

The role and status of fuzheng in cancer prevention and treatment

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Received: 26 January 2014 / Revised: 20 February 2014 / Accepted: 5 March 2014
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Abstract Traditional Chinese medicine (TCM) treatment of cancer has a long history, and is an important part of cancer prevention and control in China. Fuzheng, also called reinforcing healthy qi and supplementing the root, is the most fundamental principle of TCM in cancer prevention and control. In recent decades, this treatment has been thoroughly studied and widely applied, and played a crucial role in cancer prevention and treatment. With regard to the treatment of malignant tumors, Chinese medicine is mainly used in the following areas: improving symptoms, enhancing the quality of life, reducing postoperative recurrence and metastasis, increasing efficacy and decreasing toxicity together with radiotherapy and chemotherapy treatments, and to some extent prolonging the survival of advanced tumors.

Key words traditional Chinese medicine (TCM); Fuzheng or reinforce healthy qi and supplement the root; cancer

Chinese medicine treatment of cancer has a long history of 2000 years. In recent decades, the innovation and development of Traditional Chinese medicine (TCM) oncology has rejuvenated the precious heritage, Chinese medicine, in the treatment of cancer. According to the theories of TCM, cancer is caused by imbalances between endogenous physical conditions of the body and exogenous pathogenic factors. The internal condition of the body plays a dominant role in the onset of cancer. In other words, factors can induce cancer only when the body's own defense system fails. Those pathogenic factors, in Chinese medicine terms, include accumulated toxins, heat and blood stasis, and they attack when a person is in a weak physical condition, without the strength to resist. So, TCM doctors view cancer as a systemic disease associated with the state of the whole body. Cancer is the manifestation of a breakdown in the body's ability to handle pathogenic factors, not a local disease of cells or organs. Accordingly, the treatment philosophy and strategy of TCM emphasizes holistic modulation and improvement of the whole body rather than removing the tumor mass or killing the cancerous cells. The focus of treatment is extending the life expectancy and improving the quality of life of the patient; in other words, the focus is on the patient not the tumor mass. Therefore, attention paid to the role of "the vital qi" in the battle against tumors is par-

ticularly prominent and important. The four rules of the TCM treatment of tumors are: reinforcing healthy qi and supplementing the root, invigorating blood and dissolving stasis, clearing heat and resolving toxins, and softening hardness and dissipating masses. Reinforcing healthy qi and supplementing the root is the most basic rules of traditional Chinese medicine in cancer prevention and treatment. This treatment has been thoroughly studied and widely applied, and played a crucial role in cancer prevention and treatment.

The content of Fuzheng

The word "Fuzheng", known as reinforcing healthy qi and supplementing the root, is one of the most important elements of Chinese medicine. It includes two parts: making up a deficiency, such as supplementing qi, nourishing the blood, enriching yin and warming yang; and conditioning the balance: "warm, harmony, regulation and the nourishment are all supplements" posed by the later generation. In addition to supplementing, it lays more stress on conditioning and balancing.

The theoretical framework of Fuzheng in cancer prevention and treatment

The occurrence and development of the tumor is a process of struggle between the vital qi and pathogens. Deficiency syndrome exists throughout the entire process

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and plays a key role in the growth of the tumor.

The tumor comes on “deficiency” and develops throughout “deficiency”. In a narrow sense, “deficiency syndrome” means the lack of viscera qi and blood, yin and yang, such as qi deficiency, blood deficiency, yin deficiency and yang deficiency. Broadly defined, deficiency syndrome includes dysfunctional organs, yin and yang disorder, qi and blood disorder, which reduces the whole body’s vital resistance. Under normal circumstances, the body is in a harmonious state where the organs and blood function well, that is to say, the so-called “yin is calm and yang is sound”. However, once the balance is broken due to internal or external factors, there will be “yin and yang imbalance”, and the body disease-resistant ability is reduced, so people are more prone to a variety of diseases. As it stated in Huangdi Neijing, “the vital qi inside keeps pathogens away”, “in order for pathogens to invade, qi must be deficient”, it shows how important the vital qi is in the battle against pathogens. “Deficiency syndrome” is the fundamental cause of the disease, and tumorigenesis is no exception. TCM believes that tumorigenesis is closely related to the body’s ability to resist diseases. The impaired vital qi contributes most to tumorigenesis. Cancer is a systemic disease, and mass is only a partial manifestation of the systemic disease. Standing from the concept of wholism, TCM thinks that the emergence and development of malignant tumor is mainly due to the deficiency of vital qi, yin and yang imbalance and organ dysfunction, resulting in qi stagnation and blood stasis, toxins condensed and some other critical consequences.

