

Application of traditional Chinese medicine in the treatment of breast cancer

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Abstract. Breast cancer is one of the common nasty tumors that seriously endanger women's health problems. Its incidence and mortality rate rank first among female malignant tumors in the world. At the same time, the prevalence and mortality rate of women in China remain high, and it shows a trend of younger age. With the acceleration of social rhythm, irregular diet, increasing pressure and other reasons, the incidence of breast cancer in women is increasing year by year. Currently, the treatment of breast cancer usually includes surgery, chemoradiotherapy, endocrine therapy, targeted drugs, etc. Although these combined therapies are effective in reducing the mortality rate of breast cancer, the side effects on the patients' body are still large. Most of the previous studies focused on the perspective of western medicine, but this paper analyzed the theory, cognition and the therapeutic effects of traditional Chinese medicine on breast cancer from the perspective of Chinese medicine. The results of this study show that traditional Chinese medicine treatment of breast cancer and prognosis have good performance, especially in alleviating complications and alleviating the side effects of chemoradiation.

Keywords: breast cancer, traditional Chinese medicine, treatment, prognosis

1. Introduction

Breast cancer is one of the malignant tumors that seriously endanger the health and lives of women around the world. It is also a primary focus of cancer prevention and treatment efforts in China. According to the 2022 data on malignant tumor disease released by the National Cancer Center, there were 2.09 million new cancer cases among Chinese women in 2020, accounting for 46% of the total. The death toll reached 1.18 million, accounting for 39% of the total. New breast cancer cases were 420,000, with 120,000 fatalities, which constitutes 9.9% of the total [1]. Breast cancer cases topped the list, surpassing lung cancer. During treatment, western medicine causes serious side reactions to patients, poor prognosis and other problems. Therefore, traditional Chinese medicine (TCM) provides effective treatment options for solving these problems. Integrating TCM into breast cancer treatment can further improve the treatment strategies, reduce adverse reactions and prolong the survival time of patients. Besides, it can alleviate the physical, mental and economic burden of improper treatment on patients and their families. With the gradual improvement of western medicine in the epidemiological characteristics and treatment methods of breast cancer, traditional Chinese medicine has also become an indispensable part of breast cancer management. This paper reviews the clinical application of TCM in the treatment of breast cancer and examines the feasibility for diagnosing and treating this disease, to provide more comprehensive and personalized treatment options for breast cancer patients.

2. Literature review

2.1. Western medicine research on breast cancer based on imaging genomics

The research on imaging genomics for breast cancer aims to extract valuable insights from vast biological and medical imaging data, transforming it into quantifiable information that can guide cancer diagnosis, prognostic evaluation, treatment response prediction, and disease status monitoring. Professor Wang Huina pre-processed breast cancer genomic data, predicting the molecular characteristics based on this genomic information. He employed genomic medical imaging technologies and image segmentation methods to extract imaging features of breast cancer and develop appropriate model architectures [2]. This approach makes breast cancer less daunting, emphasizing the importance of early examination, early treatment, and early recovery.

At present, more and more studies demonstrate that imaging genomics has a significant role in the detection, treatment and prognosis of breast cancer. However, the existing technologies and methods still face many problems. For instance, the research in breast imaging is inherently multidisciplinary, necessitating collaboration across fields such as imaging and computer image processing. The integration of disciplines represented by artificial intelligence is an urgent challenge that requires attention [3]. Due to the complexity and lack of simple linear features of breast cancer cancerous regions, automated segmentation techniques often fail to meet the requirements of clinical applications. Further research is needed in this area [2].

2.2. Perception of breast cancer in traditional Chinese medicine

Chinese medicine has a long history of recognizing and treating breast cancer, treatment with syndrome differentiation and holistic concepts. This malignant tumor, known since ancient times, has led TCM to develop a unique perspective and treatment system. Historically, ancient medical texts refer to breast cancer with terms such as "breast rock" and "acute mastitis." The earliest documentation of breast cancer in Chinese medicine appears in Ge Hong's "Post-elbow Preparation of Emergency Prescription Volume 5", which describes the characteristics of breast cancer such as breast lumps being hard as stone and skin color changes. The term "breast rock" was first mentioned during the Southern Song Dynasty in Chen Ziming's "Compendium of Good Remedies for Women", but it was recorded in the most detailed way in Chen Shikong's "Surgery Zhengzong" of the Ming Dynasty.

In terms of etiology, doctors in Jin, Sui and Tang dynasties believed that the etiology of breast cancer was mostly related to qi (the vital life force or energy that flows through the body) stagnation and blood stasis [4]. In the Jin and Yuan period, the famous Jinyuan Four masters had a great influence on the treatment of tumors by traditional Chinese medicine. Zhang Congzheng poisted that breast cancer is caused by the deposition of qi and blood or emotional instabilit, advocating emotional therapy and treatments such as sweat therapy for breast cancer. Li Dongheng suggested that nourishing healthy qi could enable the body to eliminate tumors naturally. Zhu Danxi, representing the Yin Yin school, believed that the the presence of tuberculosiswithout itching or purulent is due to the accumulation of phlegm and dampness in the body, leading to breast cancer. Liu Hejian, a representative of Cold school, believed that the tumor in the body is the accumulation of hot evil, which should be treated with cold diarrhea.

