigue, easily tired, depressed, sweating, pale tongue, white fur, weak pulse.

3.5 Qi deficiency and blood stasis

Deficiency of Qi cannot promote blood circulation, leading to blood stasis. Deficiency of Qi and body fluid, insufficient essence and blood, and pulse deficiency and blood stasis. Modern research shows that the blood of cancer patients is in a hypercoagulable state ^[8]. There are some similarities. The clinical manifestations include Qi deficiency, purplish skin, pain, bleeding, purple and dark tongue, white fur, thin and astringent pulse, etc.

4. Treatment ideas

Bone marrow suppression is a common adverse reaction of cancer patients after chemotherapy. Its occurrence is based on the interaction of deficiency and deficiency and drug evil, so deficiency should be supplemented. At the end of chemotherapy, heat clearing and detoxification can be given appropriately to detoxify. It is necessary not only to prevent excessive detoxification from affecting the effect of chemotherapy drugs, but also to reduce the damage of chemotherapy drugs to the body ^[9].

In terms of pathogenesis, chemotherapy drug poison invades the body, damaging yin and yang, making liver, spleen and kidney function deficient, qi, blood, yin and yang unbalanced, and appearing pathological products such as blood stasis ^[10]. Therefore, the treatment should be based on the adjustment of liver, spleen and kidney function, combined with the treatment methods of invigorating qi, nourishing blood, nourishing yin, warming yang and removing blood stasis. For those with liver blood deficiency, first of all, nourish blood and soften the liver, so that the liver can be adjusted and the blood can run normally. At the same time, tonifying kidney and replenishing essence, liver and kidney are homologous, nourishing mother and son, and further promoting the formation of liver blood by tonifying kidney essence. For patients with weakness of spleen and stomach, even

deficiency of both spleen and kidney, spleen and stomach should be strengthened, kidney should be tonified and marrow should be produced, meanwhile, stomach should be lowered to stop vomiting, and middle jiao qi should be adjusted. For the patients with deficiency of both qi and blood, it is mainly to replenish qi and generate blood, strengthen spleen and stomach, spleen and stomach is the source of Qi and blood, and if the function of spleen and stomach is normal, Qi and blood are active. For the patients with Qi deficiency and blood stasis, tonifying qi and promoting blood circulation are the main methods. There are two reasons for blood stasis: one is due to deficiency, the other is due to Qi deficiency, and the other is due to blood deficiency. Therefore, according to the clinical symptoms of patients, take the corresponding treatment.

5. Classical prescription research

(1) The classic prescription which is mainly for invigorating qi and nourishing blood. Siwu Decoction, Bazhen Decoction, Danggui Buxue Decoction, etc. Studies have shown that ^[11] the mechanism of Bazhen Decoction and Siwu Decoction on rat hematopoietic function may be through upregulation of EPO mRNA gene to further increase the concentration of EPO in serum, stimulate the growth and differentiation of rat bone marrow hematopoietic cells, and activate immature red Line cells, so as to achieve the effect of blood enrichment.

(2) Classical prescriptions mainly for strengthening spleen and benefiting stomach. Sijunzi Decoction, Xiangsha Liujunzi Decoction, Guipi Decoction, etc. Studies have shown that ^[12] Sijunzi Decoction and Danggui Buxue Decoction can increase the peripheral blood leukocyte count, serum IL-2 and IL-6 levels and the secretion of TNF by splenic macrophages in tumor bearing mice after chemotherapy- α And spleen lymphocytes secrete IL-2 to antagonize chemotherapy-induced bone marrow suppression and enhance immune function. Moreover, the enhancement of immune function increased with the increase of dose.

(3) Classical prescriptions mainly for tonifying kidney and promoting marrow production. Zuogui Pill, Yougui Pill, Guilu Erxian Gum, Liuwei Dihuang Pill, etc. Hao Suzhen et al. ^[13] studied the effect of modified Guilu Erxian Decoction on bone marrow suppression and immune function of breast cancer patients undergoing chemotherapy. Patients with tumor were treated with Jiawei Guilu Erxian Decoction or shark liver alcohol. The use rate of G-CSF and low toxicity of bone marrow in the group of Guilu Erxian Decoction were lower than those in the group with shark liver alcohol, and the scores of immune function and quality of life were higher than that of shark liver alcohol group. It shows that Jiawei Erxian Decoction has some effect on improving human immunity and reducing bone marrow inhibition after chemotherapy. Modern pharmacological studies have shown that ^[14] Liuwei Dihuang Pills can promote the differentiation of hematopoietic stem cells, have a better protective effect on bone marrow hematopoietic function, and can effectively prevent leukopenia.