The growth of the tumor further consumes qi, which in turn contributes to the development of tumors. Modern medicine also believes that the occurrence and development of cancer is connected with the decline of overall defense function, especially with cellular immune dysfunction. The growth of the tumor will restrain immune function, thereby contributing to the growth of the tumor.

In addition, deficiency syndromes sometimes result from certain treatments, such as surgery, radiotherapy, chemotherapy. Surgical trauma, viscera damages, and hemorrhage bring varying degrees of damages to the body, and then deficiency syndromes appear, such as postoperative sweating, shortness of breath, fatigue or lack of appetite, bloating, and thin sloppy stool. Another example is chemotherapy. Its biggest drawback is to “target indiscriminately”. While killing tumor cells, it also harms the body’s normal cells, lowering patients’ physique, immune function, and quality of life.

The ways of reinforcing healthy qi and supplementing the root

Chinese herbal medicine

Invigorating spleen and supplementing qi, reinforcing qi and nourishing blood, reinforcing qi and yin, nourishing liver and kidney, warming yang for dispelling cold and so on.

Acupuncture and moxibustion therapy

Selecting points according to differentiation of symptoms and signs.

Dietotherapy

Similar to food, medicine also falls into different categories, like cold, hot, warm, reducing or reinforcing. Medicine should be taken reasonably according to each person’s health condition and the different categories of TCM.

Regimen

Regulating emotion, adjusting to temperature, keeping a healthy diet and practicing moderate exercise.

Practice of Fuzheng in cancer prevention and treatment

Experiments have proved that Fuzheng has good effects in cancer treatment, in particular, and it can significantly improve curative effect and prolong survival time of patients combining with Western medicine treatments. Currently, Fuzheng medicine has been applied to the treatment of cancers in the following areas: improving symptoms, enhancing the quality of life, reducing postoperative recurrence and metastasis, increasing efficacy and decreasing toxicity together with radiotherapy and chemotherapy treatments, and to some extent prolonging the survival time of advanced tumors.

Combination of TCM and surgeries

Using Fuzheng medicine before surgeries

To use tonic medicine is to improve the debilitating condition of the patient, increase surgical resection rate, and expand indications. TCM applies to patients with more obvious symptoms of weakness, but not to patients who need immediate surgeries. Medicine that can invigorate spleen, supplement qi, nourish the liver and kidney and sedative herbs are used to enhance patients’ physique and emotional stability in order to facilitate surgeries to be carried out, for example, Decoction of Four Noble Drugs, Decoction of Four Ingredients, Bolus for Strengthening Heart and Decoction of Wind Jujube Seed.

Using Fuzheng medicine after surgeries

Postoperative recurrence and (or) transfer is one of the main reasons threatening the survival of patients. Surgical trauma and organ damages can lead to organ dysfunction, blood fluid depletion, and then a varied of deficiency syn-

dromes occur. Differential treatments should be adopted based on different situations. TCM treatment after the surgery can effectively accelerate postoperative rehabilitation, improve symptoms, prevent or delay recurrence, and prolong survival time up to a point [1-5].

Combination of Fuzheng and chemotherapy

Chemotherapy is the main method of treatment of advanced tumors. It is very effective, but cytotoxic drugs have side effects, killing both tumor cells and normal cells, namely bone marrow suppression, gastrointestinal reactions and heart, liver and kidney dysfunction, which makes it difficult for patients suffering low quality life to keep on receiving chemotherapy. Numerous clinical trials have proved that the combination of Fuzheng medicine and chemotherapy is conducive to enhancing effects and reducing toxicity, improving the quality of life of patients and prolonging survival time to some extent [6-12].

