

Research and Application of Traditional Chinese Medicine Acupoint Application in Clinical Treatment of Tumors

Yongjian Du¹, Yanli Zhao^{2,*}

¹Shaanxi University of Chinese Medicine, Xianyang 712046, Shaanxi, China

²Affiliated Hospital of Shaanxi University of Chinese Medicine, Xianyang 712000, Shaanxi, China

*Correspondence Author

Abstract: *Malignant tumors pose a serious threat to human life and health. Treating malignant tumors requires giving full play to the advantages of various treatment methods at different stages, including surgery, radiotherapy, chemotherapy, and traditional Chinese medicine treatment. As an important supplement to internal treatment, external treatment with traditional Chinese medicine has obvious advantages such as fewer adverse reactions, good tolerance, and faster onset of effect. Traditional Chinese medicine acupoint application therapy is one of the external treatments of traditional Chinese medicine, which has the dual effects of medicine and acupoint stimulation. Under the guidance of traditional Chinese medicine theory, combined with drug administration at acupoints on meridians, traditional Chinese medicine acupoint application therapy has opened up a broader prospect for tumor treatment.*

Keywords: Traditional Chinese medicine acupoint application, Tumor, Clinical application, External treatment of traditional Chinese medicine.

1. Preface

Cancer seriously harms human life and health and has become the main cause of death and an important obstacle to extending life expectancy [1]. The treatment of malignant tumors should be comprehensive treatment, giving full play to the therapeutic advantages of different stages. Comprehensive treatment includes surgery, radiotherapy, chemotherapy, traditional Chinese medicine treatment and other methods. As an important supplement to internal treatment, external treatment with traditional Chinese medicine has the unique advantages of less adverse reactions, good tolerance, and quick onset of action [2]. Traditional Chinese medicine acupoint application therapy is a type of external treatment with traditional Chinese medicine, which produces dual effects through drugs and acupoint stimulation. Wu Shiji, as the originator of external treatment, proposed in "Li Yi Parallel Essay": "The principle of external treatment is the principle of internal treatment, and the medicine of external treatment is the medicine of internal treatment, but the methods are different." He is good at using various external treatment methods such as applying, ironing, fumigation, and rubbing to treat various complex diseases, especially diseases similar to modern tumors such as fistulas and carbuncles, and summarizes them as convenient, simple, effective, and economical. Acupoint application is a method based on the theory of meridians of traditional Chinese medicine [3]. The medicine is ground into fine powder and then formulated into pills, powders, ointments and other dosage forms. It is directly applied to acupoints to prevent and treat diseases. It is one of the traditional treatment methods of traditional Chinese medicine, which belongs to the category of external treatment and has important clinical significance. This article will discuss the mechanism of action of traditional Chinese medicine acupoint application and the current status of traditional Chinese medicine acupoint application in tumor treatment.

2. The Mechanism of Action of Traditional Chinese Medicine Acupoint Application

2.1 Local Irritation to the Body

Medicinal application is a treatment method similar to medicinal moxibustion therapy. It dilates local blood vessels and promotes blood circulation, and stimulates the body's regulatory effect through nerve reflexes. Modern research shows that when drugs act on human acupoints, certain changes will occur in the tissue structure, skin, nerves, blood vessels and lymph of the acupoints. Some traditional Chinese medicines can also stimulate acupuncture points, increase local temperature, and dilate capillaries, which is conducive to drug ingredients entering lymph and blood through the pores of the skin and exerting pharmacological effects [4]. Acupoint application may also affect the relevant receptors of the body by stimulating local parts of the body and the absorption and metabolism of drugs, and directly and reflexively adjust the functions of the cerebral cortex and autonomic nervous system. In addition, it can enhance the body's disease resistance by enhancing cellular immunity and humoral immunity, thereby achieving the purpose of preventing and treating diseases. The biology of acupoint therapy is closely related to its location on the body [5].

