

# Analysis of Combined Therapy and Treatment Effect of Localized Ultraviolet Irradiation and Shengji Yuhong Cream on Diabetic Foot

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**Abstract: Objective:** To investigate the treatment effect of combined application of localized ultraviolet irradiation and Shengji Yuhong Cream on diabetic foot patients. **Methods:** Diabetic foot patients in the control group were treated with localized ultraviolet irradiation on the basis of conventional treatment. The study group was added with Shengji Yuhong Cream on top of the localized ultraviolet irradiation on the basis of conventional treatment. **Results:** The results of ankle brachial index and dorsal foot skin temperature of that two groups before treatment were compared,  $P>0.05$ . After treatment, the ankle brachial index and dorsal foot skin temperature of the study group were better than those of the control group. The comparison between the groups and within the group was  $P<0.05$ . The total effective rate of the study group (95.65%) was higher than that of the control group (71.11%),  $P<0.05$ . **Conclusion:** The application of localized ultraviolet irradiation and Shengji Yuhong Cream in the treatment of diabetic foot is effective.

**Keywords:** *diabetic foot; localized ultraviolet irradiation; Shengji Yuhong Cream; combined treatment effect*

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## 1 Introduction

Diabetic foot is one of the complications of diabetes with high clinical incidence and is the main cause of disability in diabetic patients. Localized ultraviolet irradiation combined with Western medicine was the main clinical

solution for diabetic foot in the past. However, with the in-depth study in the field of clinical medicine in recent years, more and more clinical medical workers believe that the addition of traditional Chinese medicines on top of the above treatments may have better treatment effects in patients with diabetic foot<sup>[1]</sup>. Based on this, June 2016-2018 will be the study interval in this article and ninety patients with diabetic foot have been selected and admitted to our hospital during this interval. A study was conducted to investigate the combined application effect of localized ultraviolet irradiation and Shengji Yuhong Cream in diabetic foot patients, in order to provide a reliable basis for clinical treatment of this disease in the future, is summarized as follows.

## 2 Data and methods

### 2.1 General information

Among the 90 patients with diabetic foot, male: female=49:41, age ranging from 52-88 years old, mean age (74.25±0.91) years, duration of disease ranging from 3 weeks to 8 months, mean cause (3.42±0.21) months. Ninety patients with diabetic foot were randomized grouped (randomized digital table method), with 45 cases in the study group and the control group. The comparison of the above data of each group was  $P>0.05$ , which indicates that the grouping method in this study is clinical comparable.

### 2.2 Methods

#### 2.2.1 Treatment methods

Both groups were treated in clinical routine manner. According to the actual situation of the patients, subcutaneous injection/pump injection of insulin and

oral hypoglycemic agents were given to control blood glucose stability. Also, necessary exercise and diet guidance were given. Patients with foot infection should be given the appropriate antibacterial drugs according to the results of pathogens and drug susceptibility test as well as effective cleaning and disinfection on the foot ulcers and necrotic tissues. In the control group, patients with diabetic foot were treated with localized ultraviolet irradiation (once a day). The instrument was the short-wavelength ultraviolet radiation phototherapy instrument (model: ZYY-9), with the wavelength of 258 nm. The biological dose was selected according to the patient's wound condition. If there is more necrotic tissue and purulent discharge on the wound surface, the irradiation dose can be increased to 30-60 MED. If the wound condition is improved after irradiation treatment, the dose can be appropriately reduced to 4 MED (once a day). After the irradiation, the wound is routinely cleaned before effective localized wrapping with sterilized gauze in a mixture of saline, gentamicin and insulin. The wound was cleaned before each irradiation and the wet dressing was replaced after the irradiation. On the basis of conventional treatment, other than Shengji Yuhong Cream, the localized ultraviolet irradiation method, instrument and operator in the study group treated with localized ultraviolet irradiation were all the same as the control group. After the irradiation was completed, the wound was applied with Shengji Yuhong Cream (once a day) and the dressing same as the control group was replaced after 8 hours. Then, both groups of diabetic foot patients were treated continuously for 2 months.

### 2.2.2 Observation index

(1) Treatment situation: The changes of ankle brachial index and dorsal foot skin temperature before and after treatment were recorded. (2) Treatment effect: The effects of two groups of diabetic foot patients were recorded, in which the total effective rate of clinical treatment=significant efficiency+effective rate.

### 2.2.3 Evaluation criteria

The treatment efficacy was evaluated according to the changes in the wounds before and after treatment of the two groups of diabetic foot patients, as well as in accordance of the relevant content of the "Traditional Chinese Medicine standards for Diagnosis and Efficacy of Diseases". (1) Markedly effective: Wound ulcer and gangrene are completely healed, scab and scar can be seen on the surface; (2) Improved: Wound ulcer and gangrene area are decreased, the amount of discharge is decreased and part of granulations is visible; (3) Ineffective: Wound ulcer and gangrene area have not decreased but increased instead, the amount of discharge has increased.