Gastrointestinal reactions: Chinese medicine believes chemotherapy drugs damage vital qi, injure spleen and stomach, weaker temper, and cause organ malfunction, including spleen and stomach. Therefore, strengthening spleen-stomach and subduing the adverse flow of qi are advised during the treatment.

Marrow suppression: symptoms mainly are peripheral leukopenia, thrombocytopenia, erythropenia, and decreased hemoglobin accompanied by systemic symptoms such as pale complexion, dizziness, insomnia, palpitations, shortness of breath and so on. Chinese medicine generally considers spleen and kidney injuries and bowels blood injury are accountable for these symptoms. Reinforcing spleen and kidney and tonifying qi and blood are normally used to treat these symptoms.

Organs and tissues damage: symptoms are usually seen as hepatocyte toxicity, followed by toxic myocarditis, urocytitis, and nephritis. For liver-dysfunction patients with symptoms like increased transaminase and jaundice, they should be treated with clearing heat and promoting diuresis, soothing liver-gallbladder and supplemented with invigorating spleen and supplementing qi. For patients suffering myocardial damage, they may go through palpitation, cardiopalmus, shortness of breath, chest discomfort, and then the treatment of benefiting qi for tranquillization and promoting blood circulation to remove blood stasis is advised. For those suffering bladder and kidney damage, clearing heat and removing toxicity and strengthening qi to diuresis are advised.

Combination of Fuzheng and radiotherapy

The radiation is of “fire toxin” in TCM. Systemic reactions are commonly seen as fatigue, headache, dizziness, anorexia, nausea, vomiting, leukopenia, etc.; local reactions, based on different areas of the irradiation, can appear different manifestations, such as skin rash, hair loss,

oral, pharynx and gastrointestinal erosions, ulcers, edema or hemorrhage, radiation pneumonitis and pulmonary fibrosis, radiation proctitis, etc. These side effects can be mitigated or eliminated by Fuzheng treatment. Some Chinese herbs increase the effect of ray sensitivity to strengthen the effect of radiotherapy. As rays are of “fire toxin”, they are more likely to consume qi and damage yin. The common clinical manifestations are qi and yin injuries, and blood stasis syndromes, so nourishing yin and increasing body fluid, cooling up qi and blood, activating blood circulation and eliminating toxicant blood are commonly used in clinical treatments. Clinical studies have shown that Chinese herbs strengthen the effects of radiotherapy and reduce its side effects [13-17].

Use of Fuzheng in maintenance therapy in TCM

Maintenance therapy usually refers to the treatment patients receiving when first-line chemotherapy is under control and prior to the second-line chemotherapy. The use of Chinese medicine in maintenance therapy is a follow-up treatment for tumor patients in a stable condition, aiming for maintaining the balance of the internal environment and maximizing the time of being stable. Based on the progress of the disease and the patient’s overall body condition, TCM maintenance therapy focuses on Fuzheng or eliminating evil or different modes of them. Preliminary clinical studies indicate that maintenance therapy of traditional Chinese medicine can improve patients’ quality of life and prolong survival [18-21].

Chinese medicine treatment of advanced cancers

Because of their subjective resistance to chemotherapy, economic reasons, or the unbearable sufferings of chemotherapy, some patients with advanced cancers are only treated with Fuzheng medicine. Clinical studies have preliminarily shown that it improves quality of life, to a certain extent prolong survival, especially for the elderly [22].

Clinical research on the Chinese medicine treatment of tumors

After introducing the concept of evidence-based medicine into TCM oncology clinical research, whether it is a classic RCT or cohort studies popular among clinical research in recent years, the level of TCM oncology clinical research have been fundamentally enhanced. Here are a few clinical cancer research paradigms of the Chinese medicine treatment of cancers.