Modern medicine has also proved that anti-tumor drugs are mostly, such as clearing away heat and detoxification. Contemporary doctors have their own opinions on the basis of their predecessors. Zhou Zhongying views the pathogenesis of breast cancer as stemming from phlegm, blood stasis, and toxins, with emotional distress contributing to liver dysfunction, poor circulation, and disease manifestation in the breast, liver, and kidneys [5]. Professor Shen Li likens lactrock to carbuncle, recommending that treatment strategies be differentiated based on whether the condition is in the unburst or burst phase, adopting a dialectical approach accordingly [5].

In terms of treatment, ancient Chinese medicine believes that breast cancer is mostly closely related to the dysfunction of liver, kidney and spleen. The liver governs the smooth flow of qi throughout the body, the kidney oversees water metabolism, and the spleen manages transportation and digestion. Treatment is mostly divided into internal treatment method and external treatment method. Internal treatments focus on relieving liver tension, warming the kidneys, supporting yang, invigorating the spleen, improving dampness, and promoting blood circulation to remove stasis. External treatments may include acupuncture, cupping, and topical applications.

3. Application of TCM in the treatment of breast cancer

In diagnosing and treating illnesses, the basic ideas of Chinese medicine are implemented and play a significant role.

3.1. Clinical application of TCM

The study found that the current clinical liver qi stagnation with phlegm dampness is the main pathogenesis of modern breast cancer, accounting for up to 79.4% [6]. Most patients have different degrees of blood stasis signs, liver qi stagnation, leading to poor blood flow. The presence of cold and dampness internally further contributes to impaired ventilation. Modern clinical studies show that 45% of breast cancer patients have TCM syndrome differentiation, with blood stasis and toxin resistance being common among these patients [7]. It was found that when TCM exerts a unidirectional regulation of immune cells, it not only positively regulates anti-tumor cells, but also negatively regulates immune suppressive cells [8]. This suggests that TCM theories with herbal medicines, can help prevent cancer and mitigate complications and side effects. Additionally, TCM may enhance the prognosis of the disease, reducing the physical and psychological impacts of radiotherapy, chemotherapy, and surgery on patients. Furthermore, TCM can improve patient acceptability, decrease drug rejection, boost immunity, and thereby enhance treatment efficacy, ultimately extending recovery time and increasing patient survival rates.

3.2. The embodiment of the basic theory of TCM

In the treatment of breast cancer, Chinese medicine believes that the breast area belongs to the liver and stomach meridians, and that anger and worry may lead to injury to both the liver and the spleen, resulting in liver and qi stagnation, which in turn transforms

into heat. And spleen deficiency can lead to phlegm accumulation; the interplay of phlegm and heat can form a mass that, over time, contributes to the development of the disease.

Modern Chinese medicine scholars identify several key factors contributing to breast cancer. First, liver stagnation and emotional distress lead to injury, resulting in breast cancer. Second, the deficiencies of essence and blood in the liver and kidneys can cause the dysfunction of the viscera, meridians, qi and blood, leading to an imbalance of Yin and Yang, and stasis of qi and blood, resulting in the production of breast cancer. Third, external factors such as cold, hot, dryness and humidity can interact with phlegm and blood stasis in the body, leading to the production of breast cancer. Fourth, when the human body is weak and low in healthy qi and deficiency of qi and blood, the human body cannot carry out normal large-scale immune physiological activities, thus leading to the production of breast cancer. Fifth, a long-term preference for fatty, sweet, and greasy foods can impair the function of the spleen and stomach, causing prolonged accumulation of phlegm and turbidity, which may eventually lead to the formation of tuberculosis in the breast and, over time, breast cancer.

3.3. Treatment rules of traditional Chinese medicine

Early diagnosis is key to breast cancer treatment. The principles of TCM treatment of breast cancer are as follows.

First of all, tonic drugs are employed to enhance immunity and improve the body's environment. For example, astragalus can increase the body's resistance to evil drugs, and assist in preventing tumor development to serious stages [9]. Secondly, soft nodules are reduced by oral or external application, such as seaweed, which can reduce the compression of other tissues, increase the body's ability to local anti-tumor, delay the tumor enlargement, and affect the surrounding tissues and organs [10]. Then, regulating qi and blood involves use of qi and blood drugs, such as Taohong Siwu Decoction or through exercise, psychological and lifestyle to increase human qi and blood, so that they improve the human physiological environment [11]. It can be used for surgery, the end of radiotherapy and chemotherapy, to improve human qi deficiency, blood deficiency, and the complications after western medicine treatment. Then, clearing heat and detoxification is by taking or applying heat-clearing and detoxification prescription, such as honeysuckle, to remove the wet phlegm in the body and alleviate other symptoms [12]. Moreover, liver detoxification is to take liver detoxifying herbs such as Xiangsha Liujun Pills to improve the symptoms such as hardness of breast lumps and swelling and pain due to stagnation of qi [13]. Finally, calming the mind with herbs such as jujube kernel can help treat postoperative complications, including insomnia, palpitations, and hyperactivity [9].

