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A Review on the Research on the Treatment of Lung Cancer with Traditional Chinese Medicine

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Abstract: Lung cancer is one of the common malignant tumors in clinical practice. Its incidence and mortality rates are constantly rising, and it is also the main cause of cancer-related deaths worldwide. In recent years, the application of traditional Chinese medicine in the treatment of lung cancer has yielded significant outcomes. Consequently, the utilization of traditional Chinese medicine represents a progressive trend in anti-tumor therapy. This article will summarize the treatment of lung cancer through traditional Chinese medicine, addressing the scientific background of lung cancer, the traditional Chinese medical perspective on lung cancer, and the practical application of traditional Chinese medicine in this context. The findings indicate that Traditional Chinese Medicine (TCM) possesses significant potential in the management of lung cancer. By promoting the body's vital energy and eliminating pathogenic factors, treating both the symptoms and the root causes, it can regulate the internal circulation of the body and achieve "strengthening the body and consolidating the foundation" from the inside out. This can alleviate clinical symptoms, reduce adverse reactions, and improve the quality of life of patients.

Keywords: Lung Cancer, Traditional Chinese Medicine, Combined Treatment, Stage-based Treatment

1. Introduction

Monitoring data indicate that in 2022, China recorded 106,060 new lung cancer cases and 73,330 lung cancer fatalities [1]. The incidence and fatality rates of lung cancer have increased [1]. The primary treatment modalities for lung cancer encompass surgery, radiation, chemotherapy, targeted therapy, and immunotherapy [2]. However, these methods can all cause some adverse reactions. Moreover, lung cancer often presents itself insidiously, and most patients have no obvious symptoms in the early stages. In clinical practice, most patients seek medical treatment only when their conditions are severe, resulting in a poor prognosis [3]. Therefore, using only Western medical methods cannot meet the current medical conditions and human health needs. Numerous clinical studies indicate that traditional Chinese medicine offers specific benefits in the treatment of lung cancer, including the reduction of unpleasant responses, enhancement of quality of life, and extension of surviving duration [2]. For example, Li Yuan et al. randomly divided 96 elderly patients over 65 years old with lung squamous cell carcinoma who received traditional Chinese medicine treatment into a TCM treatment group and a TCM combined with chemotherapy group for observation, analyzing the improvement of symptoms and survival status, indicating that TCM treatment can

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improve the clinical symptoms of elderly patients with lung squamous cell carcinoma and reduce adverse reactions [4]. An extensive examination of traditional Chinese medicine for lung cancer enhances comprehension of its therapeutic approaches, establishing a basis for the modernization and scientific advancement of such treatments. Additionally, it offers alternative options for lung cancer patients, mitigates the risk of adverse drug effects, enhances treatment efficacy and quality of life, and holds substantial importance for the promotion of human health and well-being. This article will evaluate and condense the benefits of traditional Chinese medicine in lung cancer treatment and the implementation of integrated therapies.

