

Progress in Chinese and Western Medicine Treatment of Postoperative Lower Limb Lymphedema in Gynecologic Malignancies

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Keywords: Gynecologic malignancies; Lower extremity lymphedema; Traditional Chinese medicine treatment; Western medicine treatment

Abstract: Lower limb lymphedema is one of the common postoperative complications of gynecologic malignancies, which brings great physical pain and psychological pressure to patients. In clinical treatment, Western medicine is mainly based on conservative treatment, drug treatment and surgery. Chinese medicine is based on "evidence" and has various intervention methods, including internal and external application of Chinese medicine, acupuncture and moxibustion, and tui-na, etc., which are targeted and individualized. Therefore, this paper will review the treatment of this disease from both Chinese medicine and Western medicine, and aim to provide reference for the selection of treatment options for patients with various stages of lymphedema.

1. Introduction

Lower limb lymphedema is one of the most common complications after gynecologic malignancies, with an incidence of 5%-58% [1-2]. Because of its chronic and progressive clinical manifestations, if early intervention is not timely and allowed to develop further, it may eventually lead to the appearance of elephantiasis, which seriously affects patients' physical and mental health [3-4]. In recent years, scholars at home and abroad have been conducting in-depth research on postoperative lower limb lymphedema in gynecologic malignancies, and various types of treatment modalities lack systematic collation. Therefore, this paper will review the treatment of this disease from both traditional Chinese medicine and western medicine, and aim to provide ideas for the selection of treatment options for patients with various stages of lymphedema.

2. The understanding and treatment of lymphedema of the lower limbs after gynecological malignant tumor surgery in Western medicine

Lymphedema is a slow progressing and irreversible disease, which can be divided into two kinds: primary and secondary. Among them, secondary lymphedema is caused by blockage, destruction

and absence of lymph nodes or lymphatic vessels ducts due to surgery, radiotherapy and infection, resulting in obstruction of lymphatic fluid drainage and subsequent edema [5-6]. In recent years, scholars both at home and abroad have made various studies on the pathogenesis of secondary lymphedema, including: the lymphatic obstruction theory, the tissue interstitial pressure imbalance hypothesis, the inflammatory response, and the more recognized lymphatic pump failure hypothesis [7-8].

2.1. Western medical treatment of lower limb lymphedema after gynecologic malignancy surgery

2.1.1. Conservative treatment

2.1.1.1. Physiotherapy

Physiotherapy is used to accelerate blood and lymphatic fluid circulation and inhibit fibrous tissue proliferation by comprehensive decongestion method, thermal physiotherapy, and low-frequency electrical stimulation method. Comprehensive decongestive therapy (CDT), which is commonly used in clinical practice, is a safe and effective treatment method that cooperates with each other through manual drainage, bandage compression and functional exercise, and is effective in the treatment of early and middle lymphedema [6]. Cheng Qun et al. [9] treated 89 patients with lower extremity edema with a 4-week comprehensive decongestion method and found significant reductions in the circumference of the affected extremity and tissue water before and after treatment. Luo Qinghua et al. [10] found that the leg circumference of patients with mild, moderate and severe lower limb lymphedema improved significantly after using the six-part comprehensive decongestion method through their own controlled experiment, and the quality of life of patients was effectively improved. Huang Lemei et al. [11] found that modified CDT using negative pressure drainage had significant advantages over traditional CDT treatment, with higher treatment efficiency and time and cost savings, which could significantly improve clinical treatment efficiency.

Li Ke et al. [12] found that far infrared rays could effectively relieve the symptoms of swelling and pain in the lower limbs and improve the function of the limbs. Meanwhile, Wang Xiaodu et al. [13] further investigated far-infrared rays for the treatment of postoperative lymphedema in gynecological cancers through clinical observation and in vitro cell experiments and found that far-infrared rays with bandage treatment could more effectively relieve lymphedema and alleviate patients' symptoms, and patients tolerated infrared treatment better without obvious adverse reactions. Yao Luo et al. [14] studied the effectiveness of low-frequency neuromuscular therapy on lower limb lymphedema after cervical cancer surgery or radiotherapy through a controlled experiment, and found that low-frequency neuromuscular therapy could improve lymphatic circulation and was effective in relieving lower limb lymphedema. In addition, DSA-guided lumbar sympathetic nerve block [15], CO₂ laser therapy [16] and microwave combination therapy [17] can also improve lymphatic circulation in the limbs, relieve the symptoms of swelling, pain and numbness in the limbs, reduce psychological pressure and relieve patients' anxiety.

