

Preprocessing and Efficacy Analysis of Comprehensive Anti-Inflammatory Treatment for Lymphedema in Patients with Irritating Contact Dermatitis

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Abstract

Objective: To explore the pre-treatment and efficacy analysis of comprehensive anti-inflammatory treatment for lymphedema in patients with irritating contact dermatitis. **Method:** Convenience sampling method was used to observe the skin of 160 patients with upper limb lymphedema admitted to the lymphedema outpatient department of our hospital. They were divided into an observation group (80 cases) and a control group (80 cases), and both groups received a course of comprehensive anti-inflammatory treatment (20 treatments). The control group received routine skin care; On the basis of the control group, the observation group received pre-treatment of the affected limb skin: Laofuzi herbal ointment was applied externally to the prone areas of irritating contact dermatitis (such as the upper arm, inner forearm, and cubital fossa). **Result:** The incidence of irritating contact dermatitis in the observation group was significantly lower than that in the control group ($P < 0.05$, $P < 0.001$). The number of severe irritating contact dermatitis cases in the two groups was 2 and 1, respectively, with no statistically significant difference ($P > 0.05$). Patients in the observation group felt significantly better in terms of comfort, skin moisture, and itching relief after being wrapped with low elasticity bandages than those in the control group ($P < 0.05$, $P < 0.001$). The observation group had a longer duration of bandages in summer than the control group ($P < 0.05$). **Conclusion:** Preventive treatment can effectively reduce the incidence of irritating contact dermatitis, prolong the time of stress treatment, thereby increasing efficacy and improving patient compliance.

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Keywords

Comprehensive Anti-Inflammatory Treatment, Upper Limb Lymphedema, Irritating Contact Dermatitis, Effect

1. Introduction

With the increase of incidence rate of breast cancer and the progress of diagnosis and treatment technology, the number of long-term survivors of breast cancer is increasing [1], and postoperative lymphedema of breast cancer is also concerned. Upper limb lymphedema is one of the most common complications after breast cancer surgery, which seriously affects the quality of life of patients [2]. Axillary lymph node dissection is recognized as a high-risk factor for lymphedema in breast cancer patients [3] [4].

Complex Decongestion Therapy (CDT) is currently the safest and most effective conservative treatment method for early lymphedema, with good efficacy and widespread application. During the treatment process, patients with lymphedema often experience skin reactions in their affected limbs, commonly known as irritating contact dermatitis. Contact Dermatitis (CD) refers to chronic inflammation of the local skin caused by chemical irritation or type IV hypersensitivity after contact with external substances. Widman *et al.* believe that CD can be caused by dressings and bandage components, manifested as redness and small blisters, often accompanied by itching symptoms, with red rash being the most typical. When patients with comprehensive anti-inflammatory treatment for lymphedema experience irritating contact dermatitis, they may lose confidence in the treatment and cannot adhere to pressure therapy. Therefore, the symptoms of lymphedema cannot be controlled in a timely manner. At present, there are relatively few measures to address the occurrence of irritating contact dermatitis during CDT. To ensure the smooth progress of CDT and reduce the incidence of irritating contact dermatitis, this study analyzed the causes of irritating contact dermatitis in patients with lymphedema during comprehensive anti-inflammatory treatment and skin pretreatment, achieving satisfactory results. The current report is as follows.

2. Materials and Methods

2.1. General Information

After obtaining approval from the hospital ethics committee (GYX2020-002), using convenience sampling method, 160 patients with upper limb lymphedema who visited our hospital's lymphedema outpatient department from January 2019 to December 2019 were selected. Divide the patients into an observation group and a control group, with 80 cases in each group, in the order of before and after diagnosis. Inclusive criteria: 1) confirmed as breast cancer by pathological paraffin; 2) After the modified radical mastectomy for breast cancer, the affected limb

had edema to varying degrees; 3) All of them received treatment for lymphedema for the first time; 4) Diagnosis fully informed, voluntary participation and informed consent; 5) Having a primary school education or above, able to understand and master the content of health education Agree to use low elasticity bandage materials for pressure bandaging throughout the entire treatment stage. Exclusion criteria: 1) Stage IV breast cancer with distant metastasis; 2) Accompanied by other major life-threatening diseases at any time; 3) Having a history of mental illness or taking antipsychotic drugs; 4) The affected limb skin is damaged.

There was no significant difference in general information between the two groups of patients ($P > 0.05$), indicating comparability. See **Table 1**.