2. The Etiology and Pathogenesis of Lung Cancer

The emergence of lung cancer is primarily ascribed to a deficit of essential energy. Because of the imbalance of yin and yang and the invasion of pathogenic factors, the pathogenic factors enter the lungs through the weakness of the body's vital energy, causing the lungs to lose their functions of promoting and suppressing qi, resulting in poor qi circulation and qi stagnation with blood stasis. Over time, the accumulation of phlegm, qi, blood stasis, and toxins results in a complicated amalgamation of these elements. As research on the treatment of lung cancer with traditional Chinese medicine progresses, contemporary Chinese medicine researchers hold varying perspectives on the origin, pathophysiology, and progression of lung cancer. Professor Li Peiwen believes that lung cancer is mainly caused by the accumulation of pathogenic toxins in the lungs, which consume the yin qi of the lungs and the essence qi of the kidneys. The treatment should be based on the principle of "lung and kidney generating each other" to formulate prescriptions and prescribe drugs [3]. Professor Zeng Bairong deems that the occurrence of lung cancer is mainly due to qi deficiency and yin deficiency, and proposed methods of nourishing qi and yin while also considering detoxification, promoting blood circulation and resolving stasis, and dissolving nodules. He created the " Supplementing Lung and Detoxifying Decoction " [5]. Professor Zhang Yonghong considers that the basic pathogenesis of lung cancer is the deficiency of vital energy and the accumulation of cancer toxins, which runs through the entire course of the disease. The treatment should follow the principles of strengthening the body's defense and eliminating the pathogen, considering the lungs, spleen, and kidneys, as well as eliminating phlegm, promoting blood circulation, resolving toxins, and eliminating stasis [6]. Professor Li Yi also reckons that the occurrence and development of lung cancer are related to the deficiency of the lungs, spleen, and kidneys, as well as the accumulation of cancer toxins. In the early stage, treatment should focus on detoxification; in the middle stage, the principle should be "strengthening the body's defense and eliminating the pathogen, treating both the symptoms and the root cause"; in the late stage, the principle should be "strengthening the body's defense and eliminating the pathogen, treating both the symptoms and the root cause, considering the lungs, spleen, and kidneys, eliminating phlegm, promoting blood circulation, resolving toxins". In the late stage, treatment should focus on enhancing the body's defense ability [7]. Professor Li Renting posits that the incidence, progression, and prognosis of lung cancer are intricately linked to the physiological and pathological functioning of the heart, liver, spleen, and kidneys. He proposed the hypothesis of "imbalance of the five zang organs and the internal generation of cancer toxins" [3]. By integrating the understanding of the pathogenesis of lung cancer in the onset mechanism of modern medical experts, it can be seen that the pathogenesis of lung cancer always manifests as potential deficiency and external pathogenic factors. The potential deficiency is the depletion of the five zang organs, and the external manifestation is the accumulation of phlegm, qi, blood stasis, and toxins. This process runs through the entire onset process of the disease. In addition, the occurrence and development of lung cancer are not solely attributed to the lungs. The lungs facilitate the promotion and ascent of qi while regulating all meridians; the spleen serves as the source of qi and blood production, forming the body's foundation; the kidneys store essence qi and govern respiration,

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representing the fundamental balance of yin and yang; the liver regulates qi and ensures its smooth circulation. The heart regulates blood circulation and is the primary organ. The incidence and progression of lung cancer are intricately linked to the physiological and pathological functions of the heart, liver, spleen, and kidneys, reflecting the holistic principles of traditional Chinese medicine.

2.1. Principles of Traditional Chinese Medicine Treatment

The emergence of lung cancer mostly results from a deficit of essential energy and the internal production of harmful poisons. Therefore, the principles in treating lung cancer are basically to tonify the vital energy and eliminate the pathogenic toxins. Tonifying the vital energy means harmonizing the five zang-organs and enhancing the body's anti-cancer immunity, so as to ensure sufficient vital energy in the body and thereby improve the body's ability to resist external toxins, and regulate the disorder of the immune microenvironment. The treatment mainly involves tonifying qi and nourishing yin, and strengthening qi and invigorating the spleen. Eliminating the pathogenic toxins means eliminating cancerous toxins and detoxifying, inhibiting the growth, proliferation, invasion and metastasis of tumor cells. The therapy primarily consists of anti-cancer cleansing agents and medications aimed at enhancing blood circulation and alleviating stasis. Based on the understanding of the etiology and pathogenesis of lung cancer, Professor Zhang Yonghong believes that considering both the symptoms and the root causes is still the basic rule of traditional Chinese medicine in treating lung cancer. That is, tonifying the vital energy (treating deficiency) and eliminating the pathogenic toxins (treating detoxification) are carried out simultaneously, and he advocates that tonifying the vital energy and consolidating the foundation should be the main approach, while eliminating the pathogenic toxins and treating the symptoms should be the secondary approach [6]. In clinical treatment, it is necessary to pay attention to both tonifying and eliminating and to focus on the coordination of local and overall treatment.

2.2. Advantages of Traditional Chinese Medicine Treatment

The surgical, radiotherapy and chemotherapy methods of Western medicine play a crucial role in the radical treatment of early-stage tumors, but they also come with risks such as postoperative recurrence and adverse reactions caused by the treatments. Conversely, TCM demonstrates considerable benefits in the management of lung cancer. Traditional Chinese medicine can ameliorate precancerous lesions, mitigate unpleasant effects of radiotherapy and chemotherapy, prevent tumor recurrence and spread, and enhance patients' quality of life [3]. Especially for patients with advanced lung cancer, it can provide effective palliative treatment. From clinical practice and observations, it is known that palliative treatment exerts a significant impact on patients' normal sleep, so effective measures need to be taken to ameliorate this adverse condition. Currently, the traditional Chinese medical therapy for tonifying the body is widely used in clinical practice, which can effectively improve the sleep quality of patients and achieve marvelous results [8].