2.2 Acupoint Stimulation and Effects on Meridians

Meridians are important pathways for qi, blood and body fluids. If the pathways function abnormally, qi, blood, and body fluids will become unbalanced, resulting in loss of control of the flow of qi, blood, and imbalance of yin and yang [6]. During normal physiological activities, the human body's meridian system remains relatively balanced. However, when various pathogenic factors act on the meridians and cause diseases, the meridians will become imbalanced [7]. Meridians are interstitial structures based on connective tissue or fascial tissue. It is connected with blood circulation and

lymph circulation. There is a hypothesis that meridians are the gaps between tissues, and the tissue fluid in the gaps is called meridian substance. Acupoint application regulates pre-lymphatic channels (i.e. meridians or tissue spaces), thereby improving their associated lymph and blood circulation. The lymphatic system is essential for maintaining the stability of the body's internal environment. If lymphatic drainage is blocked, tissue fluid cannot be drained out in time, leading to edema. Edema affects the exchange of tissue fluid and blood substances, ultimately causing circulatory disorders among the blood, tissue fluid, and lymphatic system [3].

In terms of tumor treatment, the functions of meridians mainly include the following three aspects: (1) guiding drugs to reach the disease site, allowing external drugs to reach the target location along the meridians; (2) stimulating the effects of meridian acupoints and the neuro-endocrine-immune system to indirectly achieve immune phagocytosis, killing and inducing apoptosis; (3) communicating from the outside to the inside, improving the functions of the organs, reconciling yin and yang, and giving full play to the role of righteousness to achieve the anti-cancer effect [8]. Acupoints are the gathering points of qi and blood in the organs and are distributed on various meridians. The meridians are centered on the five internal organs of the human body, forming an organic whole with various body parts such as the six organs and the body. By utilizing the functions of essence, qi, and blood, the activities of the entire body are completed. Acupoints are special parts of the body surface where the viscera and meridian qi of the human body are infused [3]. They are not only the reaction points for diseases, but also the sites where TCM treatment is performed. Acupoint stimulation achieves smooth meridians, harmonizes Qi and blood through proximate, distant and special effects, achieving the purpose of balancing yin and yang and regulating the internal organs [9]. Acupoints have different characteristics under normal physiological and pathological conditions. When pathological changes occur in the organs, muscles and bones of the body, it will lead to an imbalance of qi and blood in the organs and meridians, an imbalance of yin and yang, and abnormal phenomena will appear on the body surface, that is, the function strength and scope of the corresponding acupoints will change. This process is called acupoint sensitization [10]. Under normal physiological conditions, acupuncture points are in a silent state, showing a static state. During the pathological stage, acupuncture points change from a silent state to an activated state, and their response to external stimuli continues to increase, showing a sensitization state" [11], there are differences in skin anatomy and function between acupoints and non-acupoints. Skin permeability varies significantly from site to site, and certain anatomical sites may be more reactive. Drugs act on acupoints and are transmitted through multiple pathways to produce local or systemic effects. Acupuncture points are concentrated points of dense and open microcirculation, with high sensitivity, low resistance, biphasic regulation, relative specificity, integrity and openness. When drugs act on acupuncture points, they will stimulate them to a certain extent and produce specific thermal changes. Certain ingredients can easily penetrate the skin and reach the depths of acupuncture points, and then pass through the meridians directly to the disease site or spread throughout the body [12]. External application of traditional Chinese medicine can be directly absorbed by the human

body through the skin acupoints. Through the stimulation of the acupoints and conduction through the meridians, it can exert the therapeutic effect of traditional Chinese medicine on related organ diseases [13].

2.3 Transdermal Absorption of Drugs

The active ingredients of the drug can cause local micro-irritation after penetrating the skin, causing local tissue temperature to increase, capillaries to dilate, accelerating local blood and lymph circulation, reducing peripheral vascular resistance and blood viscosity, thereby helping the drug quickly enter the systemic circulation and exert local effects such as analgesia, anti-inflammatory, and anti-itching [14]. Percutaneous absorption of drugs refers to controlled-release preparations that are administered through the skin and have systemic therapeutic effects. It has unique advantages over general drug delivery systems. It can avoid the first-pass effect of the liver and the destruction of gastrointestinal digestive enzymes, provide a predetermined and longer action time, maintain stable and long-lasting blood drug concentrations, reduce drug toxicity and adverse reactions, and improve efficacy [15]. Some scholars used tetrahydropyridal in the white mustard seed formula as an evaluation index, used high-performance liquid chromatography (HPLC) for quantification, and used the Franz diffusion cell method to study the permeability characteristics of acupuncture points and non-acupoint skin. The research results show that acupoints are better than non-acupoints in terms of drug storage and penetration absorption. Acupoint skin plays an important role in drug absorption, release speed, drug concentration, and the production and long-term maintenance of drug effects [16]. There are many traditional dosage forms for transdermal absorption of traditional Chinese medicine, such as powders, pastes, cakes, pills, etc. It is the crystallization of the wisdom of early humans using external treatment to treat diseases. As doctors in various historical periods have deepened their understanding of the acupoint application method, its clinical application has gradually expanded, and the dosage forms of the application method have also developed from early pastes and cakes to ointments. Nowadays, with the continuous emergence of various new polymer materials, the dosage forms of acupoint application methods have become more abundant, including film agents, gels and patches [3].

