

PRELIMINARY STUDY ON THE MECHANISM OF JIEYU XIAOZHENG GRANULE IN THE PREVENTION AND TREATMENT OF BREAST CANCER

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Abstract: The pathogenesis of breast cancer is complex and the treatment strategies are diverse, but it still faces many challenges. The current surgery, radiotherapy and chemotherapy and other treatment methods have different disadvantages and limitations, so it is urgent to find a safer and more effective treatment methods. Traditional Chinese medicine (TCM) has rich experience in clinical prevention and treatment, and TCM prescriptions can inhibit breast cancer metastasis, prevent and treat postoperative complications, and improve the quality of life of patients. To study the mechanism of jieyuxiaozheng granule in the prevention and treatment of breast cancer, to provide theoretical support for its wide clinical application, and to help to bring safer and more effective treatment plans for breast cancer patients.

Keywords: Jieyuxiaozheng granule; Breast cancer; Liver-qi depression; Traditional Chinese medicine

1 INTRODUCTION

Breast cancer, a disease in which abnormal breast cells grow out of control and form tumours, is responsible for 670,000 deaths worldwide in 2022 [1]. Currently, the pathogenesis of breast cancer is complex, and treatment strategies are diverse, but still face many challenges. For example, postoperative recurrence and metastasis are easy and the prognosis is poor, radiotherapy, chemotherapy, targeted therapy and endocrine therapy. Traditional Chinese medicine (TCM) has rich experience in clinical prevention and treatment, and TCM prescriptions can inhibit breast cancer metastasis, prevent postoperative complications, and improve patients' quality of life.

2 LIVER DEPRESSION AND QI STAGNATION AS A KEY PATHOGENESIS IN BREAST CANCER DEVELOPMENT

Chinese medicine believes that emotional and emotional disorders, liver depression and stagnation of qi are important etiologic factors in the development of breast cancer. Ancient Chinese medicine books give corresponding names to different parts of cancer and clinical characteristics, and breast cancer can be categorized as "breast rock", "breast noma", "breast stone carbuncle", "jealous breast", "stone milk", "tumbling milk", "tumbling milk", "tumble milk", "Jealousy of Milk", "Stone Milk", "Flowering Milk", "Milk Rock", etc. Chen Shikong, a medical doctor of the Ming Dynasty, proposed in his surgical monograph "Surgery Zhengzong" that the main cause of breast rock is injury due to emotion, which is most closely related to the liver, spleen and heart. Modern medical practitioners' understanding of the pathogenesis of breast cancer is also mostly based on liver depression and qi stagnation. Zhou Zhongying, a master of national medicine, pointed out that liver-qi stagnation is the key to the development of breast cancer [2]. Wu Yu et al. suggested that the core pathology of breast cancer is qi stagnation and rock formation, and its pathology is mainly divided into 4 stages, namely qi dysfunction, qi stagnation, qi stagnation and toxicity, and toxicity and rock formation. [3]. Li Jie et al. believed that there is a close correlation between emotional disorders and the development of breast cancer and even metastasis, recurrence and shortened survival [4].

According to Chinese medicine theory, the liver is the main regulator of qi and blood, and regulates mental and emotional well-being. Liver failure and liver qi stagnation can lead to mental and emotional abnormalities, which can lead to various diseases, and cancer is one of the common diseases. Whether from the perspective of Western medicine or traditional Chinese medicine, the occurrence and development of breast cancer is a complex biological process, and liver depression is one of its basic pathologies, and liver detoxification is the basic law of its correspondence [5]. Modern medical research has found that mental stress and poor mood can lead to cancer metastasis and deterioration by affecting the neuro-endocrine-immune network (NEI). Under the control of chronic emotional stress, tumor angiogenesis creates an environment for tumor development, growth and progression.

3 SOOTHING THE LIVER AND REGULATING THE QI, ELIMINATING PHEGGM AND CLEARING THE NODULATION ARE THE BASIC TREATMENT OF BREAST CANCER

The traditional Chinese medicine treatment plan of "Breast Cancer Diagnosis and Treatment Consensus of integrated Chinese and Western Medicine" takes soothing liver and regulating qi, eliminating phlegm and clearing up as the basic treatment method. Zhou Zhongying, a master of traditional Chinese medicine, proposed to treat breast cancer by

soothing the liver and relieving depression, promoting blood circulation to remove blood stasis, softening the firm and dissipating the knot, clearing heat and detoxification, and promoting dampness and resolving phlegm, according to the situation of various pathological factors and priorities [2,6]. Wu Yu et al. believe that the method of soothing liver and relieving depression in the treatment of breast cancer runs through the course of the disease [3]. The liver affects the hypothalamic pituitary gonadal axis through the limbic system, affects hormone secretion, and affects the breast [7]. Soothing the liver and regulating qi can reduce qi stagnation and reduce fire, and improve local redness, swelling, and pain in the breast [8]. The addition and subtraction of Chaihu Shugan San, the representative prescription for soothing the liver and relieving depression, can play an anti breast cancer role by influencing hormone signaling pathway and anti angiogenesis related signaling pathway. The modified Chaihu Shugan Powder combined with CAF regimen in the treatment of stage III breast cancer can improve the short-term efficacy and reduce side effects, improve the quality of life of patients, regulate the expression of tumor markers, estrogen levels and serum matrix metalloproteinases (MMPs) expression [9].