2.2. Method

2.2.1. Control Group: Evaluated and Treated by a Lymphedema Therapist

All patients were given a course of CDT with a duration of 28 days and 20 sessions (rest on Saturdays and Sundays). CDT includes four steps: specialized bare handed lymphatic drainage, elastic bandage compression, limb functional exercise, and personalized skin care [5] [6] [7] [8] [9]. Routine skin care should be given first, followed by manual lymphatic drainage, with each step lasting about 10 minutes. Then, low elasticity bandages should be used to compress the bandage, and patients should be taught functional exercise. The main content of this

Table 1. Distribution of general information of two groups of patients (N = 160).

General information	Observation group (n = 80)	Control group (n = 80)	P
Age	59.78 ± 10.63	57.03 ± 9.92	0.741
<50	15	18	
≥50	65	62	
Cancer staging			0.090
I - II	36	34	
III	44	46	
Culture			0.830
Primary school	24	25	
Middle school	43	43	
Undergraduate or above	23	22	
Degree of limb edema			0.053
Grade I	16	18	
Grade II	42	39	
Grade III	22	23	

study on health education was developed based on the 18 guidelines for preventing lymphedema proposed by the NLN International Lymphedema Website in 2003. The entire treatment process takes about 1 hour, once a day, and 20 times is a course of treatment.

2.2.2. Pre CDT Care

Patients all have certain negative emotions, and lymphedema therapists need to understand the patient's emotional changes, do a good job of psychological counseling, inform the patient of the effectiveness and necessity of CDT, actively communicate with the patient and their family, discuss the condition together, explain the methods, steps, and prognosis of CDT, etc.; Introduce successful cases to eliminate patient concerns and gain trust; Inform patients of the potential occurrence of irritating contact dermatitis during treatment, and encourage them to understand the relevant knowledge of irritating contact dermatitis before treatment, learn self-care, and eliminate negative emotions.

Firstly, routine skin care is given before performing unarmed lymphatic drainage: allowing patients to sit or lie down in a completely relaxed state, international lymphedema therapists will sequentially open lymphatic pathways according to the degree of edema and condition of the patient, and then perform centripetal unarmed lymphatic drainage. Unarmed lymphatic drainage can promote lymphatic reflux, help lymphatic circulation, and reduce lymphatic retention. The technique should be light, gentle, shallow, and rubbing to avoid causing local skin redness [10] [11] [12] [13]. Guide patients to use the method of self-manual lymphatic drainage for touching. When performing manual drainage, the affected limb is lifted up, and the principle of gravity drainage is used to accelerate the reflux of lymph and blood in the affected limb. Touch for 30 minutes each time, at least three times a day, and persist every day. When touching, pay attention to the direction of lymphatic drainage and the drainage to the nearest healthy lymphatic pathway.

Elastic bandage compression therapy: The lymphedema therapist checks the integrity of the skin before applying pressure. Focus on understanding the patient's previous bandaging, including their feelings, skin itching, pain, and other discomforts.

After the bare handed lymphatic drainage is completed, the patient is immediately bandaged with low elasticity bandages on the affected upper limb. Fixed bandages, tubular bandages, polyester cotton pads, and low elasticity bandages are wrapped in three layers in sequence. Cotton bandages are used to protect the skin and prevent skin damage. The density of the wrapping can be adjusted according to the skin condition. If there is itching, the density of the wrapping should be reduced and an additional layer should be wrapped around the area.

If there are irregularities or wrinkles on the skin, it is necessary to cross wrap the bandage in a shape of 8 to prevent it from loosening. Apply a pressure of 30 - 40 mmHg [14] [15] to wrap it above the polyester pad.

Based on the tightness that can accommodate one finger, if it is too loose, it

will lose the bandaging effect. If it is too tight, it may cause disorders in the blood circulation and lymphatic circulation of the affected upper limb of the patient.

Functional exercise: Guide patients to perform joint movements under pressure therapy to promote the flow of lymphatic fluid. When exercising, muscles expand and contract, and bandages counteract the intermittent pressure of muscle expansion and apply force to deep tissues; when resting, the muscles relax, and the restoring force of the bandage acts on the persistent pressure generated by the tissue. Encourage patients to cooperate with abdominal deep breathing, and based on their specific conditions, encourage them to use the Eight Section Brocade to “regulate their body”, “regulate their breath”, and “regulate their heart”. Physiologically, it can unblock the body’s meridians, ensure smooth circulation of qi and blood, and have the functions of preserving essence, nourishing qi, and preserving spirit. After appropriate functional exercise, patients can then undergo self-manual lymphatic drainage.