3.4. Mechanism of action of traditional Chinese medicine

Traditional Chinese medicine has huge and rich experience in treating specific diseases with specific prescriptions. The theoretical basis guarantees the correctness of the method, and the practical results also give feedback on the accuracy of the theory. Traditional Chinese medicine has the characteristics of multiple components, multiple targets and multiple pathways. In modern times, it is found that the proliferation of breast cancer cells depends on multiple cellular signaling pathways for transmission. Modern studies have shown that the activation of these pathways leads to the upregulation of cyclins, thereby promoting cell proliferation. And some traditional Chinese medicine components can inhibit the fine proliferation and metastasis of breast cancer, thus inhibiting the proliferation of tumor cells. For example, Huangqin (*Scutellaria baicalensis*) through target network research, can exert anti-tumor effects by inhibiting tumor cell growth, metastasis and angiogenesis, blocking the tumor cell cycle, and promoting apoptosis of tumor cells [14]. An active substance of ginseng, known as ginsenoside, which plays an important role in anticancer activity. It can block the growth of cancer cells through dead cells and other signaling pathways, thus promoting the apoptosis of cancer cells [15]. Moreover, studies show that TCM can inhibit tumor development, improve the sensitivity of chemotherapy and radiation drugs, reduce therapeutic damage and enhance the function of organ immune system. Traditionally, herbs have also been used to reduce drug-related fatigue and pain as well as symptoms of cachexia, increase resistance to respiratory infections, reduce gastrointestinal side effects and protect liver function [16].

4. Challenges and prospects

With the development of science, TCM and Western medicine increasingly complement each other. The clinical performance of traditional Chinese medicine is becoming more standardized and refined. However, huge gaps remain in the treatment of breast cancer in several areas.

First, the research on the component molecules is not completely clear, and there is a lack of systematic theoretical guidance, unified diagnosis and treatment methods. This absence of a clear scientific basis limits the application of traditional Chinese medicine in the treatment of breast cancer. Secondly, breast cancer patients mostly receive radiotherapy, chemotherapy, targeted drugs and other treatment means, while there are also few cases of diagnosis and treatment of TCM, lacking substantial sample sizes for data support. In addition, clinical data can vary widely due to factors, such as environment and diet, leading to great uncertainties in the prediction, diagnosis, treatment, and prognosis of breast cancer. Finally, the current data of TCM on breast cancer is still not comprehensive, and various schools of TCM holding differing views are not unified. Establishing a complete and scientific system for TCM treatment of breast cancer remains a challenge for scholars.

Therefore, future research directions can consider the following aspects. First, the study of Chinese medicine should be further advanced to make the pharmacological performance of Chinese medicine clear. This involves accurately depicting TCM pharmacology and specifying the roles and indications of various herbs. Second, there are many producing areas of traditional Chinese medicine and a wide range of doses, so standardized management should be strengthened to control the quality of medicinal materials. Third, research on TCM diagnosis and treatment of breast cancer should be more refined over time, breaking through the constraints, and thus enhancing TCM's role in clinical practice. Researchers and clinical staff in breast cancer should focus on inheriting and developing TCM while pursuing international collaborations to obtain more clinical sample data for analysis. Fourth, Chinese medicine scholars have different views on breast cancer pathology, and the treatment is not the same. There is still a long way to go for scholars to explore the fine direction of new TCM molecules for the treatment of breast cancer and the mechanism of TCM. It is vital to give full play to the characteristics and methods of traditional Chinese medicine in the treatment of breast cancer.

5. Conclusion

This paper mainly examines the application of Chinese medicine in the diagnosis and treatment of breast cancer, methods and theoretical ideas. Under the development of modern science, more and more people are choosing Chinese medicine for the diagnosis and treatment of breast cancer, which has proven effective in managing significant side effects. With good diagnosis, treatment and prognosis, Chinese medicine not only improves the popularization of Chinese medicine in today's society, but also paves the way for its internationalization. The culture of Chinese medicine is profound, and its holistic concepts and evidence-based treatment have been tested for thousands of years, continuing to play an important role in today's fast-paced medical environment.

However, this paper also has some shortcomings. For example, the lack of clinical data of TCM in breast cancer treatment affects the assessment of its safety. Looking forward to the future, TCM culture, which has undergone extensive textual research, should be committed to the in-depth study of the complex principles of TCM in contemporary medical era. At the same time, through large-scale clinical experience and data collection, a more scientific TCM treatment system will be established to promote its development and integration into modern medicine.

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