3. Clinical Application of Traditional Chinese Medicine in Lung Cancer Treatment

3.1. Stage-based Treatment

According to the stage of lung cancer's onset, the emphasis on tonifying the body and eliminating pathogenic factors also varies. Professor Li Renting, based on clinical experience, classified lung cancer into three stages: precancerous lesions, postoperative treatment, and tumor-bearing survival. The emphasis on tonifying the body and eliminating pathogenic factors differs in different stages [3].

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3.1.1. Pre-cancerous Lesions of Lung Cancer - attack as the Main Approach, with Supplementation as a Secondary One

The precancerous stage of lung cancer is mainly characterized by pulmonary nodular lesions [3]. The insufficiency of the body's essential energy and the infiltration of pathogenic substances result in spleen deficiency and liver stagnation, causing the concurrent accumulation of phlegm and blood stasis, which culminates in the development of nodules. If left untreated for a long time, it may develop into malignancy and eventually progress to lung cancer. Therefore, in clinical practice, early intervention and treatment should be carried out as soon as possible. At this time, although the body's vital energy is damaged, it has not yet been exhausted, so the main approach should be to adopt methods of eliminating pathogenic factors and supplementing the healthy qi. Commonly used methods include clearing phlegm and resolving nodules, regulating the liver and spleen, etc. In terms of medication, drugs such as Houttuynia cordata,cat's claw grass, and half-branch vine are often selected to clear the lungs and detoxify and resolve nodules. Drugs like poria cocos, atractylodes, and pseudostellaria heterophylla are used to strengthen the spleen and stomach and promote digestion. Drugs like chaihu, pericarpium cinnamomi, and rose are used to regulate the liver, relieve depression, and harmonize emotions [3]. By adjusting the circulation of qi and blood within the body and improving the microcirculation of the lungs, the progression of the lesion can be slowed down, and the risk of pulmonary nodules transforming into lung cancer can also be reduced.

3.1.2. Postoperative Treatment for Lung Cancer - combining Attack and Nourishment Approaches

Operative intervention is a prevalent therapeutic approach for early-stage pulmonary carcinoma. Nonetheless, the majority of patients will encounter recurrence or metastasis following the operation, potentially jeopardizing their lives. According to traditional Chinese medicine theory, even if the cancerous tumors are removed after surgery, radiotherapy, chemotherapy or other treatments, the cancer cell toxins have not been completely eliminated. Furthermore, the use of the body's vital energy by cancer cells, along with deficiencies in qi, blood, and bodily fluids, along with the irregular control of qi movement, would diminish the body's capacity to combat foreign invaders. Once there are emotional fluctuations, it is very likely to lead to mental exhaustion, liver qi stagnation and qi stagnation, further aggravating the body's deficiency. Cancer cells can quickly recover and invade the body. The body is still in a pathological state of "deficiency of vital energy and retention of toxins", and the probability of recurrence and metastasis of lung cancer will significantly increase [3]. Therefore, in the treatment after lung cancer surgery, clinical practice requires the use of a combination of promoting and inhibiting methods. Common treatment methods include clearing the lungs and benefiting the lungs, strengthening the spleen and warming the kidneys, nourishing the heart and calming the mind, activating blood circulation and resolving stasis, tonifying qi and nourishing blood, etc. The six-flavor spleen decoction is often adjusted according to the syndrome type, combined with drugs for activating blood circulation, resolving nodules and resolving nodules, to protect the weak and deficient organs, detoxify and fight cancer, make the five zang organs harmonious, have a source of qi and blood, soothe the liver and regulate the lungs, and at the same time can effectively reduce the probability of recurrence or metastasis after tumor surgery, radiotherapy or chemotherapy [3].