(4) Xiaoyao Powder, Chaihushugan Powder, Yueju Pill, etc. Jiang Tao et al. ^[15] studied the application of Xiaoyaosan in mice with bone marrow suppression after irradiation, which showed that Xiaoyaosan could effectively regulate the expression of TPO, EPO and GM-CSF in serum, promote the recovery of hematopoietic function in mice with bone marrow suppression after irradiation, and repair the peripheral blood picture of mice.

(5) The classic prescriptions which mainly focus on activating blood stasis: Zhuyu Decoction, Buyang Huanwu Decoction, etc. The results showed that Buyang Huanwu Decoction ^[16] promoted the proliferation of hematopoietic stem cells and promoted the differentiation of erythrocytes to improve the red blood cells by improving the expression level of EPO and EpoR mRNA.

6. Single Chinese Medicine

Analysis on the medication rule of Chinese medicine for preventing and treating bone marrow

suppression after radiotherapy and chemotherapy shows that *Astragalus membranaceus*, *Angelica sinensis*, *Atractylodes macrocephala* Koidz, *Codonopsis pilosula*, *Lycium barbarum*, *Caulis Spatholobi* and *Ginseng* are frequently used. Most of them are drugs for invigorating qi and promoting fluid production, nourishing yin and activating blood ^[17]. *Astragalus membranaceus* can stimulate human peripheral monocytes to produce a large number of G-CSF, granulocyte-monocyte colony stimulating factor and hematopoietic factor, increase the number of white blood cells and reduce the degree of bone marrow suppression ^[18]. *Caulis Spatholobi* ^[19] can stimulate the proliferation of hematopoietic progenitor cells in myelosuppression mice and alleviate the endogenous proliferation defect of hematopoietic progenitor cells. Among them, the catechins in *spatholobus suberectus* have the strongest proliferation stimulating activity, which may be the main substance to stimulate the hematopoietic system. Ginseng soap II in ginseng can promote the recovery of bone marrow cells and cell vitality in mice, and significantly increase the content of IL-1, IL-3 and il-6b in mice ^[20].

7. Acupuncture

Acupuncture, as a traditional medical technique in China, is based on the intermediate basic theory, and according to the syndrome types of patients, the corresponding meridians, acupoints and appropriate techniques are selected. Studies have shown that ^[21] acupuncture can increase the serum colony stimulating factors, enhance the activity of stimulating factors, enhance the division and proliferation of bone marrow stem cells, and increase the number of granulocytes synthesized by granulosa in bone marrow. Wu Guoliang, Chen Changnan, etc. ^[22] have studied the application of acupuncture in preventing and treating bone marrow suppression after chemotherapy, and found that acupuncture dialectical treatment can significantly reduce the incidence of bone marrow suppression in malignant tumor patients during chemotherapy, reduce the severity of bone marrow suppression, and improve the quality of life of patients. Wang Jiannan, Zhang Weixing et al. ^[23] studied the effect of drug separated moxibustion on bone marrow suppression during chemotherapy of gastric cancer. The conclusion shows that drug separated moxibustion can effectively alleviate bone marrow suppression caused by chemotherapy. To a certain extent, relieve the clinical symptoms and improve the quality of life of patients. Studies have shown that moxibustion at Zusanli can stimulate the activities of various digestive enzymes, improve cardiovascular function, enhance blood cell level, and have a good regulatory effect on pituitary adrenal cortex function.

8. Conclusions

Bone marrow suppression is an important reason that patients can't get enough medical treatment after chemotherapy, which seriously affects the therapeutic effect of patients. It is essential to prevent and cure the occurrence of bone marrow suppression in chemotherapy. Traditional Chinese medicine has certain advantages in preventing and treating the occurrence of bone marrow suppression in chemotherapy, which can be treated through dialectical treatment. We can also use the method of acupuncture and medicine combined with ^[24] to prevent and treat myelosuppression, which will also achieve good curative effect. Integrated traditional Chinese and Western medicine can not only reduce the chemotherapy-induced myelosuppression, but also reduce the adverse reactions of Western medicine in the treatment of myelosuppression ^[25].

At present, whether it is prescriptions, traditional Chinese medicine, or acupuncture, certain achievements have been made in the molecular mechanism of treatment of bone marrow suppression caused by chemotherapy ^[26]. But there are also some problems. Lack of multi center and large sample research. But there is no doubt about the clinical effect of traditional Chinese medicine. I believe that in the future, when the mechanism of action of traditional Chinese medicine is more and more in-depth, traditional Chinese medicine will be more and more used in clinical.

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