2.2.3. Health Education

Guiding patients to prevent the recurrence or aggravation of lymphedema and daily self-care measures, as well as strategies to reduce the risk of lymphedema [16] [17].

On the basis of the control group, the observation group was given skin pre-treatment by a lymphedema therapist: before applying low elasticity bandage pressure bandaging, Laofuzi herbal ointment 2 - 3 cm was applied externally to the prone areas of irritating contact dermatitis (the entire upper arm, inner forearm, and cubital fossa). After drying, the next step was carried out. Before and after each treatment, the patient’s edema and swelling reduction, the time of low elasticity bandage pressure bandaging, and whether there were local skin reactions such as redness, itching, pain, blisters, comfort, moisturization, and anti-itching effect after bandaging were observed and recorded. During the skin care process, there were no cases where skin symptoms occurred and treatment was interrupted.

2.3. Observation Indicators and Evaluation Methods

Evaluation criteria for irritating contact dermatitis [18]: Compare the occurrence and degree of response of two groups of patients with irritating contact dermatitis. Stimulating contact dermatitis is a common and frequently occurring disease in dermatology, which is caused by the contact between the skin mucosa and external pathogenic substances, leading to acute and chronic inflammatory reactions of the skin mucosa. Its clinical classification is mild, with mild skin itching and erythema, with an area of less than 5 × 5 cm; Moderate to severe skin itching, with scattered erythema and papules, with an area of 5 × 5 cm or more; Severe skin itching is abnormal, with obvious blisters, erosion, and exudation, with an area of more than 10 × 10 cm.

Symptom evaluation criteria for irritating contact dermatitis: Subjectively

judged, it can be divided into four degrees: no changes in the skin, mild or scattered erythema, moderate or fused erythema, severe erythema and edema [19].

Skin moisture: subjective judgment can be made based on the presence of dryness and the degree of desquamation (no, light, medium, heavy) [20], and the skin moisture before and after treatment can be compared between two groups of patients.

Evaluation criteria for itch relief efficacy and comfort: evaluated based on the patient's subjective sensation.

2.4. Statistical Methods

Data input into SPSS 21.0 software, descriptive statistical analysis, chi square test, t-test, and K-W test were used to test the level of accuracy $\alpha = 0.05$.

3. Result

3.1. Comparison of Circumference between Two Groups of Upper Limb Lymphedema

The measurement methods of the control group and the observation group were carried out by the same therapist, the same inelastic ruler, and the same measurement site before treatment, and the difference in circumference between the healthy and affected sides of the patient's tiger mouth, wrist crease, and 6 cm above the wrist crease, with a spacing of 6 cm, was recorded. The results showed that there was no statistically significant difference in the degree of lymphedema in each part of the two groups ($P > 0.05$) (Table 2).

3.2. Symptom Scoring of Irritating Contact Dermatitis

According to the symptom scoring criteria for irritating contact dermatitis, it is possible to subjectively assess changes in the skin, including redness, dryness, and itching caused by blisters (Table 3).

3.3. Comparison of Comfort, Skin Moisturization, and Effectiveness in Relieving Itching

After pre-treatment of the skin before bandage application, patients in the

Table 2. Comparison of upper limb circumference between two groups of lymphedema (cm, $\bar{x} \pm s$).

Group	Beside the thumb	Wrist striation	6 cm	12 cm	18 cm	24 cm
Observation group	1.83 ± 2.28	2.56 ± 2.38	3.48 ± 3.23	3.61 ± 3.82	3.02 ± 3.21	2.89 ± 2.78
Treatment group	1.82 ± 2.08	2.58 ± 2.46	3.52 ± 3.02	3.58 ± 3.79	3.13 ± 3.26	2.85 ± 2.59
t	1.387	1.861	1.536	1.136	1.978	2.150
P	0.658	0.234	0.332	0.636	0.111	0.201

Table 3. Comparison of symptoms of irritating contact dermatitis between two groups of patients.