3. Clinical Application of Traditional Chinese Medicine Acupoint Application in Tumors

Malignant tumors and their complications have variable conditions, involve multiple organs, and have complex symptoms. External treatment can be applied at all stages of the disease. Especially after entering the middle and late stages, complications such as pain, pleural and ascites effusion, and swollen lymph nodes often occur. Traditional Chinese medicine often differentiates syndromes as "deficiency and excess" and "deficiency and excess mixed". It is often difficult to comprehensively consider it in treatment, which is very difficult. Because the patient's righteousness has been deficient and his physical condition is poor, commonly used treatment methods and medications such as softening and dispersing stagnation, promoting blood circulation and removing blood stasis, are subject to certain restrictions.

However, there are no such contraindications to using external therapy. Local treatment with traditional Chinese medicine has specific effects and can be withdrawn or administered at any time without causing major medical accidents [17].

3.1 Acupoint Application to Treat OIC (Opioid Analgesic-related Constipation)

Advanced malignant tumors are often accompanied by cancer pain, and opioids are an important treatment method for the treatment of advanced cancer pain [18]. The navel is regarded as "the origin of innateness and the foundation of acquired nature", and is also called Shenque point. Shenque connects the internal organs and meridians of the body. Drugs can quickly reach the liver through the venous network, especially the portal vein, thereby improving the utilization efficiency of drugs. Zhu Ting [19] and others [20] used traditional Chinese medicine navel therapy bags (containing drugs such as rhubarb, mirabilis, cinnamon, clove, costus, astragalus, angelica and citrus aurantium) to treat OIC. The research results showed that the total effective rate reached 79.49%, which was significantly higher than the 57.89% of lactulose oral solution. Yang Yang [21] found that external application of the Zhizhu patch (made from *Fructus aurantium*, *Atractylodes*, *Polygonum cuspidatum* and *Senna* leaves) to the navel can significantly improve constipation symptoms and improve the patient's quality of life. Chen Yinsong [22] and others used abdominal massage and navel therapy to treat acupuncture points such as Zhongwan, Tianshu and Zusanli in patients with OIC, and achieved satisfactory results. Simply applying rhubarb to the umbilicus can also effectively prevent and treat constipation associated with malignant tumors [23]. Li Fengling [24] used plaster to treat constipation after chemotherapy at acupoints such as Juxu point, Zusanli point and Tianshu point, and achieved significant results and improved the patient's anxiety.

3.2 Acupointapplication to Treat Gastrointestinal Reactions after Chemotherapy

Chemotherapy is one of the important methods in the treatment of malignant tumors. Patients often face drug side effects, such as anorexia, nausea, vomiting and other gastrointestinal adverse reactions. These side effects are the main reason why patients are most worried about chemotherapy. Failure to effectively control these side effects will cause psychological burden to patients and may delay the progress of disease treatment [25]. According to clinical observations by Liu Ying and others [9], it was found that topical application of traditional Chinese medicine plasters on acupoints can effectively prevent delayed gastrointestinal reactions caused by cisplatin. Zhang Xiang [26] and others also achieved satisfactory results by using products that warm the meridians and strengthen the spleen and stomach to prevent vomiting caused by chemotherapy. Zhang Meng and others successfully used acupoint application to relieve nausea and vomiting caused by chemotherapy for digestive tract tumors [27]. Wang Xuebing and others found through clinical research that external treatment of traditional Chinese medicine combined with western medicine is effective in treating adverse reactions and has good curative effect on chemotherapy-related gastrointestinal reactions [28].