3.1.3. Survival with Lung Cancer While Carrying Tumors - attack as the Main Approach, with Supplementation as a Secondary One

In the advanced stage of lung cancer, patients have suffered from prolonged illness and suffer from severe depletion of vital energy. The cancer toxins are not only difficult to eliminate but also tend to

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affect other organs. The deficiency of the heart, liver, spleen and kidney is even more serious at this time. Usually, surgical opportunities are lost and patients are advised to "survive with the tumor". Therefore, the clinical treatment focuses on strengthening the body and eliminating the pathogenic factors as the main approach, while using methods such as warming the kidney and strengthening the spleen, nourishing the liver and calming the mind, and tonifying the lung and reducing toxicity to treat the tumor. Professor Li Renting combined the syndrome and the disease to formulate tumor treatment prescriptions such as Baiyuan Anti-Cancer Decoction, the core formula of "Fertilizing Earth to Generate Metal" , and Supplementing Qi and Nourishing Yin Formula, which have been recognized by many doctors and widely applied in clinical practice with excellent results [3]. For instance, Mu Anna et al. selected 98 lung cancer patients and divided them into two groups. The control group received radiotherapy, whereas the observation group was administered the Qi-boosting and Yin-nourishing Decoction alongside the control group's treatment. The findings indicated that the occurrence of adverse reactions, tumor marker levels, and TCM symptom scores in the observation group post-treatment were significantly lower than in the control group ($P < 0.05$), whereas immunoglobulin levels were elevated compared to the control group. This suggests that the Qi-boosting and Yin-nourishing Decoction, in conjunction with radiotherapy, may modulate immune function in patients, decrease tumor marker levels, and lower the occurrence of adverse reactions [2]. For patients with deficiency of the five zang-organs and accumulation of cancer toxins and stasis, Pei Yuan Hua Yu Anti-Cancer Decoction is often used in combination with heat-clearing and detoxifying drugs for treatment. For those with a deficiency of vital energy and stasis accumulation, the core formula Bu Tuo Sheng Jin is often used to replenish the qi of the spleen and lung, detoxify, disperse nodules and eliminate stasis. For those with lung and kidney Yin deficiency, Bai Lian Gu Jin Decoction is often used to tonify the lung and benefit the kidney to improve the quality of life and prolong survival time [3].

3.2. Combined Treatment of Lung Cancer with Traditional Chinese Medicine and Chemotherapy

The integration of TCM with chemotherapy serves as a significant adjunctive treatment modality, demonstrating benefit for patients with lung cancer [9]. The integration of traditional Chinese medicine with platinum-based chemotherapy is presently the predominant treatment regimen for NSCLC [9]. Studies have suggested that NSCLC patients often use the Four Gentlemen Decoction as the basic formula during chemotherapy courses, combined with Astragalus, Pinellia, etc., to tonify qi and raise yang, promote qi circulation and eliminate phlegm [10]. Researchers from Shanghai proved that the combination of traditional Chinese medicine and cisplatin (DDP) can partially alleviate the symptoms of vomiting, pain, and diarrhea in patients with early NSCLC and reduce side effects [9]. Some scholars have found that the combination of Astragalus and DDP enhances the sensitivity of DDP to cancer, reduces toxic side effects, induces tumor cell apoptosis, and inhibits tumor cell migration [11]. Previous studies have shown that the prescriptions that tonify the kidney and strengthen qi can alleviate fatigue symptoms caused by paclitaxel chemotherapy drugs and improve the survival rate of lung cancer patients [12].

3.3. Combined Treatment of Lung Cancer with Traditional Chinese Medicine and Radiotherapy

In clinical practice, radiotherapy is mainly used for the treatment of early-stage and locally advanced lung cancer lesions. However, radiotherapy is prone to causing adverse reactions such as radiation pneumonitis and fatigue. The integration of TCM with radiotherapy can augment treatment efficacy, diminish adverse responses, stabilize lesions, enhance immunological function, and increase survival

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rates [2]. Oridonin is a chemical extracted from the Chinese plant Sophora flavescens. Research indicates that Oridonin serves as a radiosensitizer, augmenting the effectiveness of radiotherapy by amplifying DNA damage and promoting cell apoptosis [13]. Zhang Shuo conducted basic experimental research on the combination of Fugu Zhuyu Granules and radiotherapy, and concluded that Fugu Zhuyu Granules have certain radiosensitizing effects. Combined with radiotherapy, it can significantly inhibit the growth of bone metastases in nude mice with lung cancer, promote apoptosis of transplanted tumor cells, alleviate patient pain, improve the clinical syndrome of traditional Chinese medicine, reduce the incidence of toxic and side effects, and the effect is significantly better than using the granules alone or radiotherapy alone [14].