Group	Numbers	Erythema	Dry	Blister	Skin itching
Control Group	80	38	28	18	39
Observation group	80	3	5	1	2
χ^2	-	6.33	5.66	4.34	6.32
P	-	0.000**	0.000**	0.000**	0.000**

* P < 0.05, ** P < 0.001.

observation group felt that the low elasticity bandage application increased comfort, moisturized the skin, and had a good anti itching effect. The number of patients in the observation group who underwent bandage dressing for 12 - 20 hours and 20 - 24 hours in summer was significantly higher than that in the control group (P < 0.05) (Table 4 and Table 5).

3.4. Comparison of the Degree of Occurrence of Irritating Contact Dermatitis between Two Groups

52 cases of irritating contact dermatitis occurred during the two CDT periods, mostly in areas such as the upper arm, medial forearm, and cubital fossa. The number of cases of various degrees of irritating contact dermatitis in the observation group after skin pretreatment was significantly lower than that in the control group. Except for severe irritating contact dermatitis, the differences in all other degrees were statistically significant, that is, P < 0.05. The comparison of the severity of two groups of stimulating contact dermatitis is shown in Table 6.

4. Discussion

4.1. Analysis of the Causes of Irritating Contact Dermatitis

At present, comprehensive anti-inflammatory treatment has not been fully popularized in China, and most patients with lymphedema have undergone radiotherapy and chemotherapy. The body's resistance and skin mucosal protective barrier ability of the affected limb have decreased, and the skin of the affected limb is sensitive, which can easily lead to skin infections. When the weather is hot in summer, it is easy to sweat, and metabolites and irritants such as sweat tend to accumulate on the epidermis, which can lead to varying degrees of eczema [20]. Due to prolonged use of low elasticity bandages, the skin lacks breathability and is prone to irritating contact dermatitis. In clinical practice, it is often difficult to identify the cause of the disease and there is a lack of ideal treatment plans. At present, the commonly used drugs for treating dermatitis in clinical practice include glucocorticoid drugs such as compound betamethasone. The long-term adverse reactions of topical use are thinning of the skin at the medication site, capillary proliferation, local or systemic immune disorders, and elevated

Table 4. Comparison of comfort, skin moisturization, and itching relief effects between two groups of patients.

Group	Numbers	Comfort level	Skin Moisturization	Antipruritic effect
Control group	80	60	50	1
Observation group	80	80	78	76
χ^2	-	-11.79	-11.27	-8.72
P	-	0.000**	0.000**	0.000**

* P < 0.05, ** P < 0.001.

Table 5. Comparison of the duration of bandage wrapping between two groups of patients in summer.

Group	Numbers	Duration of bandage wrapping			χ^2	P
		8 - 12 h	12 - 20 h	20 - 24 h		
Control group	80	33	27	20	6.835	0.032
Observation group	80	18	32	30		

Table 6. Number of cases of irritant contact dermatitis of different degrees during treatment in two groups of patients (N = 160).

Group	No response	Light	Medium	Heavy	Total
Control group	38	35	5	2	80
Observation group	70	8	1	1	80
Z	-10.344	6.481	2.236	1.141	5.61
P	0.000**	0.000**	0.025*	0.157	0.000**

* P < 0.05, ** P < 0.001.

serum IgE levels [21]. In addition, hormonal ointment has great side effects and is contraindicated to breast cancer patients. It should be avoided to use hormonal ointment too early. For patients with upper limb lymphedema of breast cancer, it is extremely important to keep the skin clean and use appropriate topical drugs to prevent skin infection and reduce fibrosis and keratinization. However, currently, there are very few topical skin care preparations that are suitable and have significant therapeutic effects for such patients. Lymphedema therapists perform routine skin care during the treatment process, lacking correct and scientific guidance [18].

In practical clinical practice, the most important nursing measures commonly used to prevent irritating contact dermatitis are skin care, including strict hygiene protection, skin cleanliness and integrity, and handling skin complications. Skin care for preventing irritating contact dermatitis in patients with lymphedema and low elasticity bandage compression is extremely rare.

4.2. Main Ingredients and Effects of Laofuzi Herbal Ointment

Laofuzi Herbal Ointment is a type of herbal ointment, mainly composed of Aloe Varae, Cortex Pseudolaricis, Radix Sophorae Flavescens, Fructus Cnidii, Rhizoma Coptidis, and Chlorhexidine Acetate (0.2% - 0.3%). It not only has good moisturizing effects, but also has antibacterial and bactericidal effects, can remove toxic metabolites from bacterial infections, as well as endotoxins left by killed bacteria [22]. Suitable for skin itching, dermatitis, eczema, urticaria, sweat spots, and mosquito bites, it has good anti-inflammatory and anti-allergic effects [23].