Lin *et al* [4] studied on I-III non-small cell lung cancer, and conducted polycentric, large sample, randomized, and partially double-blind clinical trial. 546 cases of postoperative I-III non-small cell lung cancer were divided into three groups. All three groups enjoyed the

identical Western medicine treatment, that is, vinorelbine plus cisplatin (NP) or paclitaxel plus cisplatin (TP) schemes used for routine postoperative chemotherapy. On this basis, they were randomly divided into Yifei Qinghua Gao group (184 cases), shenyijiaonang group (186 patients) and placebo control group (176 cases) and observed for 2 years. The endpoint criteria were one to two years survival, recurrence metastasis rate, and disease-free survival. Simultaneously the quality of life and immune function were observed. The results showed that: 1-year survival rates of Yifei Qinghua Gao group, shenyijiaonang group, and placebo control group were 83.15%, 89.19% and 78.98%. There was a significant difference between shenyijiaonang group and the placebo group ($P < 0.05$); 2-year survival rates were 52.17%, 64.86% and 47.16%, and there was a significant difference between shenyijiaonang group and the placebo group ($P < 0.05$). Recurrence rates were 50.28%, 45.11%, and 55.81%, indicating that Yifei Qinghua Gao group and shenyijiaonang group were superior to the placebo group, but there was no significant difference ($P > 0.05$). This study preliminarily showed that the use of Fuzheng medicine (shenyijiaonang and Yifei Qinghua Gao) as adjuvant therapy could significantly improve clinical symptoms of non-small cell lung resection patients, increase patients' Karnofsky performance score and weight, improve quality of life, regulate patients' NK cells and T cell subsets, prolong one and two years survival time of patients, and decrease the trend of recurrence and metastasis. After safety analysis, there was no serious adverse reaction, and clinical applications did not pose any risk to the patients.

Lin *et al*^[23] studied 586 cases of IIA to IV primary non-small cell lung cancer patients. Random, double-blind, placebo-controlled, polycentric clinical research methods were used to study the combined group of Chinese medicine and Western medicine and Western medicine treatment group, with the total enrolled number of 414 (199 cases of combined group, and 215 cases of Western group), together with 173 cases of non-random Chinese medicine group. The combined group (NP program) used chemotherapy and Shenyi capsule; Western medicine group (NP program), chemotherapy plus placebo. In terms of symptoms improvements, physical condition and side effects, the outcomes showed that the combined group was significantly better than the treatment group. The most convincing evidence was that in the comparison of median survival, the combined group was 12.03 months with the best effect, Chinese medicine treatment group, 10.92 months, followed by Western medicine treatment group, 8.46 months. There was a significant difference between the combined group and Western medicine group ($P = 0.0118$).

Yang *et al*^[5] studied on II and III colorectal cancer patients, and it was a prospective cohort study. According

to whether they received comprehensive treatment of traditional Chinese medicine or not, 222 cases were divided into the combined group and Western medicine treatment group. The treatment group followed NCCN guidelines, and the combined group received Western medicine and comprehensive TCM treatment, including decoction and oral Chinese patent medicines. Five-year follow-up studies showed that the recurrence rates of past five years were 0%, 2.04%, 11.69%, 14.06%, 21.28% respectively in the combined group, and 4.08%, 16.35%, 21.65%, 25.93%, 38.18% in Western medicine treatment group. There were statistically significant difference in two years ($\chi = 12.117$, $P = 0.000$). The recurrence time was 26.5 months in the combined group, and 16 months in Western medicine group. The comprehensive TCM treatment on the basis of NCCN treatment guidelines reduced recurrence and metastasis rates of II, III colorectal cancer patients.

Conclusion

Chinese medicine treatment of cancer has a long history and is an essential part of China's cancer prevention and treatment. It sees lives and diseases from a new perspective. It is an efficient means to resisting diseases and safeguarding health in the course of long-term practices. The tumor is closely related to deficiency syndromes, and Fuzheng is one of the most basic methods to treat cancers, and is throughout different stages of the therapy. Certain achievements have been accomplished in the clinical practice of TCM treatment of cancers. Clinical medicine in the 21st century has entered the era of evidence-based medicine. We should stick to the merits of Fuzheng in cancer treatment, and accomplish more and higher-quality evidence-based medicine, which is the challenge before us and the direction to move forward as well.

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