Research by Tong Li and others found that TCM syndrome differentiation and treatment combined with external therapy can safely and effectively treat gastrointestinal reactions caused by chemotherapy for acute myeloid leukemia, and has obvious advantages [29].

3.3 Acupointapplication to Treat Lung Cancer-related Cough

Primary bronchial lung cancer is the most common cancer worldwide, and persistent or recurrent cough is a major quality of life problem in lung cancer patients [30]. In a study on the treatment of cough in advanced non-small cell lung cancer with spleen deficiency and phlegm-dampness type [31], Shan Mengjun and others selected 87 patients, applied the cough-relieving and phlegm-reducing acupoints to Tiantu and Dazhui points, and compared the treatment with Asmei. After 1 week of treatment, the effective rate of the acupoint application group was 90.9%, while that of the Asme group was 83.7%; in addition, the acupoint application group was superior to the Asme group in terms of improving the score of night cough symptoms and cough visual analog score. Sun Qi [32] treated 92 patients with lung cancer cough and asthma, of which the control group received conventional anti-infection treatment, while the treatment group used acupoint application on the basis of conventional anti-infection treatment. After 14 days of treatment, the effective rate of the treatment group was 76.1%, while that of the control group was 55.5%; in addition, the treatment group could more effectively relieve the anxiety and depression of patients. He Yanyan [33] treated 64 patients with lung cancer, and the treatment group used acupoint application on the patients' Feishu, Zhongfu, and Gaohuang acupoints every day, while the control group did not use it. After 1 week of treatment, the effective rate of the treatment group was significantly higher than that of the control group. Wang Han [34] applied acupoint application to the Feishu, Pishu, Shenshu, Tanzhong, Gaohuang, Dingchuan and other acupoints of patients with lung cancer cough. After 2 weeks of treatment, 2 of the 20 patients showed significant improvement and 14 were effective. Dr.He [35] applied acupuncture patches to the Dazhui, Fengmen, Feishu, Tanzhong, Gaohuang, Shenshu and other acupoints. After 10 treatments, the total effective rate of 60 patients with lung cancer cough was 83.3%. Meng Qiming et al. [36] collected 42 patients with lung cancer and cough. The control group took codeine phosphate orally, and the treatment group added clove powder to the control group, and applied acupoint application on the Neiting, Fenglong, and Tiantu acupoints. After 6 days of treatment, the effective rate of the treatment group was 95.24%, while that of the control group was 80.95%.

4. Summary

In summary, acupoint application method has dual therapeutic effects, which can not only stimulate acupoints but also produce pharmacological effects. Meridian points have external sensitivity and amplification effects on drugs, allowing the drugs to stay in the acupoints for a long time or be released throughout the body, thereby producing an overall regulatory effect. This effect is not just a simple superposition of acupoint stimulation and drug absorption, but an interaction, which can achieve therapeutic effects that cannot

be achieved by simple medication or acupuncture, producing an effect of one plus one greater than two [5]. However, there are still several problems. First, the research on the mechanism of acupoint application is still incomplete. The theory of "the same principle inside and outside" mentioned in "Li Yi Pianwen" lays the basic theoretical foundation for external treatment. However, due to differences in dosage forms and routes of administration, its biological effects are also different. It is obviously not comprehensive enough to explain the mechanism of acupoint application therapy by simply using "the same principles both internally and externally". Secondly, the selection of acupoints is not standardized. Different acupoints are selected for the same disease, or too many acupoints are selected, with insufficient understanding of the effects of acupoints. Third, the drug prescriptions for acupoint application are blind, single dosage forms, often self-made prescriptions or empirical prescriptions, with complex ingredients, unclear active ingredients and low content, which restricts the standardized development of this therapy. Finally, there are few systematic studies on the adverse reactions of acupoint application and drugs. In order to better leverage the advantages of acupoint application therapy, the treatment mechanism of acupoint application therapy should be further explored in the future, and the drug formulation and acupoint selection of acupoint application therapy should be standardized so that it can better adapt to the development of today's medical environment.