4 JIEYUXIAOZHENG REGULATING THE “NEURO-ENDOCRINE-IMMUNE NETWORK” TO FIGHT TUMORS

Jieyuxiaozheng granule composed of Chai Hu, Tu Bei Mu and Toadstool Powder, it is effective in relieving depression and dispersing lumps, detoxifying and subduing swellings, possibly by acting on the p53 signaling pathway, phosphatidylinositol 3 kinase /protein kinase B (PI3K-Akt) signaling pathway, mitogen-activated protein kinase (MAPK) signaling pathway et al. Antagonizing chronic stress to combat breast cancer [10]. Chaihu in the formula belongs to the liver, gallbladder and lung meridians, functioning to reconcile the epidermis and the interior, detoxifying the liver and relieving depression, elevating the sun and lifting the trap, retreating the fever and intercepting malaria, and it is an important medicine to detoxify the liver and relieving depression, and the analysis of the clinical statistics shows that Chaihu ranks the first in terms of the frequency of the use of the medicine for the treatment of breast cancer [11]. It was found that Saikasaponin D (SSD), the active ingredient of Saikhu, inhibited the proliferation of MCF-7 cells in breast cancer. Promotes apoptosis in MCF-7 cells, and its mechanism of action may be related to The Janus kinase 2 (JAK2)/signal transducer and activator of transcription 3 (STAT3) pathway is related [12]. SSD blocks the proliferation of the human breast cancer SK-BR-3 cell line; the cell cycle of the SK-BR-3 cell line is blocked in the G2 phase to promote apoptosis in this cell [13]. SSD also inhibits the growth of MDA-MB-231 cells in breast cancer and blocks MDA-MB-231 cells in G2 phase, and its mechanism of cell cycle blocking may be related to its reduction of protein expression of cell cycle-related factors [14].

Bulbus Fritillariae belongs to the lung and spleen meridians. It can detoxify, disperse nodules and detumescence. It is commonly used in the treatment of breast cancer clinically. Modern pharmacological studies have found that the effective ingredients of Bulbus Fritillariae Thunbergii have a strong inhibitory effect on breast cancer cells [15]. TBMS1 A can inhibit breast cancer cell metastasis by inhibiting the chemokine C-X-C-motif ligand 12, CXCL12 - chemokine C-X-C-motif receptor 4, CXCR4 signal pathway [16]. Triple negative breast cancer (TNBC) has a high degree of malignancy and is prone to metastasis and recurrence. TBMS1 can inhibit the proliferation, migration and invasion of triple negative breast cancer cells by inhibiting AKT/NF - κ B signaling pathway [17]. Due to the lack of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) expression, TNBC cannot benefit from endocrine therapy and anti-HER2-targeted therapy, and advanced patients can only choose chemotherapy. Dong Jing et al. [18] found that the treatment group of advanced TNBC patients treated with compound Tu Bei Mu preparation combined with chemotherapy drugs had better short-term objective response rate, ORR, median progression free survival, PFS, traditional Chinese medicine symptoms, and quality of life efficacy than the chemotherapy control group without traditional Chinese medicine. Chansu has the effects of reducing swelling and relieving pain. Zhou Bo et al. [19] found that Yuanhua Bufotalin can effectively block the migration of breast cancer cells by inhibiting the synthesis of matrix metalloproteinase 2, MMP2 and MMP-9, so as to achieve the effect of inhibiting the proliferation of breast cancer cells and blocking cell metastasis.

In summary, psychological stress can induce a balance imbalance of NEI leading to diseases, and negative emotional stimuli are also regulated by the central nervous system, hypothalamus, and NEI. Psychological stress and adverse emotional stimulation will lead to stagnation of liver qi, which also has neuroendocrine immune dysfunction, and is the key pathogenesis of the occurrence and development of breast cancer. Traditional Chinese medicine often relieves breast cancer by soothing the liver and invigorating the spleen, promoting qi and relieving depression, and traditional Chinese medicine prescriptions based on emotional intervention in breast cancer have good effects in anti-cancer. Bupleurum chinense, Fritillaria thunbergii and Bufonis bufonis all have an effect on the neuroendocrine immune function of the body and play an anti-tumor role, which can prevent and treat breast cancer by regulating NEI.

5 CONCLUSION

Breast cancer is the most common malignant tumor among women. Its incidence rate has continued to increase in recent years in China, posing a serious threat to the life safety of patients. The current treatment methods such as surgery, radiotherapy, and chemotherapy have varying degrees of shortcomings and limitations, so finding safer and more effective treatment methods has become an urgent task. To study the mechanism of Jieyu Xiaozheng Granule in the

prevention and treatment of breast cancer, provide theoretical support for its extensive clinical application, and help to bring more safe and effective treatment for breast cancer patients.

COMPETING INTERESTS

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