2.1.1.2. Drug therapy

Western medicine drugs for lymphedema mainly include diuretics, intravenous active drugs, interferon, and antibiotics. Wang Jixue et al. [18] reported that the combination of bacitracin, low-molecular heparin sodium, and hepaticoside sodium could effectively reduce the circumference of the affected limb in the short term without adverse effects. Guo Qu et al. [19] found that preservation of the external iliac terminal lymph nodes combined with intrapelvic injection of

Pseudomonas aeruginosa significantly reduced the incidence of lower limb lymphedema and was able to reduce the incidence of pelvic lymphoid cysts. Han Linghua et al. [20] used four different types of creams to apply to the affected limbs of patients with lower limb lymphedema and found that one of them, condylone lymphatic management gel cream, had a rapid anti-itch effect with no significant adverse effects and could effectively improve the patients' skin symptoms.

No specific drug has been found for the treatment of lymphedema, but it can be used as an adjunctive treatment in combination with other treatments to relieve patients' symptoms and improve their quality of life.

2.1.2. Surgical treatment

Surgical treatment for postoperative lower limb lymphedema in gynecologic malignancies is divided into two main categories: one is physiological surgical therapy through lymphovascular venous anastomosis, lymph node or flap transplantation, and the other is ablative surgical therapy through aspiration or excision of skin and subcutaneous tissue [21-22]. The main goal is to reduce the lymphatic drainage load and enhance the functioning of the lymphatic system, thus relieving the symptoms of lymphedema.

Vascularized lymph node transplantation (VLNT) can stimulate lymphatic vessel generation through venous shunts of lymphatic fluid to better restore local lymphatic circulation. Schaverien et al. [23] found a significant reduction in the volume of the affected limb and a significant reduction in the incidence of cellulitis after VLNT. Ciudad et al. [24] first combined VLNT with radical resection with preserved penetration (RRPP) and found it to be safe and effective in improving lymphatic drainage, promoting lymphatic circulation, reducing the incidence of infection, and it is effective in advanced lymphedema, which is a boon to patients with advanced lymphedema.

Lymphovascular-venous anastomosis (LVA) is an anastomosis of a still-functioning lymphatic vessel to a nearby vein to transfer lymphatic fluid from the damaged lymphatic vessel to the vein, which can effectively improve local swelling and relieve patients' symptoms. Wang Xinyu et al. [25] found that LVA combined with compound decongestion significantly increased the rate of limb edema circumference reduction and was more effective in patients with early stage lymphedema, but its long-term results did not meet expectations. Olszewski et al. [26] found in a 5-year follow-up of 1300 patients who underwent LSA that the limb circumference improvement rate could be as high as 80% in some patients, but in patients with previous lymphangioleiitis or tissue fibrosis the improvement was not more than 30%-40% in patients with previous lymphadenopathy or tissue fibrosis.

The ablation method involves excision of skin and subcutaneous tissue in patients with lymphedema suffering from skin tissue fibrosis, with a view to reducing the volume of the affected limb, improving the degree of swelling, and alleviating the patient's pain. In a controlled trial, Yingying Chen [27] found a significantly lower rate of postoperative complications and higher patient satisfaction after using liposuction reduction for perioperative patients. In a trial to study the efficiency of lymphatic liposuction for the treatment of upper and lower extremity lymphedema, Moshref [28] found that unilateral lymphedema improved better than bilateral and the effect of lower extremity was better than that of upper extremity. Surgical treatment of lymphedema has a significant effect in the short term compared with conservative treatment, and it can alleviate further deterioration in patients with intermediate and advanced lymphedema, which has a better clinical effect [22].