References

- [1] Wild C. World cancer report 2020[M]. Imprimerie Faurite, France: World Health Organization, 2020.
- [2] Li Jianbo, Huo Bingjie, Zhang Jie, Zhao Weipeng. Application and reflections of traditional Chinese medicine external therapy in comprehensive treatment of malignant tumor[J]. China Journal of Traditional Chinese Medicine and Pharmacy, 2023, 38(6): 2800-2802.
- [3] Zhu Weifeng, Wang Yaqi, Wu Wenting. Modern research progress in external application of traditional Chinese medicine to acupoints [J]. China Journal of Chinese Materia Medica, 2023, 48(3):579-587.
- [4] Rong Peijing, Zhu Bing, Li Yuqing, et al. Mechanism of acupuncture regulating visceral sensation and mobility [J]. Frontiers of medicine, 2011, 5(2):151-156.
- [5] Xie Yang, Yu Xueqing. A discussion on the mechanism of action and clinical application of acupoint patches [J]. Guide of China Medicine, 2008, 6(24): 320-322.
- [6] Li Yi, Pang Bo, Hua Baojin, et al. Tumor syndrome treatment based on the "law strategy and power-base" [J]. Journal of Beijing University of Traditional Chinese Medicine, 2022, 45(7):684-688.
- [7] Ning Rongrong, Liu Mingding, Xiao Jiao, et al. A brief discussion on the application of meridian balance and imbalance in diseases based on Huangdi Neijing [J]. Lishizhen Medicine and Materia Medica Research, 2022, 33(11):2712-2714.
- [8] Nie Ben, Fu Wensheng, Ding Ni, et al. Application of external treatment methods in traditional Chinese medicine in the treatment of malignant tumors [J]. Journal of Traditional Chinese Medicine, 2018, 59(7):621-624.
- [9] Liu Ying, Cheng Jun, Peng Caoxia, et al. Clinical Research of Qingping Acupoint Application's Effects on Relieving the Loss of Appetite Induced by Cisplatin [J]. Journal of Emergency in Traditional Chinese Medicine, 2017, 26(1):176-178.
- [10] Wan Min, Zhou Yumei, Zhou Jie. Analysis of the exploration of the phenomenon and law of acupoint sensitization [J]. Journal of Clinical Acupuncture and Moxibustion, 2017, 33(3):74-77.
- [11] Fu Yanan, Xiao Qiwei, Yin Zihan, et al. Research Progress of Acupoint Sensitized Objective Imaging [J]. Chinese Archives of Traditional Chinese Medicine, 2021, 39(10):116-118.
- [12] Liu Qiang, Zhou Liling, Li Rui. Research ideas for transdermal administration of traditional Chinese medicine [J]. Traditional Chinese Drug Research and Clinical Pharmacology, 1997, 8(2):116-118.
- [13] Su Fei, Cheng Zhiqiang, Li Liya, et al. A single-center, randomized controlled study on treatment of digestive tract reactions caused by chemotherapy with herbal external application [J]. Chinese Journal of New Drugs, 2020, 29(4):408-412.
- [14] Tian Shuo, Miao Mingsan. Mechanism of External Use of Traditional Chinese Medicine—"Three MicroRegulations for Balance" Based on Neural-endocrine-immune Network [J]. Chinese Journal of Experimental Traditional Medical Formulae, 2019, 25(4):6-12.
- [15] Liu Jing, Wu Yaochi. Status quo of clinical application of acupoint plaster therapy and its mechanism [J]. Shanghai Medical & Pharmaceutical Journal, 2018, 39(24):3-5.
- [16] Guo Xiucui, Liu Xia, Xu Yuehong. Tetrahydropalmatine's permeative properties of acupoint and non-acupoint transdermal administration of Baijiezi Tufang in vitro and in vivo [J]. China Journal of Chinese Materia Medica, 2012, 37(7):1034-1038.
- [17] Xiao Li, Ho Sau lan, Hu Kaiwen, et al. The position and role of traditional Chinese medicine external treatment in the clinical treatment of malignant tumors [J]. Chinese Journal of Basic Medicine in Traditional Chinese Medicine, 2011, 17(2): 198, 200.
- [18] Lei Yan, Liu Yong. Research Progress on the Effect of Opioids on Immunotherapy in Patients with Cancer Pain [J]. Herald of Medicine, 2023, 42(9):1359-1363.
- [19] Shi Zhifu, et al. On umbilical therapy [J]. Journal of Inner Mongolia Medical University, 2020(S01):15-17.
- [20] Zhu Ting, Cao Yongyi, Li Yuzhi, et al. Therapeutic Effect of Traditional Chinese Medicine Umbilical Therapy Bag on Opioid-related Constipation [J]. Journal of Medical Information, 2020, 33(10):167-168.
- [21] Yang Yang. Clinical Observation of Zhizhu Patch in the Treatment of Opioid Related Constipation [D]. Nanjing University of Traditional Chinese Medicine, 2018.
- [22] Chen Yinsong, Kong Yuequn. Forty-One Cases of Constipation Caused by Opioids Treated with Umbilical Cord Therapy in Combination with Digital Acupoint Pressure [J]. Henan Traditional Chinese Medicine, 2019, 0(8):1271-1274.
- [23] Yang Mengjuan, Ke Pan, Yang Xiaoqin, et al. Research Progress of Preventing and Treating Chemotherapy - induced Constipation of Tumor Patients with Umbilical