### 2.3 Statistical methods

Before and after treatment, the changes of ankle brachial index and dorsal foot skin temperature of the two groups (quantitative data) are expressed by  $\bar{x} \pm s$ . The data on the treatment effect (enumerated data) of the two groups is expressed by n (%). The data was then analyzed with statistical product and service solution software (version number: SPSS.19) for t/X<sup>2</sup> test. The analysis results with P<0.05 indicates that the corresponding data is statistically significant different.

## 3 Results

### 3.1 Treatment situation

There was no significant difference between the two groups before and after treatment (P>0.05). After treatment, the ankle brachial index and dorsal foot skin temperature were higher than before. The improvement of the above indicators after treatment in the study group was better than that of the control group. The data comparison between the groups (after treatment in both groups) and within the group (before and after treatment in each group) was P<0.05 (statistically significant), as shown in Table 1:

**Table 1. Comparison of changes in ankle brachial index and dorsal foot skin temperature before and after treatment in both groups( $\bar{x} \pm s$ )**

Group	Ankle brachial index		Dorsal foot skin temperature (°C)	
	Before	After	Before	After
Study group	0.58±0.12	0.94±0.19*★	25.62±0.28	28.77±0.34*★
Control group	0.60±0.11	0.85±0.14★	25.63±0.29	27.79±0.30★

Note: \*Compared with the control group, P<0.05; ★Compared before the treatment, P<0.05.

### 3.2 Treatment effect

The total effective rate of the study group was 95.56% (43/45), whereby 30 cases were markedly effective, 13 cases were effective, and 2 cases were ineffective. The total effective rate of diabetic foot patients in the

control group was 71.11% (32/45), whereby 21 cases were markedly effective, 11 cases were effective, and 13 cases were ineffective. The total effective rate of the two groups was  $P < 0.05$  (statistically significant).

#### 4 Discussions

The incidence of diabetic foot accounts for 5.3%-10.5% of the total number of diabetic patients that culminates in the proportion of amputation as high as 50% of non-traumatic amputation in patients. Studies have shown that the main factors of diabetic foot are neurological and vascular diseases, and other factors include immune system, age, kidney function, smoking, foot plantar pressure and others. Thus, correct and effective clinical treatment is the key to ensure the efficacy of these patients and reduce their disability rate.

Localized ultraviolet irradiation is a commonly used method for the treatment of diabetic foot in the current stage. Its main purpose is to increase the temperature of the wound by irradiating the wound, accelerate the regeneration of vascular cells and connective tissue and effectively improve the blood circulation and histiocytes activity of the foot. In addition, it should be noted that the localized irradiation of diabetic foot ulcers by ultraviolet can also achieve analgesia, enhance vascular permeability and other effects to promote the absorption of other drugs on the wound surface<sup>[2]</sup>. However, it should be noted that due to individual differences, ultraviolet irradiation combined with conventional treatment may not be ideal in some cases, suggesting the need of other adjuvant treatments.

Traditional Chinese medicine classifies diabetic foot as a category of "arthralgia". It is believed that the pathogenesis of this disease lies in blood stasis. Therefore, it is proposed that the treatment should be based on the principle of activating blood circulation to promote granulation and removing blood stasis. Shengji Yuhong Cream is a pure Chinese medicine for external use. The prescription is based on "Surgical Authentic" (Shigong Chen, Qing Dynasty), which is consisted of white wax, sanguis draxonis, angelica

sinensis, comfrey, angelica dahurica, licorice, calomelas and sesame oil. Studies have shown that Shengji Yuhong Cream consists of angelica dahurica can help in removing putrefaction to promote blood circulation, relieving swelling and pain to promote granulation; sanguis draxonis and comfrey can help in relieving swelling and pain, dissipating blood stasis and detoxification; angelica sinensis can aid in enriching and activating blood, dispelling blood stasis to promote regeneration. The combination use of all these medicines can achieve the effects of removing blood stasis to promote granulation, detoxification and healing of wound, activating blood circulation to remove blood stasis. Modern pharmacology research believes that Shengji Yuhong Cream can improve the blood perfusion of ischemic tissue and effectively increase the levels of both transforming growth factor- $\beta$ 1 and heme oxygenase-1 in wounds, which is of great significance for promoting microvascular neovascularization and tissue repair. According to the analysis, on the basis of conventional treatment, the clinical treatment efficacy of the diabetic foot patients in the study group with localized ultraviolet irradiation and Shengji Yuhong Cream is significantly better than the control group lack of the Chinese medicine<sup>[3]</sup>.

In summary, the application of localized ultraviolet irradiation and Shengji Yuhong Cream in the treatment of diabetic foot has a significant effect, which is worthy for reference in practical work in the future.

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