3. Traditional Chinese medicine treatment of postoperative lower limb lymphedema in gynecologic malignant tumors

Postoperative lower limb lymphedema after gynecologic malignancy belongs to the categories of "edema", "pulse paralysis", "skin water" and "foot odor" in Chinese medicine. "Its main pathogenesis is the deficiency of qi and blood in the body after surgery or radiotherapy and damage to the veins and ligaments, resulting in internal stagnation of water and dampness and blockage of silt and blood, thus forming edema. Various medical doctors have different treatment concepts for edema, "Su Wen - Tang Liquid Mash Li Theory" has a cloud: "ping treatment in the right balance, go Guan Chen Tsuen open the door of ghosts and cleanse the house." Zhang Zhongjing put forward the theory of "blood is water if it is unfavorable" in "The Essentials of the Golden Horoscope", and pointed out the treatment principle of supporting the righteous and dispelling the evil, and regulating blood and water together [29]. In Yan's Jisheng Fang - Edema Gate, it is proposed that "first strengthen the spleen and earth, then warm the kidney and water." The principle of treatment. In clinical practice, the specific treatment methods include: oral administration of Chinese medicine, external application, fumigation, acupuncture and moxibustion, etc.

3.1. Traditional Chinese medicine treatment

3.1.1. Chinese medicine taken internally

Since the occurrence of lymphedema is closely related to various factors such as water and dampness, blood stasis, sores and toxins, and individual physique and infected evil vapors are different, legislation should be enacted according to the evidence and treatment should be divided into types. (1) Dampness and heat blocking evidence: Professor Cui Gongjian believes that this disease is caused by weakness of the spleen qi and malfunction of transportation and transformation, combined with the invasion of wind-damp-heat evil and mutual wrestling. Wu Jianping [30] used Professor Cui Gongjian's dampness and stasis removal soup combined with baking and tying therapy to treat lymphedema of the lower extremities, which was effective in reducing the degree of swelling of the patient's limbs. Li Jin et al. [31] experimentally studied the efficacy of Diosmin tablets and Dioscorea pills on damp-heat blocked lower limb lymphedema and found that the efficacy of the herbal treatment group was significantly better than that of the control group, with a treatment efficiency of 86.67%. Professor Wu Qiansheng emphasized that this disease is closely related to the mingling of "qi, blood, dampness and heat". In the acute stage, due to the stagnation of qi and blood and the accumulation of dampness and heat, it is necessary to use the formula for dampness and heat stasis to dredge and clear the source, and in the recovery period, due to the deficiency of qi and blood, it is necessary to consolidate the root and improve the posterior [32]. (2) Phlegm coagulation and blood stasis evidence: Li Nan et al. [33] concluded that this disease is caused by internal stagnation of blood stasis and phlegm-dampness, which accumulate within. By experimentally combining self-prepared Knee Red Soup with anti-swelling and pain-relieving cream, the treatment efficiency was found to be as high as 86.7%. (3) Yang deficiency and dampness obstruction: Professor He Fengjie believes that this disease is mostly caused by the deficiency of spleen and Yang combined with dampness obstruction, so the treatment should follow the method of strengthening the spleen, promoting dampness and clearing the ligaments. Wang Haijing et al. [34] followed Prof. He Fengjie's treatment concept and found that the treatment group using Wu Ling San combined with Wu Pi Drink plus and minus with Tui Na and external application had a significant reduction in leg circumference circumference than the control group, and the recurrence rate was lower after one year of follow-up. Ding Yanyan et al. [35] found that the treatment of lymphedema of the lower extremities with the addition of Wu Ling San was more

effective than the use of diuretics alone, and the treatment efficiency was up to 83.3%. In addition, Wang Bowen [36] found that combining with Fangji Fu Ling Tang on the basis of manual drainage was more effective than combining with Diosmin tablets in patients with lymphedema, and the possible reason for this was the result of the interplay of multiple components, targets, and pathways of Fangji Fu Ling Tang, which acted together. (4) Qi deficiency and blood stasis: Professor Xiong Jibai advocates that lymphedema should be treated by benefiting Qi, invigorating blood, and promoting the circulation of blood to reduce swelling. In a case of lymphedema with Qi deficiency and blood stasis, the use of tonifying Yang and Returning Five Soup combined with addition and subtraction of Fangji Fu Ling Tang, which not only promotes water and reduces swelling, but also takes into account the tonification of Qi, so that the effect of both elimination and tonification is even greater [37]. Professor Liu Longmin believed that postoperative lymphedema of the lower extremities was due to injury to the qi and depletion of blood after prolonged illness, coupled with damage to the veins and ligaments by the golden blade during surgery, resulting in a deficiency of qi and weakness in propulsion, stasis of blood flow and coagulation of water and dampness. It should be added and reduced by Si Miao Yong An Tang, which together can achieve the effect of tonifying Qi, invigorating blood, and promoting water to dispel stasis [38].