3.4. Combined Treatment of Lung Cancer with Traditional Chinese Medicine and Immunotherapy

Immunotherapy has brought new hope to many patients in tumor treatment, but it also faces problems such as rash, itching, diarrhea, pneumonia, colitis and other adverse reactions. It is of certain effect to adopt traditional Chinese medicine as an auxiliary treatment method after immunotherapy. For example, Qingzao Jiufei Decoction has been found to be effective in prolonging the survival period of NSCLC patients, enhancing the host's immune response and improving the overall survival rate [15]. Acupuncture also provides advantages for the immunotherapy of NSCLC. For example, warming moxibustion stimulating Zusanli and Feishu acupoints can effectively reduce the neutrophil/lymphocyte ratio of NSCLC patients [16].

4. Discussion

The elevated recurrence and metastatic rates of lung cancer provide a significant threat to human life and health. TCM has emerged as a preferred option for numerous patients owing to its benefits, including less toxic side effects and its capacity to mitigate the bad reactions associated with chemotherapy and radiotherapy. TCM has achieved notable advancements in the theoretical investigation of lung cancer invasion and metastasis, as well as in the empirical study of traditional Chinese remedies. It shows great potential in strengthening comprehensive treatment of lung cancer, but still has some shortcomings and challenges. Firstly, compared with Western medicine, the short-term effect of tumor control by TCM is not obvious, and the target is not clear, which is uncertain. Secondly, there are few clinical studies on the anti-tumor effect of TCM, and there is a lack of large sample clinical data. We have little understanding of the specific components and mechanism of action of TCM. Furthermore, the majority of contemporary studies concentrate on the extracts of individual Chinese medicinal substances or traditional Chinese medicine compound formulations, while external treatment modalities of traditional Chinese medicine, such as acupuncture and moxibustion, which are essential components, have garnered comparatively less focus. Consequently, the investigation and implementation of Traditional Chinese Medicine continue to encounter numerous hurdles. Enhancing fundamental research and investigating clinical applications are essential to elucidate the mechanisms and clinical significance of TCM in the integrated treatment of lung cancer, hence fostering a synergistic relationship between TCM and contemporary medicine. The combination of TCM and Western medicine will also be the development trend of treating lung cancer. By combining TCM and Western medicine means the synergistic effect of TCM and Western medicine can be exerted, achieving better therapeutic benefits and bringing good news to more cancer patients.

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5. Conclusion

Traditional Chinese Medicine possesses significant potential in the management of lung cancer. By controlling its internal circulation and enhancing the body's vital vitality from inside, it can mitigate clinical symptoms, diminish unwanted reactions, and enhance patients' quality of life. According to TCM, lung cancer is regarded as a syndrome characterized by underlying deficiency and superficial manifestation of pathogenic factors. The four major pathogenic factors, namely deficiency, phlegm, blood stasis, and toxins, run through the entire process of lung cancer's onset. Therefore, in the treatment of lung cancer, all medical practitioners adhere to the basic principle of strengthening the body's defenses and eliminating pathogenic factors. Depending on the different stages of lung cancer's onset, the treatment methods and drugs used also vary. TCM advocates starting from the overall perspective and achieving local treatment through improving systemic symptoms. The phased treatment of TCM, combined radiotherapy and chemotherapy, and combined immunotherapy all demonstrate the unique advantages of TCM. This study has notable shortcomings, including a restricted citation of literature and an inadequately comprehensive research background. This may be considered a prominent study avenue for forthcoming investigations. We can persist in conducting comprehensive research on the issues within this domain by examining recent clinical and experimental studies regarding the treatment of lung cancer with TCM, and subsequently synthesizing and generalizing the mechanisms of action and therapeutic benefits of TCM in lung cancer treatment.

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