- Application of Dahuang [J]. Western Journal of Traditional Chinese Medicine, 2019, 32(8):154-157.
- [24] Li Fengling, Hu Tianyan, Chen Jie. Clinical observation of the clinical efficacy of acupoint patches for constipation caused by chemotherapy in patients with malignant tumors [J]. Journal of Nurses Training, 2020, 35(3):285-287.
- [25] Pan Jiuling, Li Yanhui, Yin Lili. Research progress in the treatment of constipation with traditional Chinese medicine acupoint patches [J]. New Chinese Medicine, 2006, 38(4):24-25.
- [26] Zhang Xiang, Zhang Xiping, Cheng Qihui. Progress of Control of Chemo-therapy Induced Nausea and Vomiting by TCM Method [J]. Chinese Archives of Traditional Chinese Medicine, 2012, 30(5):1093-109.
- [27] Zhang Meng, Li Jinhong, Xiao Li, et al. Effect of navel therapy Shengbai Fang on bone marrow suppression and quality of life after chemotherapy for gastrointestinal tumors [J]. Shaanxi Journal of Traditional Chinese Medicine, 2017, 38(12):1690-1691.
- [28] Wang Xuebing, Zhang Wei, Li Miao. Observation of the efficacy of traditional Chinese medicine external treatment in the intervention of chemotherapy-related digestive tract reactions [J]. Global Traditional Chinese Medicine, 2013, 6(11):858-859.
- [29] Tong Li, Wang Maosheng, Zhong Zhaoling, et al. Clinical observation of internal and external combined treatment methods for the prevention and treatment of chemotherapy-induced digestive tract reactions in acute myeloid leukemia [J]. Journal of Emergency in Traditional Chinese Medicine, 2015, 24(1):163-165.
- [30] Siegel Rebecca L, Miller Kimberly D, Jemal Ahmedin, et al. Cancer Statistics, 2017 [J]. CA: a cancer journal for clinicians, 2017, 67(1):7-30.
- [31] Shan Mengjun, Shen Liping, Zhou Di, et al. Clinical observation of acupoint application therapy on improving cough symptom of advanced non-small cell lung cancer with spleen-deficiency and phlegm stagnation type [J]. Hebei Journal of Traditional Chinese Medicine, 2017, 39(7):1078-1081+1092.
- [32] Sun Qi. Experience for nursing for cough in advanced lung cancer by the acupoint application therapy [J]. Clinical Journal Of Chinese Medicine, 2018, 10(13):126-128.
- [33] He Yanyan. Observation on the efficacy and care of acupoint plaster combined with meridian flow injection method in patients with cancer cough [J]. GUANGMING JOURNAL OF CHINESE MEDICINE, 2017, 32(11):1659-1661.
- [34] Wang Han. Acupoint plaster of traditional Chinese medicine for cough and phlegm in lung cancer [J]. Inner Mongolia Journal of Traditional Chinese Medicine, 2017, 36(15):91-92.
- [35] He Yuansheng. Clinical observation of acupoint application in treating bronchogenic carcinoma with cough and asthma [J]. China's Naturopathy, 2018, 26(4):19-20.
- [36] Meng Qiming, Zhou Xutao, Shen Jian. Observation on 42 cases of cough in lung cancer treated with clove powder and codeine phosphate [J]. Journal of Practical Traditional Chinese Medicine, 2014, 30(9):850-850.