3.1.2. External application of Chinese medicine

The external treatment method of Chinese medicine is a way to penetrate and absorb drugs through the skin, acupuncture points, the five senses and nine orifices, so that the medicinal power can reach the disease directly. In the Qing dynasty, Wu Shiji's "Li Bo Era", the zong of external treatment, recorded that "the theory of external treatment is the theory of internal treatment; the medicine of external treatment is also the medicine of internal treatment" [39]. As early as in the Yellow Emperor's Classic of Internal Medicine, there is a record of "18 methods of external treatment". The external application method and fumigation method are commonly used to open the Xuanfu couples through the thermal effect, so that the ionic components of drugs are absorbed through the skin mucous membrane barrier to achieve the effects of reducing swelling and pain, activating blood circulation and resolving blood stasis [40].

Postoperative lymphedema of the lower extremities in gynecological malignancies belongs to the category of "edema" in Chinese medicine. In the Nei Jing, it is written that "all diseases, swelling, pain, soreness and shock belong to fire", and nowadays, some doctors follow the concept of "treating heat with edema", which has remarkable effect in clinical treatment [41]. Sha Rui et al. [42] used Bingli Powder to treat this disease externally, used the bitter and cold properties of borneol to clear heat and relieve pain, and used it as a "lead" to increase the permeability of the membrane and improve the absorption and utilization rate of drugs. When applied externally, mirabilite enters the skin mucosal barrier in the form of sulfate ions, relieves inflammatory reactions, and improves local microcirculation. The two cooperate with each other to achieve the effect of eliminating edema and relieving pain. In the treatment of early lower limb lymphedema, Zheng Tongli [43] used a 100:1 mixture of mannitol and ice chips to apply externally to the affected area, using the transdermal potentiation effect of ice chips to make the drug quickly absorbed transdermally, which unblocks the lymphatic vessels and clears heat and reduces swelling, with significant efficacy in early stage patients. Ye Min et al. [44] used the compound preparation Ruyi Jinhuang Paste, which utilized the effect of smallpox powder to clear heat and reduce swelling, together with the power of turmeric, dahurica and tiannanxing to activate blood circulation and eliminate blood stasis, and eliminate swelling and drain pus, and then mixed with vinegar to unblock the meridians and at the same time make the medicinal effect reach the disease place directly, and together complete the effect of eliminating edema, effectively relieving the patient's limb heaviness and other symptoms.

Due to the damage of the golden blade during the operation, combined with the injury of qi and

blood depletion after a prolonged illness, the evil toxin enters the body, resulting in damage to the veins and collaterals, blocking the flow of qi, blood and fluid, and stagnation of blood and dampness within the body. In the Treatise on Blood Evidence, it is stated that "Blood accumulation for a long time can also turn into stagnant water". Based on this theory, Professor Cao Jianchun advocated that this disease should be treated from stasis to dampness, using drugs such as peach kernel and safflower to invigorate blood stasis, pass the ligaments and relieve pain, and together with drugs such as donggua peel, daggerbelly peel and diaphanous peel, a decoction of soup to wash the affected limbs, the drugs work together to invigorate blood and dispel dampness, pass the ligaments and promote the effect of water [45]. In the Jin Kui Yao Yao, it is proposed that "blood is not conducive to water." In the treatment of this disease, the concept of harmonizing blood and water is advocated. Based on this, Song Kuiquan et al. [46] randomly divided 86 patients with unilateral lower extremity lymphedema into two groups, and based on the basic treatment of oral medicine such as Mai Zhi Ling, the treatment group was fumigated with blood activating lotion, and the control group was added with magnesium sulfate wet compress.