4.3. Skin Pretreatment Can Reduce the Incidence of Irritating Contact Dermatitis

Skin care is one of the important links in CDT. This study pretreated the skin with bandages and applied Lao Fu Zi herbal ointment to the prone areas of irritating contact dermatitis (such as the upper arm, inner forearm, and elbow socket) to prevent the occurrence of irritating contact dermatitis. The research results show that the area with the most severe edema is 6 cm - 18 cm, where the skin is the weakest and more sensitive, easily causing irritating contact dermatitis. The incidence of irritating contact dermatitis in the observation group was significantly lower than that in the control group ($P < 0.05$, $P < 0.001$), indicating that skin pre-treatment can effectively reduce the incidence of irritating contact dermatitis in patients with low elasticity bandages and pressure bandages, and can also alleviate the symptoms of CDT irritating contact dermatitis, thereby improving the effectiveness of pressure therapy. The number of cases of severe irritating contact dermatitis in the two groups was 2 and 1, respectively, with no statistically significant difference ($P > 0.05$), which may be due to insufficient sample size. **Table 3** shows that patients in the observation group were treated with aloe vera cream during the skin care process to maintain skin smoothness and facilitate hand lymphatic drainage. Skin pretreatment was also given before the bandage was applied. Patients felt that the low elasticity bandage increased comfort, increased skin moisturization, and had a faster effect on relieving itching, which was significantly better than those in the control group ($P < 0.05$, $P < 0.001$). In addition, there were no discomforts such as redness, pain, and blisters, and a small number of slight itching sensations, which could not be ruled out due to excessive sweating in hot summer and dry autumn and winter. **Figure 1** shows that in the control group, due to the lack of breathability of the skin after being bandaged in the hot summer every day, it is more likely to develop dermatitis and cannot be properly bandaged. They can only persist for 8 - 12 hours a day, and even give up bandage pressure bandage, which affects the therapeutic effect and is significantly better than the control group. Low elasticity bandage compression bandaging can have therapeutic effects on limb function exercise during both limb movement and rest [22]. At rest, elastic bandages exert



Figure 1. Comparison pictures before and after treatment.

pressure on the superficial vascular system; during activity, the contraction of limb muscles counteracts the pressure of elastic bandaging, increasing the pressure between tissues and exerting pressure on the deep vascular system, thereby accelerating the filling and emptying of blood and lymphatic fluid. Low elasticity bandage compression bandaging is one of the important steps in CDT, and requires long-term bandaging to achieve the therapeutic effect of controlling or reducing lymphedema. **Table 5** shows that the number of patients in the observation group who underwent bandage bandaging for 12 - 20 hours and 20 - 24 hours in summer was higher than that in the control group, with significant differences ($P < 0.05$). The duration of low elasticity bandage compression bandaging is related to the treatment effect. The better the treatment effect, the more effective the comprehensive anti-inflammatory treatment for lymphedema and the patient's compliance can be improved.

5. Limitations of This Study

The sample size of the study is relatively small, and in the future, the sample size can be further expanded to investigate and analyze the treatment of skin problems in the affected limb of different stages of lymphedema, in order to explore at a deeper level and provide stronger clinical evidence for the development of reasonable and effective nursing measures in clinical practice.

6. Conclusions

Stimulating contact dermatitis is a common complication during CDT. During the CDT process, skin itching, redness, dryness, rash, and keratinization are common adverse symptoms. If not treated in time, it can affect the treatment effect, and in severe cases, it can cause inflammation or infection, leading to worsening of the condition [24], forming a vicious cycle that affects the entire course of CDT. Lymphedema symptoms are not timely controlled and treated. Skin pretreatment can effectively reduce the incidence of irritating contact dermatitis, increase patient comfort, and prolong the duration of stress therapy, thereby increasing efficacy, improving CDT treatment efficacy and patient compliance, and improving quality of life. It is worth clinical application.

In addition, it was found in this study that the use of Laofuzi herbal ointment after the occurrence of irritating contact dermatitis in patients also has a very significant therapeutic effect. From this, it can be seen that Laofuzi herbal ointment is worth further long-term follow-up and observation in preventing and treating skin reactions after lymphedema CDT, and it is also worth further clinical research by researchers. The attached diagram is as in **Table 1**.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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