3.1.3. Acupuncture treatment

The Ling Shu - Meridian Vessels, "The meridian vessels are so capable of deciding life and death, dealing with all diseases, regulating reality and deficiency, and cannot be blocked." The meridians are closely related to the occurrence, development, and regression of diseases. In "The Spiritual Pivot - Nine Needles and Twelve Originals", it is written, "To use micro-needles to pass through its meridians, regulate its blood and energy, and camp its counter-smooth in and out of the meeting" It indicates that by acupuncture acupoints, the qi and blood can be regulated and the meridians can be opened to achieve the purpose of treating diseases. Zheng Shuo et al. [47] selected Houxi, Taiyuan, Sun, and Yinlingquan acupuncture points through fire acupuncture combined with the comprehensive swelling reduction method to open the Xuanfu, warm the qi and blood, draw the evil out, and improve local microcirculation, which effectively relieved the patient's symptoms of limb soreness and weakness, and the effective rate reached 93.9%, which was significantly higher than that of the control group using only the comprehensive swelling reduction method. Lv Hongyan [48] reported a case of using warm acupuncture combined with medium-frequency pulse electrotherapy in a patient with Yang deficiency and water offense and cold clotting and blood stasis. Through acupuncture points such as foot Sanli, Yinlingquan, Blood Sea, and A-Yi acupuncture points, blood and lymphatic fluid circulation was accelerated, metabolite absorption was promoted, local swelling of the affected limbs was effectively relieved, and the immunity of the body was improved, which achieved the effect of supporting the righteousness and eliminating evil. In an experiment comparing the efficacy of conventional treatment with warm acupuncture combined with intramuscular effect paste, Dong Dexi [49] found that acupuncture with suspension moxibustion on acupoints such as Yinlingquan, Feet Sanli, Sanyinjiao, Fenglong, and Kidney Yu, combined with intramuscular effect paste could significantly reduce the incidence of lymphedema in the lower limbs. Liu Yunjing [50] attributed the occurrence of lymphedema to damage to the pulse channels, poor flow of qi and blood, and stagnation of dampness and blood within the body, resulting in local swelling and numbness. By obliquely acupuncturing the three yin and three yang meridians of the affected limbs, the lymphatic fluid accumulated locally is released along the acupuncture channels, thereby relieving the degree of swelling in the affected limbs.

3.1.4. Tuina guidance

According to the Treatise on the Origin of Diseases, the treatment of "foot qi" is to guide the qi flow. Tui-na works on the body surface with certain techniques, and by pressing and rubbing the

relevant acupuncture points, it opens the meridians, moves the qi and blood, moistens the tendons and bones, and regulates the qi flow to achieve the purpose of reducing swelling. In the treatment of a patient with lymphedema of the lower limbs after cervical cancer surgery, Lei Shaohua et al. [51] used the treatment method of meridian massage, selecting the acupuncture points of the three yin meridians of the foot, and stimulating the meridians and acupoints by manipulation to regulate the flow of qi and blood, harmonize yin and yang, and relieve the patient's local swelling.

Chinese medicine has many treatment concepts for lymphedema, and it is written in the "Medical Heart Formula" that "those who treat foot odor must follow the four seasons." The treatment of "foot qi" should take into account both tonification and diarrhea in spring and autumn, while sweat and benefit should be emphasized in summer. The "Treatise on the Origin of Diseases" says: "All foot diseases are caused by wind and poison." It is advocated that the treatment should be to dispel the evil out, so that the evil goes away and the right is safe [52]. Nowadays, the treatment of lymphedema is based on "deficiency", following the concept that "all dampness and swelling belong to the spleen." Whether from "deficiency", following the concept of "all dampness and swelling belong to the spleen", treated by tonifying the kidneys, strengthening the spleen and opening the ligaments or warming the kidneys to transform the qi [53-54], or from "actual", treated by blood stasis, dampness and phlegm condensation [29-32], all improve local blood and lymphatic fluid circulation through drugs, thus reducing the symptoms of swelling of the affected limbs and improving the quality of life of patients.

4. Summary

Postoperative lower limb lymphedema in gynecological malignancies is relatively common in clinical practice, and how to prevent and treat this disease has become an urgent problem. Currently, there are many treatment modalities for postoperative lower limb lymphedema of malignant tumors, and CDT is the recognized early and intermediate treatment modality. Patients with advanced stage can relieve the swelling symptoms and improve the quality of life through surgical treatment. Chinese medicine treatment of disease follows the therapeutic principle of evidence-based treatment, which can be based on a holistic view, according to the patient's physique and the stage of disease development, and select targeted and individualized treatment plans for patients. In conclusion, the combined treatment of Chinese and Western medicine can complement each other, and in the future treatment, based on the discriminatory treatment, we can choose the appropriate treatment modality according to the different stages and different types of evidence that the patient is in, so as to delay the further development of lymphedema and maximize the quality of life of the patient.

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